EXIT 45 INTERCHANGE RECONFIGURATION MM 44.9

Scarborough – South Portland, Maine
Contract ID: 2021.07

Geotechnical Design Report

JANUARY 14, 2021

PREPARED FOR

The Maine Turnpike
2360 Congress Street
Portland, ME 04102

PREPARED BY

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HNTB

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1.0 PROJECT DESCRIPTION AND SCOPE

1.1 Introduction

The following represents the results of the geotechnical assessment prepared by HNTB for the reconfiguration of the existing Exit 45 Interchange connecting the Maine Turnpike and Route 703 in Scarborough and South Portland, Maine (**Figure 1: Project Site Location Map**). This report addresses interchange reconfiguration construction, which involves a new Route 703 bridge with lightweight approach embankments, two entry toll plazas, two exit toll points, and other interchange improvements. The general project layout is provided by **Figure 2: Key Plan**.

The interchange reconfiguration design has utilized the subsurface exploration and laboratory testing performed for the Exit 45 Preload Embankment (Contract 2019.13), which is currently under construction. As such, no new borings or testing were conducted for this assessment, and reliance was made on the results of the previous exploration. A link for the *Geotechnical Design Report, Preload Embankment Contract* dated 7/26/19 is provided in *Section 10.0, References.*

1.2 Scope of Services

HNTB has performed the following scope of services in support of the interchange design:

- Development of final foundation recommendations for the proposed bridge, including LFRD design, seismic classification/soil properties, and pile drivability analysis.
- Development of final foundation recommendations for the proposed toll plazas, mast arms, and buildings, including LFRD design, ASD design, seismic classification/soil properties, and pile drivability analysis.
- Development of final foundation recommendations for the proposed sign truss at Sta. 1062+50, including LFRD design, seismic classification/soil properties, and pile drivability analysis.
- Final design of high embankments to include detailing of lightweight fill and refinements of stability analyses.
- Geotechnical assessment and optimization of the design options for ramp crossovers and development of final design in support of MOT schemes and snowplow turnaround.
- Reviewed existing data and results of the on-going Preload Embankment Contract and incorporated it into the current design.
- Evaluation of geotechnical implications on overall project duration and schedule.

1.3 Existing Interchange and Proposed Reconfiguration

The Exit 45 Interchange was built in 1956 in a trumpet configuration. The existing Exit 45 Underpass Bridge was designed to support two lanes of H-20 loading. The bridge underwent partial deck replacement in 1979 and 1995, as well as repairs in 2000. Currently, the bridge has limited load ratings (HL-93 Loading Inventory R.F. of 0.78 and Operating R.F. of 1.01), substandard vertical clearance, and a temporary railing system that replaced the previously substandard railing. The existing tolling infrastructure is also obsolete and can no longer be maintained. Additionally, current interchange geometry has safety and operational deficiencies.

The proposed improvements involve replacement of the existing trumpet interchange with a diamond interchange, including a new two-span underpass bridge, new toll plazas along the on ramps, and exit toll points along the off ramps. The proposed diamond interchange will include two emergency vehicle ramps that will allow emergency vehicles to move directly from northbound to southbound Turnpike barrels or vice versa.

The replacement bridge crosses the Mainline at station 2219+19, and it extends from Route 703 station 1048+46 to 1051+20. The structure has two spans totaling 274 ft. and a curb-to-curb width of 56 ft. to accommodate four 12 ft. lanes and two 4 ft. shoulders. The girders consist of 50 in. deep welded steel plate girders, which are supported by concrete integral abutments and a median concrete hammerhead pier. Bridge movement is accommodated through a combination of elastomeric bearings on the pier, low-density expanded polystyrene (better known as Geofoam) behind each abutment, and asphaltic plug joints between the at-grade approach slabs and sleeper slabs. All substructures are supported on steel H-piles driven either into glacial till or to the top of bedrock.

The west and east bridge approach embankments are currently being preloaded with a two-stage, standard weight fill. During interchange reconfiguration construction, a portion of the regular weight fill will be excavated and replaced with Geofoam to improve longitudinal stability and minimize long-term settlements. The Geofoam extends into the approach embankments 112 ft behind the West abutment and 66 ft behind the East abutment (at roadway centerline).

The two new toll plazas are Southbound Entry located at project station 113+10 and Northbound Entry located at 309+40. Both toll plazas have a similar configuration consisting of three entry lanes with overhead canopy and an adjacent toll utility building with parking lot. The toll slab and supporting grade beams are founded on steel H-plies driven either into glacial till or to the top of bedrock. The toll building is supported independently, also by a pile foundation. Note that the toll plaza areas are currently being preloaded to help control differential settlements, particularly at the building and toll structure slabs.

The two new toll points are Southbound Exit located at project station 209+42 and Northbound Exit located at 407+75. Both toll points have a similar configuration and include a mast arm supported by an independent foundation. The toll slab, supporting grade beams, and mast arms are all founded on steel H-piles driven either into glacial till or to the top of bedrock. In addition, a new overhead sign structure (OHSS) will be constructed on Route 703 at station 1062+50. The OHSS is also to be supported on steel H-piles driven either into glacial till or to the top of bedrock.

1.4 Survey Control

The project vertical datum and elevations referenced are in feet and reference the North American Vertical Datum of 1988 (NAVD 88). Boring locations were field located with elevations estimated based on topographic survey data.

2.0 GEOLOGY AND SITE CONDITIONS

2.1 Site Geology

The project is located within the Portland West 7.5-minute quadrangle in the Coastal Lowland of southwestern Maine. The region has been subjected to glaciation within the last 25,000 years (late Wisconsian glaciation) resulting in a physiographic surficial geology primarily composed of unconsolidated sediments of glacial and nonglacial origin. The bedrock geology underlaying the project site is the Eliot Formation of the Merrimack and Casco Bay Groups comprised of metamorphic rocks, which are characteristically composed of fine grained, thinly layered phyllite.

Existing geologic mapping available for the project site include bedrock and surficial geology mapping prepared by the Maine Geological Survey (MGS) for Portland West Quadrangle, Maine.

MGS surficial geology mapping identifies soil overburden in the project area as marine regressive sand deposits. The marine regressive sand deposits are said to consist of sand, silt, and minor gravel deposited in shallow marine waters from the late-glacial regression of the sea; they also may include a variety of nearshore and fluvial sediments. They commonly occur as flat sandy areas and are likely to be underlain by marine clay-silt deposits. Test soil borings done along the Maine Turnpike suggest loose interbedded marine silts and sands underlain by soft sensitive marine silts and clays typical of the Presumpscot Formation. The soft silts and clays are particularly prone to problems associated with low strength, compressibility and stability issues. A surficial geology map and the bedrock geology map are presented in **Figures 3 and 4**, respectively.

3.0 SUBSURFACE EXPLORATION

3.1 General

A subsurface exploration was conducted to characterize the soil and rock conditions at the site and also to furnish design parameters. The exploration consisted of a total of 27 borings advanced in three phases:

- A preliminary exploration to determine the project scope, including seven soil borings drilled by New England Boring Contractors with boring inspection by HNTB's subconsultant, Schonewald EA, during the period October 4-24, 2017.
- A main exploration to establish subsurface stratification and geotechnical design parameters, including 12 borings, three cone penetration tests, and three dilatometer

tests, drilled by New England Boring Contractors with boring inspection by HNTB's subconsultant, Schonewald EA, during the period April 3-May 9, 2018.

- A supplemental exploration to furnish additional data, including eight borings drilled by HNTB's subconsultant, Haley and Aldrich (H&A) during the period January 4-17, 2019.

The final boring logs and boring location plans are included in data reports provided as **Attachments 1, 2, and 3**.

The borings were advanced using cased wash boring methods from a Mobile drill rig using 4.0 inch (HW-size) and 3.0 inch (NW-size) inside diameter steel casing. Standard Penetration Testing (SPT) was performed by driving a 1-3/8-inch ID split spoon sampler with a 140-lb hammer dropped 30 inches to obtain samples at approximately 5-foot intervals. Each sample was removed from the sampler in the field, examined, and classified in accordance with Maine DOT standards. The number of hammer blows required to advance the sampler through each six-inch interval using a safety hammer was recorded and is provided on each boring log. The uncorrected SPT N-value is defined as the total number of blows required to advance the sampler through the second and third six-inch interval of any given 24-inch sampling interval. All SPT N-values discussed in this report have been corrected to reflect the 60 percent hammer efficiency (N_{60}) unless noted otherwise.

Three Cone Penetration Tests and three flat-plate Dilatometer tests were also performed to further characterize the strength compressibility characteristics of the site soils. These included shear wave velocity testing and pore pressure dissipation testing.

A summary of the borings indicating approximate locations and depths of exploration are included in **Table 3-1**. Of the 27 borings drilled across project site, 12 are located in vicinity of the bridge and toll structures and were actually utilized for the interchange reconfiguration design. These borings are indicated with an asterisk (*) in the table.

Three Cone Penetration Tests and three flat-plate Dilatometer tests were performed by ConeTec on June 5 to June 6, 2018 under the supervision of Schonewald Engineering Associates, Inc (Schonewald EA). A summary of the cone penetration tests and dilatometer tests indicating approximate locations and depths of exploration are included in **Table 3-2**. One CPT was performed with 13 shear wave velocity tests to provide additional data for seismic liquefaction assessment. Nine pore pressure dissipation tests were performed to provide information for consolidation times. All CPTs and DMTs were performed within the vicinity of the bridge.

Table 3-1: Summary of Subsurface Exploration

Boring No.	Station	Offset (feet)	Ground Elevation (feet)	Depth of Boring (feet)	Bottom of Exploration Elevation (feet)
HB-EXIT45-101	114+18	12.4 RT	63.7	97.0	-33.5
HB-EXIT45-102*	1048+03	11.6 LT	62.1	89.0	-27.0
HB-EXIT45-103*	1051+64	13.0 RT	60.9	98.0	-37.5
HB-EXIT45-104	416+65	11.1 LT	58.9	60.0	1.0
HB-EXIT45-105	306+51	28.3 LT	57.3	43.0	15.0
HB-EXIT45-106	210+86	38.3 LT	57.1	52.0	5.0
HB-EXIT45-107	310+96	50.7 LT	60.4	47.0	13.0
HB-EXIT45-201*	1055+23	27.0 LT	59.0	72.0	-13.0
HB-EXIT45-202	303+97	2.2 RT	64.0	71.0	-7.0
HB-EXIT45-203*	1053+27	32.7 LT	59.8	65.0	-5.0
HB-EXIT45-204	304+52	10.0 LT	60.5	62.0	-1.5
HB-EXIT45-205*	1051+40	93.0 LT	63.1	75.8	-12.8
HB-EXIT45-206*	1050+23	94.3 LT	63.1	86.1	-23.1
HB-EXIT45-207*	113+08	43.3 LT	64.2	100.2	-36.2
HB-EXIT45-208	116+59	49.7 LT	63.0	90.2	-27.2
HB-EXIT45-209*	200+12	15.7 RT	62.6	90.6	-28.1
HB-EXIT45-210*	202+06	35.2 RT	61.4	91.8	-30.3
HB-EXIT45-211	204+45	3.3 LT	62.4	83.0	-20.5
HB-EXIT45-212	204+81	54.6 LT	59.2	82.0	-23.0
HB-EXIT45-301	304+85	19.9 LT	60.3	20.0	40.3
HB-EXIT45-302	303+97	2.2 RT	60.0	20.0	40.0
HB-EXIT45-303*	1048+18	41.0 LT	61.4	54.0	7.4
HB-EXIT45-303A	1048+14	44.2 LT	61.4	9.0	52.4
HB-EXIT45-304A	209+45	1.0 LT	56.1	14.0	42.1
HB-EXIT45-305	209+52	1.6 LT	56.1	83.0	-26.9
HB-EXIT45-306*	309+27	1.1 LT	58.1	55.7	2.4
HB-EXIT45-307*	407+82	27.0 RT	63.9	103.6	-39.7

Table 3-2: CPT and DMT Summary

Test No.	Depth (ft)
HB-CPT-203	60.0
HB-SCPT-205	66.8
HB-CPT-209	89.2
HB-DMT-203	50.0
HB-DMT-205	50.0
HB-DMT-209	60.0

Bedrock was encountered and sampled in eight borings using a 2.0-inch inner diameter NQ-2 sized diamond-tipped core barrel. The recovery and rock quality designation (RQD) of each core was calculated and are included on the borings logs. **Table 3-3** summarizes the recovery and RQD of the rock samples obtained during the exploration.

Table 3-3: Summary of Subsurface Exploration Rock REC and RQD

Boring No.	Rock Core	Depth (feet)	REC (%)	RQD (%)
HB-EXIT45-102	R1	79.0 – 84.0	95	70
HB-EXIT45-102	R2	84.0 – 89.0	97	90
HB-EXIT45-103 (OW)	R1	88.5 – 93.0	96	67
HB-EXIT45-103 (OW)	R2	93.0 – 98.0	97	52
HB-EXIT45-205	R1	67.0 – 72.0	100	28
HB-EXIT45-205	R2	72.0 – 75.8	100	54
HB-EXIT45-206	R1	76.1 – 81.1	100	95
HB-EXIT45-206	R2	81.1 – 86.1	100	83
HB-EXIT45-207	R1	95.2 – 100.2	95	70
HB-EXIT45-305	C1	78.0 – 83.0	38	0
HB-EXIT45-306	C1	46.0 – 51.0	70	15
HB-EXIT45-306	C2	51.0 – 55.7	87	78
HB-EXIT45-307	C1	93.2 – 97.4	46	8
HB-EXIT45-307	C2	97.4 – 97.8	100	0
HB-EXIT45-307	C3	97.8 – 98.8	25	0
HB-EXIT45-307	C4	98.8 – 103.6	95	83

4.0 GEOTECHNICAL TESTING AND SOIL PROPERTIES

4.1 Laboratory Testing

A wide range of laboratory tests was conducted on samples recovered from the subsurface exploration to characterize the site soils and establish their design properties. These tests included:

- Soil Classification Tests: Testing was performed according to the following standards:

Natural Moisture Content	ASTM D2216
Atterberg Limits	ASTM D4318
Grain Size Analysis	ASTM D422
Percent Passing No. 200 Sieve	ASTM D1140

- Consolidation Tests: A total of 13 consolidation tests were performed according to the standard ASTM D2435-M.
- Shear Strength Testing: Six Direct Simple Shear tests and three Direct Shear tests were performed according to the following standards:

Consolidated Drained Direct Shear Test	ASTM D3080
Consolidated Undrained Direct Simple Shear Test	ASTM D6528

The results of the above testing are described in the *Geotechnical Design Report, Preload Embankment Contract* (see *Section 10.0, References*).

4.2 Field Testing

Significant reliance was given to in-situ vane shear testing for estimation of the shear strength of the cohesive formations. These tests were completed during drilling of the borings in accordance with the requirements outlined in ASTM D 2573. In-situ vane shear testing involves using a simple rotated blade of specified dimensions to evaluate undrained shear strengths (s_u) and remolded shear strengths (s_r) in soft to stiff clays (FHWA-IF-02-034 G.E.C. No. 5). The vane is advanced into the test soil and the blade is rotated at a maximum rate of six degrees per minute until failure of the soil occurs while the resulting torque measurement is recorded. This first test is used to approximate the peak undrained shear strength of the soil. Following the initial test, the remolded strength of the soil is measured after 10 rapid turns of the vane (FHWA-IF-02-034 G.E.C. No. 5).

4.3 Soil Properties

Design properties for site soils were principally determined using the results of the laboratory and field testing. Standard published correlations and engineering judgement were also employed to make final decisions on properties.

The cohesionless soil properties used for design are provided in **Table 4-1**. The cohesive soil properties used for design are provided in **Tables 4-2** and **4-3.**

Table 4-1: Soil Properties of Cohesionless Strata

Property	Existing Fill	Interbedded Sand and Silt – Upper	Glacial Till
N_{60} (blows/ft)(1)	7	5	49
$N_{1,60}$ (blows/ft)(2)	11	8	34
γ (pcf)(3)	113	110	121
ϕ' (deg) (4)	30	33	37
E_s (ksf)(5)	357	318	906

(1) N_{60} – SPT N-value corrected for 60% hammer efficiency.
(2) $N_{1,60}$ – SPT N-value corrected for 60% hammer efficiency, overburden pressure, rod length, and rod diameter.
(3) γ – Total unit weight, correlated from $N_{1,60}$.
(4) ϕ' – Effective angle of internal friction.
(5) E_s – Secant modulus, correlated from $N_{1,60}$.

Table 4-2: Soil Properties of Cohesive Strata

Property description	Property	Interbedded Sand and Silt – Lower	Marine Clay Crust	Marine Clay
Total Unit Weight	γ (pcf)	106	121	112
Initial Undrained Shear Strength	s_{uo} (psf)	345	1000	Varies by location and depth. See Table 8-3.
Increase in Undrained Shear Strength with Increased Stress	$\Delta s_u/\Delta\sigma$	0.12	N/A due to heavy overconsolidation.	0.20
Effective (Drained) Angle of Internal Friction	ϕ'	31°	30°	30°
Compression ratio	$C_{c\varepsilon}$	0.12	0.12	0.25
Recompression ratio	$C_{r\varepsilon}$	0.02	0.02	0.03
Overconsolidation ratio	OCR	1.2	-	1.0
Preconsolidation Pressure	σ_p' (ksf)	-	6	-
Coefficient of consolidation (due to horizontal flow)	C_h (ft^2/day)	2.0	0.45	0.45
Coefficient of consolidation (due to vertical flow)	C_v (ft^2/day)	1.0	0.30	0.30
Secondary compression index	$C_{\alpha\varepsilon}$ (strain rate)	0.007	0.007	0.007

Table 4-3: Marine Clay Initial Undrained Shear Strengths

Marine Clay Zone(1)	s_{uo} (psf)	Data obtained from borings HB-EXIT45-
East Edge U	301	103, 205, 203
East Edge M	307	103, 205, 203
East Edge B	= 432 +11.9*(10-y) (2)	103, 205, 203
Southwest U	344	102, 210
Southwest M	437	101, 102, 207, 208, 209, 210
Southwest B	= 556 + 6.0*(10-y) (2)	101, 102, 207, 208, 209, 210
North U	388	105, 106, 107, 204, 211, 212
North U*	500	301, 302, 304A, 305, 306
North M	435	105, 106, 107, 204, 211, 212
North B	= 467 + 13.0*(10-y) (2)	204, 211, 212
East U	337	104, 201, 202, 203
East M	396	104, 201, 202, 203
East B	= 450 +4.9*(10-y) (2)	104, 201, 202, 203

(1) U – upper (above elevation +30'); M – middle (between el. +30' and el. +10'); B – bottom (below el. +10'), U* top 5-6 feet of Marine Clay layer
(2) y – elevation in feet

As shown in **Table 4-3**, it was necessary to group the Marine Clay shear strengths into four different zones of the site to reflect observed trends and appropriately optimize the design. Also note that interpolations and refinements of the soil properties listed were occasionally made to reflect localized conditions at a foundation.

5.0 SUBSURFACE CONDITIONS

5.1 Generalized Subsurface Stratification

The interpretation of soil and groundwater conditions at the project site are based on information obtained at the boring locations only. This information has been used as the basis for the conclusions and recommendations contained in this report.

Generalized interpretive subsurface profiles were developed along the Route 703 bridge alignment and at each of the four toll structures (see F**igures 5A though 5D).** The profiles are intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, having been developed through interpretations of widely spaced borings and samples. Actual soil transitions included in the subsurface profile will vary and may be more erratic than indicated.

Subsurface conditions encountered in the test borings generally consist of the following strata:

1. Granular Fill
2. Interbedded Sand and Silt (ISS)

   a. ISS Upper
   b. ISS Lower
3. Marine Clay
4. Marine Clay Crust
5. Glacial Till
6. Phyllite Bedrock

Stratum 1: Granular Fill

A blanket of Granular Fill was encountered at the ground surface in a majority of the borings. The composition of this layer is predominantly fine to coarse sand with trace to some silt and trace gravel. In addition, zones of silty clay fill and other reworked natural surficial soils are occasionally present throughout. The stratum generally ranges from 4 to 10 feet in thickness. This material is typically loose to medium dense with an SPT N_{60} blow count varying between 2 and 25 blows per foot. Note that the project site is also crisscrossed by existing ramps of varying heights. These are also composed of fill, mainly common borrow.

Stratum 2: Interbedded Sand and Silt

This stratum is of marine origin and was encountered in all borings within the southwestern and southeastern quadrants of the project site. At most of locations the layer is further divided into “upper” and “lower” substrata, which are mainly distinguishable by the significant clay content of the lower member. The substrata may be further described as follows:

a. ISS Upper: This substratum is non-cohesive and mainly consists of interbedded layers of gray fine to medium sand, silty sand, and silt. The layer ranges in thickness from 4 to 20 feet, and the density of the material is typically very loose to loose with an SPT N_{60} blow count varying between 1 and 15 blows per foot.

   Two borings on the East side of the project site near Ramp C encountered thin, discontinuous pockets (≤4 feet thick) of organic sand and silt within the Upper Interbedded Sand and Silt substratum. The “organic” label is based on visual descriptions of field samples as containing fibers or peat, although subsequent laboratory testing showed the Unified classification of the pockets actually range from SM to ML. Since these organic sands and silts were encountered immediately beneath the Granular Fill, they are interpreted to be remnants of the original surface organics.

b. ISS Lower: This substratum continues the interbedded structure of the upper member, but it exhibits cohesive behavior with regard to shear strength and compressibility. The layer mainly consists of interbedded layers of gray silty clay and gray fine sandy silt. The silty clay may contain trace to some fine sand, and occasional seams and partings of sand were also noted. The average liquid limit and plasticity index of the samples tested were 26 and 9, respectively. The average water content of samples tested was 34%. The substratum generally ranges in thickness from 5 to 15 feet, and the consistency of the material is very soft with an SPT N_{60} blow count varying between Weight of Rods (WOR) and 2 blows per foot. Measured shear strengths ranged from 192 psf to 620 psf with a general trend of increasing shear strength with depth.

Several borings at the southern end of the project site encountered surficial deposits of relatively clean, fine to medium sands above the Upper Interbedded Sands and Silts. The color of the material varied from gray to red-brown, indicating possible marine and/or glacial origins. Where encountered, the sand layers were relatively thin ranging from 2 to 12 feet thick. The density of the material was uniformly very loose to loose based on SPT N_{60} blow counts. Owing to the stratigraphic similarity of these sands with the Upper Interbedded Sand and Silt substratum, they have been mapped as part of the same unit.

Stratum 3: Marine Clay

The Marine Clay stratum was encountered in all borings performed within the project limits. The layer consists of a relatively uniform gray to dark gray silty clay. The average liquid limit and plasticity index of the samples tested were 35 and 15, respectively, which corresponds a Unified classification of CL. The average water content of samples tested was 41%. The layer contains frequent shell fragments, nodules, and concretions reflecting its marine origin. Black streaking and occasional "organic" describers indicate limited organic content at some elevations and locations. In addition, seams and layers of fine sand and silt were infrequently noted. The thickness of the stratum generally ranges from 25 to 55 feet across the site.

The consistency of the Marine Clay is very soft as indicated by SPT N_{60} blow counts ranging from WOR to Weight of Hammer (WOH). Numerous field vane shear tests were performed in the stratum to obtain the in-situ and remolded undrained shear strength. Measured shear strengths ranged from 96 psf to 1,050 psf with a general trend of increasing shear strength with depth.

Stratum 4: Marine Clay Crust

The Marine Clay Crust was found to cap the Marine Clay within the northern section of the project site. The "Crust" is believed to be a highly desiccated variant of the much softer Marine Clay that lies below. The stratum principally consists of olive-brown to gray-brown silty clay (CL), although limited zones classify as silt (ML). The average liquid limit and plasticity index of the samples tested were 32 and 15, respectively, which corresponds a Unified classification of CL. The average water content of samples tested was 28%. The layer is occasionally mottled and may contain partings and seams of fine sand and sandy silt. The Crust generally ranges in thickness from 5 to 15 feet, and stratigraphically it grades relatively quickly into the underlying Marine Clay. The consistency of the stratum is generally medium stiff to stiff as indicated SPT N_{60} blow counts ranging between 5 and 22 blows per foot.

Stratum 5: Glacial Till

A stratum of Glacial Till underlies the Marine Clay and overlies Phyllite Bedrock. It was encountered in every deep boring except HB-EXIT45-102, where the Marine Clay directly overlies the bedrock. The stratum is composed of variable amounts of gray to dark gray sand, silt and gravel. The more common textural descriptions include silty sand, sandy gravel, sandy silt. The thickness of the stratum ranges from approximately 2 to 35 feet, and the density is medium dense to dense with SPT N_{60} blow count typically varying between 10 and 50 blows per foot. Cobbles and boulders were occasionally identified throughout the layer either by coring or drilling action, especially in the lower half as bedrock was approached. Two borings at the northern end of the project encountered a granular layer described as "Marine Sands" to overlie bedrock in place of the more ubiquitous Glacial Till. This differentiation was based on textural structure and presence of fluvial nodules. Because the composition and density of the deep Marine Sand is so similar to the Till, it has been mapped as part of the same stratum.

Stratum 6: Phyllite Bedrock

The basement formation of the project site is Phyllite Bedrock. The stratum was cored and sampled in eight borings during the subsurface investigation. In addition, the top of the bedrock surface was inferred in six other borings based on practical refusal of the either split spoon or roller bit. The rock generally consists of medium hard to hard, slightly to highly weathered, aphanitic to fine grained, dark gray phyllite. The foliation was generally moderately to steeply dipping, and quartz veins and calcite infillings were frequently noted.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of the sampled bedrock. RQD is defined as the sum of the pieces of recovered bedrock greater than 4 inches in length divided by the total length of core run. RQD values of the bedrock that were encountered on site ranged from 0 to 95 percent.

5.2 Groundwater

The groundwater levels were measured in most of the borings as part of the subsurface investigation, either during drilling or upon completion of the borehole. These measurements are summarized below in **Table 5-1**.

The data in **Table 5-1** indicate that ground water generally occurs within a few feet of the ground surface, which is consistent with the wetland designation of a large majority of the site prior to preload embankment construction. Note that the ground water tables vary seasonally and with precipitation events. Readings may also be influenced by drilling fluids as monitoring wells were not installed (with the exception of HB-EXIT45-103).

Table 5-1: Summary of Encountered Groundwater Elevations

Boring No.	Ground Surface Elevation (ft)	Groundwater Depth B.G.S. (ft)
HB-EXIT45-101	63.7	2.8
HB-EXIT45-102	62.1	2.5
HB-EXIT45-103 (OW)	60.9	3.3
HB-EXIT45-201	59.0	0.0
HB-EXIT45-202	64.0	3.9
HB-EXIT45-203	59.8	0.9
HB-EXIT45-204	60.5	4.7
HB-EXIT45-205	63.1	4.7
HB-EXIT45-206	63.1	4.0
HB-EXIT45-207	64.2	1.2
HB-EXIT45-208	63.0	1.3
HB-EXIT45-209	62.6	1.5
HB-EXIT45-210	61.4	5.0
HB-EXIT45-211	62.4	4.0
HB-EXIT45-212	59.2	1.9
HB-EXIT45-301	60.3	3.8
HB-EXIT45-302	60.0	3.3
HB-EXIT45-304A	56.1	0.0
HB-EXIT45-305	56.1	0.0
HB-EXIT45-307	63.9	2.5

5.3 General Site Variation

A majority of the project site is blanketed with approximately 5 to 15 feet of Granular Fill, which also contains occasional zones of silty clay fill and other reworked original surficial soils. The Granular Fill stratum thins to the North and is totally absent along the northern half of Ramps B and C. Towards the South, the Fill is underlain by the Upper Interbedded Sands and Silts, which generally range from 10 to 20 feet thick. At most locations this substratum is underlain by the Lower Interbedded Sands and Silts. The Lower Interbedded Sands and Silts are predominantly cohesive, and they range in thickness from approximately 10 to 15 feet. Note that at the proposed bridge crossing the combined thickness of the Upper and Lower substrata averages around 20 feet thick.

An abrupt stratigraphic change occurs approximately 300 feet north of the bridge. Here the Interbedded deposits totally pinch out and are replaced by Marine Clay Crust, which becomes the uppermost natural stratum. The “Crust” ranges between 10 and 15 feet in thickness, and it continues to the northern extremities of the project site.

The next lowest stratum in sequence is the soft Marine Clay, which underlies the entire project site. South of existing Route 703 the Marine Clay has an average thickness of around 50 feet. The entire layer sinks deeper towards the southwest where the lowest top and bottom elevations of the stratum occur. Note that Marine Clay thins to the North eventually shrinking to a thickness of approximately 25 feet. Further note that here the soft clay is relatively close to the ground surface, lying just beneath the Marine Clay Crust.

A veneer of Glacial Till was encountered below the Marine Clay at most locations just overlying bedrock. The thickness of the Till is highly variable ranging from 2 to 35 feet. Cobbles and boulders were occasionally identified throughout the layer, especially in the lower half as bedrock was approached.

A basement of Phyllite Bedrock underlies the entire project site. The rock generally consists of slightly to highly weathered aphanitic phyllite, with frequent quartz veins and calcite infillings. The top of rock was determined at eight different locations based on coring and sampling, and it was also inferred in six other borings based on practical refusal of the either split spoon or roller bit.

Groundwater is typically encountered at the ground surface to about 4 feet below the ground surface.

6.0 GEOTECHNICAL DESIGN RECOMMENDATIONS

6.1 Bridge Foundation Design

Geotechnical design recommendations for the new Route 703 bridge associated with the Phase 2 Exit 45 reconfiguration are discussed in the following sections. Recommendations have been developed in accordance with the 2017 AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Eighth Edition and the 2003 MaineDOT Bridge Design Guide (BDG) with updates through 2018.

6.1.1 Foundation Type Selection

A two-span steel girder with composite concrete deck superstructure with pile supported integral abutments and a median pier were chosen as the preferred superstructure/substructure combination. The substructures will be founded on steel H-Piles driven either into glacial till or to the top of bedrock. H-Pile supported foundations provide an effective solution to resist the axial and lateral loads imparted by the structure at all abutment and pier locations.

6.1.2 Resistance Factors

All foundations were designed and assessed under service, strength and extreme limit state load combinations in accordance with AASHTO LRFD Sections 3, 6, 10 and 11.

The design of H-Pile foundations under the required limit state conditions has been performed in consideration of the lateral displacement, the compressive axial geotechnical resistance of individual piles, drivability resistance, structural resistance in axial compression, and combined axial and flexure loading.

Geotechnical resistance factors have been determined in accordance with AASHTO LRFD Table 10.5.5.2.3-1, Article 6.5.4.2 and Article 11.6.2.3. The resistance factors used for substructure foundation design are provided in **Table 6-1**.

Table 6-1: Resistance Factors

Pile Foundation	Resistance Factor		
	Service Limit State	Strength Limit State	Extreme Limit State
Geotechnical Axial Compression Resistance	-	0.65	1.0
Geotechnical Uplift Resistance	-	0.50	0.8
Structural Axial Compressive Resistance	-	0.5 – 0.6	1.0
Structural Axial Resistance for Combined Axial and Flexure	-	0.7	1.0
Structural Flexural Resistance	-	1.0	1.0
Lateral Resistance	1.0	-	1.0

6.1.3 Subsurface Material Properties

Geotechnical design parameters for soil and rock were developed for each stratum based on material descriptions, standard published correlations, results from laboratory testing, and engineering judgment. A summary of soil design properties at the abutments and the center pier are included below as **Tables 6-2** through **6-4.**

Table 6-2: Engineering Properties of Soil at West Abutment

Soil Properties	Strata					
	Existing Fill	Interbedded Sand and Silt - Upper	Interbedded Sand and Silt - Lower	Marine Clay - Upper	Marine Clay - Middle	Marine Clay - Lower
N_{60}, (bpf)	7	5	-	-	-	-
$N1_{60}$, (bpf)	11	8	-	-	-	-
γ (pcf)	113	110	106	112	112	112
ϕ', (deg)	30	29	-	-	-	-
k, AGW (pci)	47	-	-	-	-	-
k, BGW (pci)	35	25	-	-	-	-
c, (psf)	-	-	345	344	437	556+6(10-y)
ε_{50}	-	-	0.02	0.02	0.02	0.02
E_s (ksi)	2.5	2.2	0.9	0.9	1.4	2.1

Table 6-3: Engineering Properties of Soil at East Abutment

Soil Properties	Strata						
	Existing Fill	Interbedded Sand and Silt - Upper	Interbedded Sand and Silt - Lower	Marine Clay - Upper	Marine Clay - Middle	Marine Clay - Lower	Glacial Till
N_{60}, (bpf)	7	5	-	-	-	-	49
$N1_{60}$, (bpf)	11	8	-	-	-	-	34
γ (pcf)	113	110	106	112	112	112	121
ϕ', (deg)	30	29	-	-	-	-	37
k, AGW (pci)	47	-	-	-	-	-	-
k, BGW (pci)	35	25	-	-	-	-	108
c, (psf)	-	-	345	301	307	431+11.9(10-y)	-
ε_{50}	-	-	0.02	0.02	0.02	0.02	-
E_s (ksi)	2.5	2.2	0.9	0.7	0.7	1.4	6.3

Table 6-4: Engineering Properties of Soil at Center Pier

Soil Properties	Strata						
	Existing Fill	Interbedded Sand and Silt - Upper	Interbedded Sand and Silt - Lower	Marine Clay - Upper	Marine Clay - Middle	Marine Clay - Lower	Glacial Till
N_{60}, (bpf)	7	5	-	-	-	-	49
$N1_{60}$, (bpf)	11	8	-	-	-	-	34
γ (pcf)	113	110	106	112	112	112	121
ϕ', (deg)	30	29	-	-	-	-	37
k, AGW (pci)	47	-	-	-	-	-	-
k, BGW (pci)	35	25	-	-	-	-	108
c, (psf)	-	-	345	322	72	494+8.95(10-y)	-
ε_{50}	-	-	0.02	0.02	0.02	0.02	-
E_s (ksi)	2.5	2.2	0.9	0.7	0.7	1.4	6.3

Where: $\overline{N_{60}}$= Average SPT-N value of stratum, corrected for hammer efficiency, in blows per foot.
$\overline{N1_{60}}$= Average SPT-N value of stratum, corrected for hammer efficiency and effective overburden pressure, in blows per foot.
γ = Total unit weight of soil - correlated.
ϕ' = Internal friction angle of drained soil, per multiple SPT-N value correlations.
k, AGW= Subgrade modulus above groundwater table – correlated.
k, BGW= Subgrade modulus below groundwater table – correlated.
c= Undrained shear strength based on in-situ vane shear testing, triaxial testing, and correlations to cone penetration testing.
ε_{50}= Strain at 50% - correlated.
y = Elevation in feet.

6.1.4 Pile Demands

Design loading information at each abutment and pier was provided by the structural engineer. The service, strength and extreme limit state load combinations for the pier were provided at the center of the foundation. The loads for the abutments were provided per pile. The loads used for each of the abutments and piers are presented in **Attachment 4.** The integral abutment piles were designed for thermal expansion of 1.23 inches.

6.1.5 Axial and Lateral Foundation Design and Recommendations

All pile foundations were analyzed for axial loading using APILE, Version 2019.9.3. The integral abutments were also analyzed for combined axial compression and flexure using LPILE Version V2019.11.01 and hand calculations.

The pile group behavior of the pier foundation was modeled using FB Multipier, Version 5.0 (FBMP). As per the recommendations of the structural engineer, the piles were analyzed using a pinned head connection and the pile cap was modeled as an infinitely stiff element. Lateral resistance reduction factors (p-multipliers) were applied to the FBMP model in accordance with AASHTO LRFD Article 10.7.2.4. Lateral deflection was limited to 1.0 inch at the pile cap elevation.

The layout and numbers of piles required for each foundation element were based on initial recommendations from the structural engineers and were adjusted where possible to achieve design economies. For construction efficiency and to minimize the number of pile load tests, consideration was given to reducing the number of different pile sizes required at each site location and for the project overall. The pile layouts for the abutments and pier are included in **Attachment 5.**

The design has been performed using H-Piles with ASTM A572 Grade 50 steel. In cases of piles driven to refusal, the geotechnical axial compressive resistance has been limited to the factored structural resistance of the proposed piles. The maximum load demand per pile in compression and uplift was determined for the strength and extreme limit state load cases.

In accordance with section 6.12 of the FHWA GEC No 12 "Design and Construction of Driven Pile Foundations," steel piles have been designed to account for an appropriate level of section loss due to corrosion. Analyses have been checked by reducing the pile flange and webs thicknesses by a net 0.125 inches to account for section loss wherever soil and groundwater conditions warrant a reduction. It should be noted that corrosion has not governed the selection of pile size, which has been dictated by drivability at the abutment and pier locations.

Tables 6-5 and 6-6 summarize the governing pile demands that result from distributing structural loads at the pile cap for the abutments and pier, respectively. Once the maximum factored axial demand is determined, the geotechnical resistance factors provided in *Section 6.1.2* are applied to derive the maximum required nominal geotechnical resistance in compression and in uplift excluding downdrag. Note that HP 14x102 piles were selected for all three substructures.

Table 6-5: Factored Axial Demand and Resistance of HP 14x102 at Strength Limit State for Abutments

Location	Unfactored Downdrag Load (kips)	Factored Downdrag Load (kips)	Factored Structural Load (kips)	Factored Axial Load (kips)	Factored Structural Resistance (kips)	Nominal Driving Resistance Required - Including Downdrag (kips)
West Abutment	184.1	193.3	317.5	510.8	611.5	785.9
East Abutment	177.8	186.7	317.5	504.2	611.5	775.7

Table 6-6: Summary of Pile Group Analysis of HP 14x102 for Center Pier

Structure	Limit State	Axial Demand (kips)		Lateral Deflection (in)		D/C
		Compression	Uplift	Longitudinal	Transverse	
Center Pier	Service	282	0	<0.1	<0.1	0.197
	Strength	372	0	-	-	0.409
	Extreme	277	0	<0.1	<0.1	0.243

Note: D/C is the Demand/Capacity ratio.

Due to the presence of soft compressible materials and placement of new fill, downdrag has been accounted for in the design of the abutments. Although the abutment piles will not be driven until preloading is completed, a minor amount of long-term settlement is expected. Downdrag is assumed to occur along the pile to a depth where the cumulative settlement is more than 0.4 inches. The downdrag loads are additive to structural demands as a factored load. Note that downdrag was not included for the design of the center pier.

A load factor of 1.05 is required for downdrag based on Table 3.4.1-2 of AASHTO LRFD. Static analysis to determine the side shear resistance of the piles has been performed using APile, Version 2019.9.3. The total factored pile axial demand in compression is the factored pile demand from the structural loads plus the factored downdrag load. **Table 6-7** presents the total pile demands with downdrag included, where applicable.

The required nominal resistance of the pier piles is a function of the factored structural demand which is divided by the required resistance factor. The required nominal resistance of the abutment piles is a function of the factored structural demand plus the factored downdrag load divided by the required resistance factor in addition to the side shear resistance along the downdrag depth.

Table 6-7: Summary of Pile Demand

Substructure	Axial Factored Demand in Compression from Structural Loads (kips)	Axial Nominal Side Resistance to Consider for Downdrag (kips)	Axial Factored Demand from Downdrag (kips)	Axial Total Factored Demand in Compression (kips)
East Abutment	317.5	184	193	511
Center Pier	372	NA	NA	372
West Abutment	317.5	177	187	504

The required nominal driving resistance has been checked against the lesser of the factored structural resistance, the factored geotechnical resistance, or the factored resistance that piles can be driven without exceeding the maximum permissible driving stresses as per AASHTO LRFD Article 10.7.8 using an axial resistance factor of 1.0 for resistance during driving as stipulated in AASHTO LRFD Article 6.5.4.2. It is anticipated that the H-piles will be driven to refusal conditions, and therefore pile axial design will be structurally controlled, either by stresses in the pile during driving or the structural resistance of the pile under static loading.

To determine whether the piles can be installed to the minimum tip elevations, preliminary wave equation analyses were performed using the software program GRL WEAP 2010 distributed by GRL Engineers, Inc. Additionally, a relationship between nominal axial geotechnical compressive resistance and the corresponding stresses in the pile was developed. Analyses were performed assuming a Delmag D46-32 hammer for this assessment. The contractor will be required to reassess drivability and independently determine an appropriate pile driving system.

Nominal axial geotechnical resistance was determined from the wave equation assessment at the specific resistance where stresses in the pile exceeded 45 ksi (the maximum permissible structural limit as per AASHTO LRFD Article 10.7.8) assuming the proposed H-Piles having a yield strength of 50 ksi.

Table 6-8 summarizes the maximum factored load imposed onto a single pile compared to the factored geotechnical resistance based on structural limitations and drivability of a single pile under the governing strength limit state.

The controlling factored axial compressive resistance is governed by either the structural resistance of the pile or the drivability at all foundation locations. The governing factored axial compressive resistance is greater than the maximum factored demand and satisfies design requirements.

Table 6-8: Limiting Factored Axial Resistance of Piles at the Strength Limit State

Substructure	Axial Total Factored Demand in Compression (kips)	Limiting Factored Structural Resistance[1] (kips)	Limiting Factored Geotechnical Resistance[2] (kips)	Estimated Factored Drivability Resistance[3] (kips)	Governing Factored Axial Compressive Resistance (kips)
East Abutment	511	611.5	786	800	611.5
Center Pier	372	752.5	572	600	572
West Abutment	504	611.5	776	800	611.5

1. Based on severe driving conditions and a resistance factor of 0.5.
2. Assumes piles are driven to hard rock or refusal conditions.
3. Based on a resistance factor of 1.0 using a Delmag 46-32 with a Fuel Setting of 4.

6.1.6 Recommended Pile Tip Elevations and Nominal Driving Resistances

HNTB anticipates that piles will reach refusal either in the glacial till or when the top of bedrock is encountered. Estimated pile tip elevations have been based on top of rock elevations and lateral requirements and are indicated in **Table 6-9**. Additionally, minimum nominal driving resistances have also been included in the table. All piles should be driven to at least the minimum pile tip elevations and to a suitable penetration depth so that the minimum required nominal driving resistance is achieved. To provide protection of the pile tip while driving through the glacial till and to bedrock, prefabricated pile tips will be specified for all piles.

Table 6-9: Estimated and Minimum Pile Tip Elevations for the Bridge Structure

Location	Bottom of Pile Cap Elevation (ft)	Minimum Pile Tip Elevation (ft)	Estimated Pile Tip Elevation (ft)	Factored Axial Load (kips)	Minimum Required Nominal Driving Resistance (kips)
East Abutment	73.3	-13	-28	511	786
Center Pier	54.5	-9	-14	373	572
West Abutment	74.0	-11	-16	504	776

HNTB recommends ordering lengths of piles that reflect a minimum of 5 additional feet per pile to accommodate variations in pile penetration, dynamic pile test instrumentation and pile head damage during driving.

6.2 Toll Structure Foundation Design

Geotechnical design recommendations for the two toll entry plazas, two toll exit points, mast arms, and overhead sign structure (OHSS) associated with the Phase 2 Exit 45 reconfiguration are discussed in the following sections. Recommendations have been developed in accordance with the 2017 AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Eighth Edition and the 2003 MaineDOT Bridge Design Guide (BDG) with updates through 2018.

6.2.1 Foundation Type Selection

For the toll entry plazas and toll exit points, pile supported concrete slabs with grade beams were chosen as the preferred superstructure/substructure combination. Concrete pile caps will be used to support the toll mast arms and OHSS. All will be founded on steel H-Piles driven either into glacial till or to the top of bedrock. H-Pile supported foundations provide an effective solution to resist the axial and lateral loads imparted by the structures at all toll locations.

6.2.2 Resistance Factors

Foundations were designed and assessed under service, strength and extreme limit state load combinations in accordance with AASHTO LRFD Sections 3, 6, 10 and 11. Refer to **Section 6.1.2** and **Table 6-1** presented previously for a description and listing of the resistance factors used.

6.2.3 Subsurface Material Properties

Geotechnical design parameters for soil and rock were developed for each stratum based on material descriptions, standard published correlations, results from laboratory testing, and engineering judgment. A summary of soil design properties at the toll structures, mast arms, and OHSS are included below as **Tables 6-10** through **6-13.**

Table 6-10: Engineering Properties of Soil SB Entry Toll Plaza

Soil Properties	Strata					
	Existing Fill	Interbedded Sand and Silt - Upper	Interbedded Sand and Silt - Lower	Marine Clay - Upper	Marine Clay - Middle	Marine Clay - Lower
$N_{60,}$ (bpf)	7	5	-	-	-	-
$N1_{60,}$ (bpf)	11	8	-	-	-	-
γ (pcf)	113	110	106	112	112	112
ϕ', (deg)	30	29	-	-	-	-
k, AGW (pci)	47	-	-	-	-	-
k, BGW (pci)	35	25	-	-	-	-
c, (psf)	-	-	345	344	437	556+6(10-y)
ε_{50}	-	-	0.02	0.02	0.02	0.02
E_s (ksi)	2.5	2.2	0.9	0.9	1.4	2.1

Table 6-11: Engineering Properties of Soil at NB Entry Toll Plaza, SB Exit Point, and Ramp B Toll Mast

Soil Properties	Strata						
	Existing Fill	Marine Clay- Crust	Marine Clay Upper*	Marine Clay Upper	Marine Clay - Middle	Marine Clay - Bottom	Glacial Till
N_{60}, (bpf)	7	7	-	-	-	-	49
$N1_{60}$, (bpf)	11	11	-	-	-	-	34
γ (pcf)	113	121	112	112	112	112	121
ϕ', (deg)	30	-	-	-	-	-	37
k, AGW (pci)	47	-	-	-	-	-	-
k, BGW (pci)	35	-	-	-	-	-	108
c, (psf)	-	1000	500	388	435	467+13(10-y)	-
ε_{50}	-	0.01	0.02	0.02	0.02	0.02	-
E_s (ksi)	2.5	4.9	1.7	1.14	1.4	1.4	6.3

*Top 6 feet of Marine Clay is substratum

Table 6-12: Engineering Properties of Soil at NB Exit Point and Ramp D Toll Mast

Soil Properties	Strata					
	Existing Fill	Interbedded Sand and Silt - Upper	Interbedded Sand and Silt - Lower	Marine Clay - Middle	Marine Clay - Bottom	Glacial Till
N_{60}, (bpf)	7	5	-	-	-	49
$N1_{60}$, (bpf)	11	8	-	-	-	34
γ (pcf)	113	110	106	112	112	121
ϕ', (deg)	30	29	-	-	-	37
k, AGW (pci)	47	-	-	-	-	-
k, BGW (pci)	35	25	-	-	-	108
c, (psf)	-	-	345	396	450+4.9(10-y)	-
ε_{50}	-	-	0.02	0.02	0.02	-
E_s (ksf)	2.5	2.2	0.9	1.2	0.5	6.3

Table 6-13: Engineering Properties of Soil at Rt. 703 OHSS

Soil Properties	Strata					
	Existing Fill	Marine Clay Crust	Marine Clay - Upper	Marine Clay - Middle	Marine Clay - Bottom	Glacial Till
N_{60}, (bpf)	7	-	-	-	-	49
$N1_{60}$, (bpf)	11	-	-	-	-	34
γ (pcf)	113	121	112	112	112	121
ϕ', (deg)	30	-	-	-	-	37
k, AGW (pci)	47	-	-	-	-	-
k, BGW (pci)	35	-	-	-	-	108
c, (psf)	-	1000	337	396	450+4.9(10-y)	-
ε_{50}	-	0.01	0.02	0.02	0.02	-
E_s (ksf)	2.5	4.9	0.7	0.7	0.5	6.3

Where: $\overline{N_{60}}$= Average SPT-N value of stratum, corrected for hammer efficiency, in blows per foot.
$\overline{N1_{60}}$= Average SPT-N value of stratum, corrected for hammer efficiency and effective overburden pressure, in blows per foot.
γ = Total unit weight of soil - correlated.
ϕ' = Internal friction angle of drained soil, per multiple SPT-N value correlations.
k, AGW= Subgrade modulus above groundwater table – correlated.
k, BGW= Subgrade modulus below groundwater table – correlated.
c= Undrained shear strength based on in-situ vane shear testing, triaxial testing, and correlations to cone penetration testing.
ε_{50}= Strain at 50% - correlated.
y = Elevation in feet.

6.2.4 Pile Demands

Design loading information at the toll structures, mast arms, and OHSS were provided by the structural engineer. The service, strength and extreme limit state load combinations were provided at the center of the foundation. The loads used for each structure are presented in **Attachment 4.**

6.2.5 Axial and Lateral Foundation Design and Recommendations

Axial and lateral resistances were evaluated for toll structure foundations similar to the methods described in Section 6.1.5 for the bridge foundations. Consideration was made to using the same H-Pile section for multiple locations for economy. Factored axial compressive loads were verified to be less than the limiting values of the factored geotechnical resistance and the factored structural resistance. Where appropriate, factored downdrag loads were included with the factored structural loads. The factored geotechnical resistance was determined from APile, with resistance factor of 0.65 applied because dynamic pile load testing will be performed. The factored structural resistance was the product of the corroded cross-sectional area of the pile, times the 50 ksi yield strength of the pile, times a resistance factor of 0.5 to 0.6, which varied based on driving conditions. Geotechnical uplift resistance was also verified where uplift demands were present. Lateral deflections were verified using FBMP. **Table 6-14**, below, summarizes the pile sizes, demands, and resistances for the Toll Plaza structures.

Table 6-14: Factored Axial Demand and Resistance at Strength Limit State for Toll Plazas/Points

Substructure	Pile Size	Unfactored Dragdown Load (kips)	Factored Dragdown Load (kips)	Factored Structural Load (kips)	Factored Axial Load (kips)	Factored Structural Resistance (kips)	Nominal Driving Resistance Required - Including Downdrag
SB Entry	HP14x102	199.4	209.4	481.0	690.4	733.8	1062.1
SB Exit	HP14x89	71.5	75.1	355.0	430.1	617.3	661.7
NB Entry	HP14x89	68.5	71.9	481.0	552.9	617.3	850.7
NB Exit	HP14x89	106.7	112.0	355.0	467.0	514.4	718.5

Table 6-15, below, summarizes the axial pile demands, moments, deflection and demands to capacity ratio for toll mast and overhead sign structure foundations.

Table 6-15: Summary of Pile Group Analysis for Toll Mast and OHSS Foundations

Substructure	Limit State	Axial Demand		Maximum Moment (kip-ft)	Depth to Maximum Moment (ft)	Lateral Deflection		D/C
		Compression (kips)	Uplift (kips)			Longitudinal (in)	Transverse (in)	
OHSS	Service	146	83.8	29.3	6.8	0.029	0.137	0.188
	Strength	48.3	0	0.61	0	-	-	0.052
	Extreme	148	83.8	29.3	6.8	0.030	0.137	0.146
Toll Mast Sta. 210+00	Service	26.1	13.4	1.9	8.7	0.109	0.0193	0.028
	Strength	28.4	14.2	12.6	7	-	-	0.045
	Extreme	35.4	20.1	12.6	7	0.093	0.078	0.051
Toll Mast Sta. 407+00	Service	24.4	15.3	12.4	0	0.061	0.055	0.045
	Strength	26.2	16.1	12.4	0	-	-	0.046
	Extreme	32.8	22.3	12.4	0	0.068	0.055	0.052

Note: D/C is the Demand/Capacity ratio.

Table 6-16, below, summarizes the demands for toll plaza, toll mast, and overhead sign structures in axial compression and uplift.

Table 6-16: Summary of Pile Demand

Substructure	Axial Factored Demand in Compression from Structural Loads (kips)	Axial Nominal Side Resistance to Consider for Downdrag (kips)	Axial Factored Demand from Downdrag (kips)	Axial Total Factored Demand in Compression (kips)	Factored Axial Demand in Uplift (kips)
SB Entry	481.0	199.4	209.4	690.4	NA
SB Exit	355.0	71.5	75.1	430.1	NA
NB Entry	481.0	68.5	71.9	552.9	NA
NB Exit	355.0	106.7	112.0	467.0	NA
OHSS	47.9	NA	NA	148.0	83.8
Toll Mast Sta. 210+00	31.7	NA	NA	35.4	20.1
Toll Mast Sta. 407+00	29.8	NA	NA	32.8	22.3

Table 6-17, below, summarizes the factored resistances for toll plaza, toll mast, and overhead sign structures in axial compression.

Table 6-17: Limiting Factored Axial Resistance of Piles at the Strength Limit State

Substructure	Axial Total Factored Demand in Compression (kips)	Limiting Factored Structural Resistance[1] (kips)	Limiting Factored Geotechnical Resistance[2] (kips)	Estimated Factored Drivability Resistance[3] (kips)	Governing Factored Axial Compressive Resistance (kips)
SB Entry	481.0	733.8	1062.1	750	733.8
SB Exit	355.0	617.3	661.7	625	617.3
NB Entry	481.0	617.3	850.7	625	617.3
NB Exit	355.0	514.4	718.5	525	514.4
OHSS	148.0	652.5	227.7	655	227.7
Toll Mast Sta. 210+00	37.5	652.5	55.4	655	55.4
Toll Mast Sta. 407+00	35.5	652.5	50.8	655	50.8

1. Based on severe driving conditions and a resistance factor of 0.5.
2. Assumes piles are driven to hard rock or refusal conditions.
3. Based on GRLWEAP results.

6.2.6 Recommended Pile Tip Elevations and Nominal Driving Resistances

HNTB anticipates that piles will reach refusal either in the glacial till or when the top of bedrock is encountered. Estimated pile tip elevations have been based on top of rock elevations and lateral requirements and are indicated in **Table 6-18**. Additionally, minimum nominal driving resistances have also been included in the table. All piles should be driven to at least the minimum pile tip elevations and to a suitable penetration depth so that the minimum required nominal driving resistance is achieved. To provide protection of the pile tip while driving through the glacial till and to bedrock, prefabricated pile tips will be specified for all piles. **Table 6-18**, below, summarizes the minimum and estimated tip elevations and minimum required nominal driving resistance for toll plaza, toll mast, and overhead sign structures.

Table 6-18: Estimated and Minimum Pile Tip Elevations

Location	Bottom of Pile Cap Elevation (ft)	Minimum Pile Tip Elevation (ft)	Estimated Pile Tip Elevation (ft)	Factored Axial Load (kips)	Minimum Required Nominal Driving Resistance (kips)
SB Entry	70.0	-20	-35	690	1062.1
SB Exit	61.8	-11	-21	430	661.7
NB Entry	62.9	23	13	553	850.7
NB Exit	62.5	-17	-30	467	718.5
OHSS	49.0	-15	-25	148	227.7
Toll Mast Sta. 210+00	55.0	-9	-21	36	55.4
Toll Mast Sta. 407+00	57.0	-14	-27	33	50.8

HNTB recommends ordering lengths of piles that reflect a minimum of 5 additional feet per pile to accommodate variations in pile penetration, dynamic pile test instrumentation and pile head damage during driving.

6.3 Toll Building Foundation Design

Geotechnical design recommendations for the two toll buildings associated with the Phase 2 Exit 45 reconfiguration are discussed in the following sections. As this is an occupied structure, recommendations have been developed in accordance with the 2018 International Building Code (IBC) using Allowable Stress Design (ASD).

6.3.1 Foundation Type Selection

Pile supported toll slabs with grade beams were chosen as the preferred superstructure/ substructure combination. The grade beams will be founded on steel H-Piles driven either into glacial till or to the top of bedrock. H-Pile supported foundations provide an effective solution to resist the axial loads imparted by the building structure.

6.3.2 Allowable Stresses and Safety Factors

In accordance with IBC Section 1810, the foundations were designed with an allowable stress of 0.5*F_y for steel material and a safety factor for geotechnical resistance of 2.5.

6.3.3 Subsurface Material Properties

Geotechnical design parameters for soil and rock were developed for each stratum based on material descriptions, standard published correlations, results from laboratory testing, and engineering judgment. The soil design properties used for each toll building were the same ones used for the adjacent toll slabs. The design properties used for the Southbound Entry Building are summarized in **Table 6-10**, and design properties used for the Northbound Entry Building are summarized in **Table 6-11.**

6.3.4 Pile Demands

Design loading information was provided by the structural designer of the building. The maximum axial demand per pile was 124 kips.

6.3.5 Foundation Design and Recommendations

Since an APILE analyses were already run for the adjacent toll entry structures, the geotechnical and structural resistances were converted back to ASD ultimate values. Safety factors were applied to compute allowable pile resistances.

The layout of the piles was received from the structural designer. Because the sites are being preloaded prior to building construction, downdrag forces were assumed to act on the piles.

Due to the presence of soft compressible materials and placement of new fill, downdrag was accounted for in the design of the piles. Pile capacities were computed with an allowance of a net 0.125 in. loss of section due to corrosion in accordance with FHWA guidelines. Refer to previous *Section 6.1.5* for additional discussion of incorporating downdrag and corrosion into the design.

The analysis yielded the pile sizes, resistances, and capacities listed in **Table 6-20**, which are recommended for design. Note that geotechnical resistance was found to control over structural resistance.

Table 6-19: Summary of Pile Resistances and Capacities – Toll Buildings

Location	Pile Size	Ultimate Resistance ASD (kips)	Allowable Resistance ASD (kips)	Deduction for Downdrag Forces (kips)	Available Load Capacity for Building Structure (kips)
SB Entry	14x102	1062	424	200	224
NB Entry	14x89	850	340	69	271

6.3.6 Recommended Pile Tip Elevations and Nominal Driving Resistances

HNTB anticipates that piles will reach refusal either in the glacial till or when the top of bedrock is encountered. Estimated pile tip elevations have been based on top of rock elevations and are indicated in **Table 6-21.** Additionally, minimum nominal driving resistances have also been included in the table. All piles should be driven to at least the minimum pile tip elevations and to a suitable penetration depth so that the minimum required nominal driving resistance is achieved. To provide protection of the pile tip while driving through the glacial till and to bedrock, prefabricated pile tips will be specified for all piles.

Table 6-20: Estimated and Minimum Pile Tip Elevations – Toll Buildings

Location	Bottom of Pile Cap Elevation (ft)	Minimum Pile Tip Elevation (ft)	Estimated Pile Tip Elevation (ft)	Minimum Required Nominal Driving Resistance (kips)
Southbound Entry Toll Building	66.4	-28	-31	1062
Northbound Entry Toll Building	59.1	14	13	851

HNTB recommends ordering lengths of piles that reflect a minimum of 5 additional feet per pile to accommodate variations in pile penetration, dynamic pile test instrumentation and pile head damage during driving.

6.4 Applying Lightweight Fill at the Bridge

6.4.1 Material Properties and Selection

The use of lightweight materials is an effective method in reducing loading on soft soils and can be used to minimize horizontal earth pressures upon abutments. Expanded Polystyrene, better known as Geofoam, is the most effective of the lightweight material options, having unit weights typically less than 5 lb/ft^3. Most other lightweight materials range in unit weight from 20 to 70 lb/ft^3. Geofoam is typically provided in 2 ft x 4 ft x 8 ft blocks but can be cut to fit various arrangements, as needed. Given the weight of Geofoam, placement can be performed with relative ease.

In the current design, Geofoam will be installed in the west and east bridge approach embankments directly behind the abutments. These embankments are the highest on the project, so the main function of the Geofoam is to increase the stability factor of safety, especially since stability berms cannot be placed given the proximity of the Turnpike. Geofoam also allows for a significant reduction in horizontal earth pressures upon the abutment. Additionally, during the interchange reconfiguration construction, a portion of the fill will be excavated and replaced with Geofoam to provide an effective surcharge. This replacement will help control post-construction settlements in the transition zone between the approach fill and abutment.

Ground improvement techniques are currently being applied to the Geofoam zones at the west and east bridge approaches as part of the ongoing Preload Embankment Contract. These include installation of prefabricated vertical drains (PVDs) and placement of a two-stage preload with regular weight fill.

The vertical stresses imposed on the Geofoam were evaluated once the embankments are in service. It was determined that Geofoam grade EPS-22, as specified by ASTM D6817, will furnish the necessary compressive resistance at less than 1% deformation.

Standard practice requires an HDPE membrane be placed over the top of the constructed Geofoam form to prevent petroleum-based products from seeping into the Geofoam should a spill occur. This is because the hydrocarbons react with the polystyrene and will deteriorate the Geofoam blocks. A 40-mil HDPE membrane is specified for this design.

Geofoam placed near the base of the pavement box requires that a load distribution slab be cast on top of the Geofoam to prevent concentrated stresses upon individual cells. This will be accomplished with a 4-inch thick concrete slab reinforced with welded wire mesh.

6.4.2 Compressible Inclusion

A limited zone of lower density Geofoam will be installed immediately behind both abutments to serve as a “compressible inclusion.” The purpose of the inclusion is to accommodate the lateral thermal strains of the integral abutments, which are estimated at 1.25 inches. EPS-15 Geofoam was chosen for the inclusion, which will extend a minimum of 9 feet behind each abutment along the baseline. This length is designed to keep Geofoam strains ≤ 1% and within the elastic range of the material. Note that the lower density Geofoam will not experience any surface loading since it is entirely located beneath the approach slab.

6.4.3 Geofoam Design Scheme

Geofoam will be used behind the proposed bridge abutments to achieve the required design heights of the approach embankments, while still maintaining adequate stability. The first stage of the preload was constructed in winter of 2020, and the second stage was placed during the fall of 2020. When consolidation is completed in Fall 2021, part of the preload will be excavated and replaced with Geofoam as part of the Interchange Reconfiguration Contract. The weight of fill cut from the embankment will be greater than the combined weight of Geofoam and the future pavement box by the weight of approximately 4-feet (in height) of common borrow, which is the height of surcharge material used in two-stage embankments without Geofoam, providing an “effective surcharge”. This will produce stress relief and help keep post-construction settlements within tolerable limits in the transition zone between the approach fill and abutment.

Geofoam thicknesses were first determined for the East and West Bridge Approaches based on the limits of height that could be supported with sufficient global stability factors of safety at the second stage of preload (Stage 2 Preload). The Geofoam was necessary for stability longitudinally towards the Maine Turnpike, where toe berms were not an option. The Geofoam thicknesses were selected to offset the height to which the preload would have been built had stability not been a limitation. For example, the height of Stage 2 Preload at Station 1048+20 was determined to be limited to elevation 77.5 feet while the final design grade is approximately elevation 85 feet. Without Geofoam, the height of preload at Station 1048+20 considered necessary to appropriately mitigate post-construction settlement would have been elevation 89 feet, which is the final design grade plus the design surcharge of 4 feet. To offset the difference between elevation 89 feet and the elevation 77.5 feet that could be achieved at the Stage 2 Preload, a 12-foot thickness of Geofoam was determined, rounded up to the nearest foot.

Settlements anticipated during the Stage 2 Preload will decrease grades below the design height (e.g. elevation 77.5 feet at Station 1048+20). Additional material will be needed to replace the height lost to Stage 2 Preload settlements while building to final grades. For example, if Stage 2 Preload settlements at Station 1048+20 are 3-feet, the top of the embankment at the completion of the Preload would be at elevation 74.5 feet. This means grades would need to be raised by 10.5 feet instead of 7.5 feet to build to final grade. To compensate, thicknesses of the Geofoam were extended at the base, typically on the order of 2 to 3 feet, to account for the lost heights due to anticipated settlements.

The top of the Geofoam is limited by the depths of guardrail posts and of the pavement box and the concrete distribution slab. The base of the Geofoam is stepped away from the abutment where Geofoam is proposed at elevations beneath the pile cap. This is to ensure the piles have appropriate lateral confinement with embankment fill rather than Geofoam and minimize undermining of the pile caps during excavation for the placement of the geofoam.

Transverse extents of the Geofoam are stepped to follow the slope. The stepping of Geofoam on either side are similar in order to ensure a balance of horizontal earth pressures. Along each approach, the Geofoam extents in the direction of traffic are stepped at the back end (end facing away from the respective abutment) with the top elevation held where the base elevation is raised incrementally with distance away from the abutment. This transition is best depicted by the Geofoam Longitudinal Profiles on Sheet Number: GT-03 and GT-04 of the contract drawings. The stepping of the Geofoam generally follows the transition in the top of preload embankment grade, ensuring the appropriate net effective surcharge. The slope of the transition prevents appreciable horizontal earth pressures from the common borrow from being imposed upon the abutment for the height of Geofoam, which means the abutment foundations have significantly less lateral load to resist. Therefore, significantly smaller foundation elements can be used than would have otherwise been required. In transitioning from an appreciable thickness of Geofoam to no Geofoam, raising the base of the Geofoam rather than lowering the top of the Geofoam is important for optimizing construction. The transition of raising the base requires significantly less excavation of the preload embankment than would be required than the transition where the base elevation is held, and the top elevation is lowered.

Approximately 12 feet of the preload material is expected to be excavated in order to place Geofoam to provide an effective surcharge and to offset the weight of the roadway material. The maximum thicknesses of the Geofoam sections will be 16 feet on the west approach and 12 feet on the east approach. The top of the Geofoam on the West Approach steps down following the slope of the highway grade moving away from the abutment, avoiding conflicts with the pavement box. The Geofoam is tapered by stepping the base beginning at 1047+80 and ending at 1047+32. For the East Approach, the stepping of the base of the Geofoam begins at sta. 1051+64 and ends at 1051+88.

Construction of a potential future diverging diamond interchange (DDI) will require placement of a significant amount of additional fill alongside the diamond interchange embankments, especially at the east and west bridge approaches. In order to prevent significant influence of the new fills upon the clays underlying the approaches constructed under the diamond contract, settlement mitigation measures would be required. It is expected that temporary steel sheeting employed for the purposes of settlement isolation will be the most cost-effective measure. However, during final design of the potential future DDI, other alternatives such as a full net zero weight embankment should also be evaluated.

To accommodate the installation of this future sheeting, openings or “slots” have been incorporated along the north end of the Geofoam. The proposed slots are four feet in width and will allow sufficient space for driving the future sheeting to isolate the diamond embankments from the new fill material associated in constructing the DDI. The slots are to be filled with leveling sand during Geofoam installation and marked with delineators to allow for easier installation of the sheet pile. Along the west approach, the slot in the Geofoam will be placed between 46.00’ LT to 50.00’ LT of the Route 703 centerline. Along the east approach, the slot will be placed between 42.00’ LT to 46.00’ LT of the Route 703 centerline.

The Geofoam has been designed to accommodate the guardrail alignment and pavement box of the potential future DDI.

6.5 Ramp Crossovers MOT

The geometry of the new Exit 45 diamond interchange is superposed upon the existing trumpet interchange. Therefore, some new ramps need to cross over existing ramps. This poses a construction challenge since traffic must be maintained on existing ramps until the new interchange is constructed and operational.

During the interchange reconfiguration construction, two crossovers will need to be addressed, including new Ramp A over existing Ramp B and new Ramp B over existing Ramp A/B. Various MOT design strategies were considered to accomplish the crossovers, including lightweight fill, signalized crossings, and bypass ramps. The highly compressible soils underlying both locations pose a constraint on potential design solutions in that preload activities will cause settlement of existing ramps while they remain in service. In addition, any portions of a new ramp not receiving a full preload treatment, e.g. wicks and surcharge, will exhibit more long-term settlement than adjoining ramp sections that are fully preloaded.

The MOT scheme selected for existing Ramp B and Ramp A/B is to fill and pave the "canyon" during a short-term closure. However, to help prevent a pavement sag from developing due to long-term differential settlement, the roadway profile over the filled "canyon" will be raised to provide additional embankment height during the remainder of the construction contract to help minimize future settlements. Wicks were previously installed through the existing ramps during the Preload Embankment Contract.

To better estimate the fill height required for the raised MOTs, the most recent settlement results from the ongoing Preload Embankment Contract were evaluated. Considering current settlement magnitudes and rates, as well as the beneficial effect of the existing embankment weight, fill heights were adjusted compared with those reported in the Preload Geotechnical Design Report. The intention was to strike a balance between MOT safety and long-term pavement performance. The revised recommended maximum fill heights are summarized in **Table 6-21**.

Table 6-21: Recommended Fill Heights for Ramp B and Ramp A/B MOTs

Location	Preload Station	Nearest Settlement Platform(s)	Maximum Fill Thickness (feet)
Ramp B	115+75	SPW-5	3.0
Ramp A/B	203+50	SPW-13 SPW-14	2.4

6.6 West Approach Snowplow Turnaround

The construction of a closed median along Route 703 with concrete barrier prevents MaineDOT snowplows from reversing direction at the limit of the Maine Turnpike and MaineDOT right-of-way. After reviewing several alternatives, a snowplow turnaround has been added at and along the southeast corner of the intersection of the west approach of Route 703 and Ramp A (southbound on). This design change necessitated the placement of additional fill during the ongoing Embankment Preload Construction Contract (2019.13), which was accomplished with change orders. The additional preload was placed in two stages. The first stage (Stage 1A) was constructed in early August 2020, and the second stage (Stage 2A) was placed during the latter half of December 2020. These placements will raise the turnaround fill to the same height as the adjacent Stage 2 embankment, including the 4-foot surcharge.

The "late" addition of the preload materials for the Snowplow Turnaround reduces the effectiveness of the surcharge for the west approach. The 15-year post-construction settlements in this area were originally estimated to range from 1 to 3 inches at the Route 703 centerline.

The delayed placement of the Snowplow fill would potentially increase these estimated settlements to 4 to 6 inches.

To offset any increases in post-construction settlement at the west approach, another 2-foot surcharge will be constructed during the first several months of the Interchange Reconfiguration Contract. The additional surcharge will need to be in place at least five months to achieve the required degree of primary consolidation, though limited excavation for abutment construction may take place earlier. Settlement modeling indicates that the supplemental surcharge will keep long-term settlements within the original design range. The limits of the 2-foot surcharge addition will extend from approximately station 1047+00 to the proposed west abutment location. In addition, it is recommended that final paving along the west approach be delayed until June 2022 to reduce settlement experienced by the pavement.

6.7 Schedule Considerations

The ongoing Phase 1 Preload Embankment Contract includes a two-stage preload with surcharge at the bridge approaches and a single-stage preload at the four toll structure locations. Current settlement trends indicate that the preload waiting periods will extend at least to late winter 2020/2021 for the toll areas and fall 2021 for the bridge. Note that although downdrag forces have been included in the design of the pile foundations for these structures, the magnitudes of the forces are based on the residual long-term settlement, i.e. after removal of surcharge. Thus, pile driving for these foundations should not proceed until preloading is substantially complete.

A supplemental Phase 2 waiting period is recommended for the permanent Ramp A embankment from Sta. 100+00 to Sta. 111+50. This embankment section was not preloaded or surcharged during Phase 1 construction due to the low heights of fill. So, the fill materials along this section should be placed early during Phase 2 construction, and they should remain in place for a minimum of 12 months prior to paving, which is anticipated to be summer of 2022. A similar waiting period restriction is also recommended for permanent Ramp C from Sta. 310+50 and north, where the fill should remain in place until March 2022 before paving. These priority treatments are designed to minimize future settlements and improve long term pavement performance.

Another schedule consideration is that the Geofoam near the abutments should not be constructed until pile driving is completed. This avoids driving heavy equipment over a recently constructed Geofoam cell and load distribution slab.

7.0 SEISMIC DESIGN RECOMMENDATIONS

7.1 Design Spectrum Using the Generalized Procedure

A seismic assessment has been performed for the project site. In accordance with AASHTO LRFD, seismic analysis was performed for a seismic event having a 7 percent probability of being exceeded in 75 years (1,000-year Return Period). Values for the peak ground coefficient (PGA) and the spectral coefficients (SS and Sl) for the design event were obtained from the USGS web site using the longitude (-70.3479) and latitude (43.6286) for the bridge site. As per AASHTO Table 3.4.2.1-1, and given the soils encountered, the site is classified as Site Class E. A preliminary analysis was performed, and a design spectrum developed based on the general Three Point Method prescribed in Section 3.4.1 of AASHTO LRFD.

The ground peak acceleration (PGA) of bedrock and other parameters for designs obtained from AASHTO and the USGS map data are given in **Table 7-1** below.

Table 7-1: Recommended Seismic Design Parameters from USGS

Return Period (years)	Peak Ground Acceleration (PGA)	Site Class B		Site Class E		
		S_S	S_I	A_S	S_{DS}	S_{DI}
1,000	0.088	0.176	0.045	0.220	0.440	0.158

S_S- horizontal spectral acceleration coefficient at 0.2-sec period on rock.
S_I- horizontal spectral acceleration coefficient at 1.0-sec period on rock.
A_S- Site adjusted peak ground acceleration.
S_{DS}- design spectral acceleration coefficient at 0.2-sec period.
S_{DI}- design spectral acceleration coefficient at 1.0-sec period.

7.1 Site Specific Study

In accordance with Table 3.10.6-1 of AASHTO LRFD, for a site with the SD1 larger than 0.15, the bridge is assigned as Seismic Performance Zone 2. A Zone 2 categorization requires a detailed seismic analysis to be performed as part of the assessment and design. Since the initially calculated value of SD1 was very close to the boundary between a Seismic Zone 1 and Seismic Zone 2 classification, a site-specific study was performed to refine the spectral acceleration shown in **Table 7-2**. The analysis relies on published correlations for index properties and shear wave velocities of the subsurface materials from SCPT data.

7.1.1 Selection of Ground Motions

Ground motions were selected from earthquakes with magnitudes ranging from 5.0 to 7.0. Acceleration time histories of these earthquakes were recorded at several instrumented locations. Ground motions for several earthquakes recorded within 5 miles to 100 miles of the instrument stations were selected for analysis and provided in **Table 11-2** below.

Table 7-2: List of Ground Motions used for Site Specific Study

Earthquake	Magnitude	Distance from Instrumentation (miles)	PGA (g)
1984 Morgan Hill	6.2 M	10	0.095
1986 North Palm Springs	6.0 M	39	0.096
1987 Whittier Narrows	6.0 M	6	0.092
1988 Saguenay, Canada	5.7 m_b	40	0.091
1982 New Hampshire	4.7 M	5	0.116

7.1.2 Scaling of Ground Motions

A target spectrum for the site was developed from the Three Point Method specified in Section 3.4.1 of AASHTO LRFD for the soft bedrock (Site Class B). The ground motions were spectrally matched using RspMatch2009 software to develop the site-specific ground motions. The target spectrum and the spectrally matched ground motions are shown in **Figure 6**.

7.1.3 Site Specific Geotechnical Parameters

Soil and rock material properties affect the shear wave amplification. In order to accommodate the site variability, upper bound, average, and lower bound material properties were used in the analysis.

Shear wave velocity (Vs) profiles were developed from SCPT sounding HB-CPT-205 from an adjacent project site. The Vs values obtained from this sounding were considered as the average velocity profile. The lower bound and upper bound Vs data were obtained by lowering or increasing the average velocity by 30 percent. Established shear wave velocity profiles used in the analysis are shown in **Figure 7**.

Laboratory test results, as well as published correlations, were utilized to determine the unit weights and plasticity indices throughout the site. The plasticity index was utilized to obtain the shear modulus and damping ratio at different shear strains. Plasticity indices were adjusted to match the material classification in the boring logs. Unit weights were used for the determination of initial shear modulus. Unit weights were adjusted to 5 pcf above and below the values obtained at the midpoint of each stratum. Units weights obtained at the midpoint of each layer are indicated in **Figure 7**.

7.1.4 Modulus Reduction and Damping Ratio

The following published modulus reduction and damping ratio curves for sand, cohesive soils, and rock were utilized as shown in **Table 7-3**.

Table 7-3: Published Modulus Reduction and Damping Ratio Curves for Sand, Cohesive Soils, and Rock

Material	Models
Sand	Seed & Idriss 1970
	EPRI 1993
Cohesive	Vucetic & Dobry 1991
	Darendeli 2001
Rock	Idriss 1991
	Schnabal 1973

7.2 Site Specific Analysis

A one-dimensional analysis was performed using the software PRO SHAKE Version 1.1 at different locations to represent the entire project site. Several analyses were performed at each location by varying input parameters to accommodate the variants in ground motions and site soils as outlined above. The spectral acceleration-period data were obtained from the Shake analysis for a return period of 1,000 years. Mean and standard deviation of the scattered spectra were computed. The mean values and one standard deviation above and below were used in establishing the site-specific response spectrum. The site-specific analysis results are shown in **Figure 8**.

7.2.1 Site Specific Response Spectrum

The recommended horizontal response spectrum for the 1,000-Year return period is shown in **Table 7-4**. Based on the site-specific analysis and revised response spectrum, the design spectral acceleration coefficient at 1.0-sec period (SD1) is reduced to 0.13 and classified as Seismic Performance Zone 1.

7.3 Liquefaction Screening

Given the results of the site-specific seismic assessment in which it was determined the 1-second period design spectral acceleration for the design earthquake, SD1, is less than 0.15, the site is categorized as a Seismic Design Category A as specified by AASHTO LRFD Section 3.5. Liquefaction assessment is therefore not required per AASHTO LRFD Section 3.5 Article C3.5 for sites fitting Seismic Design Category A.

Table 7-4: List of Ground Motions used for Site Specific Study

1,000-Year Event	
Period (sec.)	Spectral Acceleration (g)
0.00	0.17
0.07	0.36
0.40	0.36
0.52	0.30
0.75	0.20
1.00	0.14
1.50	0.09
2.00	0.05
3.00	0.04
4.00	0.03
5.00	0.02

8.0 INSTRUMENTATION

The waiting periods for the current Preload Embankment Contract will extend into the Interchange Reconfiguration Contract. Thus, it will be essential to alert the interchange reconfiguration contractor of all instrumentation locations on the Plans. Furthermore, the contractor should be required to protect all existing instrumentation from damage until it is no longer being monitored by the Engineer. The contractor should repair, replace, or reimburse for any damaged instruments at the discretion of the Resident. After completion of the waiting period for an embankment segment, the Design Team recommends continued monitoring of the selected instruments until deactivation. This will aid in confirmation of long-term settlement predictions. A monitoring frequency of every other months should generally be used.

Eventually, most instruments will be enveloped by final paving and loaming/seeding. Thus, it is recommended to give the interchange reconfiguration contractor the responsibility of deactivating the instrumentation. In brief, the recommended deactivation procedures are:

- Settlement Plates and Piezometers: These should be cut-off at least a few feet below subgrade in paved areas or a few feet below the ground surface in seeded areas. This will prevent them from remerging if future settlement or erosion occurs.
- Inclinometers: Because these are “open-cased” to great depth, they pose a future environmental concern because they are a vertical route for pollutant transport and aquifer disruption. Therefore, the inclinometers should be thoroughly tremie grouted upon abandonment. After grouting, they would be cut-off below grade according to the same guidelines described above.

9.0 LIMITATIONS OF REPORT

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the conclusions and recommendations contained in this report are necessarily limited by, among other things, the scope of field investigation and by the number of borings. Therefore, given the nature of this subsurface study, there is a possibility that actual conditions encountered will differ from those discussed in this report. Should conditions arise which differ from those described in this report, HNTB should be notified immediately and provided with all information, when available, regarding subsurface conditions.

As part of the geotechnical recommendations presented in this report, HNTB makes no warranty as to the absence or presence of any environmental hazard or waste present on any property evaluated hereunder and all reports generated here to are qualified as being based upon existing data reasonably available to HNTB and not subject to independent verification. HNTB is not responsible for any latent defects that could not be reasonably discovered during the performance of its services and makes no legal representations whatsoever concerning any matter, including but not limited to, the ownership of any property or the interpretation of any law. These limitations form a material part of this report and are considered incorporated by reference therein. No warranty for the contents of this report, neither expressed nor implied, is made except that professional services were performed in accordance with generally accepted principles and practices.

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FIGURES

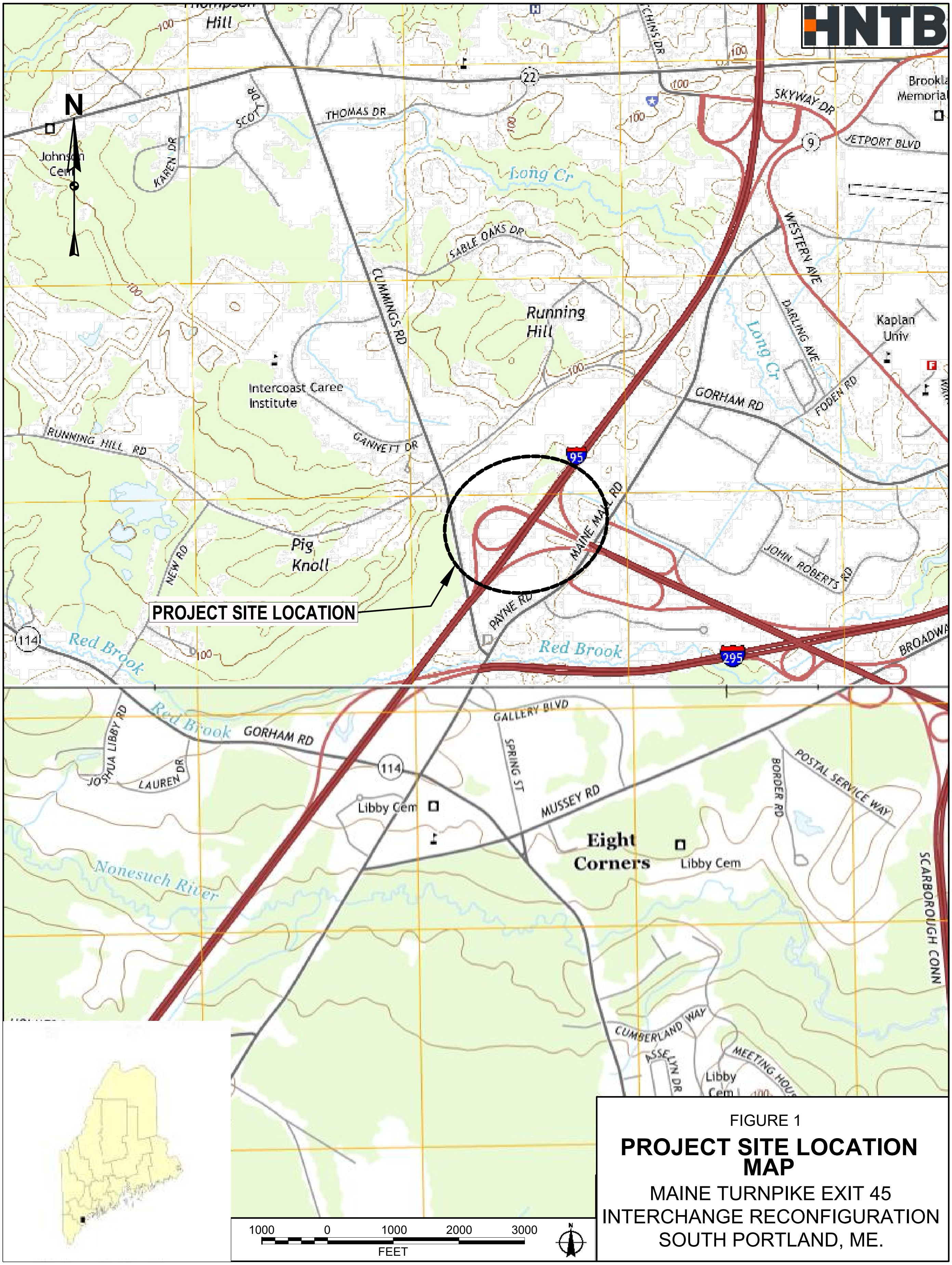
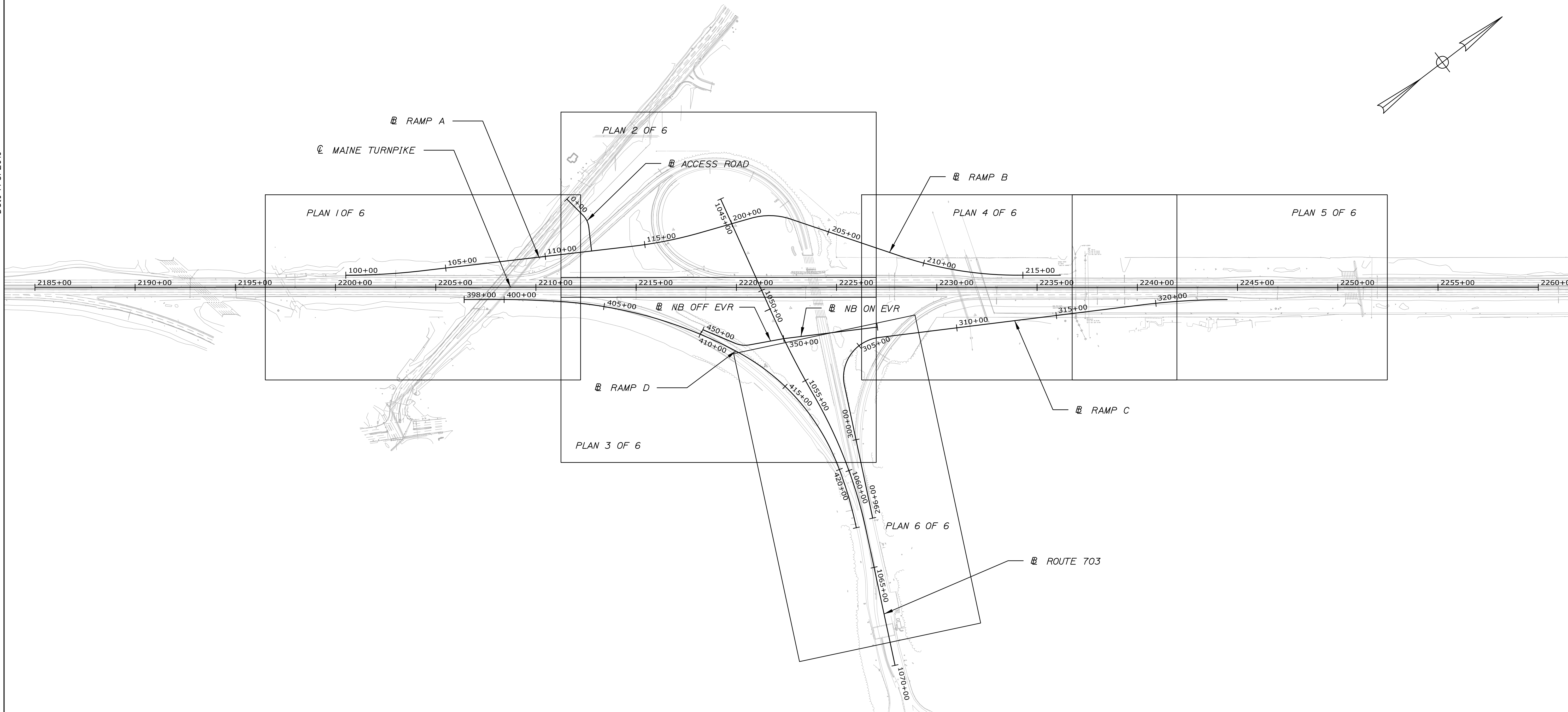


FIGURE 1

PROJECT SITE LOCATION MAP

MAINE TURNPIKE EXIT 45
INTERCHANGE RECONFIGURATION
SOUTH PORTLAND, ME.

Basemap: U.S.G.S. Portland West Quadrangle, US Topo, 2014



Date:7/8/2019

Filename: 0XX_Key Plan_Diamond.dgn

Scale: 250 0 250 500 Scale of Feet

No.	Revision	By	Date

Designed by:

HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	EDD	05\19	Checked	JRH	05\19
Drawn	AJS	05\19	In Charge of	RAL	05\19

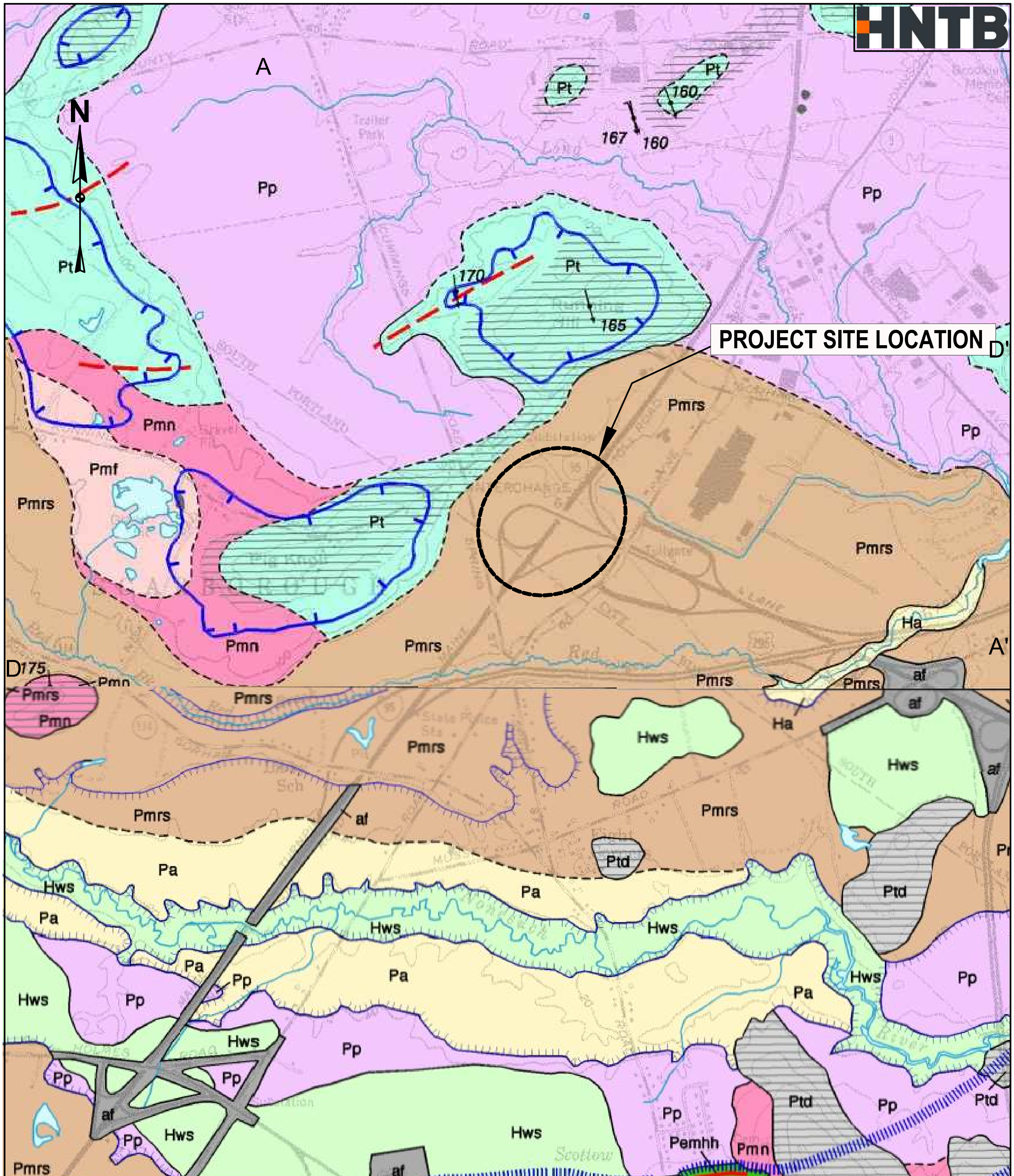
HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood, IV, P.E., P.T.O.E.

FIGURE 2
KEY PLAN



Pmrs — **Marine regressive sand deposits** - Sand, silt, and minor gravel deposited in shallow marine waters during late-glacial regression of the sea. May include a variety of nearshore and fluvial sediments. Commonly occurs as flat sandy areas and is likely to be underlain by marine clay-silt of the Presumpscot Formation.

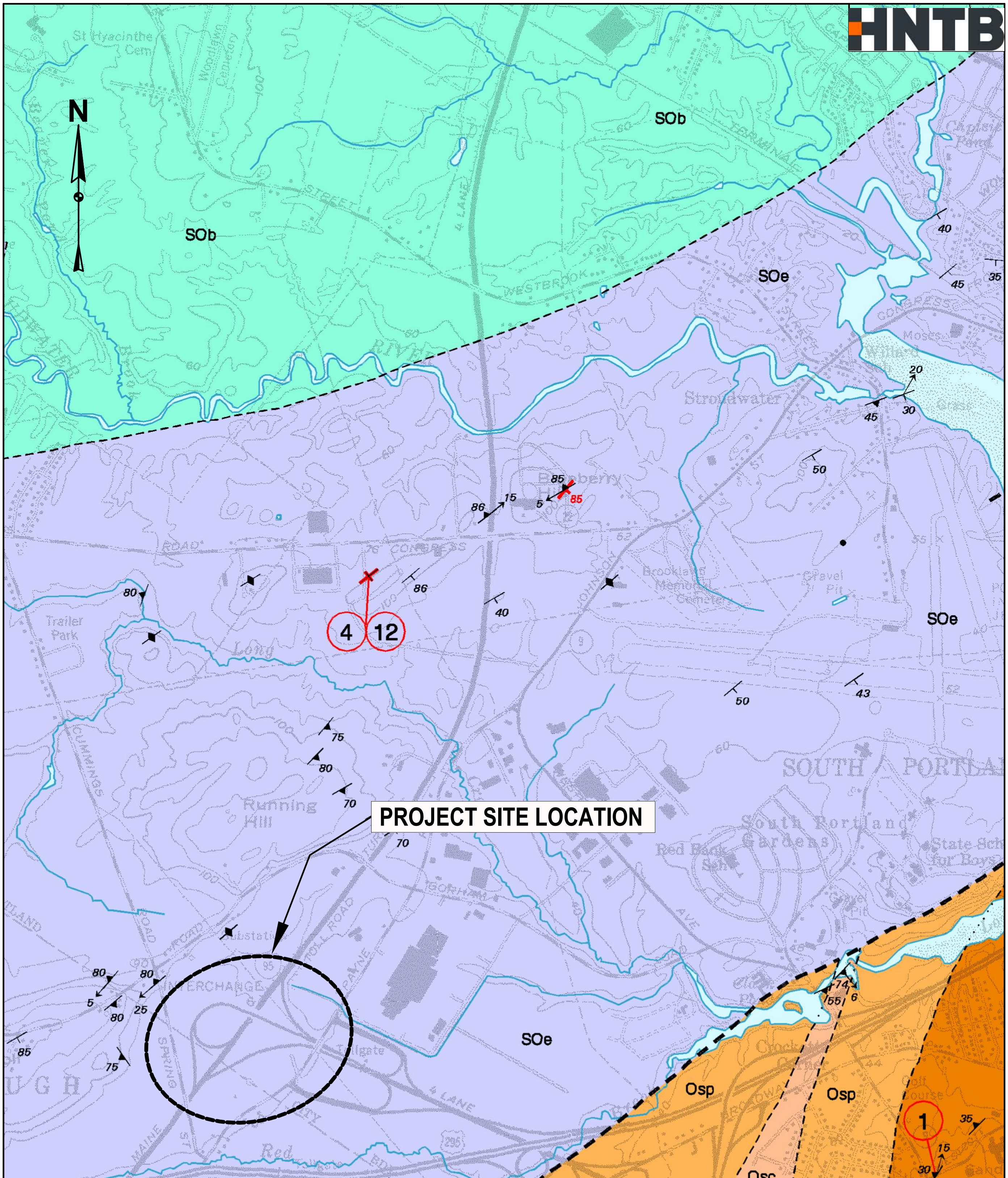
1000 0 1000 2000
FEET

FIGURE 3

SURFICIAL GEOLOGY MAP

EXIT 45 INTERCHANGE
RECONFIGURATION
SOUTH PORTLAND, ME.

Basemap: MEGS Surficial Geology Map, West Portland Quadrangle, 2008; Prouts Neck Quadrangle, 1999



SOe	**Eliot Formation**: Fine-grained buff-weathering, medium-gray quartz-plagioclase-biotite phyllite with abundant carbonate at lowest grades, calc-silicate minerals (clinozoisite, sphene, diopside, and rarely grossular) at higher grades of metamorphism; with interlayered dark gray phyllite. Formation is strongly sheared throughout.

1000 0 1000 2000
FEET

FIGURE 4

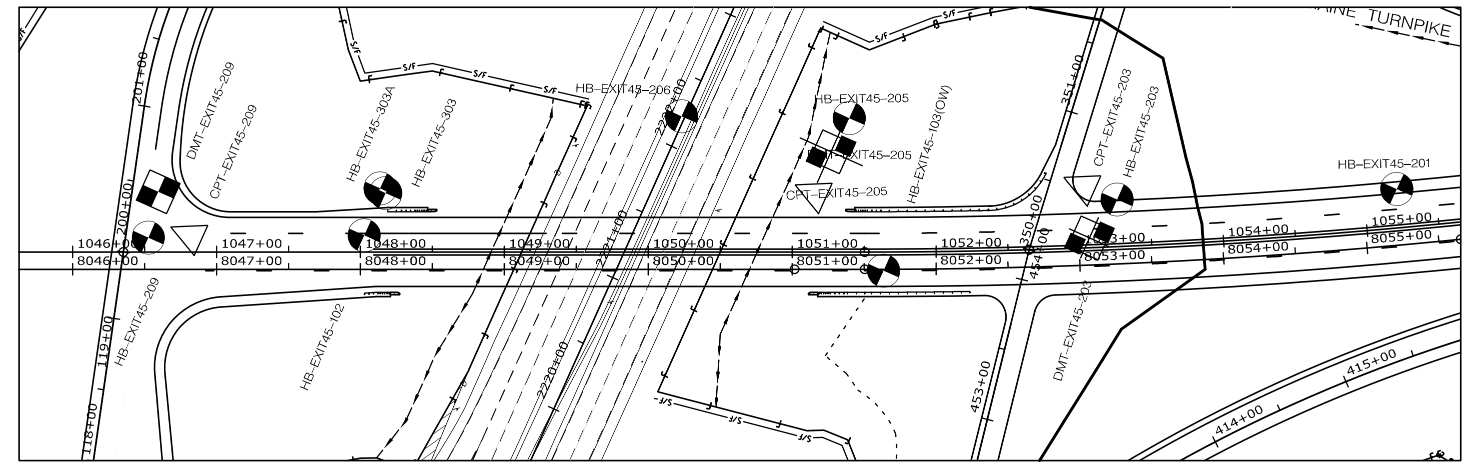
BEDROCK GEOLOGY MAP

EXIT 45 INTERCHANGE
RECONFIGURATION
SOUTH PORTLAND, ME.

Basemap: MEGS Bedrock Geology Map, Portland West Quadrangle, Maine, 2003, Scale 1:24,000

NOTES:

1. THIS SUBSURFACE PROFILE CONTAINS INTERPRETATIONS OF WIDELY SPACED TEST BORING DATA AND SHOULD NOT BE USED AS A PART OF THE CONTRACT DOCUMENTS.
2. VERTICAL AND HORIZONTAL SCALES ARE SHOWN ON PLANS. THE VERTICAL SCALE IS EXAGGERATED.
3. THE DEPTH AND THICKNESS OF SUBSURFACE STRATA INDICATED ON THE PROFILE WERE GENERALIZED FROM AND INTERPOLATED BETWEEN BORING LOCATIONS. THE TRANSITION BETWEEN MATERIALS MAY BE MORE OR LESS GRADUAL THAN INDICATED.
4. BORING LOCATIONS AND RESULTS HAVE BEEN PROJECTED TO THE ALIGNMENT PROFILE. BORING ELEVATIONS MAY DIFFER FROM APPROXIMATE GROUND SURFACE ELEVATIONS AT THE ROADWAY CENTERLINE.



LEGEND:

- FILL
- INTERBEDDED SAND & SILT - UPPER
- INTERBEDDED SAND & SILT - LOWER
- MARINE CLAY CRUST
- MARINE CLAY
- TILL
- PHYLLITE BEDROCK
- BORING LOCATIONS FOR EXIT45 PROJECT
- BORINGS PERFORMED BY HALEY & ALDRICH, INC. (2005)
- DILATOMETER LOCATION
- CONE PENETRATION TEST LOCATION
- GROUNDWATER OBSERVED WHILE DRILLING
- GROUNDWATER OBSERVED AFTER DRILLING COMPLETED

HB-EXIT45-XX = BORING NUMBER/DESIGNATION

\# = SPT-N VALUE (BLOWS/FT) CORRECTED TO N60

Su=(#)psf = UNDRAINED STRENGTH IN-SITU VANE SHEAR

= COBBLES OR BOULDERS ENCOUNTERED

REFUSAL = PRACTICAL REFUSAL OF SPLIT SPOON OR ROLLER BIT INDICATE POSSIBLE TOP OF BEDROCK

REC:XX% = ROCK CORE RECOVERY

RQD:XX% = ROCK QUALITY DESIGNATION

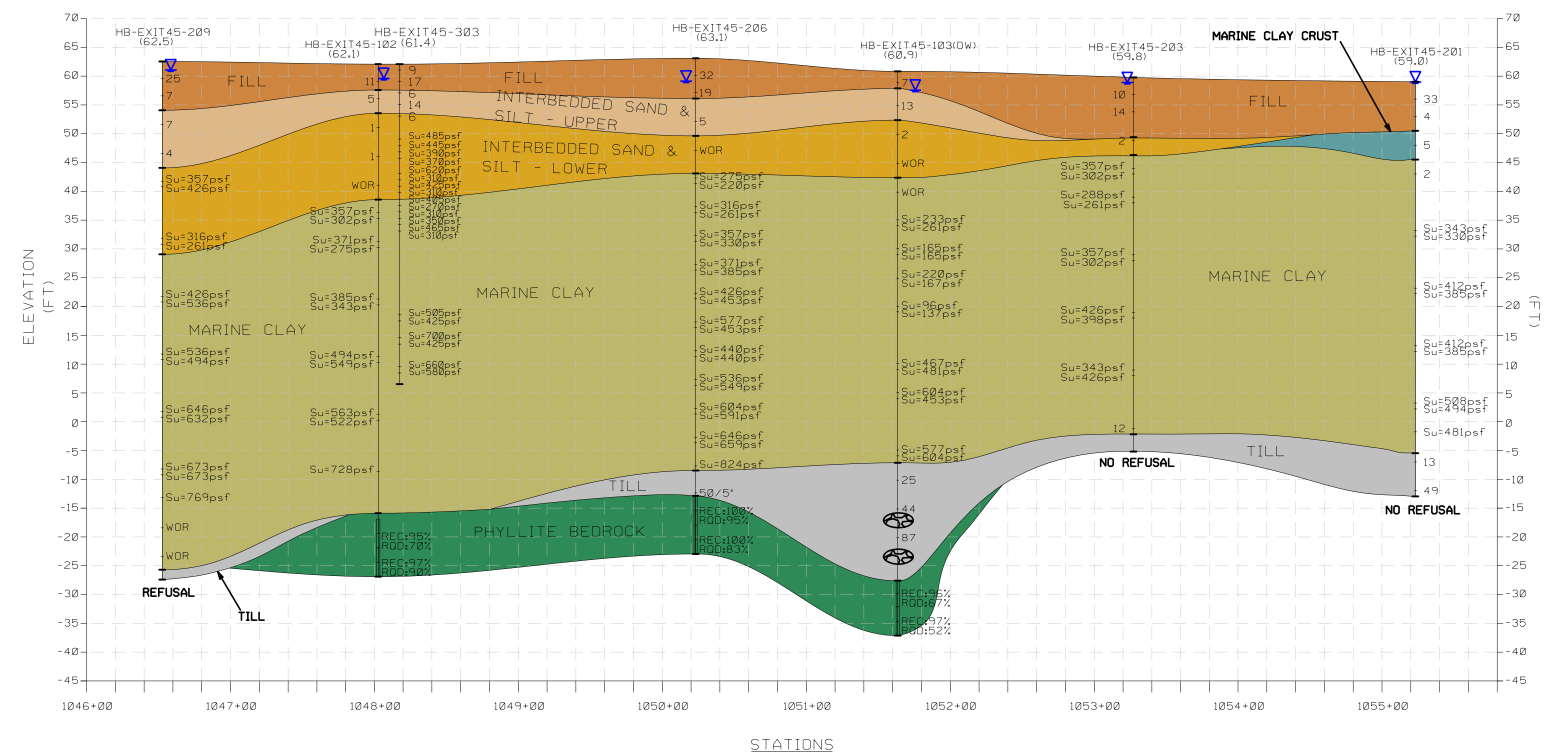


FIGURE 5A

Scale:
20 0 20 40 60 80 HORIZONTAL SCALE (FEET)
5 0 5 10 15 20 VERTICAL SCALE (FEET)

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: RAYMOND W. HANF, P.E.

	By	Date		By	Date
Designed	MRR	08/20	Checked	JRS	08/20
Drawn	MRR	08/20	In Charge of	RAL	08/20

HNTB CORPORATION
340 COUNTY ROAD, SUITE 6-C
WESTBROOK, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

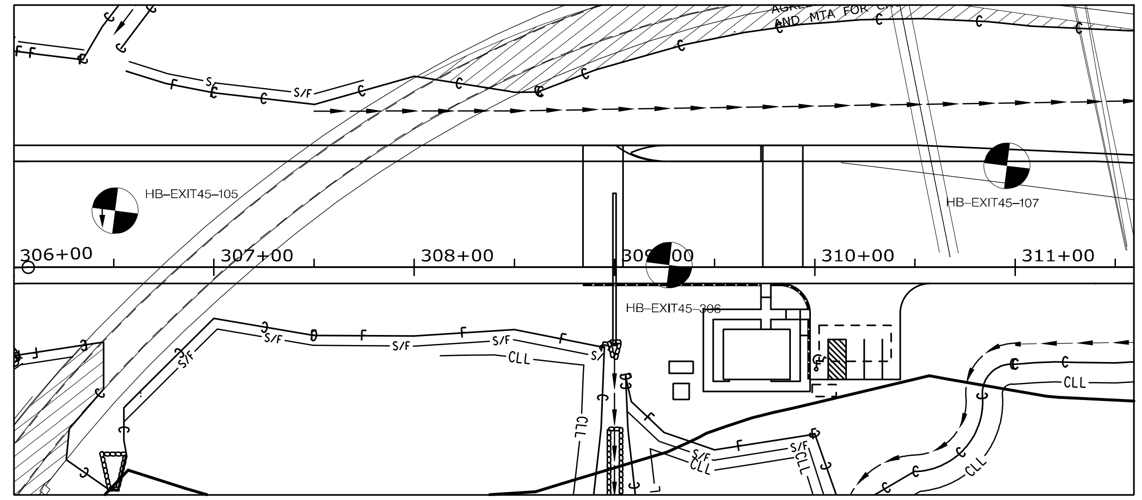
MTA PROJECT MANAGER: RALPH C. NORWOOD, IV, P.E., P.T.O.E.

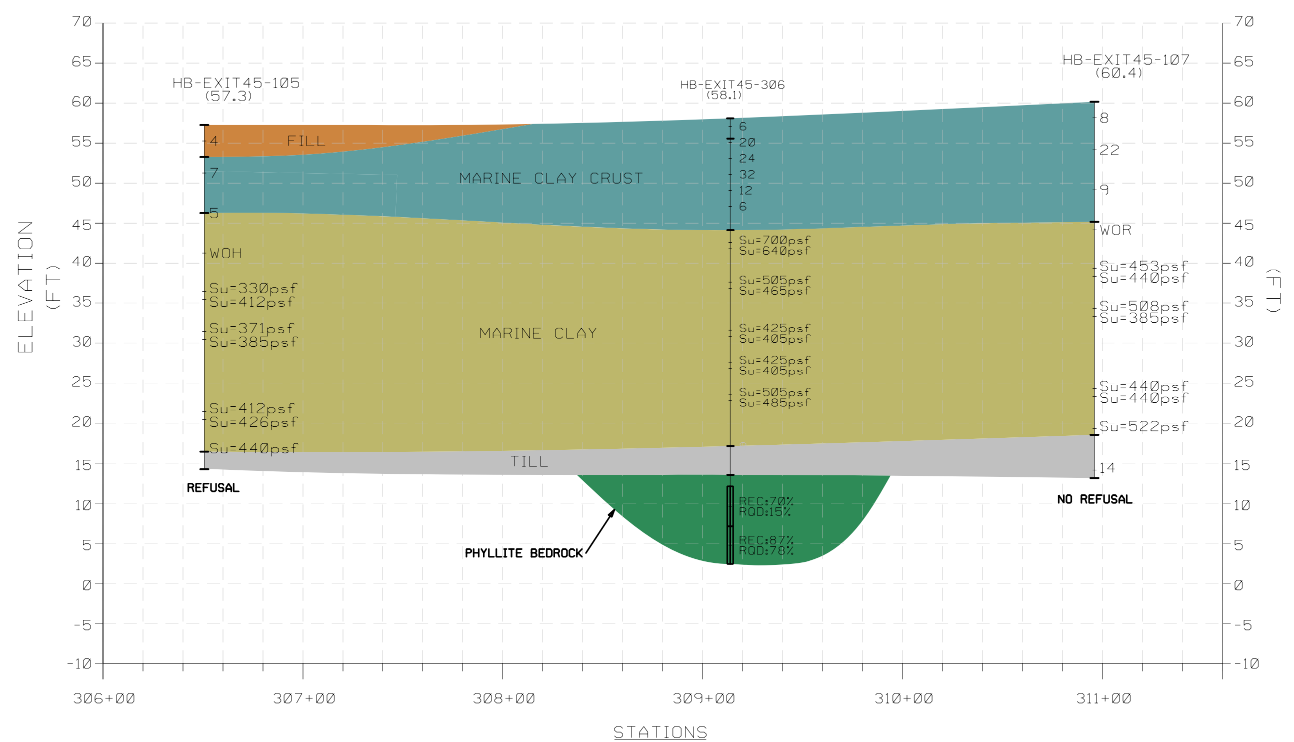
EXIT 45 INTERCHANGE RECONFIGURATION
SUBSURFACE PROFILE
PROFILE 1 OF 4
STA. 1046+50 TO STA. 1056+40

CONTRACT:2021.07

Date:$date$

Filename: $file$





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4. BORING LOCATIONS AND RESULTS HAVE BEEN PROJECTED TO THE ALIGNMENT PROFILE. BORING ELEVATIONS MAY DIFFER FROM APPROXIMATE GROUND SURFACE ELEVATIONS AT THE ROADWAY CENTERLINE.

LEGEND:

- FILL
- INTERBEDDED SAND & SILT - UPPER
- INTERBEDDED SAND & SILT - LOWER
- MARINE CLAY CRUST
- MARINE CLAY
- TILL
- PHYLLITE BEDROCK
- BORING LOCATIONS FOR EXIT45 PROJECT
- GROUNDWATER OBSERVED WHILE DRILLING
- GROUNDWATER OBSERVED AFTER DRILLING COMPLETED

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REFUSAL = PRACTICAL REFUSAL OF SPLIT SPOON OR ROLLER BIT INDICATE POSSIBLE TOP OF BEDROCK
REC:XX% = ROCK CORE RECOVERY
RQD:XX% = ROCK QUALITY DESIGNATION

FIGURE 5C

Scale: 20 0 20 40 60 80 HORIZONTAL SCALE (FEET)
5 0 5 10 15 20 VERTICAL SCALE (FEET)

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: RAYMOND W. HANF, P.E.

	By	Date		By	Date
Designed	MRR	08/20	Checked	JRS	08/20
Drawn	MRR	08/20	In Charge of	RAL	08/20

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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

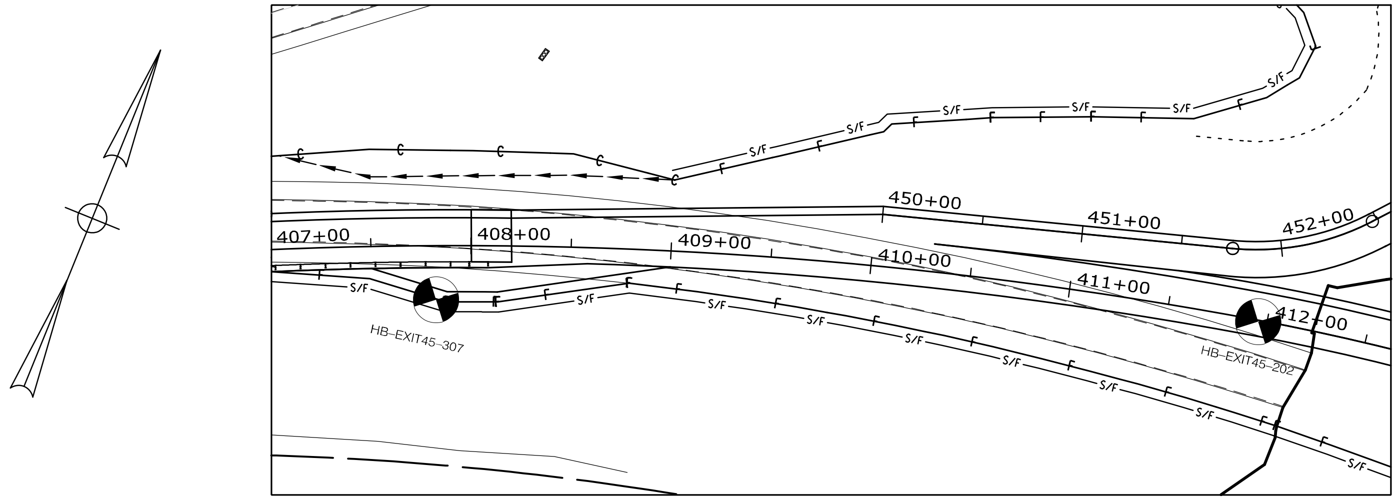
MTA PROJECT MANAGER: RALPH C. NORWOOD, IV, P.E., P.T.O.E.

EXIT 45 INTERCHANGE RECONFIGURATION
SUBSURFACE PROFILE
PROFILE 3 OF 4
STA. 306+40 TO STA. 311+00

CONTRACT:2021.07

Date:$date$

Filename: $file$



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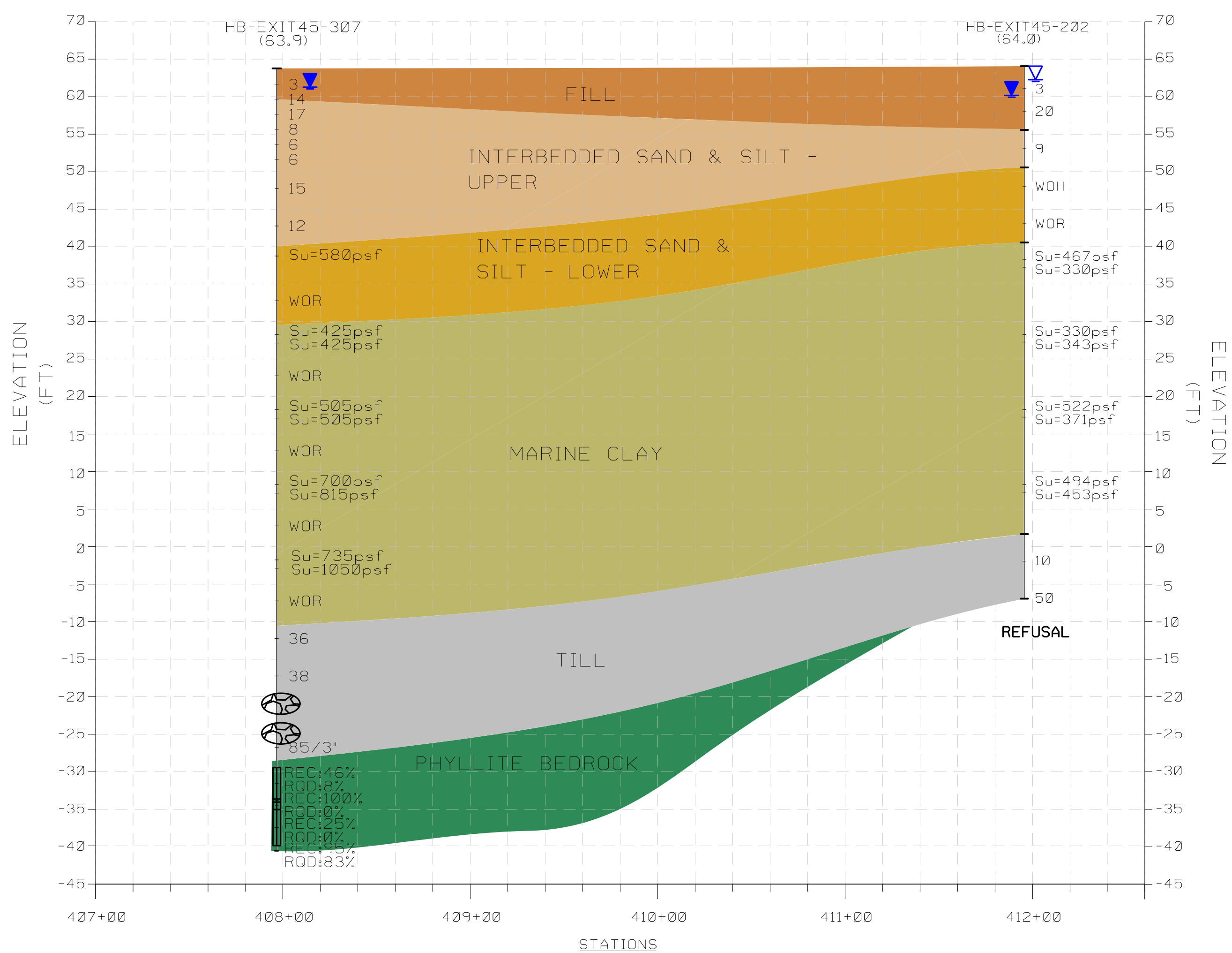

LEGEND:

- FILL
- INTERBEDDED SAND & SILT - UPPER
- INTERBEDDED SAND & SILT - LOWER
- MARINE CLAY CRUST
- MARINE CLAY
- TILL
- PHYLLITE BEDROCK
- BORING LOCATIONS FOR EXIT45 PROJECT
- DILATOMETER LOCATION
- GROUNDWATER OBSERVED AFTER DRILLING COMPLETED

HB-EXIT45-XX = BORING NUMBER/DESIGNATION
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Su=(*)psf = UNDRAINED STRENGTH IN-SITU VANE SHEAR
= COBBLES OR BOULDERS ENCOUNTERED
REFUSAL = PRACTICAL REFUSAL OF SPLIT SPOON OR ROLLER BIT INDICATE POSSIBLE TOP OF BEDROCK
REC:XX% = ROCK CORE RECOVERY
RQD:XX% = ROCK QUALITY DESIGNATION

FIGURE 5D

Scale: 20 0 20 40 60 80 HORIZONTAL SCALE (FEET); 5 0 5 10 15 20 VERTICAL SCALE (FEET)

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: RAYMOND W. HANF, P.E.

	By	Date		By	Date
Designed	MRR	08/20	Checked	JRS	08/20
Drawn	MRR	08/20	In Charge of	RAL	08/20

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MAINE TURNPIKE

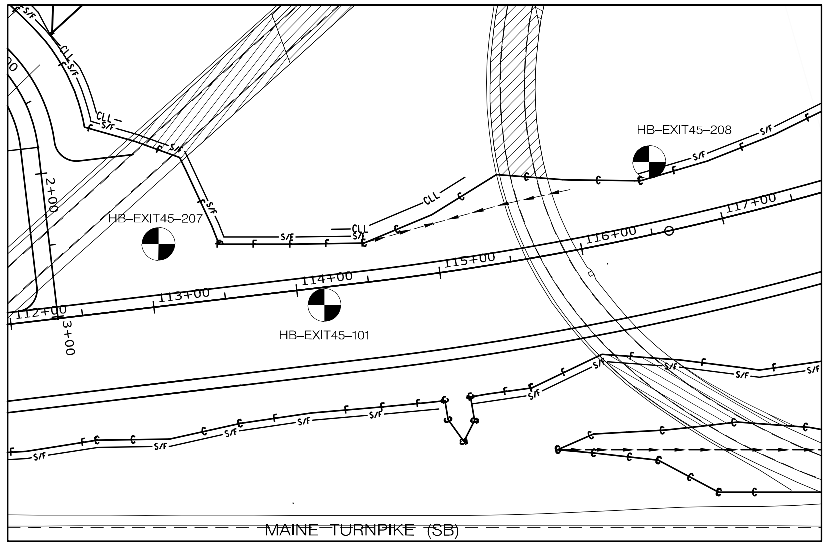
THE GOLD STAR MEMORIAL HIGHWAY

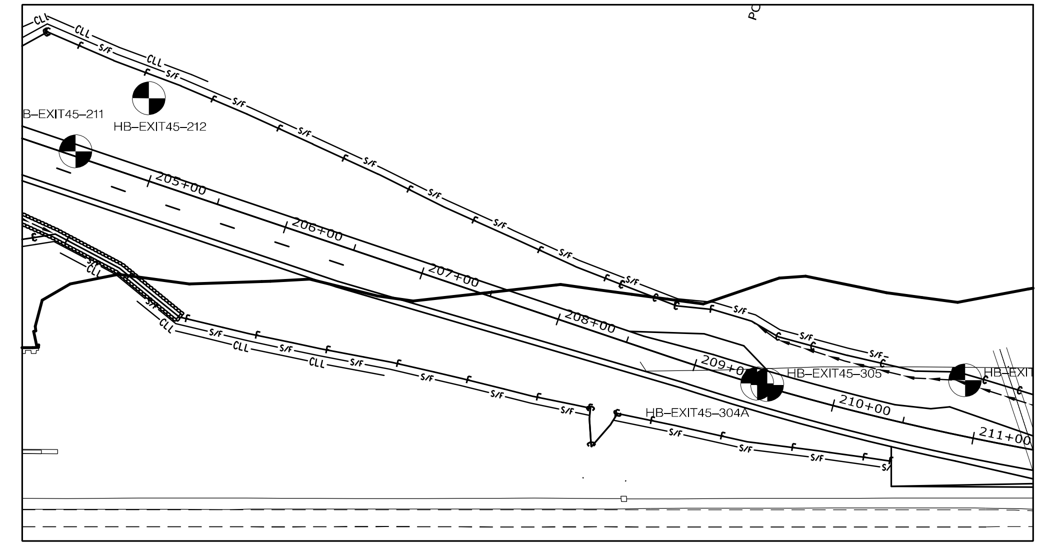
MTA PROJECT MANAGER: RALPH C. NORWOOD, IV, P.E., P.T.O.E.

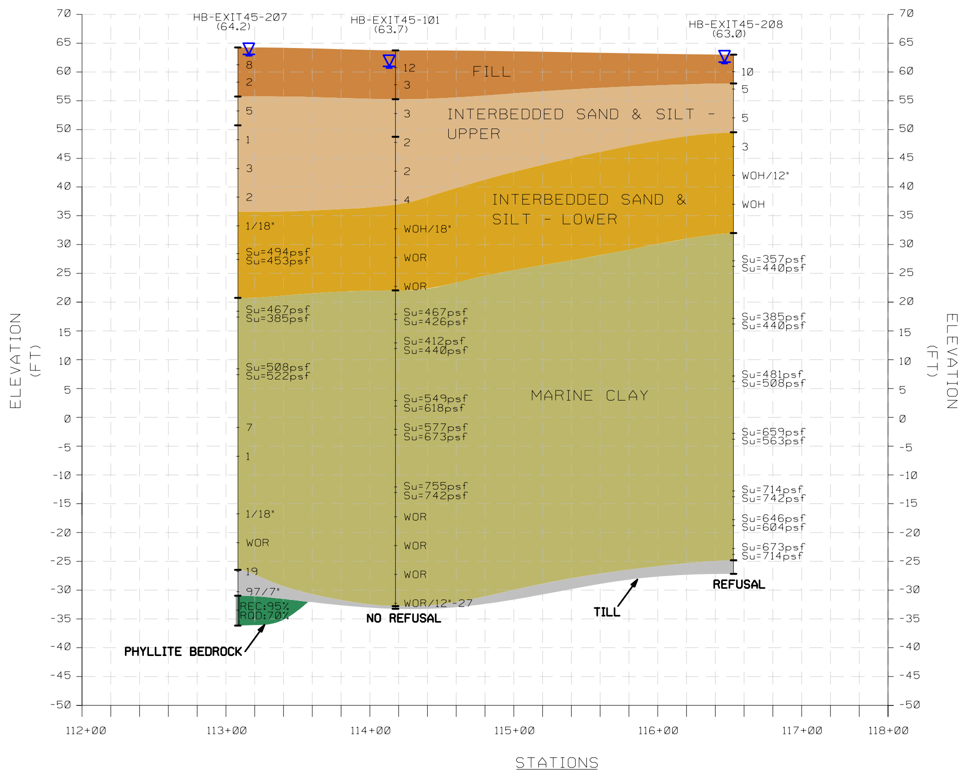
EXIT 45 INTERCHANGE RECONFIGURATION
SUBSURFACE PROFILE
PROFILE 4 OF 4
STA. 408+00 TO STA. 412+00

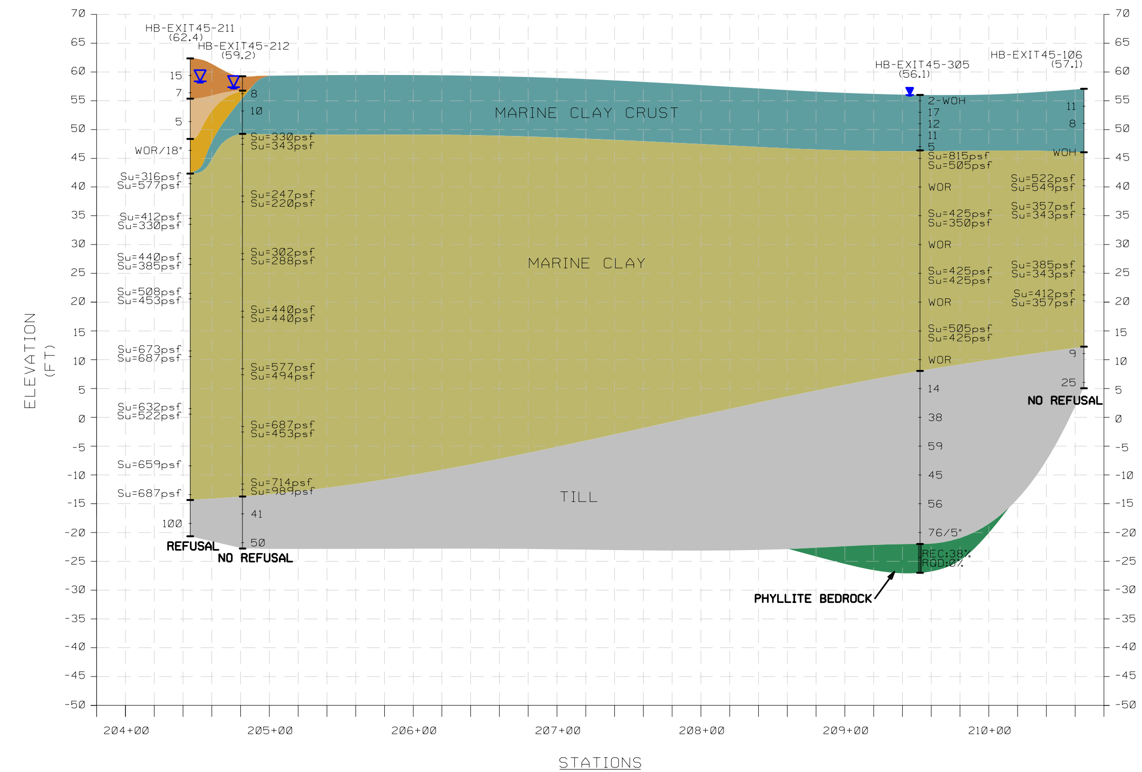
CONTRACT: 2021.07

Date: $date$
Filename: $file$









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LEGEND:

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- INTERBEDDED SAND & SILT - UPPER
- INTERBEDDED SAND & SILT - LOWER
- MARINE CLAY CRUST
- MARINE CLAY
- TILL
- PHYLLITE BEDROCK

- BORING LOCATIONS FOR EXIT45 PROJECT
- GROUNDWATER OBSERVED WHILE DRILLING
- GROUNDWATER OBSERVED AFTER DRILLING COMPLETED

- HB-EXIT45-XX = BORING NUMBER/DESIGNATION
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- = COBBLES OR BOULDERS ENCOUNTERED
- REFUSAL = PRACTICAL REFUSAL OF SPLIT SPOON OR ROLLER BIT INDICATE POSSIBLE TOP OF BEDROCK
- REC:XX% = ROCK CORE RECOVERY
- RQD:XX% = ROCK QUALITY DESIGNATION

FIGURE 5B

Scale:
20 0 20 40 60 80 HORIZONTAL SCALE (FEET)
5 0 5 10 15 20 VERTICAL SCALE (FEET)

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: RAYMOND W. HANF, P.E.

	By	Date		By	Date
Designed	MRR	08/20	Checked	JRS	08/20
Drawn	MRR	08/20	In Charge of	RAL	08/20

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340 COUNTY ROAD, SUITE 6-C
WESTBROOK, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

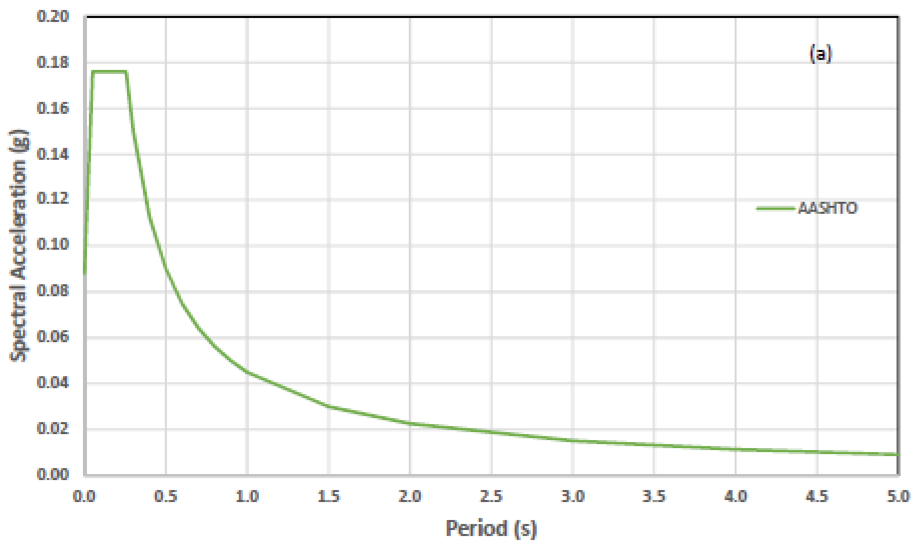
THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: RALPH C. NORWOOD, IV, P.E., P.T.O.E.

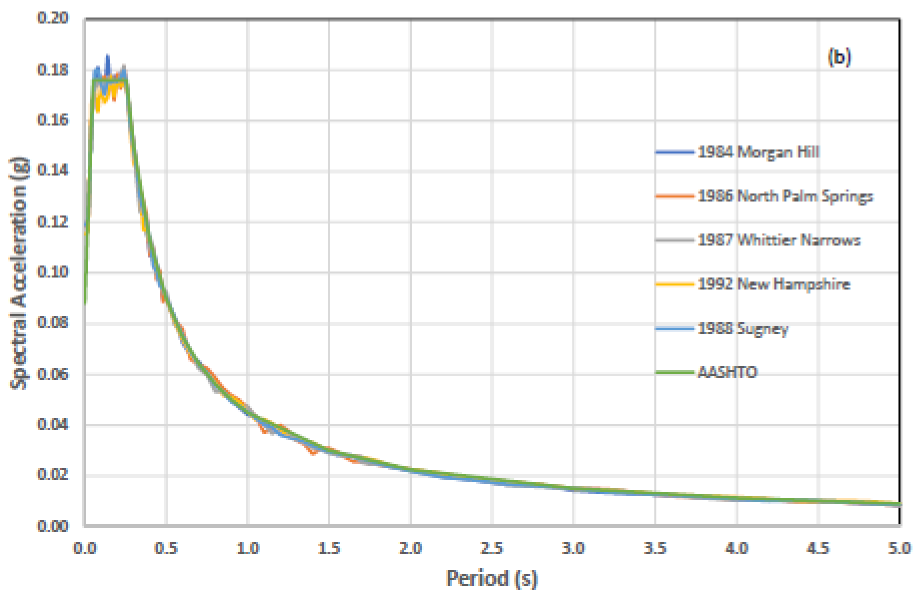
EXIT 45 INTERCHANGE RECONFIGURATION
SUBSURFACE PROFILE
PROFILE 2 OF 4
STA. 113+00 TO STA. 210+80

CONTRACT:2021.07

Date:$date$
Filename: $file$



(a) Target Spectrum



(b) Spectrum of Input Motions

FIGURE 6

Response Spectrum of Input Motions

EXIT 45 INTERCHANGE
RECONFIGURATION
SOUTH PORTLAND, ME.

HNTB

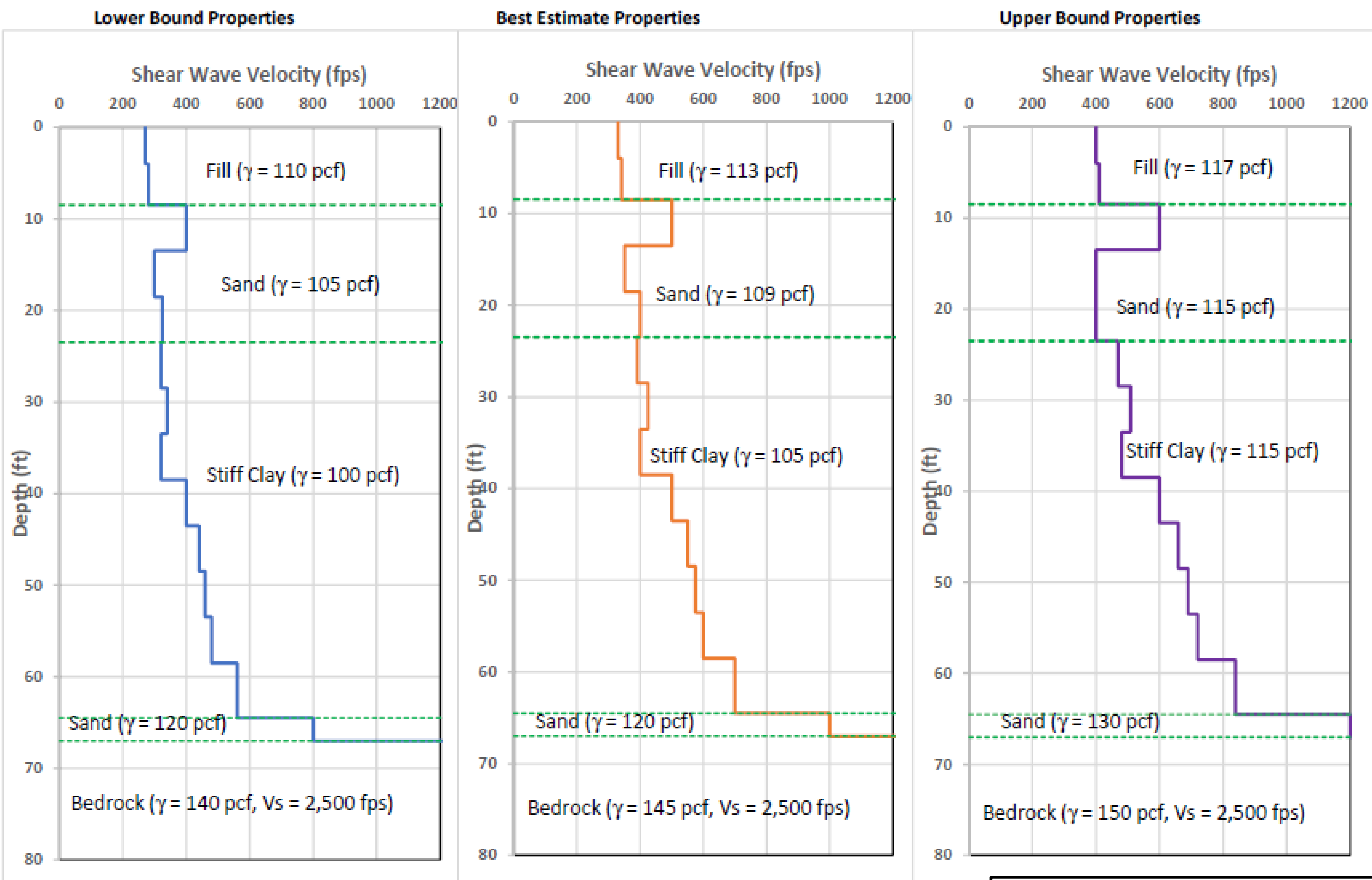


FIGURE 7

Shear Wave Velocity Profiles

EXIT 45 INTERCHANGE
RECONFIGURATION
SOUTH PORTLAND, ME.

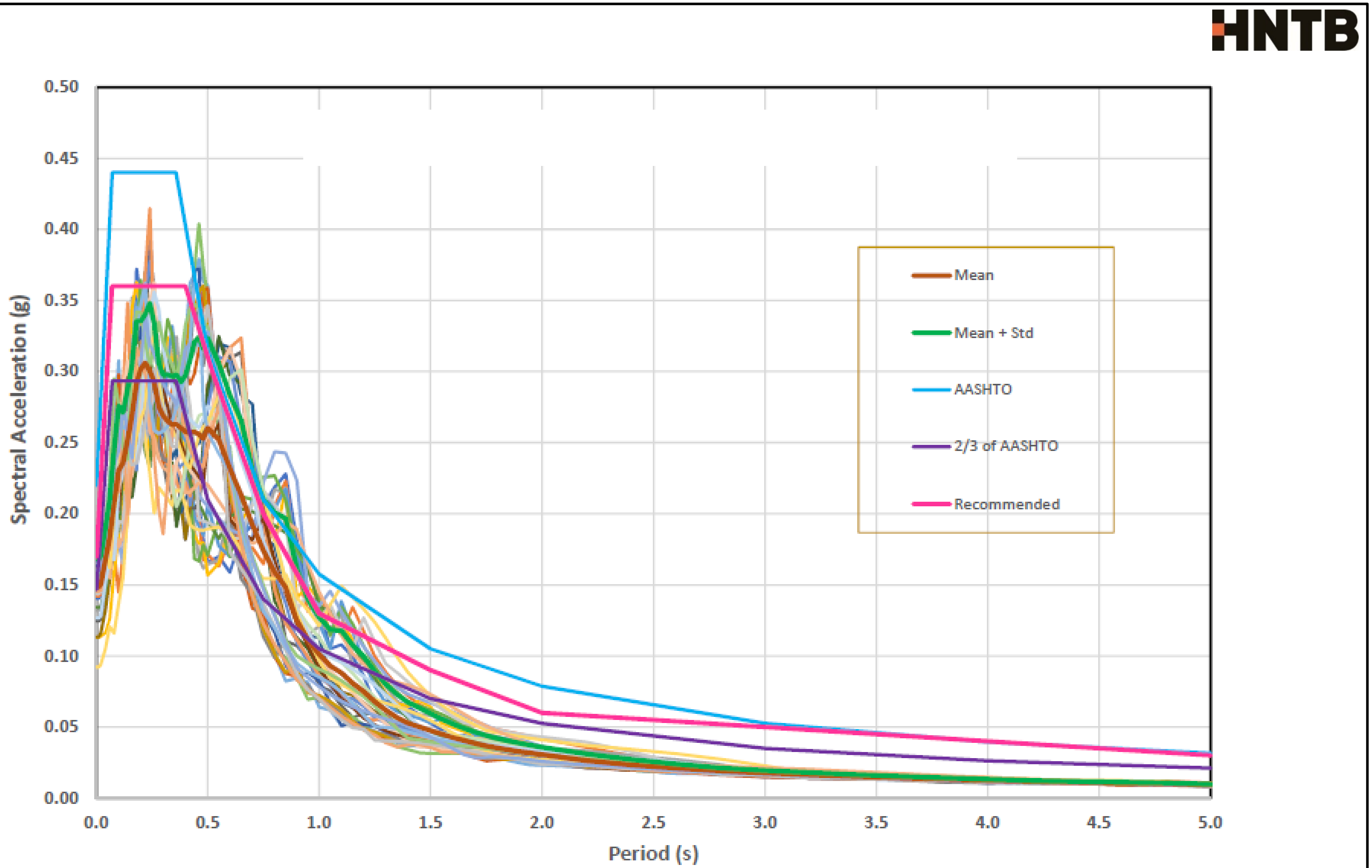


FIGURE 8

Site Specific Response Spectrum

EXIT 45 INTERCHANGE
RECONFIGURATION
SOUTH PORTLAND, ME.

ATTACHMENT 1
GEOTECHNICAL DATA REPORT
(PRELIMINARY EXPLORATION)

FIELD AND LABORATORY DATA REPORT
PRELIMINARY GEOTECHNICAL PROGRAM
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND, MAINE

PREPARED FOR:

HNTB Corporation
Westbrook, Maine

PREPARED BY:

Isabel V. (Be) Schonewald, P.E.
Schonewald Engineering Associates, Inc. (SchonewaldEA)
129 Middle Road
Cumberland, Maine 04021
Be@SchonewaldEngineering.com

December 28, 2017

SchonewaldEA Project No. 17-028

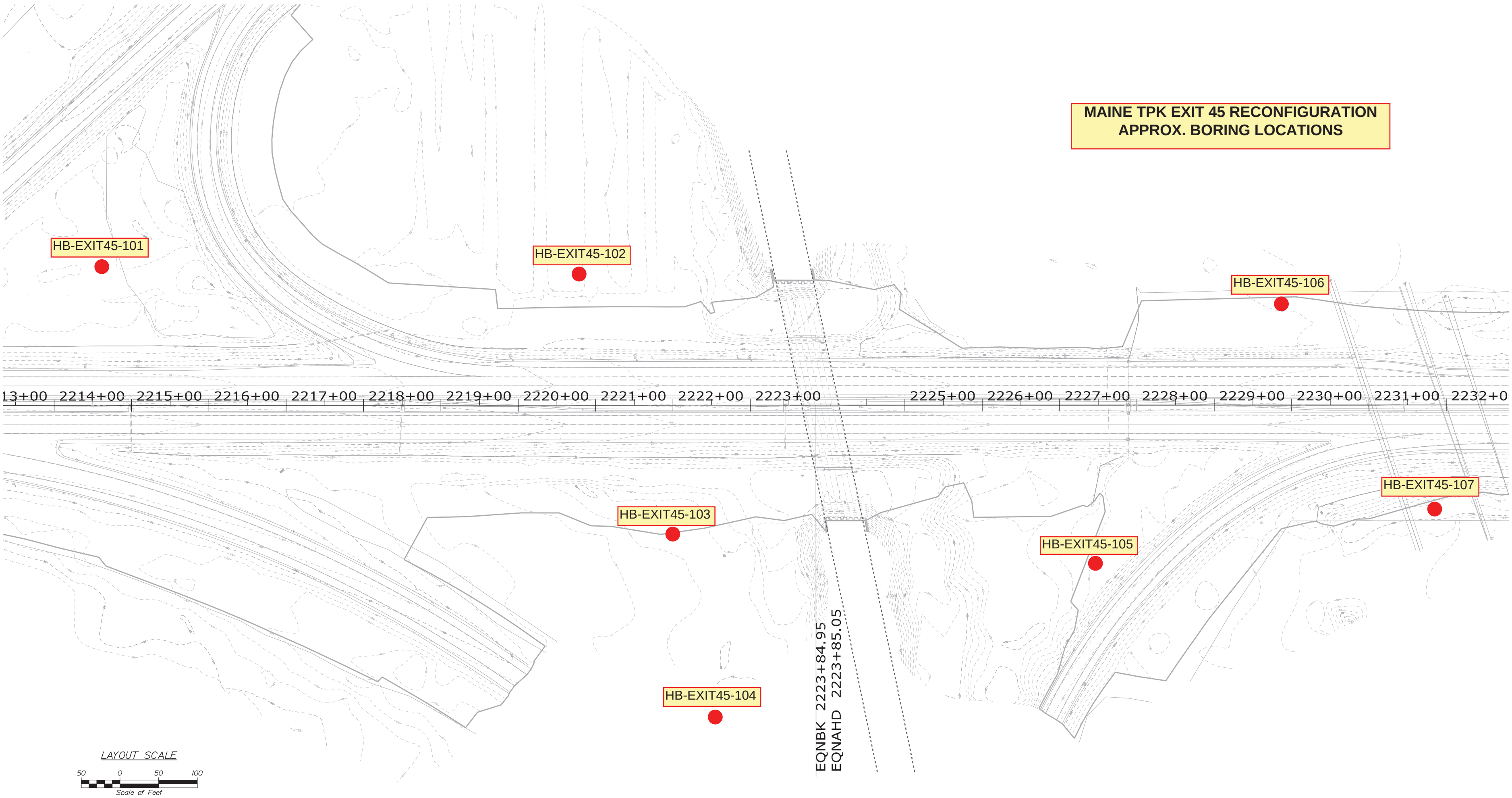
SCHONEWALD ENGINEERING ASSOCIATES, INC.
www.SchonewaldEngineering.com

FIELD AND LABORATORY DATA REPORT
PRELIMINARY GEOTECHNICAL PROGRAM
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND, MAINE

TABLE OF CONTENTS

Schonewald Engineering Associates, Inc.
www.SchonewaldEngineering.com

SUBSURFACE EXPLORATION LOCATION SKETCH


MAINE TPK EXIT 45 RECONFIGURATION
APPROX. BORING LOCATIONS
HB-EXIT45-101
HB-EXIT45-102
HB-EXIT45-103
HB-EXIT45-104
HB-EXIT45-105
HB-EXIT45-106
HB-EXIT45-107
13+00 2214+00 2215+00 2216+00 2217+00 2218+00 2219+00 2220+00 2221+00 2222+00 2223+00 2225+00 2226+00 2227+00 2228+00 2229+00 2230+00 2231+00 2232+0
EQNBK 2223+84.95
EQNAHD 2223+85.05
LAYOUT SCALE
50 0 50 100
Scale of Feet

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

LOGS OF PRELIMINARY SUBSURFACE EXPLORATIONS

Schonewald Engineering Associates, Inc.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-101 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	63.5 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/23/17; 1135-10/24/17; 1700	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB on ramp/ toll plaza)	**Casing ID/OD:**	HW to 95 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.8 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/16	2.0 - 4.0	3-6-6-8	12	12				1D: Red brown, wet, m. dense, fine to medium SAND, trace coarse Sand, trace Silt. CLEAN SANDS	
5	2D	24/15	5.0 - 7.0	1-1-2-2	3	3	3			2D: Red brown grading to brown, wet, v. loose, fine to coarse SAND, trace Silt.	
							4				
							11				
							15	55.0		8.5	
							15				
10	3D	24/5	10.0 - 12.0	1-1-2-1	3	3	8			3D: Grey brown, v. loose, fine to medium SAND, trace Silt. GREY MARINE SAND	
							11				
							25				
							25	50.0		13.5	
							23				
15	4D	24/15	15.0 - 17.0	1-2/12"-2	2	2	PUSH			4D: Grey, v. loose, interbedded Silty fine SAND; fine to medium SAND, little Silt; and Silty CLAY, trace fine Sand. INTERBEDDED MARINE SILTS AND SANDS	
20	5D	24/7	20.0 - 22.0	2-1-1/12"	2	2	PUSH			5D: Grey, v. loose, interbedded Silty fine SAND and fine to medium SAND, little to some Silt.	
							14				
25											

Remarks:

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

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

Page 1 of 4

Boring No.: HB-EXIT45-101

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings
MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-101
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	63.5 (est'd)	**Core Barrel:**	n/a
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Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
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UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/7	25.0 - 27.0	2-1-3-2	4	4	PUSH			6D: Grey, v. loose, fine SAND, trace medium to coarse Sand, trace Silt.	
30	7D	24/0	30.0 - 32.0	WOH/18"-1	0	0	PUSH			7D: No recovery. Very fine SAND, some Silt in tip of spoon.	
35	8D	24/22	35.0 - 37.0	WOR/24"	0	0	PUSH			8D: Grey, v. soft, Silty CLAY, with one 4-inch layer and several seams of very fine Sandy SILT.	
40	9D	24/24	40.0 - 42.0	WOR/24"	0	0	PUSH			9D: Grey, v. soft, Silty CLAY, with one 5-inch layer and occasional seams of very fine Sandy SILT; changing at 41.7 ft to:	
								21.8		41.7 Dark grey with black streaks, Silty CLAY. ORGANIC MARINE SILT-CLAY	
45	10D V1	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 467 / 14 psf			PUSH			10D: Grey, Silty CLAY, trace fine Sand, with nodules throughout V1: Tu=17 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		46.6 - 47.0	Su= 426 / 0 psf						V2: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
50											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-101 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	63.5 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/23/17; 1135-10/24/17; 1700	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB on ramp/ toll plaza)	**Casing ID/OD:**	HW to 95 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.8 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	11D V3	24/18	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 412 / 14 psf			PUSH			11D: Grey, Silty CLAY, with occasional nodules. V3: Tu=15 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V4		51.6 - 52.0	Su= 440 / 0 psf						V4: Tu=16 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
55	U1	24/23	55.0 - 57.0	HYD PUSH			PUSH			U1: Dark grey with black streaks, Silty CLAY.	
60	12D V5	24/22	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 549 / 14 psf			PUSH	3.5		60.0 12D: Black and dark grey, Silty CLAY, with shell fragments, one concretion, and nodules throughout. V5: Tu=20 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	WC=45.8% LL=45.9 PL=22.6 PI=23.3
	V6		61.6 - 62.0	Su= 618 / 14 psf						V6: Tu=22.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
65	13D V7	24/24	65.0 - 67.0 65.6 - 66.0	VANE INTERVAL Su= 577 / 14 psf			PUSH			13D: Black and dark grey, Silty CLAY, with shell fragments and nodules throughout. V7: Tu=21 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	WC=50.6% LL=52.8 PL=23.9 PI=28.9
	V8		66.6 - 67.0	Su= 673 / 14 psf						V8: Tu=24.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
70	U2	24/24	70.0 - 72.0	HYD PUSH			PUSH			U2: Grey and dark grey, Silty CLAY, with shell fragments.	
75											

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:**	HB-EXIT45-101
		Proj. No.:	17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	63.5 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/23/17; 1135-10/24/17; 1700	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB on ramp/ toll plaza)	**Casing ID/OD:**	HW to 95 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.8 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	14D V9	24/22	75.0 - 77.0 75.6 - 76.0	VANE INTERVAL Su= 755 / 27 psf			PUSH			14D: Dark grey and grey, Silty CLAY, with shell fragments, nodules, and few concretions. V9: Tu=27.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V10		76.6 - 77.0	Su= 742 / 0 psf						V10: Tu=27 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
										MV: Unable to push vane at 80 ft.	
80	15D	24/6	80.0 - 82.0	WOR/24"	0	0	PUSH			15D: Dark grey, v. soft, Silty CLAY, with large concretion at top of sample and black streaks and nodules throughout.	
85	16D	24/19	85.0 - 87.0	WOR/24"	0	0	PUSH			16D: Dark grey, v. soft, Silty CLAY, with nodules throughout.	
90	17D	24/13	90.0 - 92.0	WOR/24"	0	0	PUSH			17D: Dark grey, v. soft, Silty CLAY, with nodules throughout and one large concretion.	
95	18D	24/24	95.0 - 97.0	WOR/12"-27-39	27	27				Dark grey, Silty CLAY, with nodules throughout; changing at 96.5 to:	
								-33.0		96.5	
										18D: Dark grey, Silty fine to medium SAND, some Gravel, trace coarse Sand. TILL	
								-33.5		97.0	
										Bottom of Exploration at 97.0 feet below ground surface. No refusal.	
100											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings
MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-102
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	62 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/18/17; 1340-10/20/17; 1400	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed west abutment)	**Casing ID/OD:**	HW to 78 ft; NW to 79 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.5 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
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hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/17	2.0 - 4.0	5-6-5-7	11	11				Grey tan, damp, fine SAND, some Silt; changing at 3.1 ft to 1D: Brown, moist, fine to coarse SAND, trace fine Gravel, trace Silt. FILL	
								57.5		4.5	
5	2D	24/18	5.0 - 7.0	5-3-2-4	5	5	PUSH			2D: Grey, wet, loose, interbedded Silty fine SAND; fine SAND, little to some Silt; and SILT, little to some very fine Sand. INTERBEDDED MARINE SILTS AND SANDS	
10	3D	24/19	10.0 - 12.0	1/12"-1/12"	1	1	PUSH			3D: Grey, v. soft, interbedded Silty CLAY; fine to medium SAND, trace to little Silt; and Silty fine SAND.	
15	4D	24/22	15.0 - 17.0	WOR-1/18"	1	1	PUSH			4D: Grey, v. soft, interbedded Silty CLAY and fine Sandy SILT.	
20	5D	24/16	20.0 - 22.0	WOR/24"	0	0	PUSH			5D: Grey, v. soft, interbedded Silty CLAY and fine Sandy SILT.	
								38.5		23.5	
										ORGANIC MARINE SILT-CLAY	
25											

Remarks:

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Page 1 of 4

Boring No.: HB-EXIT45-102

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-102 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	62 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/18/17; 1340-10/20/17; 1400	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed west abutment)	**Casing ID/OD:**	HW to 78 ft; NW to 79 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.5 ft (open)

IN-SITU SAMPLING AND TESTING:
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MU = Unsuccessful Thin Wall Tube Sample attempt
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MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
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hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
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WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V1	24/16	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 357 / 14 psf			PUSH			6D: Dark grey, Silty CLAY, trace very fine Sand. ORGANIC MARINE SILT-CLAY V1: Tu=13 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		26.6 - 27.0	Su= 302 / 14 psf						V2: Tu=11 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
30	7D V3	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 371 / 14 psf			PUSH			7D: Dark grey, Silty CLAY, with few nodules. V3: Tu=13.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V4		31.6 - 32.0	Su= 275 / 14 psf						V4: Tu=10 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
35	U1	24/24	35.0 - 37.0	HYD PUSH			PUSH			U1: Dark grey, Silty CLAY.	CONSOL WC=41.0% LL=27.5 PL=18.2 PI=9.3
40	8D V5	24/16	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 385 / 14 psf			PUSH			8D: Dark grey, Silty CLAY. V5: Tu=14.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V6		41.6 - 42.0	Su= 343 / 14 psf						V6: Tu=12.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
45	U2	24/24	45.0 - 47.0	HYD PUSH			PUSH			U2: Dark grey with black partings, Silty CLAY, trace fine Sand (shell fragments).	CONSOL WC=41.1% LL=37.8 PL=20.0 PI=17.8
50											

Remarks:

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Page 2 of 4

Boring No.: HB-EXIT45-102

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-102 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	62 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/18/17; 1340-10/20/17; 1400	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed west abutment)	**Casing ID/OD:**	HW to 78 ft; NW to 79 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.5 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	9D V7	24/16	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 494 / 14 psf			PUSH			9D: Black grey, Silty CLAY, trace to little fine to medium Sand (shell fragments); nodules throughout. V7: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V8		51.6 - 52.0	Su= 549 / 0 psf						V8: Tu=20 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
55	U3	24/24	55.0 - 57.0	HYD PUSH			PUSH			U3: Dark grey with black streaks, Silty CLAY, trace fine Sand (shell fragments).	CONSOL WC=43.8% LL=41.6 PL=20.4 PI=21.2
60	10D V9	24/19	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 563 / 14 psf			PUSH			10D: Grey black, Silty CLAY, trace fine Sand (shell fragments); nodules throughout. V9: Tu=20.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V10		61.6 - 62.0	Su= 522 / 14 psf						V10: Tu=19 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
65	U4	24/23	65.0 - 67.0	HYD PUSH			PUSH			U4: Dark grey with black streaks, Silty CLAY.	CONSOL WC=40.9% LL=42.0 PL=20.7 PI=21.3
70	11D V11 MV	24/20	70.0 - 72.0 70.5 - 70.9	VANE/12"-WOR/12" Su= 728 / 96 psf	--		PUSH	-8.0 -8.9		70.0 11D: Dark grey, Silty CLAY with one large concretion at 70.9 ft; no black (organic) staining observed. V11: Tu=26.5 / Tr=3.5 ft-lbs (65 mm x 130 mm vane) 70.9 MV: Unable to push vane past 70.9 ft.	
75											

Remarks:

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PROJECT: Preliminary Test Borings
MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-102
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	62 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/18/17; 1340-10/20/17; 1400	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed west abutment)	**Casing ID/OD:**	HW to 78 ft; NW to 79 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	2.5 ft (open)

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RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
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WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	U5	24/23	75.0 - 77.0	HYD PUSH			PUSH			U5: Dark grey, Silty CLAY. NORMALLY CONSOLIDATED MARINE SILT-CLAY	CONSOL WC=40.6% LL=38.6 PL=20.6 PI=18.0
								-16.0		78.0	
							bounc				
80	R1	60/57	79.0 - 84.0	RQD: 42"=70%						R1: Hard, typically fresh, aphanitic to fine grained, light and medium grey PHYLLITE, with typically high-angle relic bedding and calcsilicate veining. Typically moderately spaced, moderately dipping breaks; undulating, rough, fresh and open. Core times: 1:40/ 1:35/ 1:30/ 1:35/ 1:35 min:sec/ft FAIR TO GOOD ROCK QUALITY	
				test: 80.7-81.3							UCT qp= 2.75 ksi
85	R2	60/58	84.0 - 89.0	RQD: 54"=90%						R2: Same as R1, but with only one break. Core times: 2:10/ 1:50/ 1:40/ 1:50/ 1:45 min:sec/ft GOOD TO EXCELLENT ROCK QUALITY	
								-27.0		89.0	
										Bottom of Exploration at 89.0 feet below ground surface.	
90											
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Preliminary Test Borings MeTPK Exit 45 Reconfiguration LOCATION: South Portland, Maine	Boring No.: HB-EXIT45-103 (OW) Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/4/17; 1025-10/6/17; 1340	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed east abutment)	**Casing ID/OD:**	HW to 80.7 ft; NW to 88.5 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	3.3 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/17	1.0 - 3.0	4-4-3-5	7	7				1D: Tan, moist, fine to medium SAND, trace Silt, trace fine Gravel, trace coarse Sand; changing at 2.3 ft to dark brown, fine Sandy ORGANIC SILT (likely former topsoil). FILL Grey, fine Sandy SILT in tip of spoon.	
								57.5		3.0	
5	2D	24/16	5.0 - 7.0	2-5-8-3	13	13	PUSH			2D: Grey, wet, m. dense, interbedded very fine Sandy SILT and Clayey SILT, trace very fine Sand. INTERBEDDED MARINE SANDS AND SILTS	
10	3D	24/20	10.0 - 12.0	WOH-1-1/12"	2	2	PUSH			3D: Grey, v. soft, interbedded Silty CLAY; very fine Sandy SILT; and fine SAND, little Silt.	
15	4D	24/24	15.0 - 17.0	WOR/18"-1	0	0	PUSH			4D: Grey, v. loose, interbedded, Silty fine SAND; very fine Sandy SILT; and Silty CLAY, trace to little very fine Sand.	
								42.0		18.5	
										18.5 ft: Shell fragments in wash water; occasional grinding when roller-coning.	
20	5D	24/24	20.0 - 22.0	WOR/24"	0	0	PUSH			5D: Grey, v. soft, Silty CLAY, with one 1-1/2-inch seam and occasional partings very fine Sandy SILT. ORGANIC MARINE SILT-CLAY	
25											

Remarks:

1. Groundwater level observation well installed in adjacent borehole upon completion of test boring. HB-EXIT45-103 (OW): 3-inch diameter casing to 12.5 ft BGS finished as follows:
filter sand 12.5 to 6.0 ft; 1-inch diameter Sch 40 slotted well screen 12.0 to 7.0 ft; bentonite chip plug 6.0 to 3.0 ft; locking protective casing.

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

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Page 1 of 4

Boring No.: HB-EXIT45-103

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Preliminary Test Borings MeTPK Exit 45 Reconfiguration LOCATION: South Portland, Maine	Boring No.: HB-EXIT45-103 (OW) Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/4/17; 1025-10/6/17; 1340	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed east abutment)	**Casing ID/OD:**	HW to 80.7 ft; NW to 88.5 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	3.3 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V1	24/20	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 233 / 14 psf			OPEN			6D: Grey, Silty CLAY, trace very fine Sand. V1: Tu=8.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		26.6 - 27.0	Su= 261 / 0 psf						V2: Tu=9.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
30	7D V3	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 165 / 0 psf						7D: Grey, SIlty CLAY, with small nodules. V3: Tu=6 / Tr=0 ft-lbs (65 mm x 130 mm vane)	WC=43.4% LL=32.6 PL=22.4 PI=10.2
	V4		31.6 - 32.0	Su= 165 / 14 psf						V4: Tu=6 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
35	U1	24/24	35.0 - 37.0	HYD PUSH						U1: Dark grey with black streaks, Silty CLAY.	2-PT UU TEST
40	8D V5	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 96 / 14 psf						8D: Dark grey with black streaks, Silty CLAY with small nodules throughout. V5: Tu=3.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	WC=46.6% LL=44.4 PL=22.8 PI=21.6
	V6		41.6 - 42.0	Su= 137 / 55 psf						V6: Tu=5 / Tr=2 ft-lbs (65 mm x 130 mm vane) Resistance to push; possible shell fragments.	
45	U2	24/24	45.0 - 47.0	HYD PUSH						U2: Dark grey with black streaks, Silty CLAY with shell fragments.	2-PT UU TEST
50											

Remarks:

1. Groundwater level observation well installed in adjacent borehole upon completion of test boring. HB-EXIT45-103 (OW): 3-inch diameter casing to 12.5 ft BGS finished as follows:
filter sand 12.5 to 6.0 ft; 1-inch diameter Sch 40 slotted well screen 12.0 to 7.0 ft; bentonite chip plug 6.0 to 3.0 ft; locking protective casing.

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

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

Page 2 of 4

Boring No.: HB-EXIT45-103

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Preliminary Test Borings MeTPK Exit 45 Reconfiguration LOCATION: South Portland, Maine	Boring No.: HB-EXIT45-103 (OW) Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/4/17; 1025-10/6/17; 1340	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed east abutment)	**Casing ID/OD:**	HW to 80.7 ft; NW to 88.5 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	3.3 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	9D V7	24/6	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 467 / 14 psf						9D: Dark grey, Silty CLAY with nodules; liquid. V7: Tu=17 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V8		51.6 - 52.0	Su= 481 / 0 psf						V8: Tu=17.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
55	10D V9	24/15	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 604 / 0 psf						10D: Dark grey with black streaks, Silty CLAY with nodules throughout. V9: Tu=22 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V10		56.6 - 57.0	Su= 453 / 0 psf						V10: Tu=16.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
60	U3	24/24	60.0 - 62.0	HYD PUSH						U3: Dark grey with black streaks, Silty CLAY.	CONSOL WC=42.1% LL=37.9 PL=20.3 PI=17.6
65	11D V11	24/18	65.0 - 67.0 65.6 - 66.0	VANE INTERVAL Su= 577 / 0 psf			PUSH			11D: Dark grey, Silty CLAY, with one 1- inch seam of Silty fine SAND. V11: Tu=21 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V12		66.6 - 67.0	Su= 604 / 14 psf						V12: Tu=22 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
								-7.5		68.0	
							--				
							--				
70	12D	24/10	70.0 - 72.0	15-16-9-11	25	25	25			12D: Grey, m. dense, Silty fine to medium SAND, little to some rounded Gravel, trace coarse Sand. TILL	
							28				
							35				
							41				
							57				
75											

Remarks:

1. Groundwater level observation well installed in adjacent borehole upon completion of test boring. HB-EXIT45-103 (OW): 3-inch diameter casing to 12.5 ft BGS finished as follows:
filter sand 12.5 to 6.0 ft; 1-inch diameter Sch 40 slotted well screen 12.0 to 7.0 ft; bentonite chip plug 6.0 to 3.0 ft; locking protective casing.

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-103 (OW) **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/4/17; 1025-10/6/17; 1340	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed east abutment)	**Casing ID/OD:**	HW to 80.7 ft; NW to 88.5 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	3.3 ft (open)

IN-SITU SAMPLING AND TESTING:
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	13D	24/14	75.0 - 77.0	32-21-23-32	44	44	52			13D: Dark grey, dense, fine to medium SAND, some Silt, some Gravel, trace coarse Sand.	
							59				
							128				
							RC			78 ft: Nested cobbles based on drilling behavior.	
80	14D	24/14	80.0 - 82.0	48-46-41-34	87	87	RC			14D: Grey, v. dense, fine to coarse Sandy GRAVEL, little to some Silt.	
										84.3 ft: Boulder; 0.7 ft thick	
85							RC			85 ft: Blowing sands; did not attempt sample.	
	R1	54/52	88.5 - 93.0	RQD: 36" = 67%				-28.0		88.5 ft: Practicable roller cone refusal. 88.5	
										R1: Hard, slightly weathered to fresh, aphanitic to fine grained, medium grey PHYLLITE, with thinly-laminated, typically high-angle relic bedding and carbonate-rich pockets. Moderately spaced, moderately dipping breaks; undulating, rough, shiny, typically fresh, partially open to open, with occasional mud infilling. Moderately weathered and broken from 88.5 to 89.7 feet. Core times: 2:05/ 1:40/ 1:35/ 1:30/ -- min:sec/ft FAIR ROCK QUALITY	
90				test: 89.7-90.3							UCT qp= 0.89 ksi
	R2	60/58	93.0 - 98.0	RQD: 31" = 52%						R2: Same as R1. Moderately weathered and broken from 93.1 to 94.0 feet. Core times: 1:50/ 1:35/ 1:30/ 1:45/ 1:45 min:sec/ft POOR TO FAIR ROCK QUALITY	
95											
								-37.5		98.0 **Bottom of Exploration at 98.0 feet below ground surface.**	
100											

Remarks:

1. Groundwater level observation well installed in adjacent borehole upon completion of test boring. HB-EXIT45-103 (OW): 3-inch diameter casing to 12.5 ft BGS finished as follows:
filter sand 12.5 to 6.0 ft; 1-inch diameter Sch 40 slotted well screen 12.0 to 7.0 ft; bentonite chip plug 6.0 to 3.0 ft; locking protective casing.

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Boring No.: HB-EXIT45-103

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings
MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-104
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	61 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/11/17; 0700-1630	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB off ramp)	**Casing ID/OD:**	HW to 60 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/15	2.0 - 4.0	3-5-9-13	14	14				1D: Brown tan, damp to moist, m. dense, fine to medium SAND, trace to little Silt, trace coarse Sand. GRANULAR FILL	
								56.5		4.5	
5	2D	24/13	5.0 - 7.0	2-3-7-8	10	10	PUSH			2D: Olive brown grey, mottled, moist (tight), stiff, SILT & CLAY, little fine Sand; appears disturbed. MISCELLANEOUS FILL Changing at 6.8 ft to:	
							--				
							35	54.2		6.8 — 6.8 ft: Grey, fine SAND, some Silt; appears undisturbed. INTERBEDDED MARINE SANDS AND SILTS	
							39	52.5		8.5	
							38				
10	3D	24/24	10.0 - 12.0	5-3-3-3	6	6	38			3D: Olive brown, mottled, moist (tight), m. stiff, SILT & CLAY, trace fine Sand, with pockets and partings fine Sandy SILT. MARINE SILT-CLAY CRUST	
							30				
							31				
							30				
							28				
15	4D	24/21	15.0 - 17.0	WOH/24"	0	0	39			4D: Grey, v. soft, CLAY & SILT, trace very fine Sand.	
							33	45.0		16.0	
							30				
							30				
							30				
20	5D	24/24	20.0 - 22.0	WOR/24"	0	0	PUSH			5D: Grey with darker grey streaks, Silty CLAY, trace fine Sand and nodules throughout. ORGANIC MARINE SILT-CLAY	
25											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-104 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	61 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/11/17; 0700-1630	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB off ramp)	**Casing ID/OD:**	HW to 60 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

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MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V1	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 330 / 14 psf			PUSH			6D: Dark grey with black streaks, Silty CLAY with nodules and shell fragments throughout. V1: Tu=12 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		26.6 - 27.0	Su= 357 / 14 psf						V2: Tu=13 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
30	7D V3	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 398 / 14 psf			PUSH			7D: Dark grey with black streaks, Silty CLAY with nodules throughout. V3: Tu=14.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	WC=51.2% LL=49.1 PL=25.3 PI=23.8
	V4		31.6 - 32.0	Su= 385 / 0 psf						V4: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
35	8D V5	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 440 / 14 psf			PUSH			8D: Dark grey with black streaks, Silty CLAY with nodules throughout. V5: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V6		36.6 - 37.0	Su= 467 / 0 psf						V6: Tu=17 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
40	U1	24/23	40.0 - 42.0	HYD PUSH			PUSH			U1: Dark grey with black, Silty CLAY.	
45							PUSH			45.0 ft: Skip vane test this depth. Piston sampler slipped and disturbed vane shear test depth.	
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-104 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	61 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/11/17; 0700-1630	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB off ramp)	**Casing ID/OD:**	HW to 60 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	V7		50.6 - 51.0	Su= 549 / 27 psf			PUSH			V7: Tu=20 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V8		51.6 - 52.0	Su= 494 / 14 psf						V8: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
55	U2	16/16	55.0 - 56.3	HYD PUSH			40			U2: (Tube not extend fully. Large piece rounded Gravel in bottom of tube. Material in bottom of tube: Grey, Silty fine to medium SAND.)	
	9D	24/16	56.0 - 58.0	9-9-10-11	a		35	5.0		56.0 9D: Grey, Silty fine to medium SAND, some Gravel, trace coarse Sand; one piece coarse gravel. TILL (a = 3-inch dia. spoon)	
							35				
							70				
							90				
60								1.0		60.0 **Bottom of Exploration at 60.0 feet below ground surface.** No refusal.	
65											
70											
75											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings
MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-105
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	58 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/12/17; 0800-1410	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB on ramp / toll plaza)	**Casing ID/OD:**	HW to 42 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/8	1.0 - 3.0	4-3-1-1	4	4				1D: Brown, moist, v. loose, fine to coarse SAND, some Gravel, some Silt. FILL	
								54.0		4.0	
5	2D	24/22	5.0 - 7.0	2-3-4-5	7	7	24			2D: Olive brown, mottled and desiccated, damp (tight), m. stiff, Clayey SILT, little very fine Sand as numerous partings and seams. MARINE SILT-CLAY CRUST	
							30				
							37				
							46				
							52				
10	3D	24/20	10.0 - 12.0	2-3-2-3	5	5	42			3D: Olive brown grey, moist (tight), m. stiff CLAY & SILT, trace very fine Sand as few partings.	
							38	47.0		11.0	
							38				
							36				
							36				
15	4D	24/21	15.0 - 17.0	WOR/12"-WOH/12"	0	0	PUSH			4D: Dark grey with black pockets, v. soft, Silty CLAY with two partings very fine Sandy SILT. ORGANIC MARINE SILT-CLAY	
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 330 / 14 psf			PUSH			5D: Dark grey, Silty CLAY with nodules throughout. V1: Tu=12 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		21.6 - 22.0	Su= 412 / 0 psf						V2: Tu=15 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
25											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-105 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	58 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/12/17; 0800-1410	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB on ramp / toll plaza)	**Casing ID/OD:**	HW to 42 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V3	24/16	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 371 / 14 psf			PUSH			6D: Dark grey, Silty CLAY with nodules throughout. V3: Tu=13.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V4		26.6 - 27.0	Su= 385 / 0 psf						V4: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
30	U1	24/23	30.0 - 32.0	HYD PUSH			PUSH			U1: Dark grey with black laminations, Silty CLAY.	2-PT UU TEST
35	7D V5	24/18	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 412 / 27 psf			PUSH			7D: Dark grey with black streaks, Silty CLAY with numerous nodules. V5: Tu=15 / Tr=1 ft-lbs (65 mm x 130 mm vane)	WC=41.8% LL=40.0 PL=20.5 PI=19.5
	V6		36.6 - 37.0	Su= 426 / 14 psf						V6: Tu=15.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
										V7: Tu=16 / Tr=0 ft-lbs (65 mm x 130 mm vane) Unable to push past 40.8 ft.	
40	8D V7	24/24	40.0 - 42.0 40.4 - 40.8	VANE-2-6-1 Su= 440 / 0 psf	a		30	17.2		Dark grey, Silty CLAY with numerous nodules and few concretions; changing at 40.8 ft to: 40.8	
							32			40.8 ft: Dark grey, medium to coarse SAND, little to some fine Gravel, trace to little Silt, trace fine Sand; changing at 41.0 ft to:	
							RC	15.0		41.0 ft: 8D: Grey, Silty fine to medium SAND, little to some fine Gravel. TILL (a = 3-inch dia. spoon) 42.0 ft: Abrupt split spoon and casing refusal; drilling behavior suggest possible weathered rock. 43.0	
45										**Bottom of Exploration at 43.0 feet below ground surface.** Practicable refusal of roller cone.	
50											

Remarks:

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

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

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Boring No.: HB-EXIT45-105

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings MeTPK Exit 45 Reconfiguration		**Boring No.:** HB-EXIT45-106
LOCATION: South Portland, Maine		**Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	57 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/17/17; 0845-1615	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB off ramp)	**Casing ID/OD:**	HW to 45 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA			Low wet area; thick topsoil/root mat	
	1D	24/19	2.0 - 4.0	4-5-6-8	11	11				1D: Olive brown, slightly mottled with desiccated pockets, stiff, SILT & CLAY, trace to little fine Sand as pockets and partings. MARINE SILT-CLAY CRUST	
5	2D	24/20	5.0 - 7.0	2-4-4-5	8	8	22			2D: Olive brown, slightly mottled, m. stiff, CLAY & SILT, trace fine Sand as partings.	
							38				
							40				
							40				
							37				
10	3D	24/24	10.0 - 12.0	WOH/24"	0	0	22	46.0		3D: Olive grey grading to dark grey with black streaks, v. soft, CLAY & SILT grading to Silty CLAY with one parting Silty fine SAND. Transition to: ORGANIC MARINE SILT-CLAY —11.0—	
							20				
							20				
							21				
							20				
15	4D V1	24/9	15.0 - 17.0 15.6 - 16.0	VANE INTERVAL Su= 522 / 27 psf			PUSH			4D: Dark grey, Silty CLAY. V1: Tu=19 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V2		16.6 - 17.0	Su= 549 / 0 psf						V2: Tu=20 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
20	5D V3	24/20	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 357 / 0 psf			PUSH			5D: Dark grey with black, Silty CLAY with nodules throughout. V3: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V4		21.6 - 22.0	Su= 343 / 0 psf						V4: Tu=12.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
25											

Remarks:

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

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

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Boring No.: HB-EXIT45-106

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Preliminary Test Borings MeTPK Exit 45 Reconfiguration
LOCATION: South Portland, Maine

Boring No.: HB-EXIT45-106
Proj. No.: 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	57 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/17/17; 0845-1615	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB off ramp)	**Casing ID/OD:**	HW to 45 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U1	24/23	25.0 - 27.0	HYD PUSH			PUSH			U1: Dark grey with black, Silty CLAY with shell fragments.	CONSOL WC=48.4% LL=46.4 PL=22.2 PI=24.2
30	6D V5	24/6	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 385 / 0 psf			PUSH			6D: Dark grey, Silty CLAY with nodules throughout. V5: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V6		31.6 - 32.0	Su= 343 / 0 psf						V6: Tu=12.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
35	7D V7	24/18	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 412 / 0 psf			PUSH			7D: Dark grey, Silty CLAY with nodules throughout. V7: Tu=15 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V8		36.6 - 37.0	Su= 357 / 0 psf						V8: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
40	U2	24/24	40.0 - 42.0	HYD PUSH			PUSH			U2: Dark grey, Silty CLAY, trace fine Sand.	CONSOL WC=36.8% LL=36.2 PL=19.2 PI=17.0
45	8D	24/7	45.0 - 47.0	13-6-3-3	9	9	RC	12.2		44.8 8D: Dark grey, fine to medium Sandy SILT, little to some Gravel, trace coarse Sand. TILL (Behavior during SPT suggests seams of soft silt-clay present.)	
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-106 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	57 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/17/17; 0845-1615	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed SB off ramp)	**Casing ID/OD:**	HW to 45 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	9D	24/7	50.0 - 52.0	15-11-14-9	25	25				9D: Dark grey, m. dense, GRAVEL, some fine to coarse Sand, trace to little Silt.	
								5.0		52.0	
										Bottom of Exploration at 52.0 feet below ground surface. No refusal.	
55											
60											
65											
70											
75											

Remarks:

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

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

Page 3 of 3

Boring No.: HB-EXIT45-106

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-107 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/13/17; 0940-10/16/17; 1800	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB on ramp)	**Casing ID/OD:**	HW to 45 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/16	1.0 - 3.0	4-4-4-5	8	8				1D: Olive tan, mottled and desiccated, dry, m. stiff, SILT & CLAY, little to some fine Sand, with roots.	
5	2D	24/16	5.0 - 7.0	6-10-12-15	22	22	52			2D: Olive brown, mottled, damp, v. stiff, SILT & CLAY, trace to little fine Sand.	
							80				
							85				
							85				
							84				
10	3D	24/18	10.0 - 12.0	3-4-5-4	9	9	52			3D: Olive brown, mottled, damp, stiff, Clayey SILT, trace fine Sand as numerous partings.	
							58				
							65				
							70				
							85				
15	4D	24/24	15.0 - 17.0	WOR/24"	0	0	PUSH	45.0		14.9 ft: Olive-brown, silt-clay on roller cone. 15.0 4D: Dark grey with black pockets, Silty CLAY, trace fine Sand. (Olive brown, silt-clay at top of sample.)	
20	5D V1	24/19	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 453 / 27 psf			PUSH			5D: Dark grey with black streaks, Silty CLAY, trace fine Sand. V1: Tu=16.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V2		21.6 - 22.0	Su= 440 / 27 psf						V2: Tu=16 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
25											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Preliminary Test Borings MeTPK Exit 45 Reconfiguration **LOCATION:** South Portland, Maine	**Boring No.:** HB-EXIT45-107 **Proj. No.:** 17-028

Driller:	New England Boring Contractors	**Elevation (ft.)**	60 (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer / Titus	**Datum:**		**Sampler:**	std split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-51 (track mounted)	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	10/13/17; 0940-10/16/17; 1800	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	see plot (proposed NB on ramp)	**Casing ID/OD:**	HW to 45 ft	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5 ft	**Water Level*:**	--

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines   WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V3	24/22	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 508 / 27 psf			PUSH			6D: Dark grey with black streaks, Silty CLAY. V3: Tu=18.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V4		26.6 - 27.0	Su= 385 / 27 psf						V4: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
30	U1	24/24	30.0 - 32.0	HYD PUSH						U1: Dark grey, Silty CLAY.	2-PT UU TEST
35	7D V5	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 440 / 55 psf			PUSH			7D: Dark grey, Silty CLAY, trace very fine Sand. V5: Tu=16 / Tr=2 ft-lbs (65 mm x 130 mm vane)	WC=43.7% LL=37.8 PL=20.6 PI=17.2
	V6		36.6 - 37.0	Su= 440 / 27 psf						V6: Tu=16 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
										V7: Tu=19 / Tr=2 ft-lbs (65 mm x 130 mm vane) MV: Unable to push vane past 41.4 ft. Dark grey, Silty CLAY, trace fine Sand; grading at 41.6 ft:	
40	8D V7	24/24	40.0 - 42.0 40.6 - 41.0	VANE-WOR-8 Su= 522 / 55 psf	a		72				
							52	18.4		41.6 8D: Grey, SILT, some fine to medium Sand, some Gravel, interbedded with layers of Silty CLAY. Possible transition to TILL (a = VANE INTERVAL 40 to 41.1 ft)	
							52				
							50				
							52				
45	9D	24/12	45.0 - 47.0	10-6-8-13	14	14				9D: Grey, m. dense, fine to medium SAND, little to some Silt, trace to little Gravel, trace coarse Sand. TILL	
								13.0		47.0 **Bottom of Exploration at 47.0 feet below ground surface.** No refusal.	
50											

Remarks:

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

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

Page 2 of 2

Boring No.: HB-EXIT45-107

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

PHOTOGRAPHS OF ROCK CORE OBTAINED IN PRELIMINARY SUBSURFACE EXPLORATIONS

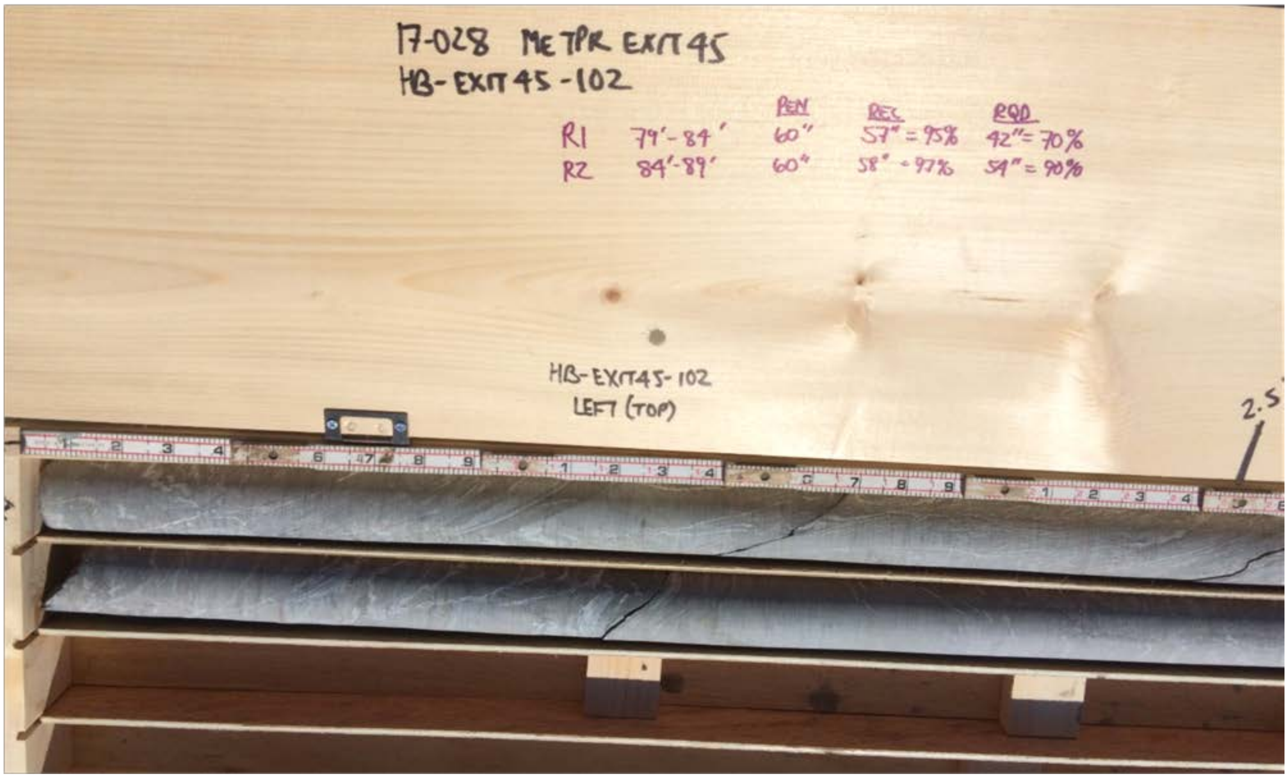


Photo 1: Core box containing dried rock core from test boring HB-EXIT45-102 left side of core box (top portion of cores).
Slots from top to bottom:
1) HB-EXIT45-102, R1
2) HB-EXIT45-102, R2.

Photo 2: Core box containing dried rock core from test boring HB-EXIT45-102 – right side of core box (bottom portion of cores).
Slots from top to bottom
1) HB-EXIT45-102, R1
2) HB-EXIT45-102, R2.

SCHONEWALD ENGINEERING ASSOCIATES, INC.

ROCK CORE PHOTOGRAPHS
TEST BORING HB-EXIT45-102
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND, MAINE

Sheet No.:
1 of 2

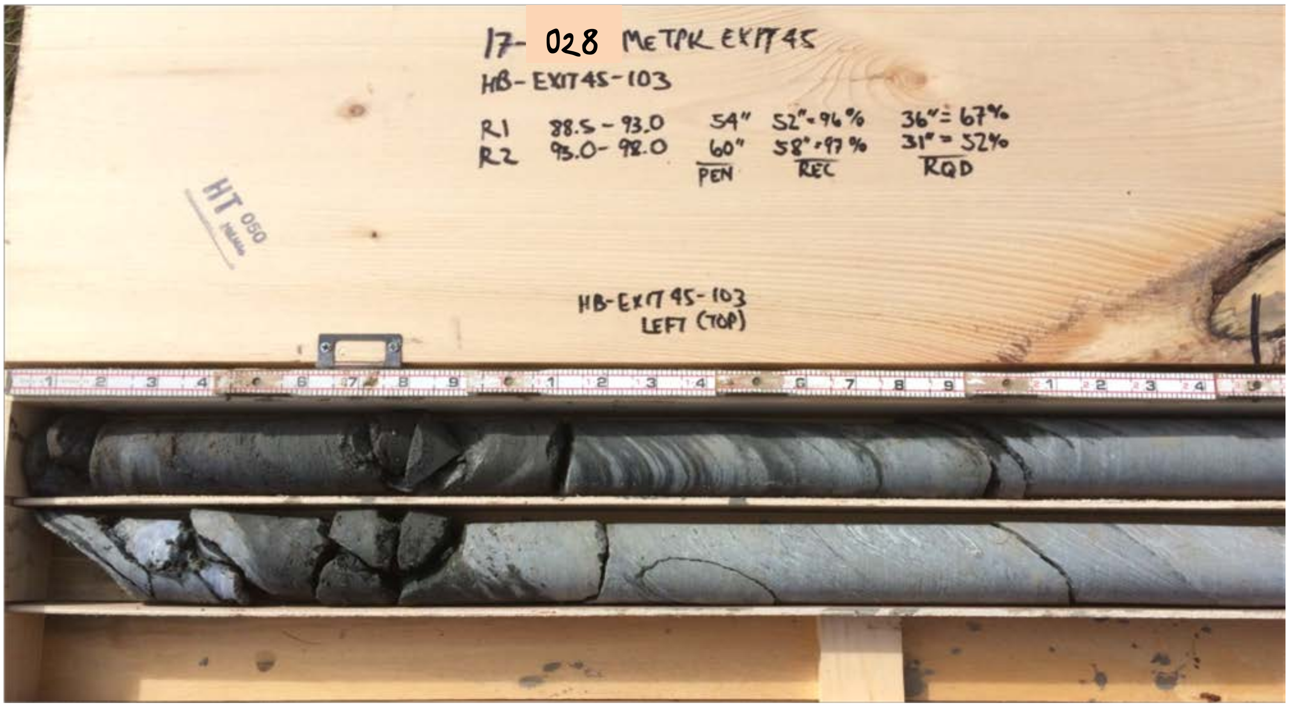


Photo 1: Core box containing dried rock core from test boring HB-EXIT45-103 left side of core box (top portion of cores).
Slots from top to bottom:
1) HB-EXIT45-103, R1
2) HB-EXIT45-103, R2.

Photo 2: Core box containing dried rock core from test boring HB-EXIT45-103 – right side of core box (bottom portion of cores).
Slots from top to bottom
1) HB-EXIT45-103, R1
2) HB-EXIT45-103, R2.

SCHONEWALD ENGINEERING ASSOCIATES, INC.

ROCK CORE PHOTOGRAPHS
TEST BORING HB-EXIT45-103
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND, MAINE

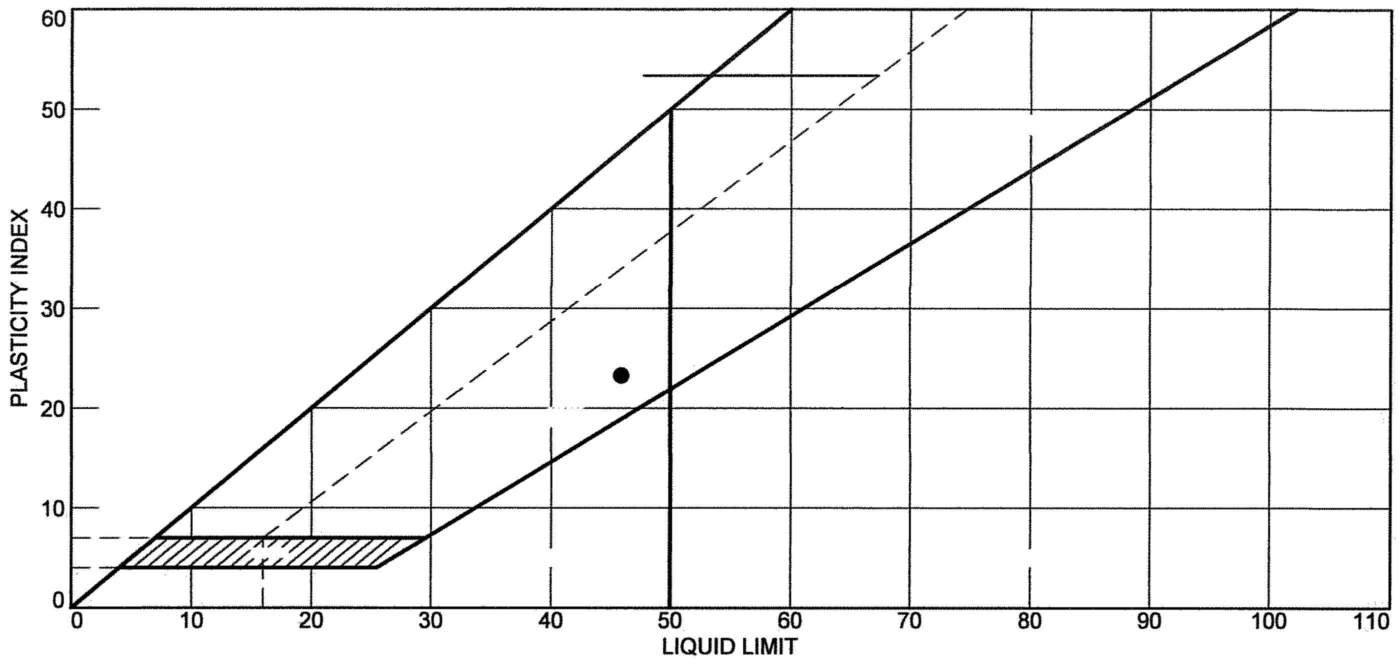
Sheet No.:

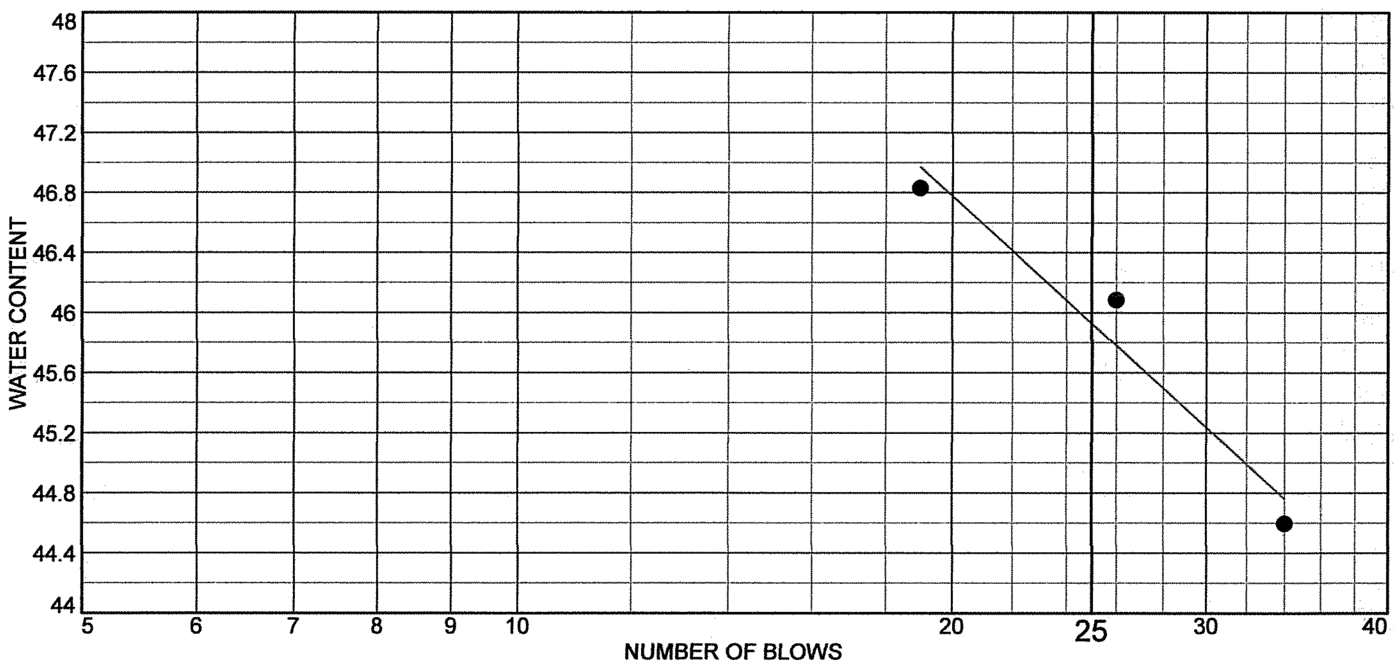
2 of 2

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

RWG&A: RESULTS OF ATTERBERG LIMITS LABORATORY INDEX TESTS ON SOIL SAMPLES

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	45.9	22.6	23.3			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-101
Sample Number: 12D **Depth:** 60'-62'

R.W. Gillespie & Associates, Inc.

Saco, Maine

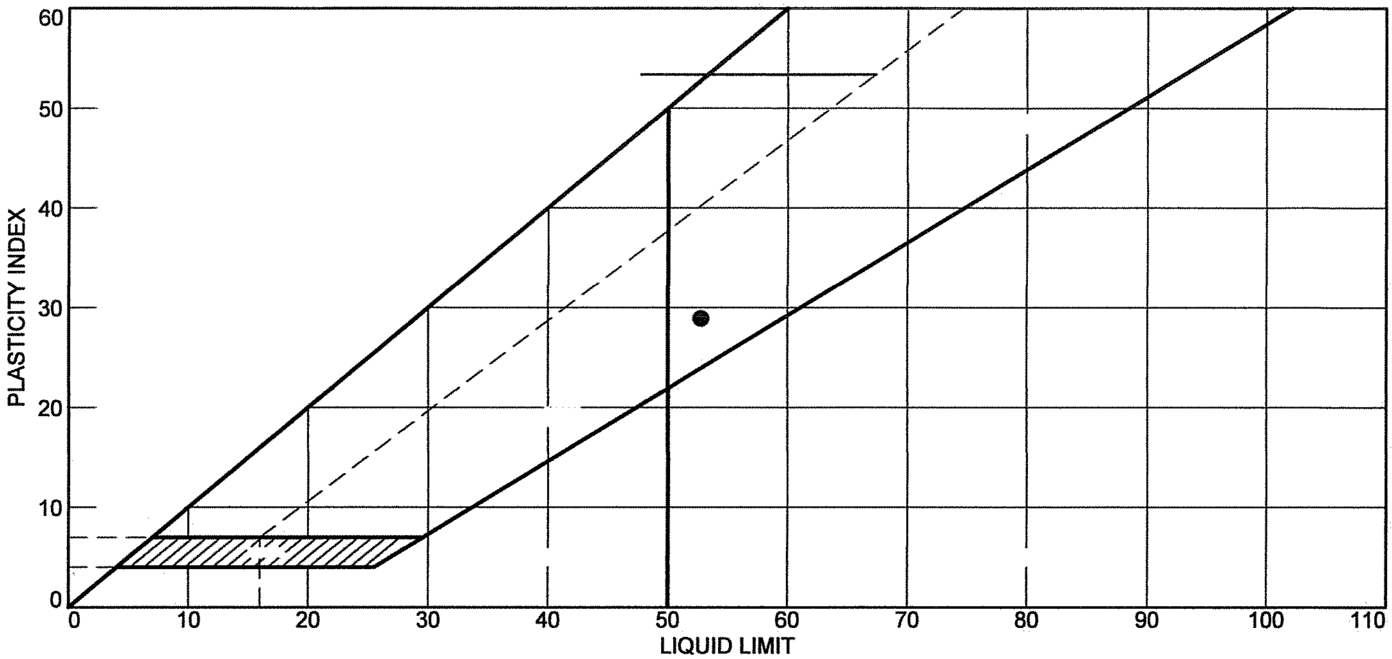
Remarks:
● Natural Moisture: 45.8%

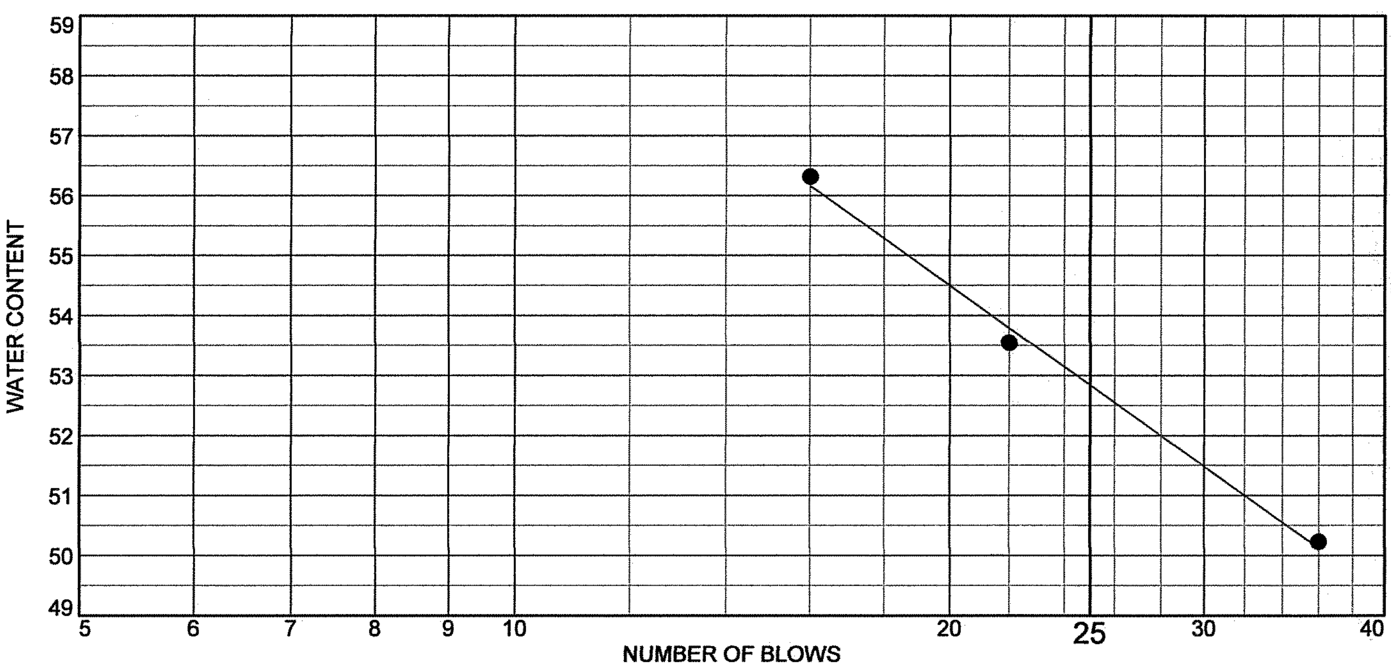
Lab No. 14779a

Tested By: AGS **Checked By:** ~~JB~~ MTG

MB

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	52.8	23.9	28.9			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-101
Sample Number: 13D **Depth:** 65'-67'

R.W. Gillespie & Associates, Inc.

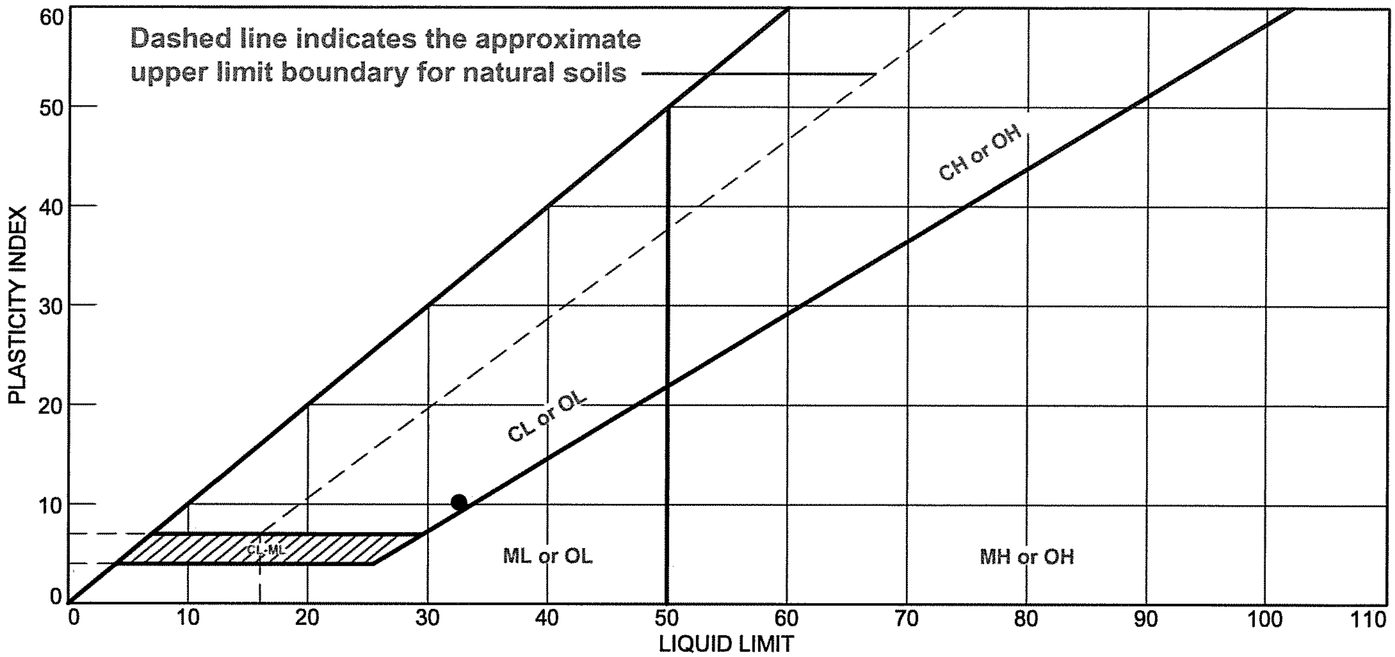
Saco, Maine

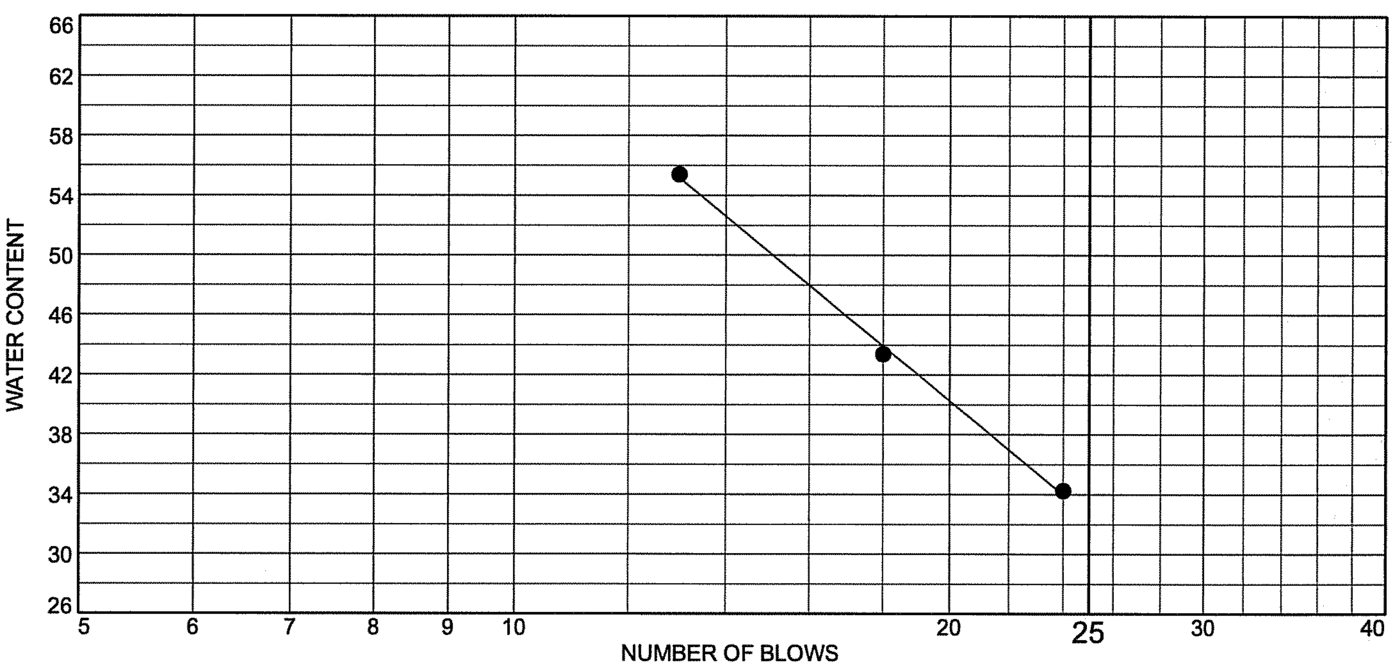
Remarks:
● Moisture Content: 50.6%

Lab No. 14779b

Tested By: AGS **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	32.6	22.4	10.2			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103
Sample Number: 7D **Depth:** 30'-32'

R.W. Gillespie & Associates, Inc.

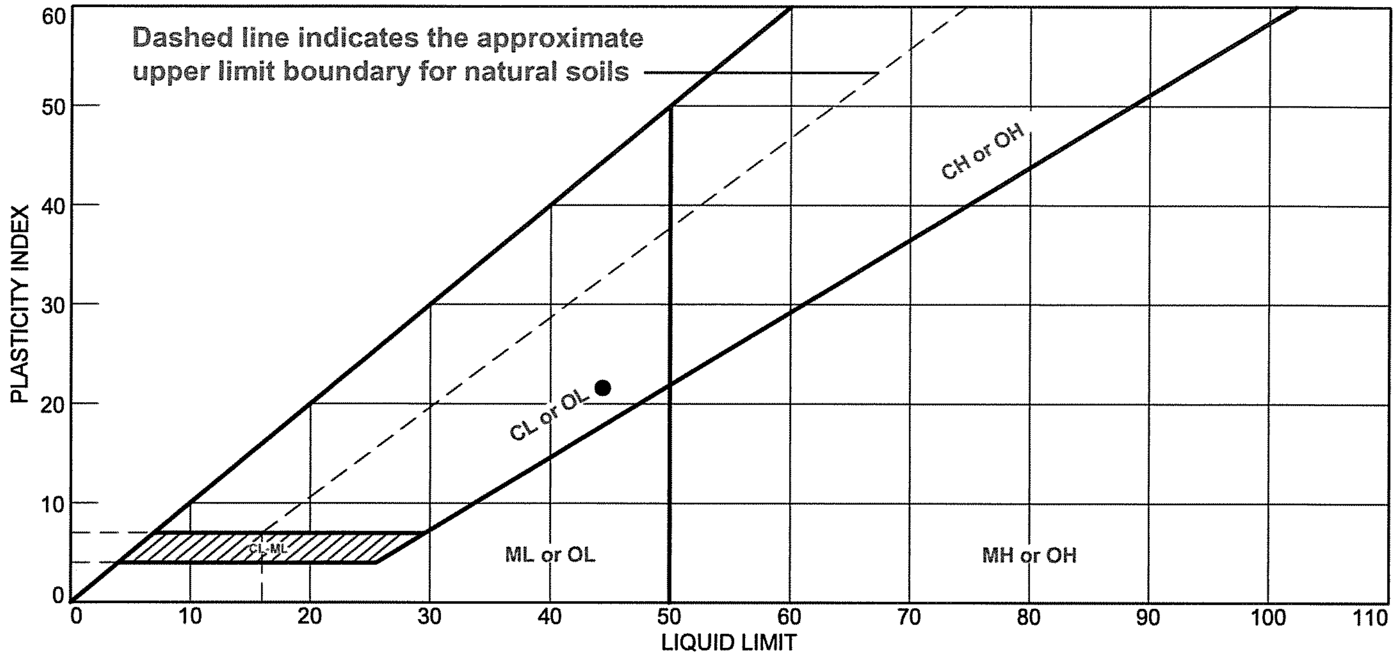
Saco, Maine

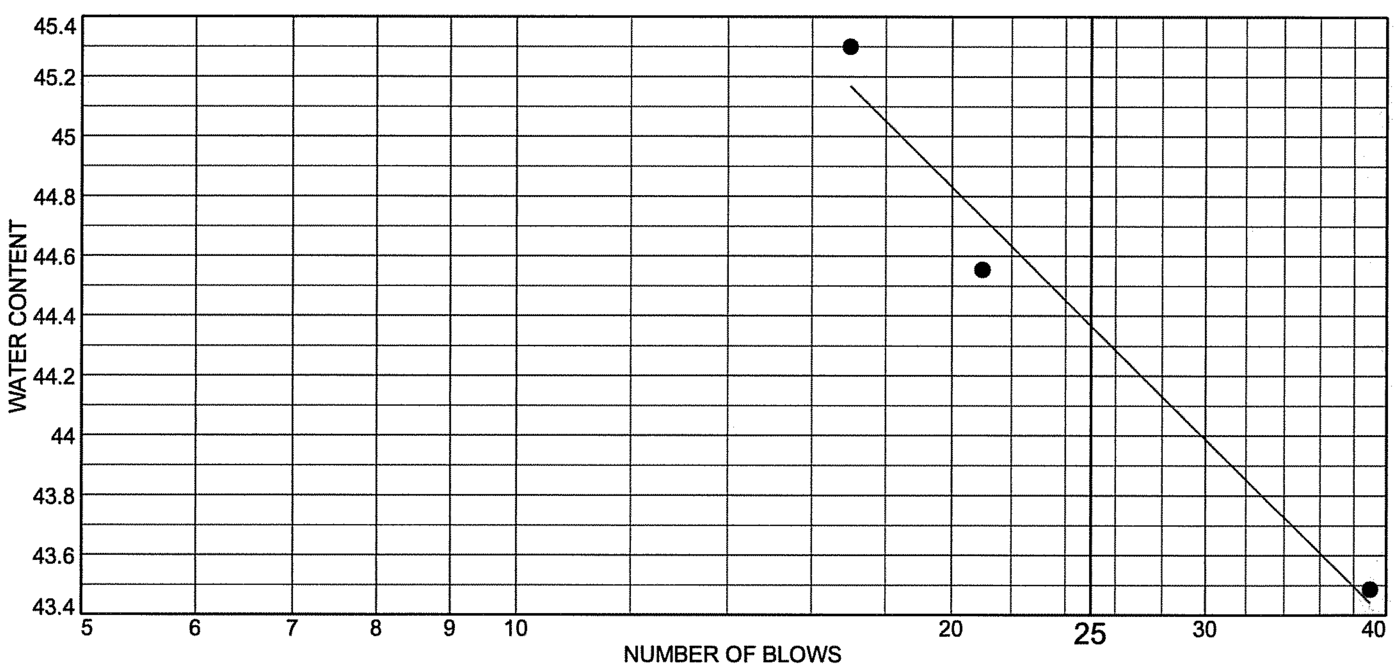
Remarks:
● Natural Moisture Content: 43.4%

Lab No. 14780a

Tested By: AGS **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	44.4	22.8	21.6			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103

Sample Number: 8D **Depth:** 40'-42'

R.W. Gillespie & Associates, Inc.

Saco, Maine

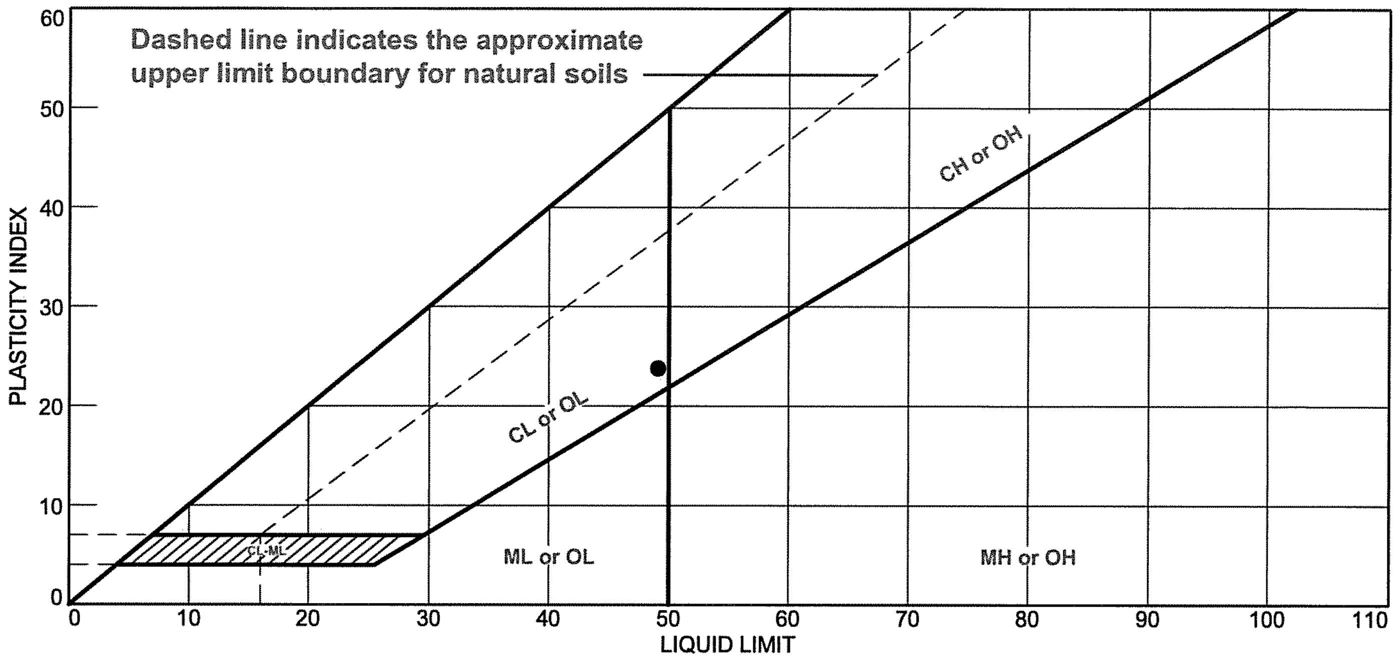
Remarks:

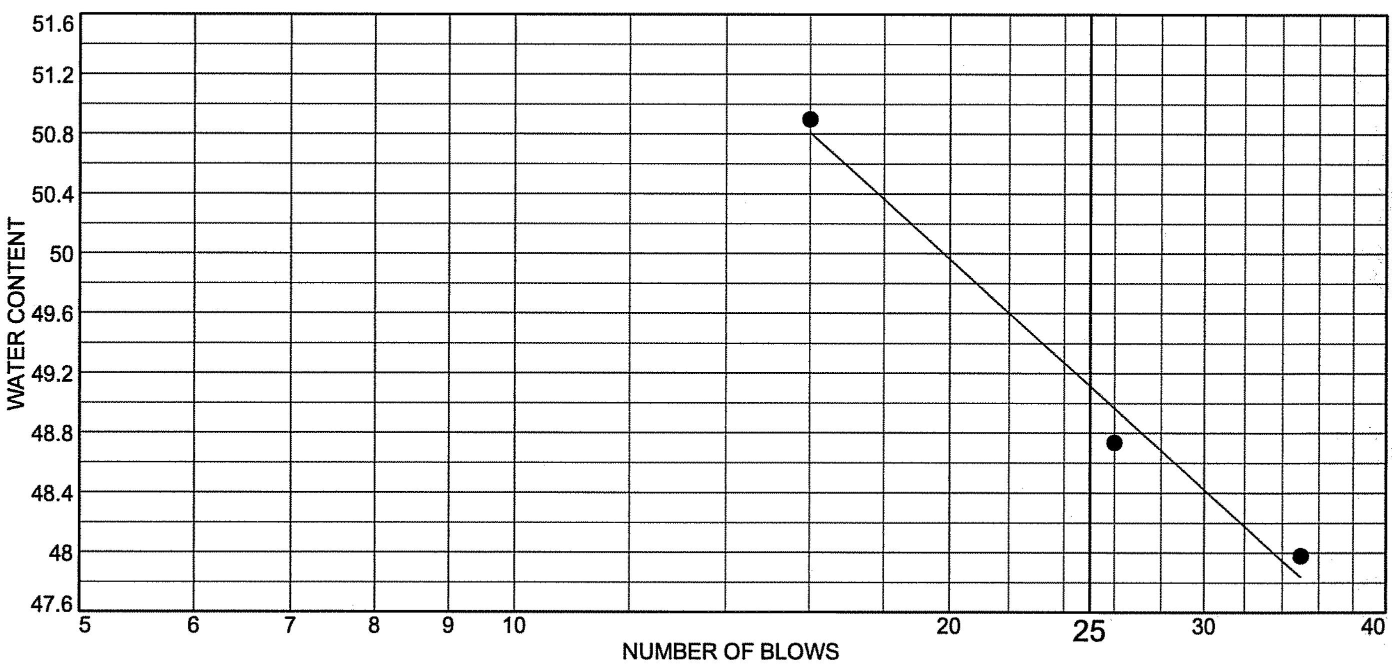
● Natural Moisture Content: 46.6%

Lab No. 14780b

Tested By: AGS **Checked By:** MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	49.1	25.3	23.8			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-104
Sample Number: 7D **Depth:** 30'-32'

R.W. Gillespie & Associates, Inc.

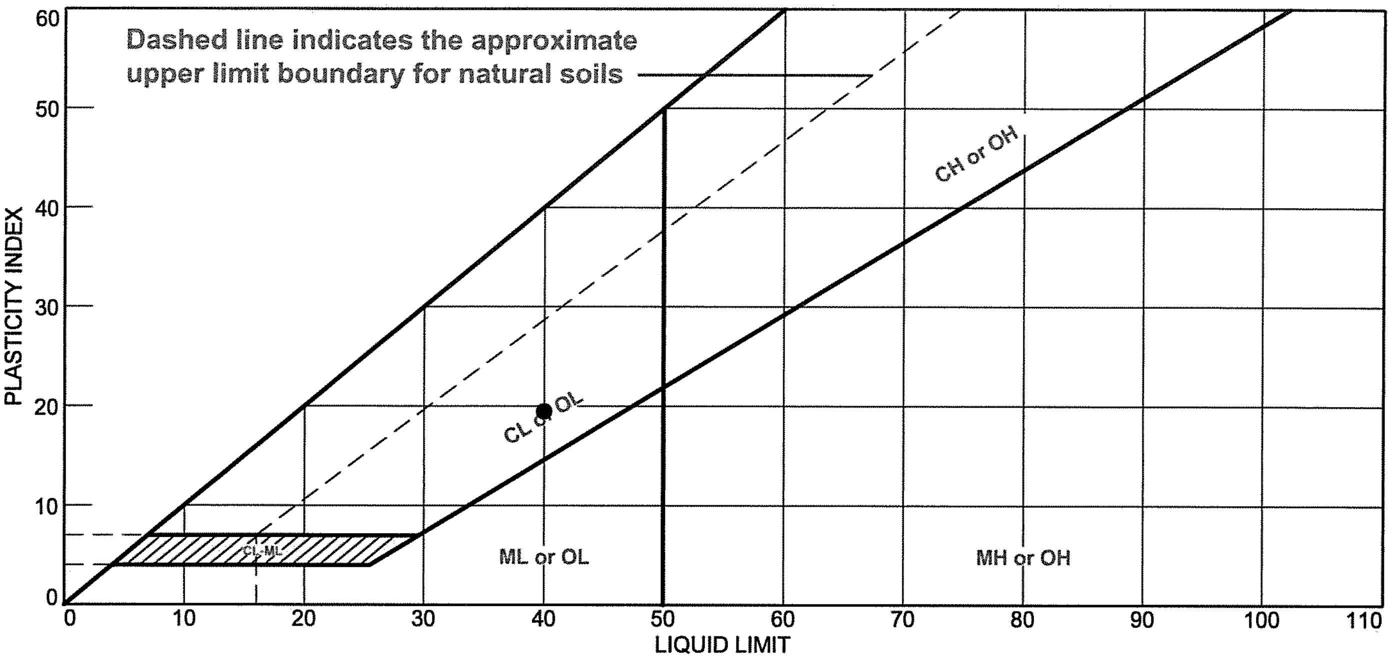
Saco, Maine

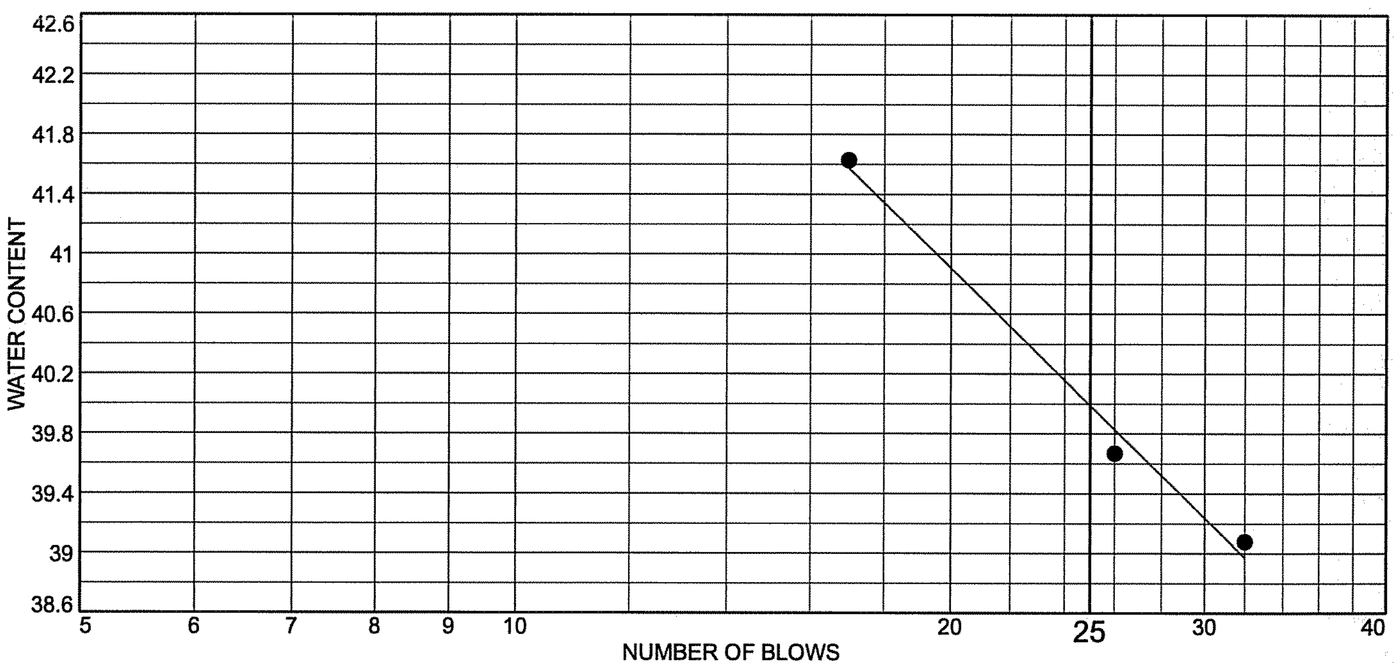
Remarks:
● Natural Moisture Content: 51.2%

Lab No. 14781

Tested By: AGS **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	40.0	20.5	19.5			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-105
Sample Number: 7D **Depth:** 35'-37'

R.W. Gillespie & Associates, Inc.

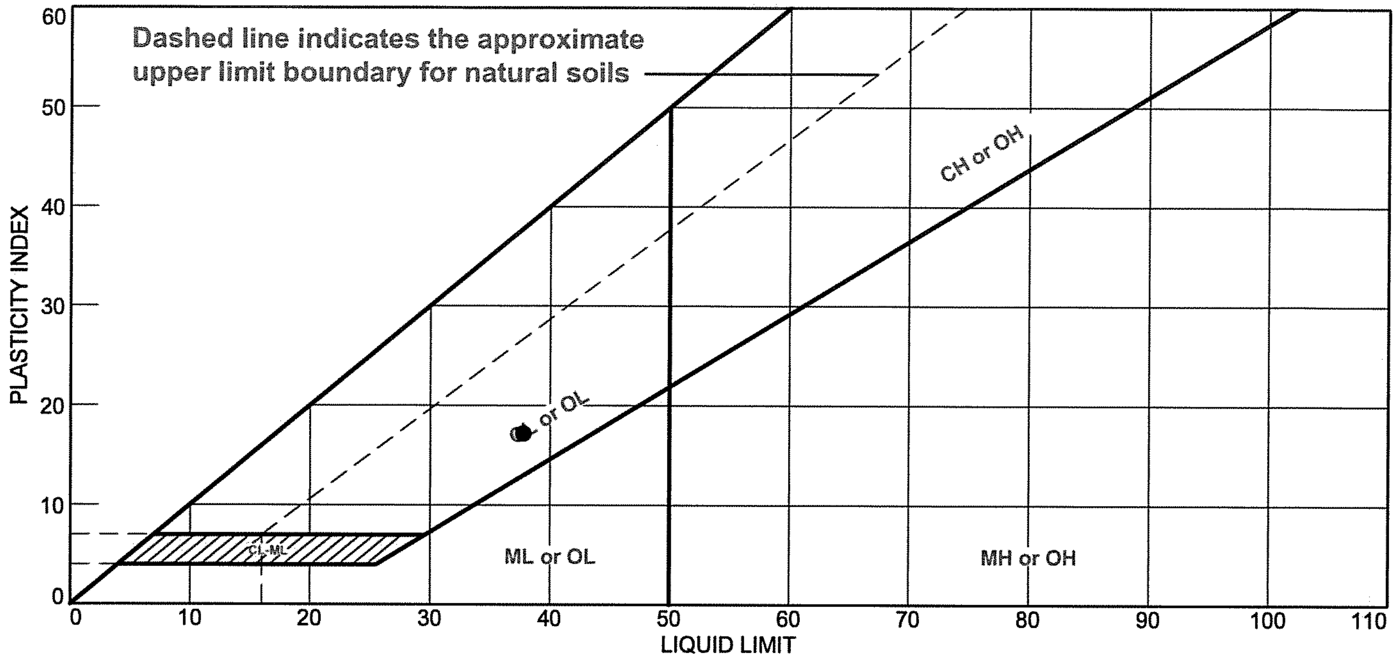
Saco, Maine

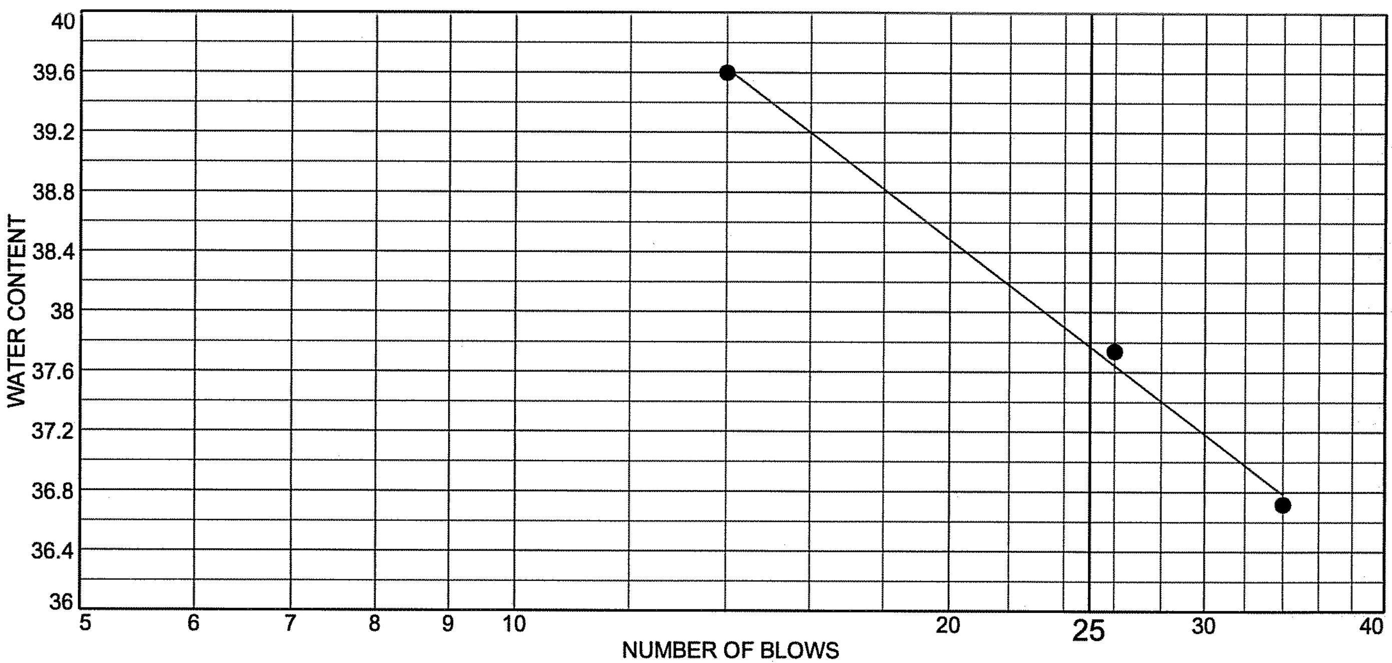
Remarks:
● Natural Moisture: 41.8%

Lab No. 14782

Tested By: AGS, JJB **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	37.8	20.6	17.2			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-107
Sample Number: 7D **Depth:** 35'-37'

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:
● Natural Moisture: 43.7%

Lab No. 14783

Tested By: AGS, JJB **Checked By:** MTG MTG

R. W. Gillespie & Associates, Inc.
86 Industrial Park Road, Suite 4, Saco, ME 04072 207-286-8008
177 Shattuck Way, Suite 1 West, Newington NH 03801 603-427-0244
44 Wood Avenue, Suite I, Mansfield, MA 508-623-0101

LETTER OF TRANSMITTAL

Date:	Project No.:
November 30, 2017	1368-009

Attention:
Isabel V. (Be) Schonewald, P.E. (Be@schonewaldengineering.co

Re:
Laboratory Testing
MTA Exit 45 Reconfiguration
South Portland, Maine

Schonewald Engineering Associates, Inc.
129 Middle Road
Cumberland, ME 04021

We are sending you attached Laboratory Test Results.

Laboratory No. (s)	Test (s) Performed
14779a & 14779b	Liquid and Plastic Limits
14780a & 14780b	Liquid and Plastic Limits
14781	Liquid and Plastic Limits
14782	Liquid and Plastic Limits
14783	Liquid and Plastic Limits

Remarks:

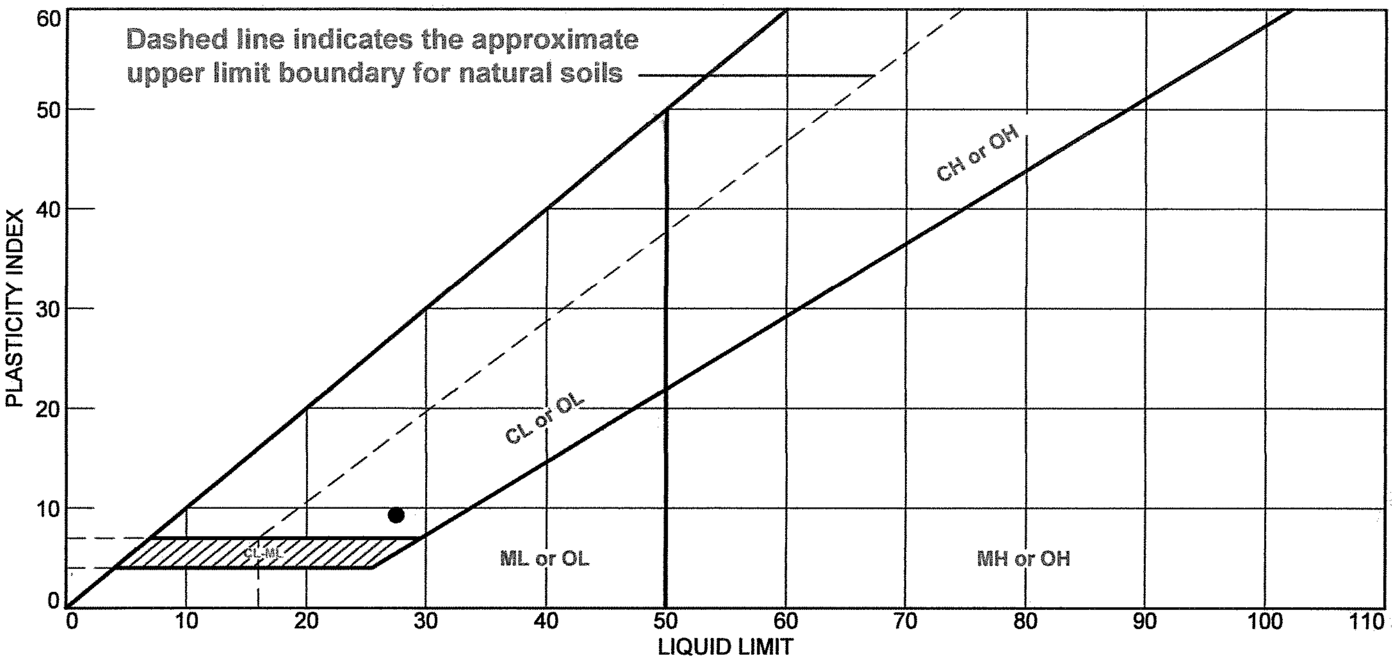
Copy to:

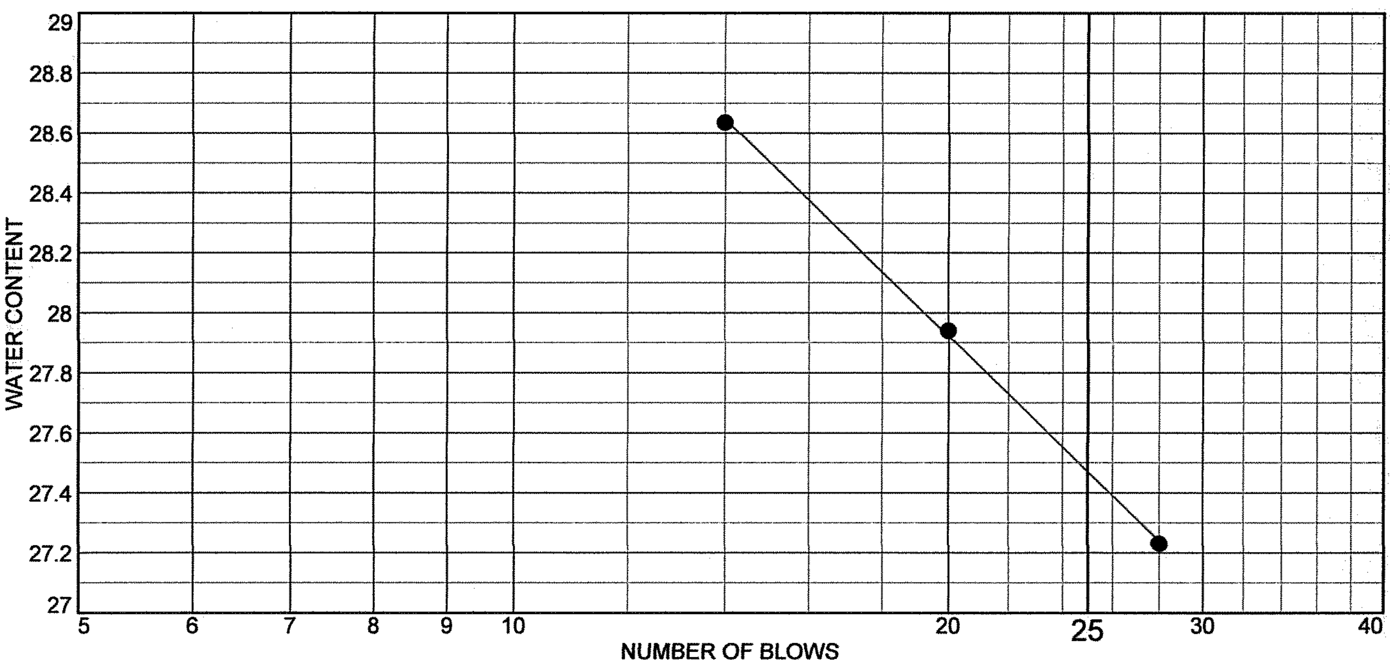
If enclosures are not noted, kindly notify us at once.

G:\PROJECTS\1300\1368\1368-009-17 MTA Exit 45\1368-009 TRANSMITTAL MASTERS.XLS

RWG&A: RESULTS OF CONSOLIDATION AND ATTERBERG LIMITS LABORATORY TESTS ON UNDISTURBED SOIL SAMPLES

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	27.5	18.2	9.3			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME

Sample Number: U-1 **Depth:** 35'-37'

R.W. Gillespie & Associates, Inc.

Saco, Maine

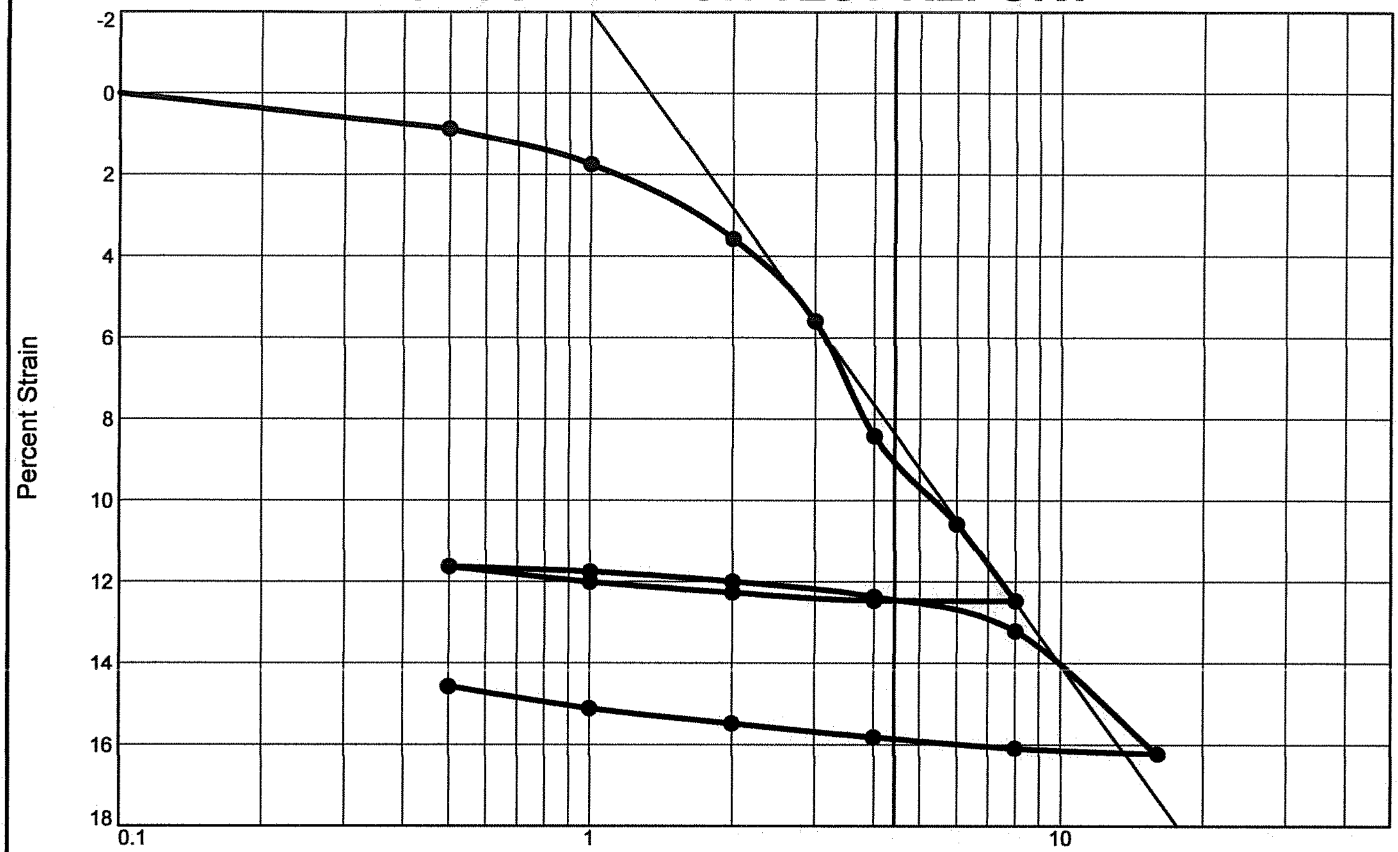
Remarks:

●Natural Moisture: 41.0%

Lab No. 14784a

Tested By: AGS, JJB **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation											
No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α
1	0.50	0.913		8	4.00	5.656		15	8.00	3.020	
2	1.00	1.260		9	2.00	2.442		16	16.00	1.096	
3	2.00	1.003		10	1.00	1.156		17	8.00	8.014	
4	3.00	0.264		11	0.50	0.654		18	4.00	3.467	
5	4.00	0.219		12	1.00	2.961		19	2.00	2.037	
6	6.00	0.471		13	2.00	2.715		20	1.00	0.669	
7	8.00	0.454		14	4.00	3.275		21	0.50	0.328	

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
108.9 %	42.9 %	80.6	27.5	9.3	2.77		5.3	0.34	0.06			1.090

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample No.:** U-1

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:

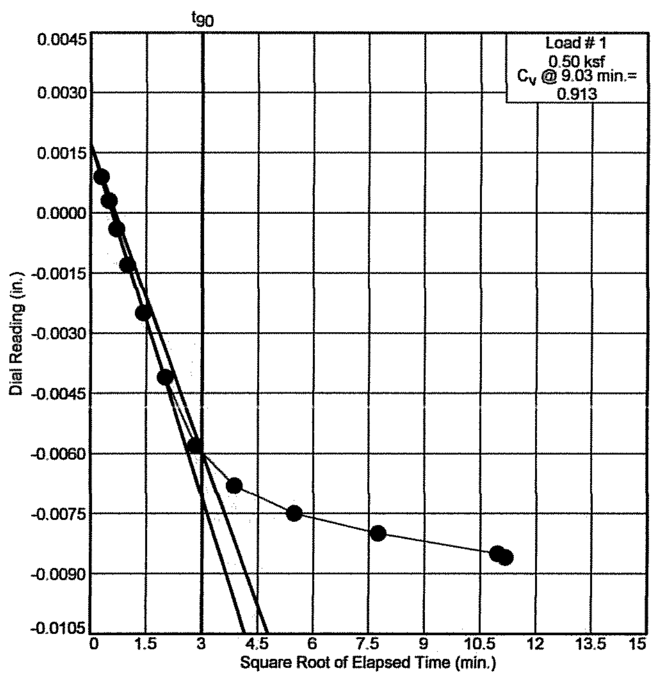
Lab No. 14784a

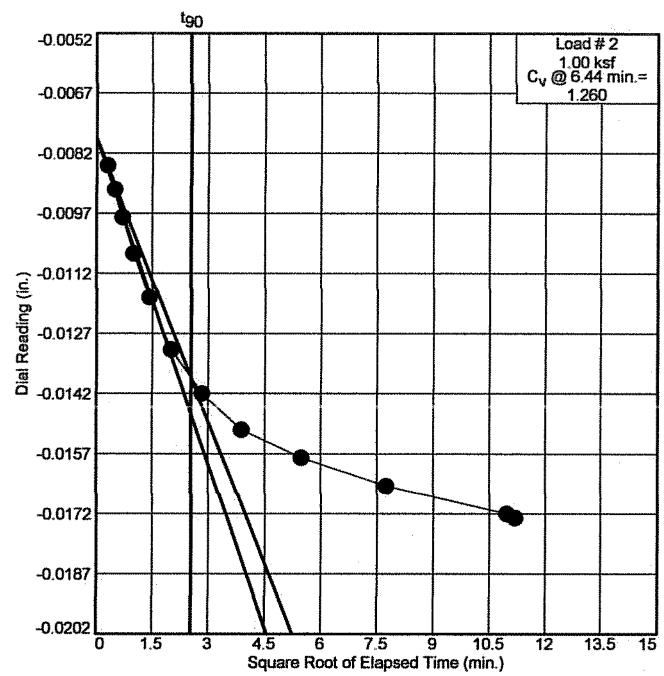
Tested By: JRF/AGS **Checked By:** MTG MTG

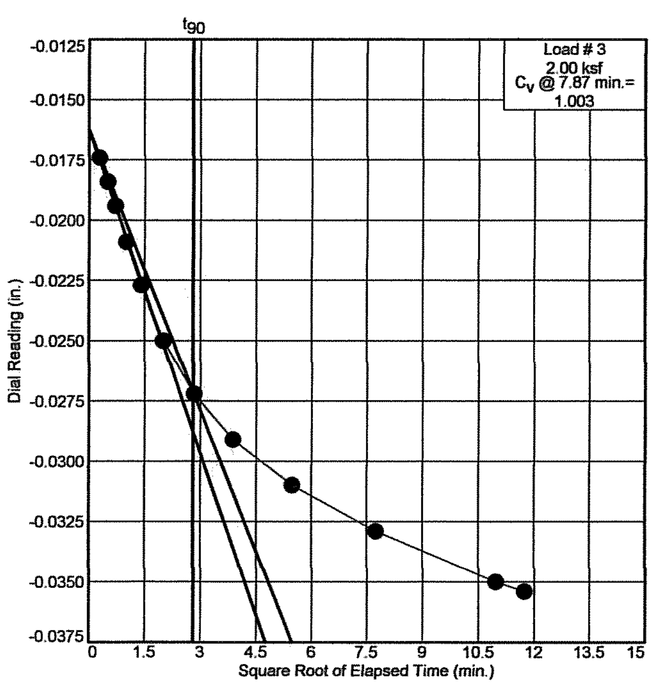
Dial Reading vs. Time

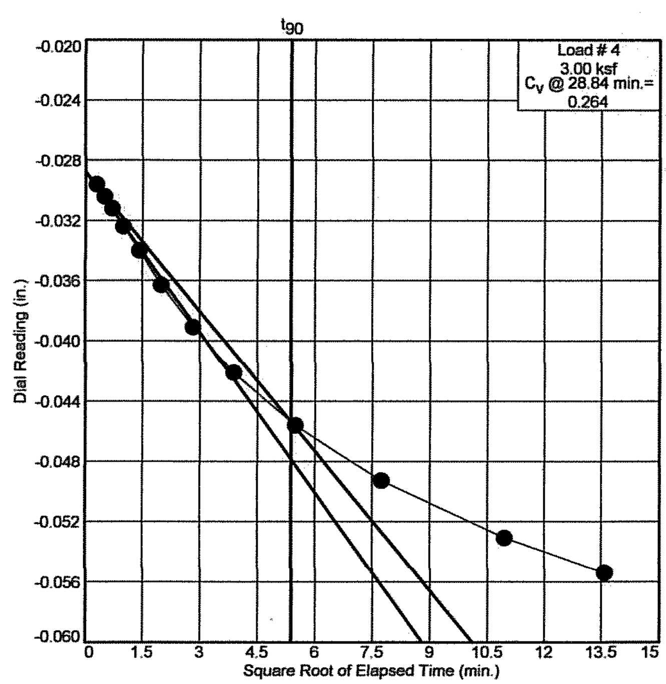
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 35'-37'   Sample Number: U-1









R.W. Gillespie & Associates, Inc.

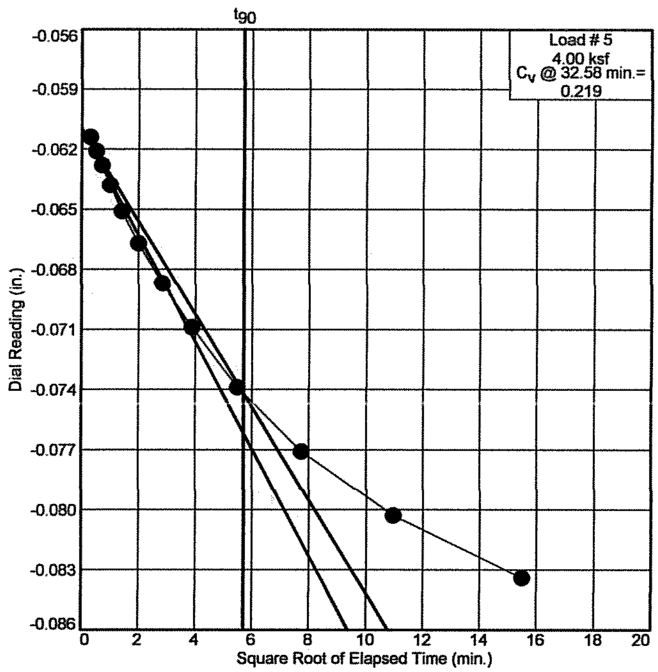
Saco, Maine

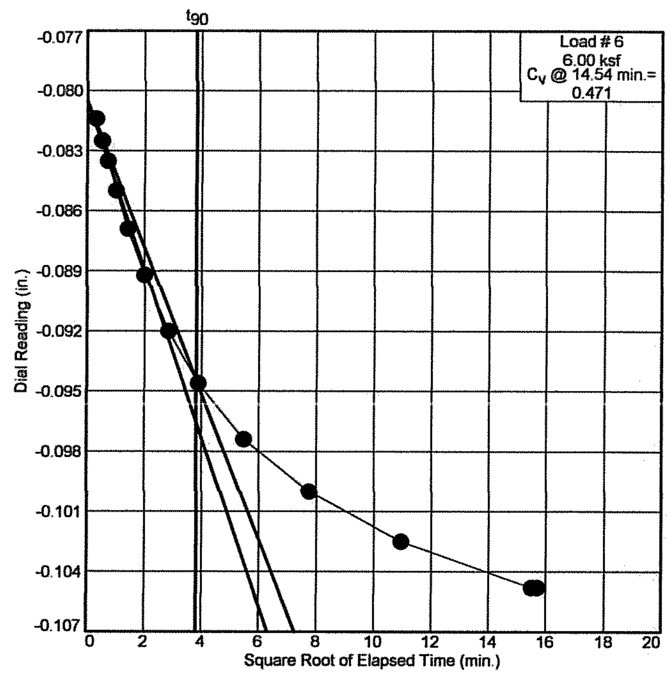
Lab No. 14785a

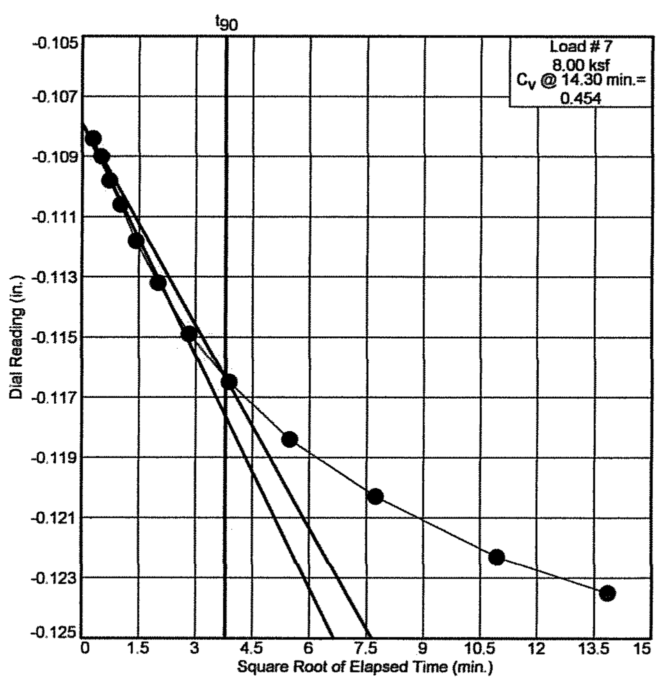
Dial Reading vs. Time

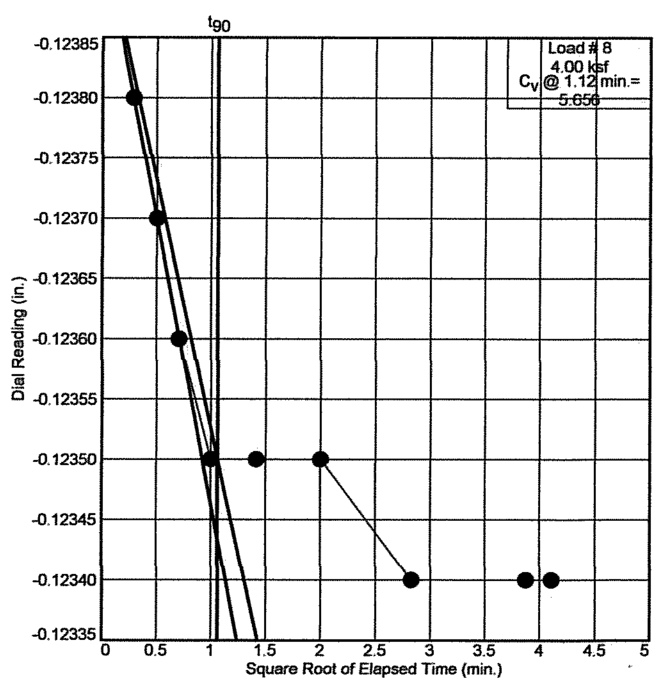
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample Number:** U-1









R.W. Gillespie & Associates, Inc.

Saco, Maine

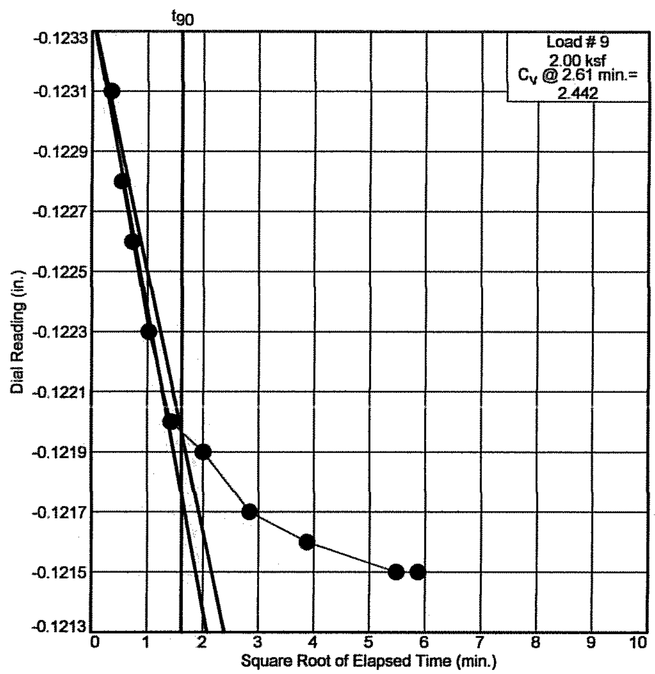
MTG

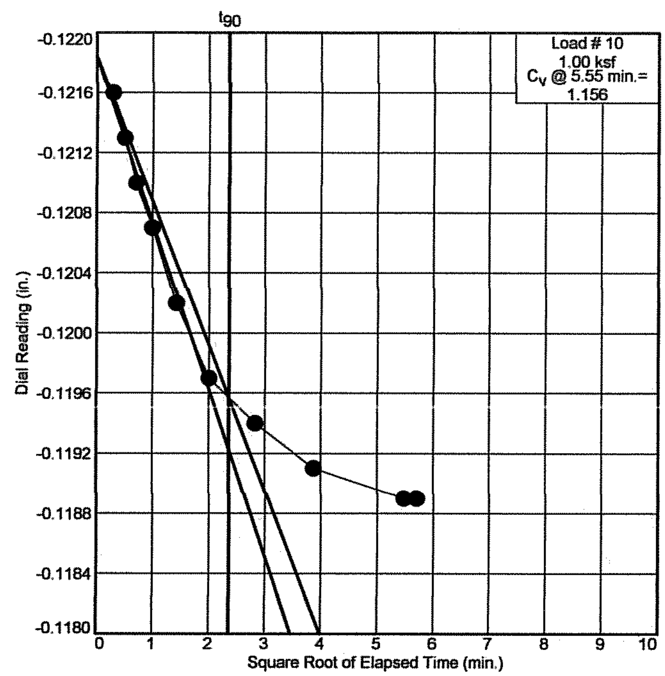
Lab No. 14786a

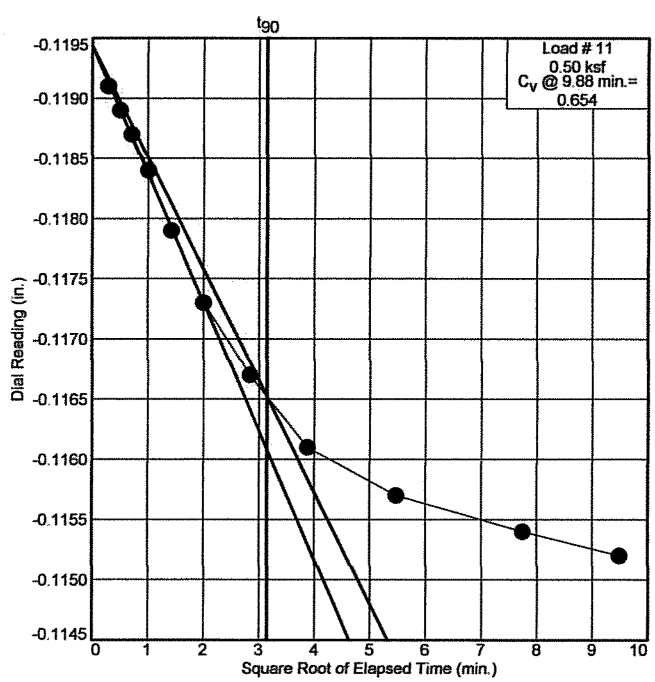
Dial Reading vs. Time

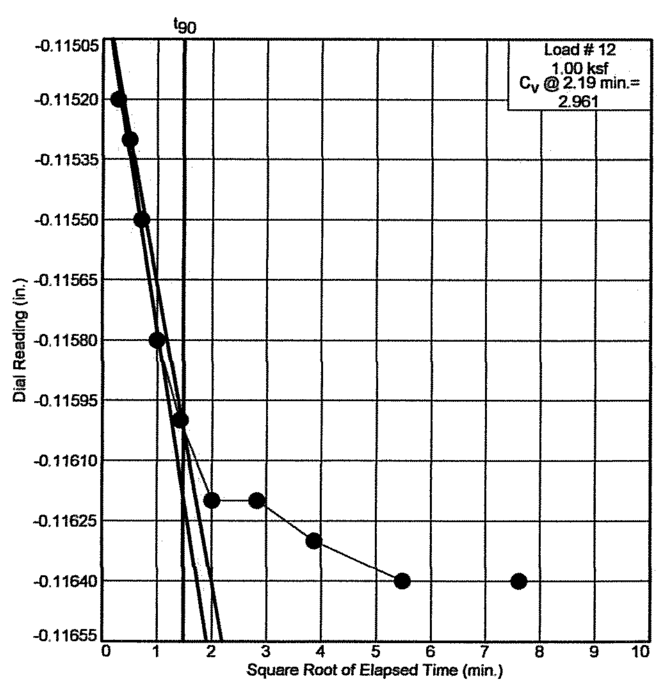
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample Number:** U-1









R.W. Gillespie & Associates, Inc.

Saco, Maine

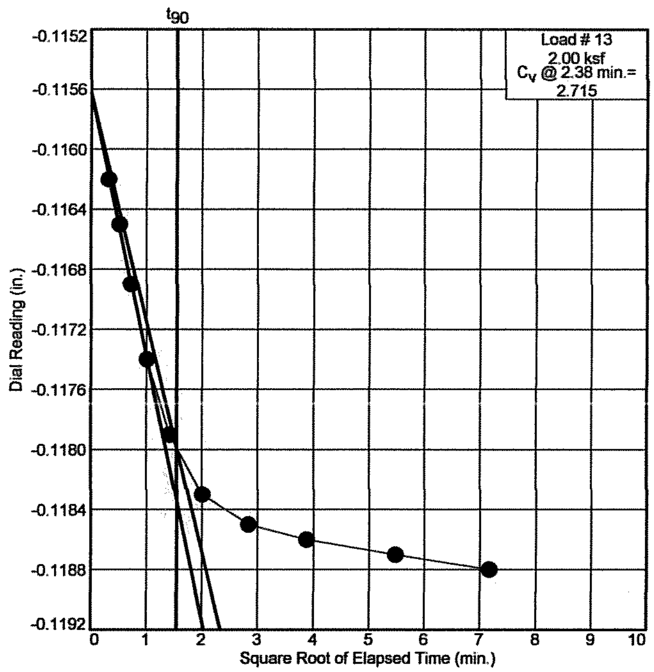
MTB

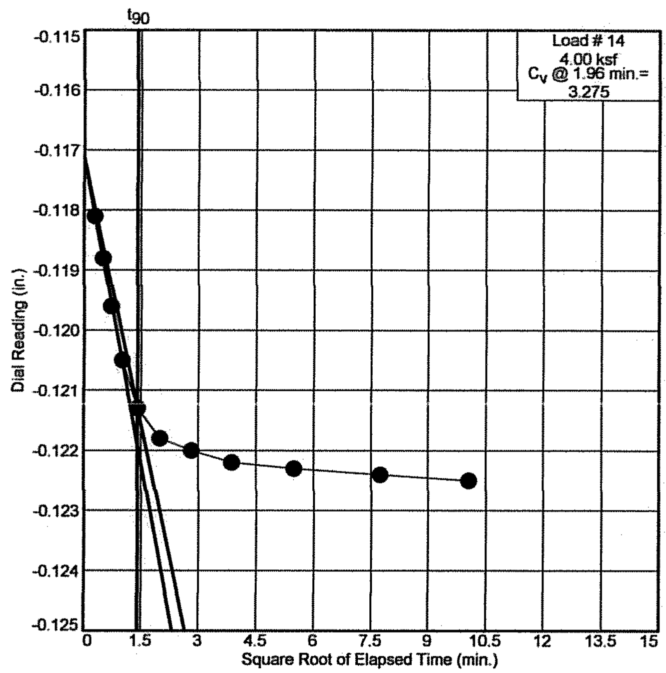
Lab No. 14787a

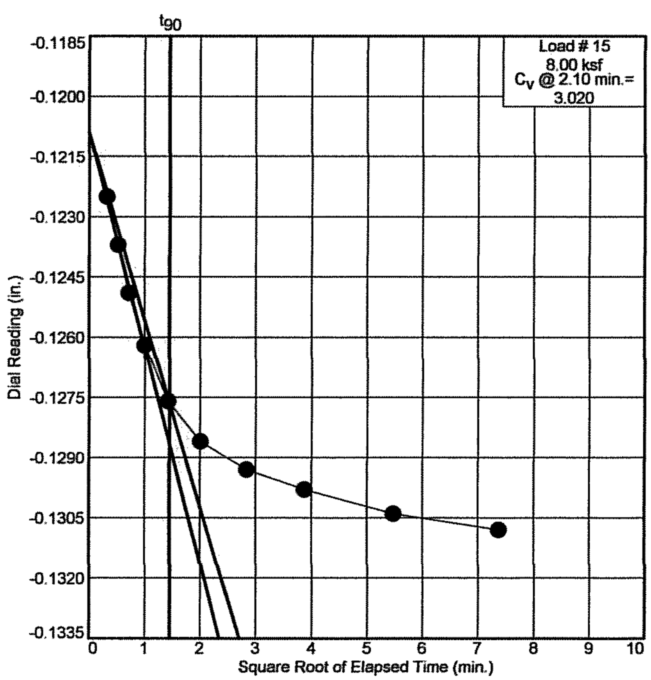
Dial Reading vs. Time

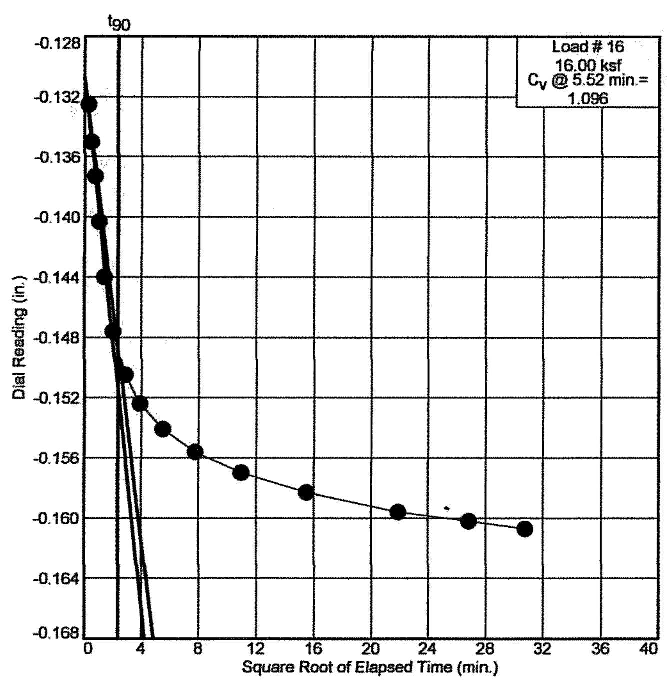
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample Number:** U-1









R.W. Gillespie & Associates, Inc.

Saco, Maine

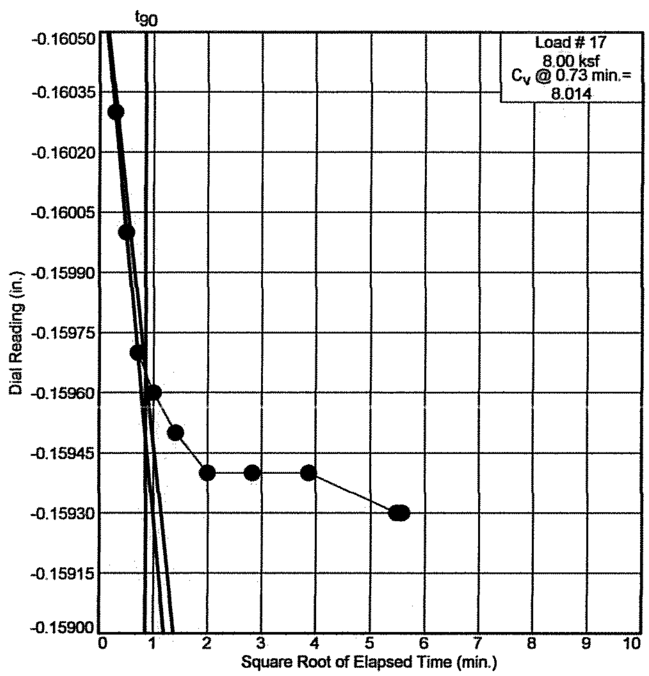
MTB

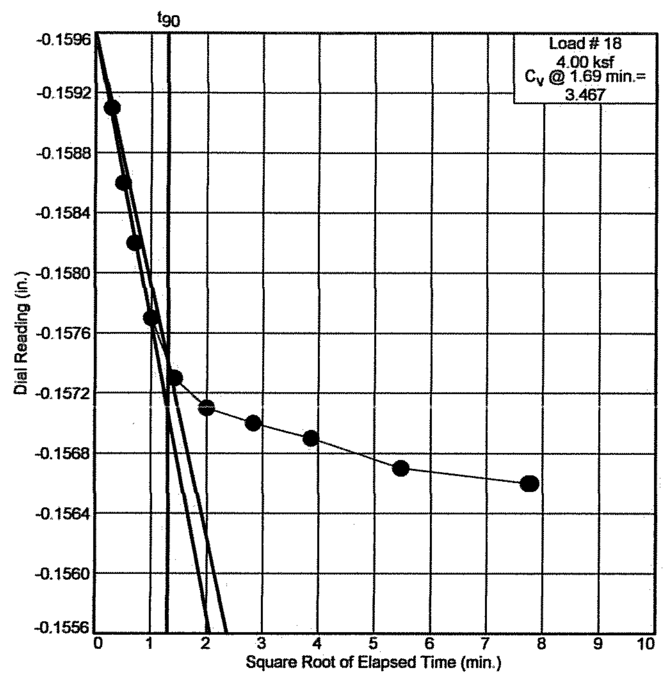
Lab No. 14788a

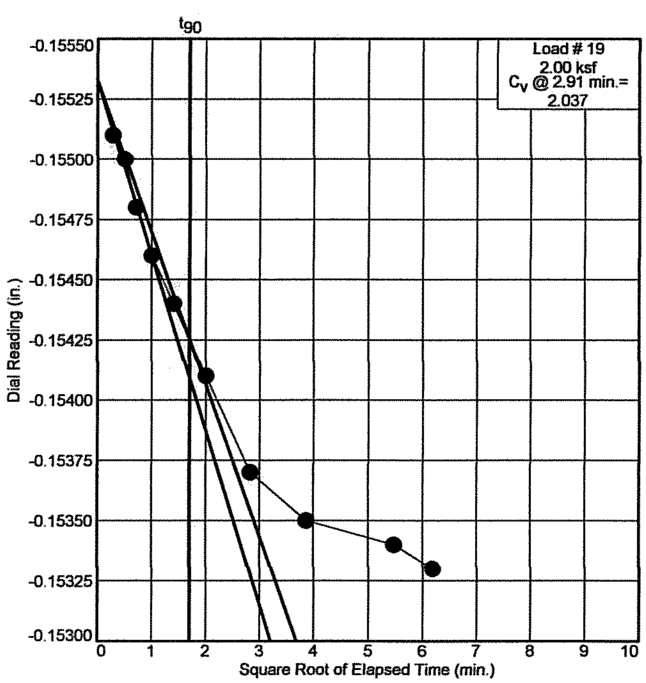
Dial Reading vs. Time

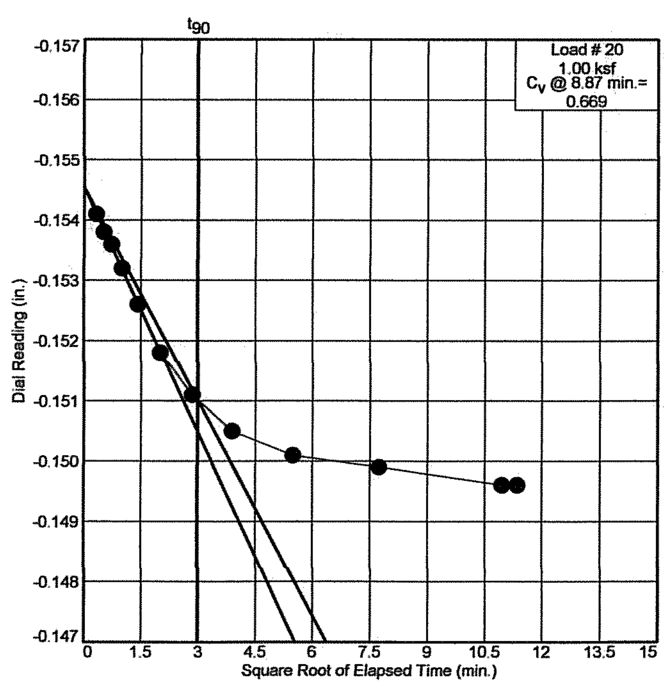
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample Number:** U-1









R.W. Gillespie & Associates, Inc.

Saco, Maine

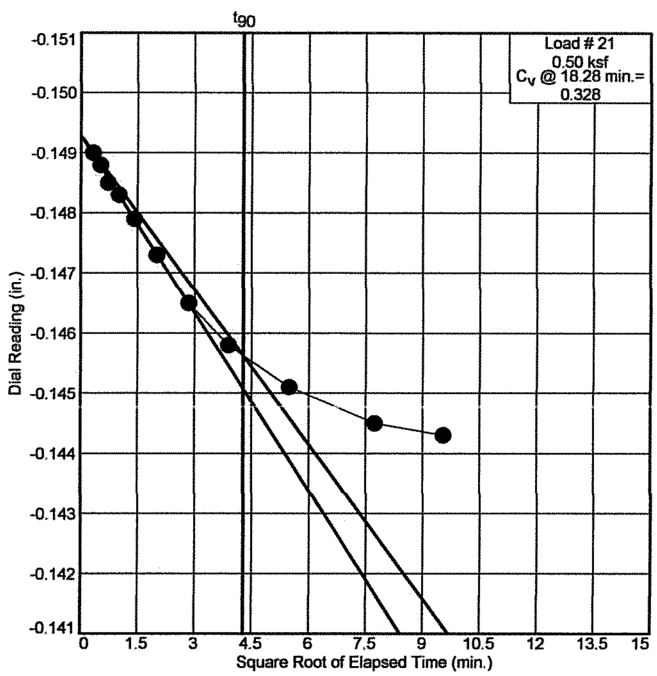
MTB

Lab No. 14789a

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME **Depth:** 35'-37' **Sample Number:** U-1



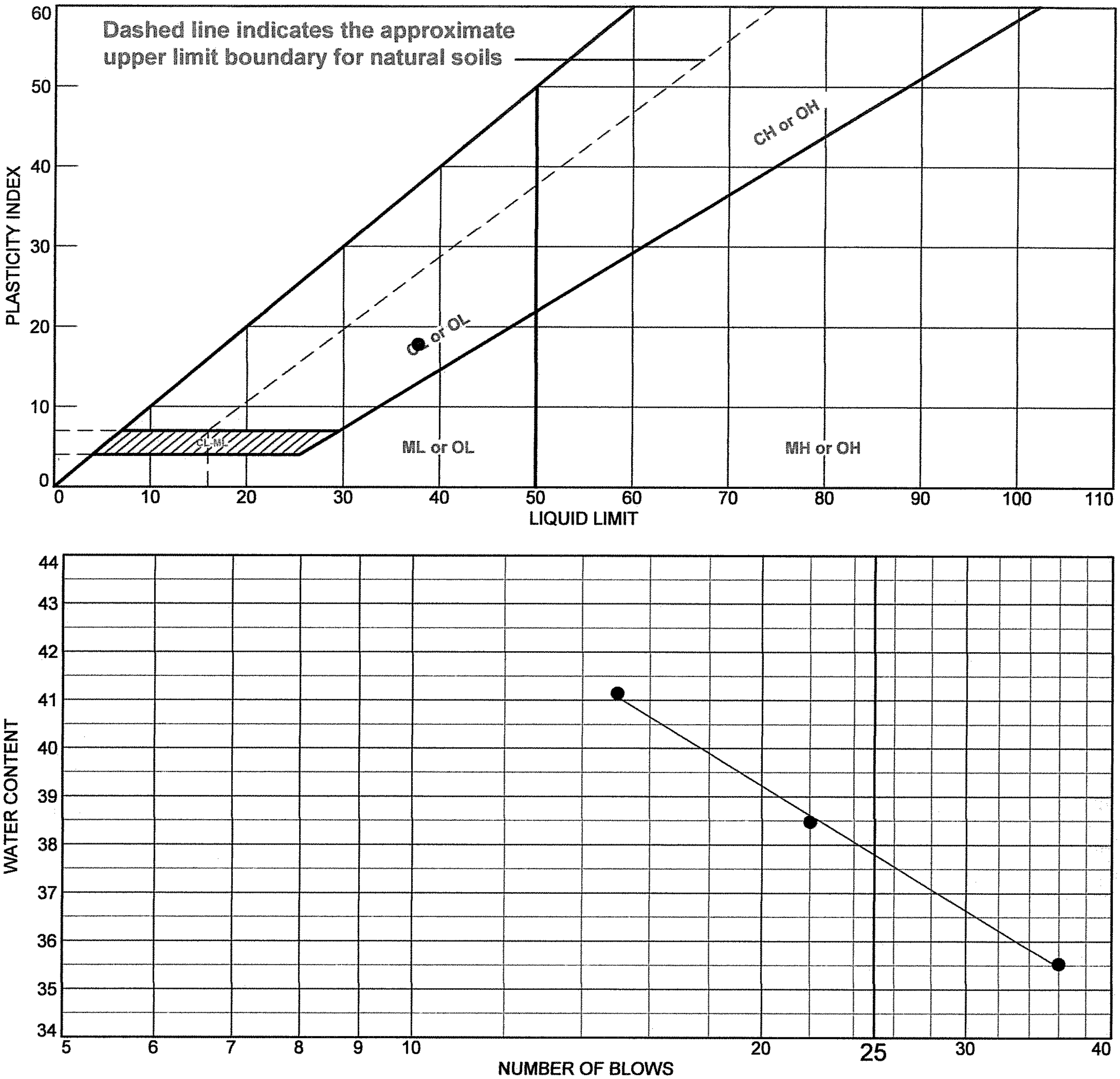
R.W. Gillespie & Associates, Inc.

Saco, Maine

MTB

Lab No. 14790a

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	37.8	20.0	17.8			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME

Sample Number: U-2 **Depth:** 45'-47'

R.W. Gillespie & Associates, Inc.

Saco, Maine

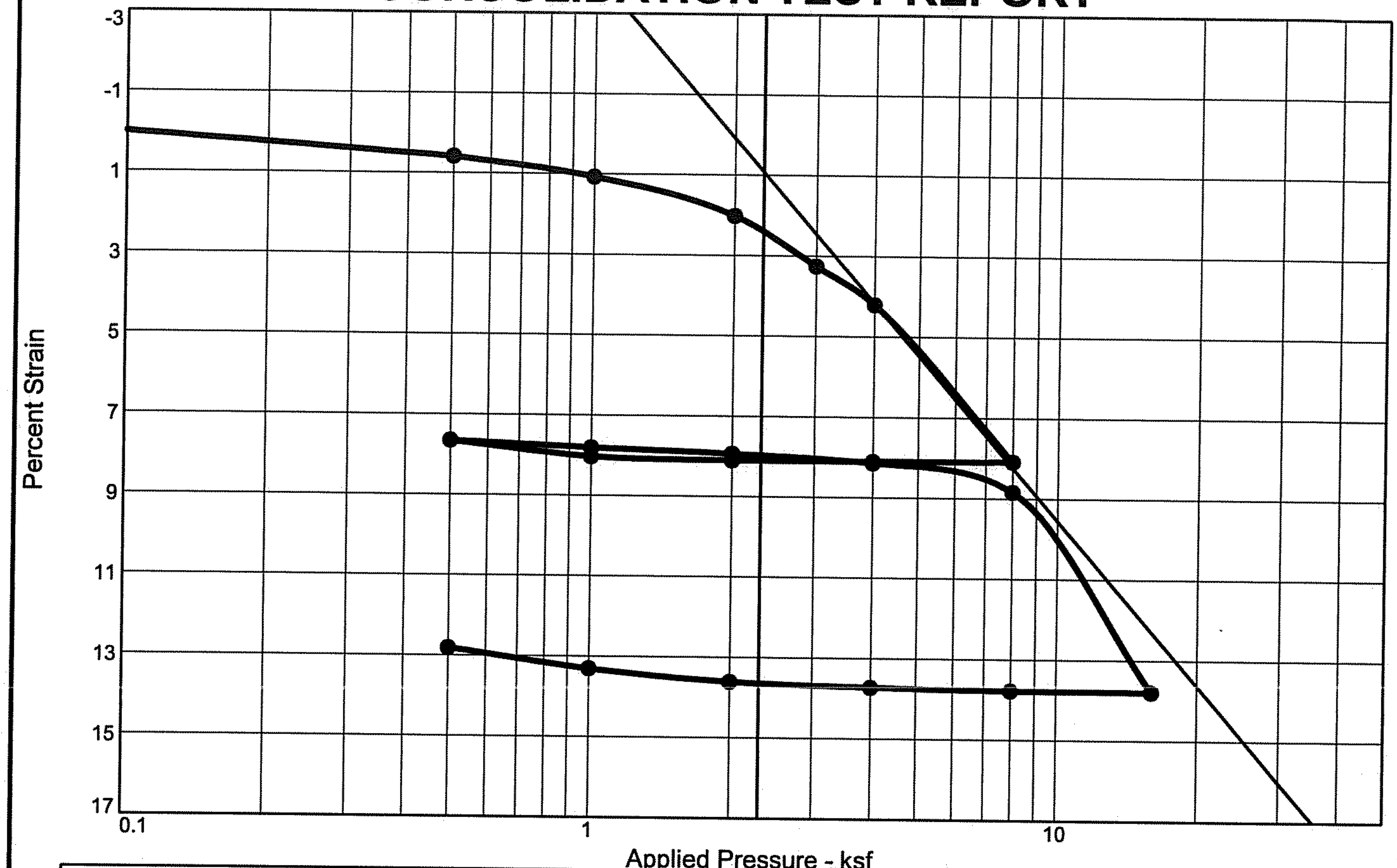
Remarks:

● Natural Moisture: 41.1%

Lab No. 14784b

Tested By: AGS, JJB **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α
1	0.50	1.895		8	2.00	21.339		15	16.00	0.432	
2	1.00	2.288		9	1.00	5.041		16	8.00	7.755	
3	2.00	1.645		10	0.50	0.859		17	4.00	6.210	
4	3.00	0.536		11	1.00	5.079		18	2.00	3.865	
5	4.00	0.435		12	2.00	3.856		19	1.00	0.905	
6	8.00	0.556		13	4.00	5.915		20	0.50	0.360	
7	4.00	0.316		14	8.00	2.570					

Coefficients of Consolidation and Secondary Consolidation

Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
91.6 %	40.2 %	80.5	37.8	17.8	2.75		3.2	0.30	0.09			1.206

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-102: South Portland, ME **Depth:** 45'-47' **Sample No.:** U-2

Remarks:

R.W. Gillespie & Associates, Inc.

Saco, Maine

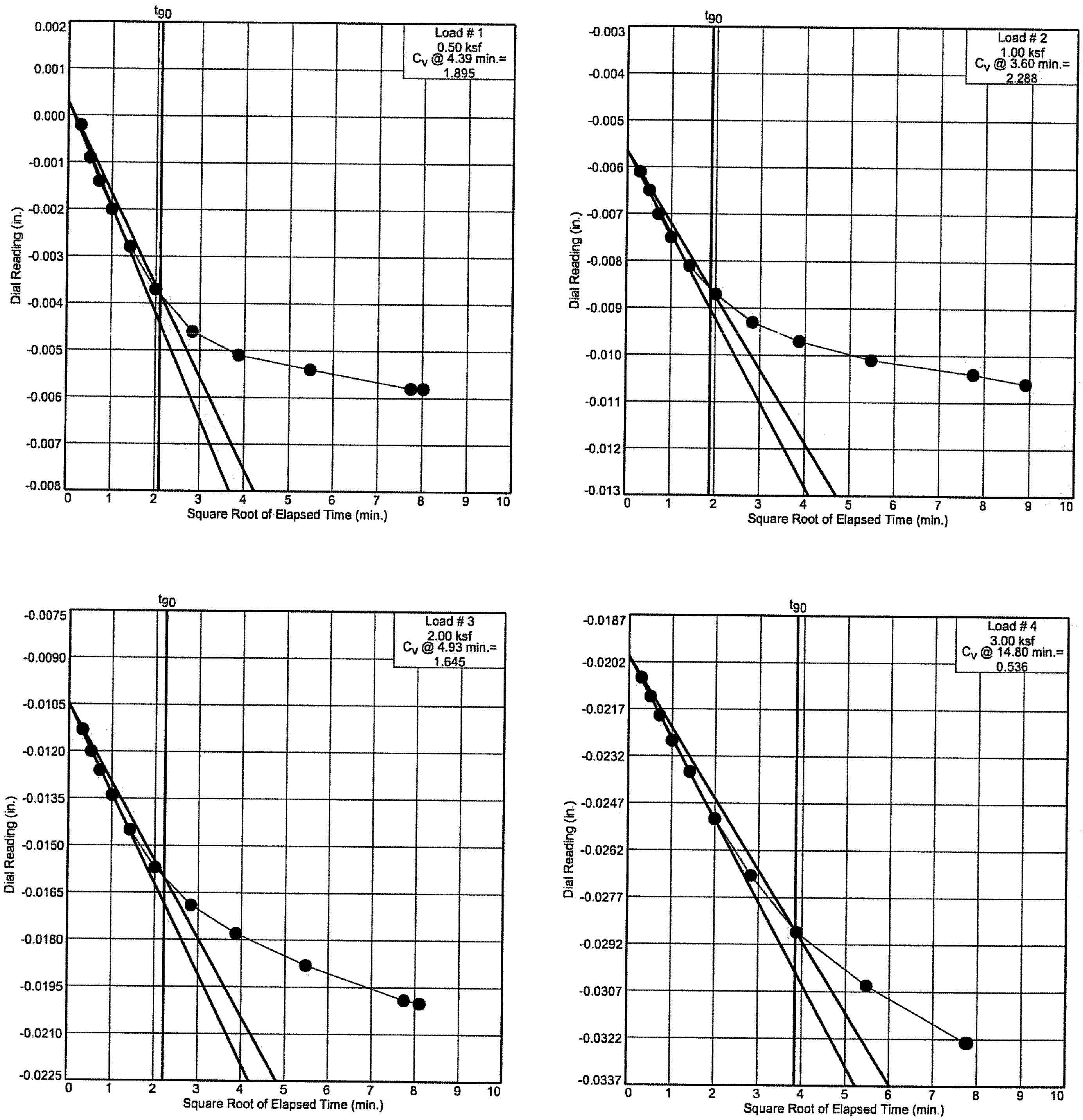
Lab No. 14784b

Tested By: JRF/AGS **Checked By:** MTG MTG

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 45'-47'   Sample Number: U-2



R.W. Gillespie & Associates, Inc.

Saco, Maine

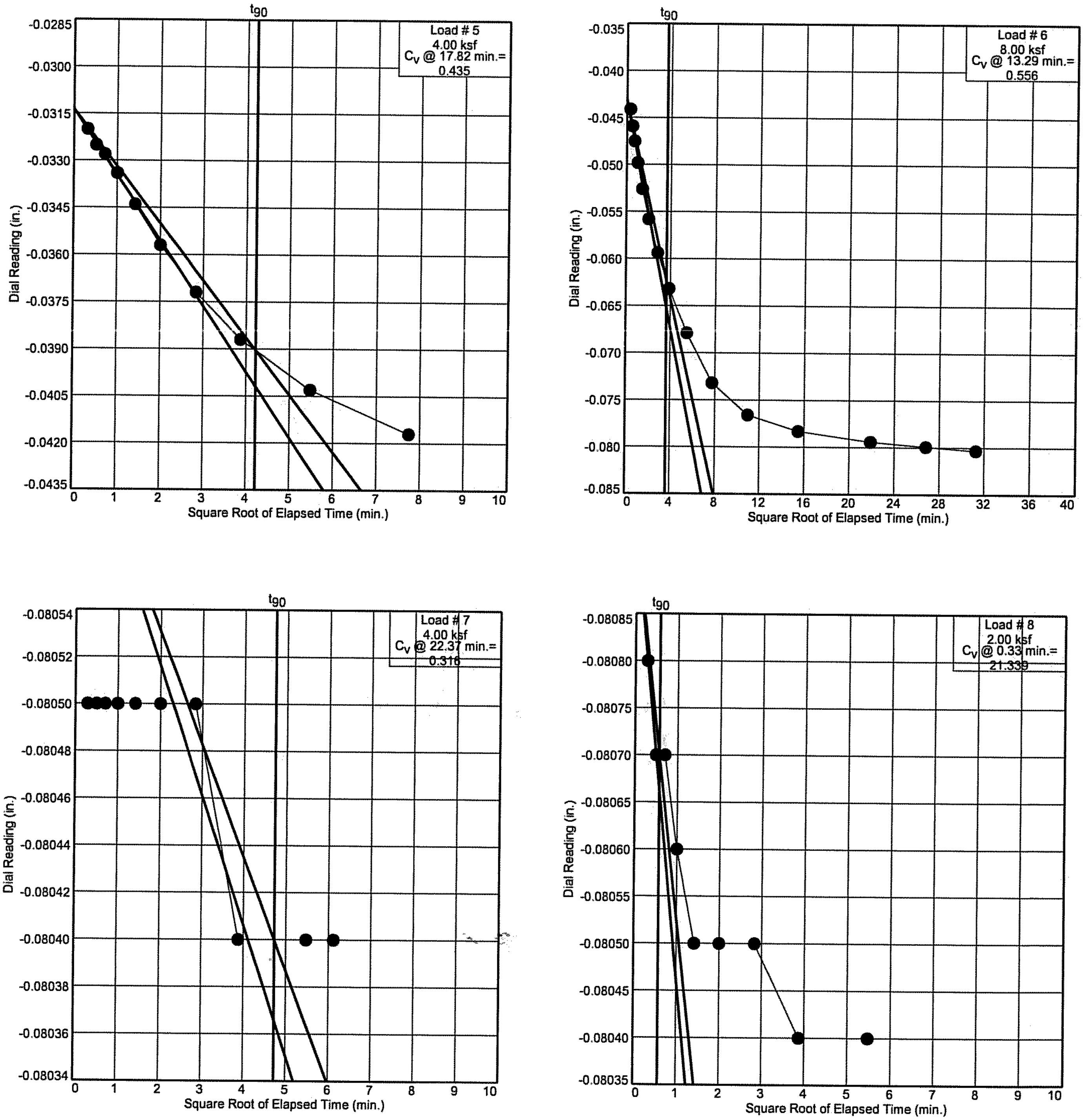
MTB

Lab No. 14785b

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 45'-47'   Sample Number: U-2



R.W. Gillespie & Associates, Inc.

Saco, Maine

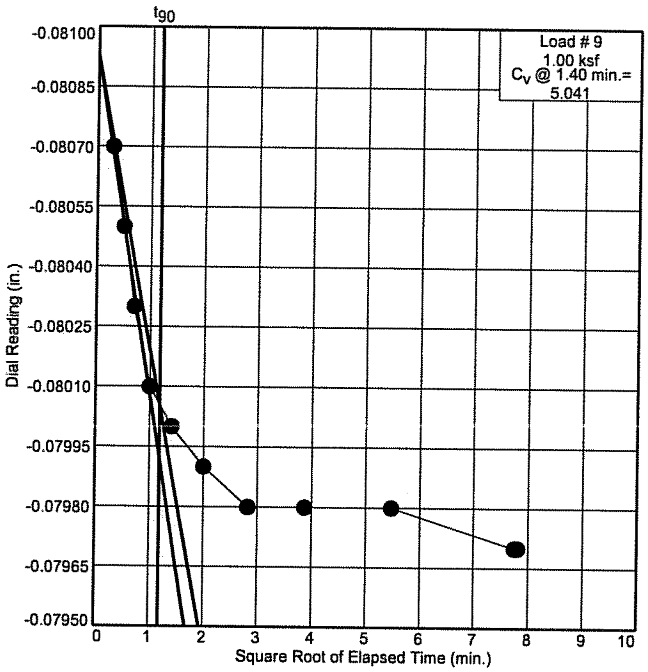
MTB

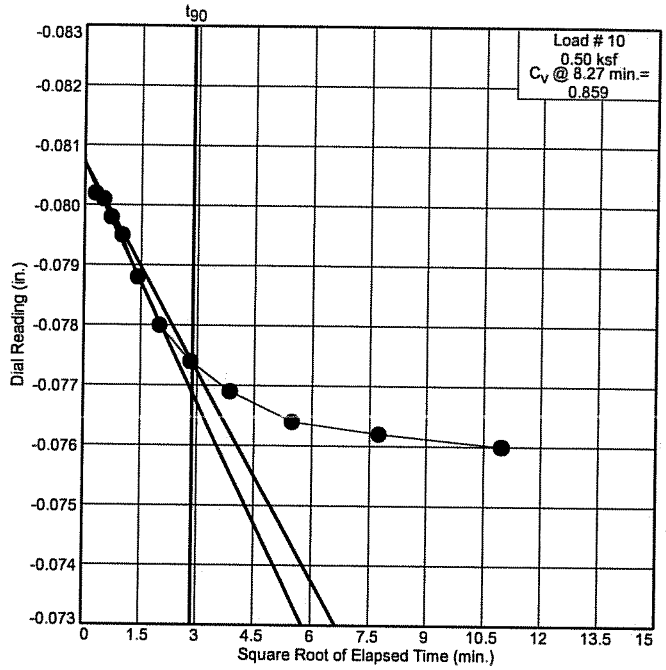
Lab No. 14786b

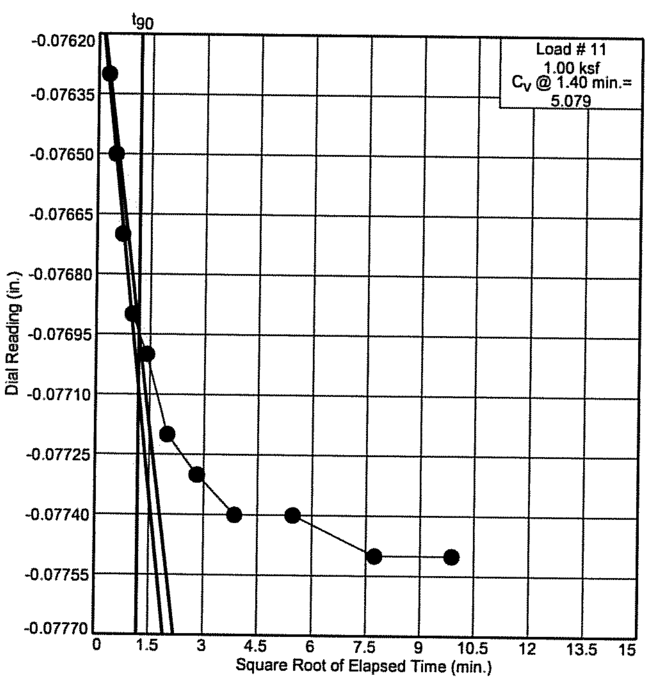
Dial Reading vs. Time

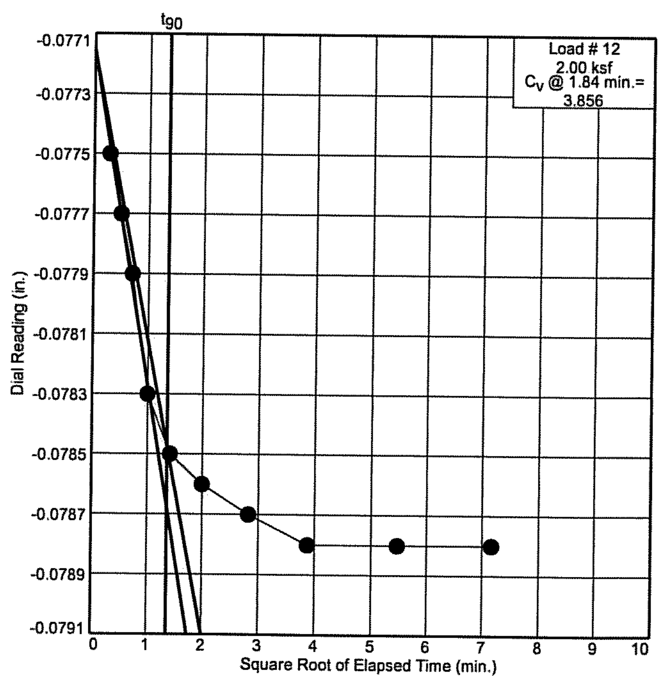
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 45'-47'   Sample Number: U-2









R.W. Gillespie & Associates, Inc.

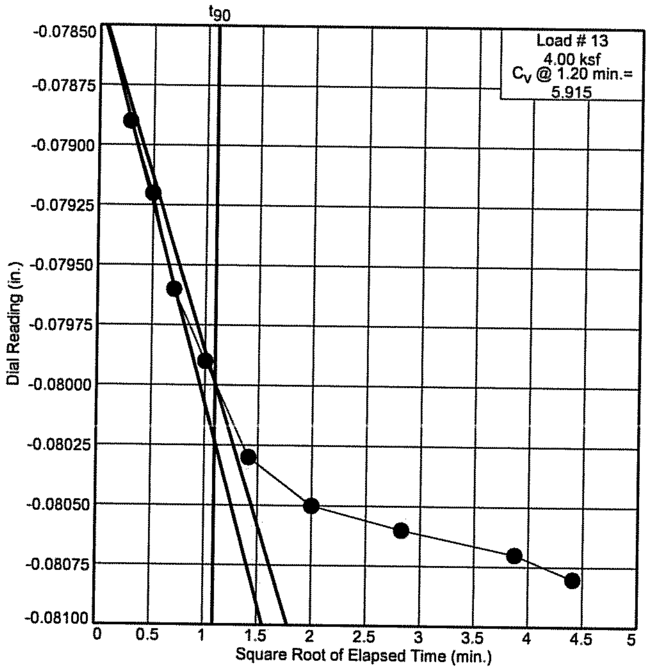
Saco, Maine

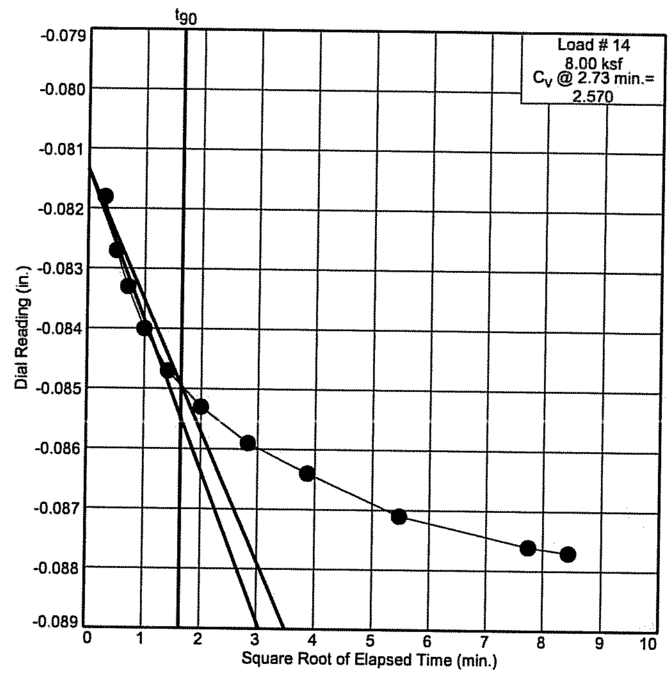
Lab No. 14787b

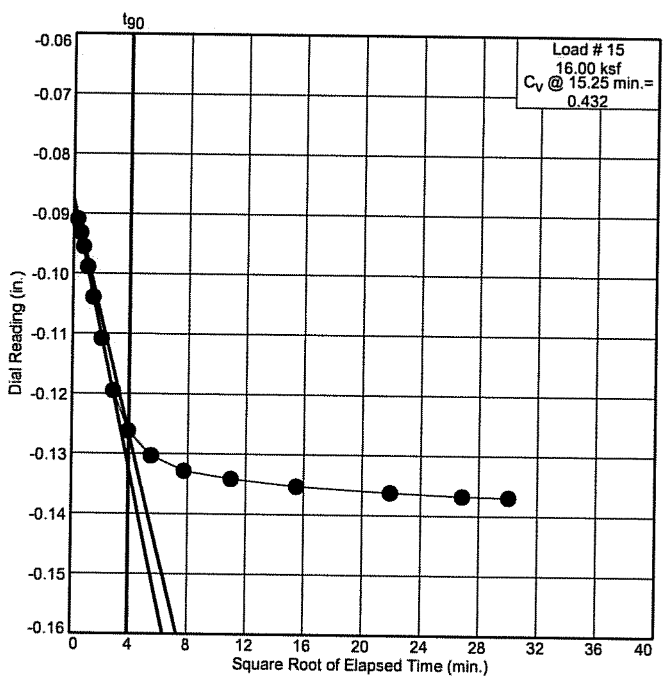
Dial Reading vs. Time

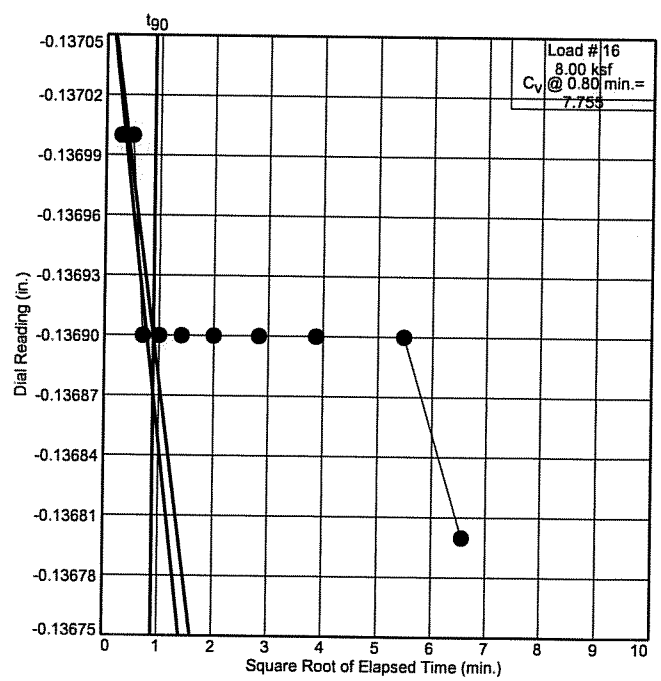
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 45'-47'   Sample Number: U-2









R.W. Gillespie & Associates, Inc.

Saco, Maine

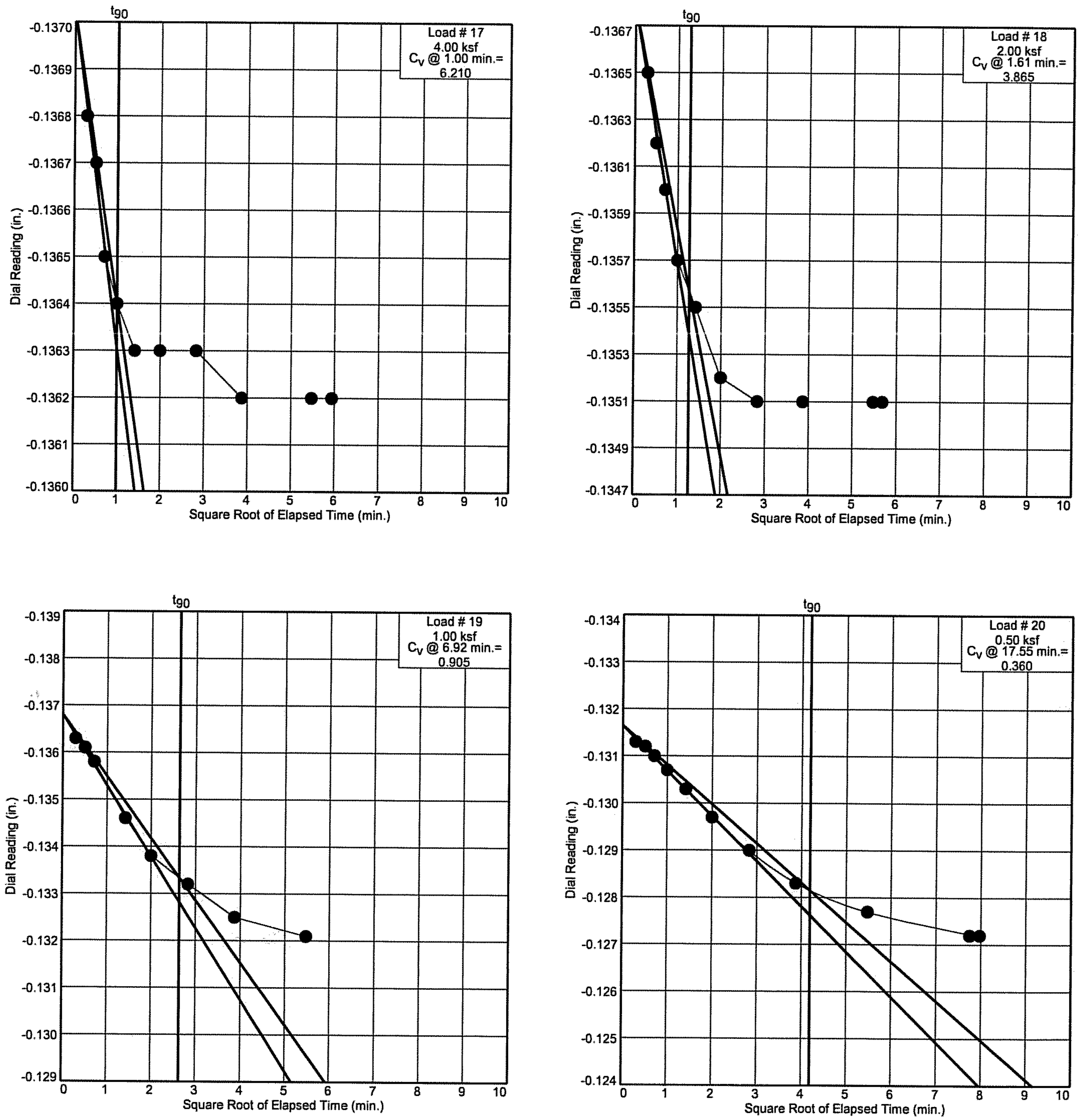
MTG

Lab No. 14788b

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 45'-47'   Sample Number: U-2

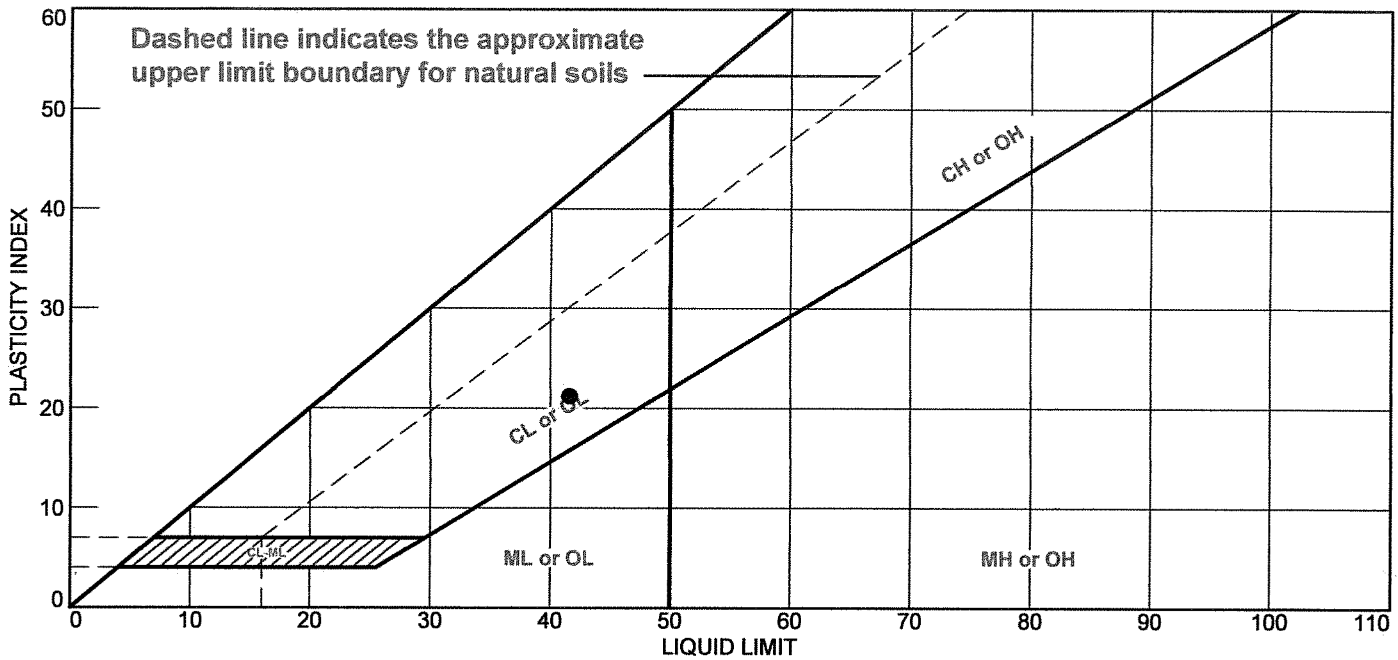


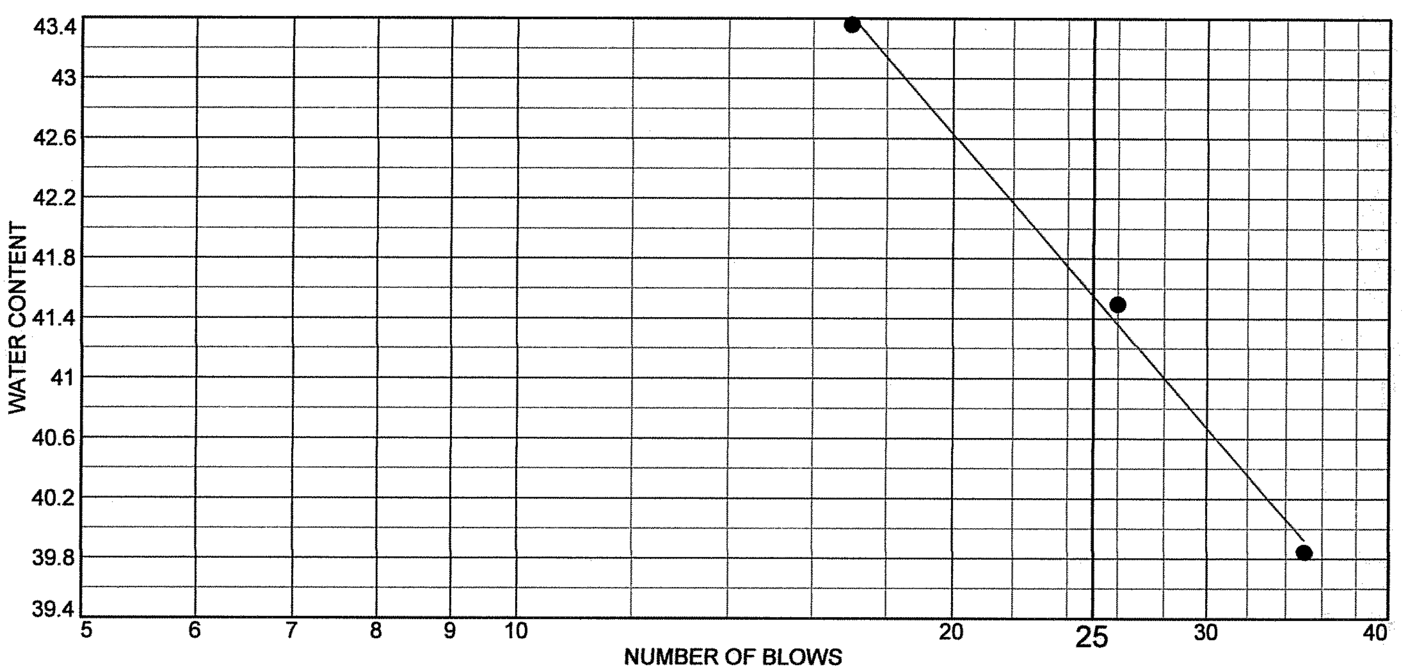
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 14789b

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty Clay	41.6	20.4	21.2			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME
Sample Number: U-3 **Depth:** 55'-57'

R.W. Gillespie & Associates, Inc.

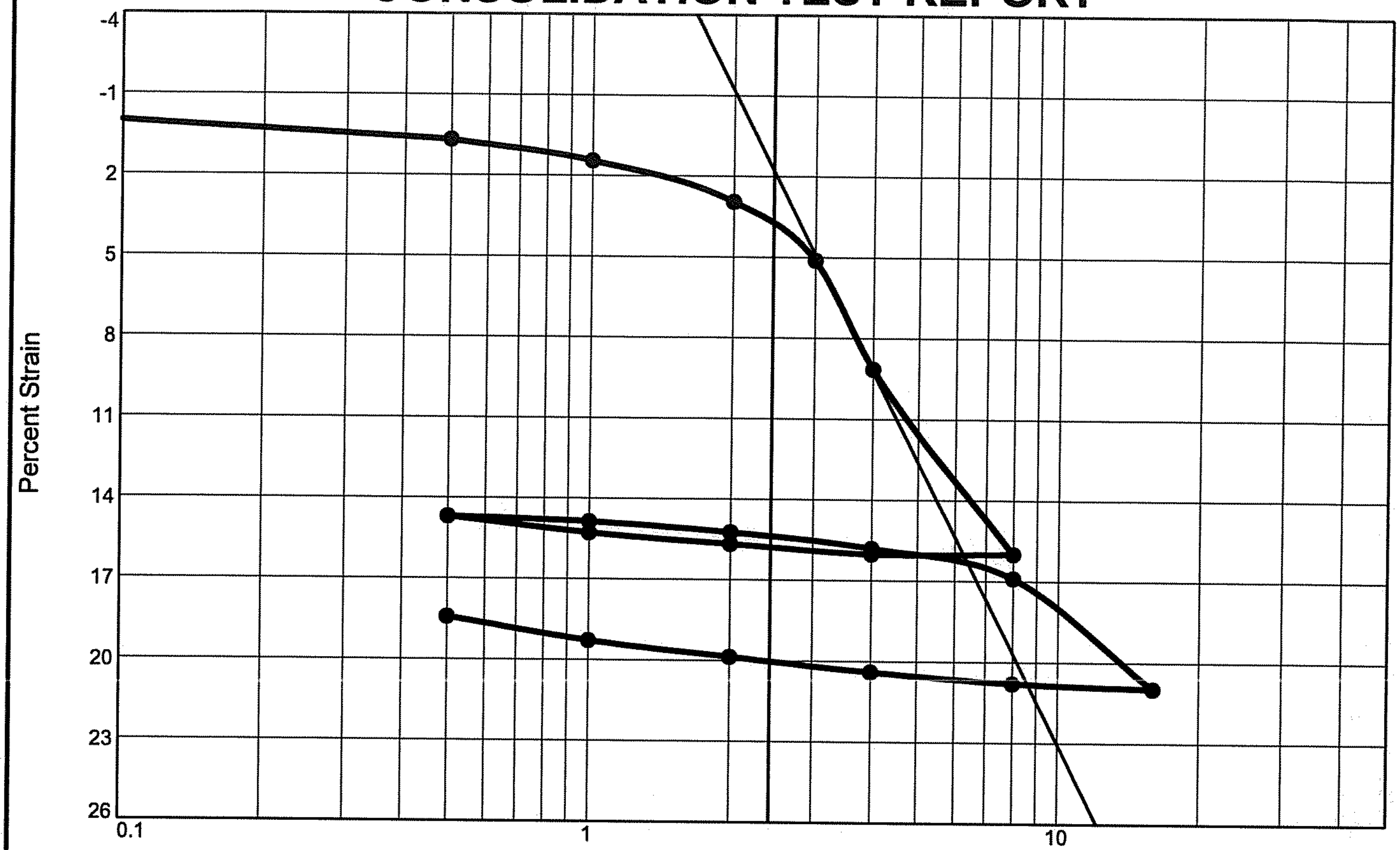
Saco, Maine

Remarks:
● Natural Moisture Content: 43.8%

Lab No. 14784c

Tested By: AGS **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α
1	0.50	2.463		8	2.00	0.883		15	16.00	0.236	
2	1.00	0.993		9	1.00	0.506		16	8.00	2.492	
3	2.00	0.569		10	0.50	0.120		17	4.00	1.003	
4	3.00	0.190		11	1.00	0.431		18	2.00	0.325	
5	4.00	0.034		12	2.00	0.633		19	1.00	0.153	
6	8.00	0.060		13	4.00	0.658		20	0.50	0.050	
7	4.00	2.117		14	8.00	0.655					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
94.9 %	43.8 %	76.7	41.6	21.2	2.75		2.8	0.79	0.09			1.269

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-102: South Portland, ME **Depth:** 55'-57' **Sample No.:** U-3

Remarks:

R.W. Gillespie & Associates, Inc.

Saco, Maine

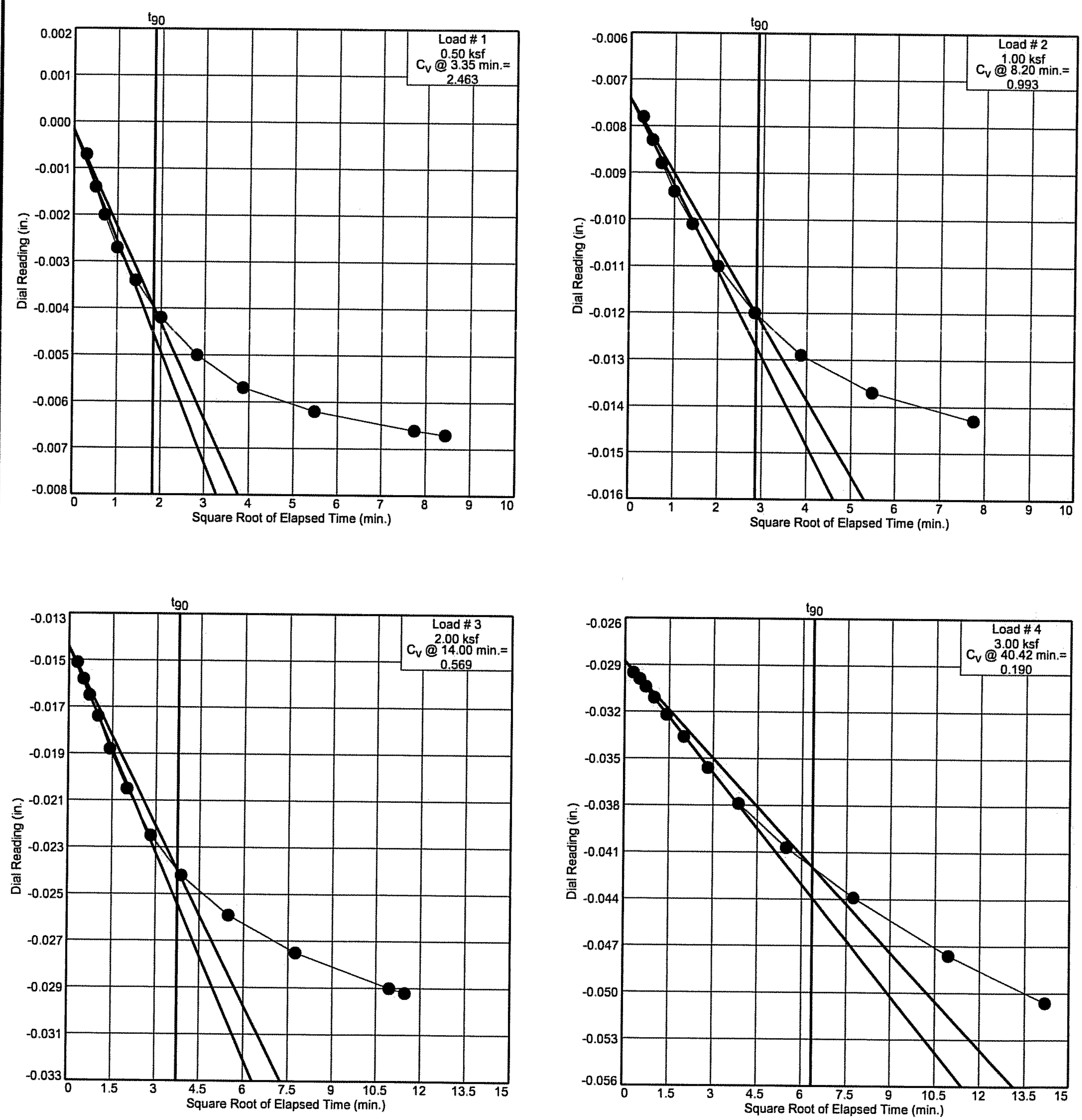
Lab No. 14784c

Tested By: JRF/AGS **Checked By:** MTG MTG

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 55'-57'   Sample Number: U-3



R.W. Gillespie & Associates, Inc.

Saco, Maine

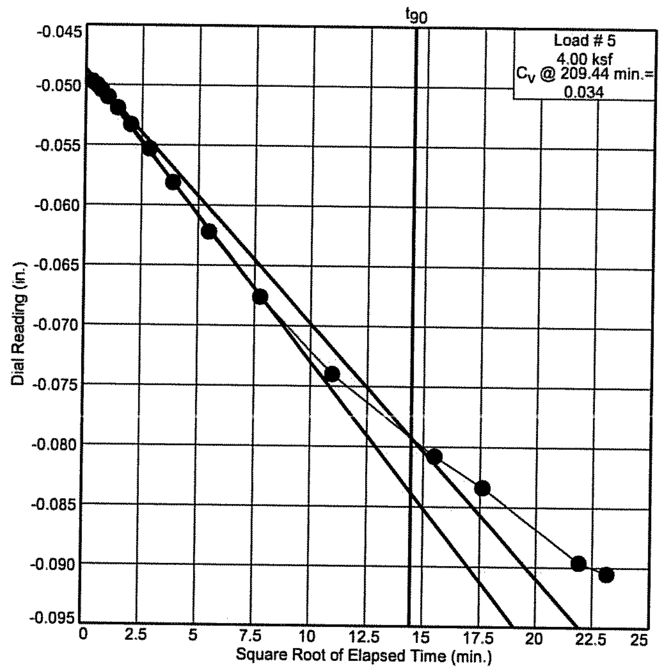
MTB

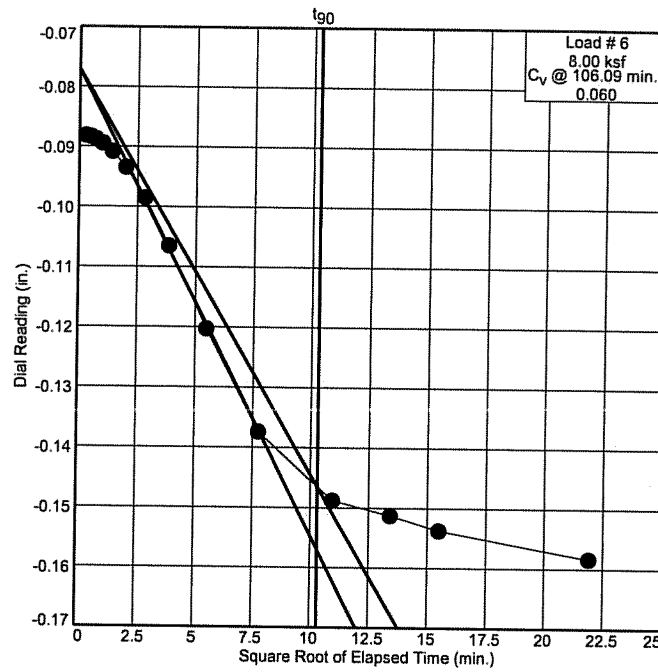
Lab No. 14785c

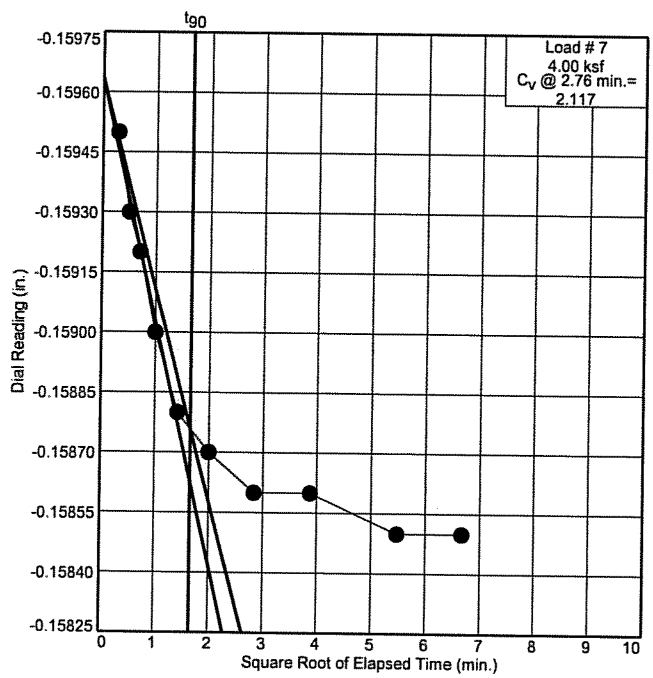
Dial Reading vs. Time

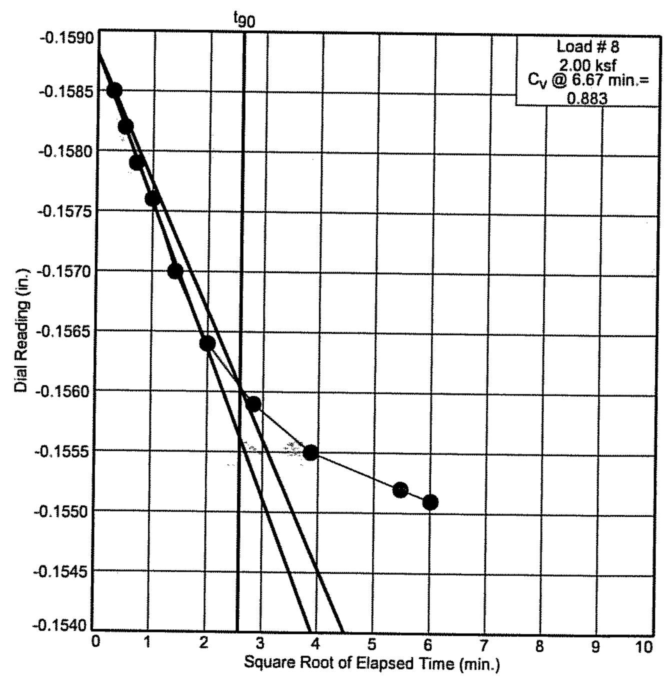
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 55'-57' Sample Number: U-3









R.W. Gillespie & Associates, Inc.

Saco, Maine

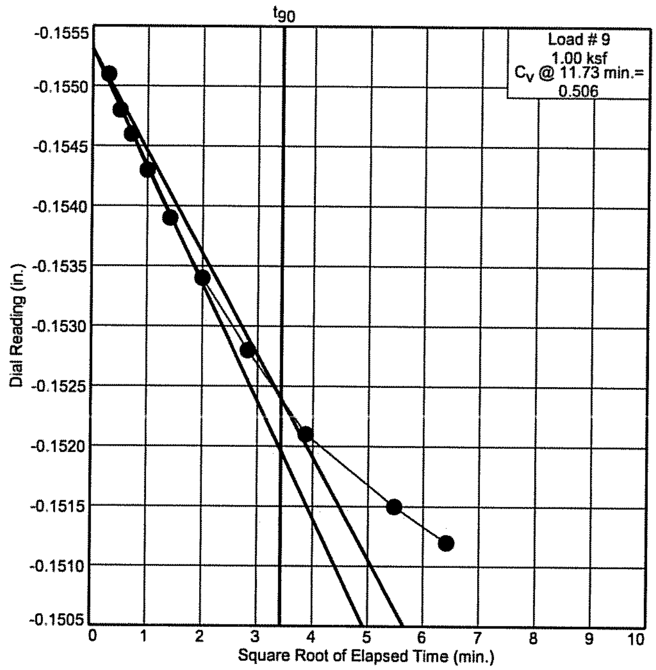
MG

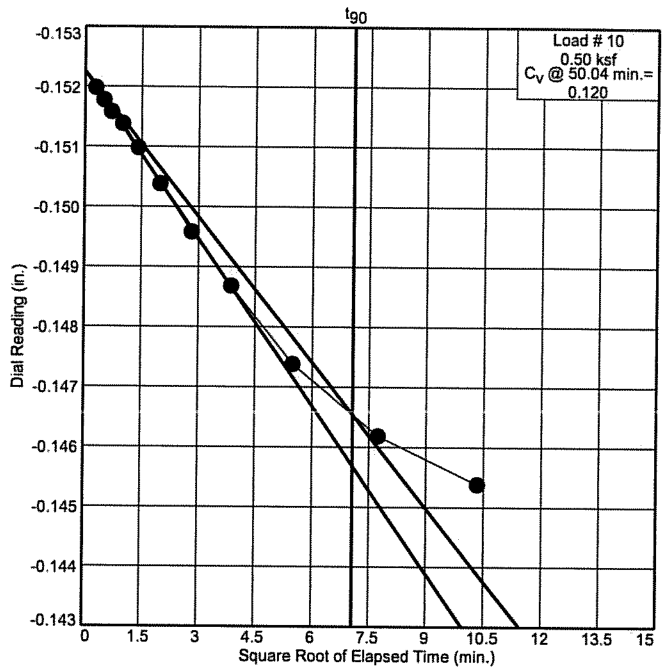
Lab No. 14786c

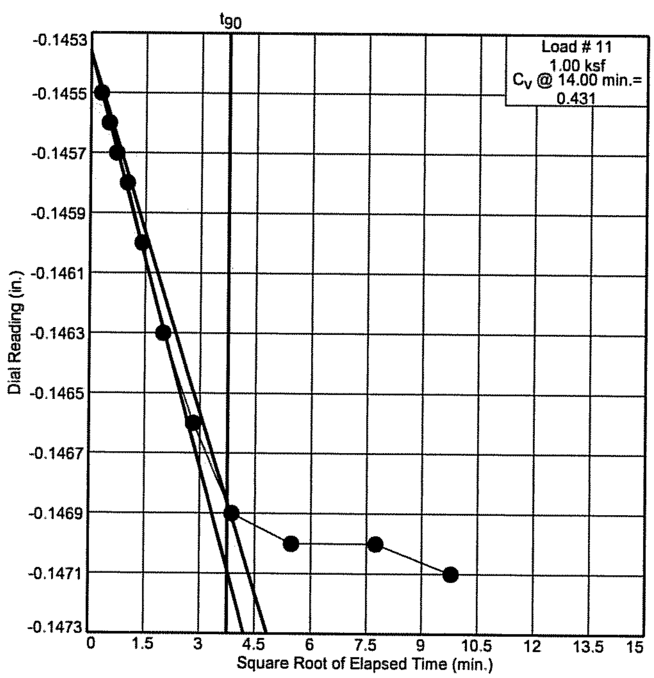
Dial Reading vs. Time

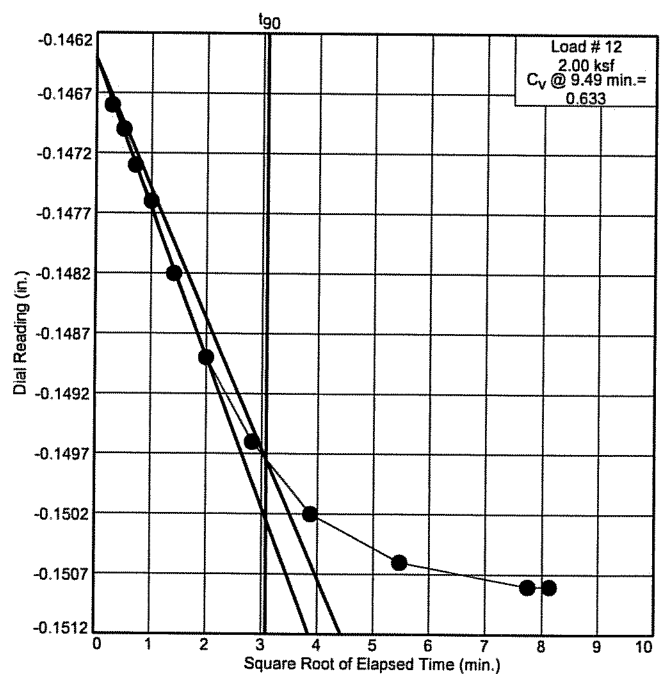
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 55'-57'   Sample Number: U-3









R.W. Gillespie & Associates, Inc.

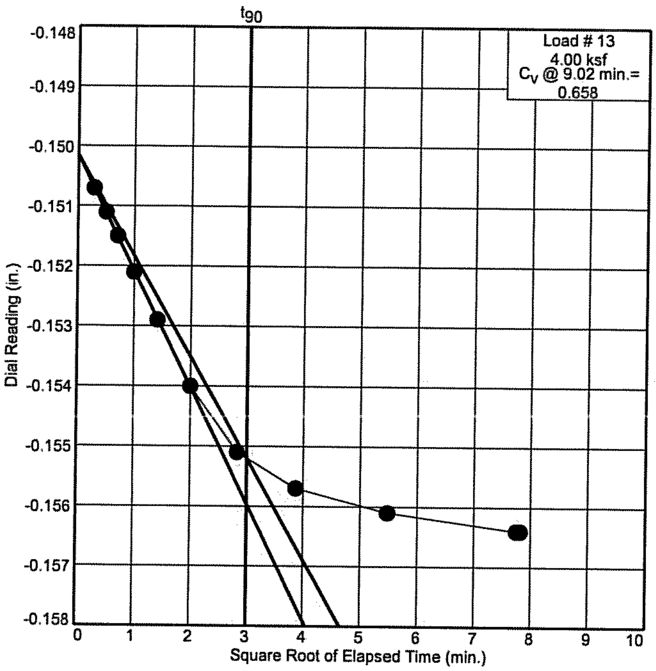
Saco, Maine

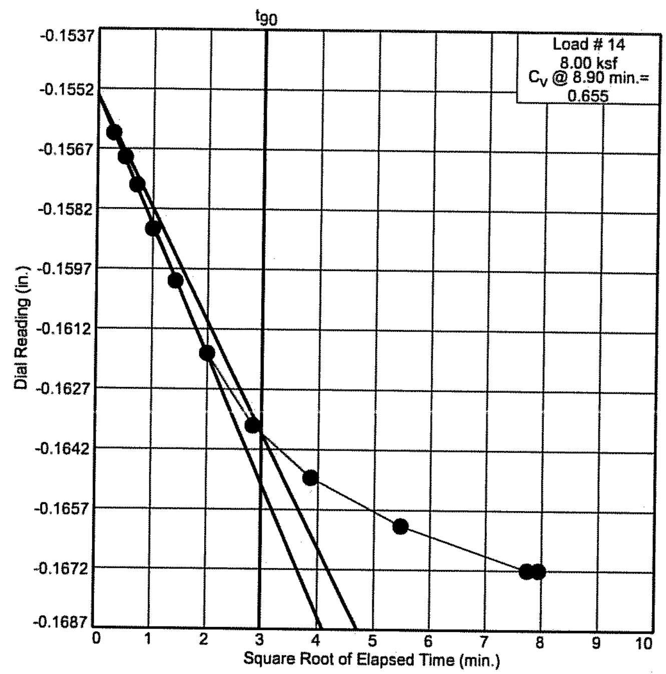
Lab No. 14787c

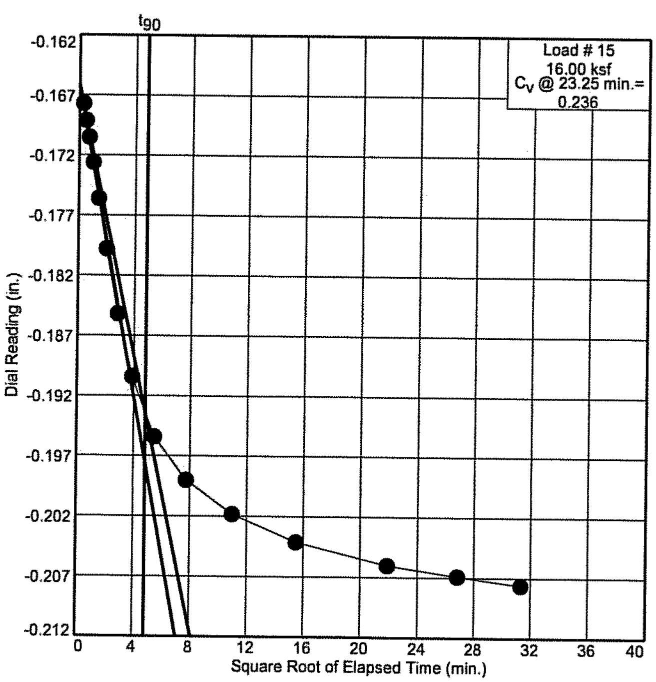
Dial Reading vs. Time

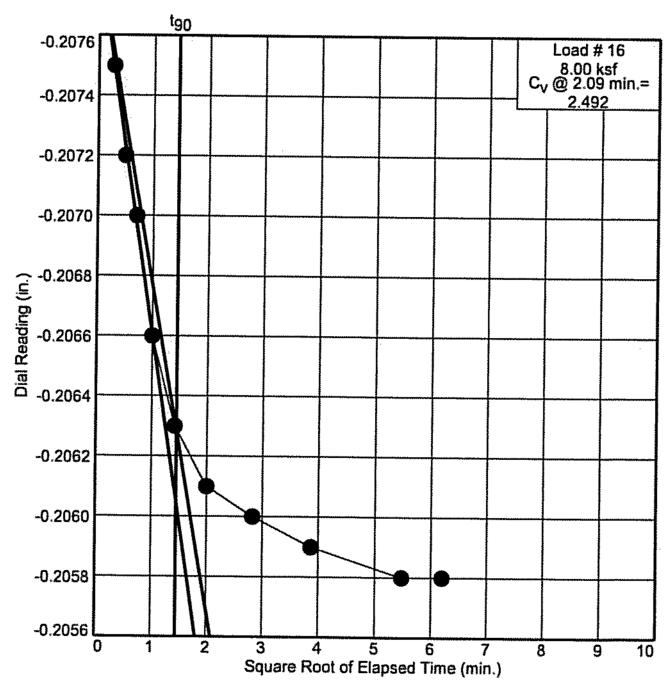
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 55'-57' Sample Number: U-3









R.W. Gillespie & Associates, Inc.

Saco, Maine

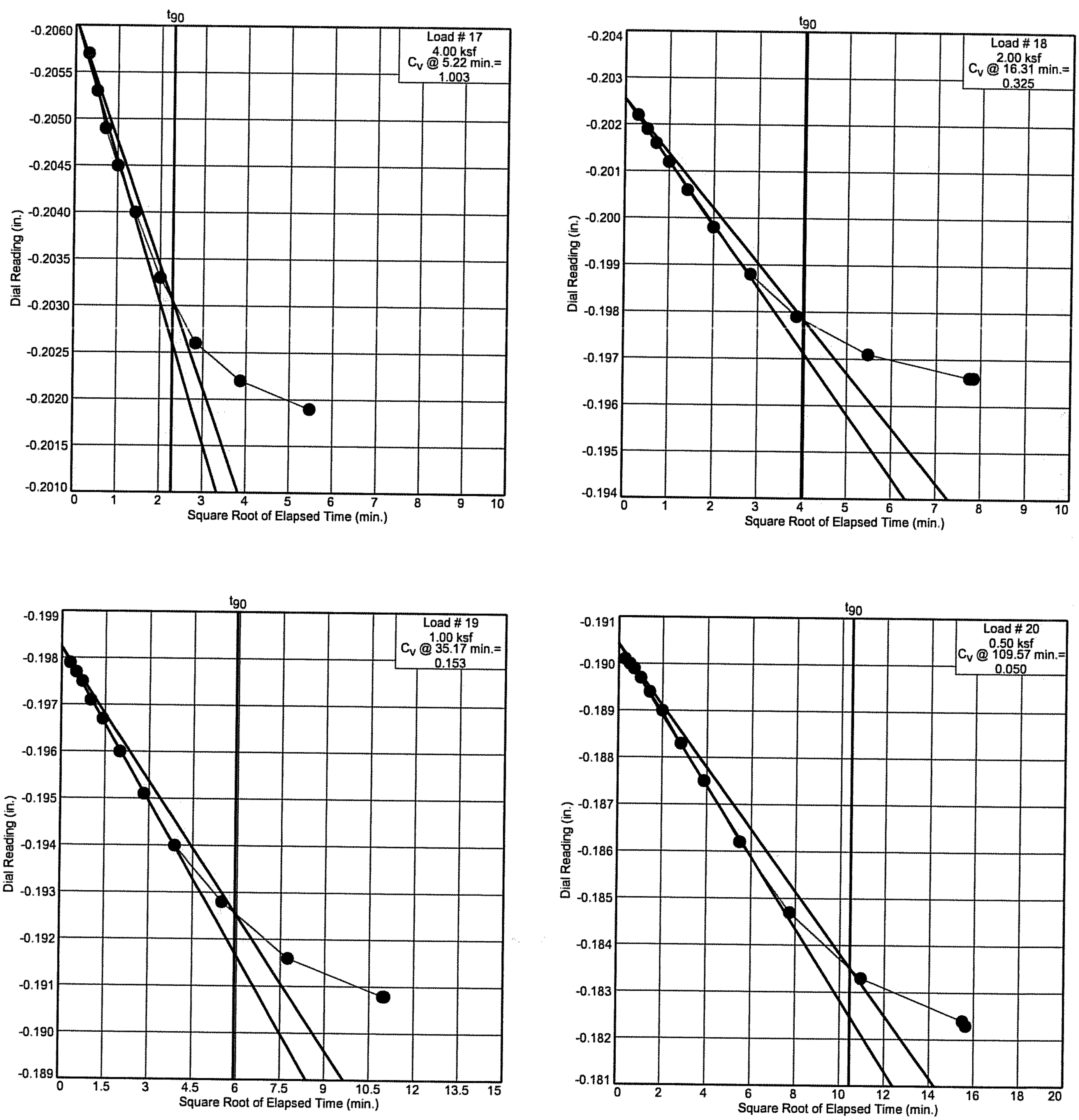
MTG

Lab No. 14788c

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 55'-57'   Sample Number: U-3



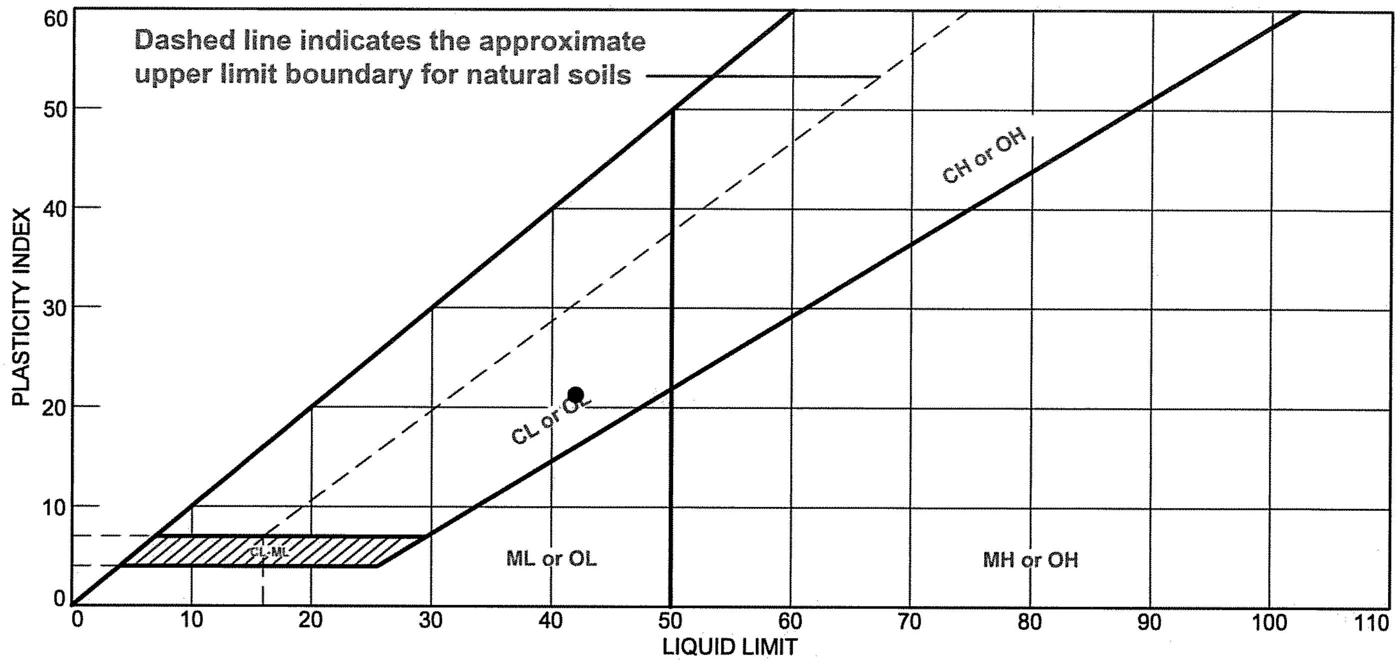
R.W. Gillespie & Associates, Inc.

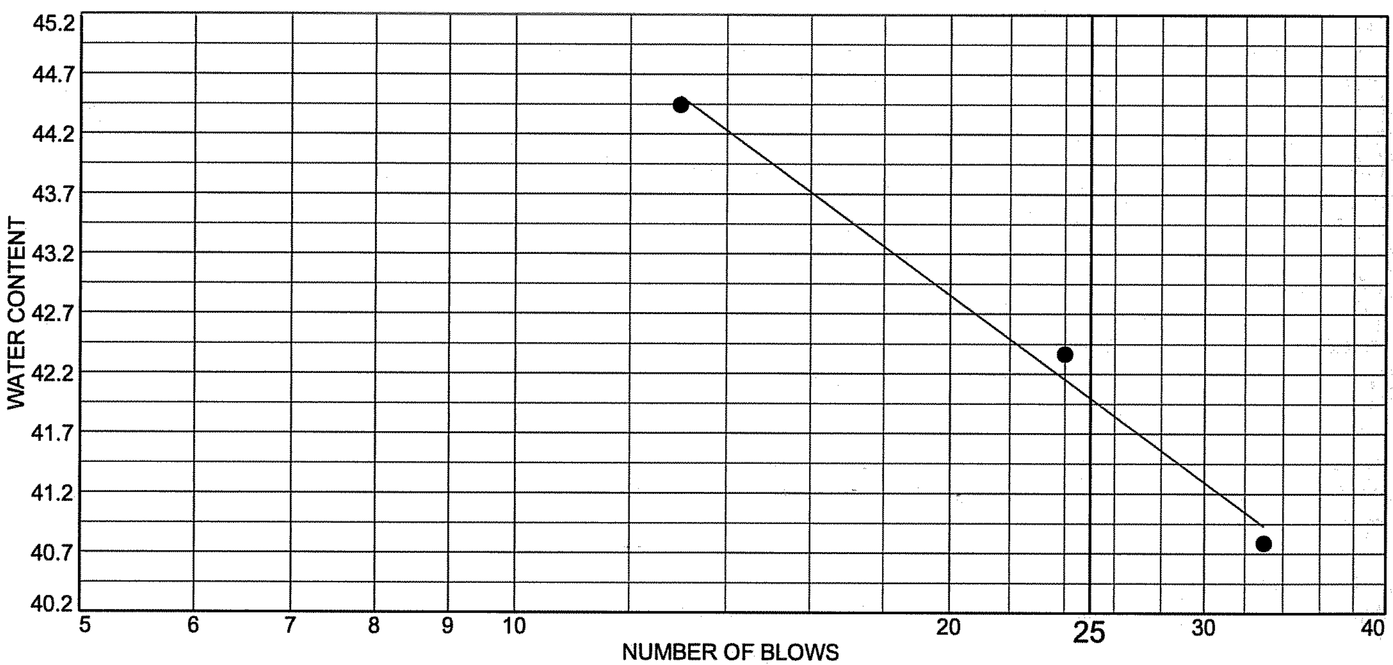
Saco, Maine

mTG

Lab No. 14789c

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	42.0	20.7	21.3			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME
Sample Number: U-4 **Depth:** 65'-67'

R.W. Gillespie & Associates, Inc.

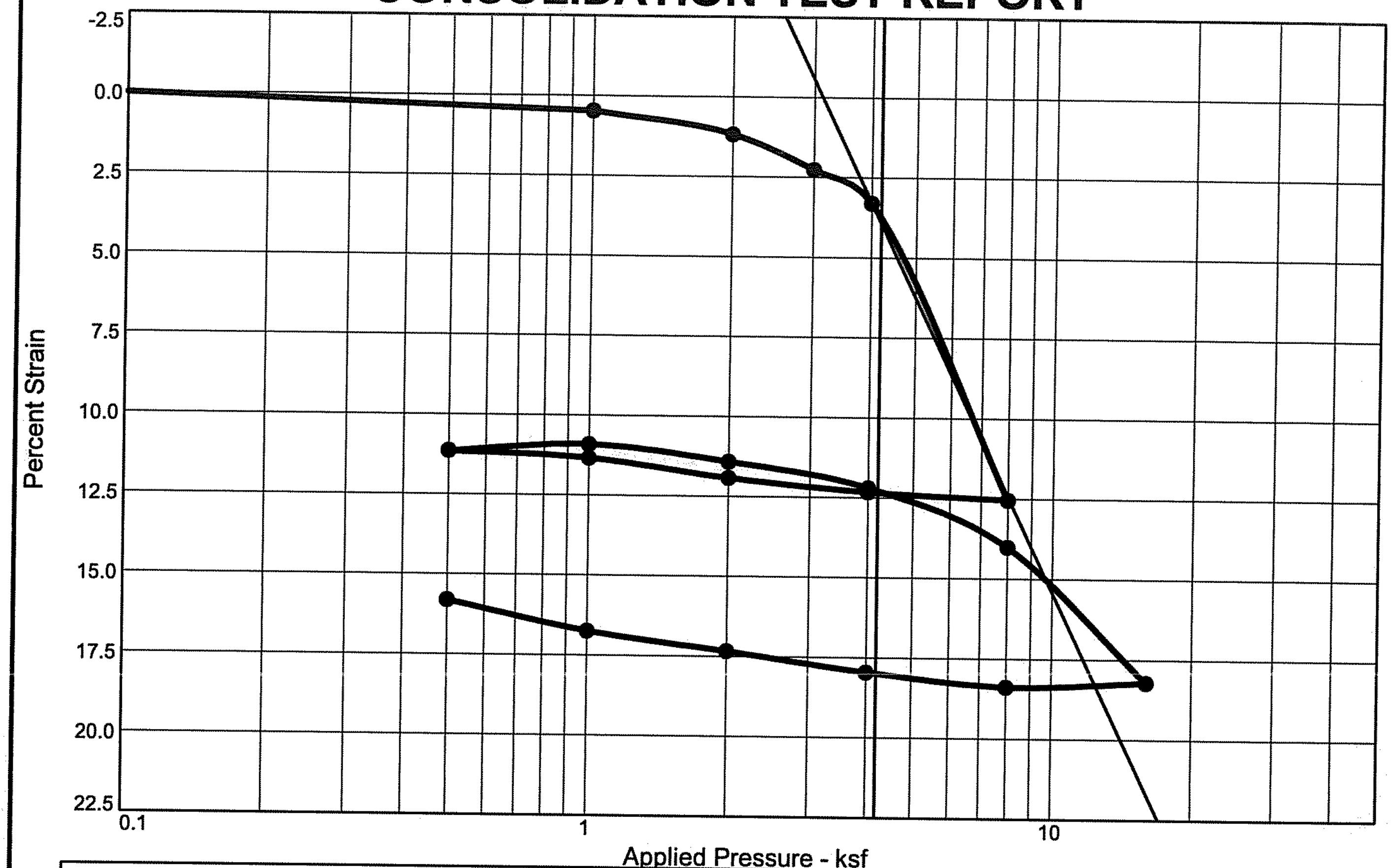
Saco, Maine

Remarks:
● Natural Moisture Content: 40.9%

Lab No. 14784d

Tested By: AGS **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α
1	1.00	1.008		8	1.00	0.363		15	8.00	3.292	
2	2.00	1.490		9	0.50	0.160		16	4.00	0.946	
3	3.00	0.641		10	1.00	2.720		17	2.00	0.343	
4	4.00	0.508		11	2.00	0.610		18	1.00	0.182	
5	8.00	0.082		12	4.00	0.703		19	0.50	0.081	
6	4.00	2.002		13	8.00	0.606					
7	2.00	0.882		14	16.00	0.332					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
101.9 %	45.1 %	77.5	42.0	21.3	2.75		4.1	0.68	0.11			1.218

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-102: South Portland, ME **Depth:** 65'-67' **Sample No.:** U-4

Remarks:

R.W. Gillespie & Associates, Inc.

Saco, Maine

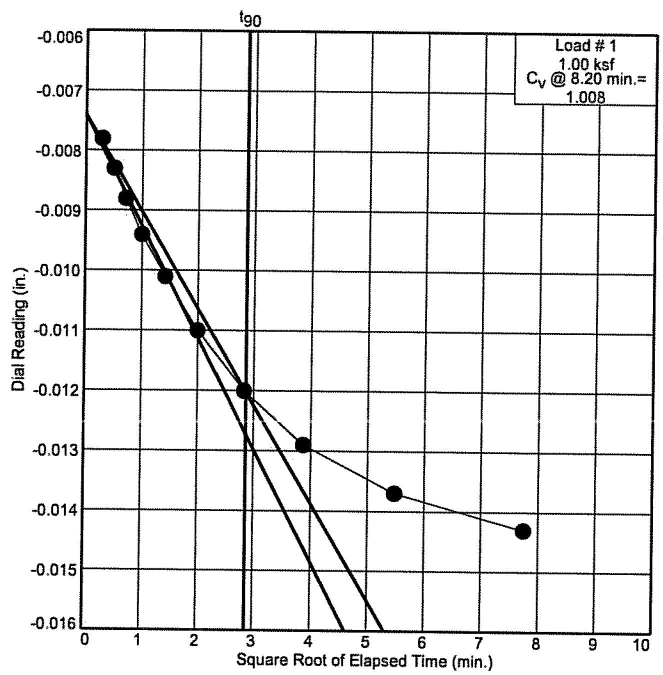
Lab No. 14784d

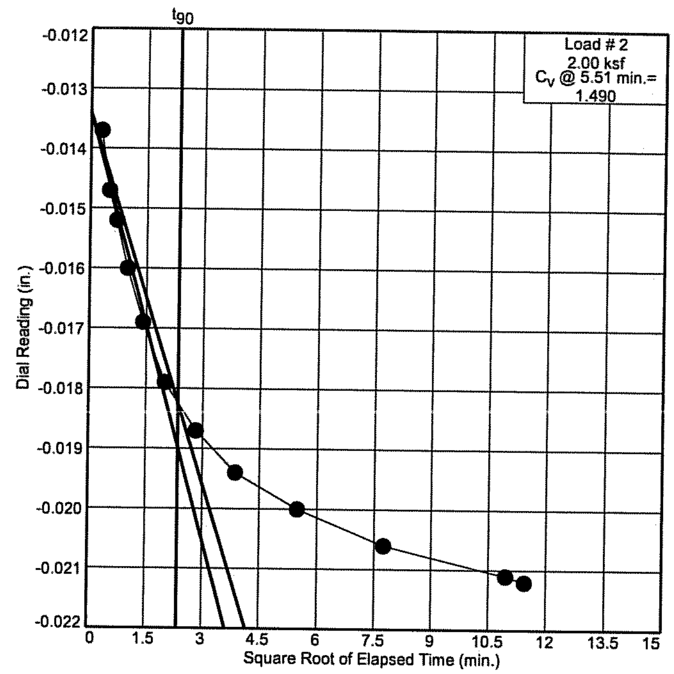
Tested By: JRF/AGS **Checked By:** MTG MTG

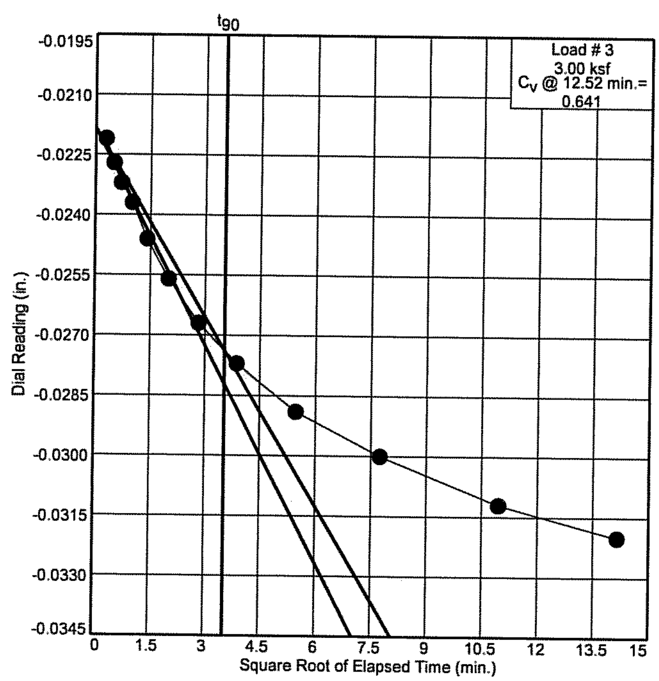
Dial Reading vs. Time

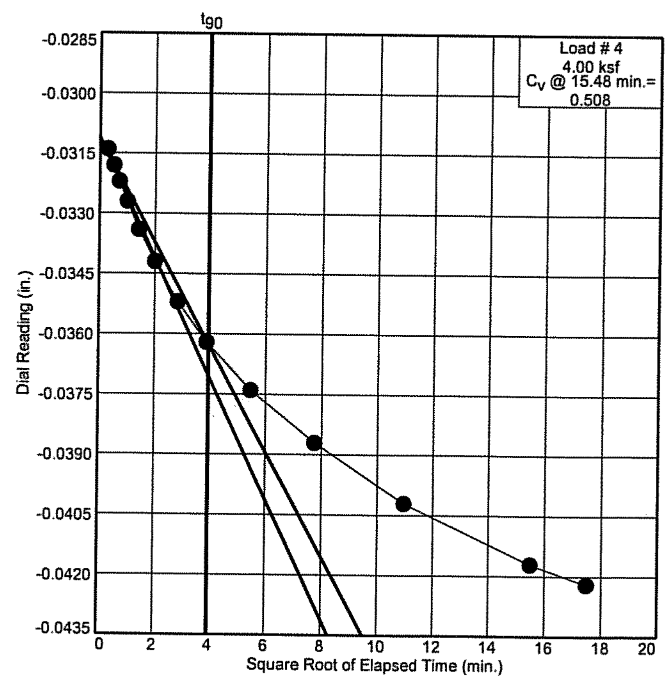
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 65'-67'   Sample Number: U-4









R.W. Gillespie & Associates, Inc.

Saco, Maine

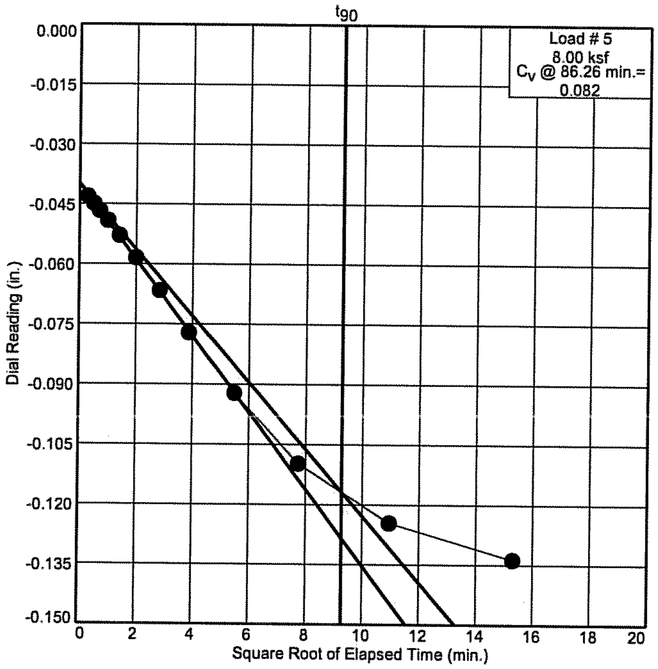
MB

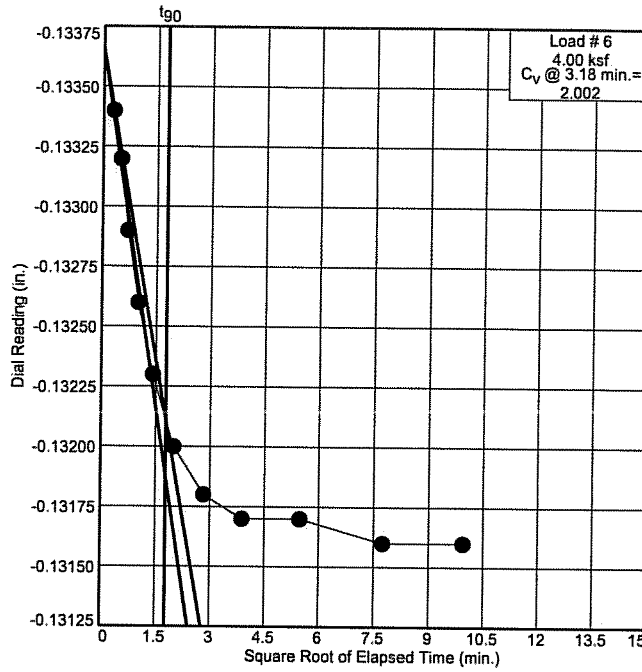
Lab No. 14785d

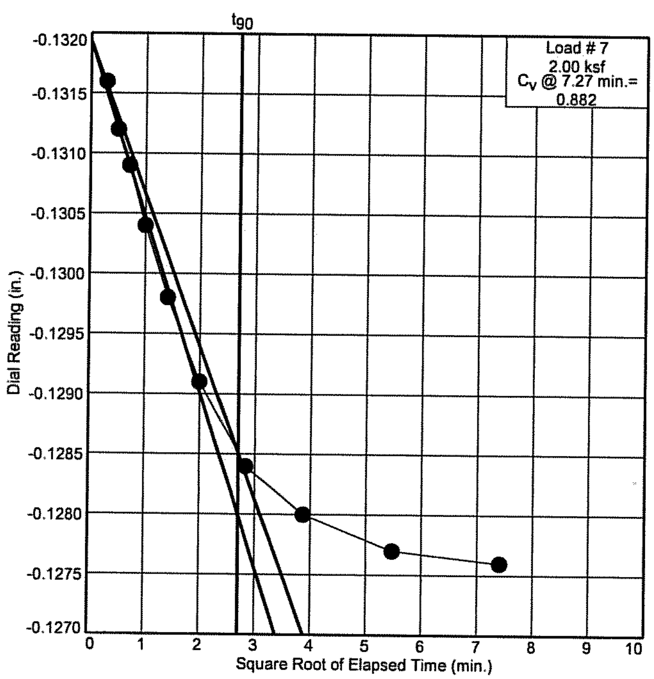
Dial Reading vs. Time

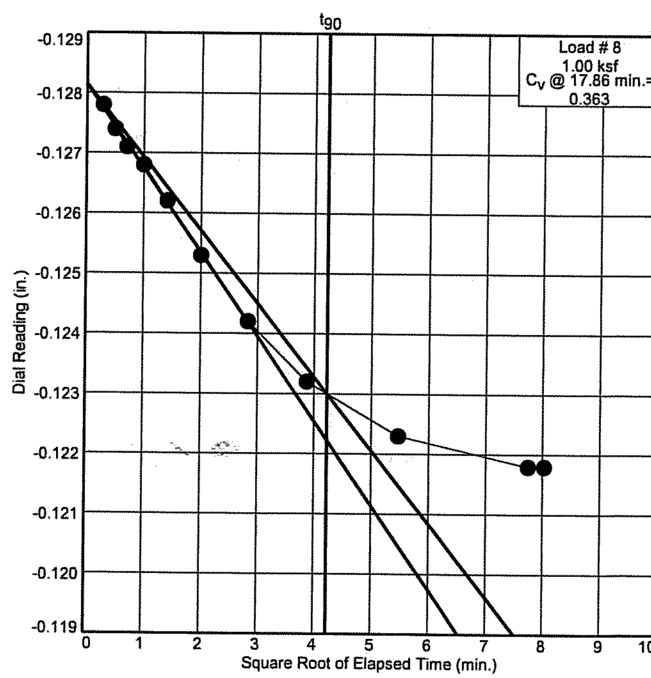
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 65'-67'   Sample Number: U-4









R.W. Gillespie & Associates, Inc.

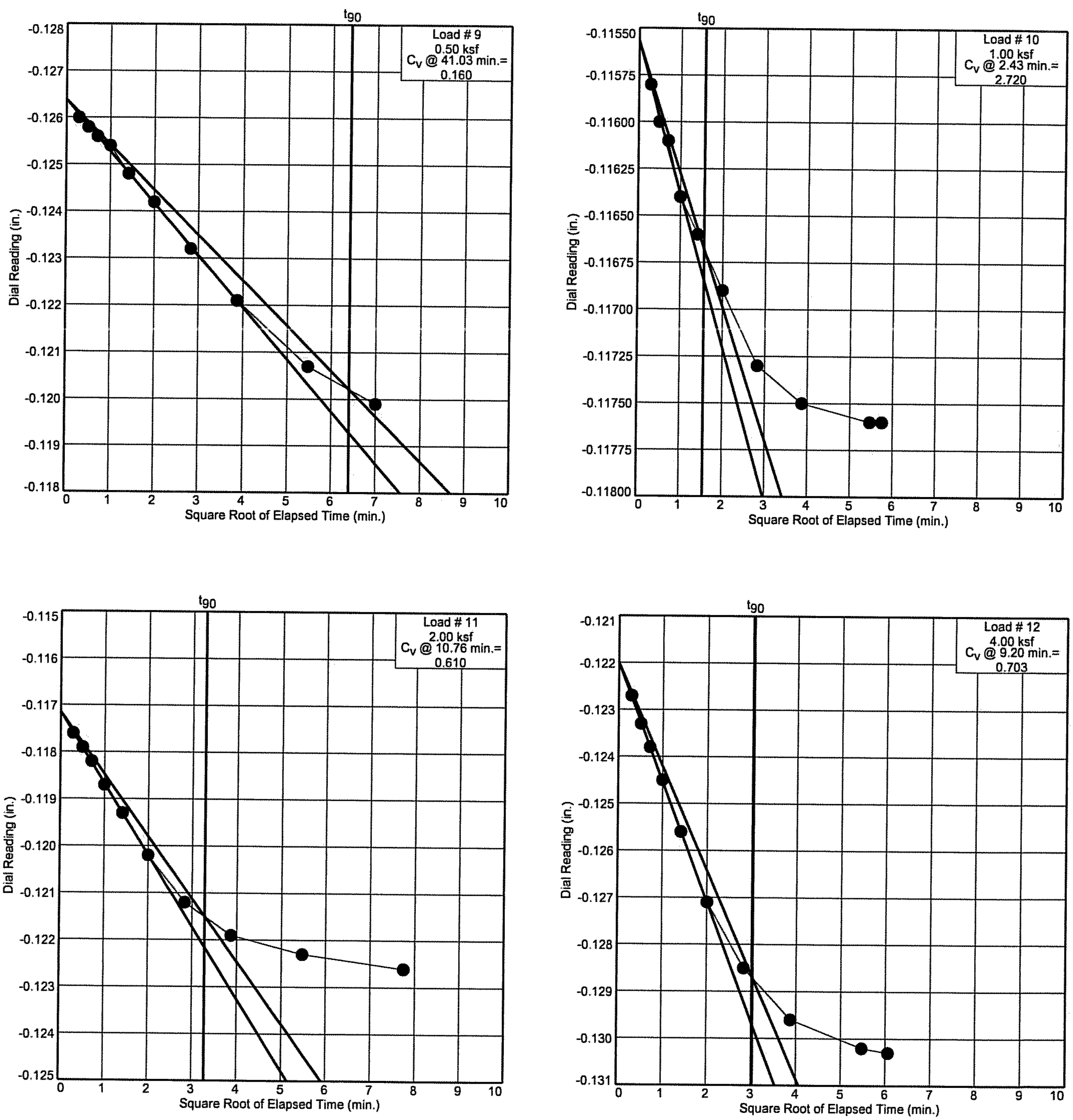
Saco, Maine

Lab No. 14786d

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 65'-67'   Sample Number: U-4



R.W. Gillespie & Associates, Inc.

Saco, Maine

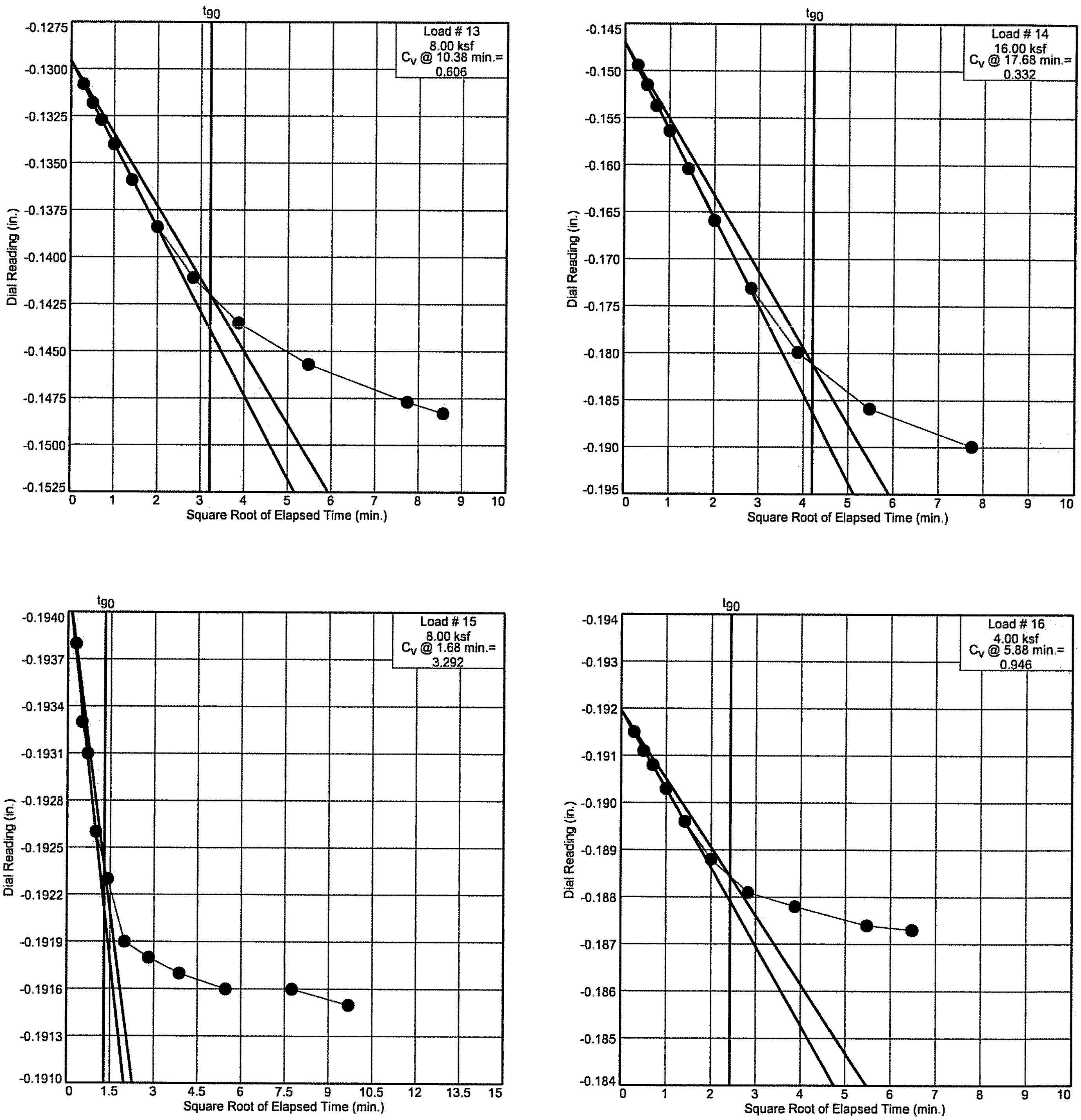
MTB

Lab No. 14787d

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 65'-67'   Sample Number: U-4



R.W. Gillespie & Associates, Inc.

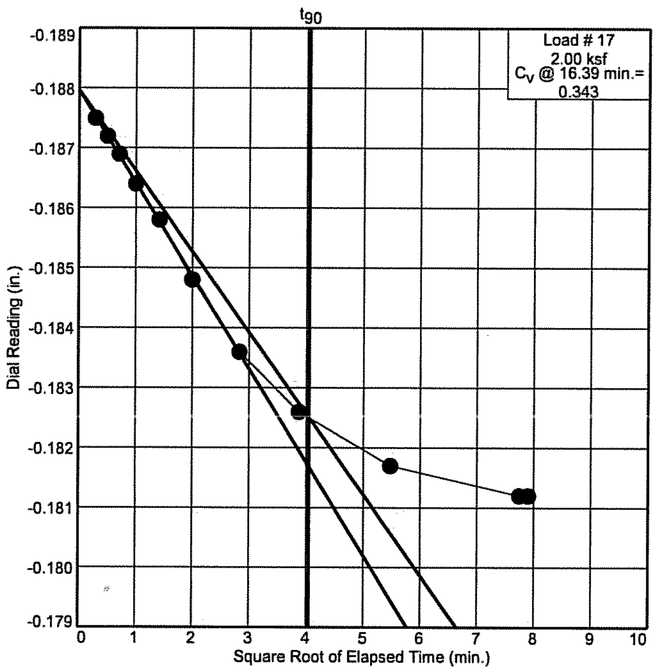
Saco, Maine

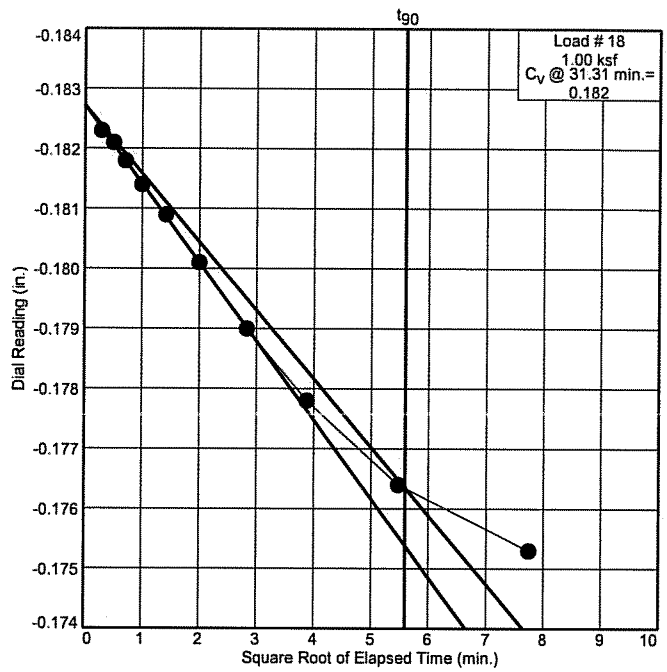
Lab No. 14788d

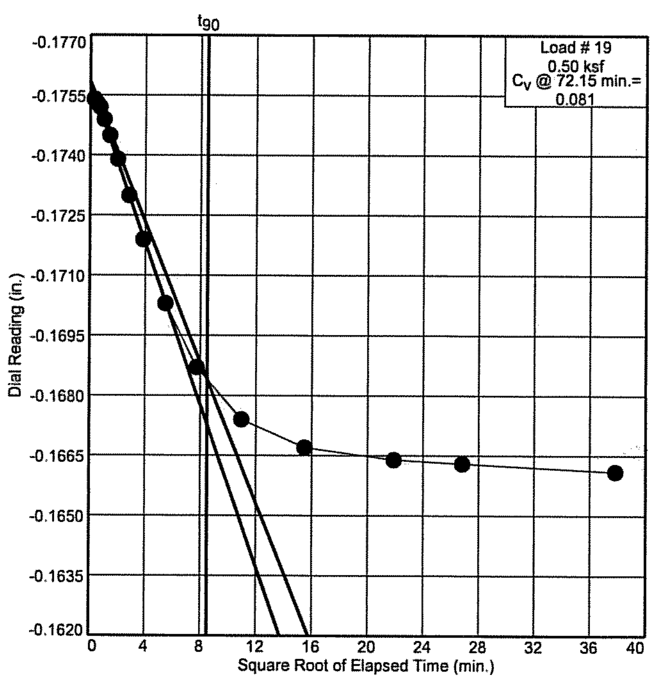
Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 65'-67' Sample Number: U-4







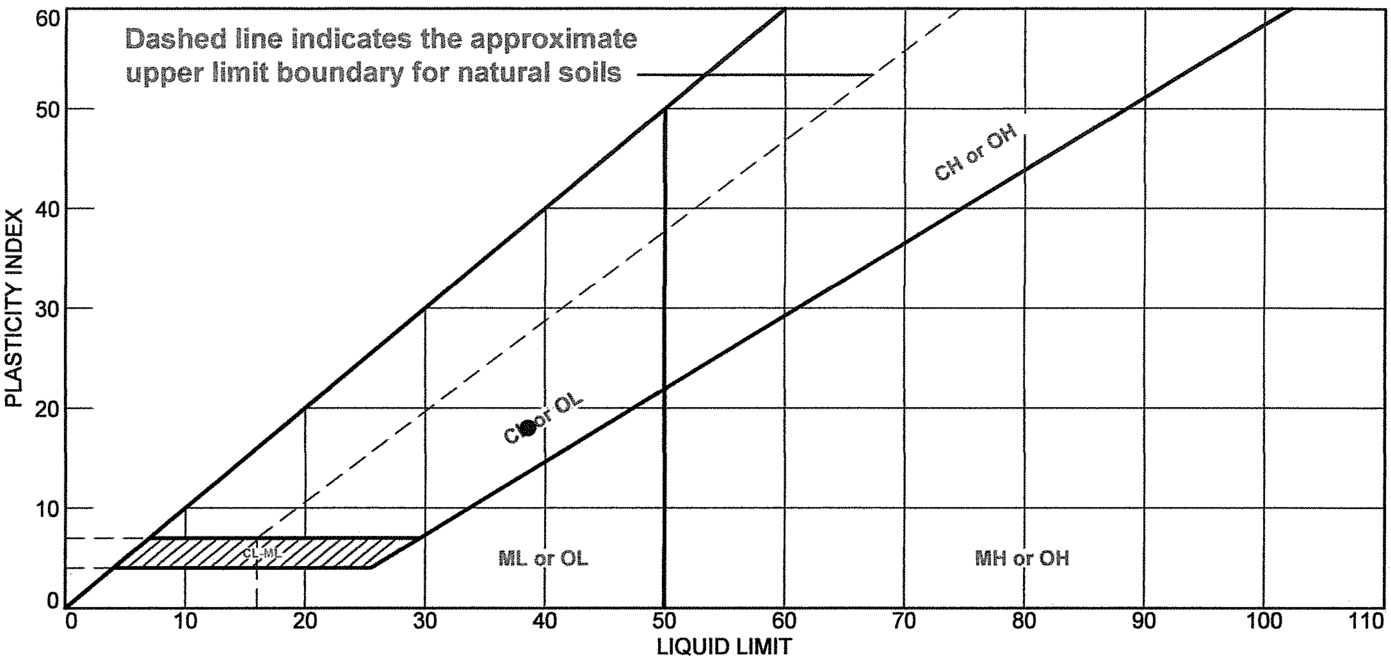
R.W. Gillespie & Associates, Inc.

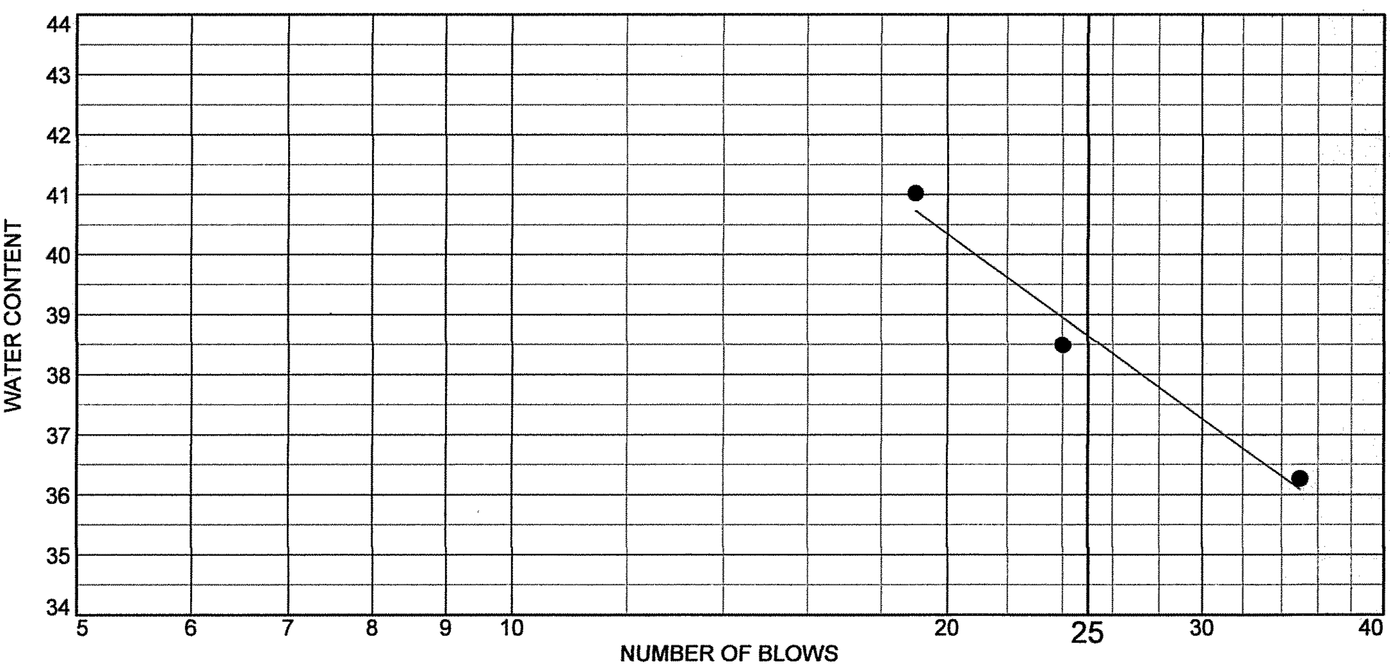
Saco, Maine

MTG

Lab No. 14789d

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	38.6	20.6	18.0			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME
Sample Number: U-5 **Depth:** 75'-77'

R.W. Gillespie & Associates, Inc.

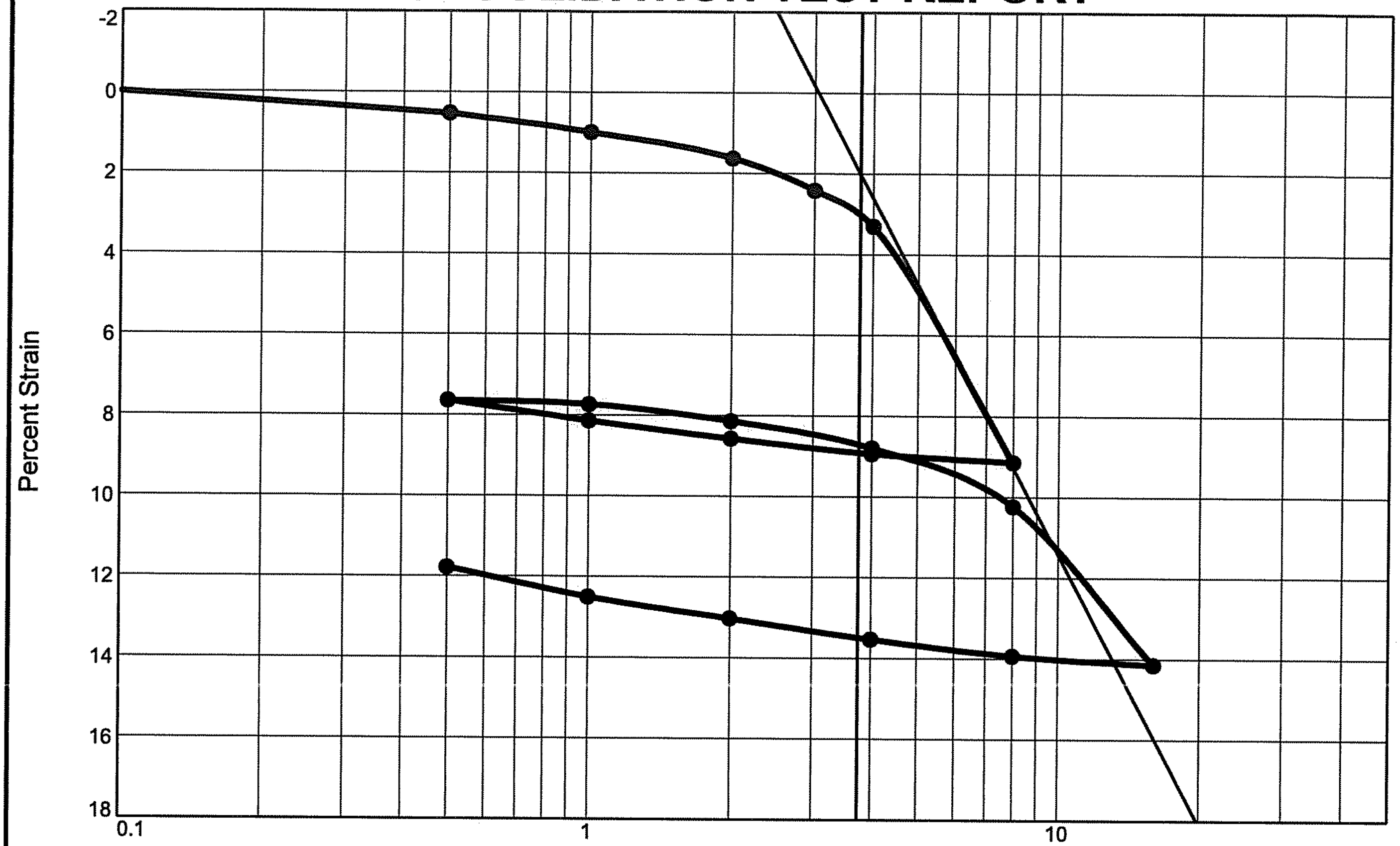
Saco, Maine

Remarks:
● Natural Moisture: 40.6%

Lab No. 14784e

Tested By: AGS **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation											
No.	Load (ksf)	C_v (ft.²/day)	C_α	No.	Load (ksf)	C_v (ft.²/day)	C_α	No.	Load (ksf)	C_v (ft.²/day)	C_α
1	0.50	1.346		8	2.00	2.973		15	16.00	0.722	
2	1.00	1.430		9	1.00	1.050		16	8.00	5.833	
3	2.00	3.273		10	0.50	0.384		17	4.00	3.086	
4	3.00	1.943		11	1.00	1.293		18	2.00	1.186	
5	4.00	0.895		12	2.00	1.390		19	1.00	0.414	
6	8.00	0.449		13	4.00	1.581		20	0.50	0.194	
7	4.00	7.087		14	8.00	1.462					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
102.6 %	36.9 %	86.3	38.6	18.0	2.75		4.3	0.44	0.09			0.990

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.
Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-102: South Portland, ME **Depth:** 75'-77' **Sample No.:** U-5

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:

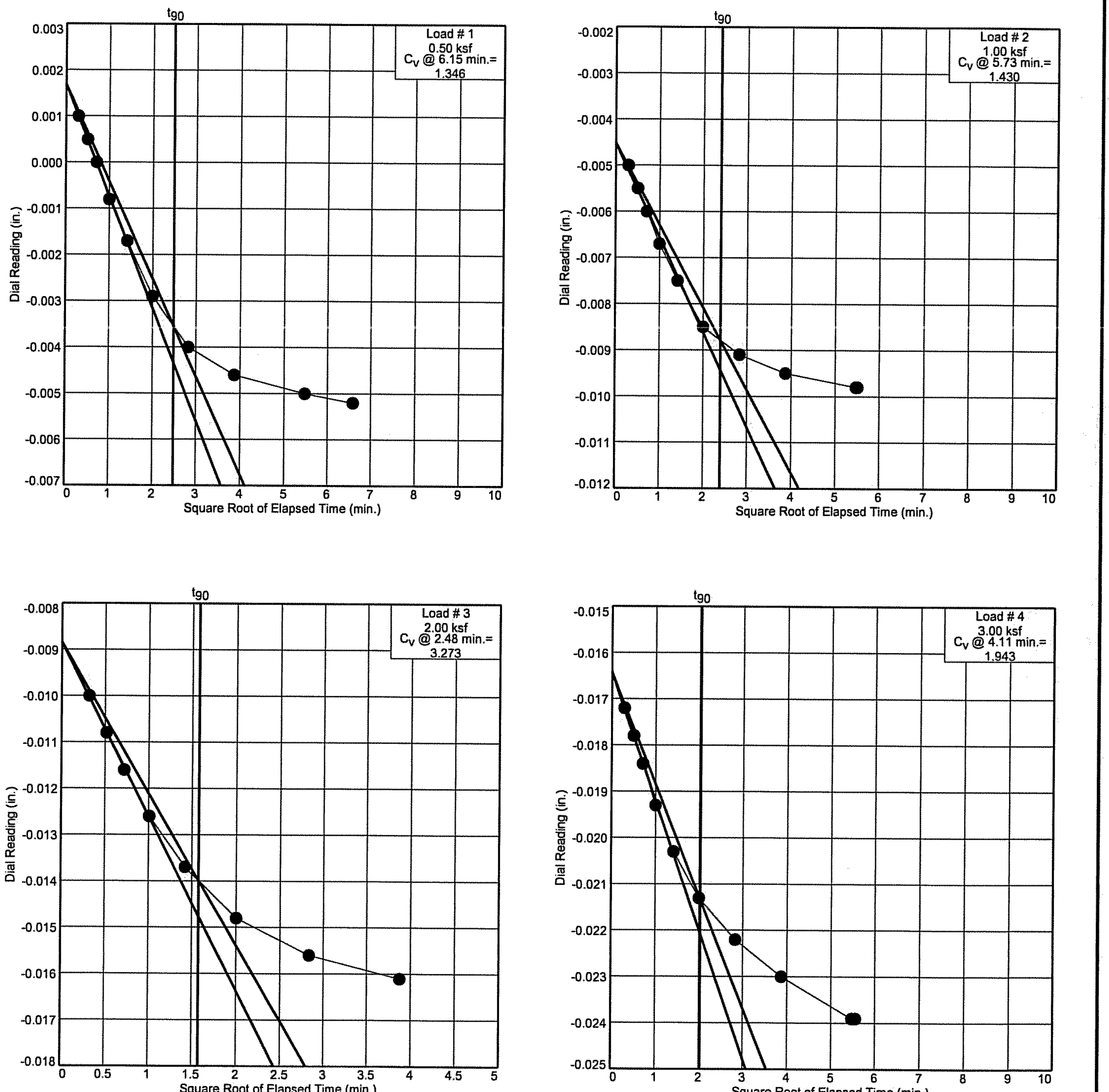
Lab No. 14784e

Tested By: AGS, JRF **Checked By:** MTG MTG

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 75'-77' Sample Number: U-5



R.W. Gillespie & Associates, Inc.

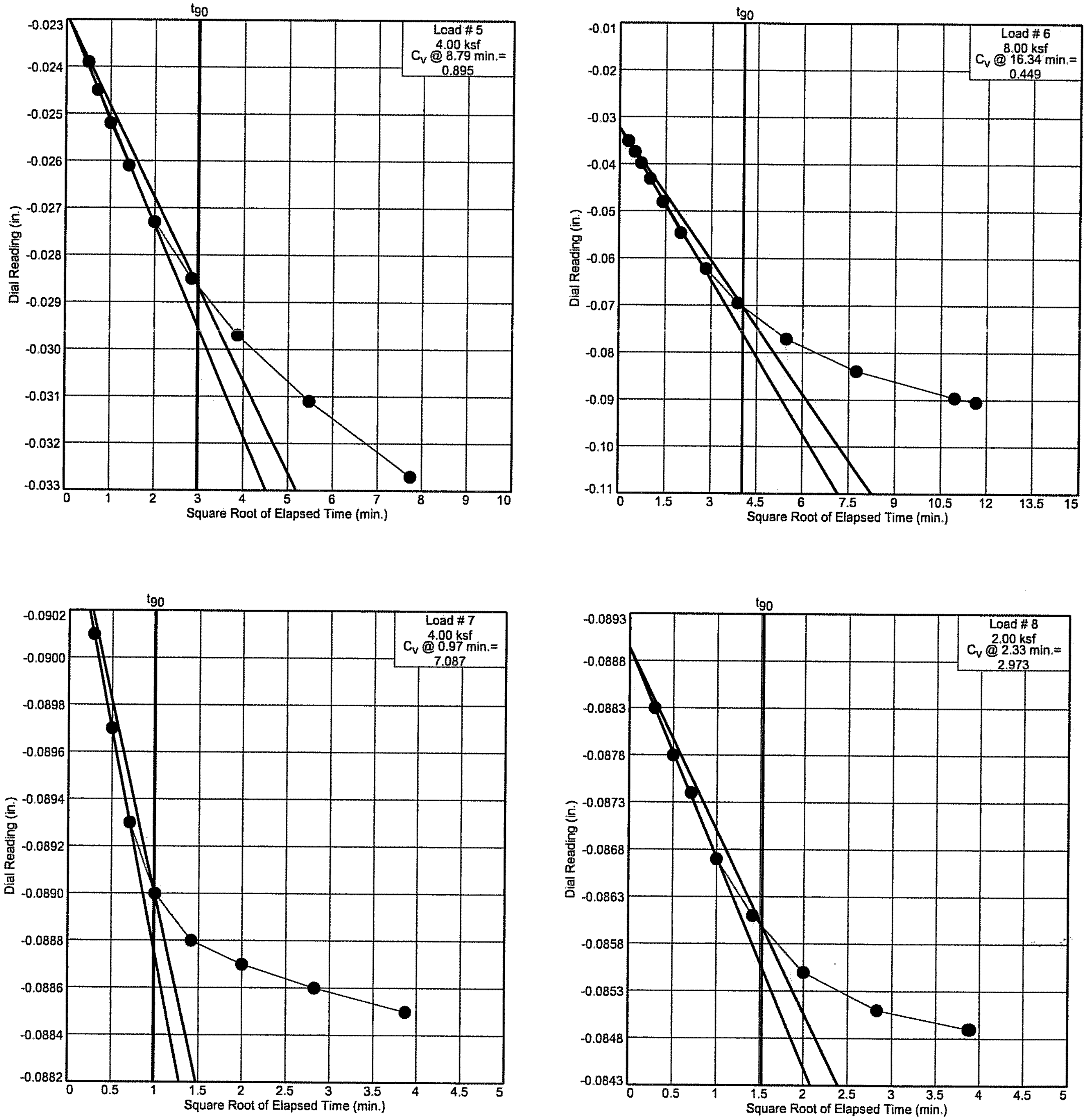
Saco, Maine

Lab No. 14784e

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 75'-77' Sample Number: U-5



R.W. Gillespie & Associates, Inc.

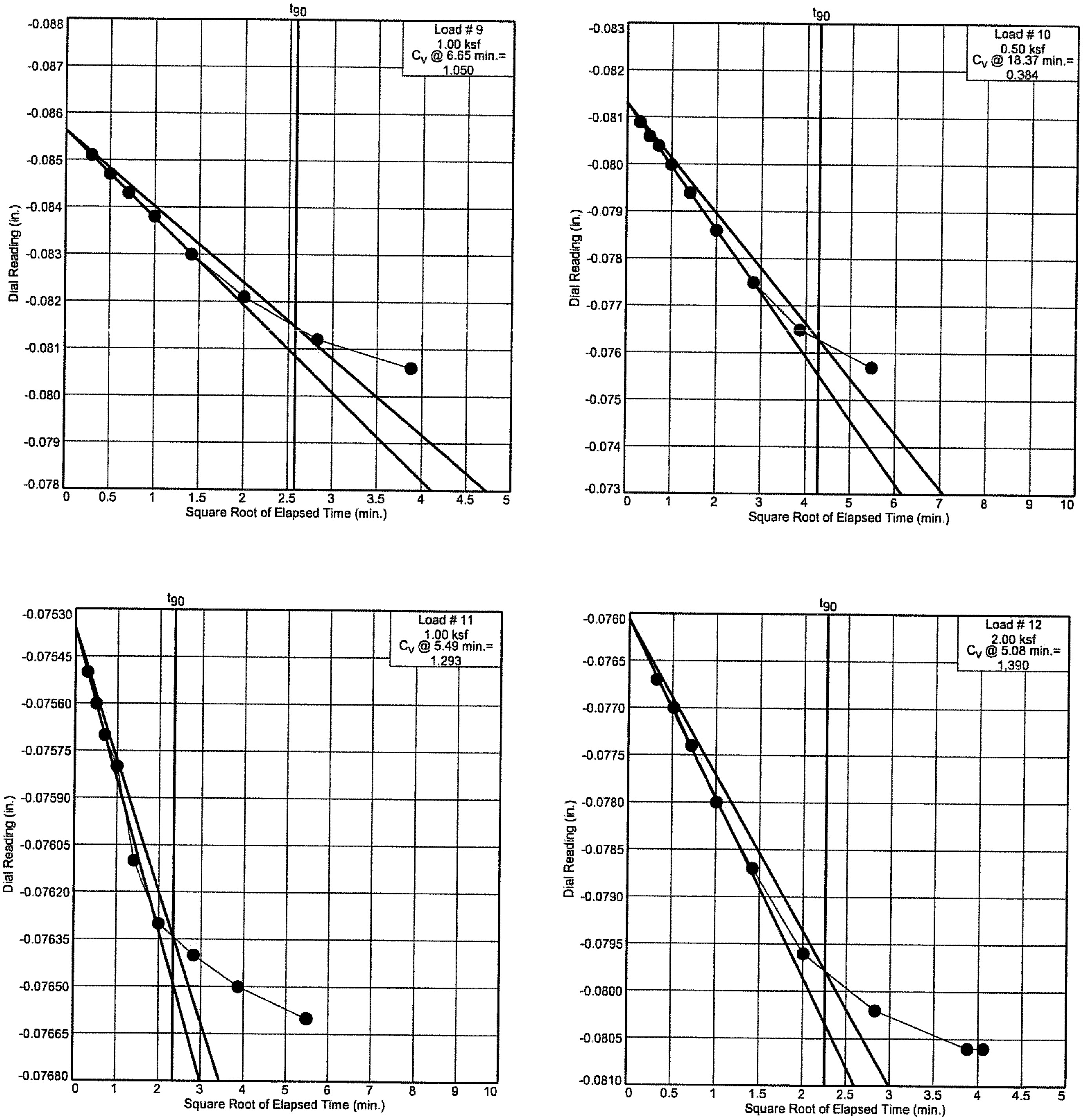
Saco, Maine

Lab No. 14784e

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME Depth: 75'-77' Sample Number: U-5



R.W. Gillespie & Associates, Inc.

Saco, Maine

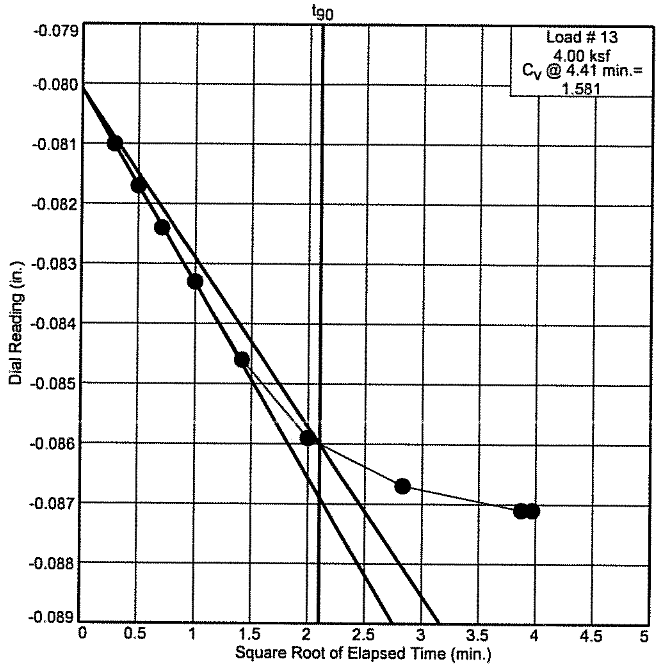
MTB

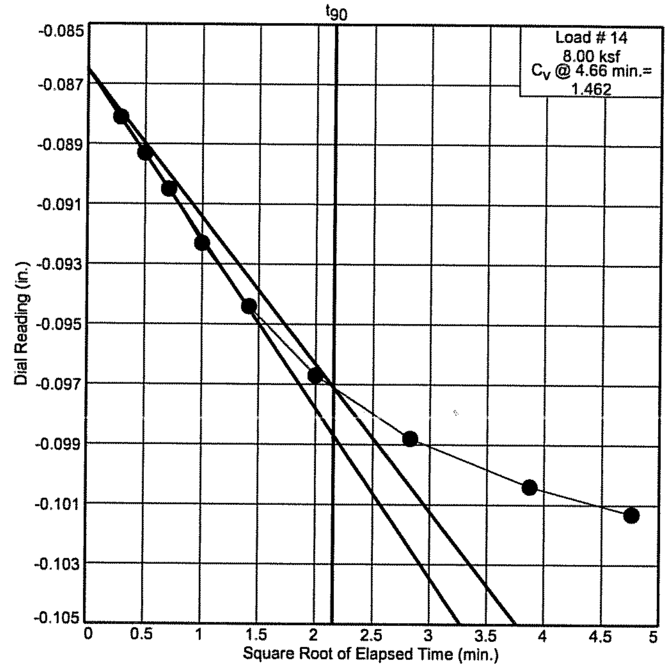
Lab No. 14784e

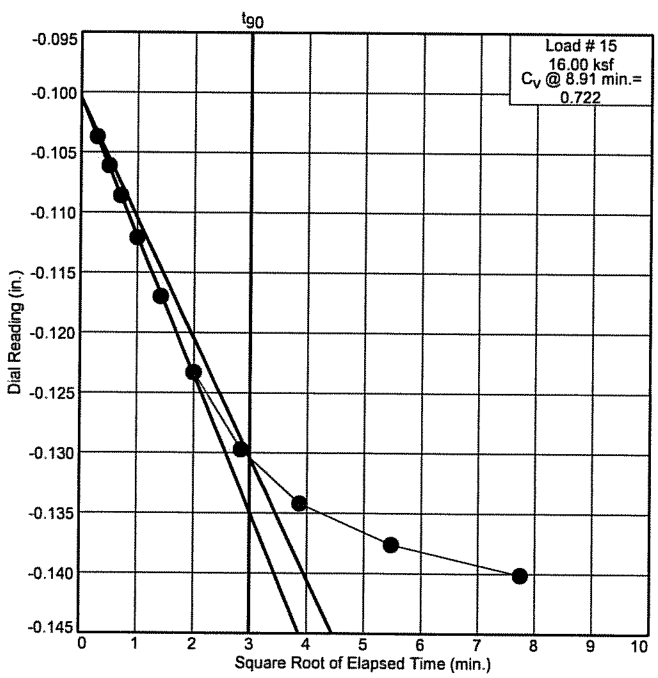
Dial Reading vs. Time

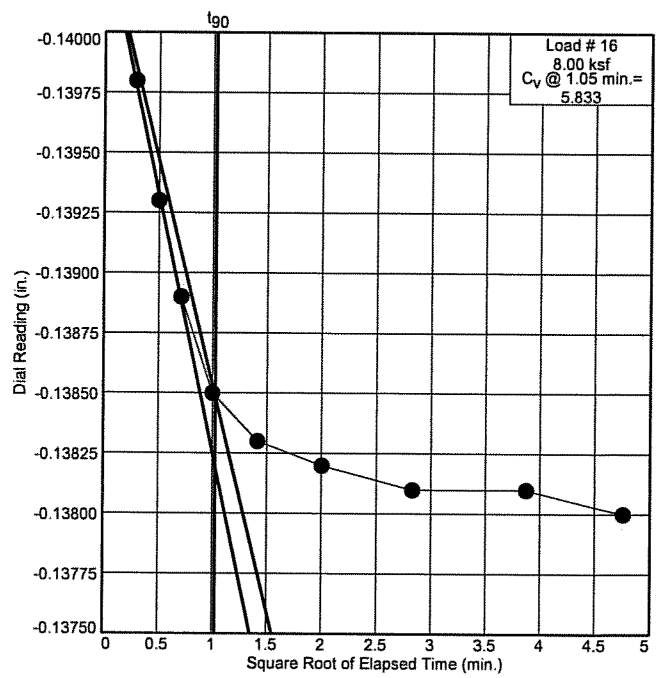
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 75'-77'   Sample Number: U-5









R.W. Gillespie & Associates, Inc.

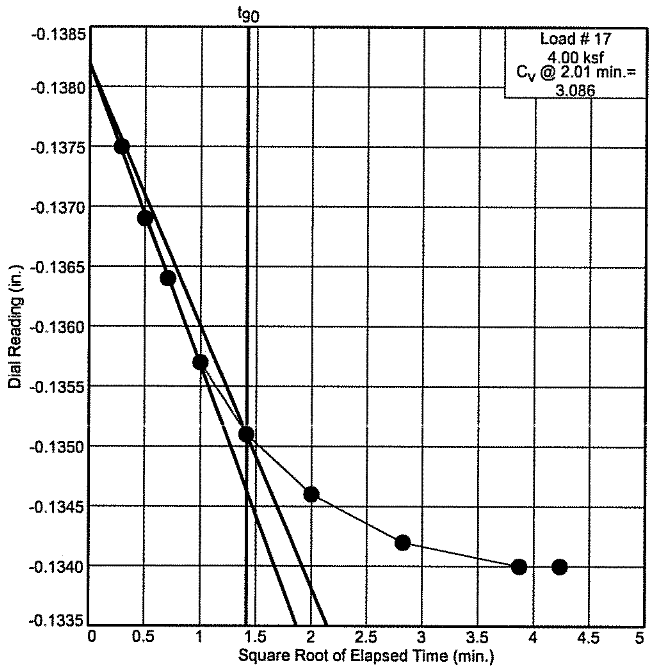
Saco, Maine

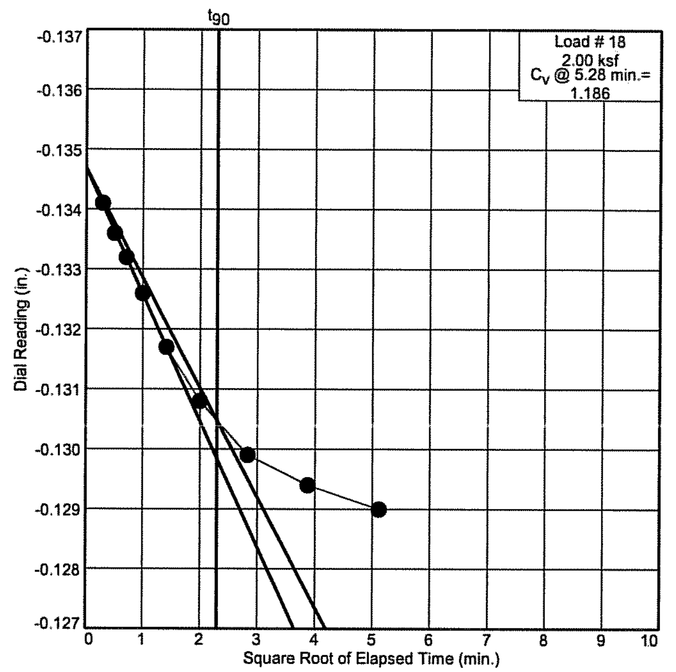
Lab No. 14784e

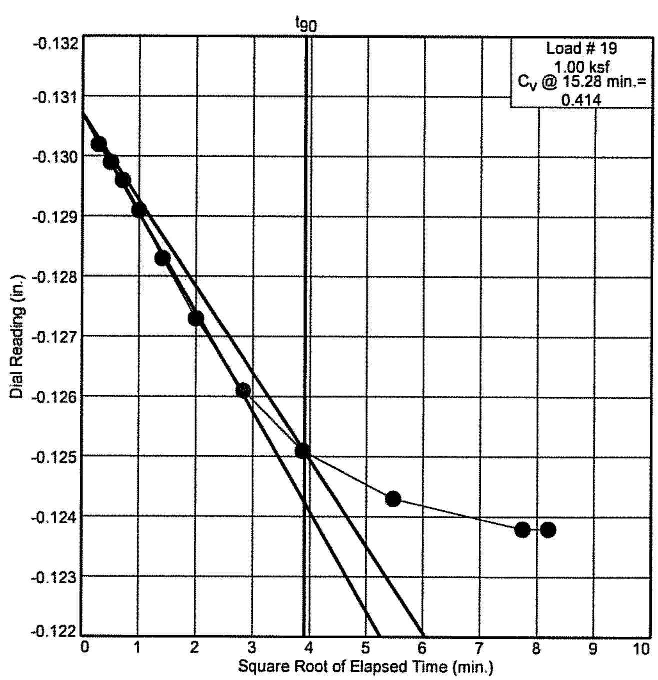
Dial Reading vs. Time

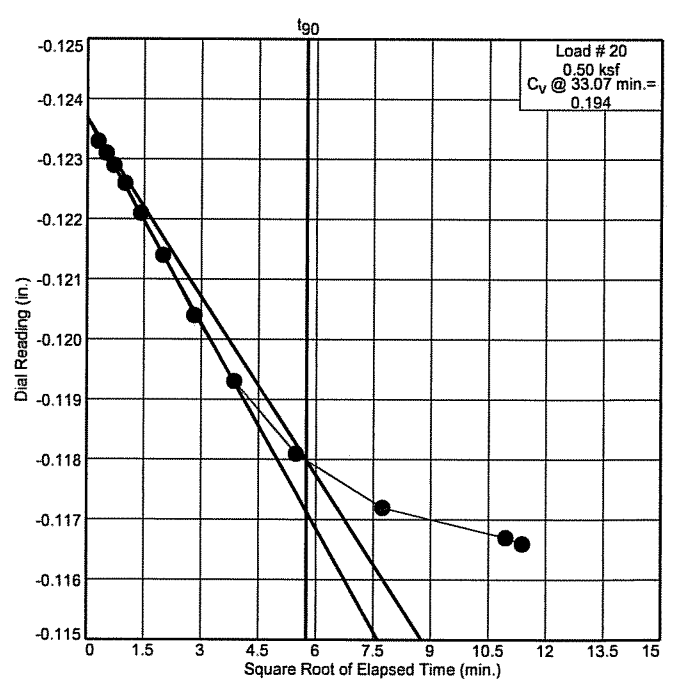
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-102: South Portland, ME   Depth: 75'-77'   Sample Number: U-5







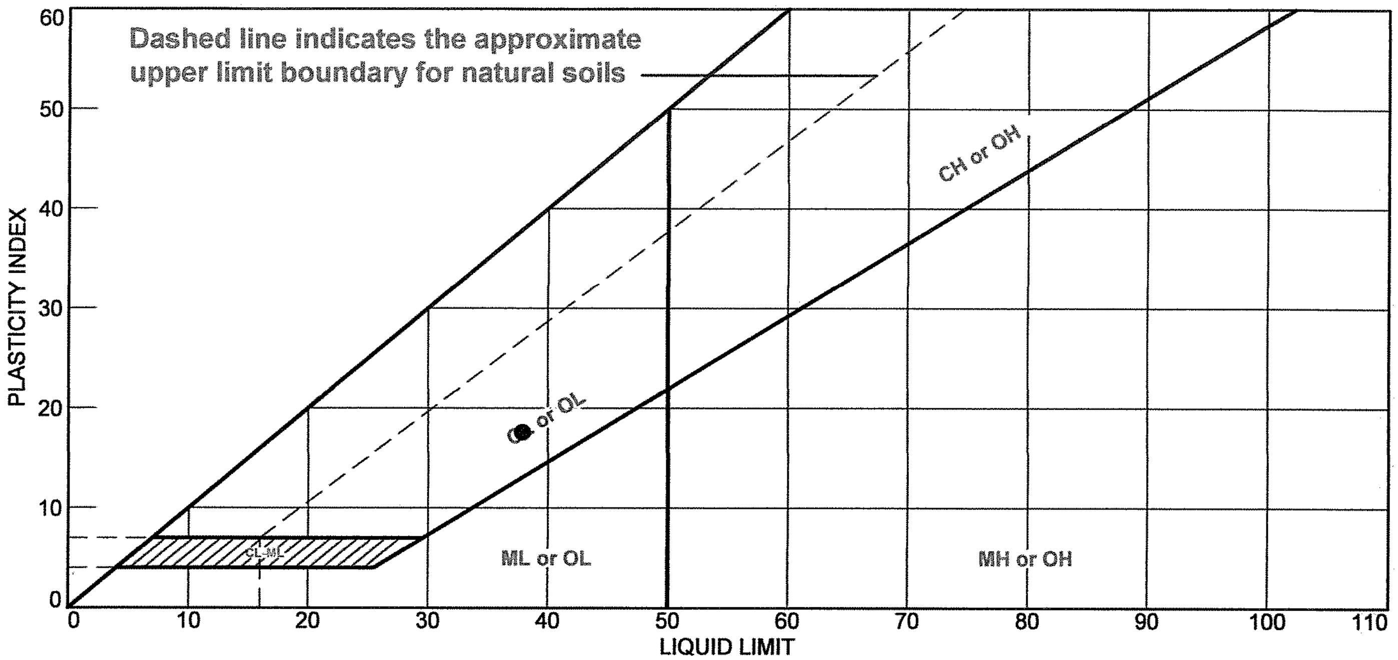


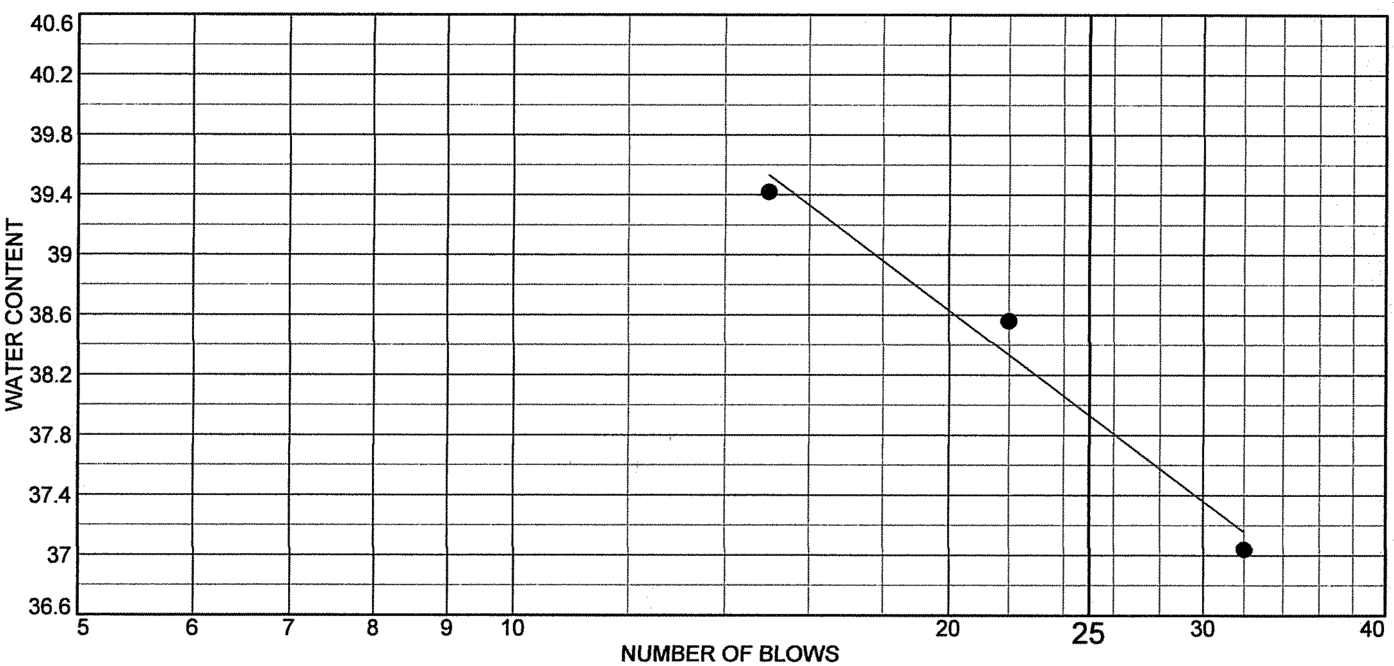
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 14784e

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	37.9	20.3	17.6			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103
Sample Number: U-3 **Depth:** 60'-62'

R.W. Gillespie & Associates, Inc.

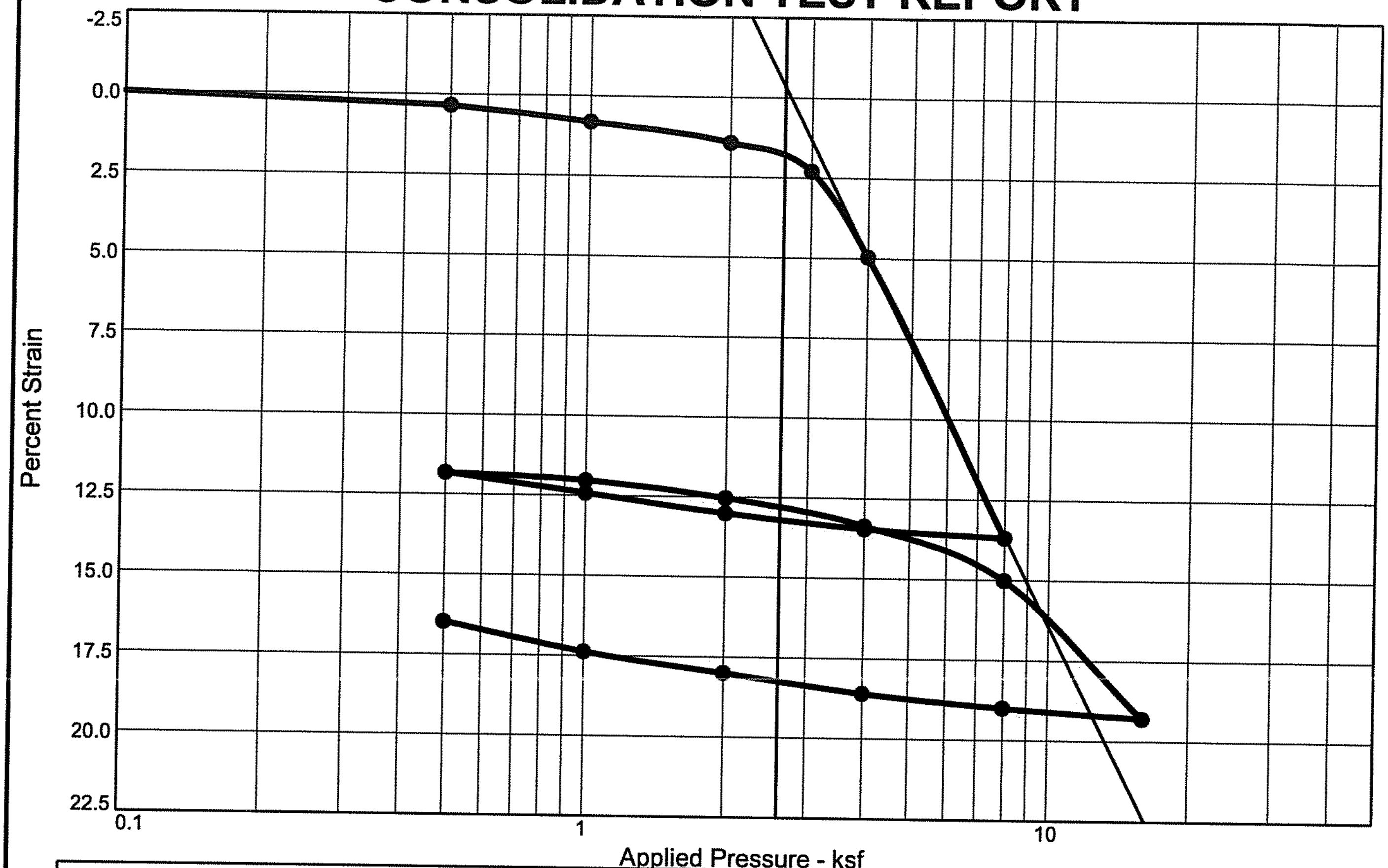
Saco, Maine

Remarks:
● Natural Moisture: 42.1%

Lab No. 14785

Tested By: AGS, JJB **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation											
No.	Load (ksf)	C_v (ft.²/day)	C_α	No.	Load (ksf)	C_v (ft.²/day)	C_α	No.	Load (ksf)	C_v (ft.²/day)	C_α
1	0.50	1.782		8	2.00	1.237		15	16.00	0.231	
2	1.00	1.924		9	1.00	0.468		16	8.00	2.961	
3	2.00	2.062		10	0.50	0.185		17	4.00	1.276	
4	3.00	1.239		11	1.00	1.399		18	2.00	0.489	
5	4.00	0.053		12	2.00	0.704		19	1.00	0.200	
6	8.00	0.121		13	4.00	0.722		20	0.50	0.095	
7	4.00	2.997		14	8.00	0.608					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
92.6 %	41.4 %	79.1	37.9	17.6	2.75		3.2	0.64	0.11			1.230

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 **Depth:** 60'-62' **Sample Number:** U-3

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:

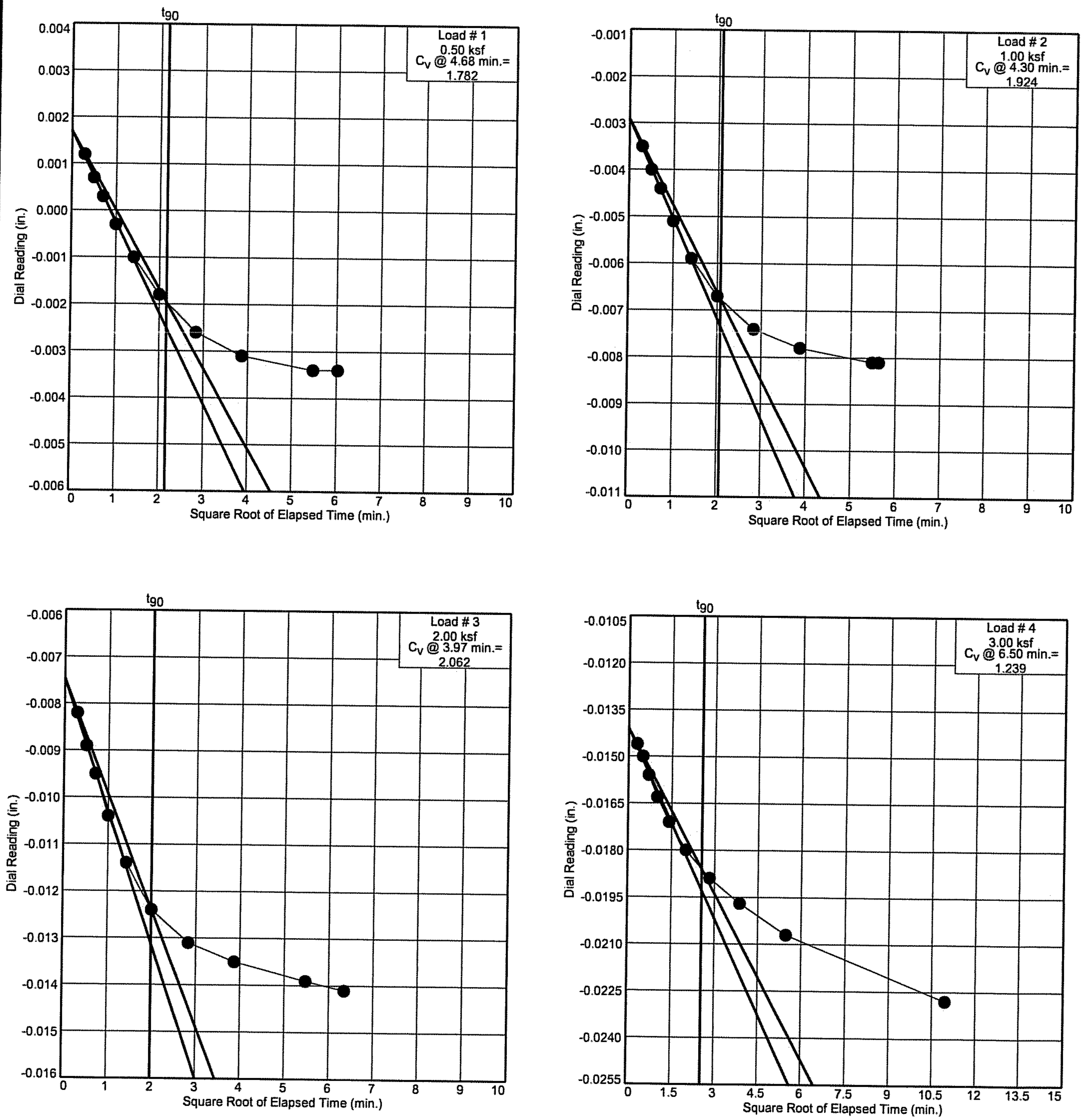
Lab No. 14785

Tested By: AGS/JRF **Checked By:** MTG MTG

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 Depth: 60'-62' Sample Number: U-3



R.W. Gillespie & Associates, Inc.

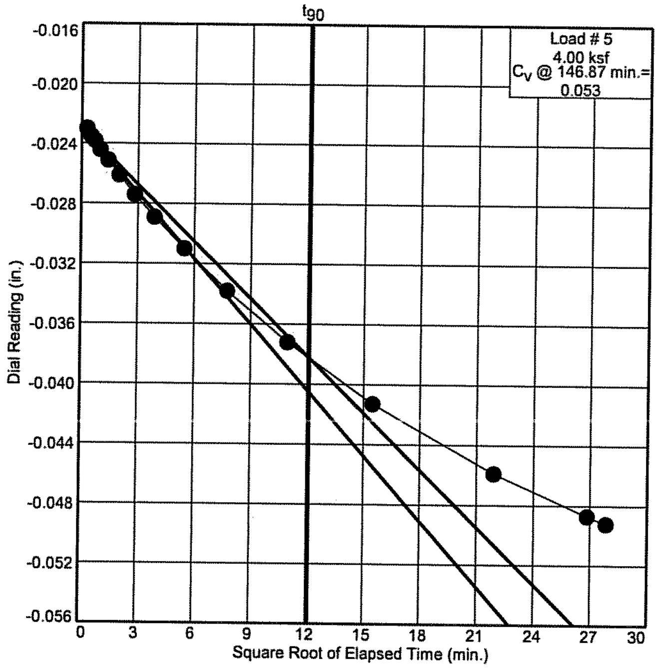
Saco, Maine

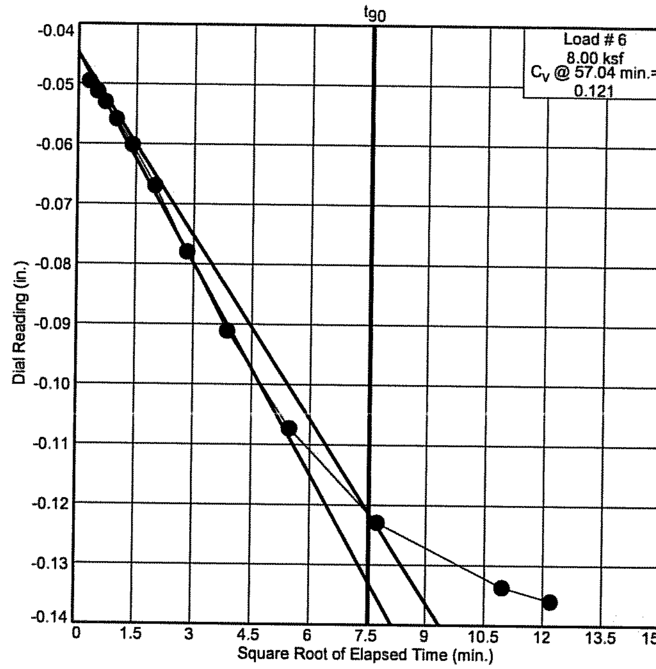
Lab No. 14785

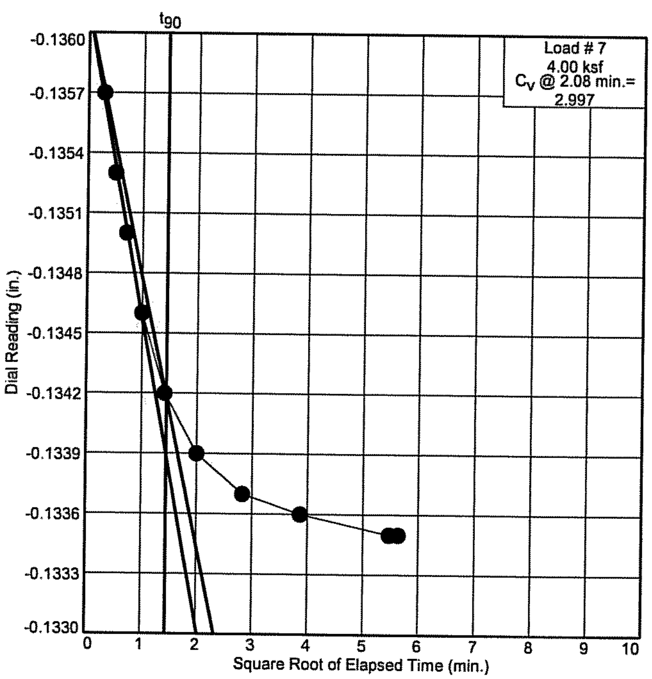
Dial Reading vs. Time

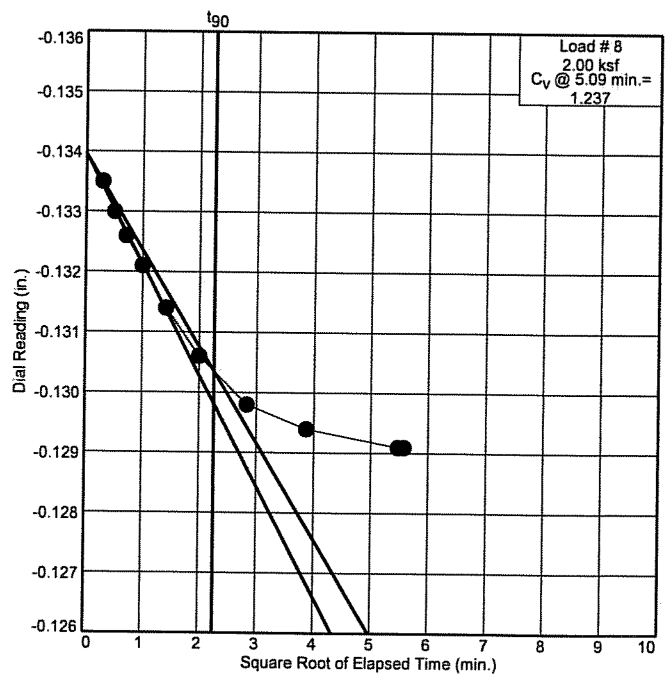
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 Depth: 60'-62' Sample Number: U-3









R.W. Gillespie & Associates, Inc.

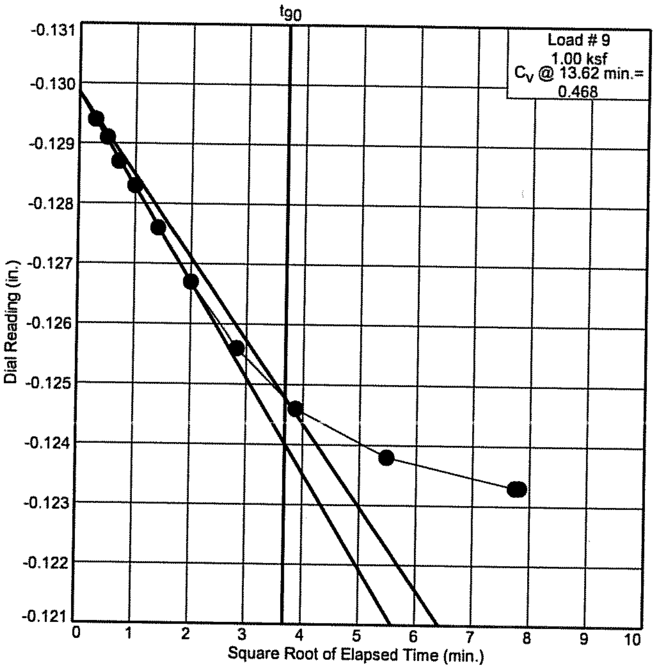
Saco, Maine

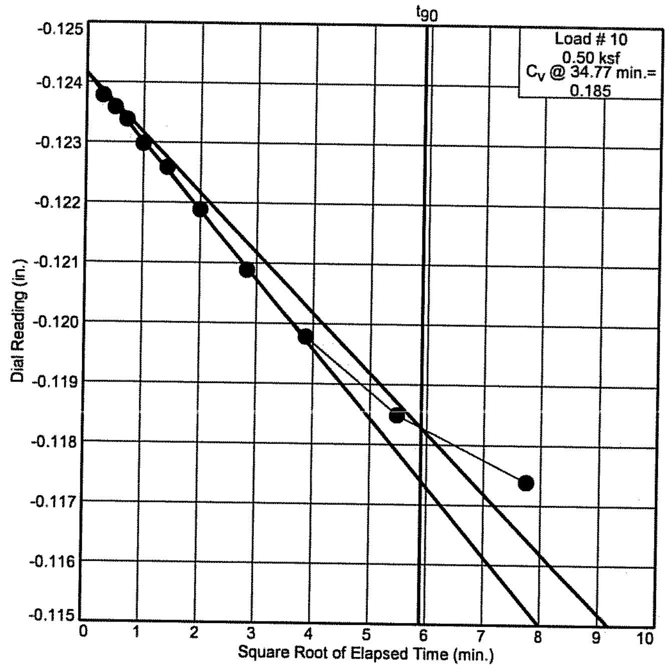
Lab No. 14785

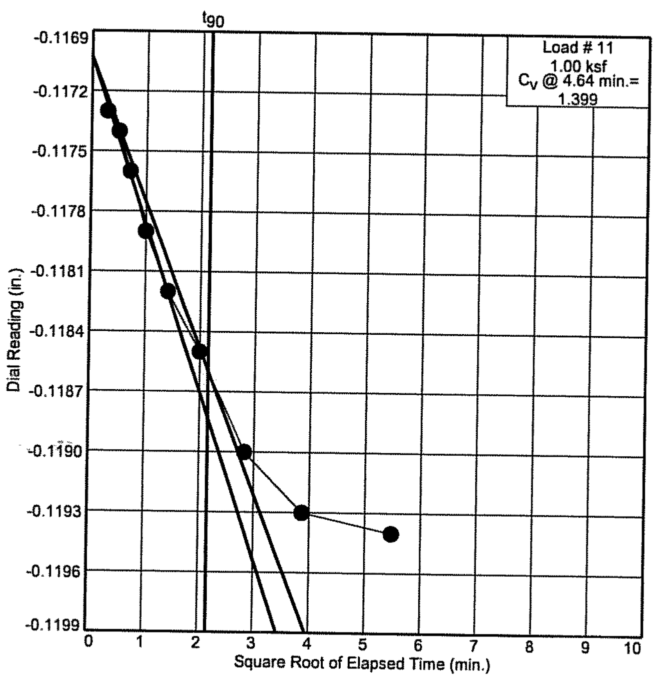
Dial Reading vs. Time

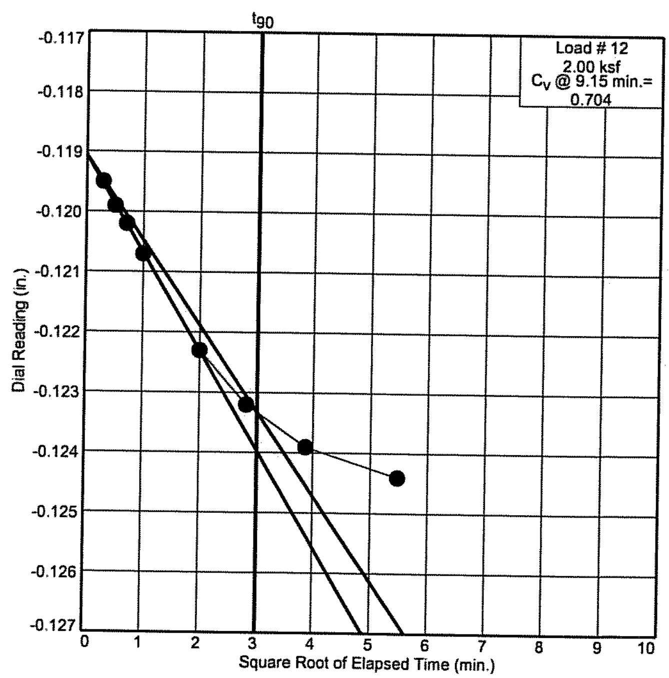
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 Depth: 60'-62' Sample Number: U-3









R.W. Gillespie & Associates, Inc.

Saco, Maine

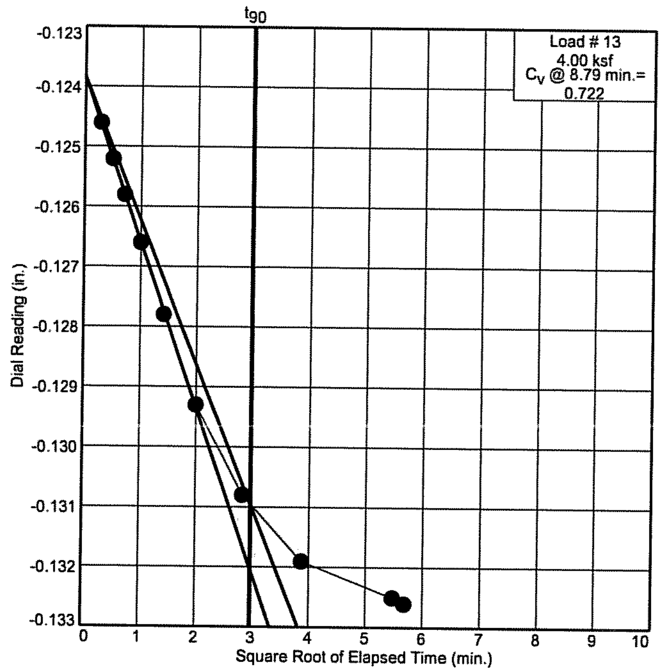
MB

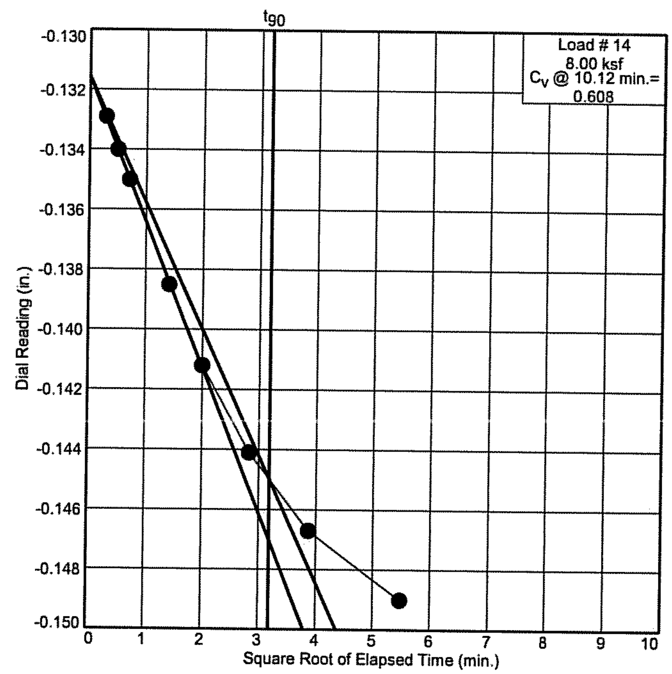
Lab No. 14785

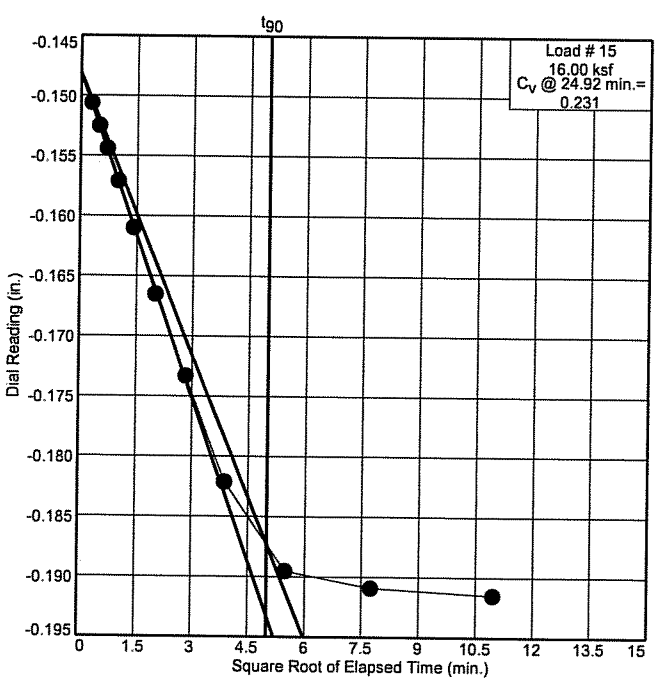
Dial Reading vs. Time

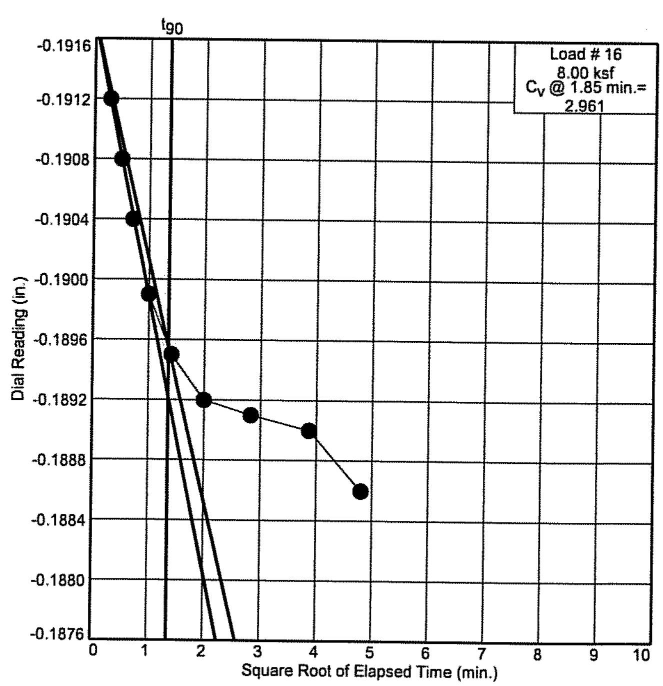
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 Depth: 60'-62' Sample Number: U-3









R.W. Gillespie & Associates, Inc.

Saco, Maine

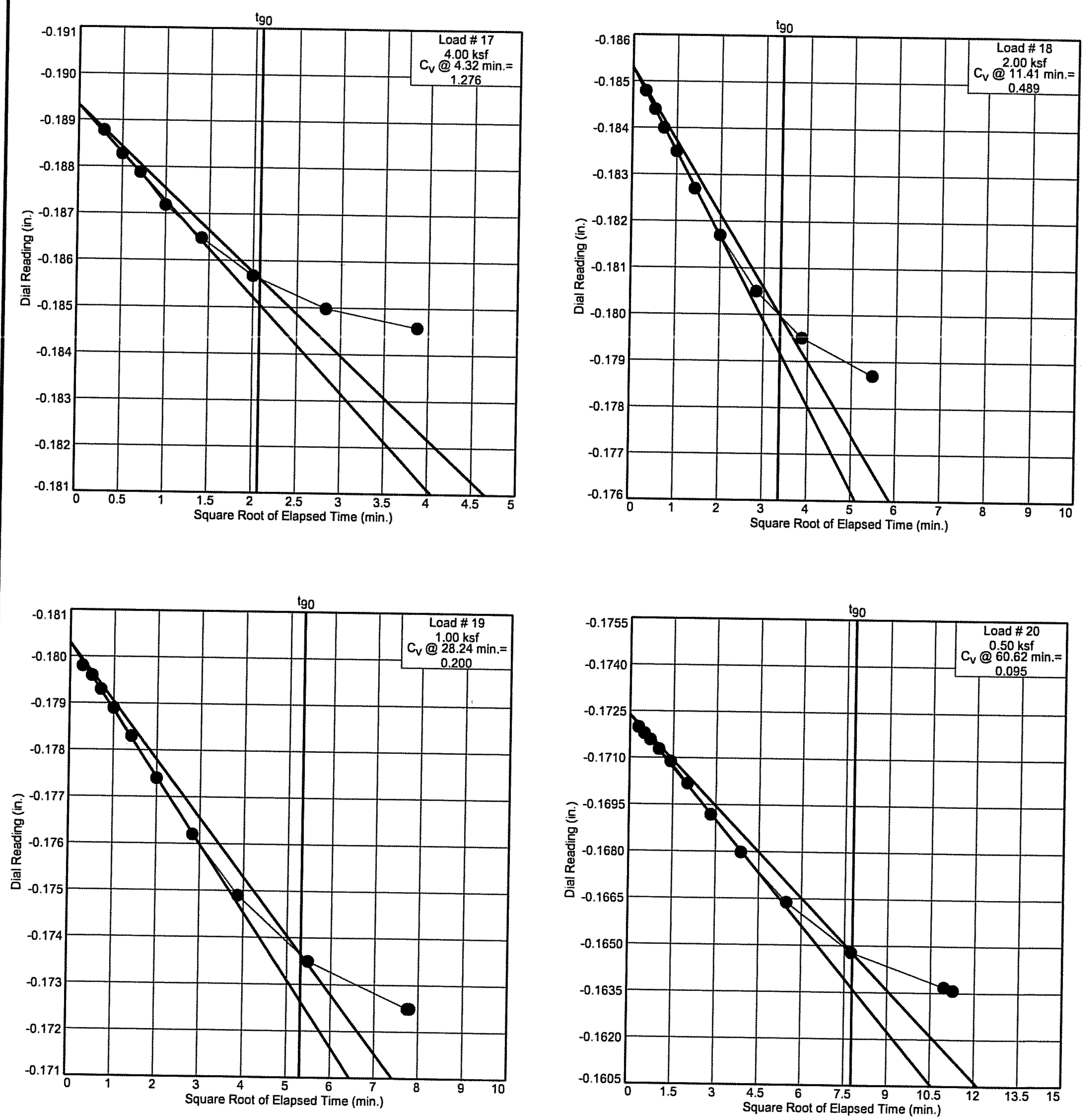
MB

Lab No. 14789

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-103 Depth: 60'-62' Sample Number: U-3

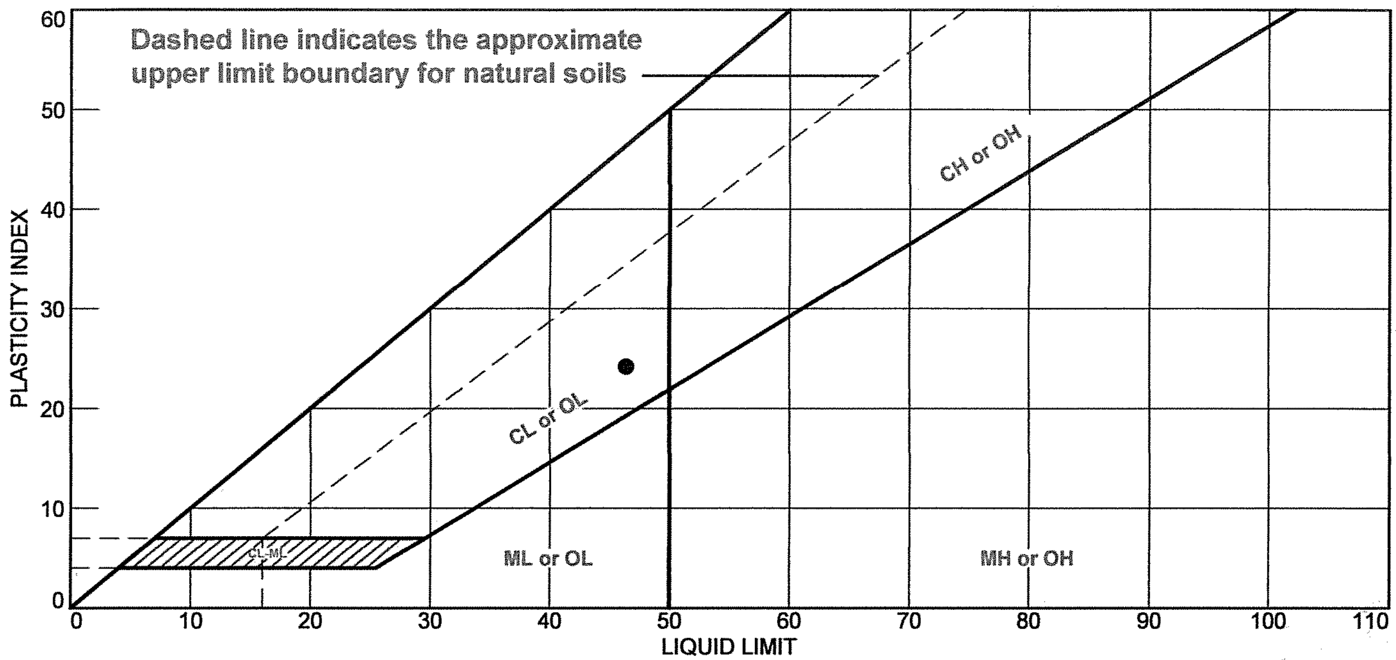


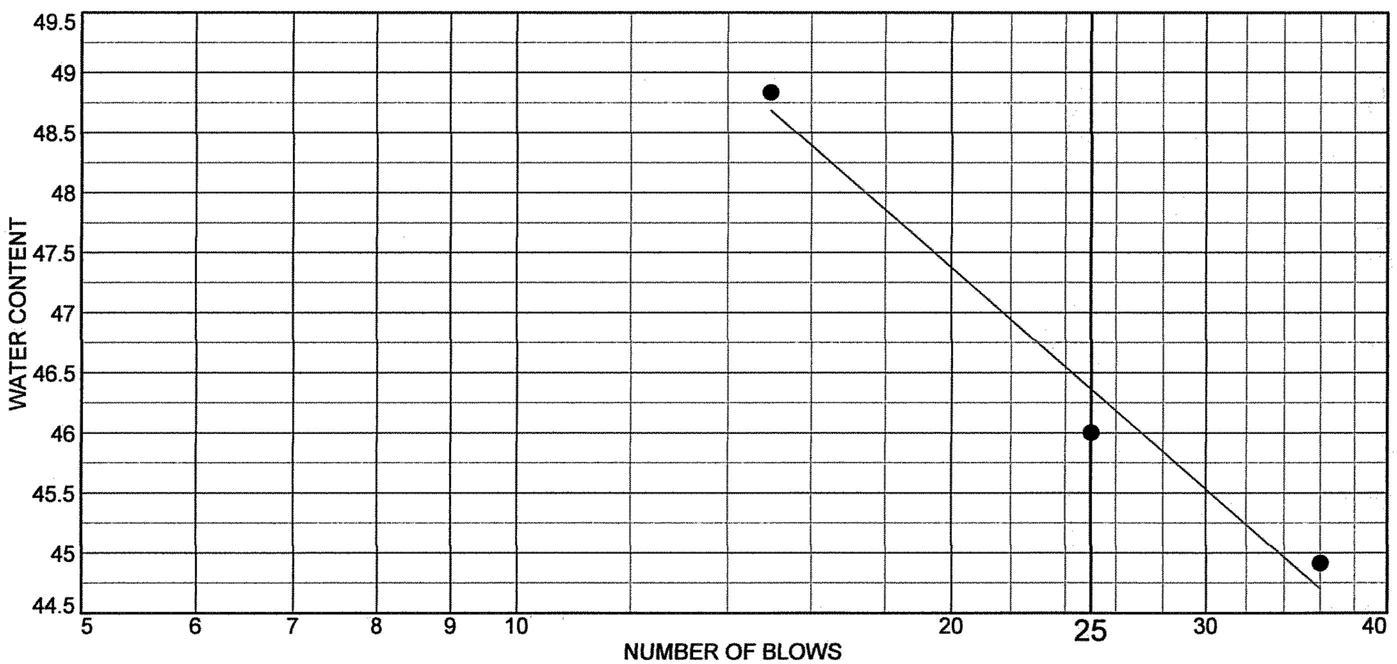
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 14795

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	46.4	22.2	24.2			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106
Sample Number: U-1 **Depth:** 25'-27'

R.W. Gillespie & Associates, Inc.

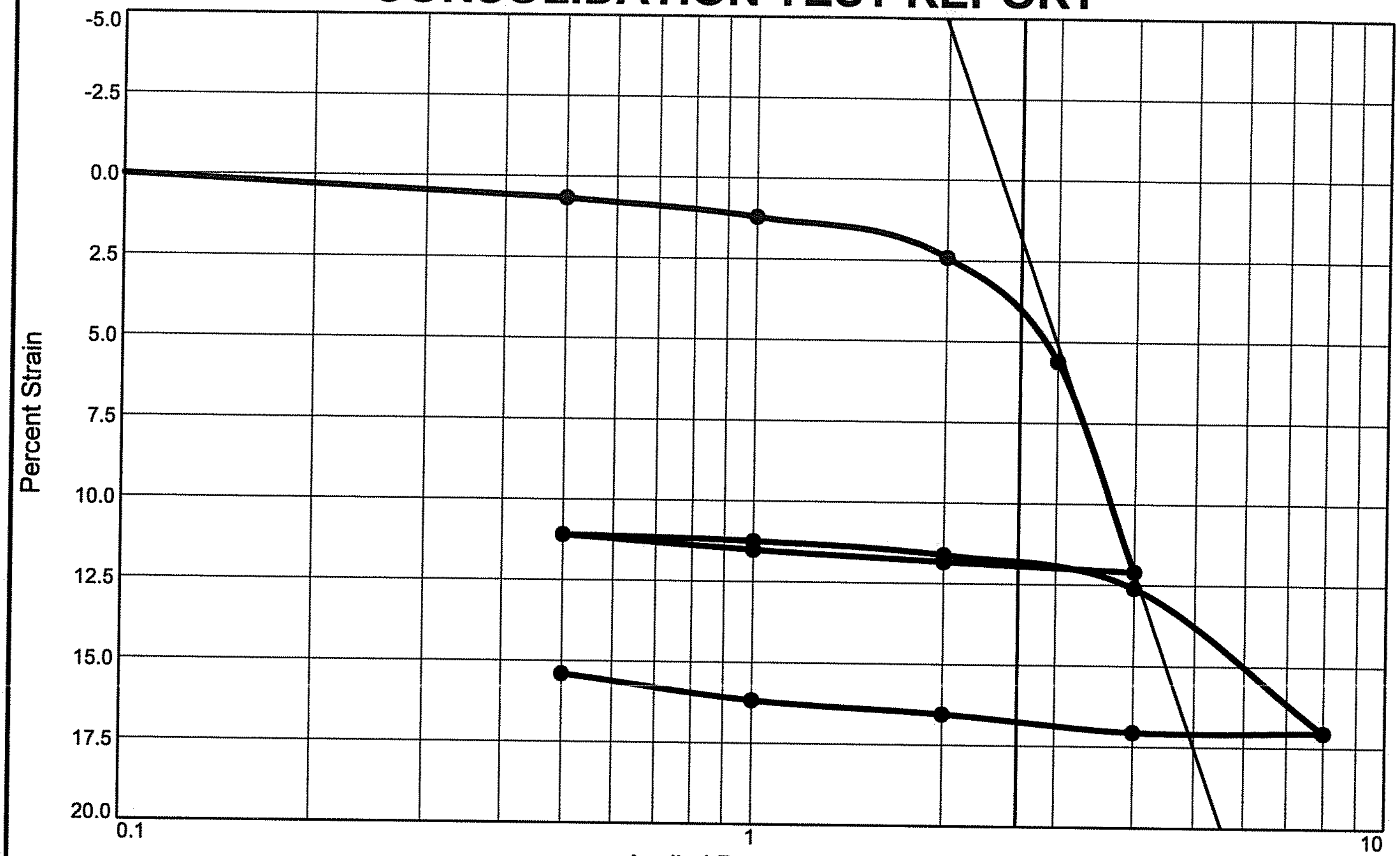
Saco, Maine

Remarks:
● Naural Moisture: 48.4%

Lab No. 14786a

Tested By: AGS, JJB **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
1	0.50	4.114		8	0.50	0.402		15	1.00	0.514	
2	1.00	1.711		9	1.00	1.206		16	0.50	0.189	
3	2.00	1.990		10	2.00	1.343					
4	3.00	0.288		11	4.00	0.838					
5	4.00	0.033		12	8.00	0.290					
6	2.00	4.227		13	4.00	3.125					
7	1.00	1.322		14	2.00	1.268					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
99.7 %	47.6 %	74.3	46.4	24.2	2.75		2.9	1.29	0.11			1.312

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 **Depth:** 25'-27' **Sample Number:** U-1

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:

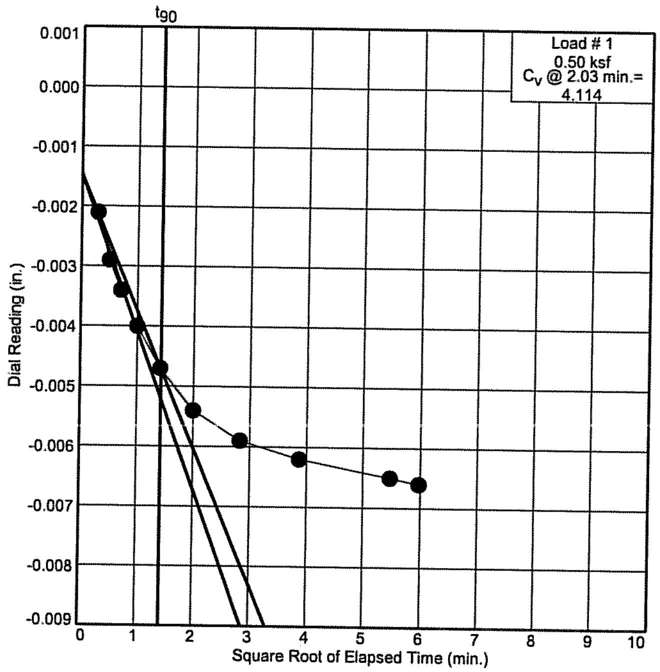
Lab No. 14786a

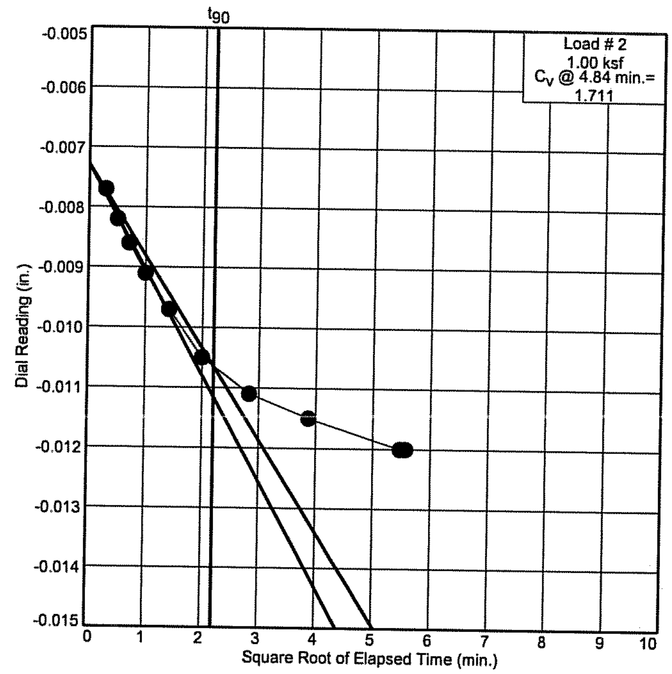
Tested By: JRF/AGS **Checked By:** MTG MTG

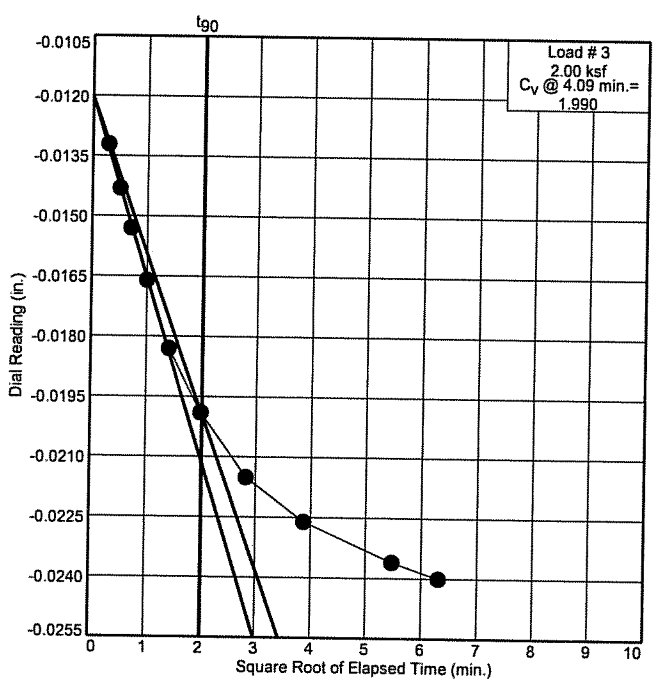
Dial Reading vs. Time

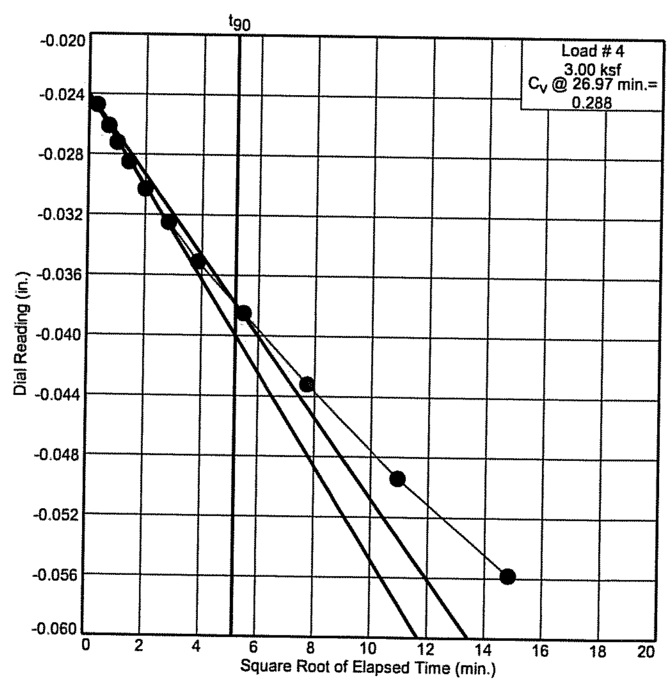
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 Depth: 25'-27' Sample Number: U-1









R.W. Gillespie & Associates, Inc.

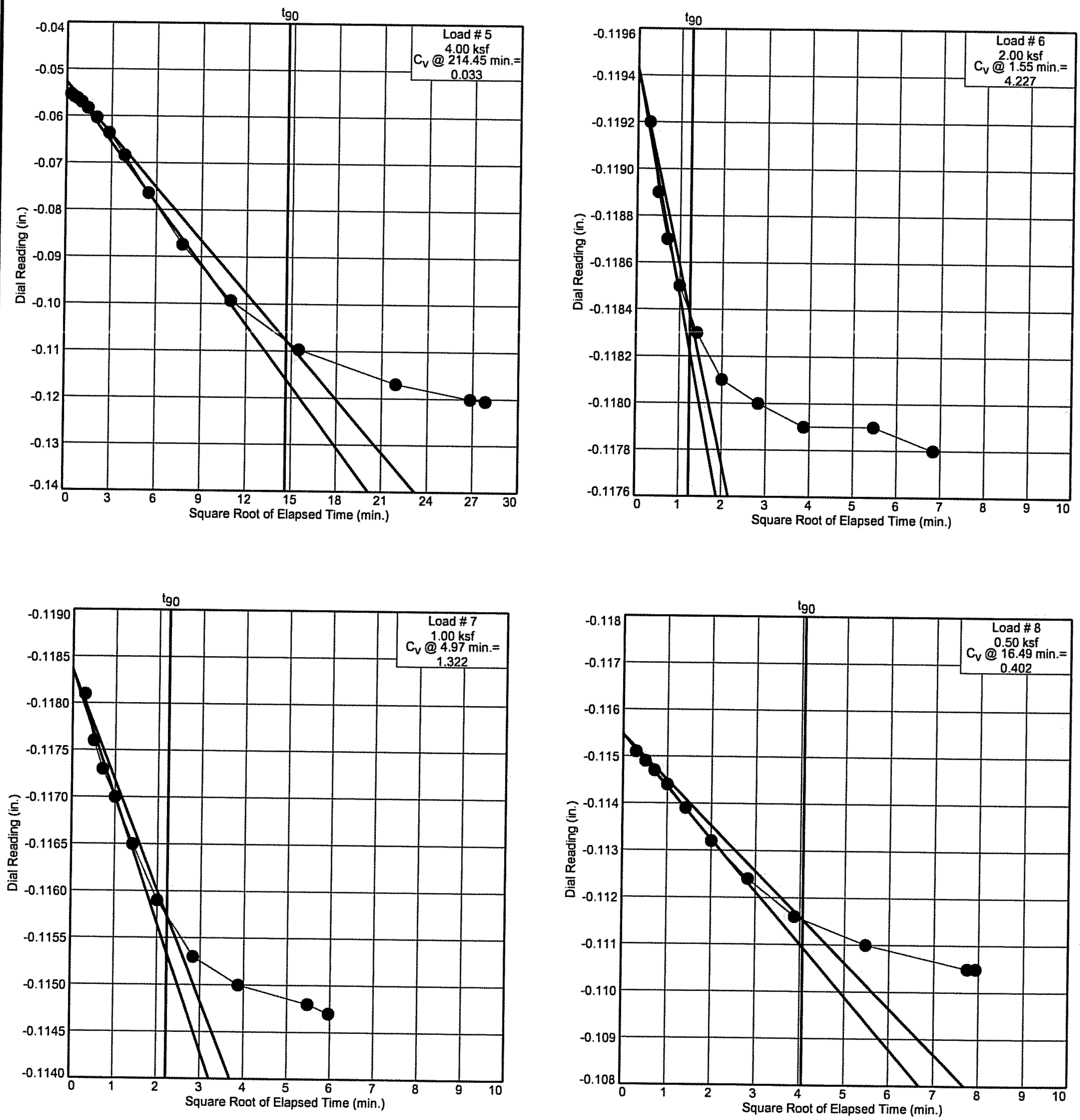
Saco, Maine

Lab No. 14786a

Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 Depth: 25'-27' Sample Number: U-1



R.W. Gillespie & Associates, Inc.

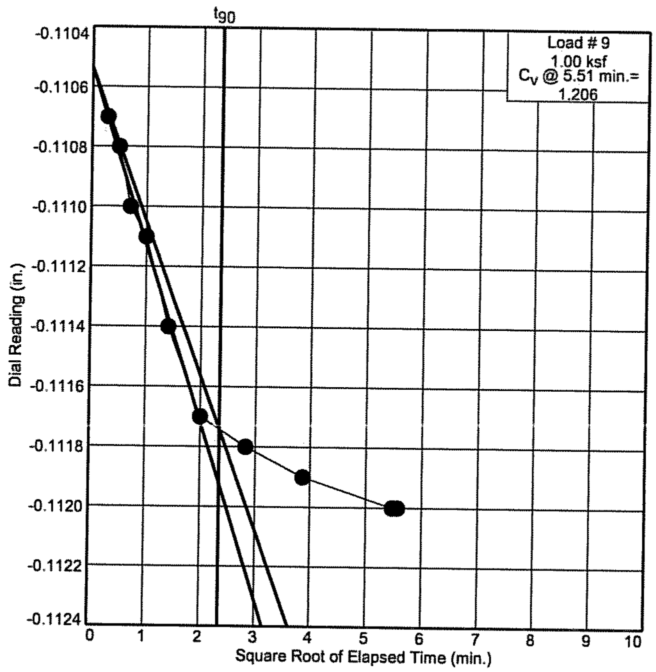
Saco, Maine

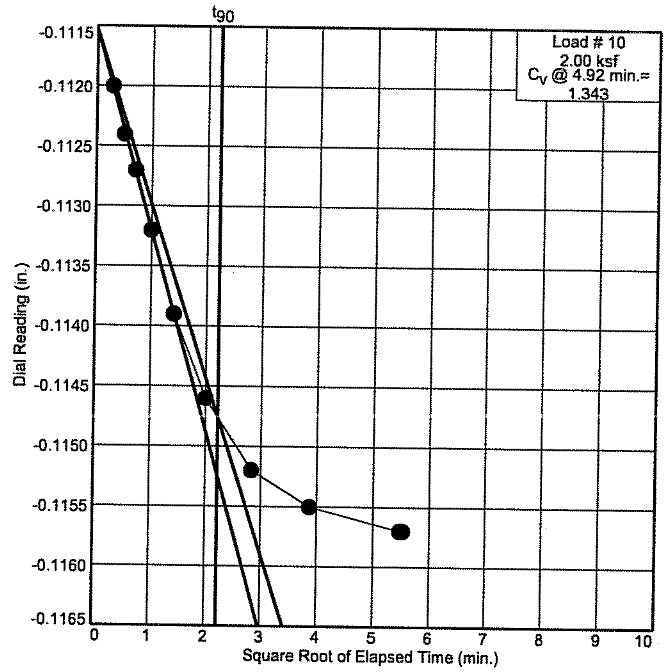
Lab No. 1478a

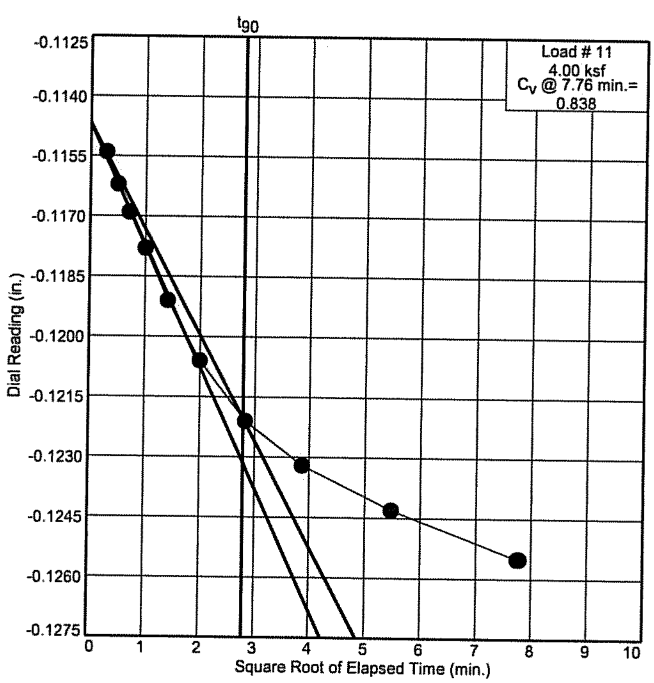
Dial Reading vs. Time

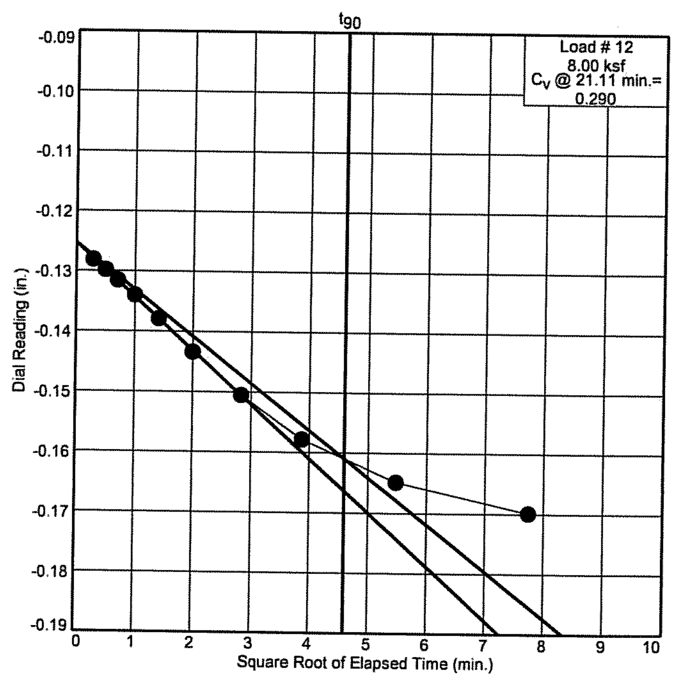
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106　　Depth: 25'-27'　　Sample Number: U-1









R.W. Gillespie & Associates, Inc.

Saco, Maine

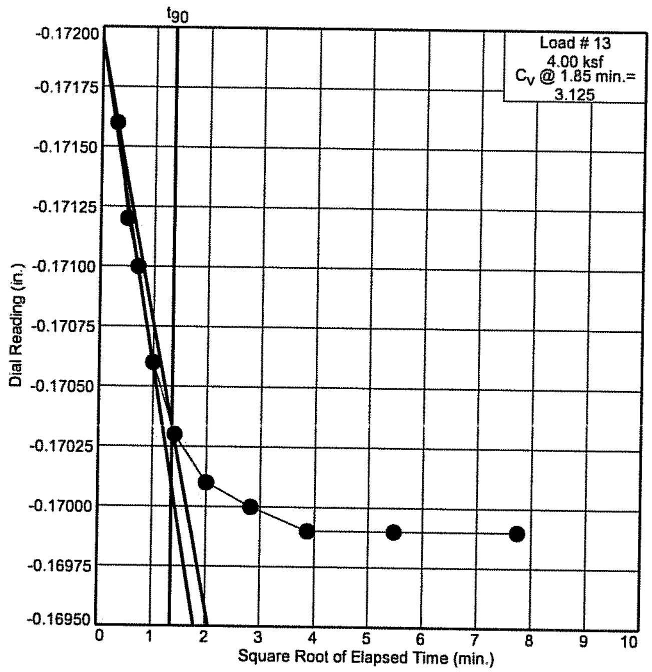
MTB

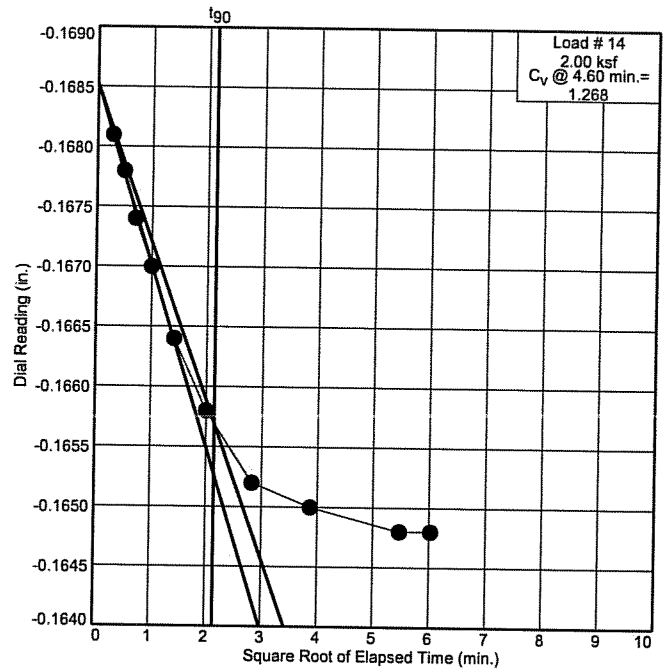
Lab No. 14786a

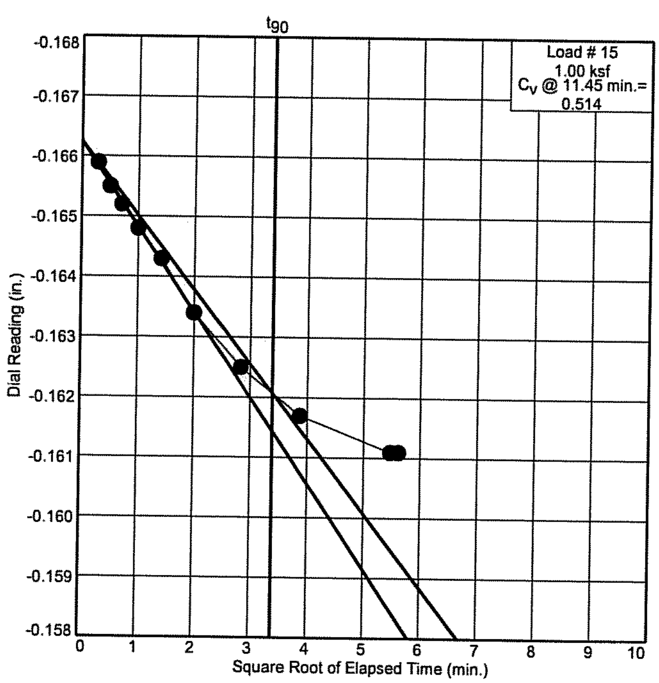
Dial Reading vs. Time

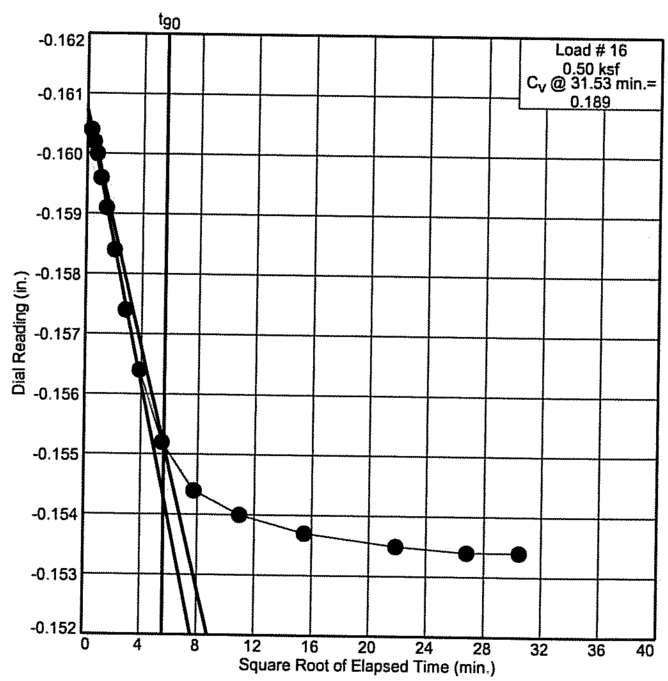
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 Depth: 25'-27' Sample Number: U-1







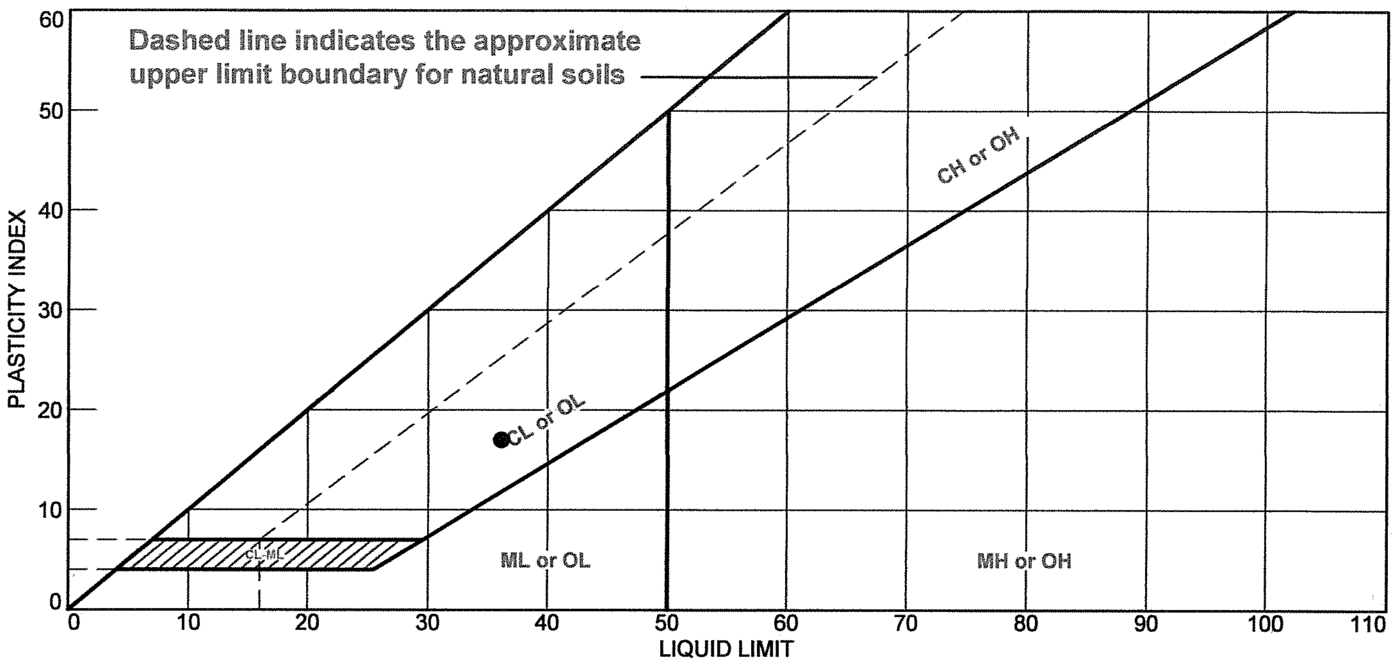


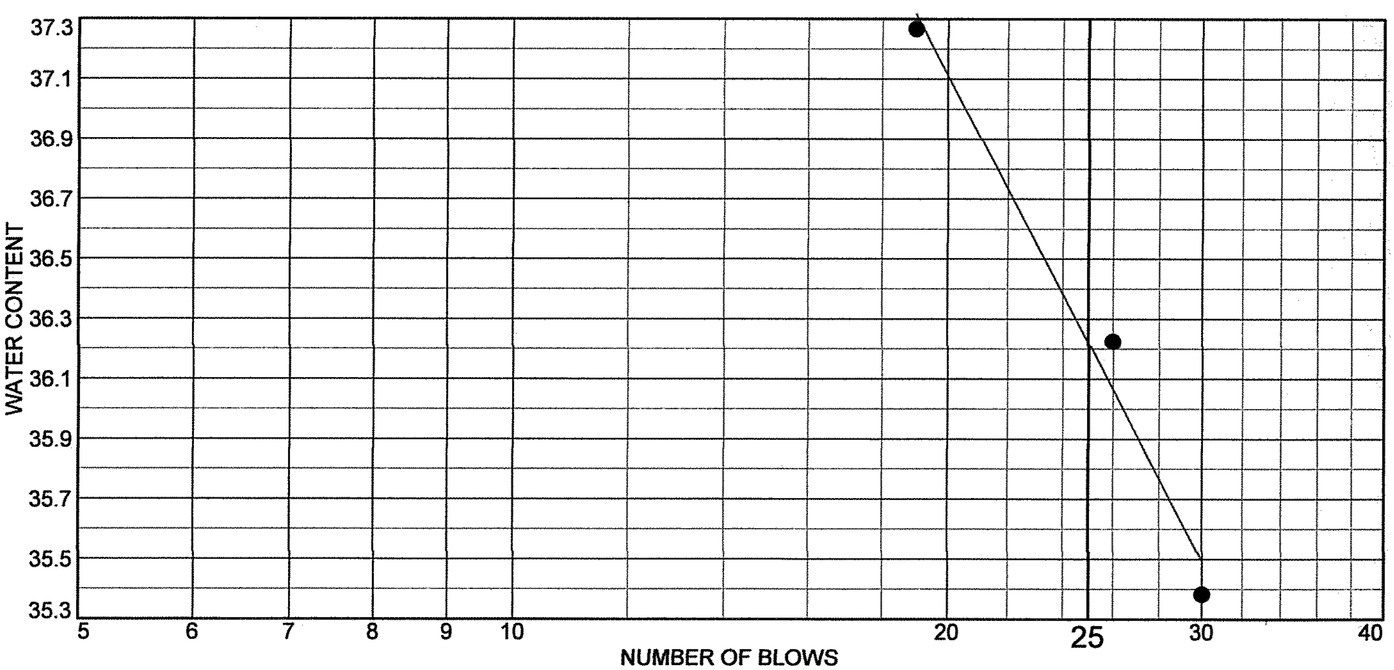
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 14790a

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	36.2	19.2	17.0			

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME

Sample Number: U-2 **Depth:** 40'-42'

Remarks:
● Natural Moisture: 36.8%

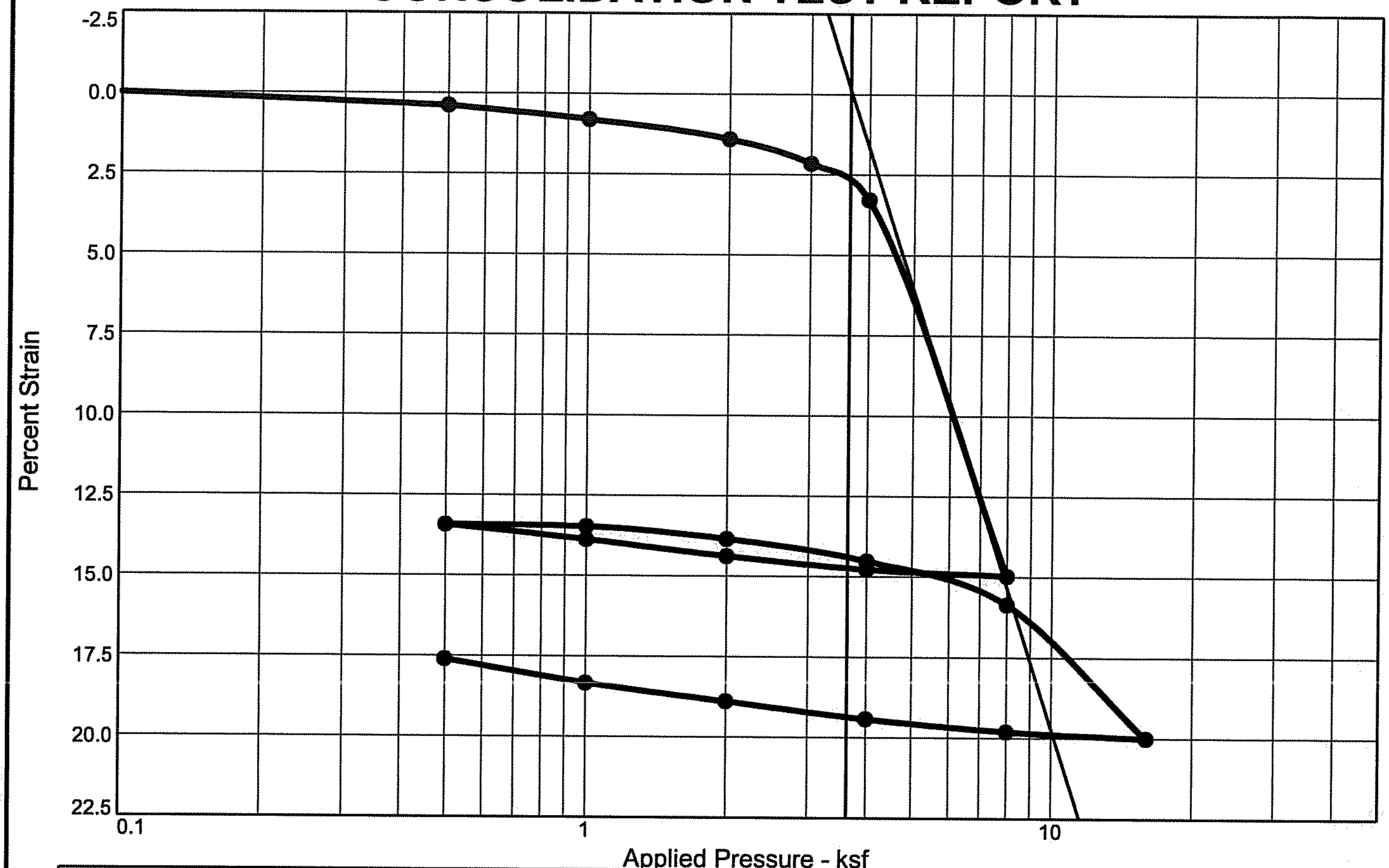
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 14786b

Tested By: AGS **Checked By:** MTG MTG

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α	No.	Load (ksf)	C_v (ft.^{2}/day)	C_α
1	0.50	2.434		9	1.00	0.606		16	8.00	3.251	
2	1.00	2.460		10	0.50	0.256		17	4.00	2.057	
3	2.00	3.928		11	1.00	0.963		18	2.00	0.628	
4	3.00	1.757		12	2.00	1.122		19	1.00	0.280	
5	4.00	0.906		13	4.00	1.129		20	0.50	0.128	
6	8.00	0.141		14	8.00	0.964					
8	2.00	1.443		15	16.00	0.353					

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
100.9 %	43.2 %	78.8	36.2	17.0	2.75		4.3	0.99	0.10			1.178

MATERIAL DESCRIPTION	USCS	AASHTO
Lean Clay		

Project No. 1368-009 **Client:** Schonewald Engineering Associates, Inc.

Project: MTA Exit 45 Reconfiguration

Loc.: HB-EXIT45-106 South Portland, ME **Depth:** 40'-42' **Sample No.:** U-2

R.W. Gillespie & Associates, Inc.

Saco, Maine

Remarks:
Natural Moisture: 43.2%

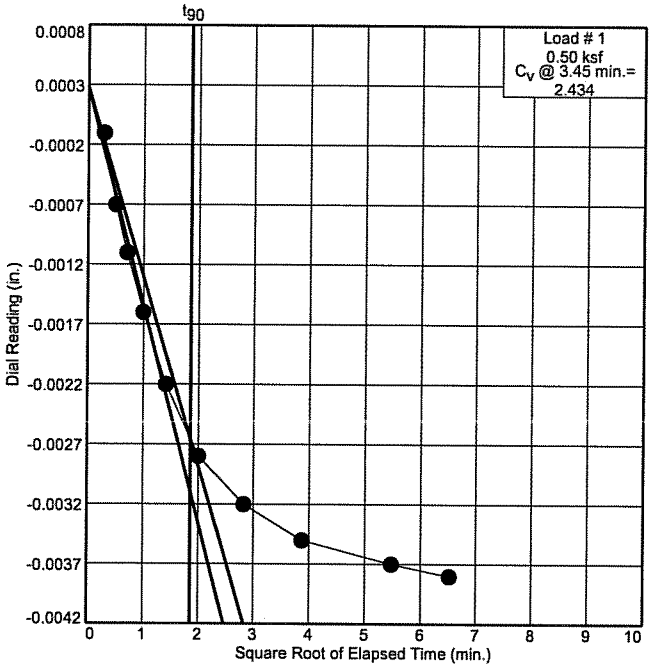
Lab No. 14786b

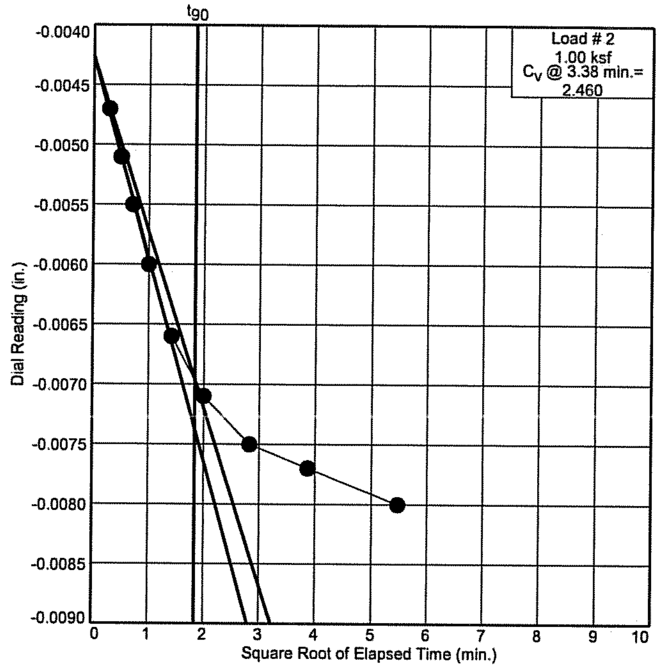
Tested By: AGS, JRF **Checked By:** MTG MTG

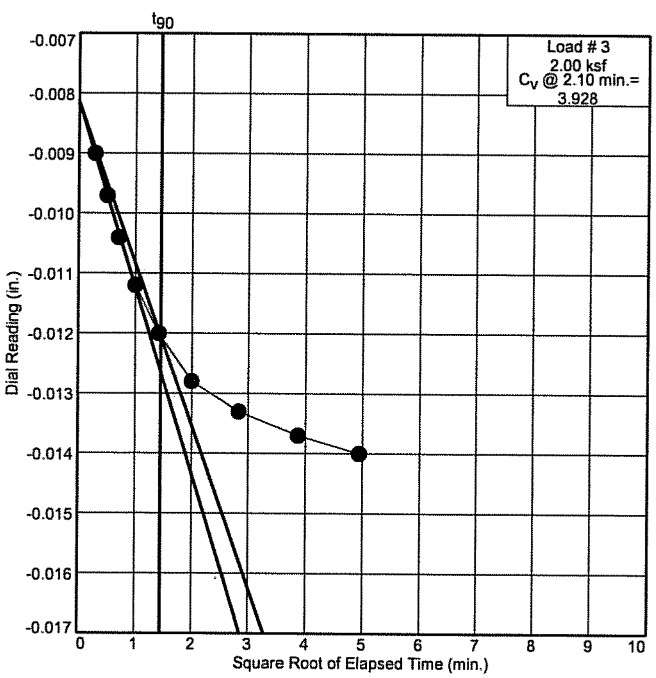
Dial Reading vs. Time

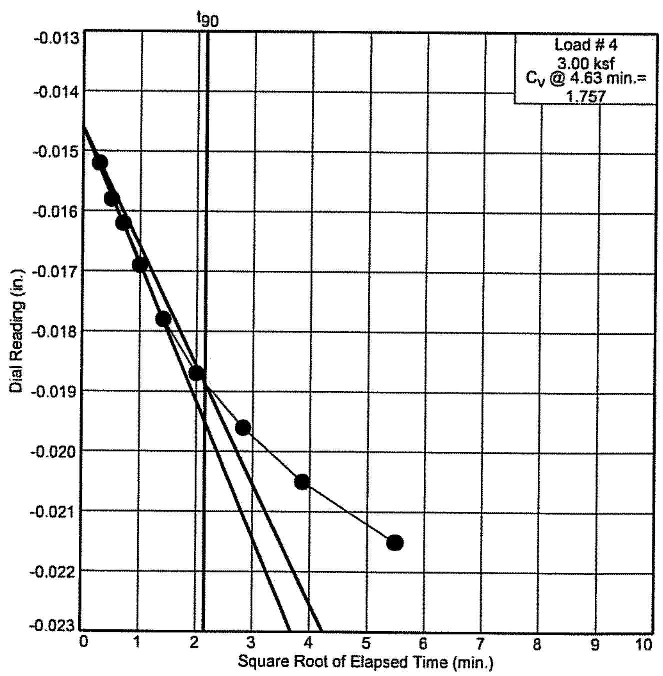
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME Depth: 40'-42' Sample Number: U-2









R.W. Gillespie & Associates, Inc.

Saco, Maine

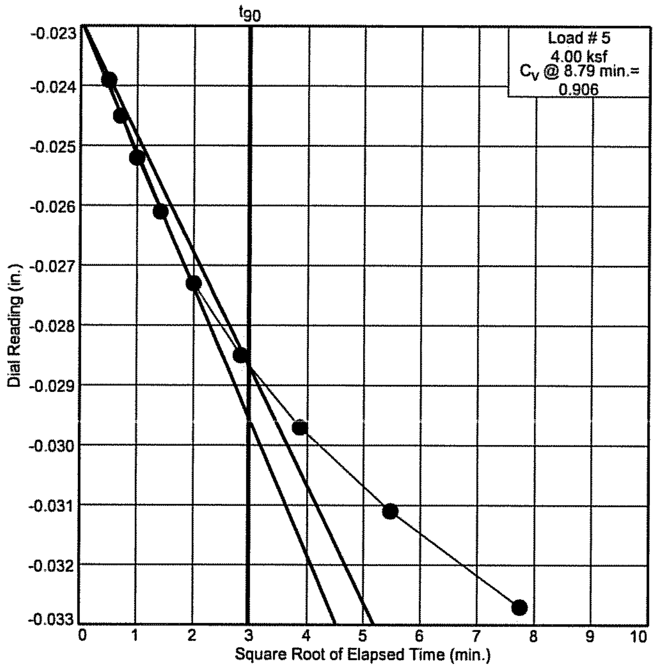
MTG

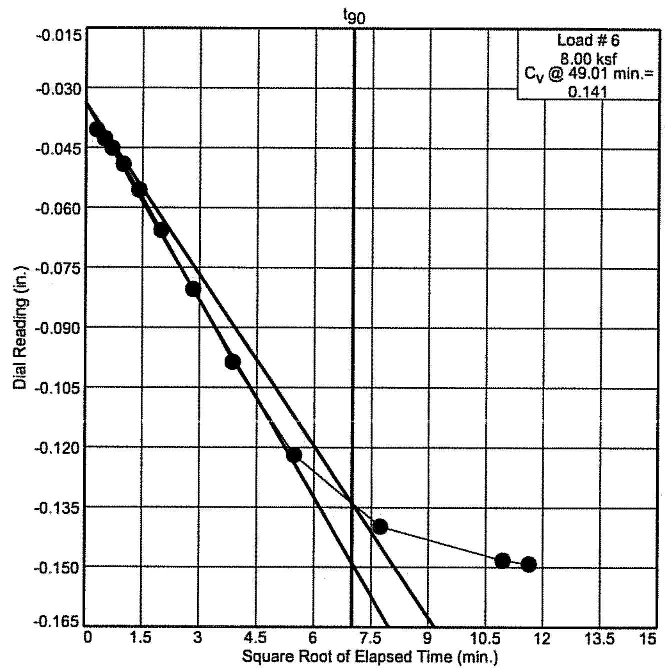
Lab No. 1478[illegible]b

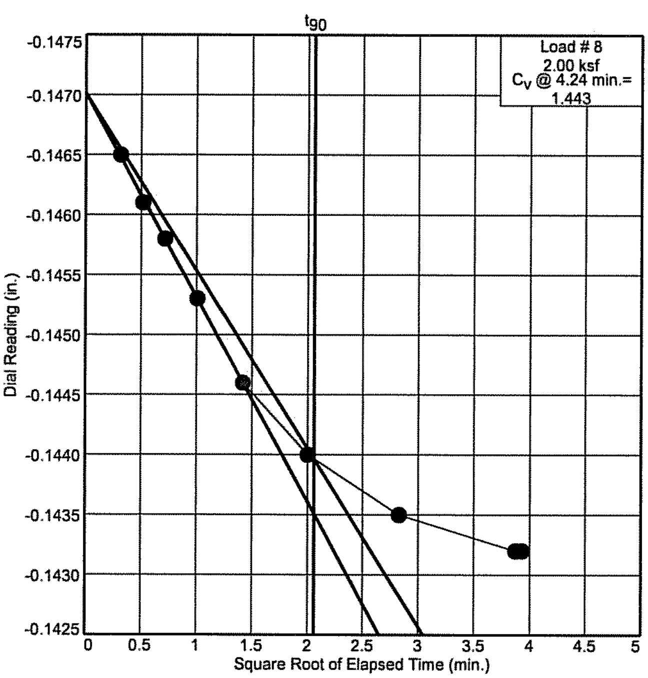
Dial Reading vs. Time

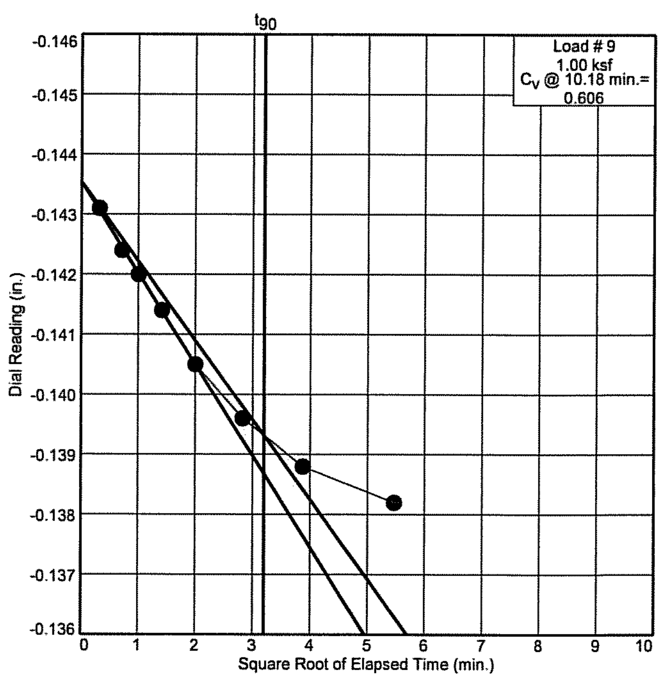
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME   Depth: 40'-42'   Sample Number: U-2









R.W. Gillespie & Associates, Inc.

Saco, Maine

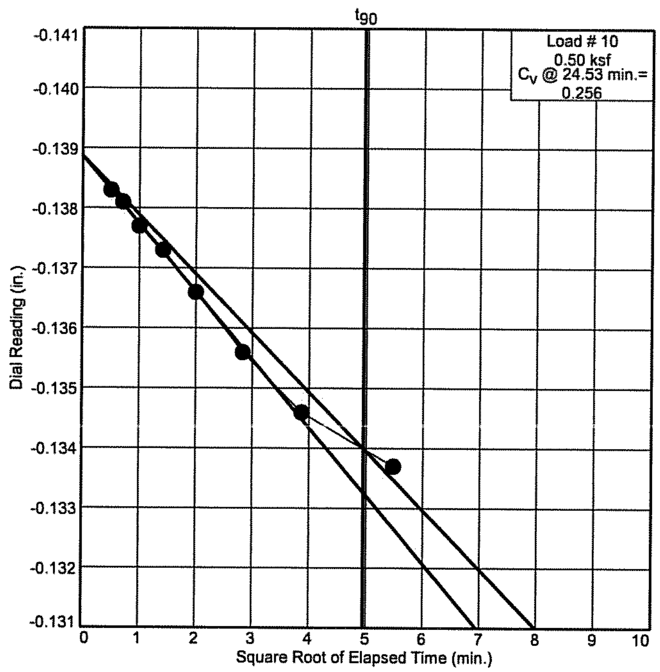
MTB

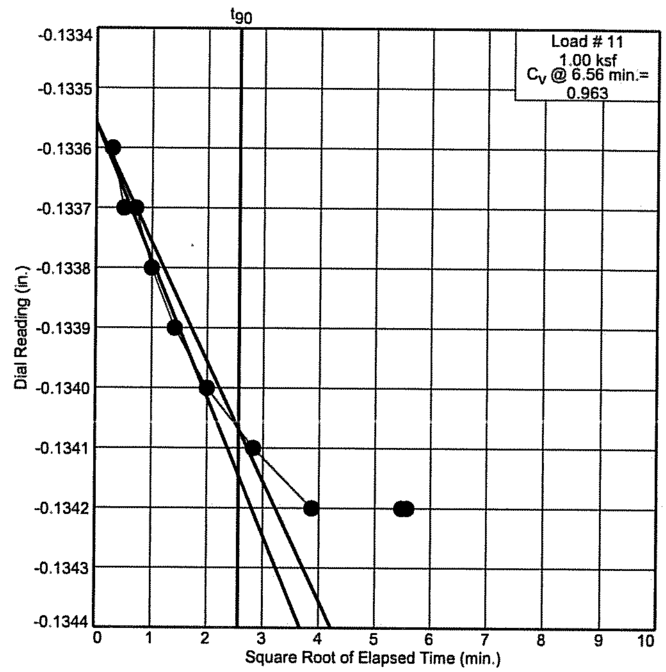
Lab No. 1478bb

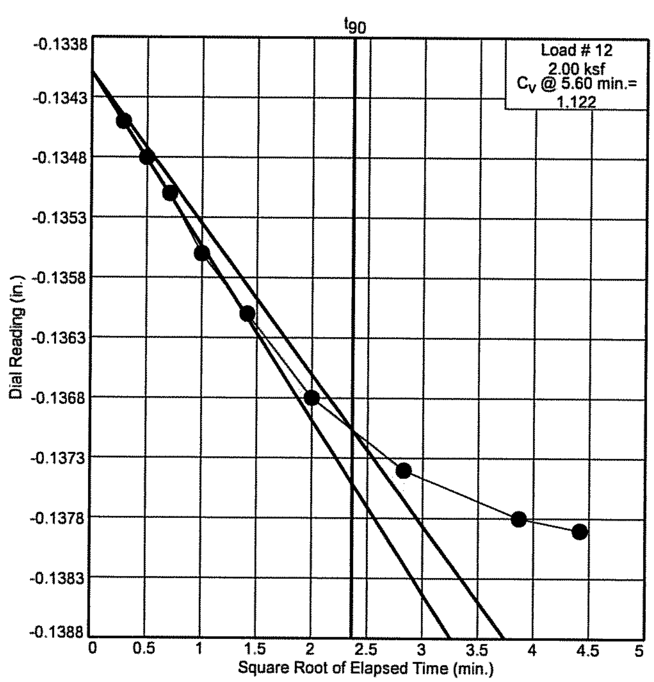
Dial Reading vs. Time

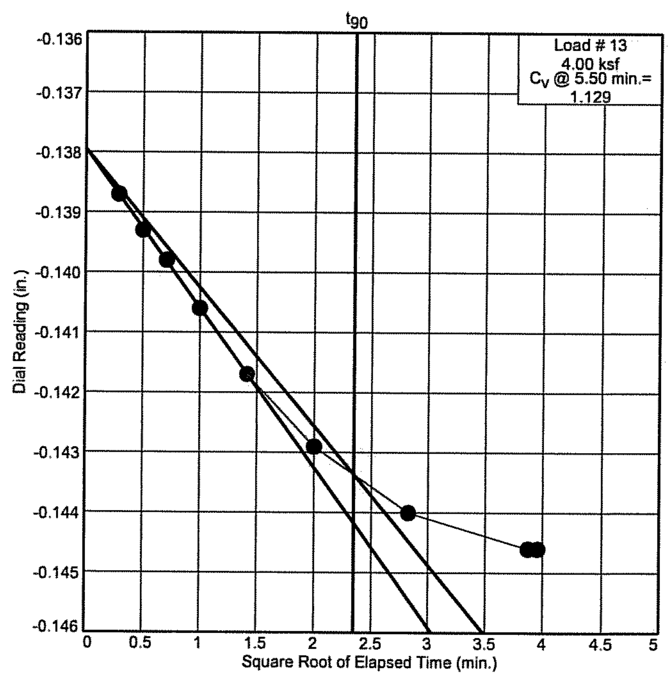
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME   Depth: 40'-42'   Sample Number: U-2









R.W. Gillespie & Associates, Inc.

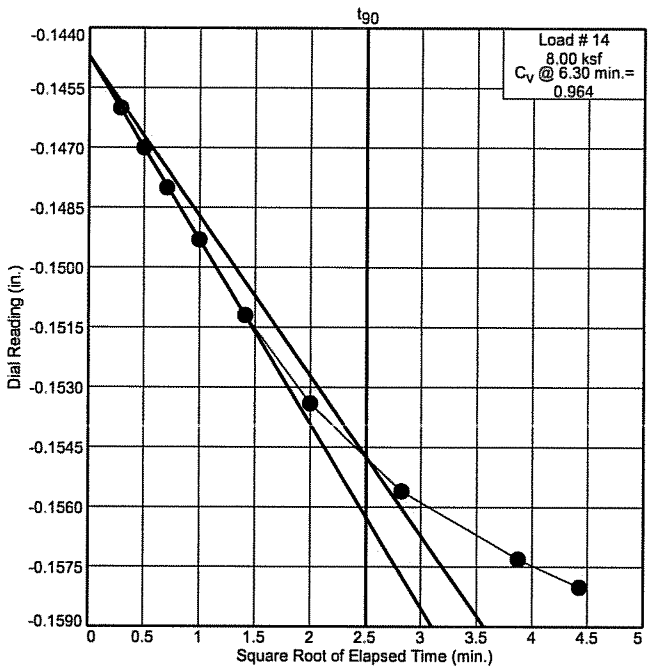
Saco, Maine

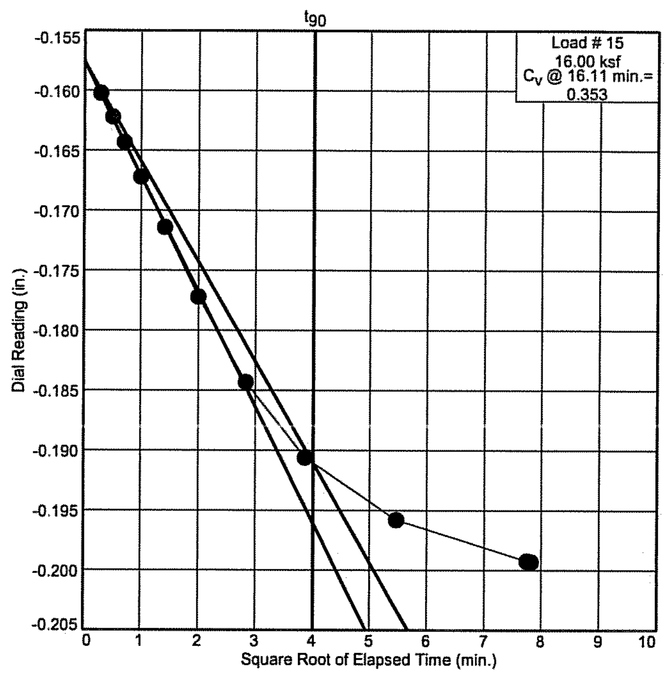
Lab No. 14789b

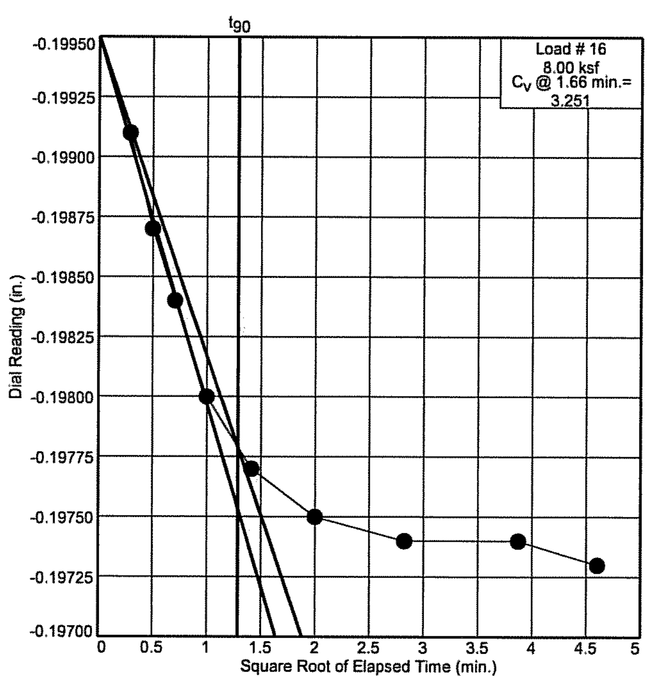
Dial Reading vs. Time

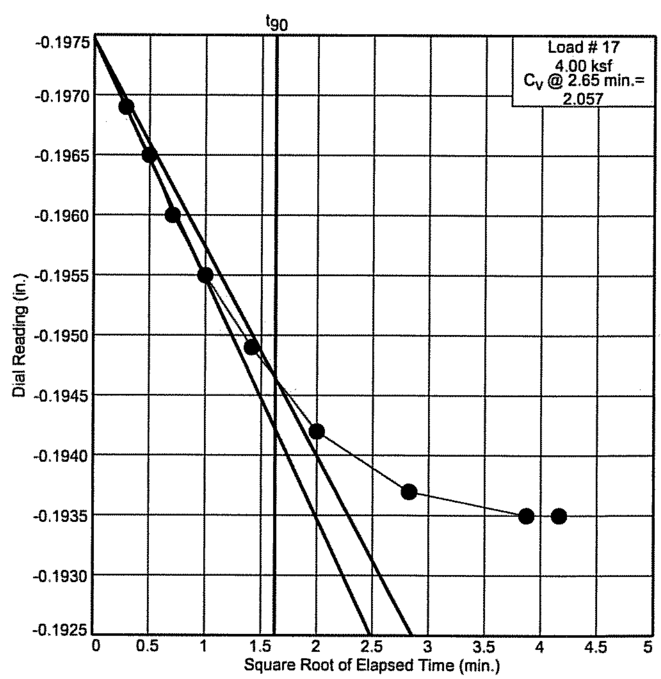
Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME   Depth: 40'-42'   Sample Number: U-2









R.W. Gillespie & Associates, Inc.

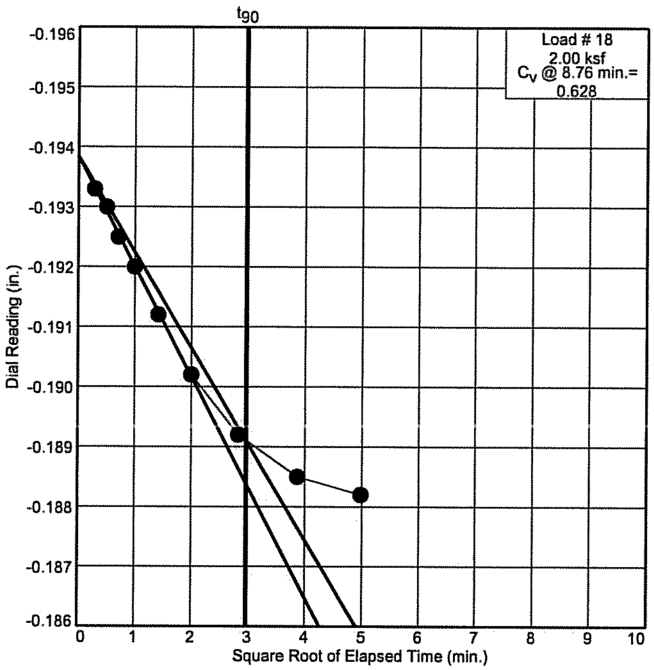
Saco, Maine

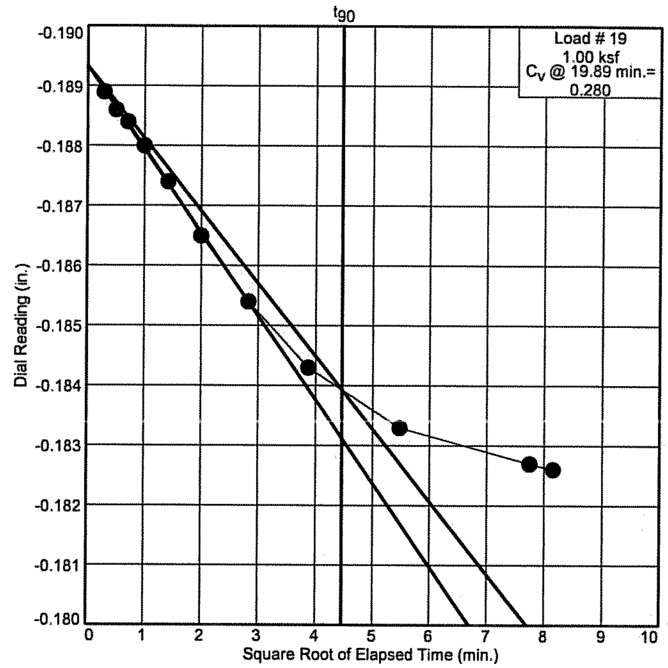
Lab No. 14796b

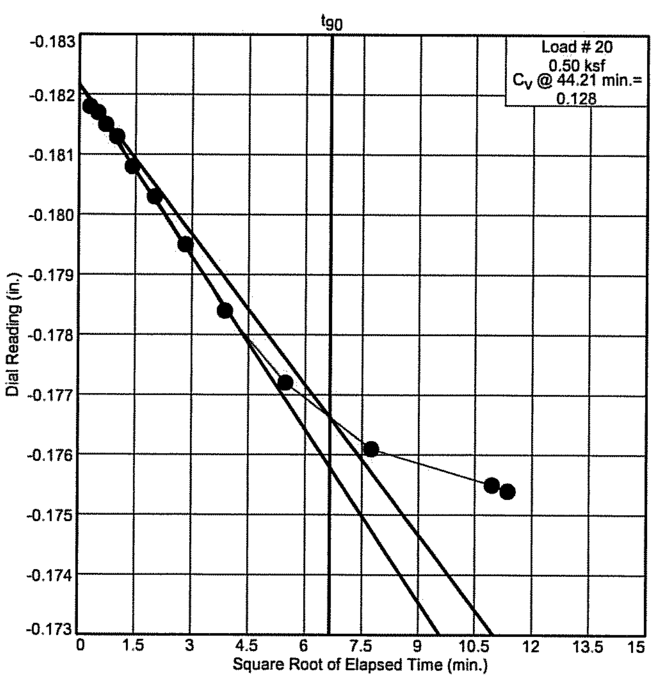
Dial Reading vs. Time

Project No.: 1368-009
Project: MTA Exit 45 Reconfiguration

Location: HB-EXIT45-106 South Portland, ME Depth: 40'-42' Sample Number: U-2







R.W. Gillespie & Associates, Inc.

Saco, Maine

MJG

Lab No. 14791b

R. W. Gillespie & Associates, Inc.
86 Industrial Park Road, Suite 4, Saco, ME 04072 207-286-8008
177 Shattuck Way, Suite 1 West, Newington NH 03801 603-427-0244
44 Wood Avenue, Suite I, Mansfield, MA 508-623-0101

LETTER OF TRANSMITTAL

Date:	Project No.:
December 8, 2017	1368-009

Attention:
Isabel V. (Be) Schonewald, P.E. (Be@schonewaldengineering.com

Schonewald Engineering Associates, Inc.

129 Middle Road

Cumberland, ME 04021

Re:
Laboratory Testing
MTA Exit 45 Reconfiguration
South Portland, Maine

We are sending you attached Laboratory Test Results.

Laboratory No. (s)	Test (s) Performed
14784a	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14784b	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14784c	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14784d	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time

Remarks:

Copy to:

If enclosures are not noted, kindly notify us at once.

G:\PROJECTS\1300\1368\1368-009-17 MTA Exit 45\1368-009 TRANSMITTAL MASTERS.XLS

R. W. Gillespie & Associates, Inc.
86 Industrial Park Road, Suite 4, Saco, ME 04072 207-286-8008
177 Shattuck Way, Suite 1 West, Newington NH 03801 603-427-0244
44 Wood Avenue, Suite I, Mansfield, MA 508-623-0101

LETTER OF TRANSMITTAL

Date:	Project No.:
December 18, 2017	1368-009

Attention:
Isabel V. (Be) Schonewald, P.E. (Be@schonewaldengineering.com

Schonewald Engineering Associates, Inc.
129 Middle Road
Cumberland, ME 04021

Re:
Laboratory Testing
MTA Exit 45 Reconfiguration
South Portland, Maine

We are sending you attached Laboratory Test Results.

Laboratory No. (s)	Test (s) Performed
14784e	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14785	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14786a	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time
14786b	Liquid& Plastic Limits, Consolidation, & Dial Reading vs. Time

Remarks:

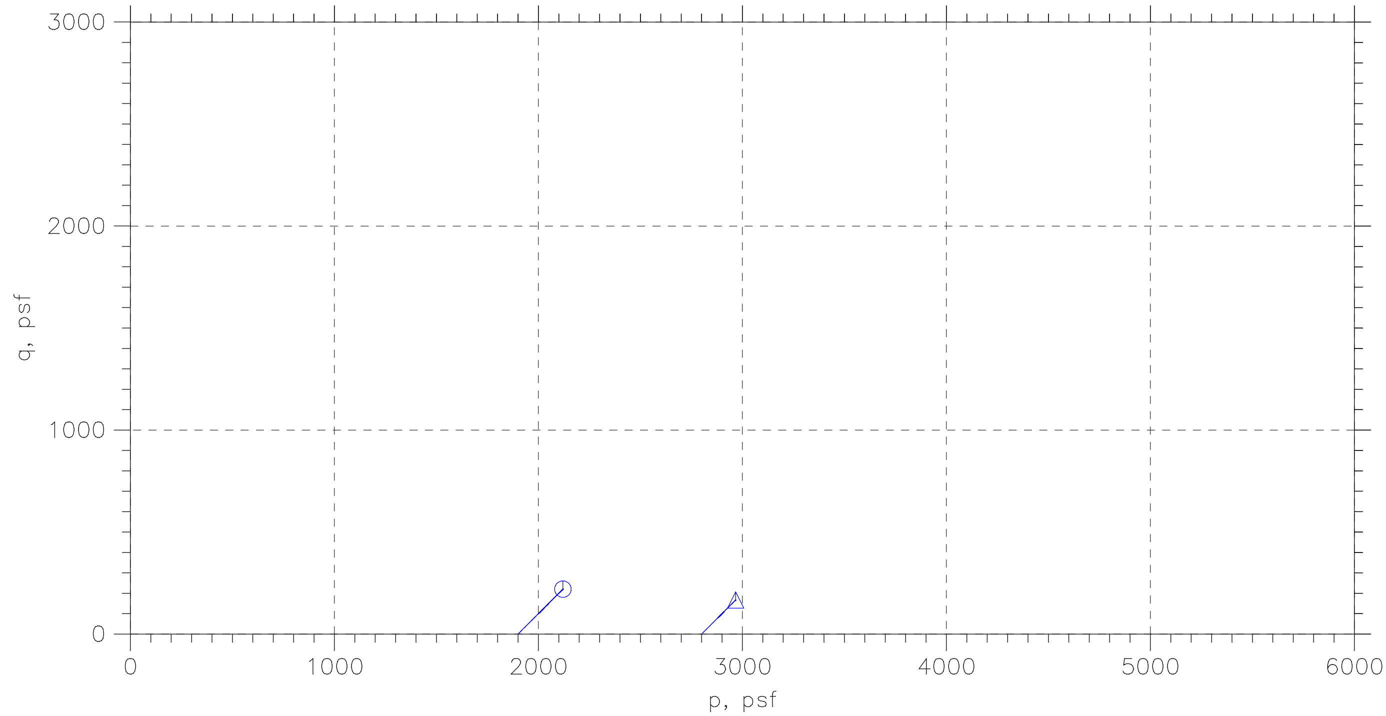
Copy to:

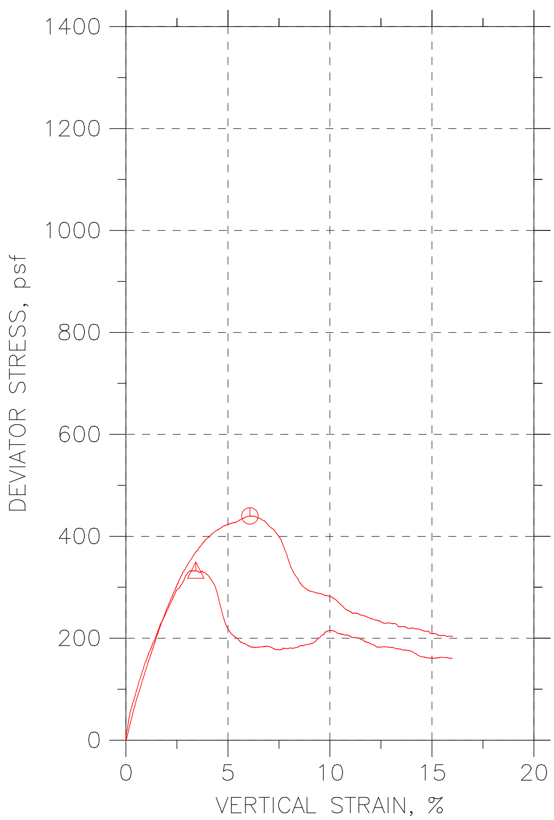
If enclosures are not noted, kindly notify us at once.

SCHONEWALD ENGINEERING ASSOCIATES, INC.
www.SchonewaldEngineering.com

GTX: RESULTS OF 2-POINT UNCONSOLIDATED UNDRAINED LABORATORY TESTS ON UNDISTURBED SOIL SAMPLES

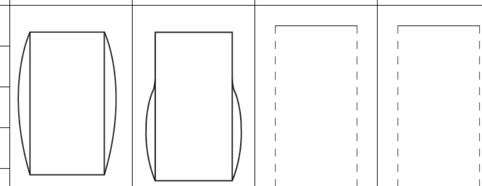
UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	○	△		
Sample No.	U1	U1		
Test No.	UU-5	UU-6		
Depth	35-37 ft	35-37 ft		
Tested by	md	md		
Test Date	12/1/17	12/1/17		
Checked by	njh	njh		
Check Date	12/6/17	12/6/17		
Diameter, in	2.65	2.7		
Height, in	5.9	5.9		
Water Content, %	37.5	34.4		
Dry Density, pcf	82.09	81.31		
Saturation, %	96.1	86.5		
Void Ratio	1.05	1.07		
Confining Stress, psf	1900	2800		
Undrained Strength, psf	220	166.8		
Max. Dev. Stress, psf	440	333.5		
Strain at Failure, %	6.07	3.43		
Strain Rate, %/min	1	1		
Estimated Specific Gravity	2.7	2.7		
Liquid Limit	---	---		
Plastic Limit	---	---		
Plasticity Index	---	---		

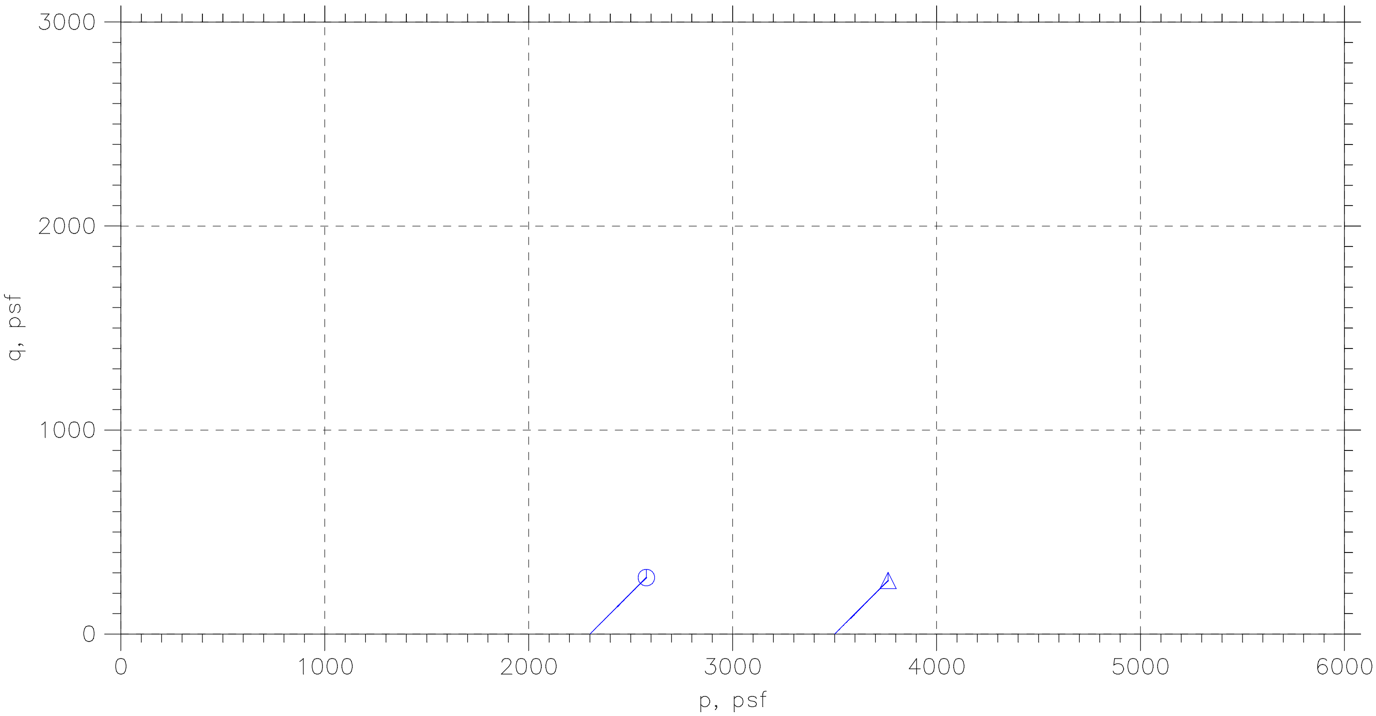
Project: METPK Exit 45
Location: South Portland, ME
Project No.: GTX-307327
Boring No.: 103
Sample Type: intact

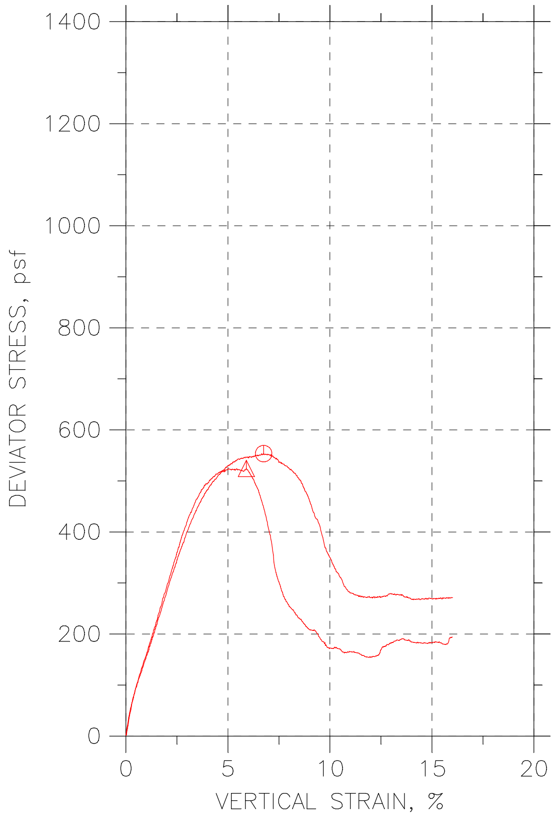


Description: Wet, dark gray clay and silt
Remarks: System R - Boring Number: HB-EXIT 45-103

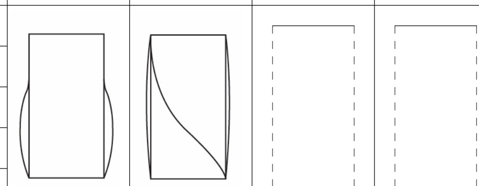
Phase calculations based on start and end of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	○	△		
Sample No.	U2	U2		
Test No.	UU-3	UU-4		
Depth	45-47 ft	45-47 ft		
Tested by	md	md		
Test Date	11/28/17	11/28/17		
Checked by	njh	njh		
Check Date	12/6/17	12/6/17		
Diameter, in	2.72	2.69		
Height, in	6.02	5.97		
Water Content, %	38.4	44.1		
Dry Density, pcf	75.53	74.74		
Saturation, %	84.2	94.8		
Void Ratio	1.23	1.26		
Confining Stress, psf	2300	3500		
Undrained Strength, psf	276.7	262.2		
Max. Dev. Stress, psf	553.5	524.3		
Strain at Failure, %	6.75	5.9		
Strain Rate, %/min	1	1		
Estimated Specific Gravity	2.7	2.7		
Liquid Limit	---	---		
Plastic Limit	---	---		
Plasticity Index	---	---		



GeoTesting EXPRESS

Project: METPK Exit 45

Location: South Portland, ME

Project No.: GTX-307327

Boring No.: 103

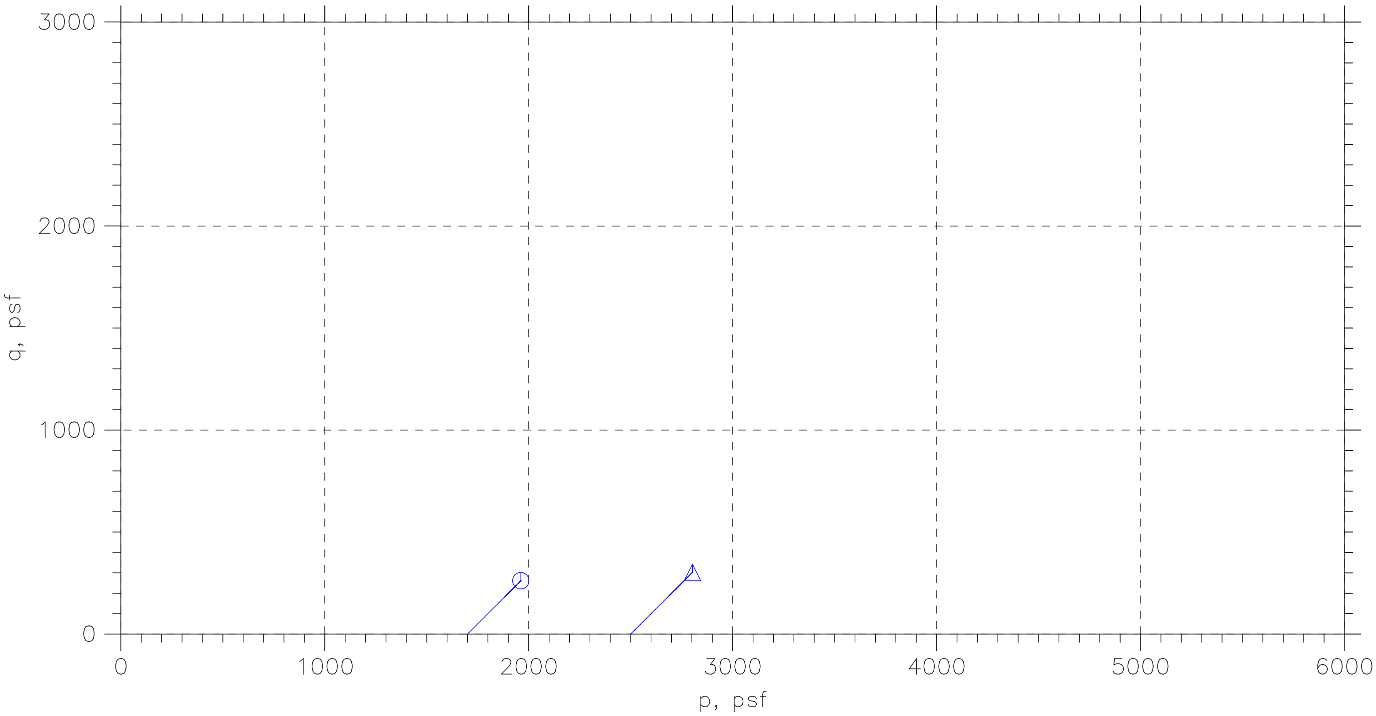
Sample Type: intact

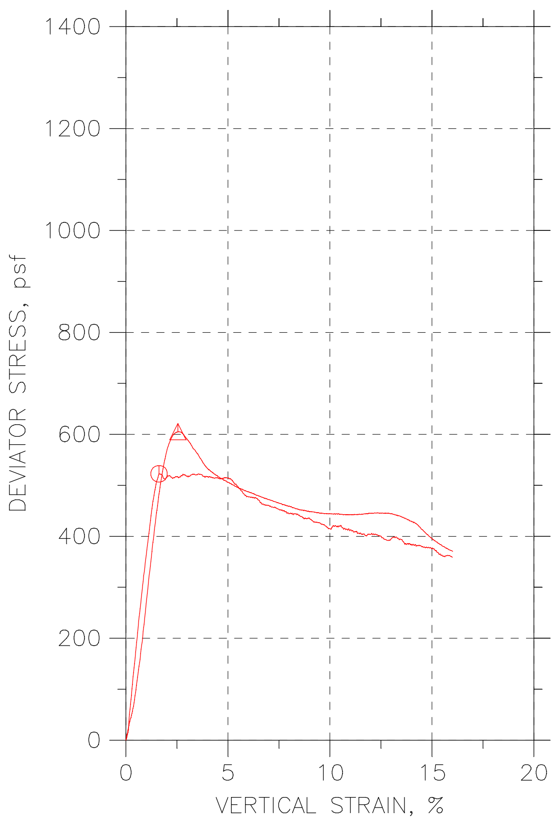
Description: Wet, gray clay and silt

Remarks: System S - Boring Number: HB-EXIT 45-103

Phase calculations based on start and end of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	○	△		
Sample No.	U1	U1		
Test No.	UU-7	UU-8		
Depth	30-32 ft	30-32 ft		
Tested by	md	md		
Test Date	12/1/17	12/1/17		
Checked by	njh	njh		
Check Date	12/6/17	12/6/17		
Diameter, in	2.72	2.73		
Height, in	5.97	5.98		
Water Content, %	39.0	40.4		
Dry Density, pcf	82.07	80.62		
Saturation, %	100.0	100.0		
Void Ratio	1.05	1.09		
Confining Stress, psf	1700	2500		
Undrained Strength, psf	261.3	302.7		
Max. Dev. Stress, psf	522.7	605.4		
Strain at Failure, %	1.62	2.55		
Strain Rate, %/min	1	1		
Estimated Specific Gravity	2.7	2.7		
Liquid Limit	---	---		
Plastic Limit	---	---		
Plasticity Index	---	---		

Project: METPK Exit 45

Location: South Portland, ME

Project No.: GTX-307327

Boring No.: 105

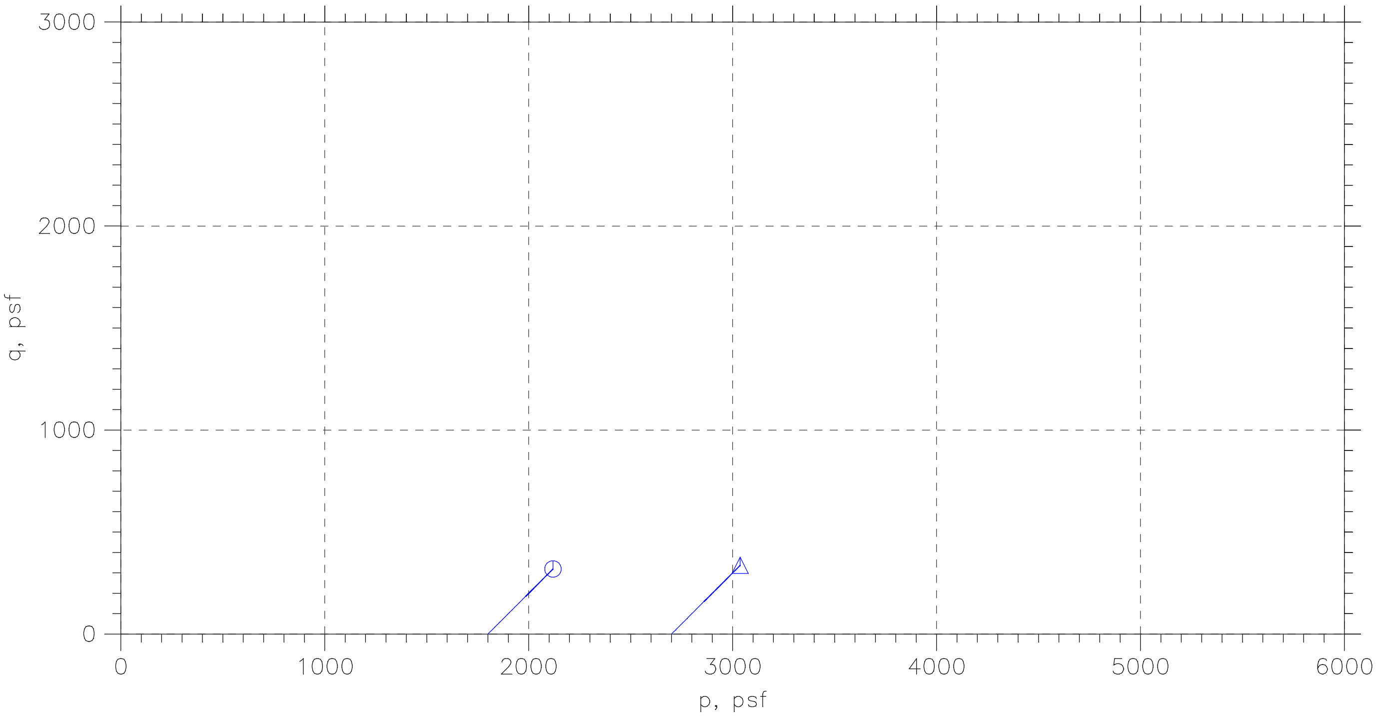
Sample Type: intact

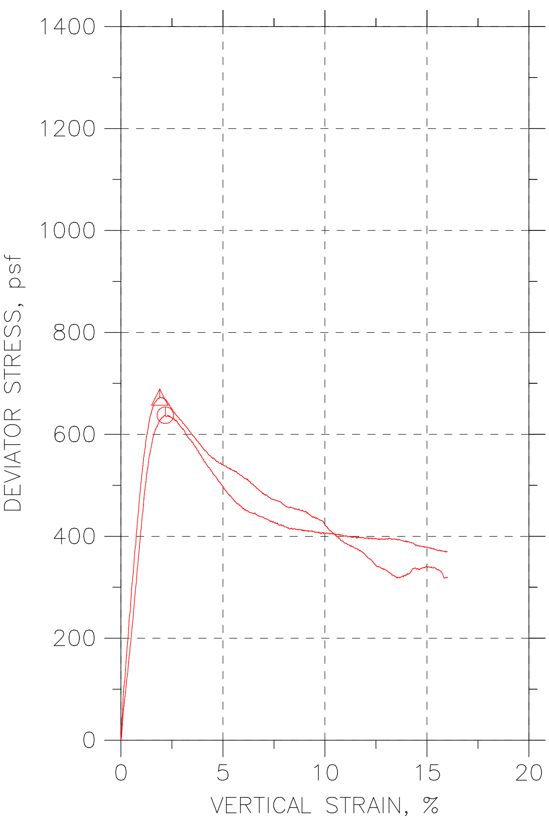
Description: Wet, dark gray clay and silt

Remarks: System R - Boring Number: HB-EXIT 45-105

Phase calculations based on start and end of test.

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

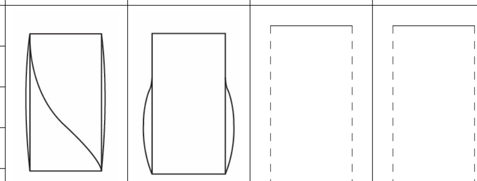




Symbol	⊙	△		
Sample No.	U1	U1		
Test No.	UU-1	UU-2		
Depth	30-32 ft	30-32 ft		
Tested by	md	md		
Test Date	11/28/17	11/28/17		
Checked by	njh	njh		
Check Date	12/6/17	12/6/17		
Diameter, in	2.85	2.85		
Height, in	5.97	6.07		
Water Content, %	45.4	46.2		
Dry Density, pcf	72.37	70.65		
Saturation, %	92.2	90.0		
Void Ratio	1.33	1.39		
Confining Stress, psf	1800	2700		
Undrained Strength, psf	318.8	336.5		
Max. Dev. Stress, psf	637.5	673.1		
Strain at Failure, %	2.18	1.9		
Strain Rate, %/min	1	1		
Estimated Specific Gravity	2.7	2.7		
Liquid Limit	---	---		
Plastic Limit	---	---		
Plasticity Index	---	---		

GeoTesting EXPRESS

Project: METPK Exit 45
Location: South Portland, ME
Project No.: GTX-307327
Boring No.: 107
Sample Type: intact



Description: Wet, gray clay and silt
Remarks: System S - Boring Number: HB-EXIT 45-107
Phase calculations based on start and end of test.

THIELSCH: RESULTS OF UNCONFINED COMPRESSION LABORATORY TESTS ON ROCK CORE SPECIMENS

LABORATORY TESTING DATA SHEET

Project Name MeTPK Exit 45 Reconfiguration
Project No. 17-028
Project Manager Be Schonewald

Location South Portland, ME
Assigned By Be Schonewald
Report Date 11.28.17

Reviewed By Matthew J. Rob...
Date Reviewed 11.29.17

				Sample Data						Compression Tests								
Boring No.	Sample No.	Depth Ft.	Laboratory No.	Moh's Hard-ness	Do in.	L in.	(1) Unit Wt. PCF	(2) Wet Density PCF	Bulk Gs.	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) Conf. Stress	(7) E sec PSI EE+06	(8) Poisson's Ratio	στ PSI	Is_{50} PSI	Rock Formation or Description or Remarks
HB-EXIT45-102	R1	80.7-81.3	17-R-1805		1.987	4.686	170.4			U	2,749	0.049		4.00	0.16			Slate; broke along foliation
HB-EXIT45-103	R1	89.7-90.3	17-R-1806		1.986	4.735	146.2			U	885	0.118		1.12	0.13			Weathered slate; broke partly along foliation

(1) Volume Determined By Measuring Dimensions
(2) Determined by Measuring Dimensions and Weight of Saturated Sample

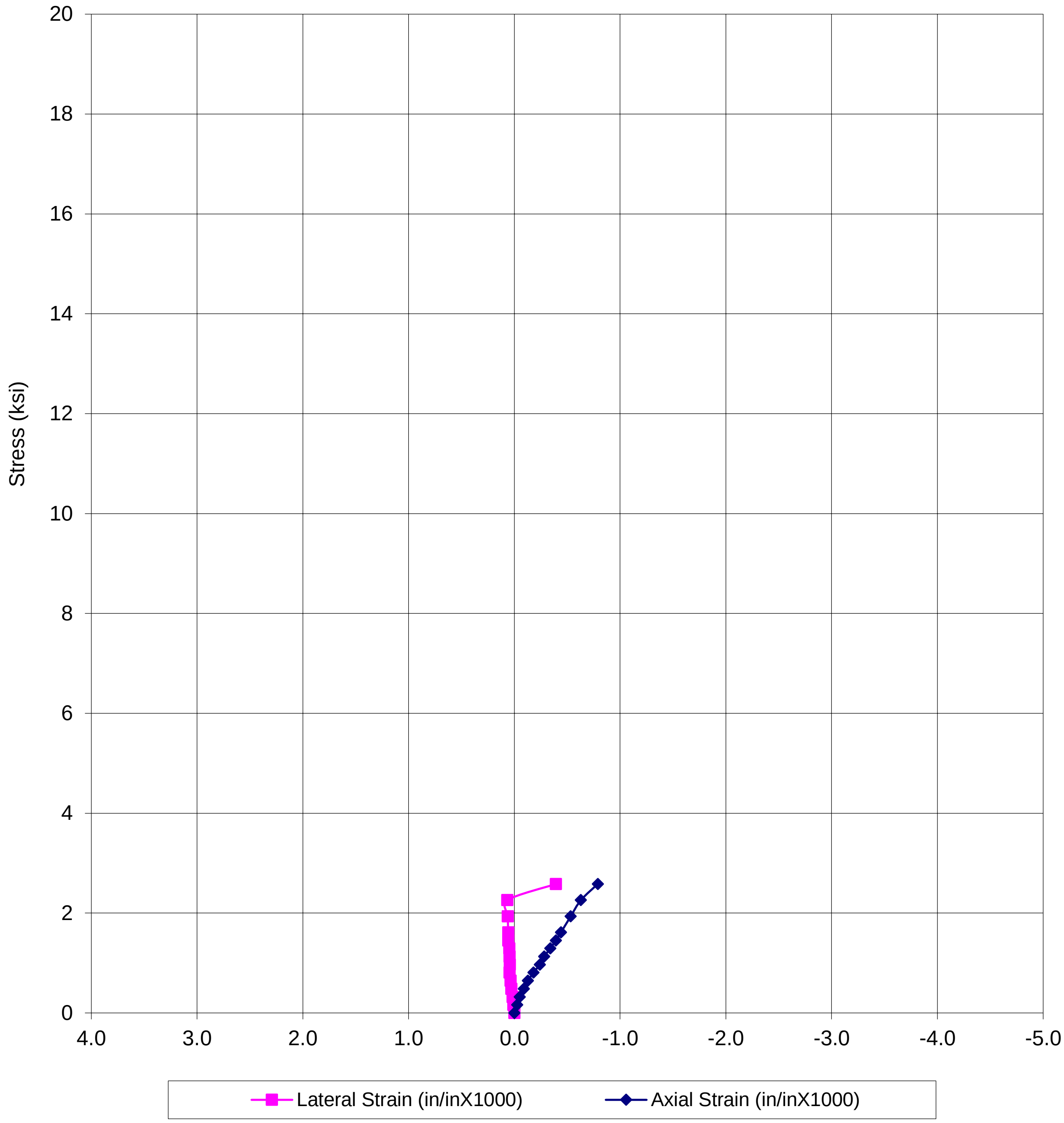
(3) P=Petrographic PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength
(4) Taken at Peak Deviator Stress

(5) Strain at Peak Deviator Stress
(6) Represents Confining Stress on Triaxial Tests
(7) Represents Secant Modulus at 50% of Total Failure Stress
(8) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

THIELSCH ENGINEERING

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

MeTPK Exit 45 Reconfiguration
South Portland, ME

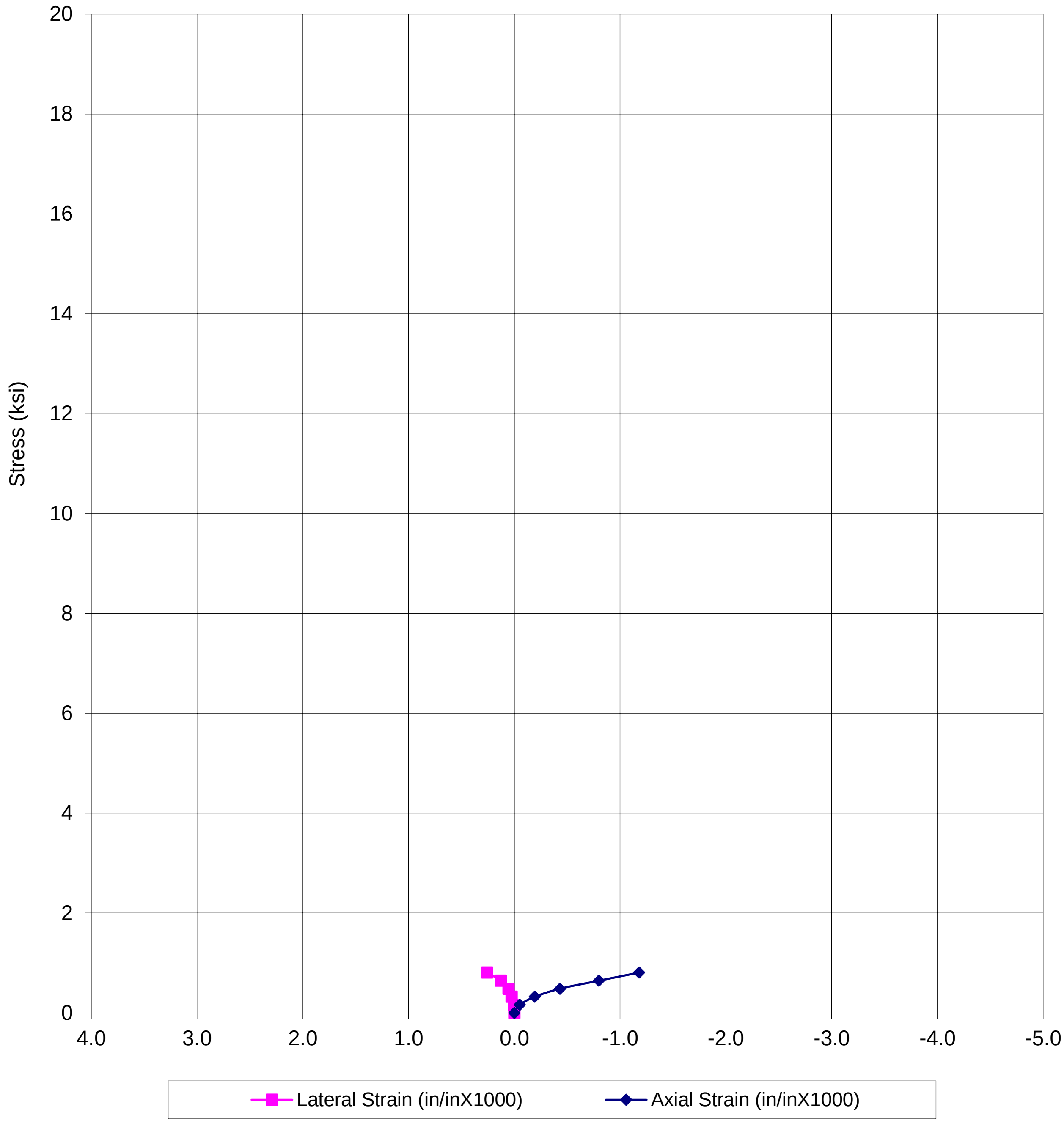


Rock Unconfined Compression Testing - ASTM D7012

Boring No.	HB-EXIT45-102	File No.	17-028
Sample No.	R-1	Date:	11.28.17
Depth:	81.0-81.4	Test No.	17-R-1805

THIELSCH ENGINEERING

MeTPK Exit 45 Reconfiguration
South Portland, ME



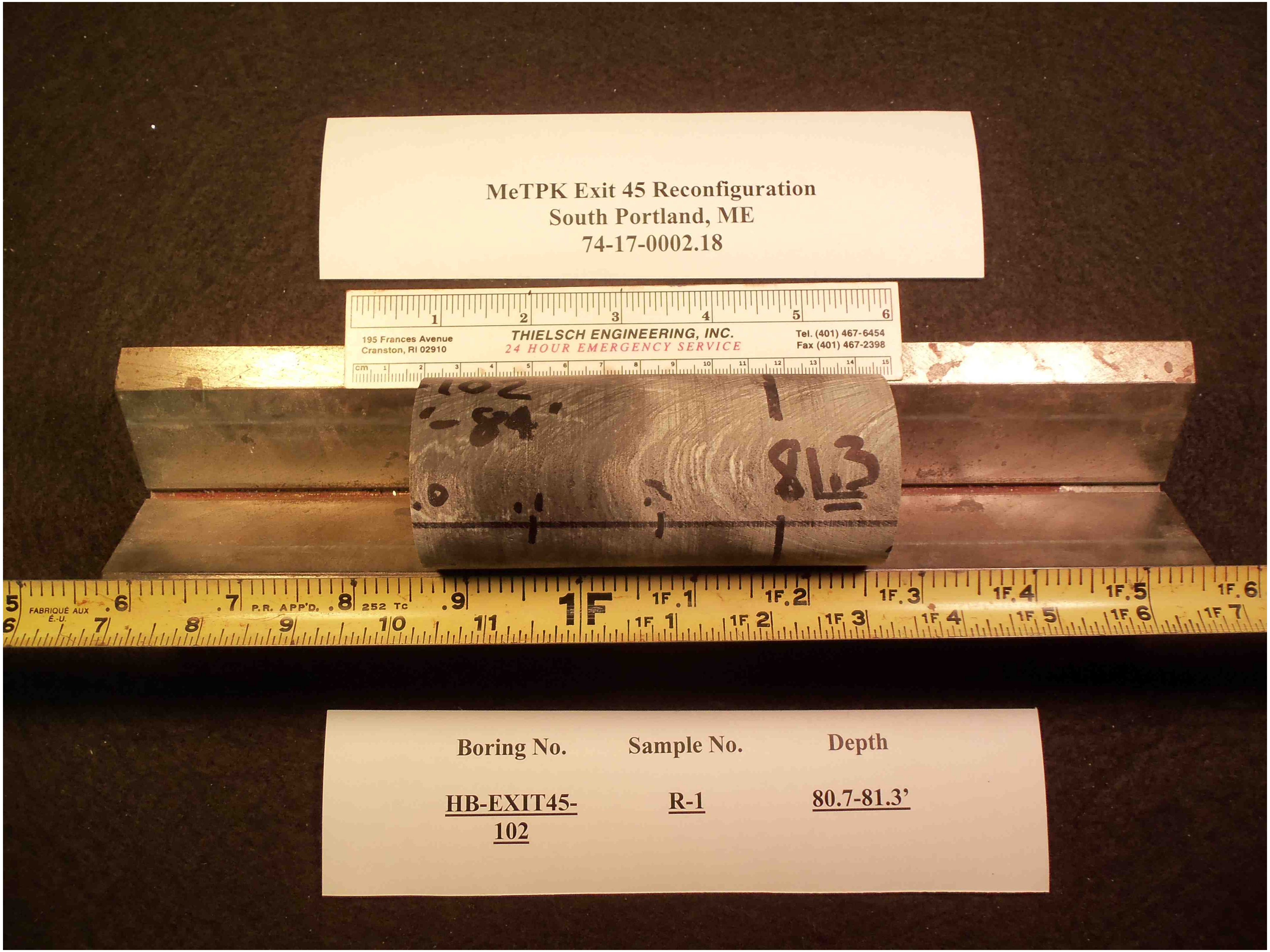
Rock Unconfined Compression Testing - ASTM D7012

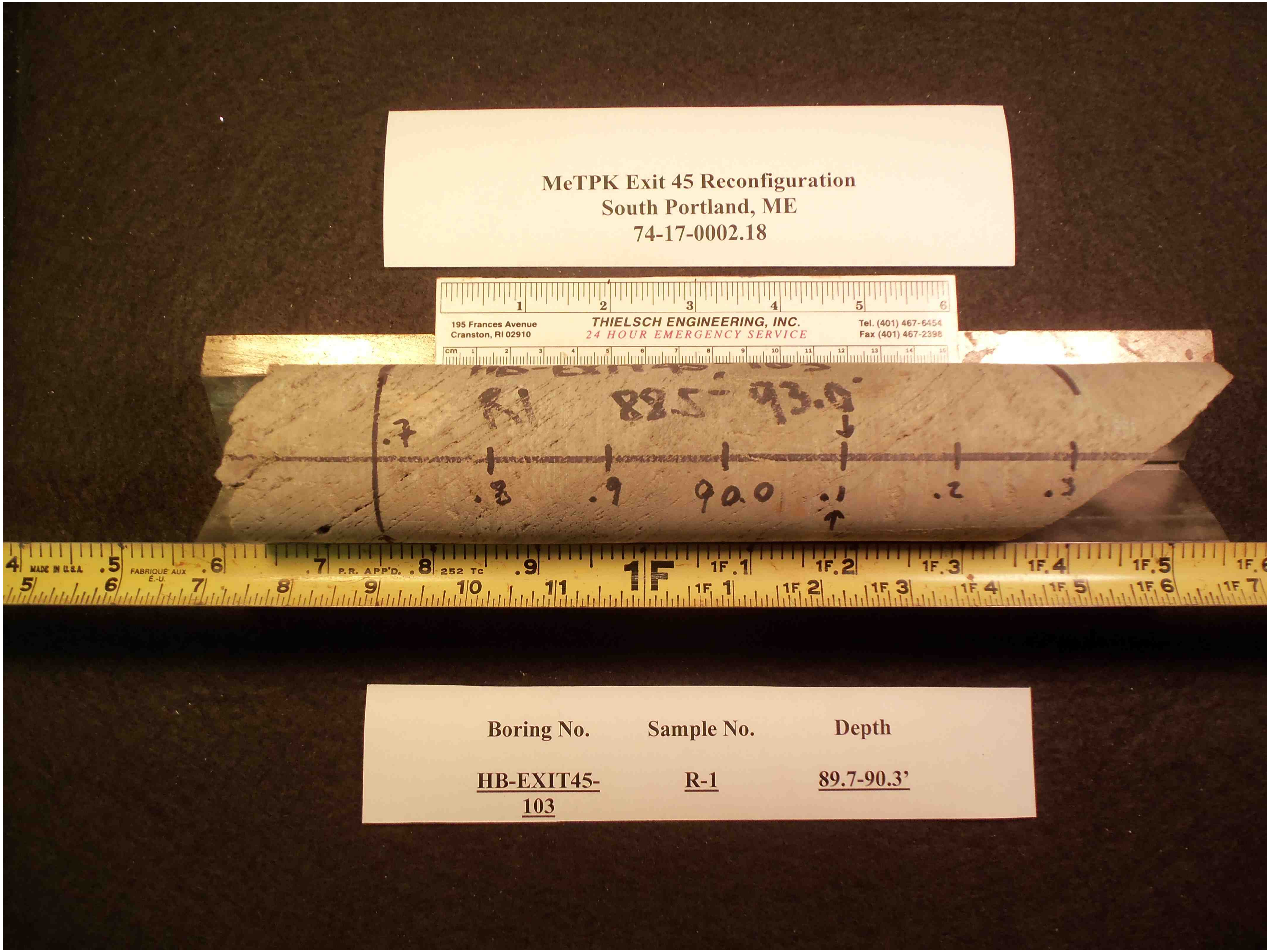
Boring No. HB-EXIT45-103
Sample No. R-1
Depth: 89.7-90.1

File No. 17-028
Date: 11/27/17
Test No. 17-R-1806

THIELSCH ENGINEERING


MeTPK Exit 45 Reconfiguration
South Portland, ME
74-17-0002.18
THIELSCH ENGINEERING, INC.
24 HOUR EMERGENCY SERVICE
195 Frances Avenue
Cranston, RI 02910
Tel. (401) 467-6454
Fax (401) 467-2398
HB-EXIT45-102
R1 79'-84'
80.7
81.0
81.3
Boring No.
Sample No.
Depth
HB-EXIT45-102
R-1
80.7-81.3'


MeTPK Exit 45 Reconfiguration
South Portland, ME
74-17-0002.18
THIELSCH ENGINEERING, INC.
24 HOUR EMERGENCY SERVICE
195 Frances Avenue
Cranston, RI 02910
Tel. (401) 467-6454
Fax (401) 467-2398
Boring No.
Sample No.
Depth
HB-EXIT45-102
R-1
80.7-81.3'


MeTPK Exit 45 Reconfiguration
South Portland, ME
74-17-0002.18
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195 Frances Avenue
Cranston, RI 02910
Tel. (401) 467-6454
Fax (401) 467-2398
Boring No.
Sample No.
Depth
HB-EXIT45-103
R-1
89.7-90.3'


MeTPK Exit 45 Reconfiguration
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Sample No.
Depth
HB-EXIT45-103
R-1
89.7-90.3'


MeTPK Exit 45 Reconfiguration
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Sample No.
Depth
HB-EXIT45-
102
R-1
80.7-81.3’


MeTPK Exit 45 Reconfiguration
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74-17-0002.18
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Fax (401) 467-2398
Boring No.
Sample No.
Depth
HB-EXIT45-103
R-1
89.7-90.3'

ATTACHMENT 2
GEOTECHNICAL DATA REPORT (FINAL PHASE EXPLORATION)

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

FIELD AND LABORATORY DATA REPORT
PHASE 2 GEOTECHNICAL PROGRAM
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND-SCARBOROUGH, MAINE

PREPARED FOR:

HNTB Corporation
Westbrook, Maine

PREPARED BY:

Isabel V. (Be) Schonewald, P.E.
Schonewald Engineering Associates, Inc. (SchonewaldEA)
129 Middle Road
Cumberland, Maine 04021
Be@SchonewaldEngineering.com

October 8, 2018

SchonewaldEA Project No. 18-008

SCHONEWALD ENGINEERING ASSOCIATES, INC.
www.SchonewaldEngineering.com

FIELD AND LABORATORY DATA REPORT
PHASE 2 GEOTECHNICAL PROGRAM
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND-SCARBOROUGH, MAINE

TABLE OF CONTENTS

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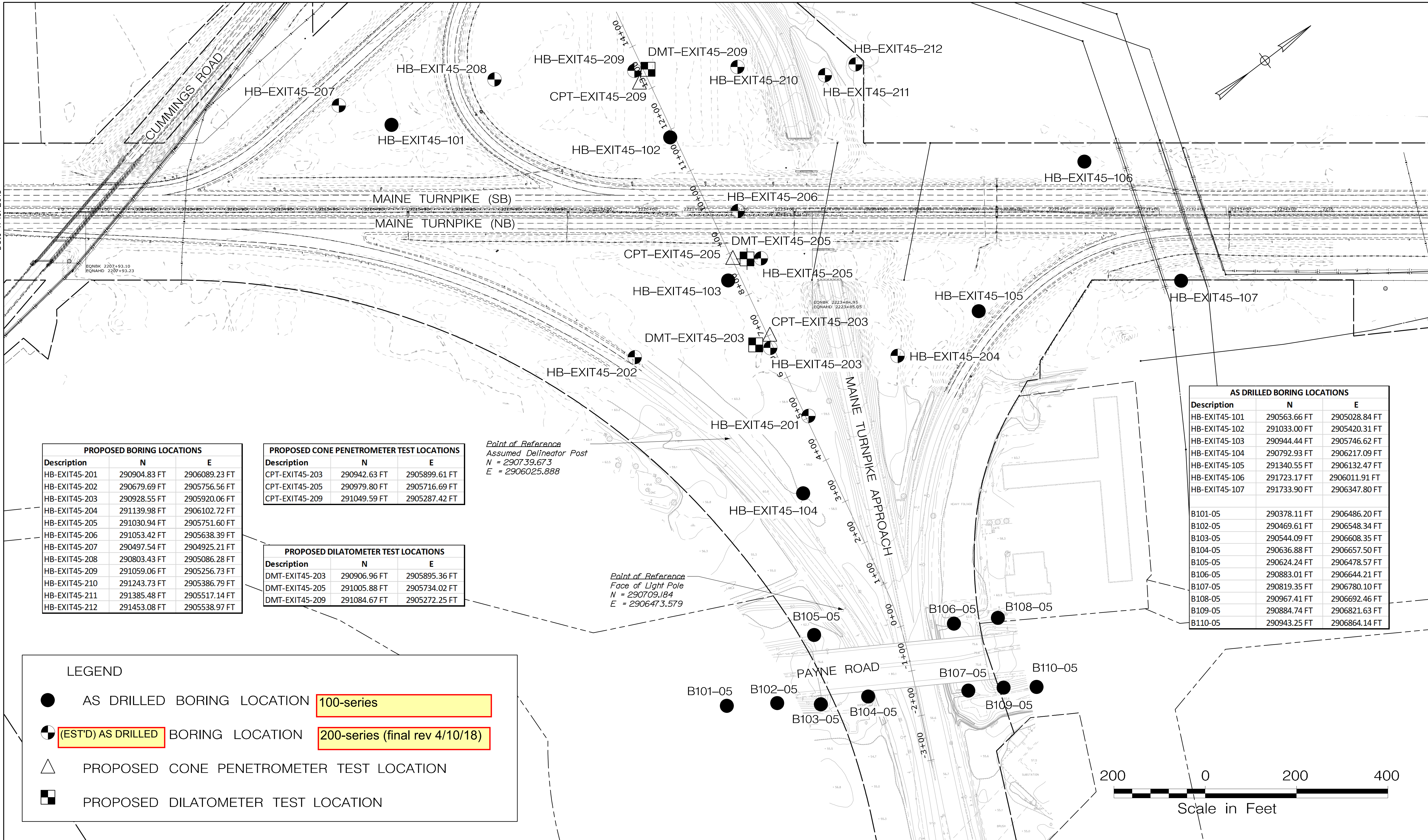
SUBSURFACE EXPLORATION LOCATION SKETCH



PROPOSED BORING LOCATIONS		
Description	**N**	**E**
HB-EXIT45-201	290904.83 FT	2906089.23 FT
HB-EXIT45-202	290679.69 FT	2905756.56 FT
HB-EXIT45-203	290928.55 FT	2905920.06 FT
HB-EXIT45-204	291139.98 FT	2906102.72 FT
HB-EXIT45-205	291030.94 FT	2905751.60 FT
HB-EXIT45-206	291053.42 FT	2905638.39 FT
HB-EXIT45-207	290497.54 FT	2904925.21 FT
HB-EXIT45-208	290803.43 FT	2905086.28 FT
HB-EXIT45-209	291059.06 FT	2905256.73 FT
HB-EXIT45-210	291243.73 FT	2905386.79 FT
HB-EXIT45-211	291385.48 FT	2905517.14 FT
HB-EXIT45-212	291453.08 FT	2905538.97 FT

PROPOSED CONE PENETROMETER TEST LOCATIONS		
Description	**N**	**E**
CPT-EXIT45-203	290942.63 FT	2905899.61 FT
CPT-EXIT45-205	290979.80 FT	2905716.69 FT
CPT-EXIT45-209	291049.59 FT	2905287.42 FT

PROPOSED DILATOMETER TEST LOCATIONS		
Description	**N**	**E**
DMT-EXIT45-203	290906.96 FT	2905895.36 FT
DMT-EXIT45-205	291005.88 FT	2905734.02 FT
DMT-EXIT45-209	291084.67 FT	2905272.25 FT

AS DRILLED BORING LOCATIONS		
Description	**N**	**E**
HB-EXIT45-101	290563.66 FT	2905028.84 FT
HB-EXIT45-102	291033.00 FT	2905420.31 FT
HB-EXIT45-103	290944.44 FT	2905746.62 FT
HB-EXIT45-104	290792.93 FT	2906217.09 FT
HB-EXIT45-105	291340.55 FT	2906132.47 FT
HB-EXIT45-106	291723.17 FT	2906011.91 FT
HB-EXIT45-107	291733.90 FT	2906347.80 FT
B101-05	290378.11 FT	2906486.20 FT
B102-05	290469.61 FT	2906548.34 FT
B103-05	290544.09 FT	2906608.35 FT
B104-05	290636.88 FT	2906657.50 FT
B105-05	290624.24 FT	2906478.57 FT
B106-05	290883.01 FT	2906644.21 FT
B107-05	290819.35 FT	2906780.10 FT
B108-05	290967.41 FT	2906692.46 FT
B109-05	290884.74 FT	2906821.63 FT
B110-05	290943.25 FT	2906864.14 FT

LEGEND

● AS DRILLED BORING LOCATION 100-series

(EST'D) AS DRILLED BORING LOCATION 200-series (final rev 4/10/18)

△ PROPOSED CONE PENETROMETER TEST LOCATION

PROPOSED DILATOMETER TEST LOCATION

Date:4/10/2018

Filename: BLPlan.dgn

Scale:			
No.	Revision	By	Date

Designed by:

HNTB

CONSULTANT PROJECT MANAGER: ----------

	By	Date		By	Date
Designed	---	--/--	Checked	---	--/--
Drawn	---	--/--	In Charge of	RAL	--/--

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: ------------

MeTPK EXIT 45 PHASE 2 EXPLORATIONS

BORING LOCATION PLAN

SHEET NUMBER:

CONTRACT:XXXX.XXX

LOGS OF 200-SERIES SUBSURFACE EXPLORATIONS

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-201 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/8/18; 1530 - 5/9/18; 1620	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 64.5'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	ground surface

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/10	2.0 - 4.0	7-15-18-7	33	33				1D: Red brown and grey brown, wet, fine to coarse SAND, some Silt; changing at 2. 4 ft to Red brown, m. dense, fine to coarse Sandy GRAVEL, some Silt. FILL	
5	2D	24/11	5.0 - 7.0	1-1-3-6	4	4	6			2D: Olive blue grey, saturated, soft, SILT, little to some fine SAND; appears to be reworked.	-#200=79.0% WC=21% LL=27 PL=17 PI=10
							14				
							22				
							29	50.5		8.5	
							27				
10	3D	24/24	10.0 - 12.0	3-2-3-3	5	5	30			3D: Olive brown, m. stiff, slightly mottled, SILT & CLAY, with one 2-inch and smaller seams Silty fine SAND. MARINE SILT-CLAY CRUST	CL A-6(11) -#200=98% WC=28% LL=29 PL=17 PI=12
							30				
							28				
							26				
							25				
15	4D	24/22	15.0 - 17.0	WOR-1-1-2	2	2	PUSH			4D: Olive grey, soft, CLAY & SILT, with occasional seams Silty fine SAND.	WC=34% LL=29 PL=19 PI=10
								40.5		18.5	
20	U1	24/21	20.0 - 22.0	HYD PUSH			PUSH			U1: Dark grey, Silty CLAY with Silty fine SAND on top and bottom of sample and shell fragments in bottom of sample. MARINE SILT-CLAY	X-RAY
25											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-201 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/8/18; 1530 - 5/9/18; 1620	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 64.5'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	ground surface

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

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ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	5D V1	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 343/ 0 psf			PUSH			5D: Dark grey black, Silty CLAY, trace very fine Sand with nodules throughout. V1: Tu=12.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V2		26.6 - 27.0	Su= 330/ 0 psf						V2: Tu=12 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
30	U2	24/23	30.0 - 32.0	HYD PUSH			PUSH			U2: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) WC=41% LL=35 PL=20 PI=15
35	6D V3	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 412/ 14 psf			PUSH			6D: Dark grey black, Silty CLAY with nodules throughout. V3: Tu=15 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	WC=44% LL=40 PL=20 PI=20
	V4		36.6 - 37.0	Su= 385/ 0 psf						V4: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
40	U3	24/24	40.0 - 42.0	HYD PUSH			PUSH			U3: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) WC=39% LL=27 PL=18 PI=9
45	7D V5	24/8	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 412/ 0 psf			PUSH			7D: Dark grey black, Silty CLAY with nodules throughout. V5: Tu=15 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V6		46.6 - 47.0	Su= 385/ 0 psf						V6: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-201 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/8/18; 1530 - 5/9/18; 1620	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 64.5'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	ground surface

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
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U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

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CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	U4	24/24	50.0 - 52.0	HYD PUSH			PUSH			U4: Dark grey, Silty CLAY.	X-RAY
55	8D V7	24/24	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 508/ 0 psf			PUSH			8D: Dark grey, Silty CLAY with nodules throughout. V7: Tu=18.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	-#200=99.5% WC=34% LL=33 PL=18 PI=15
	V8		56.6 - 57.0	Su= 494/ 14 psf						V8: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
60	9D V9	24/18	60.0 - 62.0 60.6 - 61.0	(VANE)-WOR/12" Su= 481/ 14 psf			PUSH			9D: Dark grey, Silty CLAY with nodules and multiple seams fine Sandy SILT. V9: Tu=17.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	MV									MV: Unable to push vane past 61.3 ft.	
							22/6"	-5.5		64.5	
65	10D	24/10	65.0 - 67.0	9-8-5-9	13	13	RC			64.5 ft: Apparent stratum change based on drilling behavior. 10D: Grey, m. dense, Silty fine to medium SAND, some fine Gravel, trace coarse Sand. TILL	
70	11D	24/4	70.0 - 72.0	23-24-25-19	49	49				11D: Grey, dense, fine to medium SAND, little to some fine Gravel, little to some Silt, trace coarse Sand.	
								-13.0		72.0 **Bottom of Exploration at 72.0 feet below ground surface.** No refusal.	
75											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-202
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/27/18; 1030 - 5/1/18; 1125	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 70'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.8 ft (open) / 3.9 ft (60 hrs)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/8	2.0 - 4.0	2-1-2-4	3	3				1D: Brown, wet, v. loose, fine to coarse SAND, some Silt. FILL	A-2-4(0) -#200=24%
5	2D	24/16	5.0 - 7.0	2-8-12-13	20	20	PUSH			Brown, GRANULAR FILL overlying SILT-CLAY FILL; changing at 6.0 ft to:	
								58.0		6.0	
							33			2D: Dark red brown, wet, fine to coarse SAND, little to some Silt. REDDISH CLEAN SAND	
							38				
							38	55.5		8.5	
							42				
10	3D	24/8	10.0 - 12.0	10-6-3-2	9	9	27			3D: Grey, loose, fine SAND, trace to little Silt with one 2-inch layer SILT, little to some fine Sand at top of sample. INTERBEDDED MARINE FINE SANDS AND SILT	
							27				
							25				
							23				
							22				
15	4D	24/24	15.0 - 17.0	WOH/24"	0	0	PUSH			4D: Olive grey, v. soft, Silty CLAY with three 1-inch seams and occasional partings fine SAND, some Silt.	-#200=89% WC=33% LL=29 PL=17 PI=12
20	5D	24/24	20.0 - 22.0	WOR/24"	0	0	PUSH			5D: Olive grey, v. soft, interbedded, Silty CLAY, trace very fine Sand; and fine SAND, some Silt.	
25											

Remarks:

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

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

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Boring No.: HB-EXIT45-202

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-202 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/27/18; 1030 - 5/1/18; 1125	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 70'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.8 ft (open) / 3.9 ft (60 hrs)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V1	24/21	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 467/ 14 psf			PUSH			6D: Grey, interbedded, Silty CLAY, trace very fine Sand; and fine SAND, some Silt. V1: Tu=17 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	-#200=99.5% WC=34% LL=23 PL=16 PI=7
	V2		26.6 - 27.0	Su= 330/ 14 psf						V2: Tu=12 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
								35.5		28.5	
30	U1	24/24	30.0 - 32.0	HYD PUSH			PUSH			U1: Grey, Silty CLAY, trace fine Sand. MARINE SILT-CLAY	X-RAY
35	7D V3	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 330/ 0 psf			PUSH			7D: Grey black, Silty CLAY. V3: Tu=12 / Tr=0 ft-lbs (65 mm x 130 mm vane)	WC=36% LL=31 PL=19 PI=12
	V4		36.6 - 37.0	Su= 343/ 14 psf						V4: Tu=12.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
40	U2	24/24	40.0 - 42.0	HYD PUSH			PUSH			U2: Grey black, Silty CLAY.	X-RAY
45	8D V5	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 522/ 0 psf			PUSH			8D: Dark grey black, Silty CLAY with nodules and shell fragments throughout. V5: Tu=19 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V6		46.6 - 47.0	Su= 371/ 0 psf						V6: Tu=13.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
50											

Remarks:

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

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

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Boring No.: HB-EXIT45-202

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-202 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/27/18; 1030 - 5/1/18; 1125	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 70'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.8 ft (open) / 3.9 ft (60 hrs)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	U3	24/24	50.0 - 52.0	HYD PUSH			PUSH			U3: Dark grey black, Silty CLAY.	X-RAY
55	9D V7	24/16	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 494/ 0 psf			PUSH			9D: Dark grey black, Silty CLAY with nodules throughout. V7: Tu=18 / Tr=0 ft-lbs (65 mm x 130 mm vane)	WC=40% LL=29 PL=17 PI=12
	V8		56.6 - 57.0	Su= 453/ 0 psf						V8: Tu=16.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
60	U4	24/22	60.0 - 62.0	HYD PUSH			PUSH			U4: Dark grey, Silty CLAy.	X-RAY
							--	-0.2		64.2 ft: Apparent stratum change (gravelly) based on drilling behavior. (64.2)	
65	10D	24/6	65.0 - 67.0	12-7-3-7	10	10	RC			10D: Grey, loose, fine to coarse Sandy GRAVEL, some Silt. TILL	
										68.5 to 70 ft: Open-work till; cobbles and voids based on drilling behavior.	
70	11D	12/4	70.0 - 71.0	12" drop-50/0"				-7.0		11D: Grey GRAVEL, some Silt, little fine to coarse Sand. TILL (71.0)	
										Bottom of Exploration at 71.0 feet below ground surface. At split-spoon refusal.	
75											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-203 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/7/18; 1030 - 5/8/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 65'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 6'	**Water Level*:**	0.9 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/11	2.0 - 4.0	5-7-3-5	10	10				1D: Red brown and grey brown, wet, loose, fine to coarse SAND, some Gravel, little to some Silt; somewhat layered; possibly reworked. FILL	
5	2D	24/13	5.0 - 7.0	5-5-9-9	14	14				2D: Olive brown and grey, mottled, Clayey SILT and Silty fine SAND, with grey very fine Sandy SILT in tip of spoon; possibly reworked.	
							PUSH				
10	3D	24/1	10.0 - 12.0	2-1-1-1	2	2	PUSH	49.6		Brown, GRANULAR FILL; changing at 10.4 ft to: —10.4—	
	3D-A	24/24	11.0 - 13.0	--	3"dia					3D-A: Grey, Silty CLAY with multiple seams Silty fine SAND. INTERBEDDED MARINE FINE SANDS AND SILT	
15	4D V1	24/24	15.0 - 17.0 15.6 - 16.0	VANE INTERVAL Su= 357/ 0 psf			PUSH			4D: Grey, interbedded, Silty CLAY, trace very fine Sand; and very fine Sandy SILT. V1: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	-#200=98% WC=32% LL=25 PL=16 PI=9
	V2		16.6 - 17.0	Su= 302/ 0 psf						V2: Tu=11 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
								41.5		— — — 18.5	
20	5D V3	24/9	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 288/ 0 psf			PUSH			5D: Dark grey, Silty CLAY, trace very fine Sand. MARINE SILT-CLAY V3: Tu=10.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	WC=36% LL=28 PL=17 PI=11
	V4		21.6 - 22.0	Su= 261/ 14 psf						V4: Tu=9.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
25											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

Page 1 of 3

Boring No.: HB-EXIT45-203

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-203 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/7/18; 1030 - 5/8/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 65'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 6'	**Water Level*:**	0.9 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U1	24/24	25.0 - 27.0	HYD PUSH			PUSH			U1:Dark grey black, Silty CLAY with shell fragments.	X-RAY
30	6D V5	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 357/ 0 psf			PUSH			6D: Dark grey, Silty CLAY with nodules throughout. V5: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V6		31.6 - 32.0	Su= 302/ 14 psf						V6: Tu=11 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
35	U2	24/24	35.0 - 37.0	HYD PUSH			PUSH			U2: Dark grey black, Silty CLAY with shell fragments.	X-RAY
40	7D V7	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 426/ 0 psf			PUSH			7D: Dark grey, Silty CLAY with nodules throughout. V7: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	WC=45% LL=33 PL=19 PI=14
	V8		41.6 - 42.0	Su= 398/ 0 psf						V8: Tu=14.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
45	U3	24/23	45.0 - 47.0	HYD PUSH			PUSH			U3: Dark grey, Silty CLAY.	X-RAY
50											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

Schonewald Engineering Associates, Inc.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-203 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/7/18; 1030 - 5/8/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 65'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 6'	**Water Level*:**	0.9 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	8D V9	24/24	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 343/ 0 psf			PUSH			8D: Dark grey, Silty CLAY with nodules throughout. V9: Tu=12.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
	V10		51.6 - 52.0	Su= 426/ 0 psf						V10: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
55	U4	24/22	55.0 - 57.0	HYD PUSH			PUSH			U4: Dark grey, Silty CLAY with fine SAND, some Silt on bottom of sample.	X-RAY
								1.2		58.8	
							18			58.8 ft: Driller notes probable stratum change based on drilling behavior.	
60	9D	24/11	60.0 - 62.0	12-7-5-5	12	12	33			9D: Grey, m. dense, fine to medium SAND, some Silt, little to some Gravel, trace coarse Sand. TILL	
							29				
							21				
							19				
							42				
65								-5.0		65.0 **Bottom of Exploration at 65.0 feet below ground surface.** No refusal.	
70											
75											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-204 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/1/18; 1220 - 5/2/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 55'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 15'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/14	2.0 - 4.0	16-22-26-8	48	48				1D: Dark brown black, dry, dense WEATHERED (WASTE) ASPHALT. FILL	
								56.0		4.5	
5	2D	24/9	5.0 - 7.0	1-1-1-2	2	2				2D: Dark (red) brown, and grey, wet, v. loose, ORGANIC SILT and PEAT; organic odor. ORIGINAL GROUND	SC-SM A-4(0) -#200=36% WC=21% LL=27 PL=20 PI=7
								52.0		8.5	
10	3D	24/18	10.0 - 12.0	4-5-8-8	13	13				3D: Olive brown, mottled, moist (tight), stiff, Clayey SILT, trace fine Sand. MARINE SILT-CLAY CRUST	WC=27% LL=32 PL=18 PI=14
15	4D	24/20	15.0 - 17.0	1-1-1-1	2	2	PUSH			4D: Olive brown, slightly mottled, SILT & CLAY with numerous partings fine Sandy SILT; grading at 16.0 ft to:	
								44.5		16.0 Dark grey, Silty CLAY, trace fine Sand with black streaks at tip of spoon. MARINE SILT-CLAY	
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 385/ 27 psf			PUSH			5D: Dark grey black, Silty CLAY with nodules throughout. V1: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane).	WC=42% LL=34 PL=20 PI=14
	V2		21.6 - 22.0	Su= 330/ 14 psf						V2: Tu=12 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
25											

Remarks:

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

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

Boring No.: HB-EXIT45-204

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-204 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/1/18; 1220 - 5/2/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 55'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 15'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U1	24/24	25.0 - 27.0	HYD PUSH			PUSH			U1: Dark grey, Silty CLAY.	X-RAY
30	6D V3	24/18	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 440/ 0 psf			PUSH			6D: Dark grey black, Silty CLAY with nodules and shell fragments. V3: Tu=16 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V4		31.6 - 32.0	Su= 426/ 0 psf						V4: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
35	U2	24/23	35.0 - 37.0	HYD PUSH			PUSH			U2: Dark grey, Silty CLAY.	X-RAY
40	7D V5	24/22	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 426/ 0 psf			PUSH			7D: Dark grey black, Silty CLAY with nodules. V5: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V6		41.6 - 42.0	Su= 357/ 0 psf						V6: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
45	U3	24/24	45.0 - 47.0	HYD PUSH			PUSH			U3: Grey, Silty CLAY.	X-RAY
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-204 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	60.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/1/18; 1220 - 5/2/18; 1220	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 55'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 15'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	8D V7	24/23	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 481/ 41 psf			PUSH			8D: Dark grey, Silty CLAY, trace very fine Sand. V7: Tu=17.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
	V8		51.6 - 52.0	Su= 453/ 41 psf						V8: Tu=16.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
							RC	5.7		54.8	
55	9D	24/12	55.0 - 57.0	15-12-12-14	24	24	RC			9D: Grey, m. dense, Silty fine to medium SAND, little Gravel, trace coarse Sand. TILL	
60	10D	24/2	60.0 - 62.0	15-19-25-30	44	44				10D: Grey, dense, fine to medium SAND, some Silt, trace Gravel, trace coarse Sand; appears spoon pushed a piece of gravel.	
								-1.5		62.0 **Bottom of Exploration at 62.0 feet below ground surface.** No Refusal.	
65											
70											
75											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-205	**Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/2/18; 1235 - 5/4/18; 1330	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 66'; NW to 67'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/18	2.0 - 4.0	12-11-7-9	18	18				1D: GRANULAR FILL changing at 3.3 ft to SILT-CLAY FILL. FILL	
5	2D	24/15	5.0 - 7.0	7-9-5-5	14	14	20			2D: Brown grey, wet, m. dense/stiff, layers of fine to coarse SAND, little to some Silt; and Clayey SILT, trace to little fine Sand.	
							14				
							17				
							22	54.5		8.5	
							25				
10	3D	24/14	10.0 - 12.0	4-8-3-4	11	11	30			3D: Olive grey, m. dense, interbedded, SILT, little fine Sand; fine to medium Sandy SILT; and mottled Clayey SILT; appears undisturbed. INTERBEDDED MARINE FINE SANDS AND SILT	
							23				
							19				
							18				
							14				
15	4D	24/24	15.0 - 17.0	1/24"	0	0	PUSH			4D: Grey, v. soft, interbedded, Silty CLAY, trace very fine Sand; and Silty fine SAND.	WC=31% LL=21 PL=17 PI=4
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 261/ 0 psf			PUSH			5D: Dark grey, Silty CLAY with seams of Silty fine SAND. V1: Tu=9.5 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	WC=32% LL=26 PL=17 PI=9
	V2		21.6 - 22.0	Su= 426/ 0 psf						V2: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
								39.5		23.5	
25											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-205 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/2/18; 1235 - 5/4/18; 1330	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 66'; NW to 67'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U1	24/23	25.0 - 27.0	HYD PUSH			PUSH			U1: Grey, Silty CLAY, trace very fine Sand. MARINE SILT-CLAY	X-RAY
30	6D V3	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 426/ 0 psf			PUSH			6D: Dark grey black, Silty CLAY, trace very fine Sand with occasional nodules. V3: Tu=15.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V4		31.6 - 32.0	Su= 412/ 0 psf						V4: Tu=15 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
35	U2	24/24	35.0 - 37.0	HYD PUSH			PUSH			U2: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) WC=52% LL=39 PL=21 PI=18
40	7D V5	24/19	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 220/ 0 psf			PUSH			7D: Dark grey black, Silty CLAY with nodules throughout. V5: Tu=8 / Tr=0 ft-lbs (65 mm x 130 mm vane).	-#200=98% WC=34% LL=27 PL=17 PI=10
	V6		41.6 - 42.0	Su= 206/ 0 psf						V6: Tu=7.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
45	U3	24/24	45.0 - 47.0	HYD PUSH			PUSH			U3: Dark grey black, Silty CLAY.	X-RAY
50											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-205 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/2/18; 1235 - 5/4/18; 1330	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 66'; NW to 67'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	8D V7	24/11	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 453/ 0 psf			PUSH			8D: Dark grey black, Silty CLAY with nodules throughout. V7: Tu=16.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	WC=42% LL=34 PL=21 PI=13
	V8		51.6 - 52.0	Su= 453/ 0 psf						V8: Tu=16.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
55	U4	24/23	55.0 - 57.0	HYD PUSH			PUSH			U4: Dark grey, Silty CLAY.	X-RAY
60	9D V9	24/24	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 591/ 27 psf			PUSH			9D: Dark grey, Silty CLAY with nodules throughout and one 2-inch seam and occasional partings Silty fine SAND. V9: Tu=21.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V10		61.6 - 62.0	Su= 549/ 27 psf						V10: Tu=20 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
								-1.6		64.6	
65	10D	13/7	65.0 - 66.1	2-30-50/1"	--		RC			64.6 ft: Apparent stratum change based on drilling behavior and wash water. 10D: Grey, GRAVEL, some Silt, some fine to coarse Sand; appears to be crushed rock in tip of spoon. TILL	
							RC	-3.1		66.1	
	R1	60/60	67.0 - 72.0	RQD: 17"=28%						R1: Hard, typically fresh, aphanitic to fine grained, grey, PHYLLITE, with numerous calcsilicate veins and typically moderately dipping relic bedding. One 4-inch thick quartzite layer at 70.2 to 70.5 ft. Typically close, predominately moderately dipping with occasional low angle breaks; undulating, rough, typically fresh, and open often with mud infilling; shiny. Core times: 5:05/ 3:30/ 2:15/ 3:15/ 2:20 min:sec/ft POOR ROCK QUALITY	
70											
	R2	46/46	72.0 - 75.8	RQD: 25"=54%						R2: Same as R1, except no quartzite layer and breaks are close to moderately spaced. Highly fractured 73.3 to 74.1 ft. Core times: 3:15/ 2:50/ 2:15/- min:sec ft. FAIR ROCK QUALITY	
75											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-205 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	5/2/18; 1235 - 5/4/18; 1330	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 66'; NW to 67'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.7 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75								-12.8		75.8 **Bottom of Exploration at 75.8 feet below ground surface.**	
80											
85											
90											
95											
100											

Remarks:

1. Drill two pilot holes for future CPT and DMT; approx. 10-ft apart in triangular spacing. Pilot holes to 8 ft BGS; 2-inch dia. PVC into holes to hold open; marked with traffic cones.

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

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SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-206
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/3/18; 2000-4/6/18; 0030	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (6.3' off guardrail; 123' SB of CB)	**Casing ID/OD:**	HW to 65'; NW to 76.1'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.0 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines   WC = water content (%)
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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/20	2.0 - 4.0	8-10-18-22	28	32				Top 4 inches: topsoil and organics. 1D: Tan brown, moist, m. dense, fine to coarse SAND, some Gravel, little Silt. FILL	
5	2D	24/19	5.0 - 7.0	5-4-13-11	17	19	38			2D: Predominately grey, damp, m. dense, very fine Sandy SILT with tan fine to coarse SAND, some Gravel, little Silt top and bottom.	
							71				
							55	56.0		7.0	
							58				
							72				
10	3D	24/20	10.0 - 12.0	9-2-2-2	4	5	OPEN			3D: Grey tan, v. loose, interbedded, fine SAND, trace Silt; fine to medium SAND, little Silt; fine Sandy SILT; and Silty CLAY, trace very fine Sand. INTERBEDDED MARINE FINE SANDS AND SILT	
15	4D	24/24	15.0 - 17.0	WOR/24"	0	0	33			4D: Grey, v. soft, interbedded, Organic Silty CLAY, trace very fine Sand; Silty CLAY, some very fine Sand; and fine Sandy SILT.	WC=34% LL=29 PL=17 PI=12
							30				
							28				
							24				
							24				
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 275/ 14 psf			PUSH	43.0		20.0 5D: Grey, Silty CLAY, trace to little fine Sand as partings and seams. MARINE SILT-CLAY V1: Tu=10 / Tr=0.5 ft-lbs (65 mm x 130 mm vane). V2: Tu=8 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V2		21.6 - 22.0	Su= 220/ 14 psf							
25											

Remarks:

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Page 1 of 4

Boring No.: HB-EXIT45-206

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-206 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/3/18; 2000-4/6/18; 0030	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (6.3' off guardrail; 123' SB of CB)	**Casing ID/OD:**	HW to 65'; NW to 76.1'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.0 ft (open)

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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V3	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 316/ 14 psf			OPEN			6D: Grey, Silty CLAY with pockets and seams fine Sandy SILT. V3: Tu=11.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	-#200=99.7% WC=36% LL=28 PL=18 PI=10
	V4		26.6 - 27.0	Su= 261/ 0 psf						V4: Tu=9.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
30	7D V5	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 357/ 14 psf			OPEN			7D: Dark grey black, Silty CLAY. V5: Tu=13 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V6		31.6 - 32.0	Su= 330/ 0 psf						V6: Tu=12 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
35	8D V7	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 371/ 27 psf			OPEN			8D: Dark grey black, Silty CLAY. V7: Tu=13.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V8		36.6 - 37.0	Su= 385/ 14 psf						V8: Tu=14 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
40	9D V9	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 426/ 14 psf			OPEN			9D: Dark grey black, Silty CLAY with nodules throughout. V9: Tu=15.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V10		41.6 - 42.0	Su= 453/ 14 psf						V10: Tu=16.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
45	10D V11	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 577/ 0 psf			OPEN			10D: Dark grey black, Silty CLAY with nodules and shell fragments. V11: Tu=21 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V12		46.6 - 47.0	Su= 453/ 14 psf						V12: Tu=16.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
50											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-206 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/3/18; 2000-4/6/18; 0030	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (6.3' off guardrail; 123' SB of CB)	**Casing ID/OD:**	HW to 65'; NW to 76.1'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.0 ft (open)

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R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	11D V13	24/24	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 440/ 14 psf			OPEN			11D: Dark grey black, Silty CLAY with nodules and shell fragments. V13: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V14		51.6 - 52.0	Su= 440/ 14 psf						V14: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
55	12D V15	24/24	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 536/ 14 psf			PUSH			12D: Dark grey black, Silty CLAY with nodules. V15: Tu=19.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	WC=43% LL=34 PL=20 PI=14
	V16		56.6 - 57.0	Su= 549/ 14 psf						V16: Tu=20 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
60	13D V17	24/24	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 604/ 27 psf			PUSH			13D: Dark grey black, Silty CLAY with nodules and one concretion. V17: Tu=22 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V18		61.6 - 62.0	Su= 591/ 27 psf						V18: Tu=21.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
65	14D V19	24/24	65.0 - 67.0 65.6 - 66.0	VANE INTERVAL Su= 646/ 41 psf			OPEN			14D: Dark grey, Silty CLAY. V19: Tu=23.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
	V20		66.6 - 67.0	Su= 659/ 27 psf						V20: Tu=24 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
70	15D V21	24/20	70.0 - 72.0 70.6 - 71.0	VANE INT/18"-2 Su= 824/ 69 psf	--		RC			Dark grey, Silty CLAY; changing at 71.6 ft to: V21: Tu=30 / Tr=2.5 ft-lbs (65 mm x 130 mm vane).	
	MV		71.2 - 71.2					-8.6		71.2 ft: MV: Unable to push vane past 71.2 ft. 71.6	
										71.6 ft: 15D: Grey, Silty GRAVEL, some Sand. TILL	
75											

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-206 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/3/18; 2000-4/6/18; 0030	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (6.3' off guardrail; 123' SB of CB)	**Casing ID/OD:**	HW to 65'; NW to 76.1'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.0 ft (open)

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ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
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BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	16D	11/4	75.0 - 75.9	9-50/5"	--		RC			16D: Grey, Silty GRAVEL, some fine to coarse Sand. TILL	
								-13.0		76.0	
	R1	60/60	76.1 - 81.1	RQD: 57"=95%						R1: Hard, fresh, aphanitic to fine grained, medium grey, METAPELITE with highly undulating and/or high angle relic bedding (typically thin beds with calcsilicate veins/laminations). Moderately spaced, typically low angle to horizontal breaks; undulating, rough, typically fresh and open; dull. Core times: 2:25/ 2:20/ 2:10/ 2:10/ 2:05 min:sec/ft. EXCELLENT ROCK QUALITY	
80											
	R2	60/60	81.1 - 86.1	RQD: 50"=83%						R2: Same as R1, except close to moderately spaced breaks with some discoloration and infilling. Significantly fractured from 83.1 to 83.4 and 83.8 to 84.0 ft. Core times: 1:55/ 1:40/ 2:40/ 1:55/ 1:50 min:sec/ft. GOOD ROCK QUALITY	
85											
								-23.1		86.1	
										Bottom of Exploration at 86.1 feet below ground surface.	
90											
95											
100											

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Page 4 of 4

Boring No.: HB-EXIT45-206

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-207 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/24/18; 1020 - 4/26/18; 1550	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	2.5 ft NW (compass) of staked location	**Casing ID/OD:**	HW to 90'; NW to 95.2'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.2 ft (open)

IN-SITU SAMPLING AND TESTING:
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ADDITIONAL DEFINITIONS:
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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/12	2.0 - 4.0	2-4-4-4	8	8				1D: Dark red brown, wet, loose, fine to coarse SAND, trace to little Silt. REDDISH CLEAN SANDS	
5	2D	24/9	5.0 - 7.0	1-1-1-2	2	2	PUSH			2D: Brown, wet, v. loose, fine to medium SAND, trace to little Silt.	-#200=5%
								55.5		8.5	
10	3D	24/11	10.0 - 12.0	4-4-1-1	5	5	PUSH			3D: Grey, loose, fine SAND, little to some Silt. GREY SANDS	
								50.5		13.5	
15	4D	24/21	15.0 - 17.0	2/18"-2	0	0	PUSH			4D: Grey, v. loose, interbedded, fine SAND, little to some Silt; fine to medium SAND, trace to little Silt; and SIlty CLAY. INTERBEDDED MARINE FINE SAND AND SILT	-#200=70%
20	5D	24/13	20.0 - 22.0	2-1-2-2	3	3	PUSH			5D: Grey, v. loose, fine to medium SAND, trace Silt with one 4-inch layer fine SAND, some Silt.	
							23				
25							27				

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-207 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/24/18; 1020 - 4/26/18; 1550	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	2.5 ft NW (compass) of staked location	**Casing ID/OD:**	HW to 90'; NW to 95.2'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.2 ft (open)

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/11	25.0 - 27.0	1-1-1/12"	2	2	PUSH			6D: Grey, v. loose, interbedded, fine to medium SAND, little to some Silt; Silty fine SAND; and Silty CLAY.	
30	7D	24/24	30.0 - 32.0	WOR-1/18"	1	1	PUSH			7D: Grey, v. loose, interbedded, fine Sandy SILT; fine to medium SAND, little to some Silt; and Silty CLAY.	
35	8D V1	24/8	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 494/ 14 psf			PUSH			8D: Grey, interbedded, Silty CLAY; and fine SAND, some Silt. V1: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V2		36.6 - 37.0	Su= 453/ 27 psf						V2: Tu=16.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
40	U1	24/20	40.0 - 42.0	HYD PUSH			PUSH			U1: Grey, Silty CLAY with Silty fine SAND on top and bottom surface of sample.	X-RAY
								20.5		43.5	
45	9D V3	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 467/ 14 psf			PUSH			9D: Dark grey, Silty CLAY with nodules throughout. MARINE SILT-CLAY V3: Tu=17 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V4		46.6 - 47.0	Su= 385/ 0 psf						V4: Tu=14 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
50											

Remarks:

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

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-207 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/24/18; 1020 - 4/26/18; 1550	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	2.5 ft NW (compass) of staked location	**Casing ID/OD:**	HW to 90'; NW to 95.2'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.2 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	U2	24/24	50.0 - 52.0	HYD PUSH			PUSH			U2: Dark grey, Silty CLAY.	X-RAY
55	10D V5	24/24	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 508/ 0 psf			PUSH			10D: Dark grey black, Silty CLAY with nodules throughout. V5: Tu=18.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V6		56.6 - 57.0	Su= 522/ 0 psf						V6: Tu=19 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
60	U3	24/24	60.0 - 62.0	HYD PUSH			PUSH			U3: Dark grey black, Silty CLAY.	X-RAY
	MV									MV: Unable to push vane at 65.0 ft.	
65	11D	24/24	65.0 - 67.0	4-4-3-3	3"dia		PUSH			11D: Dark grey black, Silty CLAY with (large) nodules throughout.	
	MU									MU: Tube attempted at 70.0 ft. Piston sampler not extend fully; tube dented.	
70	12D	24/2	70.0 - 72.0	1/24"	3"dia		PUSH			12D: Dark grey black, Silty CLAY with blocky structure of stiff clay nodules throughout; shell fragments.	
75											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-207 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/24/18; 1020 - 4/26/18; 1550	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	2.5 ft NW (compass) of staked location	**Casing ID/OD:**	HW to 90'; NW to 95.2'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.2 ft (open)

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-#200 = percent fines WC = water content (%)
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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	U4	24/24	75.0 - 77.0	HYD PUSH			PUSH			U4: Dark grey black, Silty CLAY.	X-RAY
80	13D	24/0	80.0 - 82.0	1-1/18"	1	1	OPEN			13D: No recovery.	
85	14D	24/24	85.0 - 87.0	WOR/24"	3"dia		RC			14D: Grey with occasional darker grey streaks, Silty CLAY with semi-hard nodules throughout and one concretion.	-#200=98% WC=35% LL=35 PL=18 PI=17
90	15D	24/18	90.0 - 92.0	1-5-14-12	19	19	RC	-26.7		Grey, Silty CLAY with semi-hard nodules throughout and several concretions; changing at 90.7 ft to: 90.7 15D: Grey, Silty GRAVEL, some fine to coarse SAND. TILL	
	16D	13/7	94.0 - 95.1	45-47-50/1"	--		RC			16D: Grey, GRAVEL, some Silt, some fine to coarse Sand with broken rock in tip of spoon.	
95	R1	60/57	95.2 - 100.2	RQD: 42"=70%				-31.2		95.2 R1: Hard, fresh to slightly weathered, aphanitic to fine grained, grey, PHYLLITE with significant calcsilicate pockets and veins (typically high angle and highly undulating). Typically moderately close, low and high angle breaks; undulating, rough, typically fresh, and open; shiny when oriented along foliation. Open fracture at 96.1 ft. Core times: 2:55/ 3:20/ 2:45/ 2:50/ 3:25 min:sec/ft. FAIR ROCK QUALITY	
100											

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Schonewald Engineering Associates, Inc.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-207 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	64 ft (est'd)	**Core Barrel:**	NQ2
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/24/18; 1020 - 4/26/18; 1550	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	2.5 ft NW (compass) of staked location	**Casing ID/OD:**	HW to 90'; NW to 95.2'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.2 ft (open)

IN-SITU SAMPLING AND TESTING:
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
100								-36.2		100.2 **Bottom of Exploration at 100.2 feet below ground surface.**	
105											
110											
115											
120											
125											

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SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-208
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/20/18; 0830 - 4/23/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	3.7 ft S (compass) of staked location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.3 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/16	2.0 - 4.0	4-3-7-7	10	10				1D: Red brown, wet, loose, fine to coarse SAND, trace to little Silt. REDDISH CLEAN SANDS	
5								58.0		5.0	
	2D	24/13	5.0 - 7.0	4-3-2-3	5	5	PUSH			2D: Grey brown, wet, loose, fine to medium SAND, little Silt, trace coarse Sand. GREY SANDS	
								54.5		8.5	
10	3D	24/10	10.0 - 12.0	1-2-3-2	5	5	PUSH			3D: Grey, loose, interbedded, fine to medium SAND, little Silt; fine SAND, some Silt, trace fine Gravel; and Silty CLAY, trace fine Sand, INTERBEDDED MARINE FINE SANDS AND SILT	
15	4D	24/5	15.0 - 17.0	1-2-1-2	3	3	PUSH			4D: Grey, v. loose, fine SAND, little Silt with one seam SILT & CLAY, little fine Sand.	
20	5D	24/15	20.0 - 22.0	WOR-WOH/12"-1	0	0	PUSH			5D: Grey, v. soft, interbedded, Silty CLAY, trace fine Sand; and Silty fine SAND.	CL A-4(6) -#200=91% WC=33% LL=25 PL=16 PI=9
25											

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-208 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/20/18; 0830 - 4/23/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	3.7 ft S (compass) of staked location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.3 ft (open)

IN-SITU SAMPLING AND TESTING:
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S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

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LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/24	25.0 - 27.0	WOH/24"	0	0	PUSH			6D: Grey, v. soft, interbedded, Silty CLAY, trace fine Sand; and Silty fine SAND.	
30	U1	24/23	30.0 - 32.0	HYD PUSH			PUSH			U1: Top of sample: Silty fine Sand.	X-RAY
								32.0		31.0	
										U1 (cont'd): Bottom of sample: Silty CLAY, trace to little fine SAND.	
35	7D V1	24/24	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 357/ 0 psf			PUSH			7D: Grey, Silty CLAY. MARINE SILT-CLAY V1: Tu=13 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V2		36.6 - 37.0	Su= 440/ 14 psf						V2: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
40	U2	24/24	40.0 - 42.0	HYD PUSH			PUSH			U2: Grey, Silty CLAY.	X-RAY CK0U (2 point) WC=40% LL=27 PL=16 PI=11
45	8D V3	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 385/ 14 psf			PUSH			8D: Grey, Silty CLAY. V3: Tu=14 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	-#200=99.9% WC=45% LL=36 PL=20 PI=16
	V4		46.6 - 47.0	Su= 440/ 14 psf						V4: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
50											

Remarks:

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Schonewald Engineering Associates, Inc.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-208 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/20/18; 0830 - 4/23/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	3.7 ft S (compass) of staked location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.3 ft (open)

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	U3	24/24	50.0 - 52.0	HYD PUSH			PUSH			U3: Dark grey black, Silty CLAY.	X-RAY
55	9D V5	24/24	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 481/ 14 psf			PUSH			9D: Dark grey black, Silty CLAY with nodules throughout. V5: Tu=17.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V6		56.6 - 57.0	Su= 508/ 14 psf						V6: Tu=18.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
60	U4	24/24	60.0 - 62.0	HYD PUSH			OPEN			U4: Dark grey black, Silty CLAY.	X-RAY
65	10D V7	24/24	65.0 - 67.0 65.6 - 66.0	VANE INTERVAL Su= 659/ 0 psf			OPEN			10D: Dark grey black, Silty CLAY with nodules throughout. V7: Tu=24 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
	V8		66.6 - 67.0	Su= 563/ 0 psf						V8: Tu=20.5 / Tr=0 ft-lbs (65 mm x 130 mm vane).	
70	U5	24/23	70.0 - 72.0	HYD PUSH			OPEN			U5: Dark grey, Silty CLAY.	X-RAY
75											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-208 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	63 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/20/18; 0830 - 4/23/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	3.7 ft S (compass) of staked location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.3 ft (open)

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UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	11D V9	24/24	75.0 - 77.0 75.6 - 76.0	VANE INTERVAL Su= 714/ 27 psf			OPEN			11D: Dark grey black, Silty CLAY with nodules throughout and occasional small concretions. V9: Tu=26 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V10		76.6 - 77.0	Su= 742/ 14 psf						V10: Tu=27 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
80	12D V11	24/24	80.0 - 82.0 80.6 - 81.0	VANE INTERVAL Su= 646/ 14 psf			OPEN			12D: Dark grey with darker grey streaks, Silty CLAY with nodules throughout. V11: Tu=23.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V12		81.6 - 82.0	Su= 604/ 27 psf						V12: Tu=22 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
85	13D V13	24/24	85.0 - 87.0 85.6 - 86.0	VANE INTERVAL Su= 673/ 14 psf			RC			13D: Dark grey, Silty CLAY, trace fine Sand with nodules throughout. V13: Tu=24.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V14		86.6 - 87.0	Su= 714/ 14 psf						V14: Tu=26 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
								-24.8		87.8 ft: Probable stratum change based on drilling behavior; very boney. 87.8	
90								-27.2		89.7 ft: Possible top of rock. 90.2 **Bottom of Exploration at 90.2 feet below ground surface.** Roller cone refusal.	
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-209 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/17/18; 0945 - 4/18/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.5 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/14	2.0 - 4.0	5-12-13-15	25	25				1D: Red brown, wet, m. dense, fine to coarse SAND, trace to little Gravel, trace to little Silt. REDDISH CLEAN SAND	
5	2D	24/20	5.0 - 7.0	4-4-3-4	7	7	10			2D: Brown, wet, loose, fine to coarse SAND, little Gravel, trace Silt.	
							12				
							13				
							13	54.0		8.5	
							9				
10	3D	24/17	10.0 - 12.0	WOH-4-3-3	7	7	5			3D: Grey, loose, interbedded, fine SAND, some Silt; Silty CLAY, trace fine Sand; and fine to medium SAND, trace Silt. INTERBEDDED MARINE FINE SANDS AND SILT	WC=28% LL=20 PL=13 PI=7
							12				
							20				
							18				
							14				
15	4D	24/14	15.0 - 17.0	2-2-3-8	5	5	15			4D: Grey, loose, interbedded, Silty fine SAND; fine to medium SAND, trace Silt; and Silty CLAY.	WC=28% LL=NV PL=NP PI=NP
							15				
							18				
							14				
							12				
20	5D V1	24/0	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 357/ 14 psf			PUSH			5D: No recovery. V1: Tu=13 / Tr=0.5 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
	V2		21.6 - 22.0	Su= 426/ 14 psf						V2: Tu=15.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
25											

Remarks:

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

Page 1 of 4

Boring No.: HB-EXIT45-209

Schonewald Engineering Associates, Inc.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-209 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/17/18; 0945 - 4/18/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.5 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U1	24/21	25.0 - 27.0	HYD PUSH			PUSH			U1: Grey, Silty CLAY with fine Sandy SILT on bottom of sample.	X-RAY
30	6D V3	24/2	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 316/ 0 psf			PUSH			6D: Grey, fine Sandy SILT. V3: Tu=11.5 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
	V4		31.6 - 32.0	Su= 261/ 0 psf						V4: Tu=9.5 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
								29.0		33.5	
35	U2	24/23	35.0 - 37.0	HYD PUSH			PUSH			U2: Grey, Silty CLAY. MARINE SILT-CLAY	X-RAY CK0U (2 point) DSS (3 point) WC=41% LL=33 PL=21 PI=12
40	7D V5	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 426/ 14 psf			PUSH			7D: Grey, Silty CLAY. V5: Tu=15.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V6		41.6 - 42.0	Su= 536/ 27 psf						V6: Tu=19.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
45	U3	24/23	45.0 - 47.0	HYD PUSH			PUSH			U3: Grey, Silty CLAY.	X-RAY
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-209	**Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/17/18; 0945 - 4/18/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.5 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	8D V7	24/24	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 536/ 27 psf			PUSH			8D: Dark grey black, Silty CLAY. V7: Tu=19.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V8		51.6 - 52.0	Su= 494/ 14 psf						V8: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
55	U4	24/24	55.0 - 57.0	HYD PUSH			PUSH			U4: Dark grey black, Silty CLAY.	X-RAY
60	9D V9	24/24	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 646/ 27 psf			OPEN			9D: Dark grey black, Silty CLAY. V9: Tu=23.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V10		61.6 - 62.0	Su= 632/ 14 psf						V10: Tu=23 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
65	U5	24/24	65.0 - 67.0	HYD PUSH			OPEN			U5: Dark grey black, Silty CLAY.	X-RAY
70	MD V11	24/0	70.0 - 72.0 70.6 - 71.0	VANE INTERVAL Su= 673/ 55 psf			OPEN			MD: No recovery. V11: Tu=24.5 / Tr=2 ft-lbs (65 mm x 130 mm vane).	
	V12		71.6 - 72.0	Su= 673/ 55 psf						V12: Tu=24.5 / Tr=2 ft-lbs (65 mm x 130 mm vane).	
75											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-209 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Schaefer/ Titus	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/17/18; 0945 - 4/18/18; 1600	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope and cathead
Boring Location:	per location	**Casing ID/OD:**	HW to 60'	**Hammer Efficiency:**	0.6
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.5 ft (open)

IN-SITU SAMPLING AND TESTING:
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	10D V13	24/24	75.0 - 77.0 75.6 - 76.0	VANE INTERVAL Su= 769/ 55 psf			OPEN			10D: Dark grey black, Silty CLAY with nodules throughout and occasional concretions. V13: Tu=28 / Tr=2 ft-lbs (65 mm x 130 mm vane).	
	MV									MV: Unable to push vane past 76.6 ft.	
80	11D	24/18	80.0 - 82.0	WOR/24"	0	0	OPEN			11D: Dark grey black, v. soft, Silty CLAY.	
85	12D	24/22	85.0 - 87.0	WOR/24"	0	0	OPEN			12D: Grey with occasional black streaks, v. soft, Silty CLAY with numerous partings and seams Silty fine SAND.	
							RC	-25.8		88.3 88.3 ft: Gravelly material based on drilling behavior; probable stratum change. TILL	
90								-27.5		90.0 90.0 ft: Very boney; possible weathered rock.	
								-28.1		90.6 **Bottom of Exploration at 90.6 feet below ground surface.** Roller cone refusal; chips in wash water appear to be crushed Phyllite.	
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-210 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	61.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/12/18; 1345-4/13/18; 1355	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	6.4 ft E (compass) of staked location	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5 ft (approx)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA			(ponded water)	
	1D	24/16	2.0 - 4.0	2-2-2-2	4	5				Top two inches of sample: ROOT MAT/ORGANIC SILT. 1D: Brown, moist, v. loose, fine to coarse SAND, little Silt, grading to grey, Silty fine to medium SAND. FILL	
								57.5		4.0	
5	2D	24/4	5.0 - 7.0	1-4-6-6	10	11	10			2D: Grey, moist, m. dense, fine to medium SAND, some Silt; appears to have pushed something ahead of spoon.	
							18				
							19				
							10				
							26				
10	3D	24/15	10.0 - 12.0	WOR-WOH/18"	0	0	4			3D: Grey, v. soft, interbedded, Silty CLAY, trace very fine Sand; Silty fine SAND; and fine to medium SAND, little Silt. INTERBEDDED MARINE FINE SANDS AND SILT	
							2				
							6				
							4				
							1				
15	4D V1	24/23	15.0 - 17.0 15.6 - 16.0	VANE INTERVAL Su= 687/ 27 psf			PUSH			4D: Grey, interbedded, Silty CLAY, trace very fine Sand; and Silty fine SAND. V1: Tu=25 / Tr=1 ft-lbs (65 mm x 130 mm vane); sandy seams noted. V2: Tu=10.5 / Tr=1 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	CL A-4(7) -#200=91% WC=38% LL=24 PL=14 PI=10
	V2		16.6 - 17.0	Su= 288/ 27 psf							
20	5D V3	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 192/ 0 psf			OPEN			5D: Dark grey, Silty CLAY with occasional partings and seams fine Sandy SILT. V3: Tu=7 / Tr=0 ft-lbs (65 mm x 130 mm vane); sandy seams noted. V4: Tu=11.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	WC=35% LL=27 PL=17 PI=10
	V4		21.6 - 22.0	Su= 316/ 14 psf							
								38.0		23.5	
25											

Remarks:

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

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

Boring No.: HB-EXIT45-210

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-210 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	61.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/12/18; 1345-4/13/18; 1355	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	6.4 ft E (compass) of staked location	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5 ft (approx)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/6	25.0 - 27.0	HYD PUSH (MU)			OPEN			Poor recovery on tube sample; sample extracted and jarred. 6D: Dark grey, Silty CLAY, trace to little fine Sand. MARINE SILT CLAY	
	V5		27.6 - 28.0	Su= 371/ 27 psf						V5: Tu=13.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V6		28.6 - 29.0	Su= 385/ 27 psf						V6: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
30	U1	24/24	30.0 - 32.0	HYD PUSH			OPEN			U1: Dark grey, Silty CLAY.	X-RAY
35	7D V7	24/22	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 385/ 27 psf			OPEN			7D: Dark grey occasional black, Silty CLAY with small nodules in upper half of sample. V7: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V8		36.6 - 37.0	Su= 343/ 14 psf						V8: Tu=12.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
40	U2	24/13	40.0 - 42.0	HYD PUSH			OPEN			U2: Dark grey, Silty CLAY.	X-RAY DSS (3 point) WC=44% LL=29 PL=18 PI=11
45	8D V9	24/24	45.0 - 47.0 45.6 - 46.0	VANE INTERVAL Su= 467/ 27 psf			OPEN			8D: Dark grey occasional darker grey streaks, Silty CLAY. V9: Tu=17 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V10		46.6 - 47.0	Su= 440/ 27 psf						V10: Tu=16 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
50											

Remarks:

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SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-210 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	61.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/12/18; 1345-4/13/18; 1355	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	6.4 ft E (compass) of staked location	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5 ft (approx)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	U3	24/23	50.0 - 52.0	HYD PUSH			OPEN			U3: Dark grey black, Silty CLAY.	X-RAY
55	9D V11	24/24	55.0 - 57.0 55.6 - 56.0	VANE INTERVAL Su= 673/ 27 psf			OPEN			9D: Dark grey black, Silty CLAY. V11: Tu=24.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V12		56.6 - 57.0	Su= 659/ 27 psf						V12: Tu=24 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
60	U4	24/23	60.0 - 62.0	HYD PUSH			OPEN			U4: Dark grey black, Silty CLAY with shell fragments on bottom of sample.	X-RAY
65	10D V13	24/24	65.0 - 67.0 65.6 - 66.0	VANE INTERVAL Su= 728/ 55 psf			OPEN			10D: Dark grey, Silty CLAY with few Silty fine SAND partings. V13: Tu=26.5 / Tr=2 ft-lbs (65 mm x 130 mm vane).	-#200=99.1% WC=37% LL=36 PL=18 PI=18
	V14		66.6 - 67.0	Su= 687/ 41 psf						V14: Tu=25 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
70	11D V15	24/24	70.0 - 72.0 70.6 - 71.0	VANE INTERVAL Su= 659/ 69 psf			OPEN			11D: Dark grey, Silty CLAY, trace very fine Sand. V15: Tu=24 / Tr=2.5 ft-lbs (65 mm x 130 mm vane).	
	V16		71.6 - 72.0	Su= 797/ 55 psf						V16: Tu=29 / Tr=2 ft-lbs (65 mm x 130 mm vane).	
								-12.1		73.6	
75											

Remarks:

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

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

Boring No.: HB-EXIT45-210

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-210
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	61.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/12/18; 1345-4/13/18; 1355	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	6.4 ft E (compass) of staked location	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5 ft (approx)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	12D	24/5	75.0 - 77.0	18-7-5-8	12	14	RC			12D: Grey, m. dense, GRAVEL, little to some Silt, little to some fine to coarse Sand. TILL	
										75 to 80 ft: Very boney.	
80	13D	18/5	80.0 - 81.5	22-22-21	43	49	RC			13D: Grey, dense, Silty GRAVEL, little to some fine to coarse Sand.	
										81.5 to 91.8 ft: Drive probe rods with 300 lb hammer to refusal.	
85											
90											
								-30.3		91.8 **Bottom of Exploration at 91.8 feet below ground surface.** Driven rod probe refusal (100 blows with 300 lb hammer for 10 inches penetration; bouncing at 91.8 ft).	
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-211 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/9/18; 1140-4/10/18; 1520	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan	**Casing ID/OD:**	HW to 30'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 10'	**Water Level*:**	4.0 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/20	2.0 - 4.0	6-8-5-2	13	15				1D: Brown tan, moist to wet, m. dense, fine to coarse SAND, some Gravel, little to some Silt. Bottom 3 inches of sample: Brown, fine Sandy ORGANIC SILT. FILL	
5	2D	24/17	5.0 - 7.0	1-2-4-4	6	7				2D: Olive brown, mottled, wet, m. stiff, CLAY & SILT, little fine Sand with one 1-inch layer grey, fine SAND, trace Silt; appears reworked.	
								55.5		7.0	
10	3D	24/16	10.0 - 12.0	7-3-3-6	6	7	27			3D: Grey, loose, interbedded, fine to medium SAND, trace to little Silt; Silty fine SAND; and Silty CLAY, trace fine Sand. INTERBEDDED MARINE FINE SANDS AND SILT	WC=26% LL=22 PL=14 PI=8
							28				
							29				
							24				
							13				
15	4D	24/23	15.0 - 17.0	WOR/18"-WOH	0	0	20			4D: Grey, v. soft, Silty CLAY, trace fine Sand with one 2-inch layer Silty fine SAND at top of sample.	
							12				
							11				
							11				
							13				
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 316/ 27 psf			12	42.5		20.0 5D: Grey with occasional black, Silty CLAY, little very fine Sand with occasional layers fine to medium SAND, some Silt and fine Sandy SILT. MARINE SILT-CLAY V1: Tu=11.5 / Tr=1 ft-lbs (65 mm x 130 mm vane); sandy seams noted. V2: Tu=21 / Tr=3 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	WC=37% LL=30 PL=18 PI=12
	V2		21.6 - 22.0	Su= 577/ 82 psf			11				
							10				
							7				
25							7				

Remarks:

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

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

Boring No.: HB-EXIT45-211

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-211 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/9/18; 1140-4/10/18; 1520	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan	**Casing ID/OD:**	HW to 30'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 10'	**Water Level*:**	4.0 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/6	25.0 - 27.0	HYD PUSH (MU)			PUSH			Poor recovery on tube sample; sample extracted and jarred. 6D: Grey, Silty CLAY, trace fine Sand.	
	V3		27.6 - 28.0	Su= 412/ 27 psf						V3: Tu=15 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V4		28.6 - 29.0	Su= 330/ 27 psf						V4: Tu=12 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
30	7D	24/0	30.0 - 32.0	HYD PUSH (MU)	3"dia		OPEN			No recovery on tube sample; resample interval using 3-inch dia. split-spoon. 7D: Grey, Silty CLAY, trace fine Sand.	
	MU	24/0	32.0 - 34.0	PUSH						MU: No recovery; inside of tube gritty.	
	8D V5	24/24	34.0 - 36.0 34.6 - 35.0	VANE INTERVAL Su= 440/ 41 psf						8D: Grey, Silty CLAY, trace fine Sand. V5: Tu=16 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
35	V6		35.6 - 36.0	Su= 385/ 27 psf			OPEN			V6: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	U1	24/22	37.0 - 39.0	HYD PUSH						U1: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) WC=42% LL=31 PL=19 PI=12
40	9D V7	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 508/ 41 psf			OPEN			9D: Dark grey black, Silty CLAY; organic odor. V7: Tu=18.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
	V8		41.6 - 42.0	Su= 453/ 27 psf						V8: Tu=16.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
45	U2	24/24	45.0 - 47.0	HYD PUSH			OPEN			U2: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) DIRECT SHEAR (3 point) WC=47% LL=37 PL=21 PI=16
50											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-211 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/9/18; 1140-4/10/18; 1520	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan	**Casing ID/OD:**	HW to 30'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 10'	**Water Level*:**	4.0 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	10D V9	24/24	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 673/ 27 psf			OPEN			10D: Dark grey black, Silty CLAY; organic odor. V9: Tu=24.5 / Tr=1 ft-lbs (65 mm x 130 mm vane).	CL A-6(20) -#200=99.1% WC=44% LL=39 PL=19 PI=20
	V10		51.6 - 52.0	Su= 687/ 27 psf						V10: Tu=25 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
55	U3	24/24	55.0 - 57.0	HYD PUSH			OPEN			U3: Dark grey black, Silty CLAY.	X-RAY CONSOL (Cv, Cα) WC=43% LL=31 PL=19 PI=12
60	11D V11	24/24	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 632/ 41 psf			OPEN			11D: Dark grey black, Silty CLAY. V11: Tu=23 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
	V12		61.6 - 62.0	Su= 522/ 27 psf						V12: Tu=19 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
65	U4	24/24	65.0 - 67.0	HYD PUSH			OPEN			U4: Dark grey, Silty CLAY.	X-RAY
70	12D V13	24/24	70.0 - 72.0 70.6 - 71.0	VANE INTERVAL Su= 659/ 55 psf			OPEN			12D: Dark grey, Silty CLAY. V13: Tu=24 / Tr=2 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	
	V14		71.6 - 72.0	Su= --/ -- psf						V14: Unable to turn vane; possible concretion or gravel.	
75											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-211 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/9/18; 1140-4/10/18; 1520	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan	**Casing ID/OD:**	HW to 30'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 10'	**Water Level*:**	4.0 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	13D V15	24/24	75.0 - 77.0 75.6 - 76.0	VANE/12"-11-12 Su= 687/ 82 psf	3"dia		RC			Dark grey, Silty CLAY with occasional concretions; changing at 76.7 ft to: V15: Tu=25 / Tr=3 ft-lbs (65 mm x 130 mm vane). MV: Unable to push vane past 76.0 ft.	
	MV							-14.2		76.7	
										13D: Grey, Silty GRAVEL, some fine to coarse Sand. TILL	
80	14D	18/18	80.0 - 81.5	31-33-56	89	100	RC			14D: Grey, v. dense, fine to coarse Sandy GRAVEL, some Silt.	
										82.2 ft: Possible top of rock.	
								-20.5		83.0 **Bottom of Exploration at 83.0 feet below ground surface.** Roller cone refusal.	
85											
90											
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-211A
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	62.5 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/10/18; 1530-4/11/18; 1050	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	4.6 ft E (compass) of HB-EXIT45-211	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
20											
25											
	U1	24/24	28.0 - 30.0	HYD PUSH						U1: Dark grey, Silty CLAY, trace very fine Sand. MARINE SILT-CLAY	
30	1D V1	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 412/ 41 psf						1D: Dark grey, Silty CLAY with multiple seams Silty fine SAND. V1: Tu=15 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	
	V2		31.6 - 32.0	Su= 371/ 27 psf				30.5		V2: Tu=13.5 / Tr=1 ft-lbs (65 mm x 130 mm vane). 32.0 **Bottom of Exploration at 32.0 feet below ground surface.** No refusal.	
35											
40											
45											

Remarks:

Test boring 211A completed adjacent to 211 to obtain a shallow tube sample; no sampling or testing above 28 ft.

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

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

Page 1 of 1

Boring No.: HB-EXIT45-211A

SCHONEWALD ENGINEERING ASSOCIATES, INC.	PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration LOCATION: South Portland-Scarborough, ME	Boring No.: HB-EXIT45-212 Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/11/18; 1125-4/12/18; 1315	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (dated 4/10/18)	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.9 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
0							SSA				
	1D	24/21	2.0 - 4.0	2-4-3-4	7	8		56.5		Wet, ROOT MAT AND ORGANIC SILT; changing at 2.5 ft to: 2.5 1D: Olive brown, mottled, m. stiff, Clayey SILT with one 2-inch layer fine Sandy SILT; grading to grey at 3.7 ft. MARINE SILT-CLAY CRUST (WEATHERED)	-#200=98% WC=30% LL=36 PL=18 PI=18
5	2D	24/14	5.0 - 7.0	4-6-3-3	9	10	20			2D: Olive grey, wet, loose, fine Sandy SILT with one 1-inch layer grey SILT at bottom of sample.	
							13				
							15				
							9				
							6				
10	3D V1	24/23	10.0 - 12.0 10.6 - 11.0	VANE INTERVAL Su= 330/ 41 psf			OPEN	49.0		10.0 3D: Olive grey, Silty CLAY, trace fine Sand with multiple seams and partings very fine Sandy SILT. MARINE SILT-CLAY V1: Tu=12 / Tr=1.5 ft-lbs (65 mm x 130 mm vane); sandy seams noted.	-#200=99.7% WC=40% LL=34 PL=18 PI=16
	V2		11.6 - 12.0	Su= 343/ 55 psf						V2: Tu=12.5 / Tr=2 ft-lbs (65 mm x 130 mm vane)	
15	U1	24/24	15.0 - 17.0	HYD PUSH			OPEN			U1: Olive grey, Silty CLAY with very fine Sand on bottom of sample.	X-RAY
20	4D V3	24/23	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 247/ 27 psf			PUSH			4D: Dark grey with occasional black, Silty CLAY, trace very fine Sand. V3: Tu=9 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V4		21.6 - 22.0	Su= 220/ 14 psf						V4: Tu=8 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
25											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Maine Turnpike I-95 Exit 45 Reconfiguration
LOCATION: South Portland-Scarborough, ME

Boring No.: HB-EXIT45-212
Proj. No.: 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/11/18; 1125-4/12/18; 1315	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (dated 4/10/18)	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.9 ft (open)

IN-SITU SAMPLING AND TESTING:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded

BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	U2	24/24	25.0 - 27.0	HYD PUSH			OPEN			U2: Dark grey, Silty CLAY.	X-RAY
30	5D V5	24/24	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 302/ 27 psf			OPEN			5D: Dark grey with occasional black, Silty CLAY V5: Tu=11 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V6		31.6 - 32.0	Su= 288/ 14 psf						V6: Tu=10.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
35	U3	24/24	35.0 - 37.0	HYD PUSH			OPEN			U3: Dark grey black, Silty CLAY; gritty from possible shell fragments.	X-RAY
40	6D V7	24/24	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 440/ 14 psf			OPEN			6D: Dark grey black, Silty CLAY. V7: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
	V8		41.6 - 42.0	Su= 440/ 14 psf						V8: Tu=16 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
45	U4	24/24	45.0 - 47.0	HYD PUSH			OPEN			U4: Dark grey black, Silty CLAY.	X-RAY
50											

Remarks:

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

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

Boring No.: HB-EXIT45-212

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-212 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/11/18; 1125-4/12/18; 1315	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (dated 4/10/18)	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.9 ft (open)

IN-SITU SAMPLING AND TESTING:
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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
SSA/HSA=solid/hollow stem auger
RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50	7D V9	24/24	50.0 - 52.0 50.6 - 51.0	VANE INTERVAL Su= 577/ 27 psf			OPEN			7D: Dark grey with occasional black, Silty CLAY with small nodules throughout. V9: Tu=21 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V10		51.6 - 52.0	Su= 494/ 14 psf						V10: Tu=18 / Tr=0.5 ft-lbs (65 mm x 130 mm vane).	
55	U5	24/24	55.0 - 57.0	HYD PUSH			OPEN			U5: Dark grey, Silty CLAY.	X-RAY
60	8D V11	24/24	60.0 - 62.0 60.6 - 61.0	VANE INTERVAL Su= 687/ 27 psf			OPEN			8D: Dark grey, Silty CLAY with nodules throughout. V11: Tu=25 / Tr=1 ft-lbs (65 mm x 130 mm vane).	
	V12		61.6 - 62.0	Su= 453/ 14 psf						V12: Tu=16.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane); sand parting or concretion noted at approx. 61.2 ft.	
65	U6	24/23	65.0 - 67.0	HYD PUSH			OPEN			U6: Dark grey, Silty CLAY.	X-RAY
70	9D V13	24/24	70.0 - 72.0 70.6 - 71.0	VANE INTERVAL Su= 714/ 41 psf			OPEN			9D: Dark grey, Silty CLAY with nodules throughout, one large (sand dollar) concretion, and one 2-inch layer Silty fine to medium SAND. V13: Tu=26 / Tr=1.5 ft-lbs (65 mm x 130 mm vane).	CL A-6(15) -#200=91% WC=28% LL=33 PL=16 PI=17
	V14		71.6 - 72.0	Su= 989/ 82 psf						V14: Tu=36 / Tr=3 ft-lbs (65 mm x 130 mm vane); several concretions and/or sand partings noted.	
							RC	-14.0		73.0 73.0 ft: Probable stratum change; gravelly material based on drilling behavior.	
75											

Remarks:

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

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

Boring No.: HB-EXIT45-212

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Maine Turnpike I-95 Exit 45 Reconfiguration **LOCATION:** South Portland-Scarborough, ME	**Boring No.:** HB-EXIT45-212 **Proj. No.:** 18-008

Driller:	New England Boring Contractors	**Elevation (ft.)**	59 ft (est'd)	**Core Barrel:**	n/a
Operator:	Enos / Share	**Datum:**	NAVD88	**Sampler:**	standard split-spoon
Logged By:	Schonewald	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	140 lbs / 30 inches
Date Start/Finish:	4/11/18; 1125-4/12/18; 1315	**Drilling Method:**	cased wash borings	**Hammer Type:**	auto hammer
Boring Location:	per plan (dated 4/10/18)	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.677
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.9 ft (open)

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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

ADDITIONAL DEFINITIONS:
N-uncorrected = N value
N_{60} = N value corrected for hammer efficiency
hammer efficiency = calculated hammer efficiency
S_u = Insitu Field Vane Shear Strength (psf)
R = Rock Core Sample
RQD = Rock Quality Designation (%)

ADDITIONAL DEFINITIONS:
WOH = weight of 140lb. hammer
WOR = weight of rods
-- = not recorded
BOREHOLE ADVANCEMENT METHODS:
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RC=roller cone/OPEN/PUSH=hydraulic push

LABORATORY TEST RESULTS:
AASHTO / USCS soil classifications
-#200 = percent fines WC = water content (%)
CONSOL= 1-D consolidation test
UU=Unconsolidated undrained triaxial test
LL=Liquid Limit / PL=Plastic Limit / PI=Plasticity Index
UCT qp = peak compressive strength of rock

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
75	10D	24/10	75.0 - 77.0	13-14-22-27	36	41	RC			10D: Grey, dense, GRAVEL, some Silt, little to some fine to coarse Sand. TILL	
80	11D	24/10	80.0 - 82.0	16-16-28-46	44	50				11D: Grey, dense, Silty GRAVEL, little to some fine to coarse Sand.	A-1-b(0) -#200=20%
								-23.0		82.0 **Bottom of Exploration at 82.0 feet below ground surface.** No refusal.	
85											
90											
95											
100											

Remarks:

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

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

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

PHOTOGRAPHS OF ROCK CORE OBTAINED IN 200-SERIES SUBSURFACE EXPLORATIONS

Photo 1: Core box containing wetted rock core from test boring HB-EXIT45-205 left side of core box (top portion of cores).
Slots from top to bottom:
1) HB-EXIT45-205, R1
2) HB-EXIT45-205, R2.

Photo 2: Core box containing wetted rock core from test boring HB-EXIT45-205 – right side of core box (bottom portion of cores).
Slots from top to bottom
1) HB-EXIT45-205, R1
2) HB-EXIT45-205, R2.

SCHONEWALD ENGINEERING ASSOCIATES, INC.

ROCK CORE PHOTOGRAPHS
TEST BORING HB-EXIT45-205
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND-SCARBOROUGH, MAINE

Sheet No.:
1 of 2

Photo 3: Core box containing wetted rock core from test borings HB-EXIT45-206 and -207 left side of core box (top portion of cores).
Slots from top to bottom:
1) HB-EXIT45-206, R1
2) HB-EXIT45-206, R2
3) Empty
4) HB-EXIT45-207, R1.

Photo 4: Core box containing wetted rock core from test borings HB-EXIT45-206 and -207 – right side of core box (bottom portion of cores).
Slots from top to bottom
1) HB-EXIT45-206, R1
2) HB-EXIT45-206, R2
3) Empty
4) HB-EXIT45-207, R1.

SCHONEWALD ENGINEERING ASSOCIATES, INC.

ROCK CORE PHOTOGRAPHS
TEST BORINGS HB-EXIT45-206 AND -207
MAINE TURNPIKE EXIT 45 RECONFIGURATION
SOUTH PORTLAND-SCARBOROUGH, MAINE

Sheet No.:

2 of 2

SCHONEWALD ENGINEERING ASSOCIATES, INC.
■ www.SchonewaldEngineering.com ■

RESULTS OF LABORATORY TESTS COMPLETED BY GTX ON SPLIT-SPOON AND UNDISTURBED TUBE SOIL SAMPLES

(Note that due to the file sizes, x-rays of the tube samples are not included herein. The x-rays were shared via Dropbox.)

Amount of Material Passing #200 Sieve - ASTM D1140

Boring ID	Sample ID	Depth	Visual Description	Fines, %
HB-EXIT45-201	2D	5-7 ft	Moist, olive gray clay with sand	79.0
HB-EXIT45-201	8D	55-57 ft	Moist, very dark gray clay	99.5
HB-EXIT45-202	4D	15-17 ft	Wet, dark gray clay	89.3
HB-EXIT45-202	6D	25-27 ft	Wet, dark gray silty clay	99.5
HB-EXIT45-203	4D	15-17 ft	Wet, dark gray clay	97.9
HB-EXIT45-205	7D	40-42 ft	Wet, very dark gray clay	97.6
HB-EXIT45-206	6D	25-27 ft	Wet, dark gray clay	99.7
HB-EXIT45-207	2D	5-7 ft	Moist, gray sand	4.6
HB-EXIT45-207	4D	15-17 ft	Moist, gray sandy clay	70.0
HB-EXIT45-207	14D	85-87 ft	Moist, dark gray clay	98.4

Notes: Tests performed using Method B - washing using a wetting agent
Dry mass of test specimen was determined directly

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Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	07/26/18	Checked By:	emm
Depth :	---	Test Id:	462298		

Amount of Material Passing #200 Sieve - ASTM D1140

Boring ID	Sample ID	Depth	Visual Description	Fines, %
HB-EXIT45-208	8D	45-47 ft	Wet, dark gray clay	99.9
HB-EXIT45-210	10D	65-67 ft	Moist, dark gray clay	99.1
HB-EXIT45-212	1D	2-4 ft	Moist, olive gray clay	97.5
HB-EXIT45-212	3D	10-12 ft	Wet, dark gray clay	99.7

Notes: Tests performed using Method B - washing using a wetting agent

Dry mass of test specimen was determined directly

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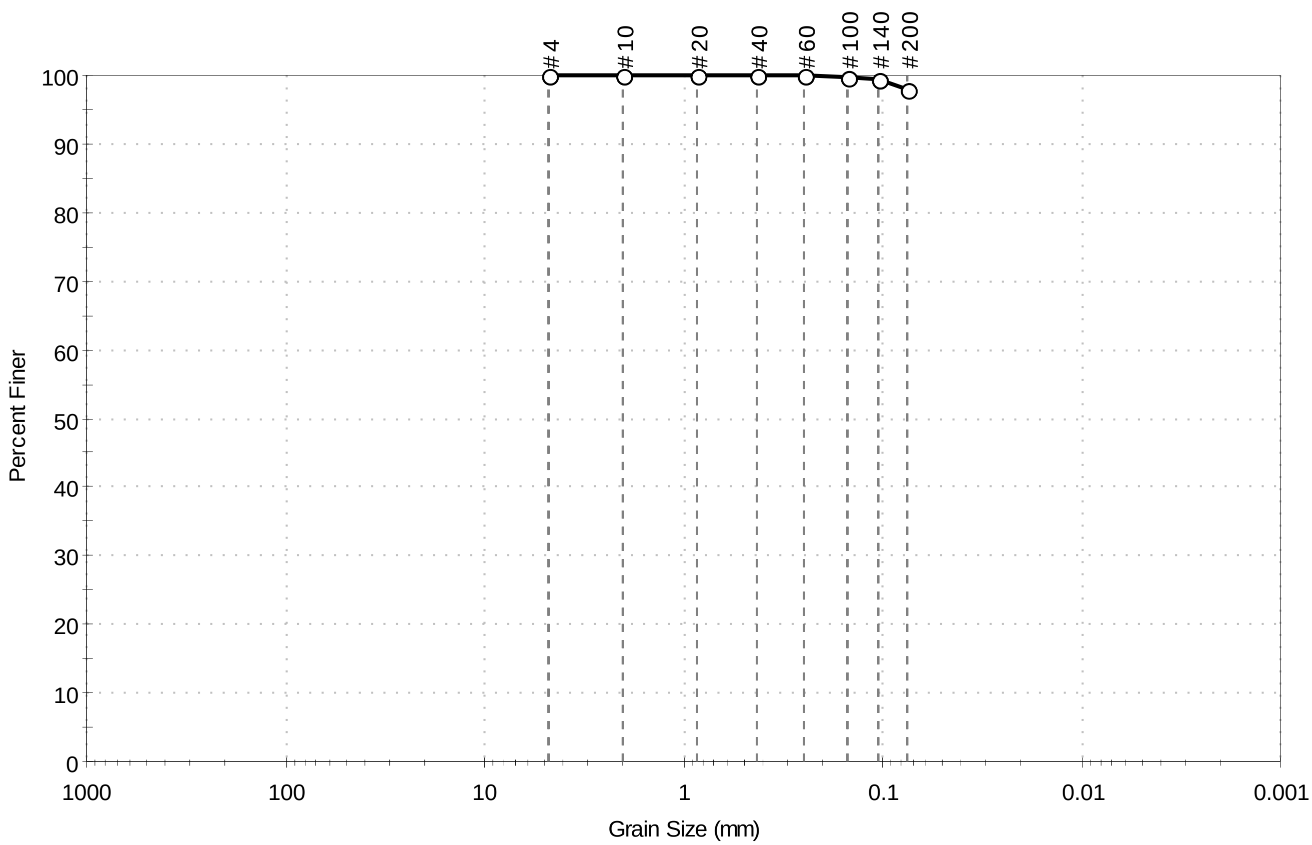
Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME — Project No: GTX-307957
Boring ID: HB-EXIT45- 201 — Sample Type: jar — Tested By: GA
Sample ID: 3D — Test Date: 07/26/18 — Checked By: emm
Depth : 10-12 ft — Test Id: 462299
Test Comment: ---
Visual Description: Moist, olive gray clay
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	2.0	98.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#140	0.11	99		
#200	0.075	98		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Clayey Soils (A-6 (11))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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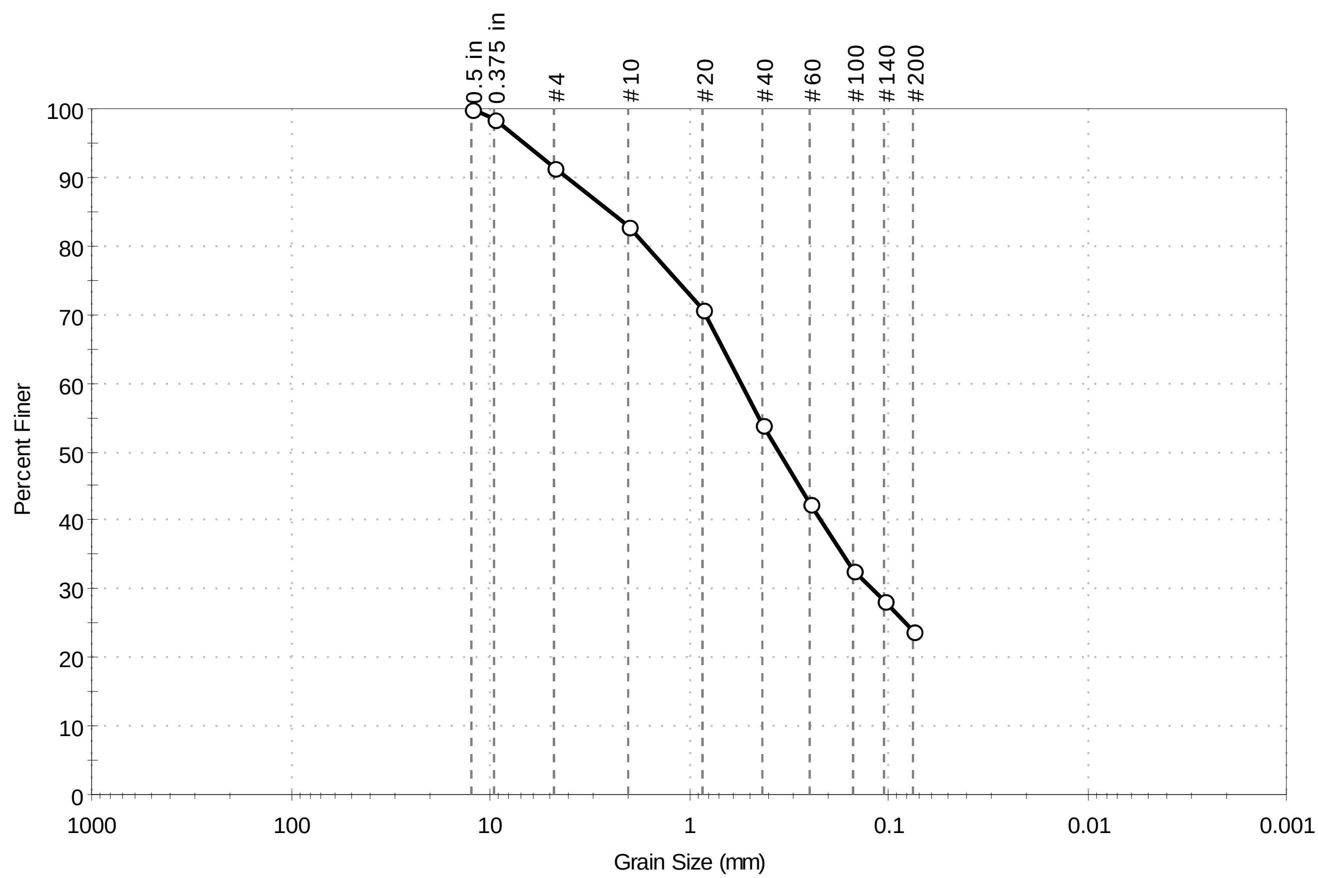
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 202	Sample Type:	jar	Tested By:	GA
Sample ID:	1D	Test Date:	07/26/18	Checked By:	emm
Depth :	2-4 ft	Test Id:	462300		
Test Comment:	---				
Visual Description:	Moist, reddish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	8.5	67.6	23.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	92		
#10	2.00	83		
#20	0.85	71		
#40	0.42	54		
#60	0.25	42		
#100	0.15	33		
#140	0.11	28		
#200	0.075	24		

Coefficients

D_{85} = 2.4601 mm D_{30} = 0.1204 mm

D_{60} = 0.5446 mm D_{15} = N/A

D_{50} = 0.3531 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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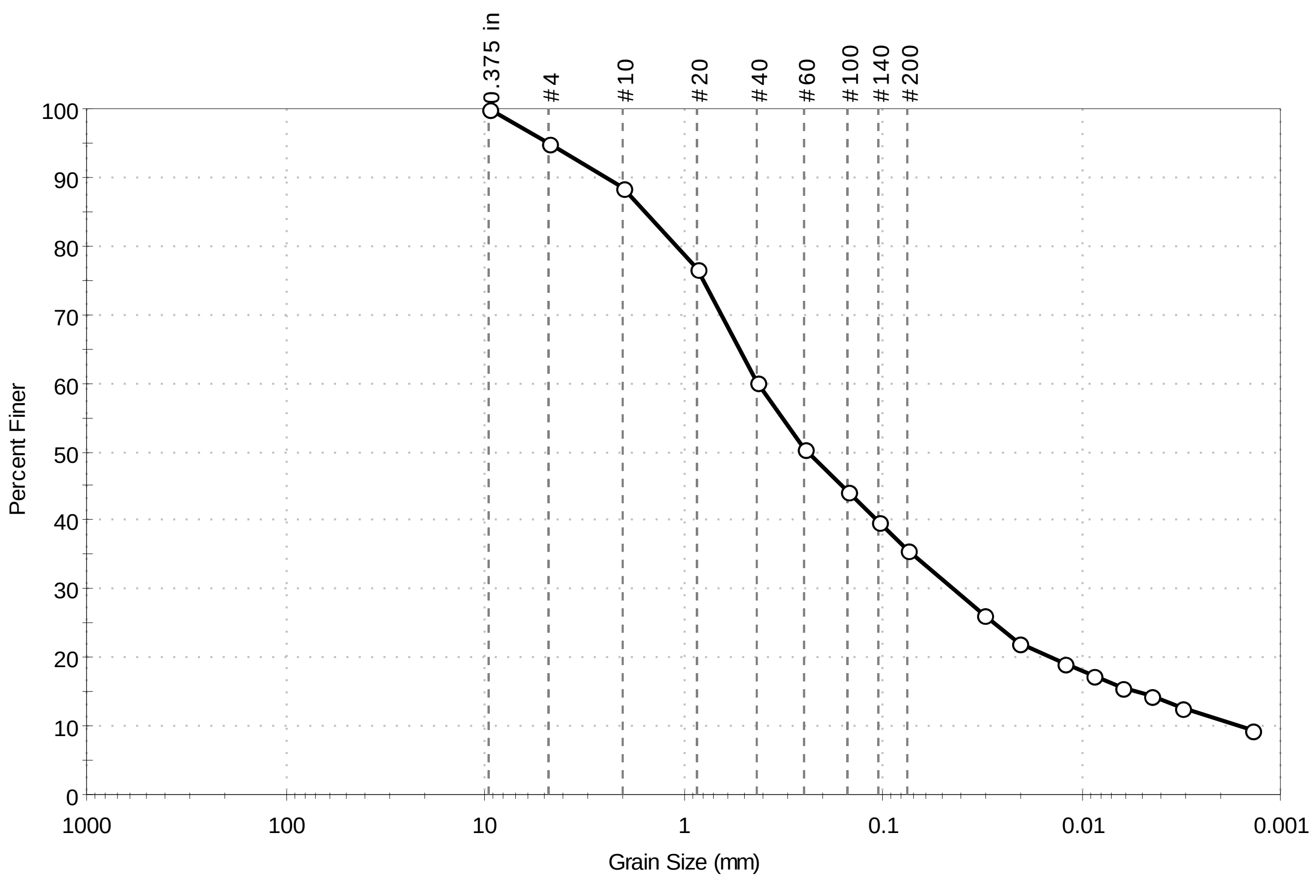
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 204	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	07/26/18	Checked By:	emm
Depth :	5-7 ft	Test Id:	462304		
Test Comment:	---				
Visual Description:	Moist, dark gray silty, clayey sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	4.8	59.4	35.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	95		
#10	2.00	89		
#20	0.85	77		
#40	0.42	60		
#60	0.25	50		
#100	0.15	44		
#140	0.11	40		
#200	0.075	36		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0307	26		
---	0.0208	22		
---	0.0122	19		
---	0.0088	17		
---	0.0063	16		
---	0.0045	14		
---	0.0032	13		
---	0.0014	9		

Coefficients

D_{85} = 1.5529 mm D_{30} = 0.0434 mm
D_{60} = 0.4236 mm D_{15} = 0.0053 mm
D_{50} = 0.2403 mm D_{10} = 0.0016 mm
C_u = 264.750 C_c = 2.779

Classification

ASTM Silty, Clayey SAND (SC-SM)

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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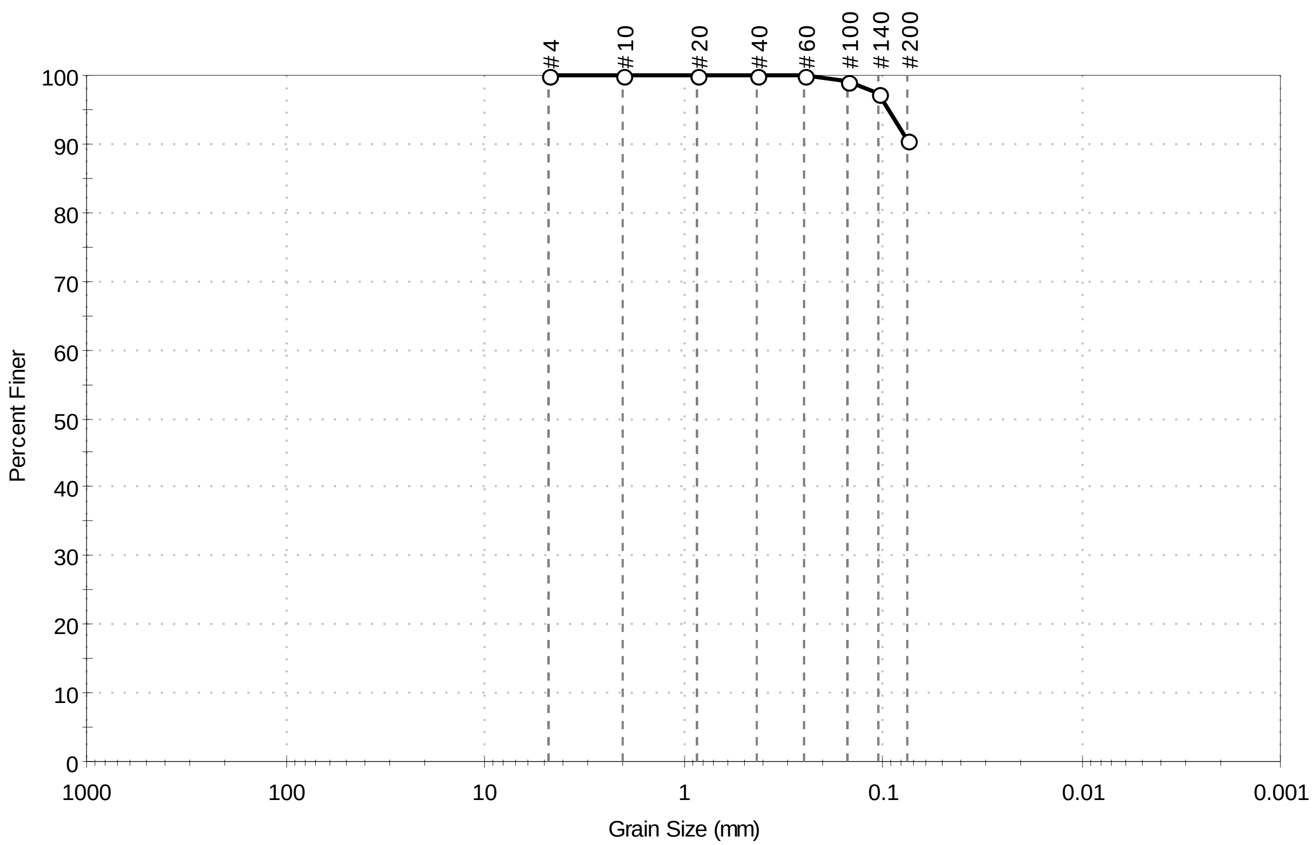
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 208	Sample Type: jar	Tested By:	GA
Sample ID: 5D	Test Date: 07/26/18	Checked By:	emm
Depth : 20-22 ft	Test Id: 462301		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	9.4	90.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	97		
#200	0.075	91		

Coefficients

D_{85} = N/A	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Silty Soils (A-4 (6))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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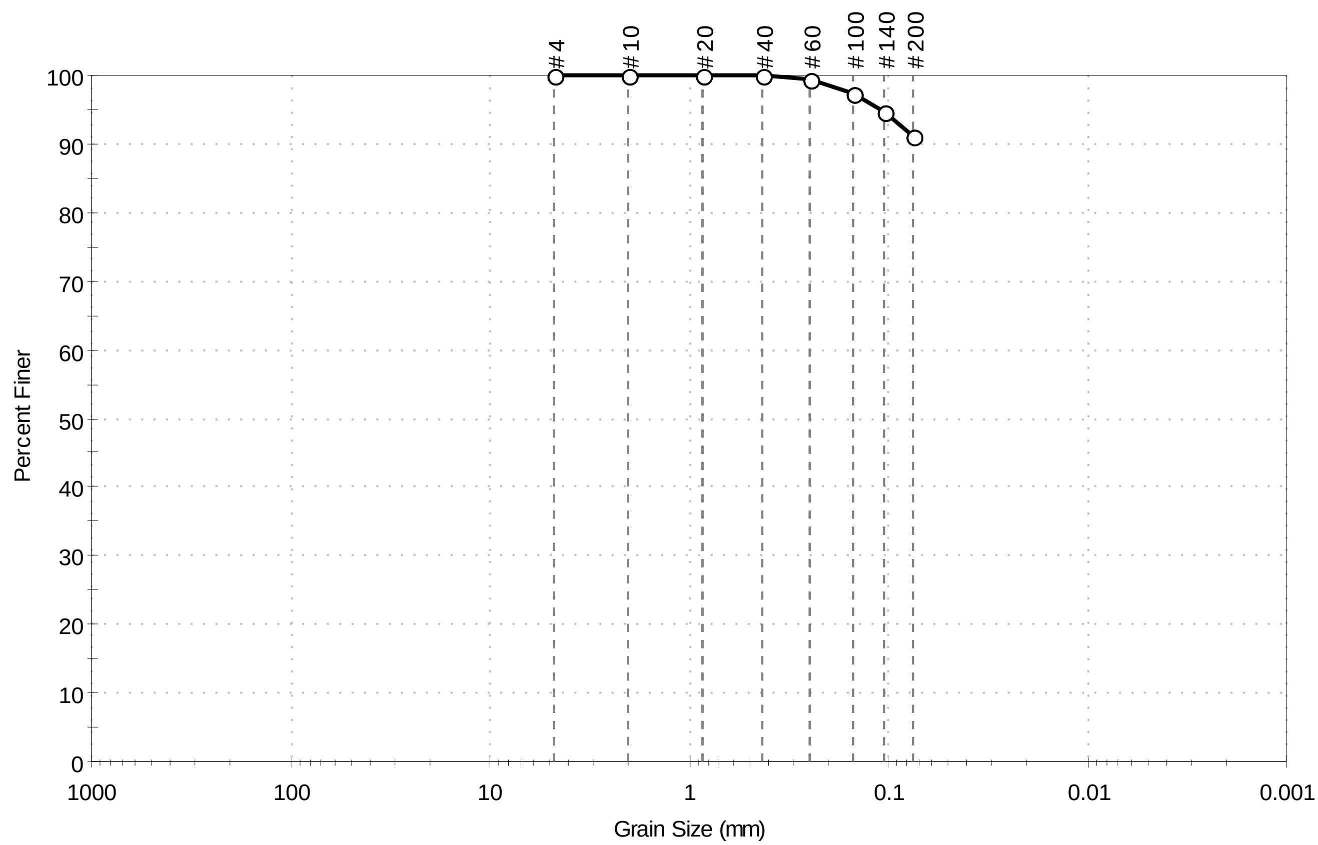
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 210	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	07/26/18	Checked By:	emm
Depth :	15-17 ft	Test Id:	462302		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	8.9	91.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	97		
#140	0.11	95		
#200	0.075	91		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Silty Soils (A-4 (7))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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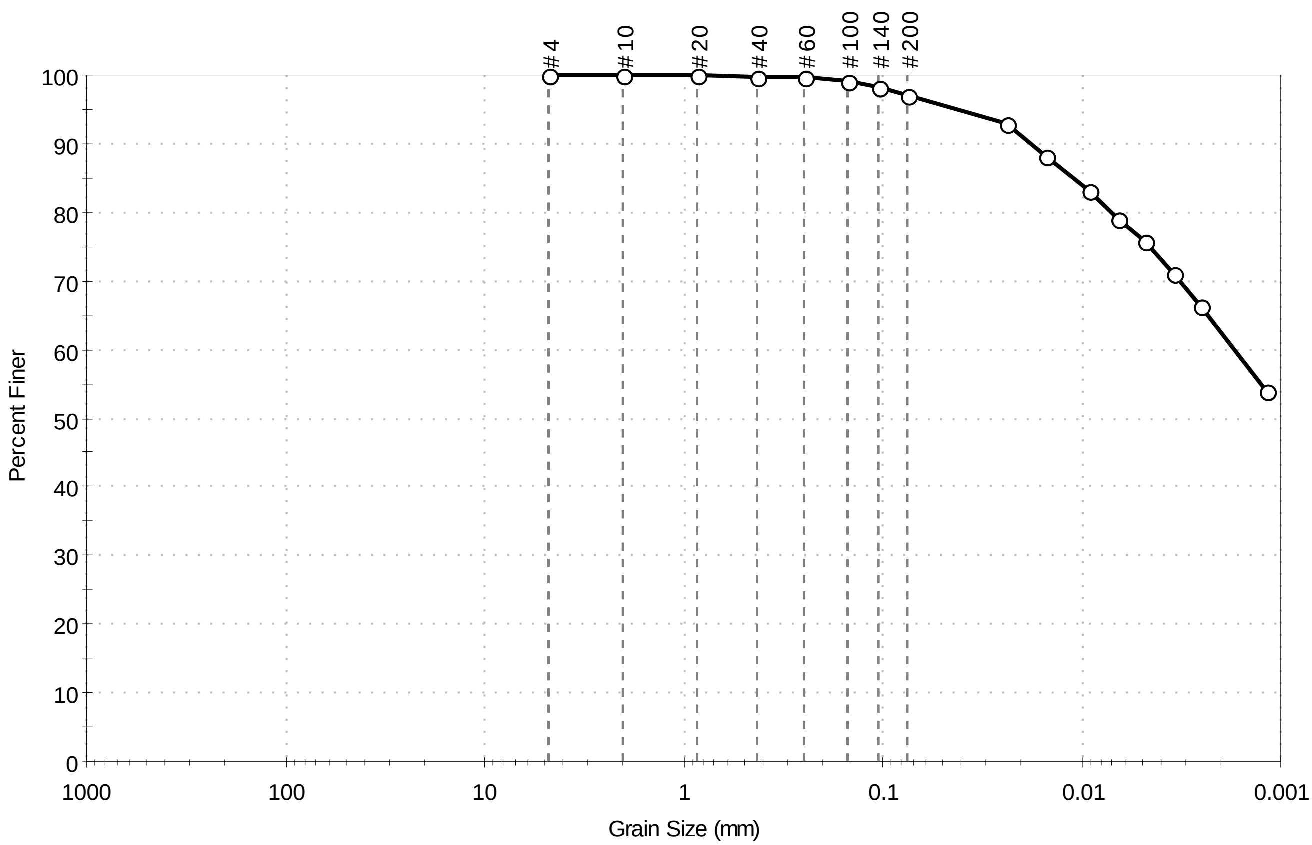
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 211	Sample Type: jar	Tested By:	GA
Sample ID: 10D	Test Date: 07/26/18	Checked By:	emm
Depth : 50-52 ft	Test Id: 462305		
Test Comment:	---		
Visual Description:	Wet, very dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	3.0	97.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	98		
#200	0.075	97		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0241	93		
---	0.0153	88		
---	0.0091	83		
---	0.0066	79		
---	0.0048	76		
---	0.0035	71		
---	0.0025	66		
---	0.0012	54		

Coefficients

D_{85} = 0.0110 mm | D_{30} = N/A
D_{60} = 0.0017 mm | D_{15} = N/A
D_{50} = N/A | D_{10} = N/A
C_u = N/A | C_c = N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Clayey Soils (A-6 (20))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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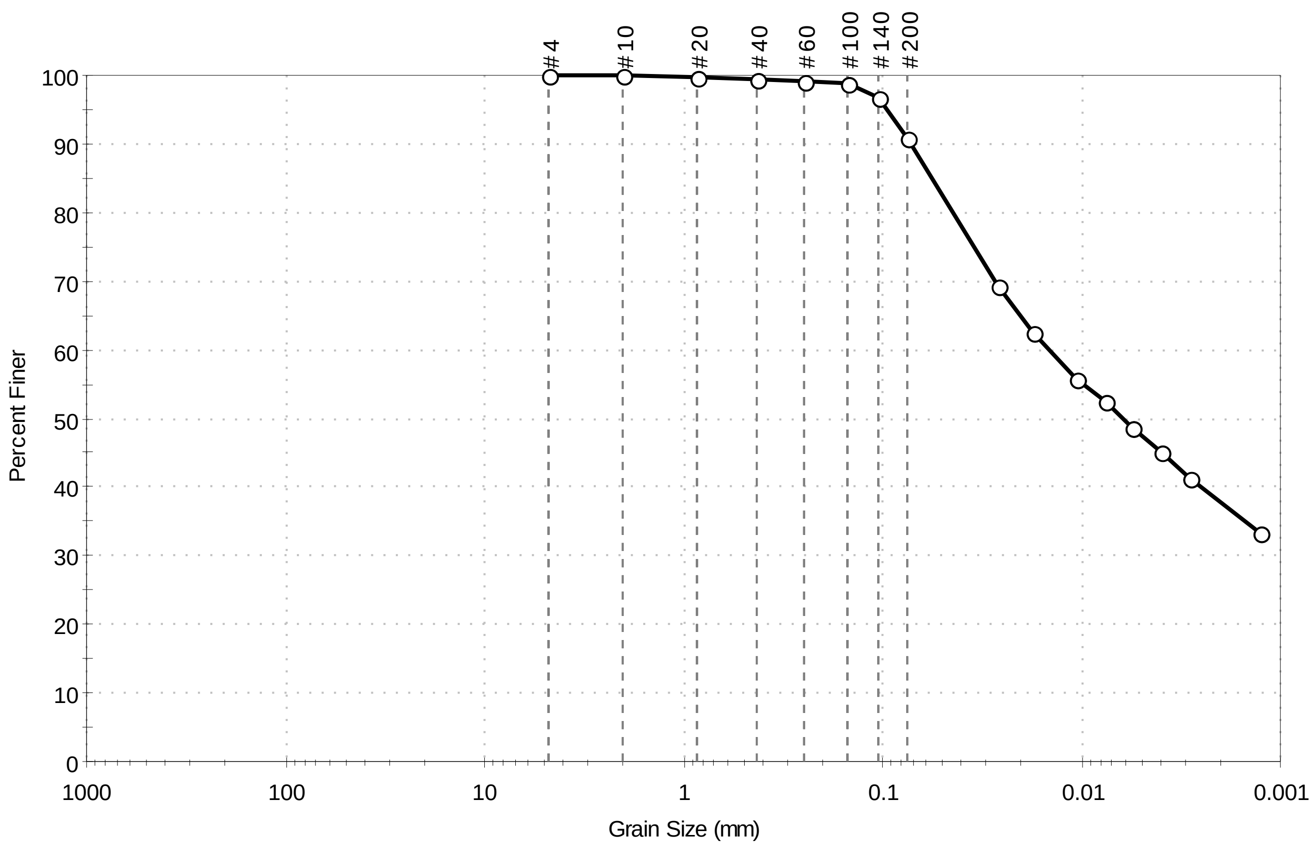
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 212	Sample Type: jar	Tested By:	GA
Sample ID: 9D	Test Date: 07/26/18	Checked By:	emm
Depth : 70-72 ft	Test Id: 462306		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	9.2	90.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	99		
#100	0.15	99		
#140	0.11	97		
#200	0.075	91		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0265	69		
---	0.0175	62		
---	0.0107	56		
---	0.0077	53		
---	0.0055	49		
---	0.0040	45		
---	0.0029	41		
---	0.0013	33		

Coefficients

D_{85} = 0.0567 mm D_{30} = N/A

D_{60} = 0.0146 mm D_{15} = N/A

D_{50} = 0.0062 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM   Lean CLAY (CL)

AASHTO   Clayey Soils (A-6 (15))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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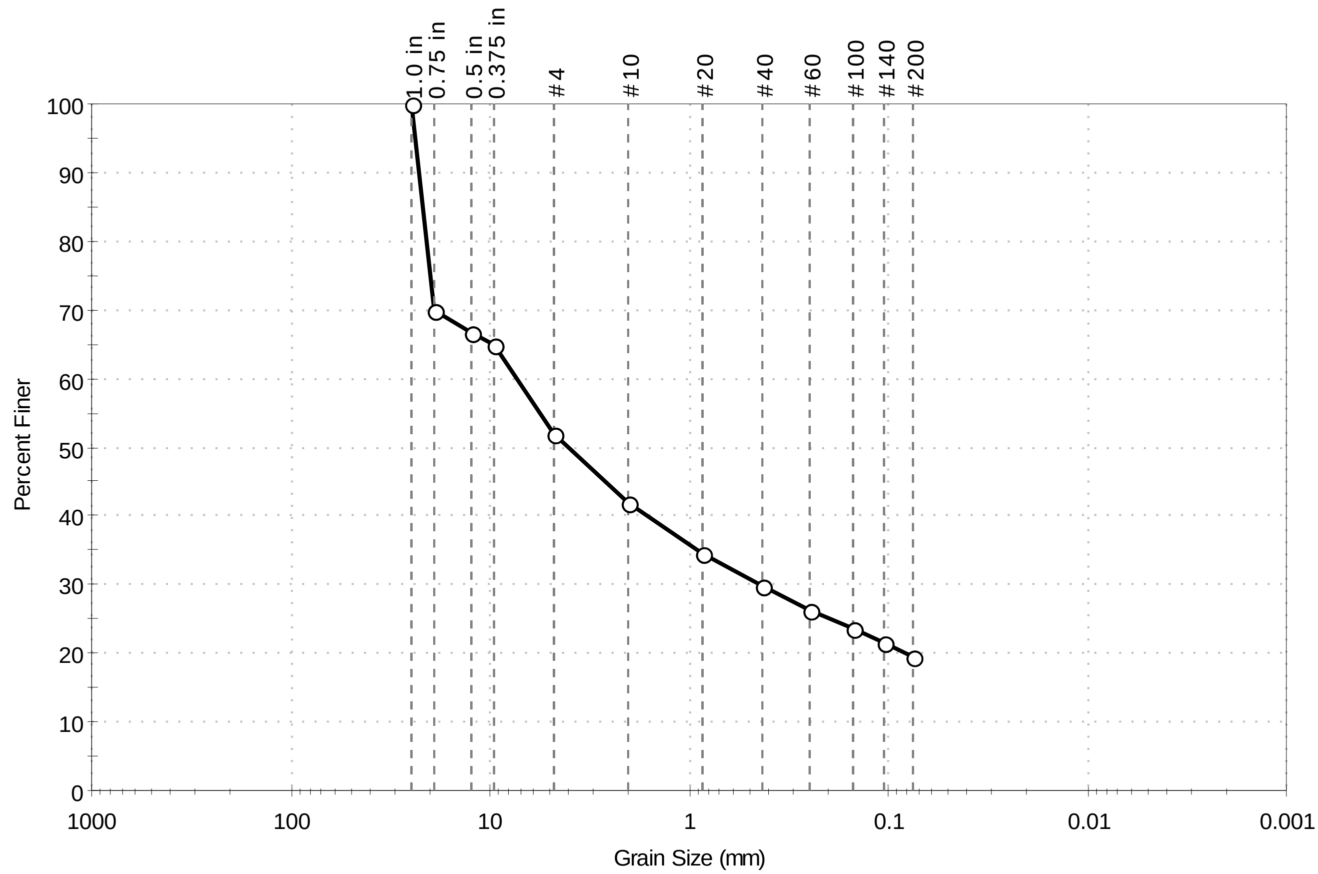
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 212	Sample Type: jar	Tested By:	GA
Sample ID: 11D	Test Date: 07/26/18	Checked By:	emm
Depth : 80-82 ft	Test Id: 462303		
Test Comment:	---		
Visual Description:	Moist, gray silty gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	48.0	32.4	19.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	70		
0.5 in	12.50	67		
0.375 in	9.50	65		
#4	4.75	52		
#10	2.00	42		
#20	0.85	35		
#40	0.42	30		
#60	0.25	26		
#100	0.15	24		
#140	0.11	22		
#200	0.075	20		

Coefficients

D_{85} = 21.8018 mm | D_{30} = 0.4453 mm

D_{60} = 7.3179 mm | D_{15} = N/A

D_{50} = 4.0056 mm | D_{10} = N/A

C_u = N/A | C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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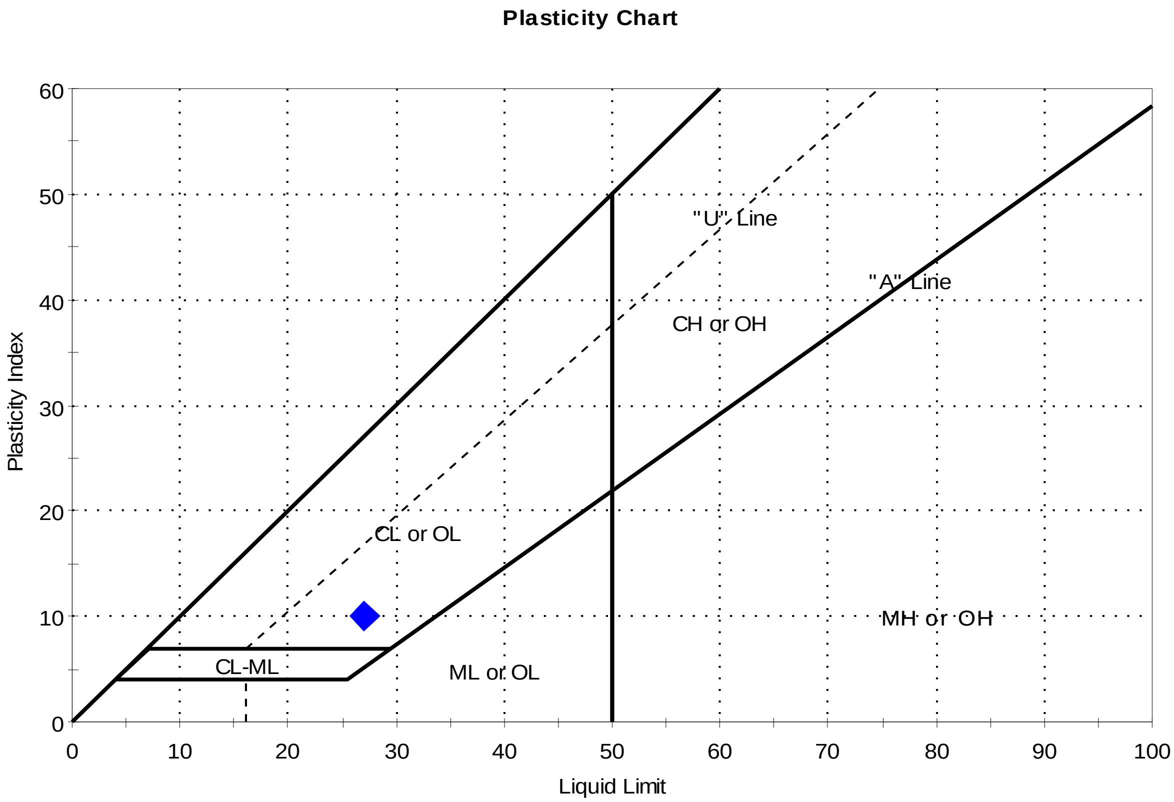
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 201	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	07/19/18	Checked By:	emm
Depth :	5-7 ft	Test Id:	462249		
Test Comment:	---				
Visual Description:	Moist, olive gray clay with sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	2D	B-EXIT45 201	5-7 ft	21	27	17	10	0.4	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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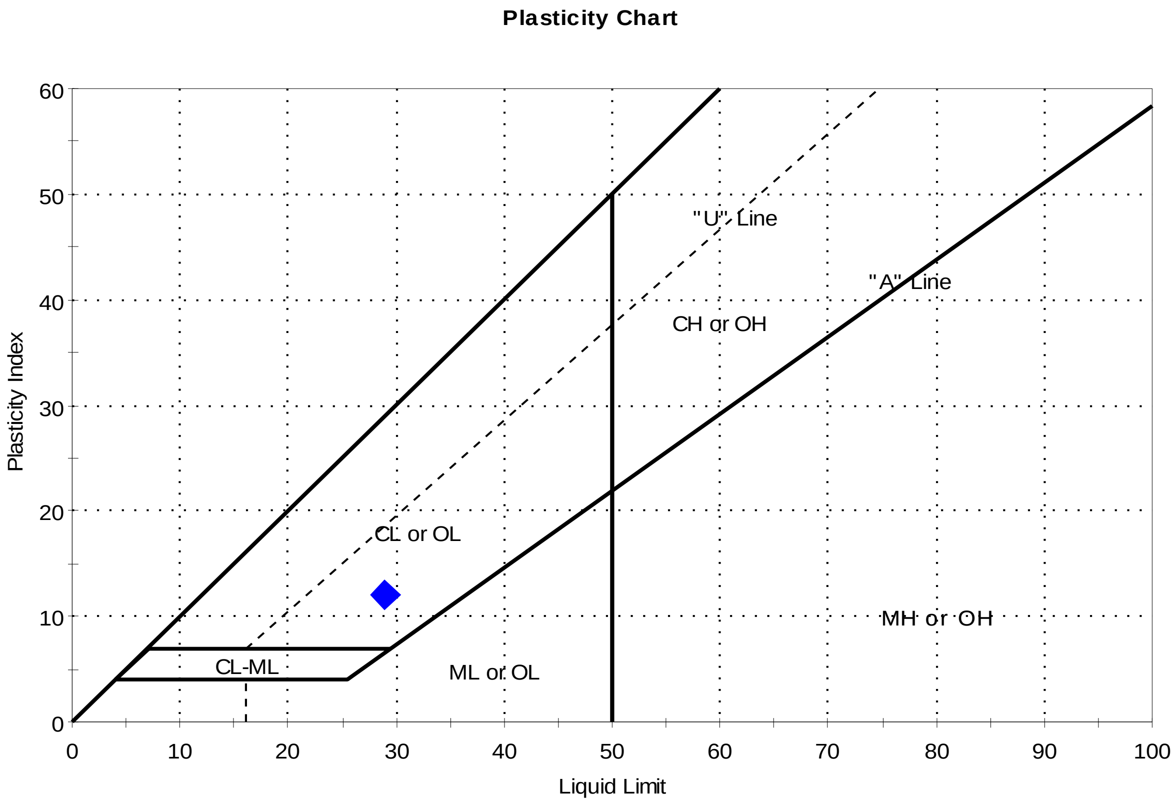
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 201	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	07/19/18	Checked By:	emm
Depth :	10-12 ft	Test Id:	462250		
Test Comment:	---				
Visual Description:	Moist, olive gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-EXIT45 201	10-12 ft	28	29	17	12	0.9	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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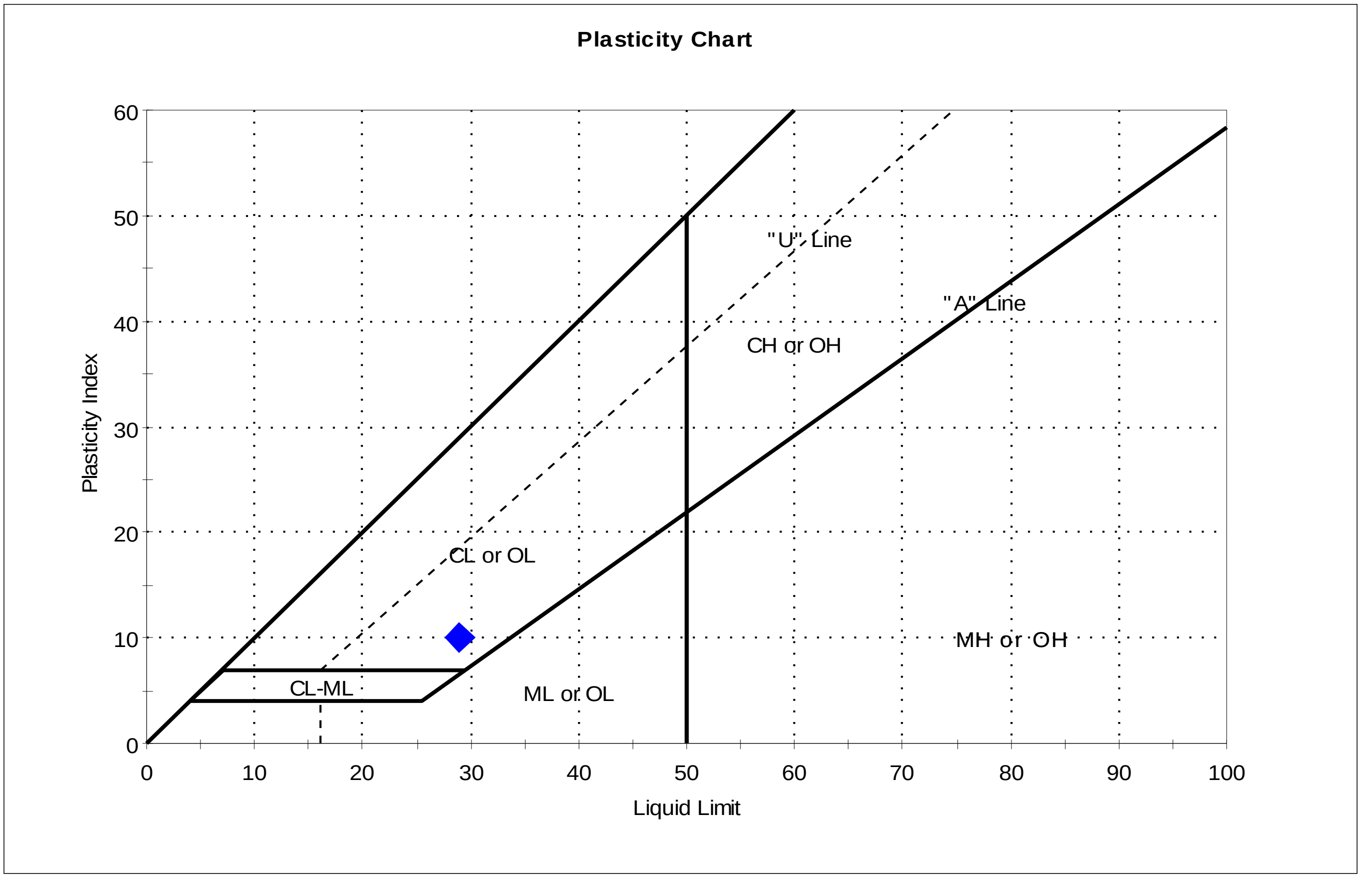
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 201	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	07/26/18	Checked By:	emm
Depth :	15-17 ft	Test Id:	462251		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 201	15-17 ft	34	29	19	10	1.5	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

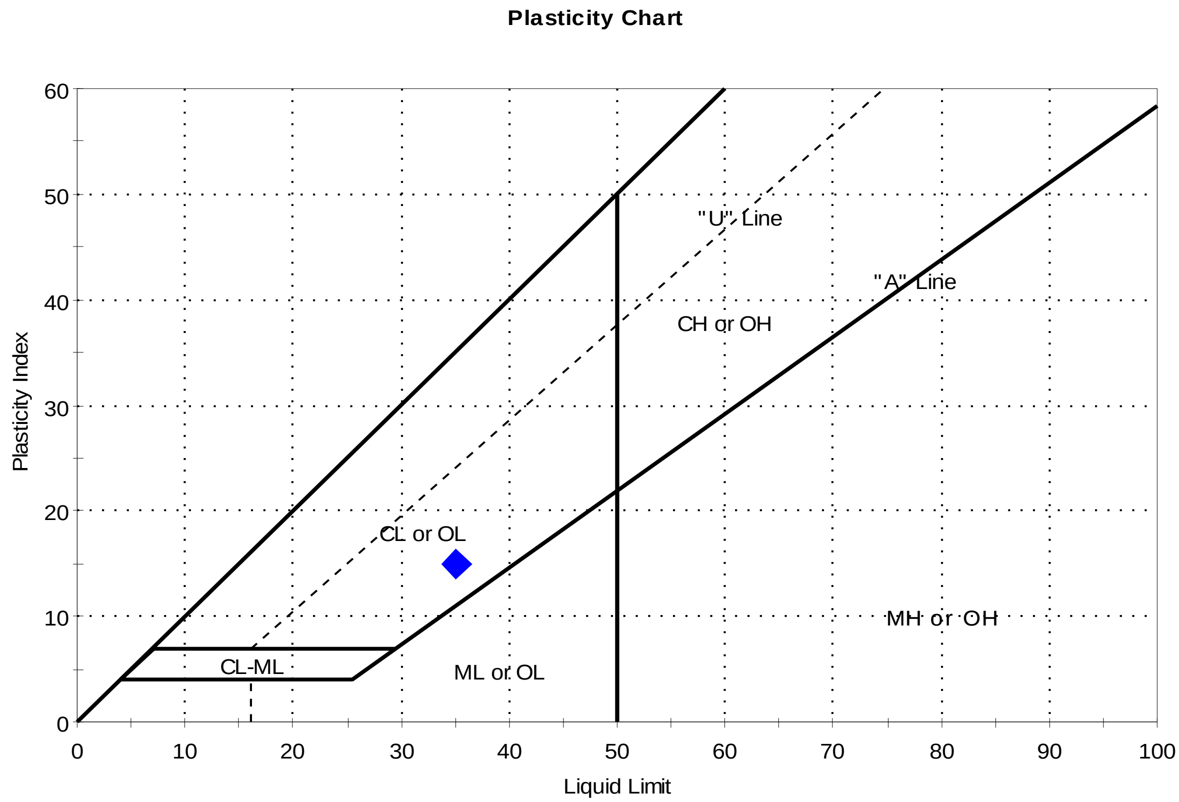
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:47 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45-201	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	08/15/18	Checked By:	emm
Depth :	30-32 ft	Test Id:	466571		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	30-32 ft	41	35	20	15	1.4	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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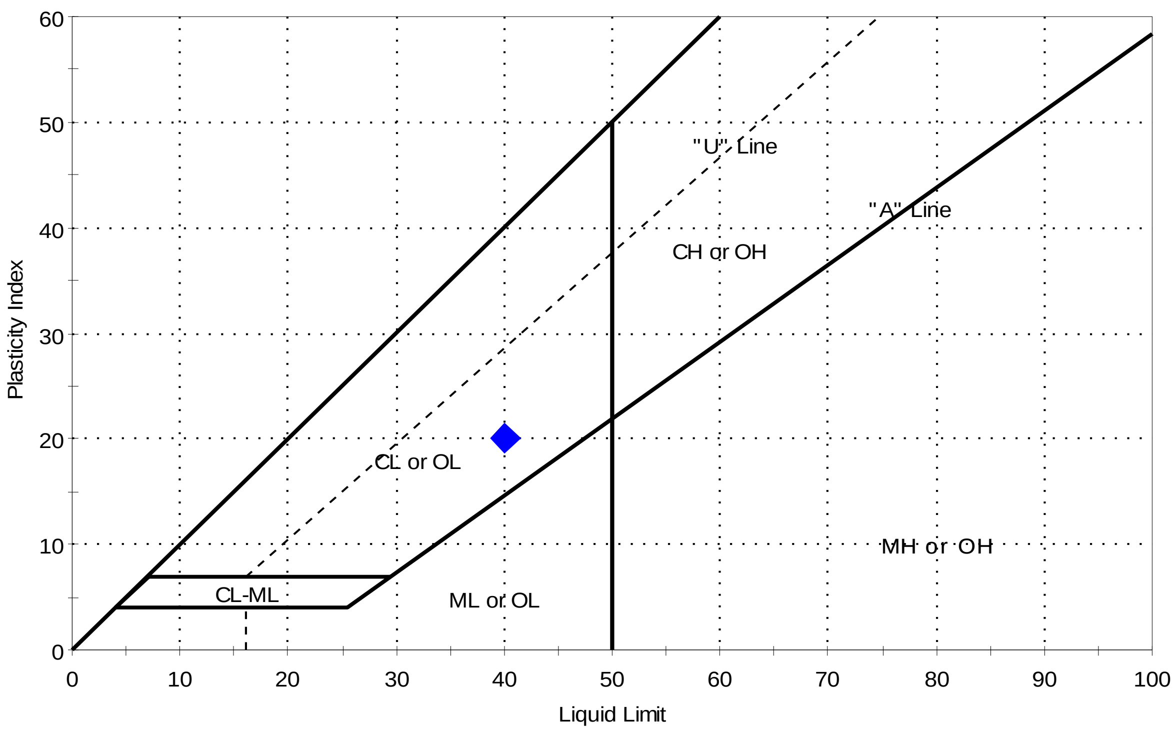
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID:	HB-EXIT45- 201	Sample Type: jar	Tested By: GA
Sample ID:	6D	Test Date: 07/26/18	Checked By: emm
Depth :	35-37 ft	Test Id: 462252	
Test Comment:	---		
Visual Description:	Wet, very dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	6D	B-EXIT45 201	35-37 ft	44	40	20	20	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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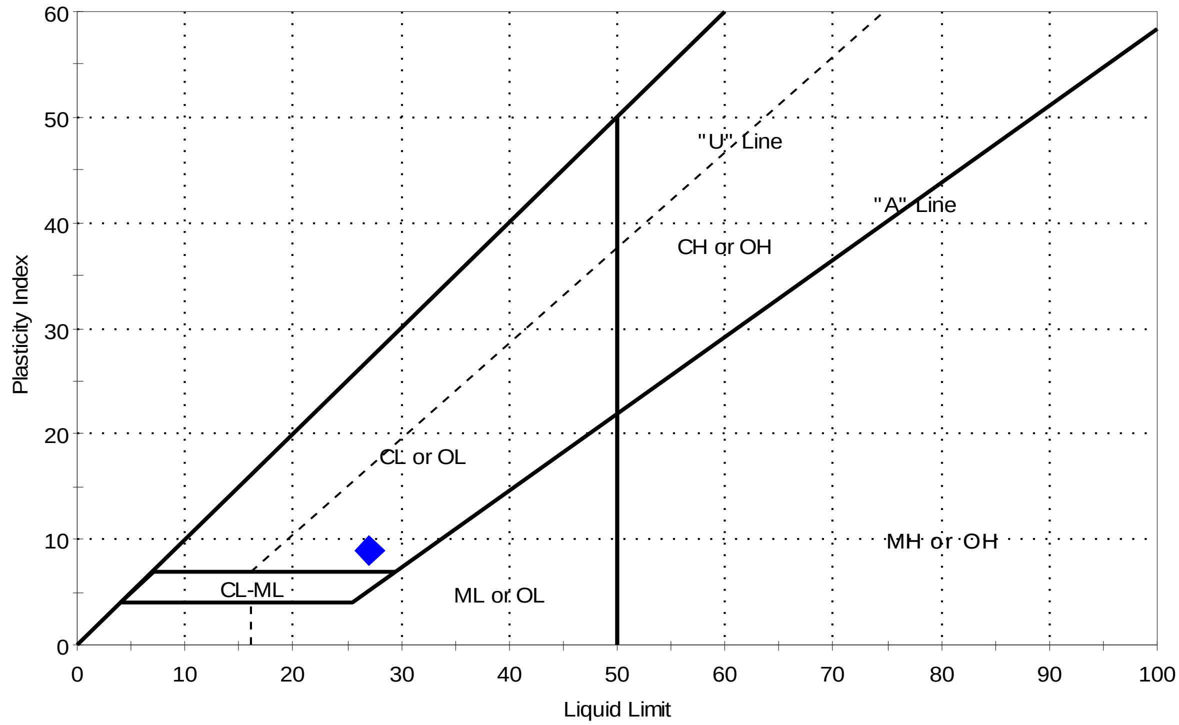
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID:	HB-EXIT45-201	Sample Type: tube	Tested By: cam
Sample ID:	U3	Test Date: 08/03/18	Checked By: emm
Depth :	40-42 ft	Test Id: 466572	
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U3	-EXIT45-2	40-42 ft	39	27	18	9	2.3	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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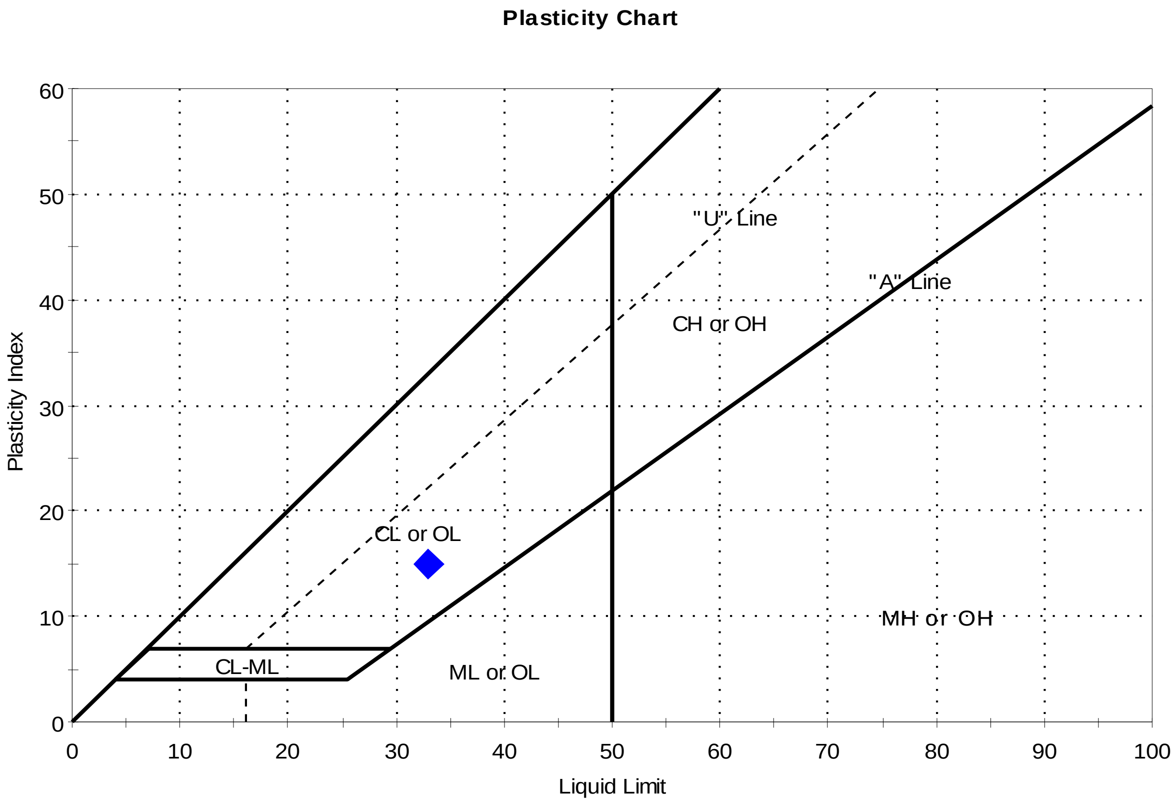
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 201	Sample Type:	jar	Tested By:	GA
Sample ID:	8D	Test Date:	07/19/18	Checked By:	emm
Depth :	55-57 ft	Test Id:	462253		
Test Comment:	---				
Visual Description:	Moist, very dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8D	B-EXIT45 201	55-57 ft	34	33	18	15	1.1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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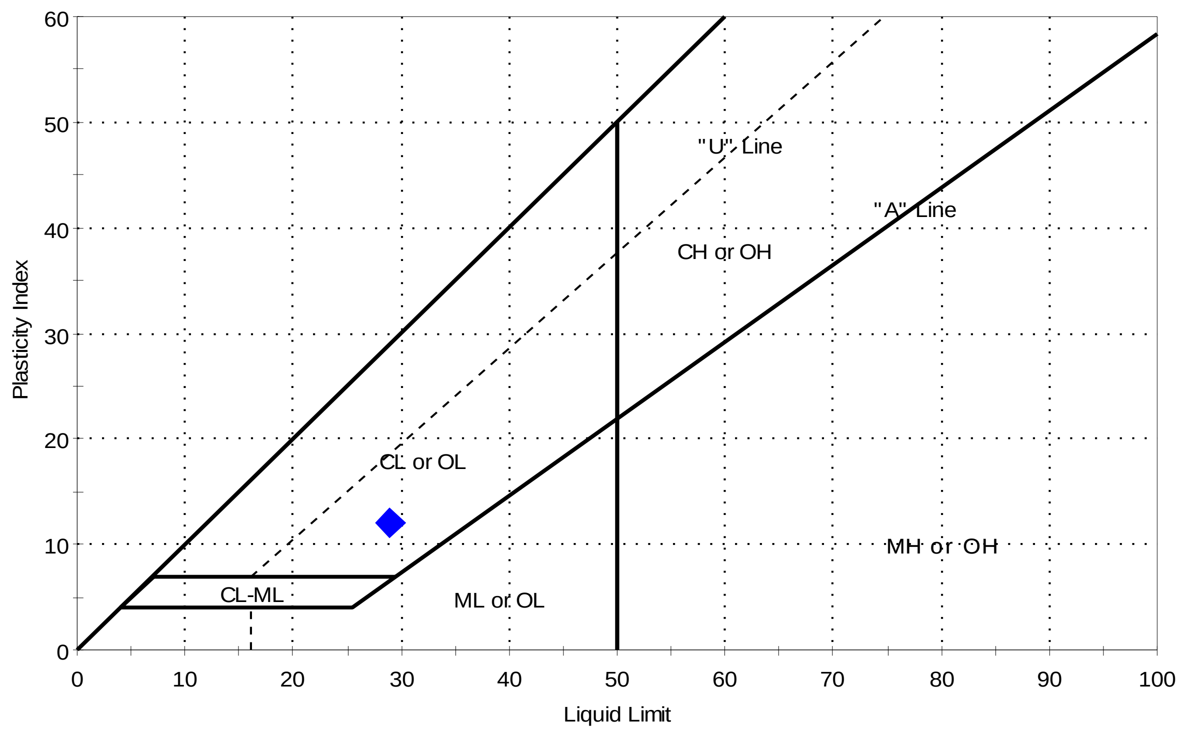
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 202	Sample Type: jar	Tested By:	GA
Sample ID: 4D	Test Date: 07/20/18	Checked By:	emm
Depth : 15-17 ft	Test Id: 462254		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 202	15-17 ft	33	29	17	12	1.4	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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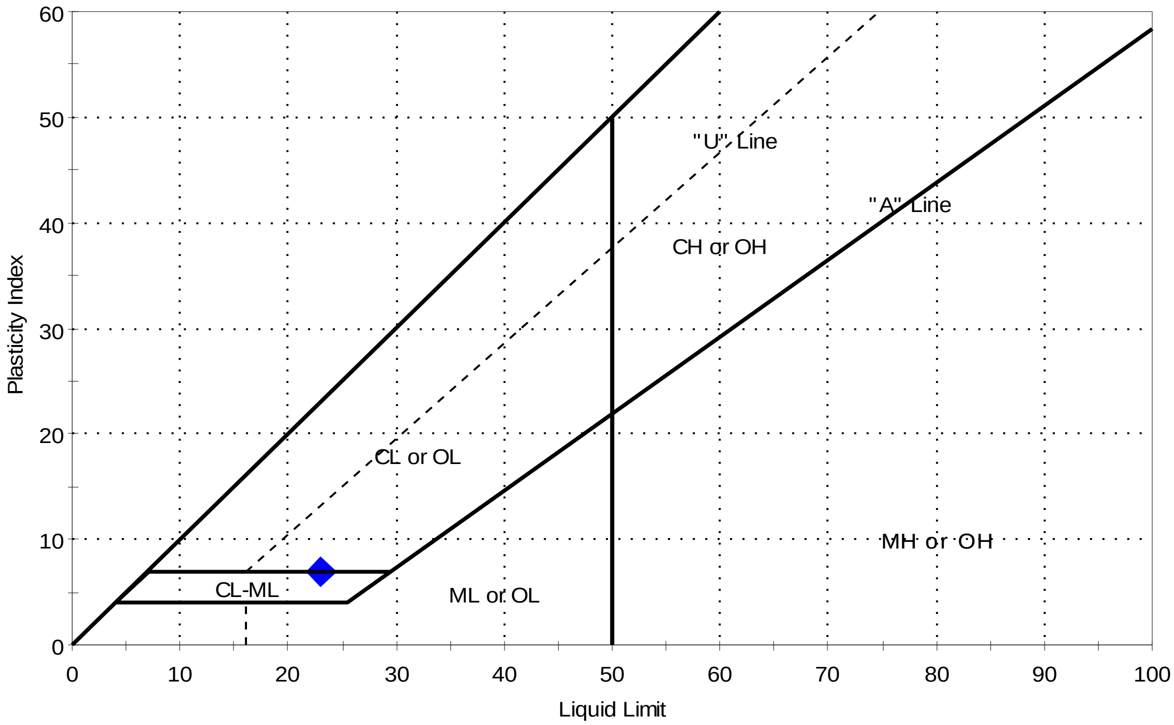
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 202	Sample Type:	jar	Tested By:	GA
Sample ID:	6D	Test Date:	07/20/18	Checked By:	emm
Depth :	25-27 ft	Test Id:	462255		
Test Comment:	---				
Visual Description:	Wet, dark gray silty clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	6D	B-EXIT45 202	25-27 ft	34	23	16	7	2.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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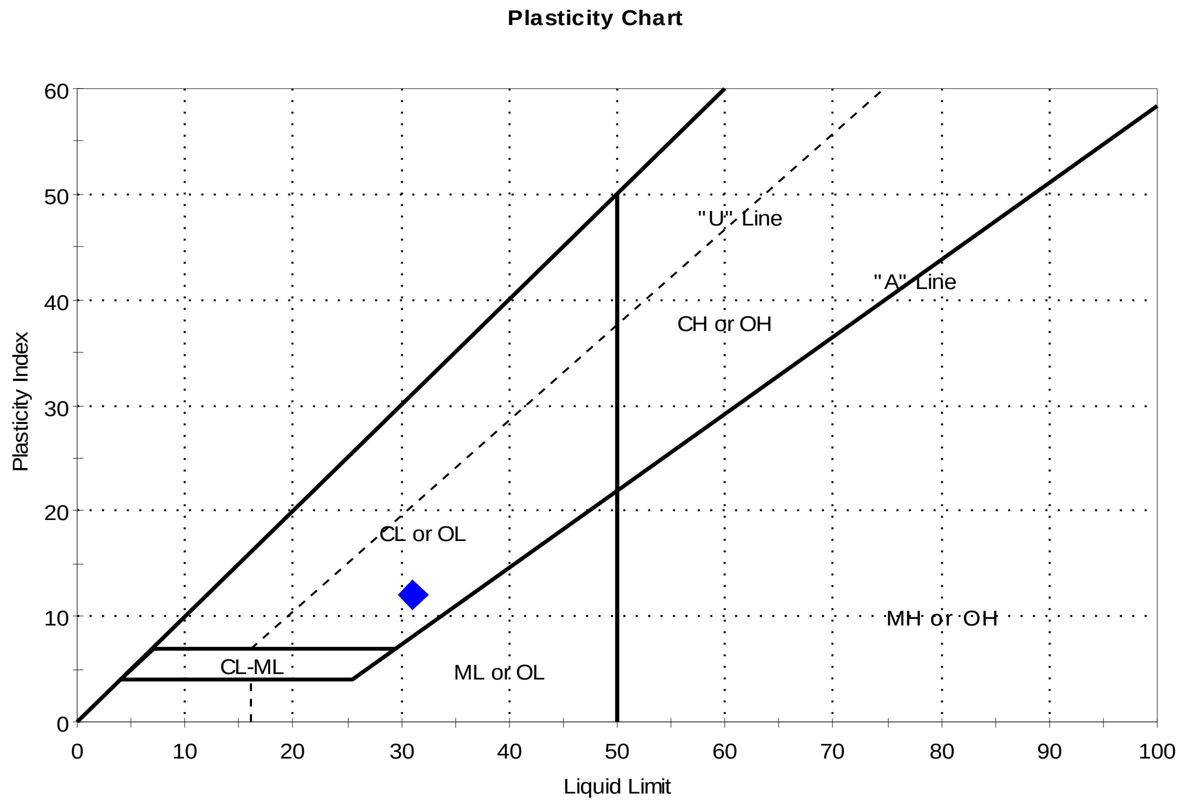
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 202	Sample Type:	jar	Tested By:	GA
Sample ID:	7D	Test Date:	07/25/18	Checked By:	emm
Depth :	35-37 ft	Test Id:	462256		
Test Comment:	---				
Visual Description:	Wet, olive clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	7D	B-EXIT45 202	35-37 ft	36	31	19	12	1.4	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

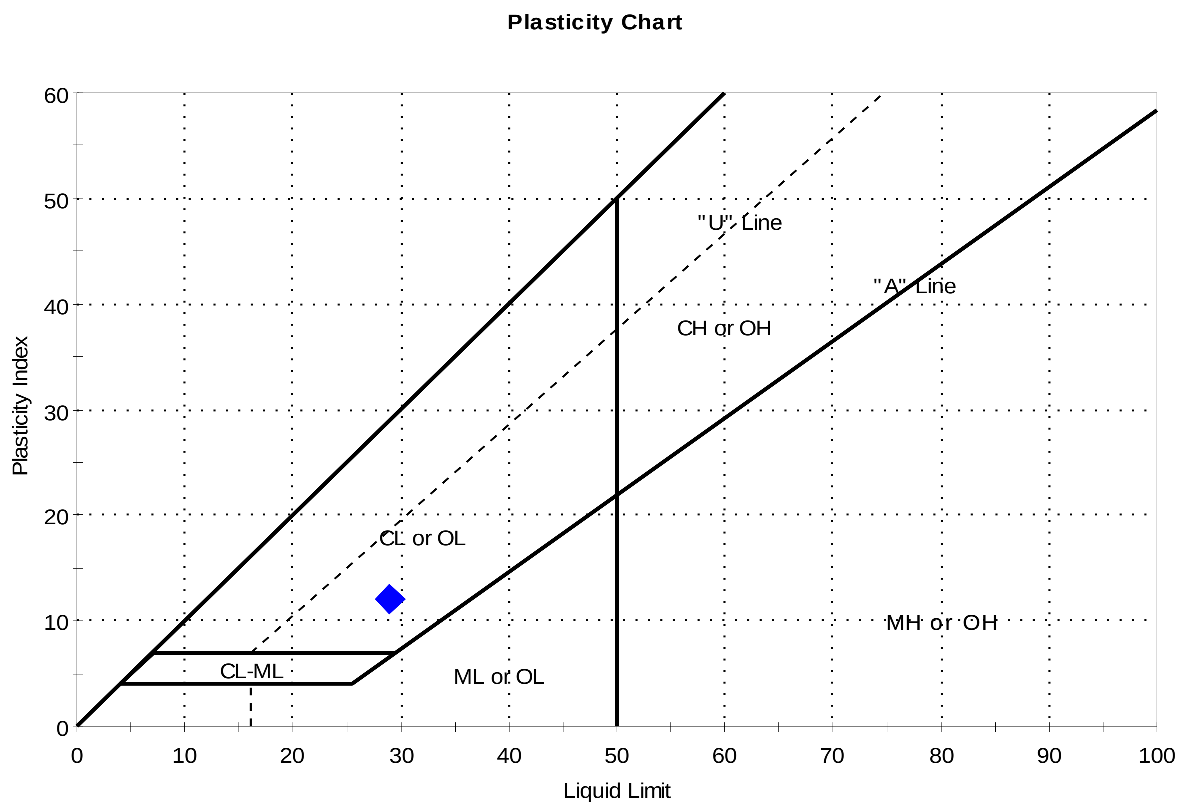
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:51 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 202	Sample Type:	jar	Tested By:	GA
Sample ID:	9D	Test Date:	07/25/18	Checked By:	emm
Depth :	55-57 ft	Test Id:	462257		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	9D	B-EXIT45 202	55-57 ft	40	29	17	12	1.9	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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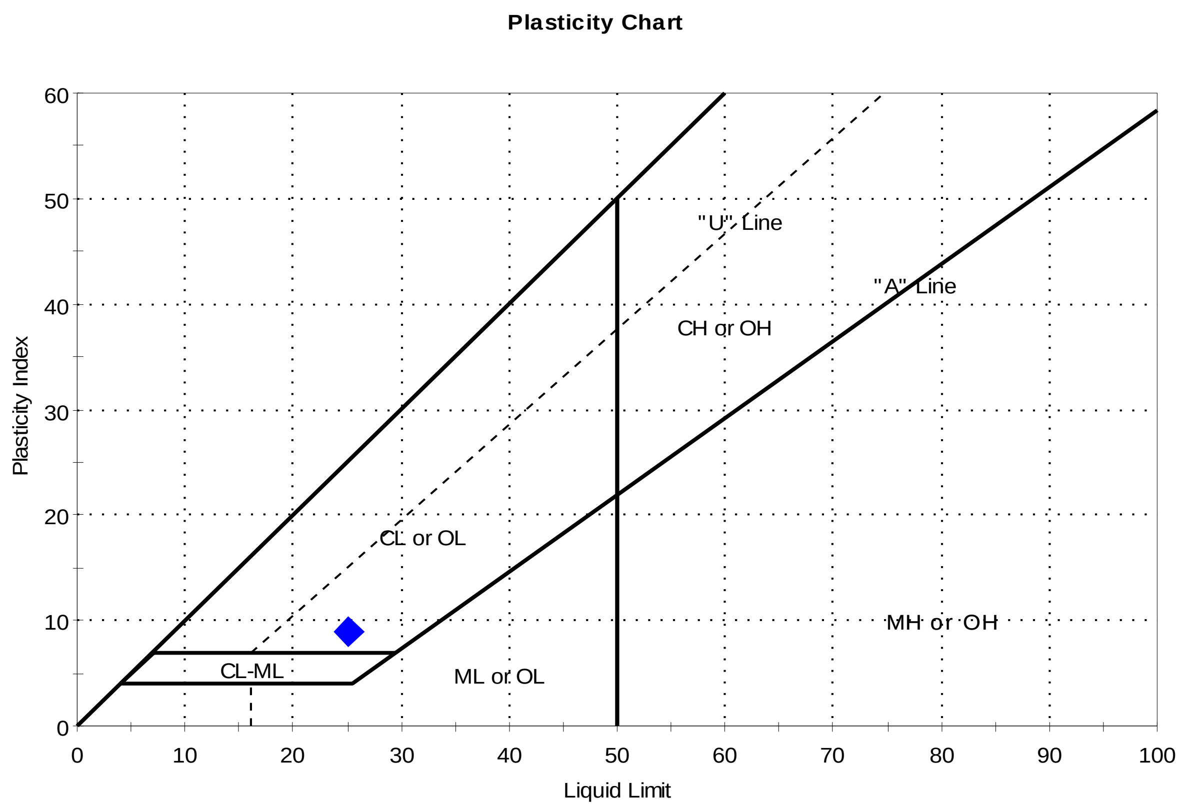
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 203	Sample Type: jar	Tested By:	GA
Sample ID: 4D	Test Date: 07/19/18	Checked By:	emm
Depth : 15-17 ft	Test Id: 462258		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 203	15-17 ft	32	25	16	9	1.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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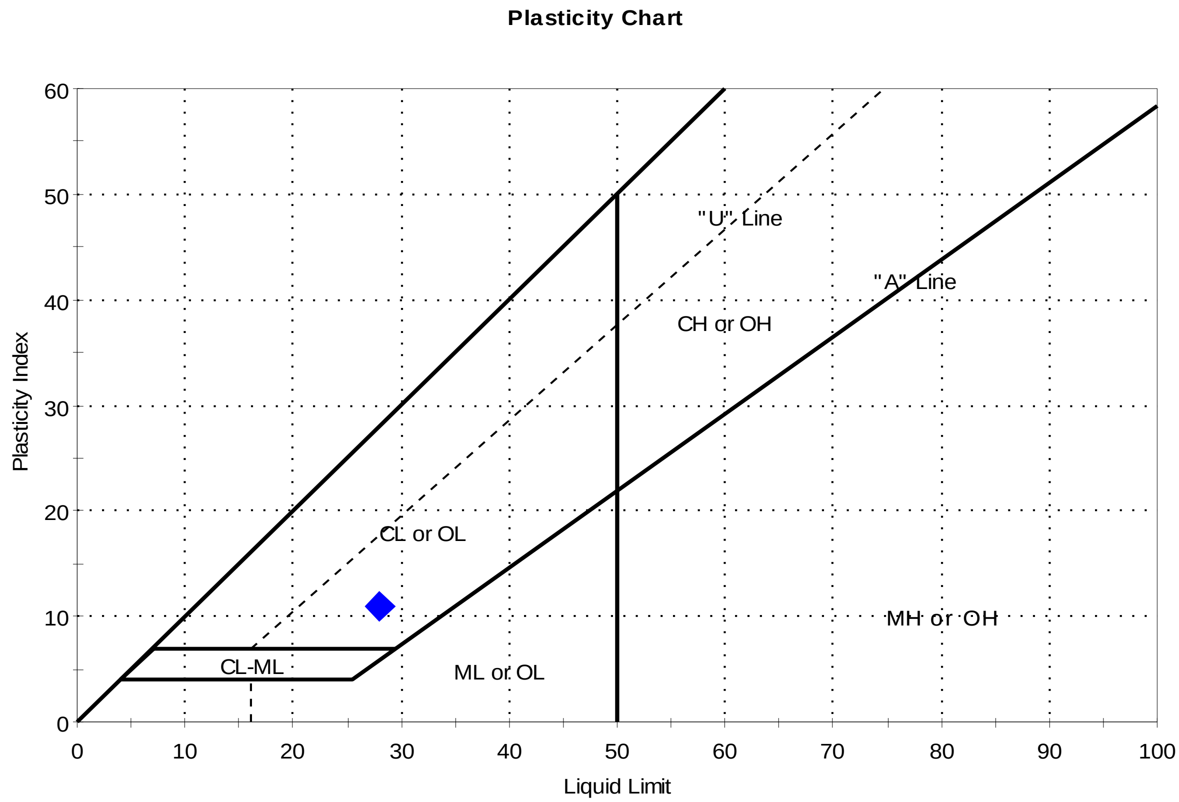
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID:	HB-EXIT45- 203	Sample Type: jar	Tested By: GA
Sample ID:	5D	Test Date: 07/25/18	Checked By: emm
Depth :	20-22 ft	Test Id: 462259	
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 203	20-22 ft	36	28	17	11	1.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

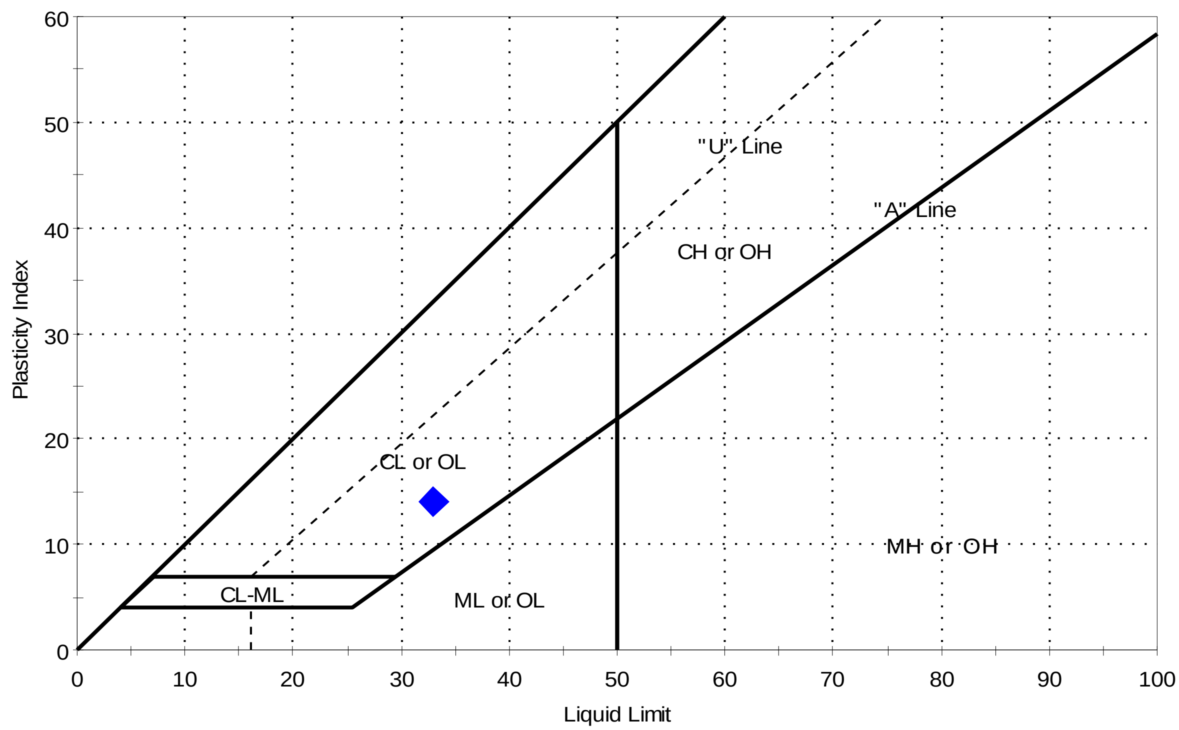
Toughness: MEDIUM

printed 9/20/2018 3:29:52 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 203	Sample Type:	jar	Tested By:	GA
Sample ID:	7D	Test Date:	07/26/18	Checked By:	emm
Depth :	40-42 ft	Test Id:	462260		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	7D	B-EXIT45 203	40-42 ft	45	33	19	14	1.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

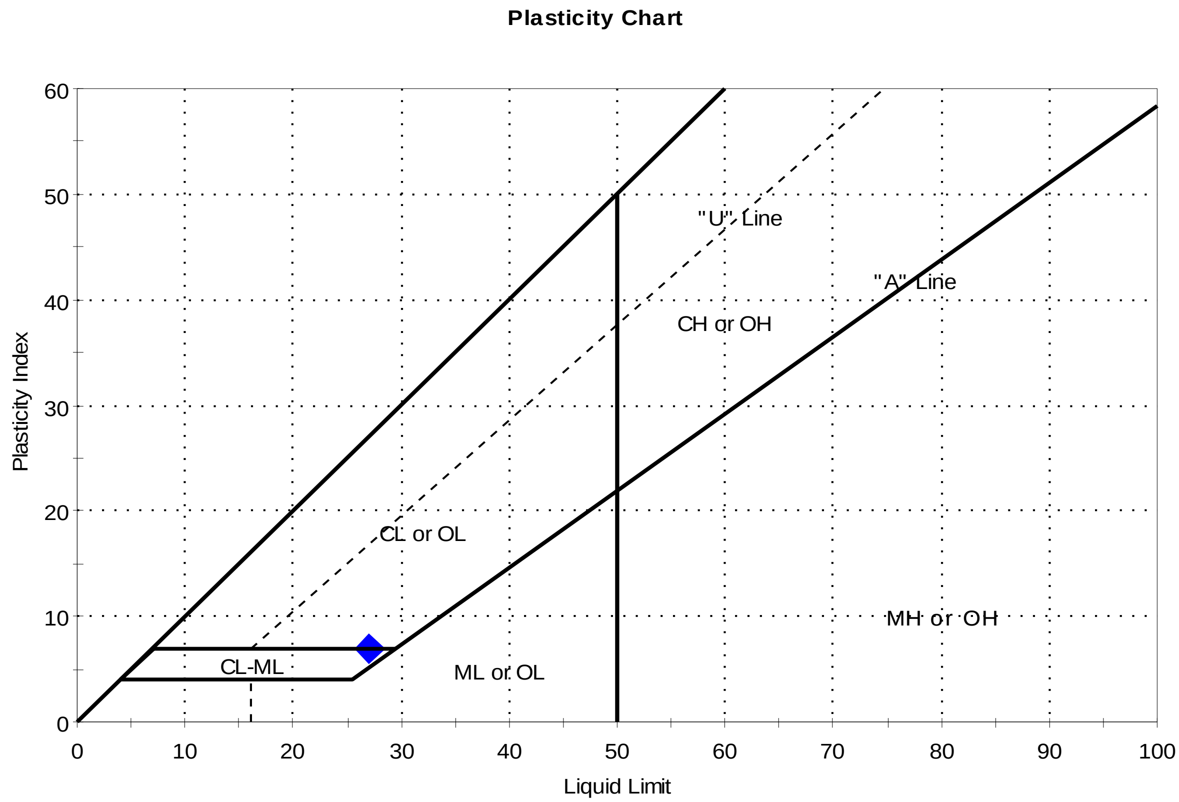
Toughness: MEDIUM

printed 9/20/2018 3:29:52 PM

GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 204	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	07/26/18	Checked By:	emm
Depth :	5-7 ft	Test Id:	462261		
Test Comment:	---				
Visual Description:	Moist, dark gray silty, clayey sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	2D	B-EXIT45 204	5-7 ft	21	27	20	7	0.2	Silty, Clayey SAND (SC-SM)

Sample Prepared using the WET method

40% Retained on #40 Sieve

Dry Strength: VERY HIGH

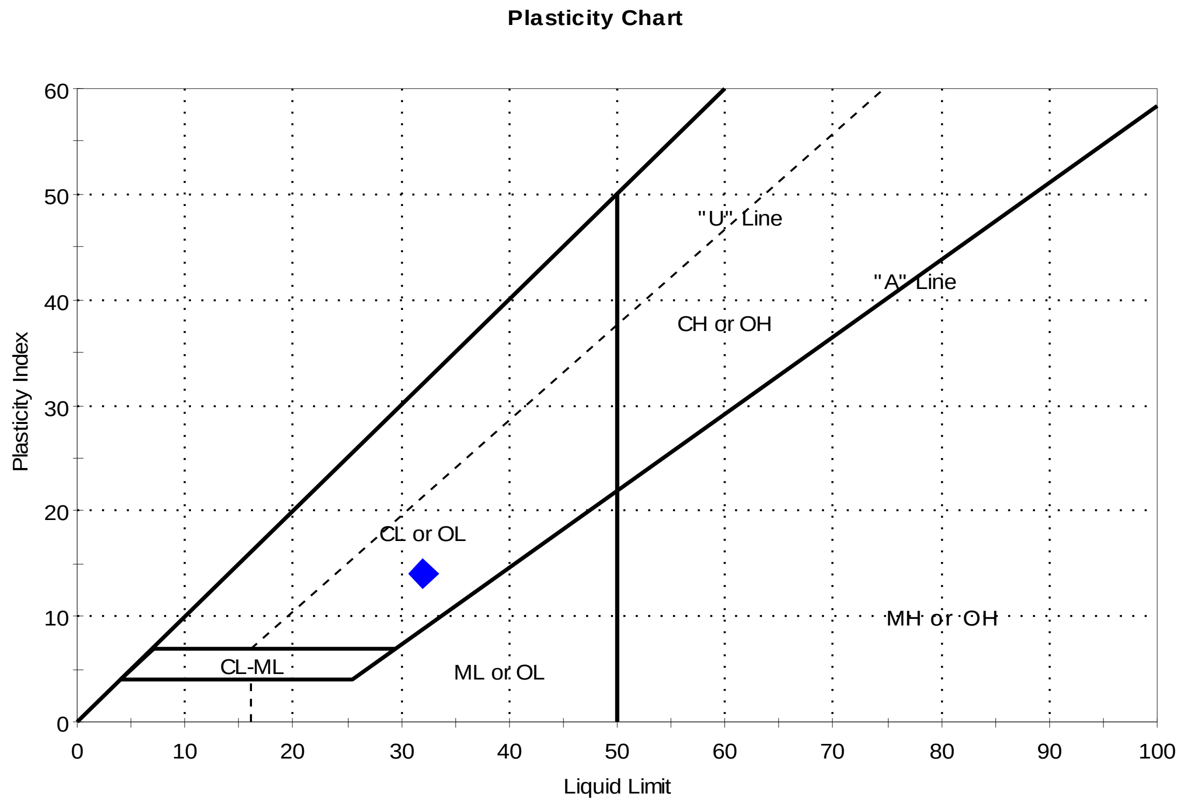
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:53 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 204	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	07/26/18	Checked By:	emm
Depth :	10-12 ft	Test Id:	462262		
Test Comment:	---				
Visual Description:	Moist, olive clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-EXIT45 204	10-12 ft	27	32	18	14	0.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

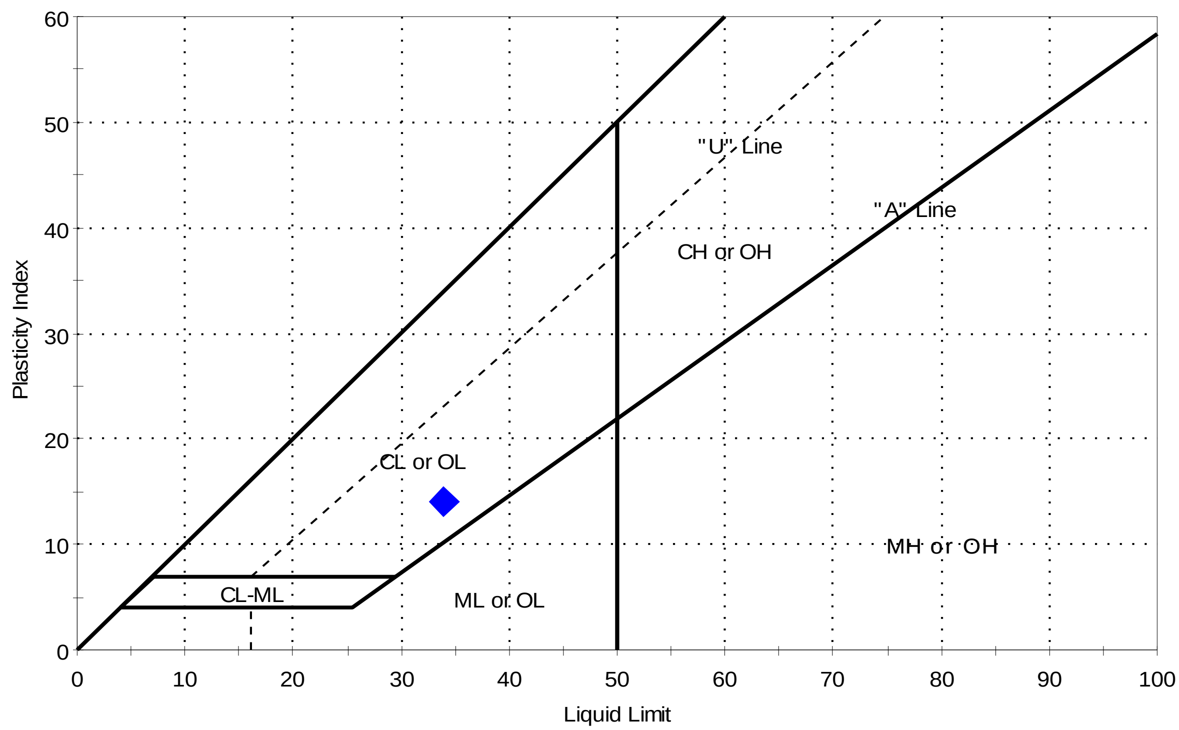
Toughness: MEDIUM

printed 9/20/2018 3:29:53 PM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 204	Sample Type: jar	Tested By:	GA
Sample ID: 5D	Test Date: 07/26/18	Checked By:	emm
Depth : 20-22 ft	Test Id: 462263		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 204	20-22 ft	42	34	20	14	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

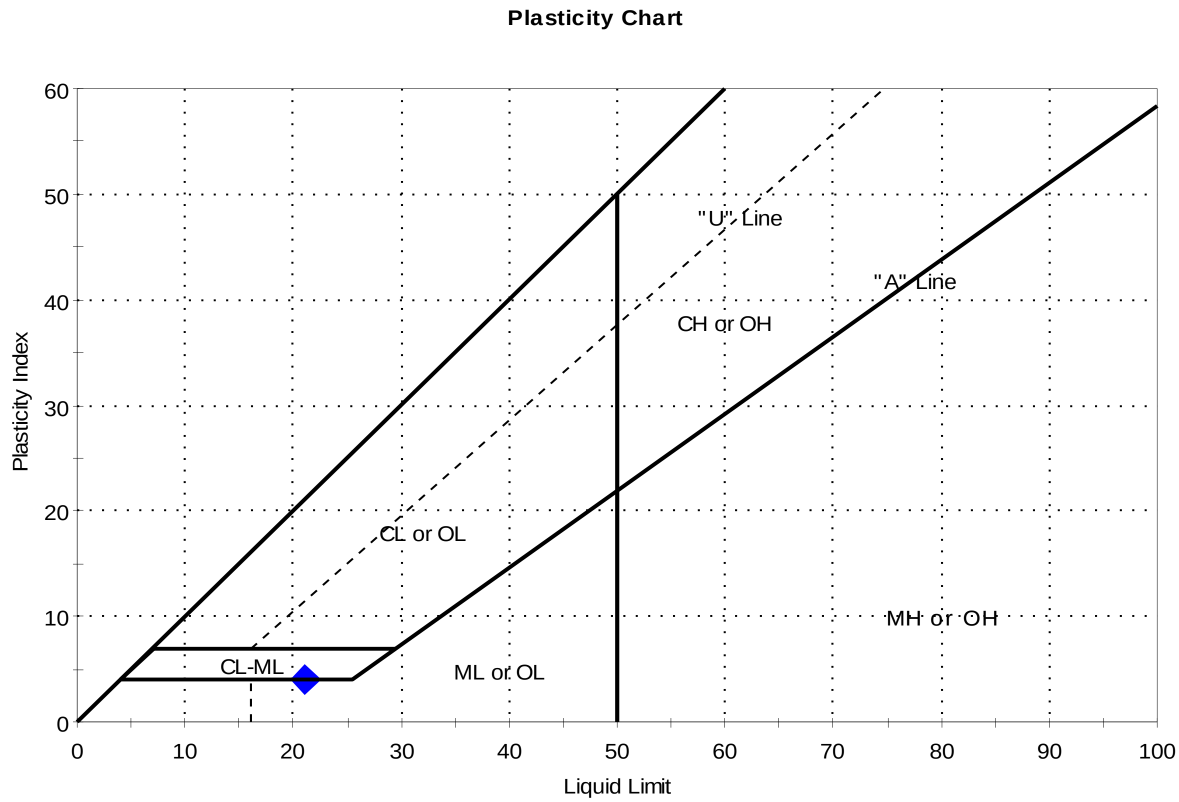
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:54 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 205	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	07/26/18	Checked By:	emm
Depth :	15-17 ft	Test Id:	462264		
Test Comment:	---				
Visual Description:	Wet, dark gray silty clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 205	15-17 ft	31	21	17	4	3.5	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

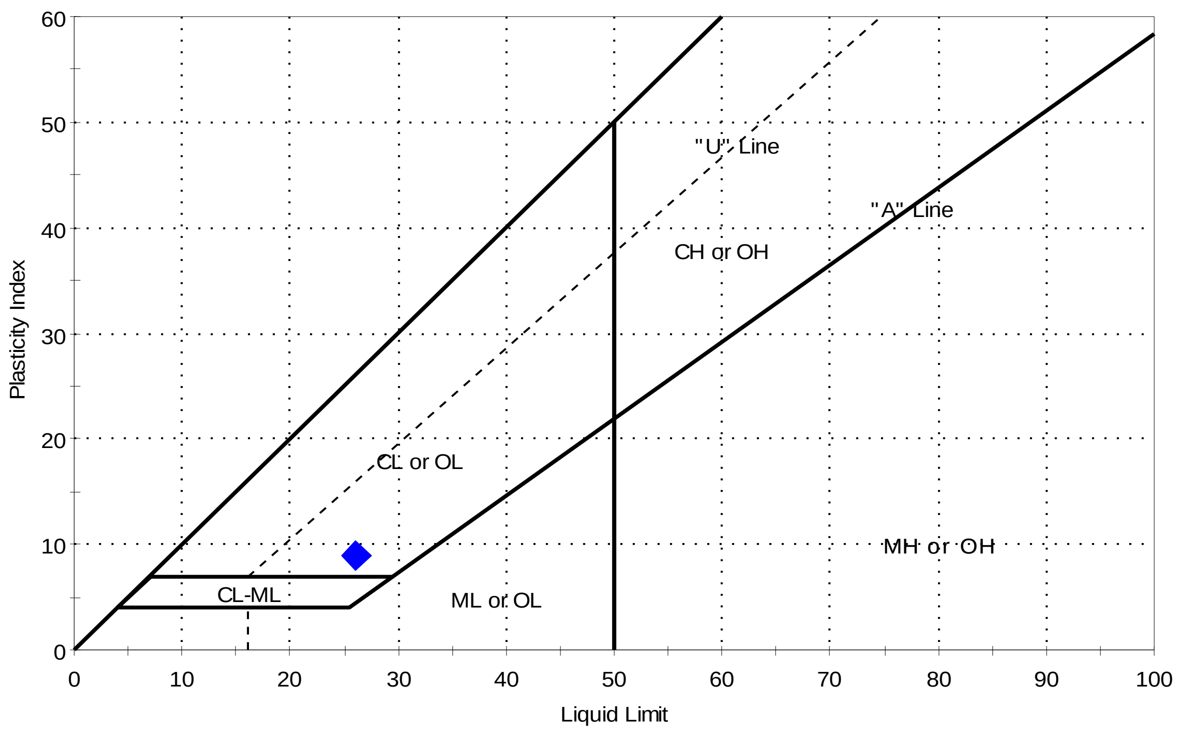
Toughness: MEDIUM

printed 9/20/2018 3:29:54 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 205	Sample Type:	jar	Tested By:	GA
Sample ID:	5D	Test Date:	07/25/18	Checked By:	emm
Depth :	20-22 ft	Test Id:	462265		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 205	20-22 ft	32	26	17	9	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

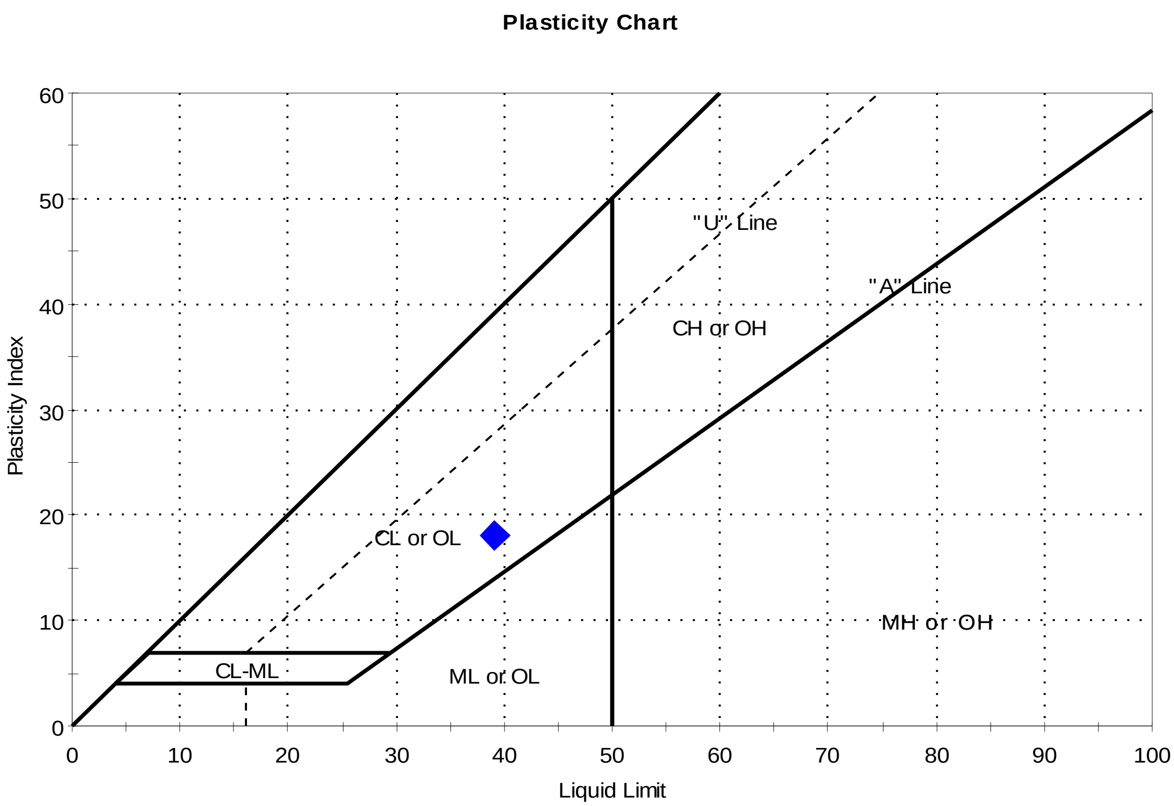
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:54 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45-205	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	08/15/18	Checked By:	emm
Depth :	35-37 ft	Test Id:	466570		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	35-37 ft	52	39	21	18	1.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

printed 9/20/2018 3:29:55 PM

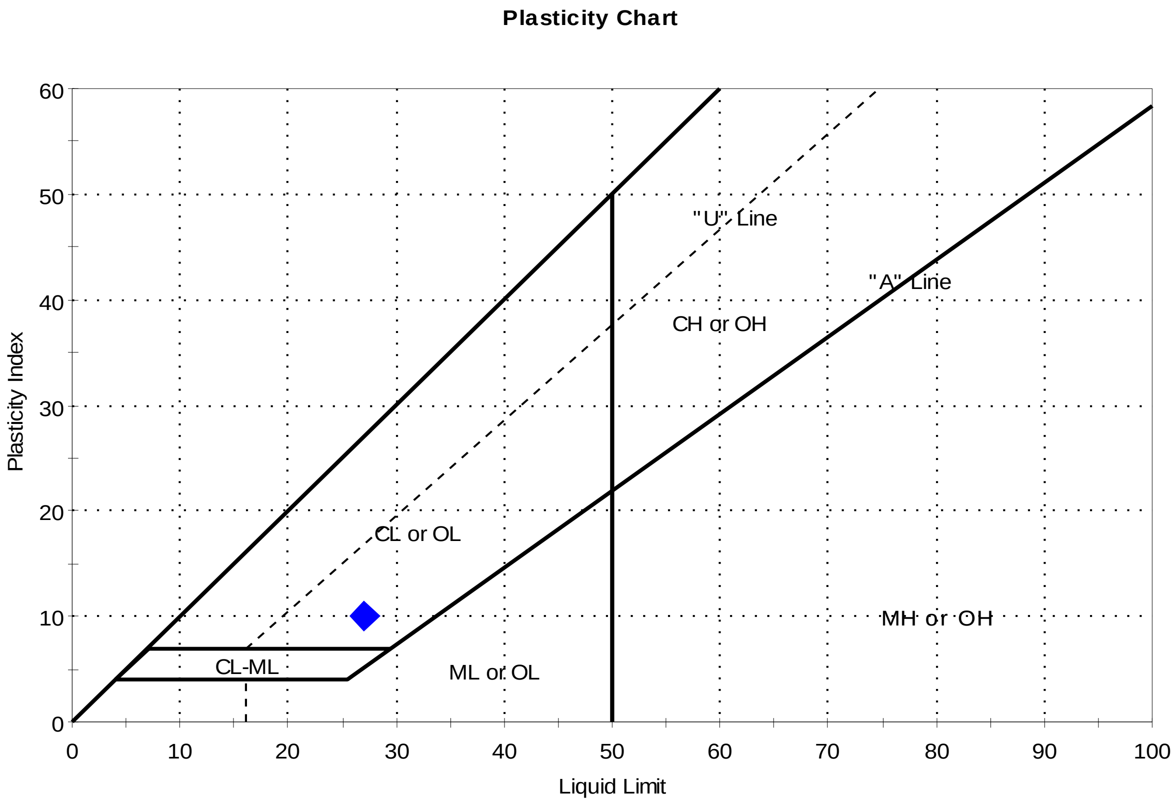
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 205	Sample Type:	jar	Tested By:	GA
Sample ID:	7D	Test Date:	07/20/18	Checked By:	emm
Depth :	40-42 ft	Test Id:	462266		

Test Comment: ---

Visual Description: Wet, very dark gray clay

Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	7D	B-EXIT45 205	40-42 ft	34	27	17	10	1.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

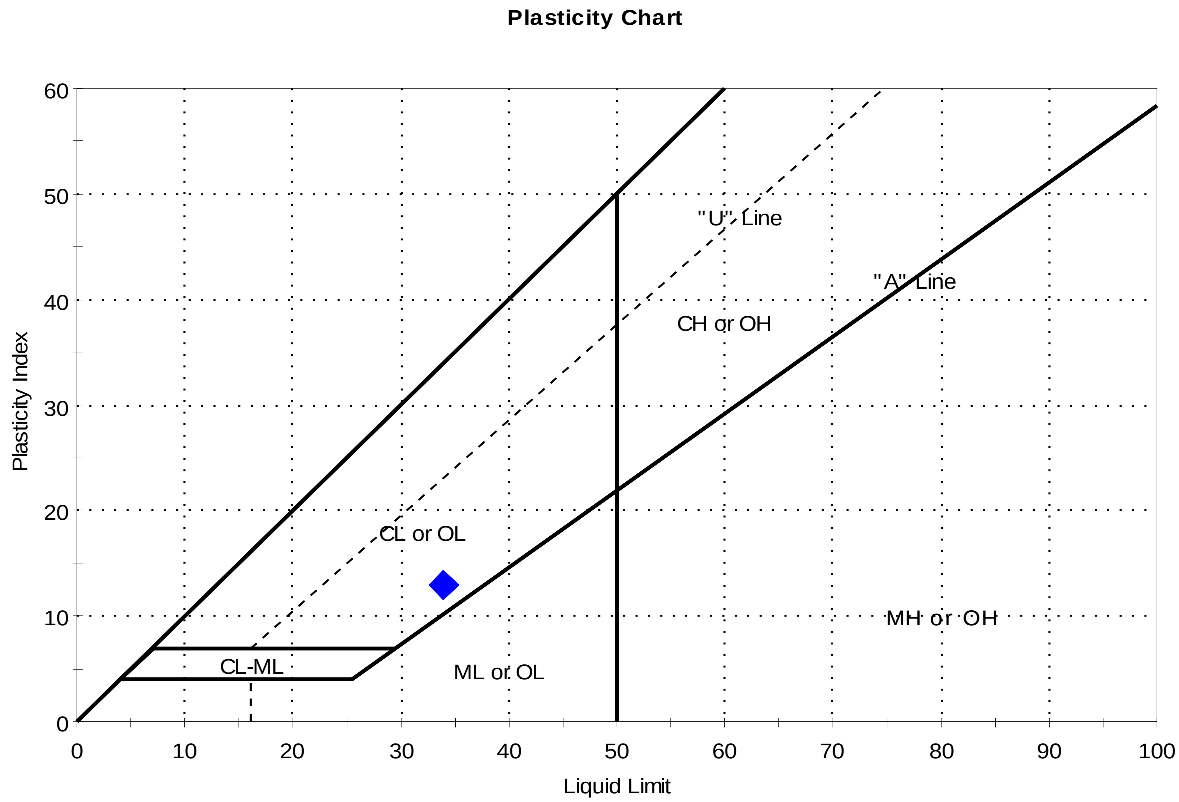
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:55 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 205	Sample Type:	jar	Tested By:	GA
Sample ID:	8D	Test Date:	07/25/18	Checked By:	emm
Depth :	50-52 ft	Test Id:	462267		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8D	B-EXIT45 205	50-52 ft	42	34	21	13	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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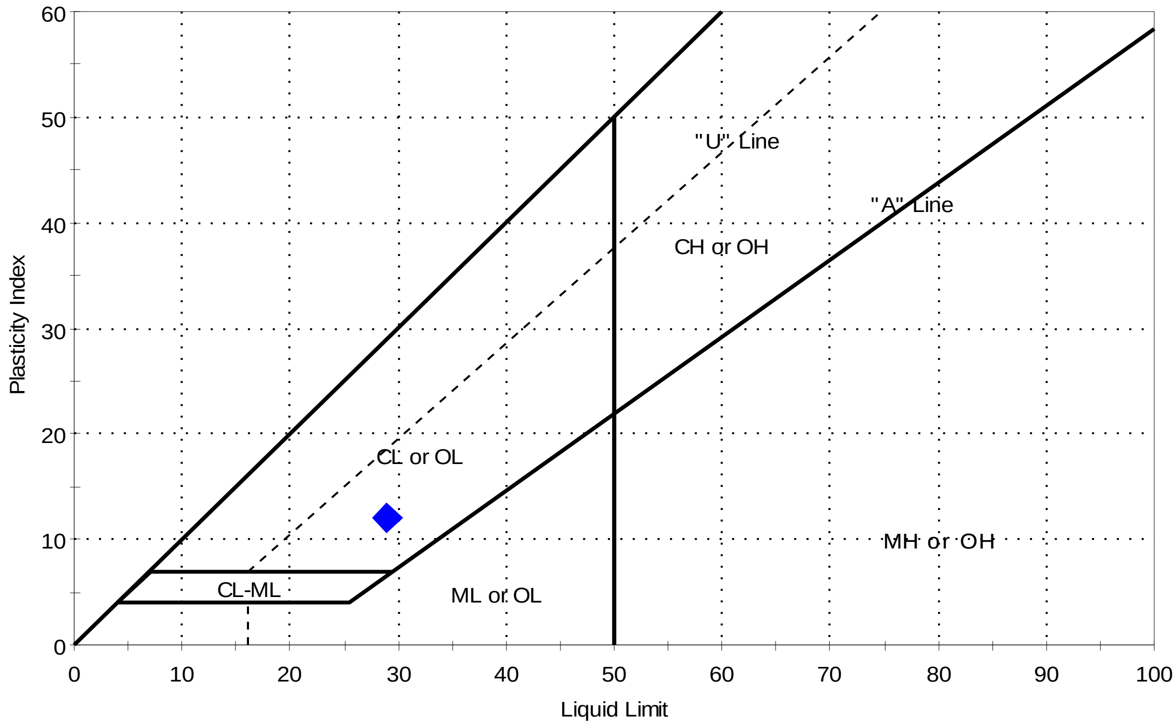
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 206	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	07/25/18	Checked By:	emm
Depth :	15-17 ft	Test Id:	462268		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 206	15-17 ft	34	29	17	12	1.5	

Sample Prepared using the WET method

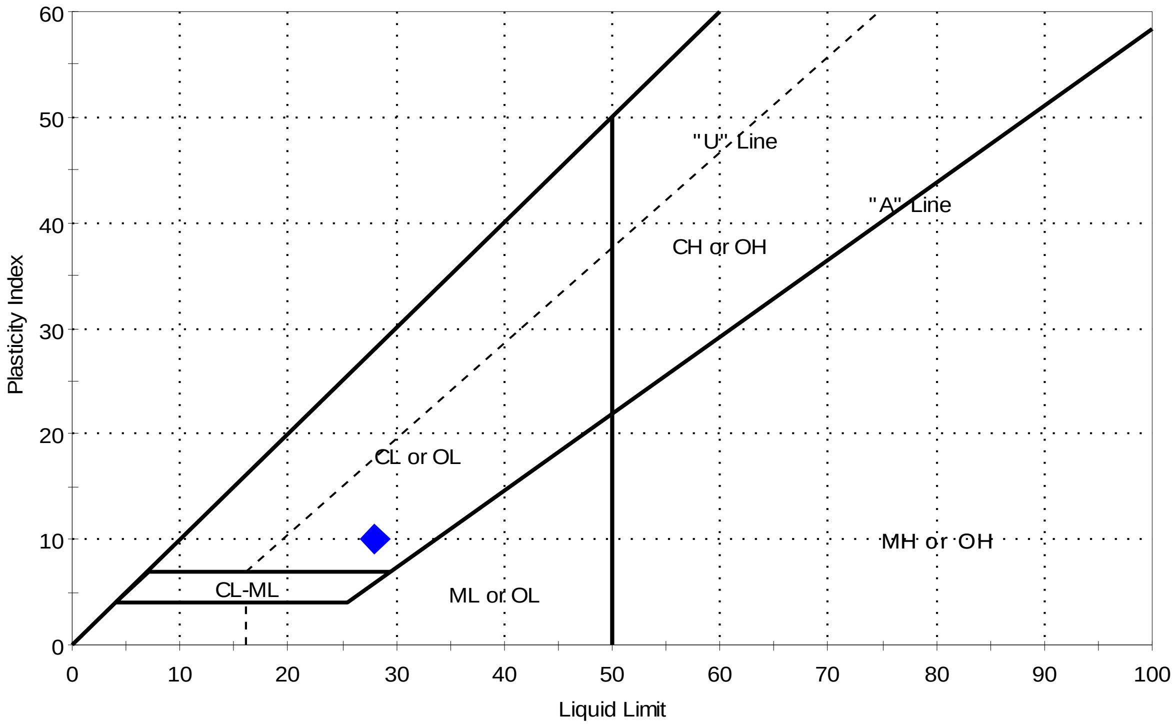
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 206	Sample Type: jar	Tested By:	GA
Sample ID: 6D	Test Date: 07/20/18	Checked By:	emm
Depth : 25-27 ft	Test Id: 462269		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	6D	B-EXIT45 206	25-27 ft	36	28	18	10	1.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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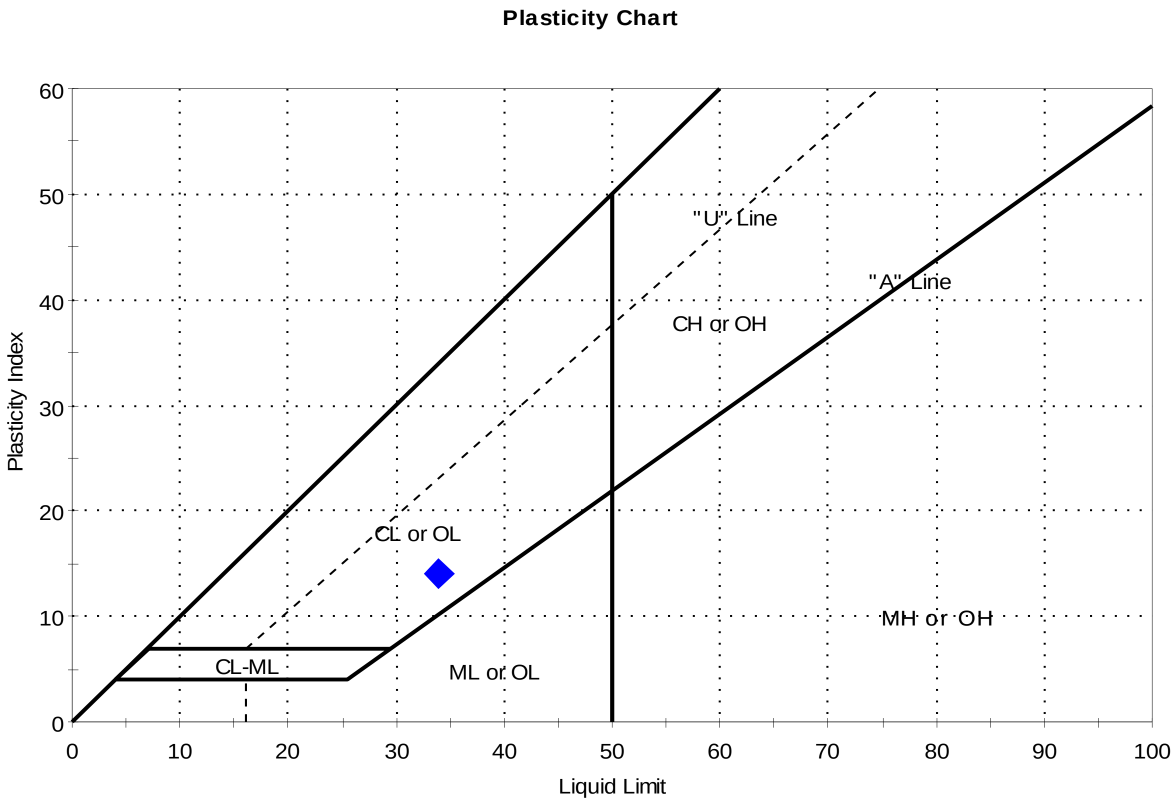
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 206	Sample Type:	jar	Tested By:	GA
Sample ID:	12D	Test Date:	07/25/18	Checked By:	emm
Depth :	55-57 ft	Test Id:	462270		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	12D	B-EXIT45 206	55-57 ft	43	34	20	14	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

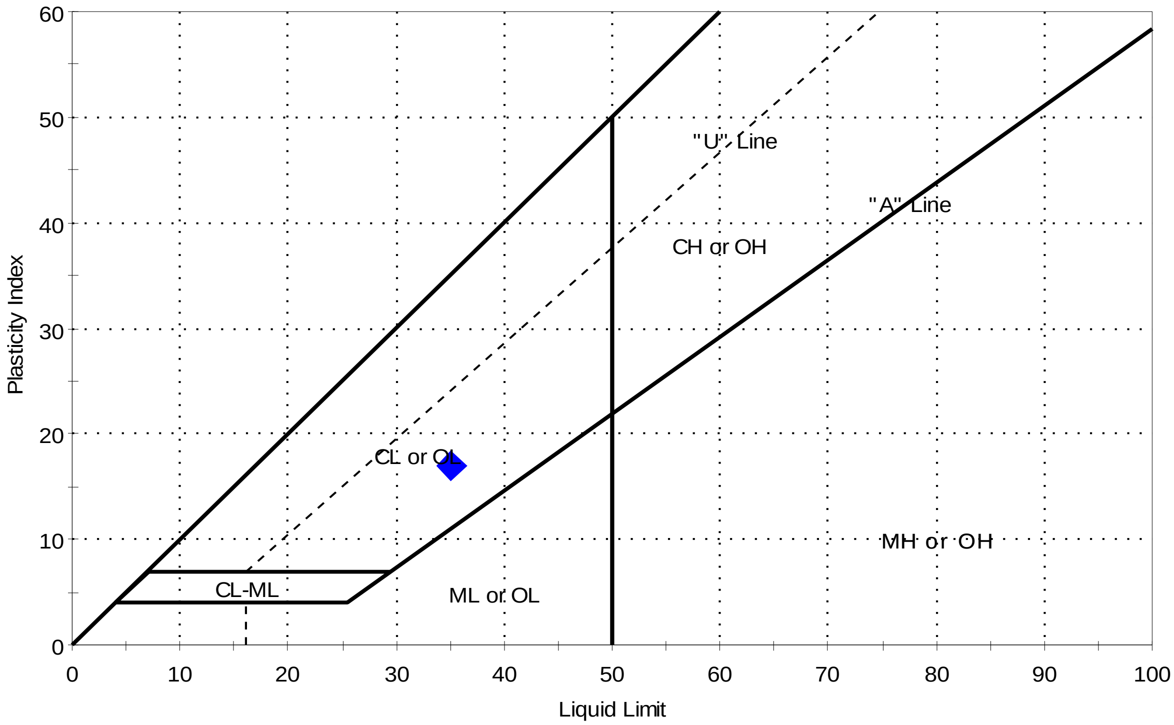
Toughness: MEDIUM

printed 9/20/2018 3:29:57 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 207	Sample Type:	jar	Tested By:	GA
Sample ID:	14D	Test Date:	07/19/18	Checked By:	emm
Depth :	85-87 ft	Test Id:	462271		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	14D	B-EXIT45 207	85-87 ft	35	35	18	17	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

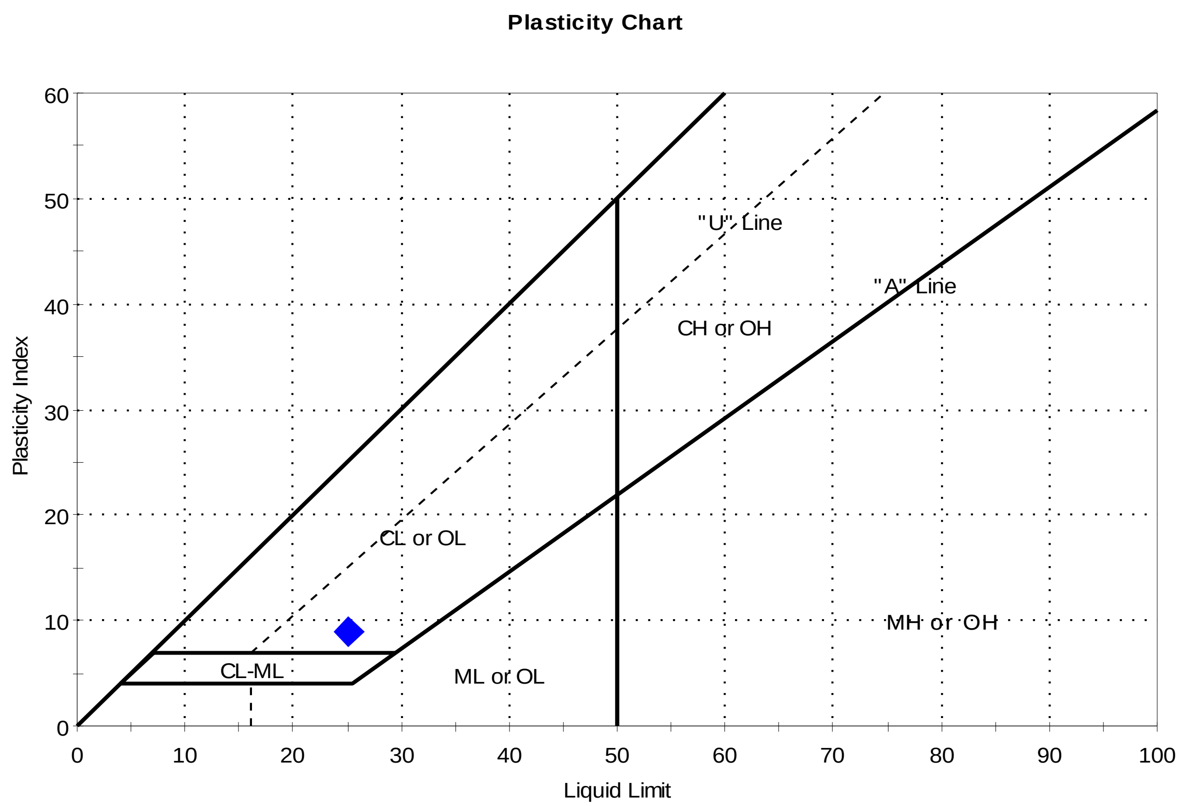
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:57 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 208	Sample Type:	jar	Tested By:	GA
Sample ID:	5D	Test Date:	07/19/18	Checked By:	emm
Depth :	20-22 ft	Test Id:	462272		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 208	20-22 ft	33	25	16	9	1.8	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

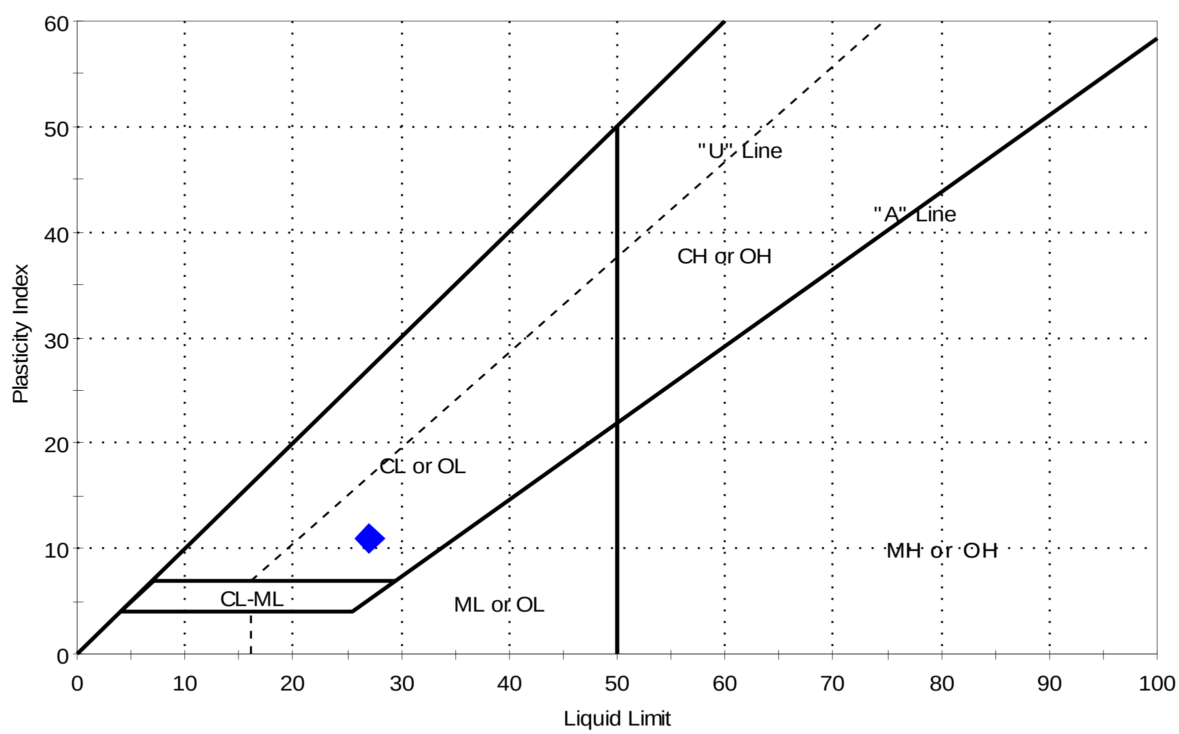
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:58 PM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45-208	Sample Type: tube	Tested By: cam	
Sample ID: U2	Test Date: 08/02/18	Checked By: emm	
Depth : 40-42 ft	Test Id: 462374		
Test Comment:	---		
Visual Description:	Wet, gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	40-42 ft	40	27	16	11	2.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

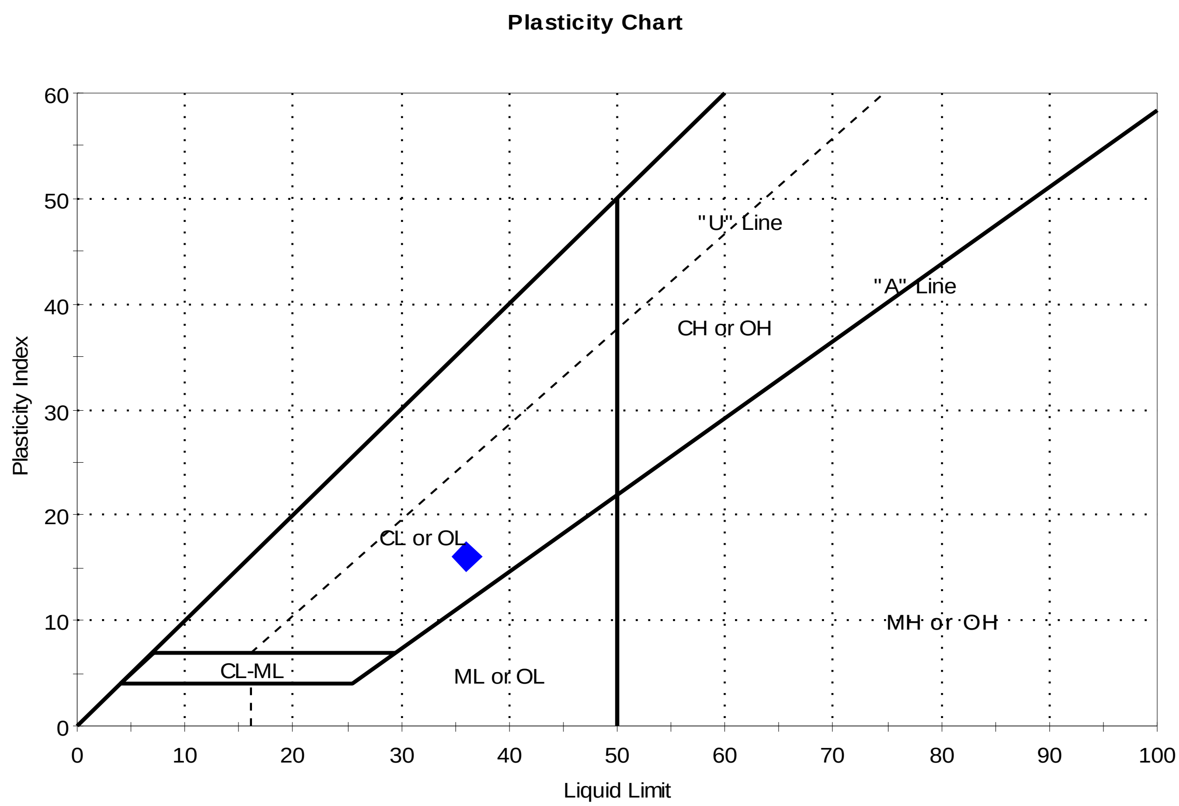
Dilatancy: SLOW

Toughness: LOW

printed 9/20/2018 3:29:58 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 208	Sample Type:	jar	Tested By:	GA
Sample ID:	8D	Test Date:	07/20/18	Checked By:	emm
Depth :	45-47 ft	Test Id:	462273		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	8D	B-EXIT45 208	45-47 ft	45	36	20	16	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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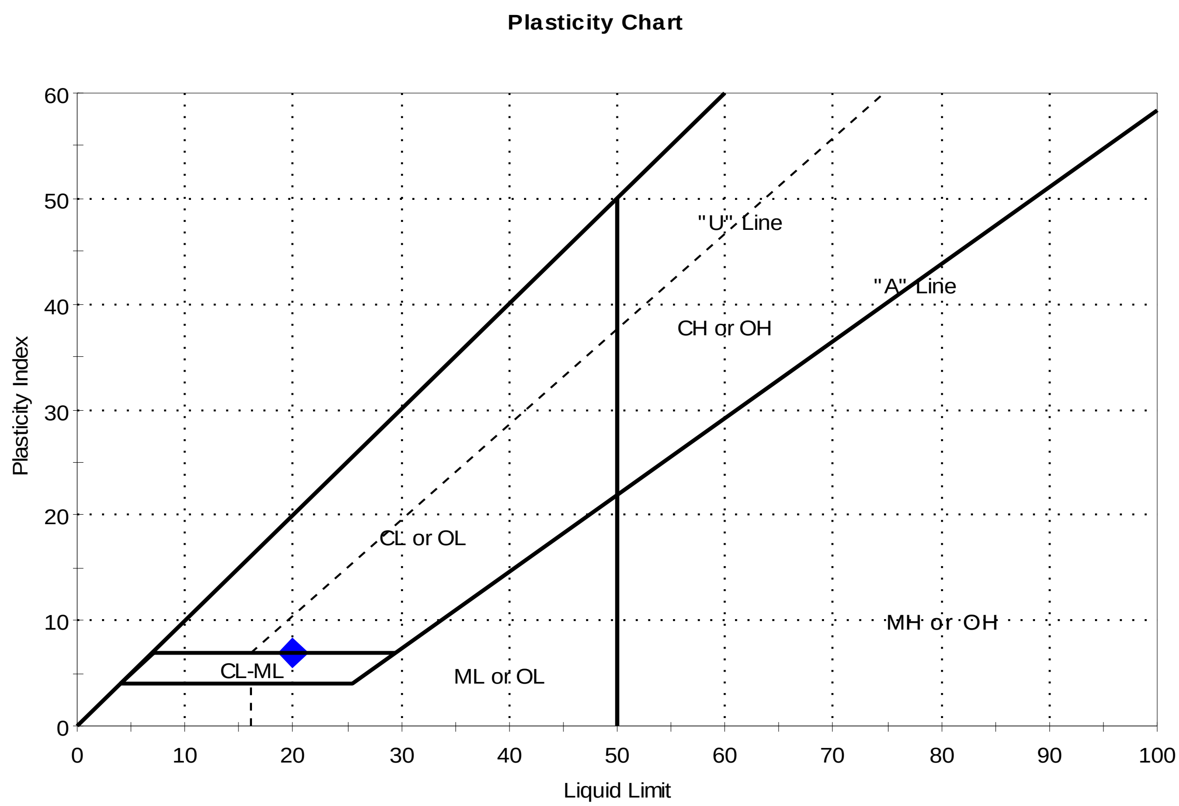
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 209	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	07/25/18	Checked By:	emm
Depth :	10-12 ft	Test Id:	462274		
Test Comment:	---				
Visual Description:	Wet, dark gray clay with sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-EXIT45 209	10-12 ft	28	20	13	7	2.1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:29:59 PM

Client:	Schonewald Engineering Associates, Inc.
Project:	MeTPK Exit 45 Reconfiguration
Location:	Phs 2 South Portland, ME
Project No:	GTX-307957
Boring ID:	HB-EXIT45- 209
Sample Type:	jar
Tested By:	GA
Sample ID:	4D
Test Date:	07/25/18
Checked By:	emm
Depth :	15-17 ft
Test Id:	462275
Test Comment:	---
Visual Description:	Moist, dark gray silt
Sample Comment:	---

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 209	15-17 ft	28	n/a	n/a	n/a	n/a	

Dry Strength: NONE

Dilatancy: RAPID

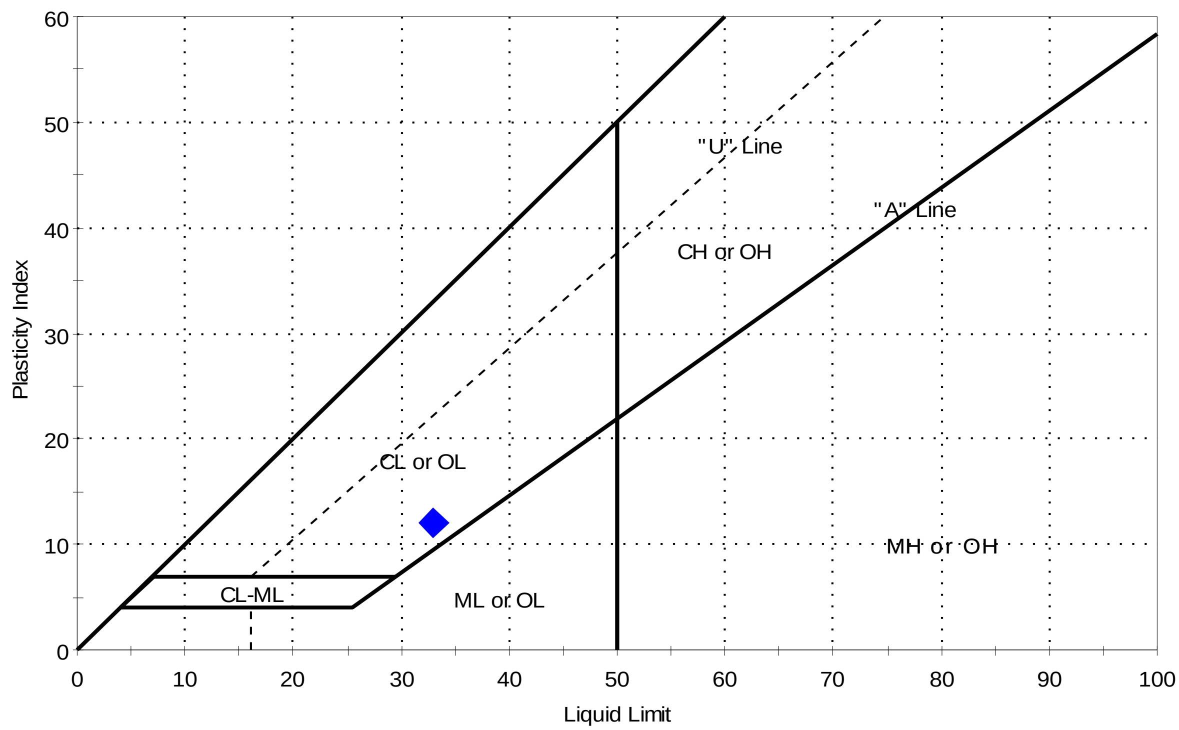
Toughness: n/a

The sample was determined to be Non-Plastic

printed 9/20/2018 3:29:59 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45-209	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	08/02/18	Checked By:	emm
Depth :	35-37 ft	Test Id:	462372		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	35-37 ft	41	33	21	12	1.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

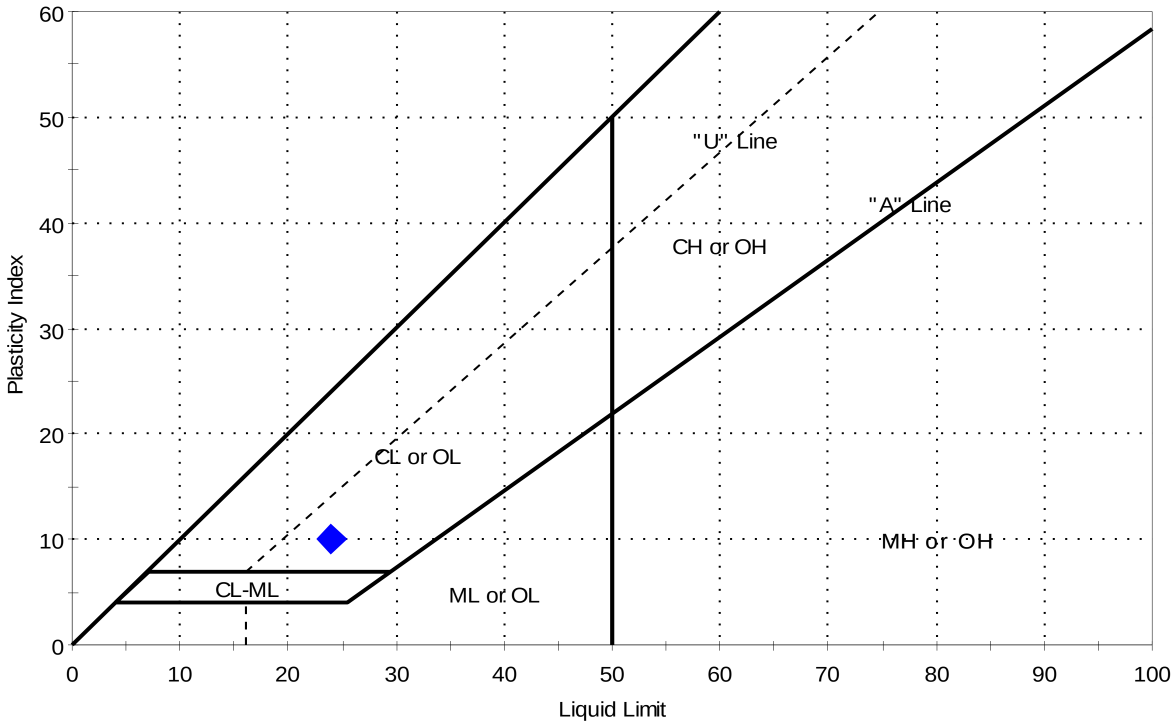
Dilatancy: SLOW

Toughness: LOW

printed 9/20/2018 3:30:00 PM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 210	Sample Type: jar	Tested By:	GA
Sample ID: 4D	Test Date: 07/20/18	Checked By:	emm
Depth : 15-17 ft	Test Id: 462276		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	4D	B-EXIT45 210	15-17 ft	38	24	14	10	2.4	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

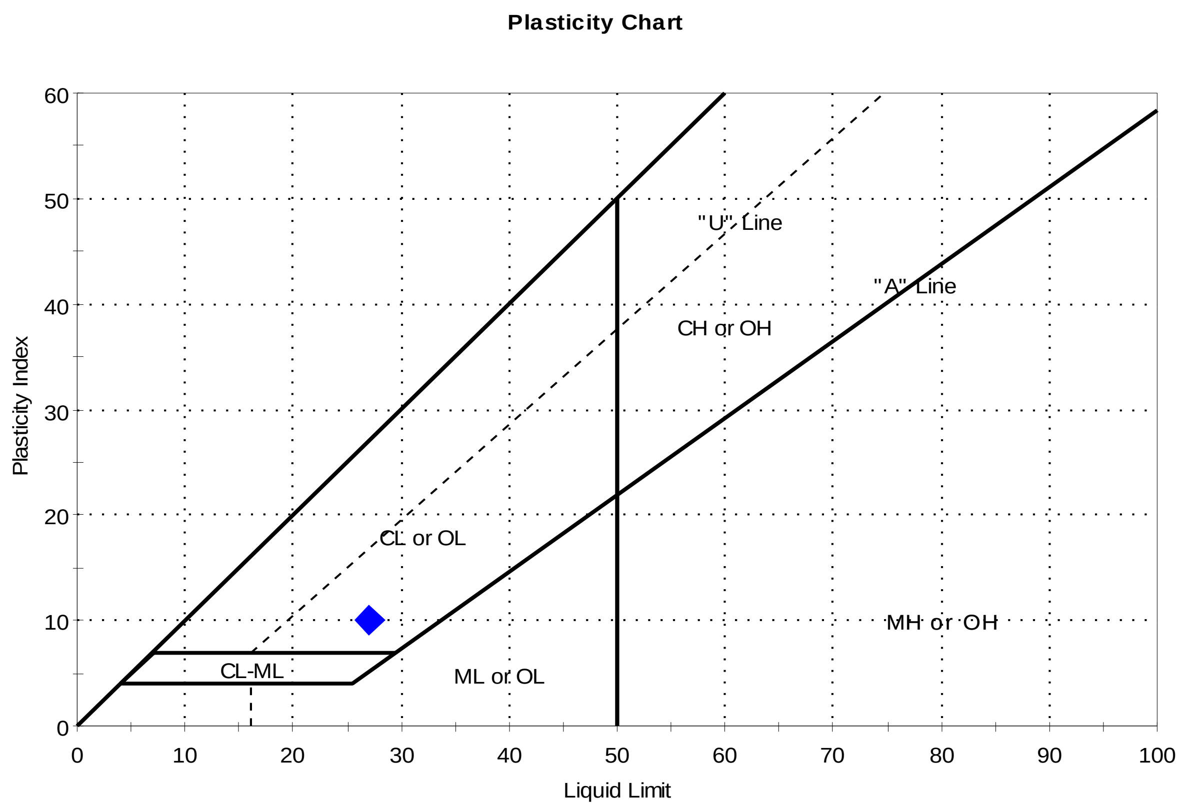
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:30:00 PM

Client:	Schonewald Engineering Associates, Inc.			
Project:	MeTPK Exit 45 Reconfiguration			
Location:	Phs 2 South Portland, ME		Project No:	GTX-307957
Boring ID:	HB-EXIT45- 210	Sample Type: jar	Tested By:	GA
Sample ID:	5D	Test Date: 07/26/18	Checked By:	emm
Depth :	20-22 ft	Test Id: 462277		
Test Comment:	---			
Visual Description:	Wet, dark gray clay			
Sample Comment:	---			

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 210	20-22 ft	35	27	17	10	1.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

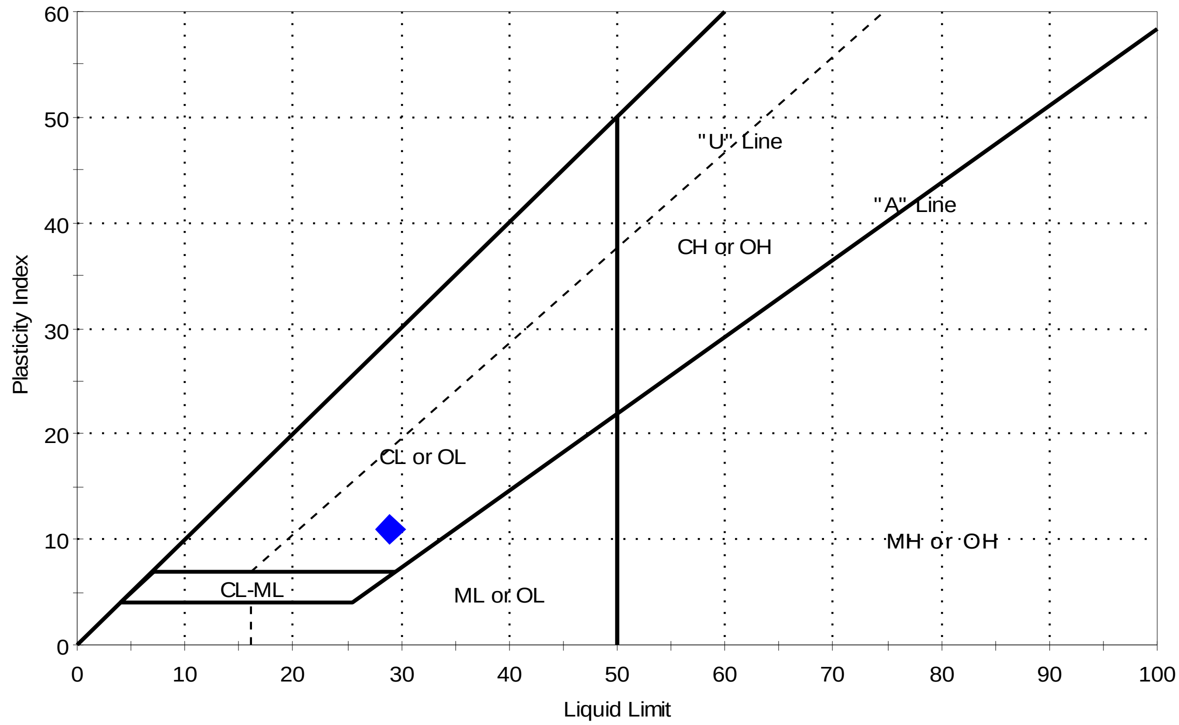
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:30:00 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45-210	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	08/16/18	Checked By:	emm
Depth :	40-42 ft	Test Id:	462373		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	40-42 ft	44	29	18	11	n/a	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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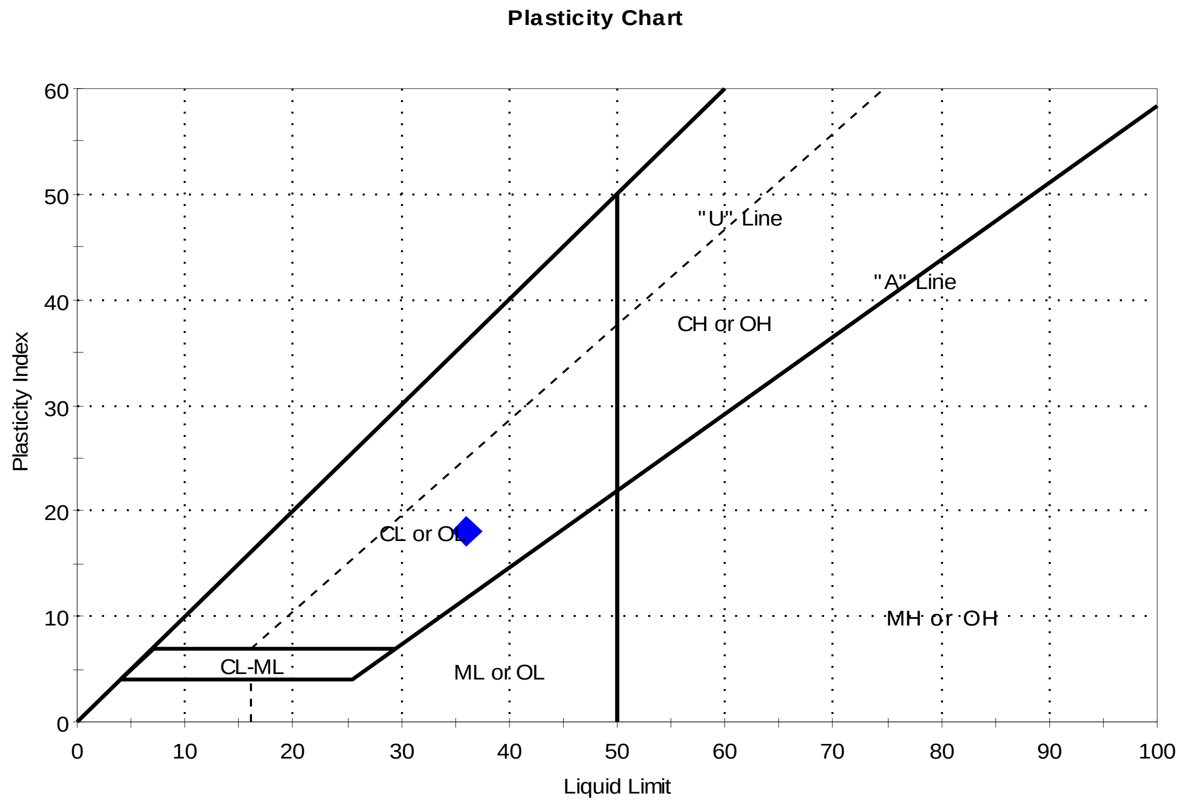
GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 210	Sample Type: jar	Tested By:	GA
Sample ID: 10D	Test Date: 07/20/18	Checked By:	emm
Depth : 65-67 ft	Test Id: 462278		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	10D	B-EXIT45 210	65-67 ft	37	36	18	18	1.1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

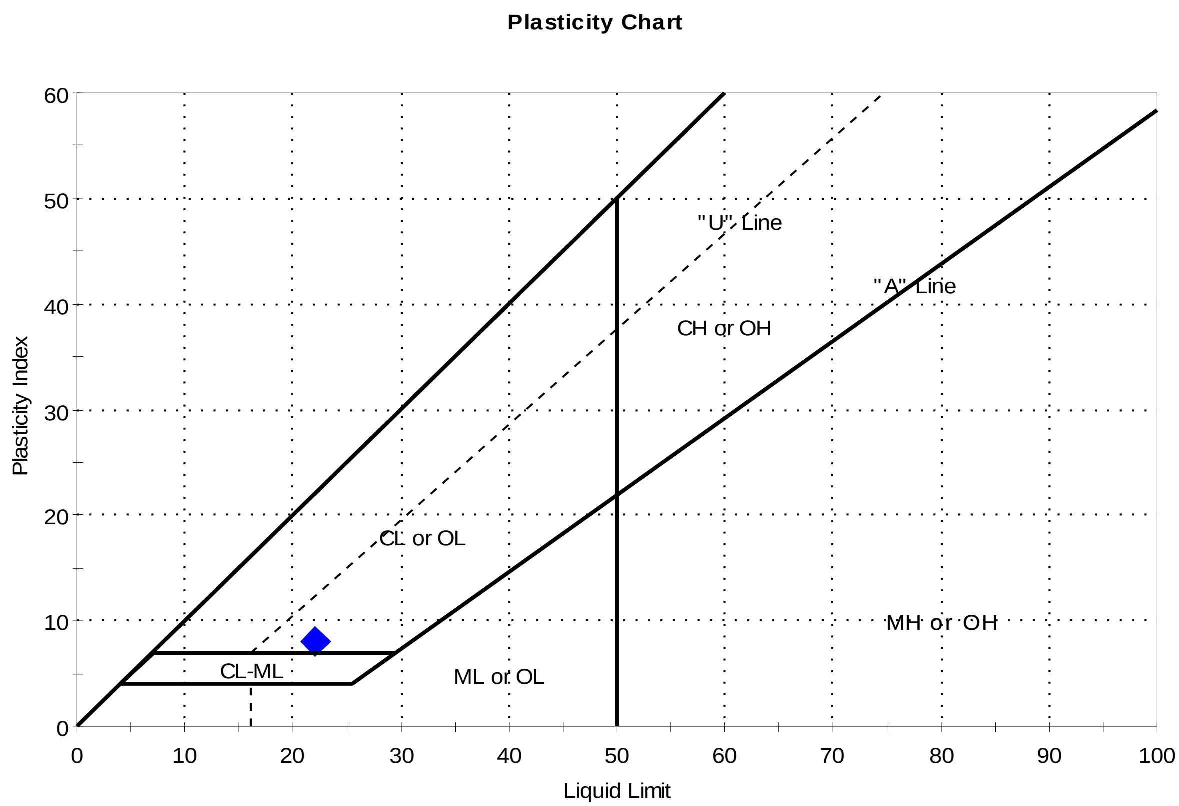
Dilatancy: SLOW

Toughness: MEDIUM

printed 9/20/2018 3:30:01 PM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID:	HB-EXIT45- 211	Sample Type: jar	Tested By: GA
Sample ID:	3D	Test Date: 07/25/18	Checked By: emm
Depth :	10-12 ft	Test Id: 462279	
Test Comment:	---		
Visual Description:	Wet, olive gray sandy clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-EXIT45 211	10-12 ft	26	22	14	8	1.5	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

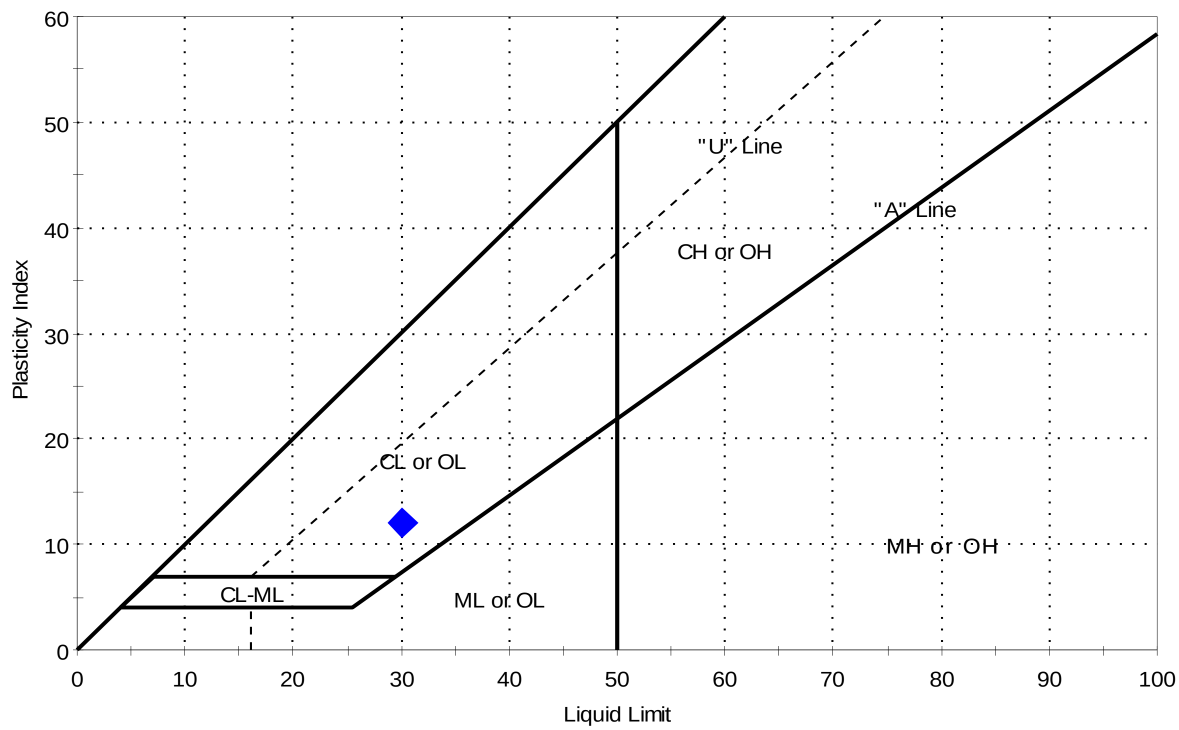
printed 9/20/2018 3:30:02 PM

GeoTesting EXPRESS

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 211	Sample Type:	jar	Tested By:	GA
Sample ID:	5D	Test Date:	07/26/18	Checked By:	emm
Depth :	20-22 ft	Test Id:	462280		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	5D	B-EXIT45 211	20-22 ft	37	30	18	12	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

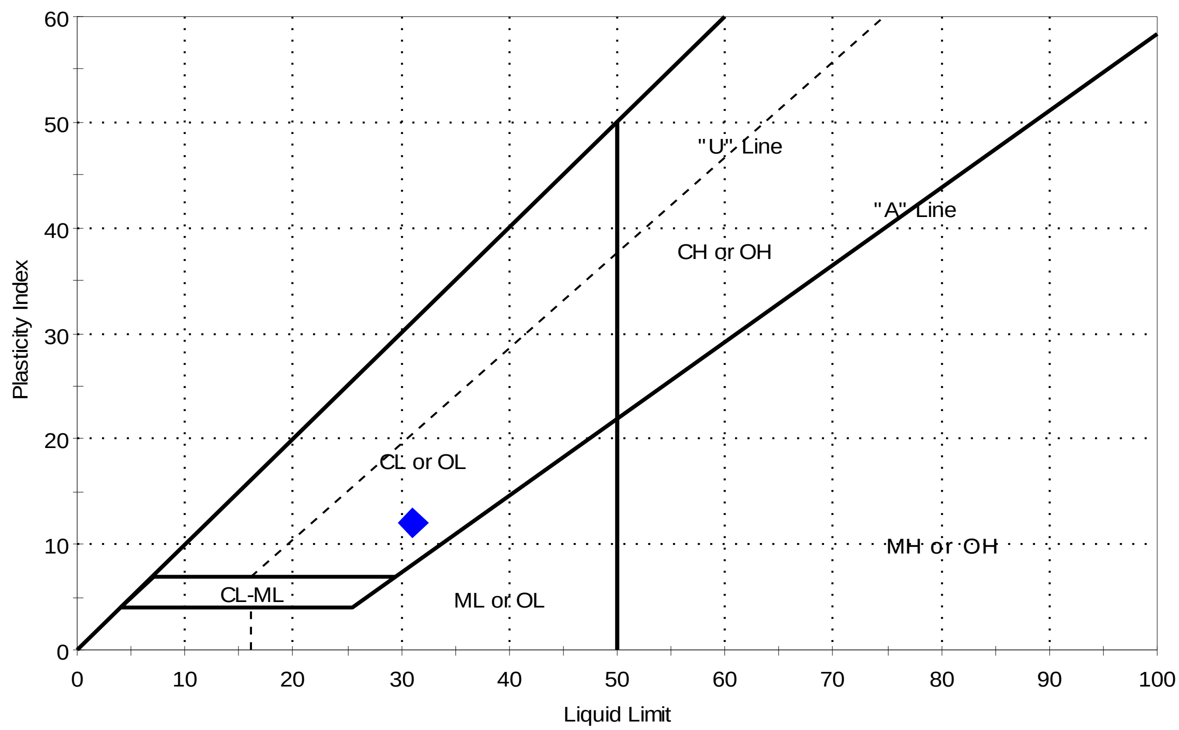
Dilatancy: NONE

Toughness: MEDIUM

printed 9/20/2018 3:30:02 PM

Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID:	HB-EXIT45-211	Sample Type: tube	Tested By: cam
Sample ID:	U1	Test Date: 08/03/18	Checked By: emm
Depth :	37-39 ft	Test Id: 466567	
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	-EXIT45-2	37-39 ft	42	31	19	12	1.9	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

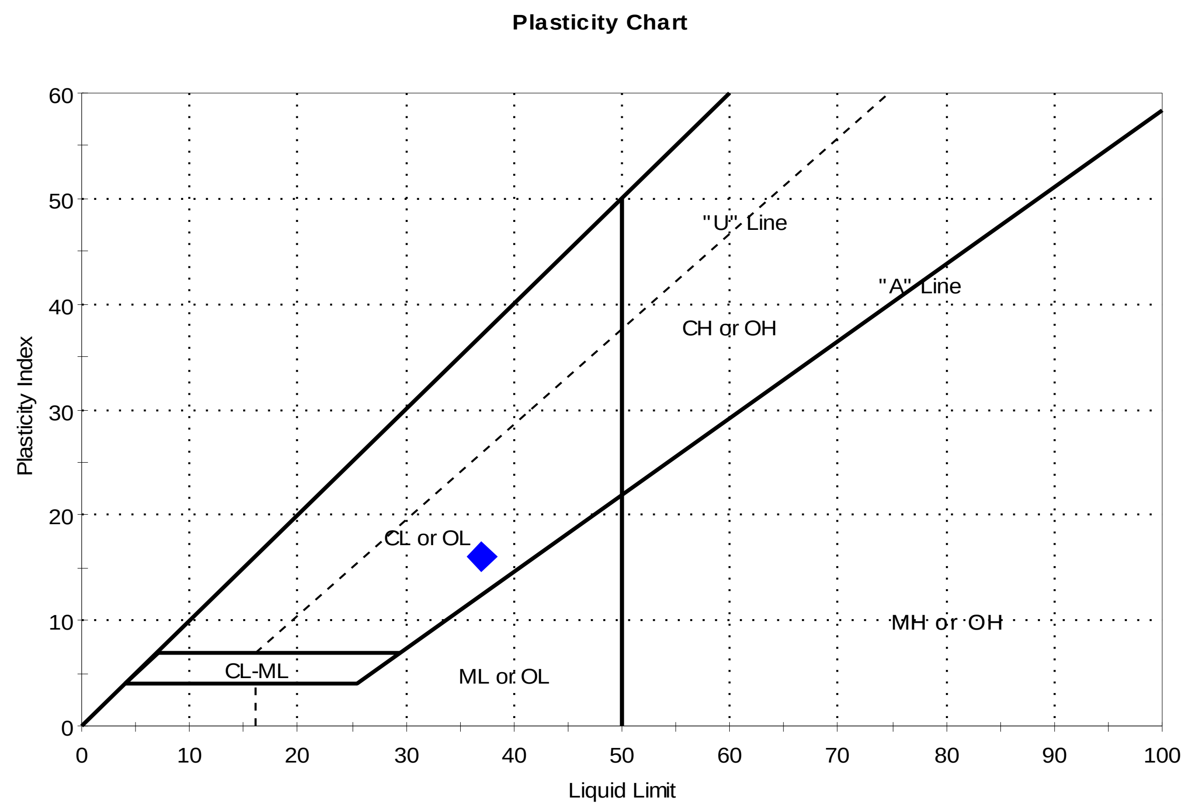
Toughness: LOW

printed 9/20/2018 3:30:02 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45-211	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	08/14/18	Checked By:	emm
Depth :	45-47 ft	Test Id:	466568		

Test Comment:	---
Visual Description:	Wet, dark gray clay
Sample Comment:	---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-2	45-47 ft	47	37	21	16	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

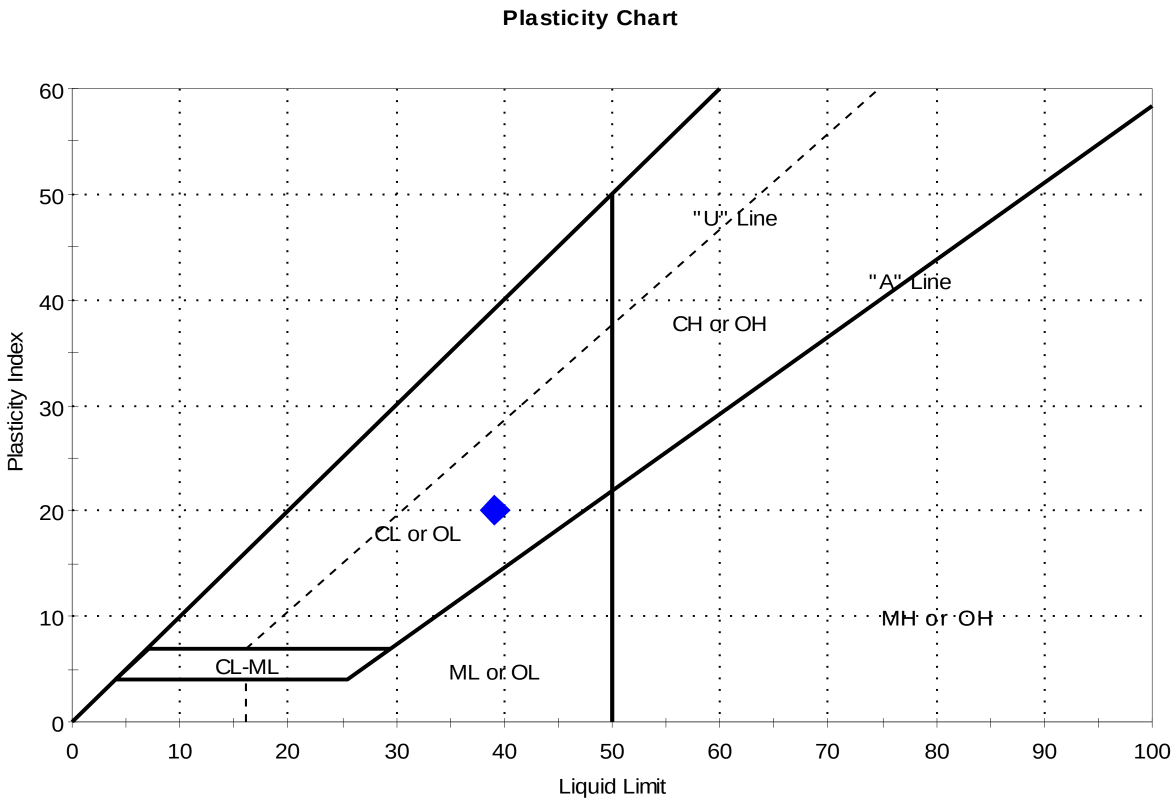
Dilatancy: RAPID

Toughness: LOW

printed 9/20/2018 3:30:03 PM

Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 211	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	07/26/18	Checked By:	emm
Depth :	50-52 ft	Test Id:	462281		
Test Comment:	---				
Visual Description:	Wet, very dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	10D	B-EXIT45 211	50-52 ft	44	39	19	20	1.3	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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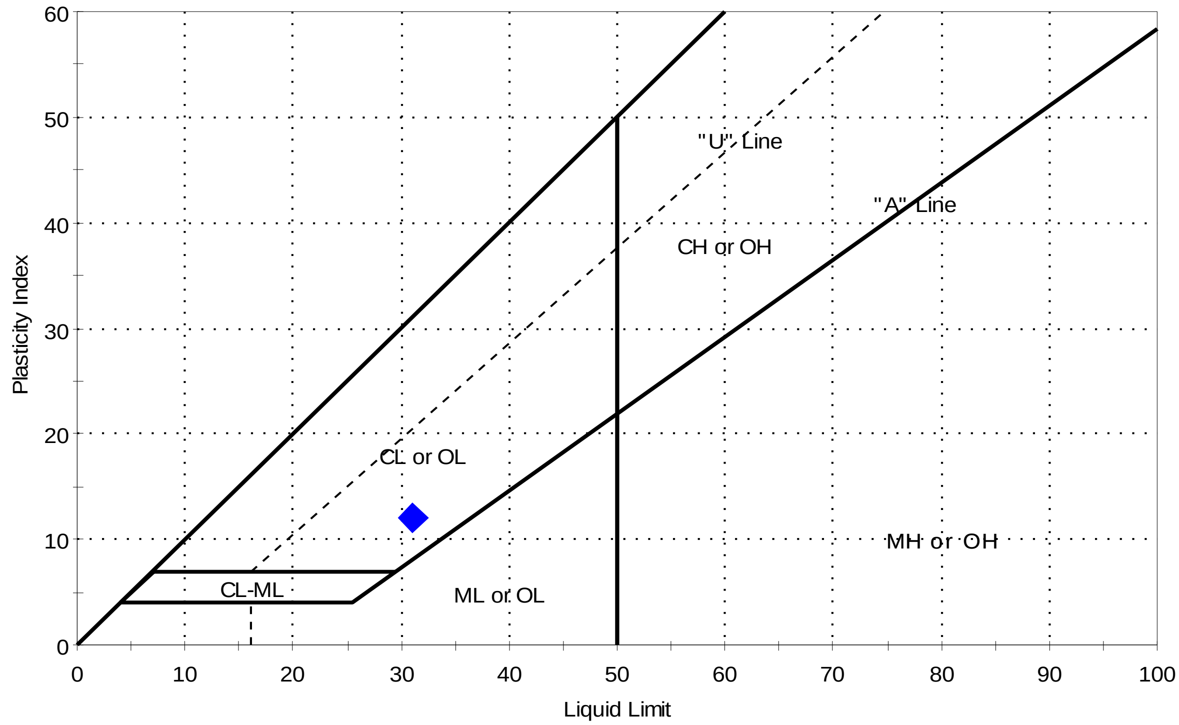
Client:	Schonewald Engineering Associates, Inc.
Project:	MeTPK Exit 45 Reconfiguration
Location:	Phs 2 South Portland, ME
Project No:	GTX-307957
Boring ID:	HB-EXIT45-211
Sample Type:	tube
Tested By:	cam
Sample ID:	U3
Test Date:	08/07/18
Checked By:	emm
Depth :	55-57 ft
Test Id:	466569
Test Comment:	---
Visual Description:	Wet, dark gray clay
Sample Comment:	---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U3	-EXIT45-2	55-57 ft	43	31	19	12	2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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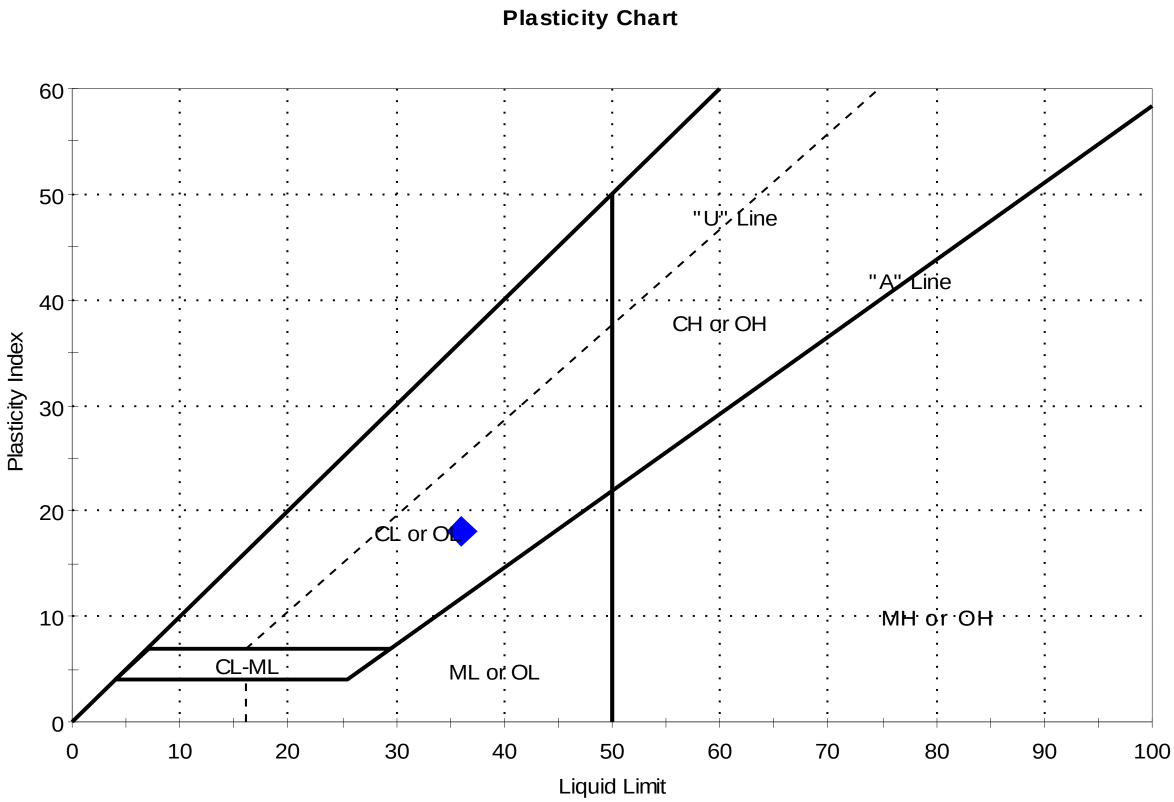
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 212	Sample Type:	jar	Tested By:	GA
Sample ID:	1D	Test Date:	07/19/18	Checked By:	emm
Depth :	2-4 ft	Test Id:	462282		

Test Comment: ---
Visual Description: Moist, olive gray clay
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	1D	B-EXIT45 212	2-4 ft	30	36	18	18	0.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilatancy: NONE
Toughness: MEDIUM

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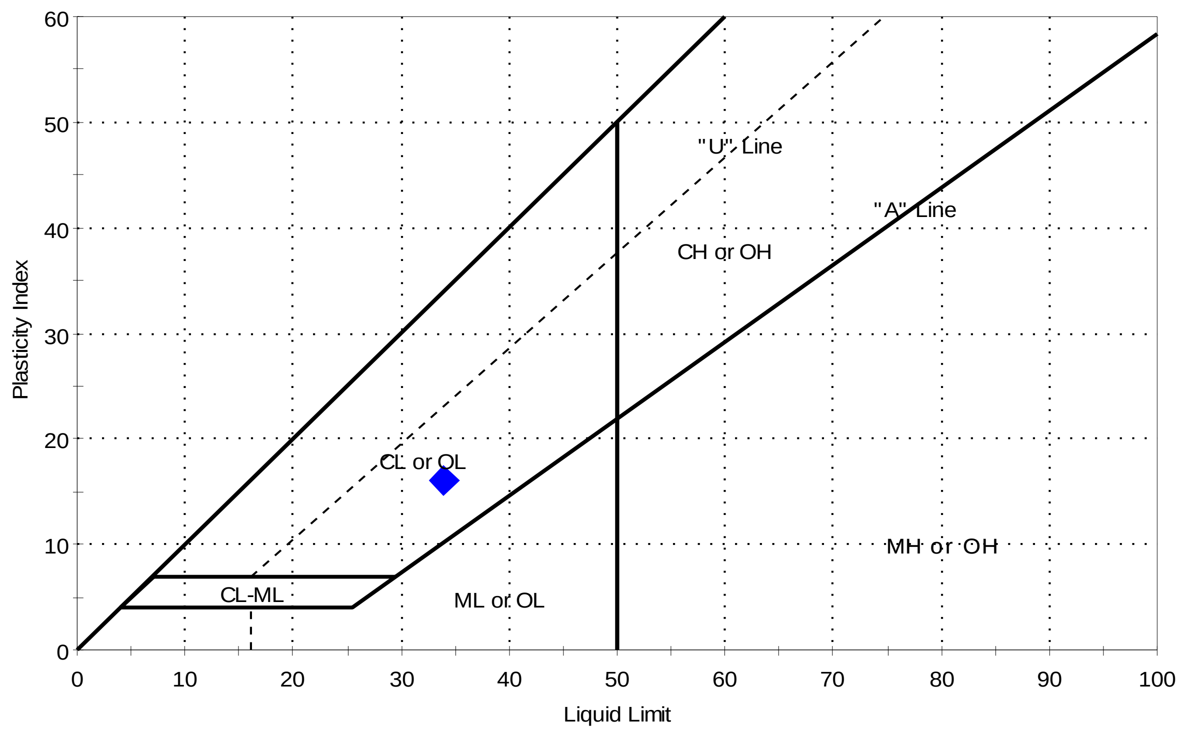
Client:	Schonewald Engineering Associates, Inc.				
Project:	MeTPK Exit 45 Reconfiguration				
Location:	Phs 2 South Portland, ME			Project No:	GTX-307957
Boring ID:	HB-EXIT45- 212	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	07/20/18	Checked By:	emm
Depth :	10-12 ft	Test Id:	462283		
Test Comment:	---				
Visual Description:	Wet, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-EXIT45 212	10-12 ft	40	34	18	16	1.4	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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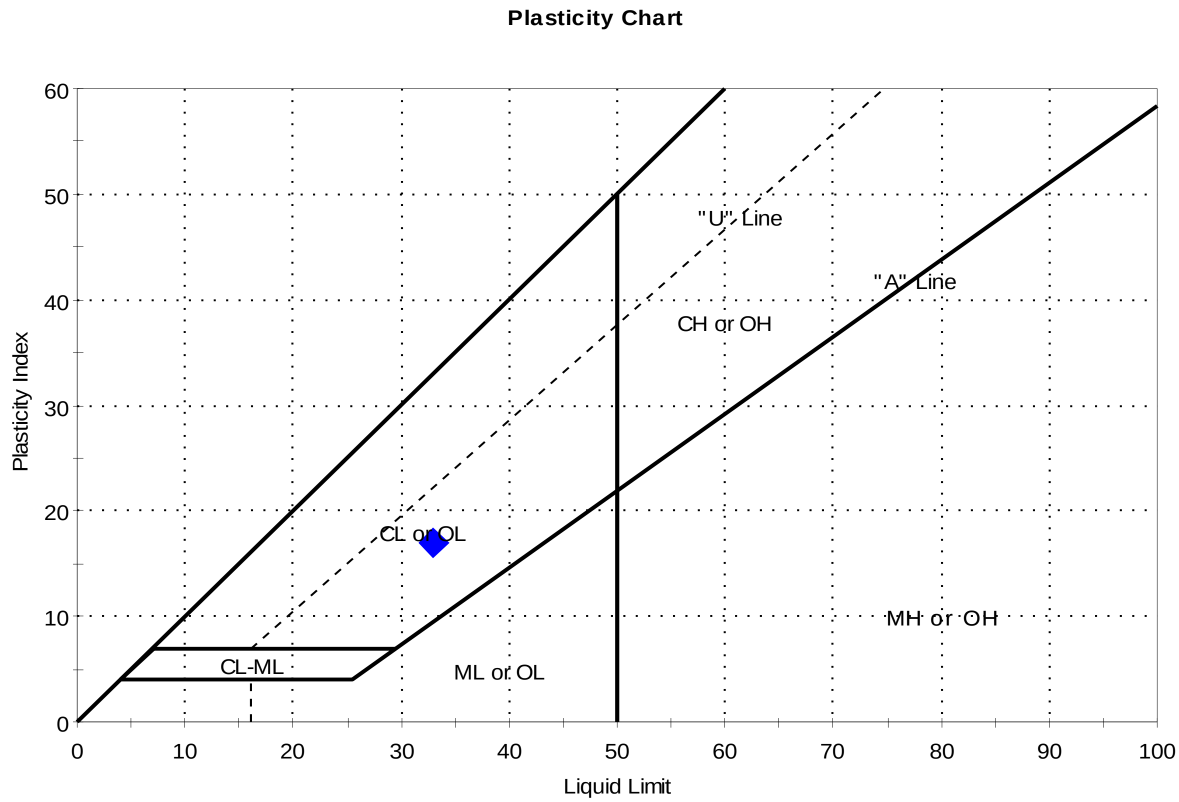
Client:	Schonewald Engineering Associates, Inc.		
Project:	MeTPK Exit 45 Reconfiguration		
Location:	Phs 2 South Portland, ME	Project No:	GTX-307957
Boring ID: HB-EXIT45- 212	Sample Type: jar	Tested By:	GA
Sample ID: 9D	Test Date: 07/26/18	Checked By:	emm
Depth : 70-72 ft	Test Id: 462284		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	9D	B-EXIT45 212	70-72 ft	28	33	16	17	0.7	Lean CLAY (CL)

Sample Prepared using the WET method

1% Retained on #40 Sieve

Dry Strength: VERY HIGH

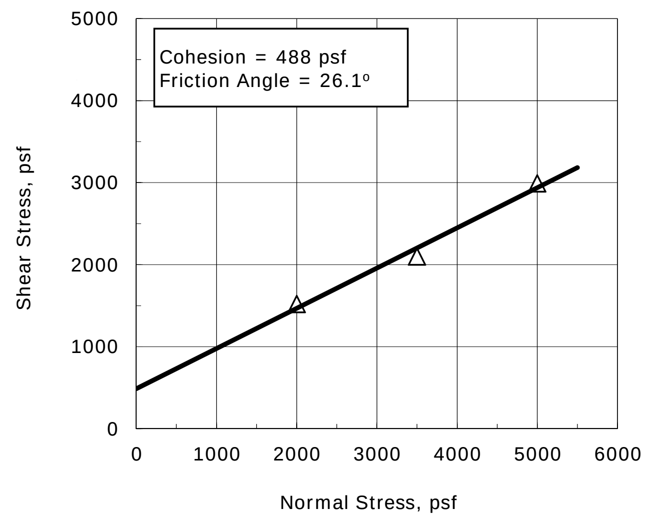
Dilatancy: SLOW

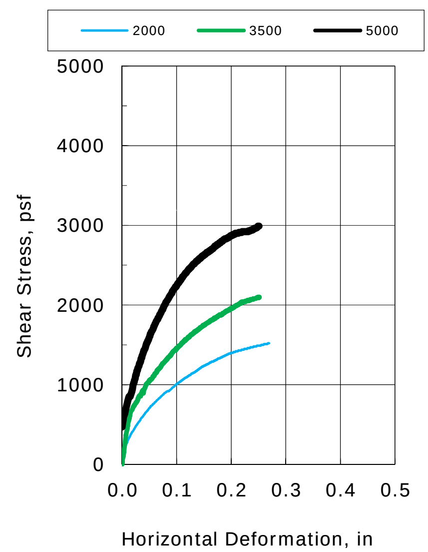
Toughness: MEDIUM

printed 9/20/2018 3:30:06 PM

Client:	Schonewald Engineering Associates, Inc.
Project Name:	MeTPK Exit 45 Reconfiguration
Project Location:	Phs 2 South Portland, ME
GTX #:	307957
Test Date:	08/23/18
Tested By:	md
Checked By:	njh
Boring ID:	HB-EXIT 45-211
Sample ID:	U-2
Depth, ft:	45-47
Visual Description:	Wet, dark gray clay

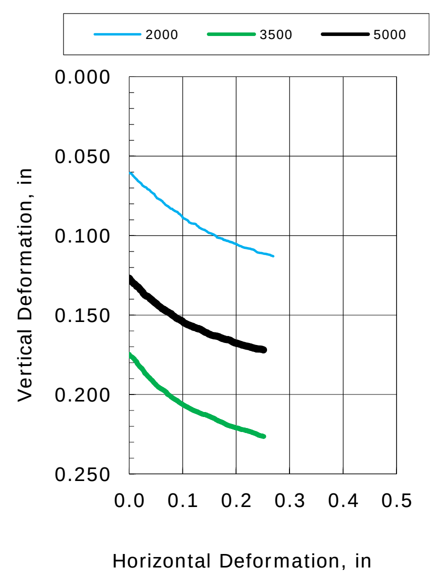
Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D3080





Test No.:	DS-1	DS-2	DS-3
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	134	140	137
Initial Dry Density, pcf:	69.8	74.4	75.1
Initial Moisture Content, %:	48.6	46.5	41.7
Initial Bulk Density, pcf:	103.6	108.9	106.4
Initial Degree of Saturation:	92.6	99.1	90.5
Initial Void Ratio:	1.42	1.27	1.24
Final Dry Density, pcf:	78.7	96.1	90.7
Final Moisture Content, %:	46.5	36.3	28.6
Final Bulk Density, pcf:	115.2	131.0	116.6
Normal Stress, psf:	2000	3500	5000
Maximum Shear Stress, psf:	1520	2100	2990
Shear Rate, in/min:	0.0003	0.0003	0.0003

Sample Type:	intact
Estimated Specific Gravity:	2.70
Liquid Limit:	37
Plastic Limit:	21
Plasticity Index:	16
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---



Notes: Moisture content obtained before shear from sample trimmings
Moisture Content determined by ASTM D2216
Atterberg Limits determined by ASTM D4318
Extruded from tube, cut, trimmed and placed into apparatus at the as-received density and moisture content

Values for cohesion and friction angle determined from best-fit straight line to the data for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

"---" indicates testing required to determine these values was not requested.

Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils by ASTM D6528

Client:	Schonewald Engineering Associates, Inc.	GTX#:	307957
Project Name:	MeTPK Exit 45 Reconfiguration	Test Date:	8/23/18
Project Location:	Phs 2 South Portland, ME		

Boring ID: HB-EXIT 45-209
Sample ID: U-2
Depth, ft: 35-37

Visual Description: Wet, dark gray clay

Test Equipment: Top and bottom box (circular) = 2.50 in diameter. Load cells and LVDT's connected to data acquisition system for shear force, normal load, horizontal and vertical displacement; surface area = 4.91 in^2, soil height = 1 inch. Stacked rings used. Set up included porous stones with pins.

Test Condition: Inundated prior to consolidation

Sample Type and Preparation: density — Extruded from tube, cut, trimmed and placed into apparatus at as-received and moisture content.

Parameter	Point 1	Point 2	Point 3	Point 4	Point 5
Test No.	DSS-1	DSS-2			
Initial Moisture Content, %	37.2	30.3			
Initial Dry Density, pcf	81.0	81.2			
Nominal Rate of Shear Strain, %/hr	5.0	5.0			
Vertical Consolidation Stress, psf	2,200	2,845			
Vertical Consolidation Stress at Shear, psf	2,200	2,032			
Final Moisture Content, %	34.4	37.7			
Measured Peak Shear Stress, psf	248.7	430.5			
Shear Strain at Peak Shear Stress, %	6.3	4.4			
Membrane Correction, psf	50	33			
Corrected Peak Shear Stress, psf	198.7	397.5			
S_u / σ'_{vc}	0.09	0.20			

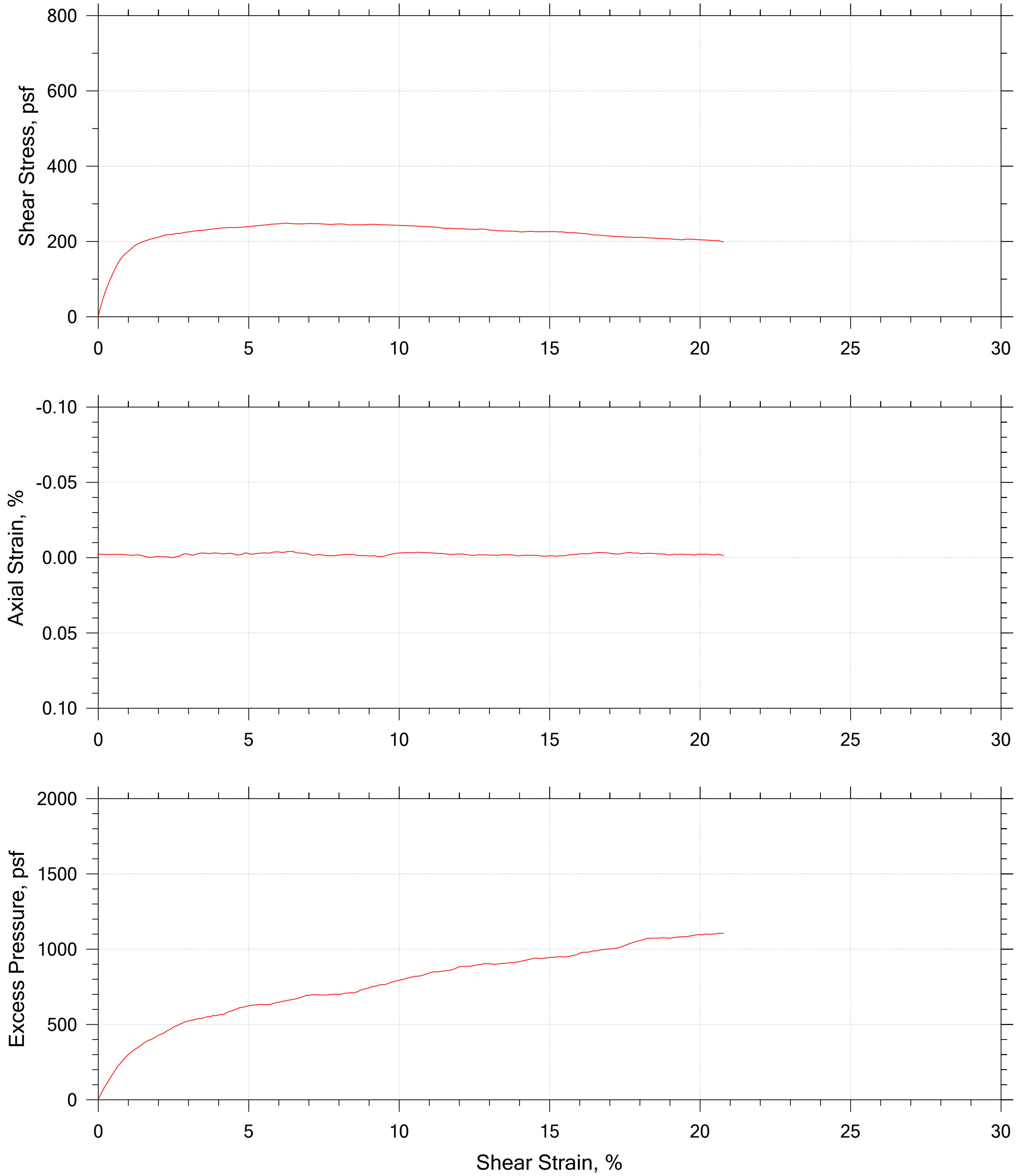
Comments:

Tested By: md

Checked By: njh

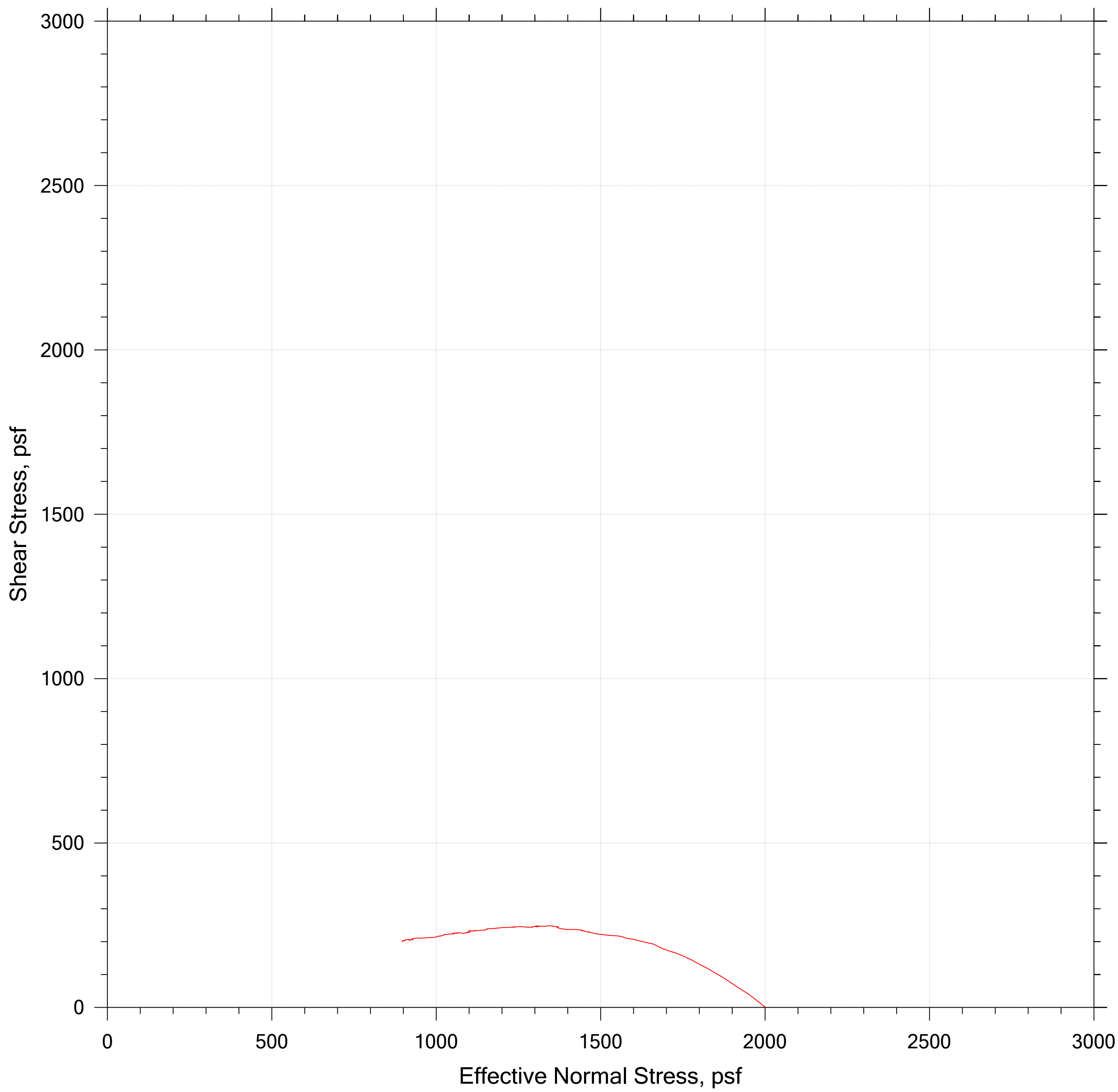
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



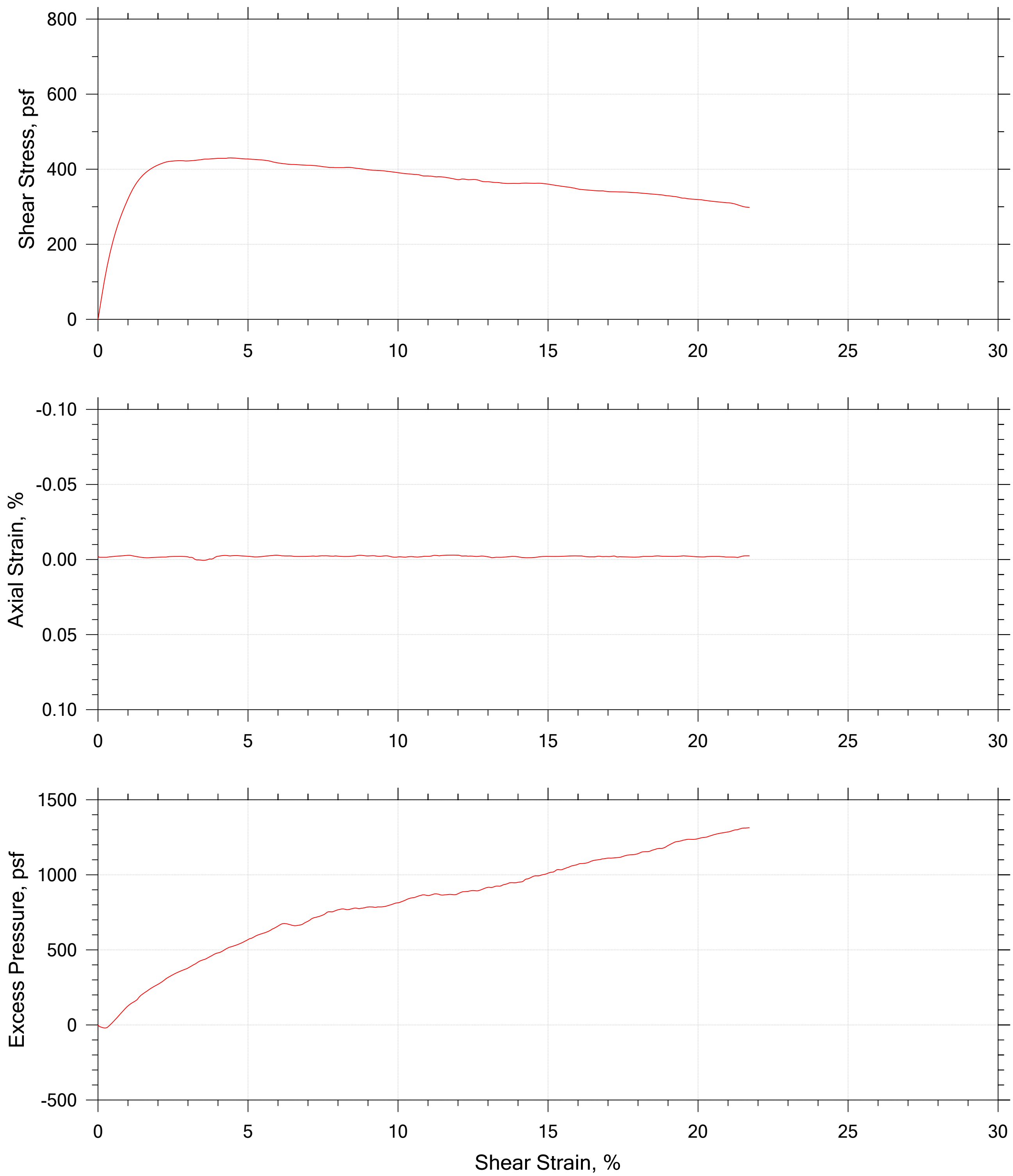
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/14/18	Depth: 35-37 ft
	Test No.: DSS-1	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



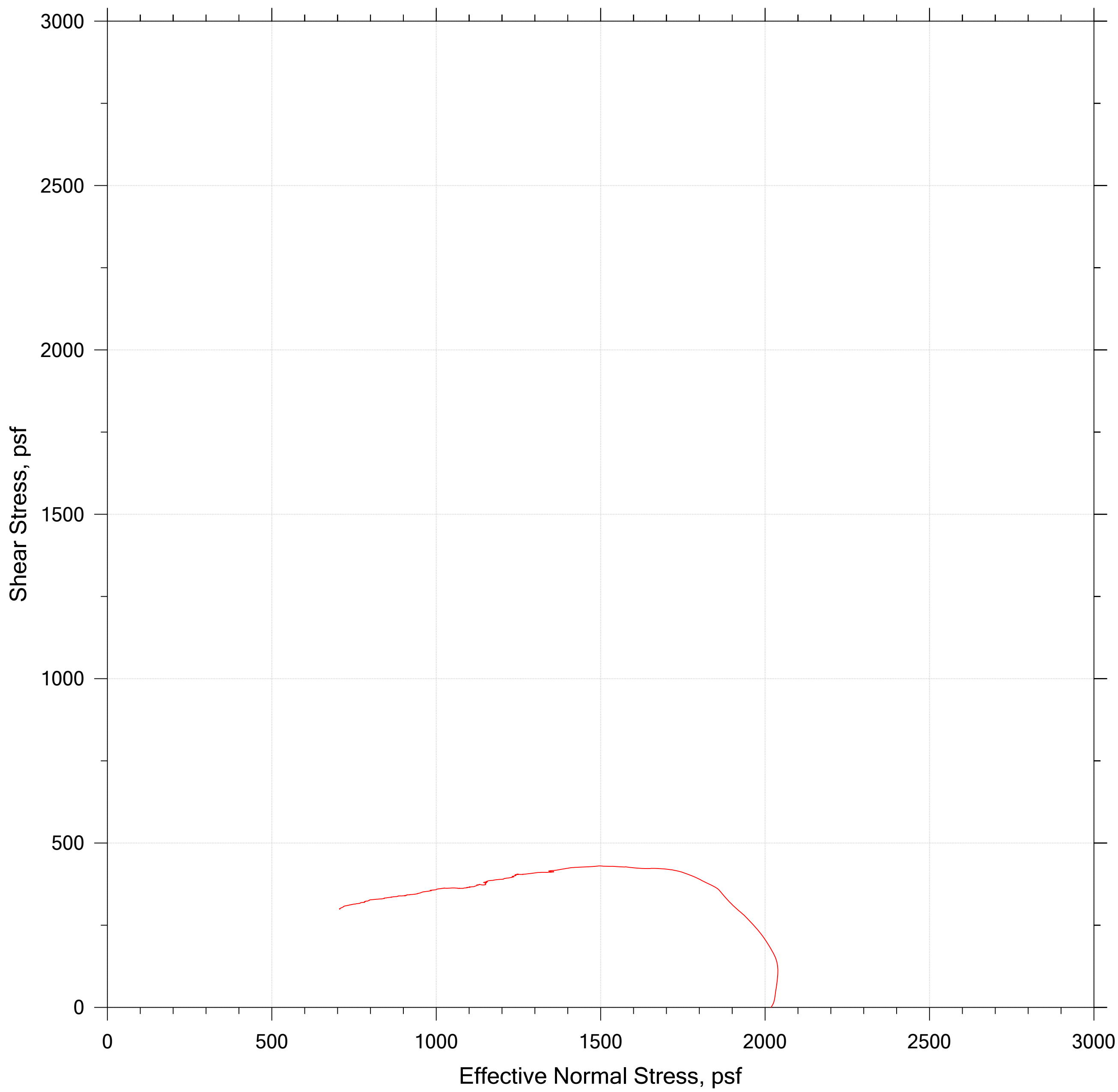
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/14/18	Depth: 35-37 ft
	Test No.: DSS-1	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
Sample No.: U-2	Test Date: 08/14/18	Depth: 35-37 ft
Test No.: DSS-2	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System HH		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/14/18	Depth: 35-37 ft
	Test No.: DSS-2	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System HH		

Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils by ASTM D6528

Client:	Schonewald Engineering Associates, Inc.	GTX#:	307957
Project Name:	MeTPK Exit 45 Reconfiguration	Test Date:	8/31/18
Project Location:	Phs 2 South Portland, ME		

Boring ID: HB-EXIT 45-209
Sample ID: U-2
Depth, ft: 35-37

Visual Description: Wet, dark gray clay

Test Equipment: Top and bottom box (circular) = 2.50 in diameter. Load cells and LVDT's connected to data acquisition system for shear force, normal load, horizontal and vertical displacement; surface area = 4.91 in^2, soil height = 1 inch. Stacked rings used. Set up included porous stones with pins.

Test Condition: Inundated prior to consolidation

Sample Type and Preparation: density — Extruded from tube, cut, trimmed and placed into apparatus at as-received and moisture content.

Parameter	Point 1	Point 2	Point 3	Point 4	Point 5
Test No.	DSS-5				
Initial Moisture Content, %	30.3				
Initial Dry Density, pcf	82.7				
Nominal Rate of Shear Strain, %/hr	5.0				
Vertical Consolidation Stress, psf	4,064				
Vertical Consolidation Stress at Shear, psf	2,032				
Final Moisture Content, %	38.5				
Measured Peak Shear Stress, psf	442				
Shear Strain at Peak Shear Stress, %	3.3				
Membrane Correction, psf	28				
Corrected Peak Shear Stress, psf	414				
S_u / σ'_{vc}	0.20				

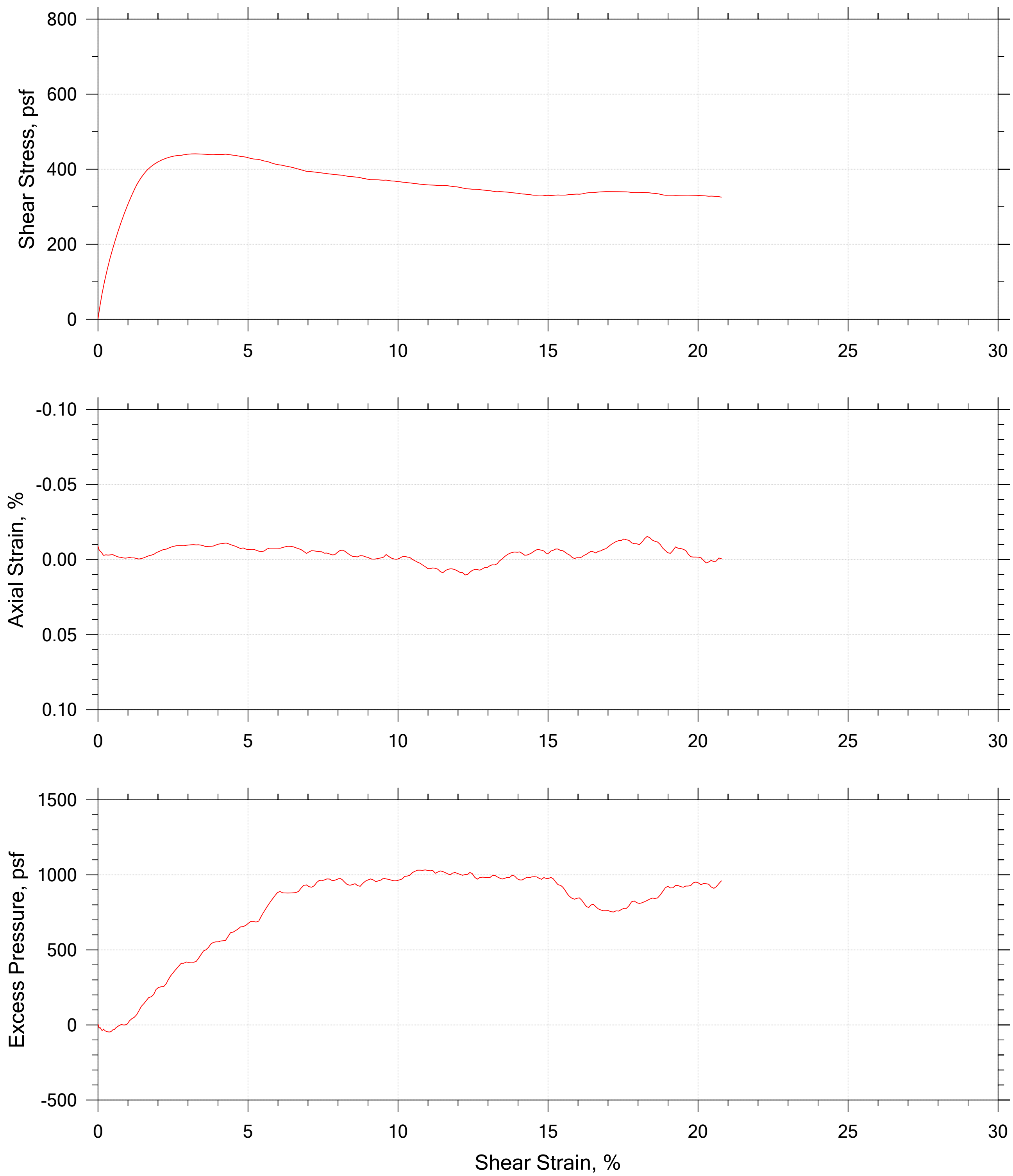
Comments:

Tested By: md

Checked By: njh

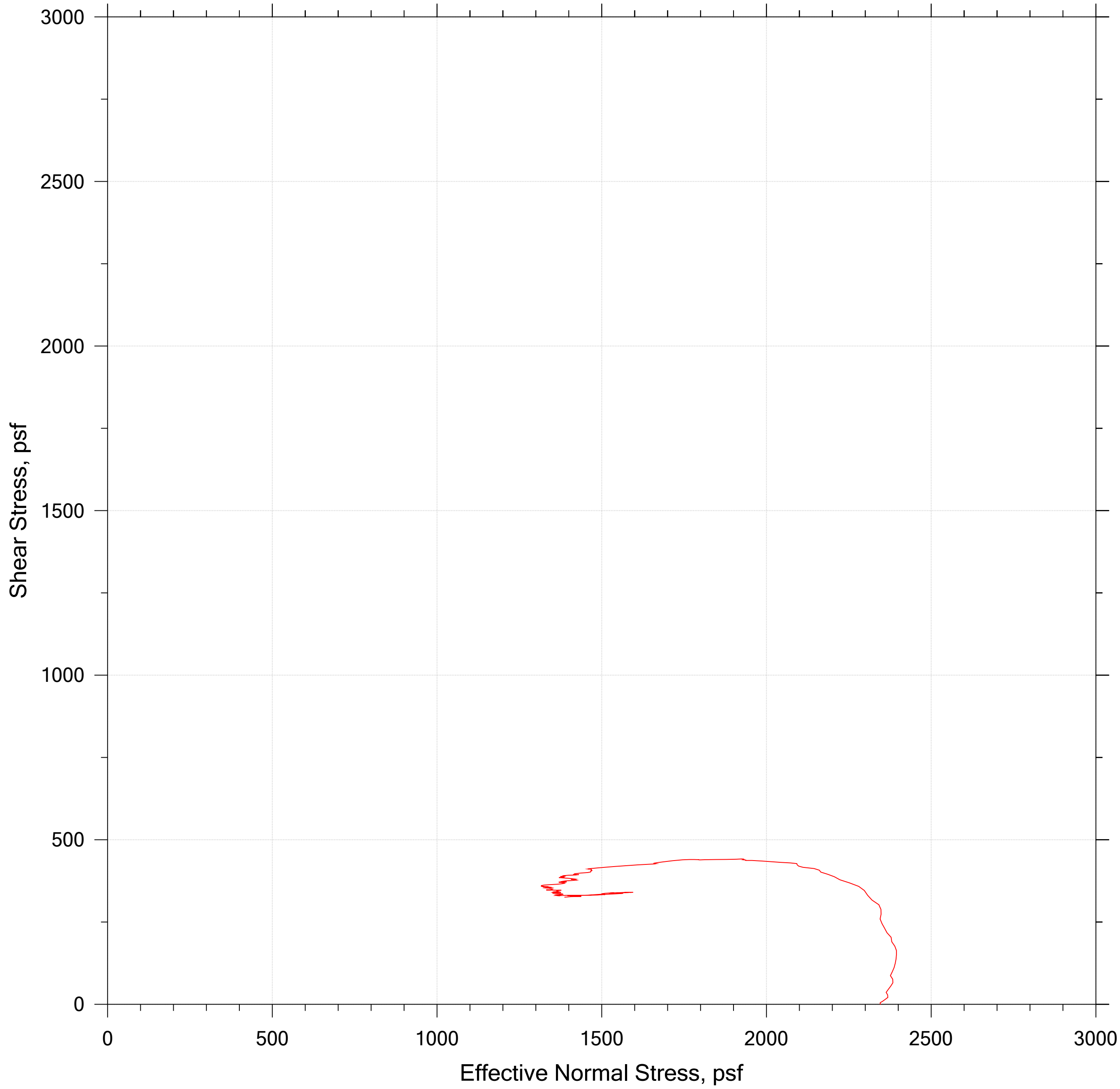
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/31/18	Depth: 35-37 ft
	Test No.: DSS-5	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System HH		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-209	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/31/18	Depth: 35-37 ft
	Test No.: DSS-5	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System HH		

GeoTesting EXPRESS

Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils by ASTM D6528

Client:	Schonewald Engineering Associates, Inc.	GTX#:	307957
Project Name:	MeTPK Exit 45 Reconfiguration	Test Date:	8/15/18
Project Location:	Phs 2 South Portland, ME		

Boring ID: HB-EXIT 45-210
Sample ID: U-2
Depth, ft: 40-42

Visual Description: Wet, dark gray clay

Test Equipment: Top and bottom box (circular) = 2.50 in diameter. Load cells and LVDT's connected to data acquisition system for shear force, normal load, horizontal and vertical displacement; surface area = 4.91 in^2, soil height = 1 inch. Stacked rings used. Set up included porous stones with pins.

Test Condition: Inundated prior to consolidation

Sample Type and Preparation: density — Extruded from tube, cut, trimmed and placed into apparatus at as-received and moisture content.

Parameter	Point 1	Point 2	Point 3	Point 4	Point 5
Test No.	DSS-3	DSS-4			
Initial Moisture Content, %	36.3	44.3			
Initial Dry Density, pcf	85.3	73.1			
Nominal Rate of Shear Strain, %/hr	5.0	5.0			
Vertical Consolidation Stress, psf	2,500	3,150			
Vertical Consolidation Stress at Shear, psf	2,500	2,250			
Final Moisture Content, %	27.4	33.9			
Measured Peak Shear Stress, psf	605.9	510.1			
Shear Strain at Peak Shear Stress, %	15.0	9.5			
Membrane Correction, psf	59	60			
Corrected Peak Shear Stress, psf	546.9	450.1			
S_u / σ'_{vc}	0.22	0.20			

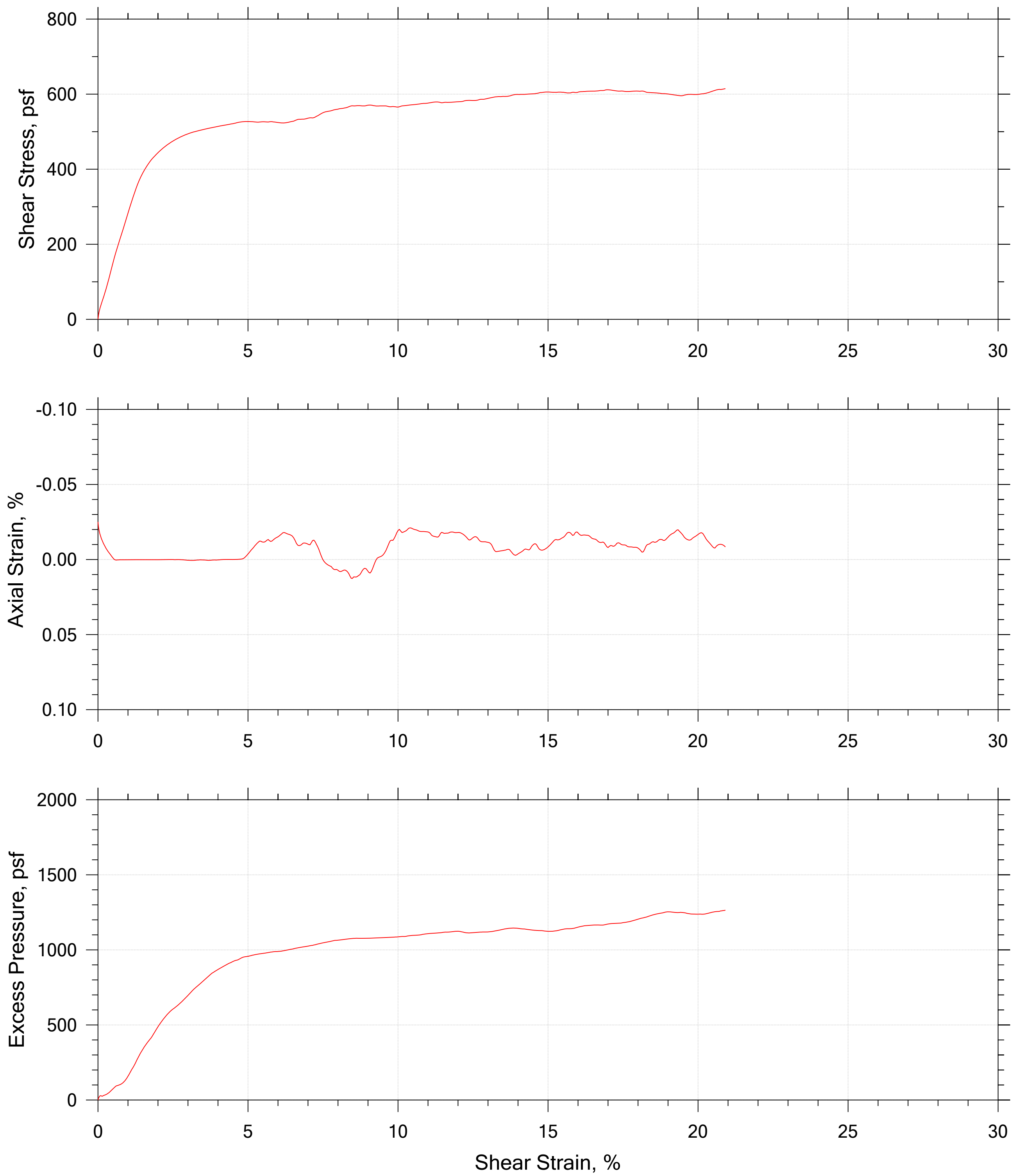
Comments:

Tested By: md

Checked By: njh

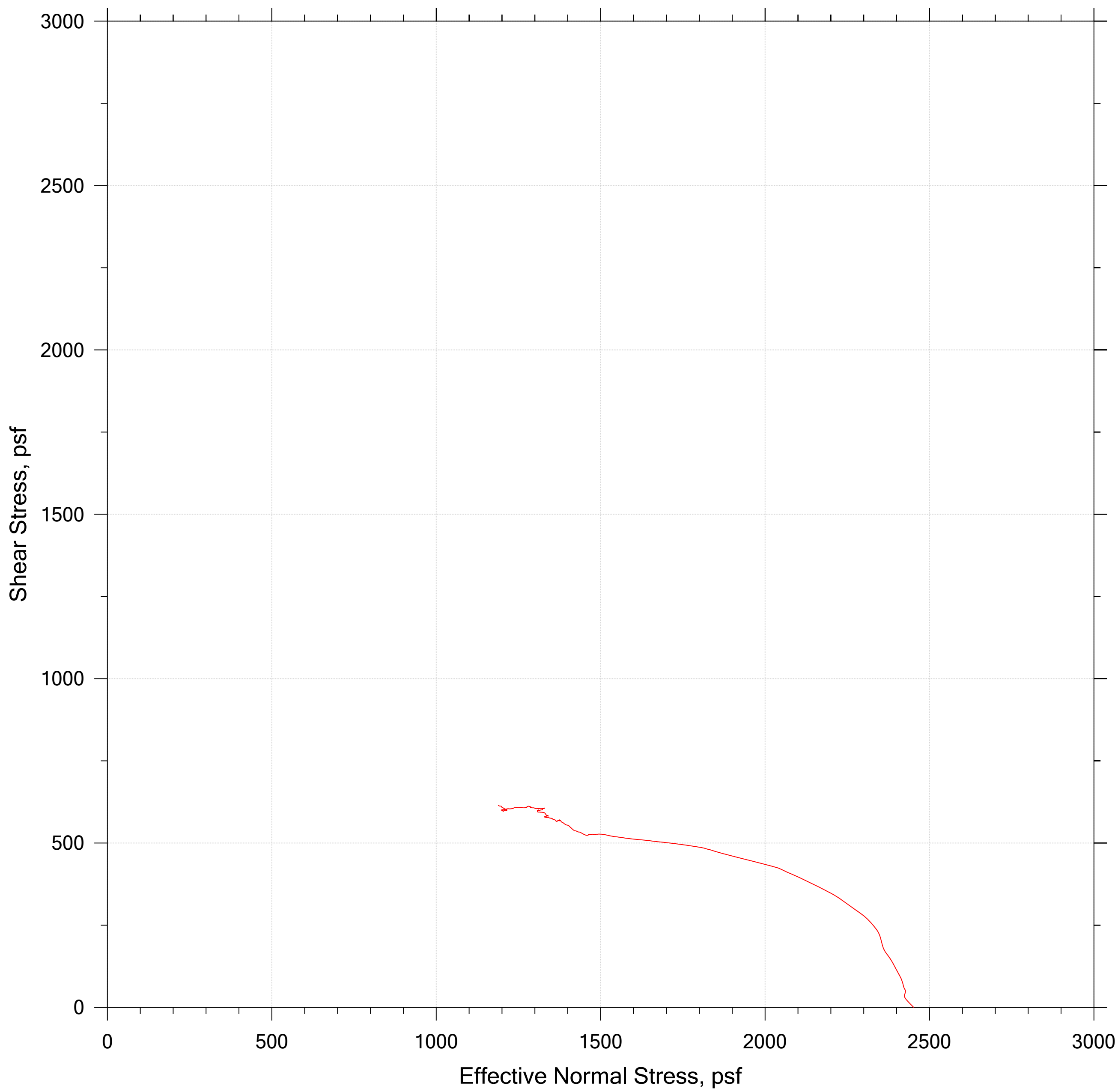
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



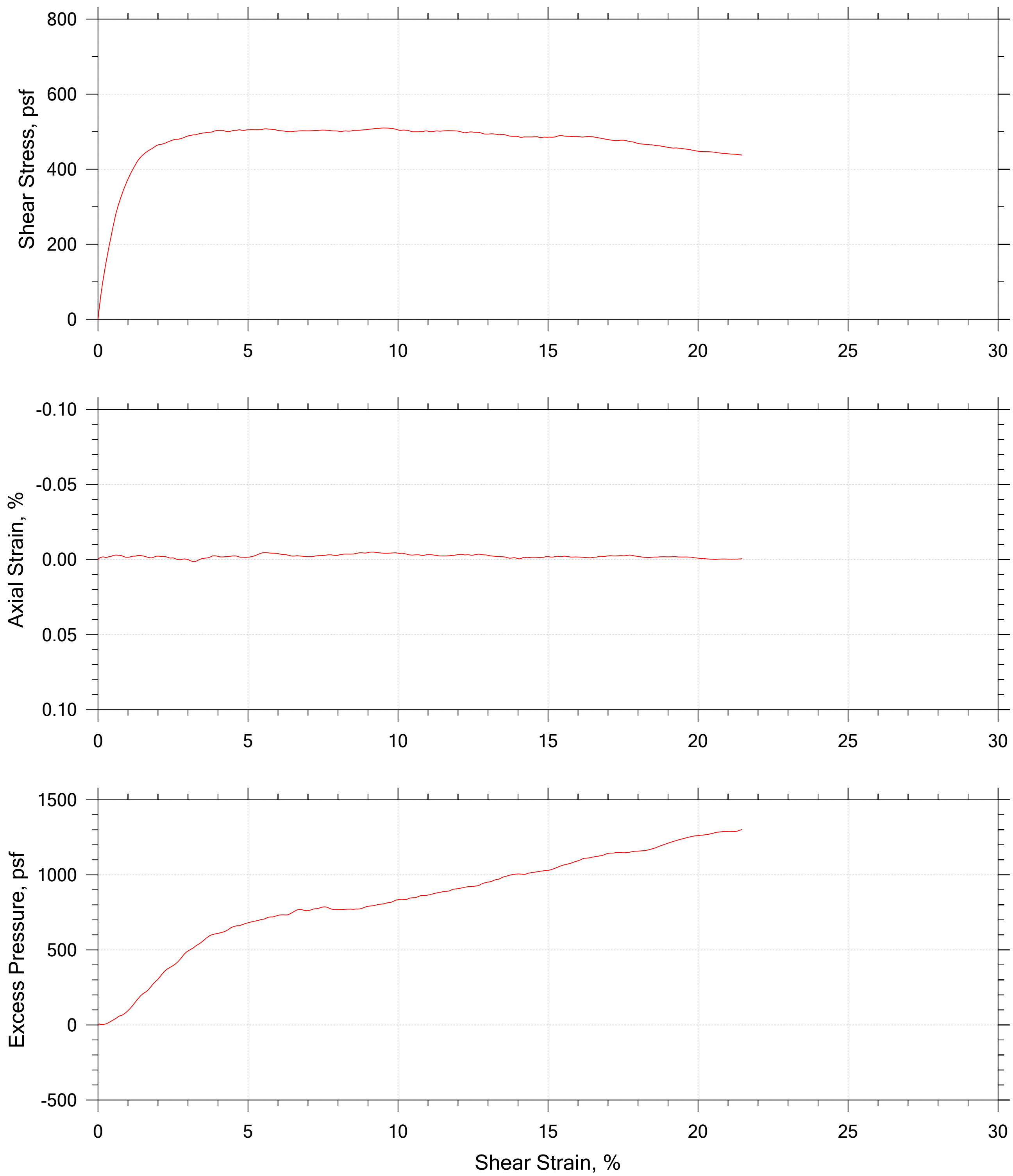
GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/15/18	Depth: 40-42 ft
	Test No.: DSS-3	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System HH		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



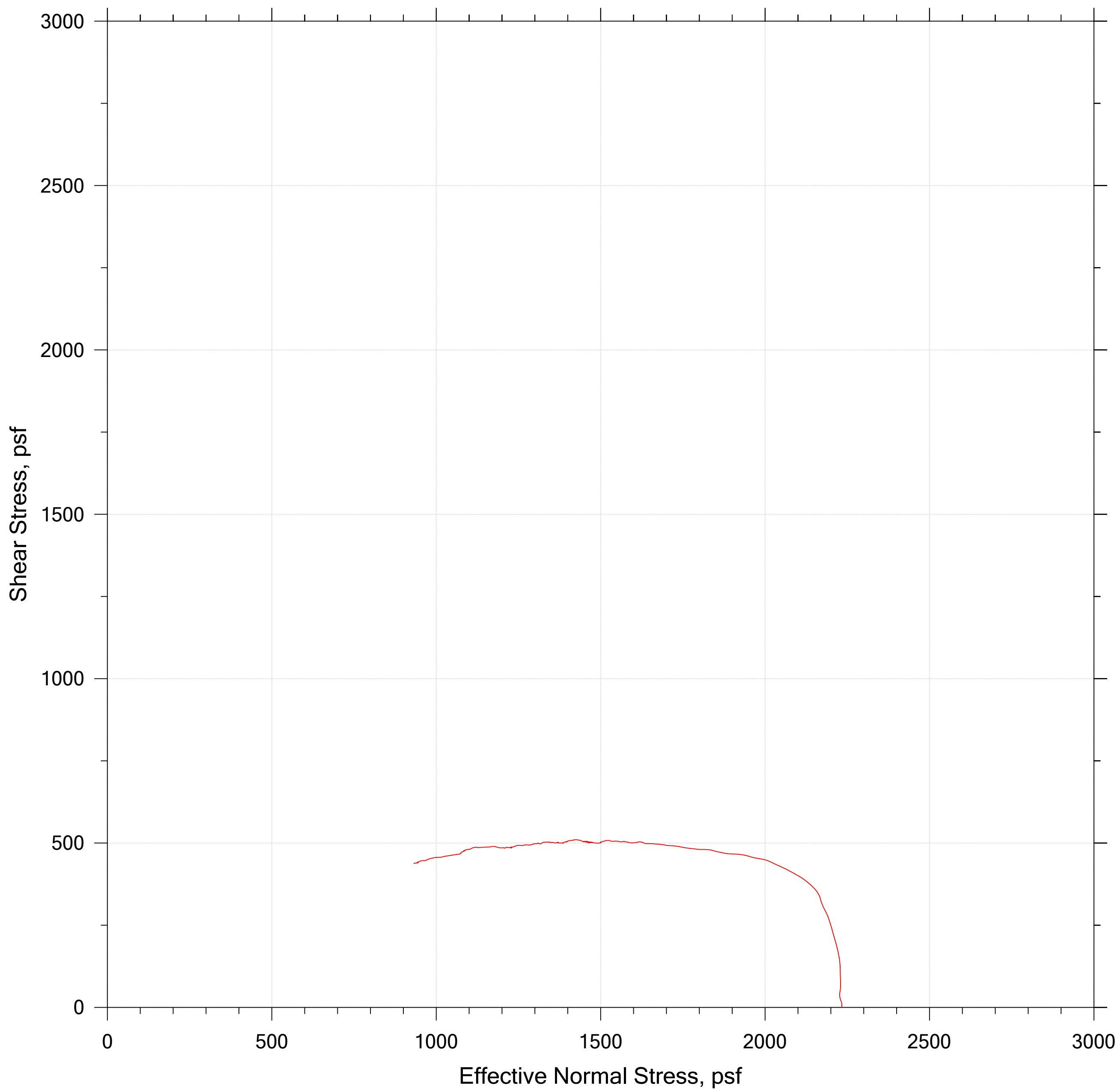
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/15/18	Depth: 40-42 ft
	Test No.: DSS-3	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System HH		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/15/18	Depth: 40-42 ft
	Test No.: DSS-4	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 08/15/18	Depth: 40-42 ft
	Test No.: DSS-4	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

GeoTesting EXPRESS

Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils by ASTM D6528

Client: Schonewald Engineering Associates, Inc. GTX#: 307957
Project Name: MeTPK Exit 45 Reconfiguration Test Date: 9/4/18
Project Location: Phs 2 South Portland, ME

Boring ID: HB-EXIT 45-210
Sample ID: U-2
Depth, ft: 40-42

Visual Description: Wet, dark gray clay

Test Equipment: Top and bottom box (circular) = 2.50 in diameter. Load cells and LVDT's connected to data acquisition system for shear force, normal load, horizontal and vertical displacement; surface area = 4.91 in^2, soil height = 1 inch. Stacked rings used. Set up included porous stones with pins.

Test Condition: Inundated prior to consolidation

Sample Type and Preparation: density Extruded from tube, cut, trimmed and placed into apparatus at as-received and moisture content.

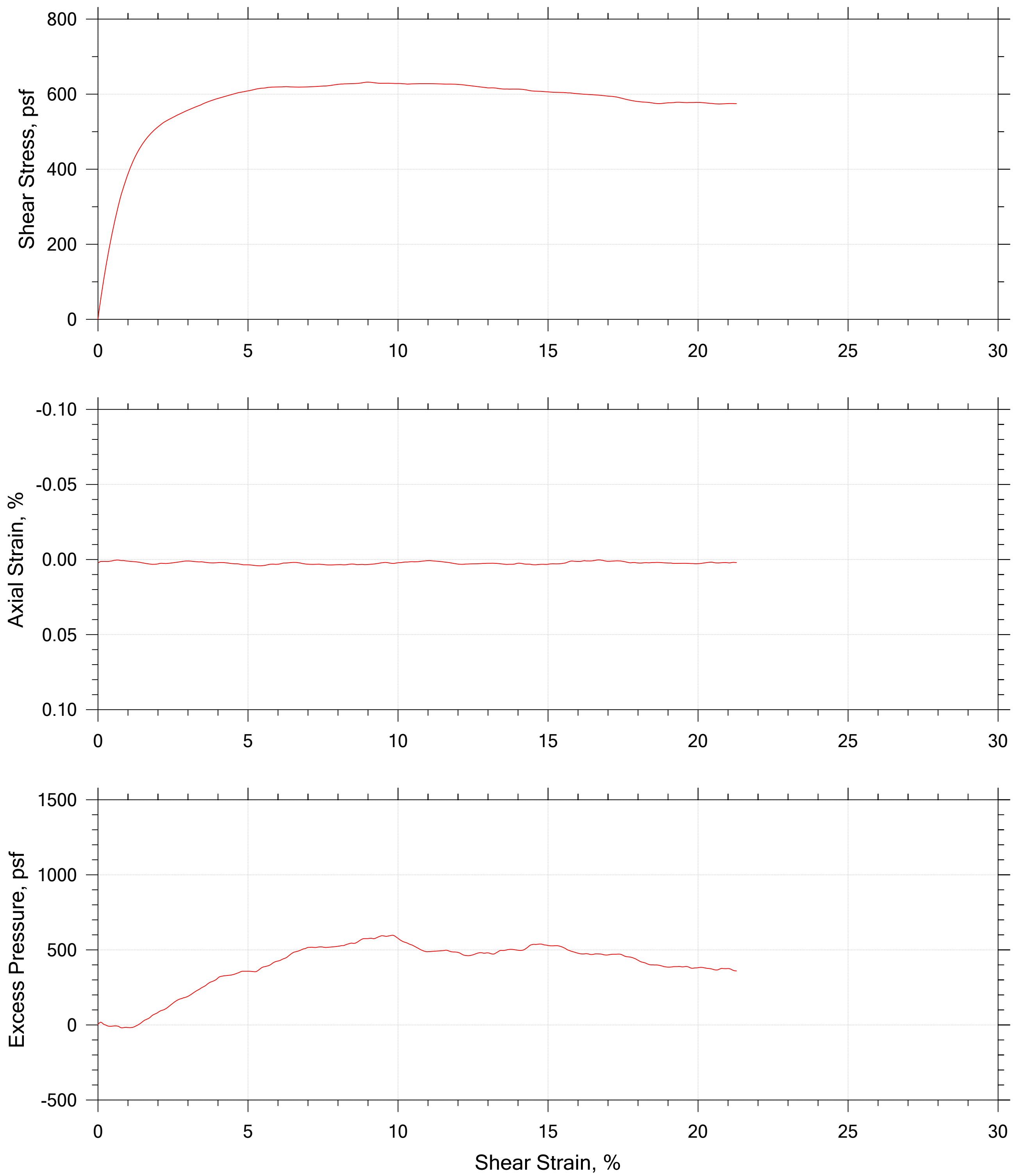
Parameter	Point 1	Point 2	Point 3	Point 4	Point 5
Test No.	DSS-7				
Initial Moisture Content, %	38.5				
Initial Dry Density, pcf	75.4				
Nominal Rate of Shear Strain, %/hr	5.0				
Vertical Consolidation Stress, psf	4,500				
Vertical Consolidation Stress at Shear, psf	2,250				
Final Moisture Content, %	36.3				
Measured Peak Shear Stress, psf	628				
Shear Strain at Peak Shear Stress, %	10.1				
Membrane Correction, psf	61				
Corrected Peak Shear Stress, psf	567				
S_u / σ'_{vc}	0.25				

Comments:

Tested By: md Checked By: njh

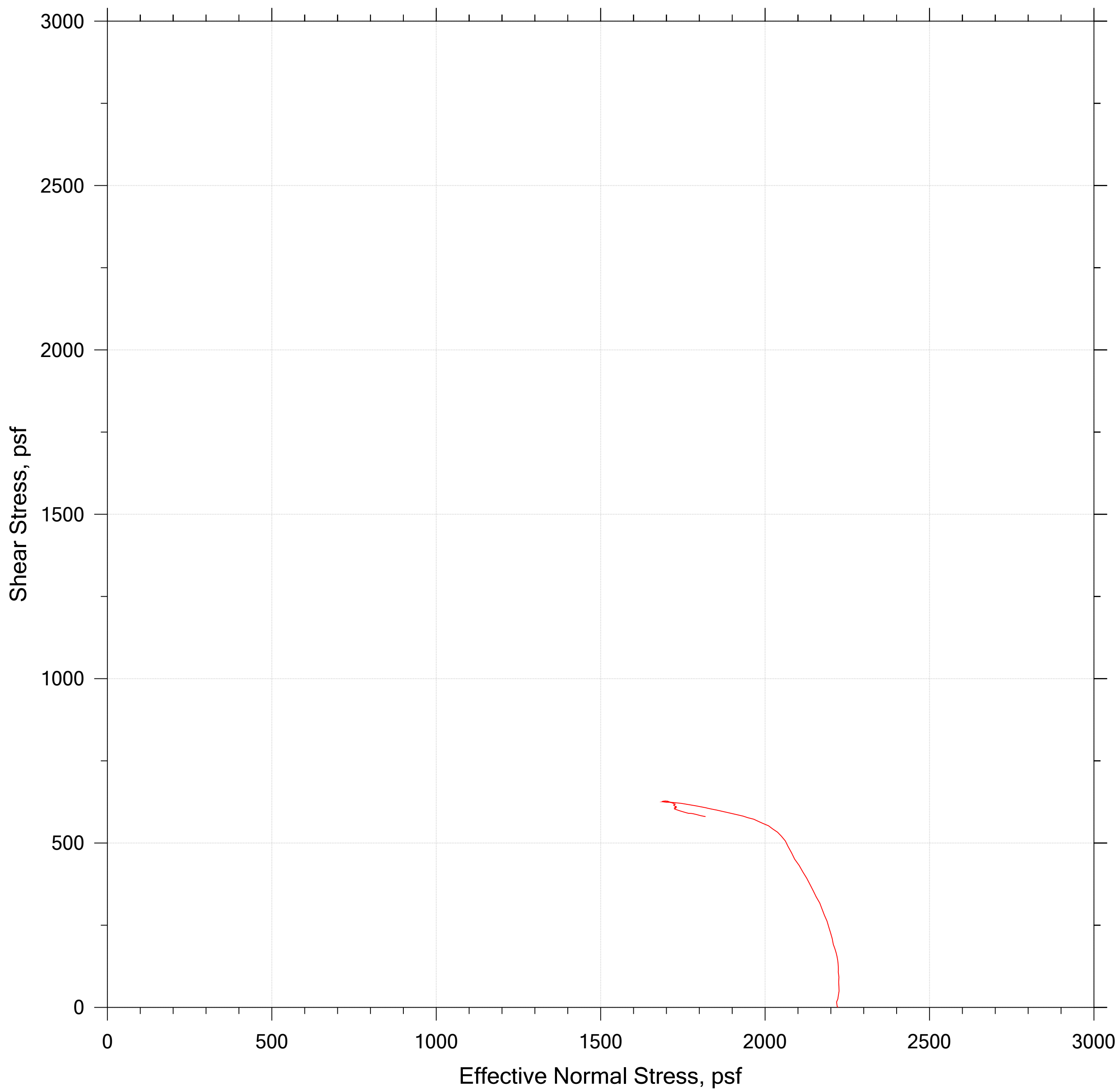
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

DIRECT SIMPLE SHEAR TEST
by ASTM D6528



GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 09/04/18	Depth: 40-42 ft
	Test No.: DSS-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

DIRECT SIMPLE SHEAR TEST
by ASTM D6528

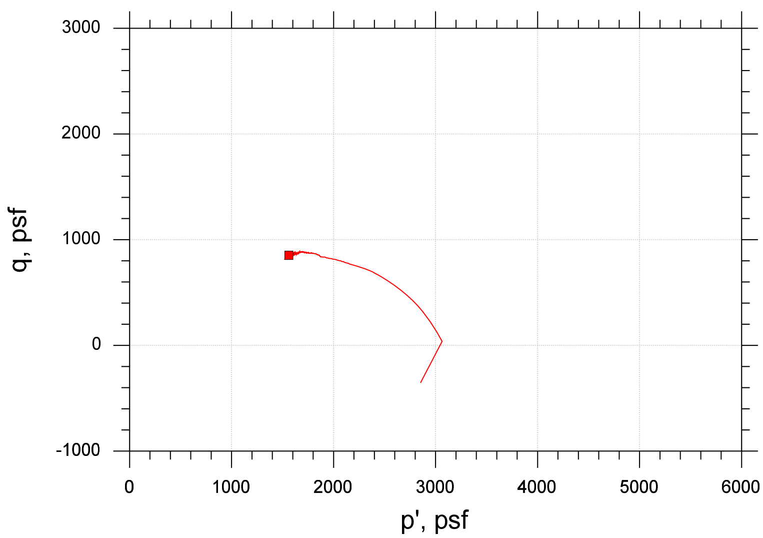


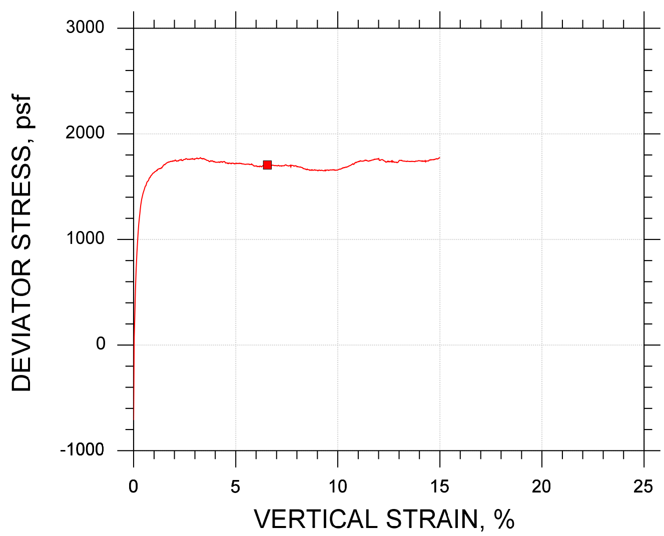
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-210	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 09/04/18	Depth: 40-42 ft
	Test No.: DSS-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System GG		

GeoTesting EXPRESS

Client: Schonewald Engineering Associates, Inc.	
Project Name: MeTPK Exit 45 Reconfiguration	
Project Location: Phs 2 South Portland, ME	
Project Number: GTX-307957	
Tested By: md	Checked By: njh
Boring ID: HB-EXIT 45-208	
Preparation: intact	
Description: Wet, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 27	Plastic Limit: 16
Plasticity Index: 11	Estimated Specific Gravity: 2.7

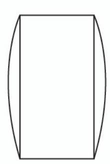
CONSOLIDATED UNDRAINED TRIAXIAL TEST





Symbol		■			
Sample ID		U2			
Depth, ft		40-42 ft			
Test Number		CKOU-2-1			
Initial	Height, in	4.470			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	34.8			
	Dry Density, pcf	85.6			
	Saturation (Wet Method), %	97.1			
	Void Ratio	0.968			
Before Shear	Moisture Content, %	34.3			
	Dry Density, pcf	87.6			
	Cross-sectional Area (Method A), in²	2.930			
	Saturation, %	100.0			
	Void Ratio	0.925			
	Back Pressure, psf	2.200e+004			
Vertical Effective Consolidation Stress, psf		2467.			
Horizontal Effective Consolidation Stress, psf		3207.			
Vertical Strain after Consolidation, %		2.419			
Volumetric Strain after Consolidation, %		2.417			
Time to 50% Consolidation, min		---			
Shear Strength, psf		852.5			
Strain at Failure, %		6.55			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1705.			
Effective Minor Principal Stress at Failure, psf		709.6			
Effective Major Principal Stress at Failure, psf		2415.			
B-Value		0.96			

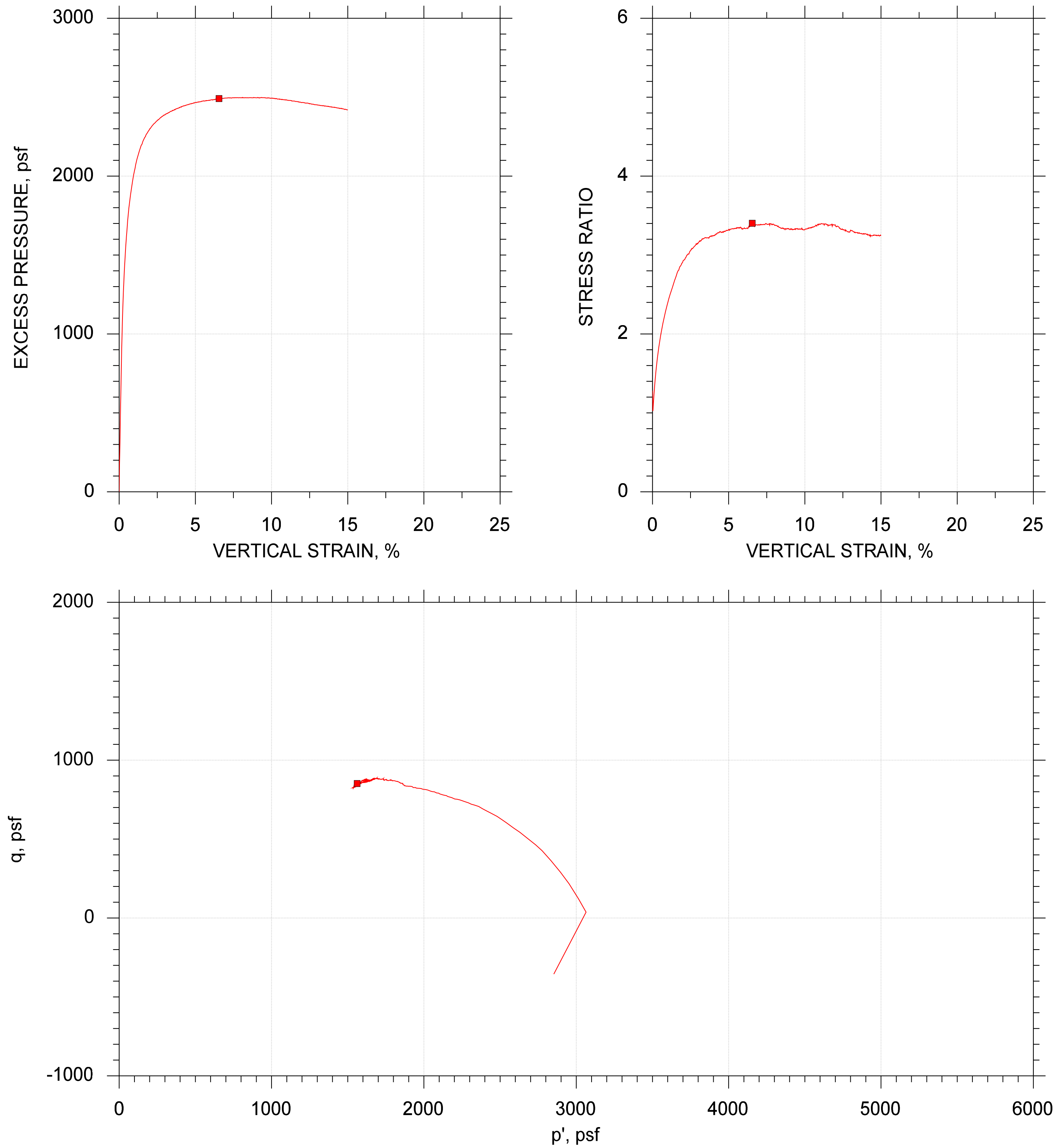
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System II, Ko = 1.28 prior to shear phase

CONSOLIDATED UNDRAINED TRIAXIAL TEST



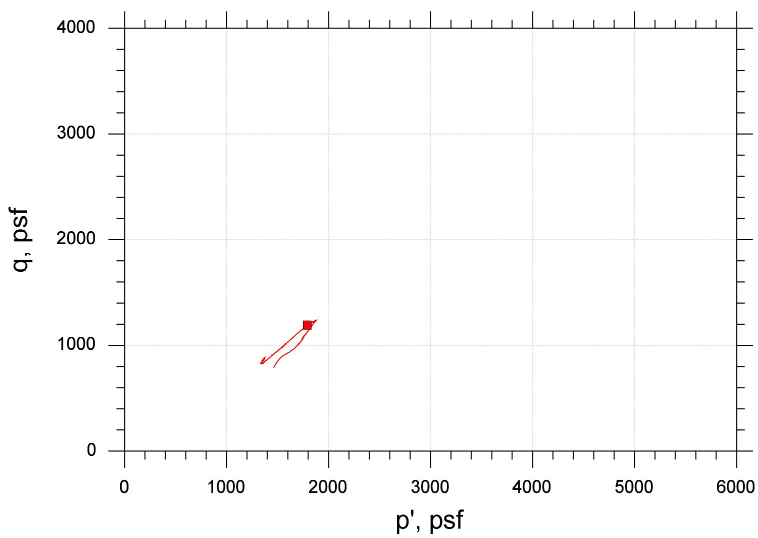
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CKOU-2-1	40-42 ft	md	07/31/18	njh	8/14/18	307957-CKOU-2-1n.dat

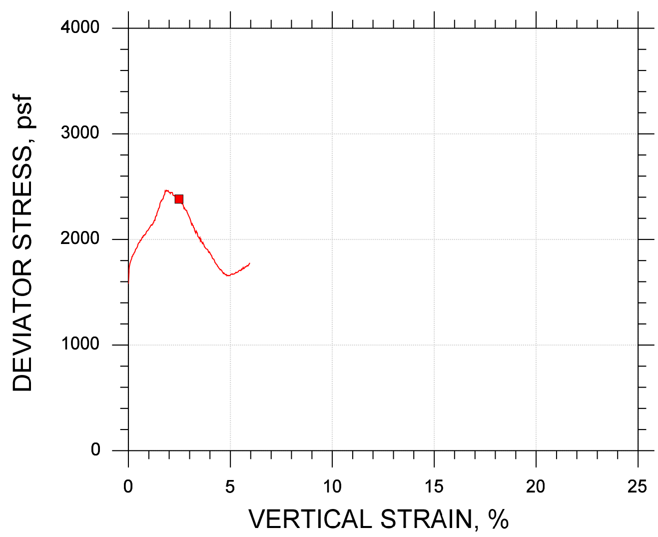
Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-208	Sample Type: intact	
Description: Wet, gray clay		
Remarks: System II, Ko = 1.28 prior to shear phase		

GeoTesting EXPRESS

Client: Schonewald Engineering Associates, Inc.	
Project Name: MeTPK Exit 45 Reconfiguration	
Project Location: Phs 2 South Portland, ME	
Project Number: GTX-307957	
Tested By: md	Checked By: njh
Boring ID: HB-EXIT 45-208	
Preparation: intact	
Description: Wet, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 27	Plastic Limit: 16
Plasticity Index: 11	Estimated Specific Gravity: 2.7

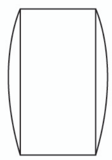
CONSOLIDATED UNDRAINED TRIAXIAL TEST





Symbol		■			
Sample ID		U2			
Depth, ft		40-42 ft			
Test Number		CKOU-2-2			
Initial	Height, in	4.480			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	42.1			
	Dry Density, pcf	78.9			
	Saturation (Wet Method), %	100.0			
	Void Ratio	1.14			
Before Shear	Moisture Content, %	39.3			
	Dry Density, pcf	81.7			
	Cross-sectional Area (Method A), in²	2.932			
	Saturation, %	100.0			
	Void Ratio	1.06			
	Back Pressure, psf	2.198e+004			
Vertical Effective Consolidation Stress, psf		2202.			
Horizontal Effective Consolidation Stress, psf		671.6			
Vertical Strain after Consolidation, %		3.837			
Volumetric Strain after Consolidation, %		3.842			
Time to 50% Consolidation, min		---			
Shear Strength, psf		1191.			
Strain at Failure, %		2.48			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		2383.			
Effective Minor Principal Stress at Failure, psf		599.8			
Effective Major Principal Stress at Failure, psf		2982.			
B-Value		0.96			

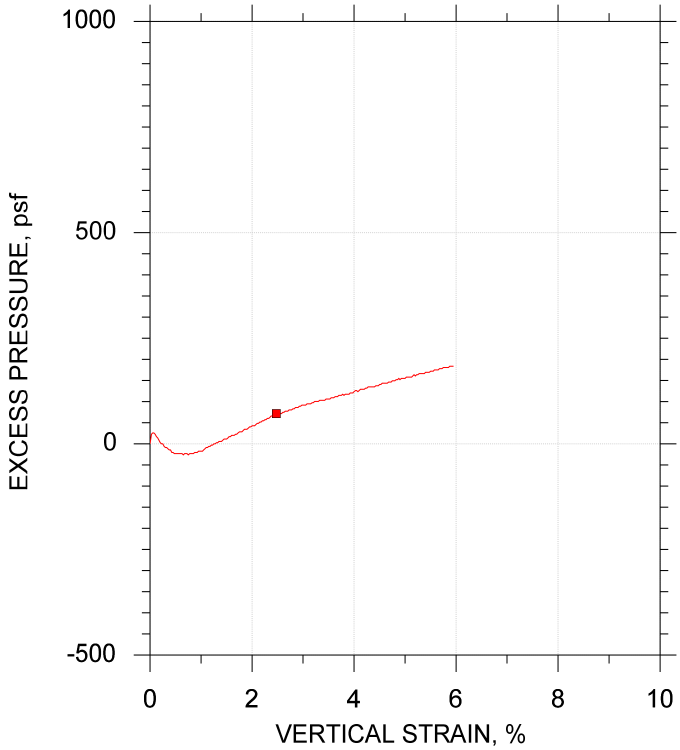
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

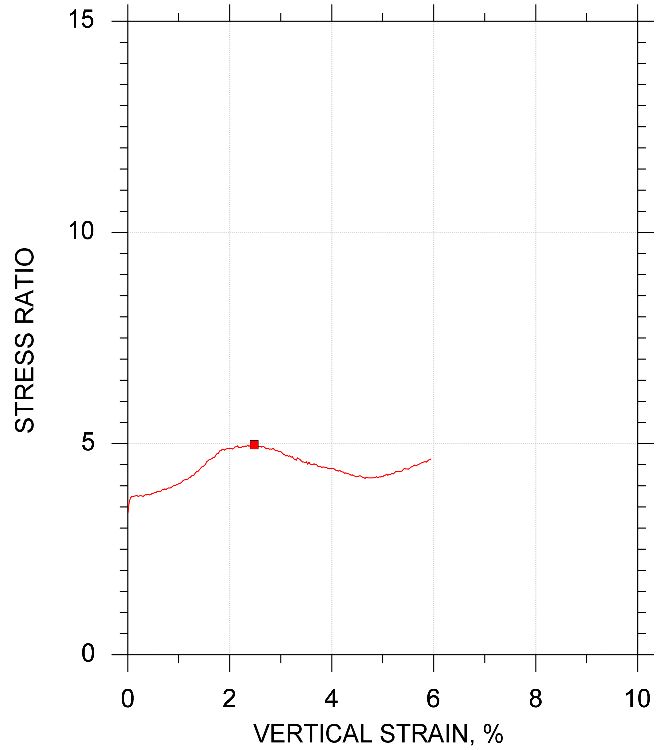


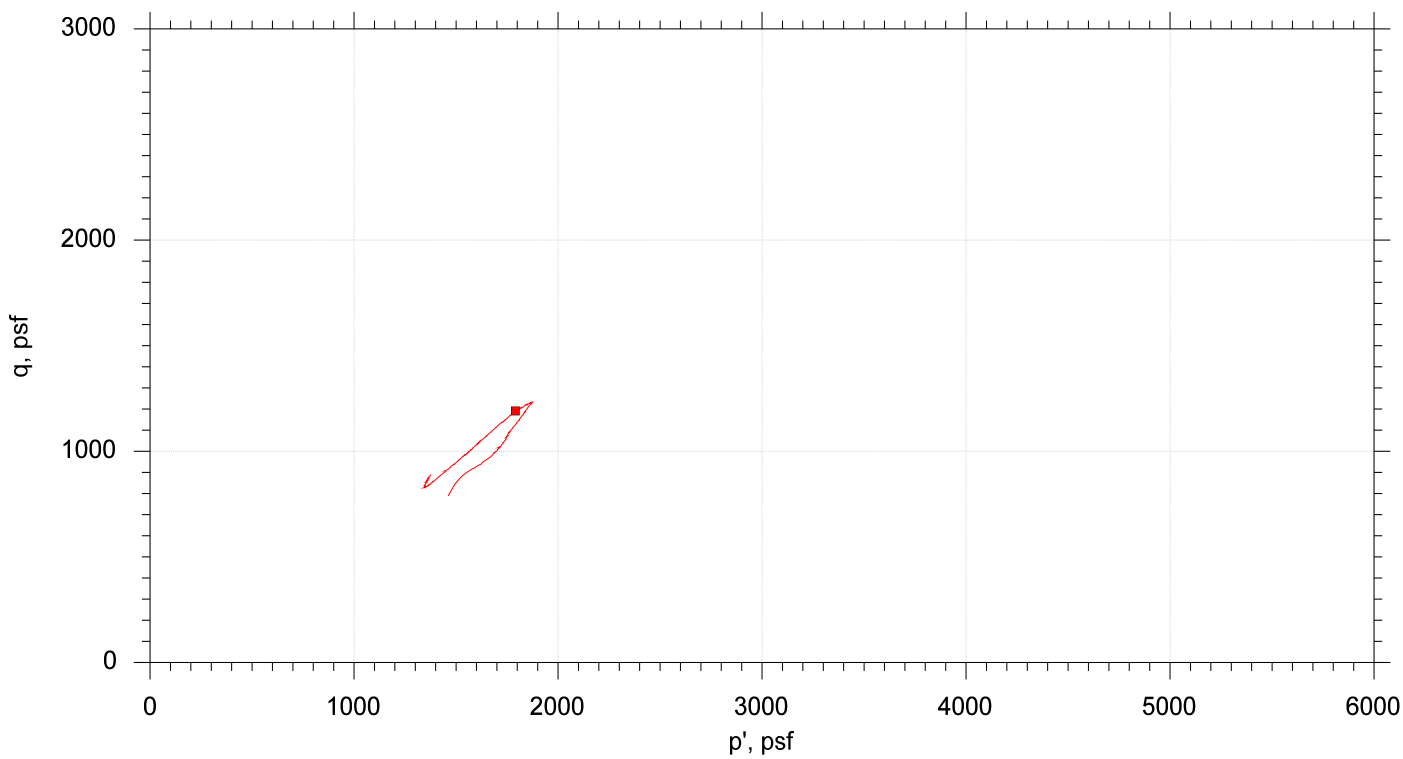
Remarks:

System K, Ko = 0.30 prior to shear phase

CONSOLIDATED UNDRAINED TRIAXIAL TEST







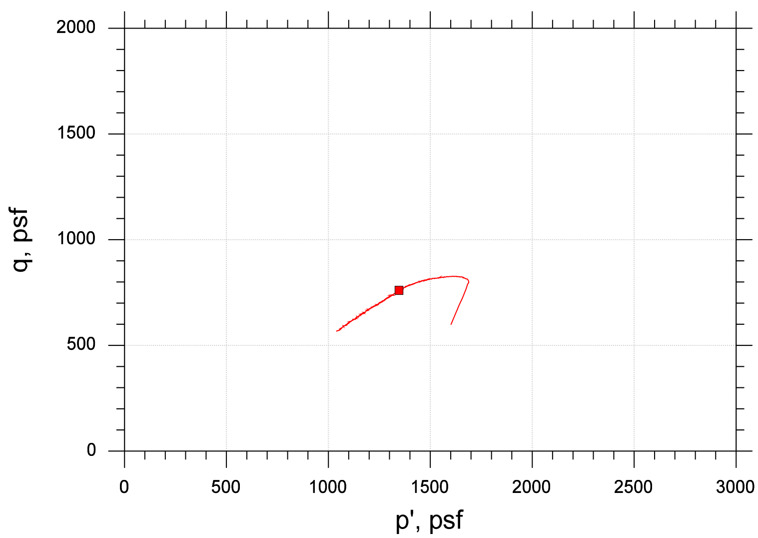
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CKOU-2-2	40-42 ft	md	07/31/18	njh	8/14/18	307957-CKOU-2-2n.dat

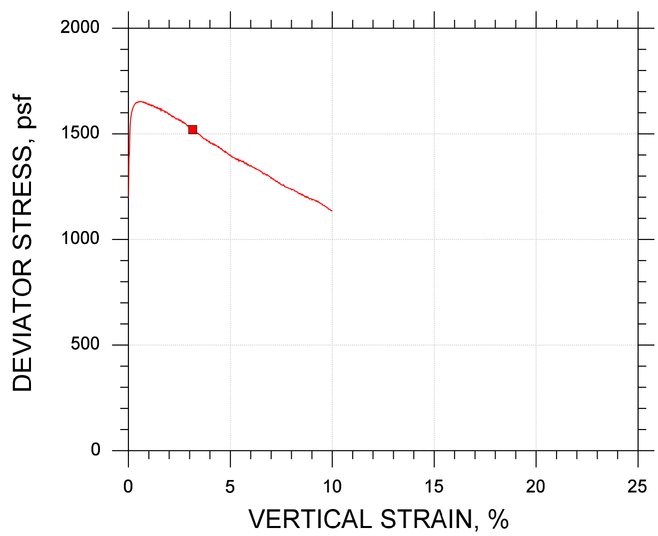
GeoTesting EXPRESS

Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-208	Sample Type: intact	
Description: Wet, gray clay		
Remarks: System K, Ko = 0.30 prior to shear phase		

Client: Schonewald Engineering Associates, Inc.	
Project Name: MeTPK Exit 45 Reconfiguration	
Project Location: Phs 2 South Portland, ME	
Project Number: GTX-307957	
Tested By: md	Checked By: njh
Boring ID: HB-EXIT 45-209	
Preparation: intact	
Description: Wet, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 33	Plastic Limit: 21
Plasticity Index: 12	Estimated Specific Gravity: 2.7

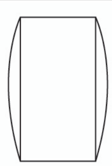
CONSOLIDATED UNDRAINED TRIAXIAL TEST





Symbol		■			
Sample ID		U2			
Depth, ft		35-37 ft			
Test Number		CKOU-1-1			
Initial	Height, in	4.480			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	36.8			
	Dry Density, pcf	84.4			
	Saturation (Wet Method), %	99.6			
	Void Ratio	0.996			
Before Shear	Moisture Content, %	34.7			
	Dry Density, pcf	87.1			
	Cross-sectional Area (Method A), in²	2.931			
	Saturation, %	100.0			
	Void Ratio	0.936			
	Back Pressure, psf	2.170e+004			
Vertical Effective Consolidation Stress, psf		2157.			
Horizontal Effective Consolidation Stress, psf		1003.			
Vertical Strain after Consolidation, %		3.300			
Volumetric Strain after Consolidation, %		3.293			
Time to 50% Consolidation, min		---			
Shear Strength, psf		760.0			
Strain at Failure, %		3.15			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1520.			
Effective Minor Principal Stress at Failure, psf		586.5			
Effective Major Principal Stress at Failure, psf		2106.			
B-Value		0.96			

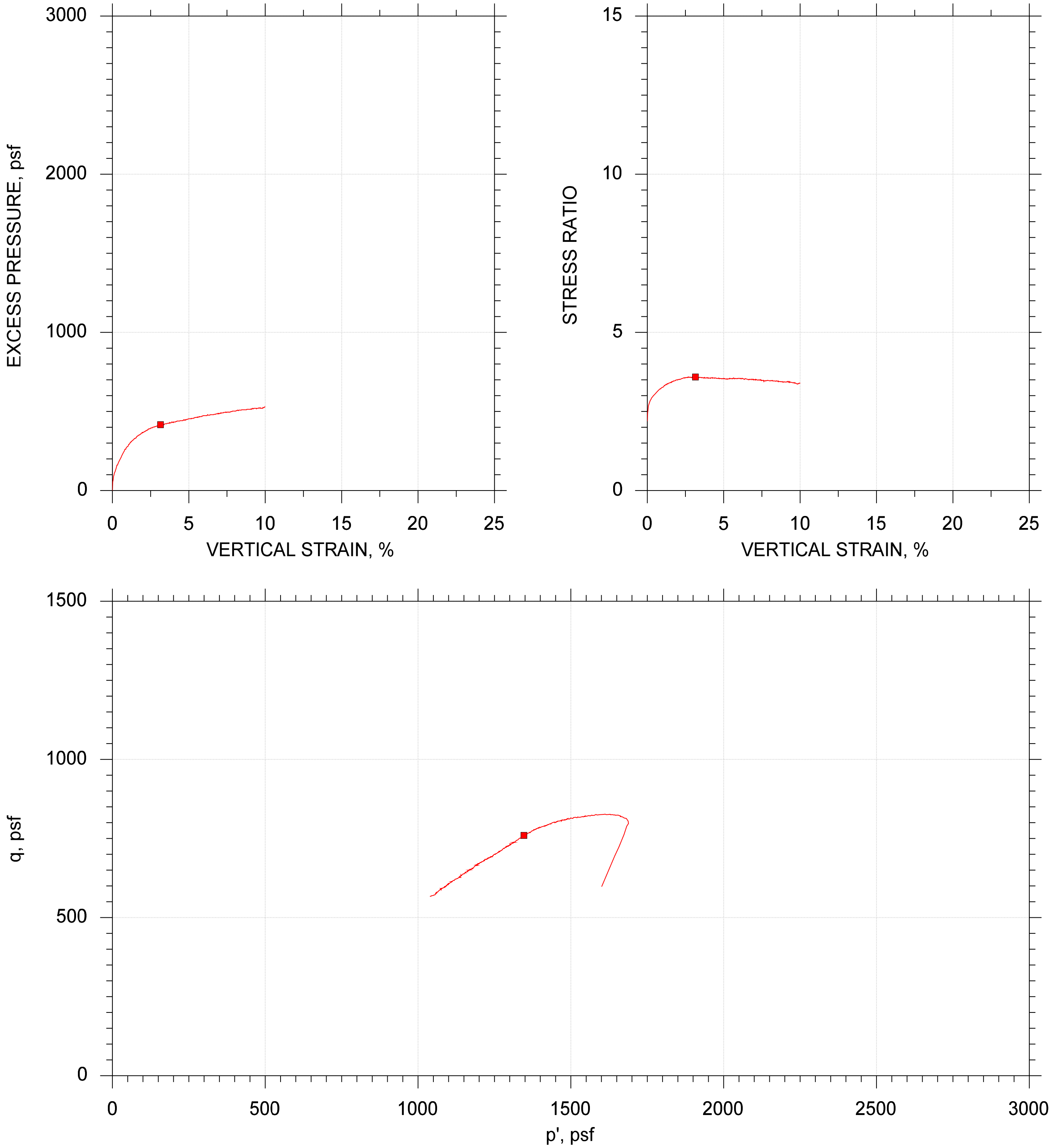
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System K, Ko = 0.46 prior to shear phase

CONSOLIDATED UNDRAINED TRIAXIAL TEST



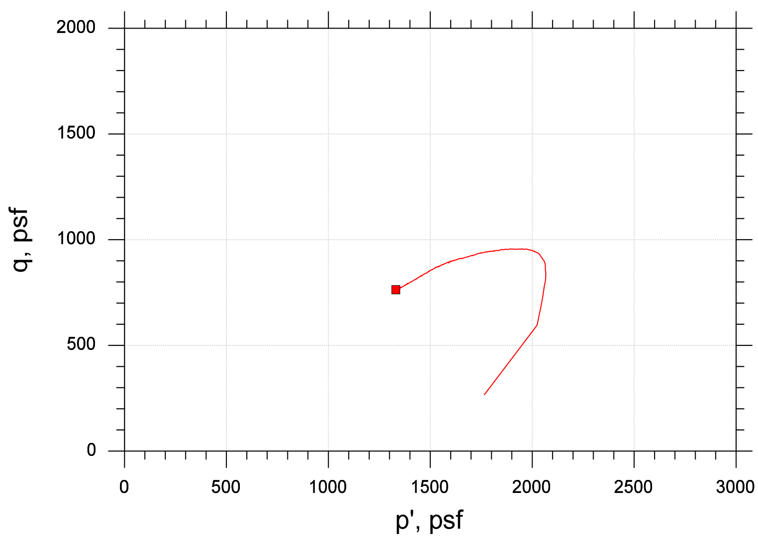
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CKOU-1-1	35-37 ft	md	07/31/18	njh	8/14/18	307957-CKOU-1-1n.dat

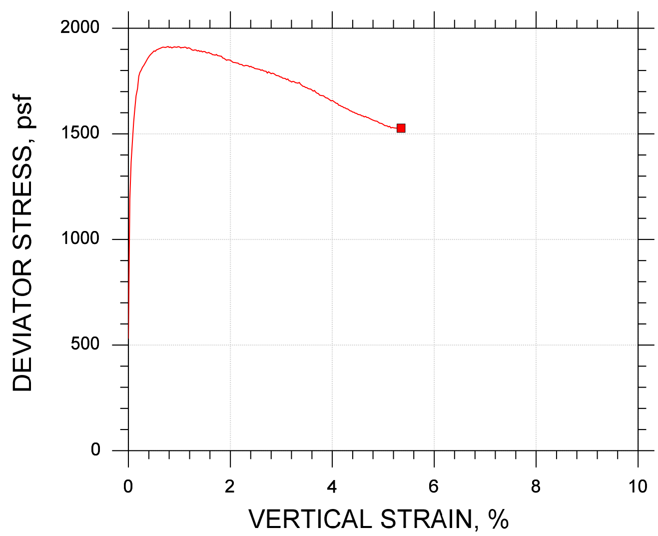
GeoTesting EXPRESS

Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-209	Sample Type: intact	
Description: Wet, dark gray clay		
Remarks: System K, Ko = 0.46 prior to shear phase		

Client: Schonewald Engineering Associates, Inc.	
Project Name: MeTPK Exit 45 Reconfiguration	
Project Location: Phs 2 South Portland, ME	
Project Number: GTX-307957	
Tested By: md	Checked By: njh
Boring ID: HB-EXIT 45-209	
Preparation: intact	
Description: Wet, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 33	Plastic Limit: 21
Plasticity Index: 12	Estimated Specific Gravity: 2.7

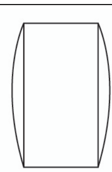
CONSOLIDATED UNDRAINED TRIAXIAL TEST





Symbol		■			
Sample ID		U2			
Depth, ft		35-37 ft			
Test Number		CKOU-1-2			
Initial	Height, in	4.40			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	41.0			
	Dry Density, pcf	78.6			
	Saturation (Wet Method), %	96.8			
	Void Ratio	1.15			
Before Shear	Moisture Content, %	38.4			
	Dry Density, pcf	82.8			
	Cross-sectional Area (Method A), in²	2.929			
	Saturation, %	100.0			
	Void Ratio	1.04			
	Back Pressure, psf	1.980e+004			
Vertical Effective Consolidation Stress, psf		2026.			
Horizontal Effective Consolidation Stress, psf		1499.			
Vertical Strain after Consolidation, %		5.23			
Volumetric Strain after Consolidation, %		5.32			
Time to 50% Consolidation, min		---			
Shear Strength, psf		763.4			
Strain at Failure, %		5.35			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1527.			
Effective Minor Principal Stress at Failure, psf		567.0			
Effective Major Principal Stress at Failure, psf		2094.			
B-Value		0.95			

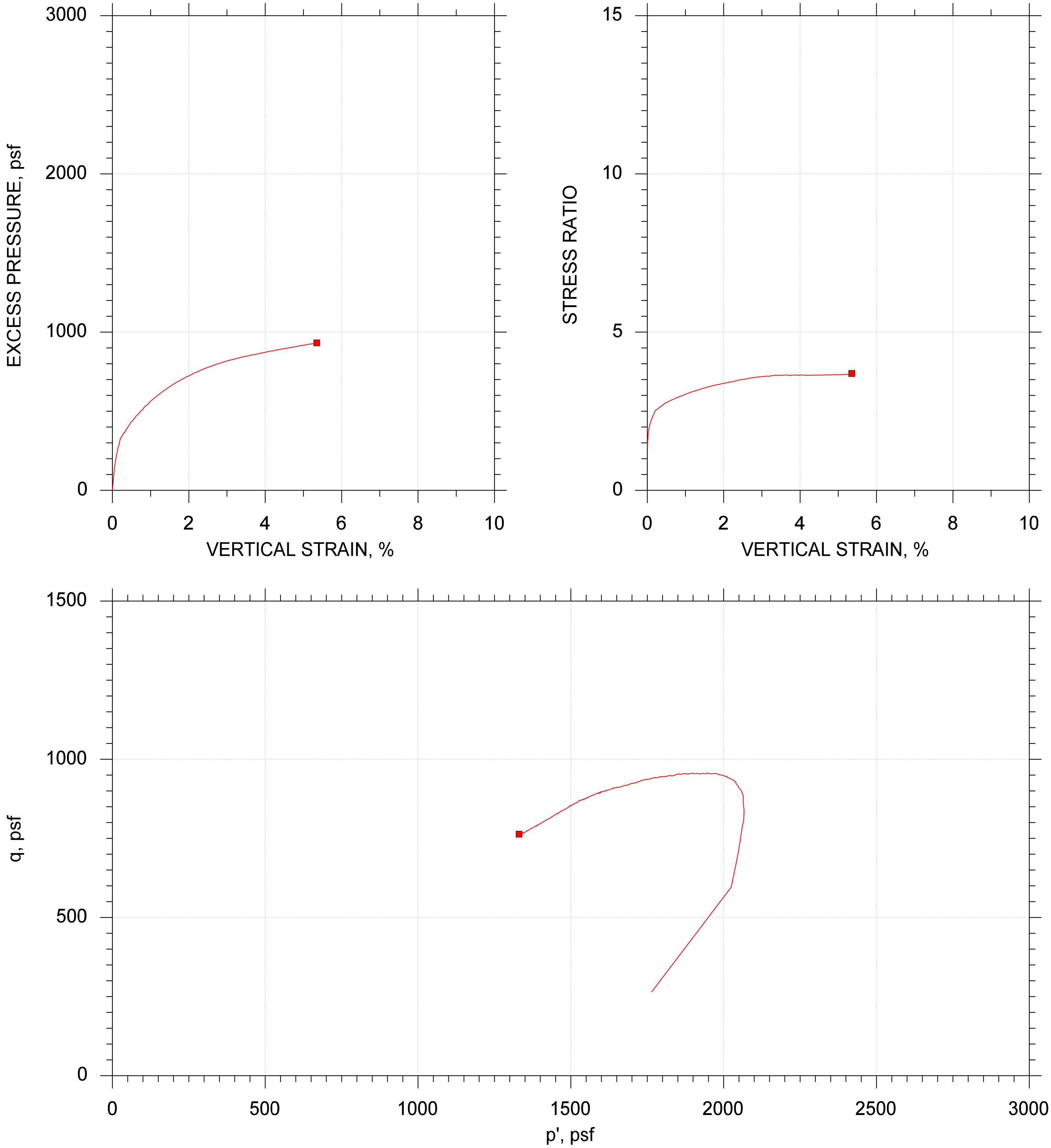
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System S, Ko = 0.74 prior to shear phase

CONSOLIDATED UNDRAINED TRIAXIAL TEST



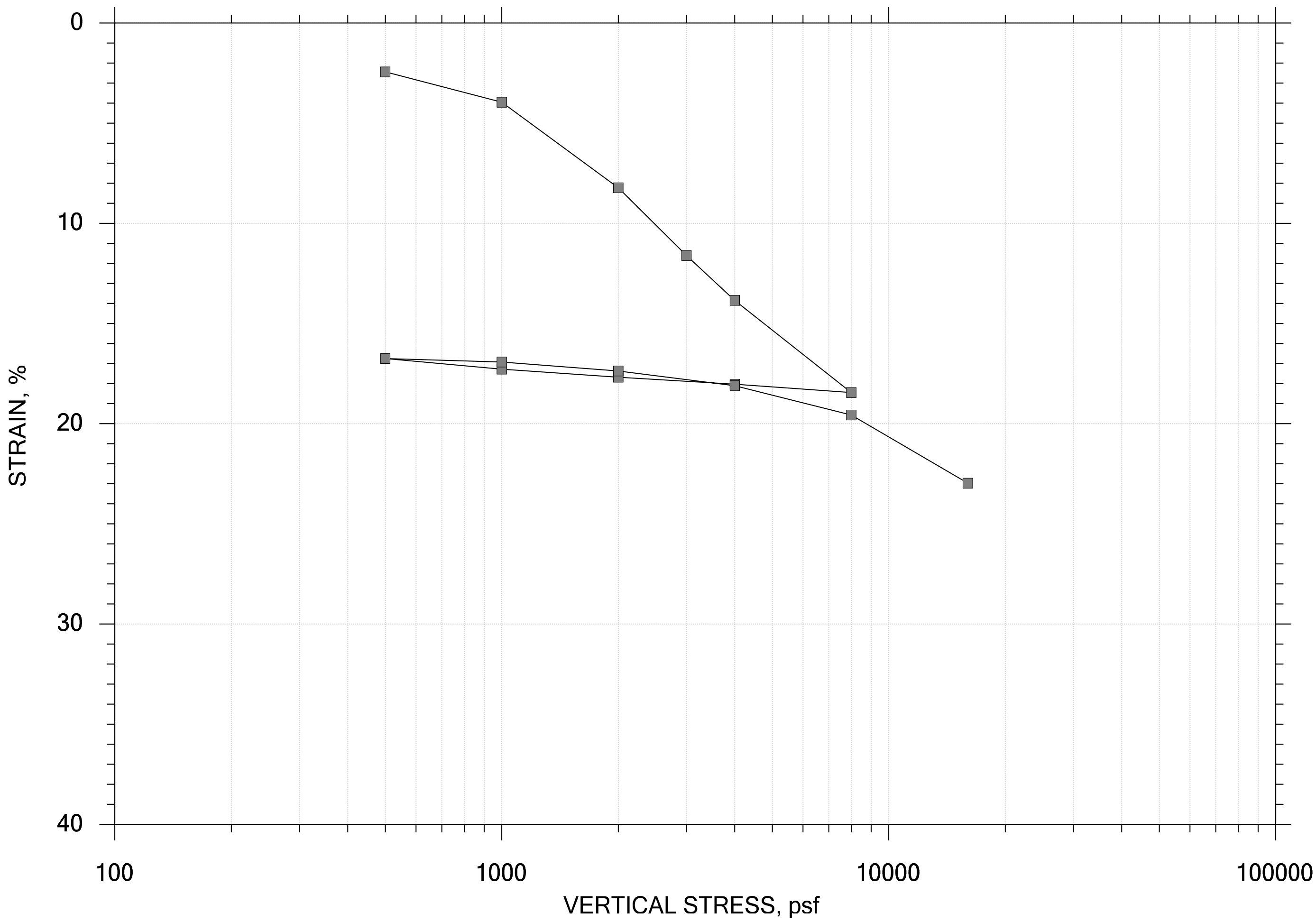
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CKOU-1-2	35-37 ft	md	07/31/18	njh	8/14/18	307957-CKOU-1-2an.dat

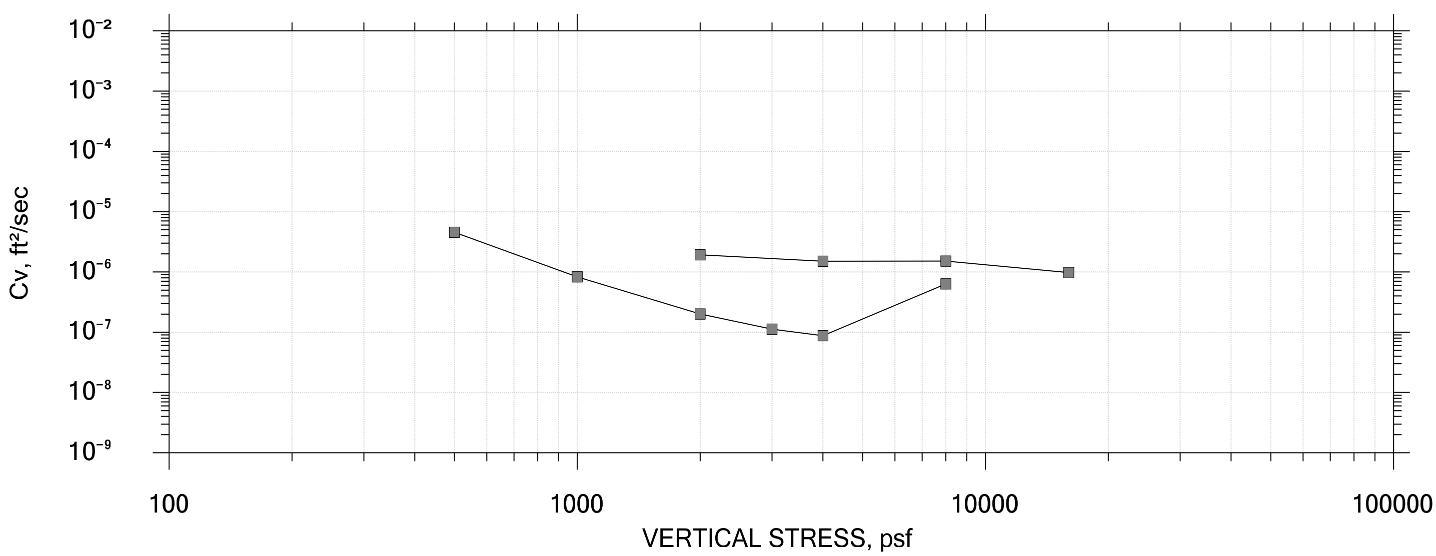
GeoTesting EXPRESS

Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-209	Sample Type: intact	
Description: Wet, dark gray clay		
Remarks: System S, Ko = 0.74 prior to shear phase		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

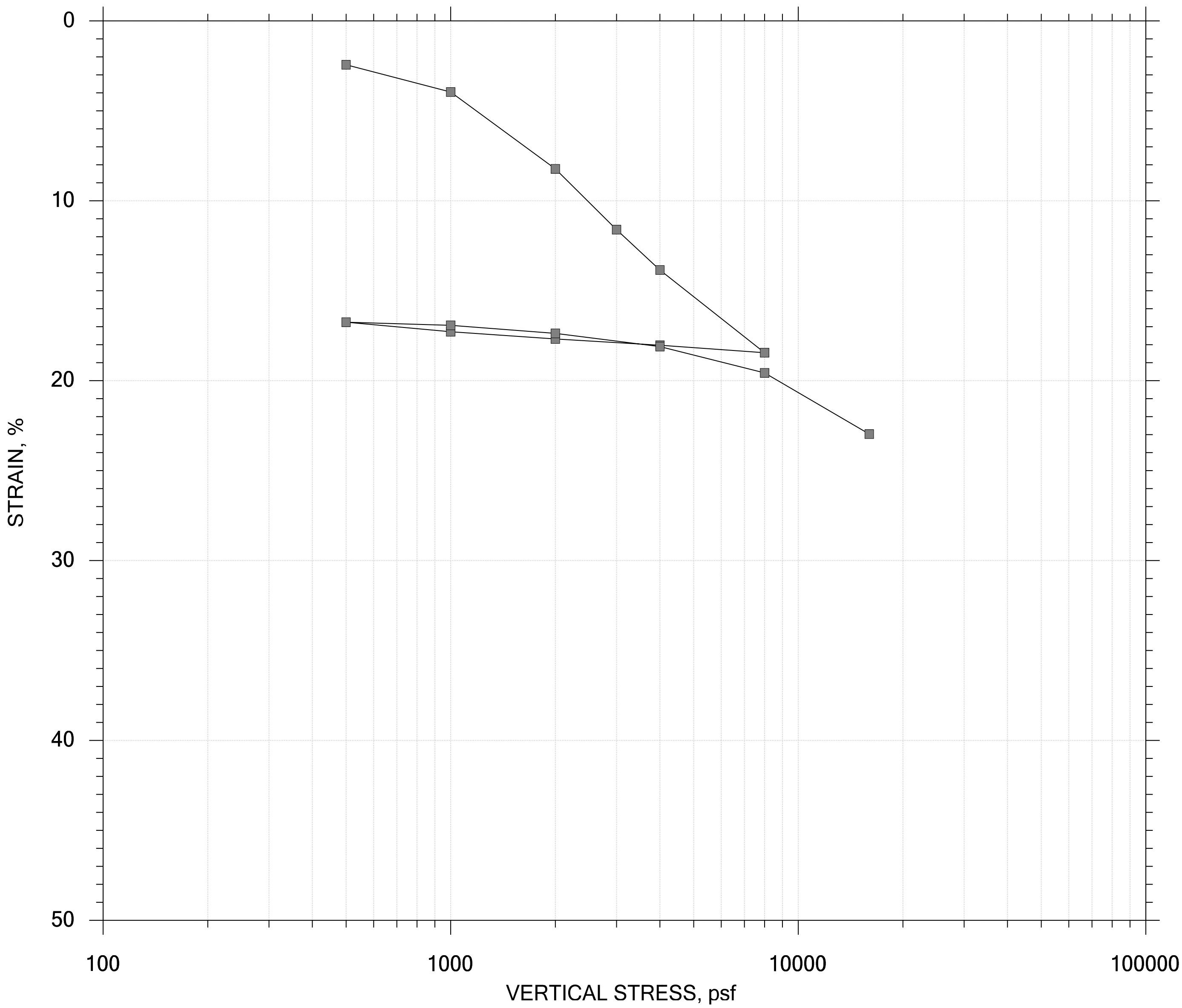




GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	42.99	26.29
Preconsolidation Stress: ---				Dry Unit Weight, pcf	78.509	99.378
Compression Ratio: ---				Saturation, %	99.99	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.18	0.72
LL: 35	PL: 20	PI: 15	GS: 2.74			

GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		
	Displacement at End of Increment		

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Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-201
Tested By: md
Checked By: njh
Sample No.: U2
Test Date: 07/26/18
Depth: 30-32 ft
Test No.: IP-1
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System O

Estimated Specific Gravity: 2.74
Liquid Limit: 35
Specimen Diameter: 2.50 in
Initial Void Ratio: 1.18
Plastic Limit: 20
Initial Height: 1.00 in
Final Void Ratio: 0.720
Plasticity Index: 15
Final Height: 0.79 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-209	RING		C-927
Wt. Container + Wet Soil, gm	99.960	254.64	237.75	136.38
Wt. Container + Dry Soil, gm	72.360	211.15	211.15	109.72
Wt. Container, gm	8.4500	109.99	109.99	8.3300
Wt. Dry Soil, gm	63.910	101.16	101.16	101.39
Water Content, %	43.19	42.99	26.29	26.29
Void Ratio	---	1.18	0.720	---
Degree of Saturation, %	---	99.99	100.00	---
Dry Unit Weight, pcf	---	78.509	99.378	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-201
Tested By: md
Checked By: njh
Sample No.: U2
Test Date: 07/26/18
Depth: 30-32 ft
Test No.: IP-1
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System O

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.02436	1.12	2.44	6.533	3.67e-006	4.87e-005	9.63e-004
2	1.00e+003	0.03947	1.09	3.95	32.074	7.17e-007	3.02e-005	1.17e-004
3	2.00e+003	0.08223	0.998	8.22	100.787	2.15e-007	4.28e-005	4.95e-005
4	3.00e+003	0.1160	0.925	11.6	140.450	1.42e-007	3.38e-005	2.59e-005
5	4.00e+003	0.1384	0.876	13.8	230.422	8.11e-008	2.24e-005	9.79e-006
6	8.00e+003	0.1845	0.776	18.4	26.705	6.46e-007	1.15e-005	4.01e-005
7	4.00e+003	0.1803	0.785	18.0	3.005	5.46e-006	1.04e-006	3.06e-005
8	2.00e+003	0.1768	0.792	17.7	6.894	2.40e-006	1.77e-006	2.30e-005
9	1.00e+003	0.1728	0.801	17.3	25.004	6.68e-007	3.95e-006	1.42e-005
10	500.	0.1675	0.812	16.7	55.598	3.04e-007	1.06e-005	1.74e-005
11	1.00e+003	0.1692	0.809	16.9	0.000	0.00e+000	3.44e-006	0.00e+000
12	2.00e+003	0.1737	0.799	17.4	12.962	1.30e-006	4.46e-006	3.13e-005
13	4.00e+003	0.1810	0.783	18.1	9.512	1.75e-006	3.67e-006	3.46e-005
14	8.00e+003	0.1957	0.751	19.6	14.855	1.09e-006	3.67e-006	2.15e-005
15	1.60e+004	0.2296	0.677	23.0	17.173	8.86e-007	4.25e-006	2.03e-005

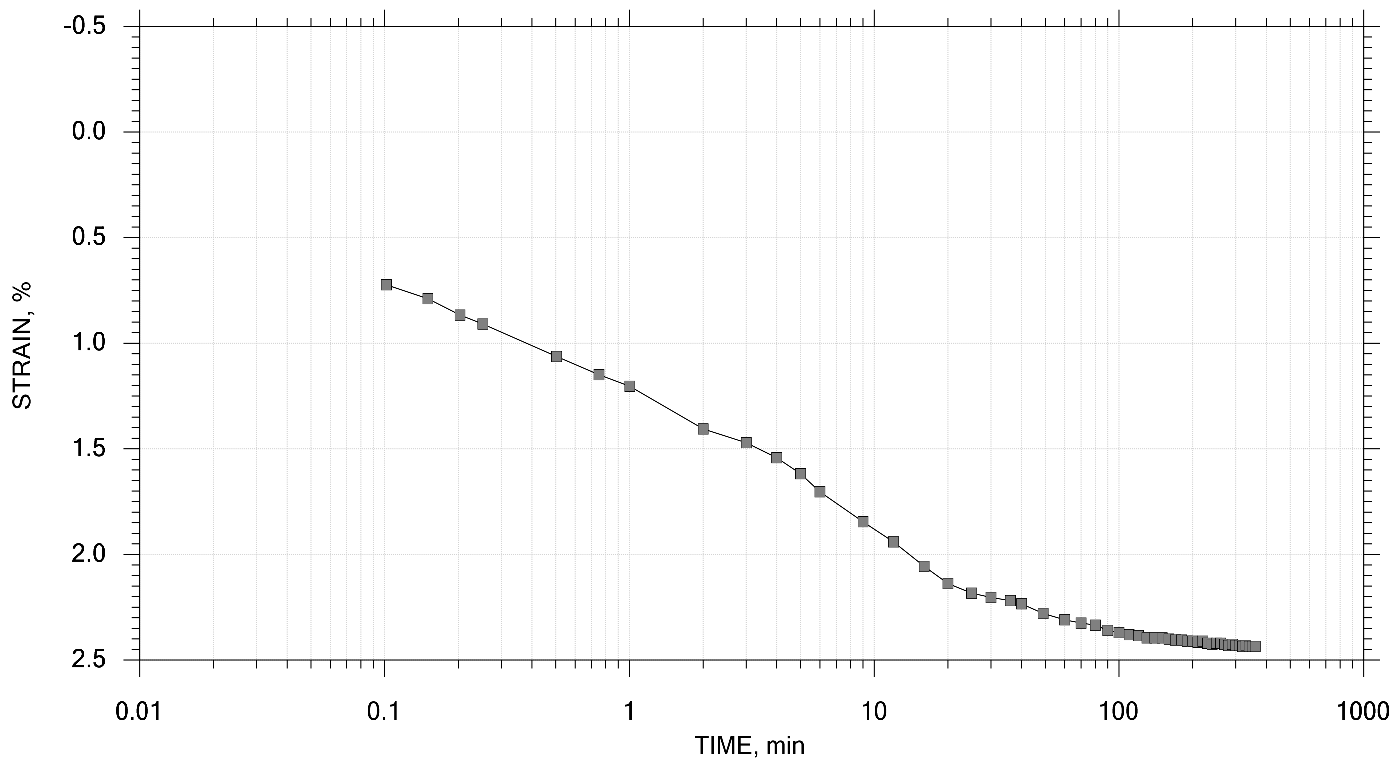
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.02436	1.12	2.44	0.000	0.00e+000	4.87e-005	0.00e+000	0.00e+000
2	1.00e+003	0.03947	1.09	3.95	6.022	8.87e-007	3.02e-005	1.45e-004	0.00e+000
3	2.00e+003	0.08223	0.998	8.22	32.005	1.57e-007	4.28e-005	3.62e-005	0.00e+000
4	3.00e+003	0.1160	0.925	11.6	51.914	8.91e-008	3.38e-005	1.62e-005	0.00e+000
5	4.00e+003	0.1384	0.876	13.8	0.000	0.00e+000	2.24e-005	0.00e+000	0.00e+000
6	8.00e+003	0.1845	0.776	18.4	6.832	5.87e-007	1.15e-005	3.64e-005	0.00e+000
7	4.00e+003	0.1803	0.785	18.0	0.000	0.00e+000	1.04e-006	0.00e+000	0.00e+000
8	2.00e+003	0.1768	0.792	17.7	0.000	0.00e+000	1.77e-006	0.00e+000	0.00e+000
9	1.00e+003	0.1728	0.801	17.3	0.000	0.00e+000	3.95e-006	0.00e+000	0.00e+000
10	500.	0.1675	0.812	16.7	0.000	0.00e+000	1.06e-005	0.00e+000	0.00e+000
11	1.00e+003	0.1692	0.809	16.9	0.000	0.00e+000	3.44e-006	0.00e+000	0.00e+000
12	2.00e+003	0.1737	0.799	17.4	0.000	0.00e+000	4.46e-006	0.00e+000	0.00e+000
13	4.00e+003	0.1810	0.783	18.1	2.679	1.44e-006	3.67e-006	2.85e-005	0.00e+000
14	8.00e+003	0.1957	0.751	19.6	0.000	0.00e+000	3.67e-006	0.00e+000	0.00e+000
15	1.60e+004	0.2296	0.677	23.0	3.652	9.67e-007	4.25e-006	2.22e-005	0.00e+000

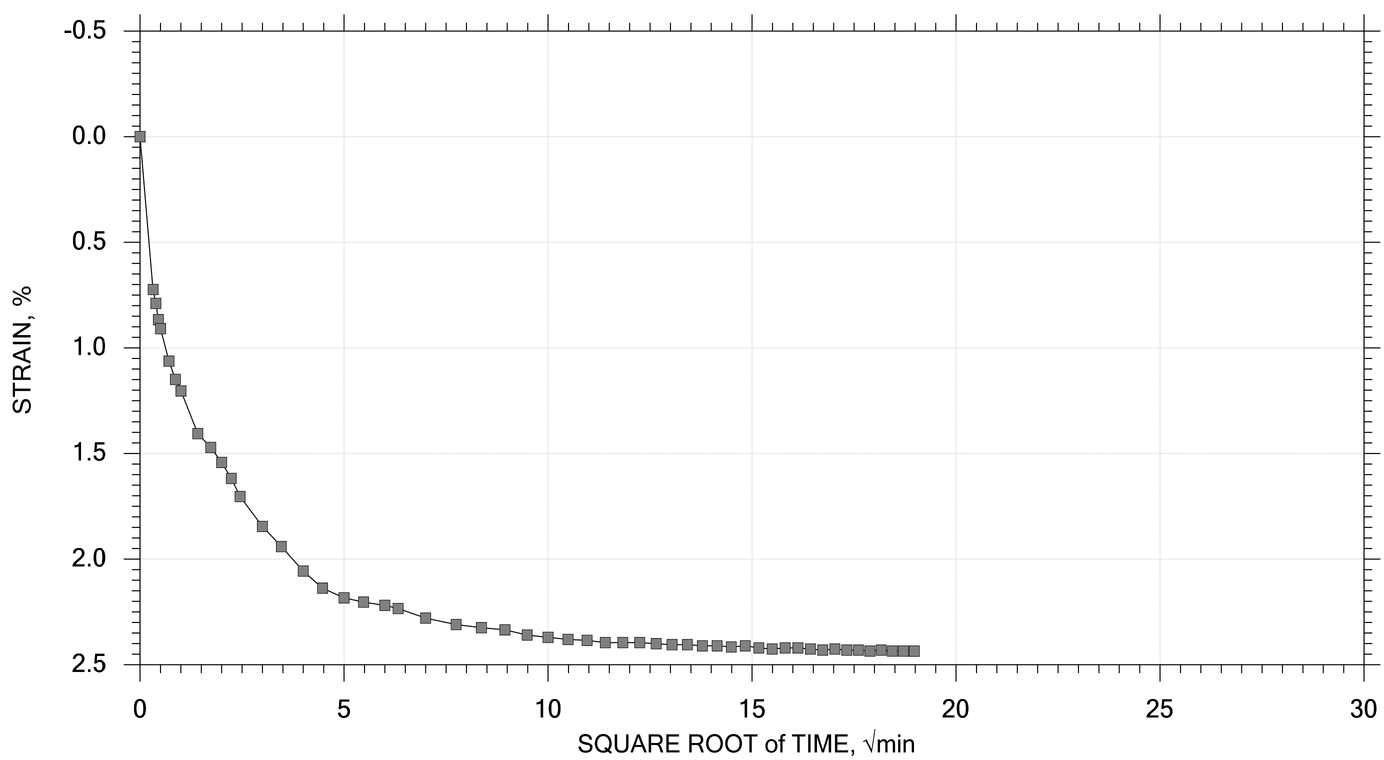
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





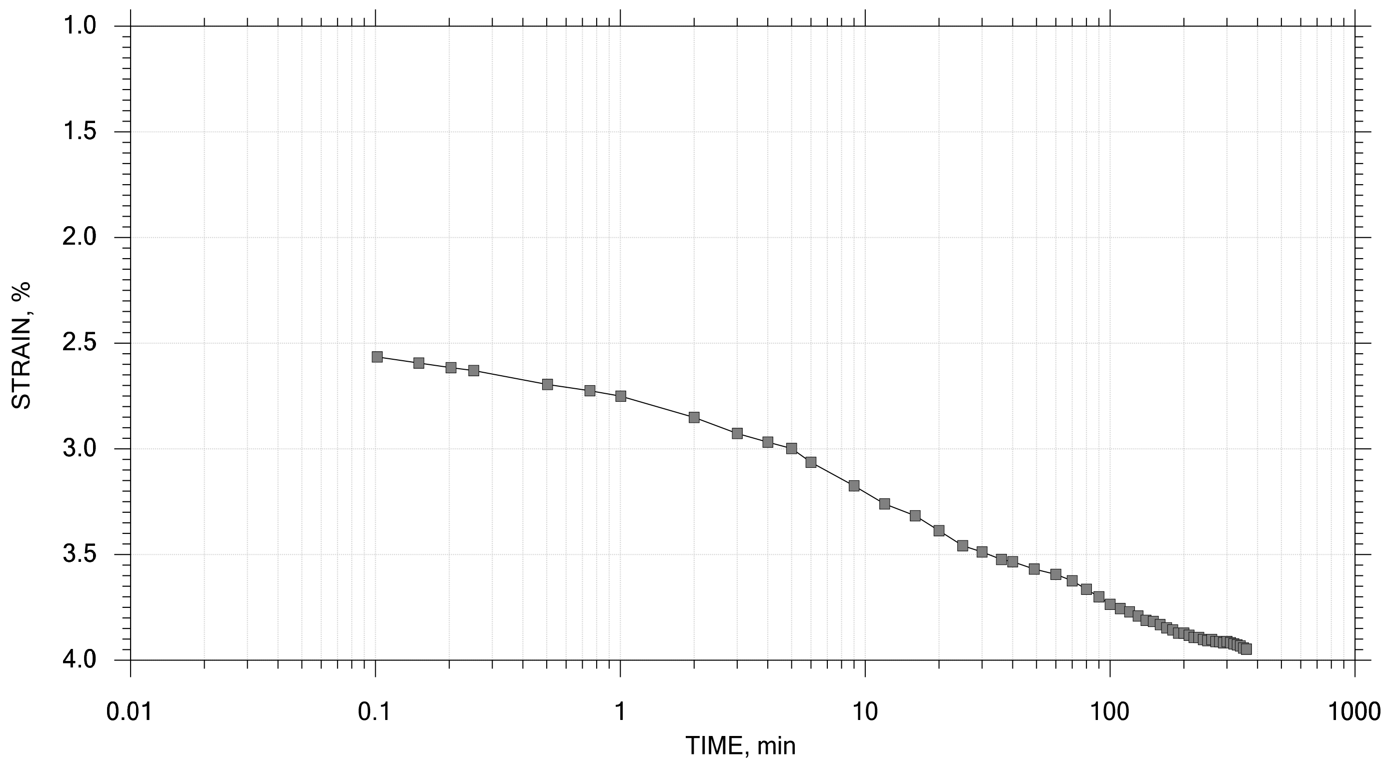
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

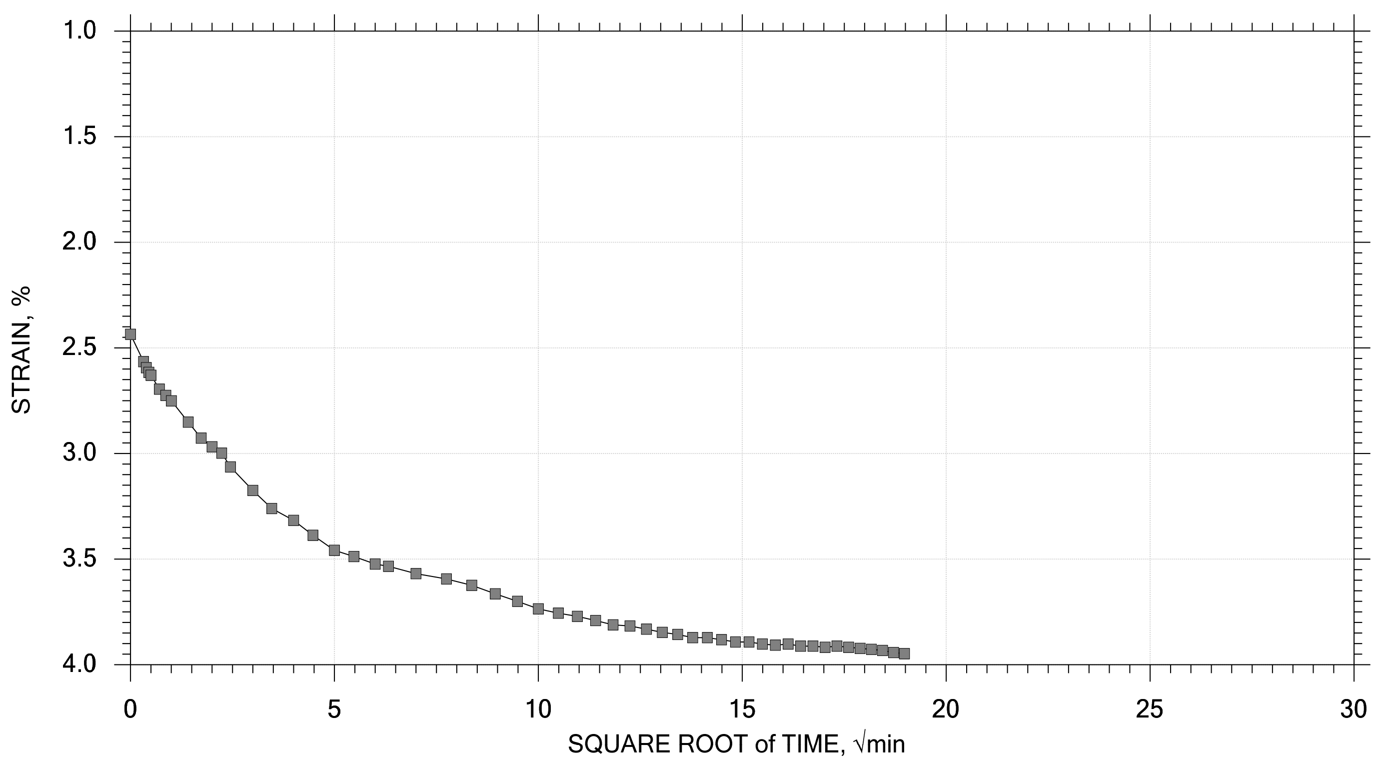
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





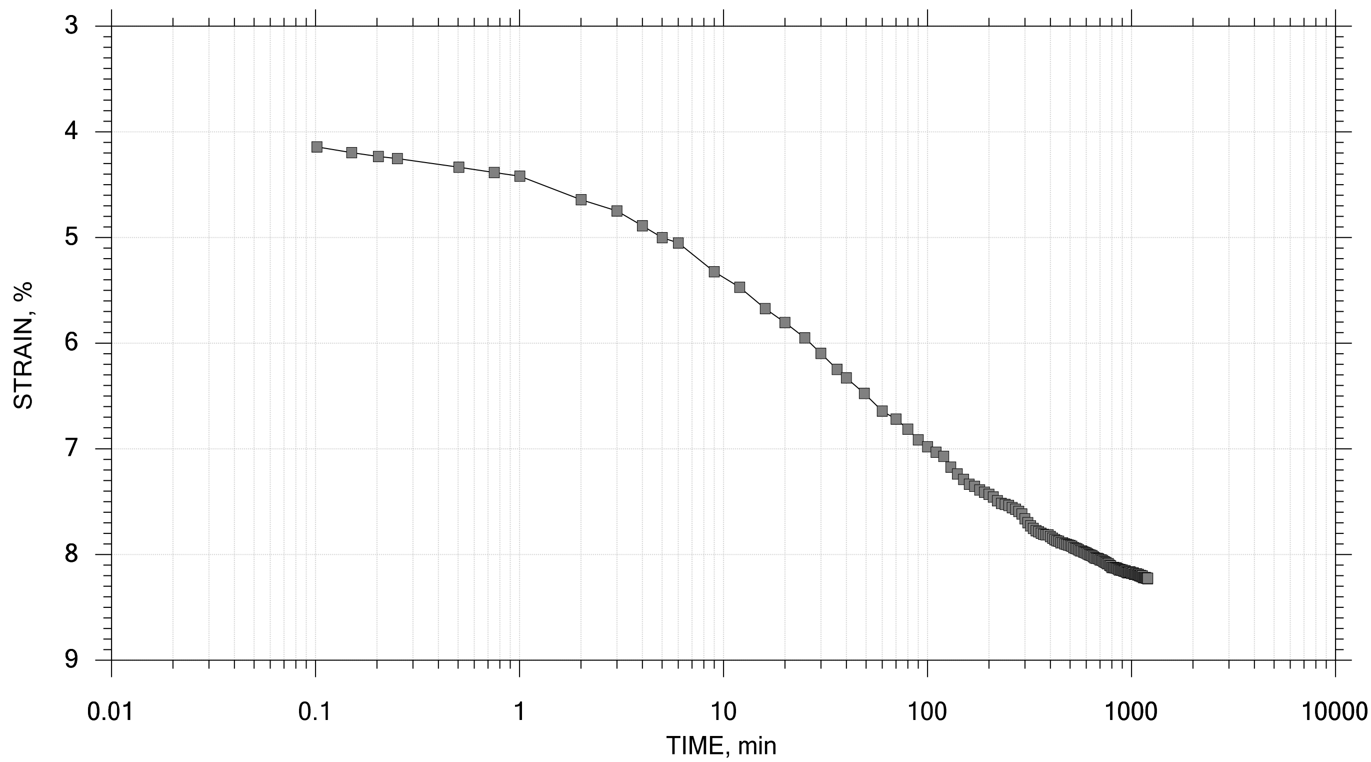
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

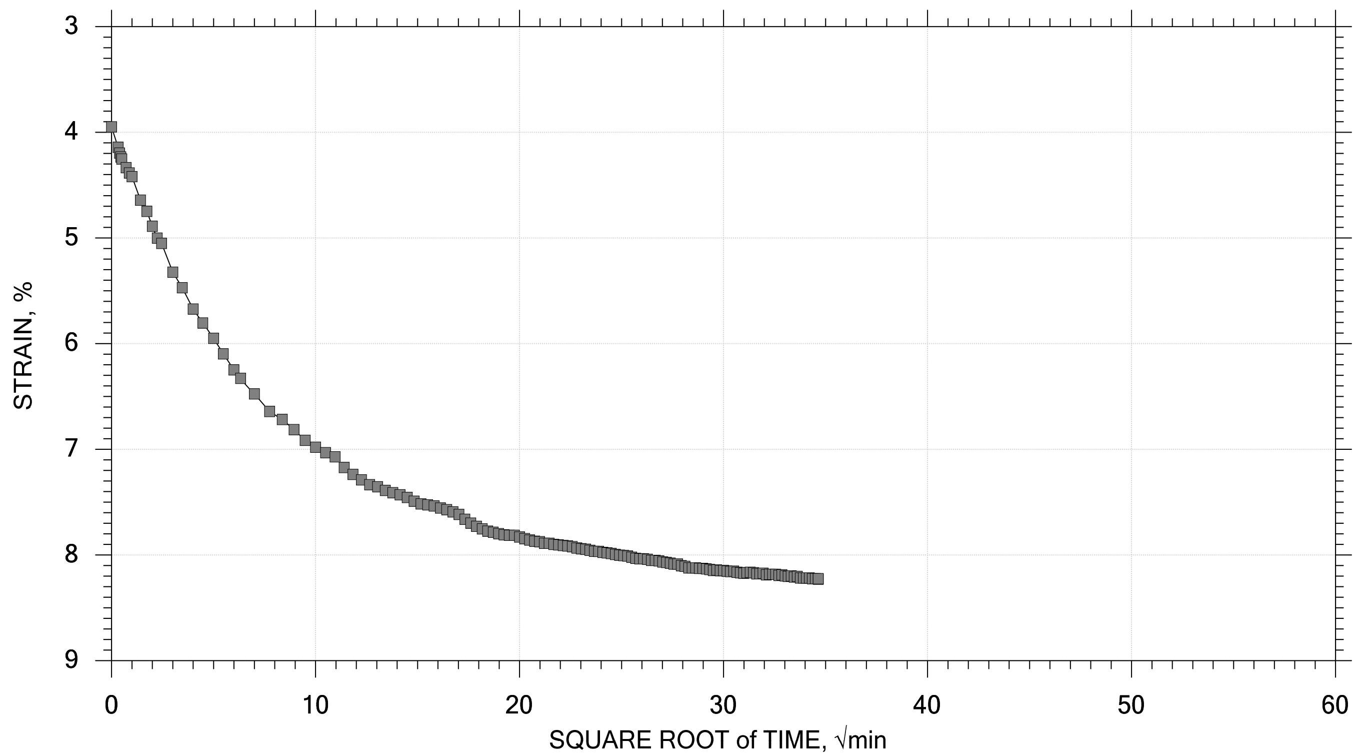
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





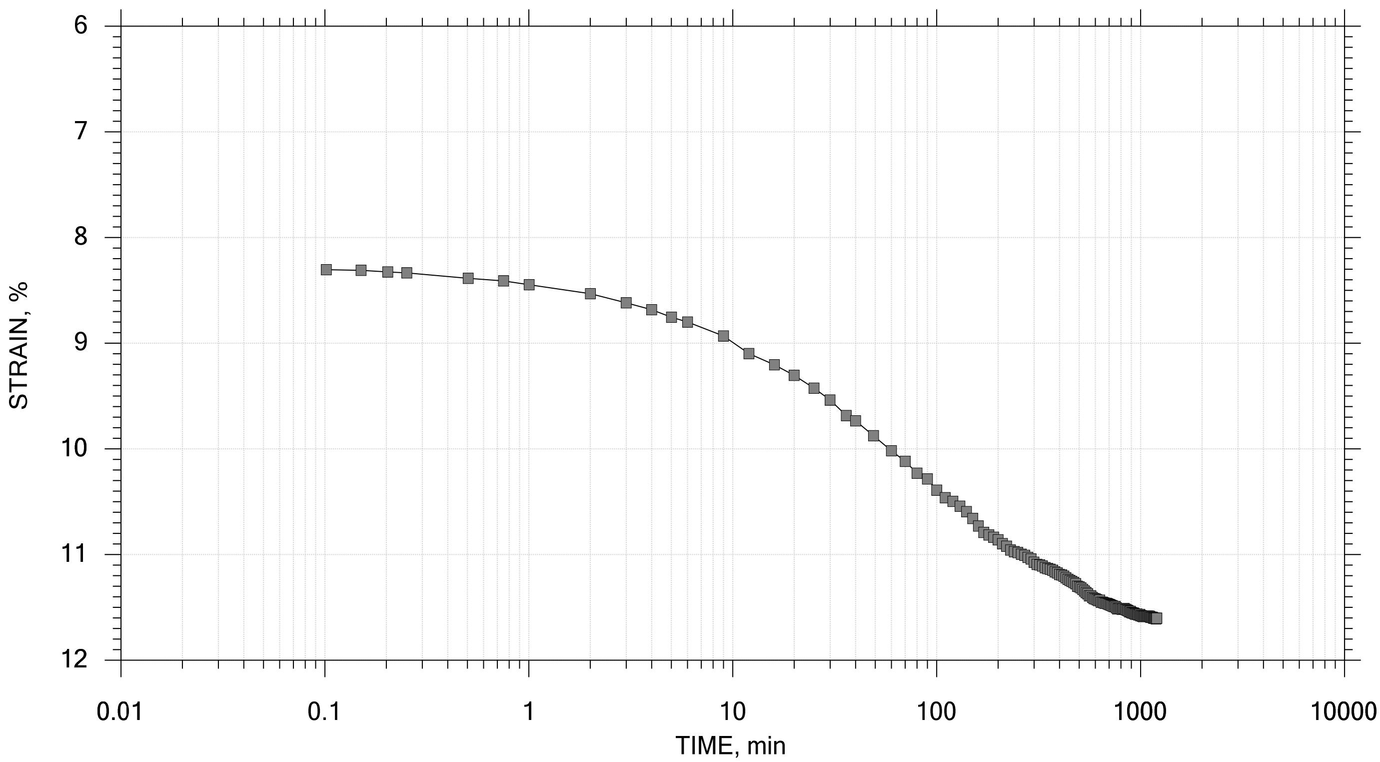
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

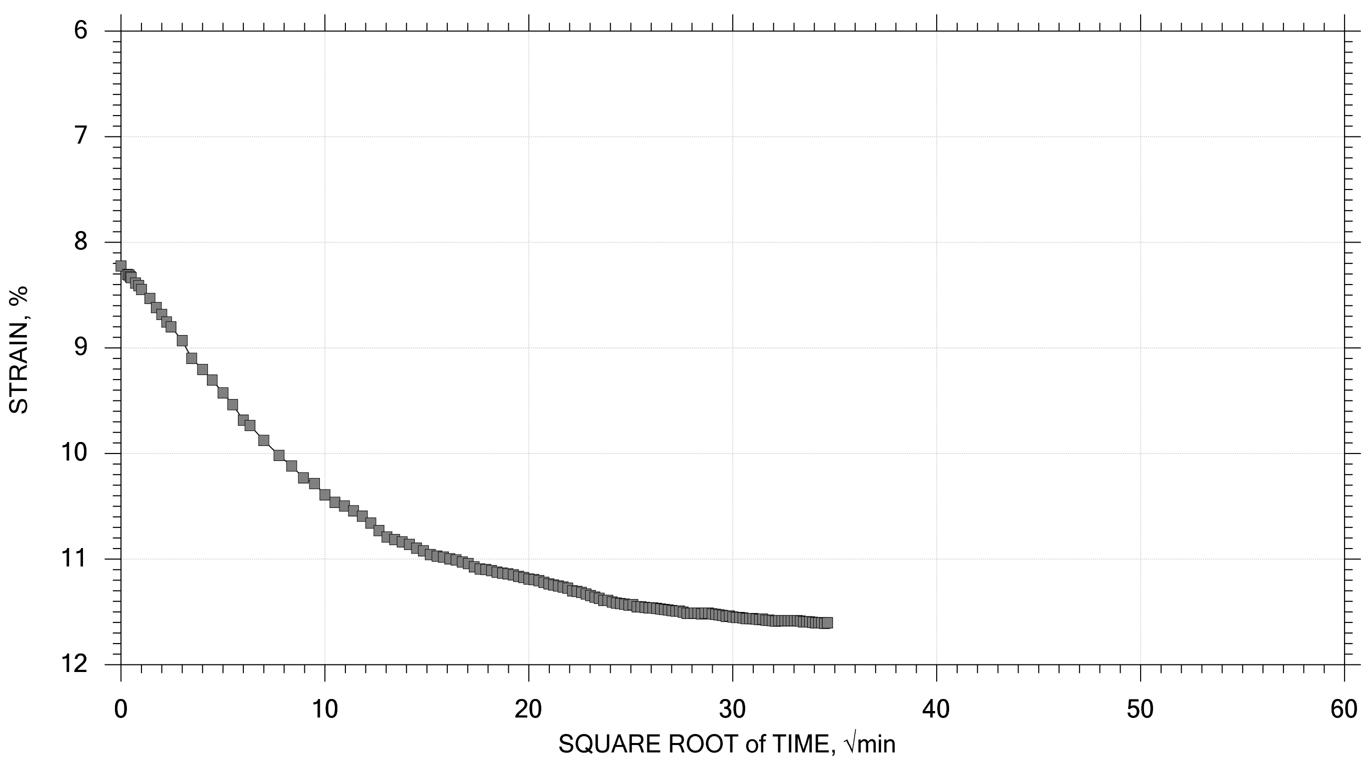
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





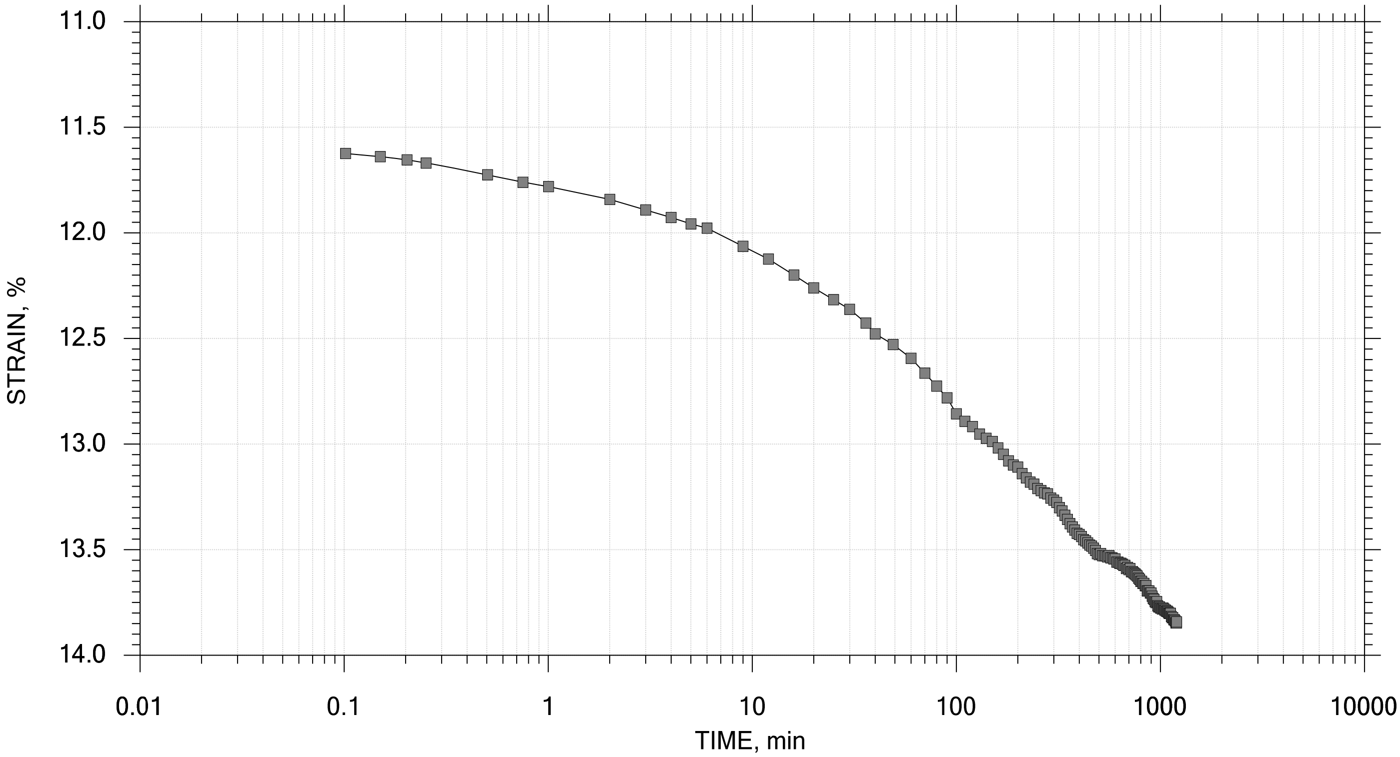
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

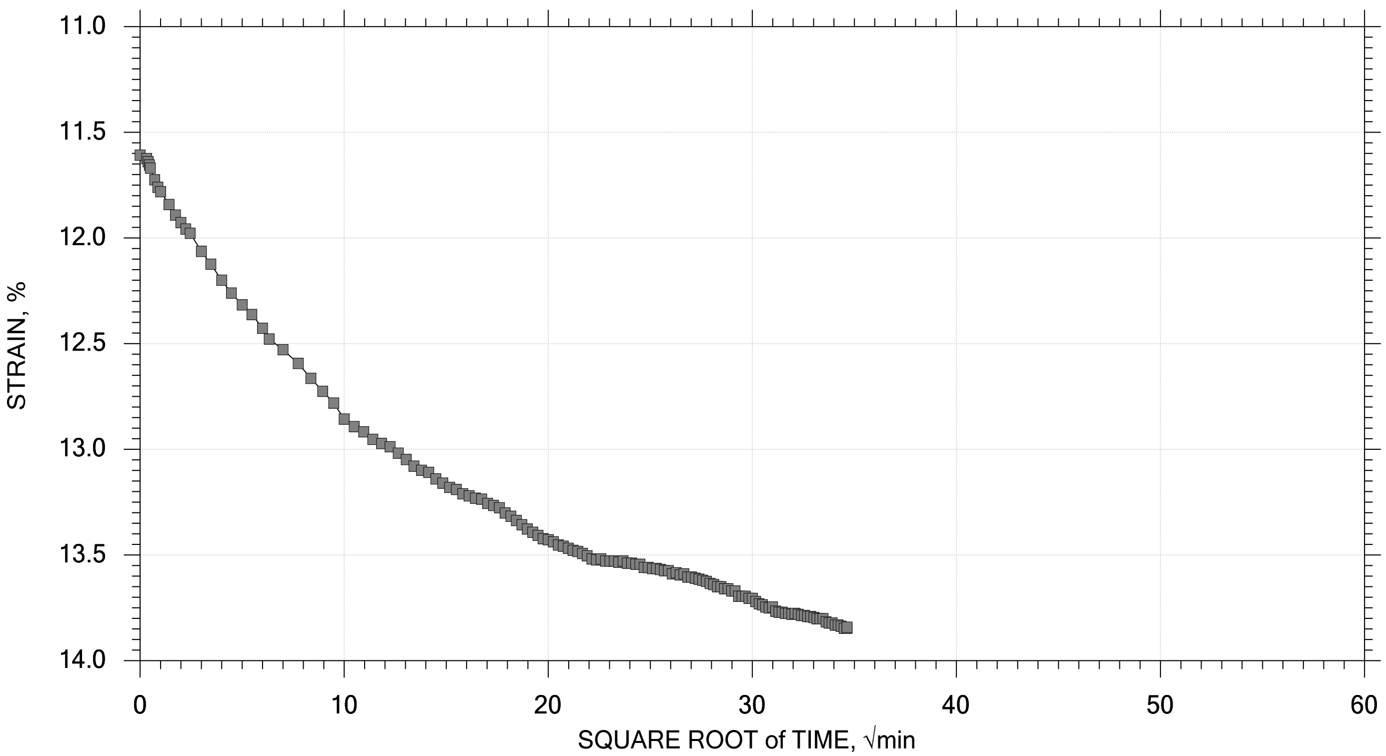
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





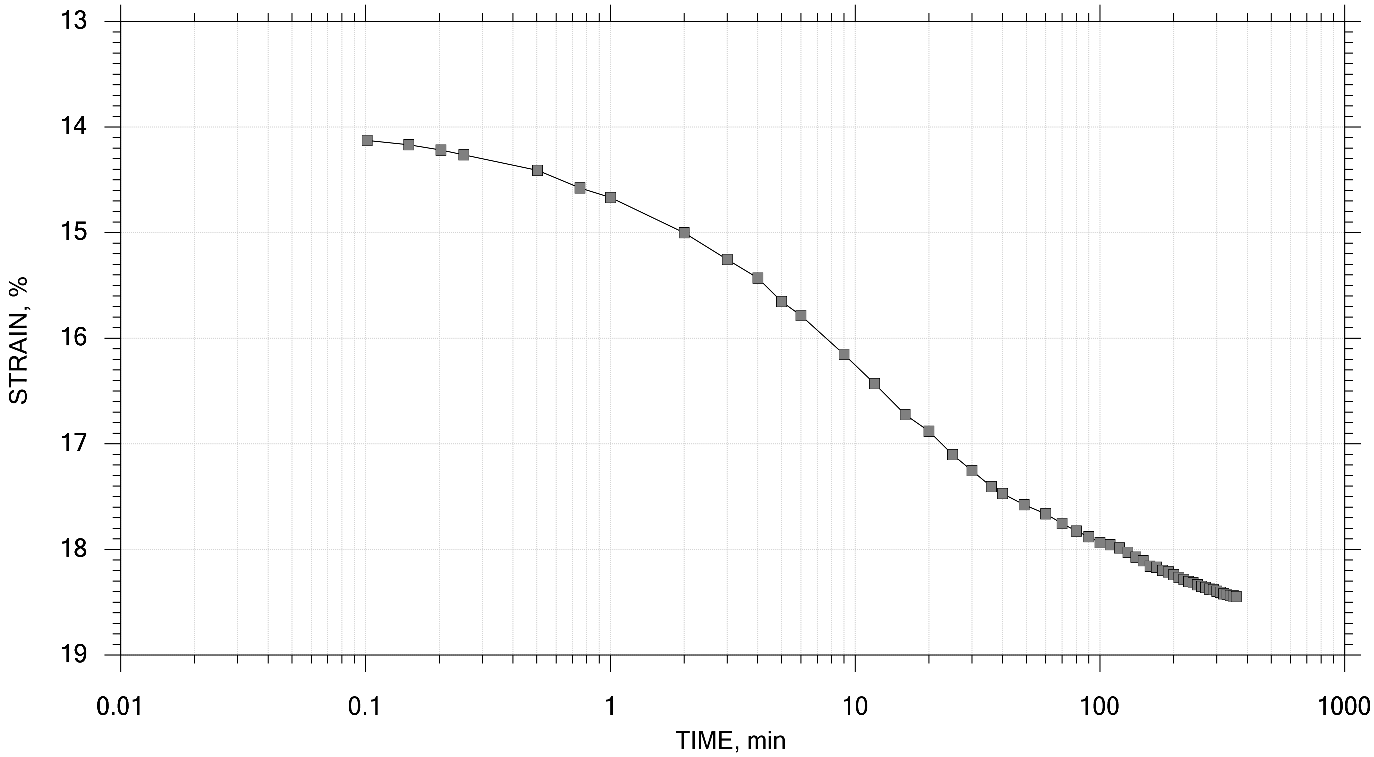
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

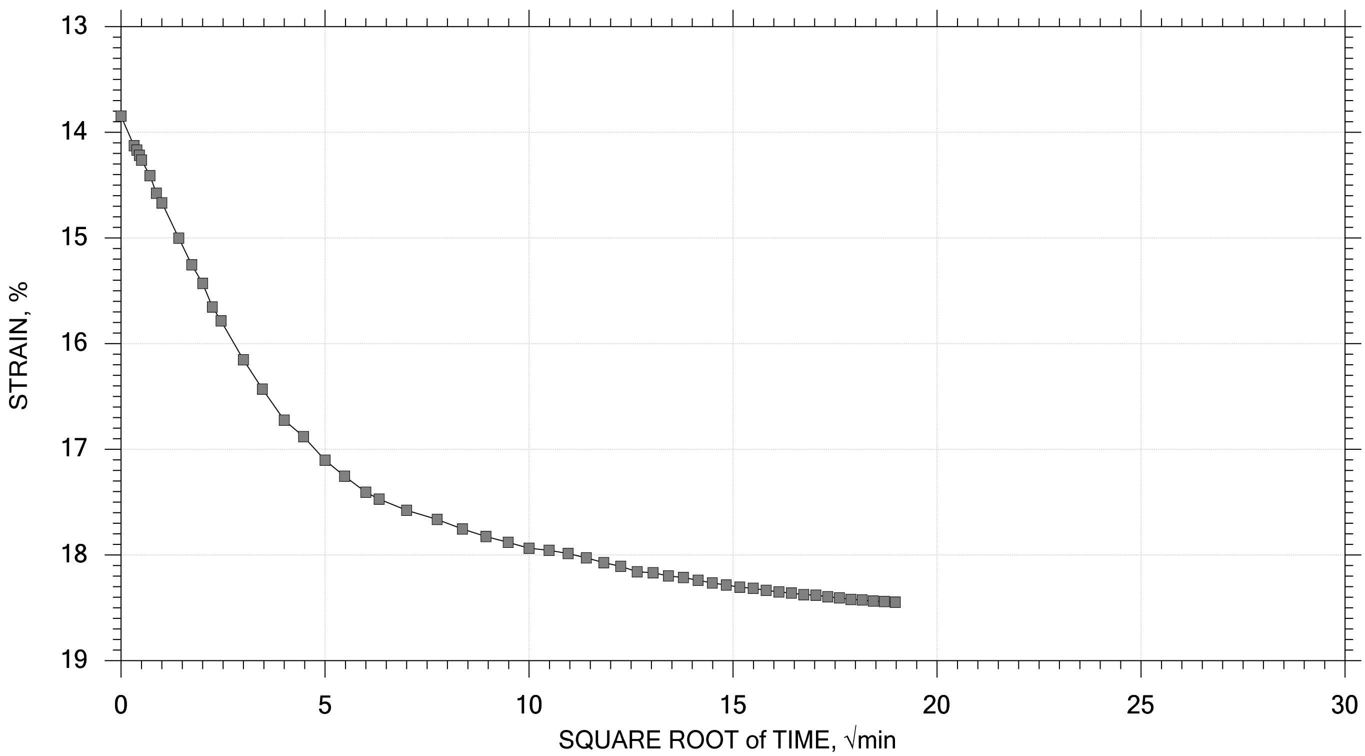
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





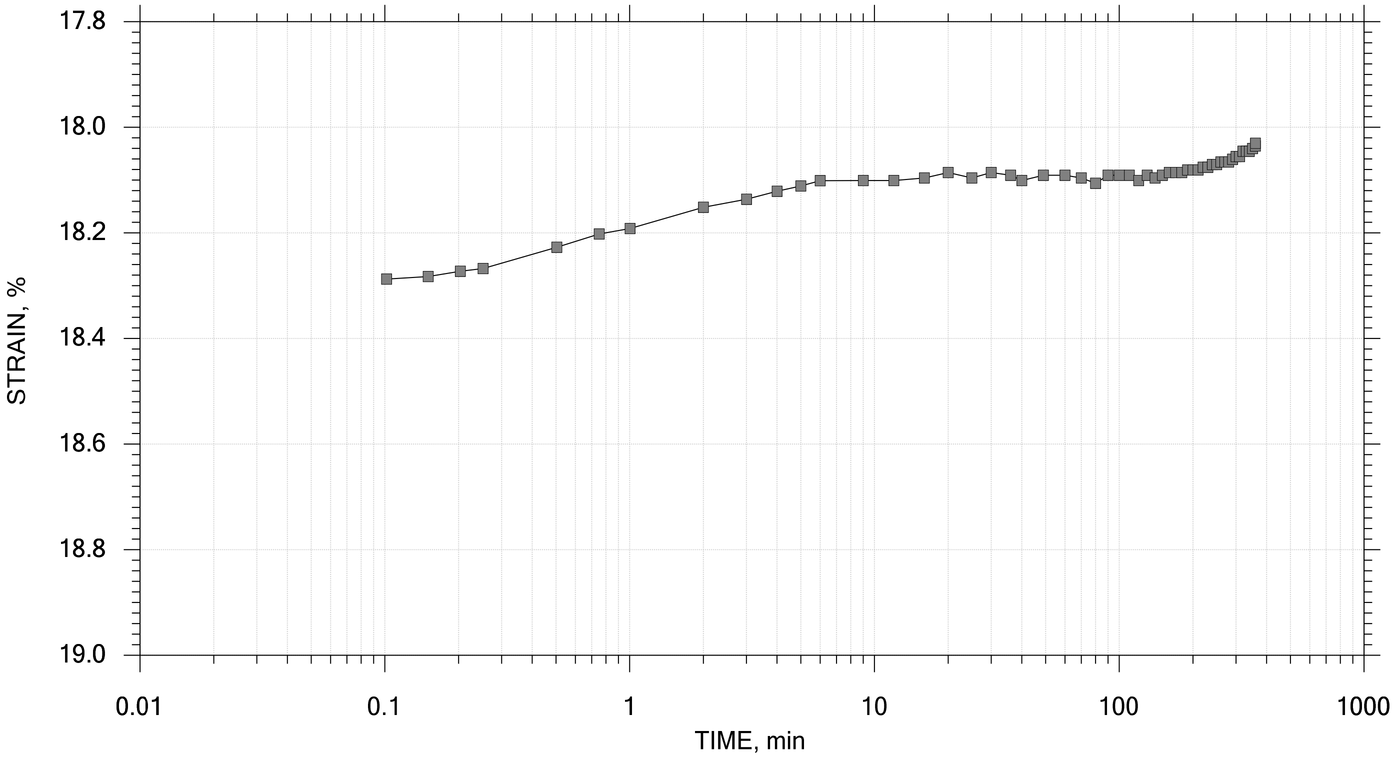
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

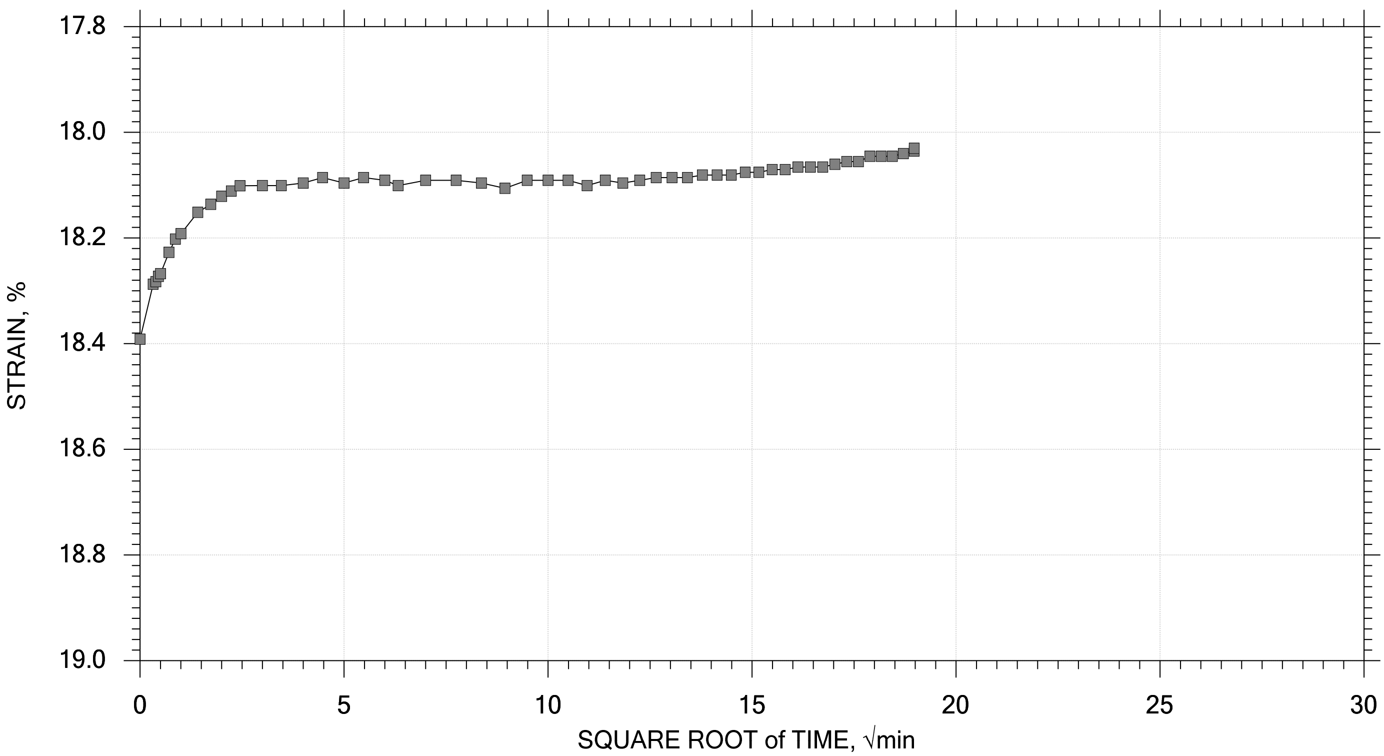
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





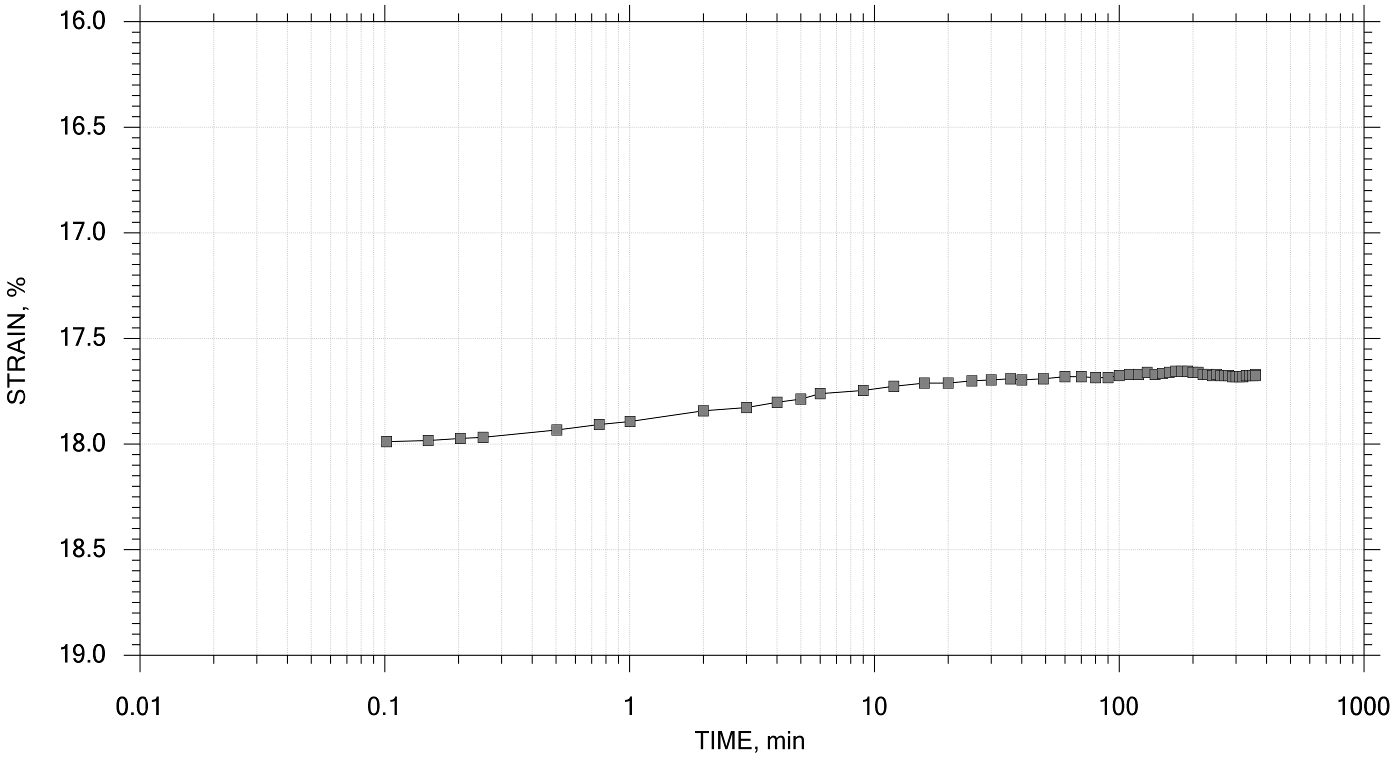
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
GeoTesting EXPRESS	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

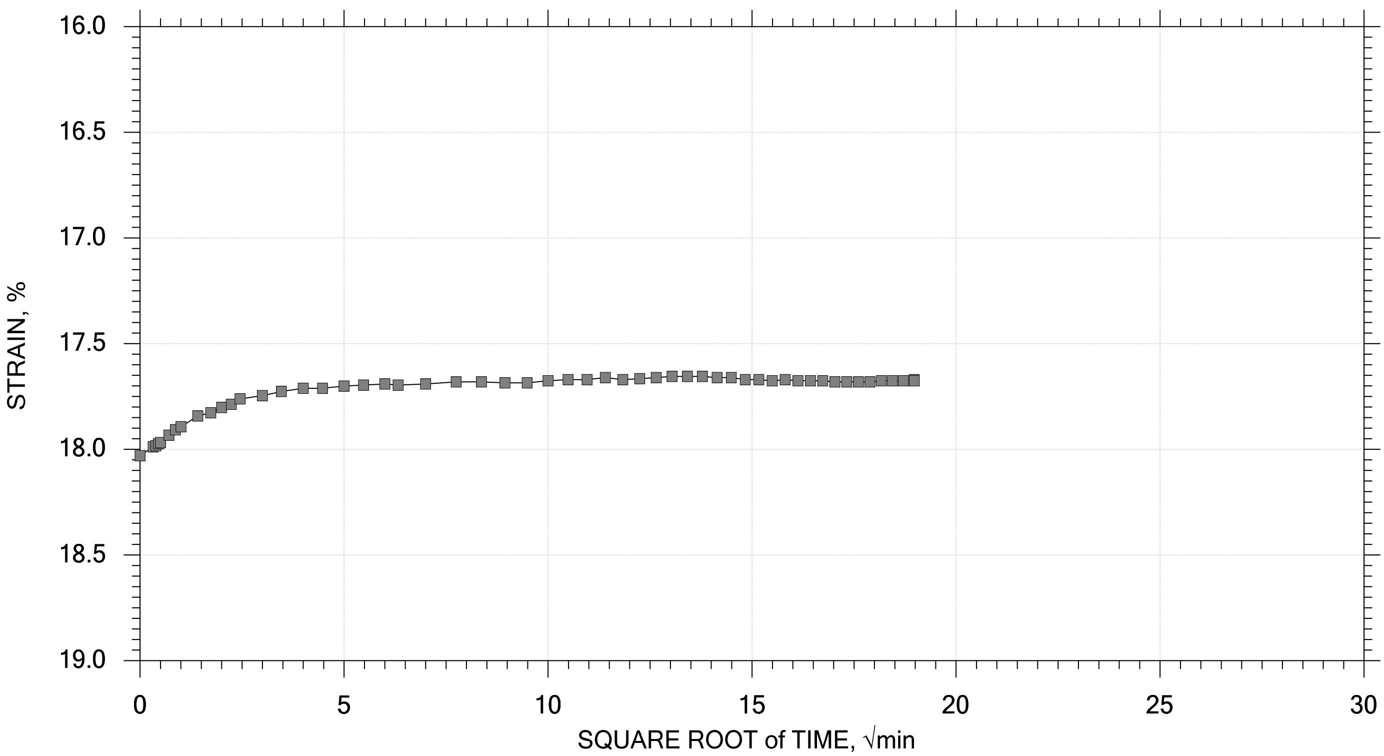
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





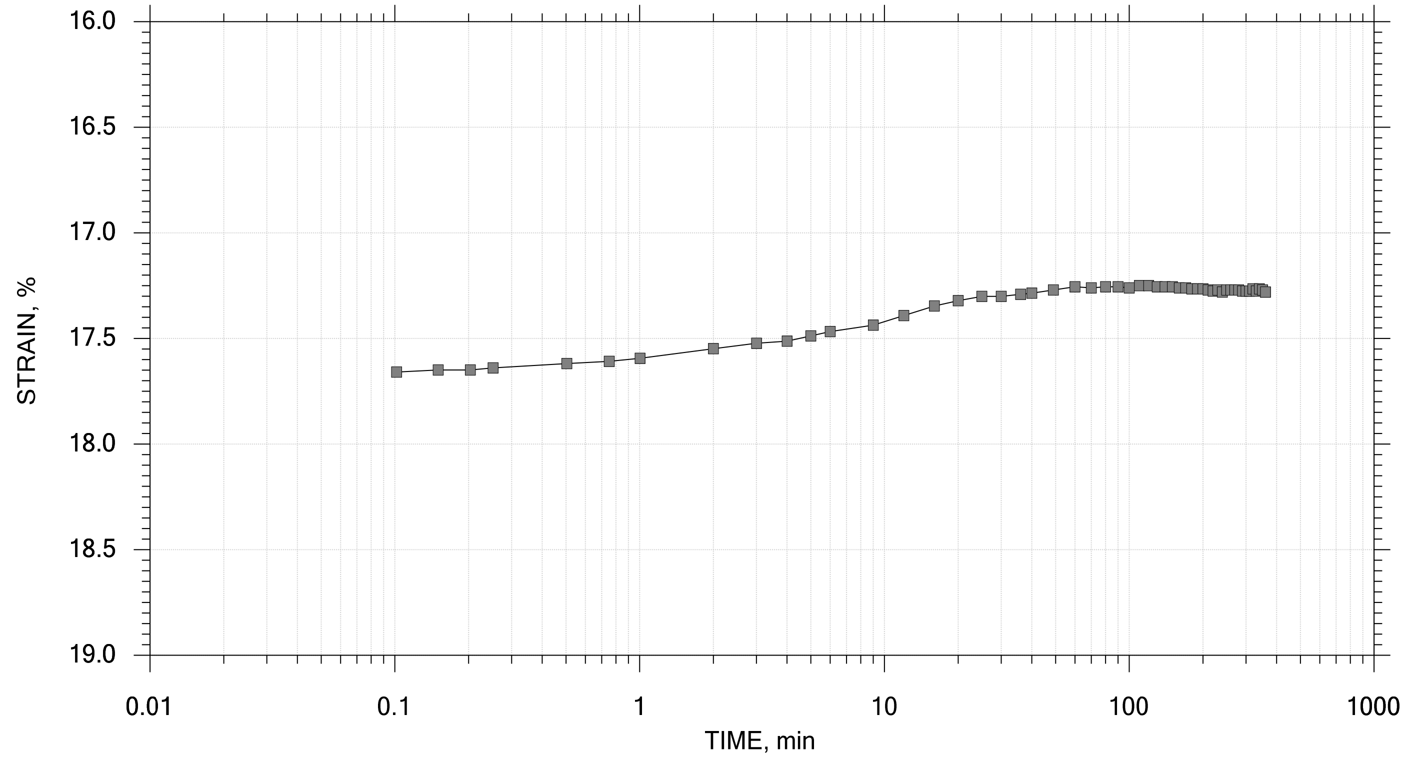
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

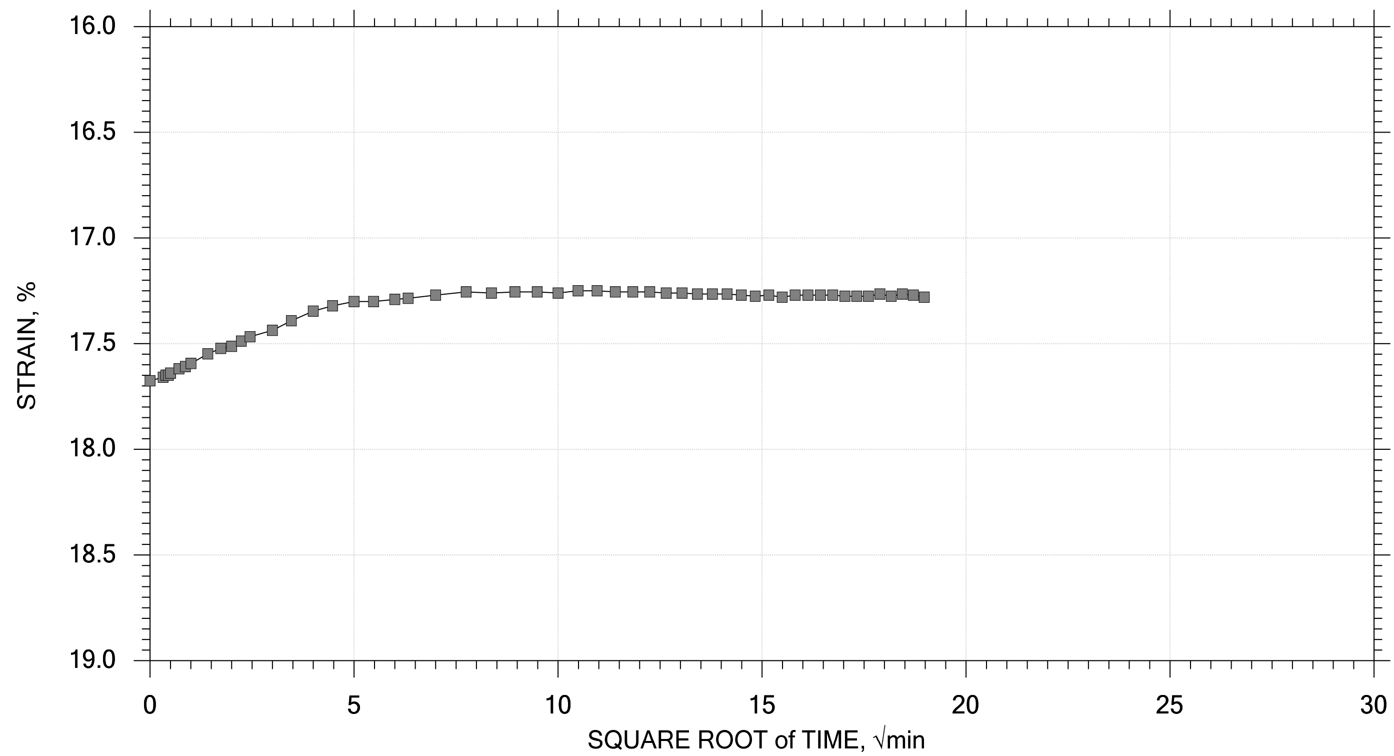
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





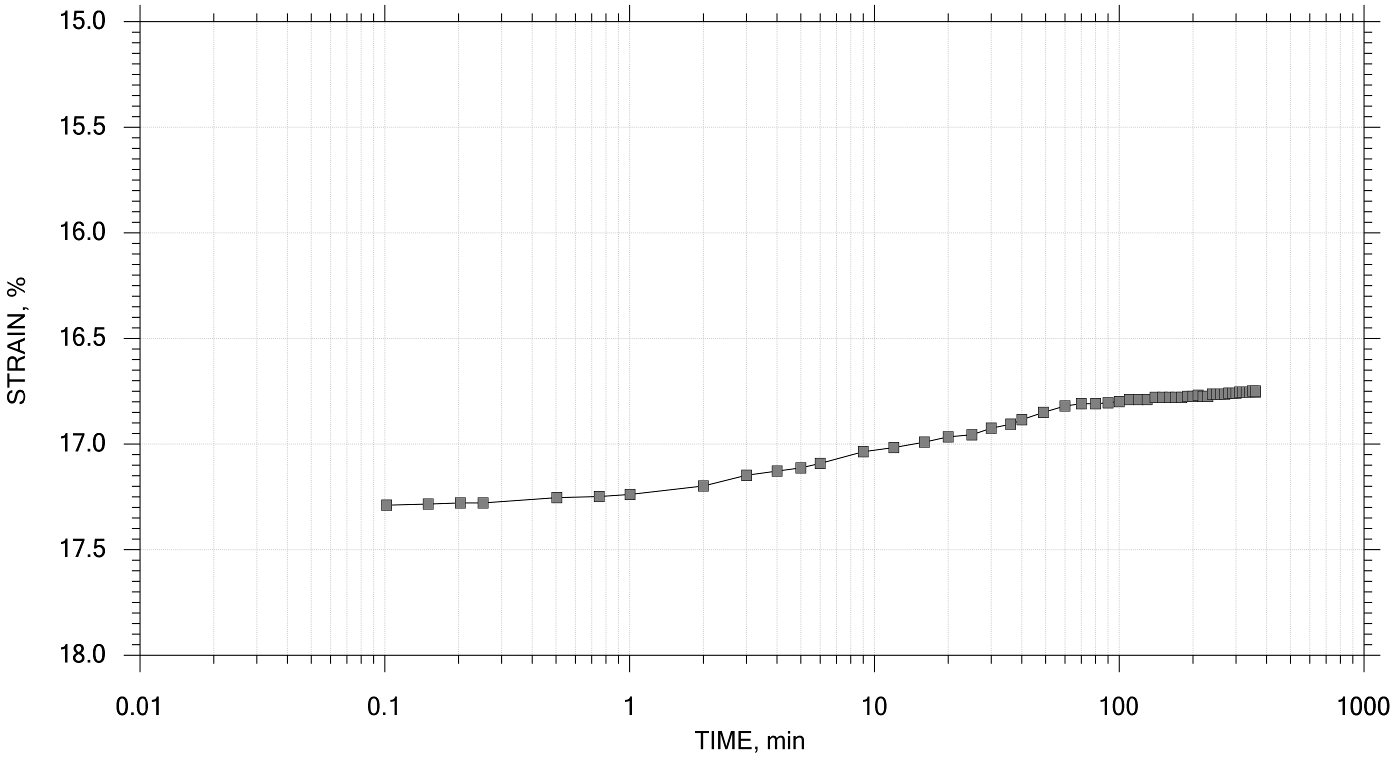
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

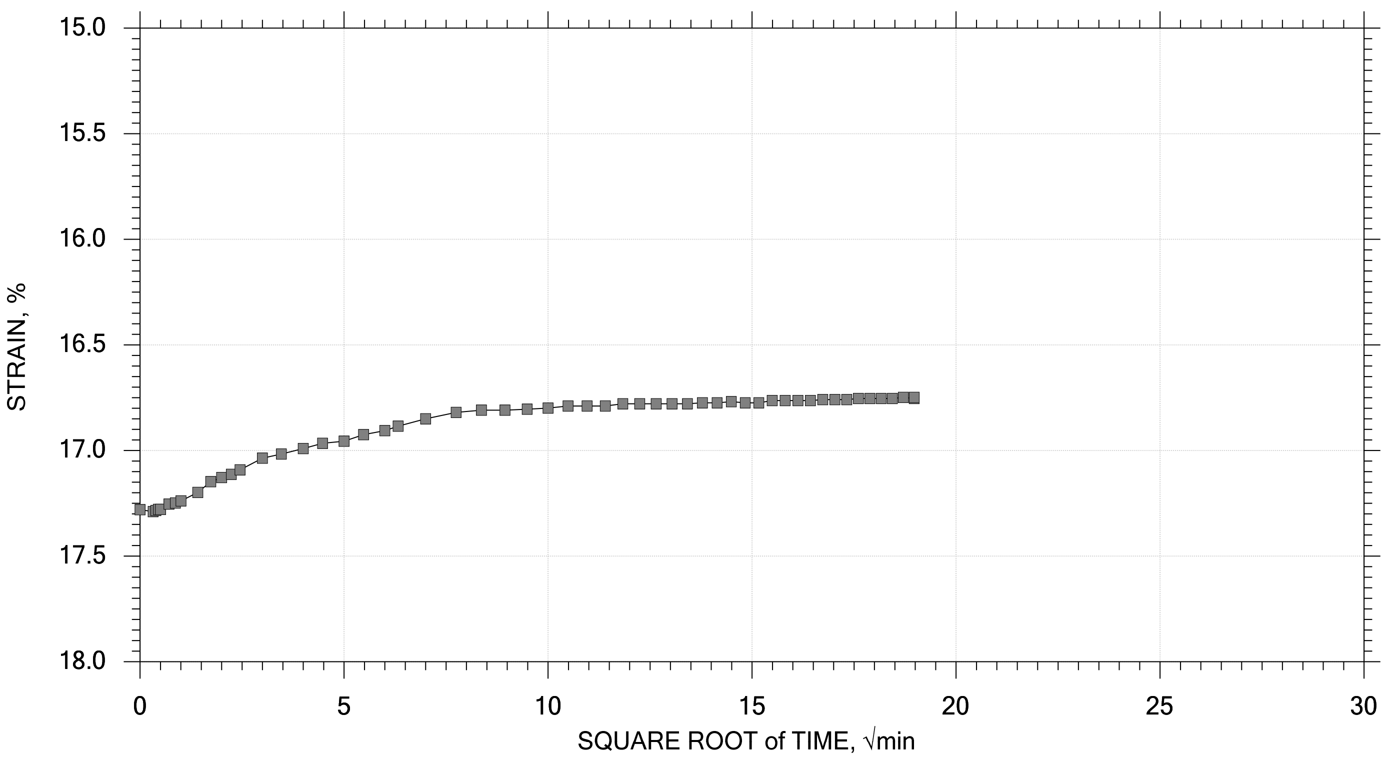
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 500 psf





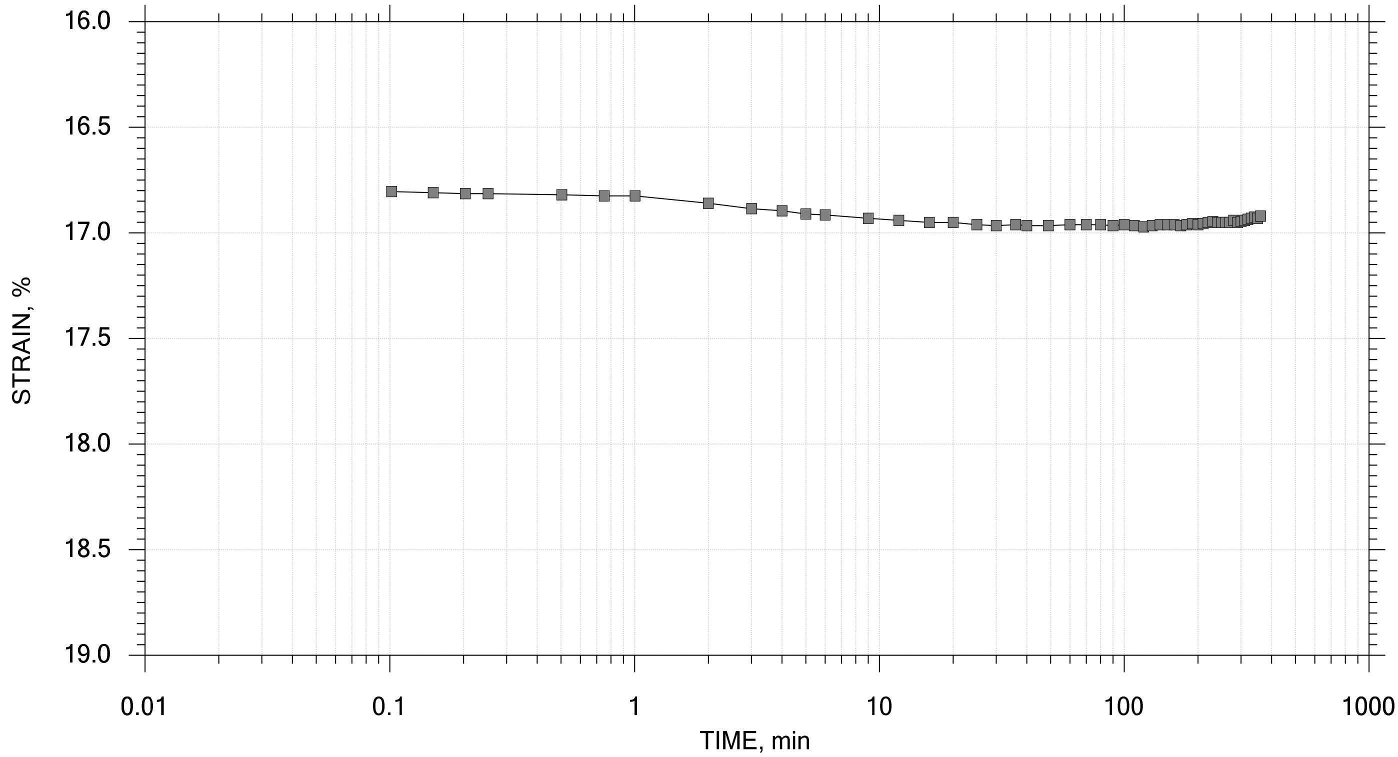
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

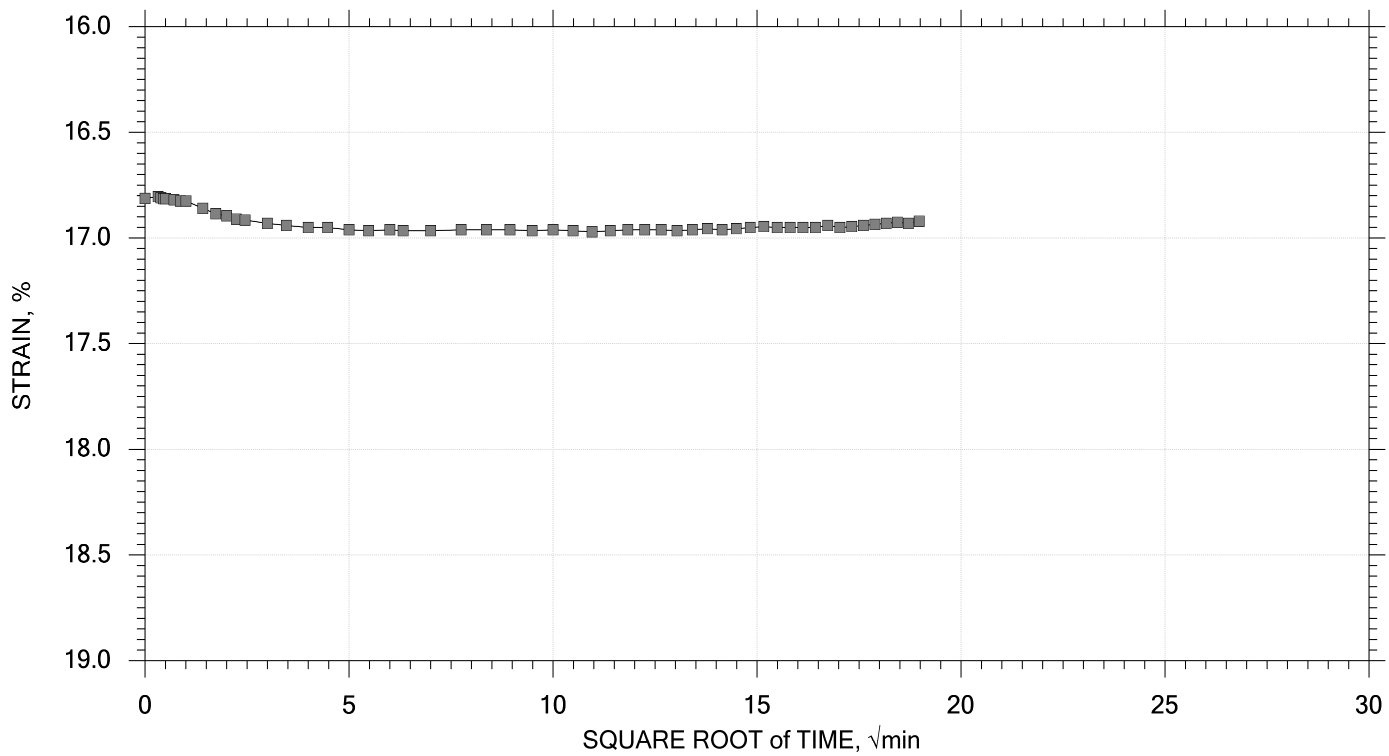
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





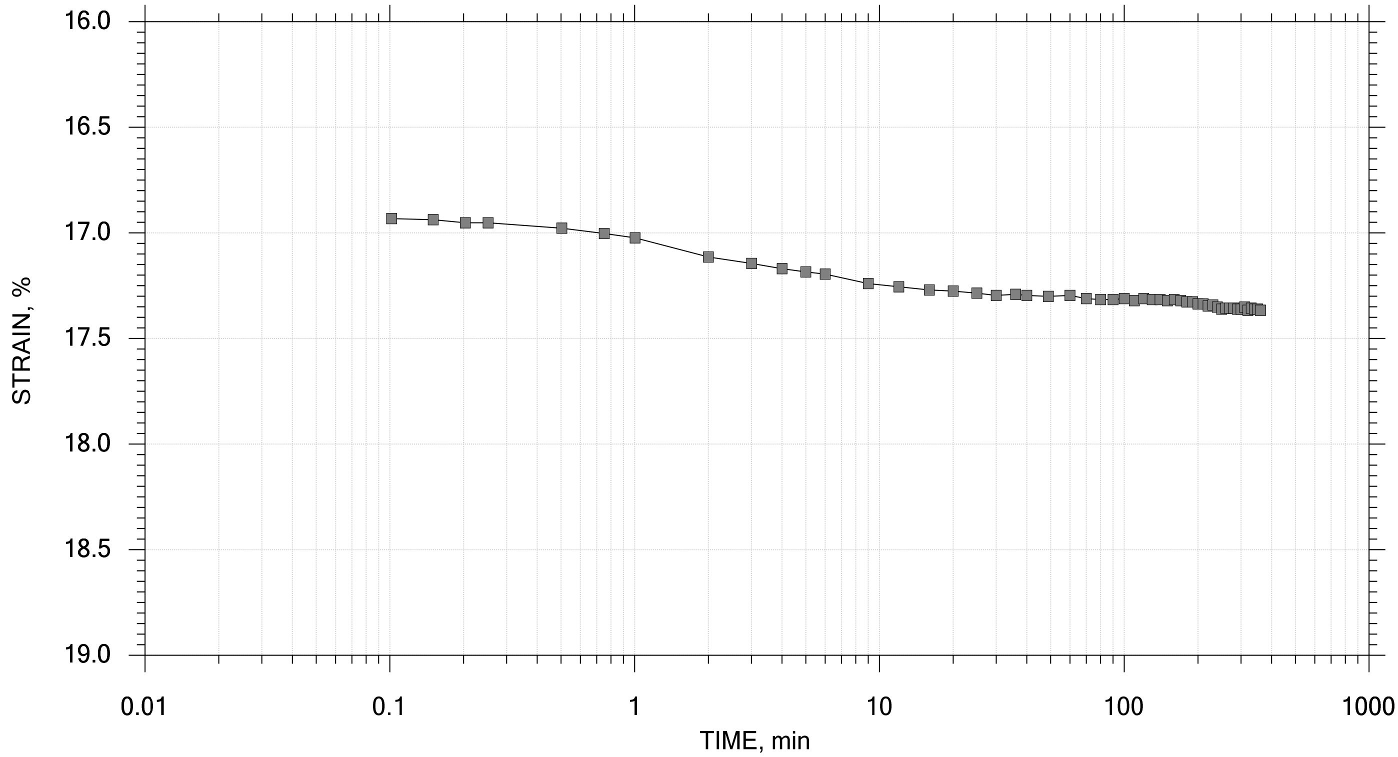
GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

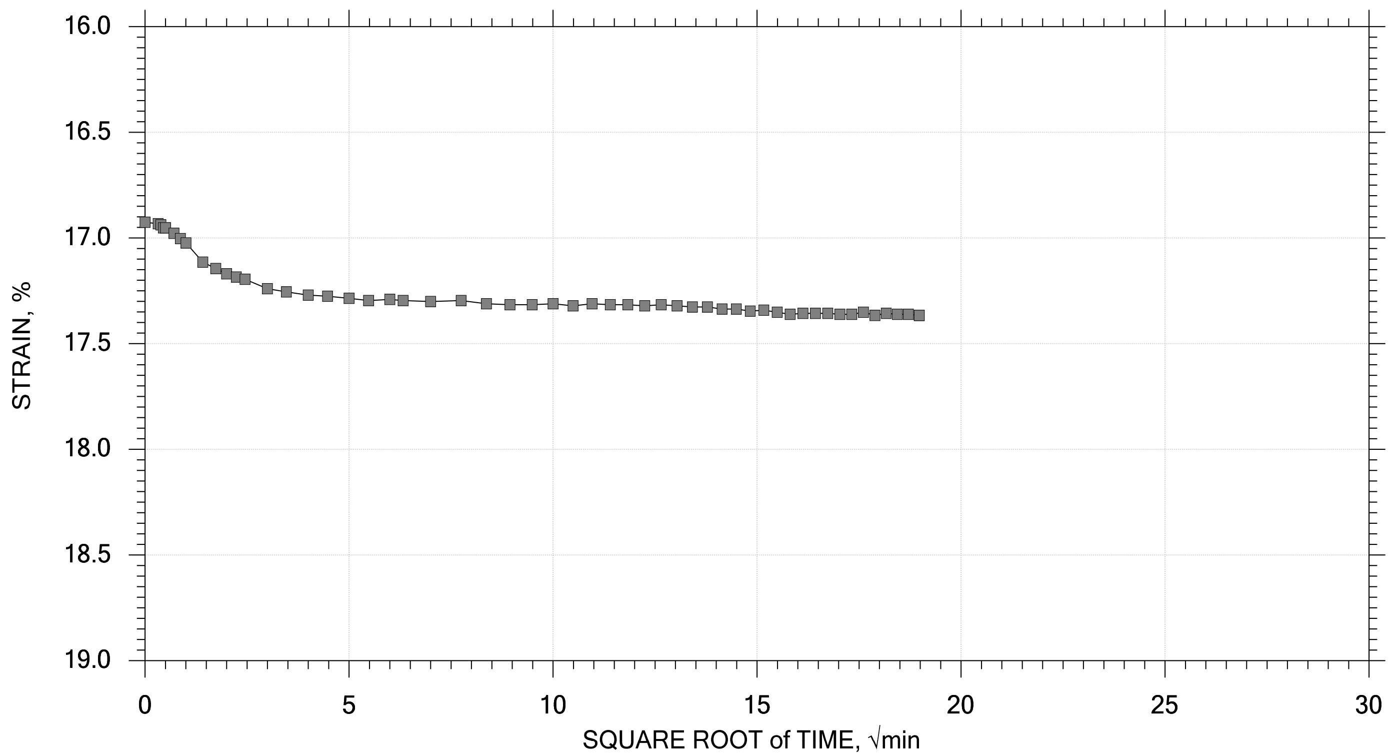
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





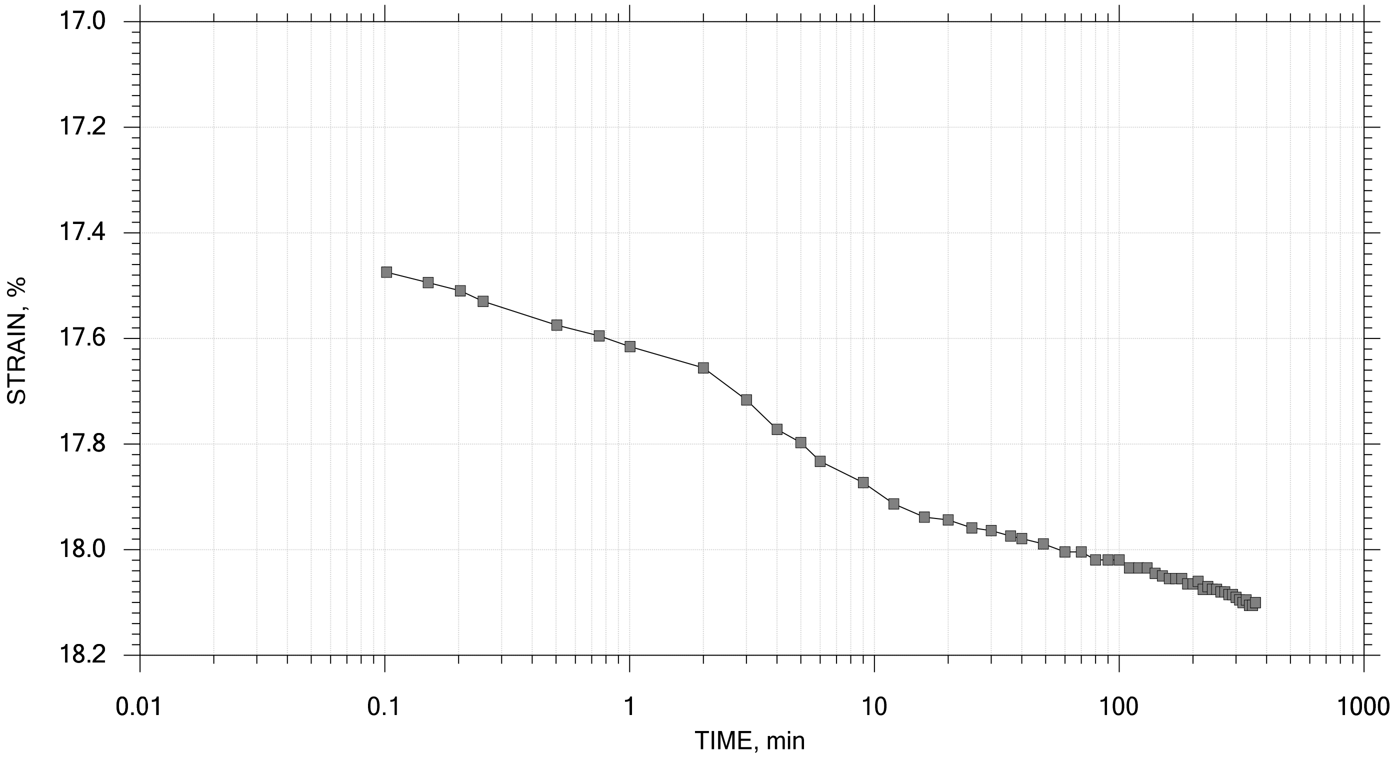
Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
Depth: 30-32 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System O		

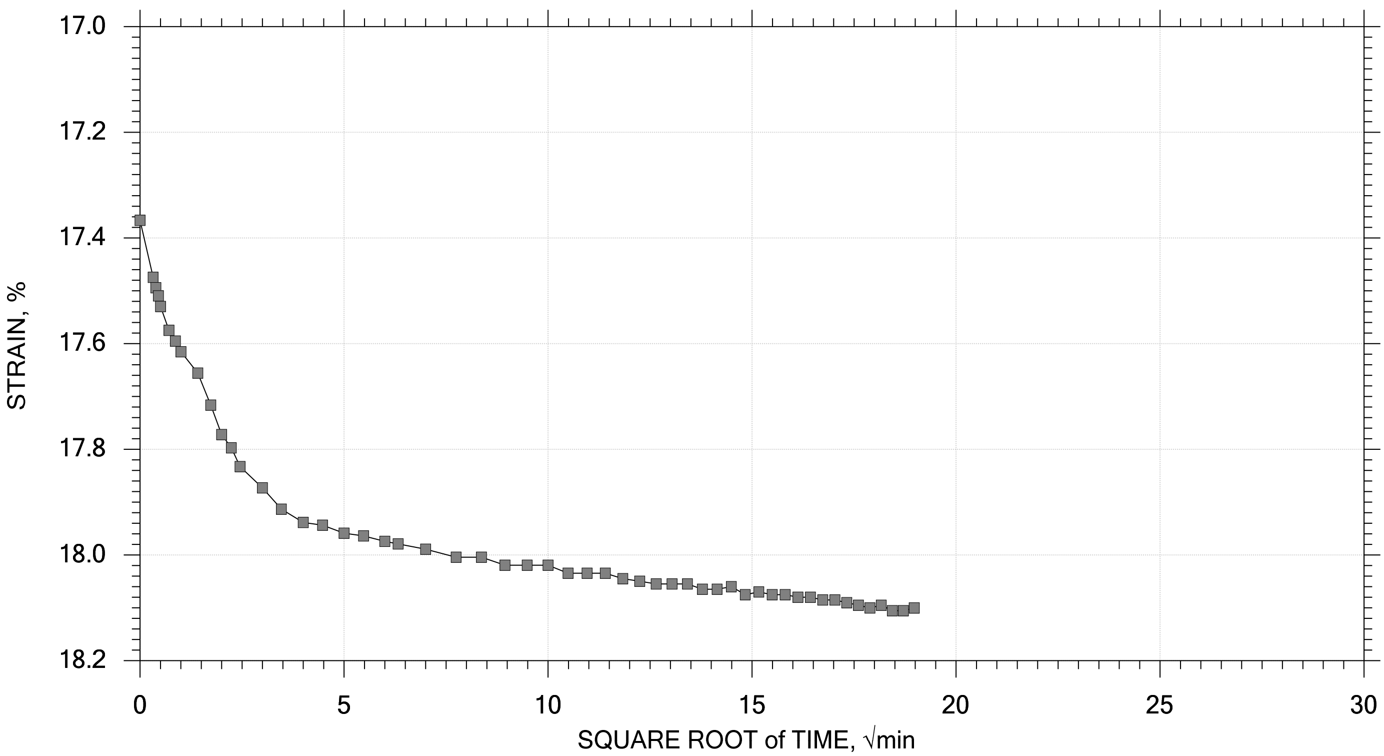
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





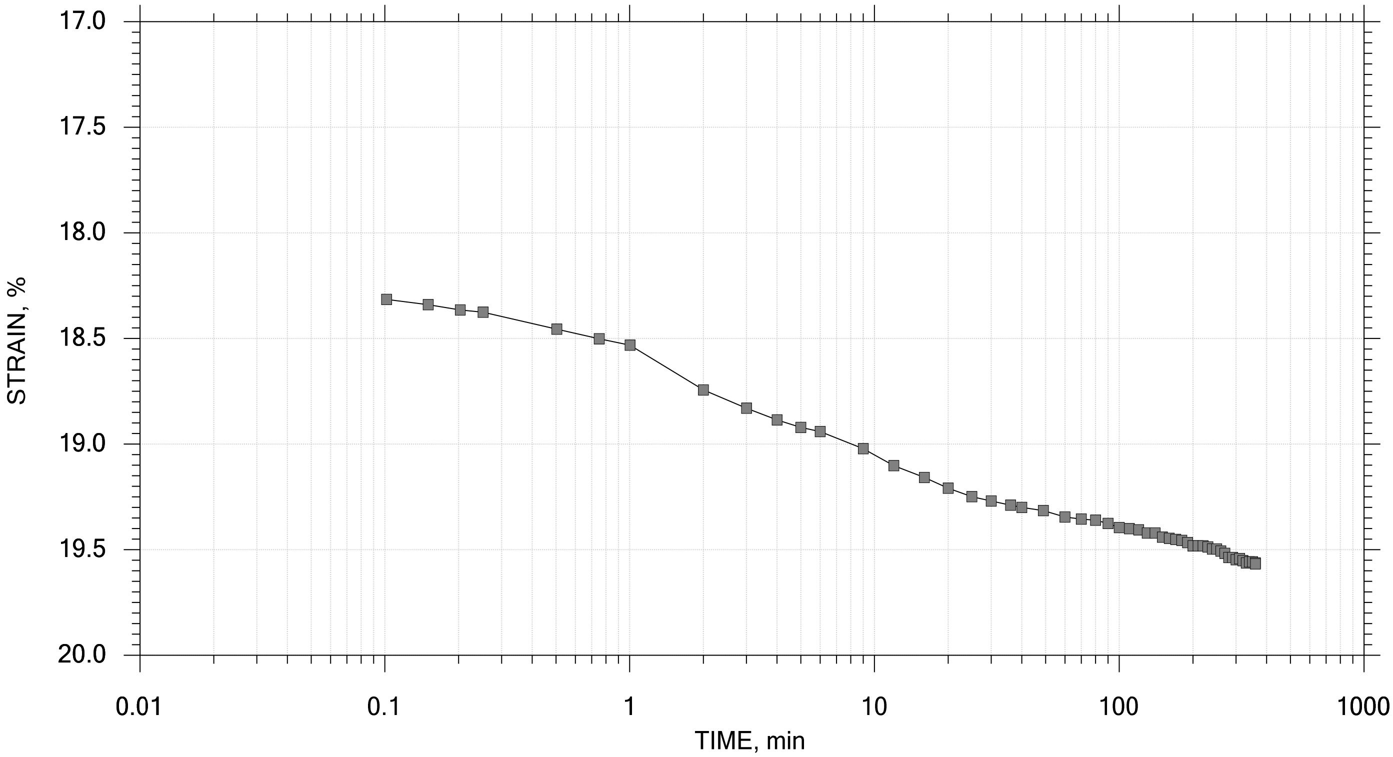
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

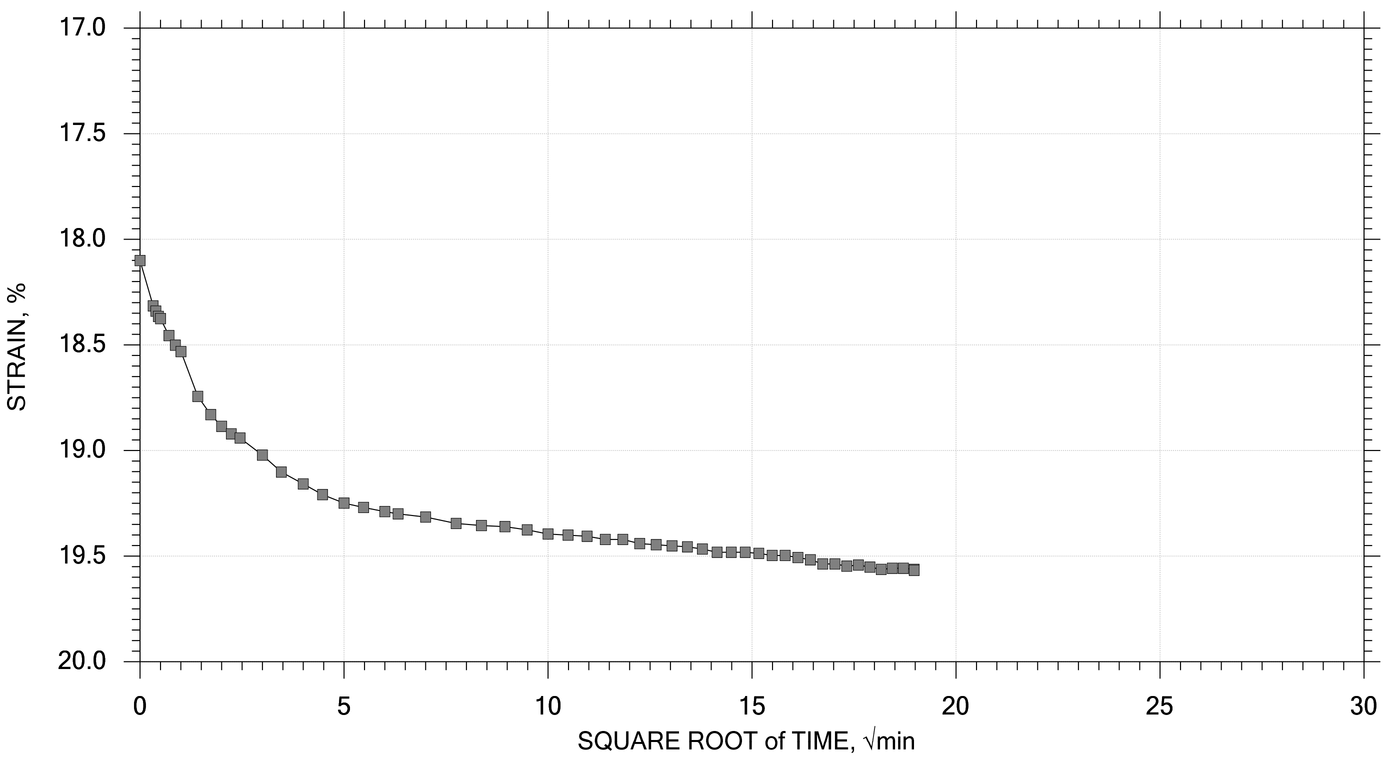
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





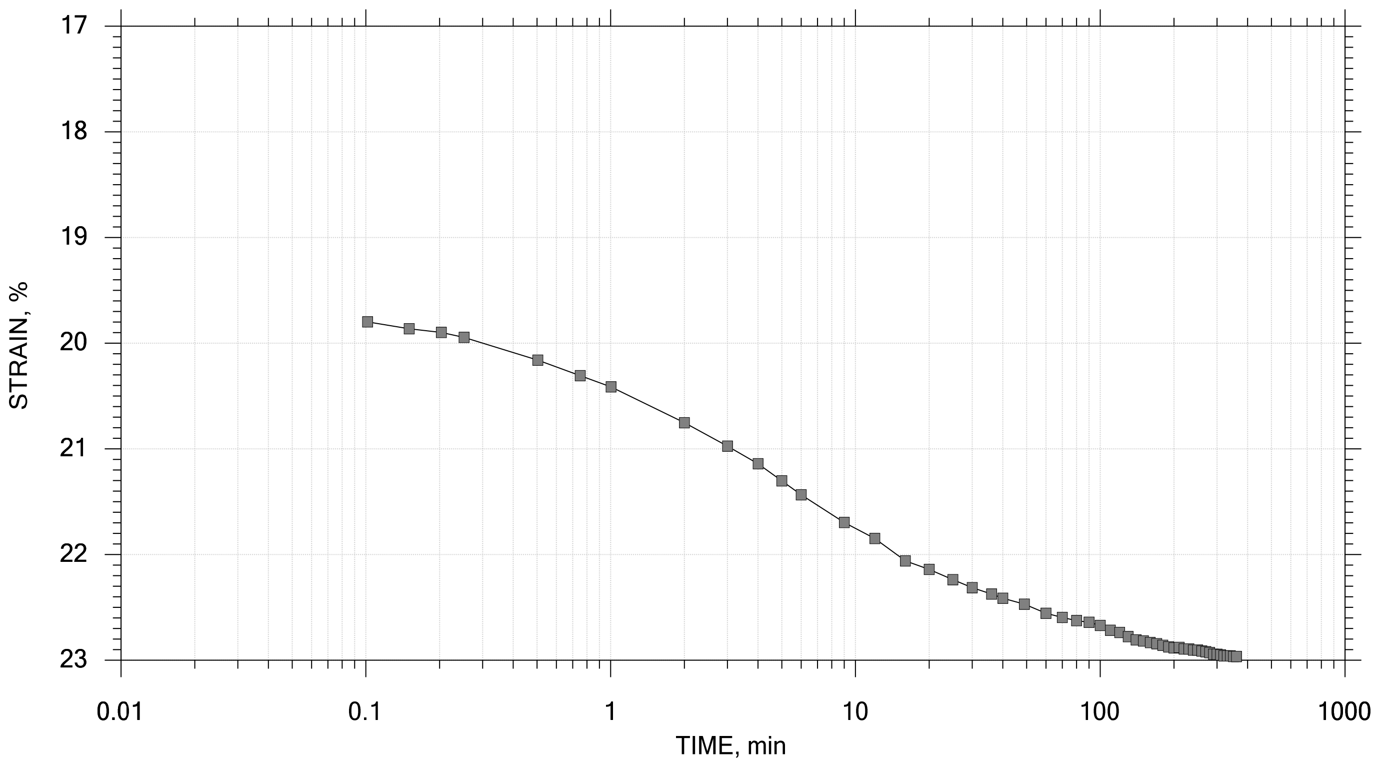
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

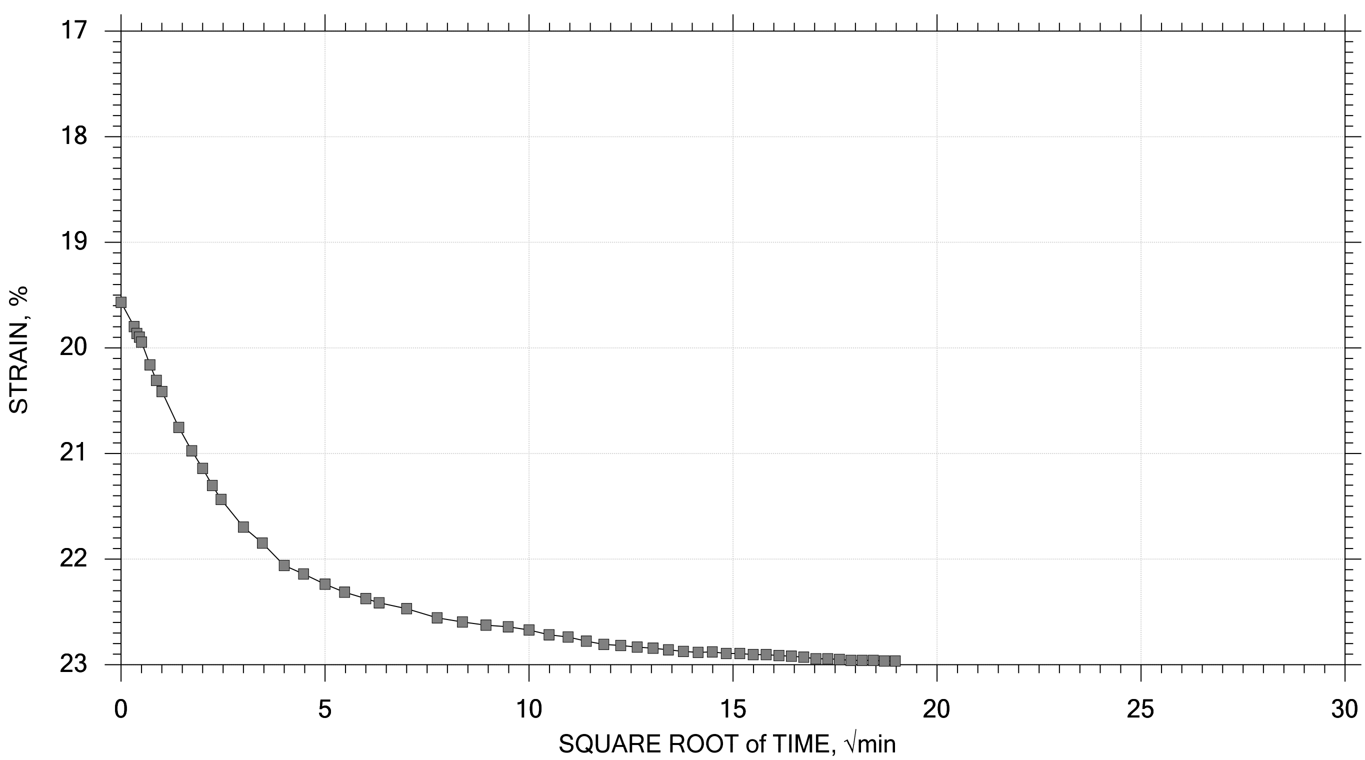
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf

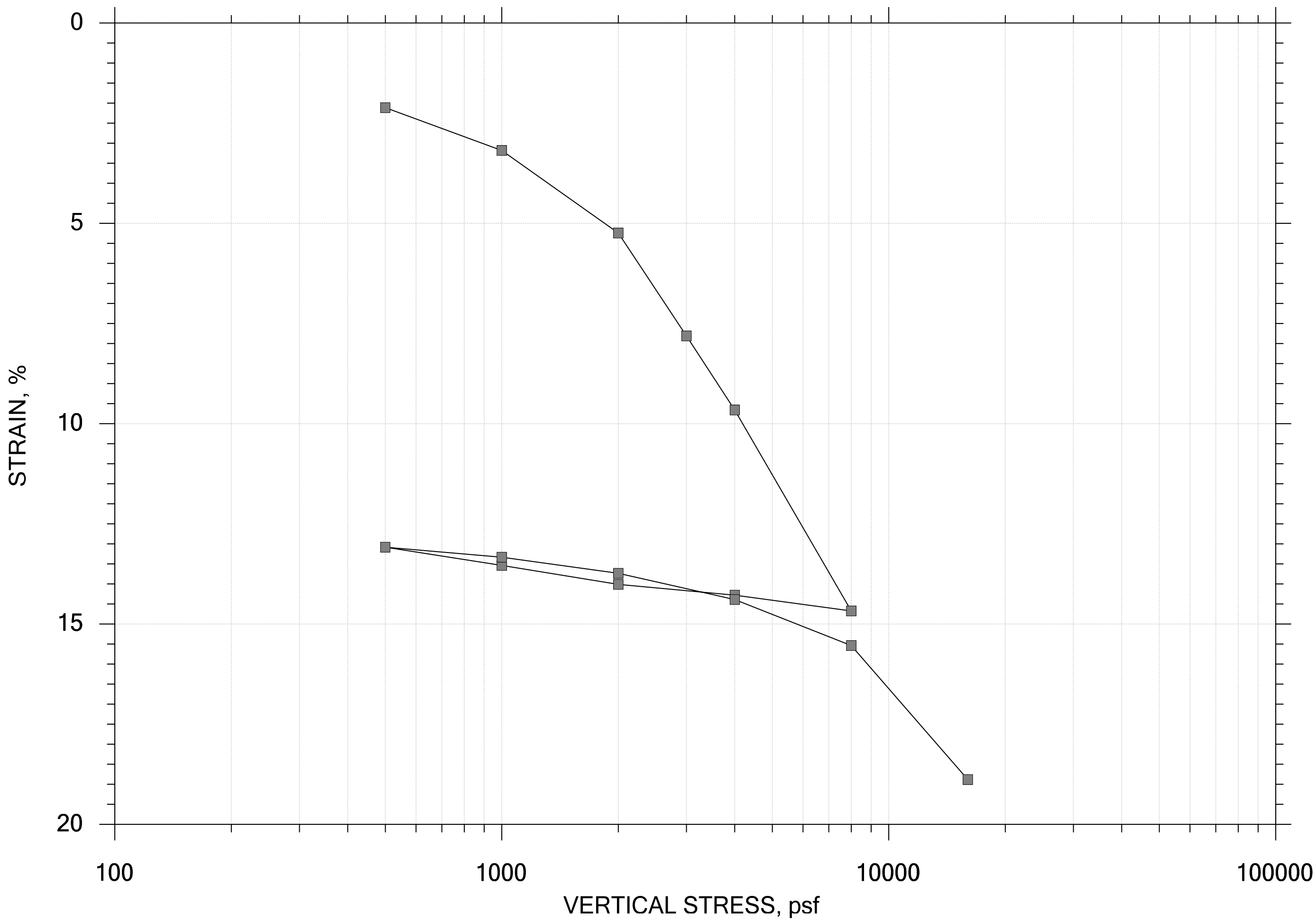


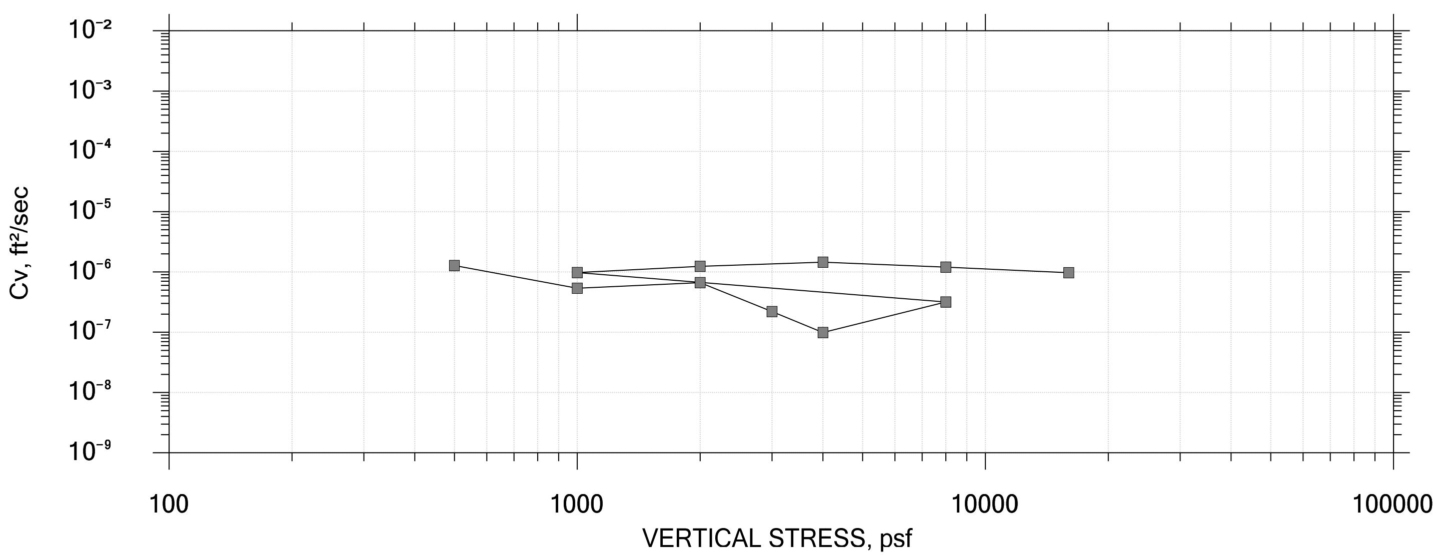


GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 07/26/18	Test No.: IP-1
	Depth: 30-32 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

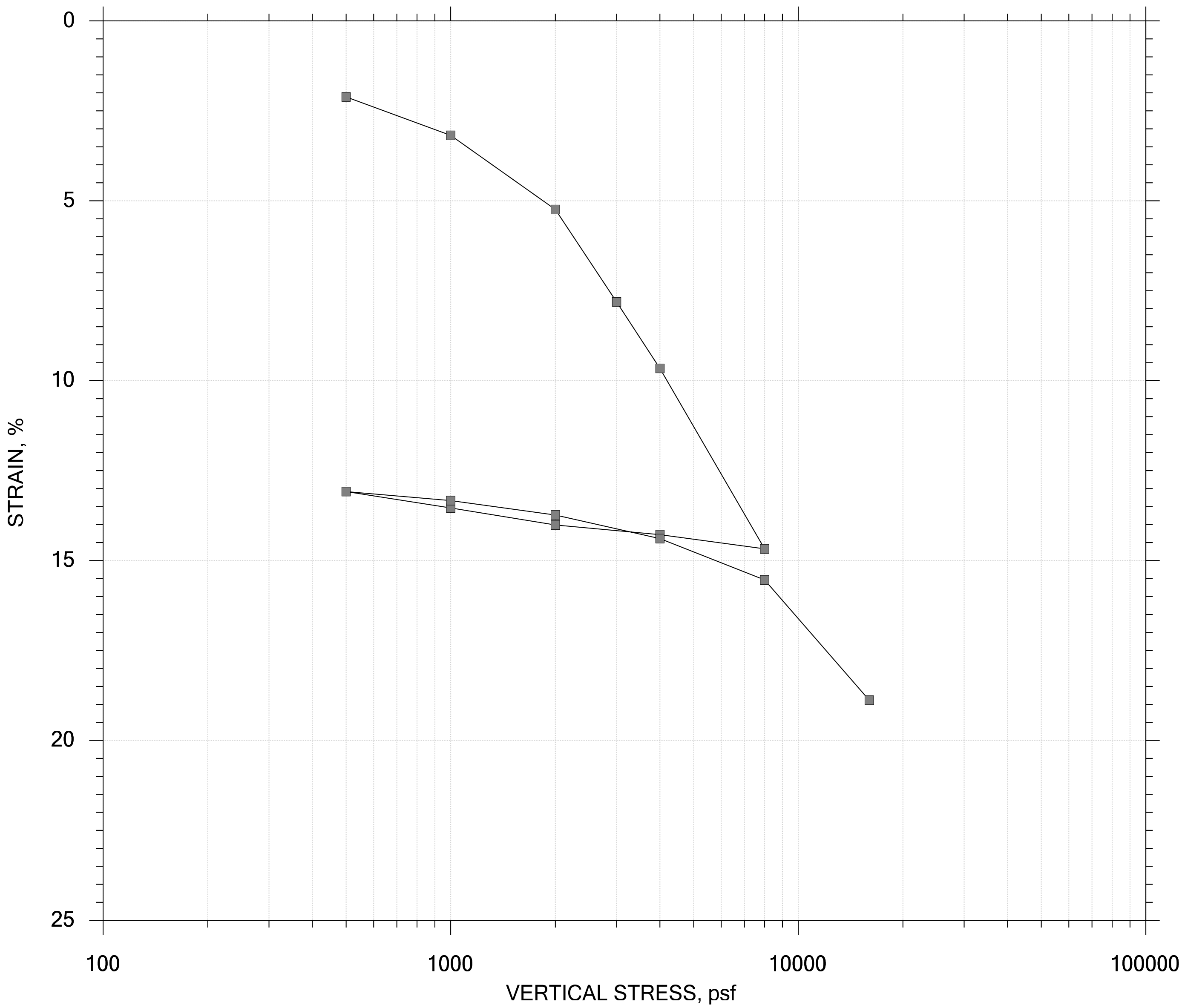




Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
Depth: 40-42 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System T		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	37.32	24.72
Preconsolidation Stress: ---				Dry Unit Weight, pcf	84.221	101.47
Compression Ratio: ---				Saturation, %	99.99	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.01	0.67
LL: 27	PL: 18	PI: 9	GS: 2.72			

GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-201
Tested By: md
Checked By: njh
Sample No.: U3
Test Date: 07/26/18
Depth: 40-42 ft
Test No.: IP-2
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System T

Estimated Specific Gravity: 2.72
Liquid Limit: 27
Specimen Diameter: 2.50 in
Initial Void Ratio: 1.01
Plastic Limit: 18
Initial Height: 1.00 in
Final Void Ratio: 0.672
Plasticity Index: 9
Final Height: 0.83 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-1075	RING		D-1574
Wt. Container + Wet Soil, gm	110.00	259.90	246.23	144.18
Wt. Container + Dry Soil, gm	81.490	219.40	219.40	117.23
Wt. Container, gm	8.2800	110.88	110.88	8.2200
Wt. Dry Soil, gm	73.210	108.52	108.52	109.01
Water Content, %	38.94	37.32	24.72	24.72
Void Ratio	---	1.01	0.672	---
Degree of Saturation, %	---	99.99	100.00	---
Dry Unit Weight, pcf	---	84.221	101.47	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Boring No.: HB-EXIT 45-201
Sample No.: U3
Test No.: IP-2

Location: Phs 2 South Portland, ME
Tested By: md
Test Date: 07/26/18
Sample Type: intact

Project No.: GTX-307957
Checked By: njh
Depth: 40-42 ft
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System T

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.02112	0.972	2.11	17.209	1.40e-006	4.22e-005	3.18e-004
2	1.00e+003	0.03178	0.950	3.18	26.479	8.78e-007	2.13e-005	1.01e-004
3	2.00e+003	0.05239	0.909	5.24	36.493	6.17e-007	2.06e-005	6.86e-005
4	3.00e+003	0.07811	0.857	7.81	127.696	1.68e-007	2.57e-005	2.33e-005
5	4.00e+003	0.09658	0.820	9.66	232.423	8.79e-008	1.85e-005	8.76e-006
6	8.00e+003	0.1467	0.719	14.7	82.823	2.29e-007	1.25e-005	1.55e-005
7	4.00e+003	0.1428	0.727	14.3	368.055	4.88e-008	9.82e-007	2.58e-007
8	2.00e+003	0.1401	0.732	14.0	18.265	9.90e-007	1.35e-006	7.22e-006
9	1.00e+003	0.1354	0.742	13.5	18.528	9.85e-007	4.74e-006	2.52e-005
10	500.	0.1308	0.751	13.1	135.063	1.37e-007	9.08e-006	6.69e-006
11	1.00e+003	0.1333	0.746	13.3	11.129	1.66e-006	4.99e-006	4.47e-005
12	2.00e+003	0.1373	0.738	13.7	21.144	8.68e-007	4.03e-006	1.89e-005
13	4.00e+003	0.1439	0.724	14.4	17.741	1.02e-006	3.27e-006	1.80e-005
14	8.00e+003	0.1553	0.701	15.5	21.435	8.28e-007	2.87e-006	1.28e-005
15	1.60e+004	0.1888	0.634	18.9	17.604	9.55e-007	4.18e-006	2.16e-005

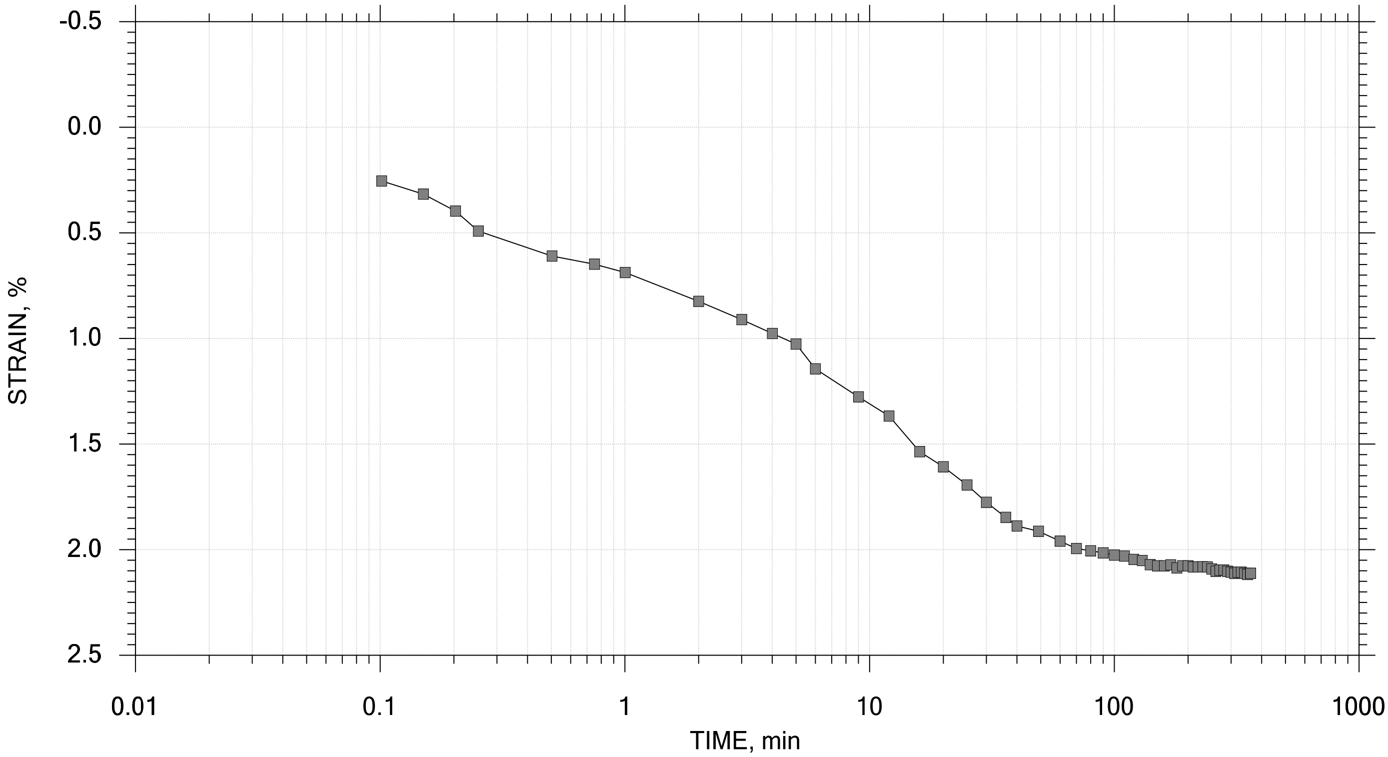
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.02112	0.972	2.11	0.000	0.00e+000	4.22e-005	0.00e+000	0.00e+000
2	1.00e+003	0.03178	0.950	3.18	12.360	4.37e-007	2.13e-005	5.03e-005	0.00e+000
3	2.00e+003	0.05239	0.909	5.24	8.055	6.49e-007	2.06e-005	7.22e-005	0.00e+000
4	3.00e+003	0.07811	0.857	7.81	0.000	0.00e+000	2.57e-005	0.00e+000	0.00e+000
5	4.00e+003	0.09658	0.820	9.66	0.000	0.00e+000	1.85e-005	0.00e+000	0.00e+000
6	8.00e+003	0.1467	0.719	14.7	15.404	2.85e-007	1.25e-005	1.93e-005	0.00e+000
7	4.00e+003	0.1428	0.727	14.3	0.000	0.00e+000	9.82e-007	0.00e+000	0.00e+000
8	2.00e+003	0.1401	0.732	14.0	0.000	0.00e+000	1.35e-006	0.00e+000	0.00e+000
9	1.00e+003	0.1354	0.742	13.5	0.000	0.00e+000	4.74e-006	0.00e+000	0.00e+000
10	500.	0.1308	0.751	13.1	27.115	1.58e-007	9.08e-006	7.74e-006	0.00e+000
11	1.00e+003	0.1333	0.746	13.3	0.000	0.00e+000	4.99e-006	0.00e+000	0.00e+000
12	2.00e+003	0.1373	0.738	13.7	0.000	0.00e+000	4.03e-006	0.00e+000	0.00e+000
13	4.00e+003	0.1439	0.724	14.4	2.896	1.45e-006	3.27e-006	2.56e-005	0.00e+000
14	8.00e+003	0.1553	0.701	15.5	2.966	1.39e-006	2.87e-006	2.15e-005	0.00e+000
15	1.60e+004	0.1888	0.634	18.9	4.236	9.22e-007	4.18e-006	2.08e-005	0.00e+000

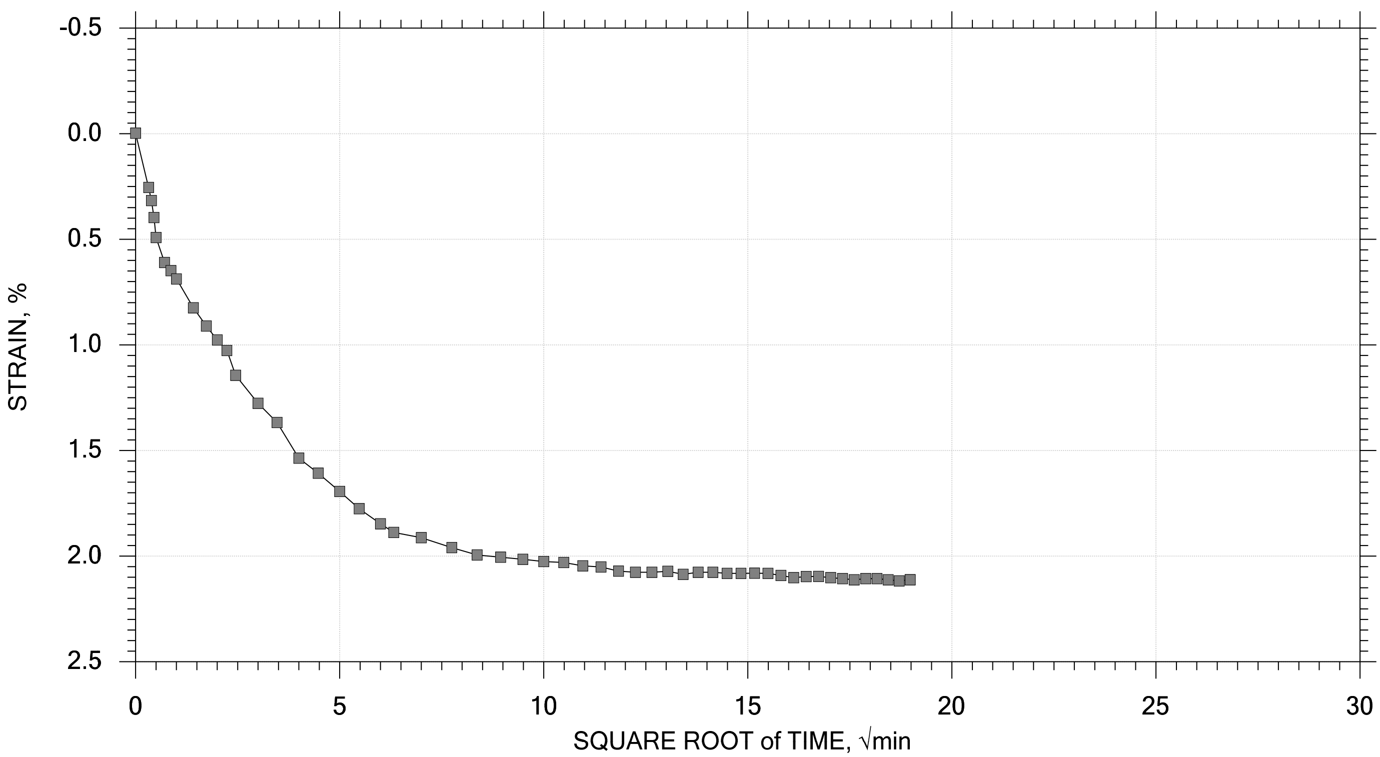
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





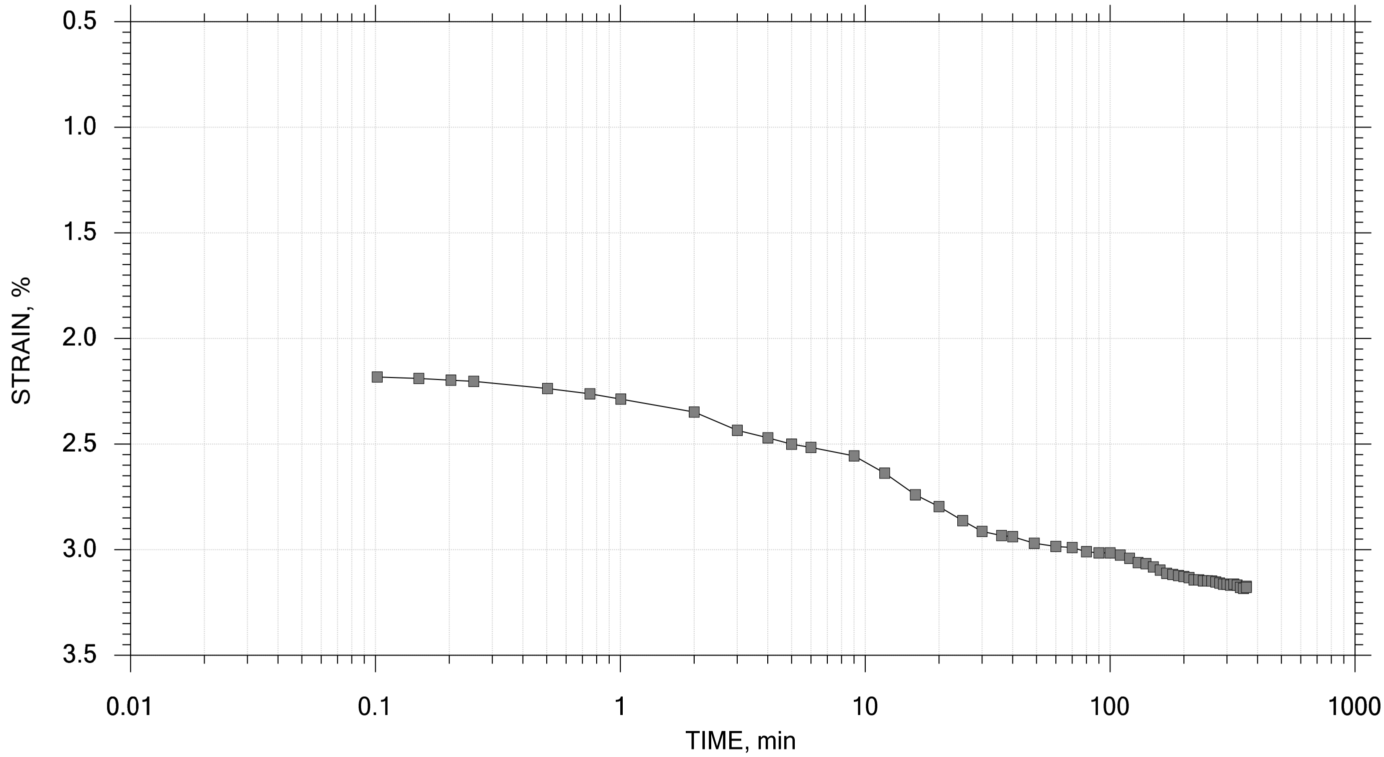
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

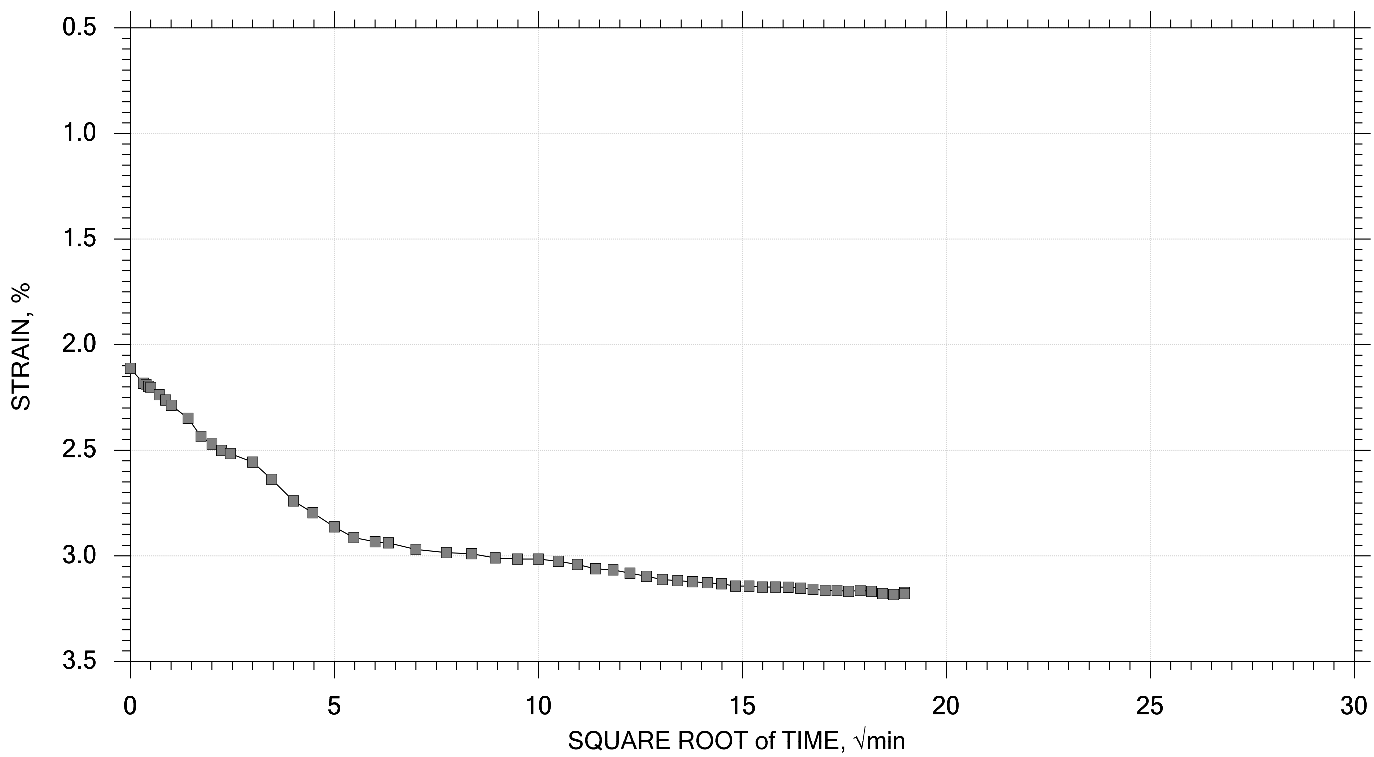
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





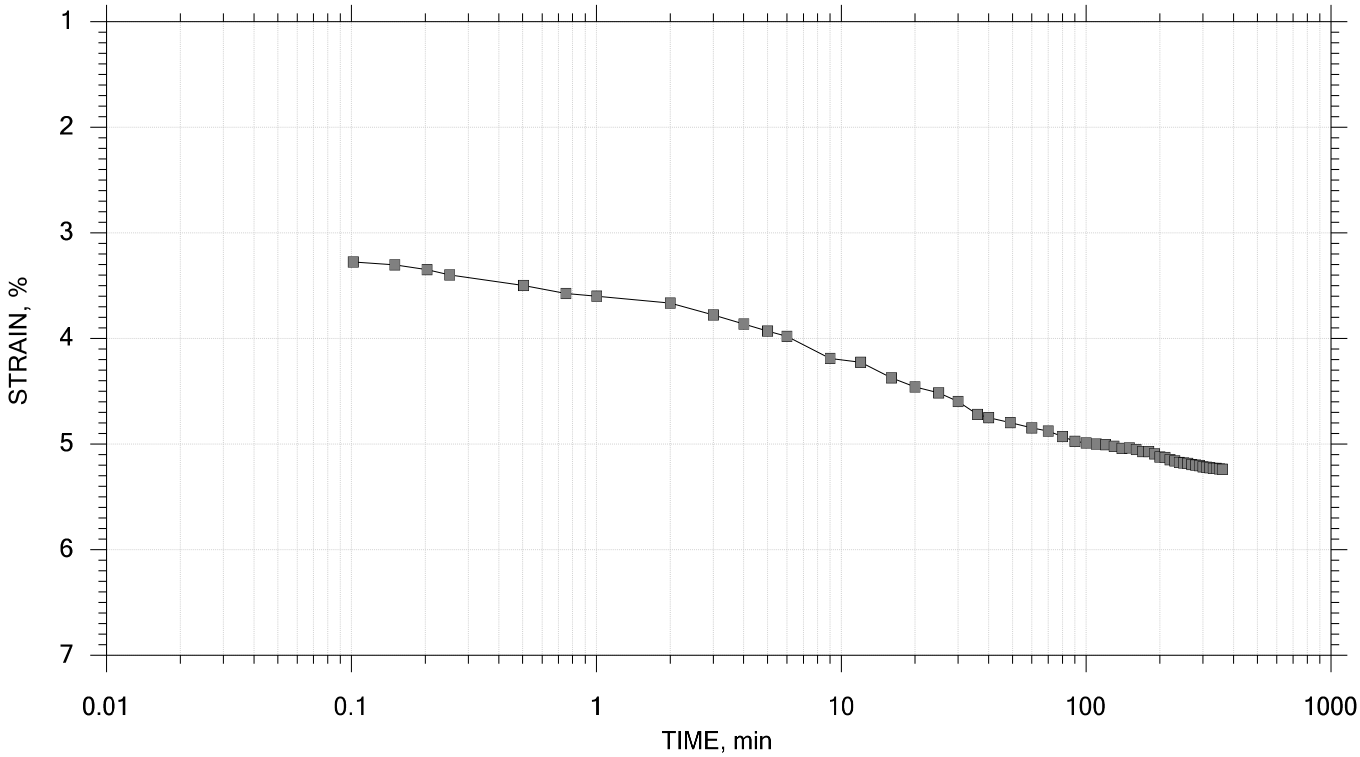
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

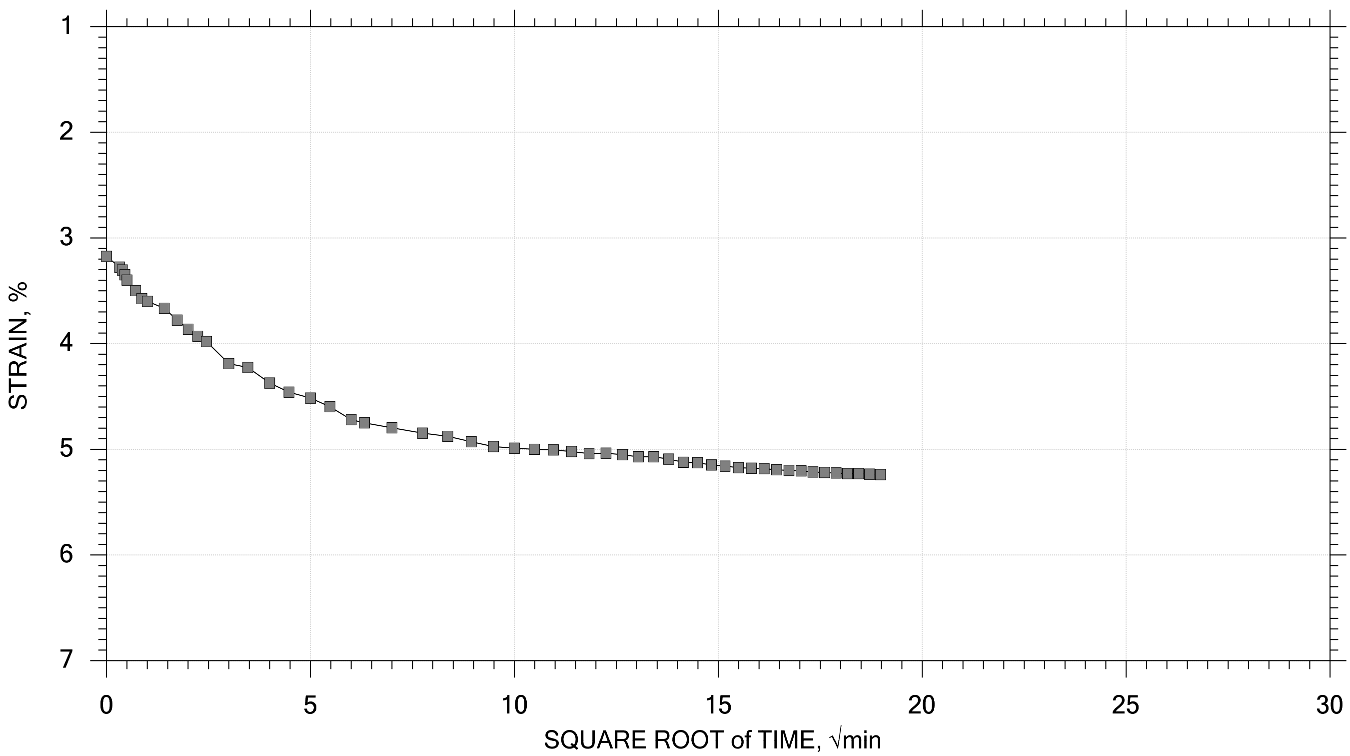
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





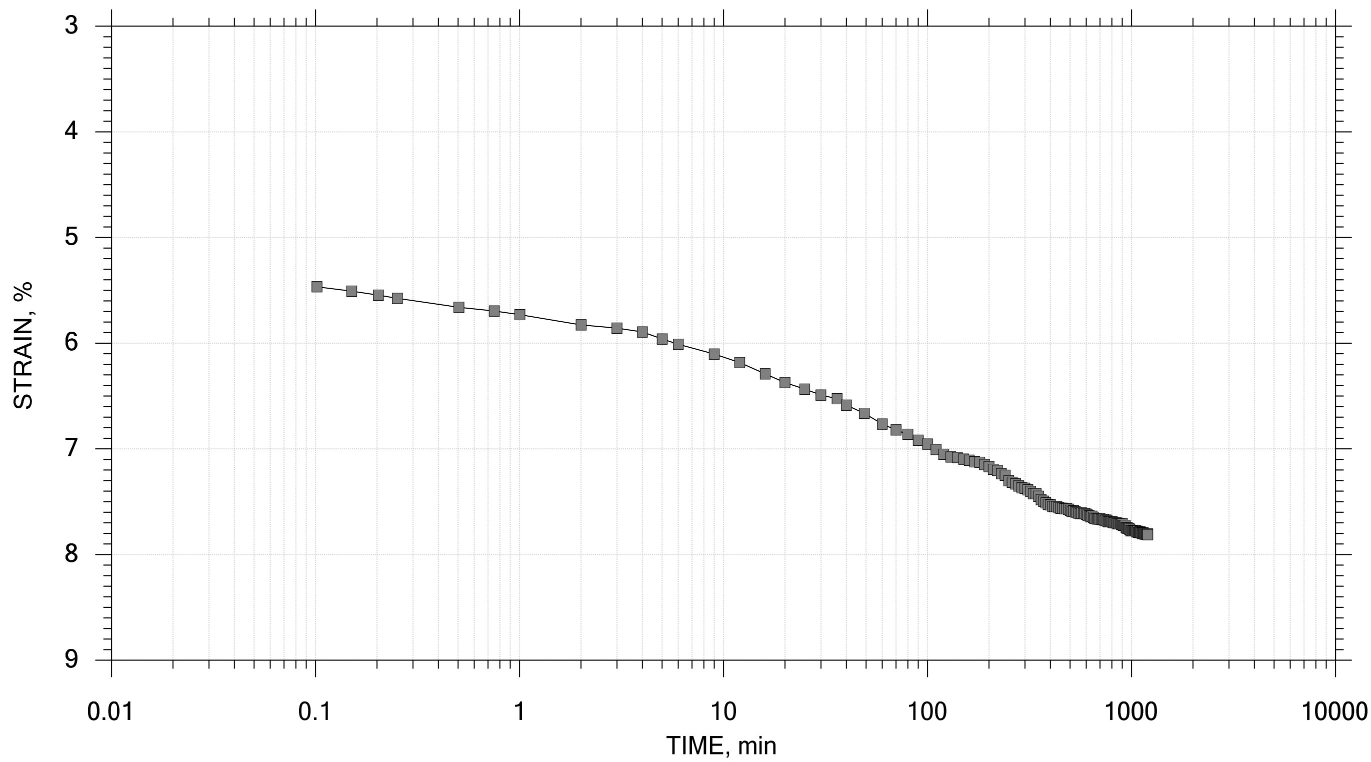
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

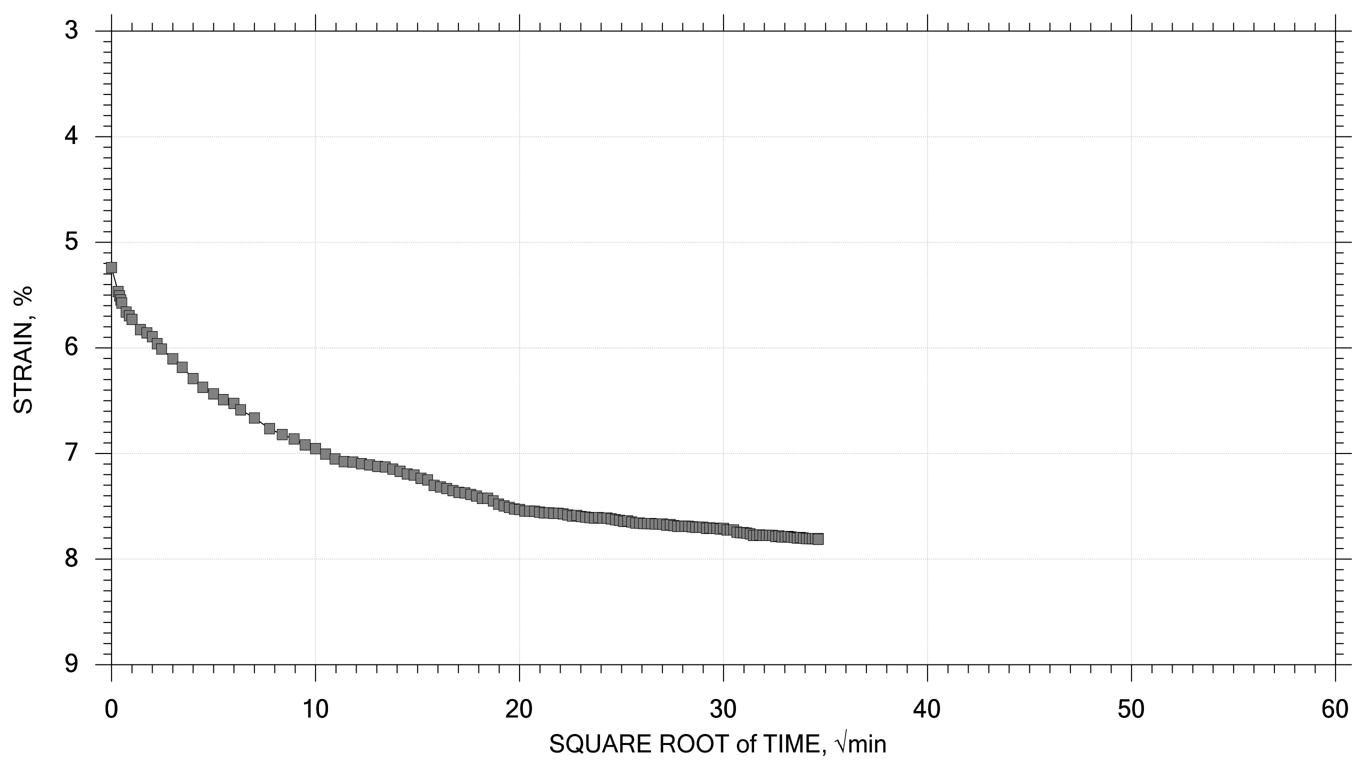
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





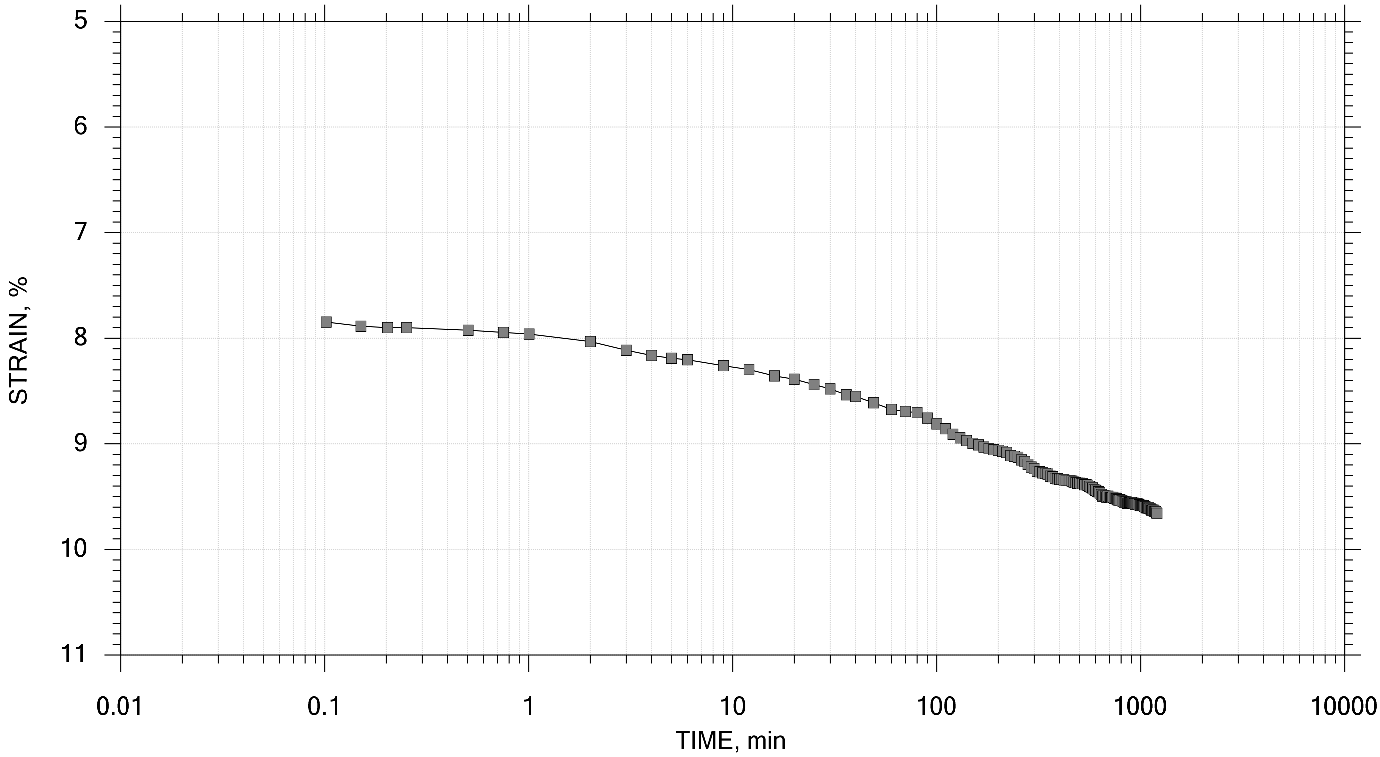
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

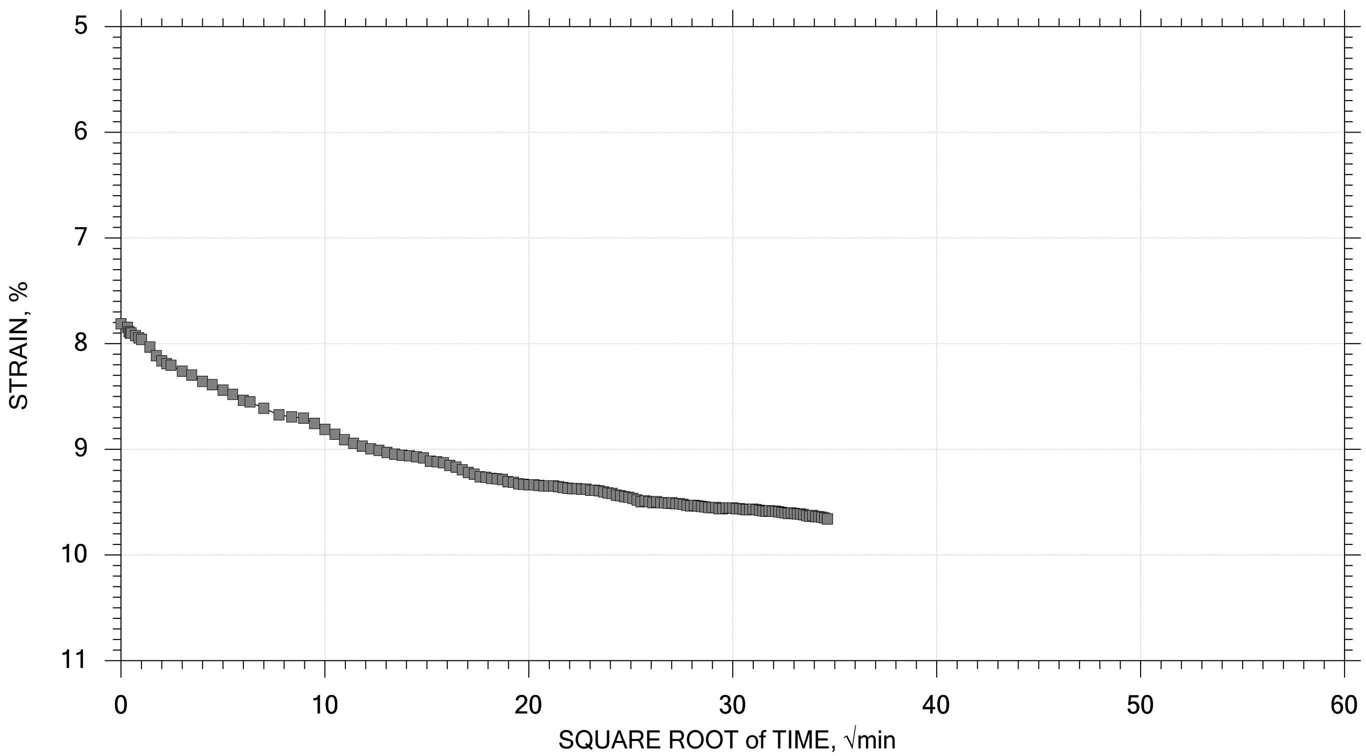
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





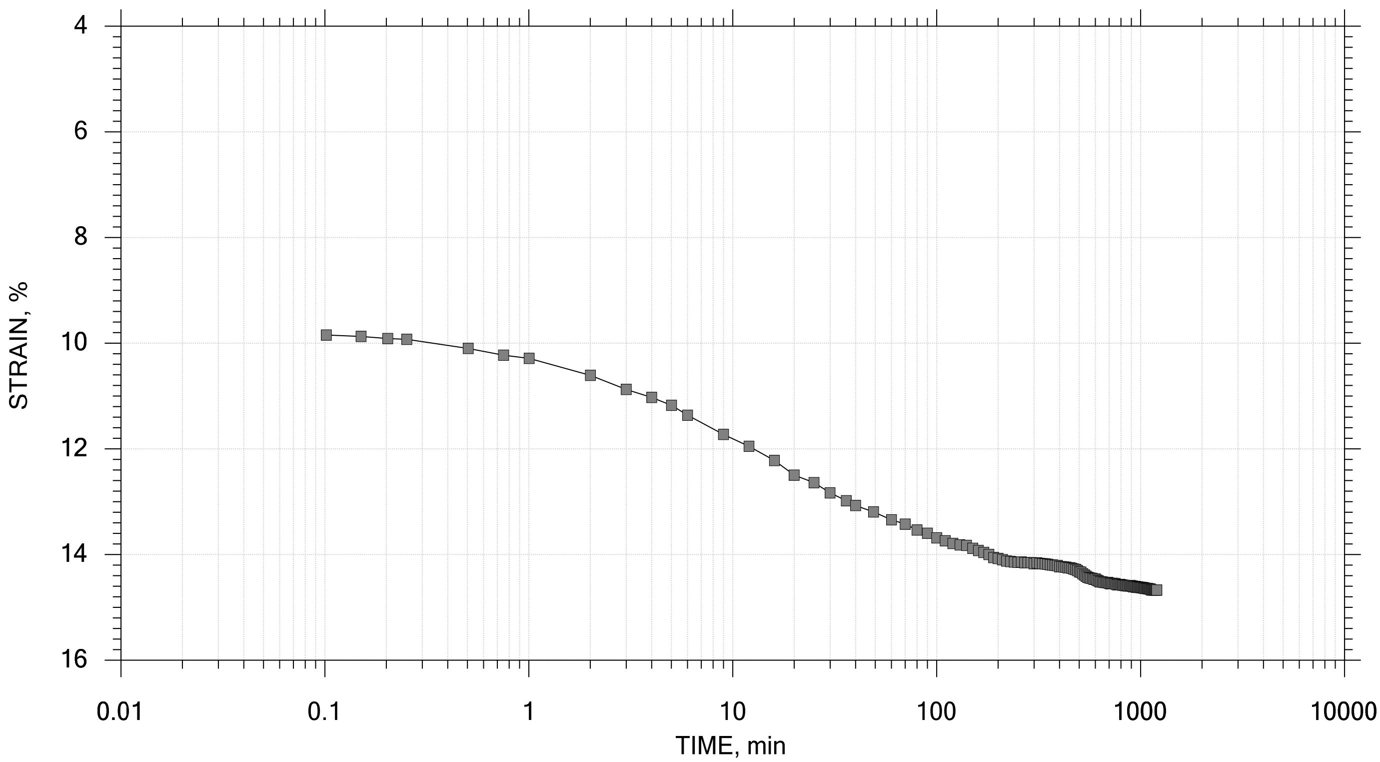
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

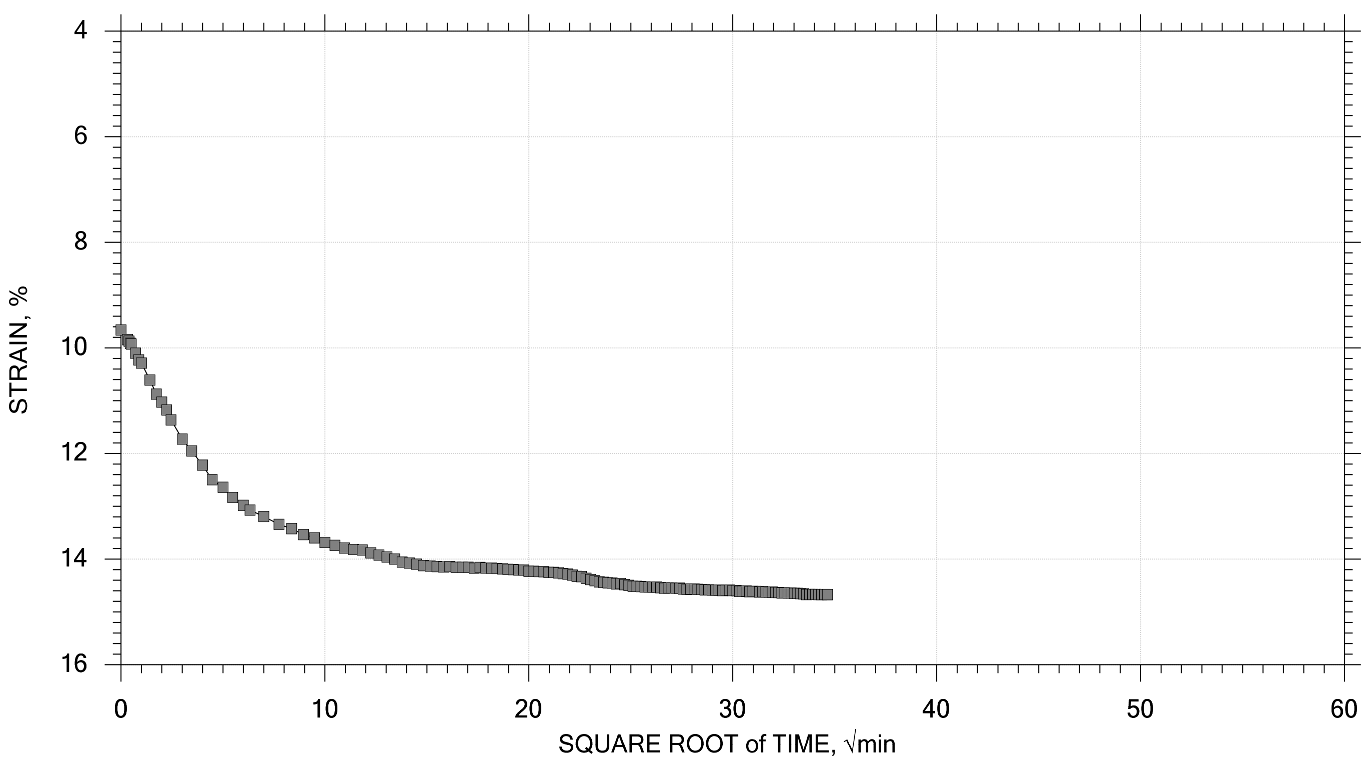
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





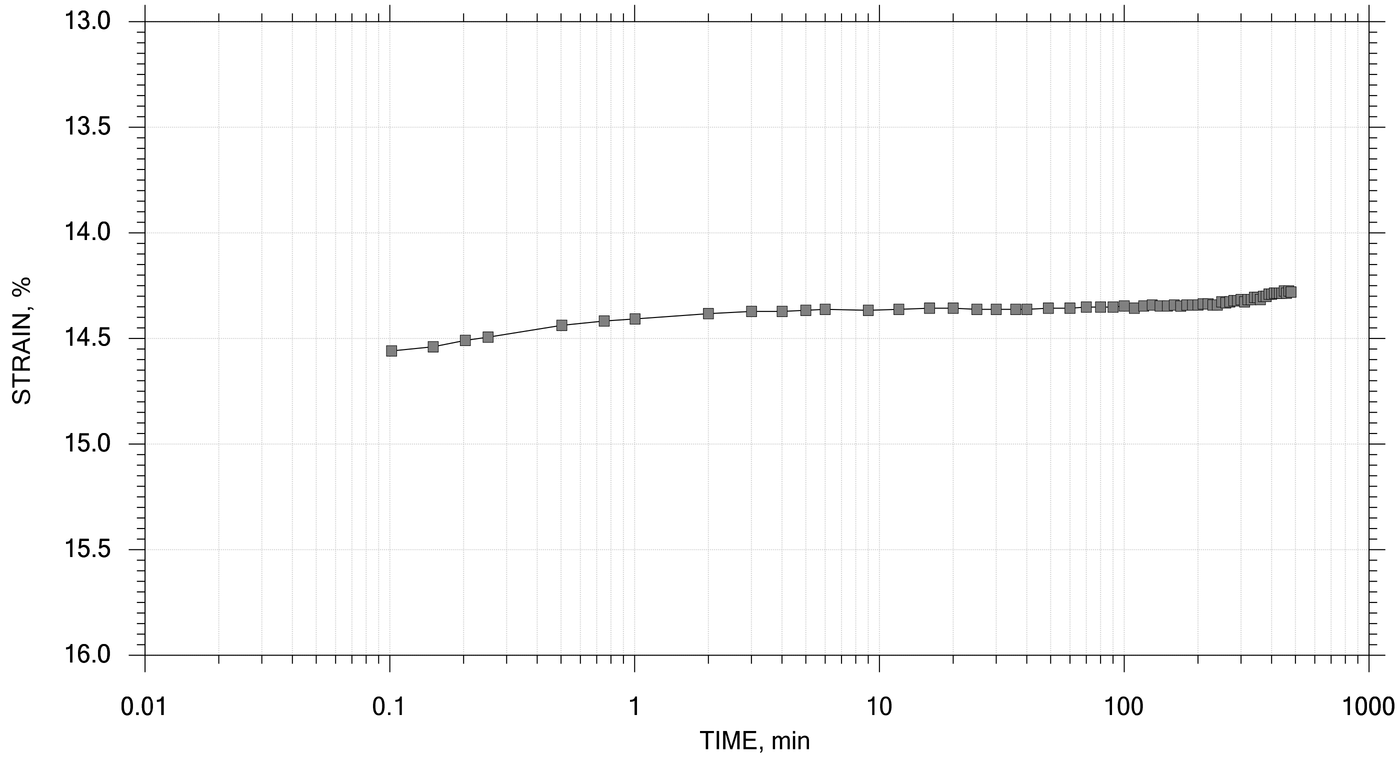
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

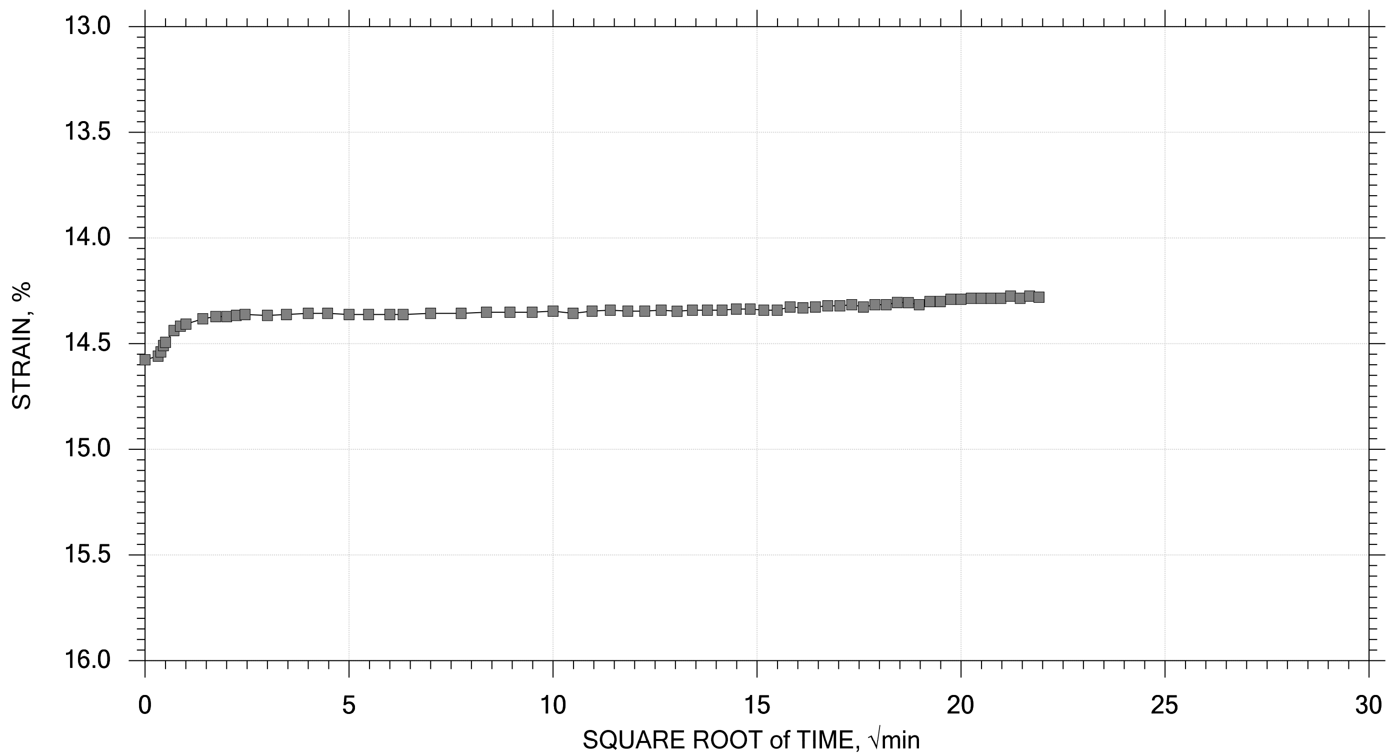
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





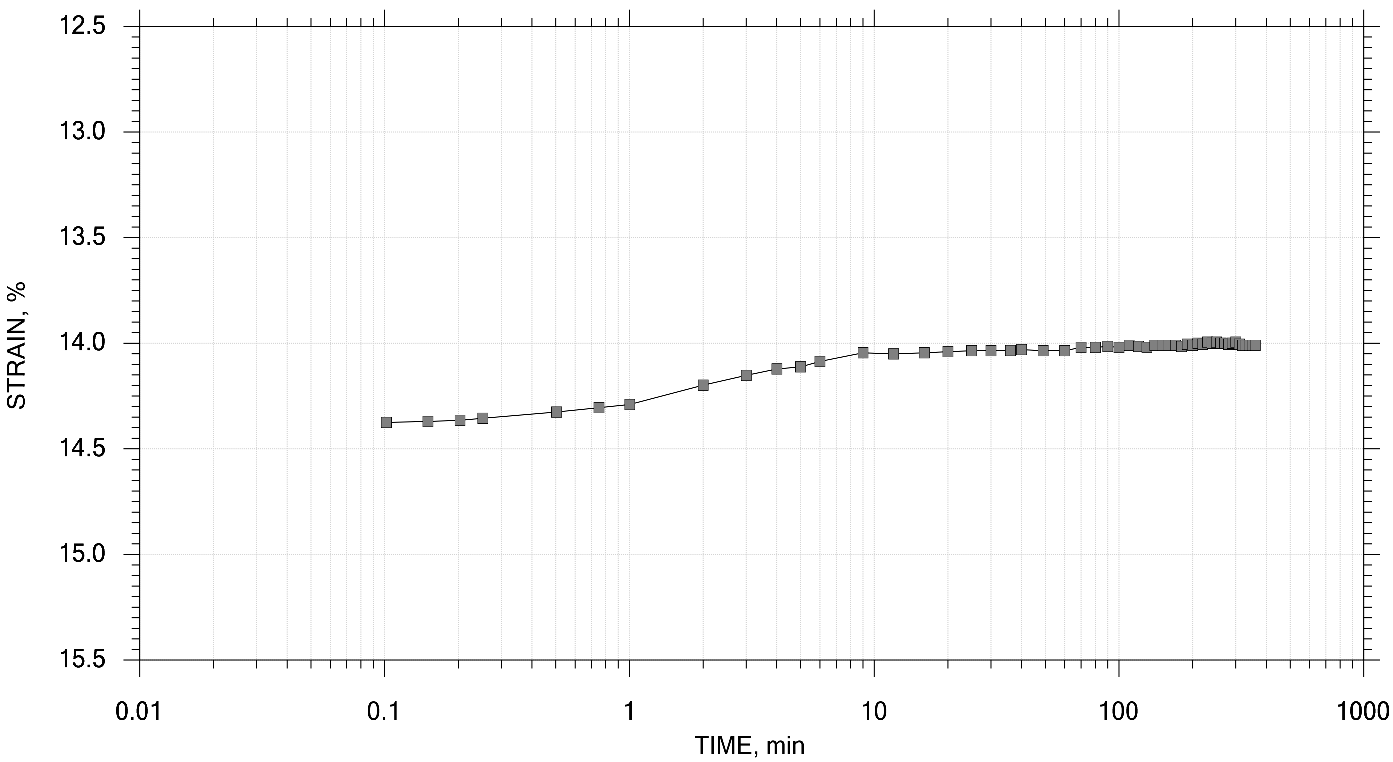
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

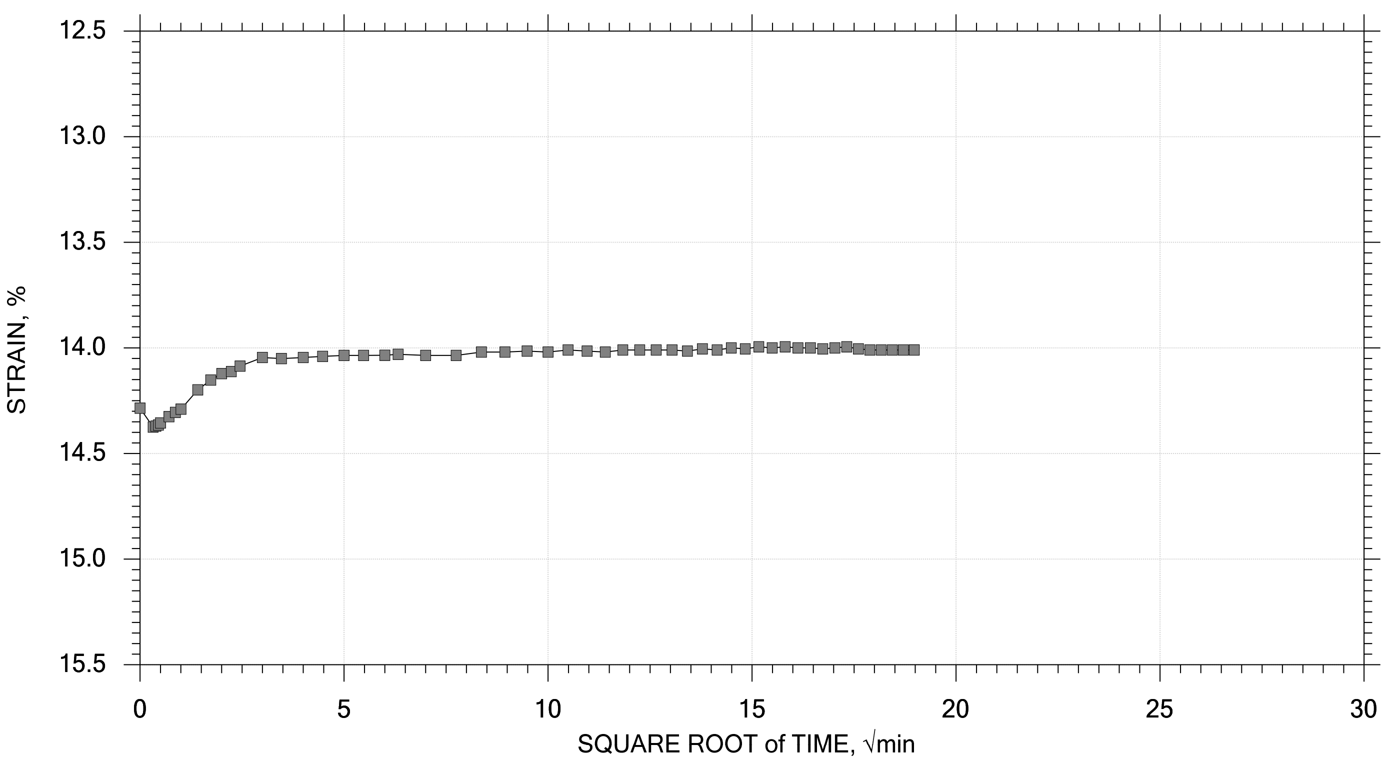
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





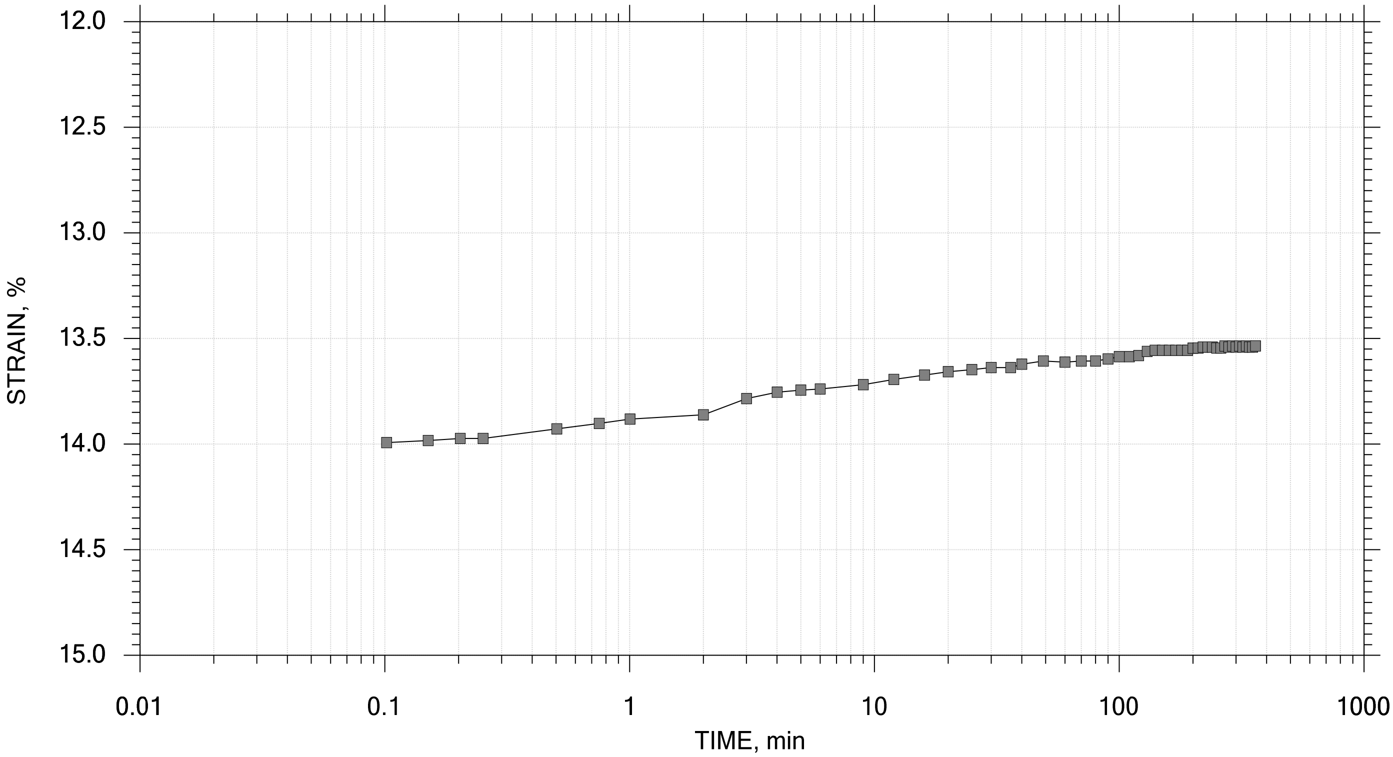
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

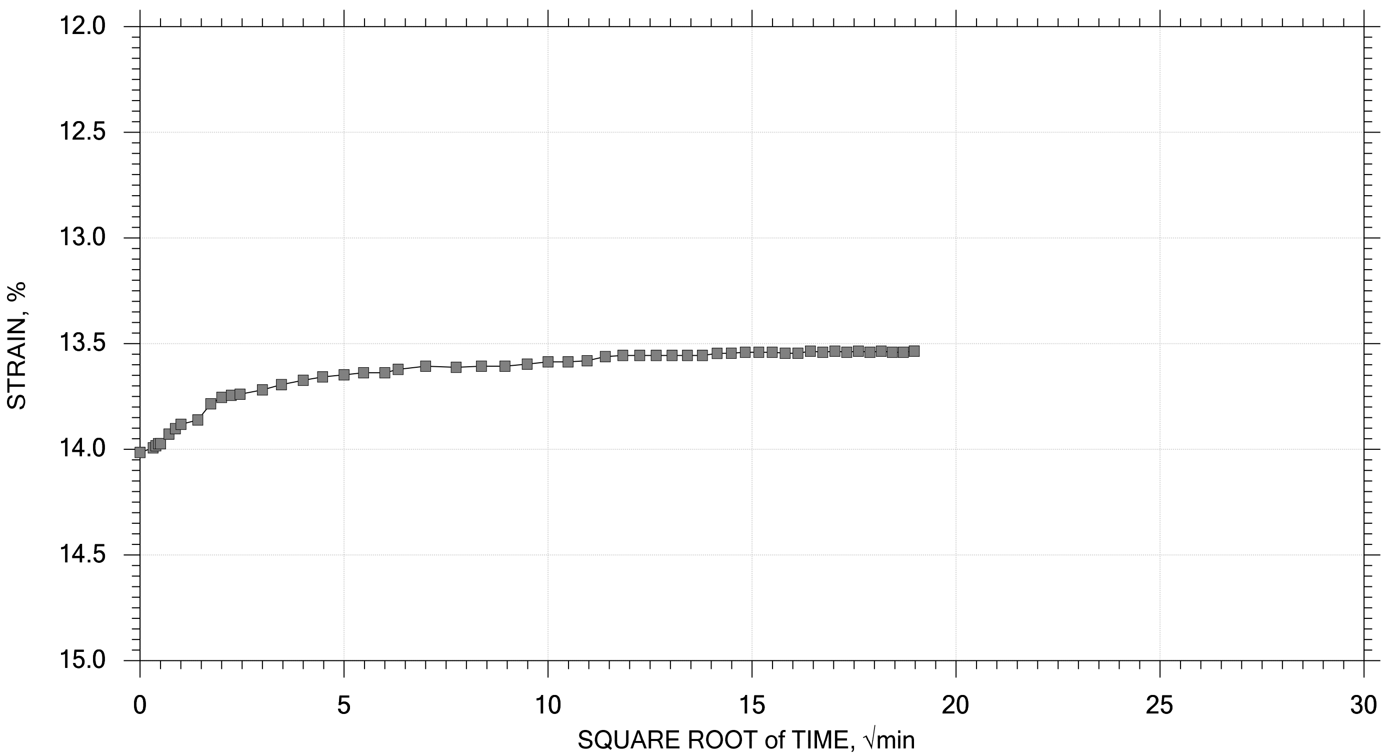
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





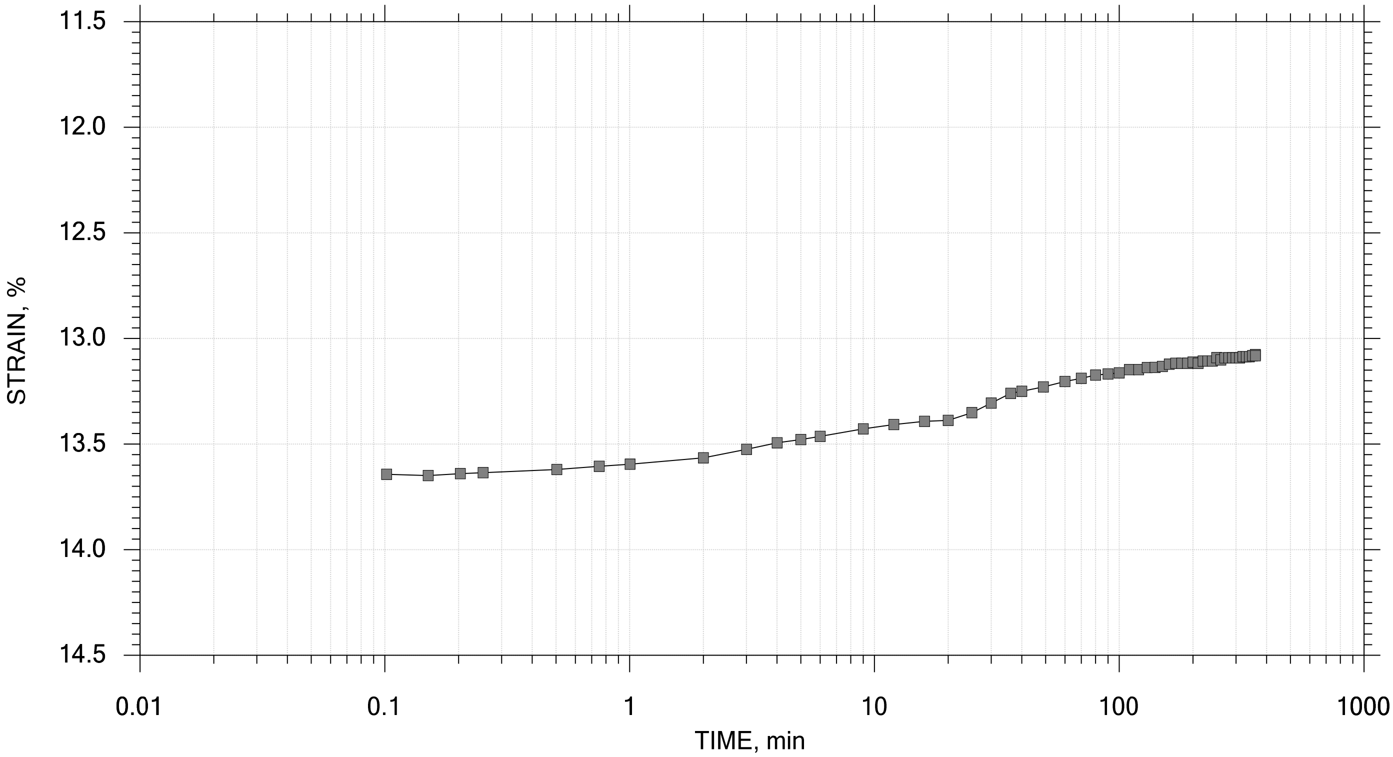
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

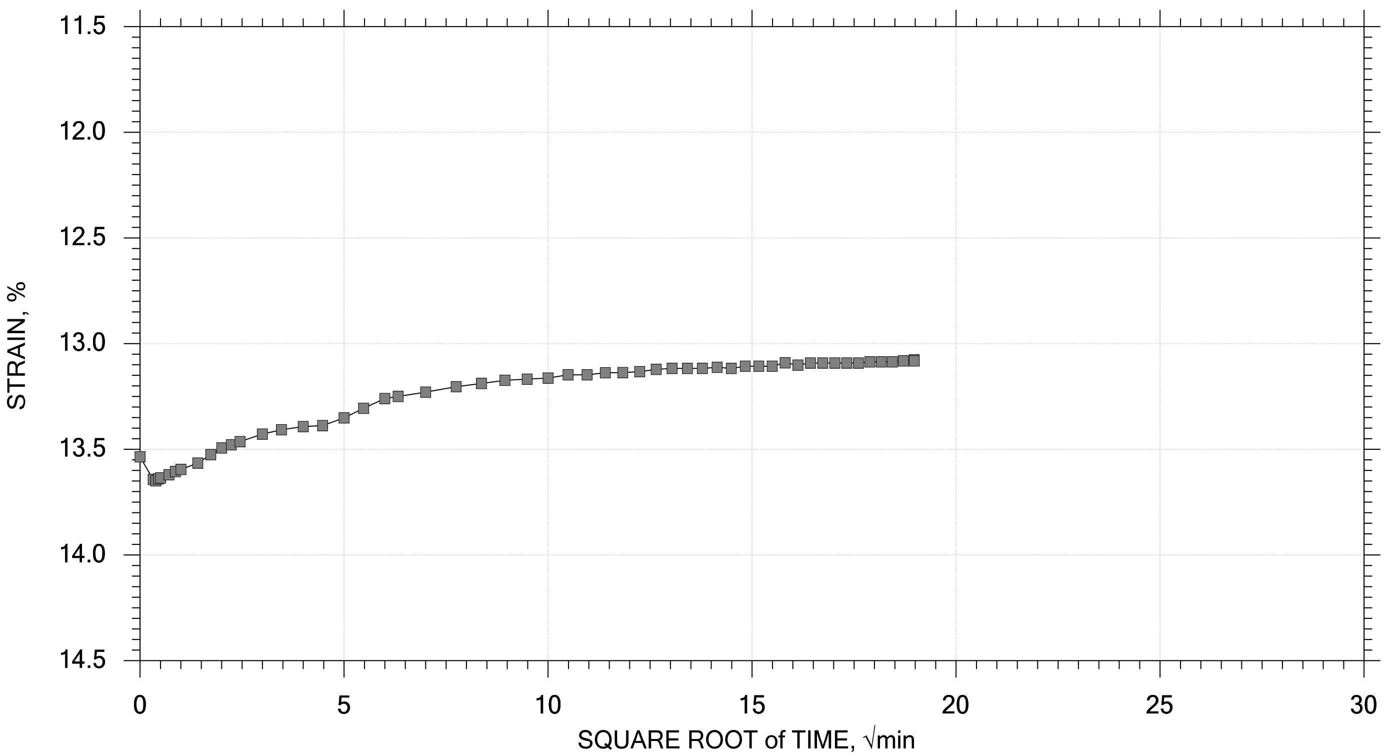
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 500 psf





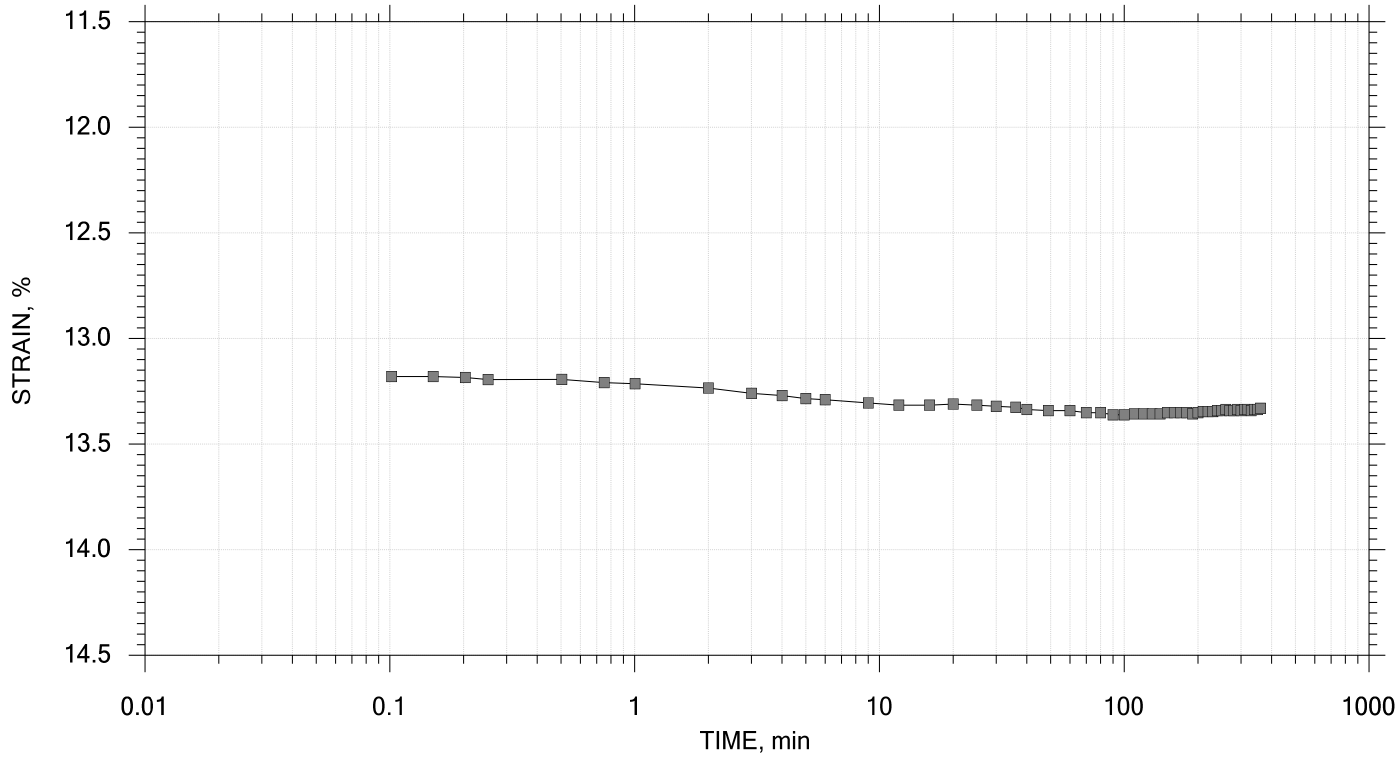
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

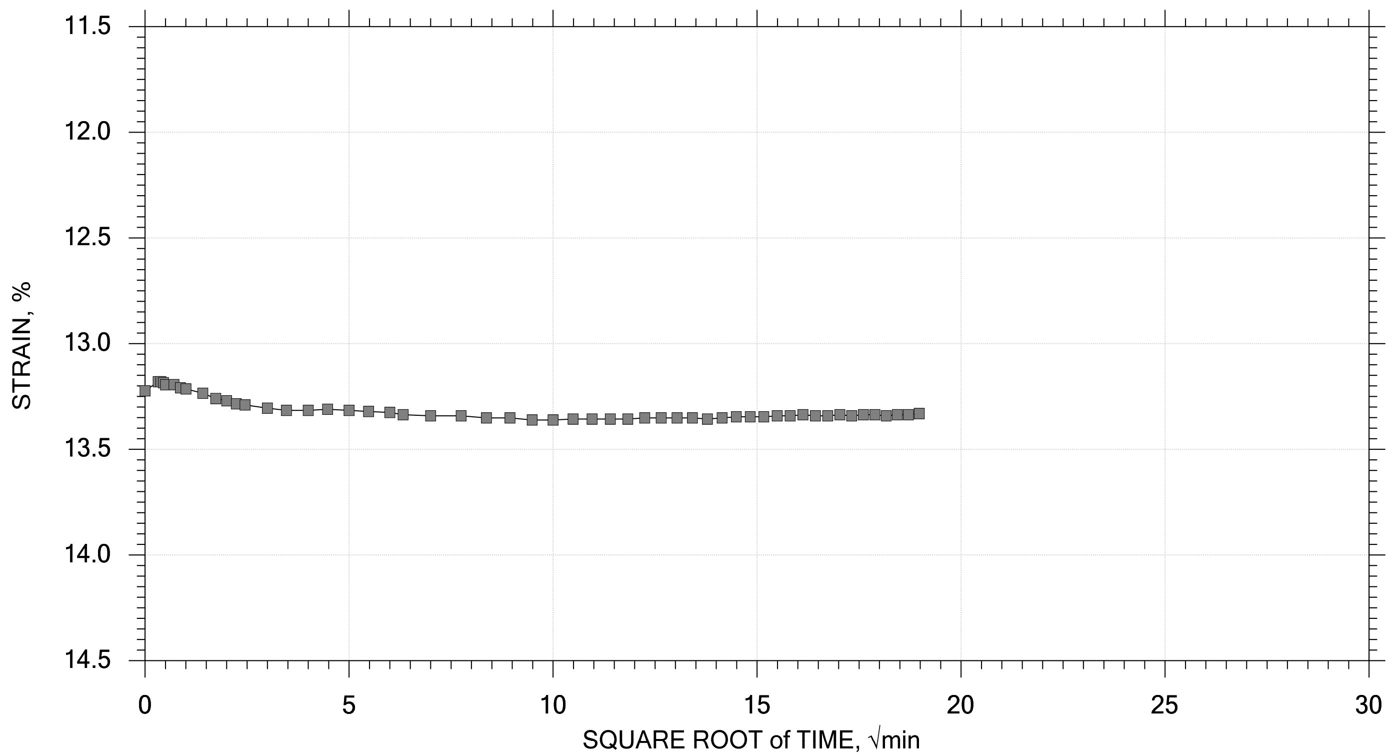
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





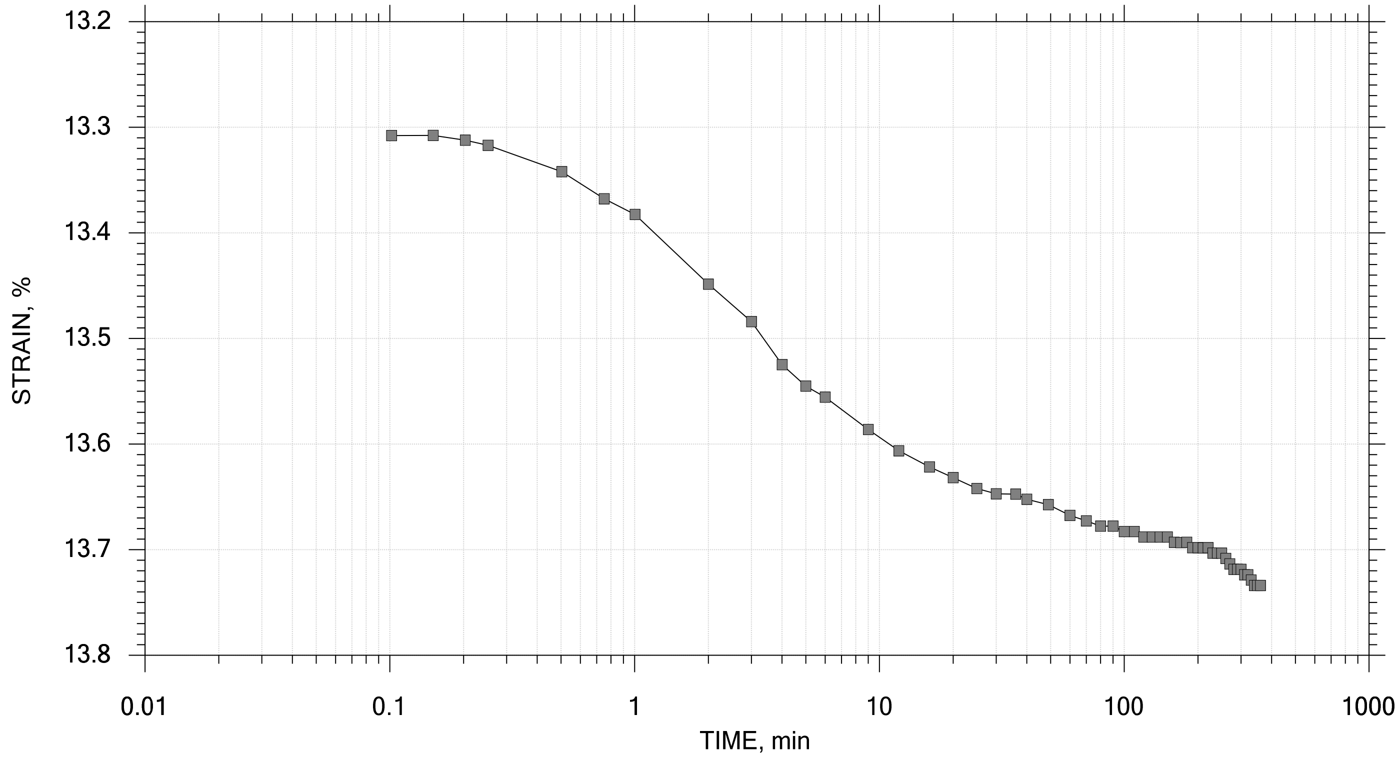
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

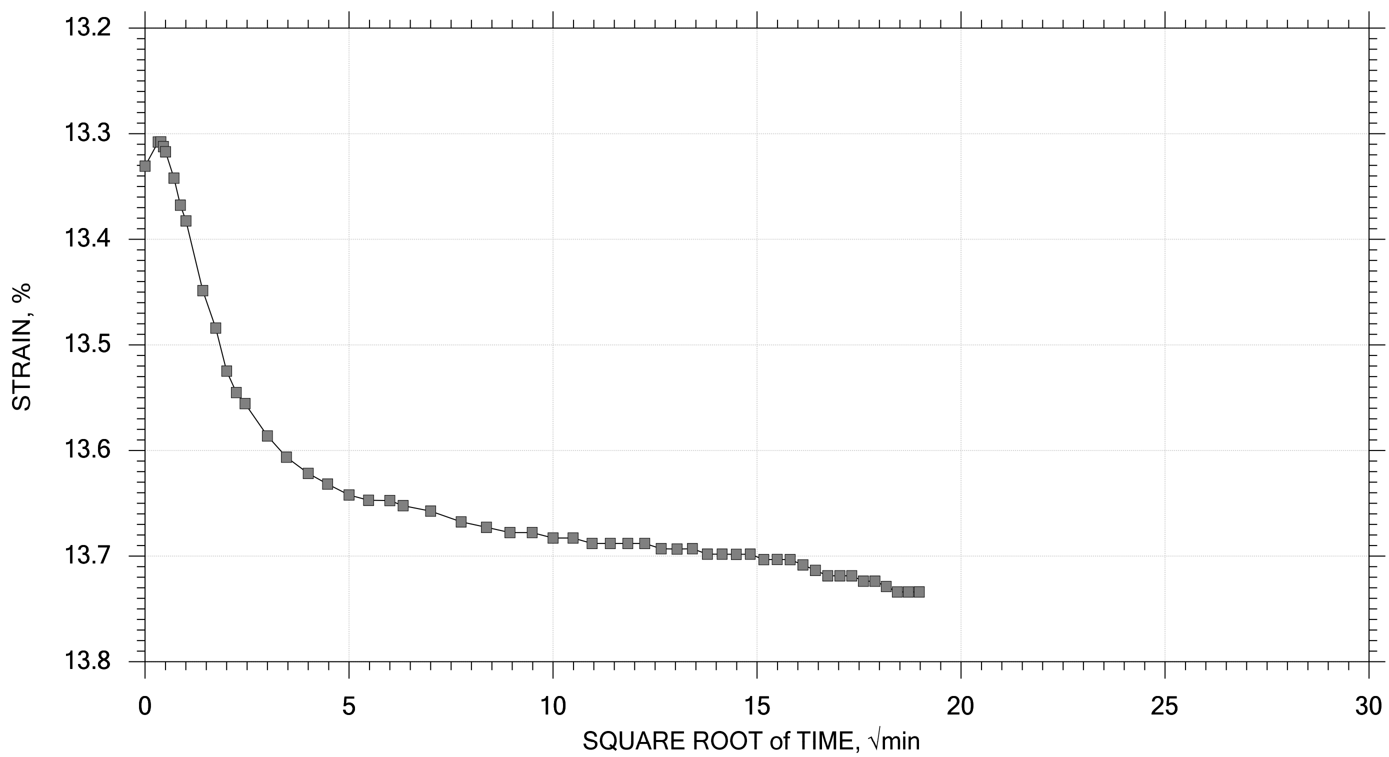
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





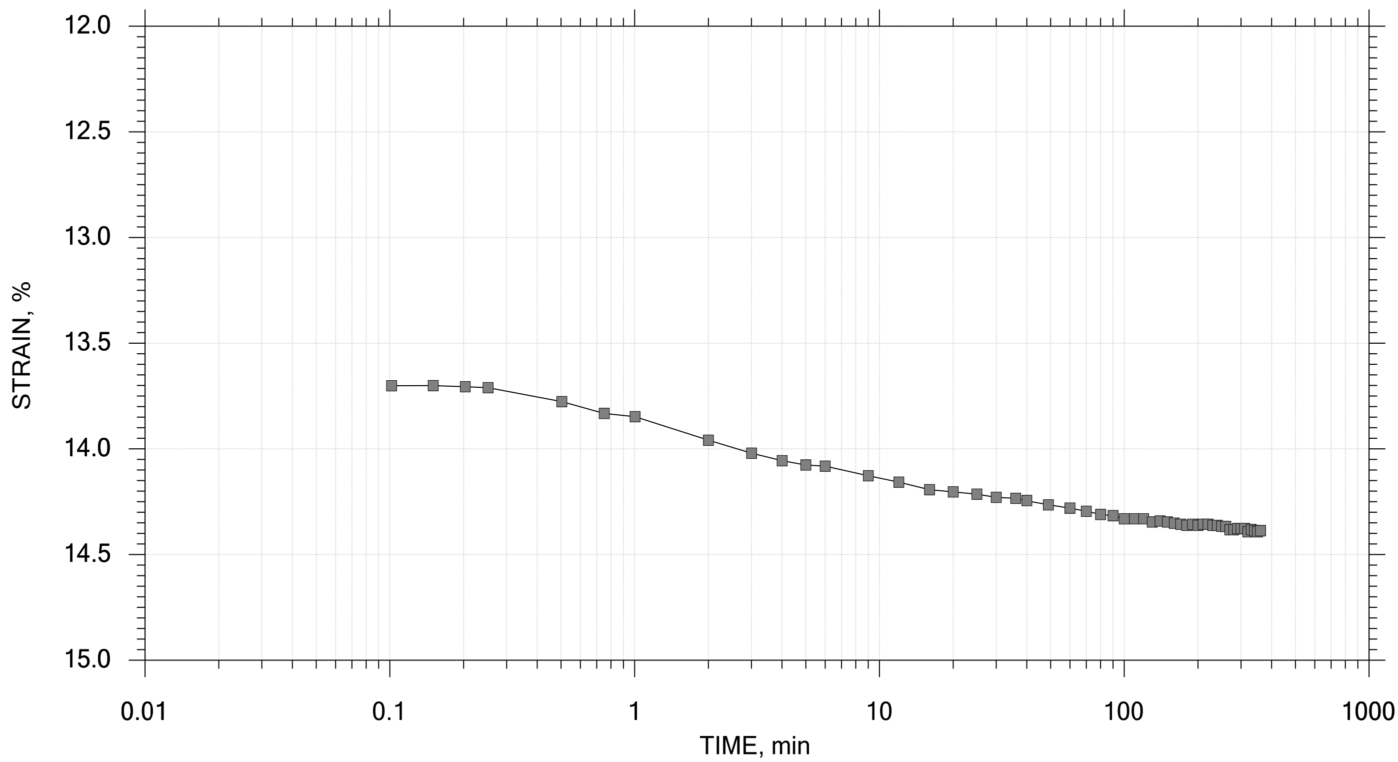
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

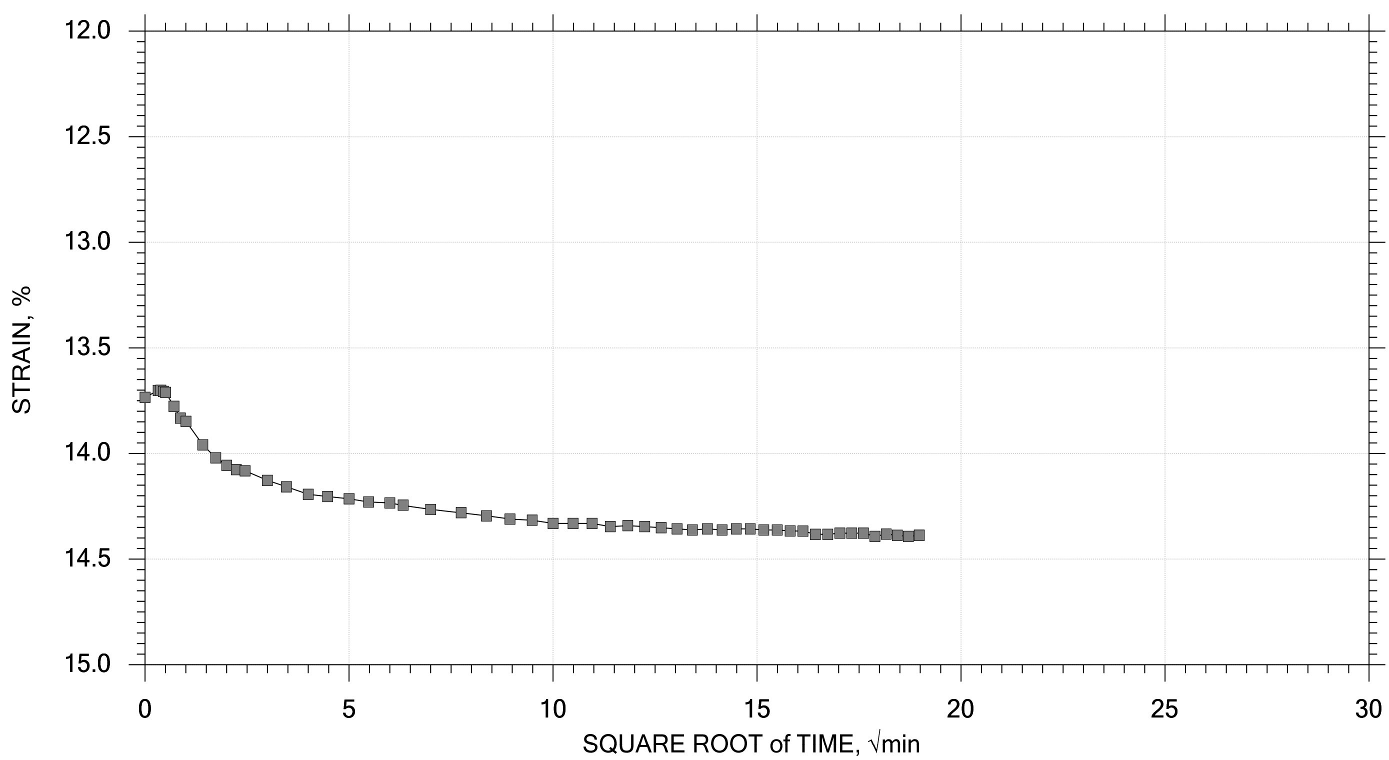
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





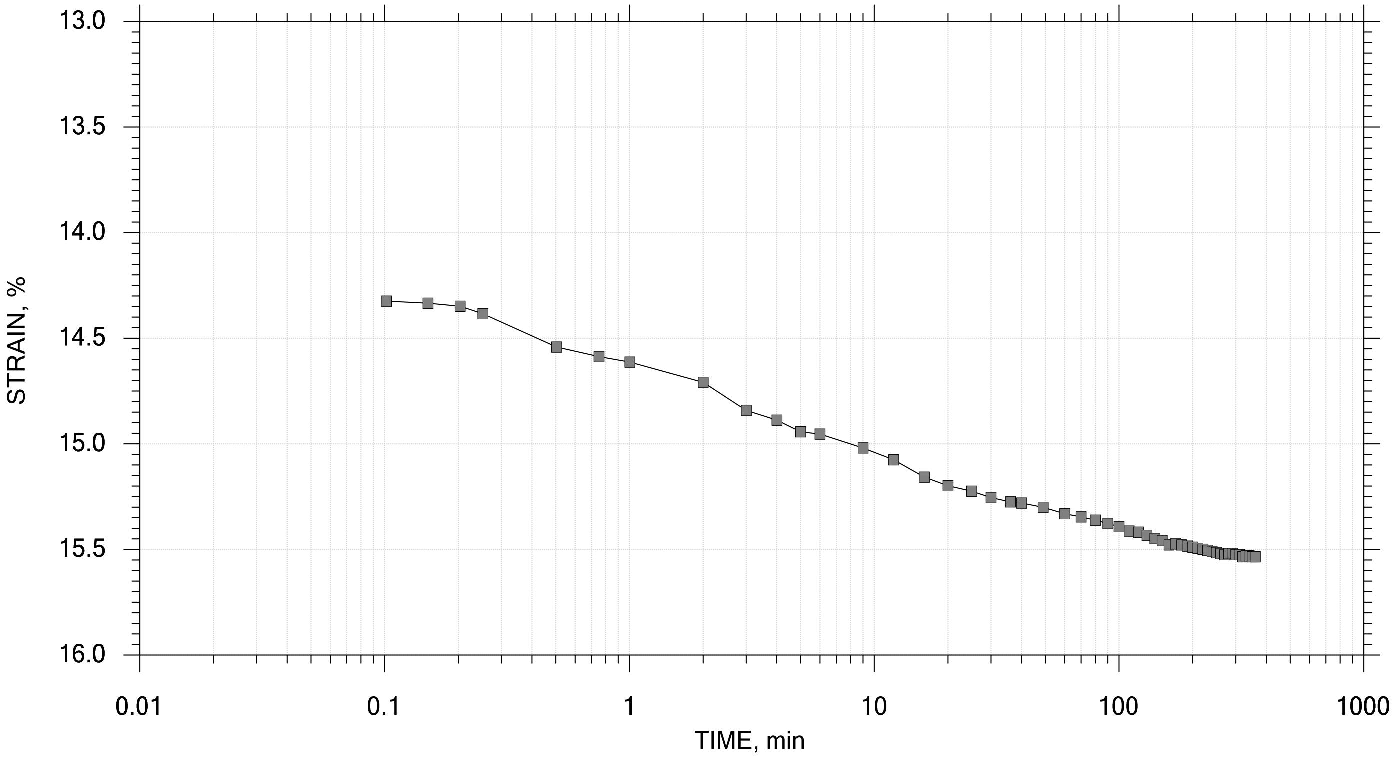
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

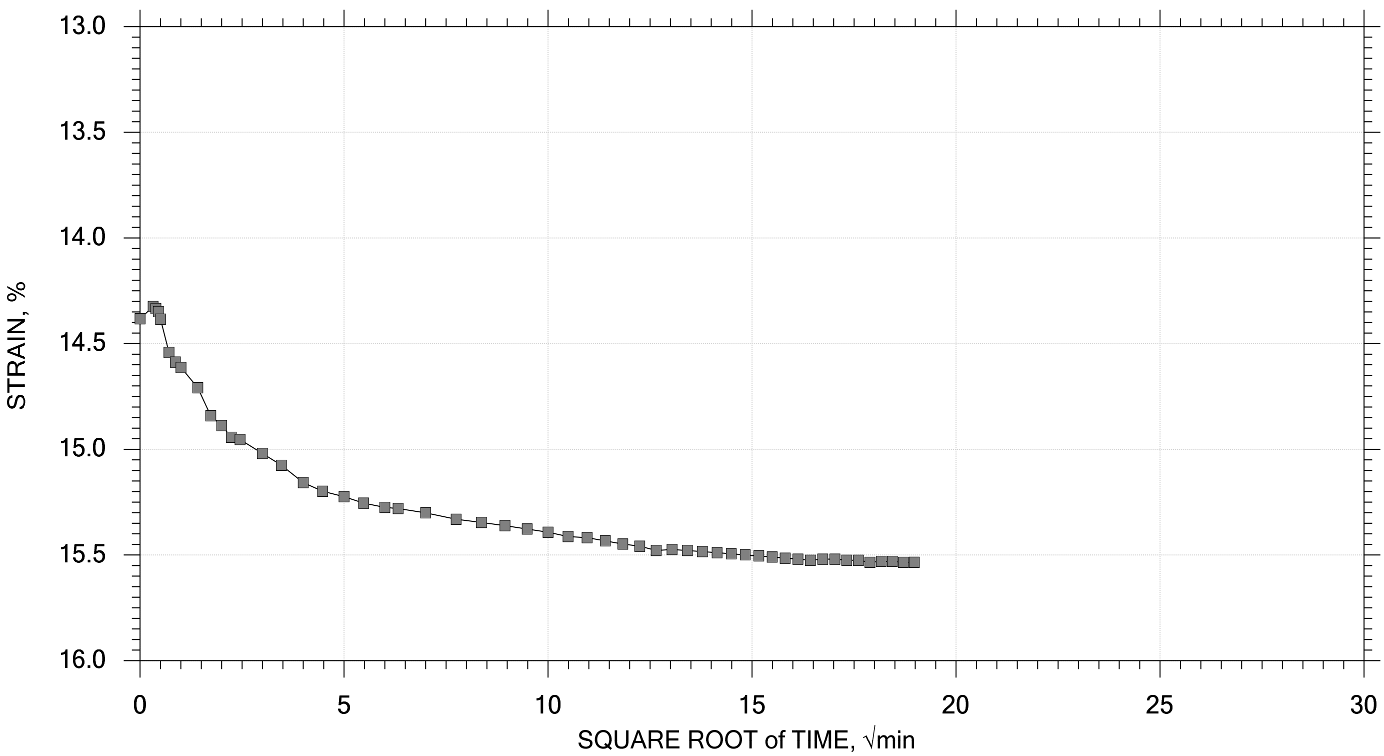
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





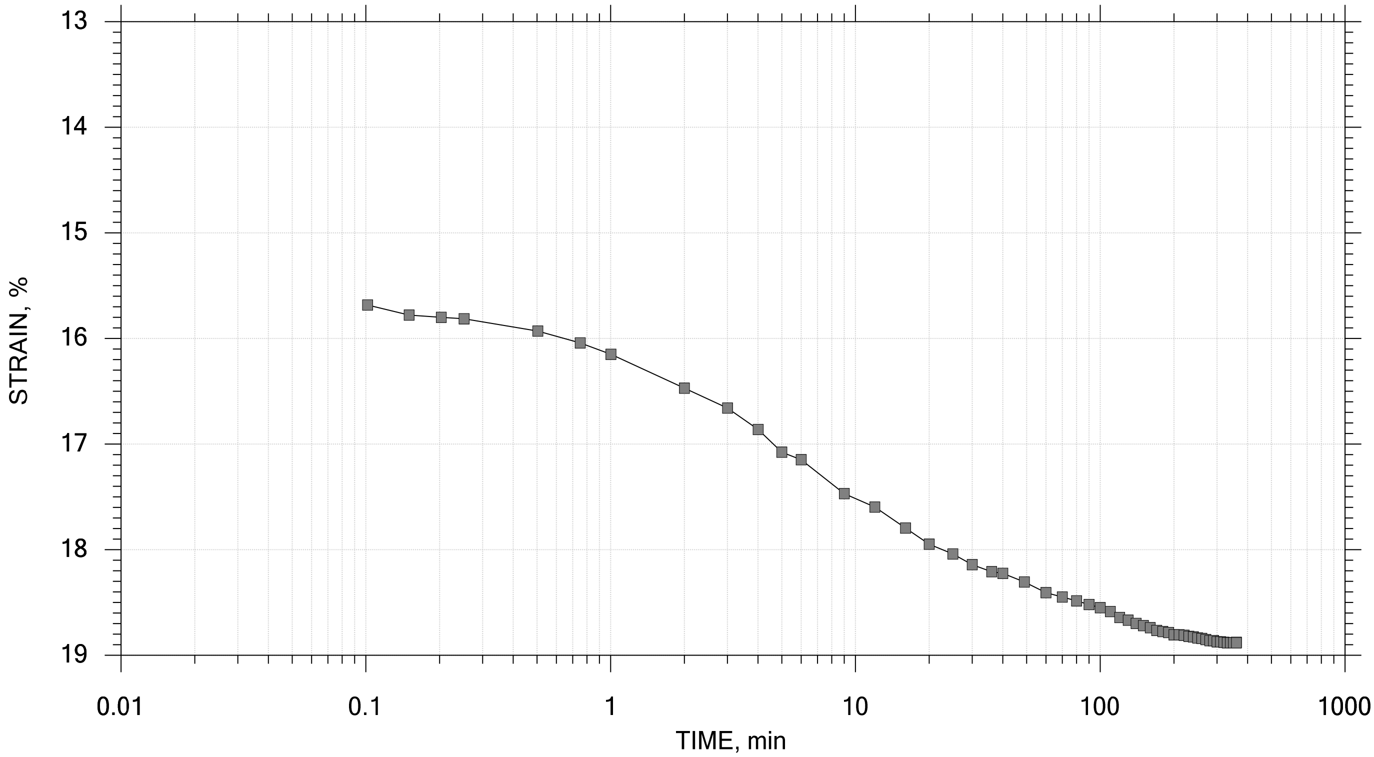
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

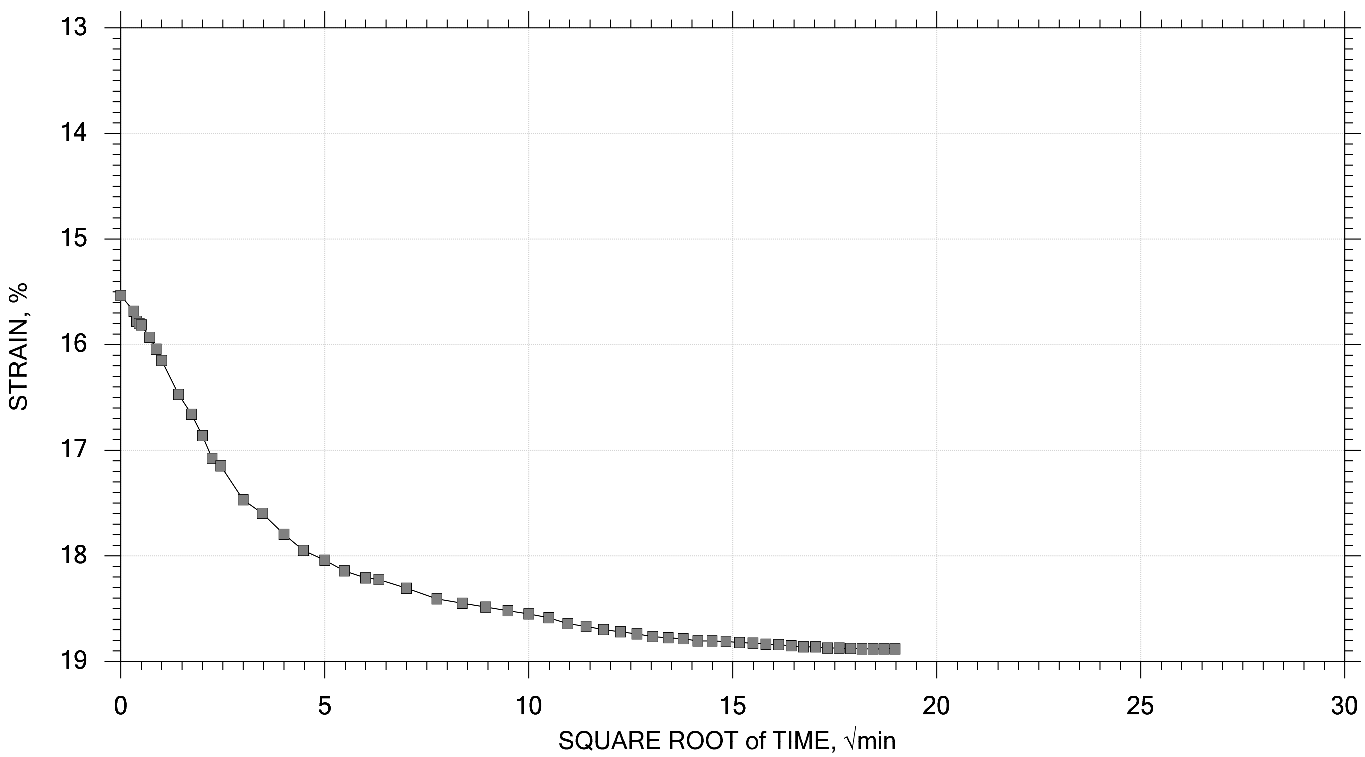
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf

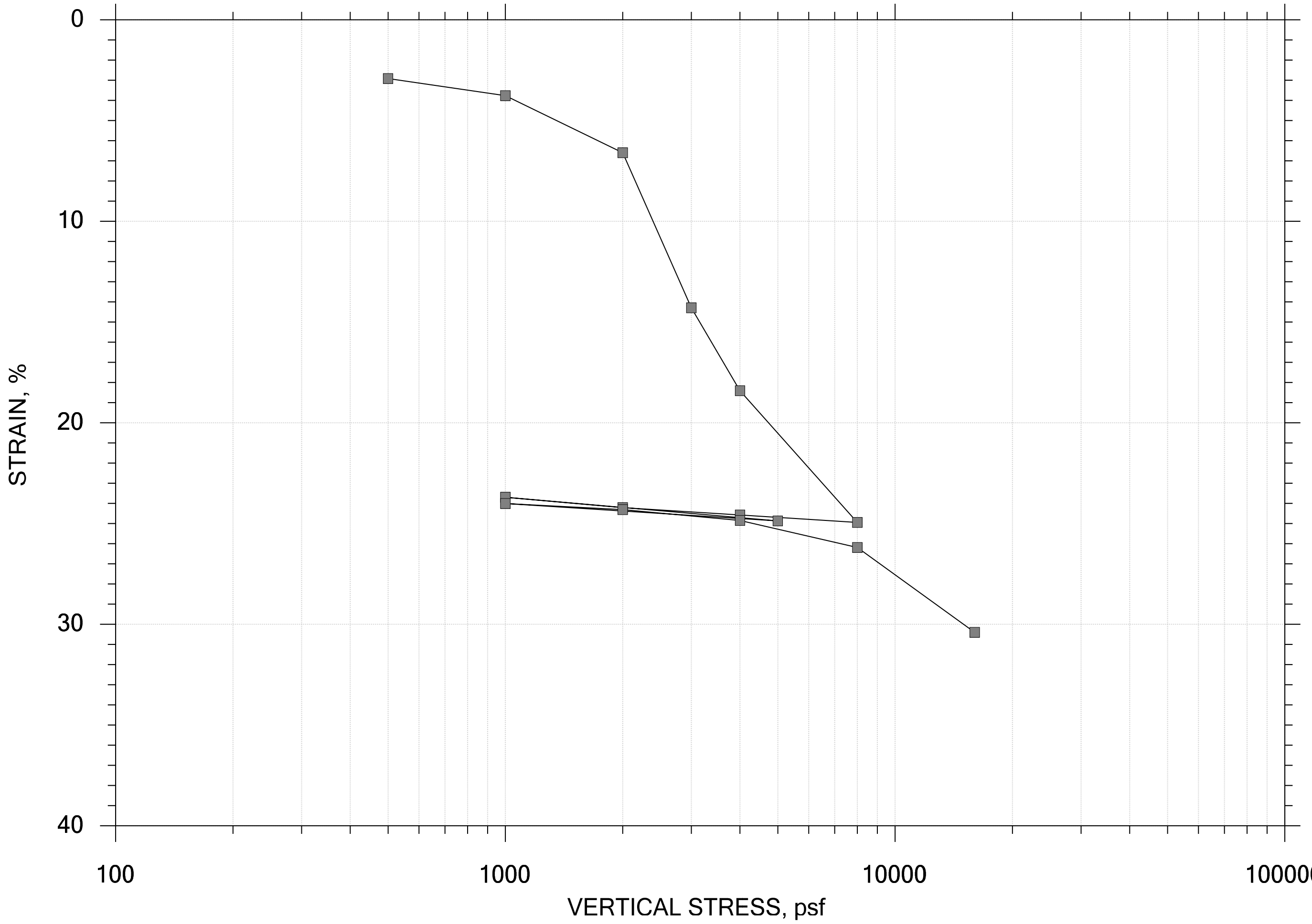


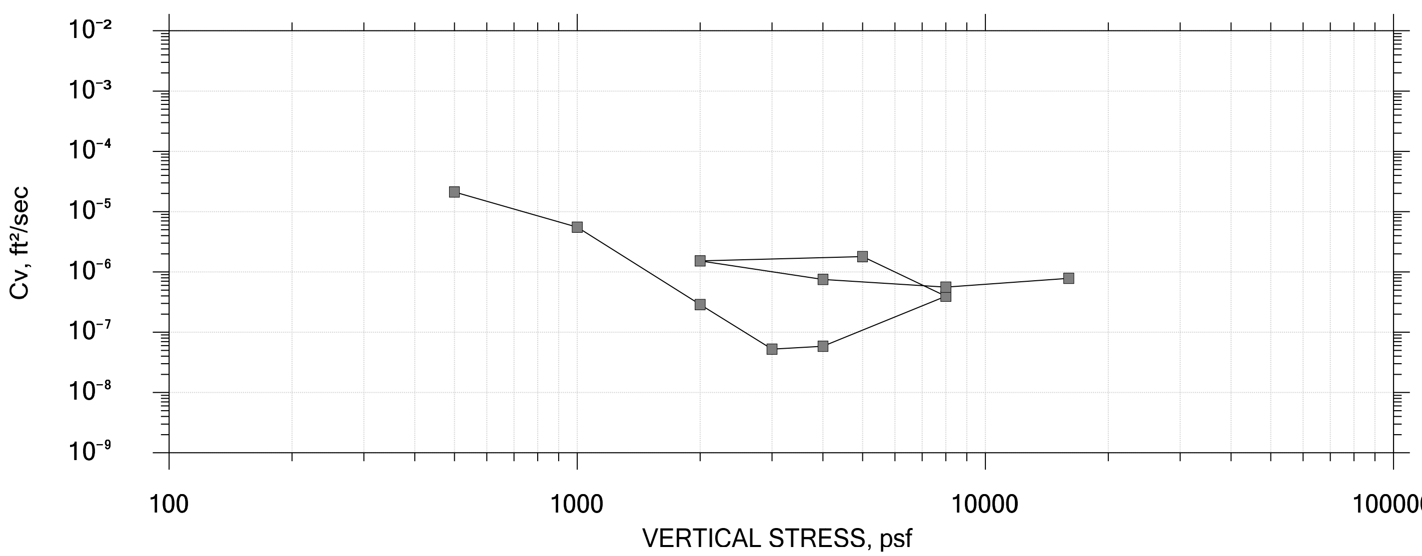


GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-201	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 07/26/18	Test No.: IP-2
	Depth: 40-42 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

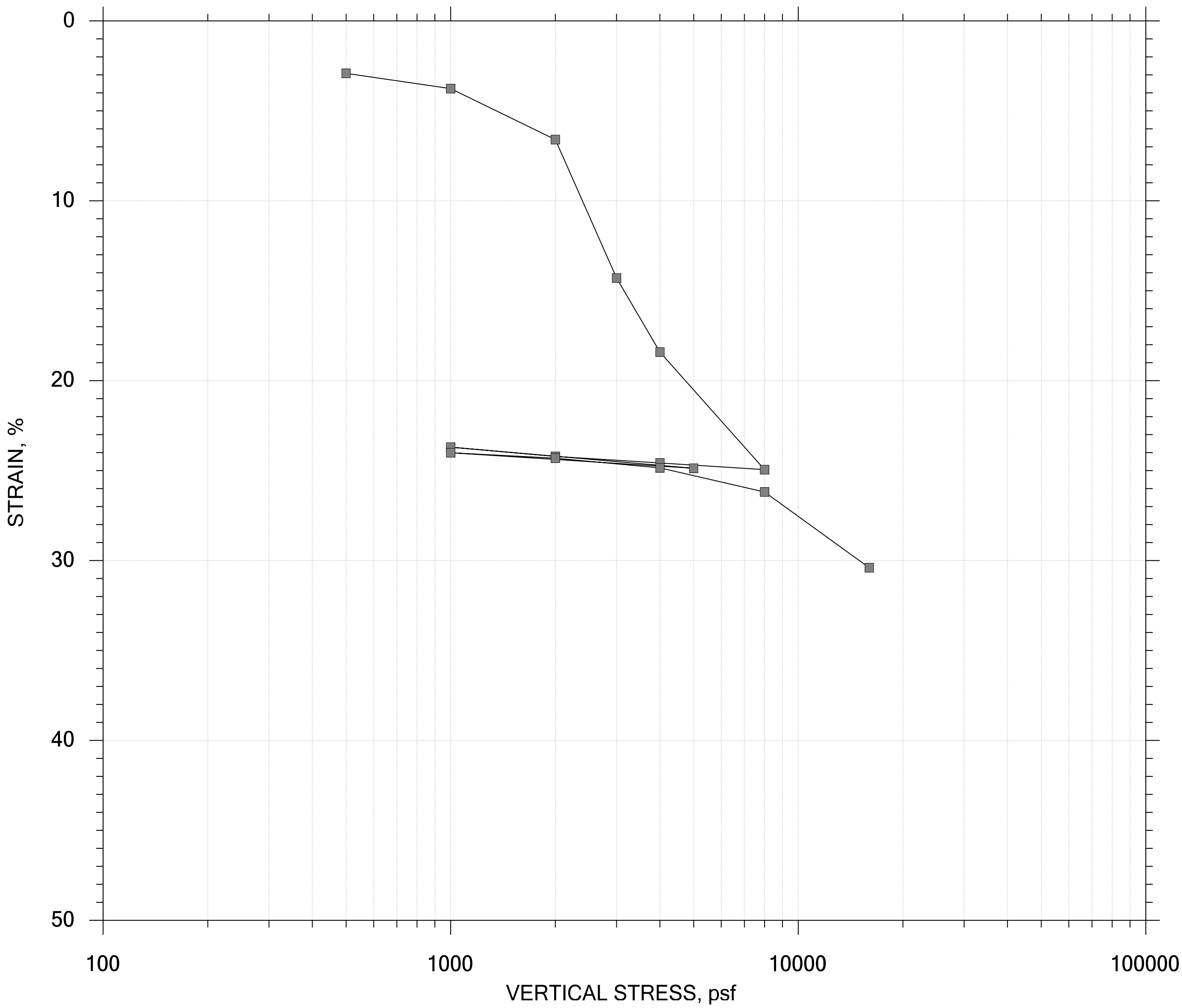




GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	51.34	25.19
Preconsolidation Stress: ---				Dry Unit Weight, pcf	71.158	101.65
Compression Ratio: ---				Saturation, %	99.66	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.42	0.70
LL: 39	PL: 21	PI: 18	GS: 2.76			

GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-205
Tested By: md
Checked By: njh
Sample No.: U-2
Test Date: 07/31/18
Depth: 35-37 ft
Test No.: IP-3
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System Y

Estimated Specific Gravity: 2.76
Liquid Limit: 39
Specimen Diameter: 2.50 in
Initial Void Ratio: 1.42
Plastic Limit: 21
Initial Height: 1.00 in
Final Void Ratio: 0.696
Plasticity Index: 18
Final Height: 0.70 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	A-1374	RING		C-131
Wt. Container + Wet Soil, gm	142.91	248.16	224.19	124.09
Wt. Container + Dry Soil, gm	96.710	201.09	201.09	100.78
Wt. Container, gm	8.4000	109.40	109.40	8.2600
Wt. Dry Soil, gm	88.310	91.689	91.689	92.520
Water Content, %	52.32	51.34	25.19	25.19
Void Ratio	---	1.42	0.696	---
Degree of Saturation, %	---	99.66	100.00	---
Dry Unit Weight, pcf	---	71.158	101.65	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-205
Tested By: md
Checked By: njh
Sample No.: U-2
Test Date: 07/31/18
Depth: 35-37 ft
Test No.: IP-3
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System Y

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.02912	1.35	2.91	2.267	1.05e-005	5.82e-005	3.30e-003
2	1.00e+003	0.03761	1.33	3.76	7.360	3.12e-006	1.70e-005	2.85e-004
3	2.00e+003	0.06592	1.26	6.59	133.255	1.66e-007	2.83e-005	2.53e-005
4	3.00e+003	0.1429	1.08	14.3	341.118	5.77e-008	7.70e-005	2.40e-005
5	4.00e+003	0.1841	0.976	18.4	318.386	5.39e-008	4.12e-005	1.20e-005
6	8.00e+003	0.2494	0.818	24.9	39.602	3.80e-007	1.63e-005	3.35e-005
7	4.00e+003	0.2457	0.827	24.6	7.743	1.79e-006	9.30e-007	9.00e-006
8	2.00e+003	0.2421	0.836	24.2	33.711	4.16e-007	1.82e-006	4.08e-006
9	1.00e+003	0.2369	0.849	23.7	50.042	2.84e-007	5.15e-006	7.88e-006
10	5.00e+003	0.2487	0.820	24.9	10.495	1.34e-006	2.94e-006	2.13e-005
11	1.00e+003	0.2401	0.841	24.0	13.283	1.05e-006	2.15e-006	1.23e-005
12	2.00e+003	0.2430	0.834	24.3	7.544	1.87e-006	2.99e-006	3.01e-005
13	4.00e+003	0.2484	0.821	24.8	14.765	9.45e-007	2.69e-006	1.37e-005
14	8.00e+003	0.2618	0.788	26.2	34.553	3.94e-007	3.36e-006	7.13e-006
15	1.60e+004	0.3040	0.686	30.4	17.270	7.31e-007	5.27e-006	2.08e-005

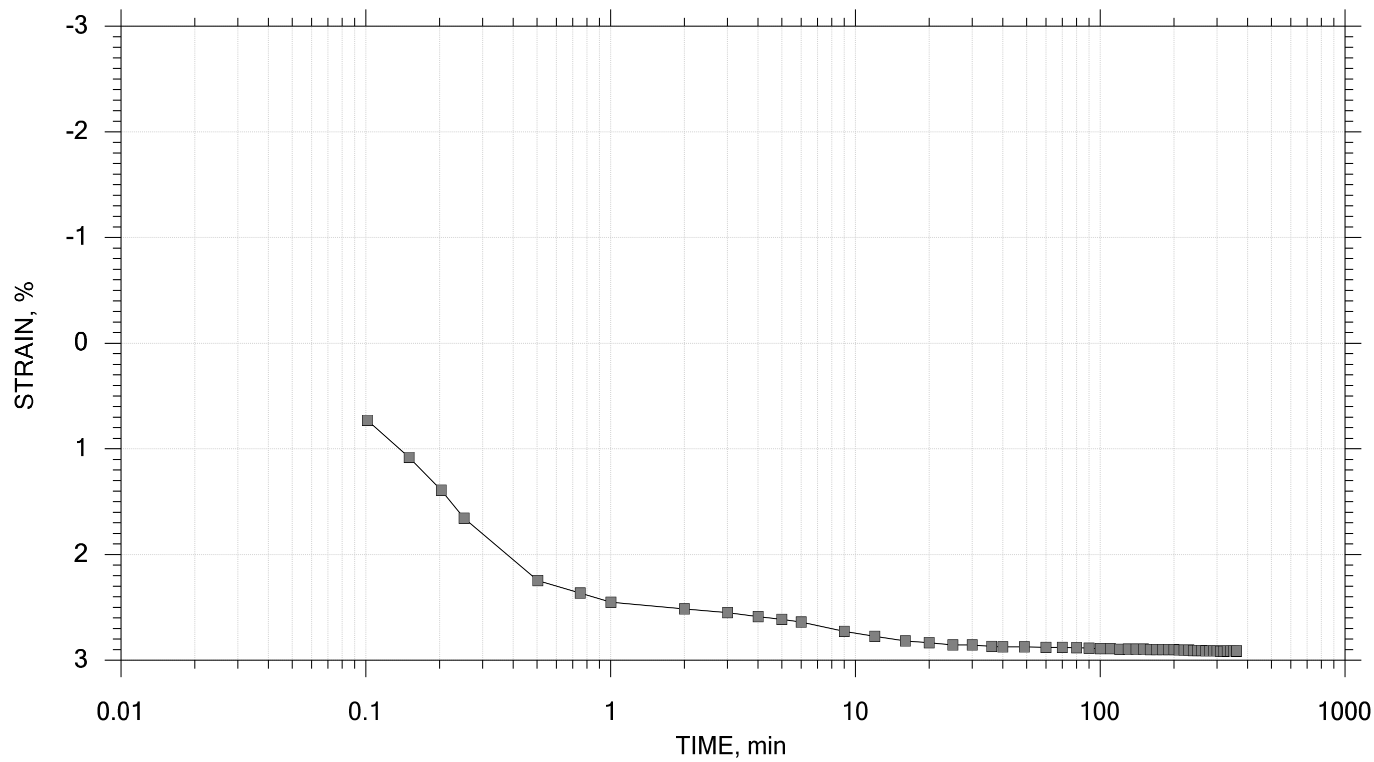
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.02912	1.35	2.91	0.000	0.00e+000	5.82e-005	0.00e+000	0.00e+000
2	1.00e+003	0.03761	1.33	3.76	0.501	1.06e-005	1.70e-005	9.73e-004	0.00e+000
3	2.00e+003	0.06592	1.26	6.59	0.000	0.00e+000	2.83e-005	0.00e+000	0.00e+000
4	3.00e+003	0.1429	1.08	14.3	98.888	4.62e-008	7.70e-005	1.92e-005	0.00e+000
5	4.00e+003	0.1841	0.976	18.4	69.136	5.77e-008	4.12e-005	1.28e-005	0.00e+000
6	8.00e+003	0.2494	0.818	24.9	9.197	3.80e-007	1.63e-005	3.35e-005	0.00e+000
7	4.00e+003	0.2457	0.827	24.6	1.372	2.35e-006	9.30e-007	1.18e-005	0.00e+000
8	2.00e+003	0.2421	0.836	24.2	5.439	5.99e-007	1.82e-006	5.87e-006	0.00e+000
9	1.00e+003	0.2369	0.849	23.7	8.744	3.77e-007	5.15e-006	1.05e-005	0.00e+000
10	5.00e+003	0.2487	0.820	24.9	1.757	1.86e-006	2.94e-006	2.96e-005	0.00e+000
11	1.00e+003	0.2401	0.841	24.0	4.241	7.67e-007	2.15e-006	8.92e-006	0.00e+000
12	2.00e+003	0.2430	0.834	24.3	2.501	1.31e-006	2.99e-006	2.11e-005	0.00e+000
13	4.00e+003	0.2484	0.821	24.8	0.000	0.00e+000	2.69e-006	0.00e+000	0.00e+000
14	8.00e+003	0.2618	0.788	26.2	0.000	0.00e+000	3.36e-006	0.00e+000	0.00e+000
15	1.60e+004	0.3040	0.686	30.4	3.831	7.65e-007	5.27e-006	2.17e-005	0.00e+000

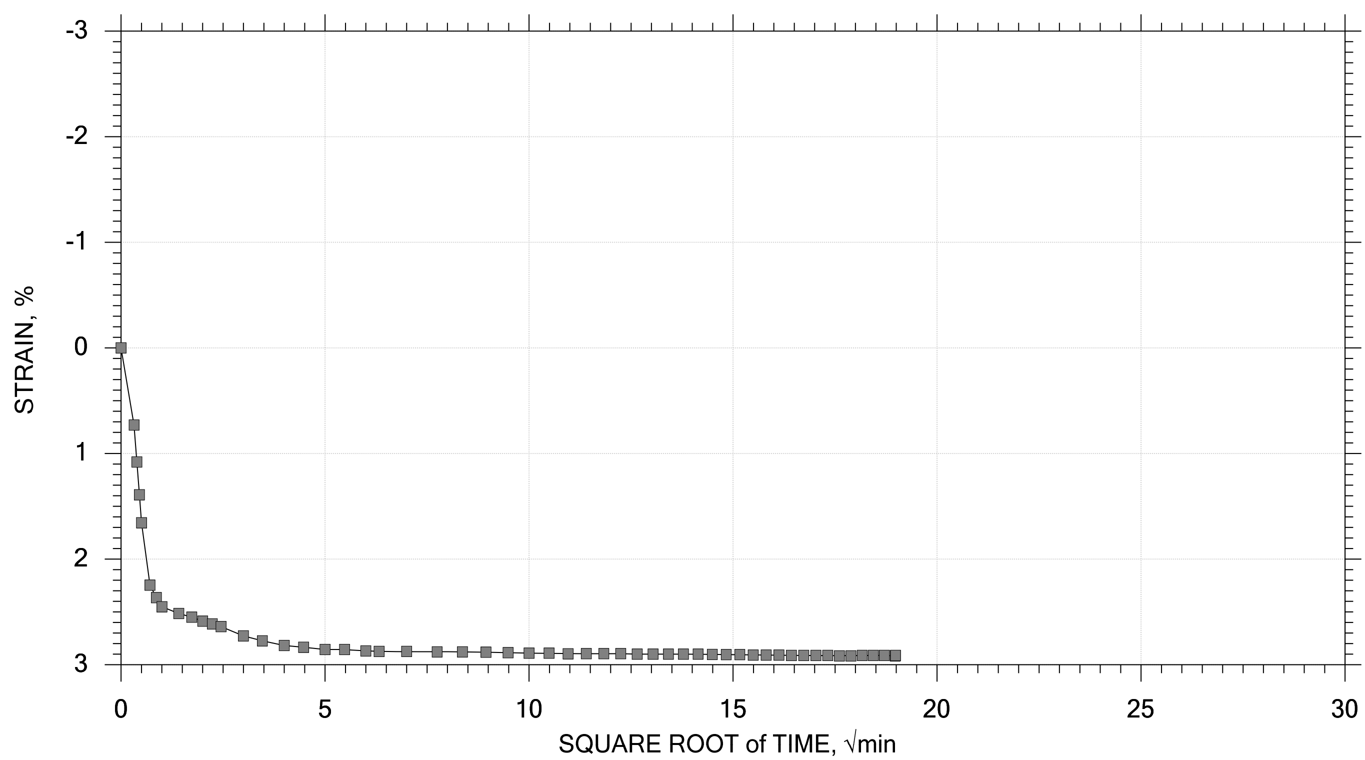
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





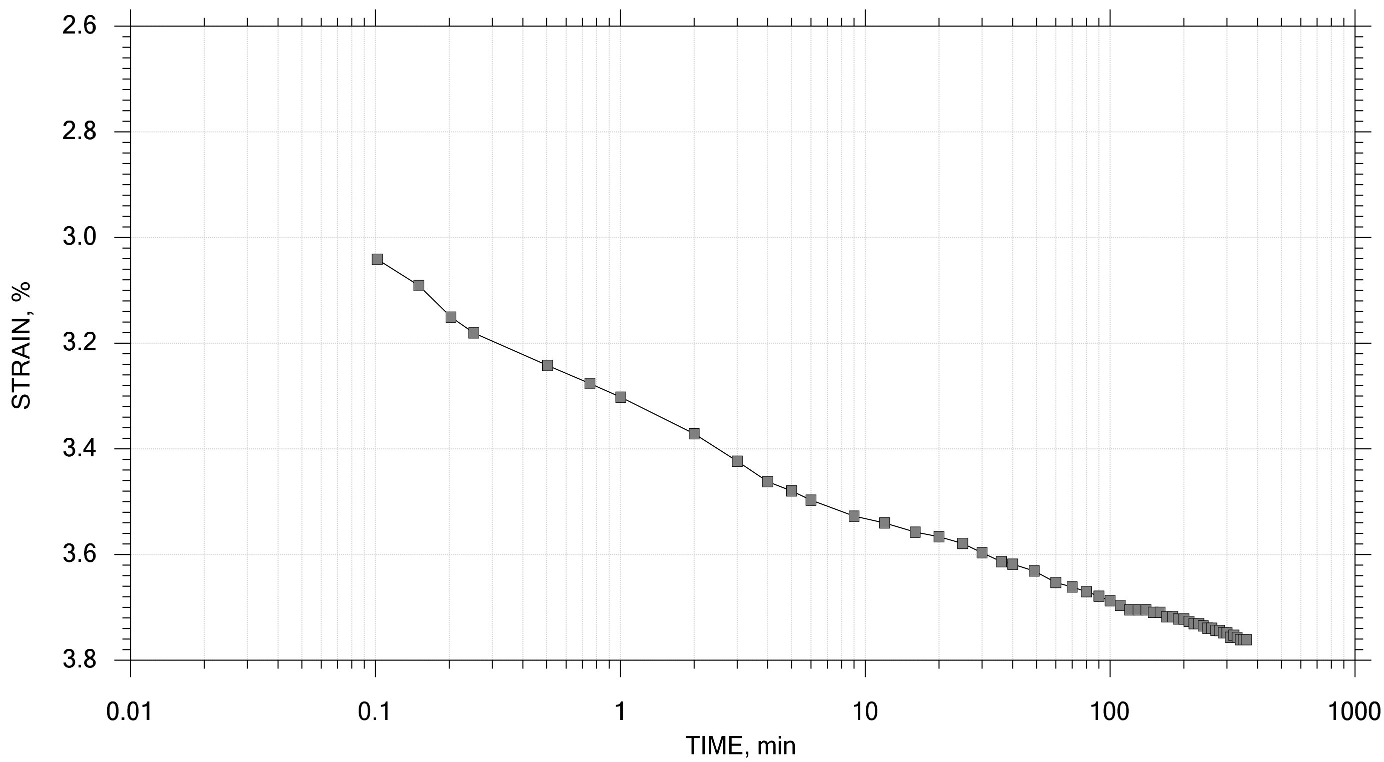
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

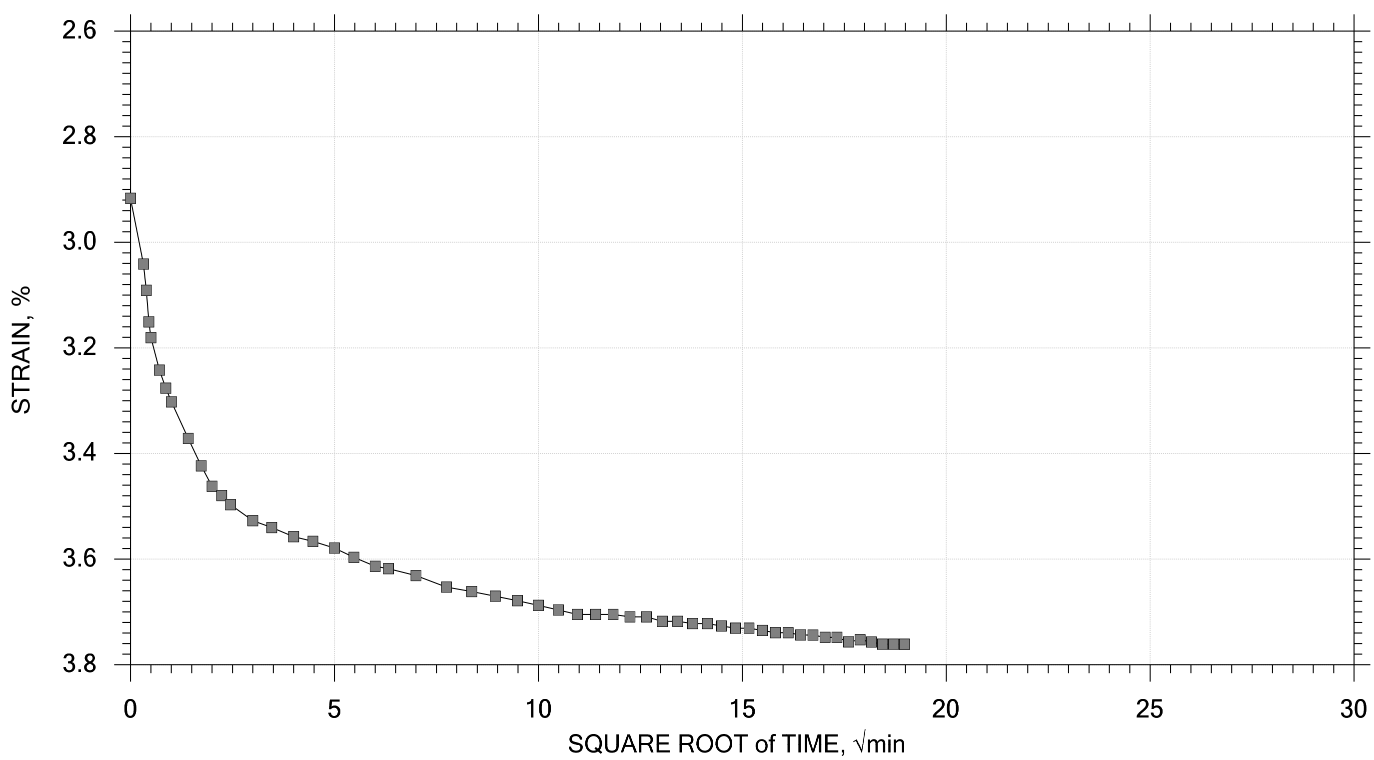
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





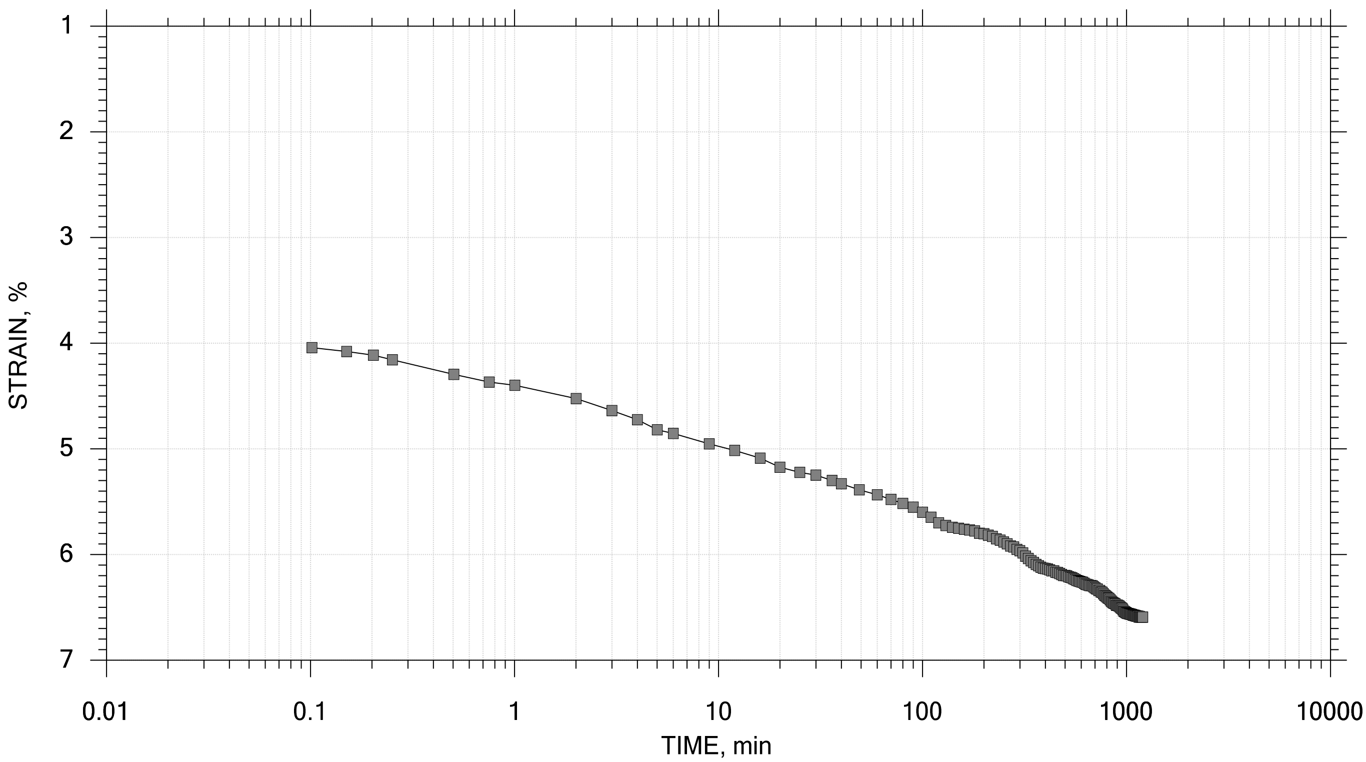
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

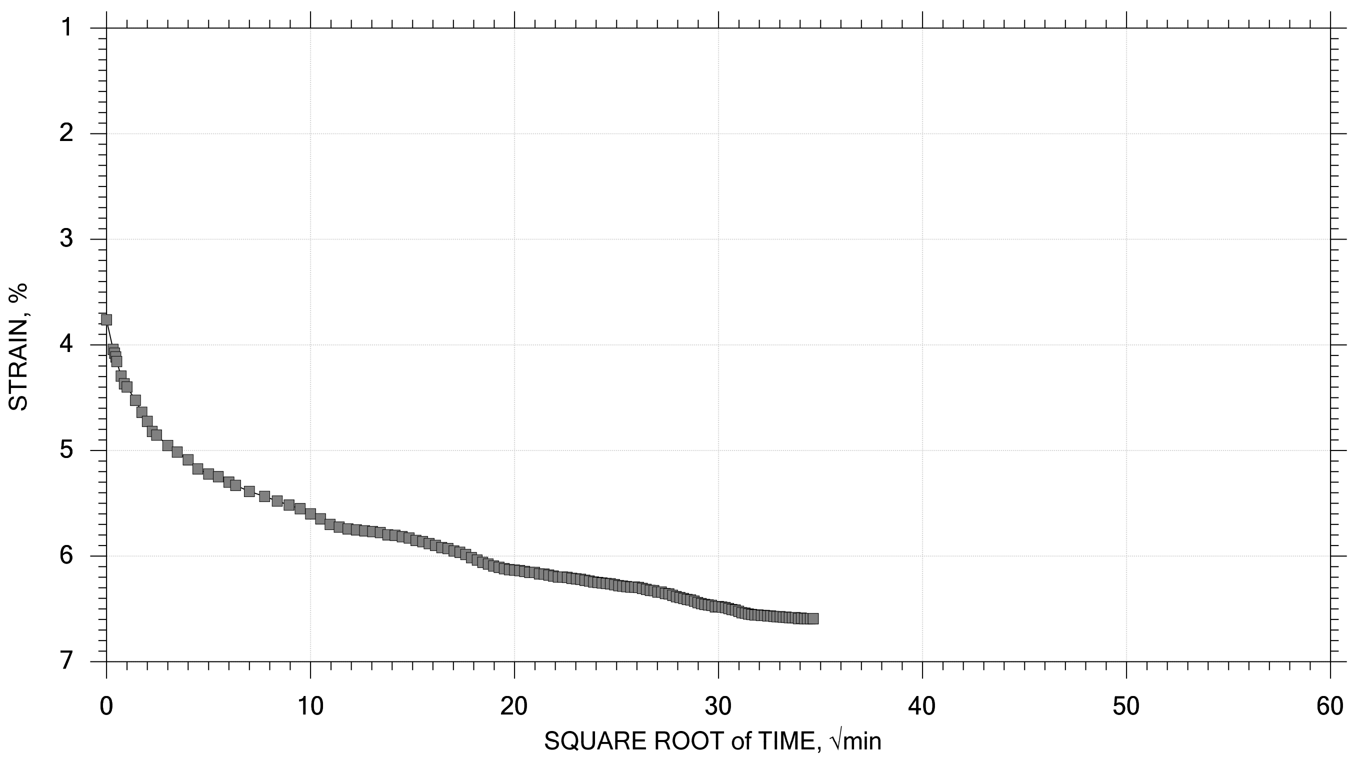
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





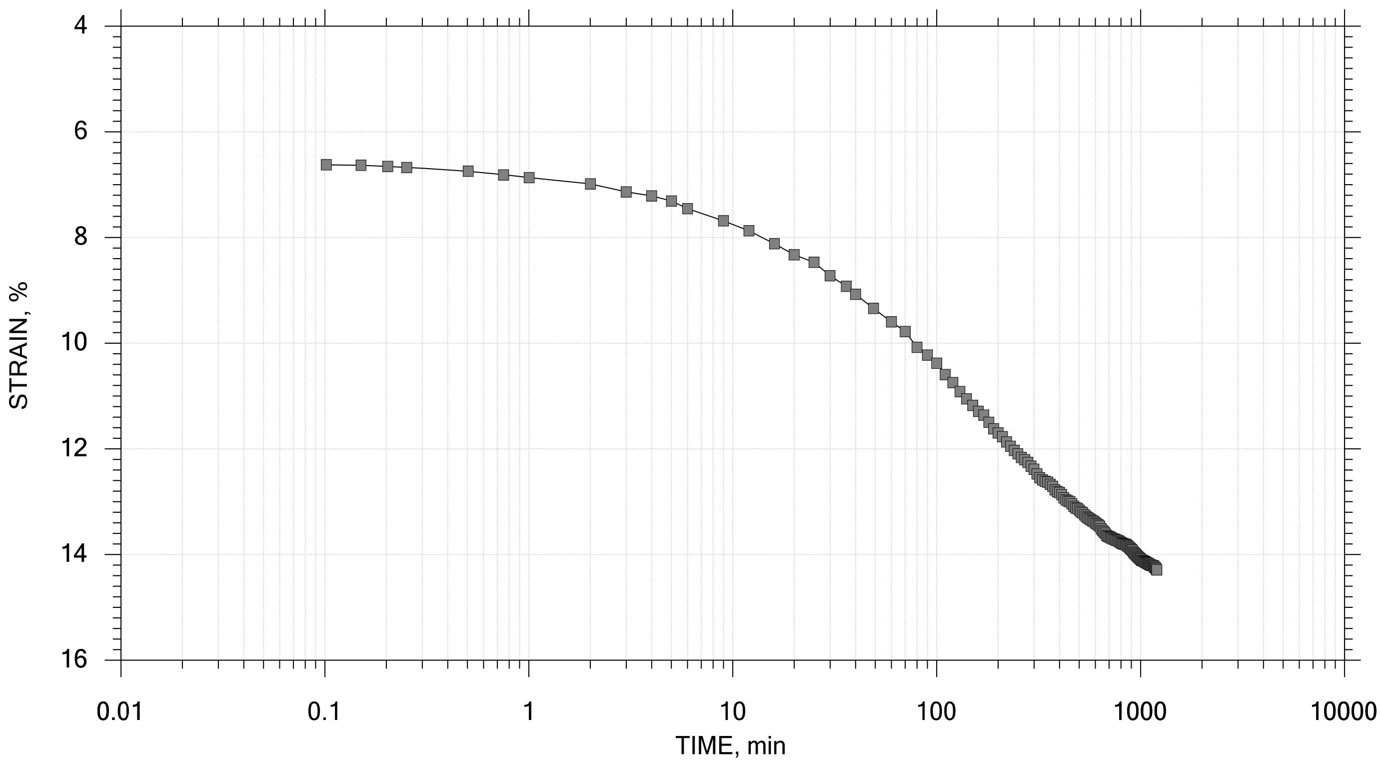
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

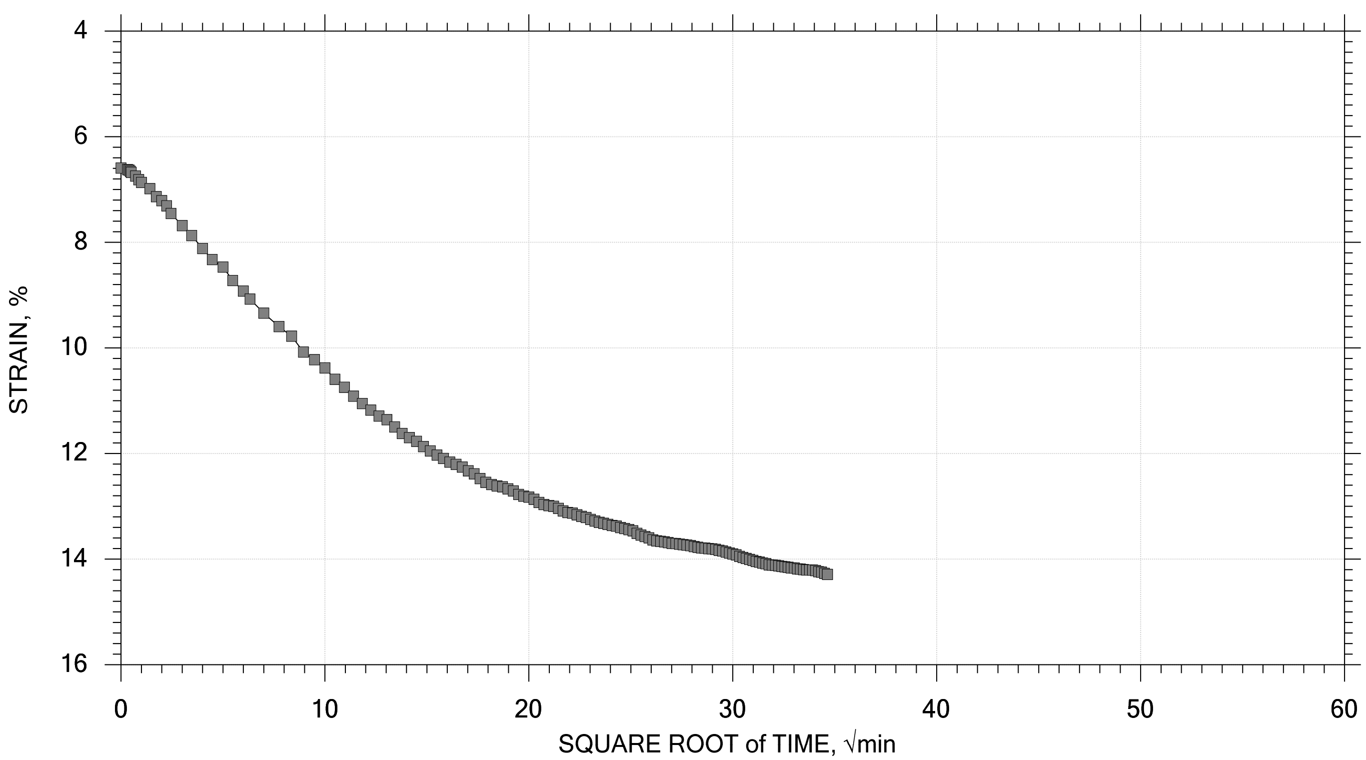
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





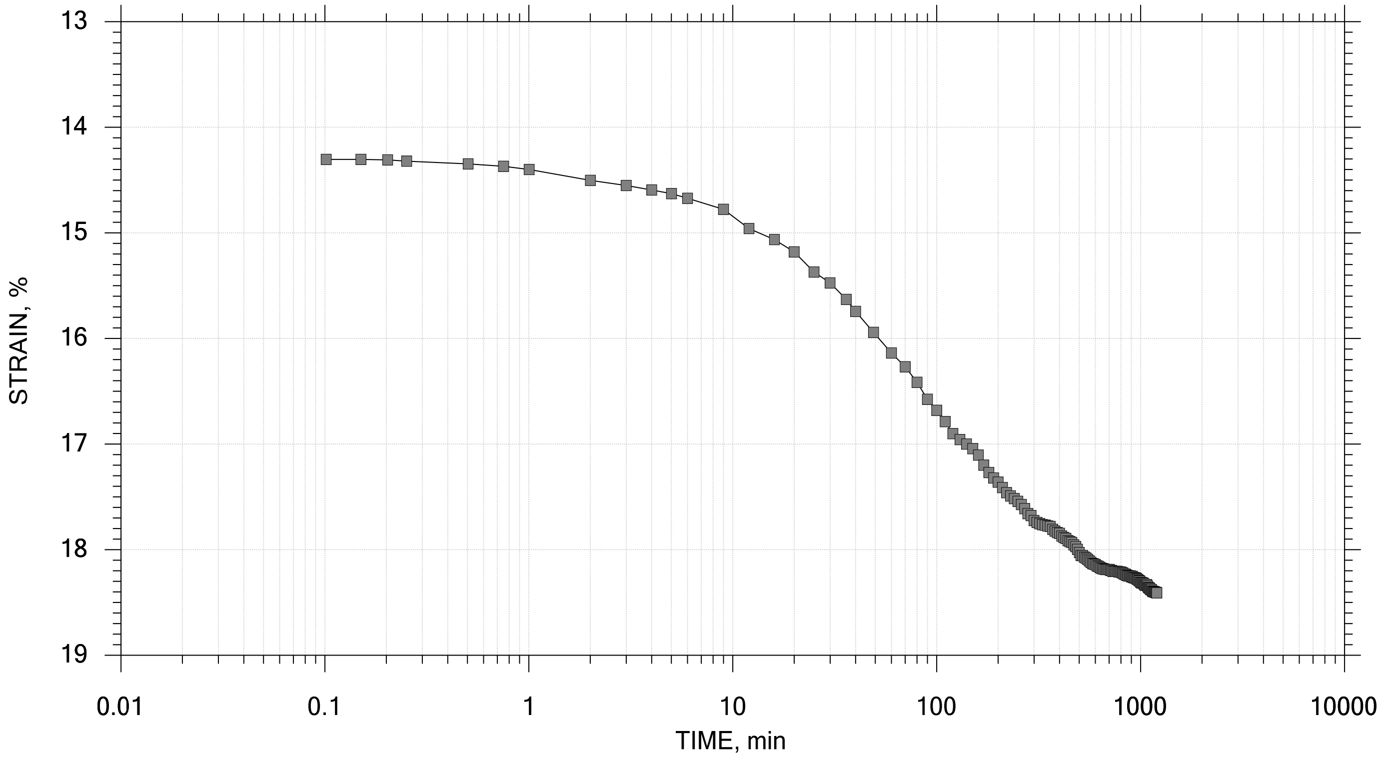
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

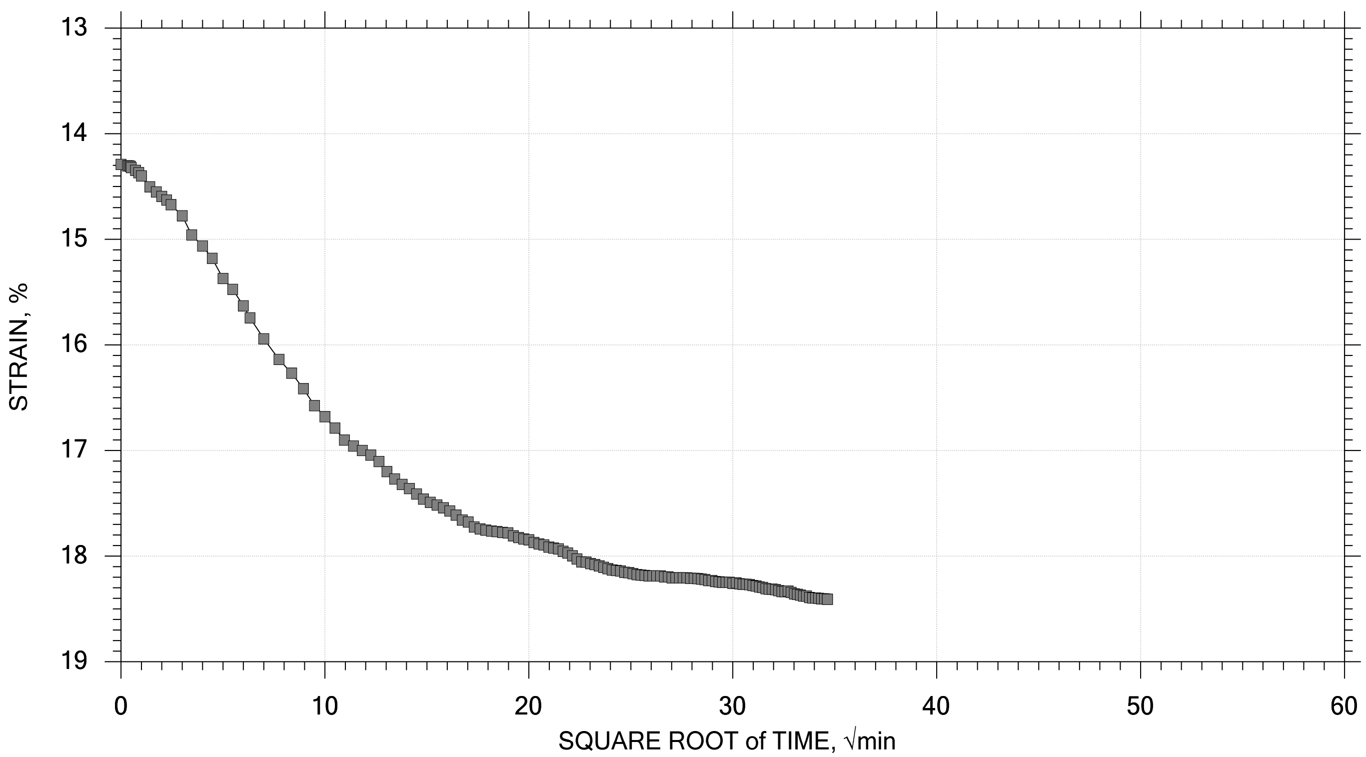
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





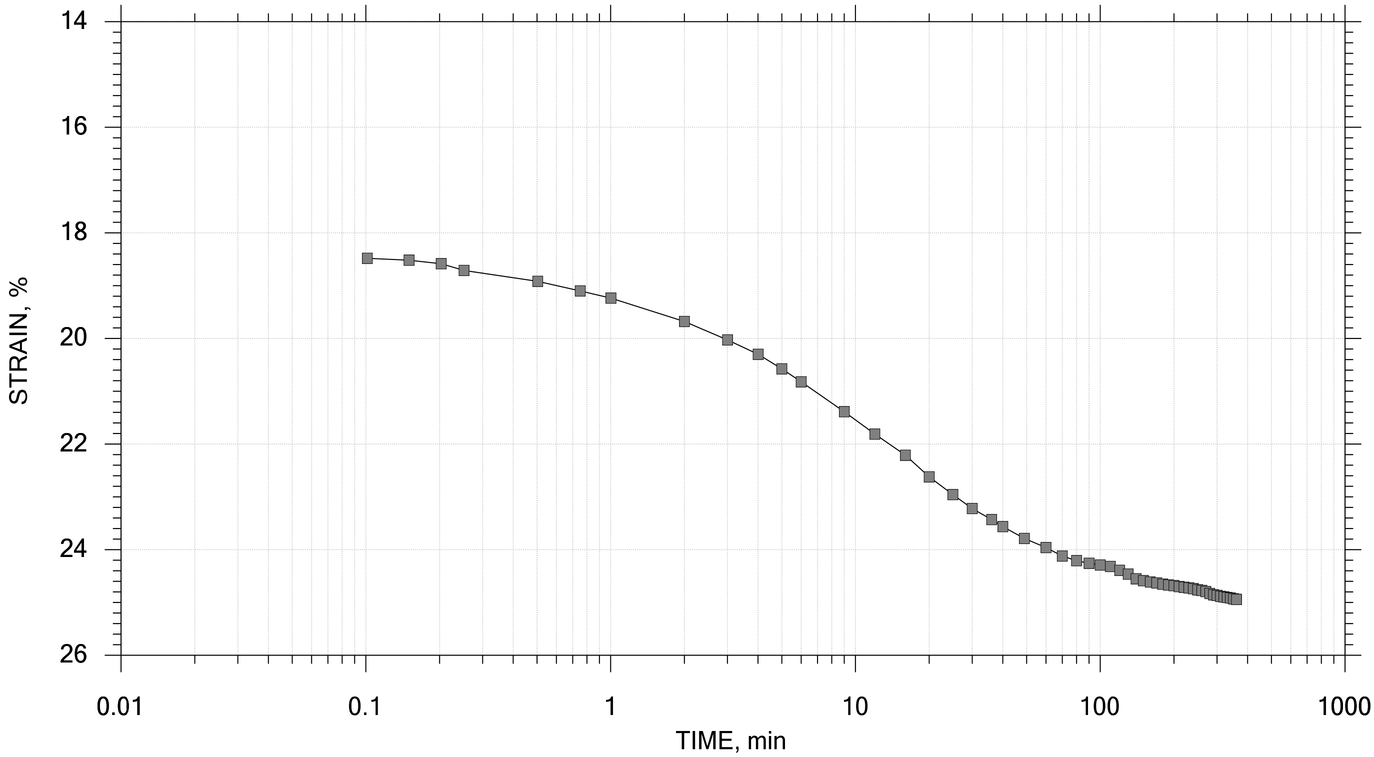
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

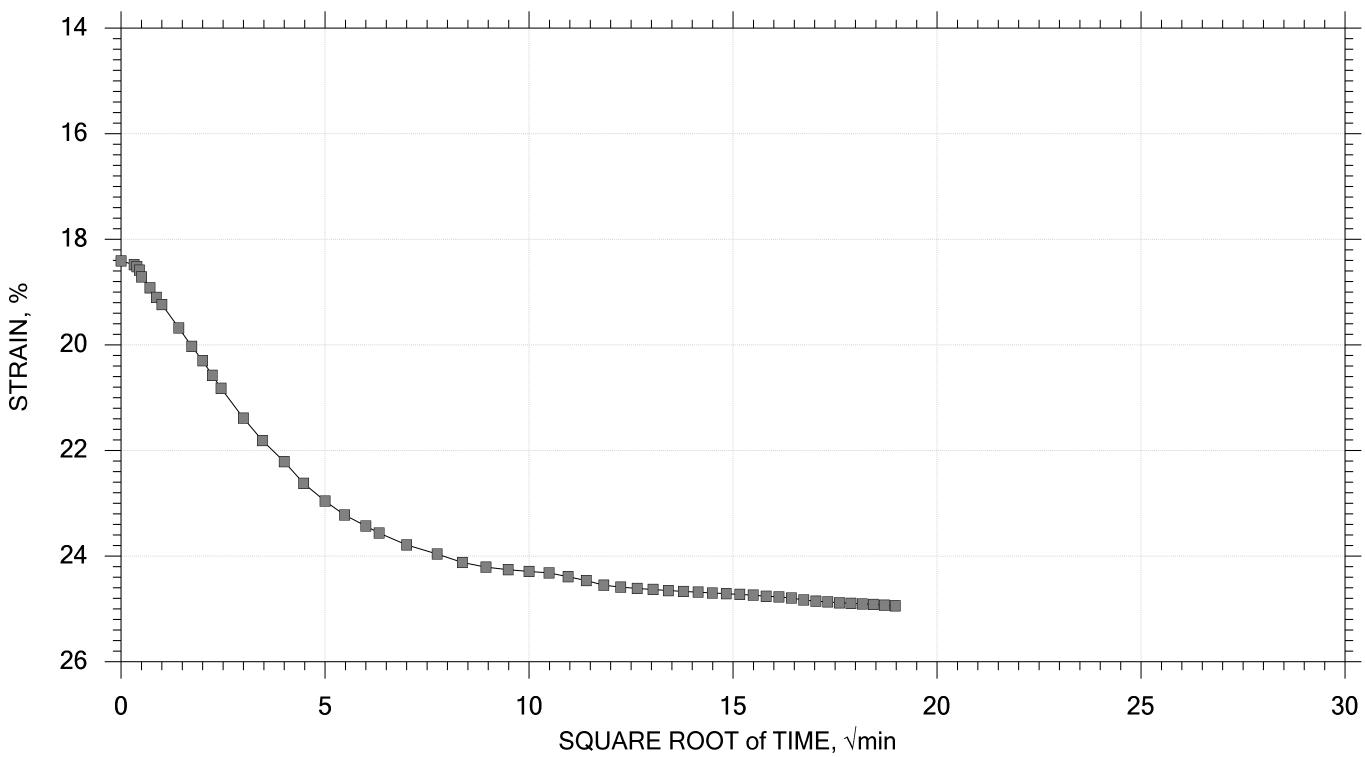
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





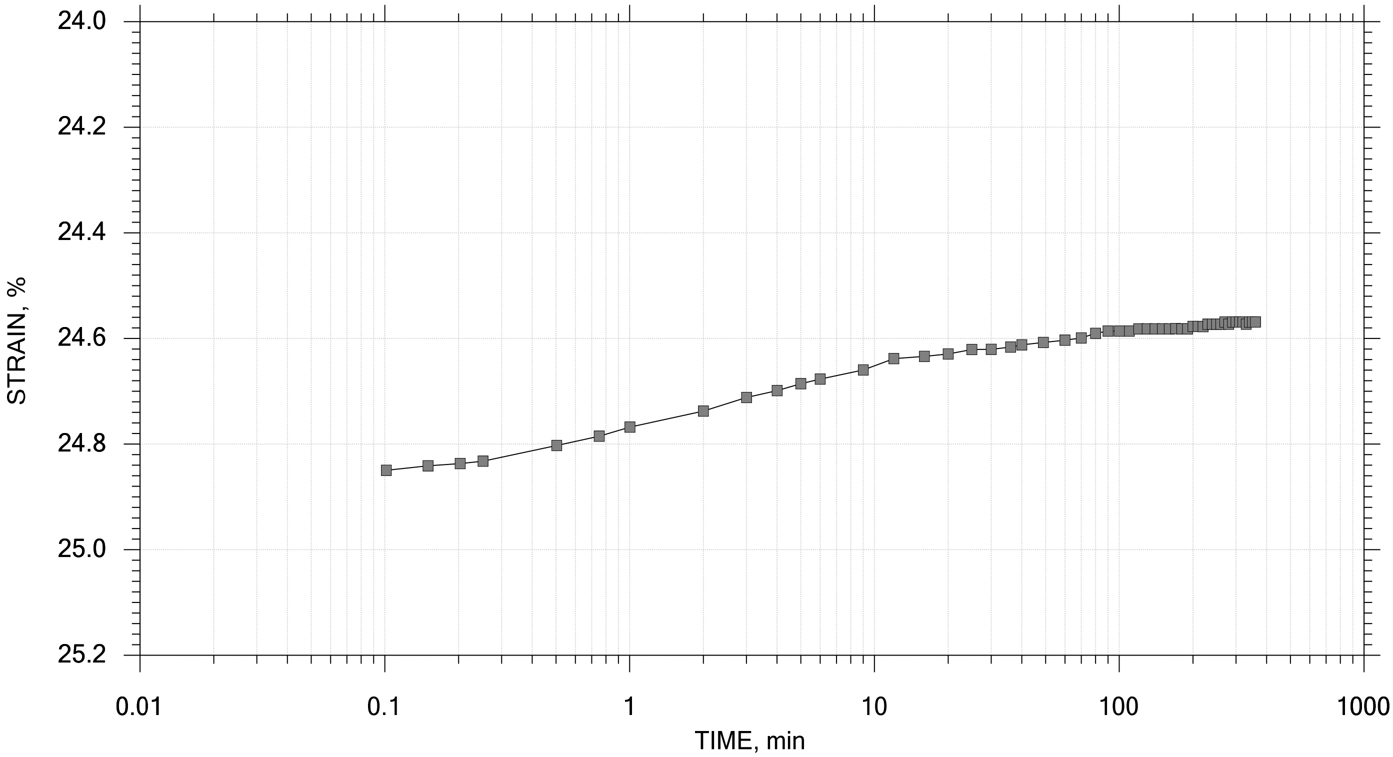
GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

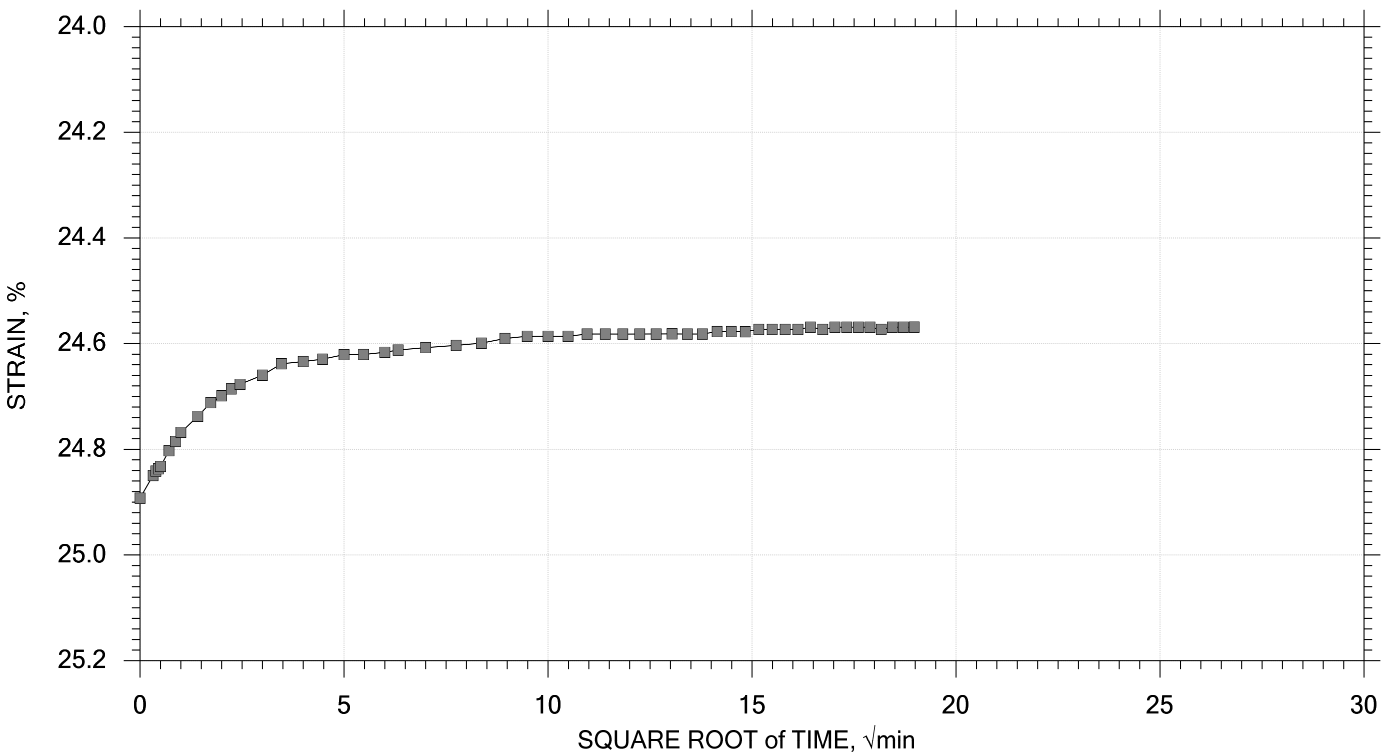
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





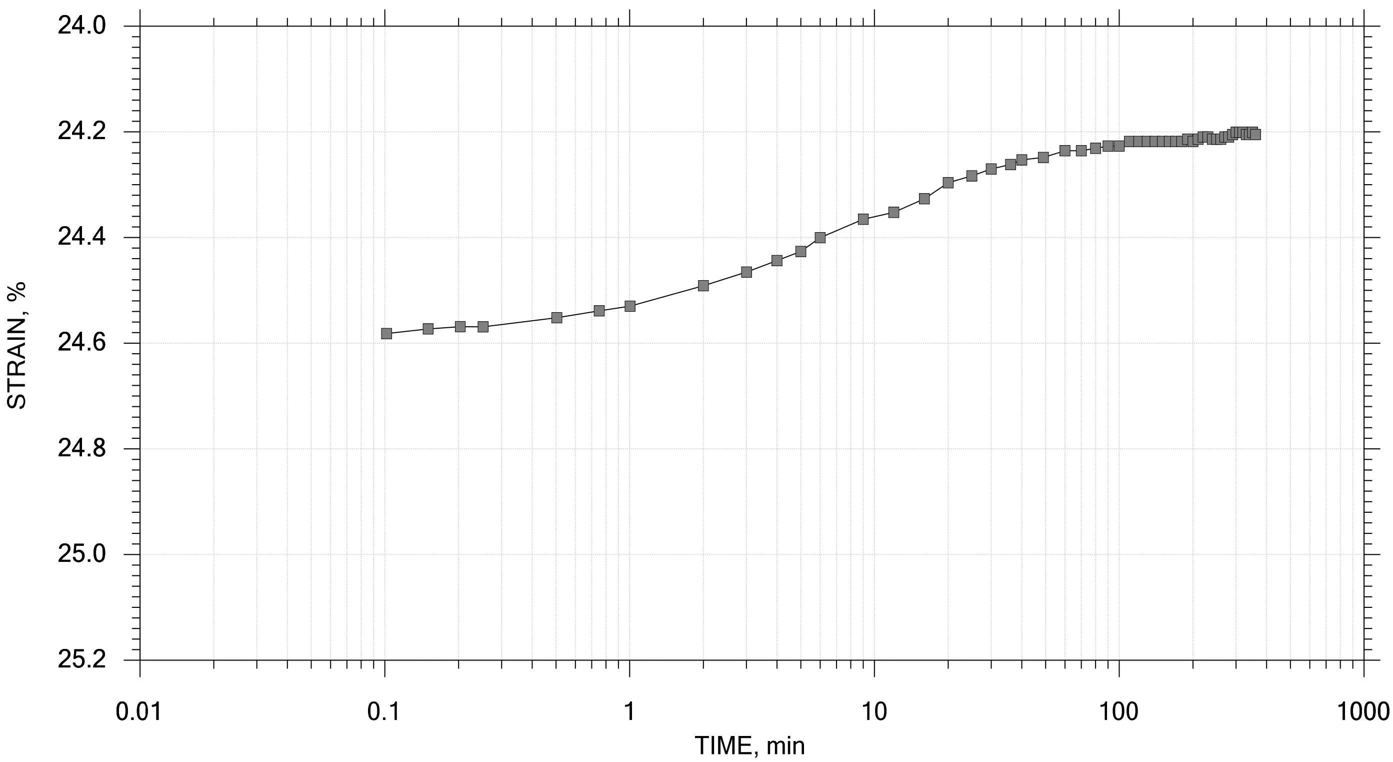
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

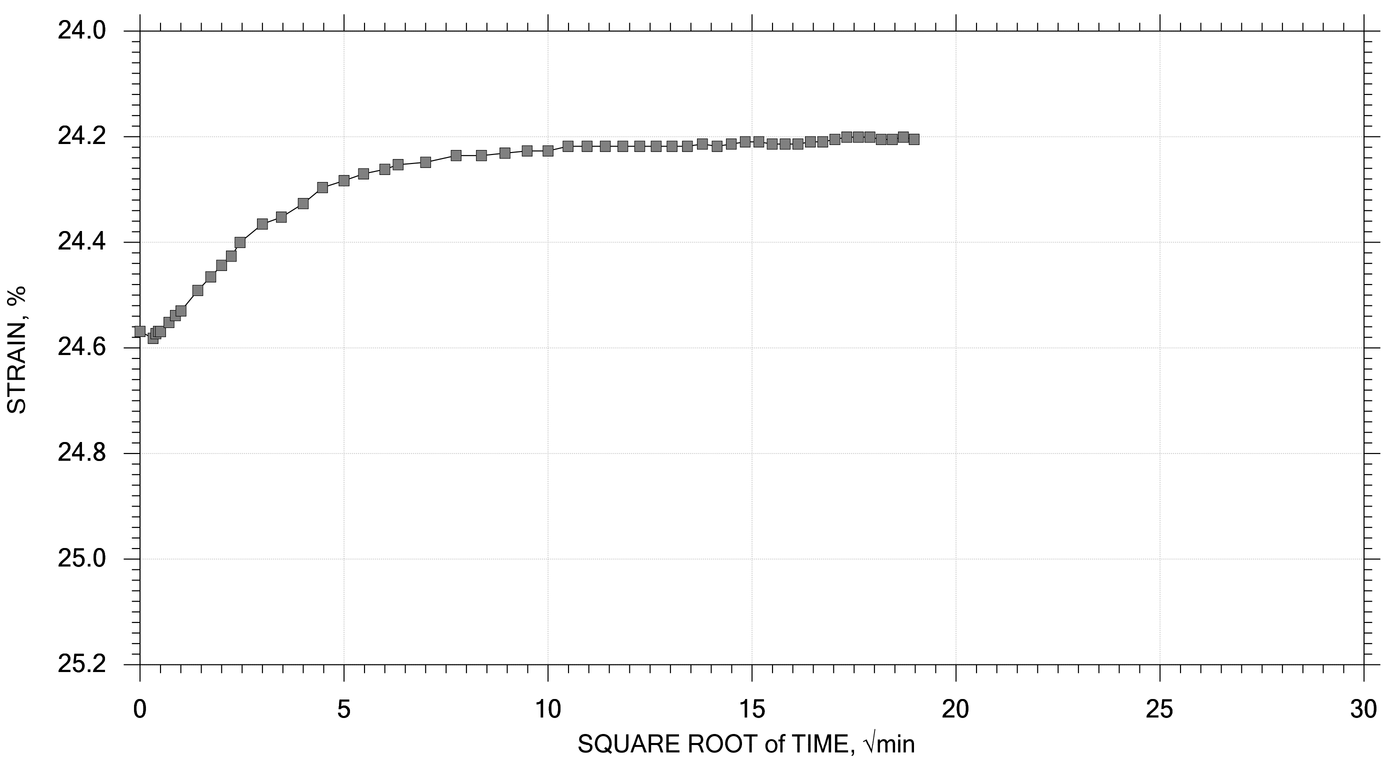
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





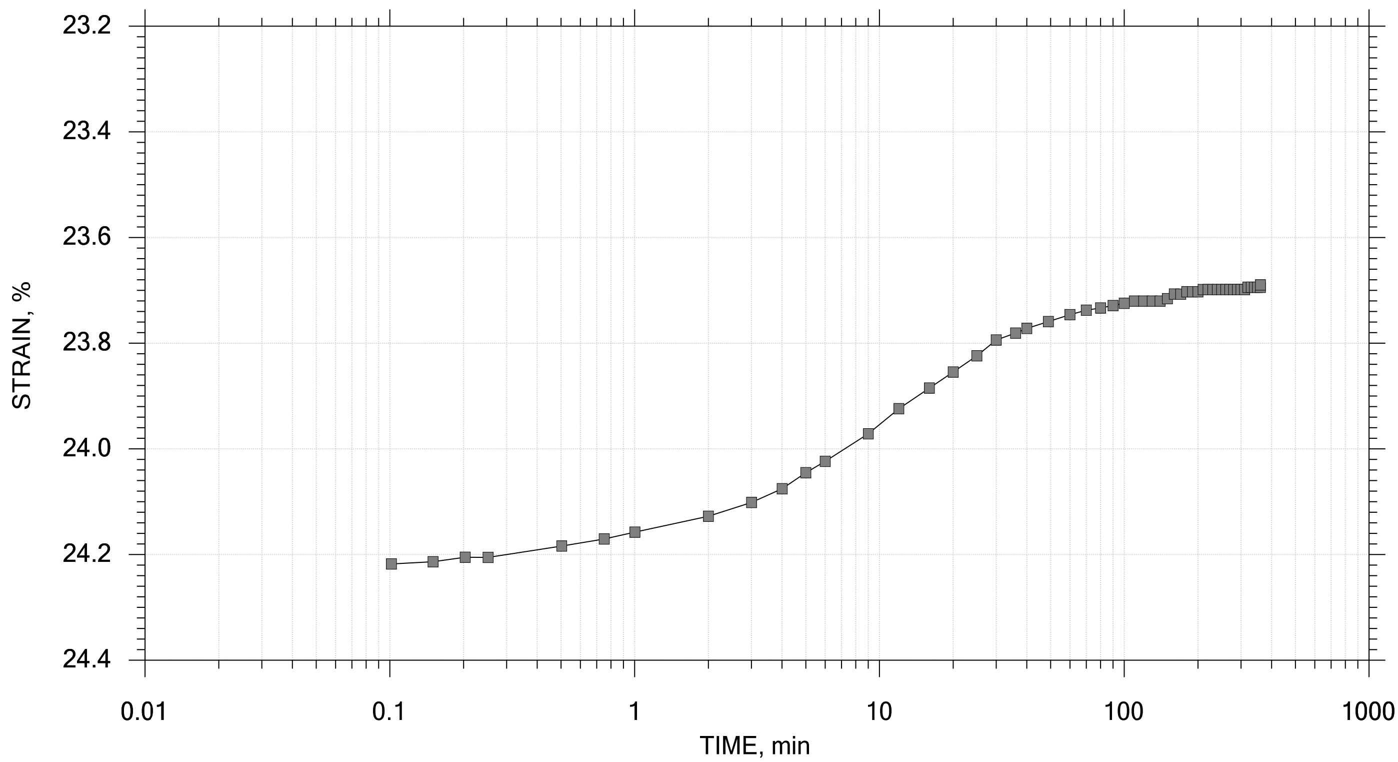
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

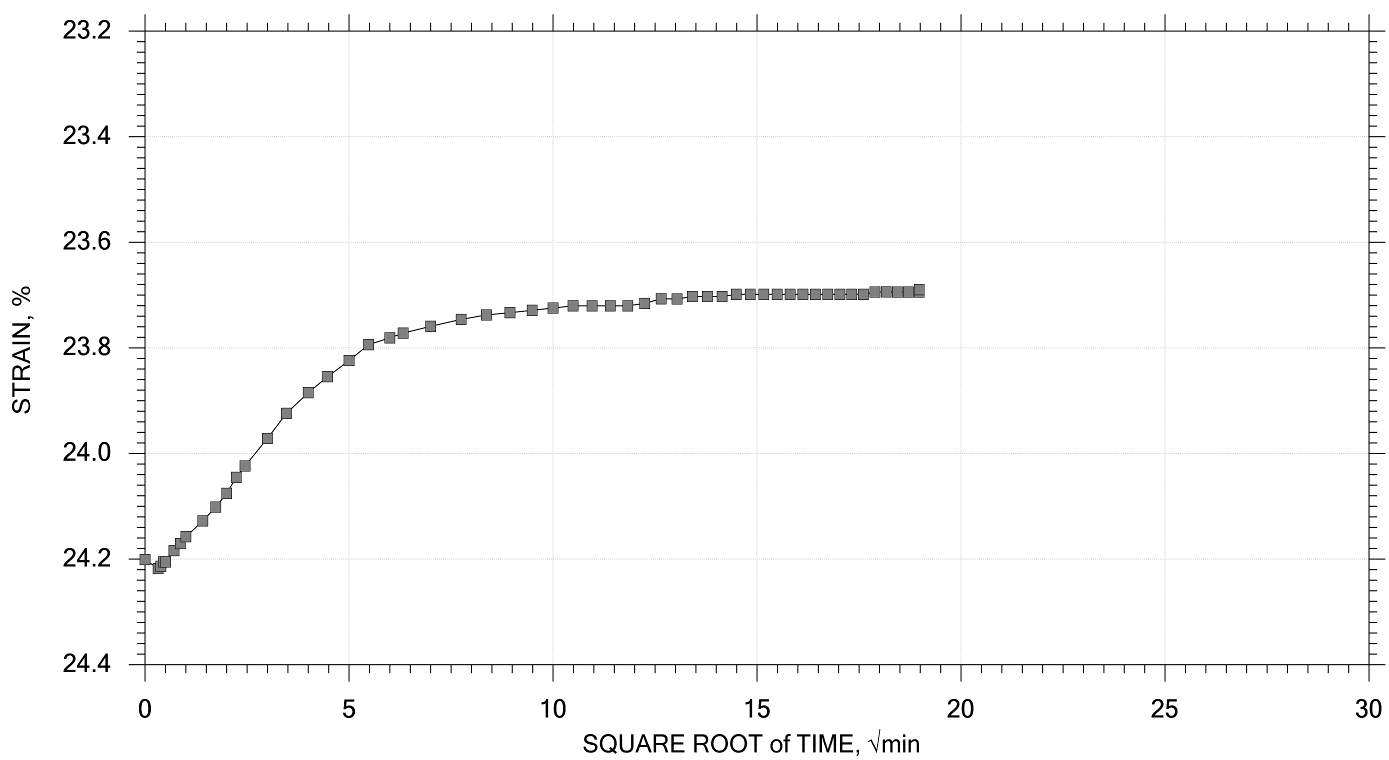
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





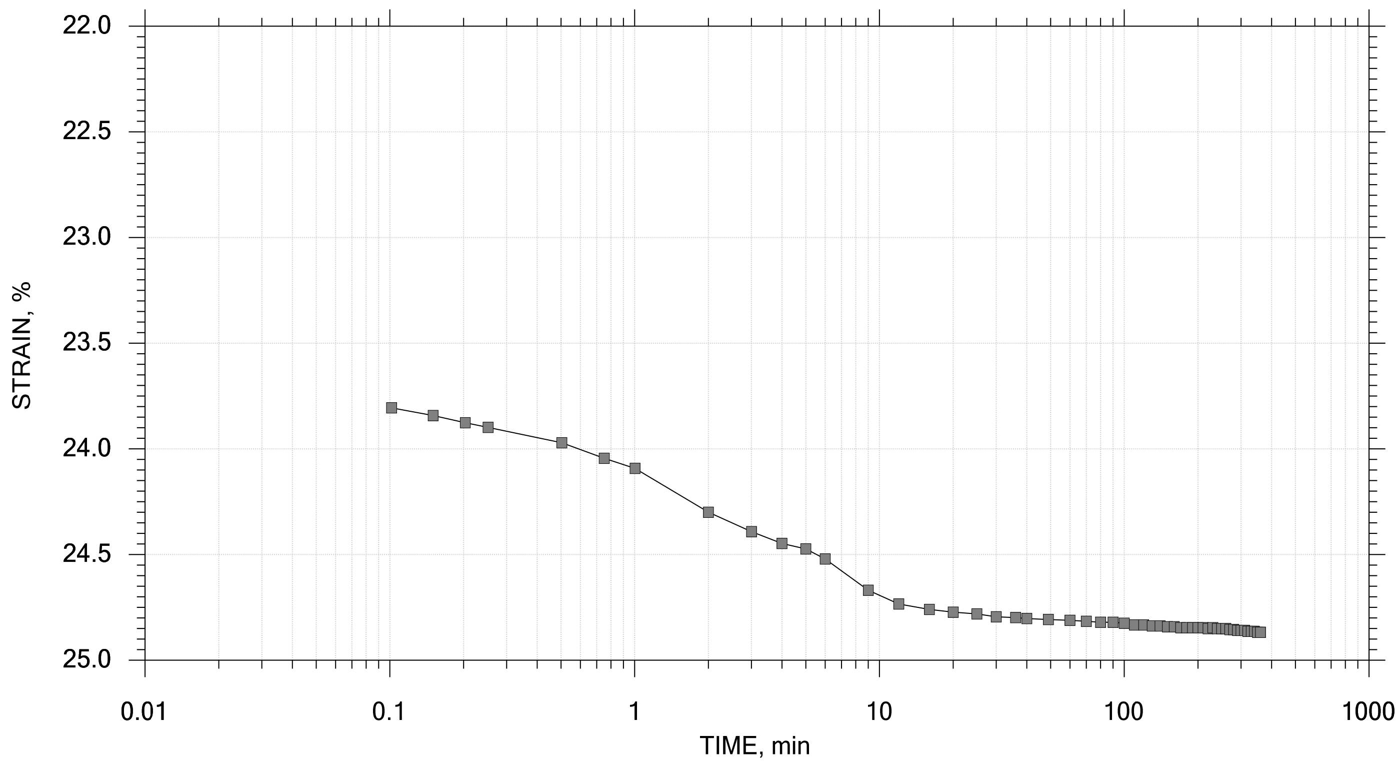
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

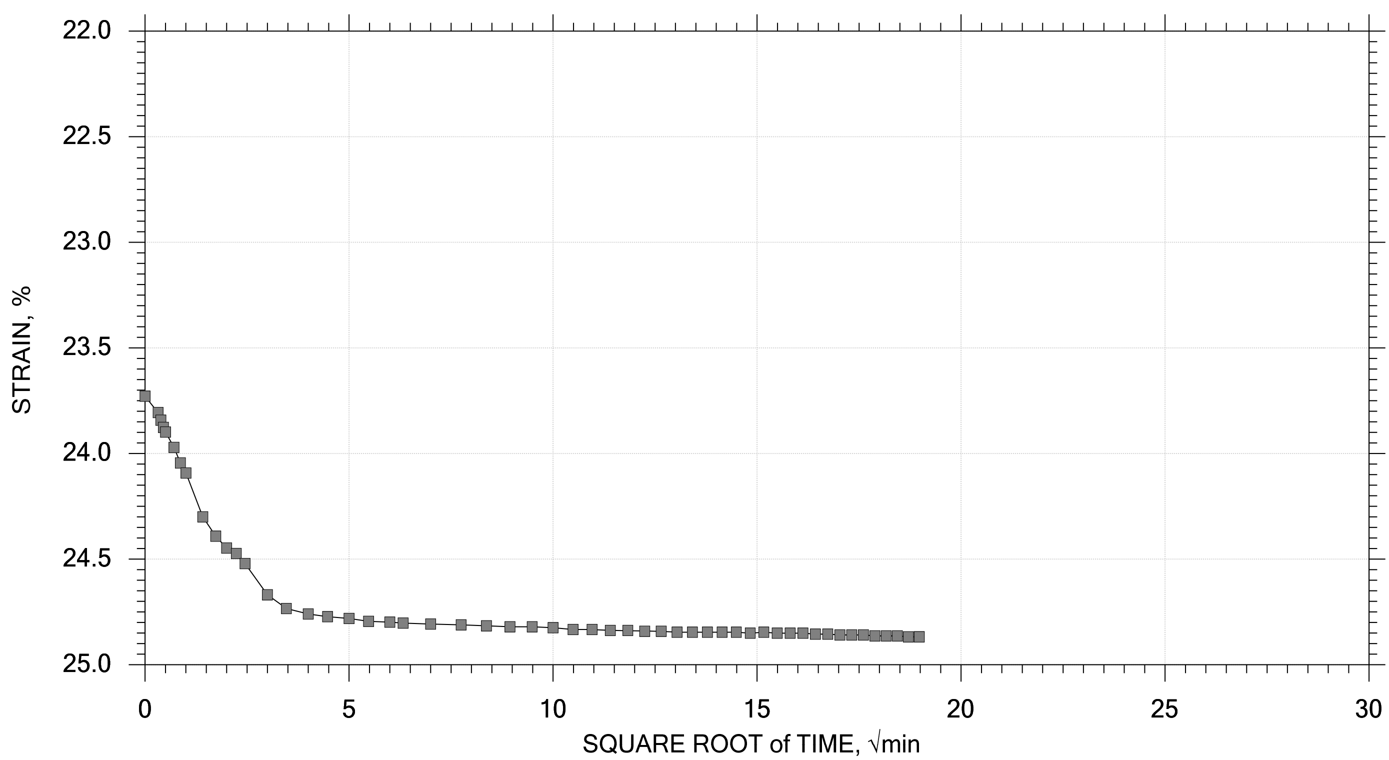
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 5000 psf





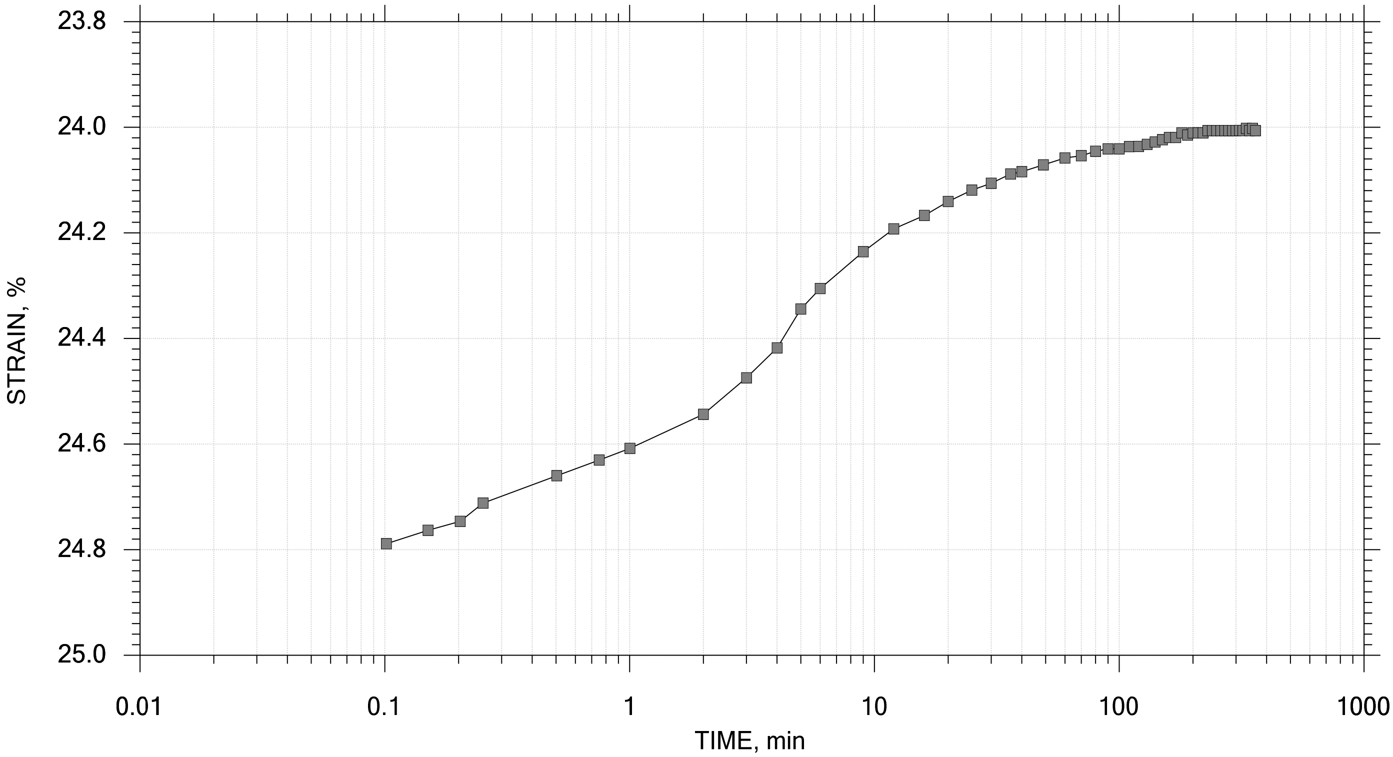
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

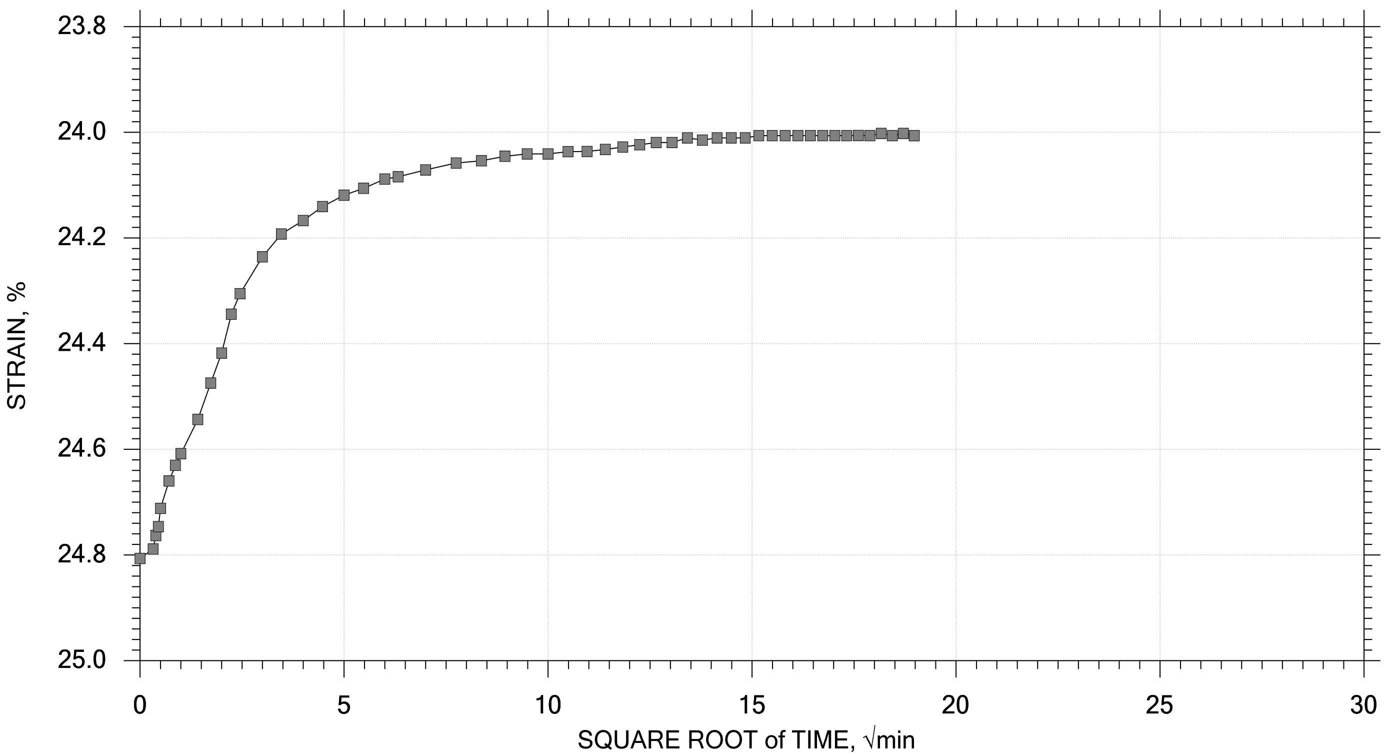
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





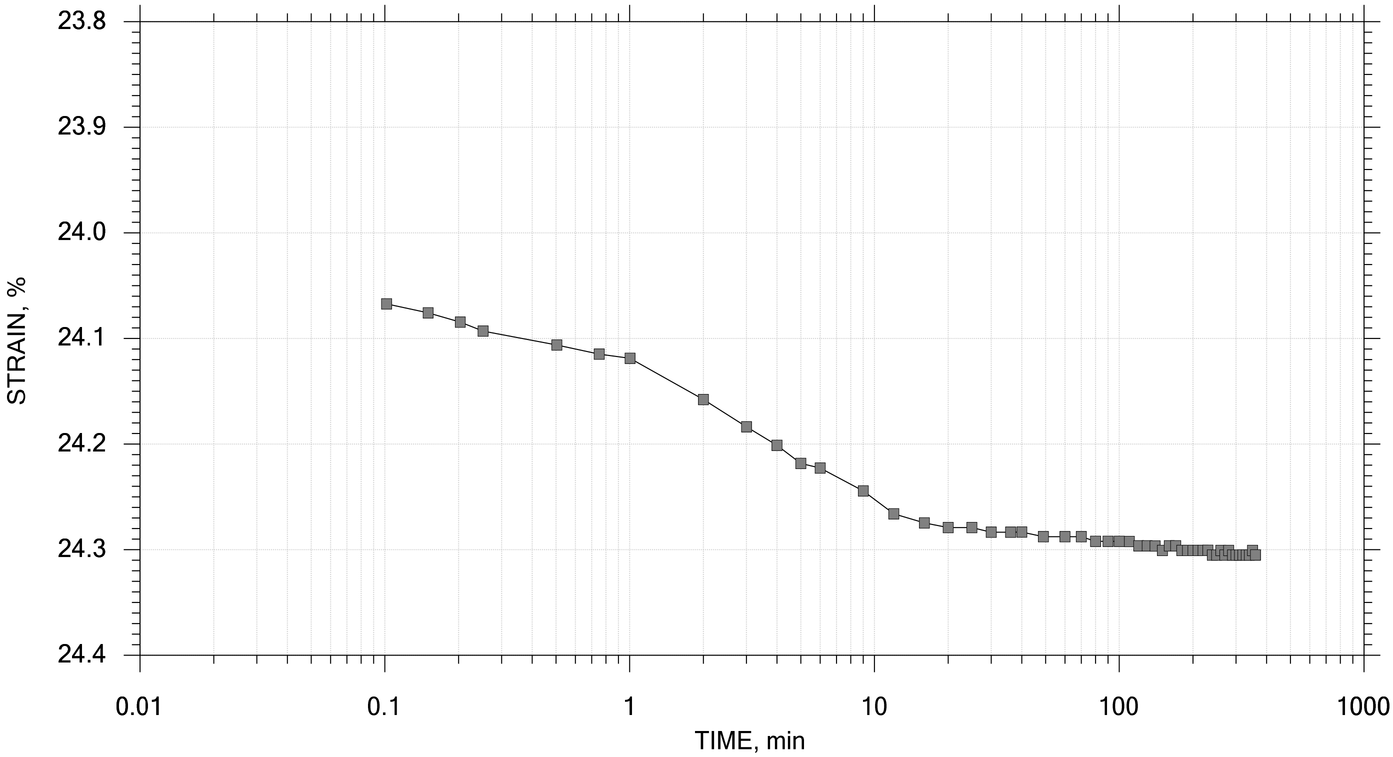
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

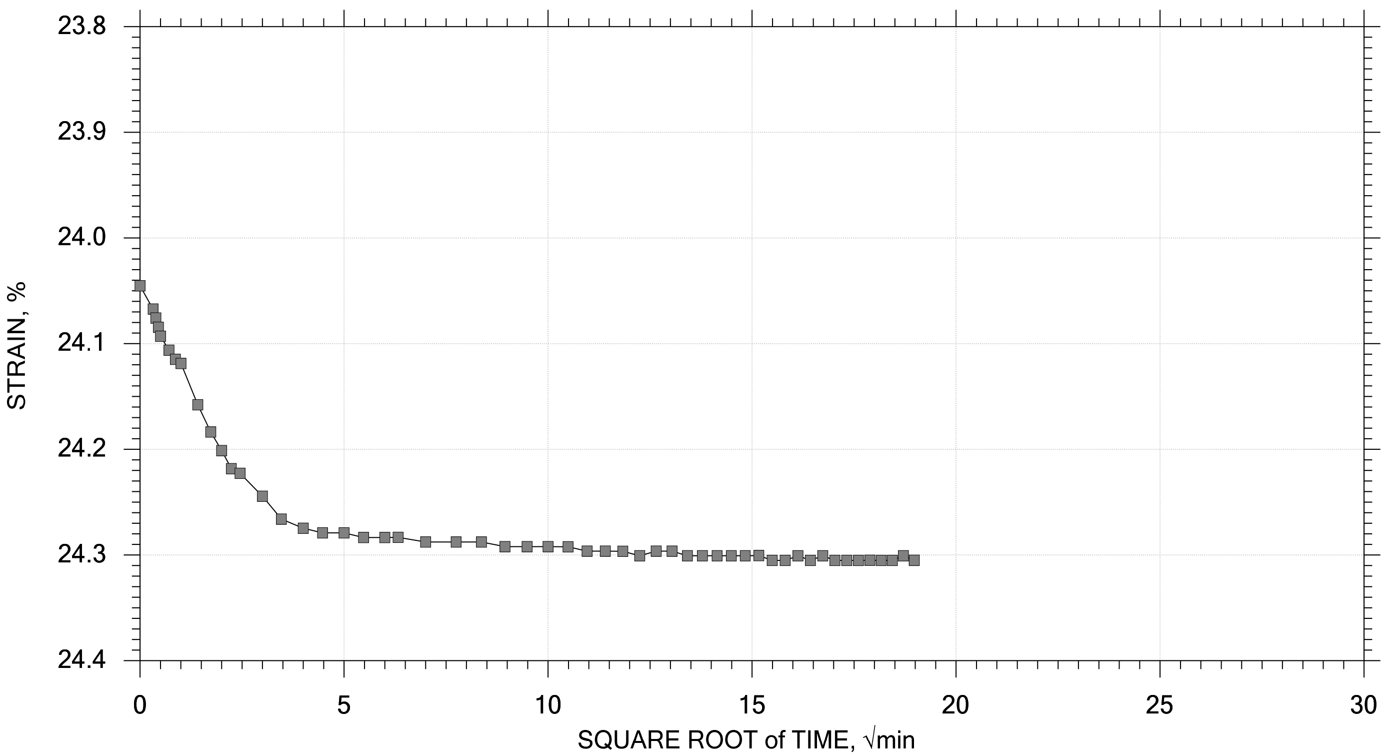
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





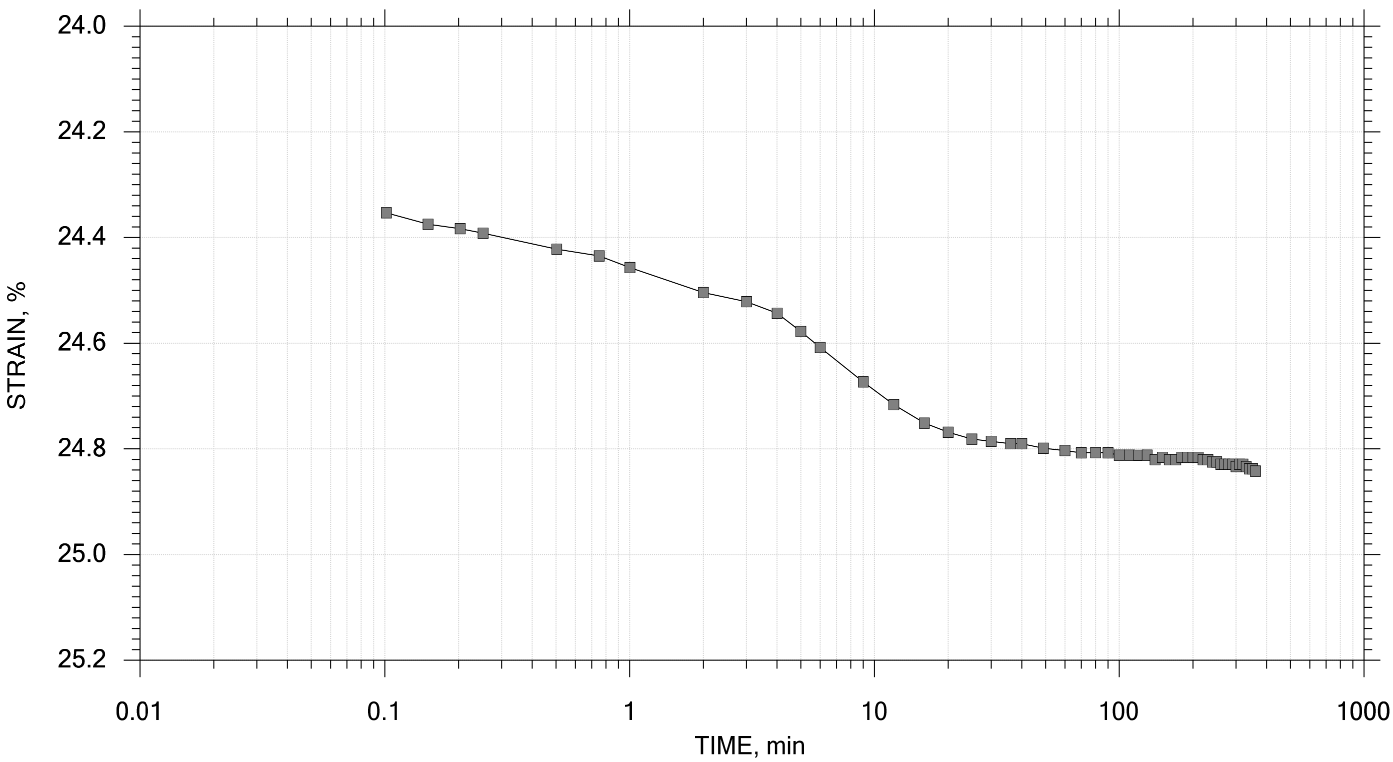
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

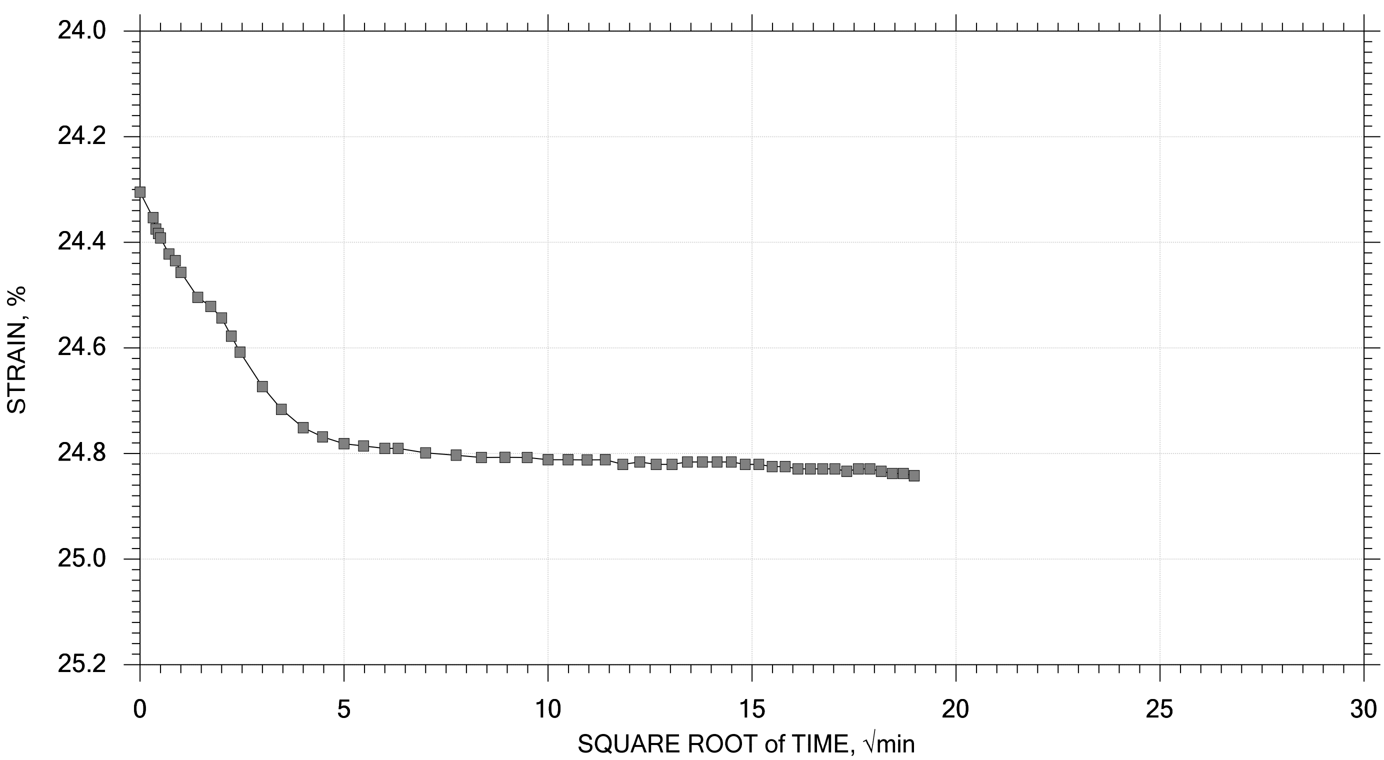
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





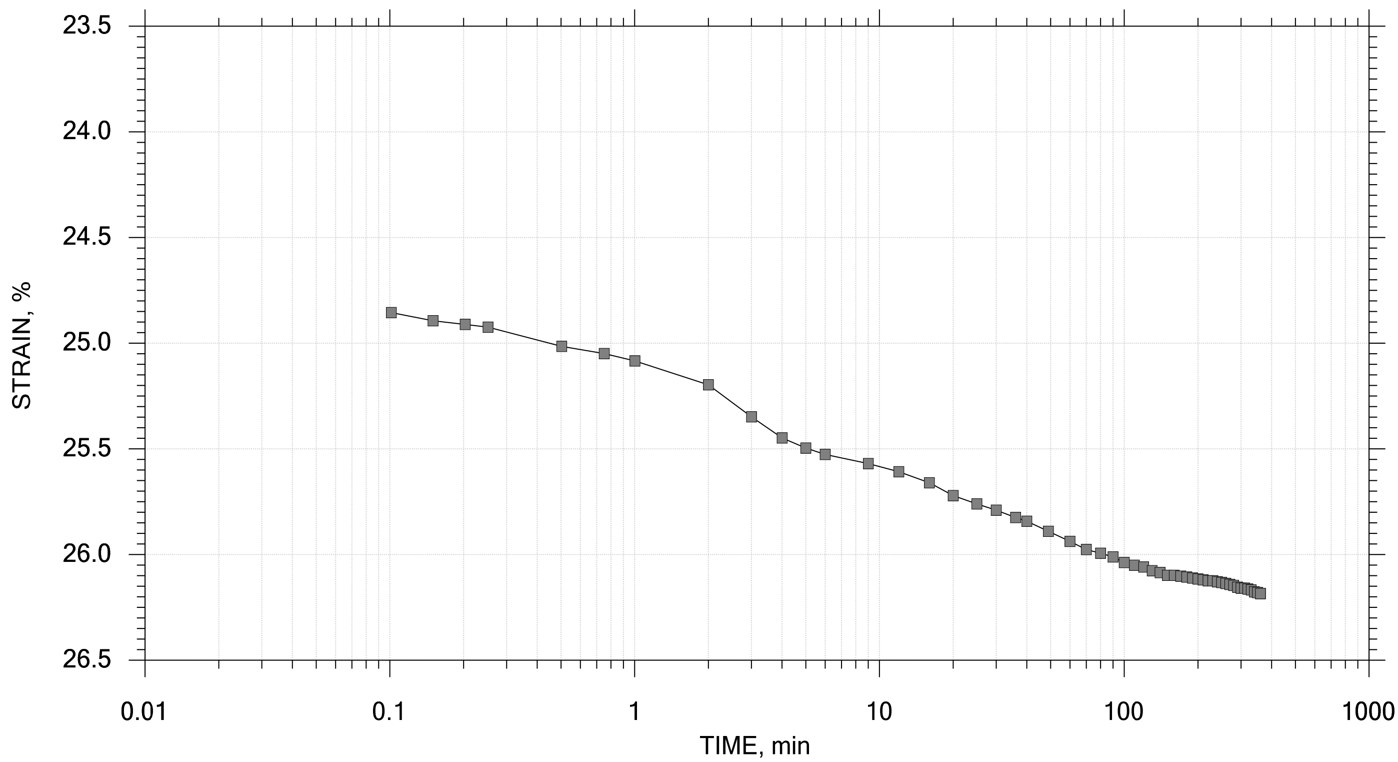
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

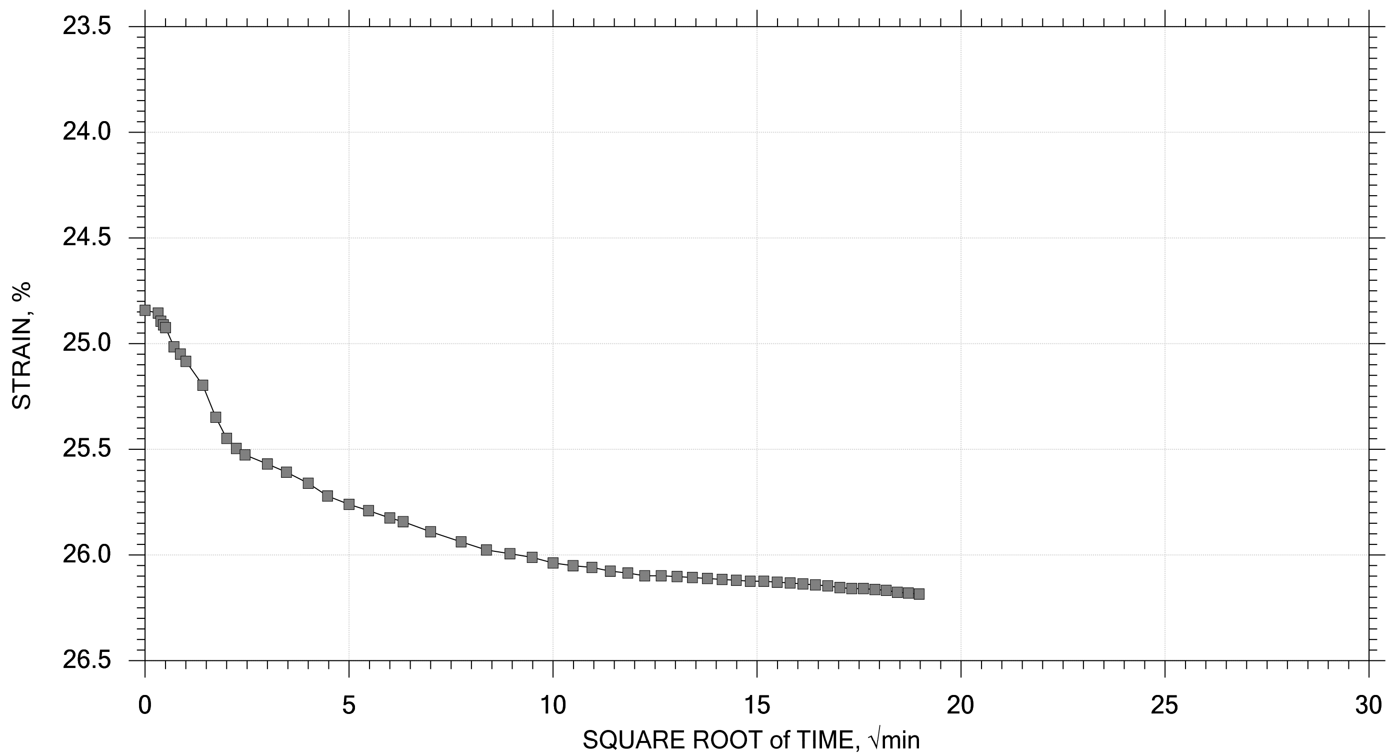
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





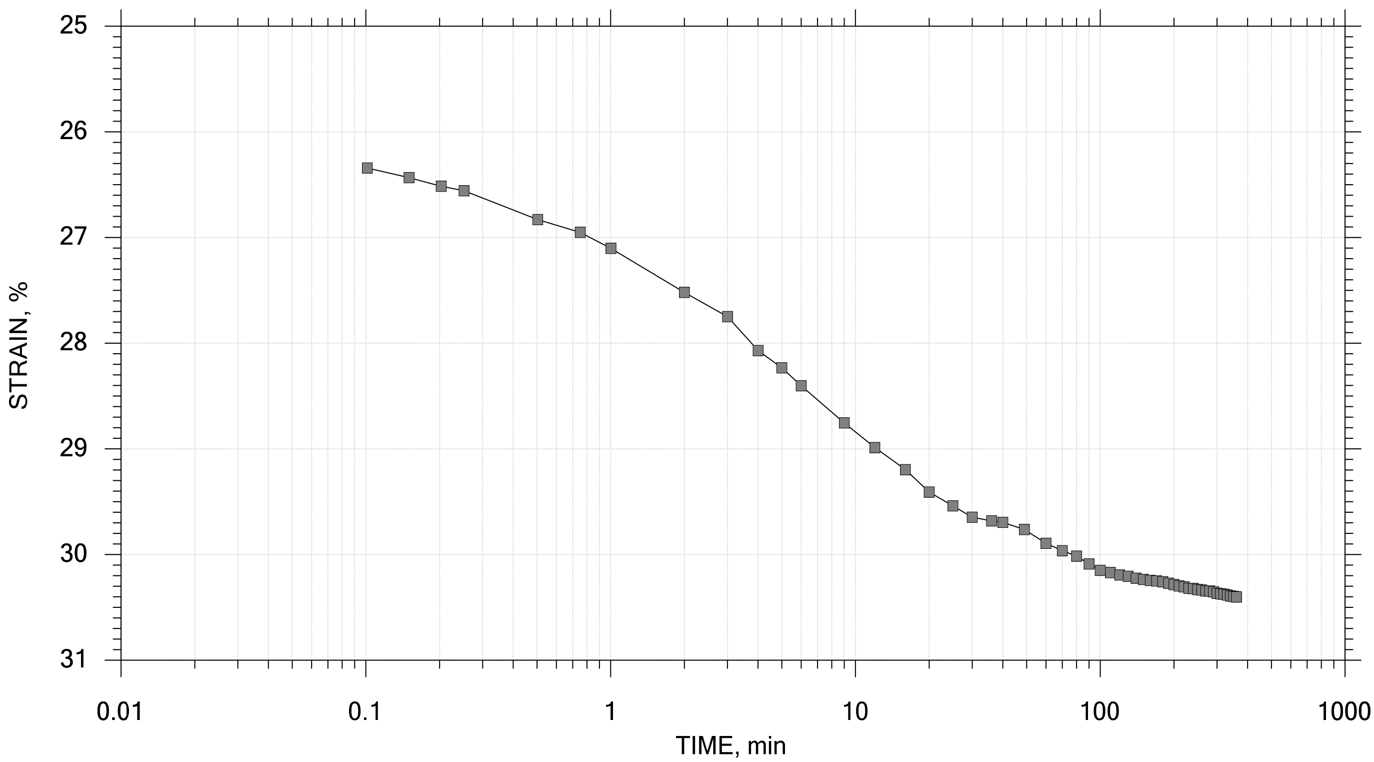
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

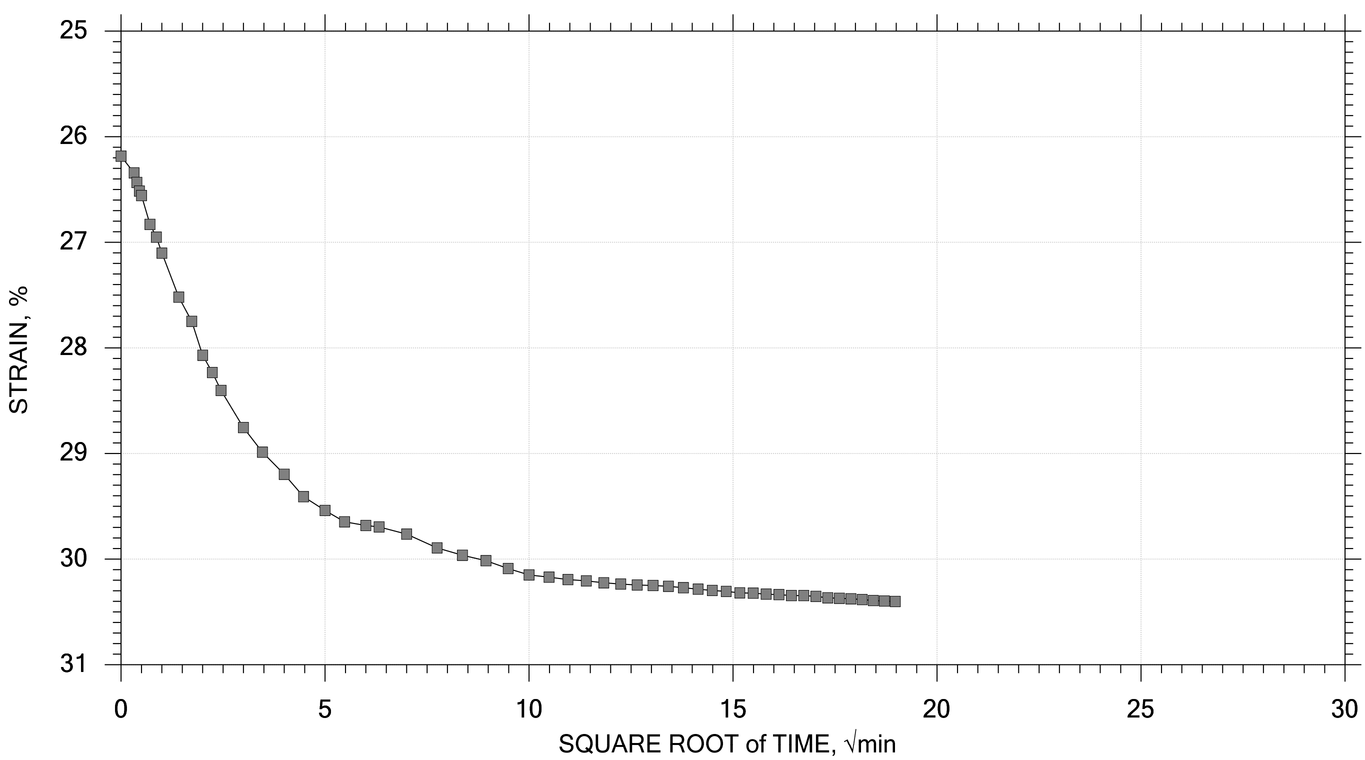
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf

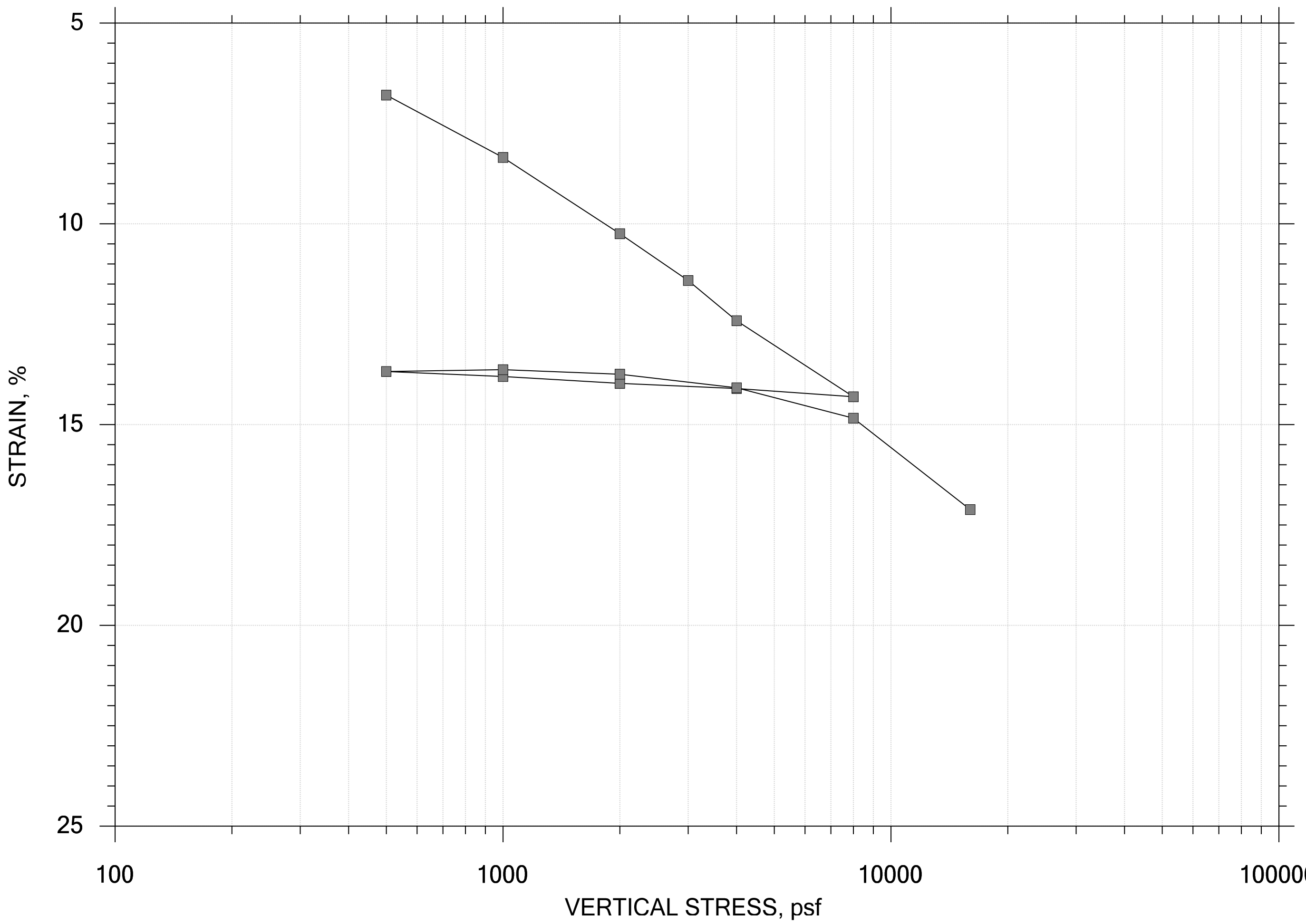


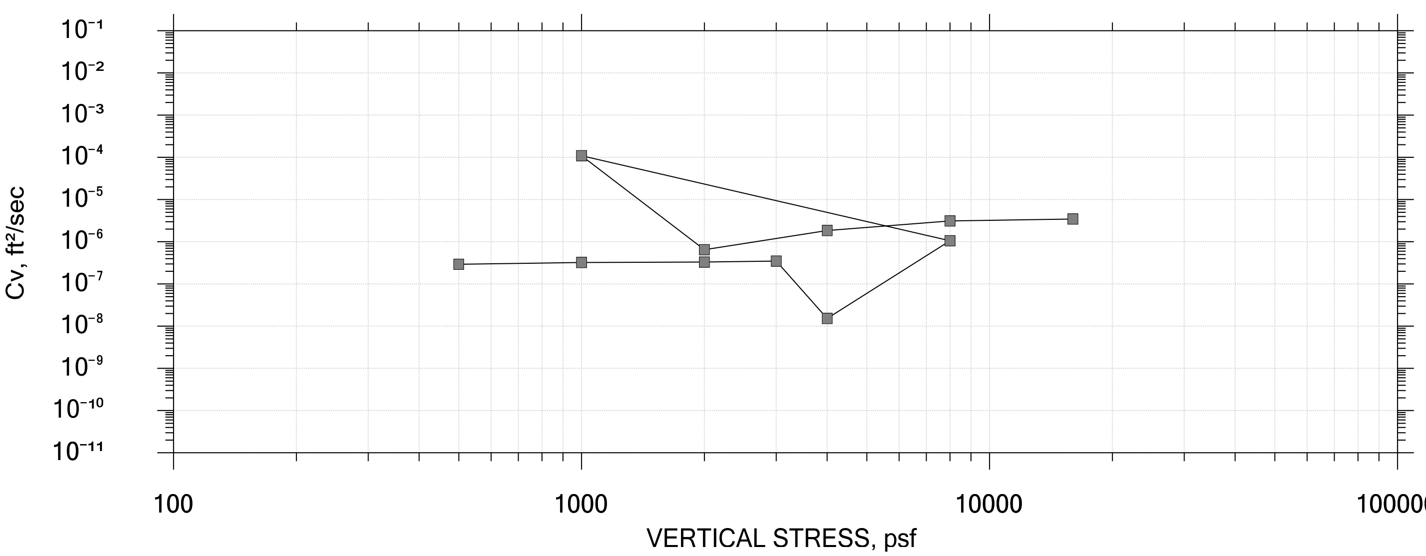


GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-205	Tested By: md	Checked By: njh
	Sample No.: U-2	Test Date: 07/31/18	Test No.: IP-3
	Depth: 35-37 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

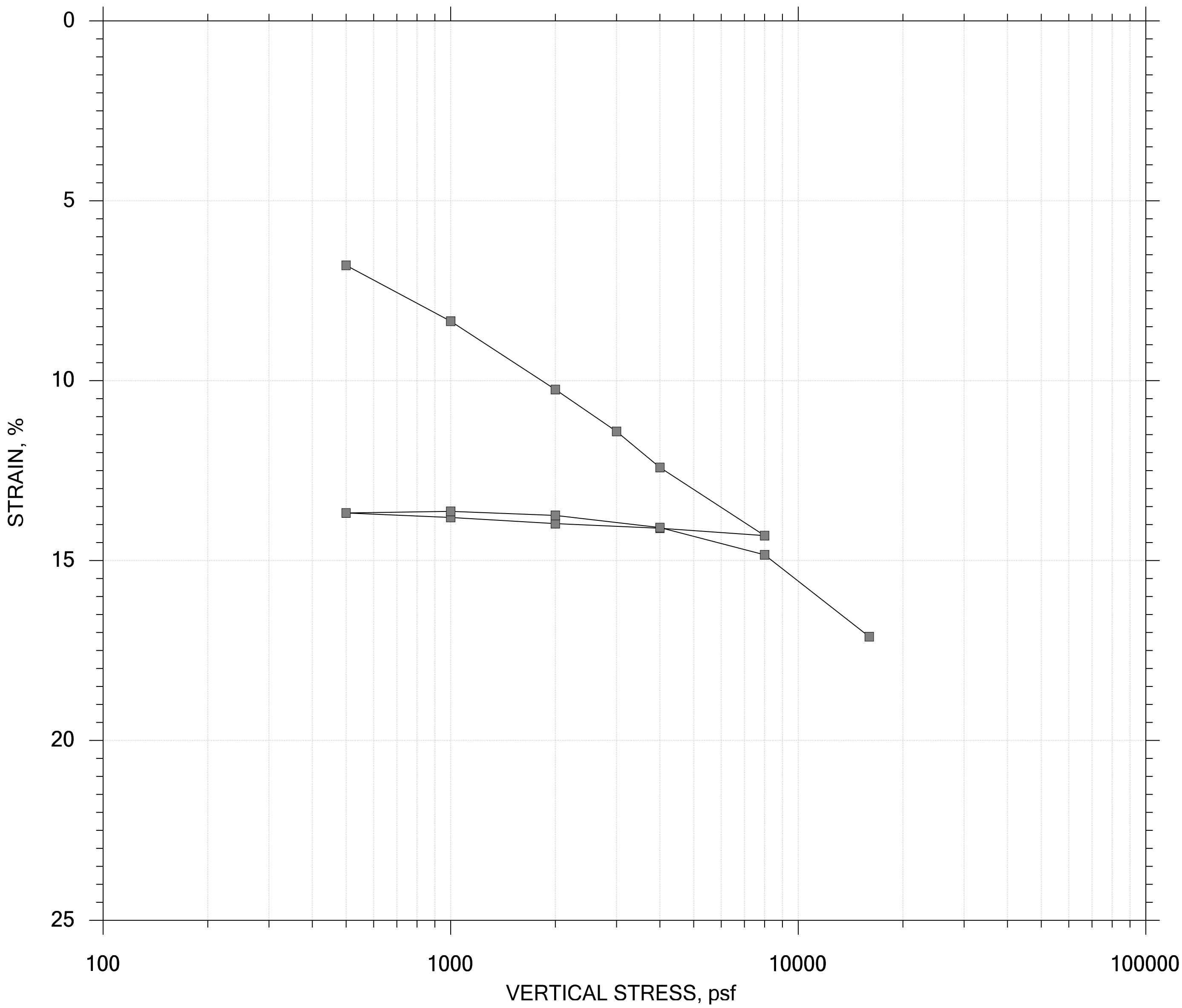




Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
Depth: 37-39 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System V		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	34.88	21.81
Preconsolidation Stress: ---				Dry Unit Weight, pcf	86.787	107.14
Compression Ratio: ---				Saturation, %	98.30	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	0.97	0.60
LL: 31	PL: 19	PI: 12	GS: 2.74			

GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-211
Tested By: md
Checked By: njh
Sample No.: U1
Test Date: 07/31/18
Depth: 37-39 ft
Test No.: IP-4
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System V

Estimated Specific Gravity: 2.74
Liquid Limit: 31
Specimen Diameter: 2.50 in
Initial Void Ratio: 0.973
Plastic Limit: 19
Initial Height: 1.00 in
Final Void Ratio: 0.598
Plasticity Index: 12
Final Height: 0.81 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	A-2433	RING		D-1776
Wt. Container + Wet Soil, gm	191.15	259.80	245.19	145.25
Wt. Container + Dry Soil, gm	141.14	220.80	220.80	120.75
Wt. Container, gm	8.1300	108.97	108.97	8.4300
Wt. Dry Soil, gm	133.01	111.83	111.83	112.32
Water Content, %	37.60	34.88	21.81	21.81
Void Ratio	---	0.973	0.598	---
Degree of Saturation, %	---	98.30	100.00	---
Dry Unit Weight, pcf	---	86.787	107.14	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-211
Tested By: md
Checked By: njh
Sample No.: U1
Test Date: 07/31/18
Depth: 37-39 ft
Test No.: IP-4
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System V

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.06794	0.839	6.79	47.191	4.85e-007	1.36e-004	3.56e-004
2	1.00e+003	0.08346	0.809	8.35	73.140	2.87e-007	3.10e-005	4.80e-005
3	2.00e+003	0.1024	0.771	10.2	82.245	2.45e-007	1.90e-005	2.51e-005
4	3.00e+003	0.1141	0.748	11.4	115.384	1.69e-007	1.17e-005	1.06e-005
5	4.00e+003	0.1241	0.728	12.4	5362.690	3.55e-009	1.00e-005	1.92e-007
6	8.00e+003	0.1431	0.691	14.3	21.314	8.64e-007	4.73e-006	2.21e-005
7	4.00e+003	0.1410	0.695	14.1	12.000	1.51e-006	5.11e-007	4.15e-006
8	2.00e+003	0.1397	0.698	14.0	13.996	1.30e-006	6.48e-007	4.53e-006
9	1.00e+003	0.1380	0.701	13.8	36.001	5.05e-007	1.70e-006	4.63e-006
10	500.	0.1368	0.703	13.7	49.004	3.73e-007	2.53e-006	5.09e-006
11	1.00e+003	0.1363	0.704	13.6	0.049	3.73e-004	-8.59e-007	-1.73e-003
12	2.00e+003	0.1374	0.702	13.7	22.298	8.20e-007	1.12e-006	4.93e-006
13	4.00e+003	0.1408	0.695	14.1	11.550	1.57e-006	1.70e-006	1.44e-005
14	8.00e+003	0.1484	0.680	14.8	6.224	2.88e-006	1.89e-006	2.94e-005
15	1.60e+004	0.1711	0.636	17.1	6.073	2.85e-006	2.84e-006	4.37e-005

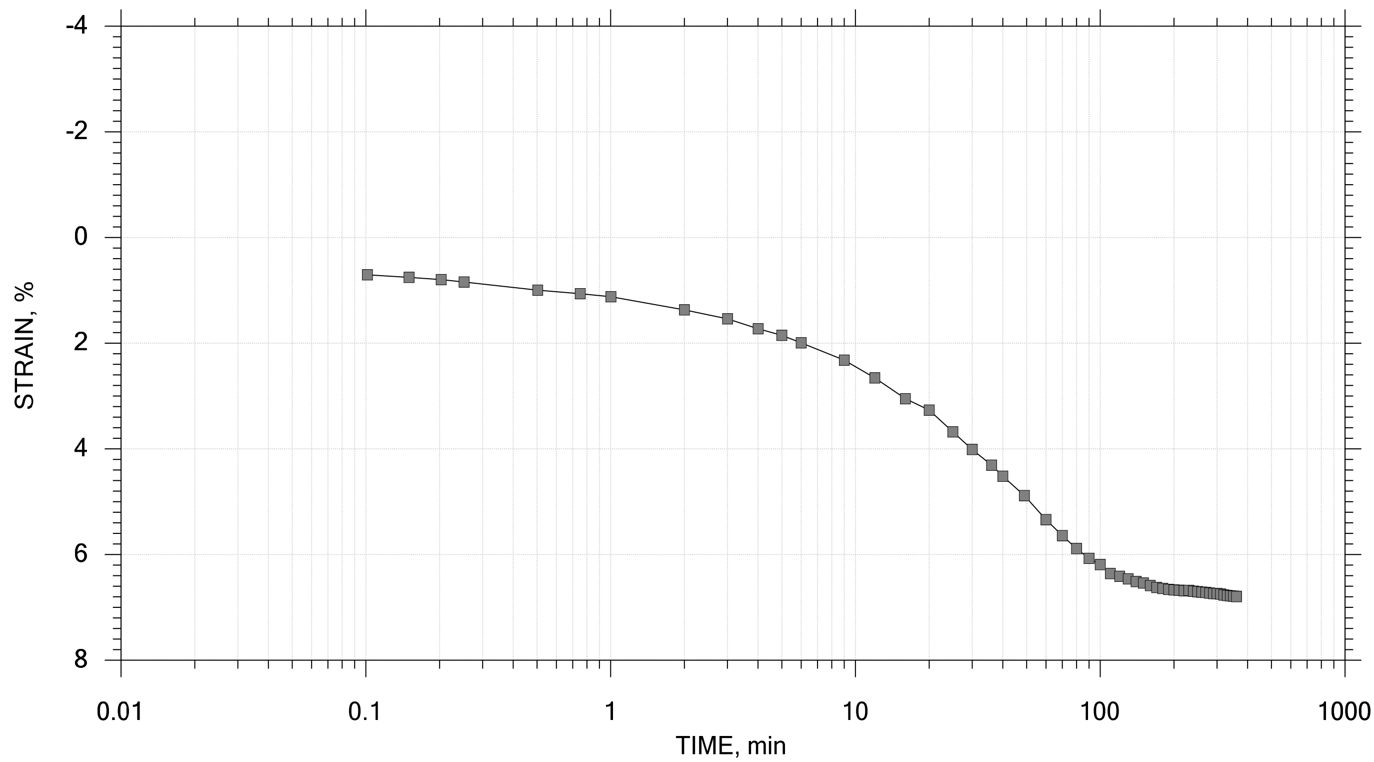
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.06794	0.839	6.79	22.561	2.36e-007	1.36e-004	1.73e-004	0.00e+000
2	1.00e+003	0.08346	0.809	8.35	14.913	3.27e-007	3.10e-005	5.46e-005	0.00e+000
3	2.00e+003	0.1024	0.771	10.2	17.224	2.72e-007	1.90e-005	2.79e-005	0.00e+000
4	3.00e+003	0.1141	0.748	11.4	0.000	0.00e+000	1.17e-005	0.00e+000	0.00e+000
5	4.00e+003	0.1241	0.728	12.4	0.000	0.00e+000	1.00e-005	0.00e+000	0.00e+000
6	8.00e+003	0.1431	0.691	14.3	3.814	1.12e-006	4.73e-006	2.86e-005	0.00e+000
7	4.00e+003	0.1410	0.695	14.1	0.000	0.00e+000	5.11e-007	0.00e+000	0.00e+000
8	2.00e+003	0.1397	0.698	14.0	0.000	0.00e+000	6.48e-007	0.00e+000	0.00e+000
9	1.00e+003	0.1380	0.701	13.8	0.000	0.00e+000	1.70e-006	0.00e+000	0.00e+000
10	500.	0.1368	0.703	13.7	0.000	0.00e+000	2.53e-006	0.00e+000	0.00e+000
11	1.00e+003	0.1363	0.704	13.6	0.000	0.00e+000	-8.59e-007	-0.00e+000	0.00e+000
12	2.00e+003	0.1374	0.702	13.7	0.000	0.00e+000	1.12e-006	0.00e+000	0.00e+000
13	4.00e+003	0.1408	0.695	14.1	2.282	1.85e-006	1.70e-006	1.69e-005	0.00e+000
14	8.00e+003	0.1484	0.680	14.8	0.000	0.00e+000	1.89e-006	0.00e+000	0.00e+000
15	1.60e+004	0.1711	0.636	17.1	1.164	3.46e-006	2.84e-006	5.30e-005	0.00e+000

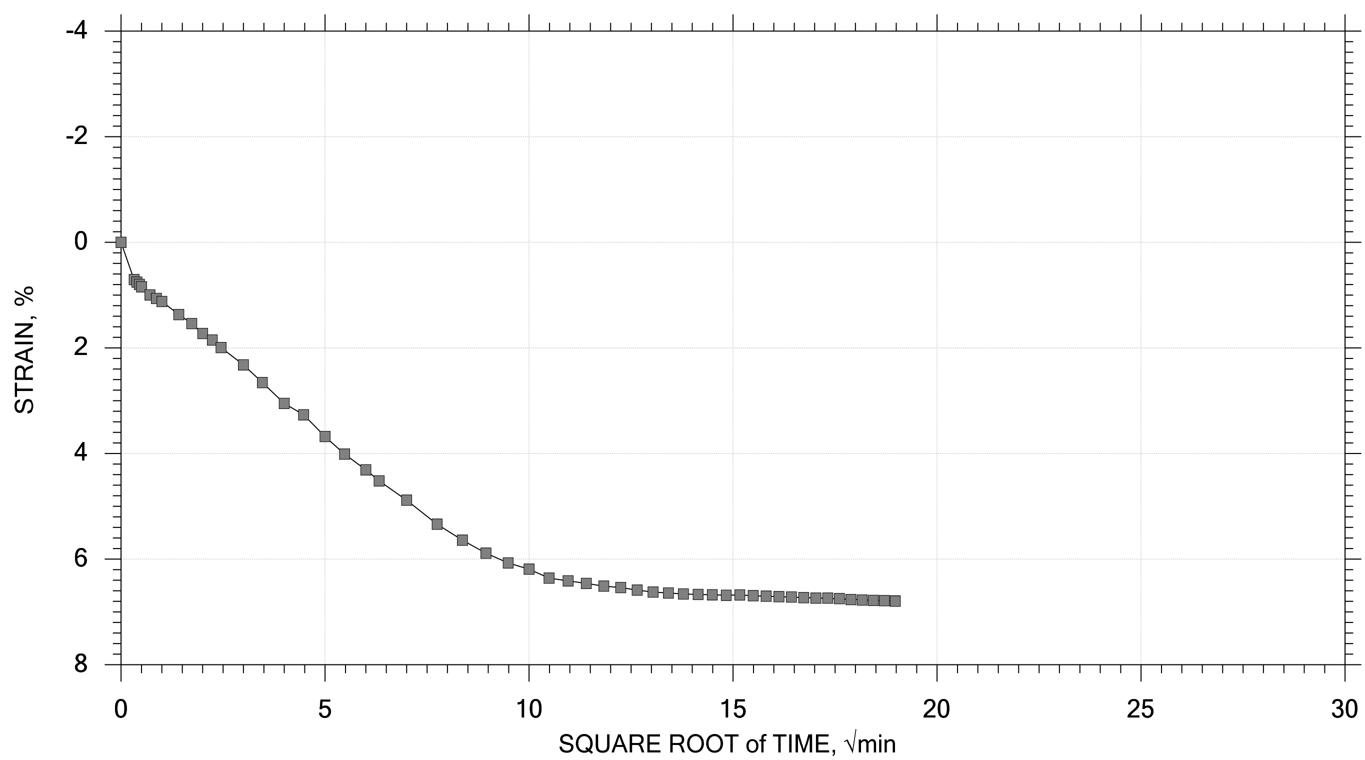
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





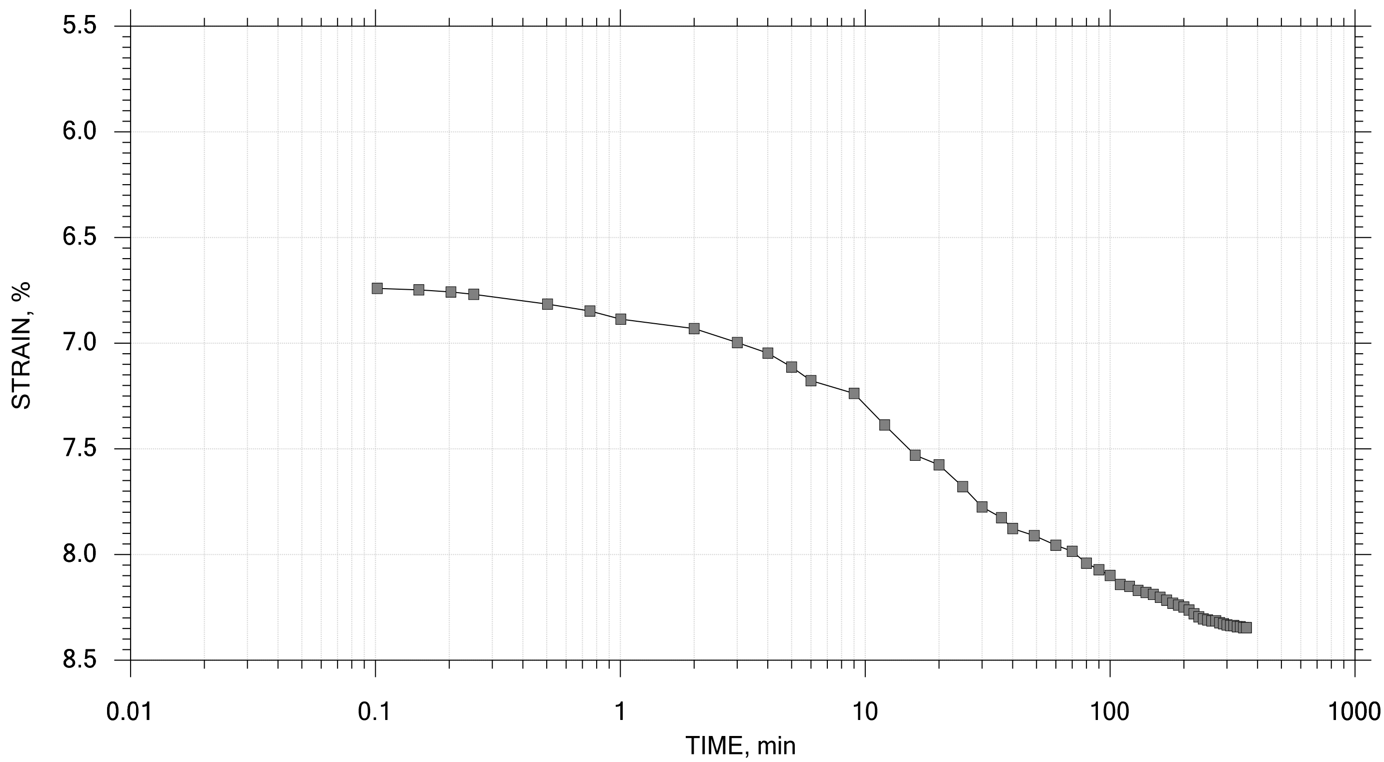
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

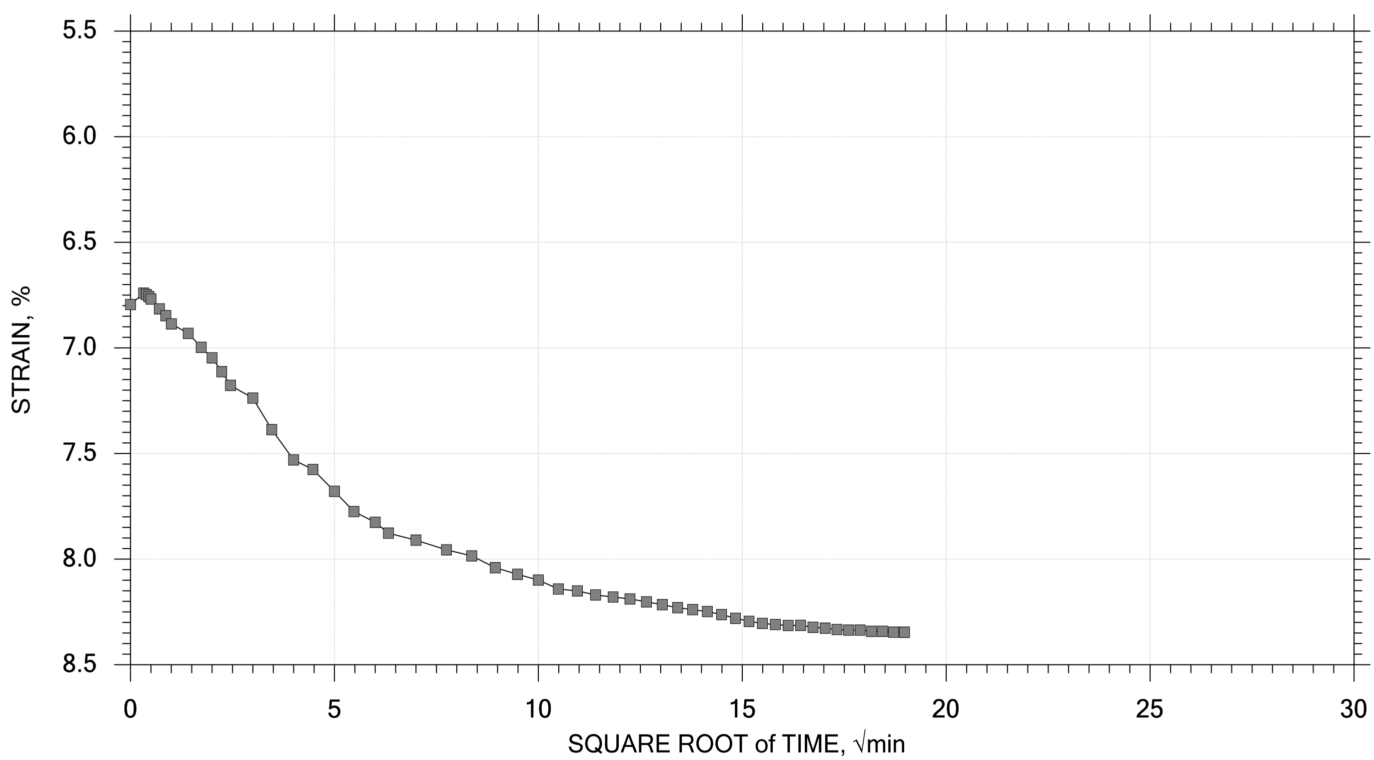
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





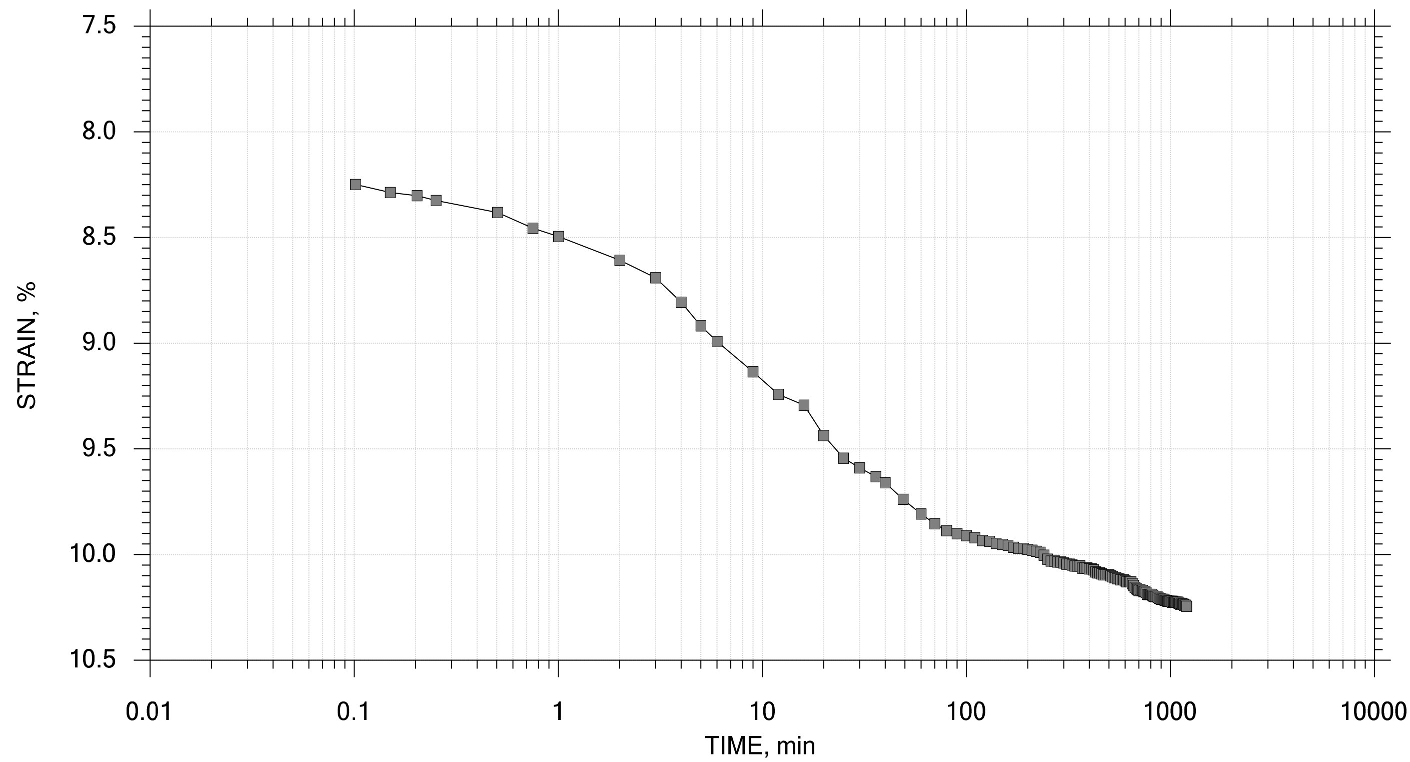
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

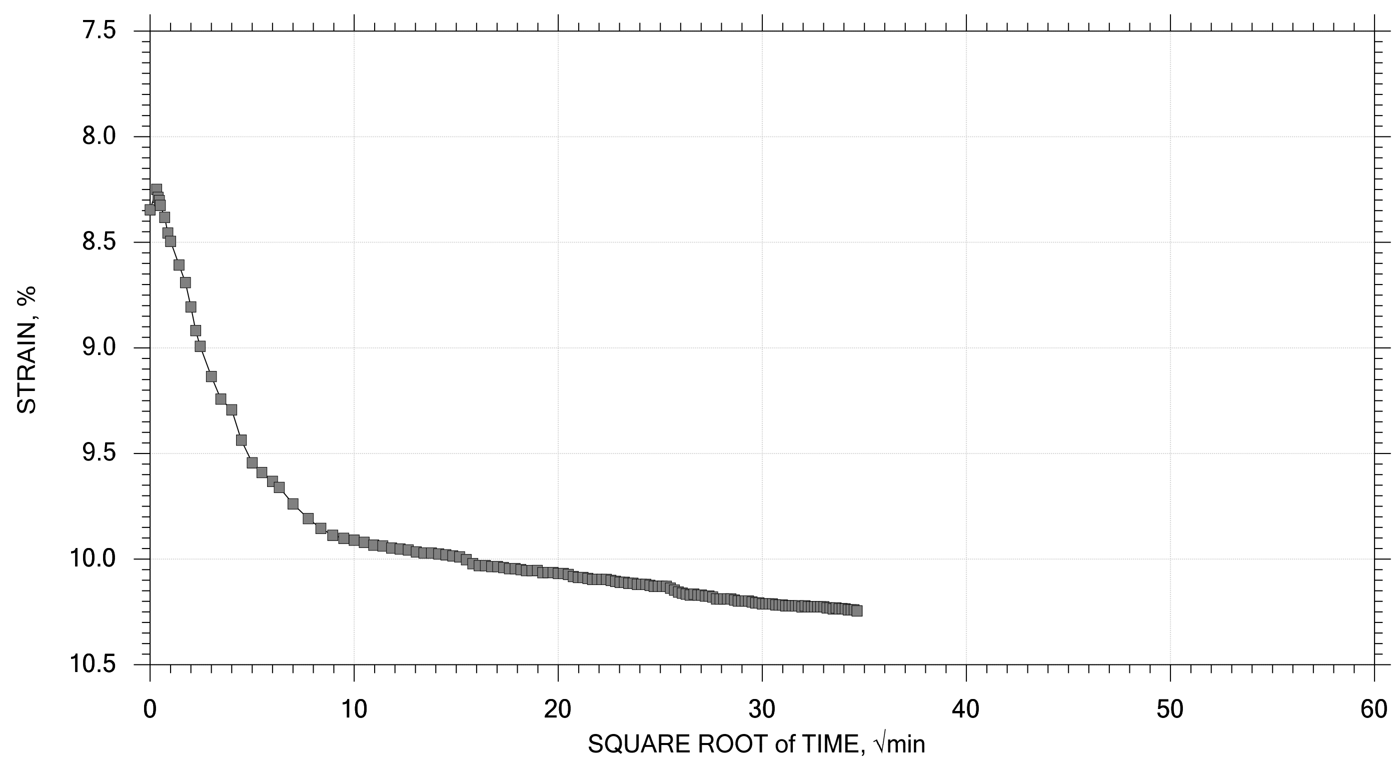
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





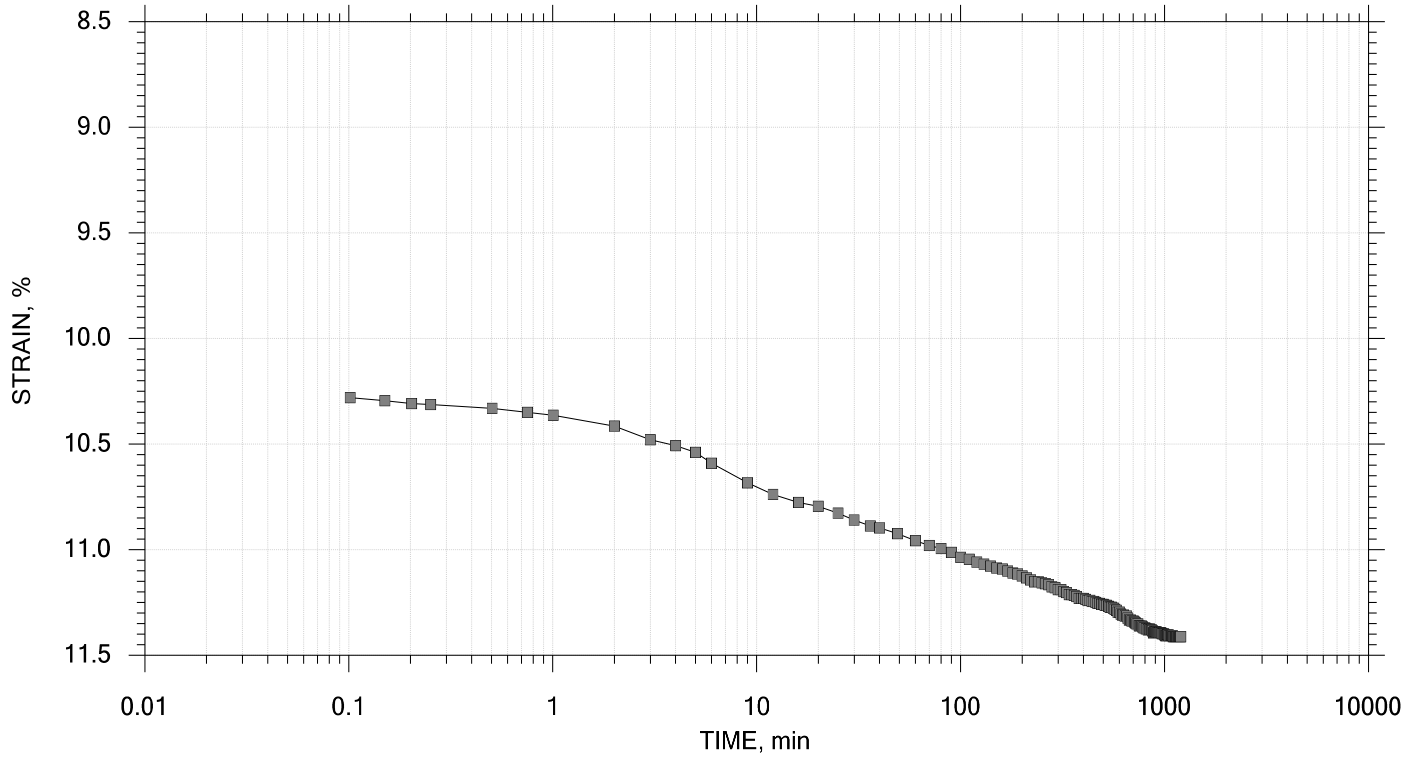
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

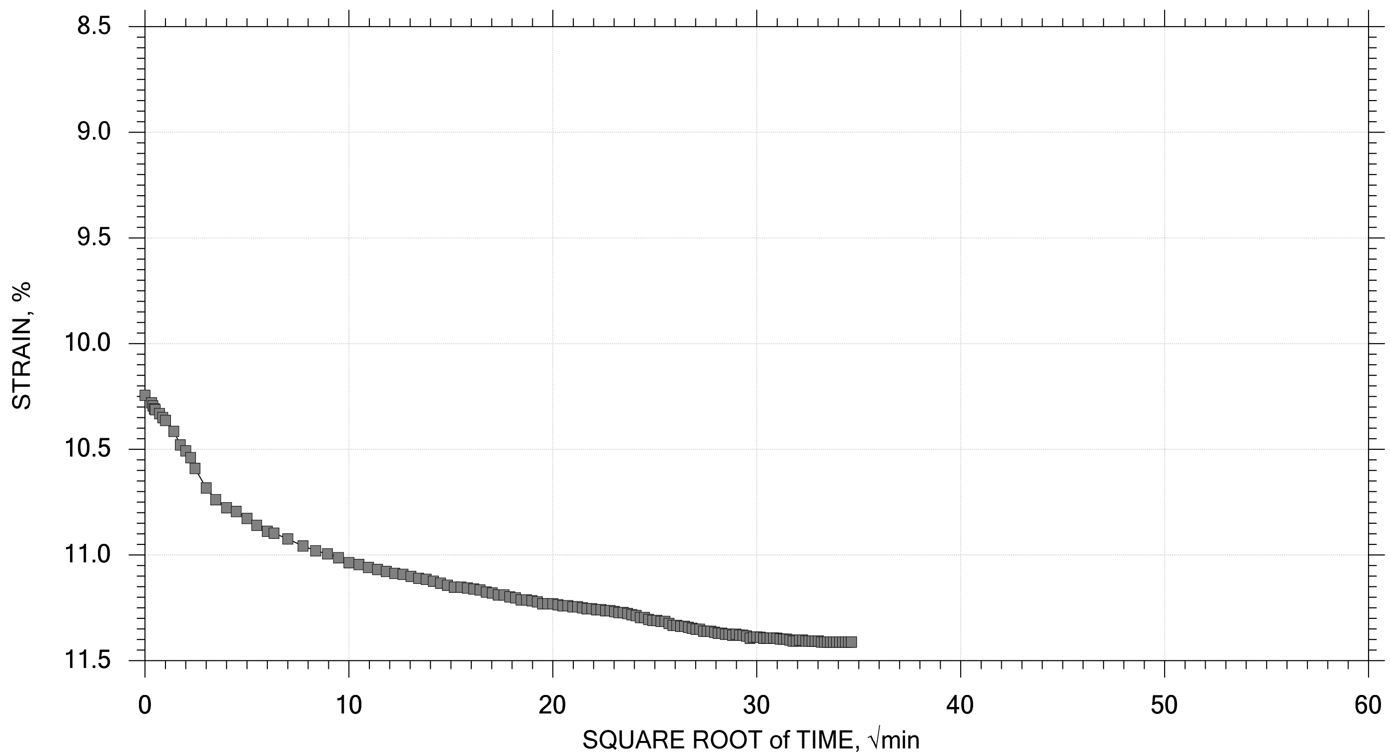
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





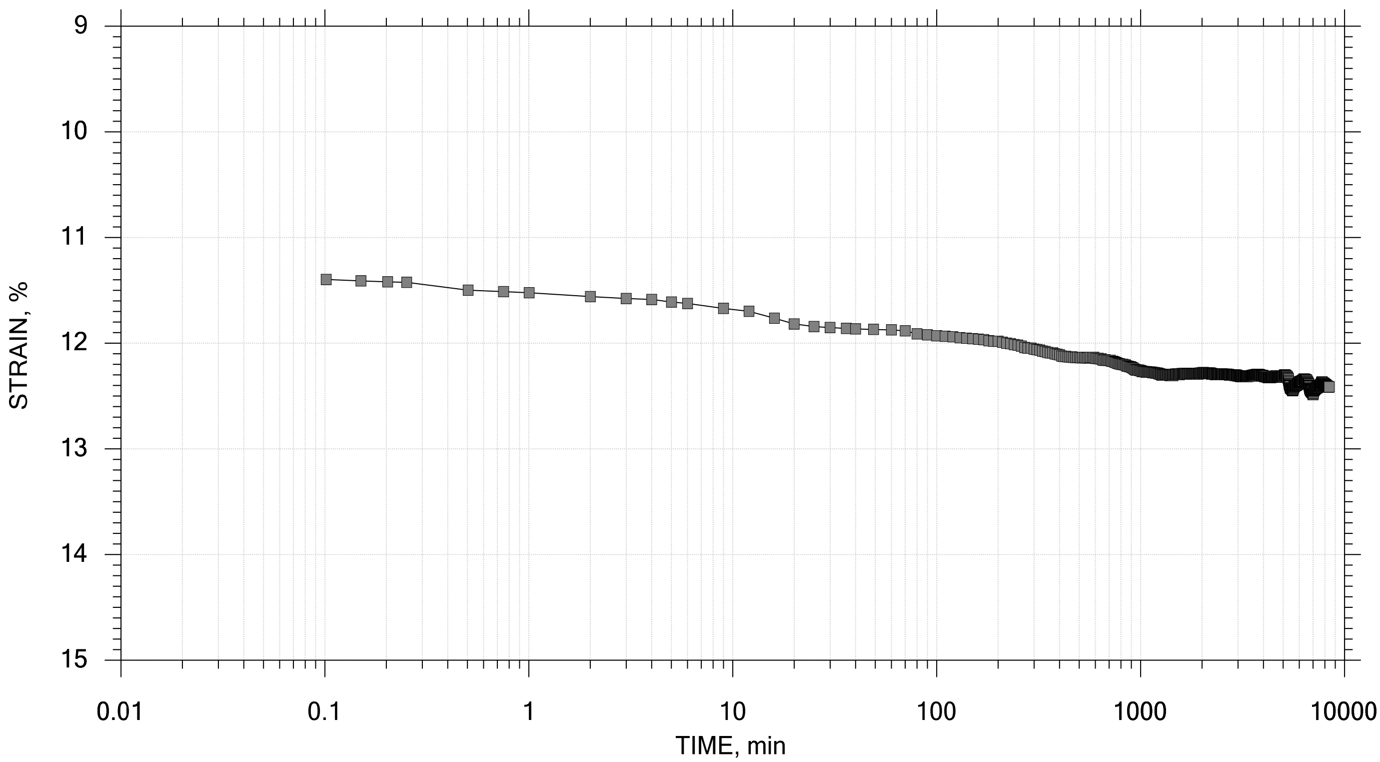
Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
Depth: 37-39 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System V		

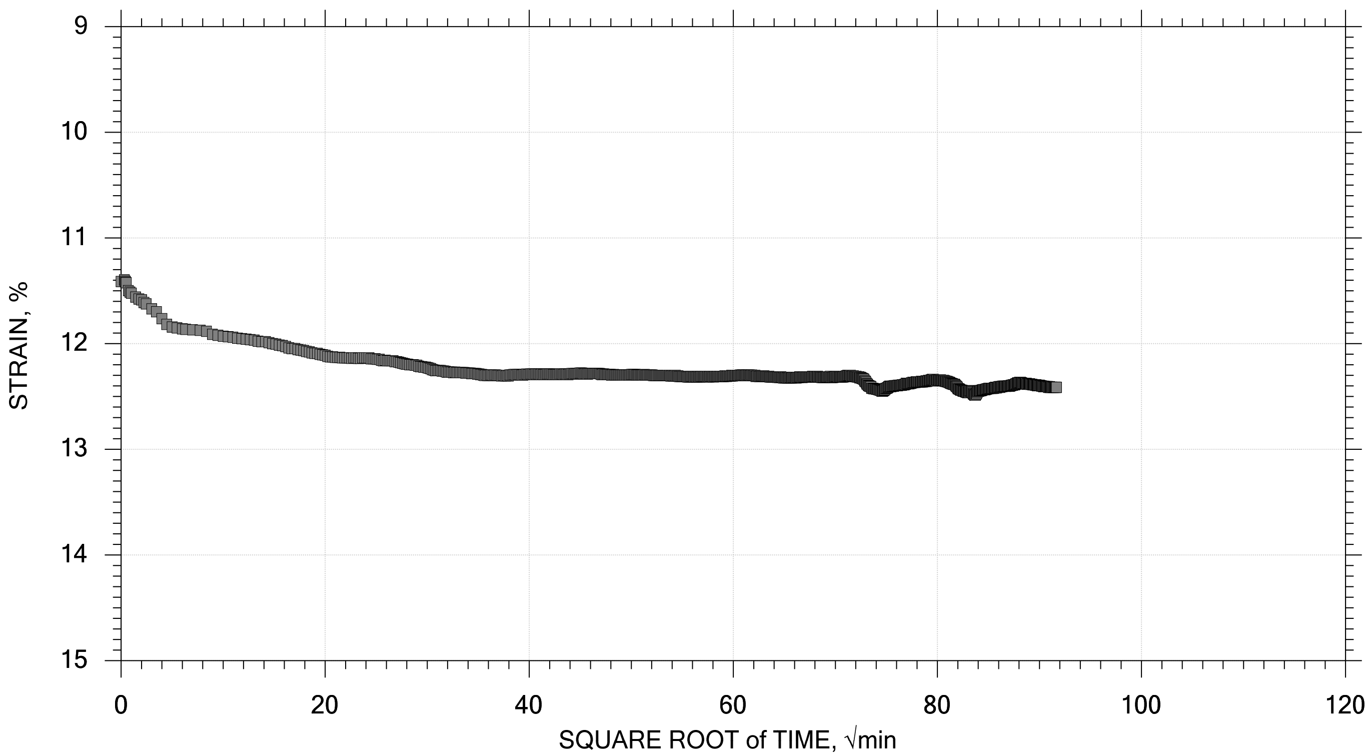
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





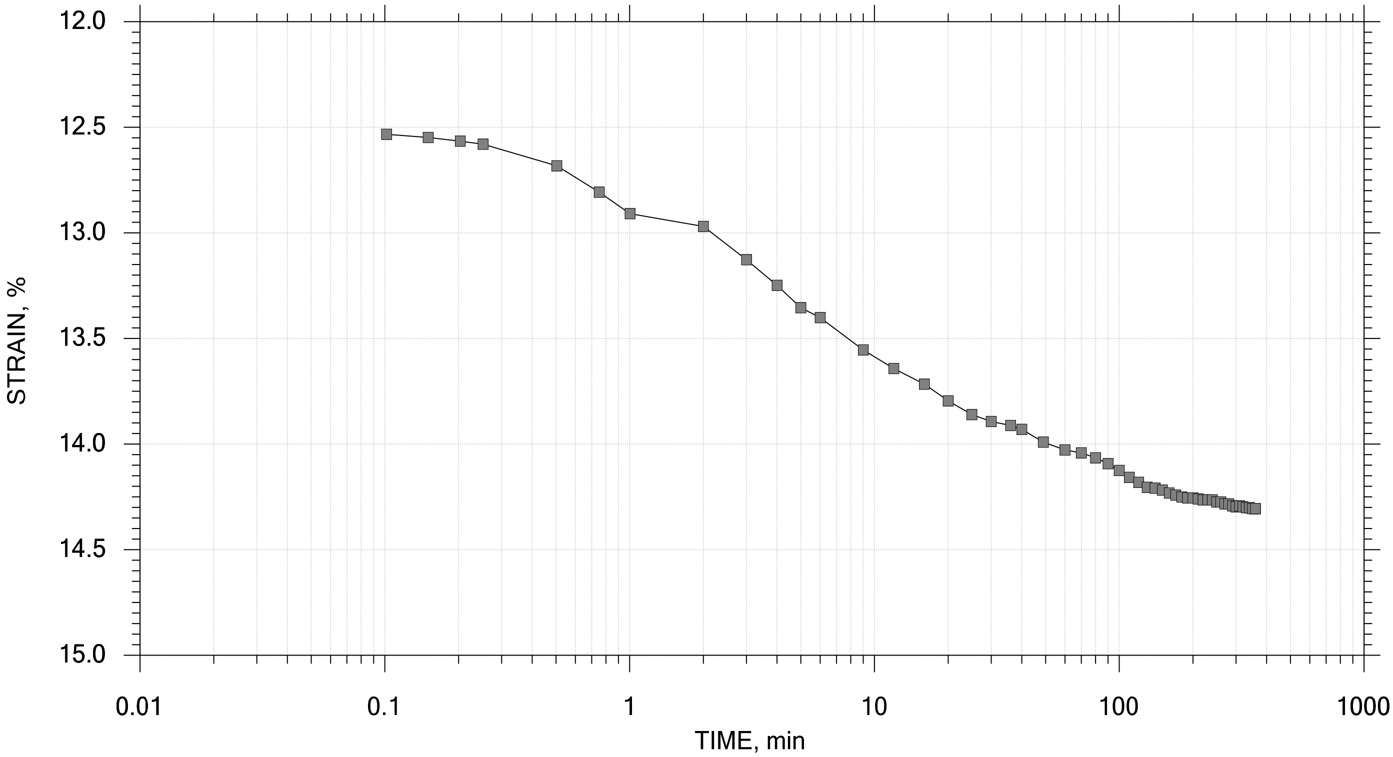
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

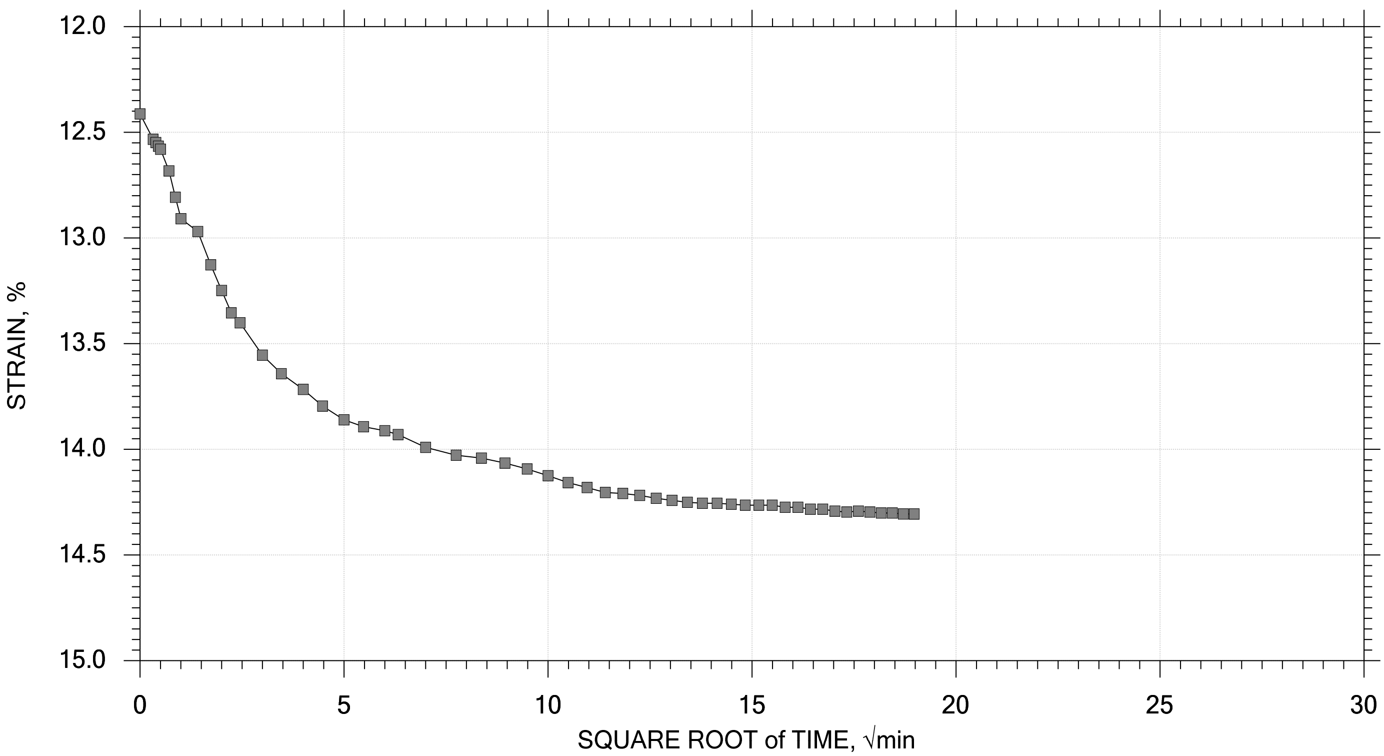
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





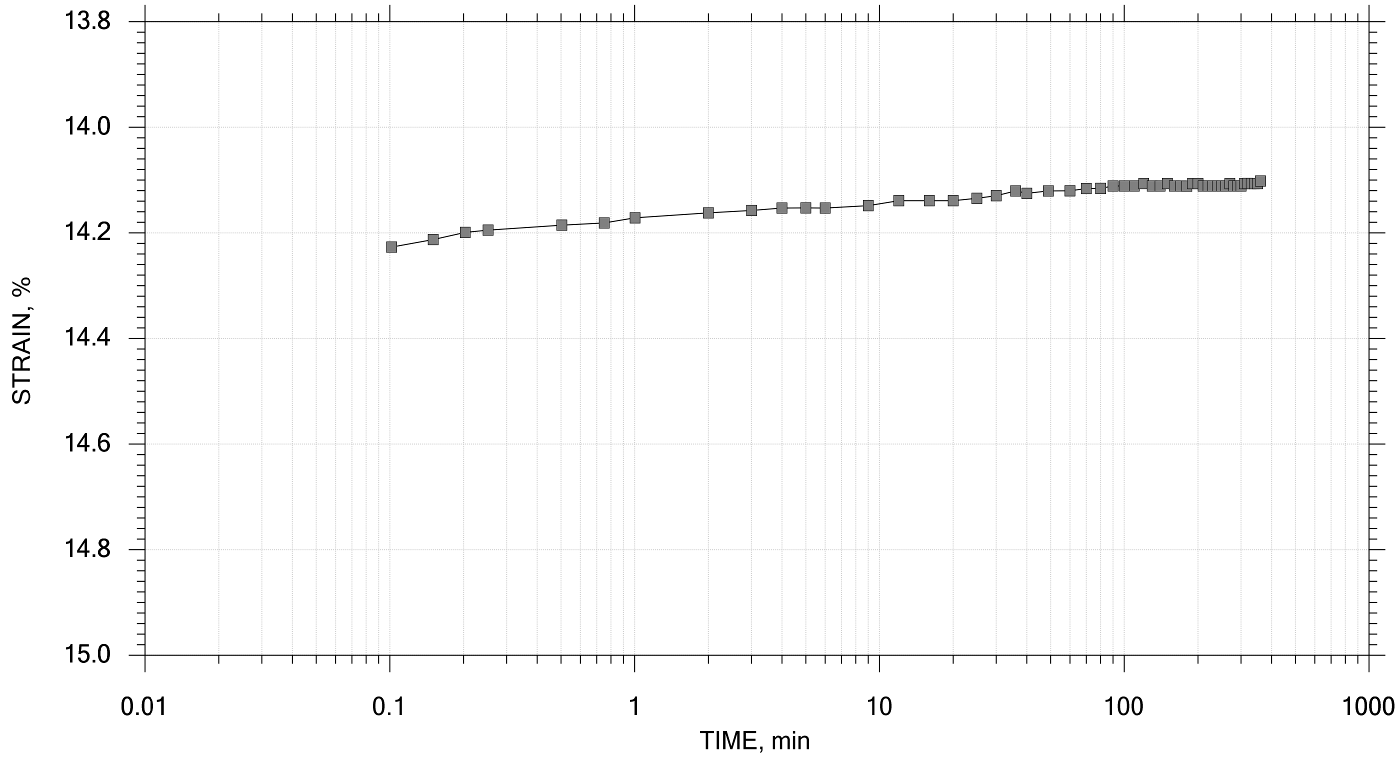
Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
Depth: 37-39 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System V		

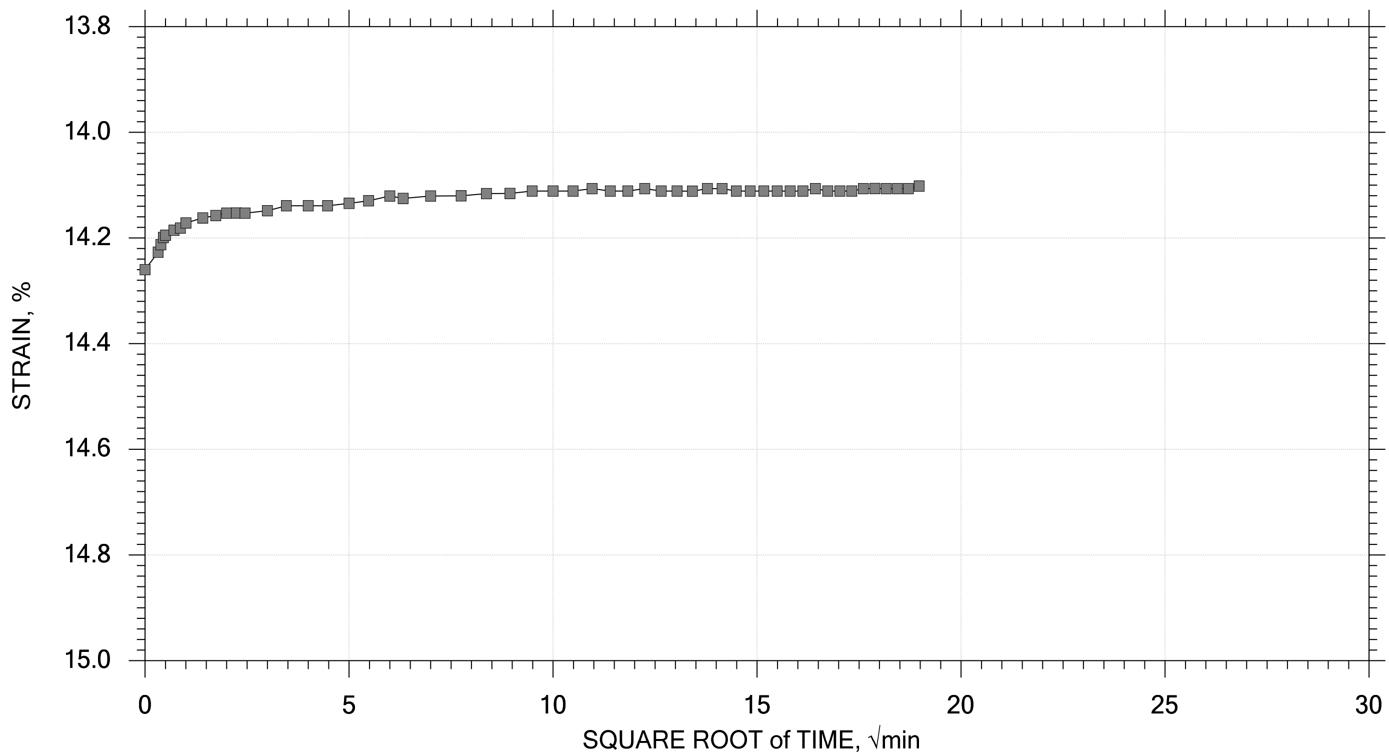
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





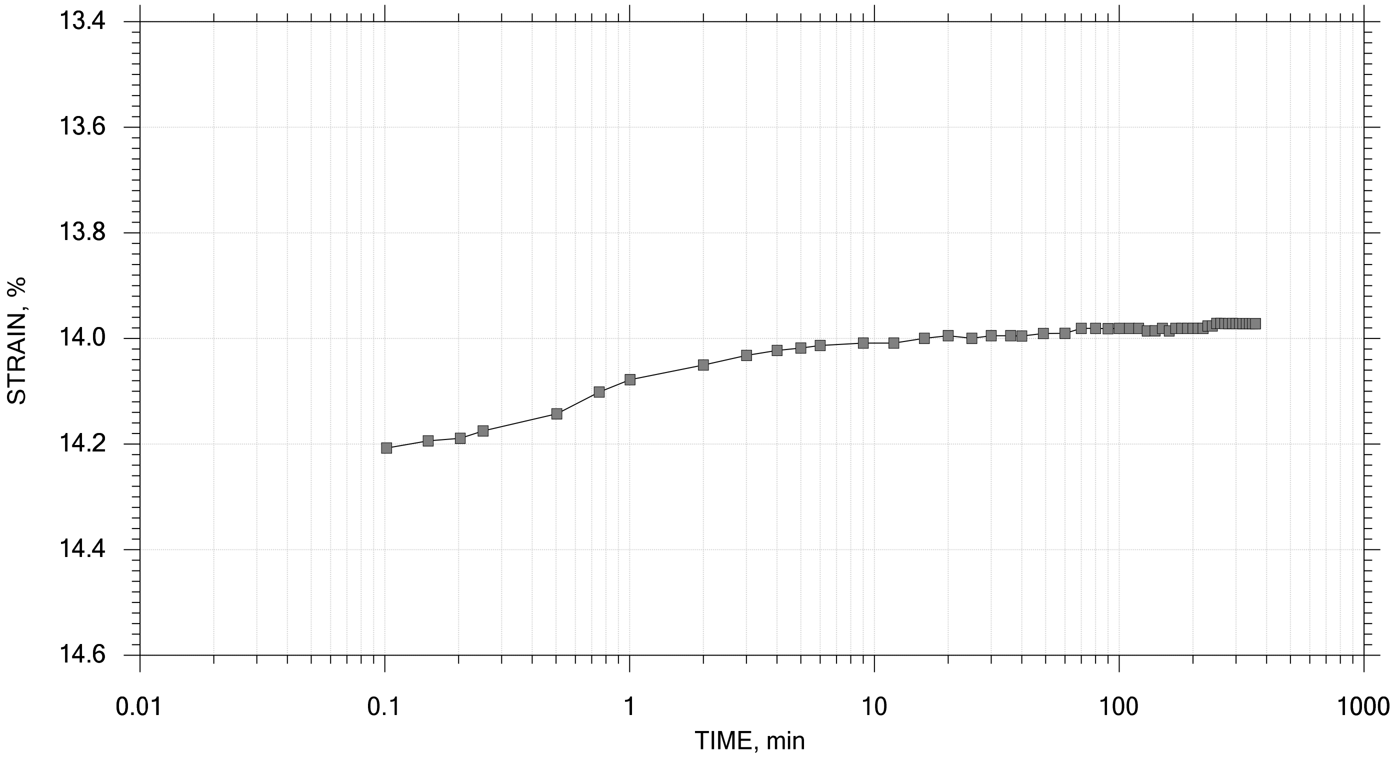
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

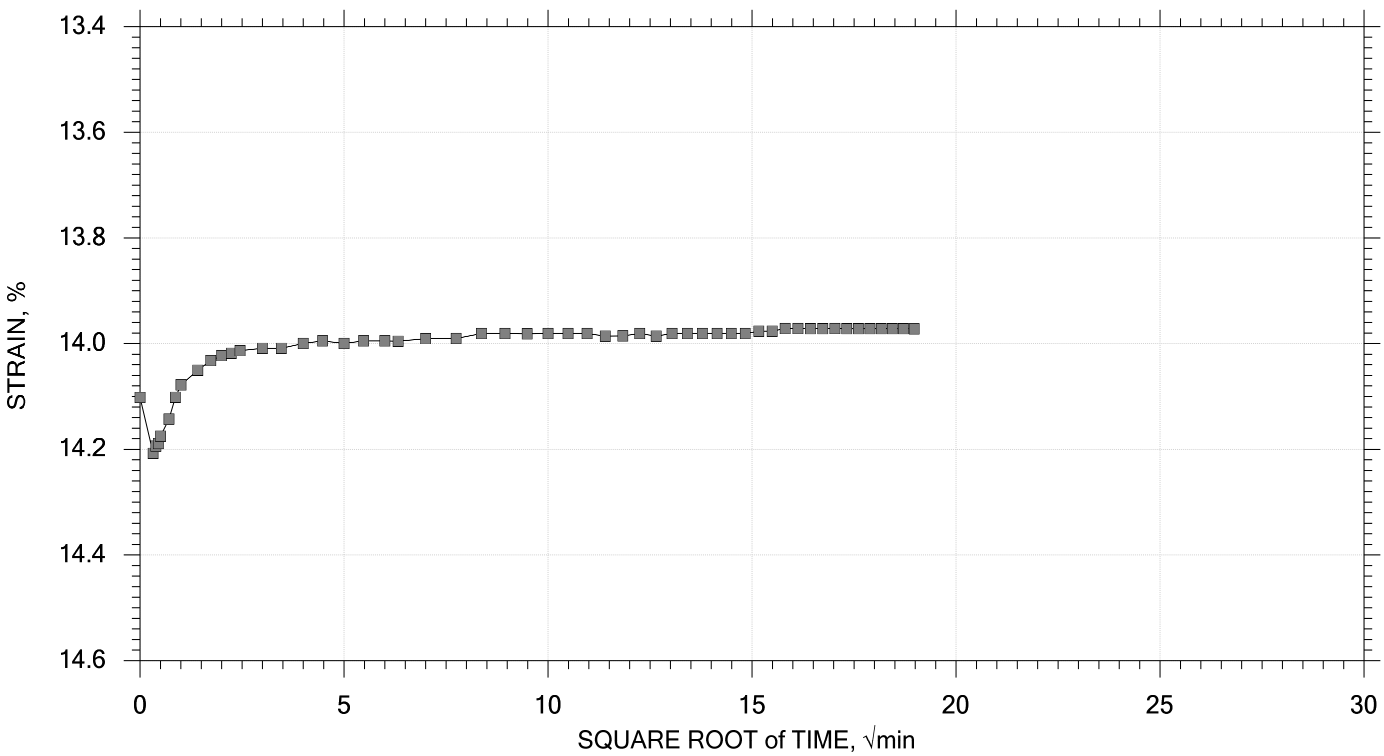
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





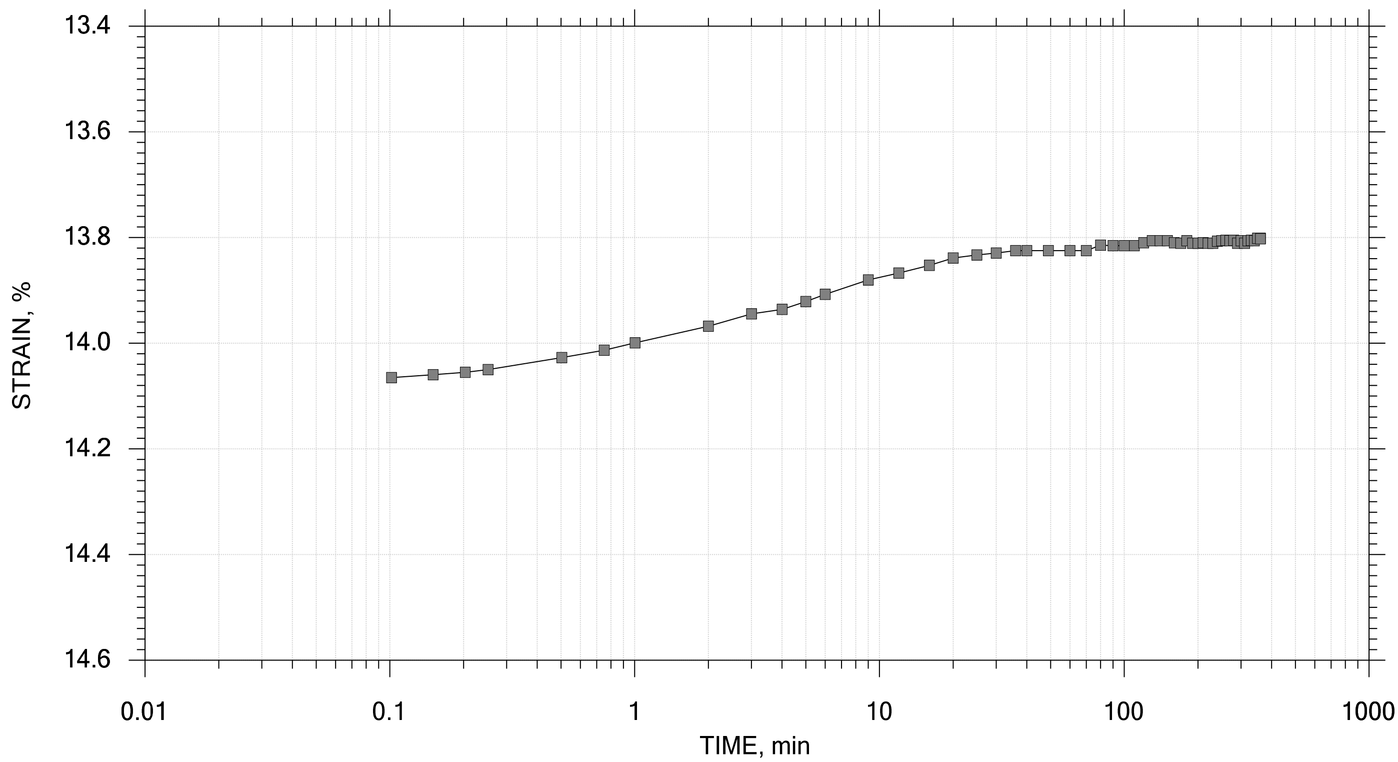
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

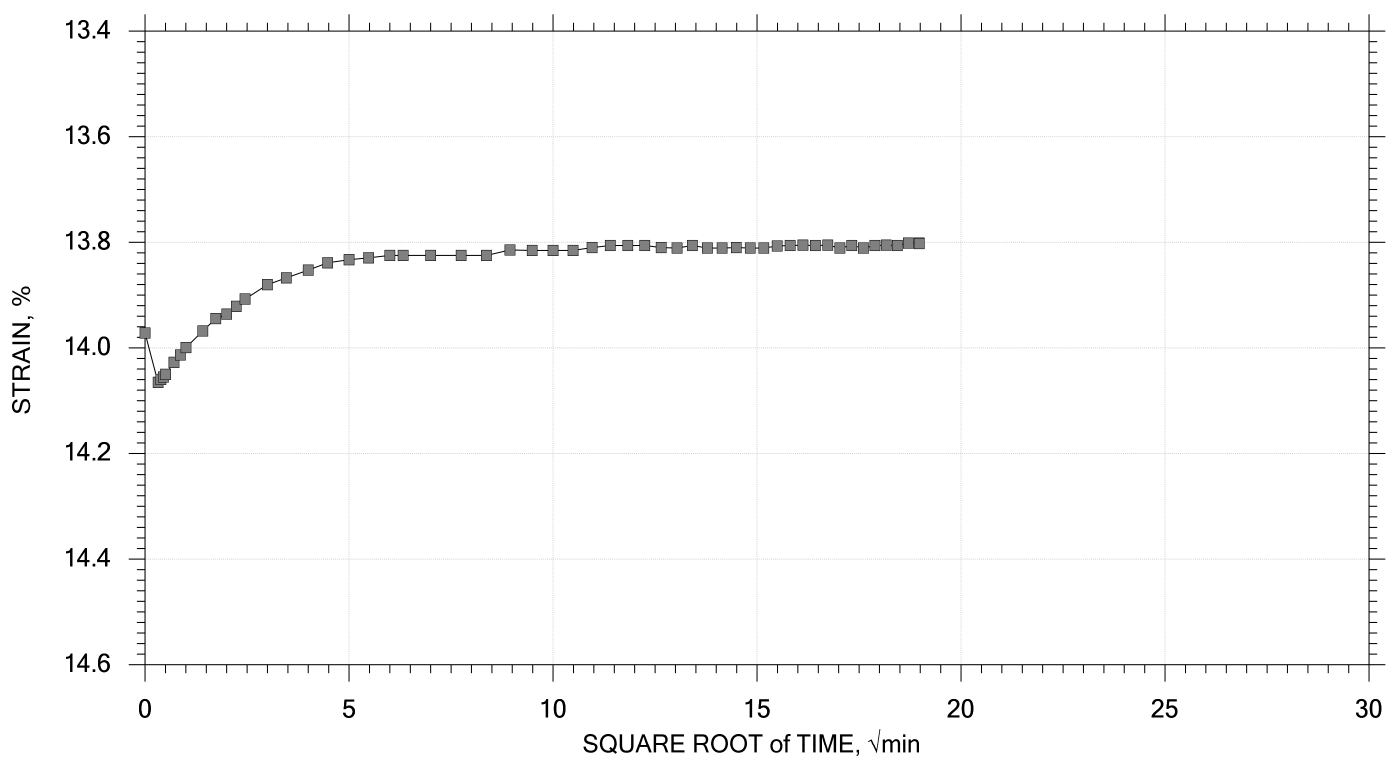
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





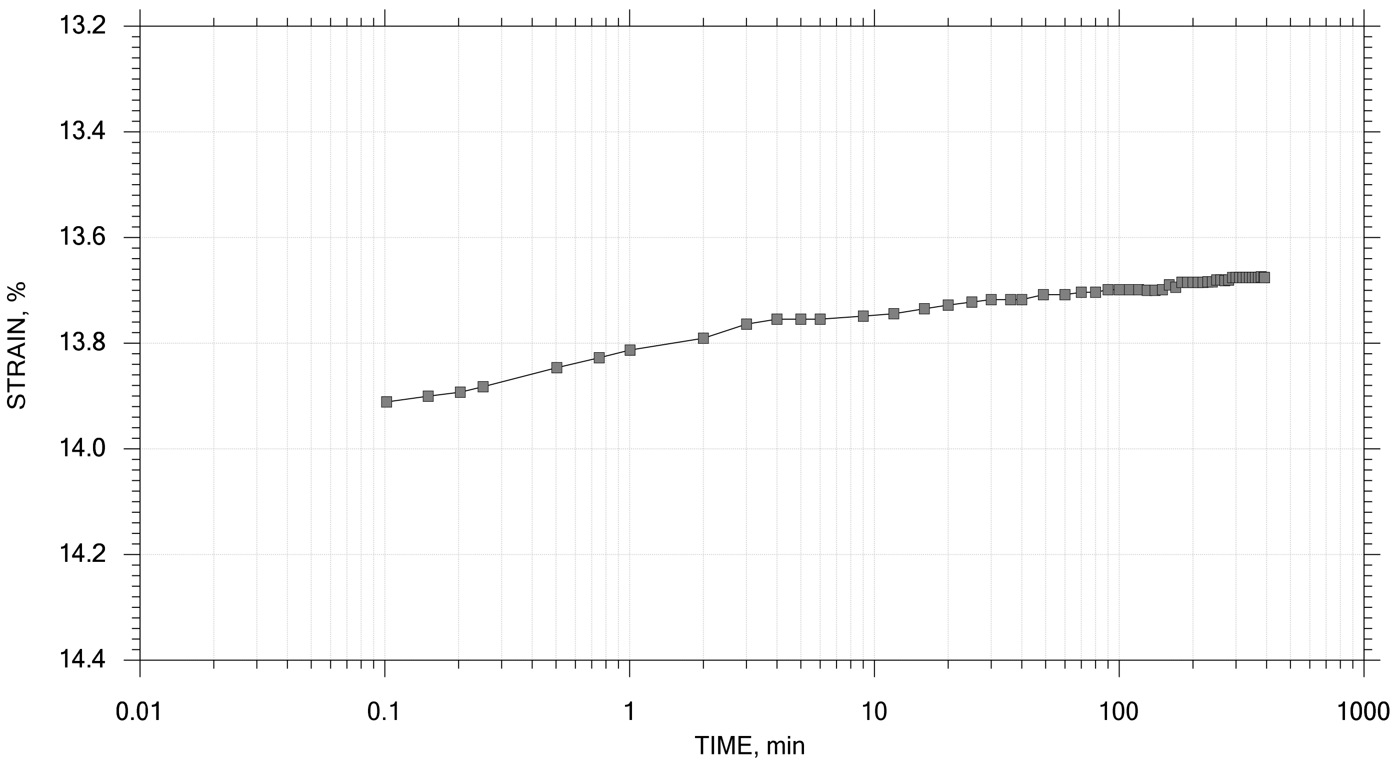
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

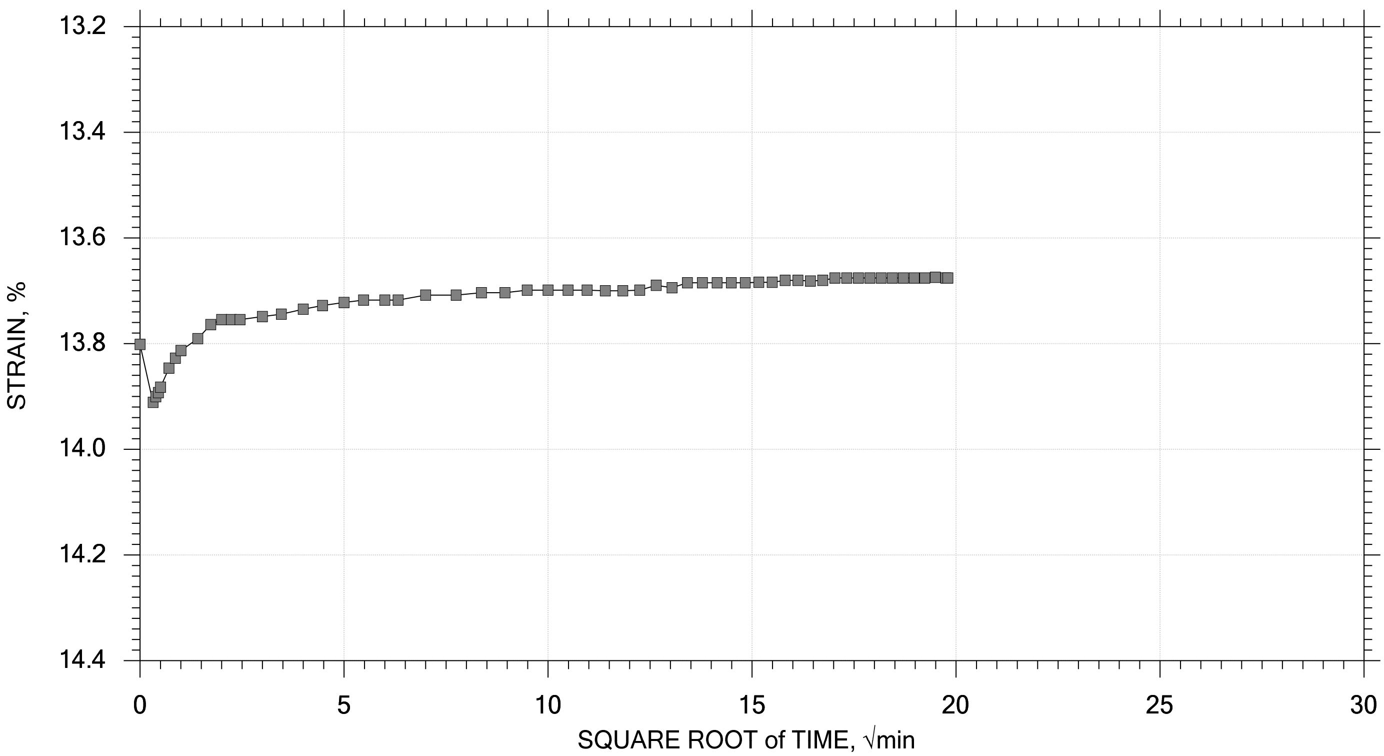
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 500 psf





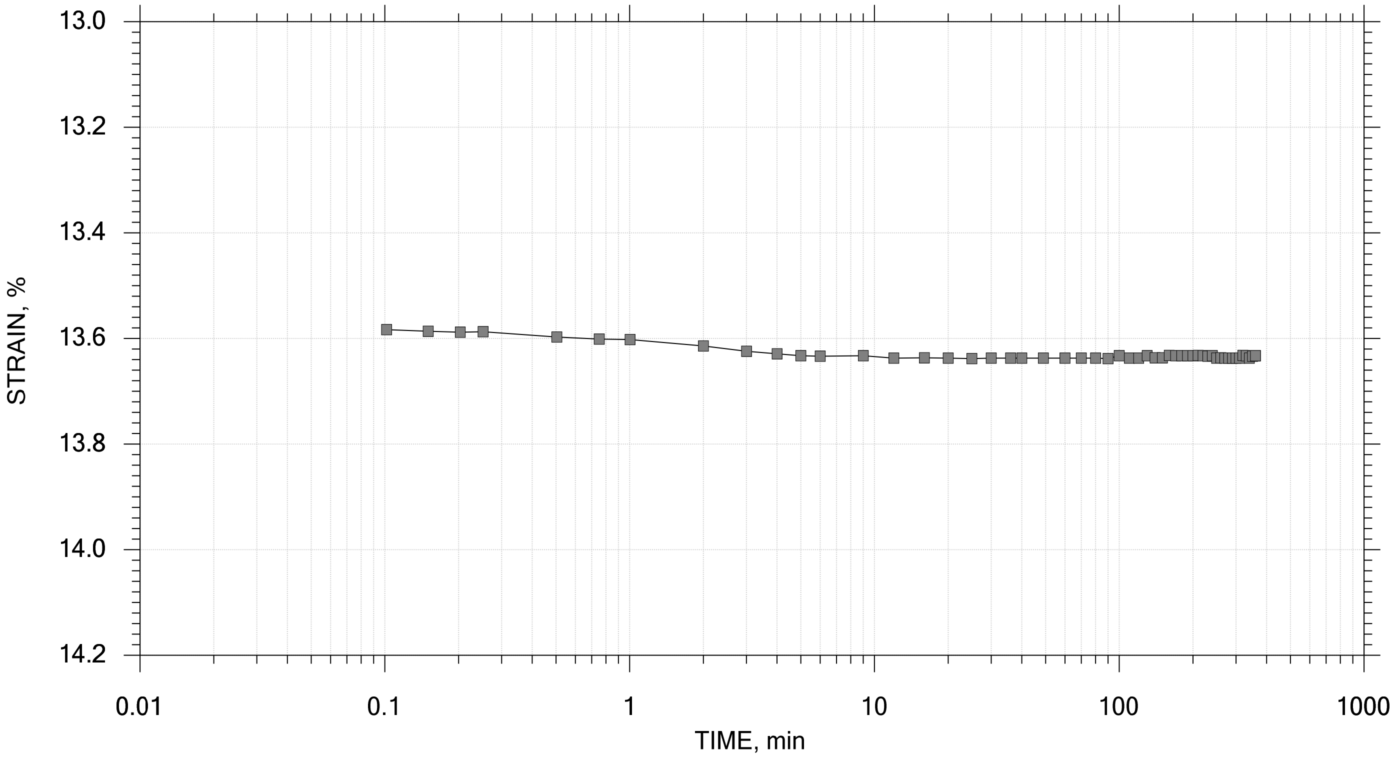
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

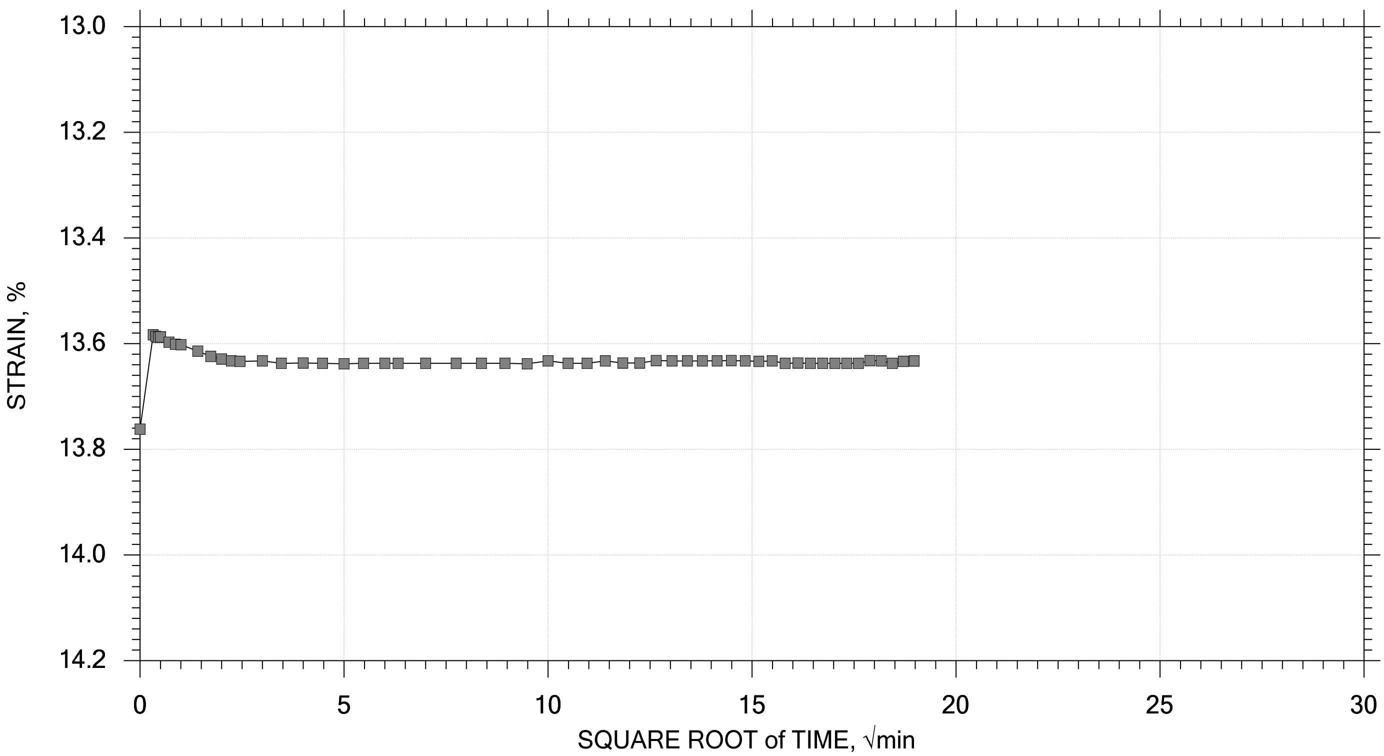
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





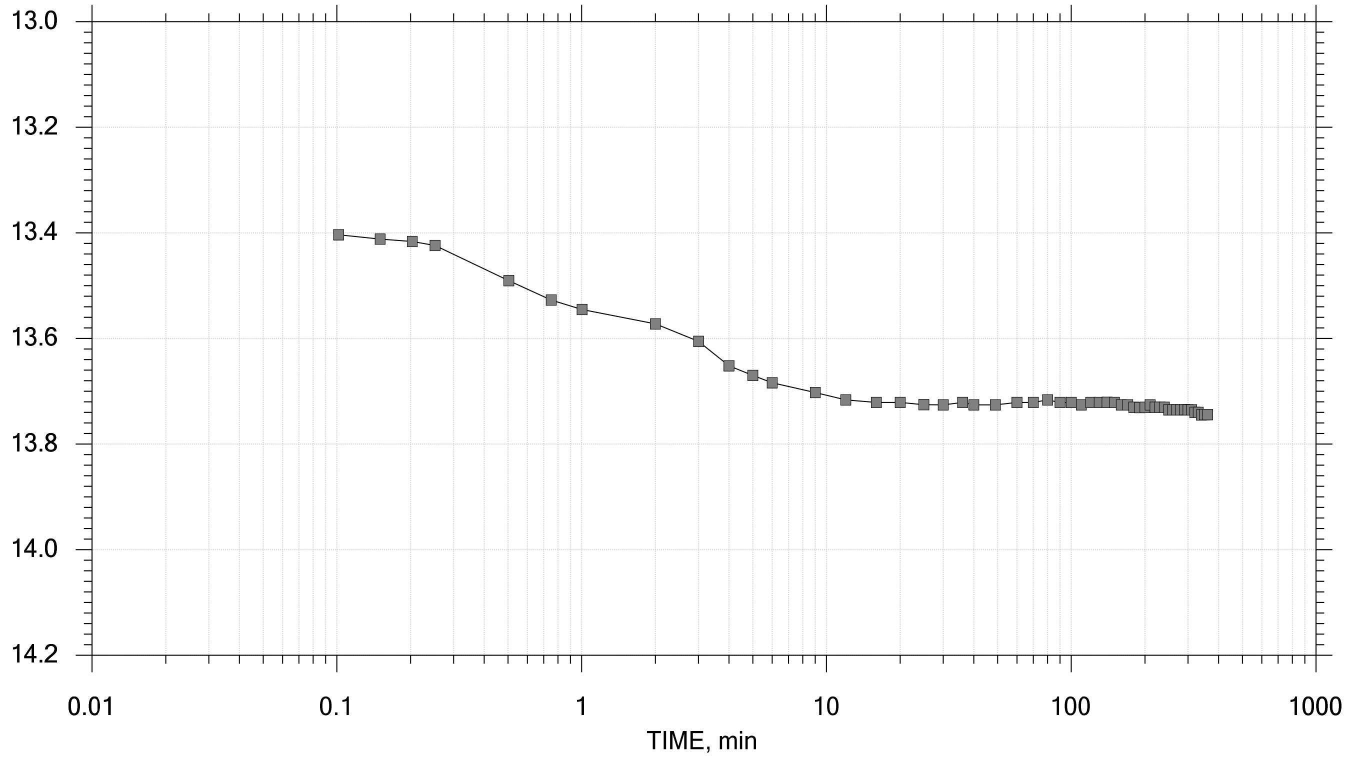
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

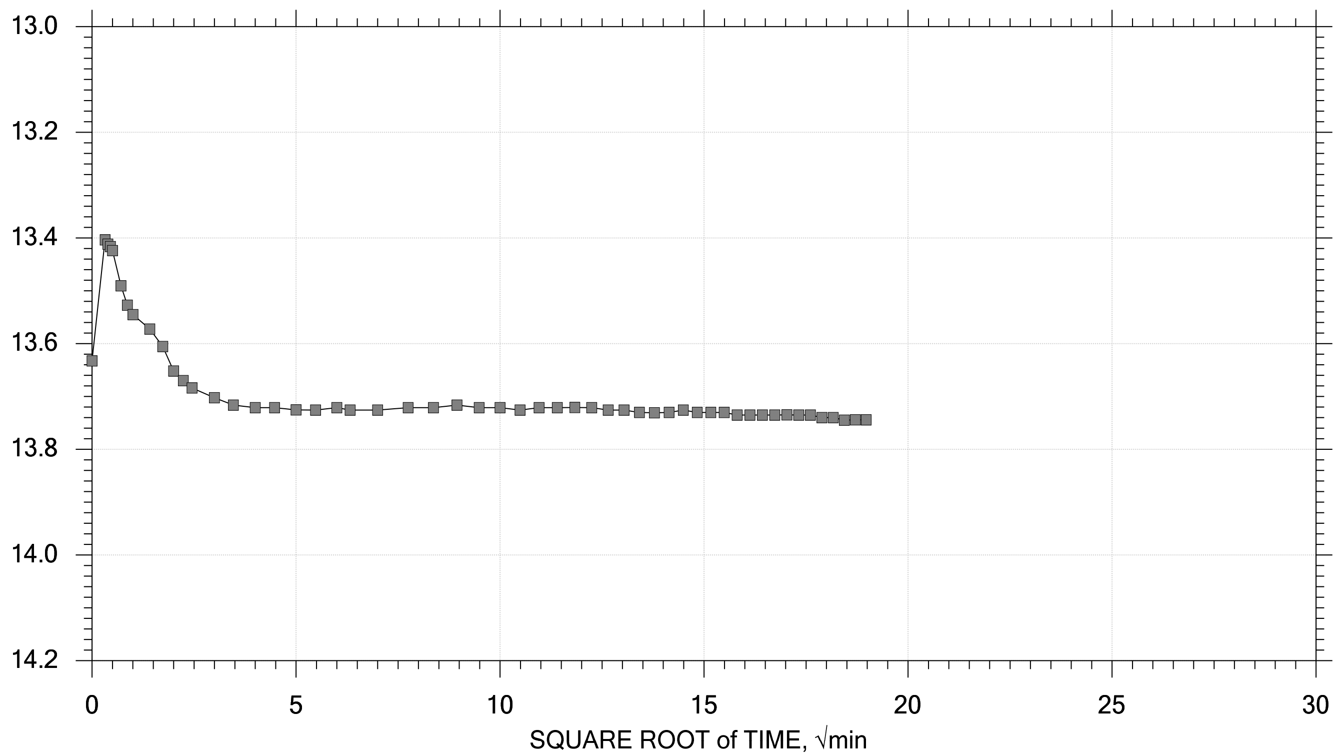
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





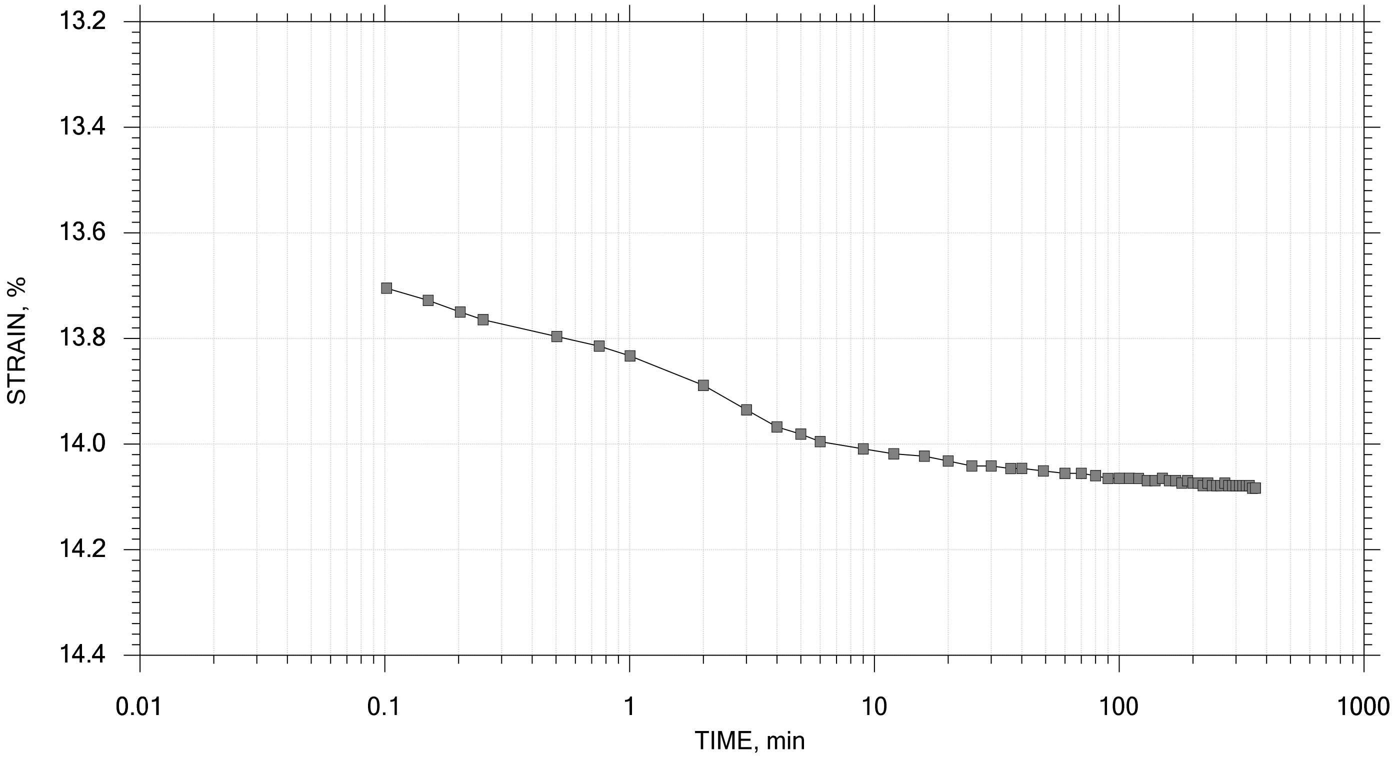
GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

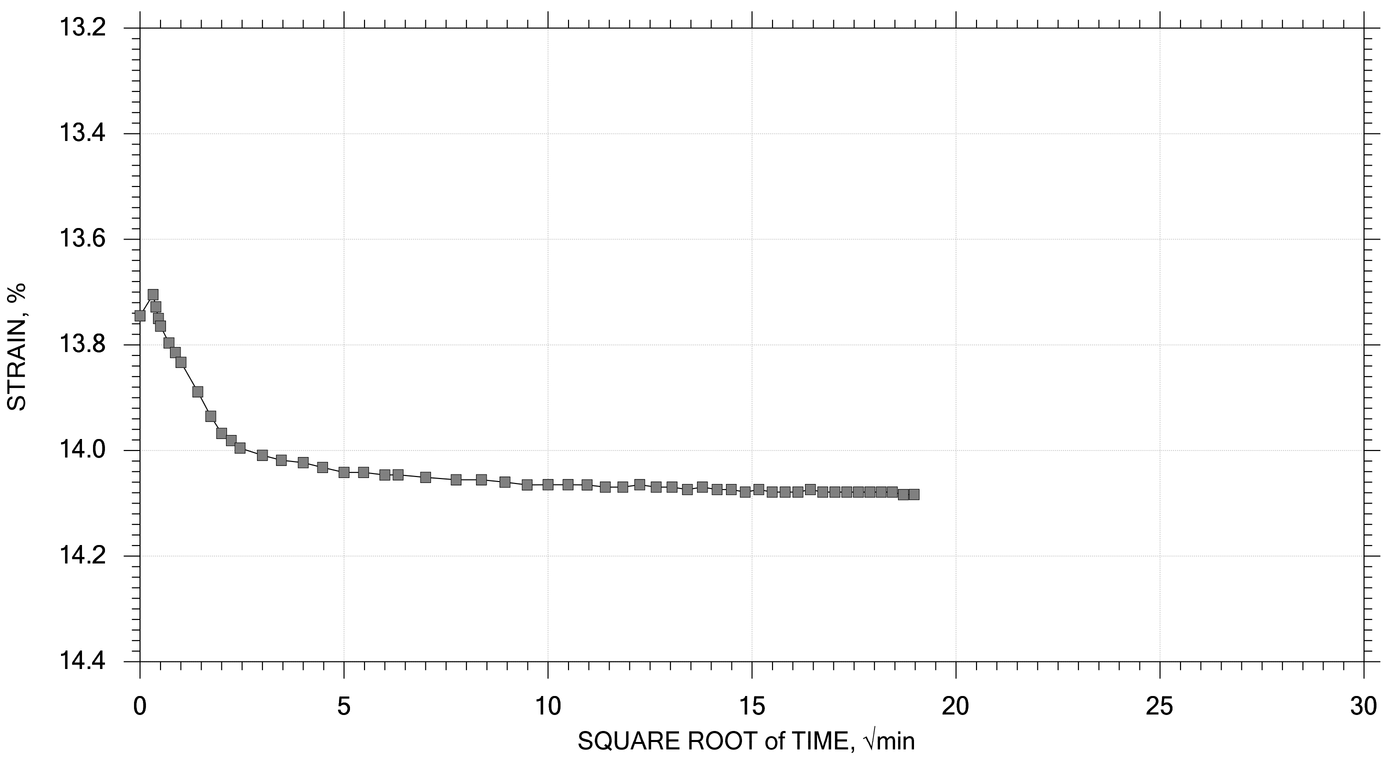
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





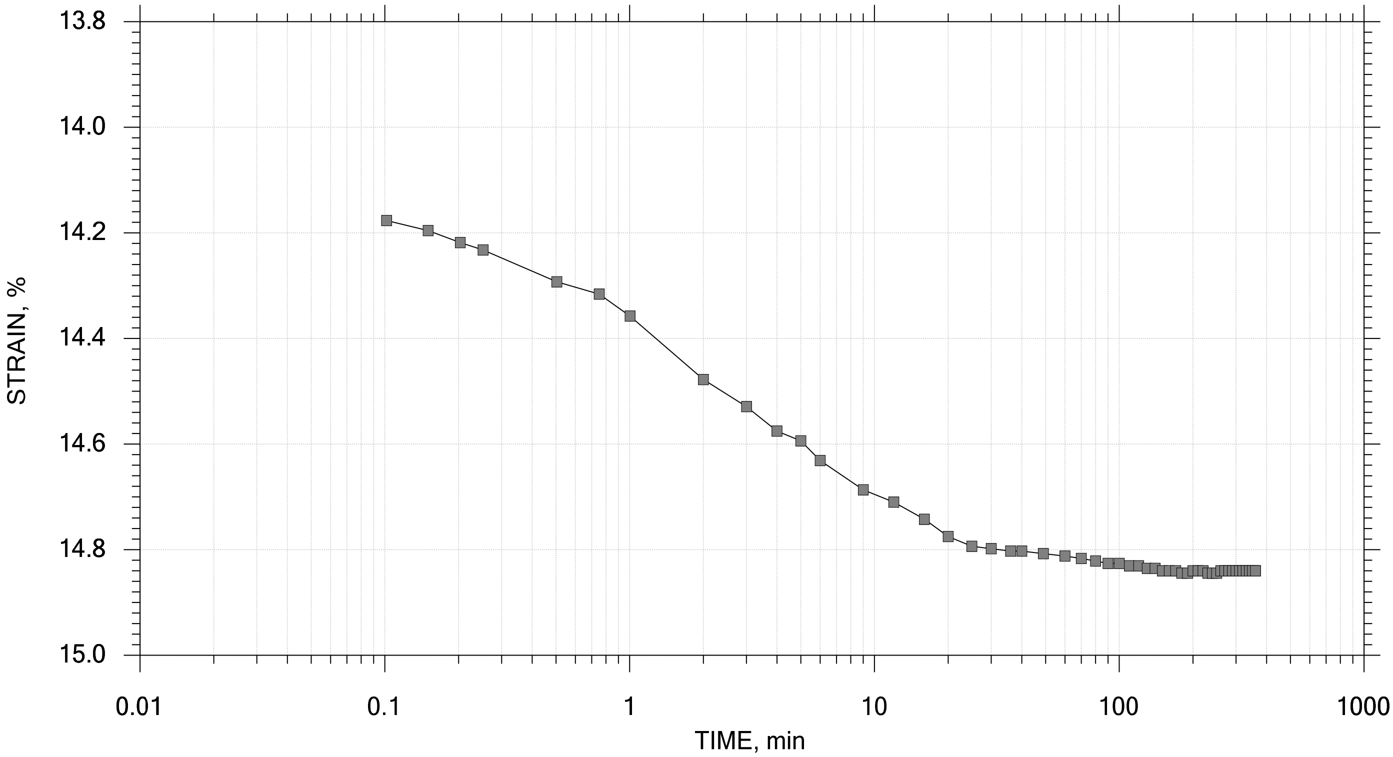
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

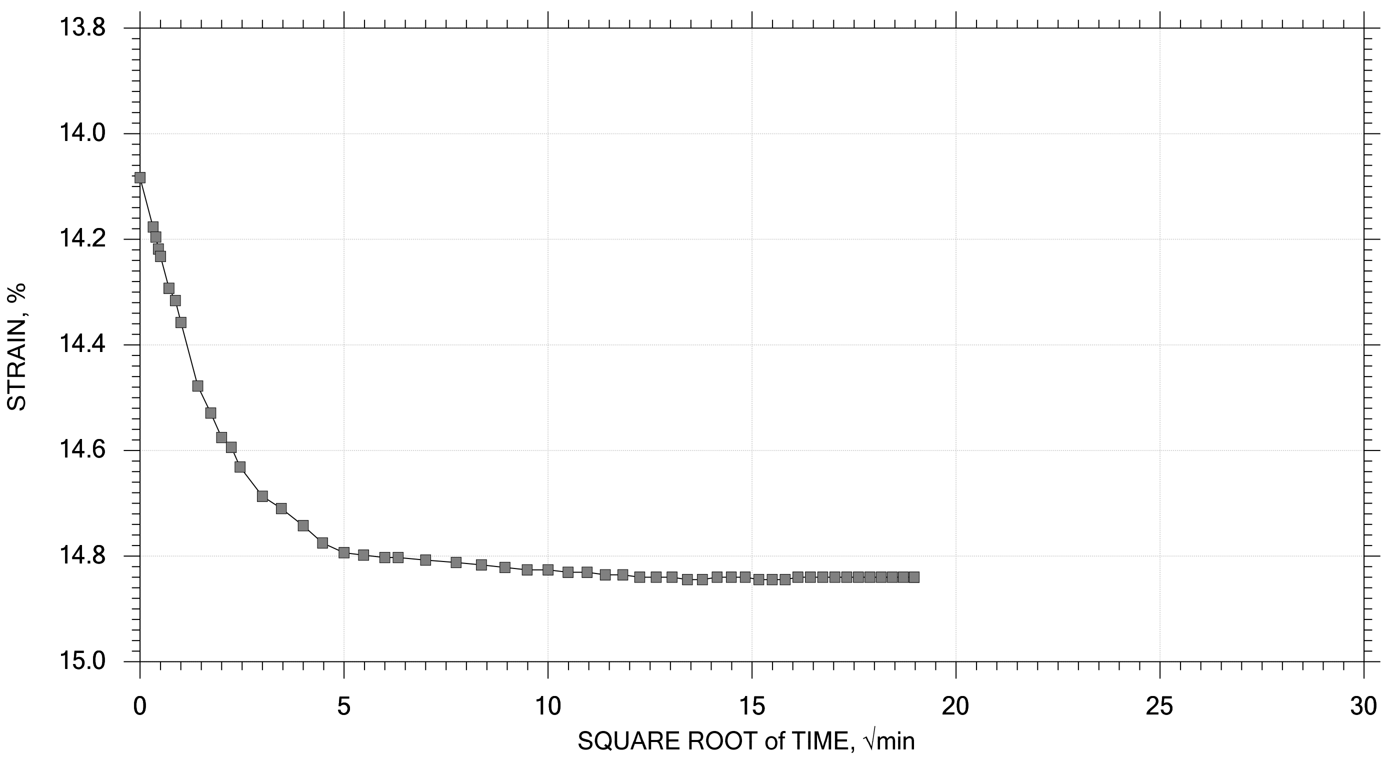
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





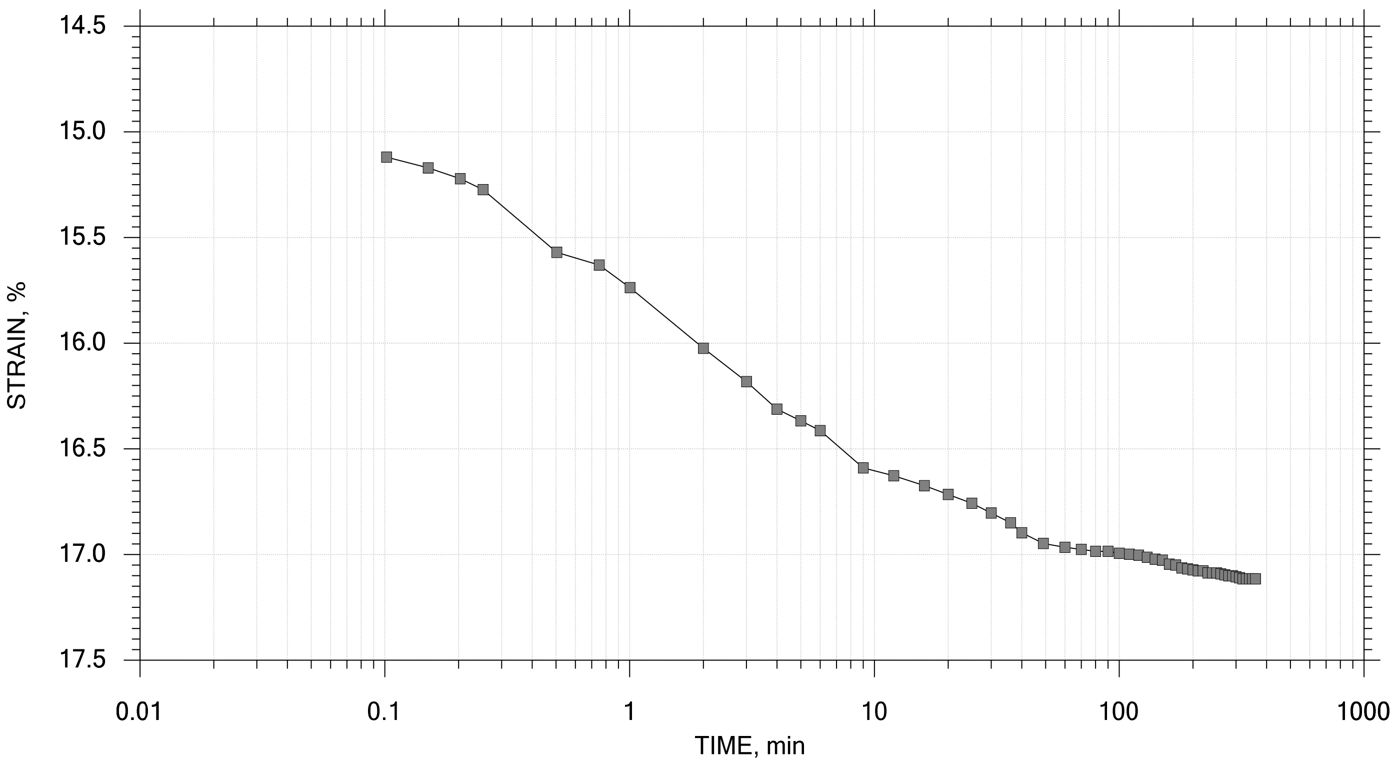
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

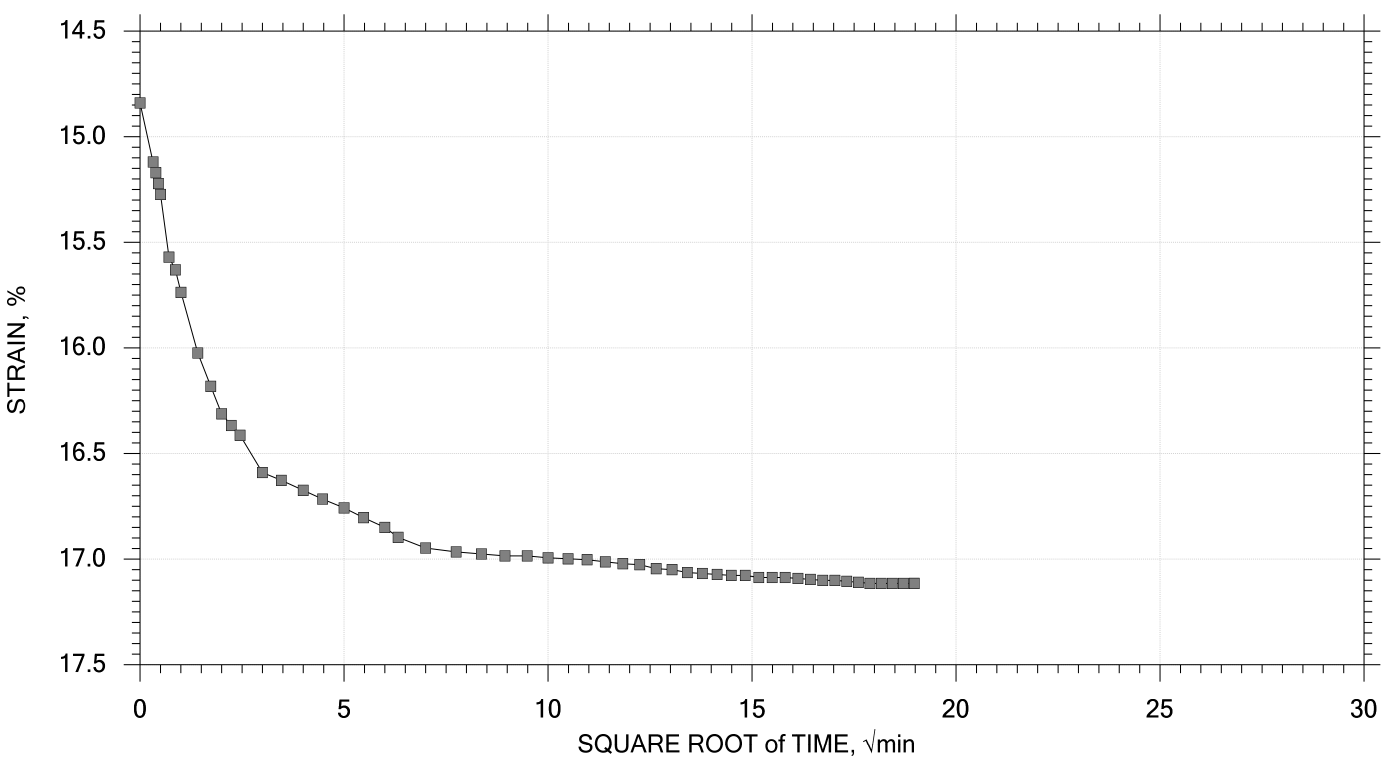
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf

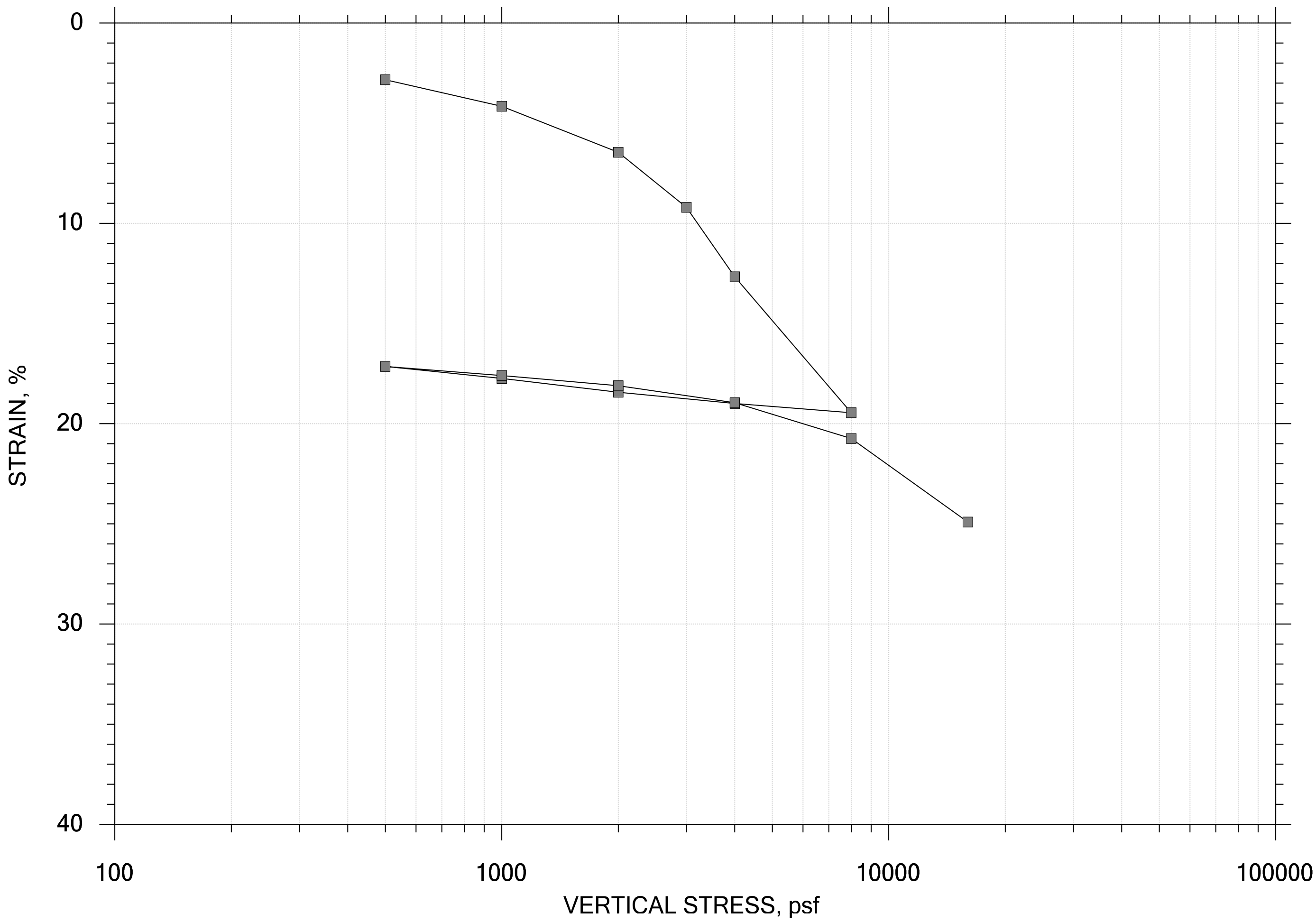


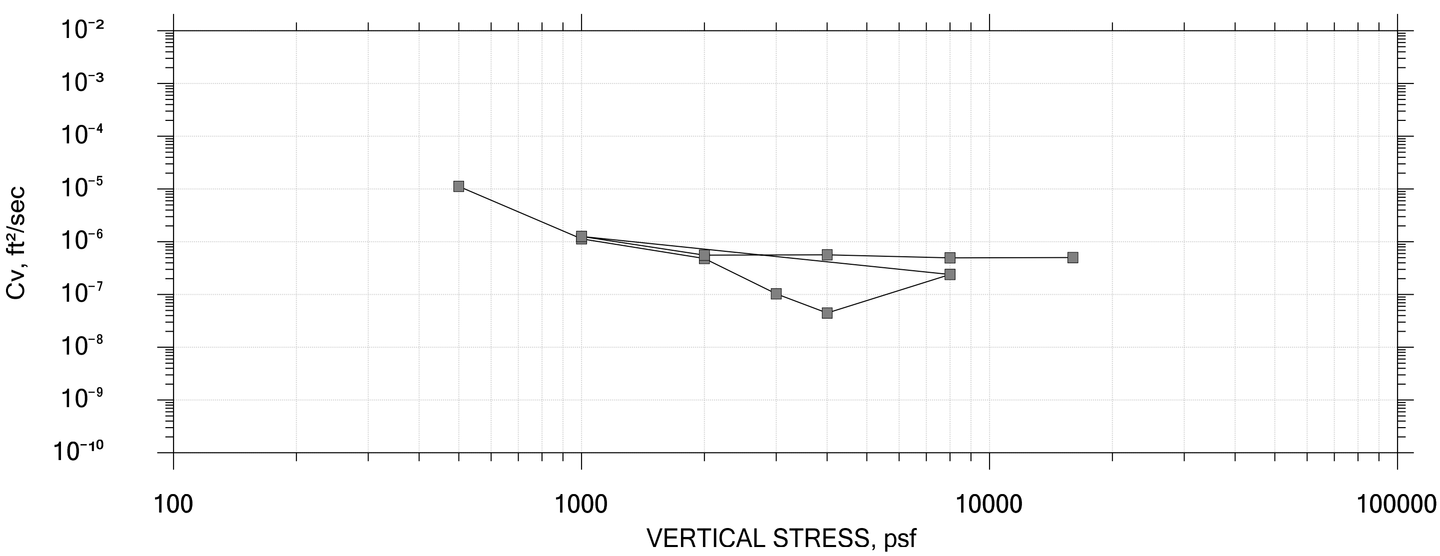


GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 07/31/18	Test No.: IP-4
	Depth: 37-39 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

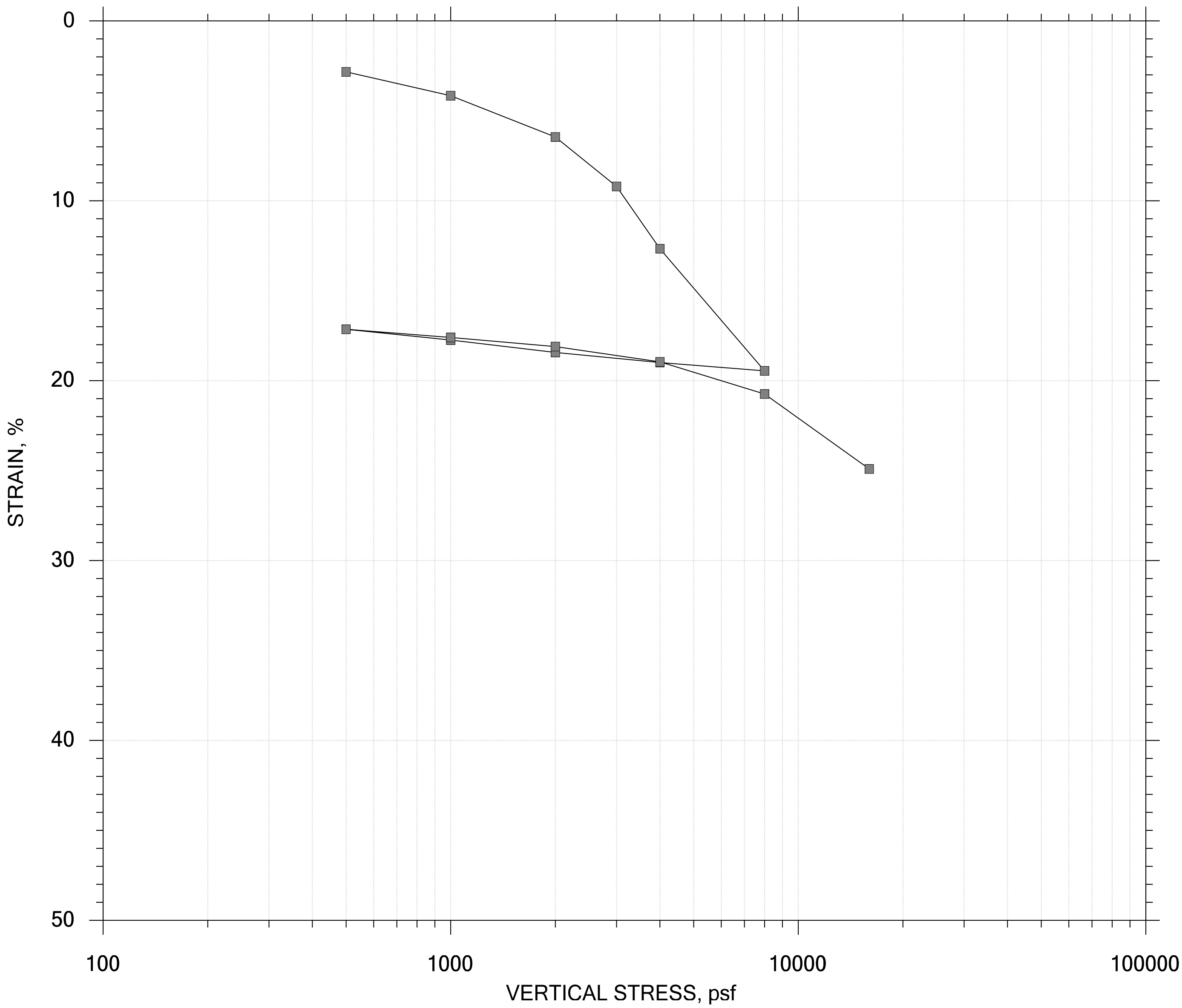




GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	53.11	30.75
Preconsolidation Stress: ---				Dry Unit Weight, pcf	69.453	92.604
Compression Ratio: ---				Saturation, %	99.79	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.45	0.84
LL: 37	PL: 21	PI: 16	GS: 2.73			

GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-211
Tested By: md
Checked By: njh
Sample No.: U2
Test Date: 08/01/18
Depth: 45-47 ft
Test No.: IP-5
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System T

Estimated Specific Gravity: 2.73
Liquid Limit: 37
Specimen Diameter: 2.50 in
Initial Void Ratio: 1.45
Plastic Limit: 21
Initial Height: 1.00 in
Final Void Ratio: 0.839
Plasticity Index: 16
Final Height: 0.75 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	B-1744	RING		A-2617
Wt. Container + Wet Soil, gm	119.05	248.04	228.03	128.70
Wt. Container + Dry Soil, gm	83.490	200.51	200.51	100.38
Wt. Container, gm	8.3300	111.02	111.02	8.2800
Wt. Dry Soil, gm	75.160	89.492	89.492	92.100
Water Content, %	47.31	53.11	30.75	30.75
Void Ratio	---	1.45	0.839	---
Degree of Saturation, %	---	99.79	100.00	---
Dry Unit Weight, pcf	---	69.453	92.604	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-211
Tested By: md
Checked By: njh
Sample No.: U2
Test Date: 08/01/18
Depth: 45-47 ft
Test No.: IP-5
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System T

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.02826	1.38	2.83	3.049	7.82e-006	5.65e-005	2.38e-003
2	1.00e+003	0.04153	1.35	4.15	20.781	1.10e-006	2.65e-005	1.57e-004
3	2.00e+003	0.06454	1.29	6.45	81.002	2.72e-007	2.30e-005	3.37e-005
4	3.00e+003	0.09198	1.23	9.20	234.157	8.90e-008	2.74e-005	1.32e-005
5	4.00e+003	0.1266	1.14	12.7	419.007	4.65e-008	3.46e-005	8.68e-006
6	8.00e+003	0.1945	0.975	19.4	69.481	2.49e-007	1.70e-005	2.28e-005
7	4.00e+003	0.1899	0.986	19.0	3.799	4.21e-006	1.15e-006	2.61e-005
8	2.00e+003	0.1843	1.00	18.4	28.979	5.60e-007	2.81e-006	8.47e-006
9	1.00e+003	0.1774	1.02	17.7	58.481	2.82e-007	6.89e-006	1.05e-005
10	500.	0.1714	1.03	17.1	140.004	1.19e-007	1.20e-005	7.76e-006
11	1.00e+003	0.1760	1.02	17.6	16.001	1.05e-006	9.18e-006	5.18e-005
12	2.00e+003	0.1810	1.01	18.1	36.501	4.54e-007	5.05e-006	1.24e-005
13	4.00e+003	0.1895	0.987	18.9	35.437	4.60e-007	4.24e-006	1.05e-005
14	8.00e+003	0.2074	0.943	20.7	36.888	4.27e-007	4.48e-006	1.03e-005
15	1.60e+004	0.2491	0.841	24.9	25.045	5.84e-007	5.21e-006	1.64e-005

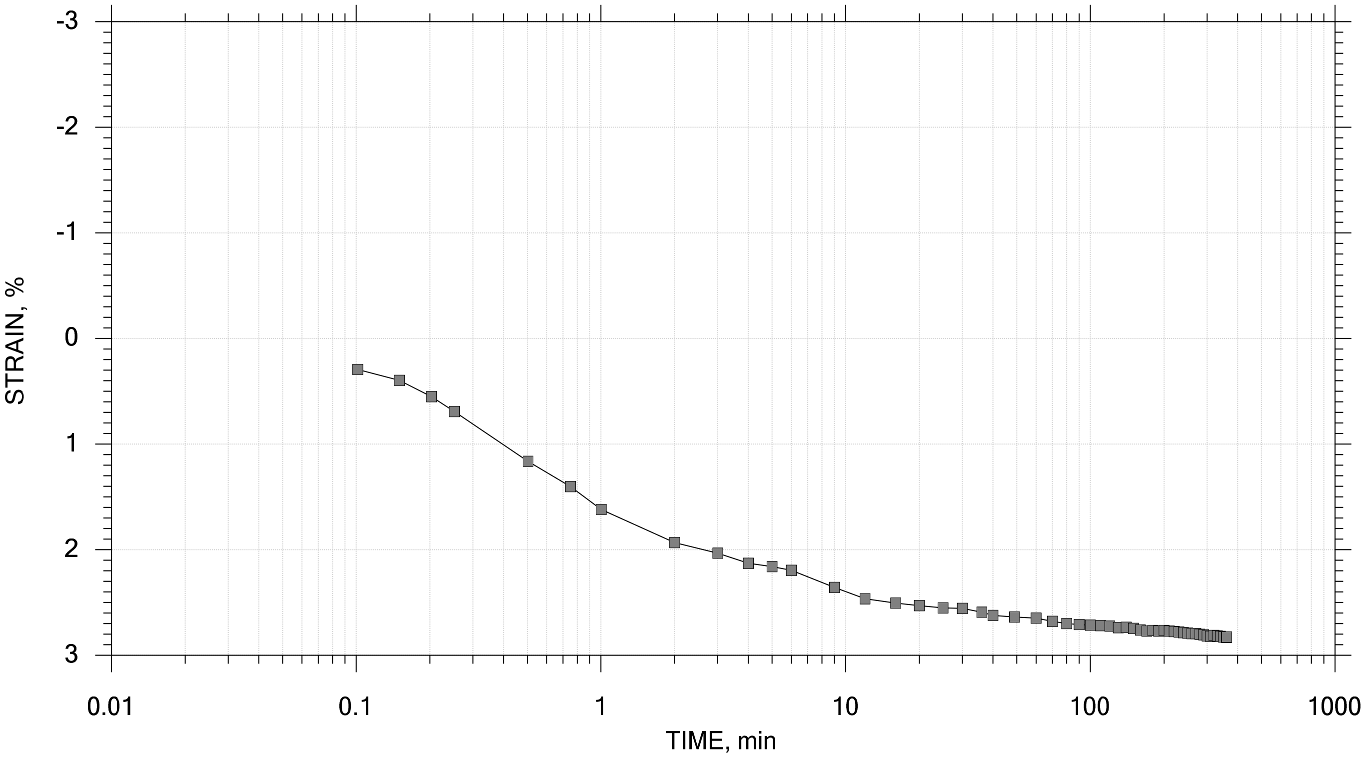
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.02826	1.38	2.83	0.497	1.11e-005	5.65e-005	3.40e-003	0.00e+000
2	1.00e+003	0.04153	1.35	4.15	4.711	1.13e-006	2.65e-005	1.61e-004	0.00e+000
3	2.00e+003	0.06454	1.29	6.45	0.000	0.00e+000	2.30e-005	0.00e+000	0.00e+000
4	3.00e+003	0.09198	1.23	9.20	0.000	0.00e+000	2.74e-005	0.00e+000	0.00e+000
5	4.00e+003	0.1266	1.14	12.7	112.465	4.02e-008	3.46e-005	7.51e-006	0.00e+000
6	8.00e+003	0.1945	0.975	19.4	17.391	2.31e-007	1.70e-005	2.11e-005	0.00e+000
7	4.00e+003	0.1899	0.986	19.0	0.000	0.00e+000	1.15e-006	0.00e+000	0.00e+000
8	2.00e+003	0.1843	1.00	18.4	4.693	8.03e-007	2.81e-006	1.21e-005	0.00e+000
9	1.00e+003	0.1774	1.02	17.7	0.000	0.00e+000	6.89e-006	0.00e+000	0.00e+000
10	500.	0.1714	1.03	17.1	25.362	1.53e-007	1.20e-005	9.95e-006	0.00e+000
11	1.00e+003	0.1760	1.02	17.6	3.204	1.21e-006	9.18e-006	6.01e-005	0.00e+000
12	2.00e+003	0.1810	1.01	18.1	0.000	0.00e+000	5.05e-006	0.00e+000	0.00e+000
13	4.00e+003	0.1895	0.987	18.9	6.141	6.16e-007	4.24e-006	1.41e-005	0.00e+000
14	8.00e+003	0.2074	0.943	20.7	0.000	0.00e+000	4.48e-006	0.00e+000	0.00e+000
15	1.60e+004	0.2491	0.841	24.9	7.955	4.27e-007	5.21e-006	1.20e-005	0.00e+000

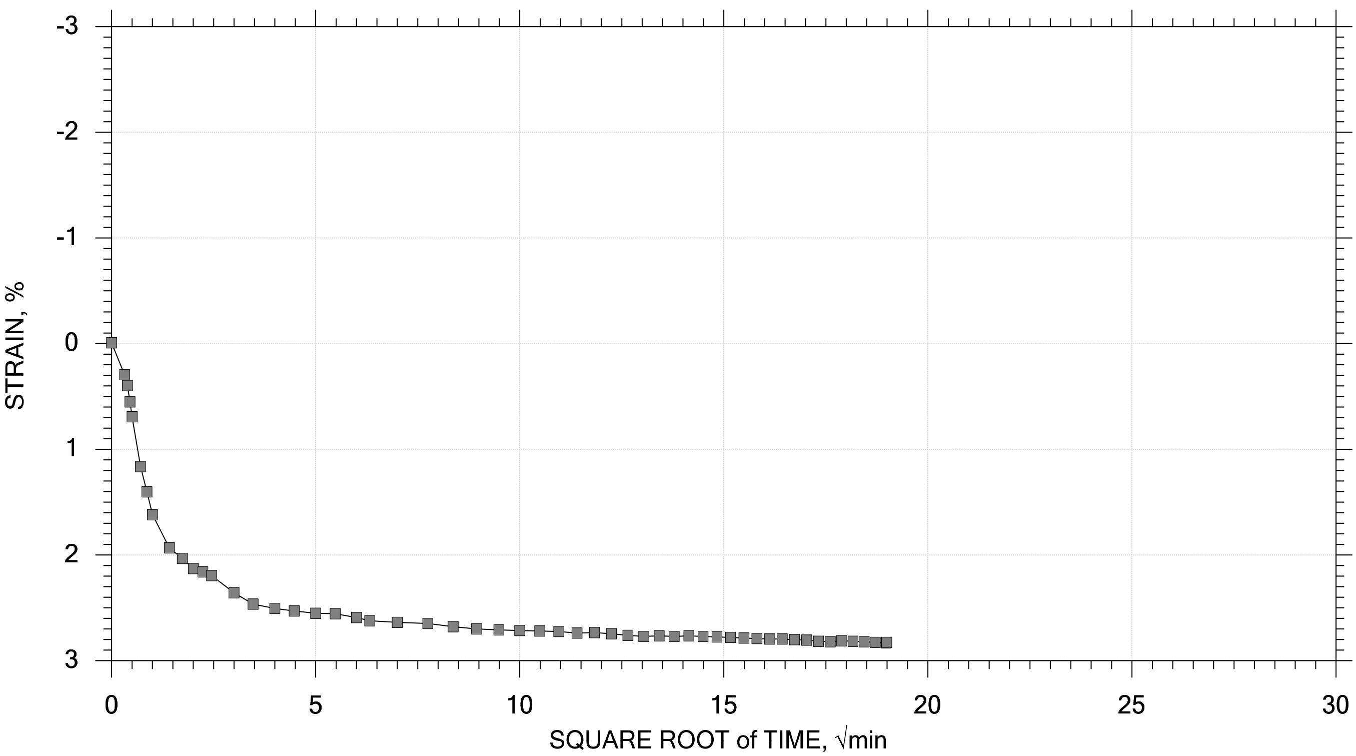
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





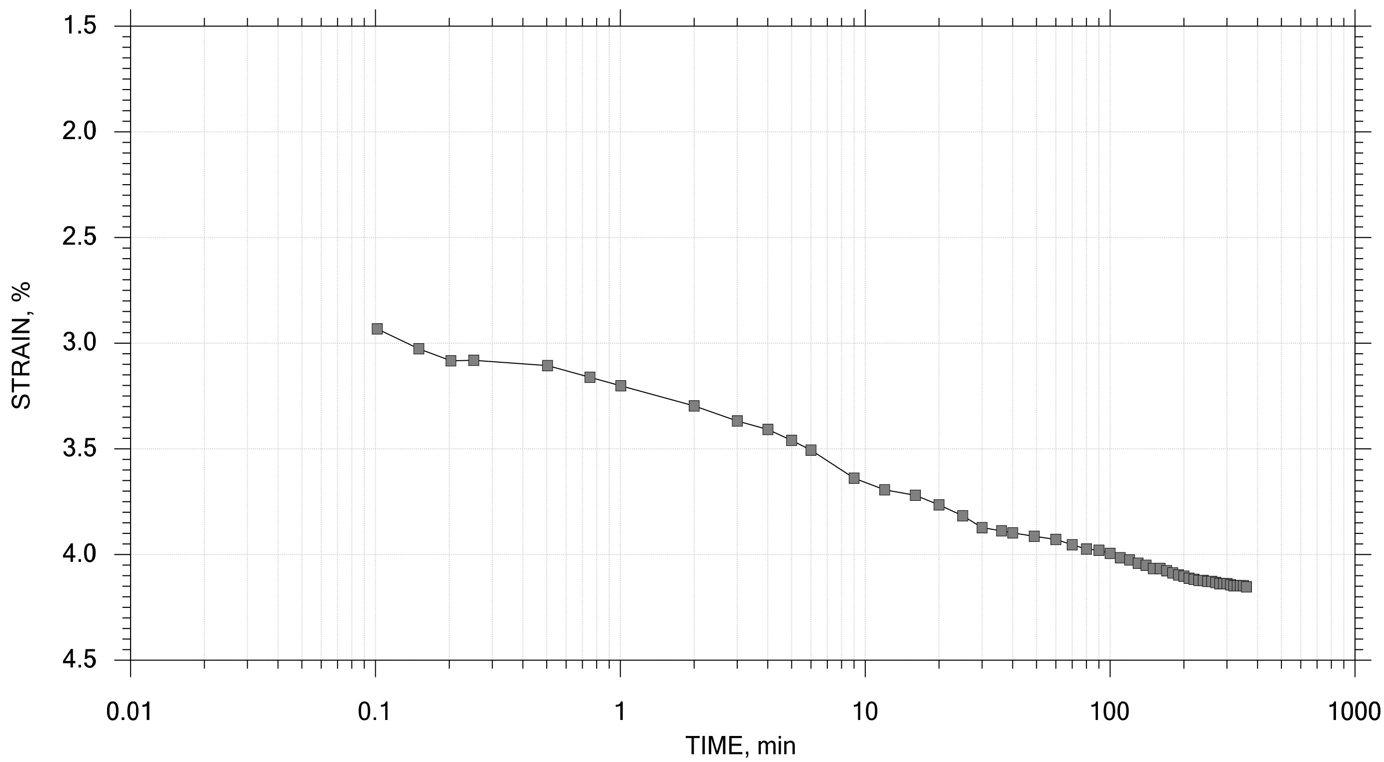
Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
Depth: 45-47 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System T		

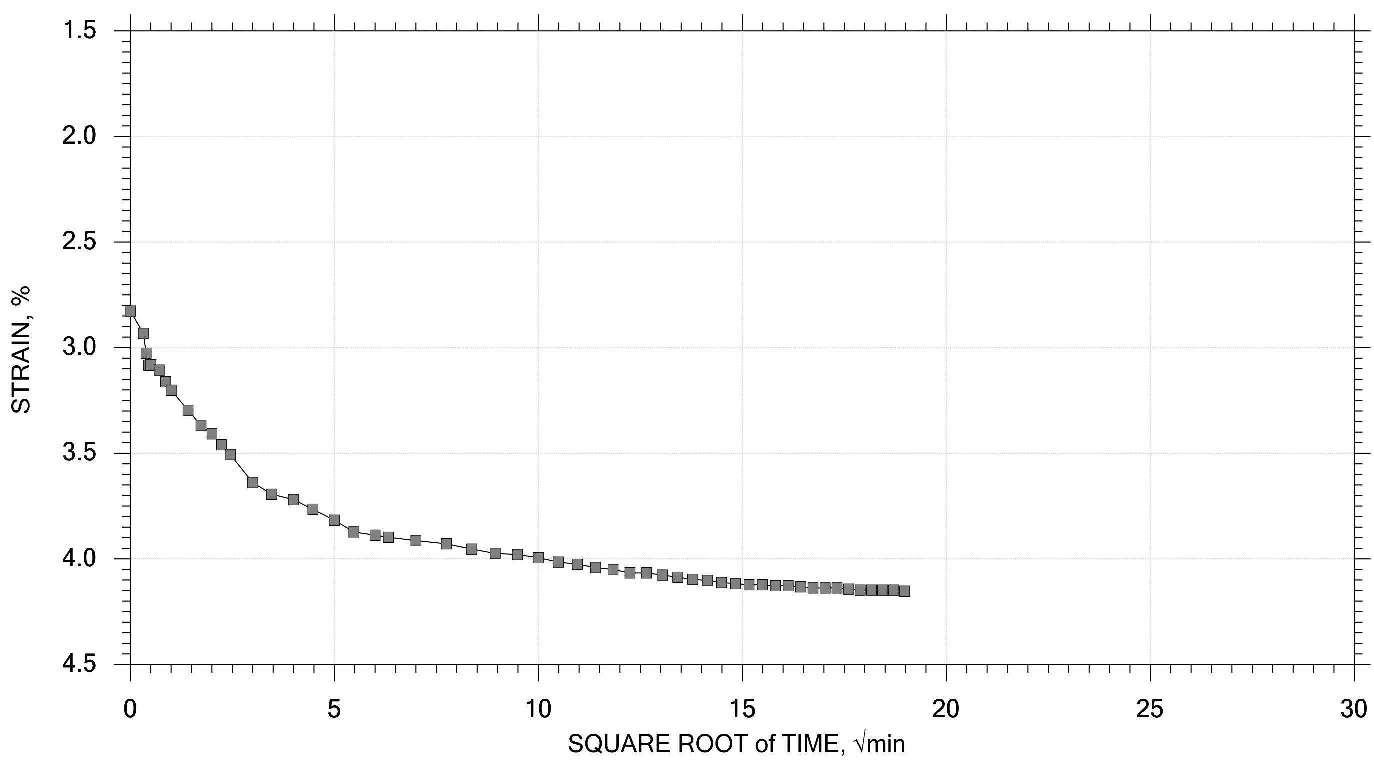
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





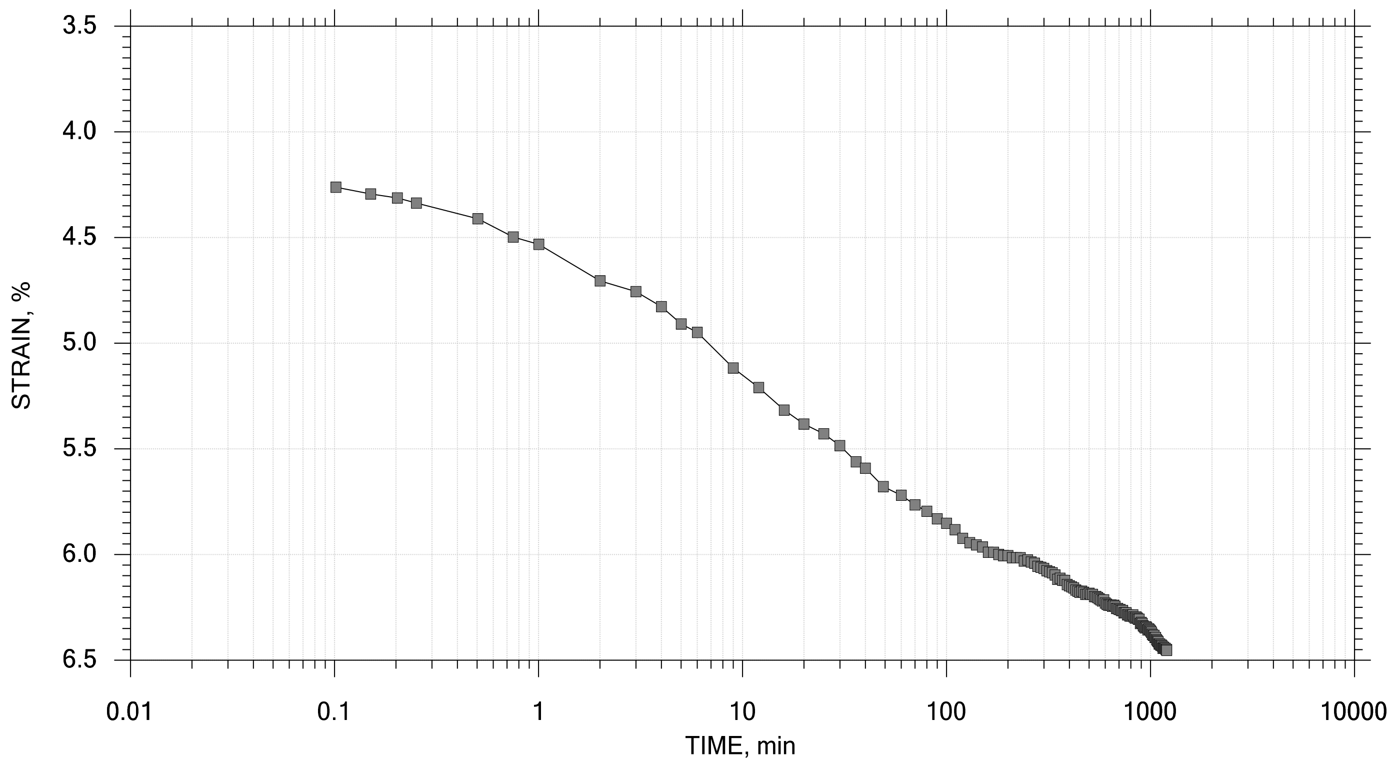
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

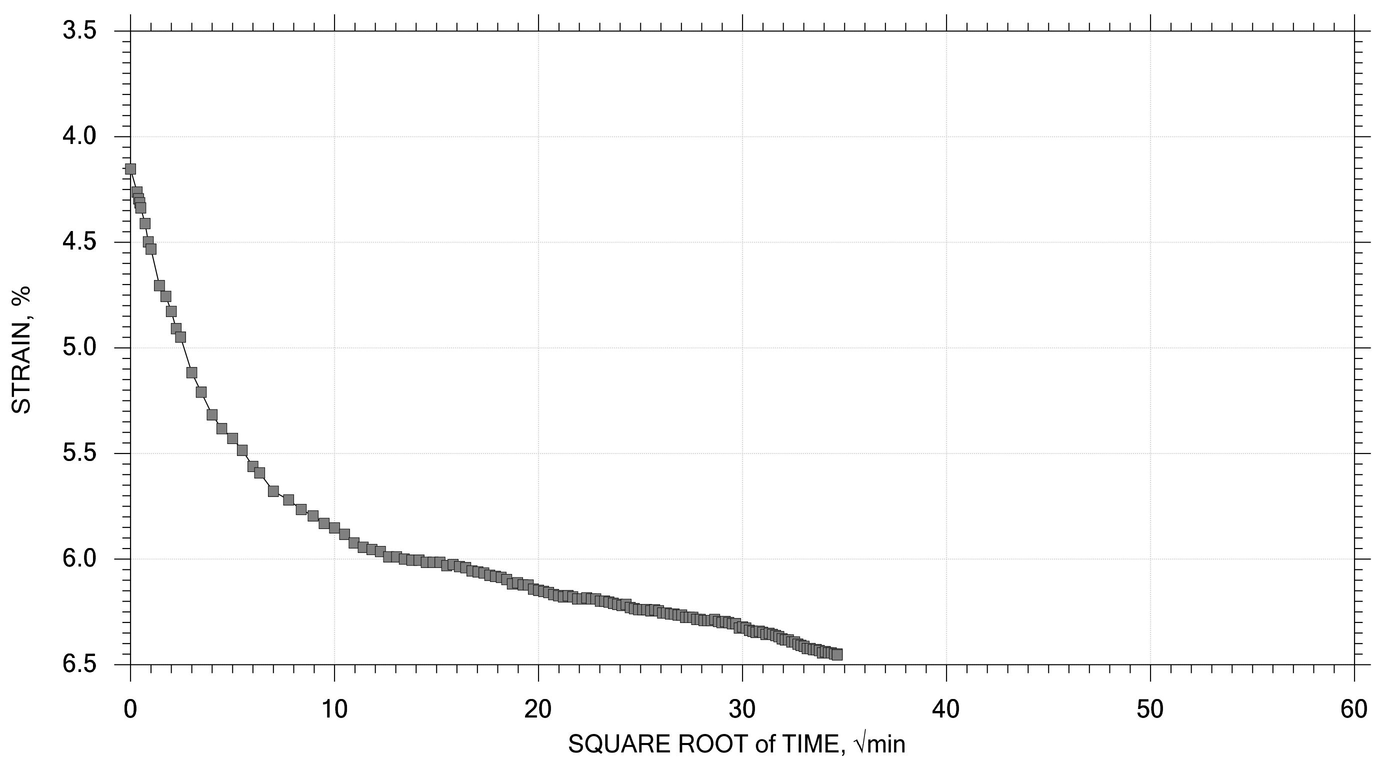
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





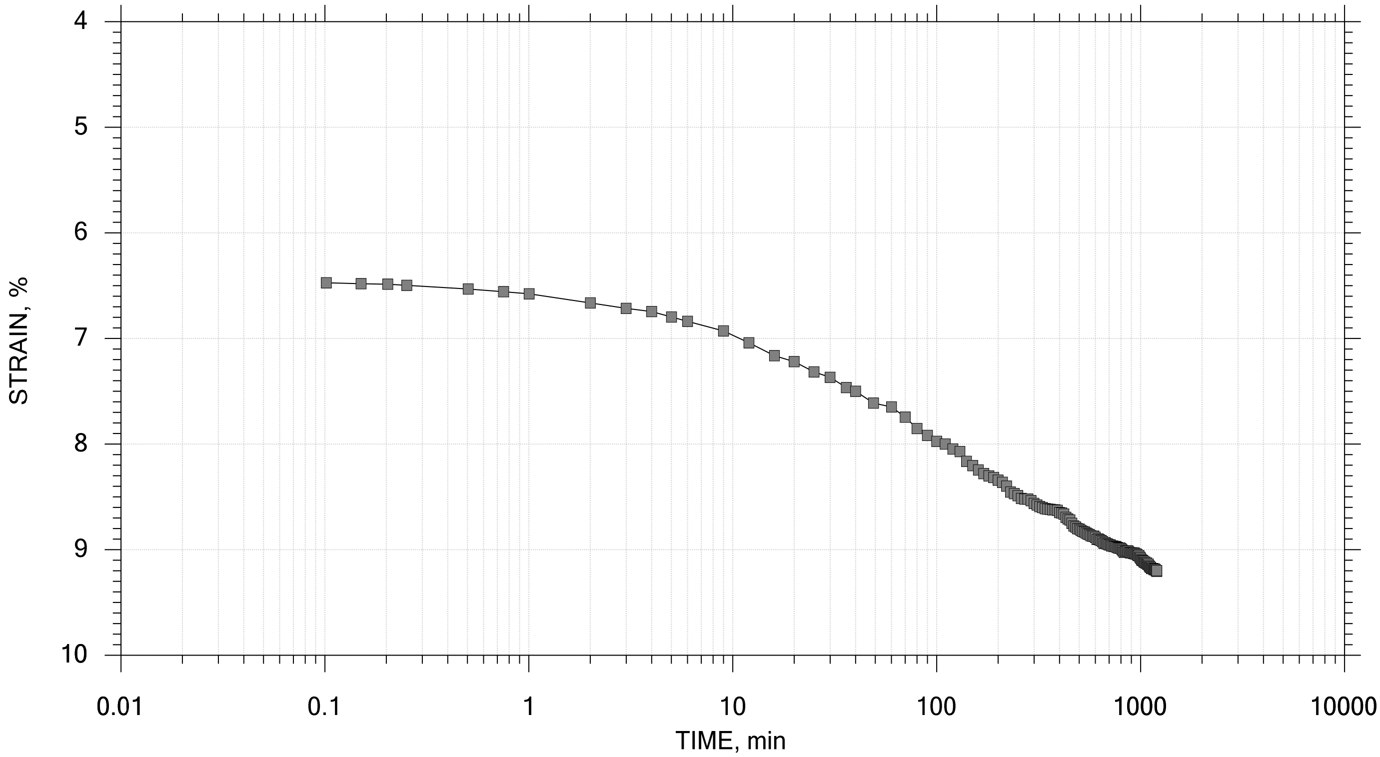
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

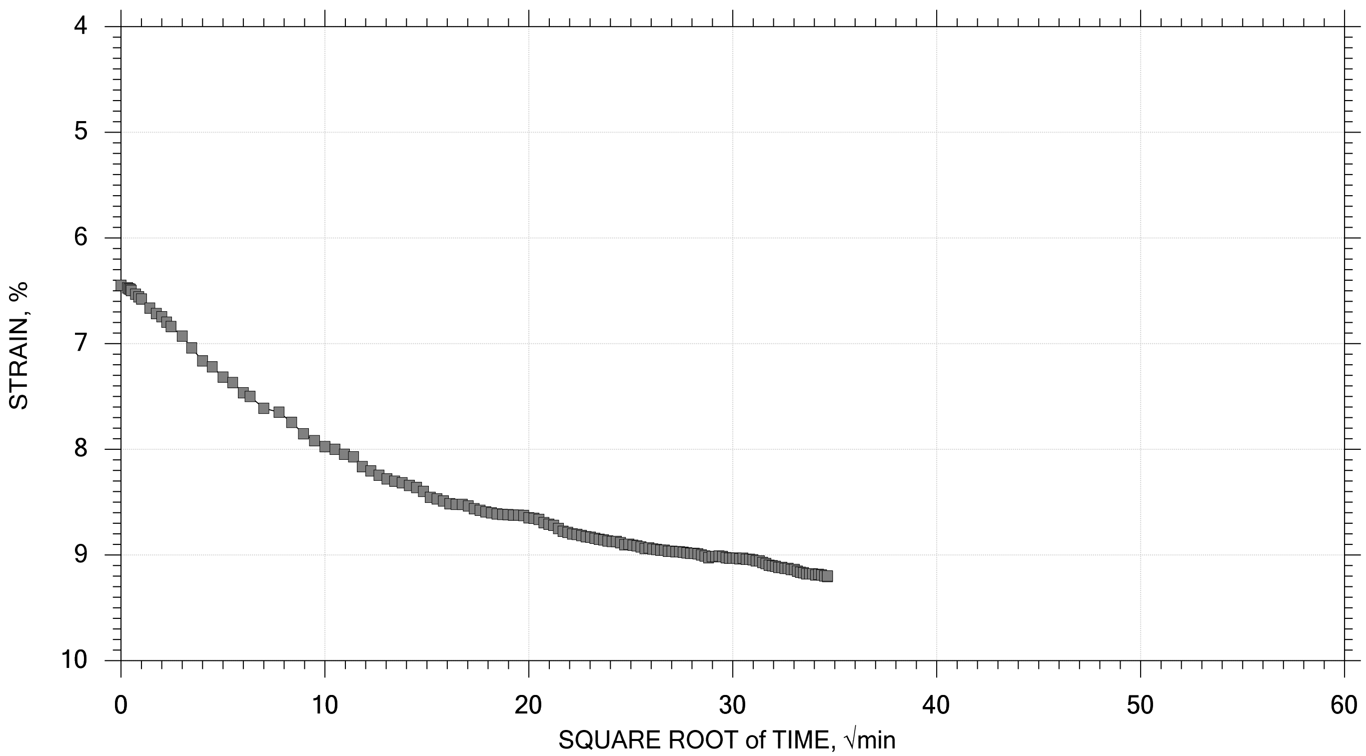
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





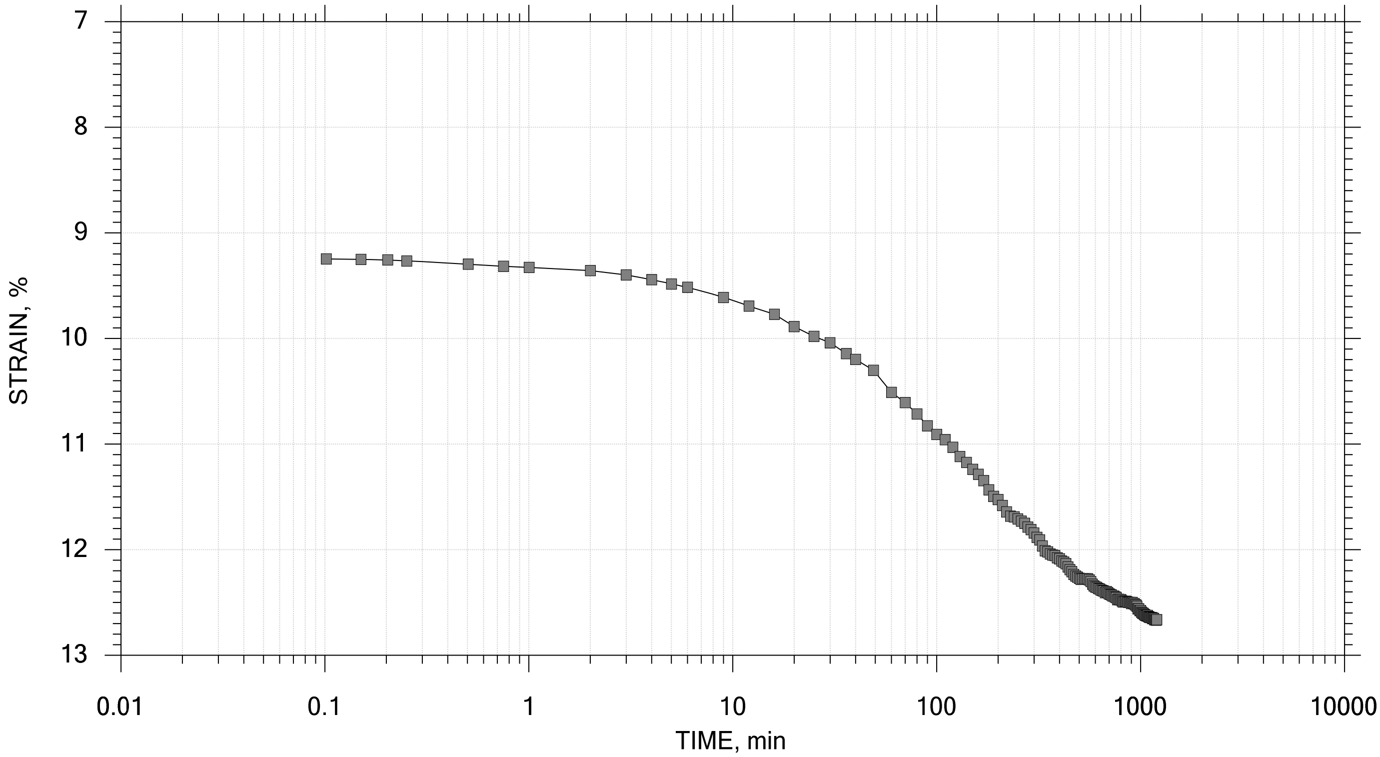
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

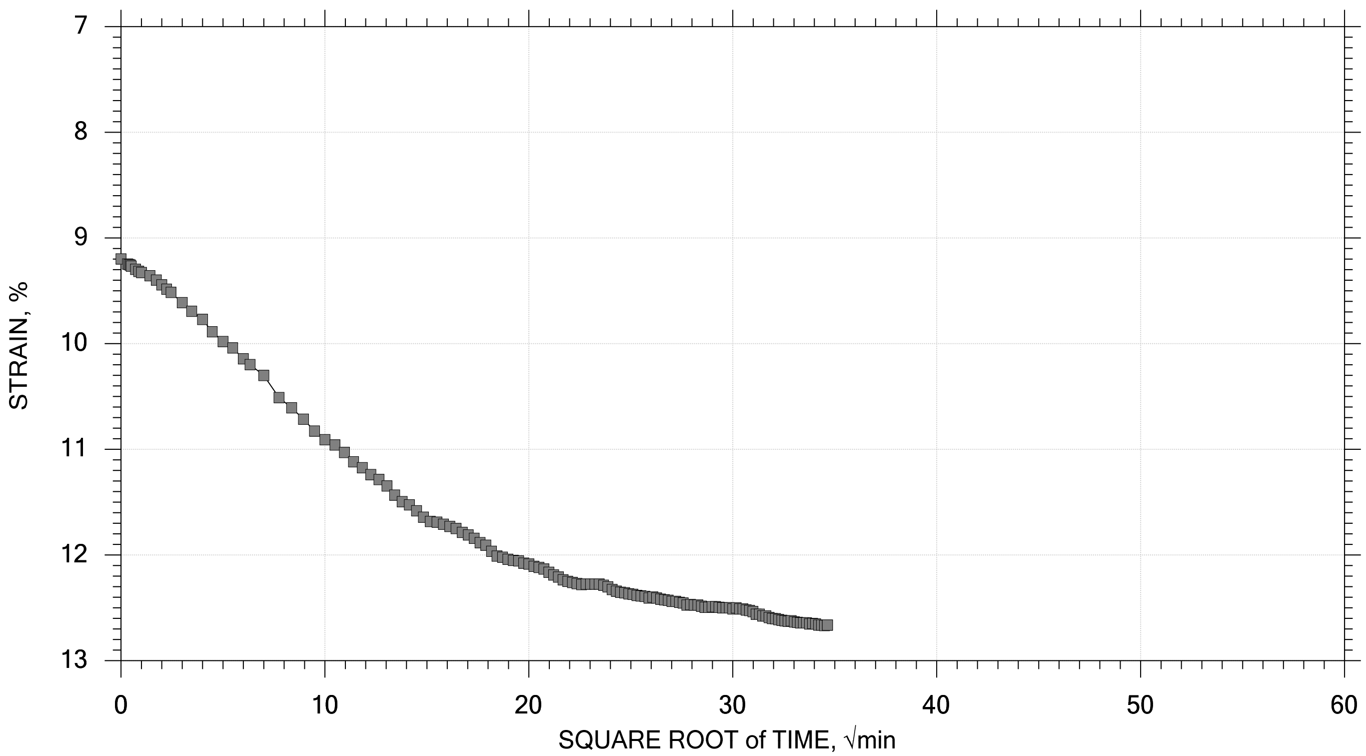
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





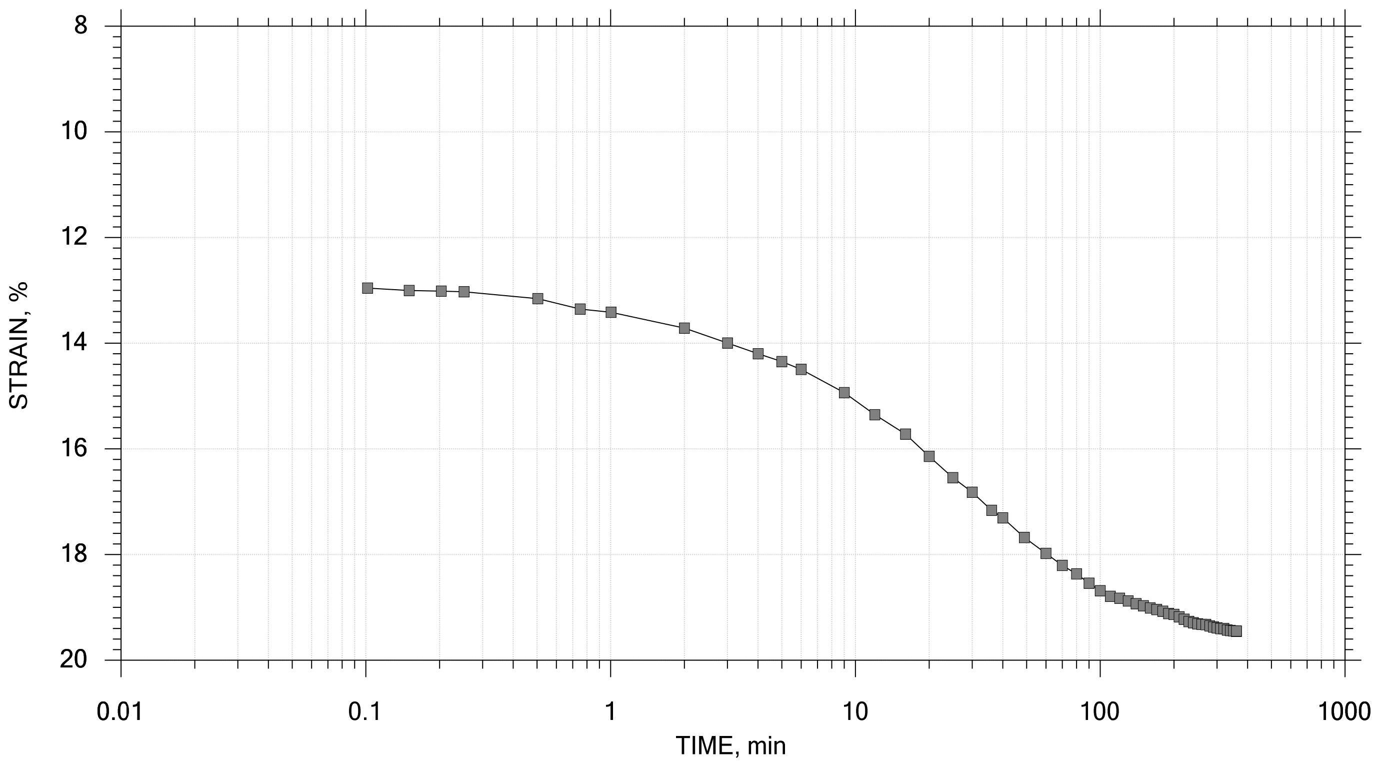
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

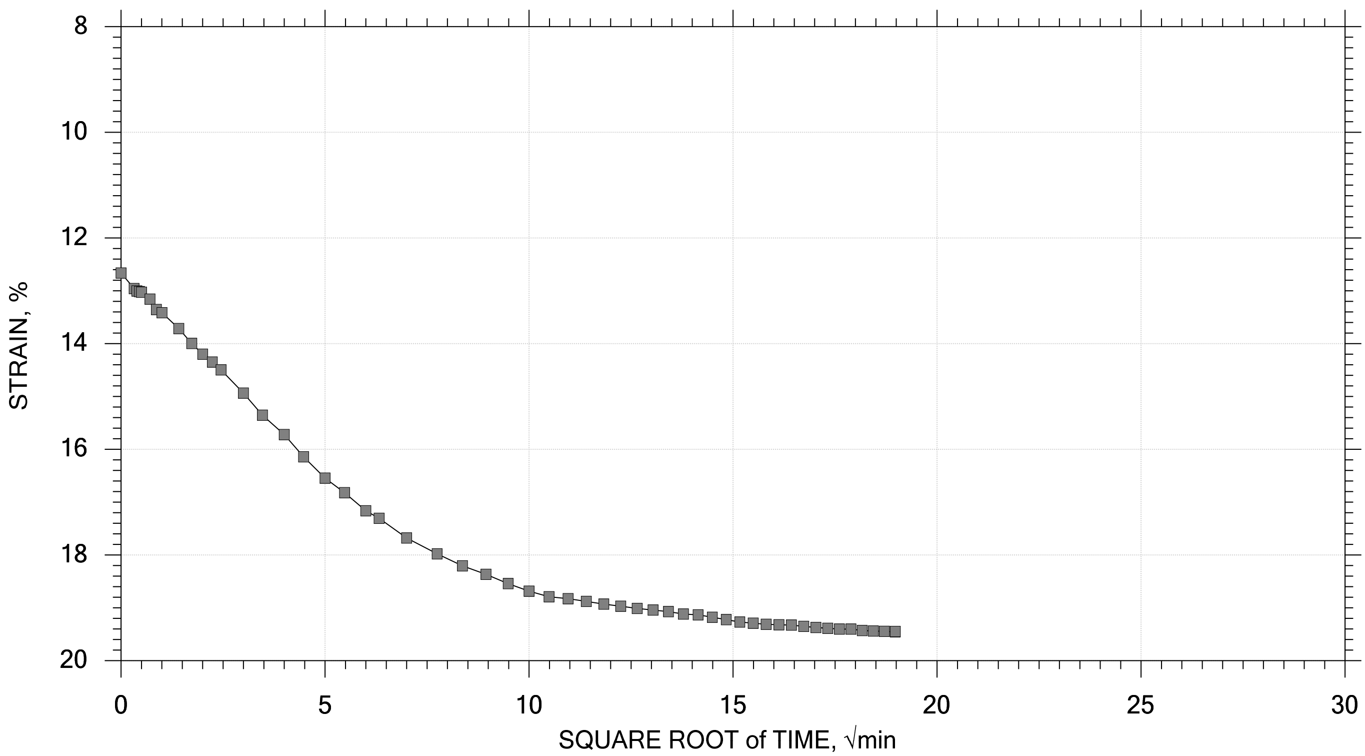
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





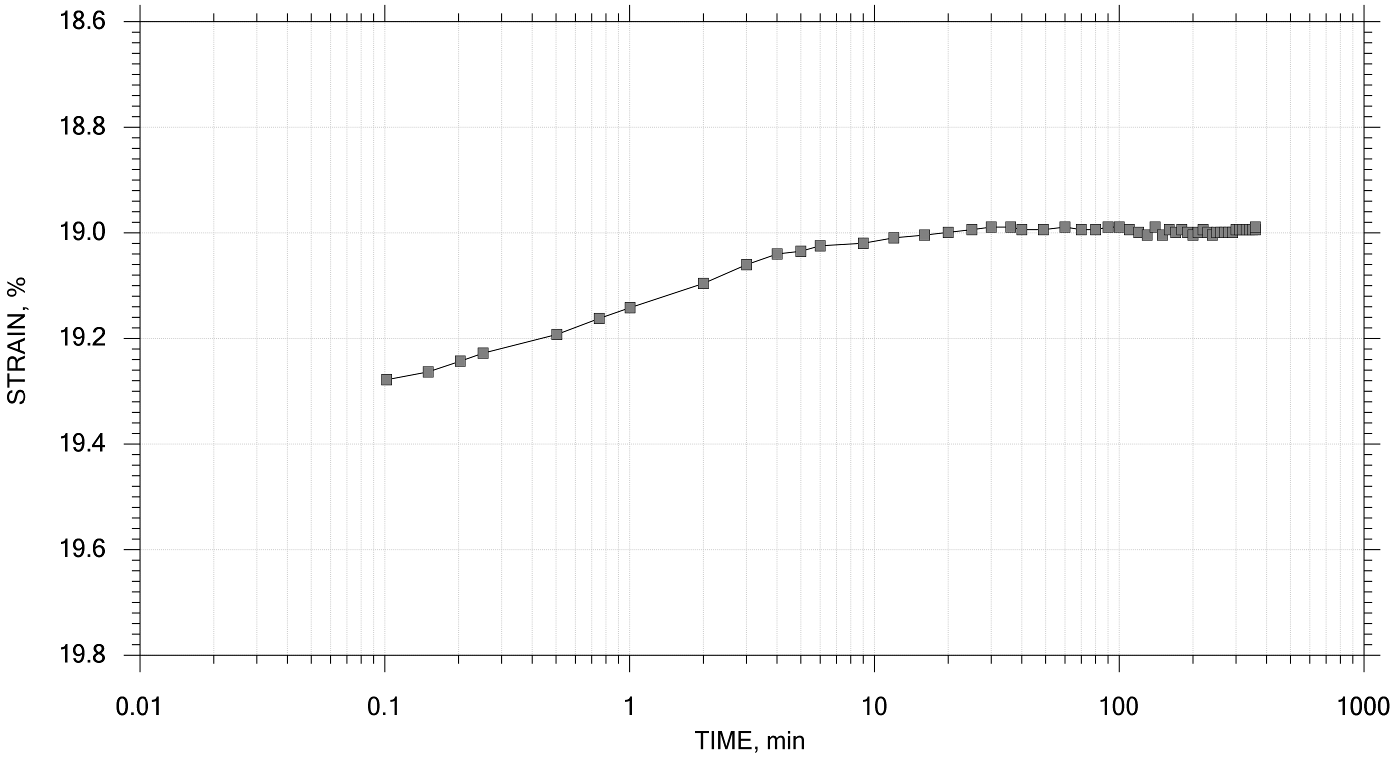
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

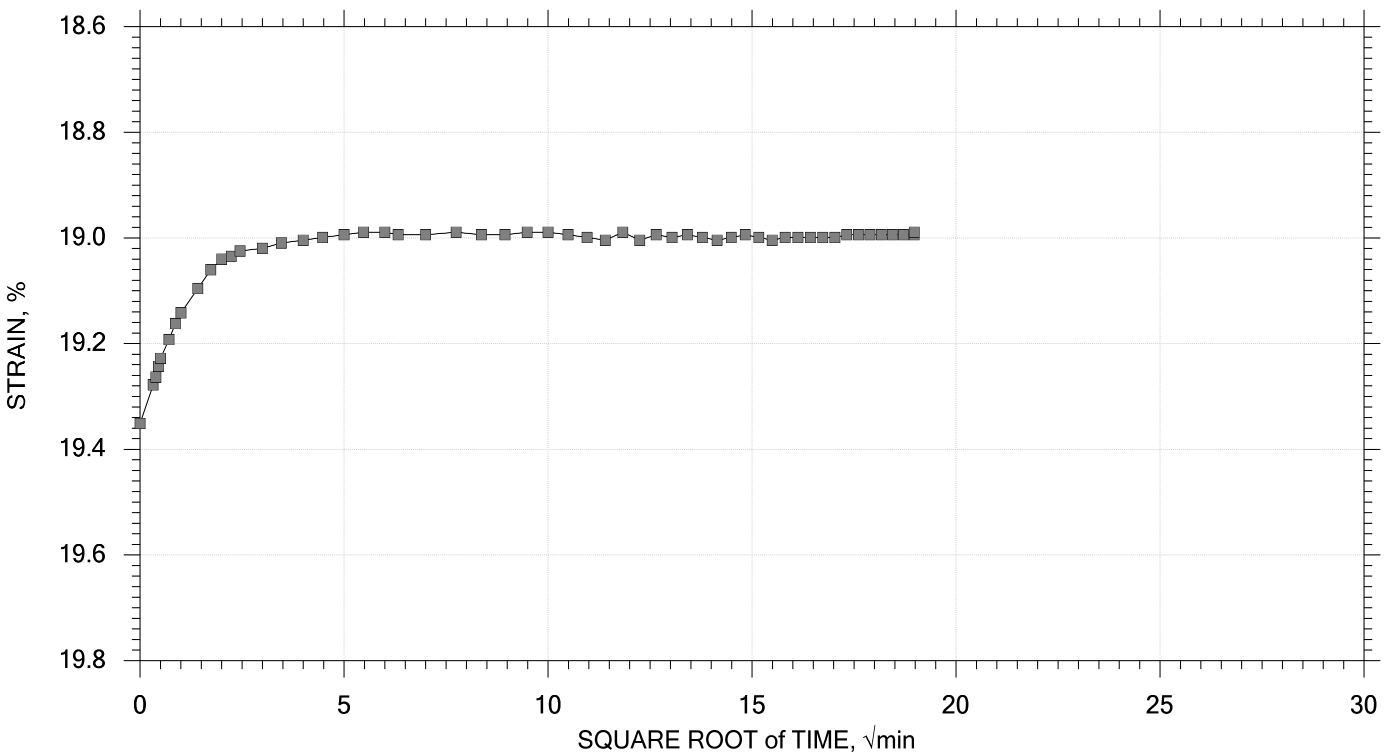
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





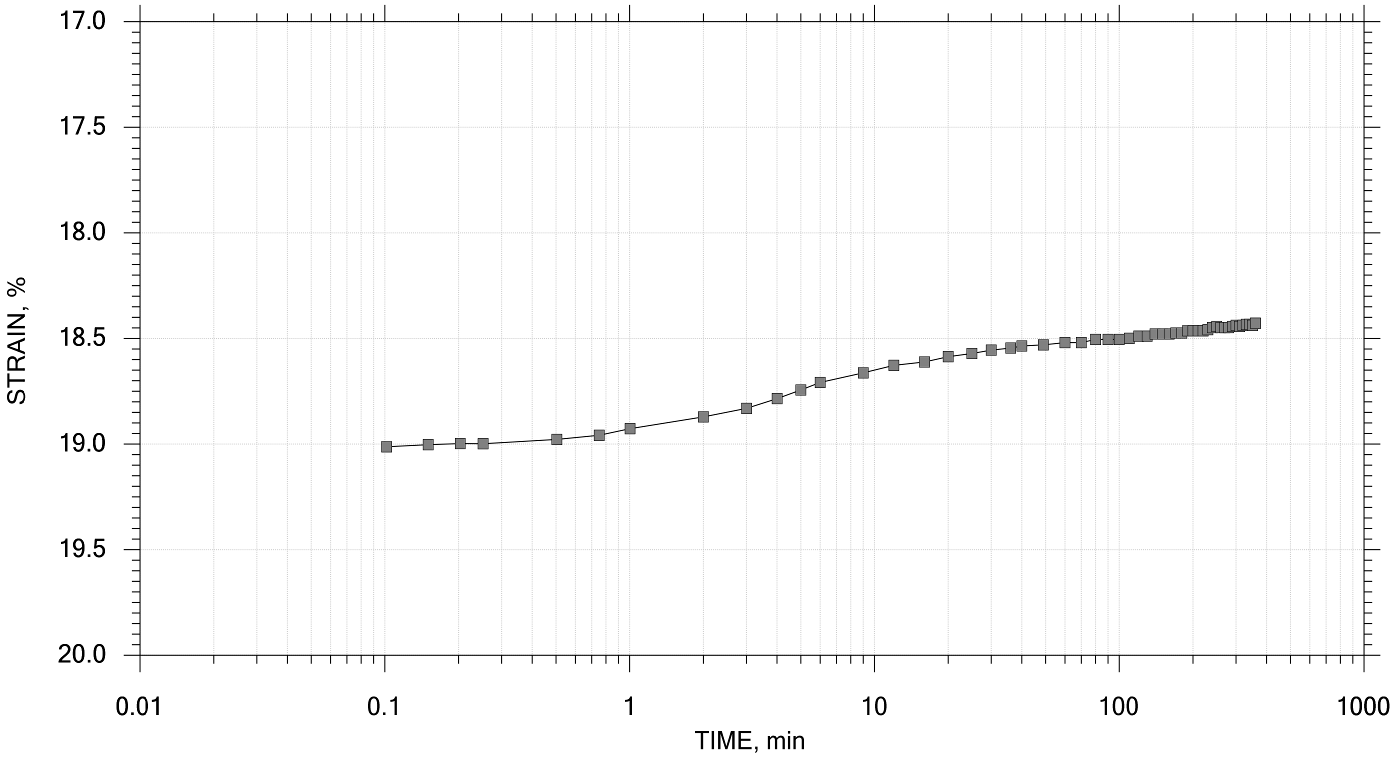
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

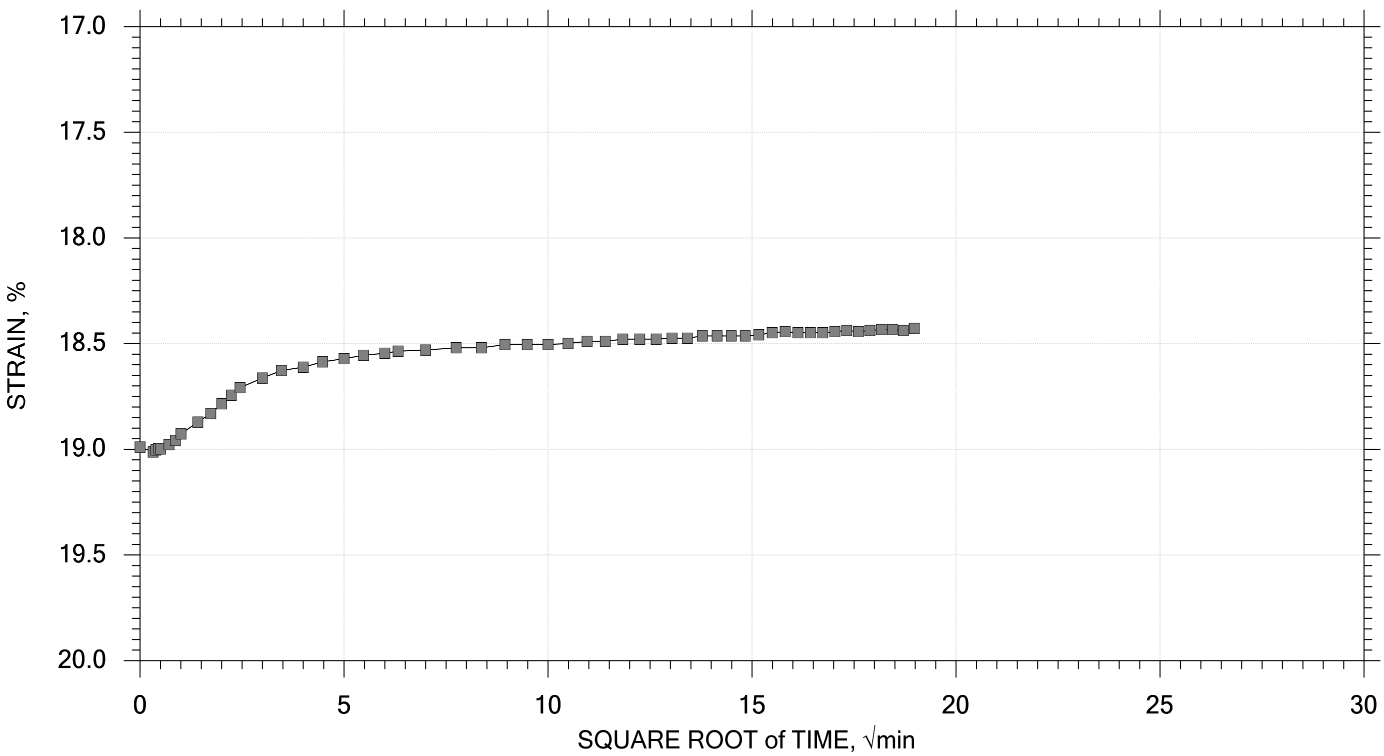
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





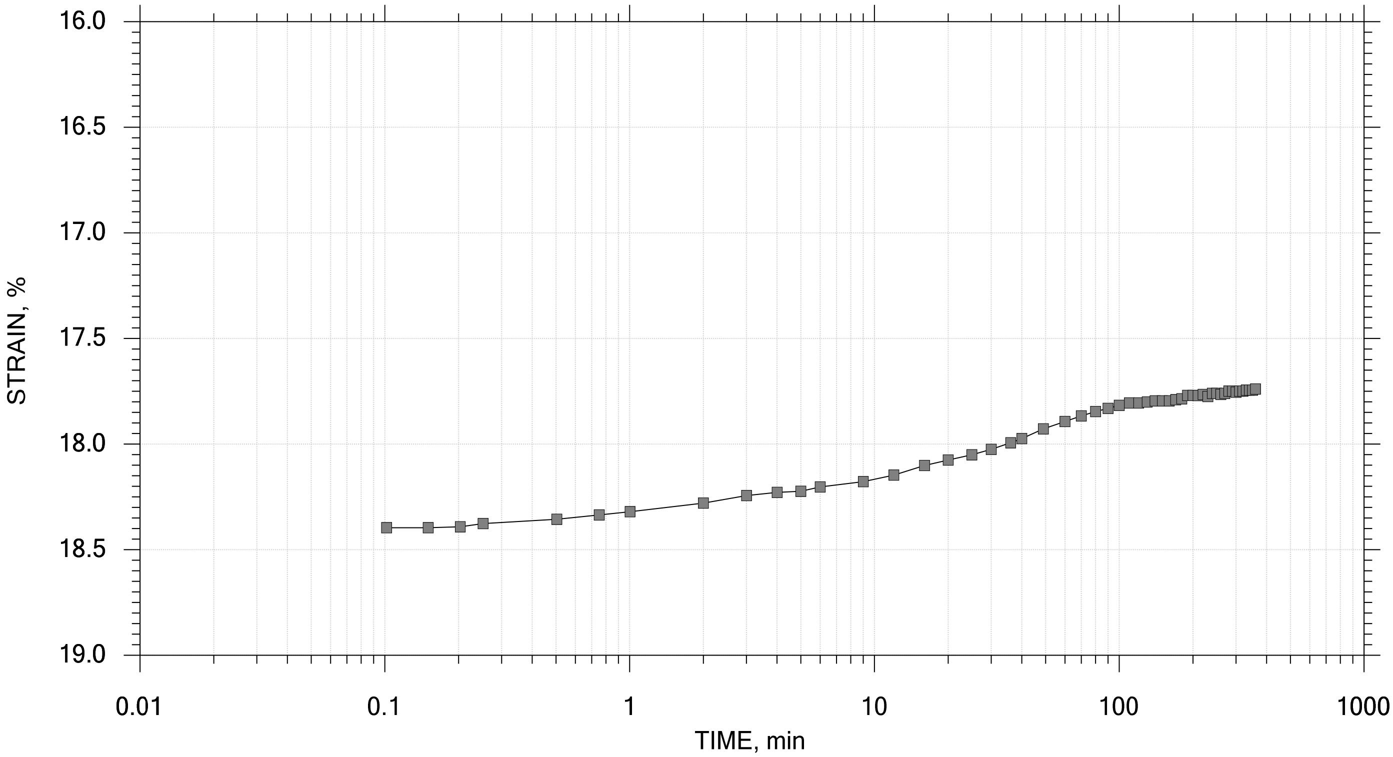
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

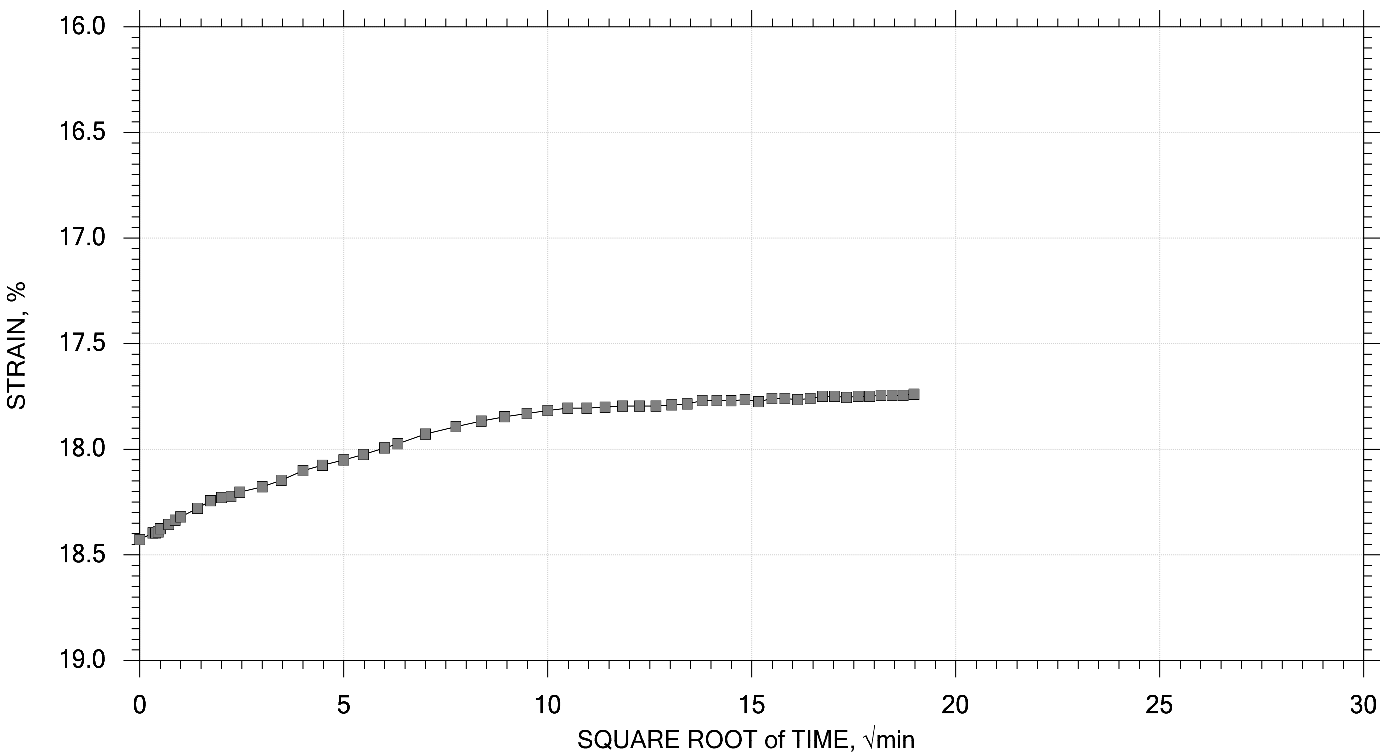
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





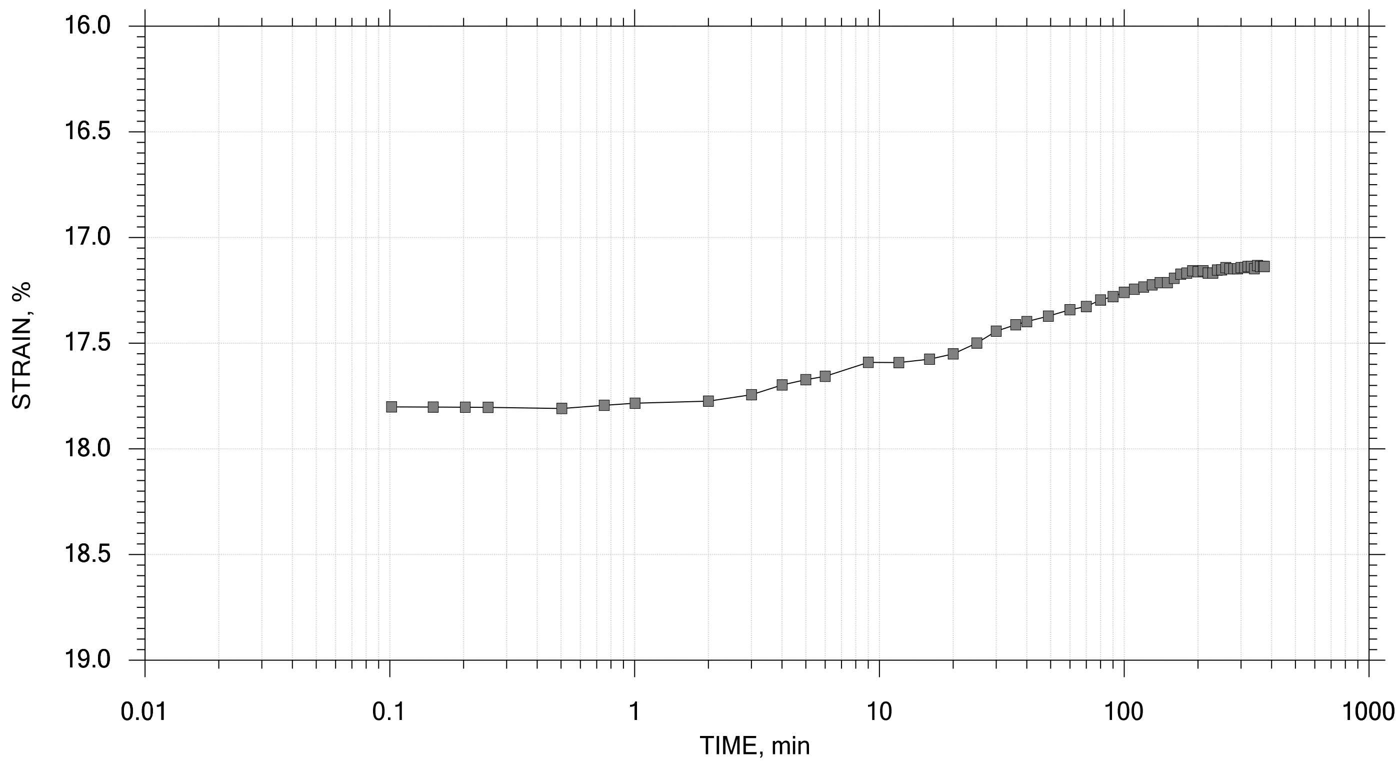
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

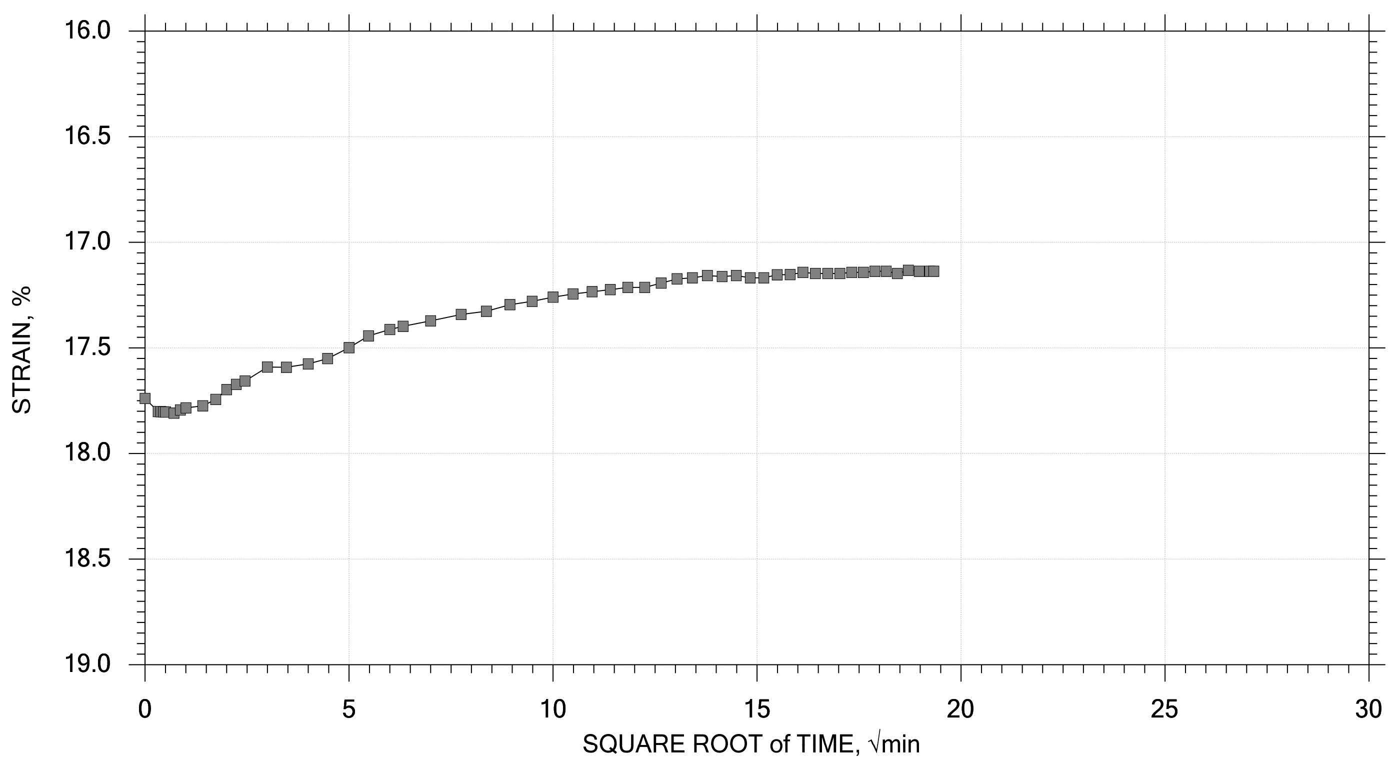
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 500 psf





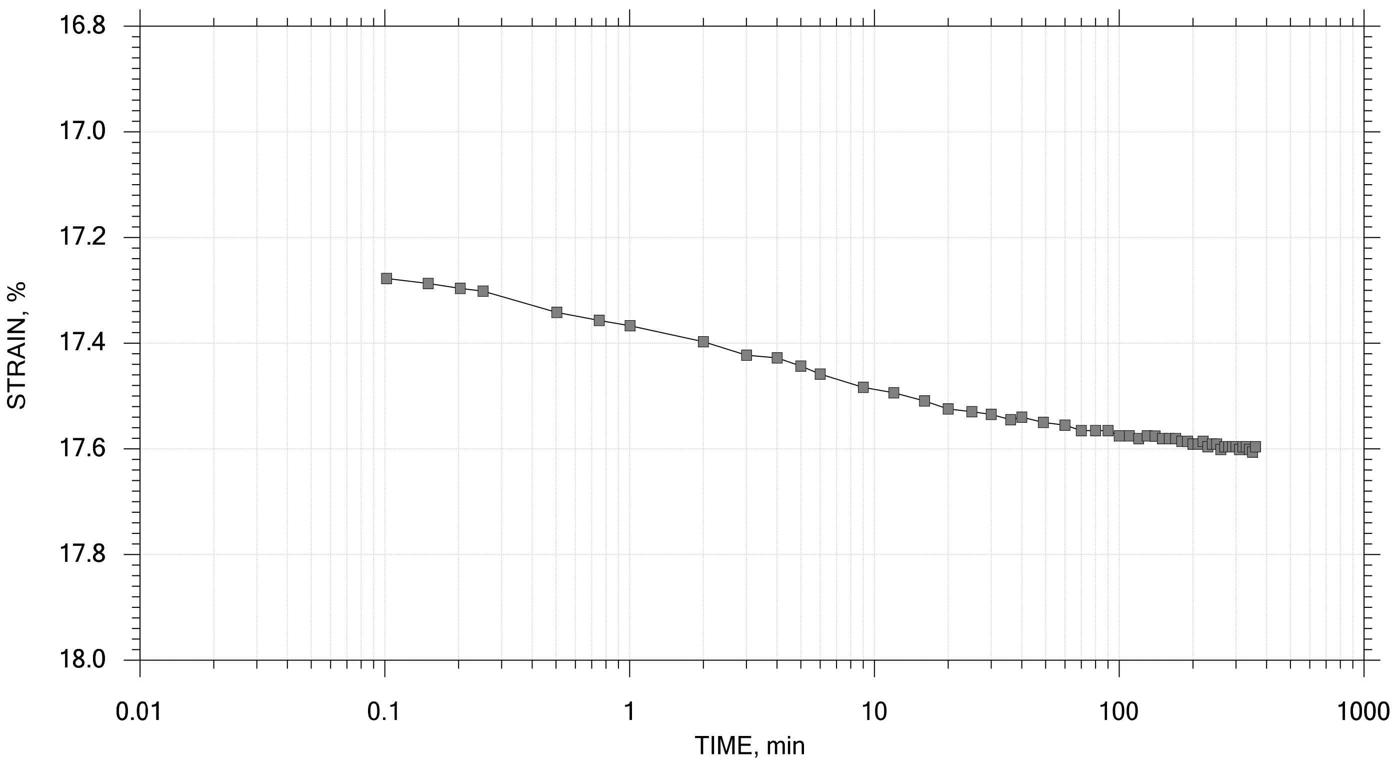
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

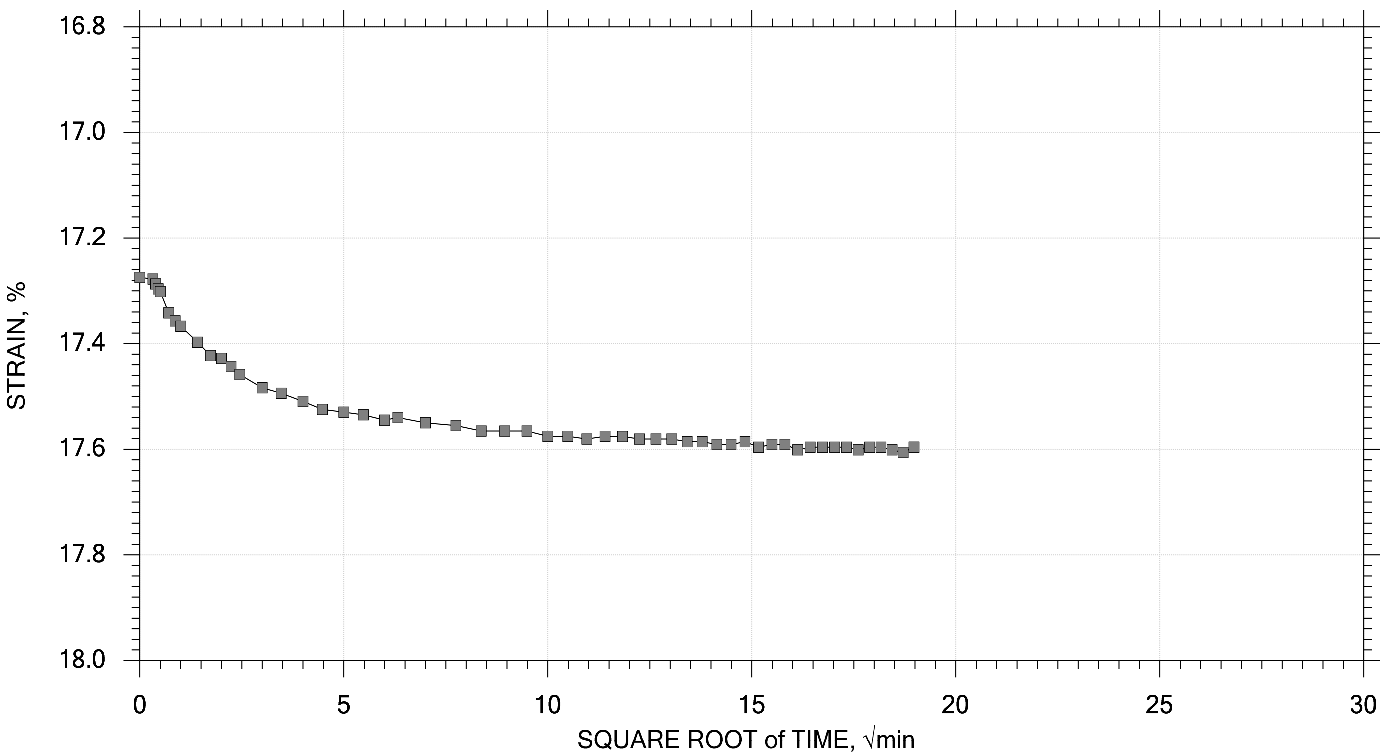
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





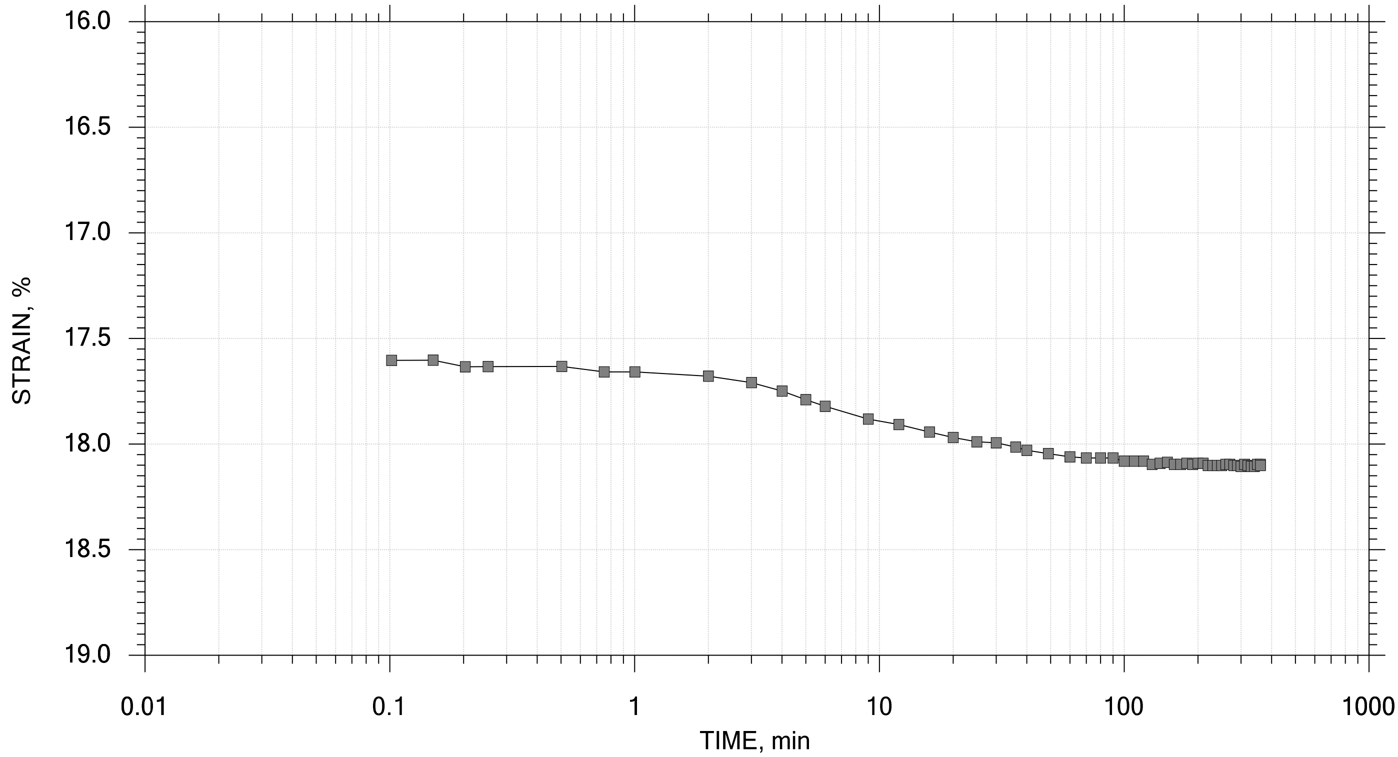
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

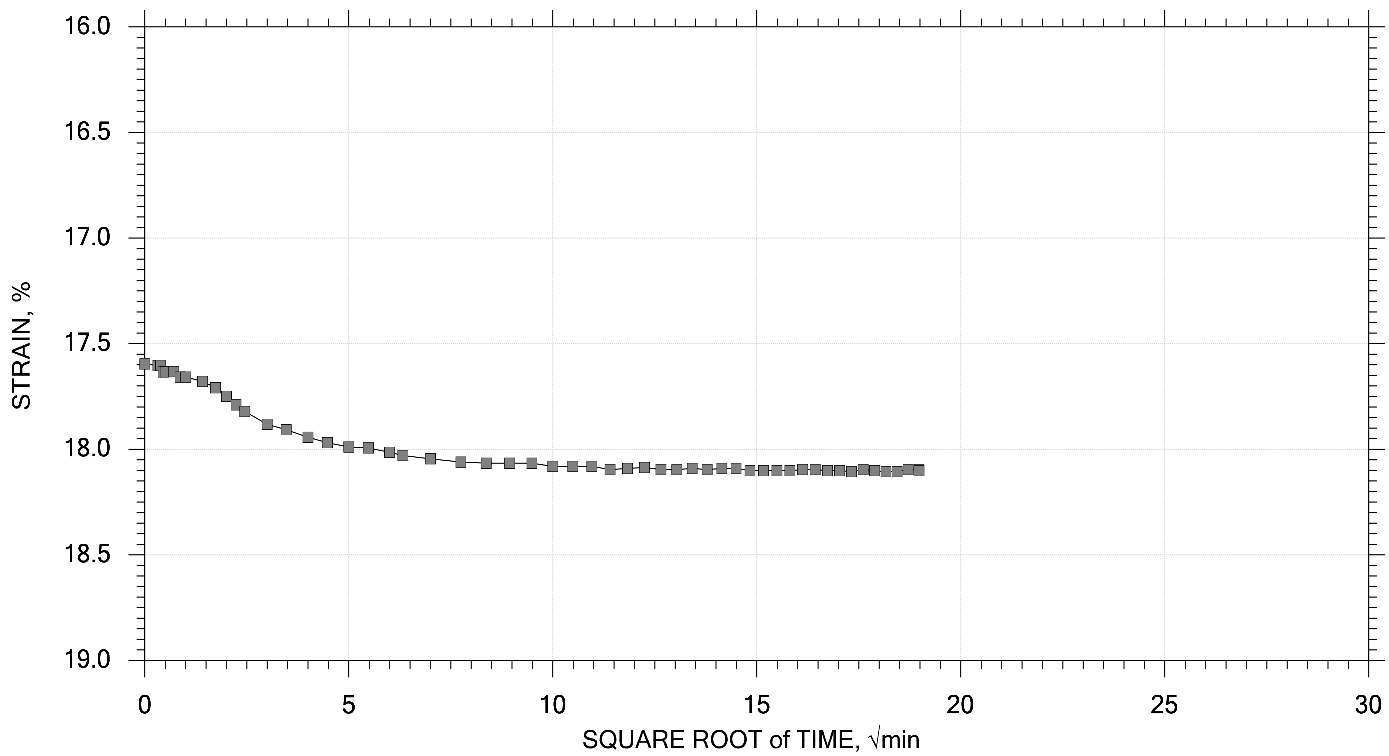
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





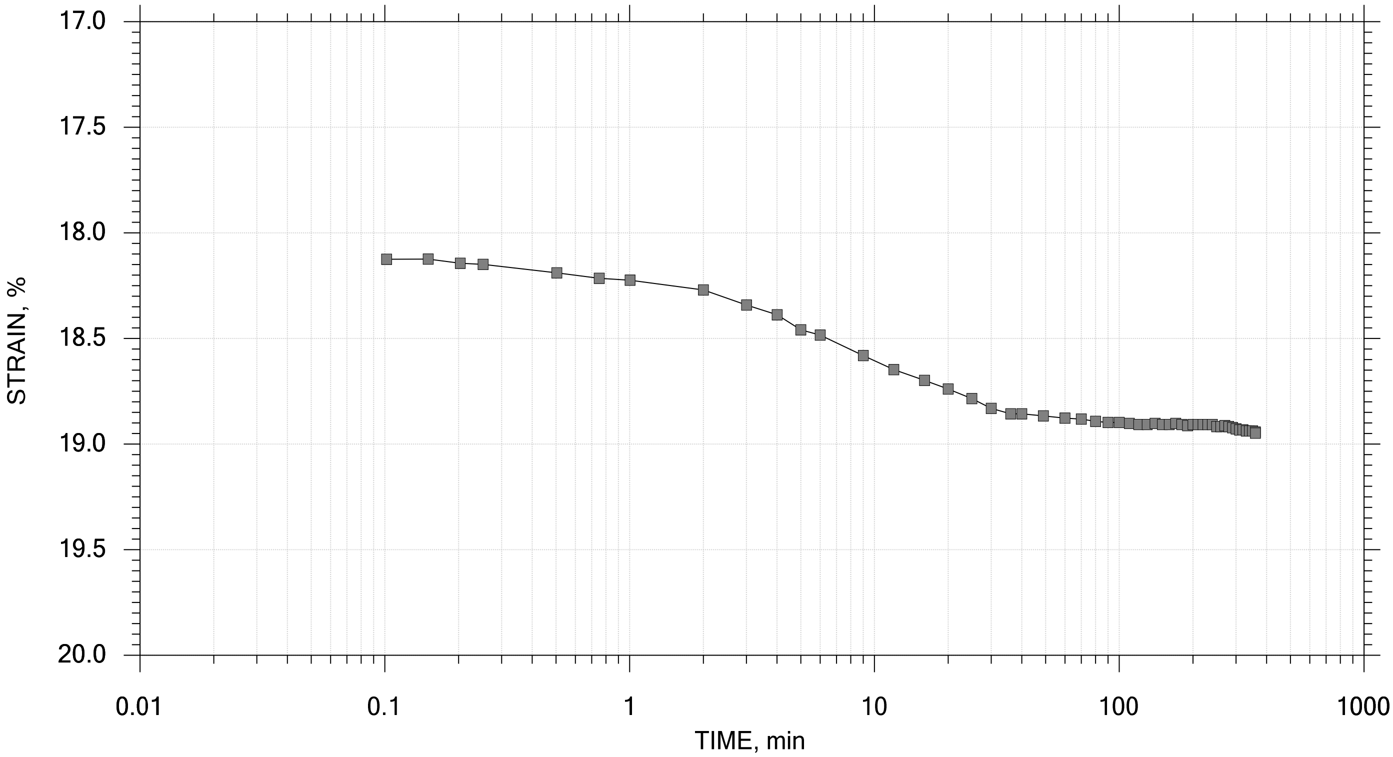
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

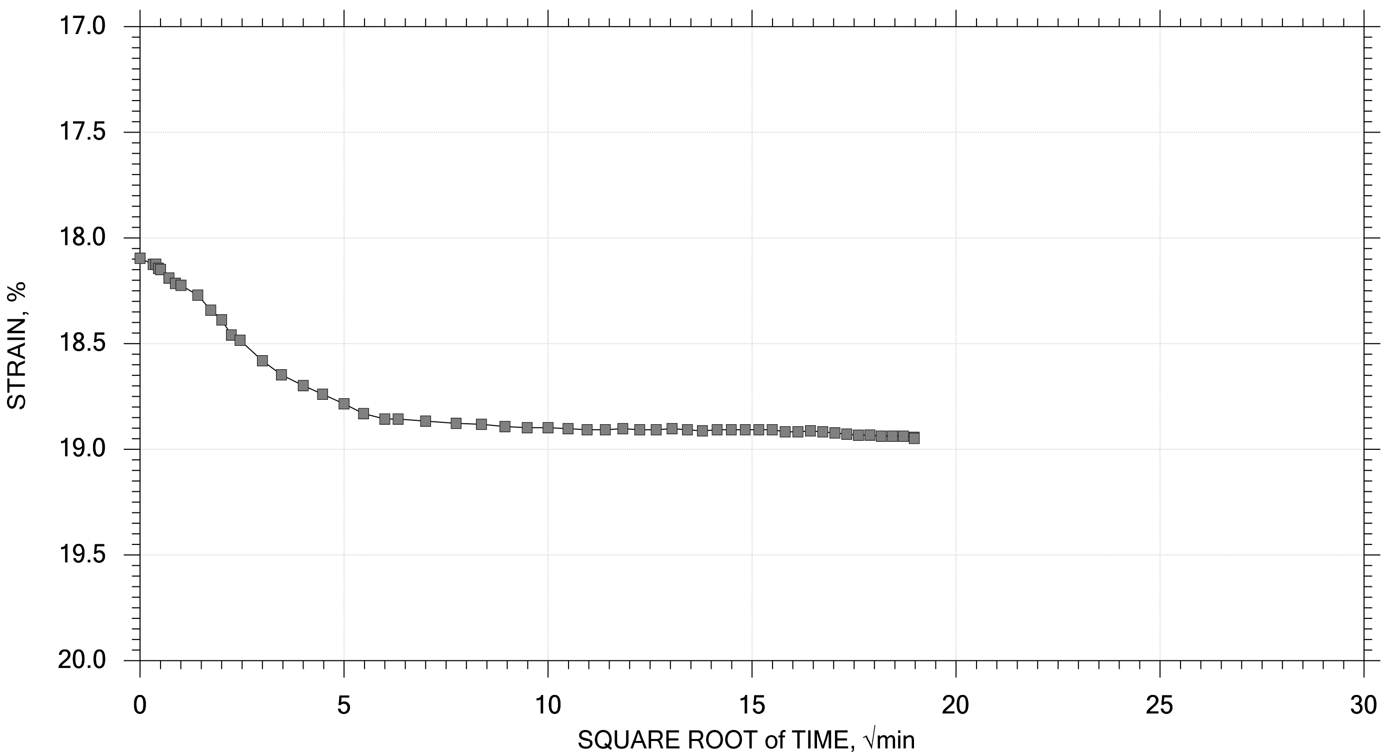
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





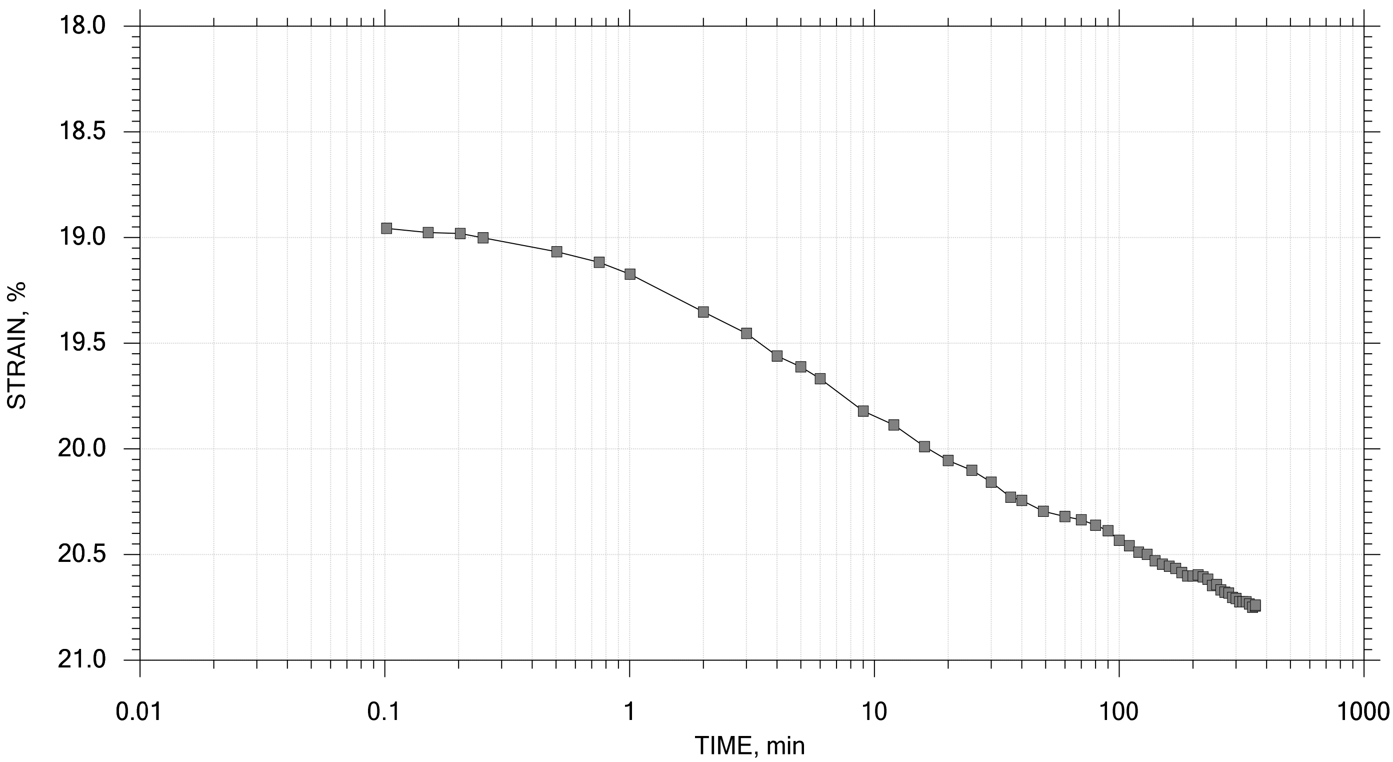
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

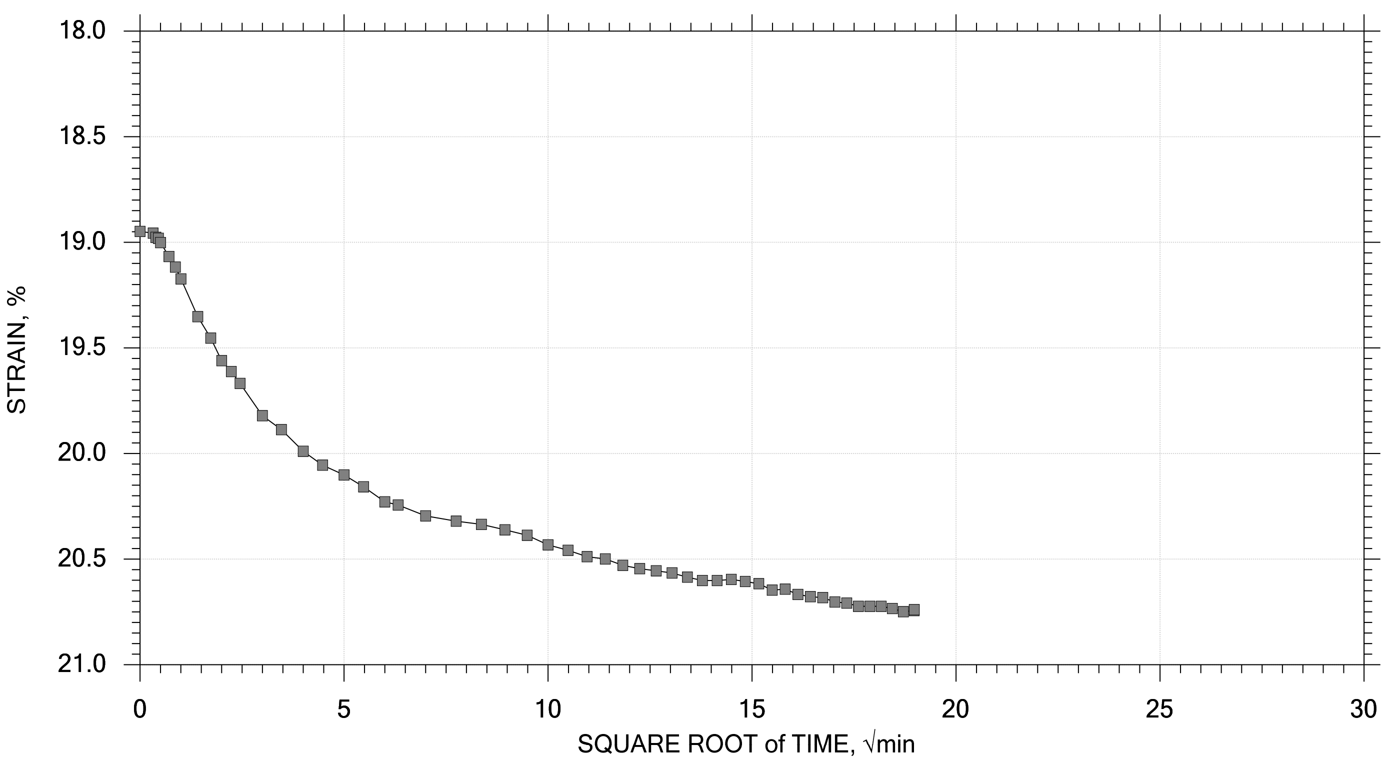
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





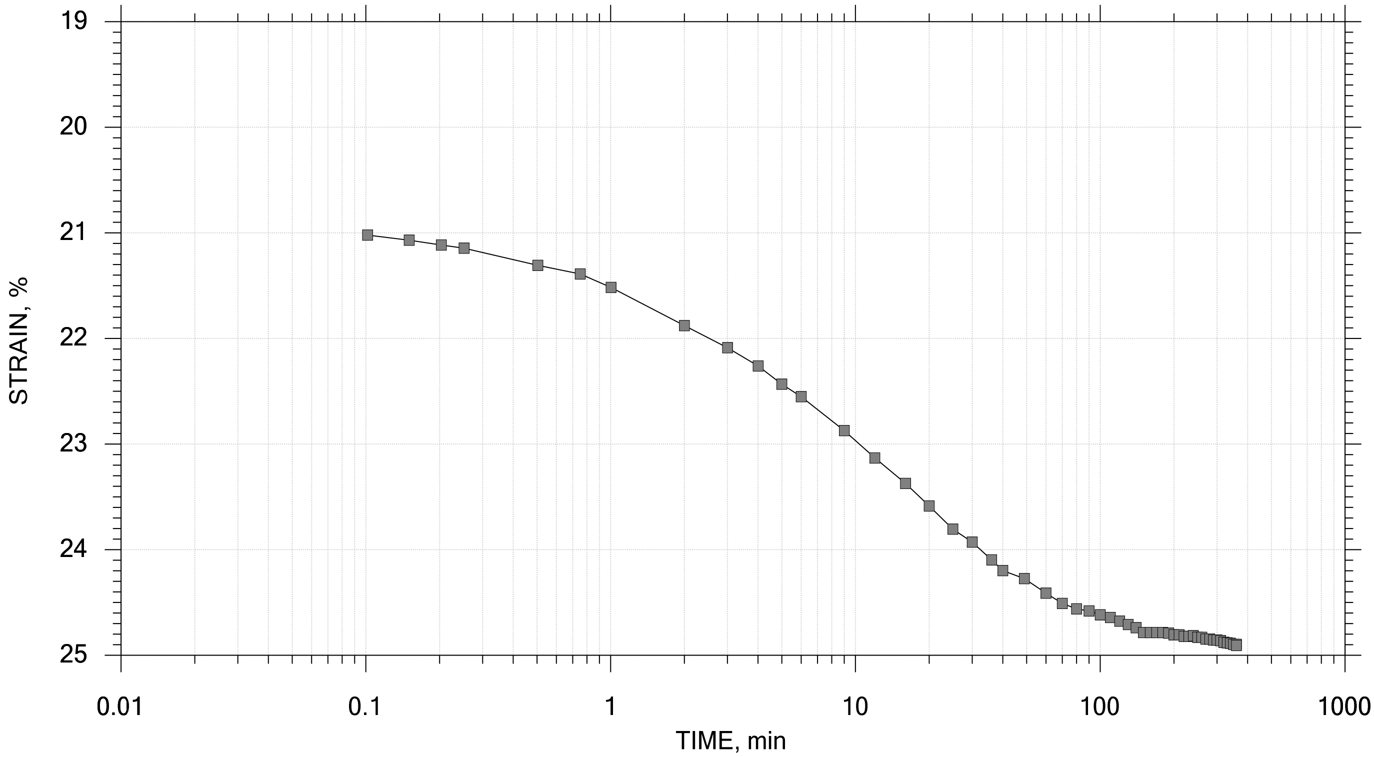
GeoTesting EXPRESS			
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

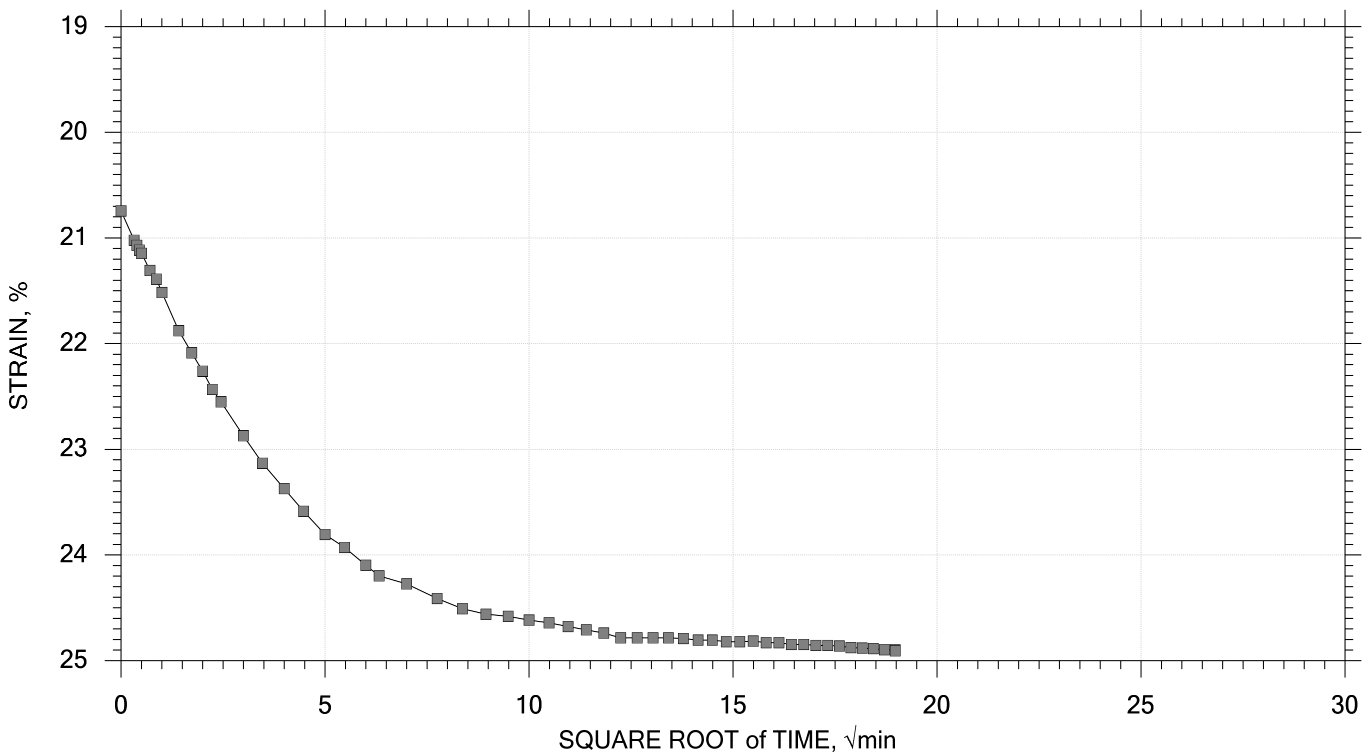
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf

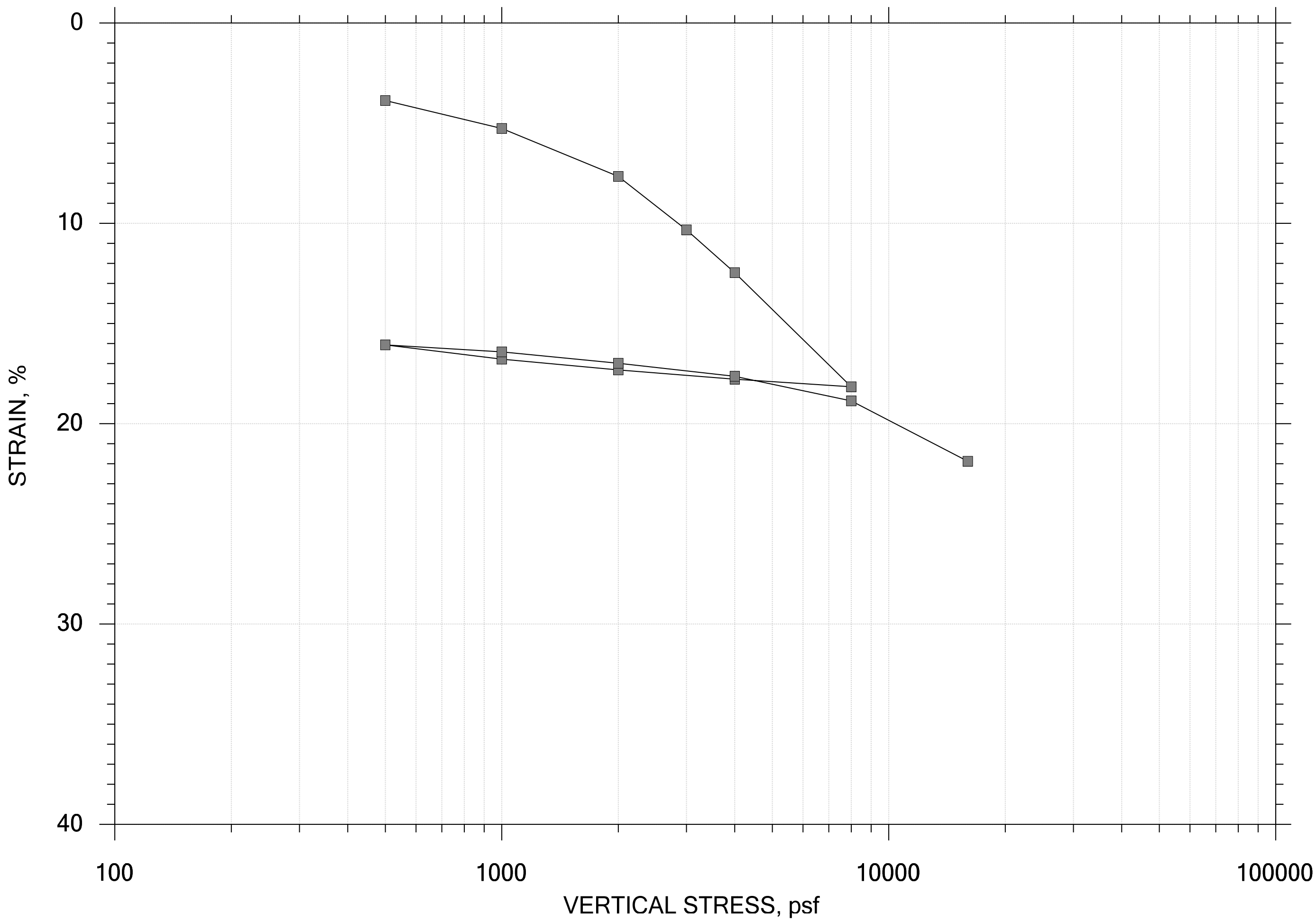


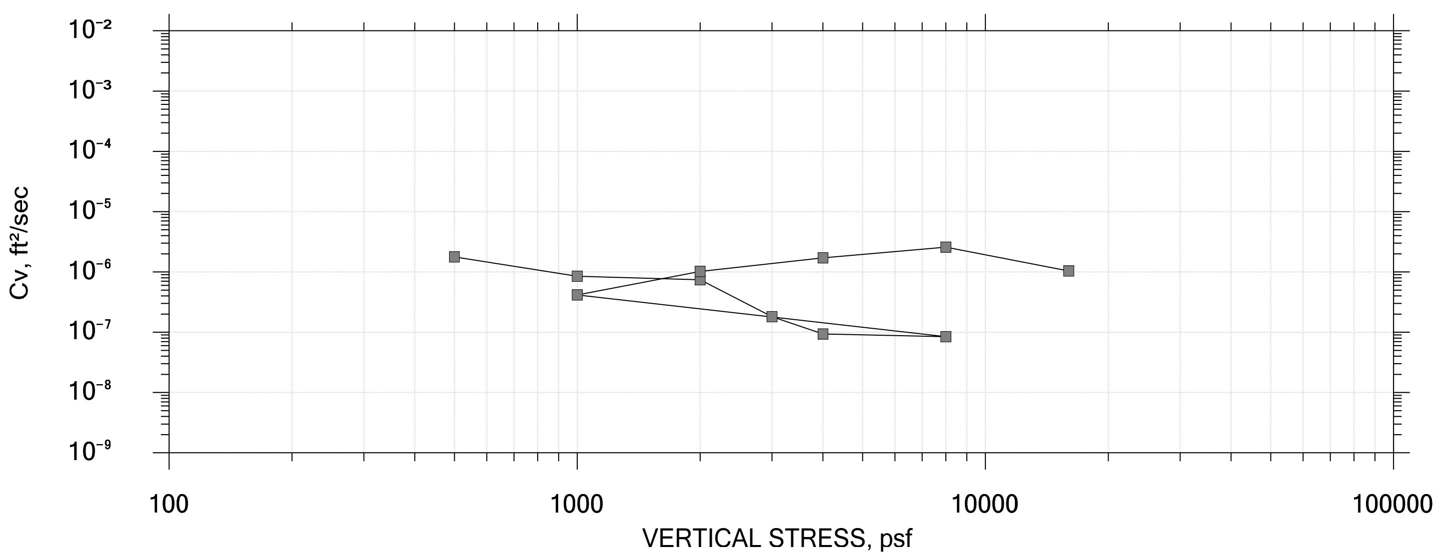


GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U2	Test Date: 08/01/18	Test No.: IP-5
	Depth: 45-47 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System T		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

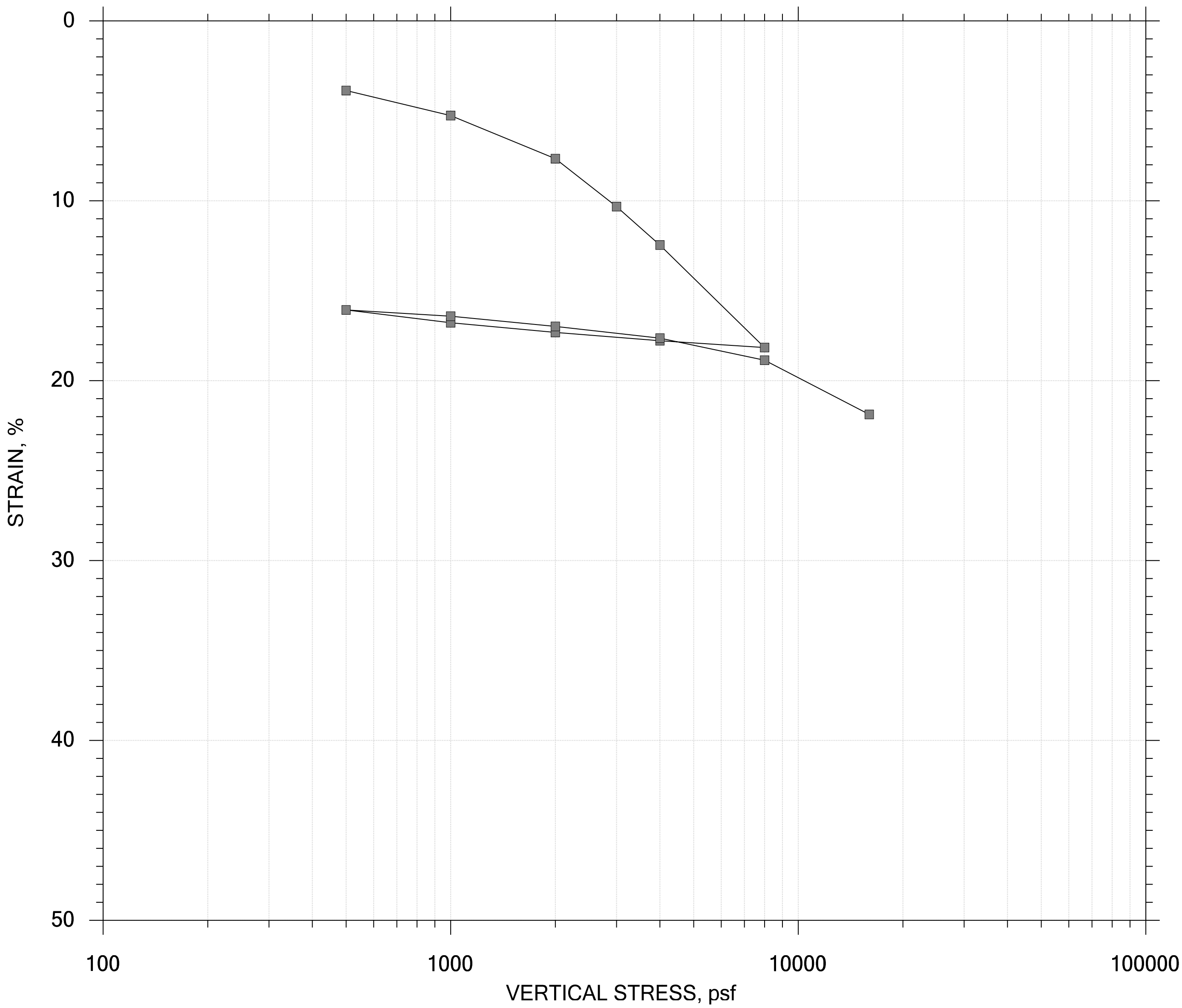




GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	43.72	27.72
Preconsolidation Stress: ---				Dry Unit Weight, pcf	78.008	97.51
Compression Ratio: ---				Saturation, %	99.98	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.20	0.76
LL: 31	PL: 19	PI: 12	GS: 2.75			

Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
Depth: 55-57 ft	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System O		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Location: Phs 2 South Portland, ME
Project No.: GTX-307957
Boring No.: HB-EXIT 45-211
Tested By: md
Checked By: njh
Sample No.: U3
Test Date: 08/01/18
Depth: 55-57 ft
Test No.: IP-6
Sample Type: intact
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System O

Estimated Specific Gravity: 2.75
Liquid Limit: 31
Specimen Diameter: 2.50 in
Initial Void Ratio: 1.20
Plastic Limit: 19
Initial Height: 1.00 in
Final Void Ratio: 0.764
Plasticity Index: 12
Final Height: 0.80 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	A-1354	RING		A-1464
Wt. Container + Wet Soil, gm	112.55	254.64	238.56	137.64
Wt. Container + Dry Soil, gm	81.120	210.70	210.70	109.63
Wt. Container, gm	8.4700	110.18	110.18	8.5900
Wt. Dry Soil, gm	72.650	100.52	100.52	101.04
Water Content, %	43.26	43.72	27.72	27.72
Void Ratio	---	1.20	0.764	---
Degree of Saturation, %	---	99.98	100.00	---
Dry Unit Weight, pcf	---	78.008	97.510	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: MeTPK Exit 45 Reconfiguration
Boring No.: HB-EXIT 45-211
Sample No.: U3
Test No.: IP-6

Location: Phs 2 South Portland, ME
Tested By: md
Test Date: 08/01/18
Sample Type: intact

Project No.: GTX-307957
Checked By: njh
Depth: 55-57 ft
Elevation: ---

Soil Description: Wet, dark gray clay
Remarks: System O

Displacement at End of Increment

	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/psf	k ft/day
1	500.	0.03865	1.12	3.87	14.162	1.67e-006	7.73e-005	6.95e-004
2	1.00e+003	0.05261	1.09	5.26	22.567	9.90e-007	2.79e-005	1.49e-004
3	2.00e+003	0.07657	1.04	7.66	32.413	6.62e-007	2.40e-005	8.56e-005
4	3.00e+003	0.1032	0.977	10.3	145.674	1.40e-007	2.67e-005	2.01e-005
5	4.00e+003	0.1246	0.930	12.5	233.526	8.25e-008	2.13e-005	9.49e-006
6	8.00e+003	0.1815	0.804	18.2	1050.003	1.68e-008	1.42e-005	1.29e-006
7	4.00e+003	0.1778	0.813	17.8	2.687	6.15e-006	9.38e-007	3.11e-005
8	2.00e+003	0.1731	0.823	17.3	5.673	2.94e-006	2.33e-006	3.69e-005
9	1.00e+003	0.1678	0.835	16.8	24.902	6.78e-007	5.37e-006	1.96e-005
10	500.	0.1607	0.850	16.1	91.511	1.87e-007	1.42e-005	1.43e-005
11	1.00e+003	0.1642	0.843	16.4	60.001	2.87e-007	6.97e-006	1.08e-005
12	2.00e+003	0.1698	0.830	17.0	18.532	9.19e-007	5.67e-006	2.81e-005
13	4.00e+003	0.1763	0.816	17.6	9.786	1.71e-006	3.24e-006	3.00e-005
14	8.00e+003	0.1886	0.789	18.9	9.008	1.82e-006	3.07e-006	3.02e-005
15	1.60e+004	0.2188	0.722	21.9	16.293	9.55e-007	3.77e-006	1.94e-005

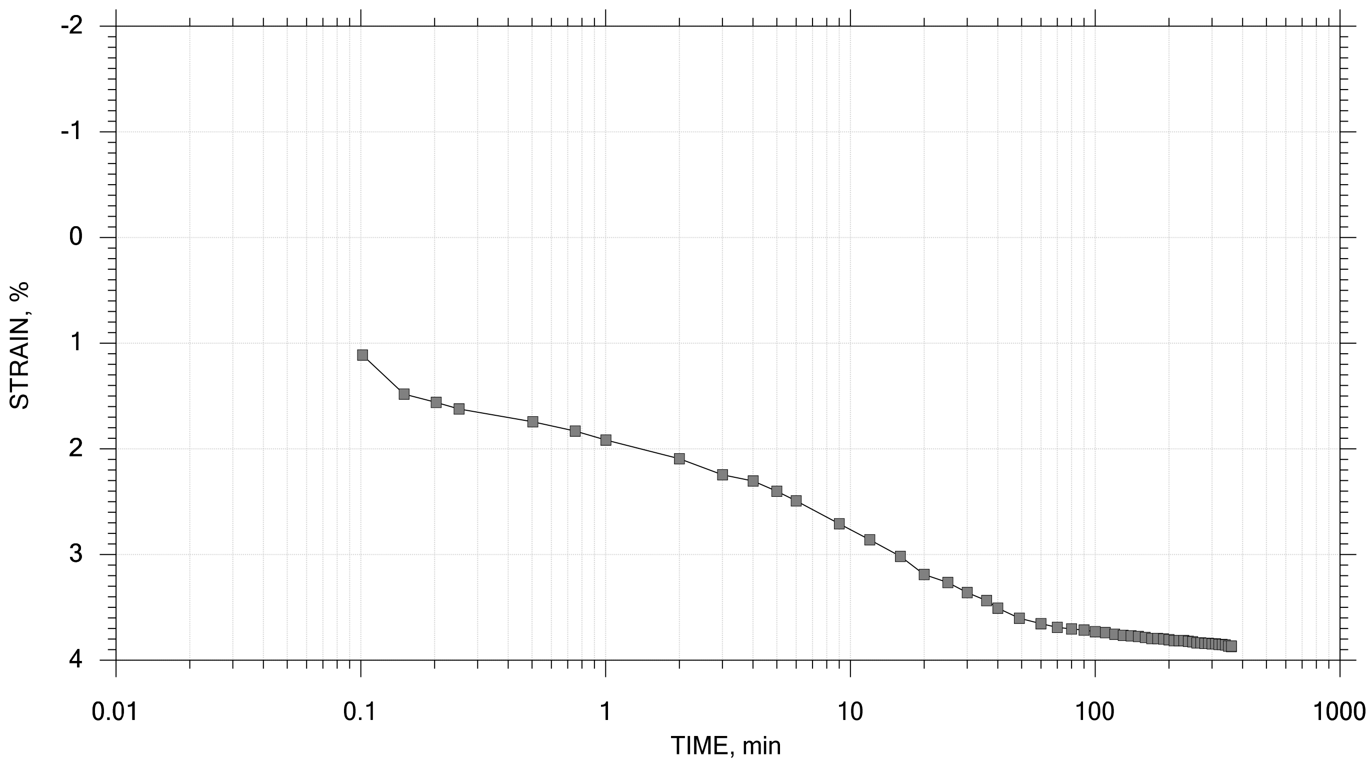
	Applied Stress psf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/psf	k ft/day	Ca %
1	500.	0.03865	1.12	3.87	0.000	0.00e+000	7.73e-005	0.00e+000	0.00e+000
2	1.00e+003	0.05261	1.09	5.26	6.645	7.81e-007	2.79e-005	1.18e-004	0.00e+000
3	2.00e+003	0.07657	1.04	7.66	6.454	7.73e-007	2.40e-005	9.99e-005	0.00e+000
4	3.00e+003	0.1032	0.977	10.3	0.000	0.00e+000	2.67e-005	0.00e+000	0.00e+000
5	4.00e+003	0.1246	0.930	12.5	0.000	0.00e+000	2.13e-005	0.00e+000	0.00e+000
6	8.00e+003	0.1815	0.804	18.2	0.000	0.00e+000	1.42e-005	0.00e+000	0.00e+000
7	4.00e+003	0.1778	0.813	17.8	0.000	0.00e+000	9.38e-007	0.00e+000	0.00e+000
8	2.00e+003	0.1731	0.823	17.3	0.000	0.00e+000	2.33e-006	0.00e+000	0.00e+000
9	1.00e+003	0.1678	0.835	16.8	0.000	0.00e+000	5.37e-006	0.00e+000	0.00e+000
10	500.	0.1607	0.850	16.1	0.000	0.00e+000	1.42e-005	0.00e+000	0.00e+000
11	1.00e+003	0.1642	0.843	16.4	0.000	0.00e+000	6.97e-006	0.00e+000	0.00e+000
12	2.00e+003	0.1698	0.830	17.0	0.000	0.00e+000	5.67e-006	0.00e+000	0.00e+000
13	4.00e+003	0.1763	0.816	17.6	0.000	0.00e+000	3.24e-006	0.00e+000	0.00e+000
14	8.00e+003	0.1886	0.789	18.9	1.378	2.77e-006	3.07e-006	4.59e-005	0.00e+000
15	1.60e+004	0.2188	0.722	21.9	3.646	9.91e-007	3.77e-006	2.02e-005	0.00e+000

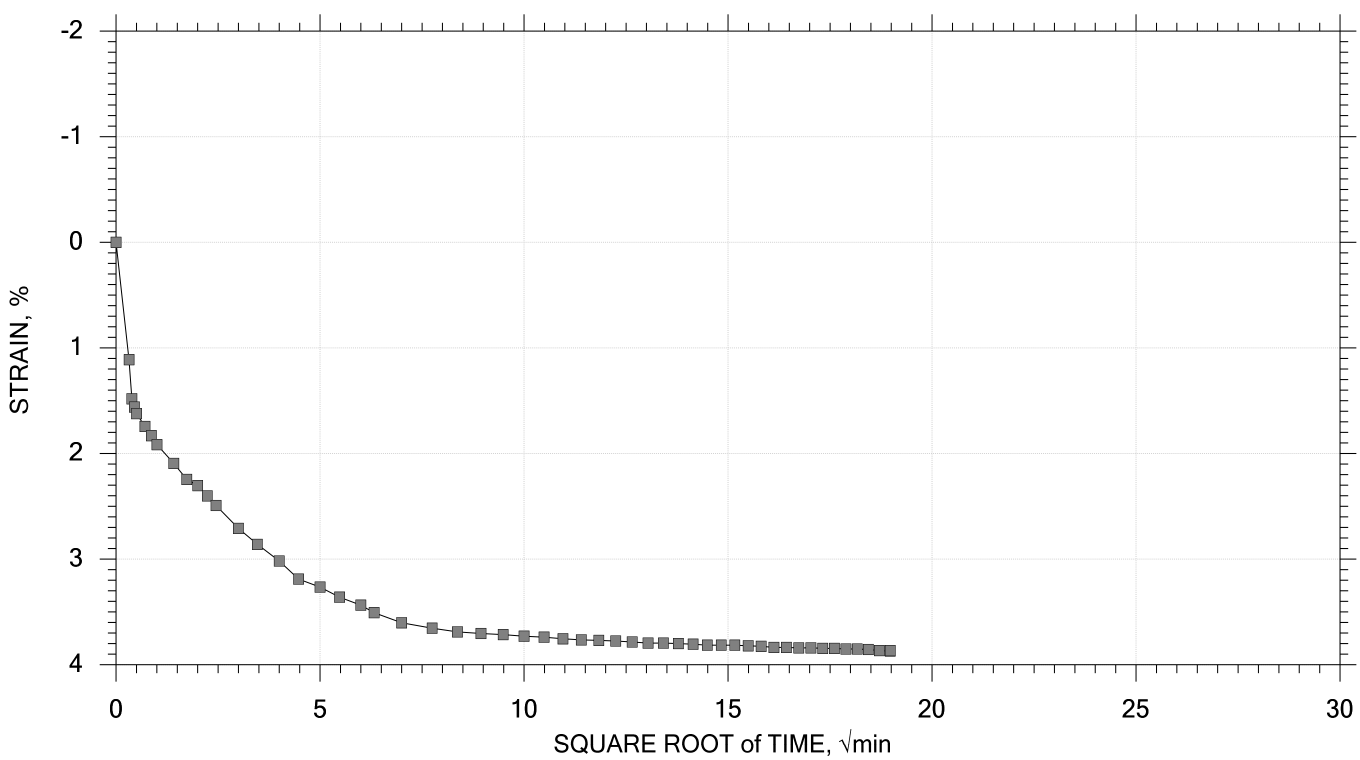
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 1 of 15

Stress: 500 psf





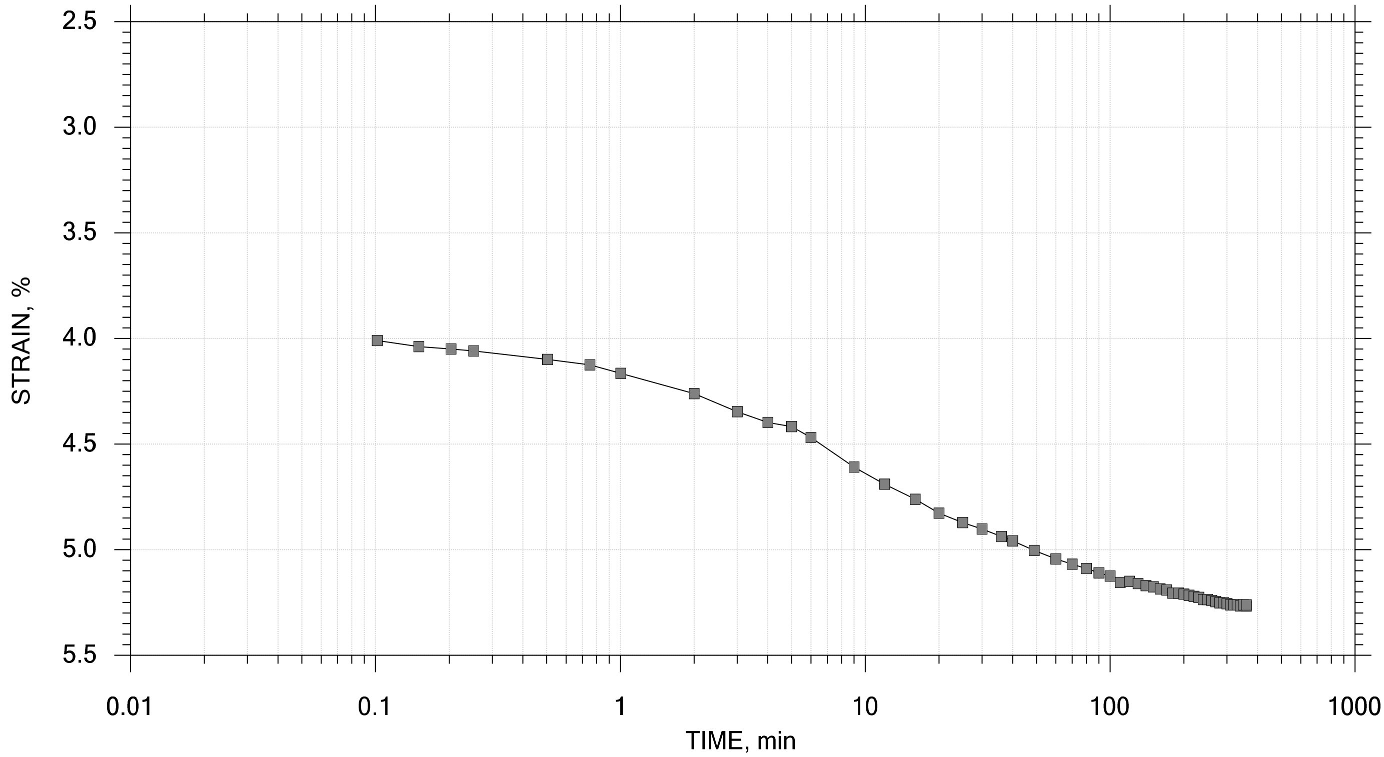
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

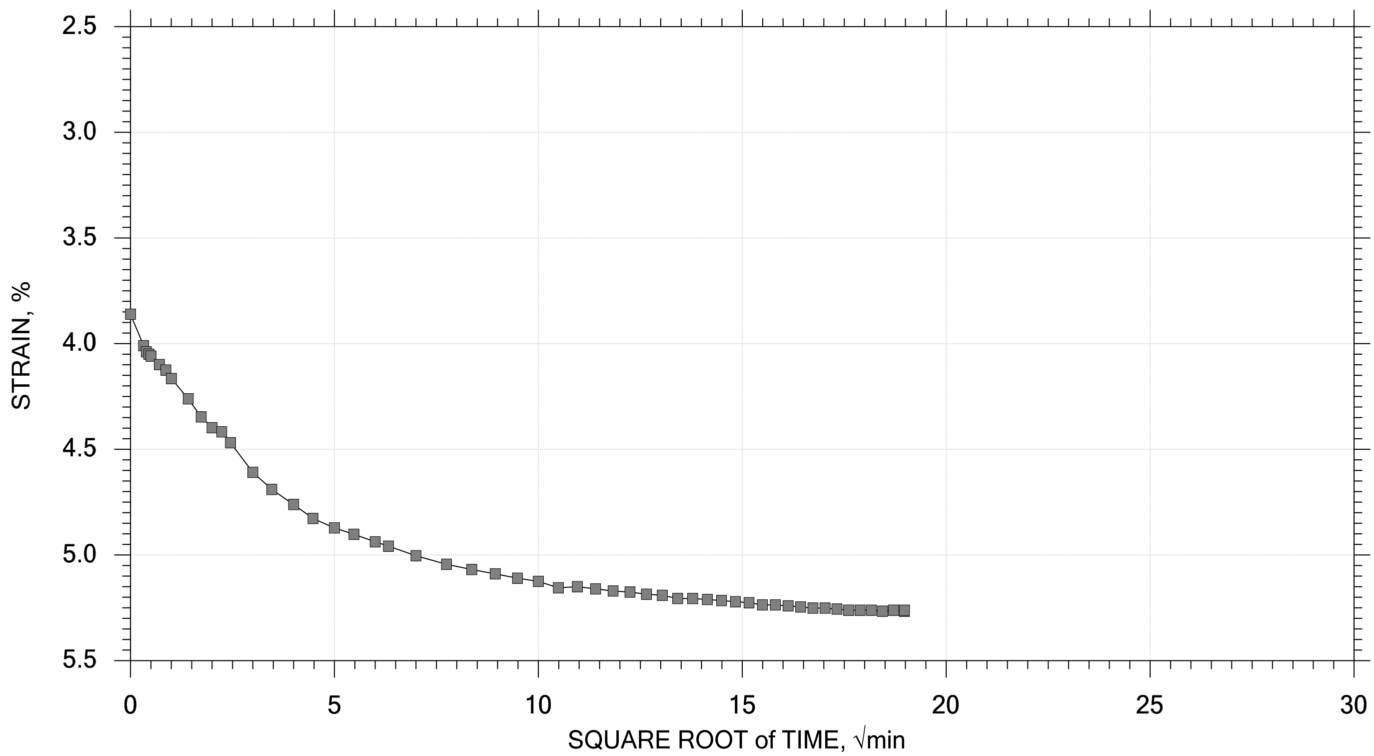
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 1000 psf





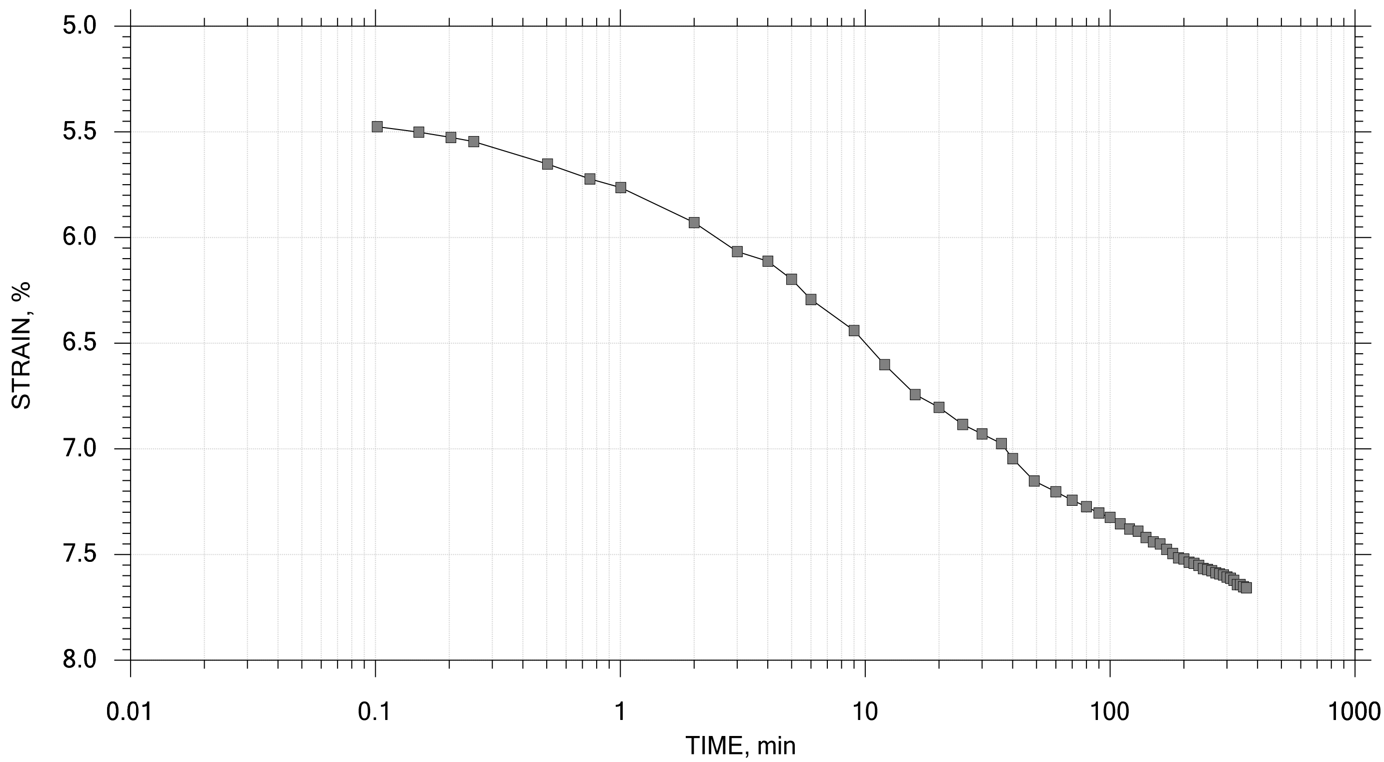
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

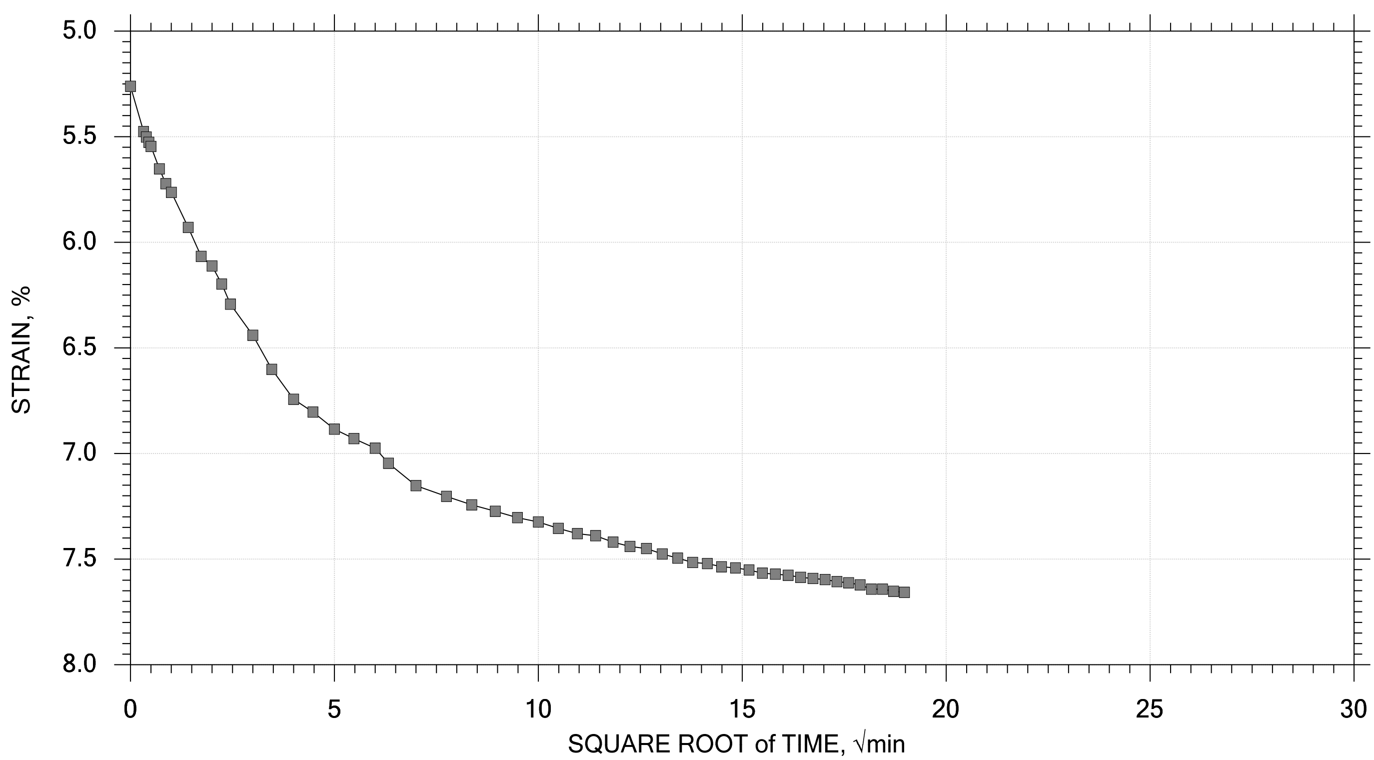
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 2000 psf





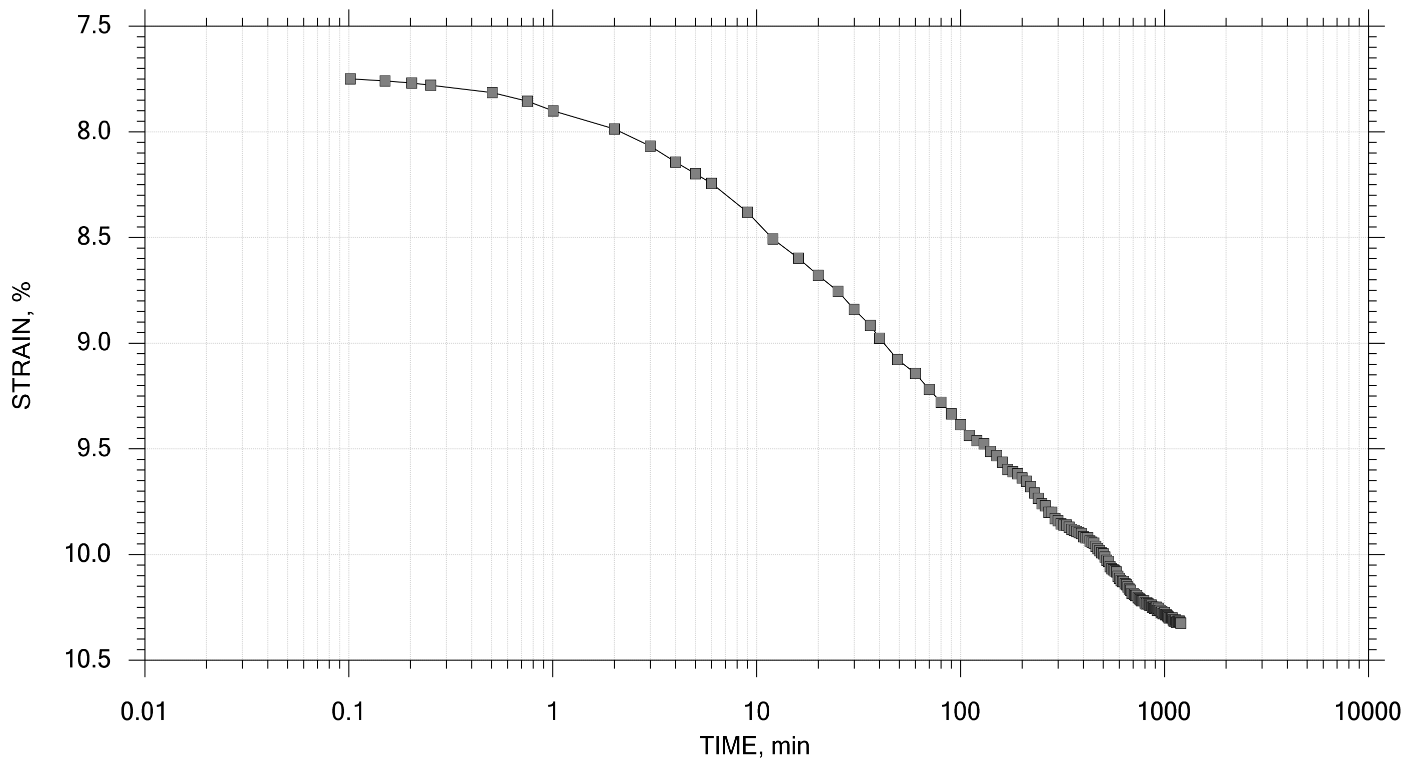
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

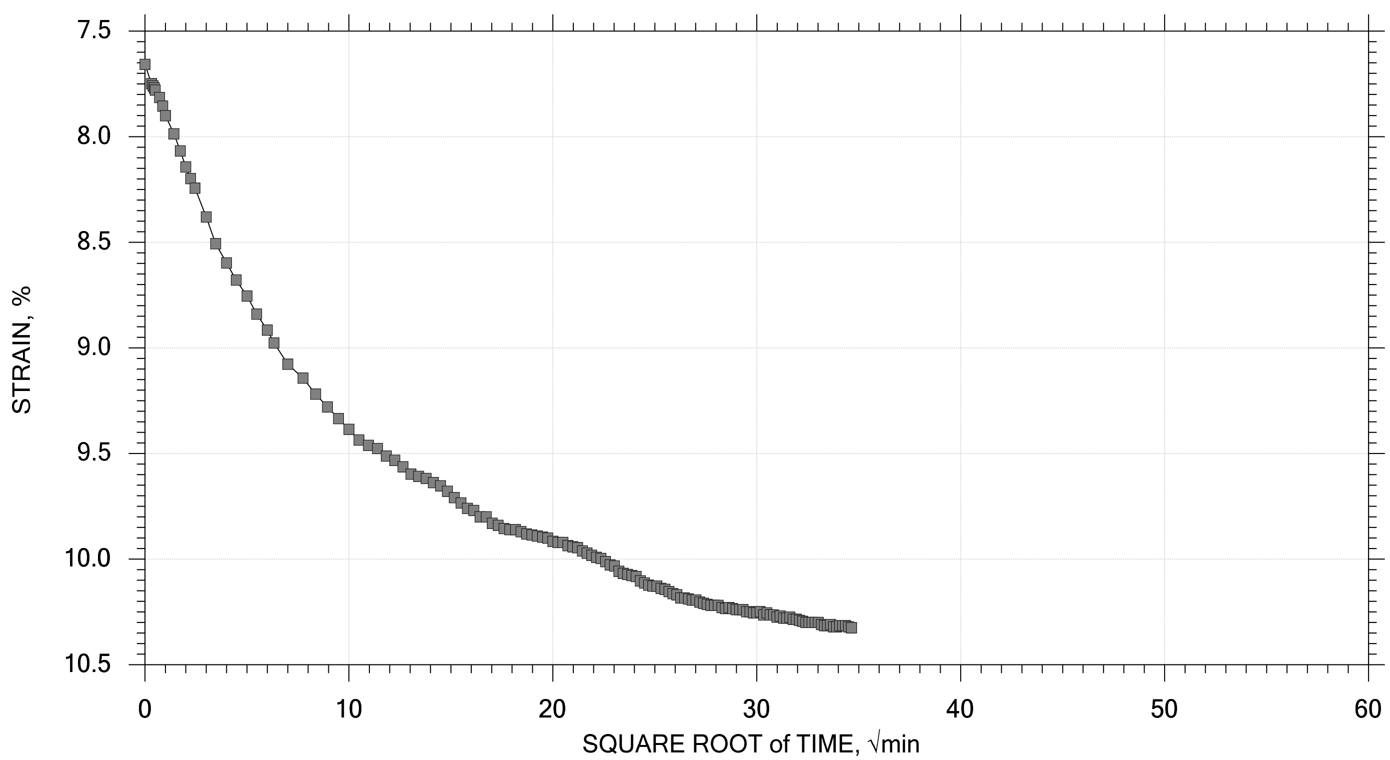
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 3000 psf





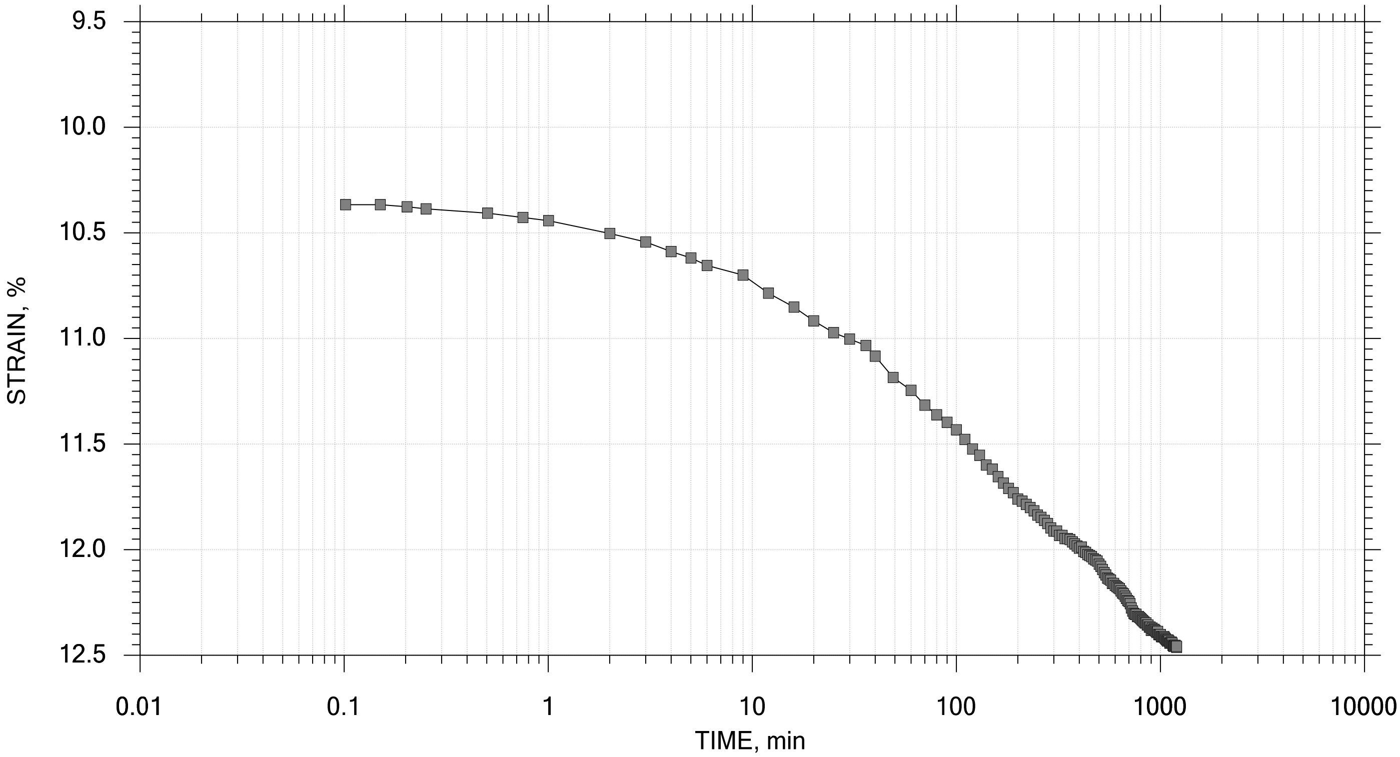
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

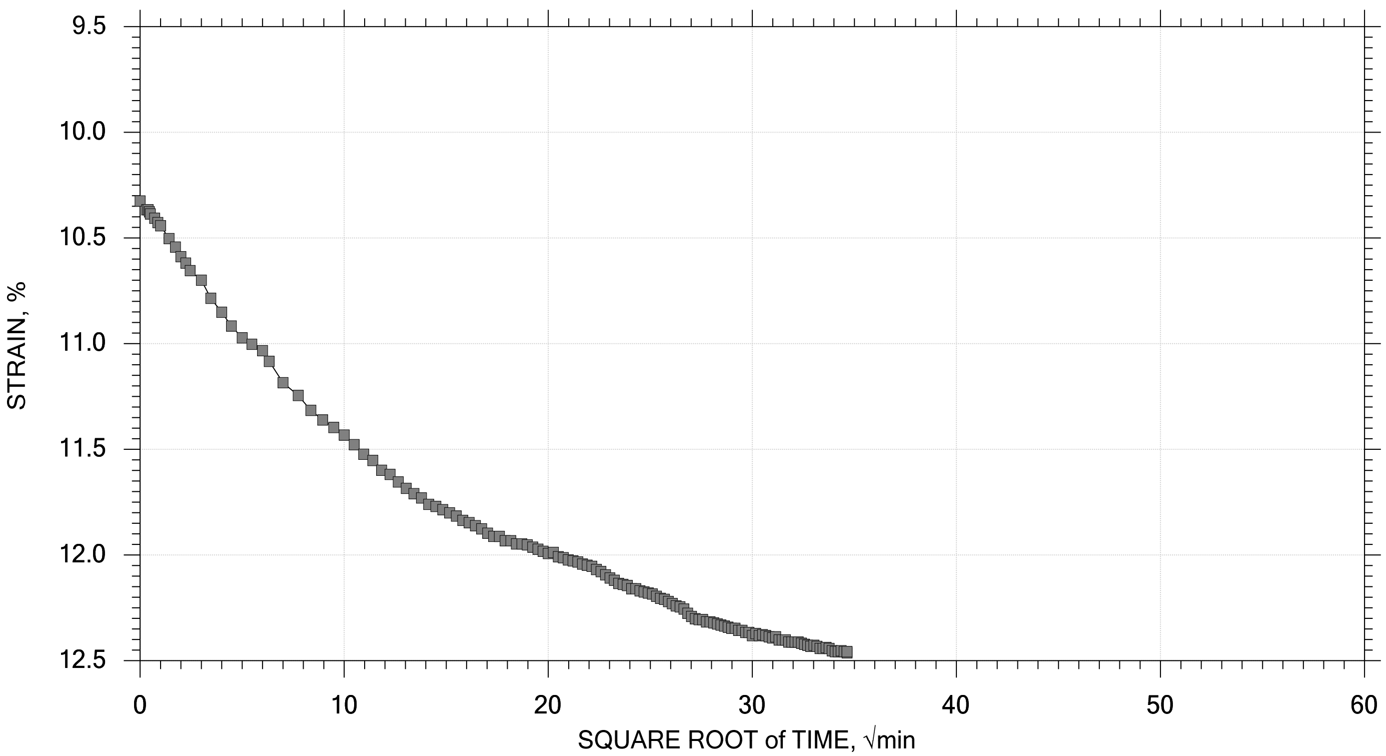
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 4000 psf





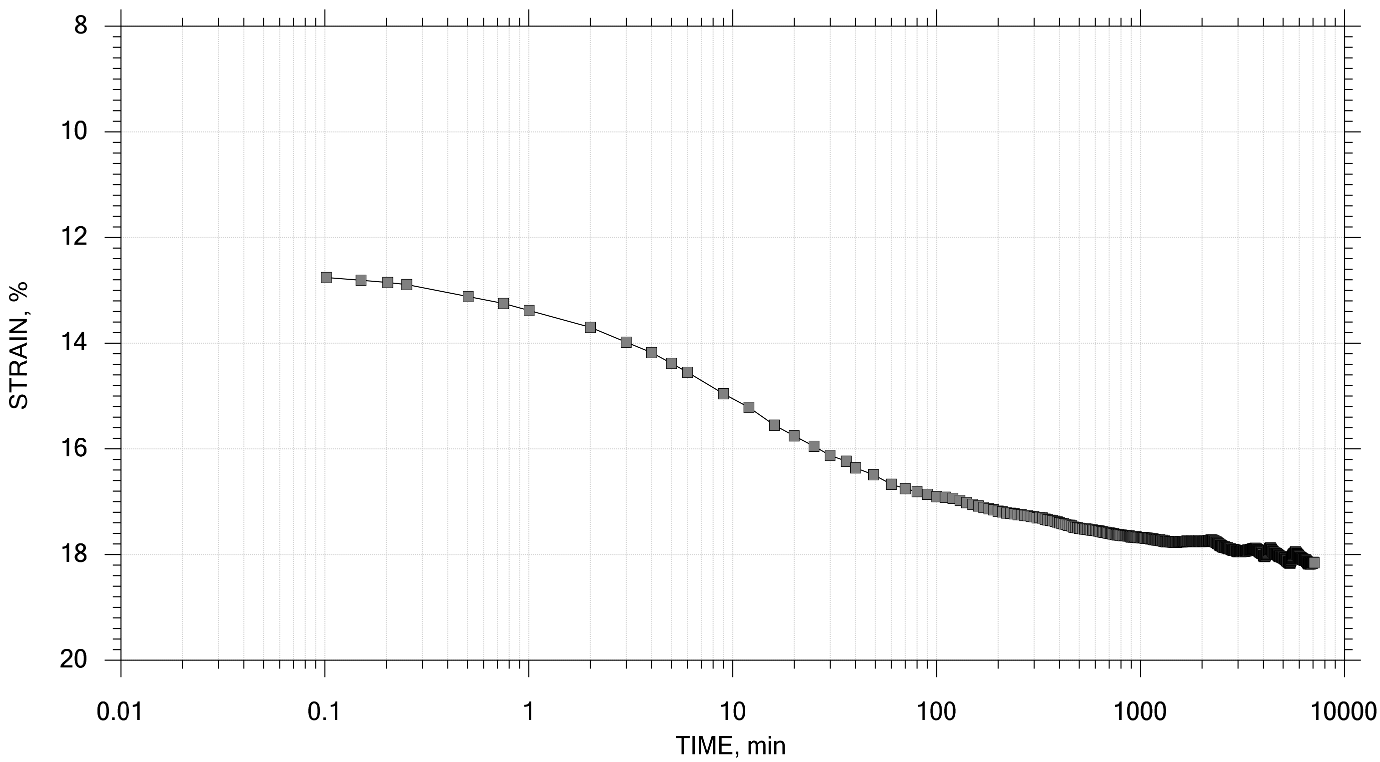
	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
GeoTesting EXPRESS	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

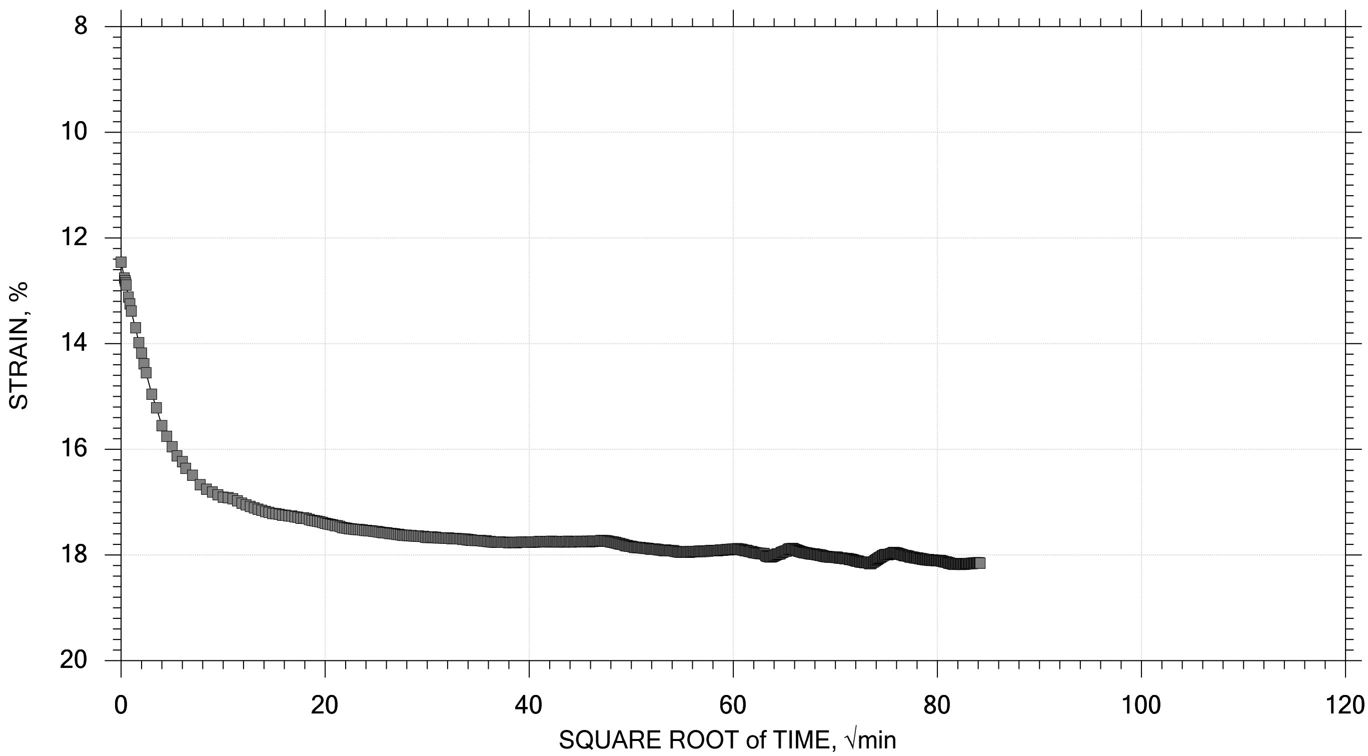
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 8000 psf





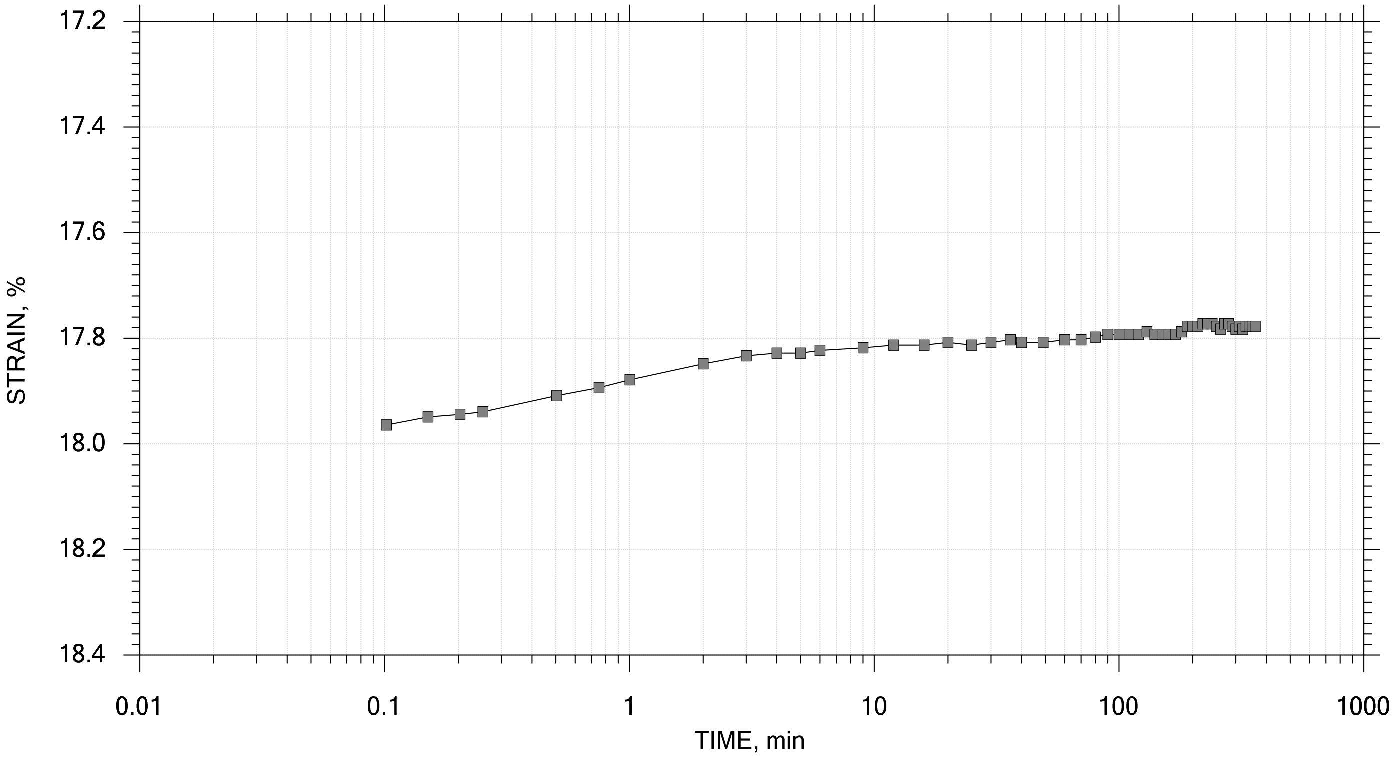
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

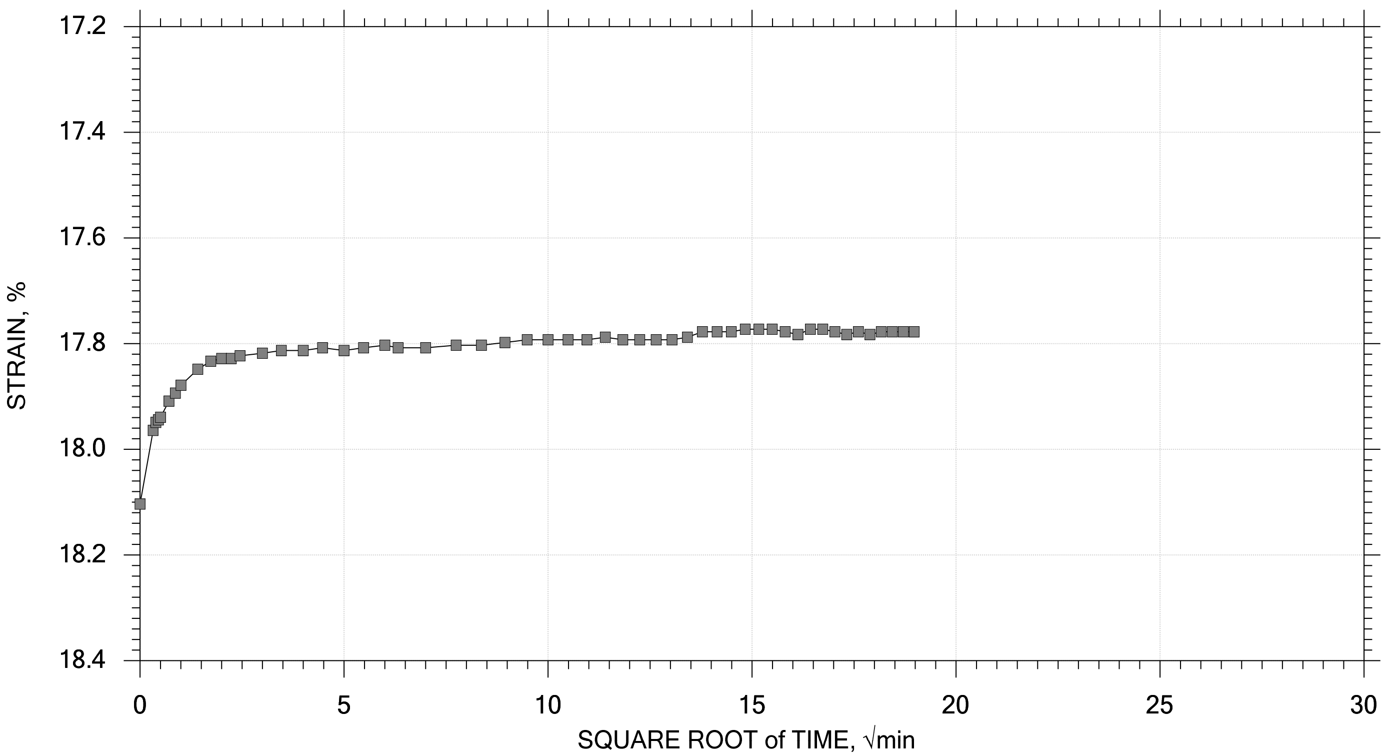
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4000 psf





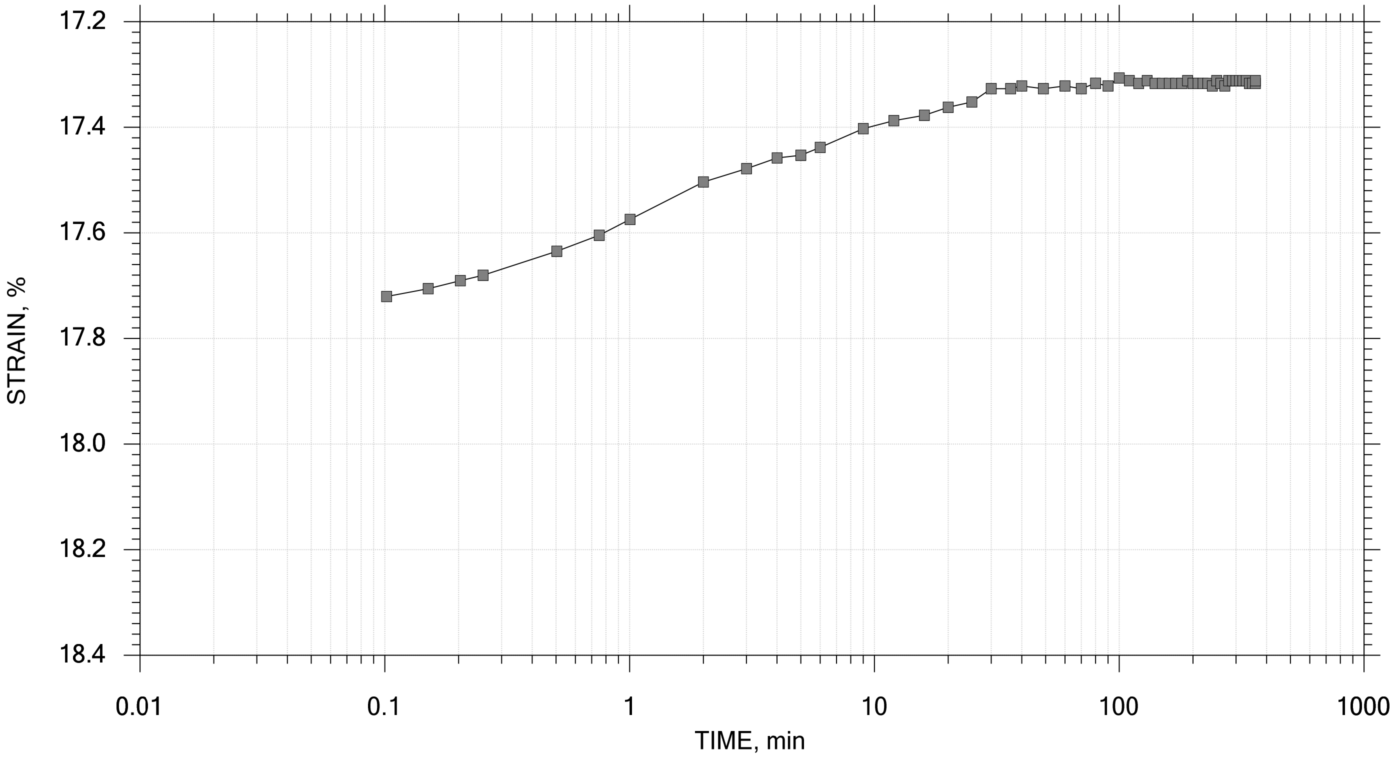
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

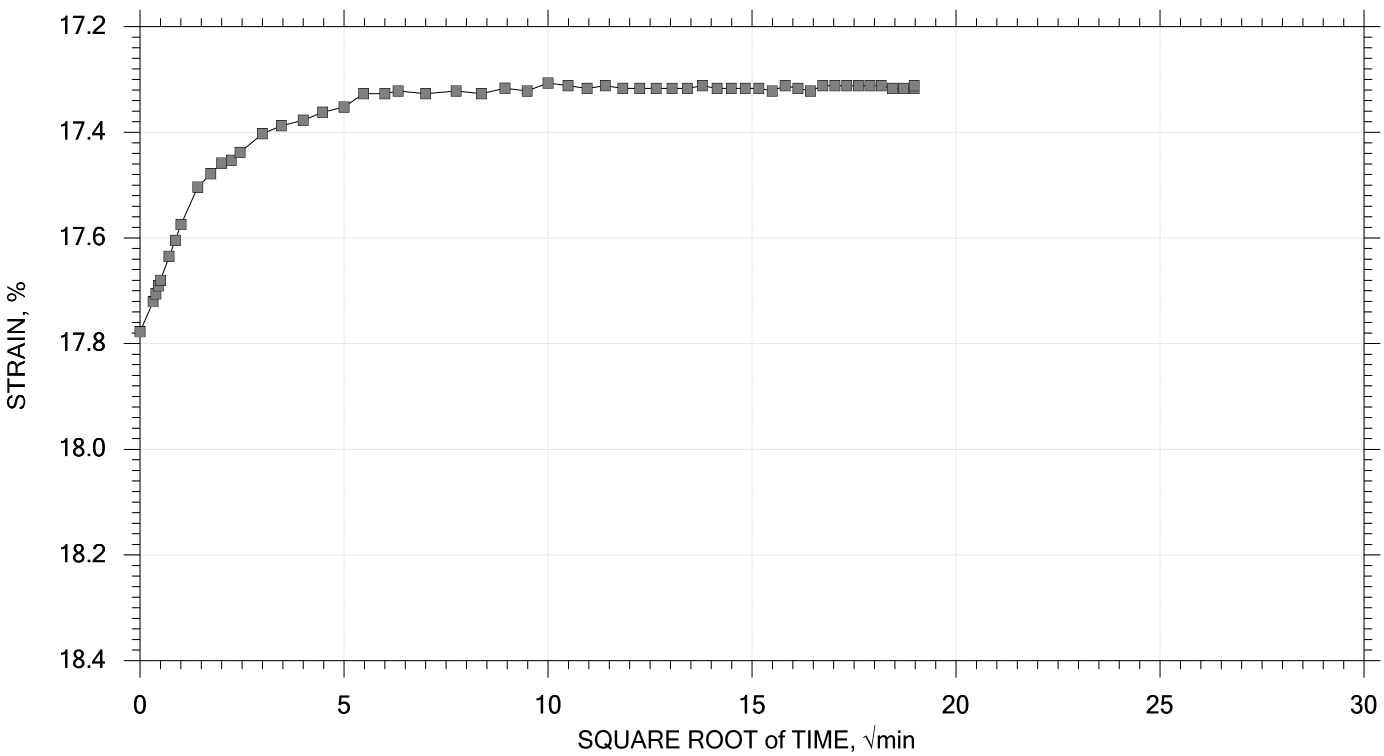
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 2000 psf





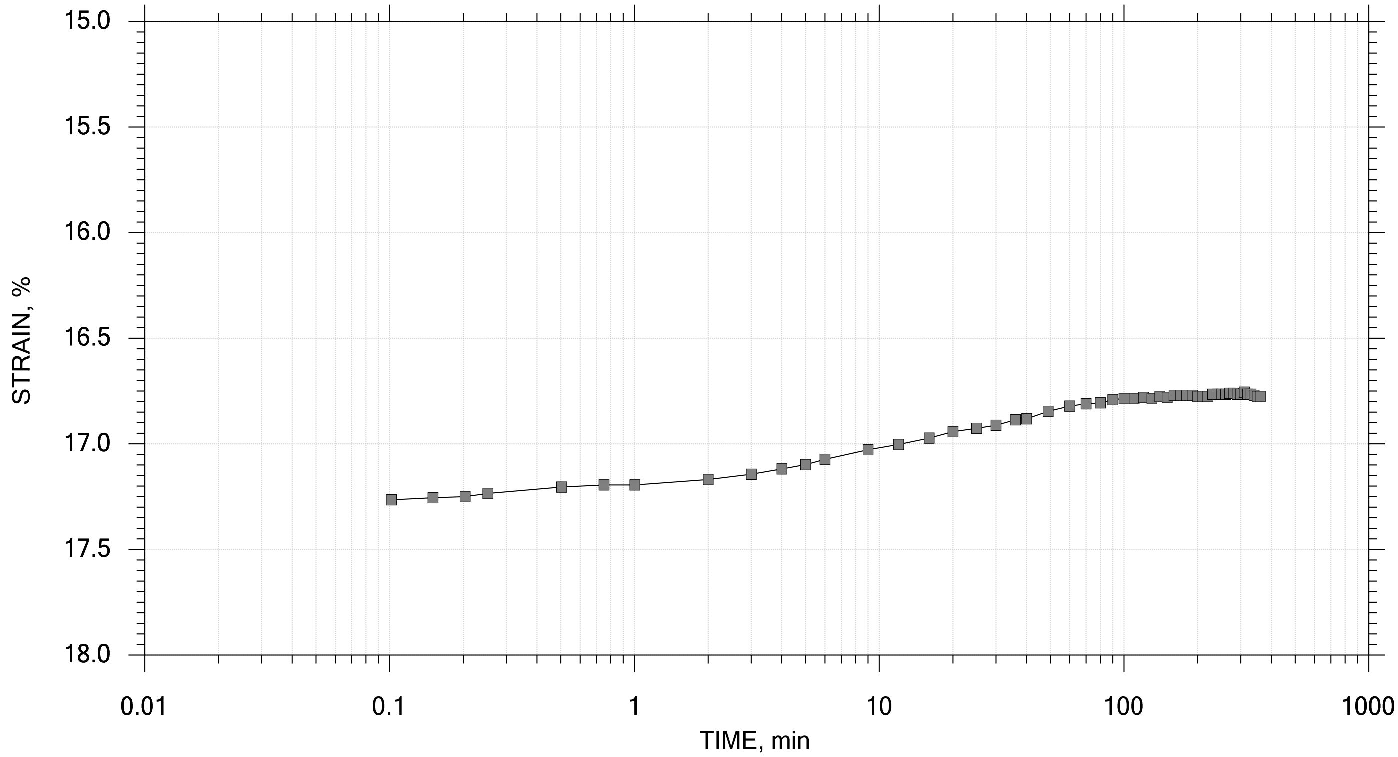
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

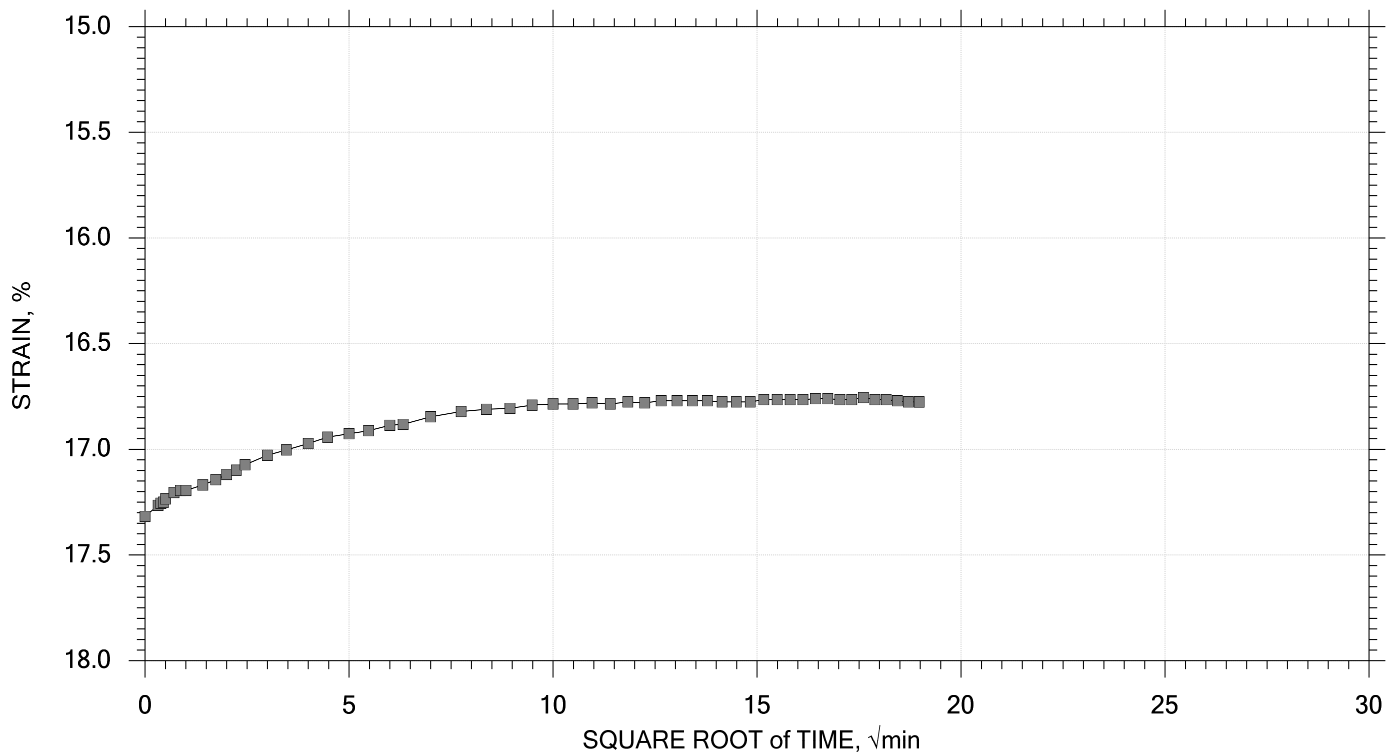
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 1000 psf





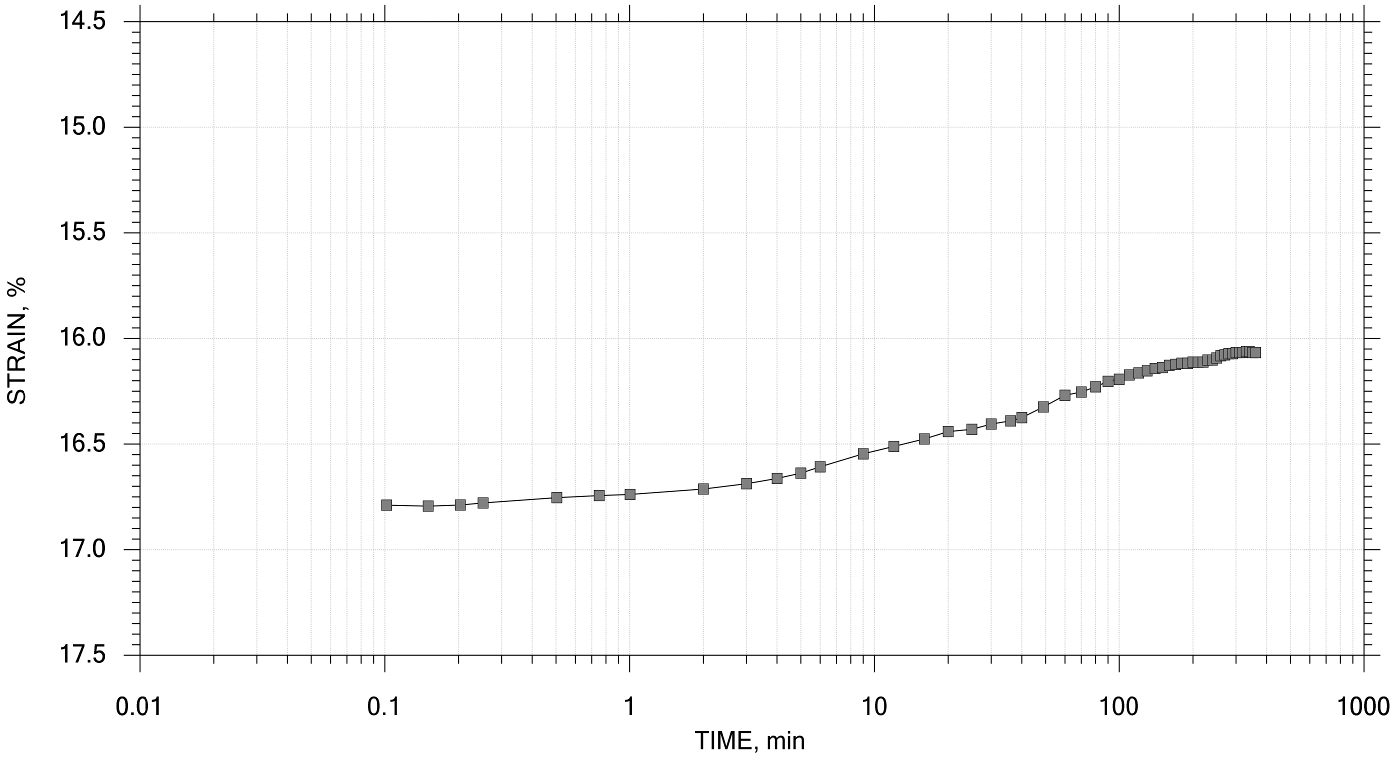
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

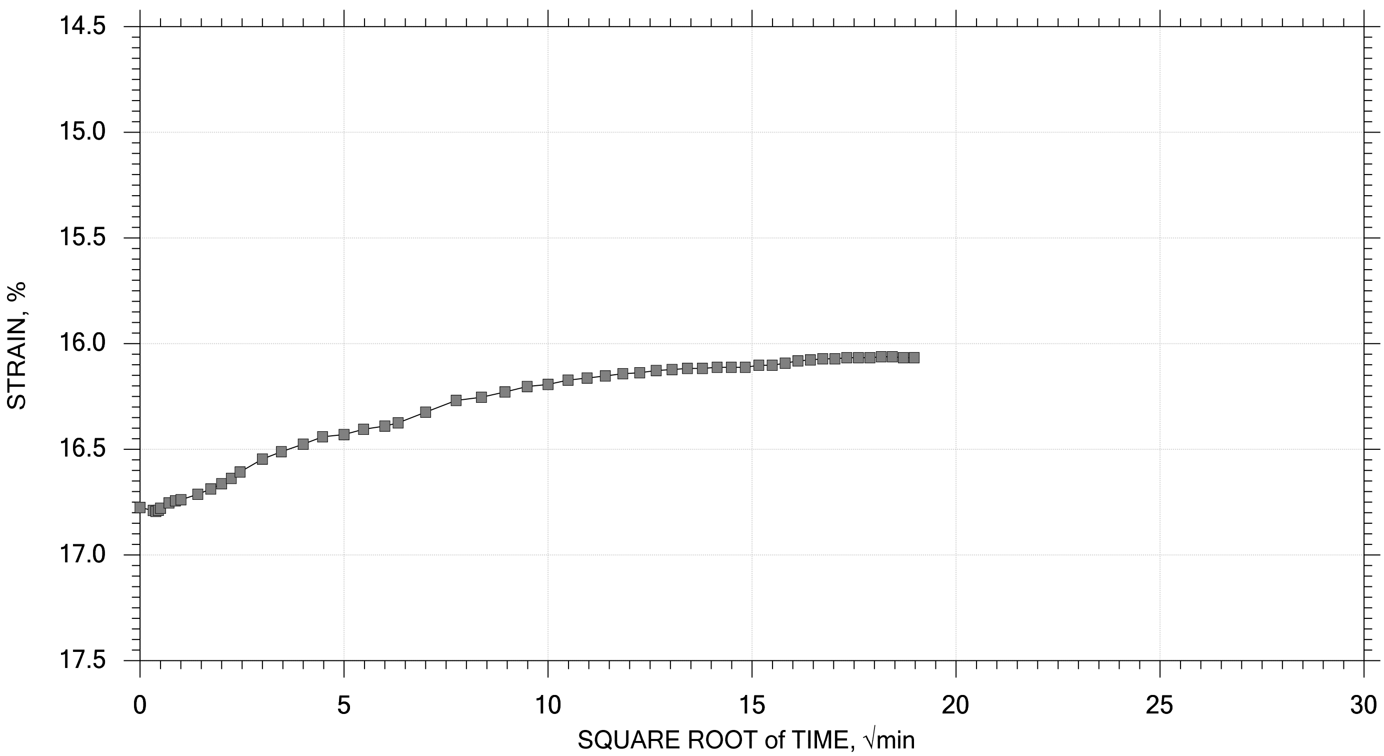
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 500 psf





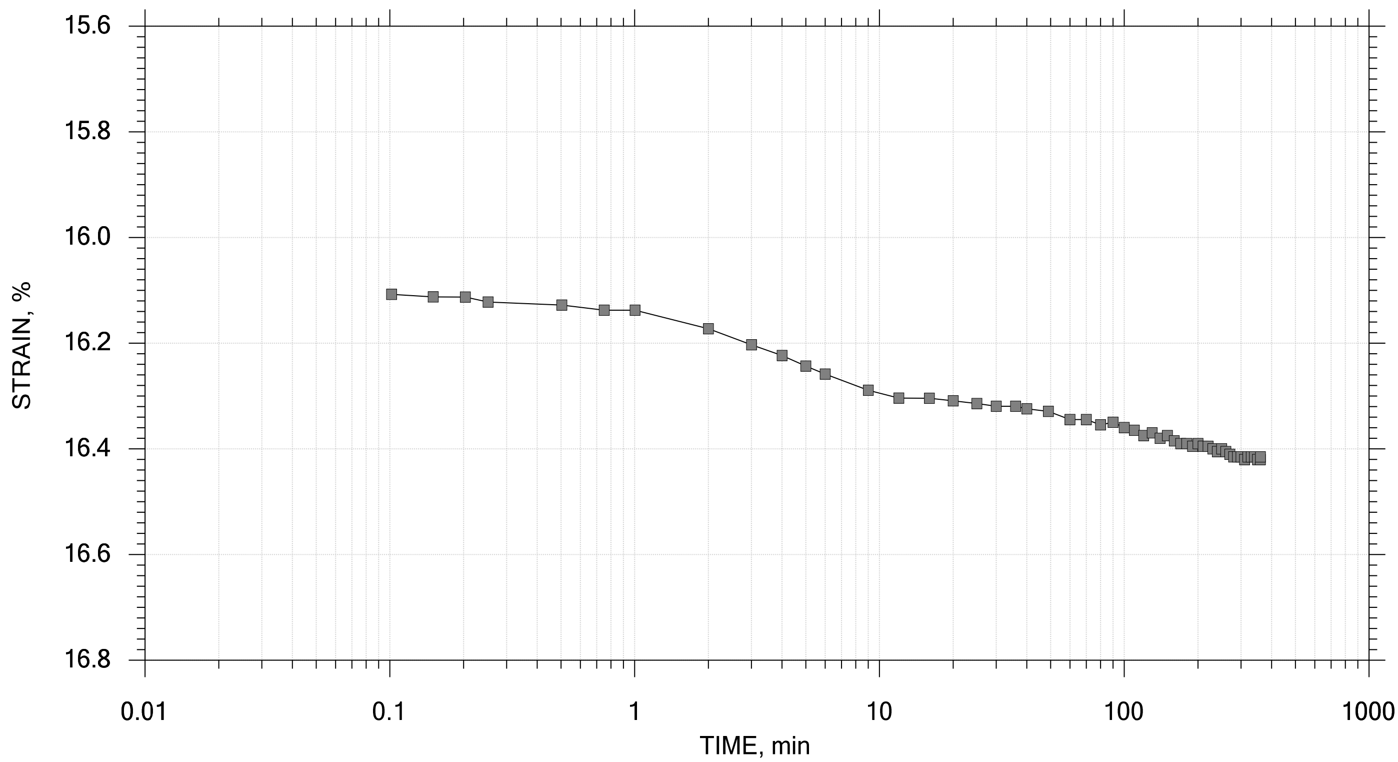
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

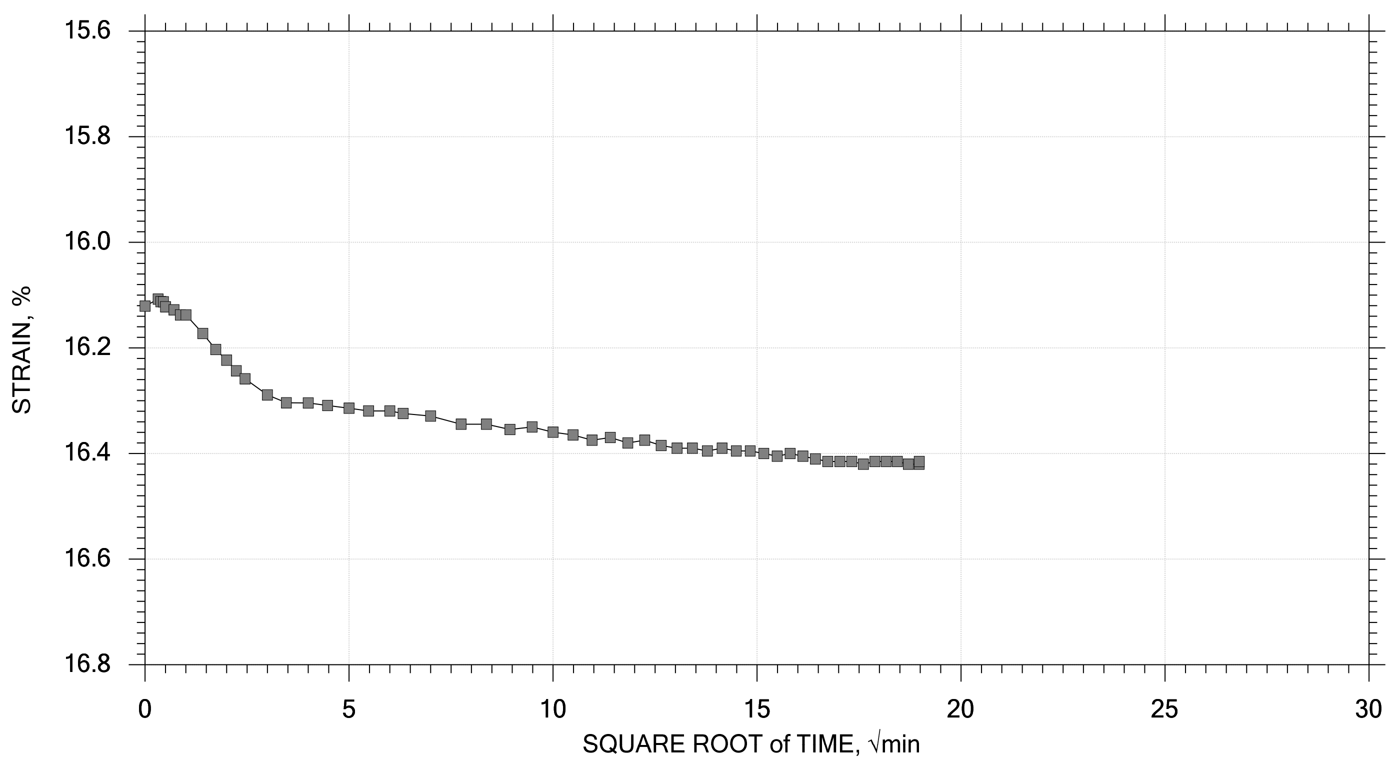
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 1000 psf





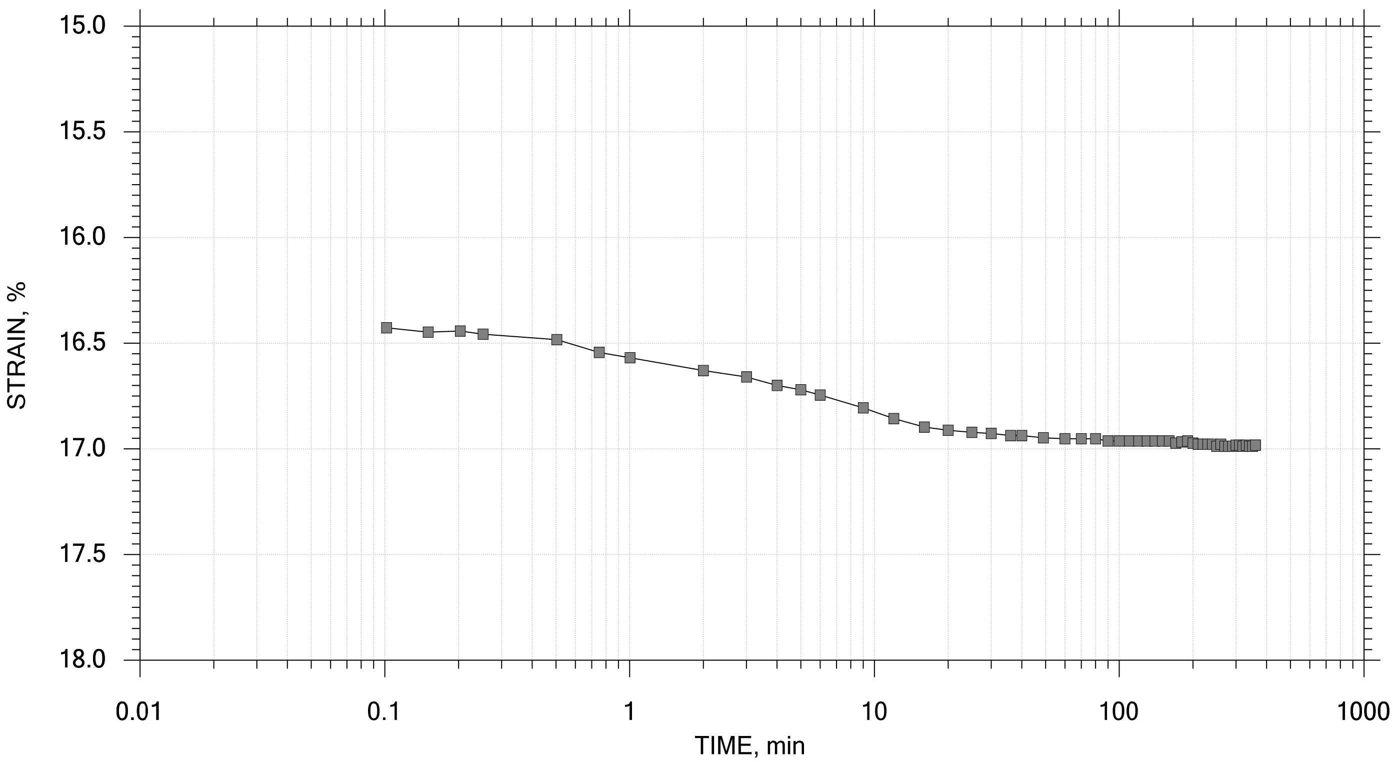
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

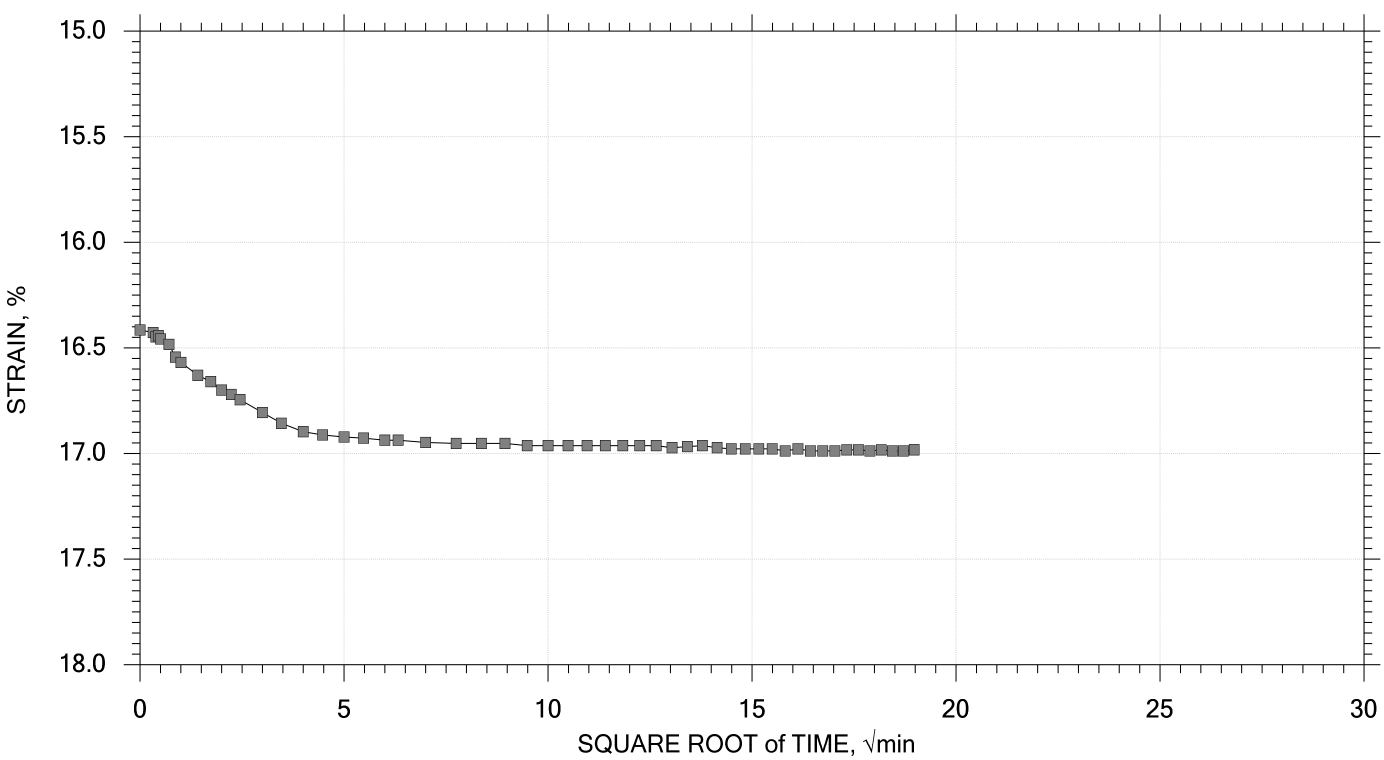
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2000 psf





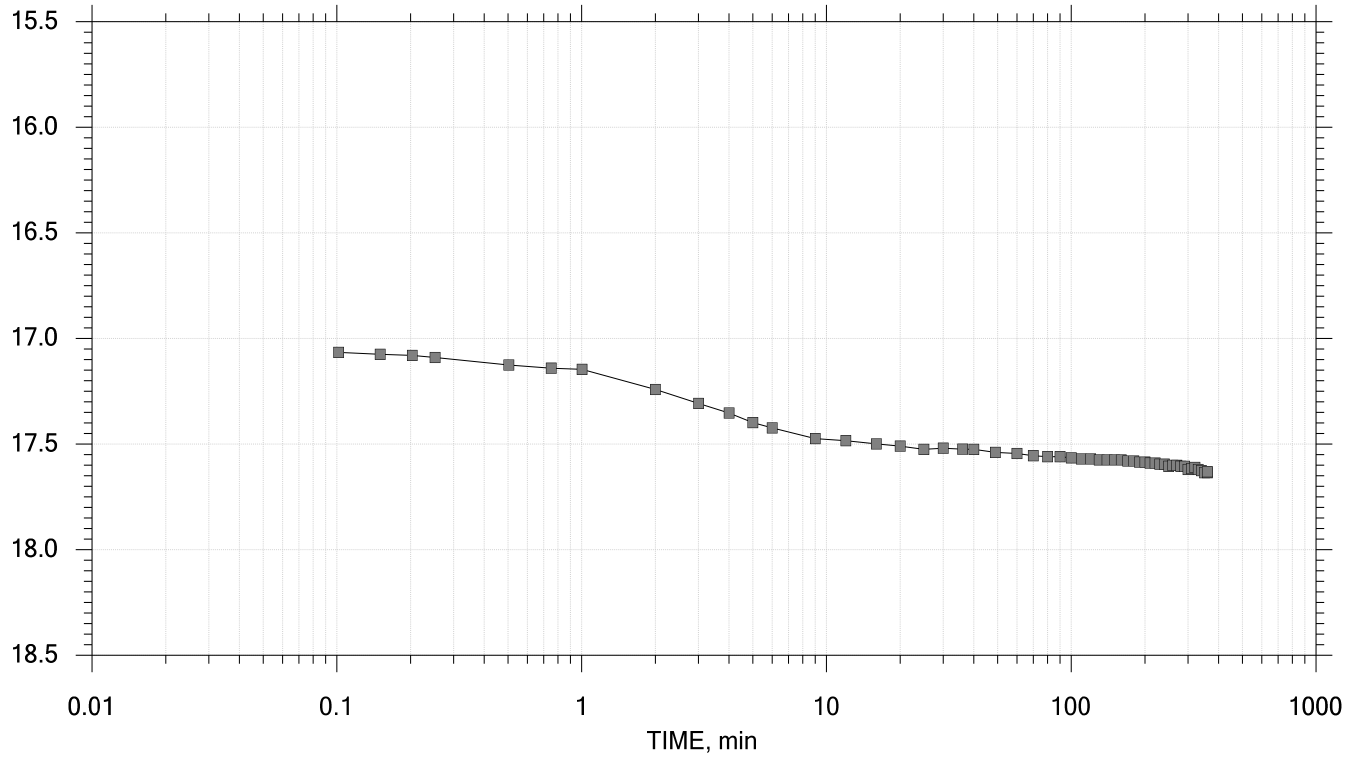
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

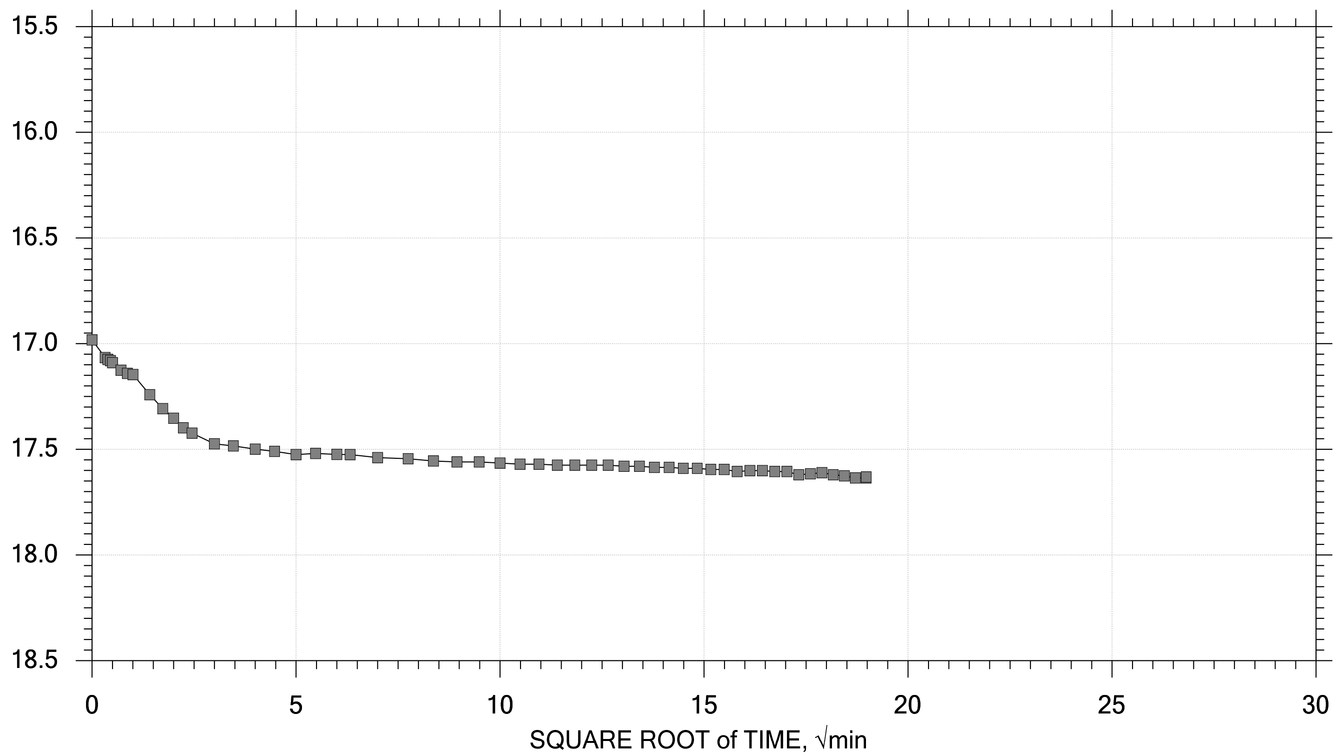
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 4000 psf





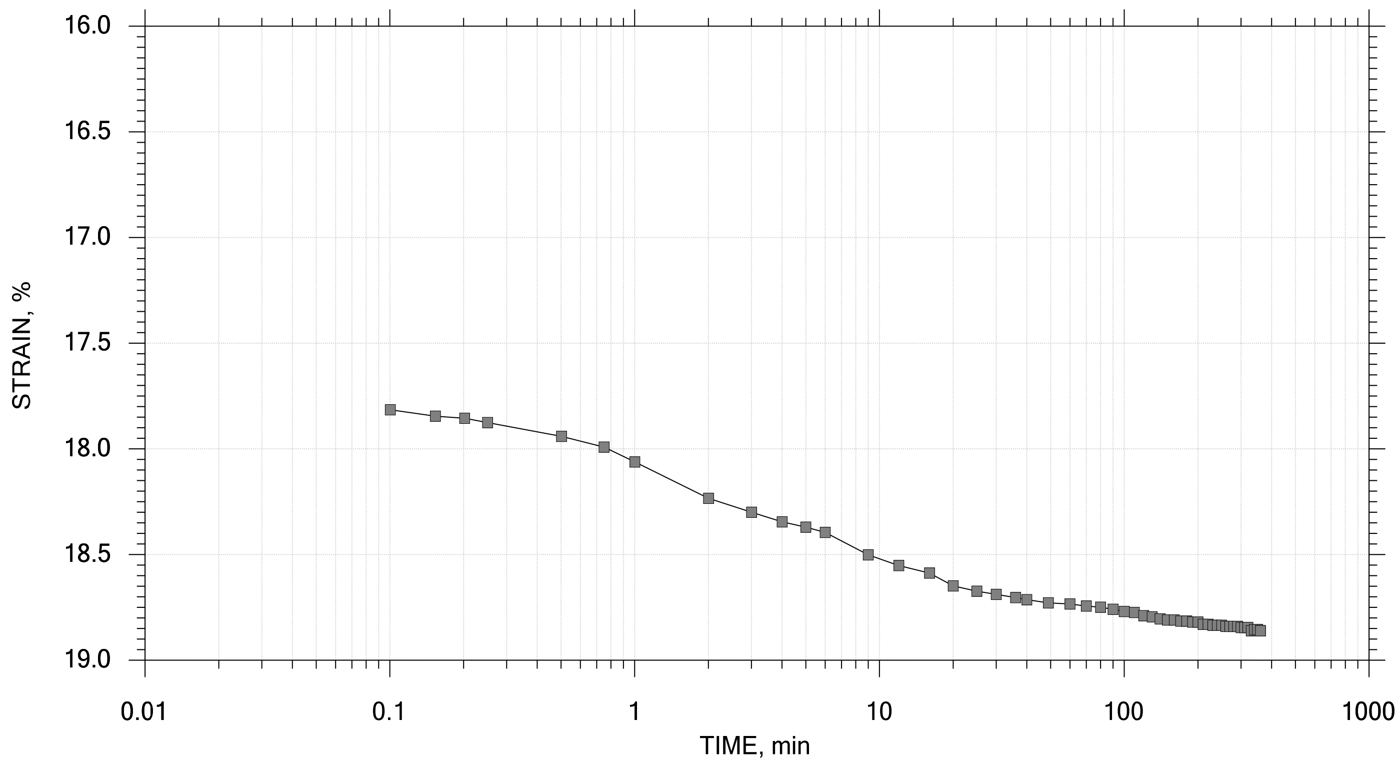
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

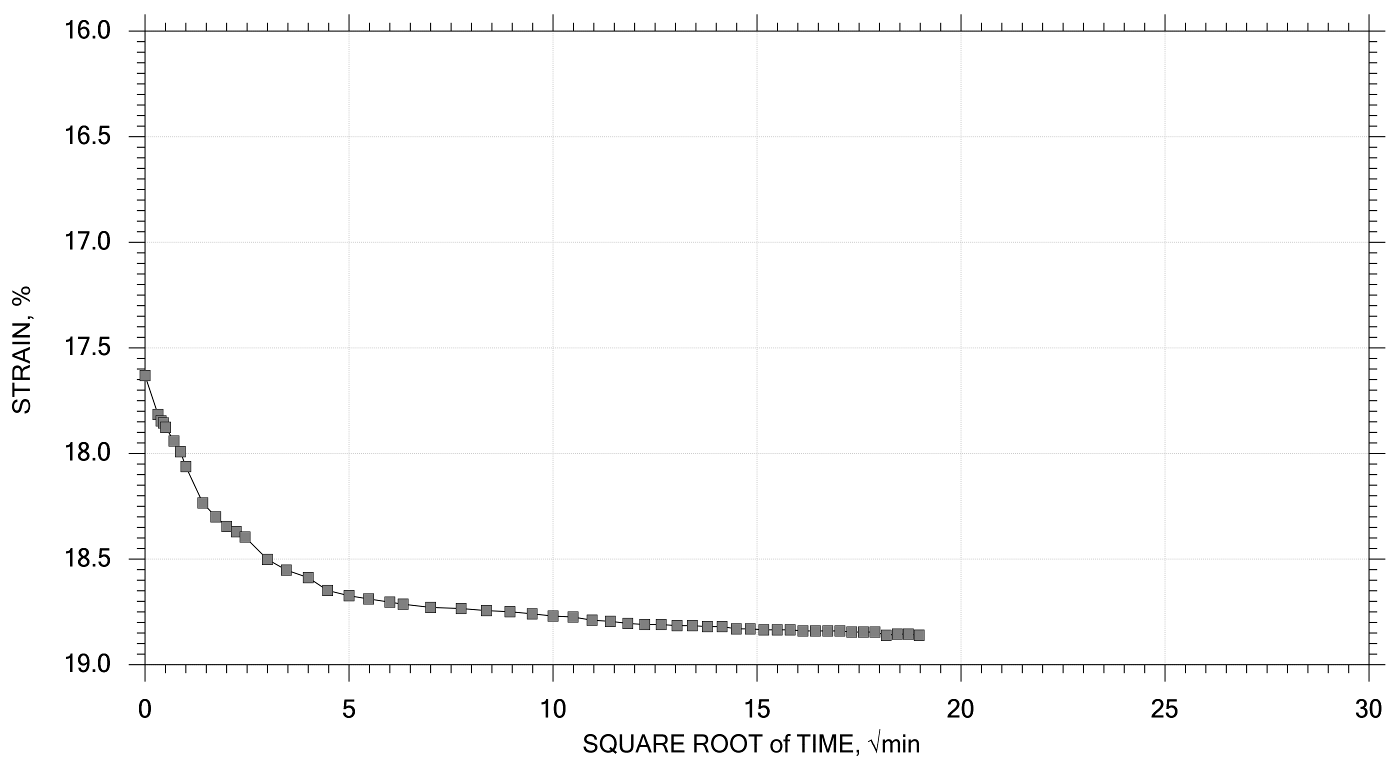
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 8000 psf





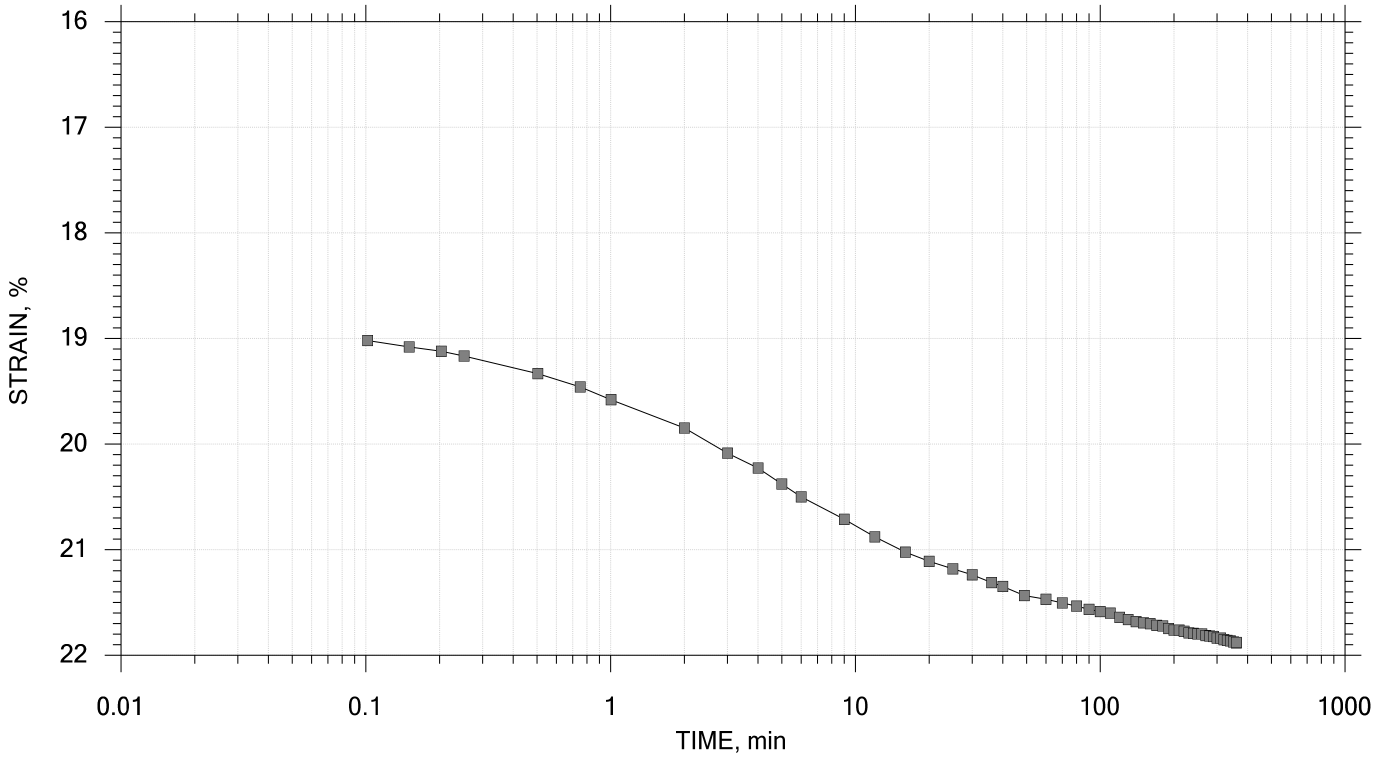
GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

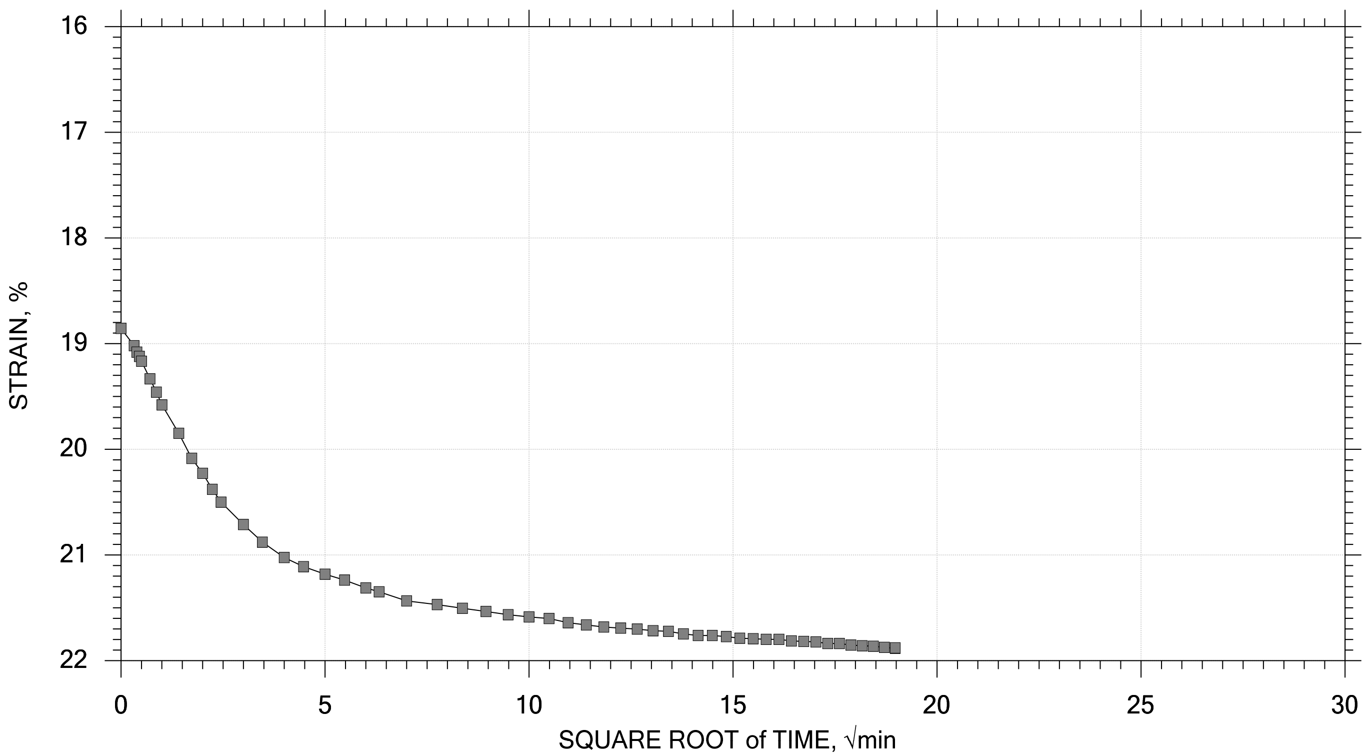
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 16000 psf





GeoTesting EXPRESS	Project: MeTPK Exit 45 Reconfiguration	Location: Phs 2 South Portland, ME	Project No.: GTX-307957
	Boring No.: HB-EXIT 45-211	Tested By: md	Checked By: njh
	Sample No.: U3	Test Date: 08/01/18	Test No.: IP-6
	Depth: 55-57 ft	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System O		

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COPY OF CONETEC'S REPORT ON
CONE PENETROMETER AND FLAT PLATE DILATOMETER TESTING

PRESENTATION OF SITE INVESTIGATION RESULTS

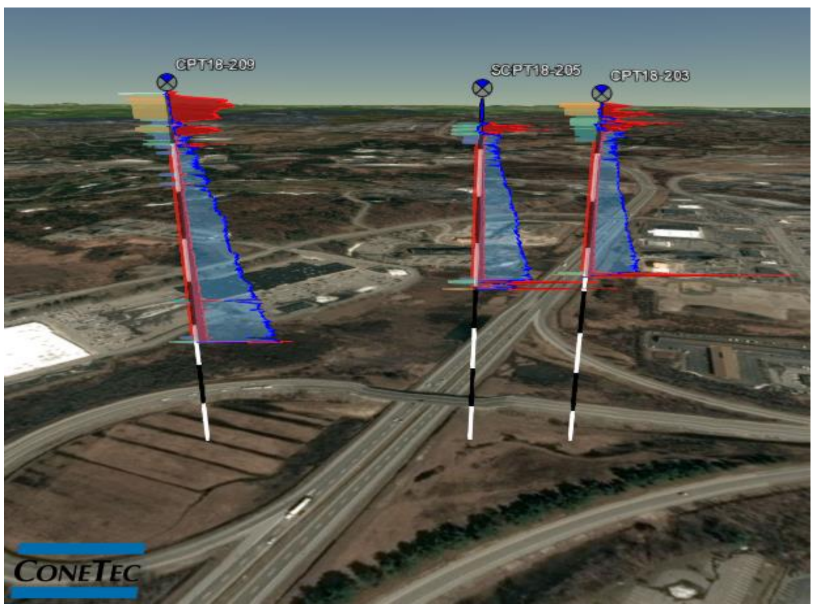
Exit 45, Maine Turnpike
Scarborough, Maine

Prepared for:

HNTB Corporation

ConeTec Job No: 18-53065

Project Start Date: 5-Jun-2018
Project End Date: 6-Jun-2018
Report Date: 11-Jun-2018



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Introduction

The enclosed report presents the results of a piezocone penetration testing (CPTu or CPT) and seismic piezocone penetration testing (SCPTu or SCPT) program and also a flat plate dilatometer test (DMT) carried out at the Exit 45, Maine Turnpike site located in Scarborough, Maine. The site investigation program was conducted by ConeTec Inc. (ConeTec), under contract to HNTB Corporation (HNTB) of Parsippany, New Jersey. Onsite engineering oversite was provided by Schonewald Engineering of Portland, Maine

A total of 2 cone penetration tests, 1 seismic cone penetration test and 3 flat plate dilatometer tests were completed at 3 locations. The CPT, SCPT and DMT program was performed to evaluate the subsurface soil conditions. CPT, SCPT & DMT sounding locations were selected and numbered under supervision of Schonewald personnel (Ms. Be Schonewald).

Project Information

Project	
Client	HNTB Corporation
Project	Exit 45, Maine Turnpike, Scarborough, ME
ConeTec project number	18-53065

A map from CESIUM including the CPT test locations is presented below.

Rig Description	Deployment System	Test Type
CPT Track Rig	25 ton track mounted (twin cylinders)	CPT, SCPT and DMT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT, SCPT and DMT	GPS (GlobalSat MR-350)	32619 (WGS 84 / UTM North)

Cone Penetration Test (CPT)	
Depth reference	Ground surface at the time of the investigation.
Tip and sleeve data offset	0.1 meter. This has been accounted for in the CPT data files.
Pore pressure dissipation (PPD) tests	Nine pore pressure dissipation tests were completed to determine the phreatic surface and consolidation characteristics.
Additional Comments	Shear wave velocity tests were conducted at five foot depth intervals at one location. DMT was also performed at all locations.

Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
521:T1500F15U500	521	15	225	1500	15	500

Limitations

This report has been prepared for the exclusive use of HNTB Corporation (Client) for the project titled "Exit 45, Maine Turnpike, Scarborough, ME". The report's contents may not be relied upon by any other party without the express written permission of ConeTec. ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

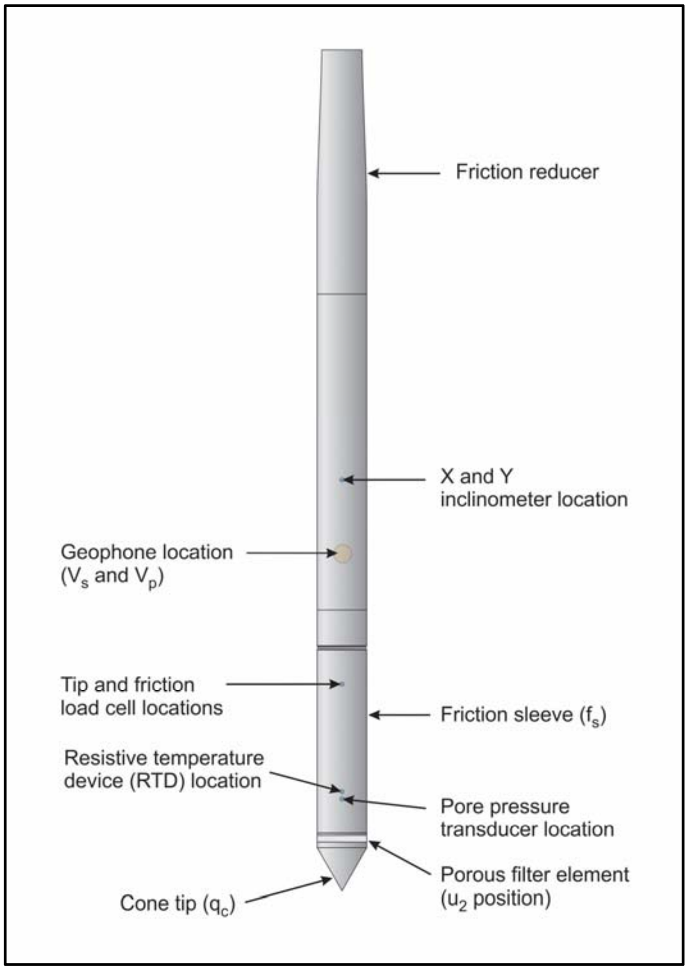


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording intervals are either 2.5 cm or 5.0 cm depending on project requirements; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerin or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil or glycerin under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al, 1986:

$$q_t = q_c + (1\text{-}a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (Rf) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is included in an appendix.

For additional information on CPTu interpretations, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

Mayne, P.W. and Peuchen, J., 2012, “Unit weight trends with cone resistance in soft to firm clays”, Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355.

Shear wave velocity testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave (Vp) velocity is also determined.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that triggers the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

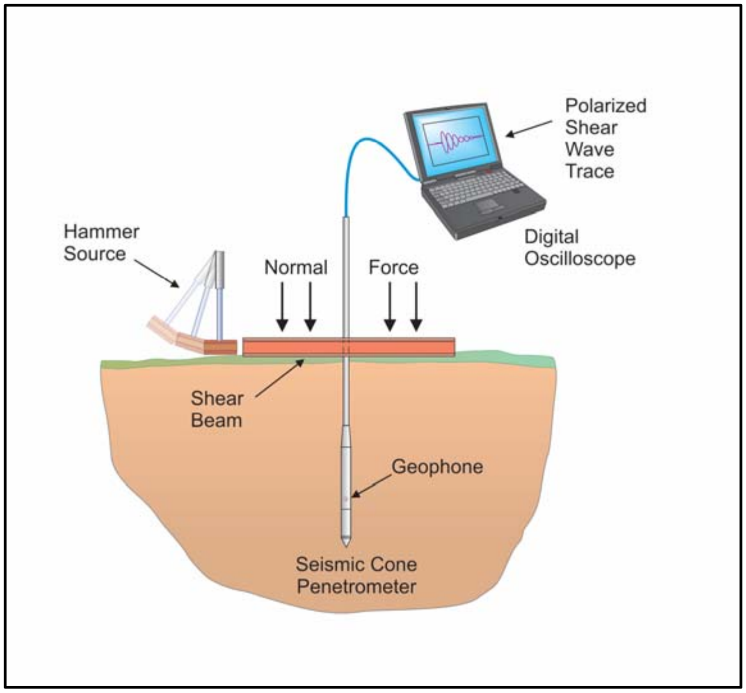


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Multiple wave traces are recorded for quality control purposes. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et.al. (1986).

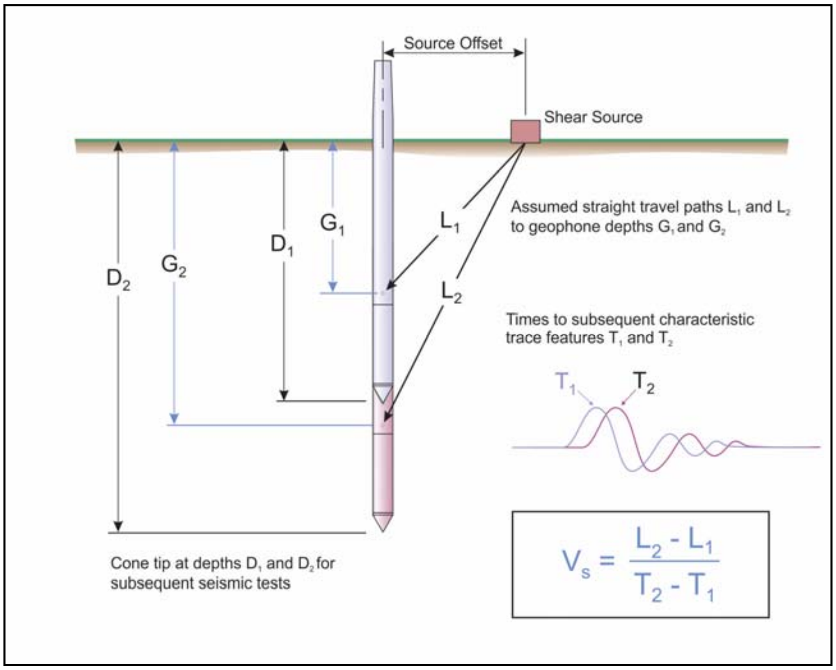


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

The average shear wave velocity to a depth of 100 feet (30 meters) ($\bar{v}_s$) has been calculated and provided for all applicable soundings using the following equation presented in ASCE, 2010.

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{v_{si}}}$$

where: $\bar{v}_s$ = average shear wave velocity ft/s (m/s)
d_i = the thickness of any layer between 0 and 100 ft (30 m)
v_{si} = the shear wave velocity in ft/s (m/s)
$\sum_{i=1}^{n} d_i$ = 100 ft (30 m)

Average shear wave velocity, $\bar{v}_s$ is also referenced to V_{s100} or V_{s30}.

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

American Society of Civil Engineers (ASCE), 2010, "Minimum Design Loads for Buildings and Other Structures", Standard ASCE/SEI 7-10, American Society of Civil Engineers, ISBN 978-0-7844-1085-1, Reston, Virginia.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

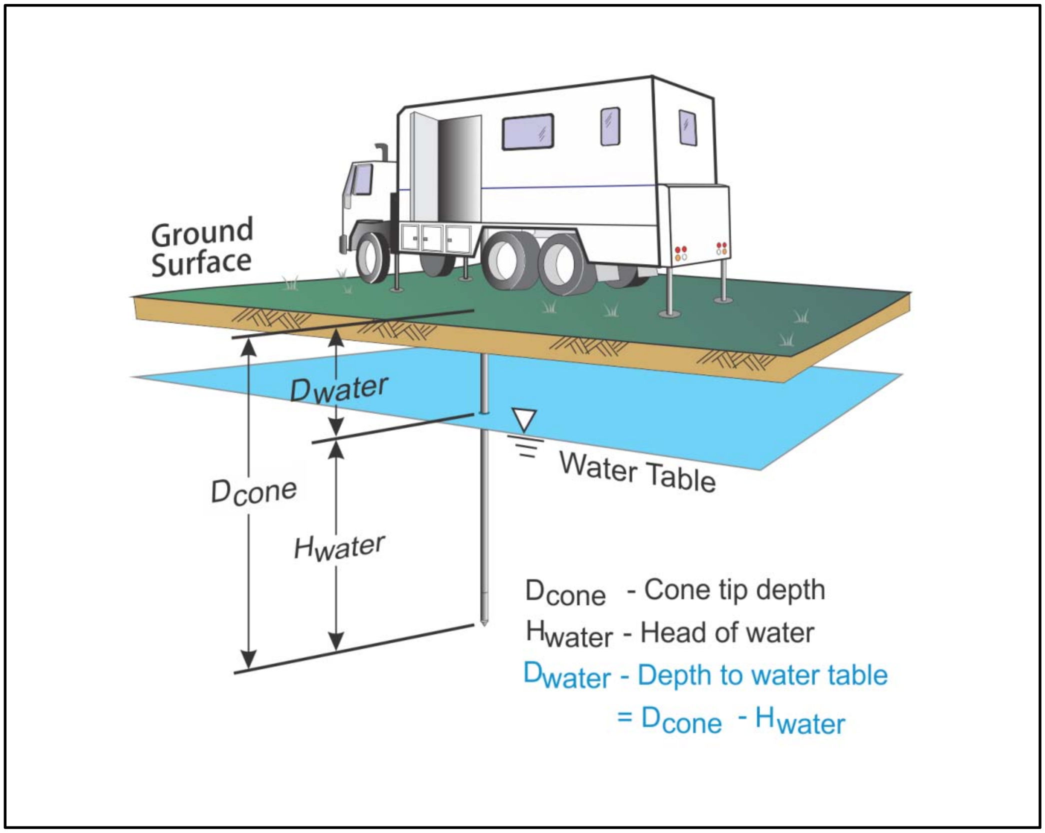


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

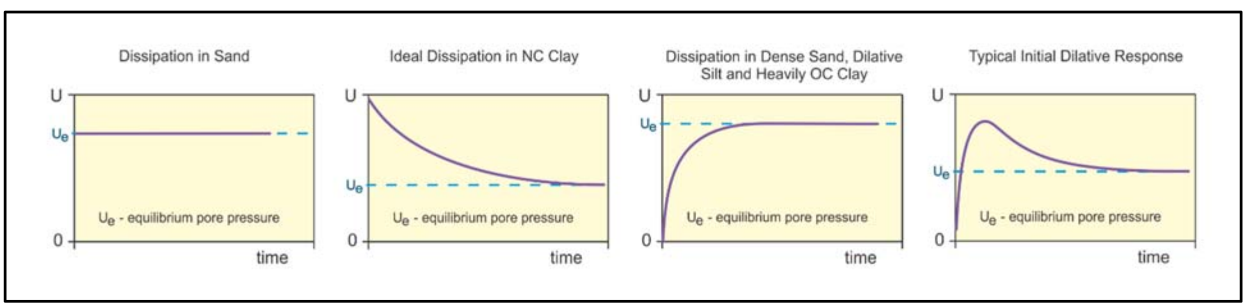


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve of Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T* is the dimensionless time factor (Table Time Factor)

a is the radius of the cone

I_r is the rigidity index

t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby, 1991)

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby, 1991), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, “Monotonic and dilatory pore pressure decay during piezocone tests”, Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, “Analytical cavity expansion-critical state model cone dissipation in fine-grained soils”, Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, “The piezometer probe: a useful investigation tool”, Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, “Estimating coefficient of consolidation from piezocone tests”, Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, “An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils”, Canadian Geotechnical Journal, 36(2): 369-381.

Teh, C.I., and Houlsby, G.T., 1991, “An analytical study of the cone penetration test in clay”, Geotechnique, 41(1): 17-34.

Flat plate dilatometer tests (DMT) are conducted using a flat steel blade with a thin, expandable, circular membrane mounted on one surface, a control unit and a compressed gas (typically nitrogen) supply. A photo of the system is presented in Figure DMT-1.

The dilatometer blade is connected to the up-hole control box by a pneumatic tube with an inner conductor wire. The tube is threaded through a set of steel push rods. The control unit has pressure gauges, an audio-visual signal, a gas flow control and vent valve. A syringe is used to quantify the stiffness of the blade membrane.

Figure DMT-1. Flat plate dilatometer system
(Marchetti, http://www.marchetti-dmt.it/pagespictures/blade&case.htm)

Prior to conducting a DMT profile, the blade membrane stiffness is recorded according to the current ASTM D6635 specifications and the system is assembled and tested for any leaks.

The dilatometer blade is pushed into the ground to the desired depth from surface or through a cased hole using a CPT rig or a drill rig. The blade is inflated using compressed gas and up to three pressure readings are recorded, the A reading at zero deflection (lift-off) and the B reading when a deflection of 1.1 mm has been achieved. An optional C reading representing the closing pressure can be recorded by slowly deflating the membrane soon after B is reached. The blade is advanced to subsequent depths and the test procedures are repeated at each test depth, up to the sounding termination depth. After the blade is retracted membrane stiffness values are recorded.

The dilatometer operating procedures are performed in general accordance with the current ASTM D6635 standard.

The interpretation of the dilatometer data is based on the pressure related parameters p_o and p_1 that are derived from the recorded A and B pressure values corrected for membrane stiffness and the gauge zero offset. Figure DMT-2 shows p_o and p_1.

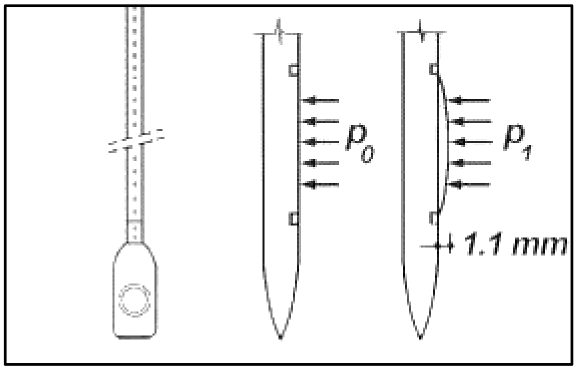


Figure DMT-2. Flat plate dilatometer p_0 and p_1
(Marchetti, http://www.marchetti-dmt.it/)

The A reading is the pressure required to lift-off the membrane while the B reading is the pressure required to move the center of the membrane by 1.1 mm. The C pressure measurement is the pressure at which the membrane returns to the A position and is used to estimate equilibrium pore pressures in sand. The A and B pressure readings are corrected by the membrane stiffness values at the respective membrane deflections that are recorded before and after each test location.

The empirical correlations use the parameters p_0, p_1 and p_2 derived from the A, B and C readings accounting for membrane stiffness and gauge offset. These parameters provide the basic values needed in the empirical correlations developed by Marchetti et al. (2001). The equations for these parameters are presented in the relevant appendix.

The p_o, p_1 and p_2 parameters are used to calculate the DMT indices, material index (I_D), horizontal stress index (K_D), and dilatometer modulus (E_D). Soil type is inferred from the material index. Clays generally have a material index of less than 0.6. The material index for silts is generally between 0.6 and 1.8, while sands generally exhibit a material index greater than 1.8. While K_D and E_D have limited direct use in geotechnical design, they are critical for determining parameters that are required for most design calculations such as earth pressure coefficient (K_o), undrained shear strength (S_u), and over consolidation ratio (OCR).

A summary of the tests including coordinates and estimated phreatic surface, along with plots and tabular results are provided in the relevant appendices. The calculated geotechnical parameters presented are based on published empirical correlations and are provided only as a first approximation. No warranty, expressed or implied, is made to the accuracy of these estimated geotechnical parameters.

References

ASTM D6635-01, Reapproved 2007, "Standard Test Method for Performing the Flat Plate Dilatometer ", ASTM, West Conshohocken, US.

Foti, D., Lancellotta, R., Marchetti, D., Monaco, P., and Totani, P., 2006, “Interpretation of SDMT tests in a transversely isotropic medium”, Proceedings from the Second International Conference on the Flat Dilatometer, Washington, DC., April 2-5.

Marchetti, S., Monaco P., Totani G. and Calabrese M., 2001, “The Flat Dilatometer Test (DMT) in soil investigations”, A Report by the ISSMEGE Committee TC16. Proc. IN SITU 2001, Intnl. Conf. On In Situ Measurement of Soil Properties, Bali, Indonesia, May 2001, 41 pp.

Marchetti, S., n.d, [Photographs of DMT and SDMT system], Retrieved from http://www.marchetti-dmt.it/pagespictures/blade&case.htm.

Marchetti, S., n.d, [Illustration of DMT blade, po and p1], http://www.marchetti-dmt.it/.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Normalized Cone Penetration Test Plots
- Seismic Cone Penetration Test Plots
- Seismic Cone Penetration Test Tabular Results
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots
- Flat Plate Dilatometer Test Plots and Tabular Results

Cone Penetration Test Summary and

Standard Cone Penetration Test Plots

	Job No:	18-53065
	Client:	HNTB Corporation
	Project:	Exit 45, Maine Turnpike, Scarborough, ME
	Start Date:	05-Jun-2018
	End Date:	06-Jun-2018

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing[2] (m)	Easting (m)	Refer to Notation Number
CPT18-203	18-53065_CP203	6-Jun-2018	521:T1500F15U500	3.0	60.04		4831814	391627	
SCPT18-205	18-53065_SP205	6-Jun-2018	521:T1500F15U500	3.0	66.76	13	4831828	391570	
CPT18-209	18-53065_CP209	5-Jun-2018	521:T1500F15U500	3.0	89.24		4831863	391420	
Totals	3 soundings				216.04	13			

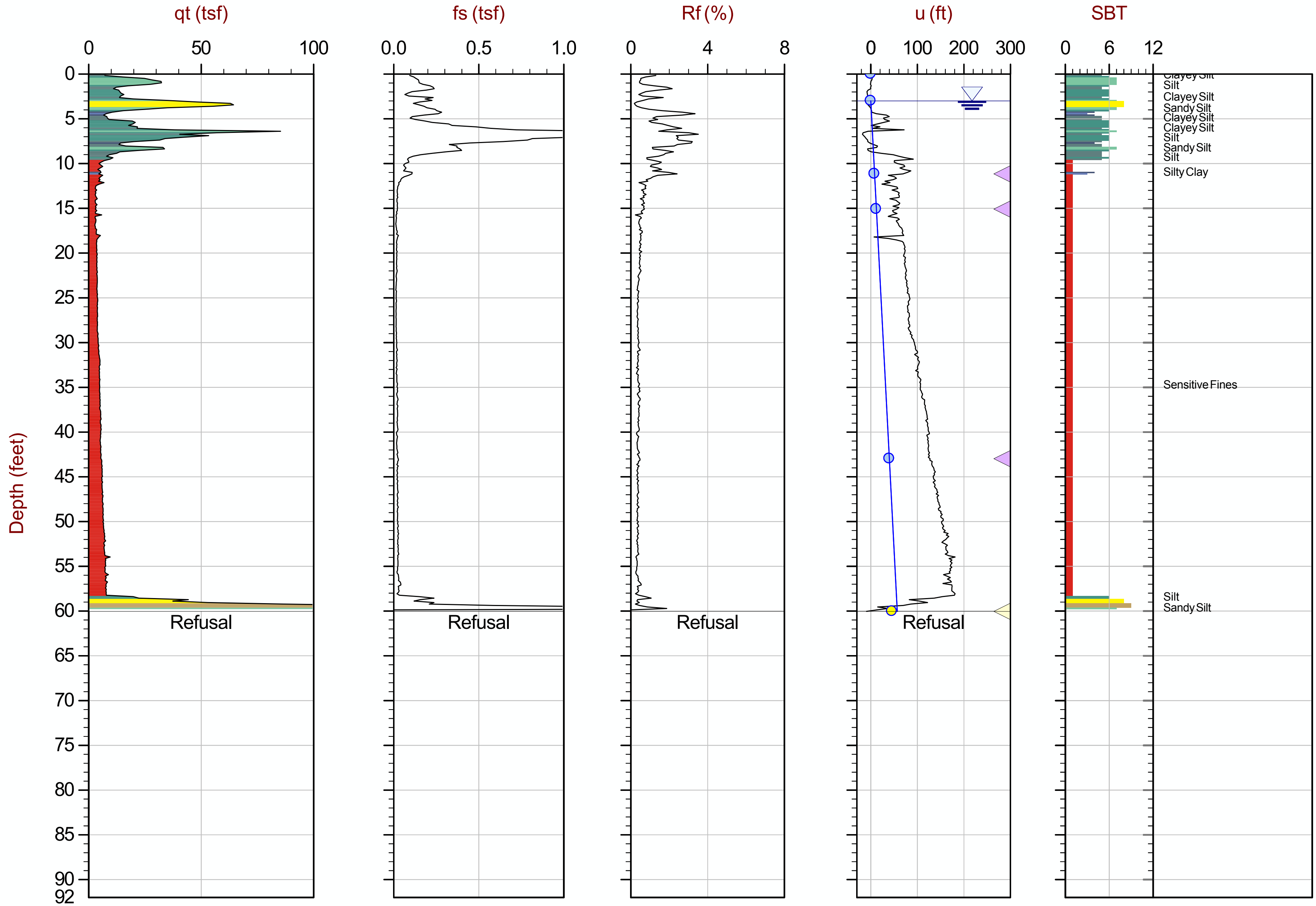
1. Assumed phreatic surface depths were determined from the pore pressure data unless otherwise noted. Hydrostatic data were used for calculated parameters.
2. Coordinates are WGS 84 / UTM Zone 19 and were collected using a MR-350 GlobalSat GPS Receiver.
3. Assumed phreatic surface provided by the client
4. No phreatic surface detected

CONETEC

HNTB Corporation

Job No: 18-53065
Date: 2018-06-06 12:05
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-203
Cone: 521:T1500F15U500



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_CP203.COR

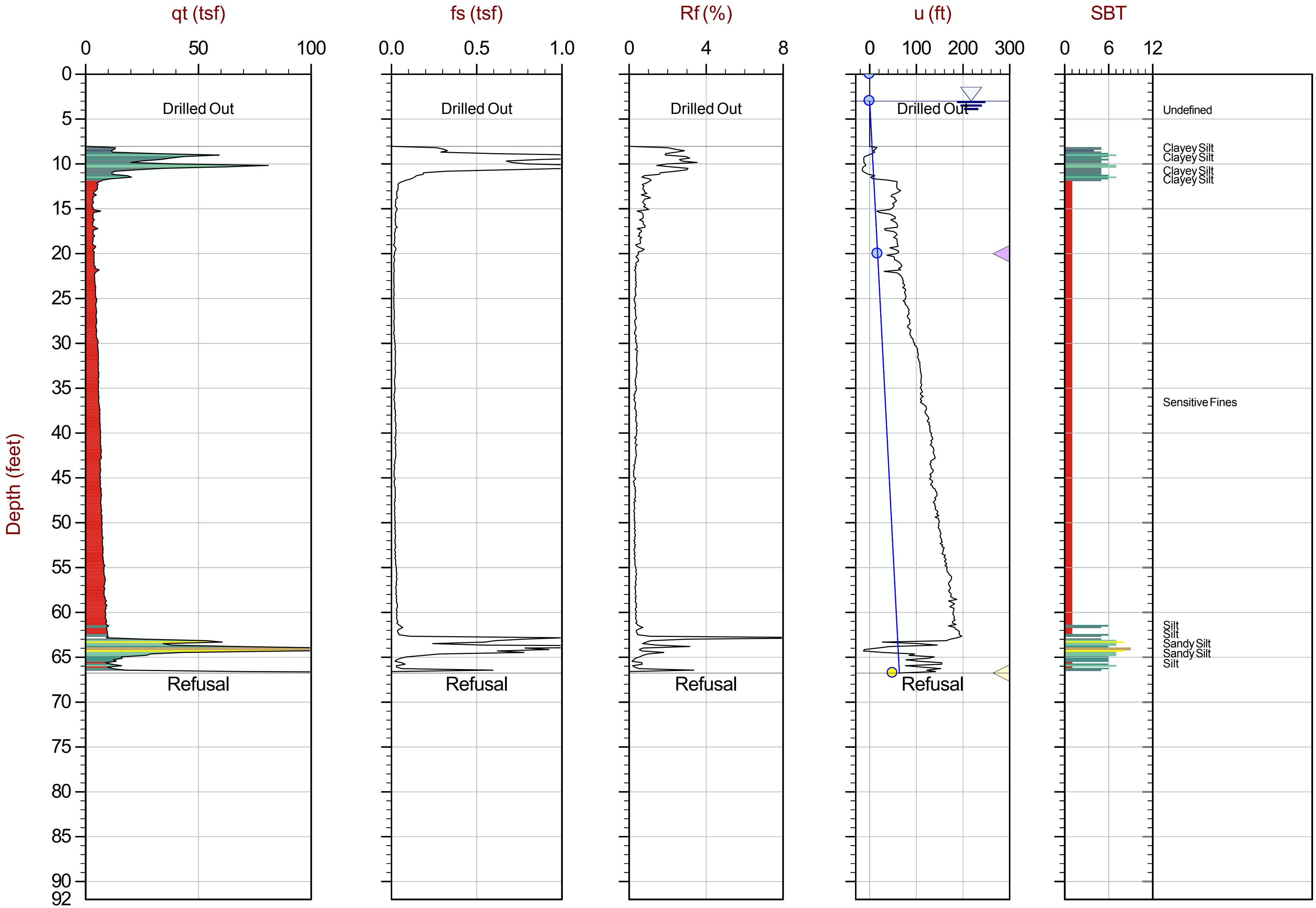
SBT: Robertson and Campanella, 1986
Coords: UTM Zone 19 N: 4831814m E: 391627m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

HNTB Corporation

Job No: 18-53065
Date: 2018-06-06 08:51
Site: Exit 45, Maine Turnpike, Scarborough, ME
Sounding: SCPT18-205
Cone: 521:T1500F15U500



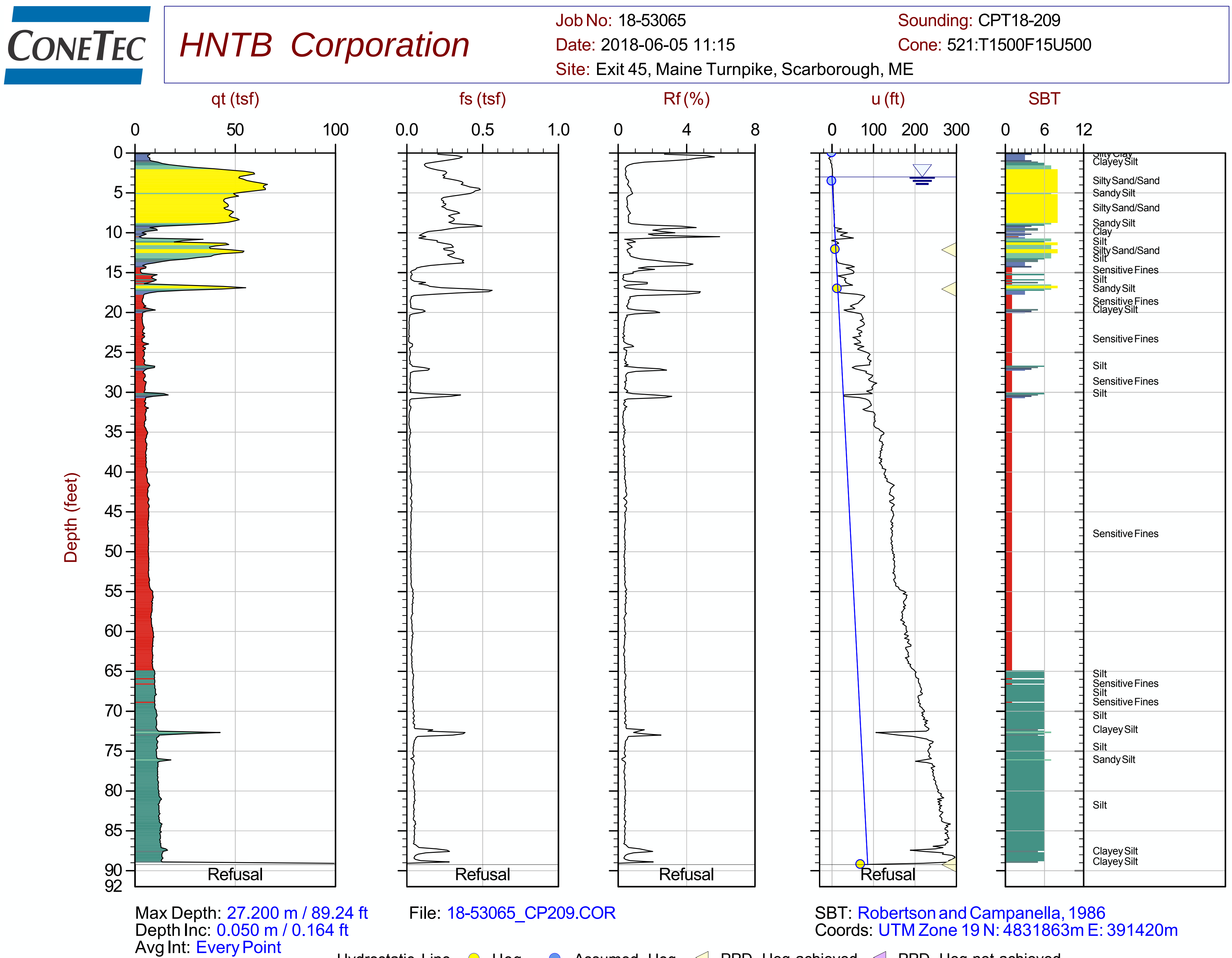
Max Depth: 20.350 m / 66.76 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_SP205.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 19 N: 4831828m E: 391570m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



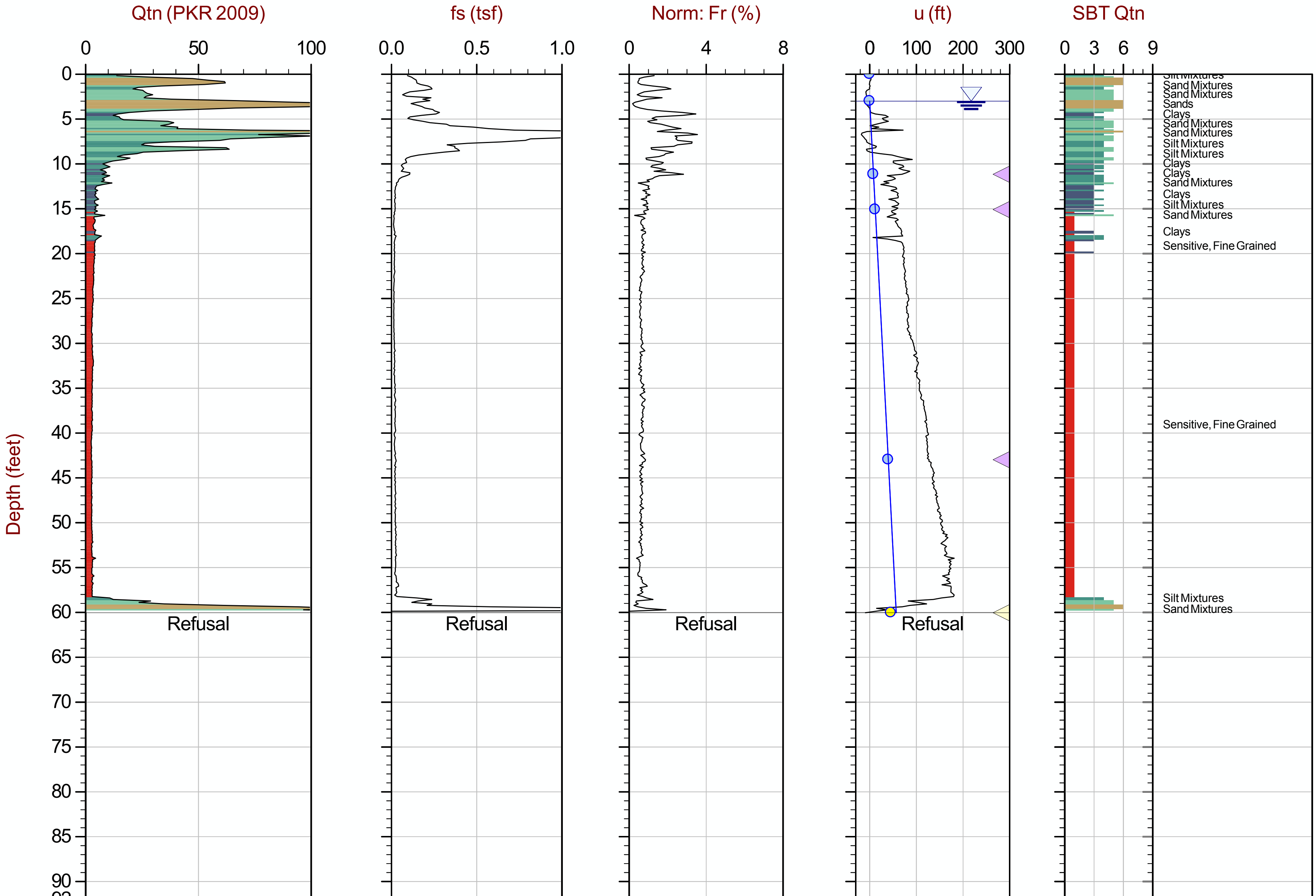
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Normalized Cone Penetration Test Plots

CONETEC

HNTB Corporation

Job No: 18-53065
Date: 2018-06-06 12:05
Site: Exit 45, Maine Turnpike, Scarborough, ME
Sounding: CPT18-203
Cone: 521:T1500F15U500



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_CP203.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 19 N: 4831814m E: 391627m

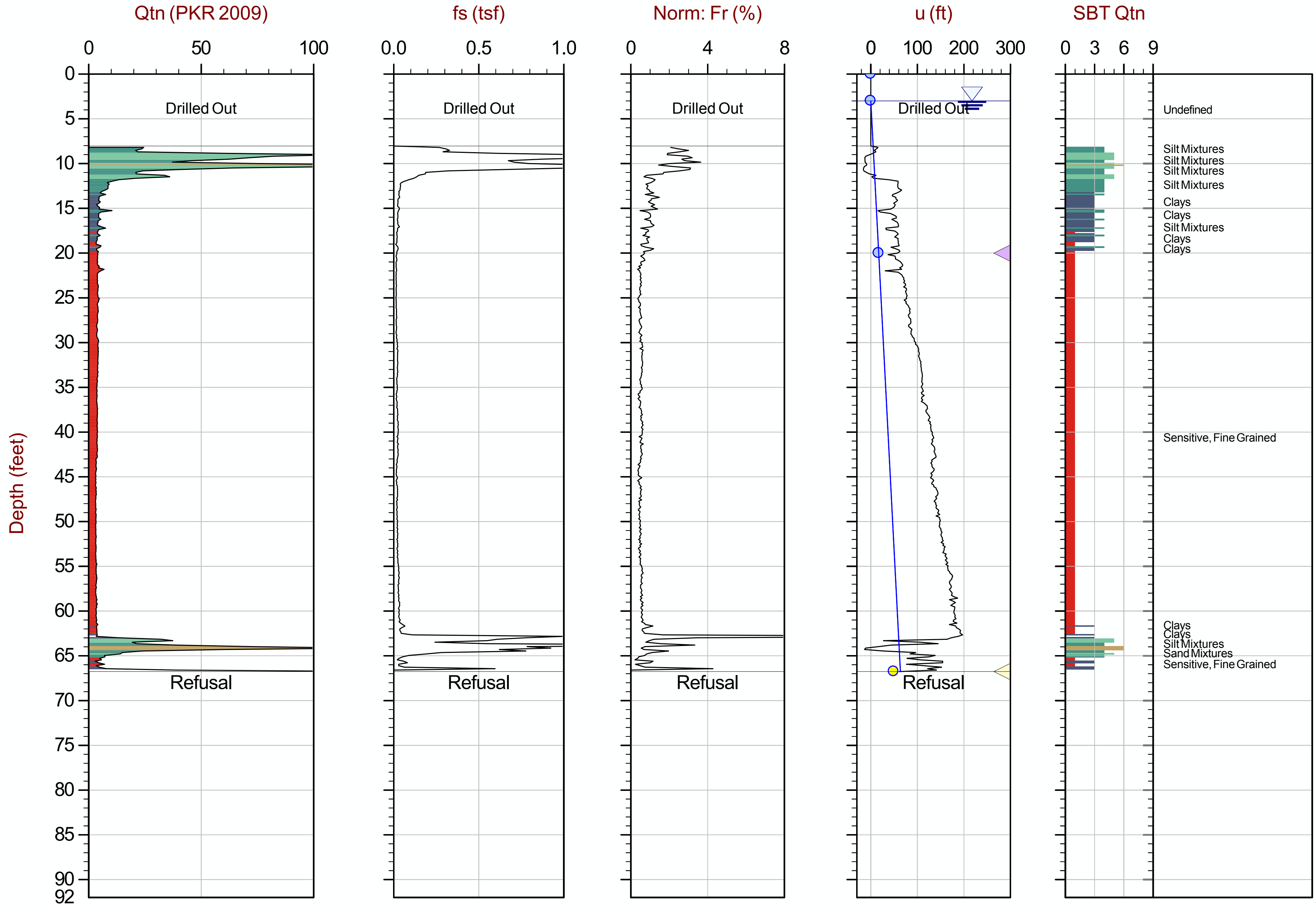
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

HNTB Corporation

Job No: 18-53065
Date: 2018-06-06 08:51
Site: Exit 45, Maine Turnpike, Scarborough, ME
Sounding: SCPT18-205
Cone: 521:T1500F15U500



Max Depth: 20.350 m / 66.76 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_SP205.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 19 N: 4831828m E: 391570m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

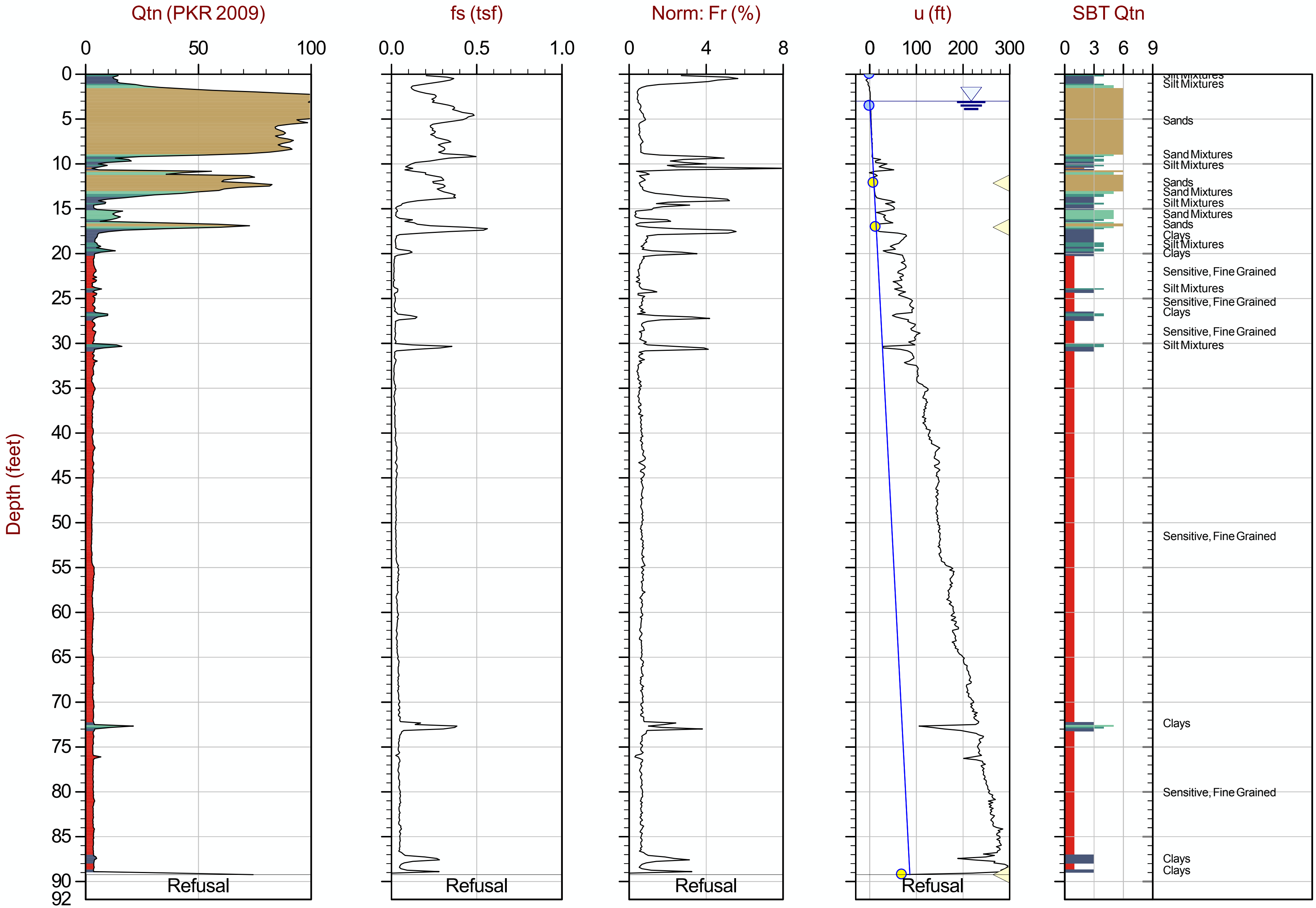
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

HNTB Corporation

Job No: 18-53065
Date: 2018-06-05 11:15
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-209
Cone: 521:T1500F15U500



Max Depth: 27.200 m / 89.24 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_CP209.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 19 N: 4831863m E: 391420m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

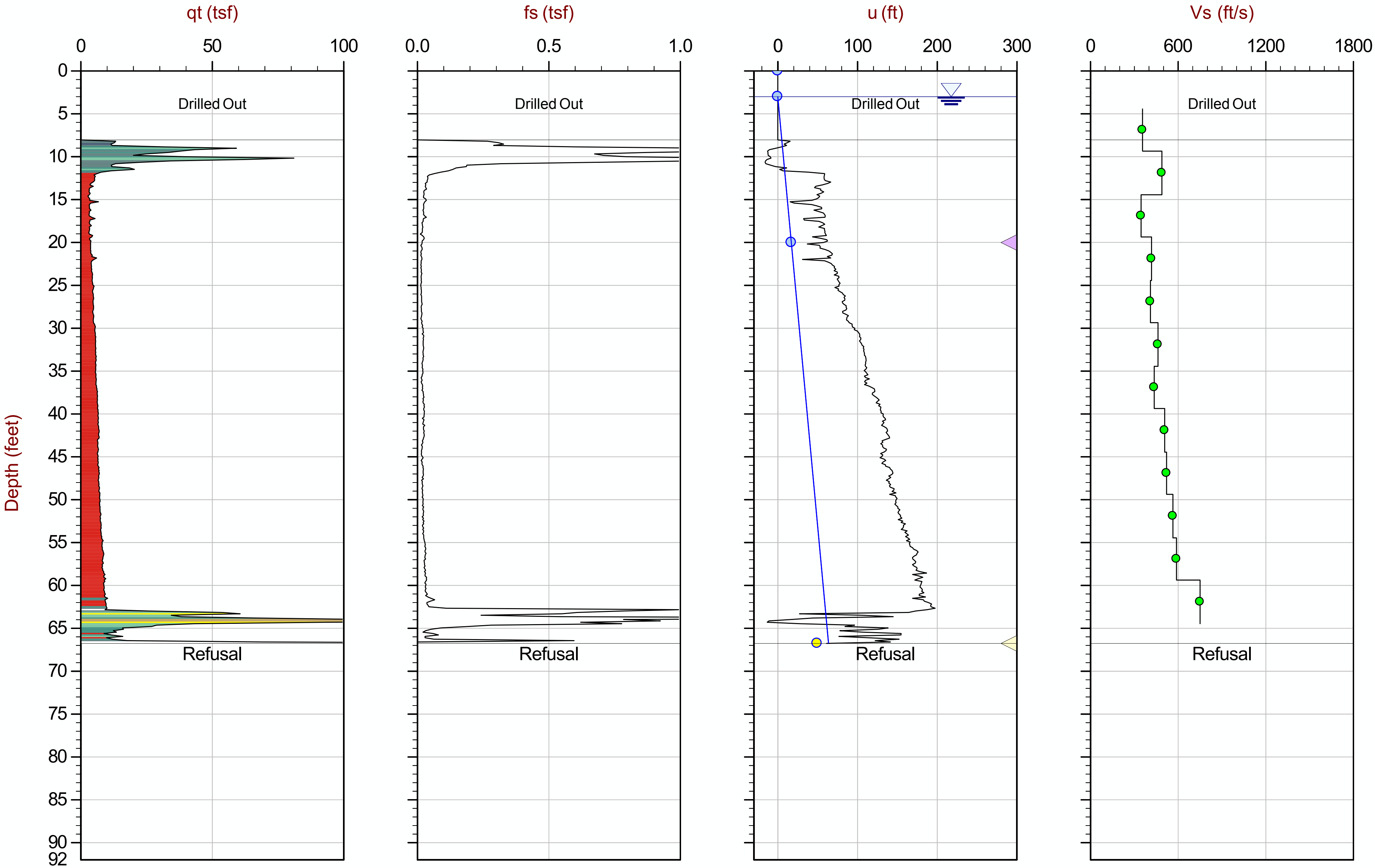
Seismic Cone Penetration Test Plots

CONETEC

CONETEC

HNTB Corporation

Job No: 18-53065
Date: 2018-06-06 08:51
Site: Exit 45, Maine Turnpike, Scarborough, ME
Sounding: SCPT18-205
Cone: 521:T1500F15U500



Max Depth: 20.350 m / 66.76 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 18-53065_SP205.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 19 N: 4831828m E: 391570m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results (Vs)

Job No:	18-53065
Client:	HNTB Corporation
Project:	Exit 45, Maine Turnpike, Scarborough, ME
Sounding ID:	SCPT18-205
Date:	06-Jun-2018

Seismic Source:	Beam
Source Offset (ft):	2.46
Source Depth (ft):	0.00
Geophone Offset (ft):	0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.08	4.43	5.07			
10.01	9.35	9.67	4.60	12.92	356
15.09	14.44	14.64	4.98	10.17	489
20.01	19.36	19.51	4.87	14.06	346
25.10	24.44	24.57	5.05	12.10	418
30.02	29.36	29.47	4.90	11.96	410
35.10	34.45	34.54	5.07	10.98	462
40.03	39.37	39.45	4.91	11.27	436
45.11	44.46	44.52	5.08	10.00	508
50.03	49.38	49.44	4.91	9.43	521
55.12	54.46	54.52	5.08	9.00	564
60.04	59.38	59.43	4.92	8.34	589
65.12	64.47	64.52	5.08	6.77	750

Pore Pressure Dissipation Summary and

Pore Pressure Dissipation Plots

CONETEC

Job No: 18-53065
Client: HNTB Corporation
Project: Exit 45, Maine Turnpike, Scarborough, ME
Start Date: 05-Jun-2018
End Date: 06-Jun-2018

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50}[a] (s)	Assumed Rigidity Index (I_r)	c_h[b] (cm^2/min)
CPT18-203	18-53065_CP203.PPD	15	700	11.15	8.15		3.00	455.54	100	1.54
CPT18-203	18-53065_CP203.PPD	15	1800	15.09	12.09		3.00	1526.7	100	0.46
CPT18-203	18-53065_CP203.PPD	15	2700	42.98	39.98		3.00	2471.7	100	0.28
CPT18-203	18-53065_CP203.PPD	15	200	60.04	45.67	14.37				
SCPT18-205	18-53065_SP205.PPD	15	900	20.01	17.01		3.00	475.91	100	1.47
SCPT18-205	18-53065_SP205.PPD	15	300	66.76	49.45	17.31				
CPT18-209	18-53065_CP209.PPD	15	200	12.14	8.58	3.56				
CPT18-209	18-53065_CP209.PPD	15	200	17.06	13.31	3.75				
CPT18-209	18-53065_CP209.PPD	15	350	89.24	69.53	19.71				
Totals	9 dissipations		122.5 min							

a. Time is relative to where umax occurred

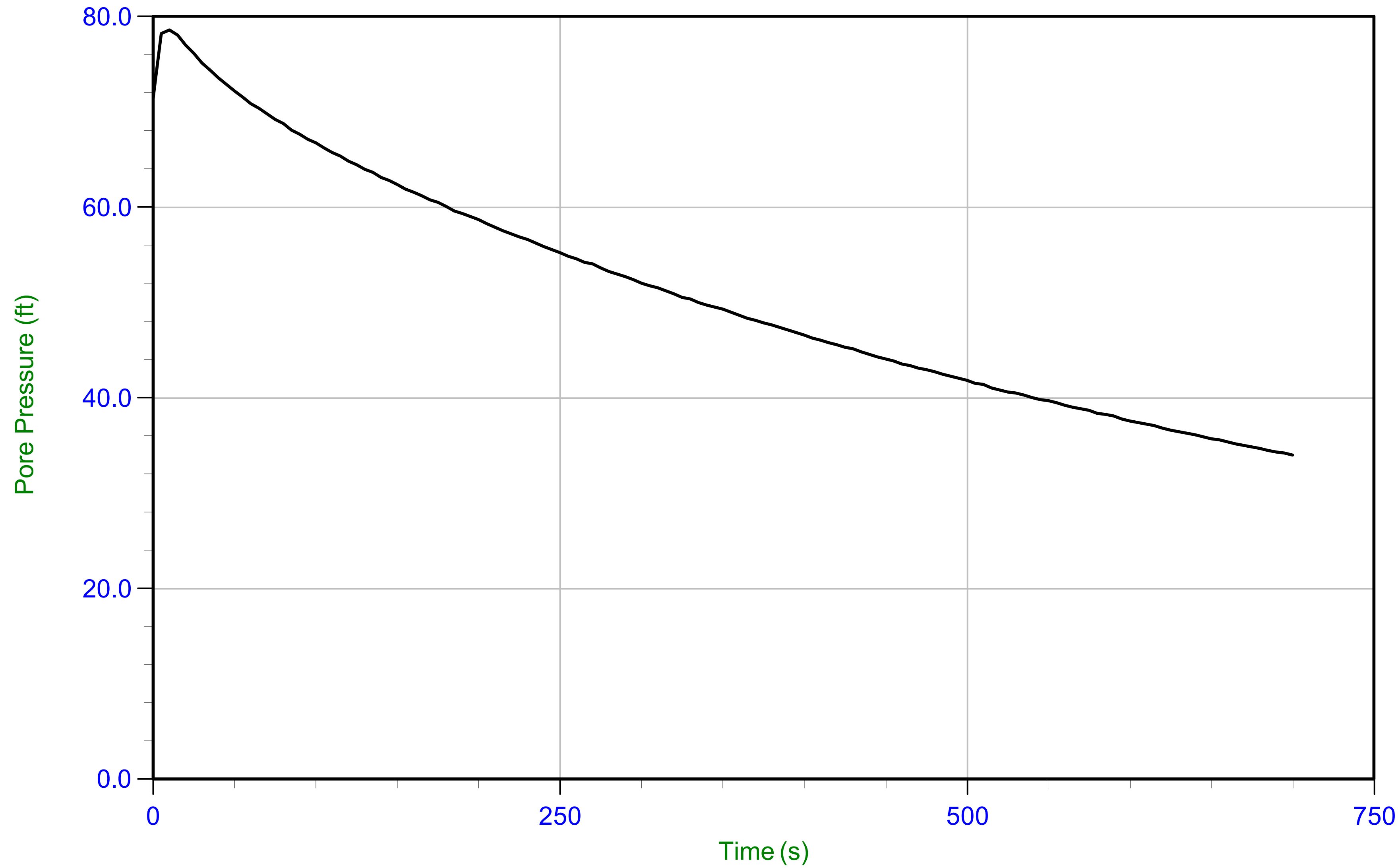
b. Houlsby and Teh, 1991

ConeTec

HNTB

Job No: 18-53065
Date: 06-Jun-2018 12:05:00
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-203
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP203.PPD
Depth: 3.400 m / 11.155 ft
Duration: 700.0 s

U Min: 34.0 ft
U Max: 78.6 ft

WT: 0.914 m / 3.000 ft
Ueq: 8.2 ft
U(50): 43.37 ft

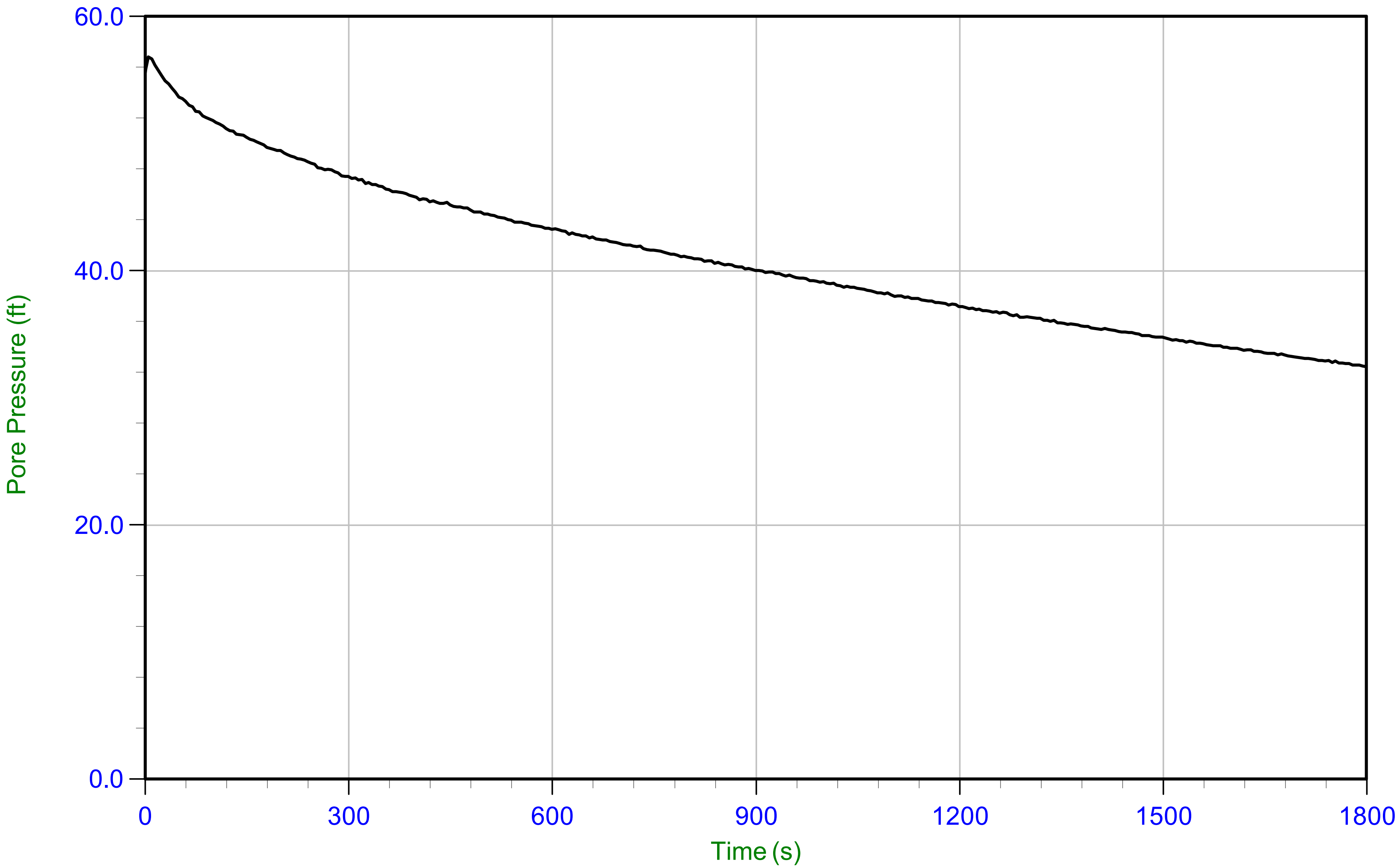
T(50): 455.5 s
Ir: 100
Ch: 1.5 cm²/min

ConeTec

HNTB

Job No: 18-53065
Date: 06-Jun-2018 12:05:00
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-203
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP203.PPD
Depth: 4.600 m / 15.092 ft
Duration: 1800.0 s

U Min: 32.5 ft
U Max: 56.8 ft

WT: 0.914 m / 3.000 ft
Ueq: 12.1 ft
U(50): 34.46 ft

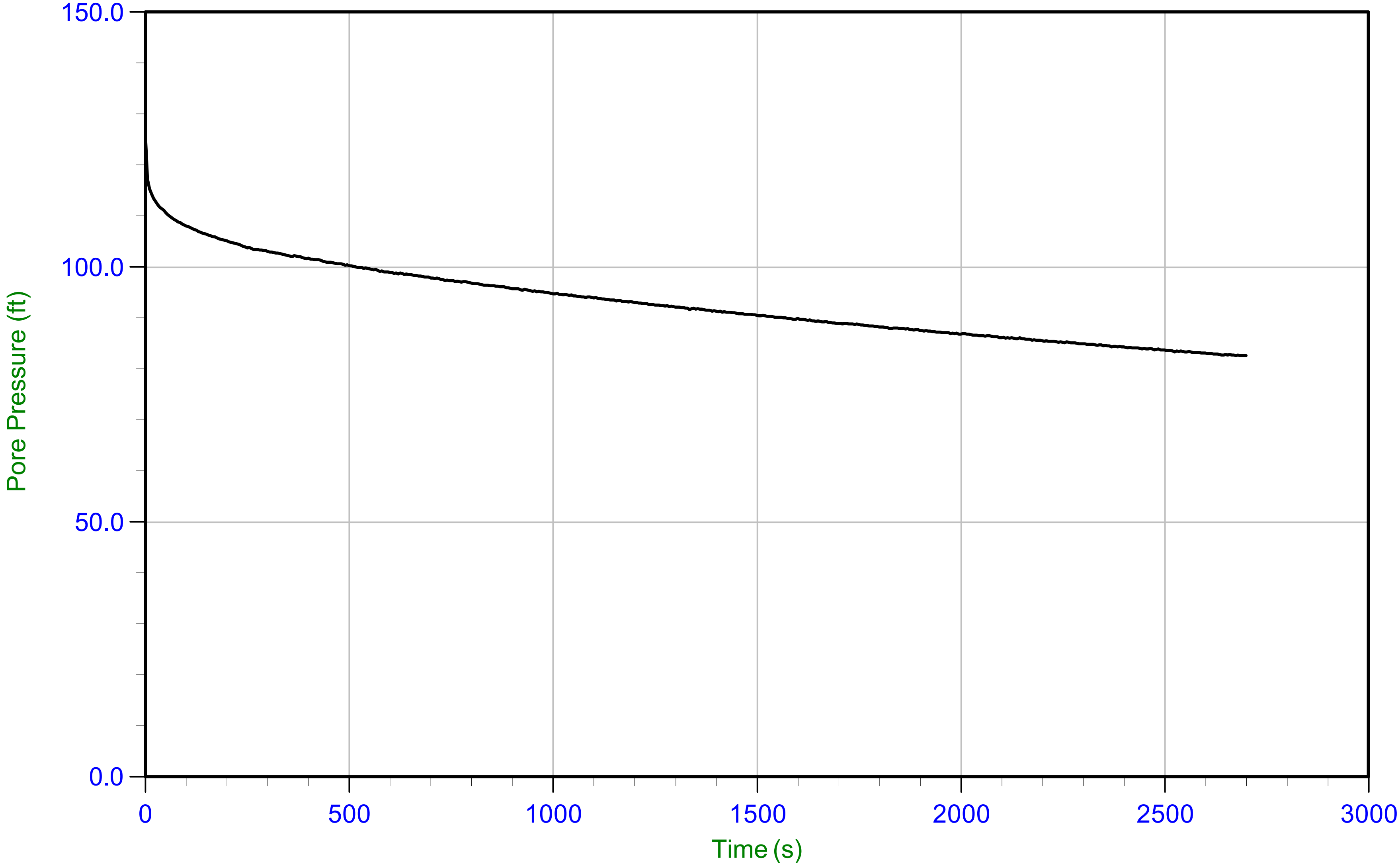
T(50): 1526.7 s
Ir: 100
Ch: 0.5 cm²/min

ConeTec

HNTB

Job No: 18-53065
Date: 06-Jun-2018 12:05:00
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-203
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP203.PPD
Depth: 13.100 m / 42.978 ft
Duration: 2700.0 s

U Min: 82.6 ft
U Max: 127.9 ft

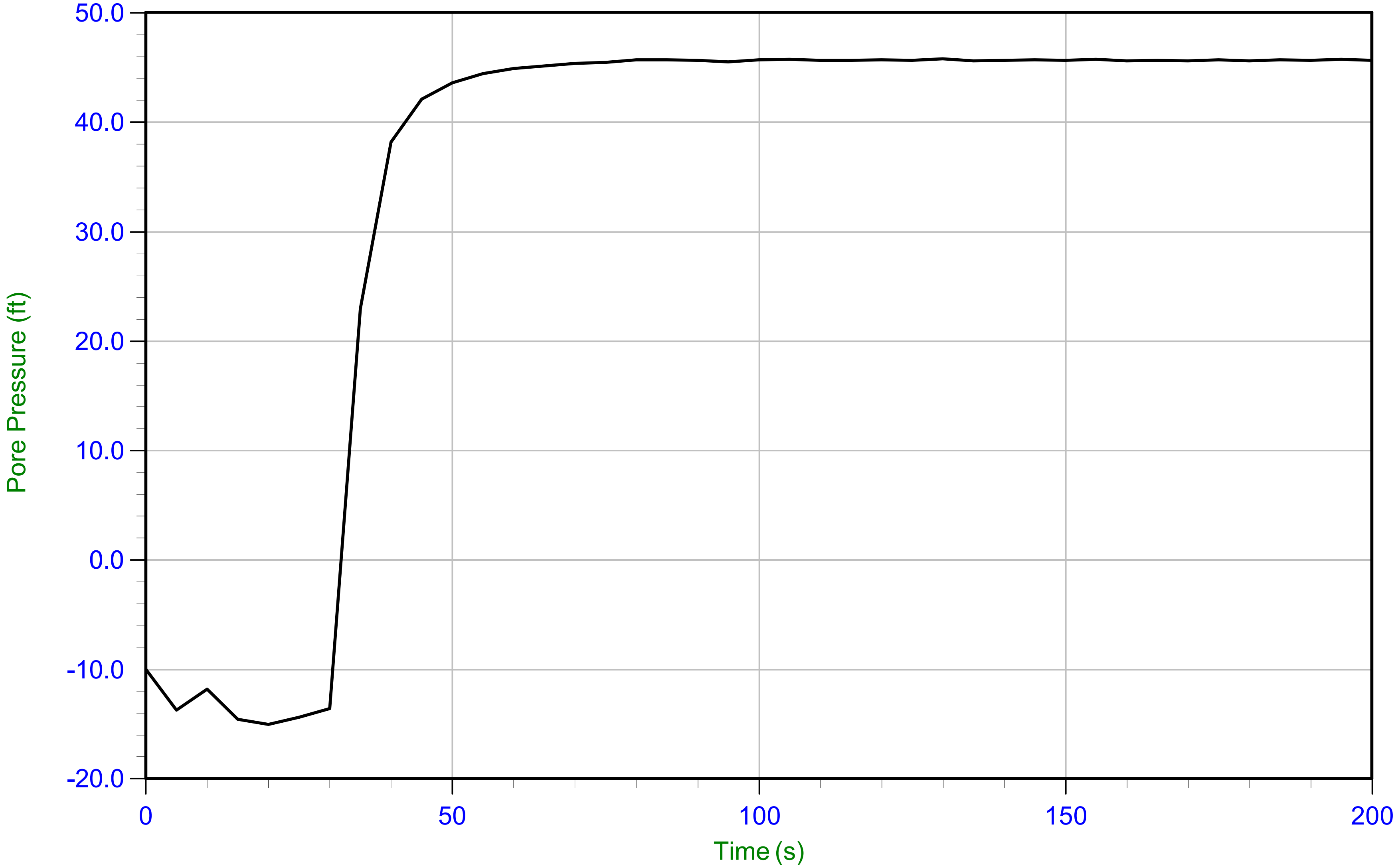
WT: 0.914 m / 3.000 ft
Ueq: 40.0 ft
U(50): 83.92 ft

T(50): 2471.7 s
Ir: 100
Ch: 0.3 cm²/min

HNTB

Job No: 18-53065
Date: 06-Jun-2018 12:05:00
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-203
Cone: AD521 Area=15 cm²

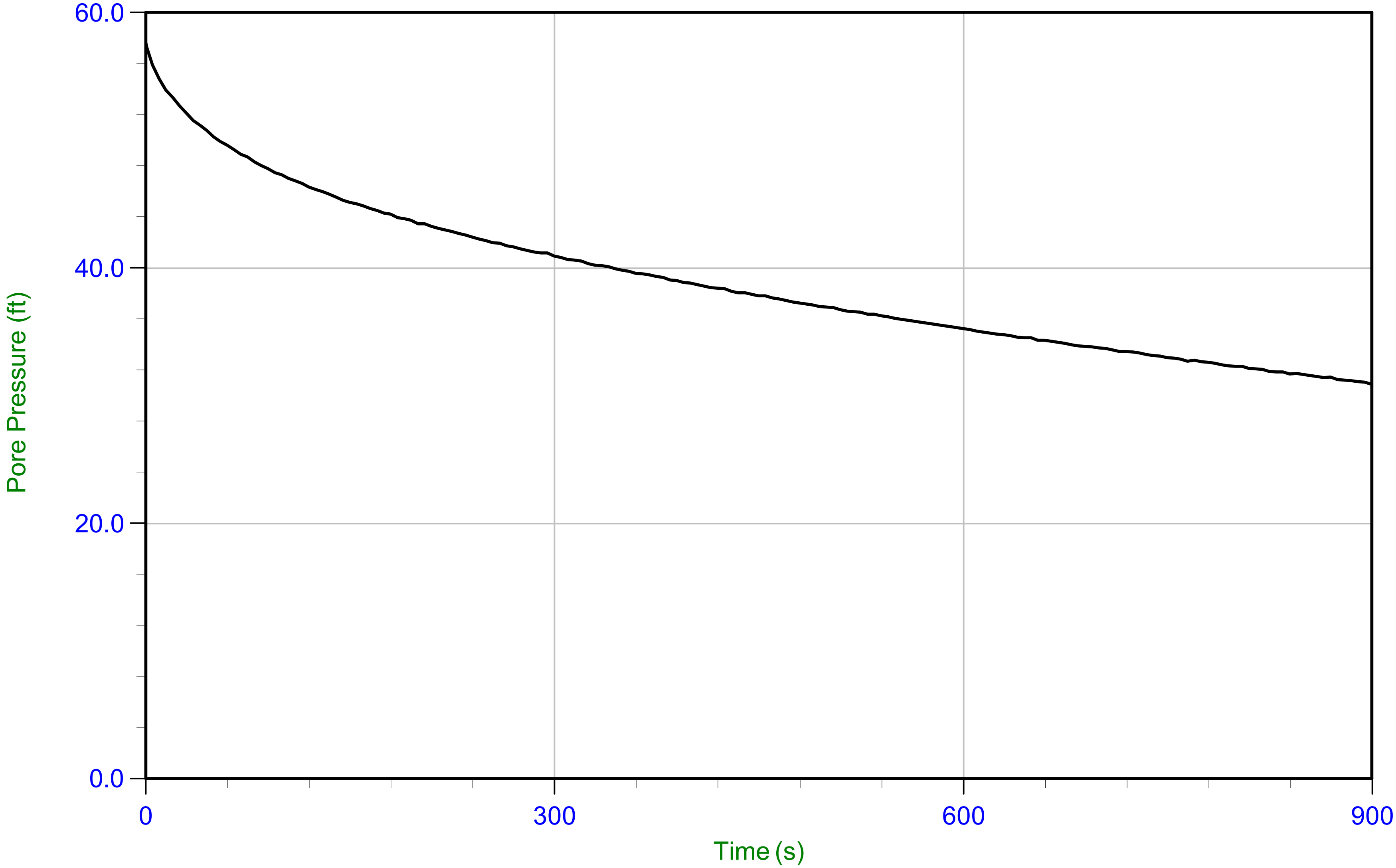


Trace Summary:

Filename: 18-53065_CP203.PPD
Depth: 18.300 m / 60.039 ft
Duration: 200.0 s

U Min: -15.0 ft
U Max: 45.8 ft

WT: 4.379 m / 14.367 ft
Ueq: 45.7 ft



Trace Summary:

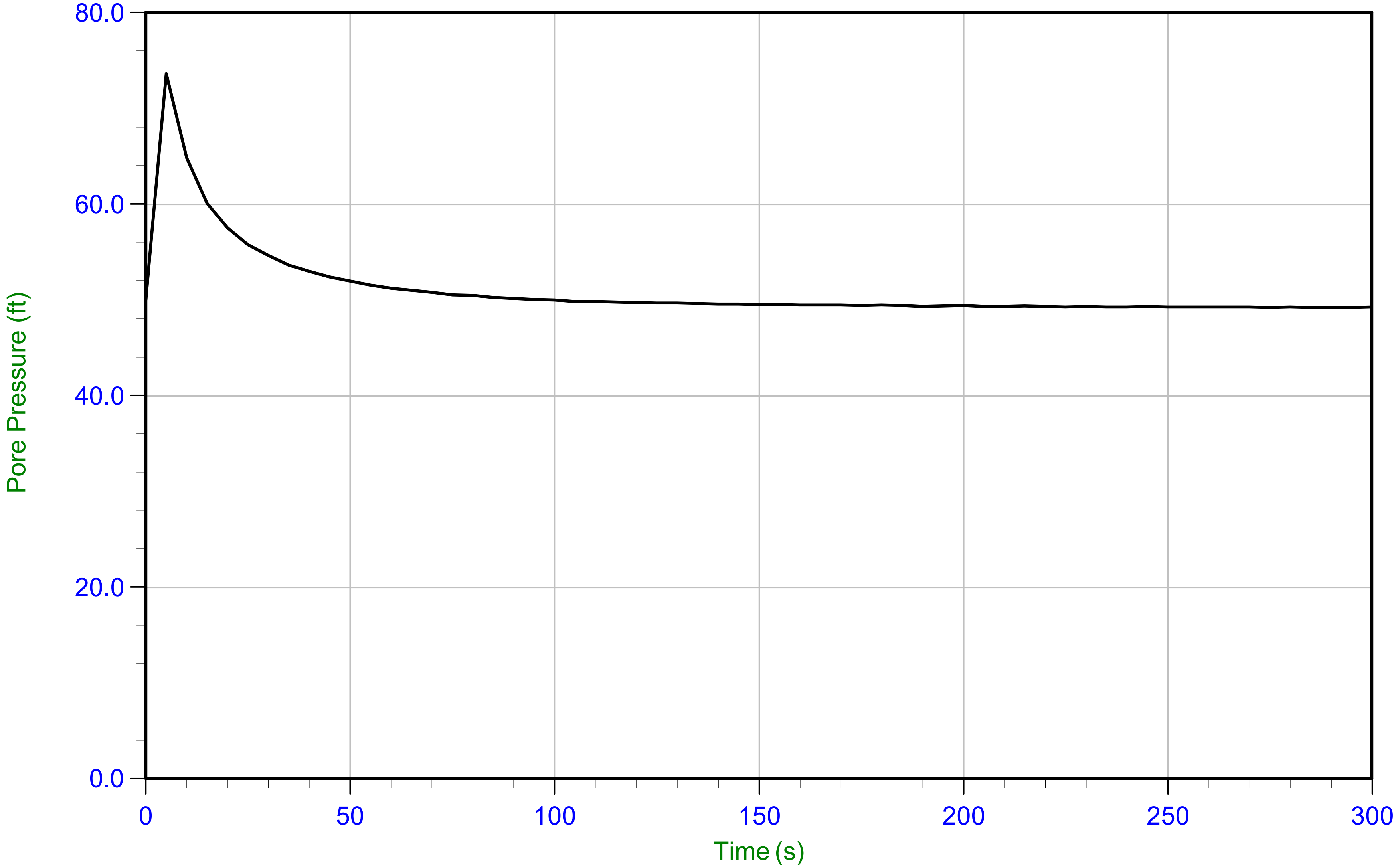
Filename: 18-53065_SP205.PPD	U Min: 30.9 ft	WT: 0.914 m / 3.000 ft	T(50): 475.9 s
Depth: 6.100 m / 20.013 ft	U Max: 57.6 ft	Ueq: 17.0 ft	Ir: 100
Duration: 900.0 s		U(50): 37.31 ft	Ch: 1.5 cm²/min

ConeTec

HNTB

Job No: 18-53065
Date: 06-Jun-2018 08:51:20
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: SCPT18-205
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_SP205.PPD
Depth: 20.350 m / 66.764 ft
Duration: 300.0 s

U Min: 49.2 ft
U Max: 73.6 ft

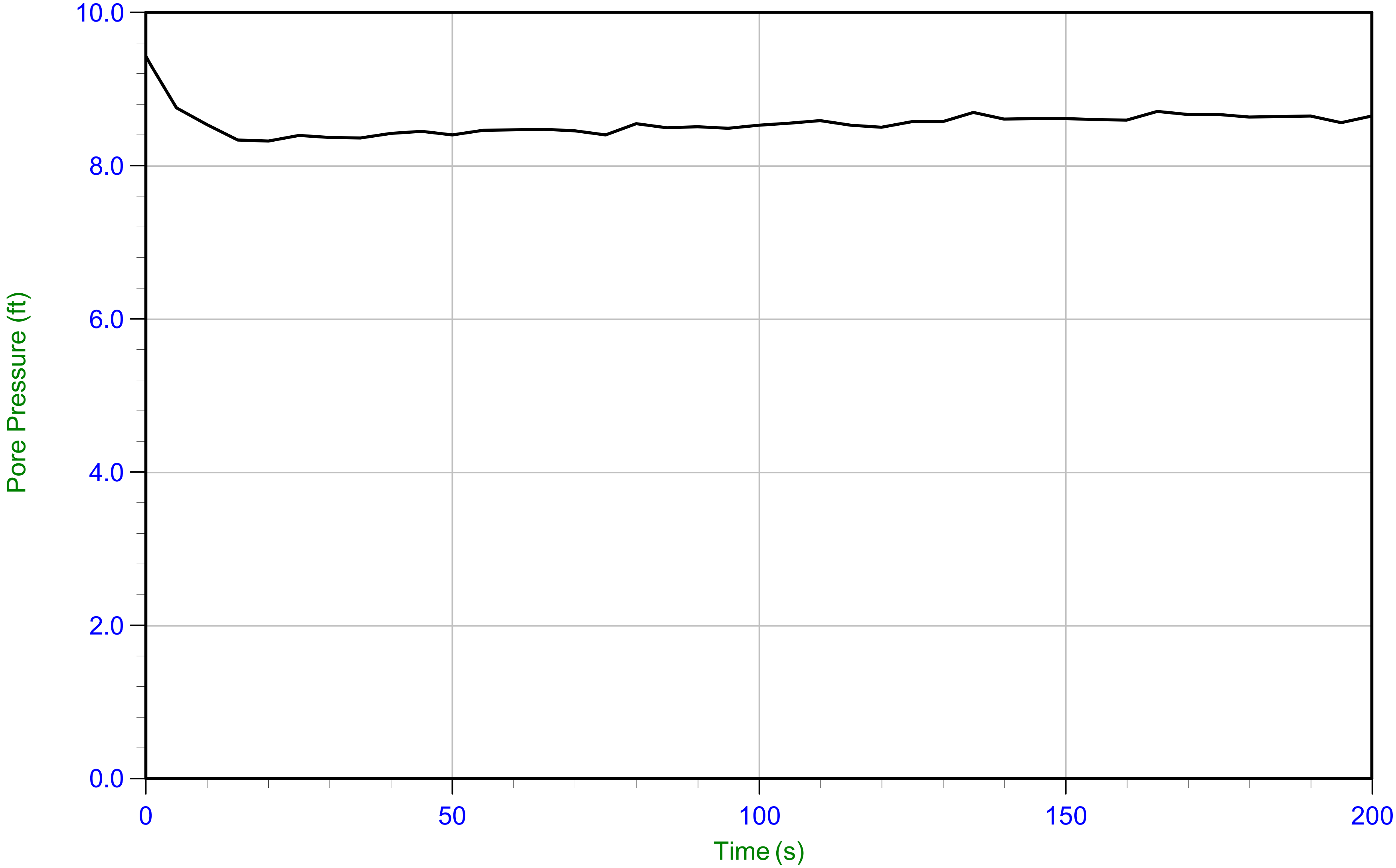
WT: 5.276 m / 17.310 ft
Ueq: 49.5 ft

CONETEC

HNTB

Job No: 18-53065
Date: 05-Jun-2018 11:15:21
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-209
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP209.PPD
Depth: 3.700 m / 12.139 ft
Duration: 200.0 s

U Min: 8.3 ft
U Max: 9.4 ft

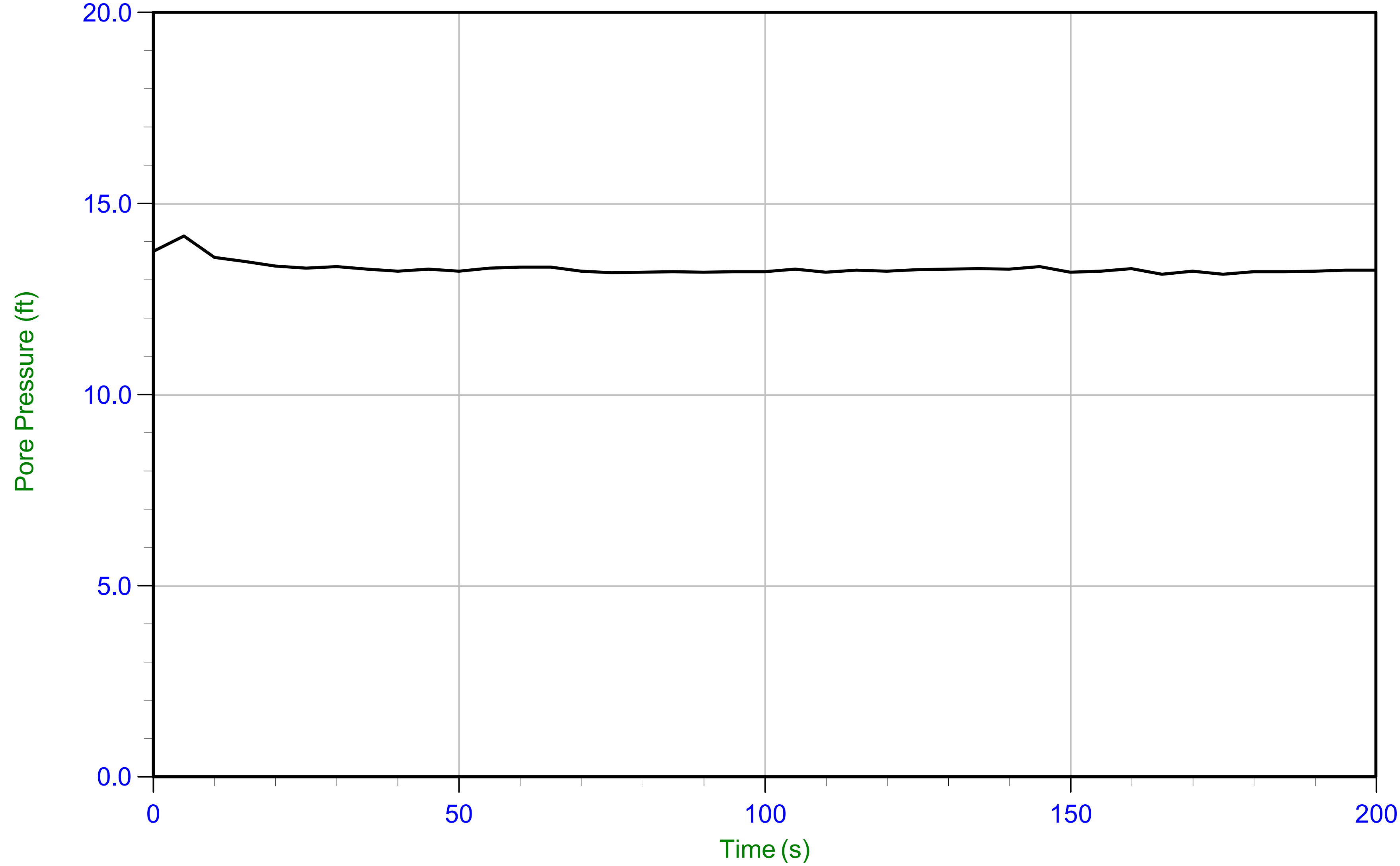
WT: 1.084 m / 3.556 ft
Ueq: 8.6 ft

CONETEC

HNTB

Job No: 18-53065
Date: 05-Jun-2018 11:15:21
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-209
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP209.PPD
Depth: 5.200 m / 17.060 ft
Duration: 200.0 s

U Min: 13.2 ft
U Max: 14.2 ft

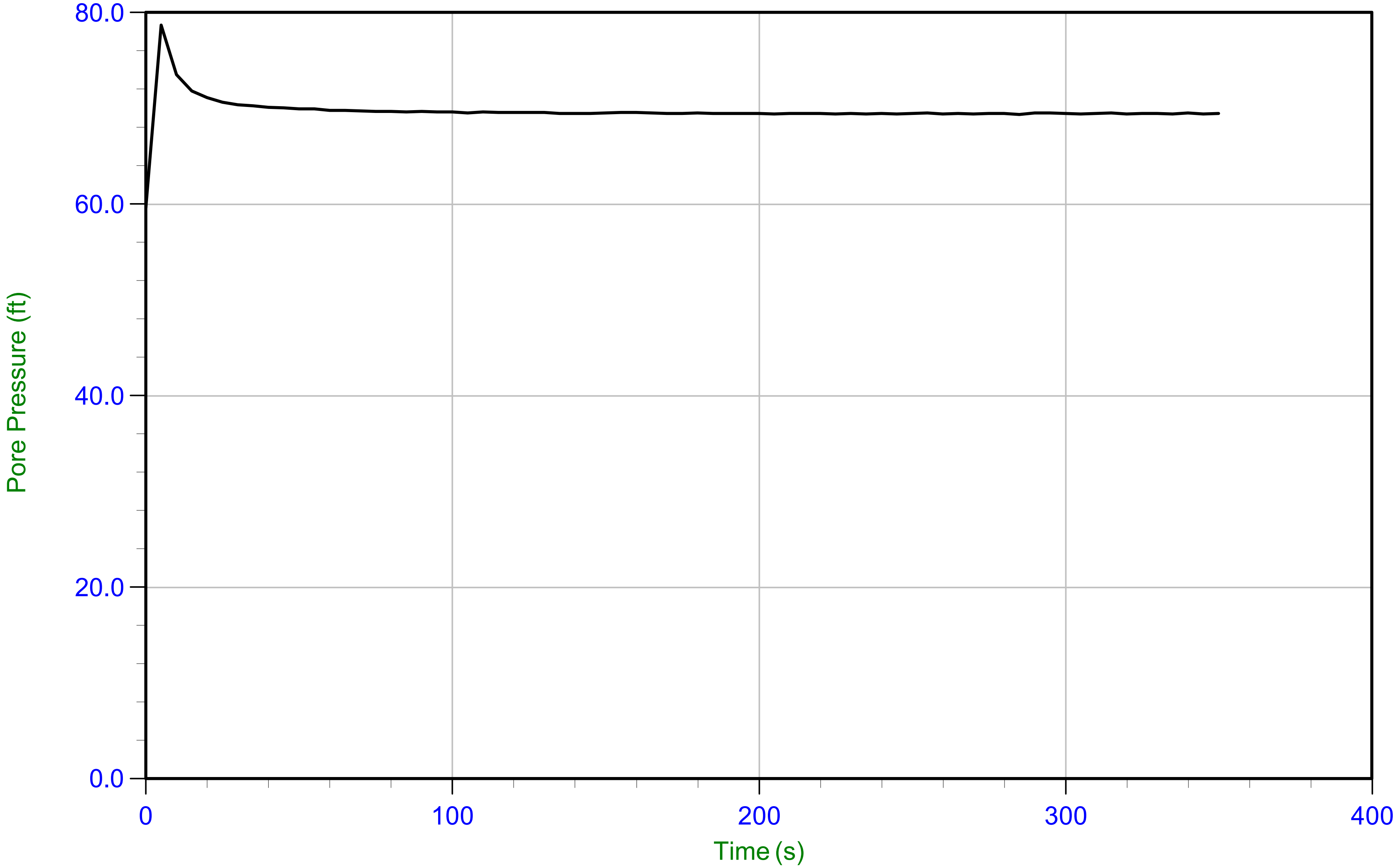
WT: 1.143 m / 3.750 ft
Ueq: 13.3 ft

CONETEC

HNTB

Job No: 18-53065
Date: 05-Jun-2018 11:15:21
Site: Exit 45, Maine Turnpike, Scarborough, ME

Sounding: CPT18-209
Cone: AD521 Area=15 cm²



Trace Summary:

Filename: 18-53065_CP209.PPD
Depth: 27.200 m / 89.238 ft
Duration: 350.0 s

U Min: 59.6 ft
U Max: 78.7 ft

WT: 6.008 m / 19.711 ft
Ueq: 69.5 ft

Flat Plate Dilatometer Test Plots and Tabular Results

CONETEC

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831813
Client:	HNTB-Parsippany	Easting (m):	391624
Sounding ID:	DMT18-203	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	14.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS

Depth[1]	A	B	C	ΔA	ΔB	p_0	p_1	p_2	u_0	γ_T[2]	σ_{v0}	σ_{v0}'	I_D	K_D	E_D	K_0	OCR[3]	OCR[4]	φ'[4]	R_M	s_u[4]	s_u[5]	M
(ft)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(psf)	(pcf)	(psf)	(psf)			(ksf)				(deg)		(psf)	(psf)	(ksf)
1.00	0.75	4.20		0.15	0.20	0.75	4.00		0.00	104.06	104.07	104.07	4.37	14.95	235.90				42.25	2.88			679.58
2.00	3.20	8.90		0.15	0.20	3.08	8.70		0.00	114.81	218.88	218.88	1.82	29.41	407.11				44.91	3.52			1433.62
3.00	1.75	5.60		0.15	0.20	1.73	5.40		0.00	109.18	328.07	328.07	2.13	10.98	266.34				40.92	2.59			689.45
4.00	2.65	7.65		0.15	0.20	2.57	7.45		0.00	112.97	441.04	441.04	1.90	12.16	353.85				41.37	2.69			950.09
5.00	5.15	15.60		0.15	0.20	4.80	15.40		0.00	121.16	562.21	562.21	2.21	17.81	768.57				42.98	3.05			2341.52
6.00	4.95	9.60		0.15	0.20	4.89	9.40		0.00	116.20	678.42	678.42	0.92	15.04	327.21	2.35	7.65	23.27		2.89	1858.42	1020.25	944.44
7.00	3.25	6.90		0.15	0.20	3.24	6.70		0.00	112.34	790.77	790.77	1.07	8.54	251.12	1.67	4.35	9.63		2.34	1068.49	675.64	588.51
8.00	3.40	5.30		0.15	0.20	3.47	5.10		0.00	108.55	899.33	899.33	0.47	8.06	117.95	1.60	4.10	8.80		2.28	1130.48	725.25	268.86
9.00	2.85	3.75		0.15	0.20	2.97	3.55		0.00	102.28	1001.62	1001.62	0.19	6.20	41.85	1.35	3.15	5.84		2.01	906.08	620.82	84.11
10.00	2.35	3.25		0.15	0.20	2.47	3.05		0.00	101.34	1102.96	1102.96	0.23	4.68	41.85	1.11	2.38	3.77		1.72	702.62	516.39	72.08
11.00	2.20	3.15		0.15	0.20	2.32	2.95		0.00	101.46	1204.43	1204.43	0.27	4.02	45.66	0.99	2.05	2.98		1.57	634.75	484.54	71.53
12.00	1.95	2.35		0.15	0.20	2.10	2.15		0.00	89.15	1293.59	1293.59	0.03	3.39	3.80	0.87	1.72	2.27		1.39	549.69	438.07	5.29
13.00	1.90	2.50		0.15	0.20	2.04	2.30		0.00	96.48	1390.08	1390.08	0.13	3.06	19.02	0.80	1.56	1.94		1.29	520.66	425.54	24.48
14.00	2.00	2.65		0.15	0.20	2.14	2.45		0.00	97.59	1487.68	1487.68	0.15	3.00	22.83	0.78	1.53	1.88		1.27	542.70	445.90	28.88
15.00	1.80	2.30		0.15	0.20	1.94	2.10		41.37	93.78	1581.46	1540.09	0.08	2.61	11.41	0.70	1.33	1.51		1.12	472.00	401.56	12.81
16.00	1.90	2.35		0.15	0.20	2.05	2.15		103.80	92.07	1673.54	1569.73	0.05	2.65	7.61	0.71	1.35	1.56		1.14	492.03	416.73	8.68
17.00	2.20	2.75		0.15	0.20	2.34	2.55		166.23	95.91	1769.45	1603.22	0.09	2.94	15.22	0.77	1.50	1.83		1.25	572.04	472.10	18.98
18.00	2.10	2.60		0.15	0.20	2.24	2.40		228.66	94.27	1863.73	1635.06	0.07	2.72	11.41	0.72	1.39	1.62		1.17	529.42	445.49	13.32
19.00	2.30	2.95		0.15	0.20	2.44	2.75		291.10	97.95	1961.68	1670.59	0.14	2.87	22.83	0.76	1.46	1.76		1.22	577.23	479.45	27.86
20.00	2.30	2.80		0.15	0.20	2.44	2.60		353.53	94.57	2056.26	1702.73	0.07	2.79	11.41	0.74	1.42	1.68		1.19	567.49	474.77	13.59
21.00	2.30	2.75		0.15	0.20	2.45	2.55		415.96	92.61	2148.88	1732.92	0.05	2.71	7.61	0.72	1.38	1.60		1.16	556.50	469.05	8.83
22.00	2.40	2.90		0.15	0.20	2.54	2.70		478.39	94.65	2243.53	1765.15	0.07	2.74	11.41	0.73	1.39	1.63		1.17	574.87	483.17	13.38
23.00	2.55	3.15		0.15	0.20	2.69	2.95		540.82	97.33	2340.87	1800.06	0.11	2.82	19.02	0.74	1.43	1.71		1.20	607.86	507.21	22.86
24.00	2.60	3.15		0.15	0.20	2.74	2.95		603.25	96.30	2437.18	1833.93	0.09	2.79	15.22	0.74	1.42	1.68		1.19	612.08	511.94	18.14
25.00	2.55	3.15		0.15	0.20	2.69	2.95		665.68	97.21	2534.40	1868.72	0.11	2.65	19.02	0.71	1.35	1.55		1.14	583.72	494.73	21.65
26.00	2.55	3.10		0.15	0.20	2.69	2.90		728.11	96.08	2630.49	1902.38	0.09	2.57	15.22	0.69	1.31	1.48		1.11	572.74	489.01	16.86
27.00	2.55	3.10		0.15	0.20	2.69	2.90		790.54	96.02	2726.51	1935.97	0.09	2.49	15.22	0.67	1.27	1.41		1.08	561.15	482.76	16.38
28.00	2.60	3.15		0.15	0.20	2.74	2.95		852.97	96.06	2822.58	1969.61	0.09	2.47	15.22	0.66	1.26	1.39		1.07	564.82	486.96	16.25
29.00	2.70	3.25		0.15	0.20	2.84	3.05		915.40	96.20	2918.78	2003.39	0.09	2.50	15.22	0.67	1.27	1.42		1.08	583.64	501.61	16.45
30.00	2.90	3.45		0.15	0.20	3.04	3.25		977.83	96.53	3015.32	2037.49	0.08	2.64	15.22	0.70	1.34	1.54		1.13	633.09	537.13	17.25
31.00	3.05	3.70		0.15	0.20	3.19	3.50		1040.26	98.72	3114.05	2073.80	0.12	2.71	22.83	0.72	1.38	1.60		1.16	665.76	561.18	26.49
32.00	3.40	4.15		0.15	0.20	3.53	3.95		1102.69	100.71	3214.77	2112.08	0.14	2.97	30.44	0.78	1.51	1.85		1.26	761.26	626.99	38.21
33.00	3.25	3.90		0.15	0.20	3.39	3.70		1165.12	98.97	3313.75	2148.64	0.11	2.75	22.83	0.73	1.40	1.64		1.18	703.21	590.46	26.85
34.00	3.45	4.05		0.15	0.20	3.59	3.85		1227.55	98.37	3412.13	2184.58	0.09	2.87	19.02	0.76	1.46	1.75		1.22	754.14	626.51	23.21
35.00	3.45	4.05		0.15	0.20	3.59	3.85		1289.98	98.32	3510.45	2220.48	0.09	2.79	19.02	0.74	1.42	1.68		1.19	741.73	620.27	22.69
36.00	3.50	4.15		0.15	0.20	3.64	3.95		1352.41	99.25	3609.71	2257.30	0.11	2.76	22.83	0.73	1.41	1.66		1.18	744.17	623.94	26.99
37.00	3.50	4.10		0.15	0.20	3.64	3.90		1414.84	98.30	3708.02	2293.18	0.09	2.70	19.02	0.72	1.37	1.59		1.16	732.75	618.22	22.00
38.00	3.70	4.35		0.15	0.20	3.84	4.15		1477.27	99.48	3807.50	2330.23	0.10	2.80	22.83	0.74	1.43	1.69		1.20	781.84	653.23	27.31
39.00	3.90	4.60		0.15	0.20	4.03	4.40		1539.70	100.51	3908.02	2368.32	0.11	2.91	26.63	0.76	1.48	1.79		1.23	831.18	688.24	32.85
40.00	3.85	4.50		0.15	0.20	3.99	4.30		1602.13	99.62	4007.64	2405.51	0.10	2.79	22.83	0.74	1.42	1.68		1.19	803.72	672.07	27.24
41.00	4.00	4.65		0.15	0.20	4.14	4.45		1664.56	99.80	4107.45	2442.89	0.09	2.85	22.83	0.75	1.45	1.74		1.21	838.15	697.16	27.73
42.00	3.90	4.50		0.15	0.20	4.04	4.30		1726.99	98.70	4206.16	2479.17	0.08	2.70	19.02	0.72	1.38	1.60		1.16	795.42	670.55	22.06
43.00	4.10	4.75		0.15	0.20	4.24	4.55		1789.42	99.86	4306.03	2516.61	0.09	2.80	22.83	0.74	1.43	1.69		1.20	844.49	705.56	27.32
44.00	4.20	4.95		0.15	0.20	4.33	4.75		1851.85	101.40	4407.44	2555.59	0.12	2.81	30.44	0.74	1.43	1.70		1.20	861.57	719.15	36.54
45.00	4.40	5.15		0.15	0.20	4.53	4.95		1914.28	101.65	4509.09	2594.81	0.12	2.91	30.44	0.77	1.48	1.79		1.23	911.62	754.68	37.57
46.00	4.45	5.15		0.15	0.20	4.58	4.95		1976.71	101.00	4610.10	2633.39	0.10	2.88	26.63	0.76	1.47	1.77		1.23	915.37	759.40	32.64
47.00	4.75	5.50		0.15	0.20	4.88	5.30		2039.14	102.04	4712.15	2673.01	0.11	3.05	30.44	0.80	1.55	1.93		1.28	996.62	815.30	39.05
48.00	4.70	5.40		0.15	0.20	4.83	5.20		2101.57	101.26	4813.42	2711.85	0.10	2.95	26.63	0.77	1.50	1.83		1.25	968.48	799.13	33.23
49.00	4.85	5.60		0.15	0.20	4.98	5.40		2164.00	102.09	4915.52	2751.52	0.11	2.99	30.44	0.78	1.52	1.88		1.26	1002.19	823.69	38.47
50.00	4.95	5.70		0.15	0.20	5.08	5.50		2226.43	102.18	5017.72	2791.28	0.10	3.00	30.44	0.79	1.53	1.89		1.27	1020.84	838.34	38.57

1. Depth is referenced below the exisiting ground surface at the time of testing.
2. Mayne et al., 2002

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831813
Client:	HNTB-Parsippany	Easting (m):	391624
Sounding ID:	DMT18-203	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	14.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS

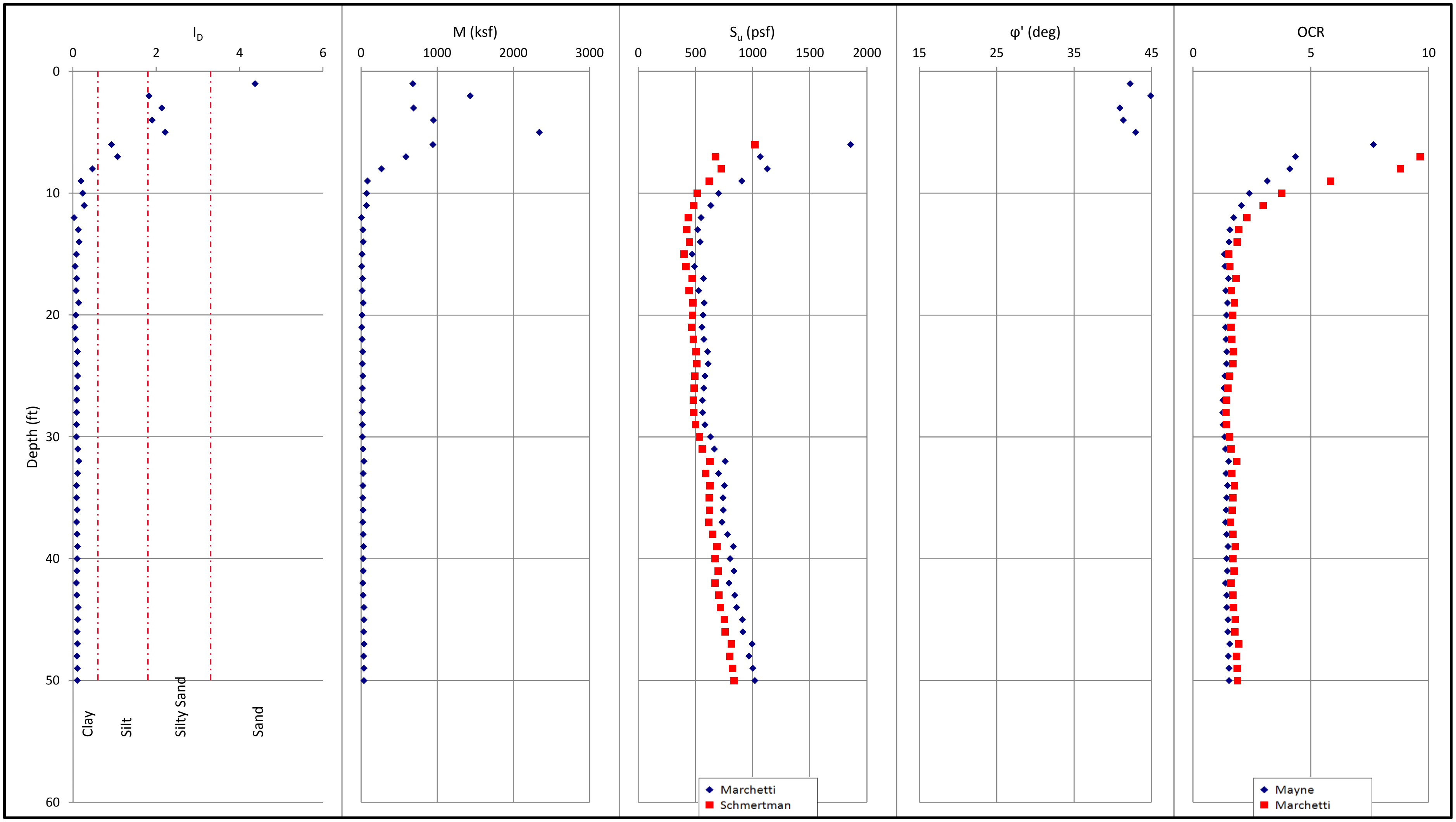
Depth[1]	A	B	C	ΔA	ΔB	p_0	p_1	p_2	u_0	γ_T[2]	σ_{v0}	σ_{v0}'	I_D	K_D	E_D	K_0	OCR[3]	OCR[4]	φ'[4]	R_M	s_u[4]	s_u[5]	M
(ft)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(psf)	(pcf)	(psf)	(psf)			(ksf)				(deg)		(psf)	(psf)	(ksf)

3. Mayne, 1995
4. Marchetti et al., 2001
5. Schmertman, 1991

CONETEC

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831813
Client:	HNTB-Parsippany	Easting (m):	391624
Sounding ID:	DMT18-203	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	14.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

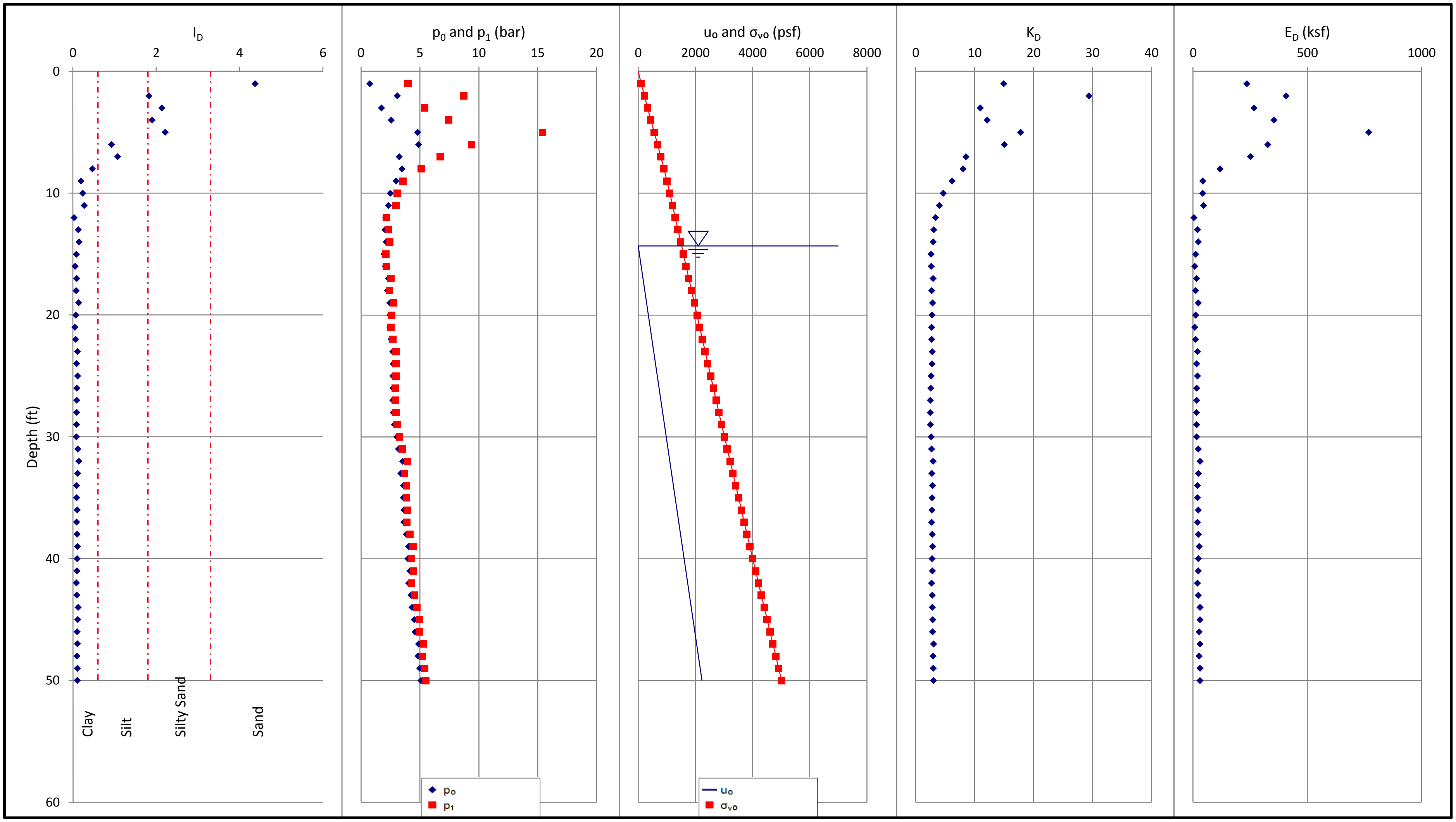
FLAT PLATE DILATOMETER TEST RESULTS



CONETEC

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831813
Client:	HNTB-Parsippany	Easting (m):	391624
Sounding ID:	DMT18-203	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	14.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS



Sheet 4 of 4

CONETEC

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831828
Client:	HNTB-Parsippany	Easting (m):	391570
Sounding ID:	DMT18-205	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	17.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

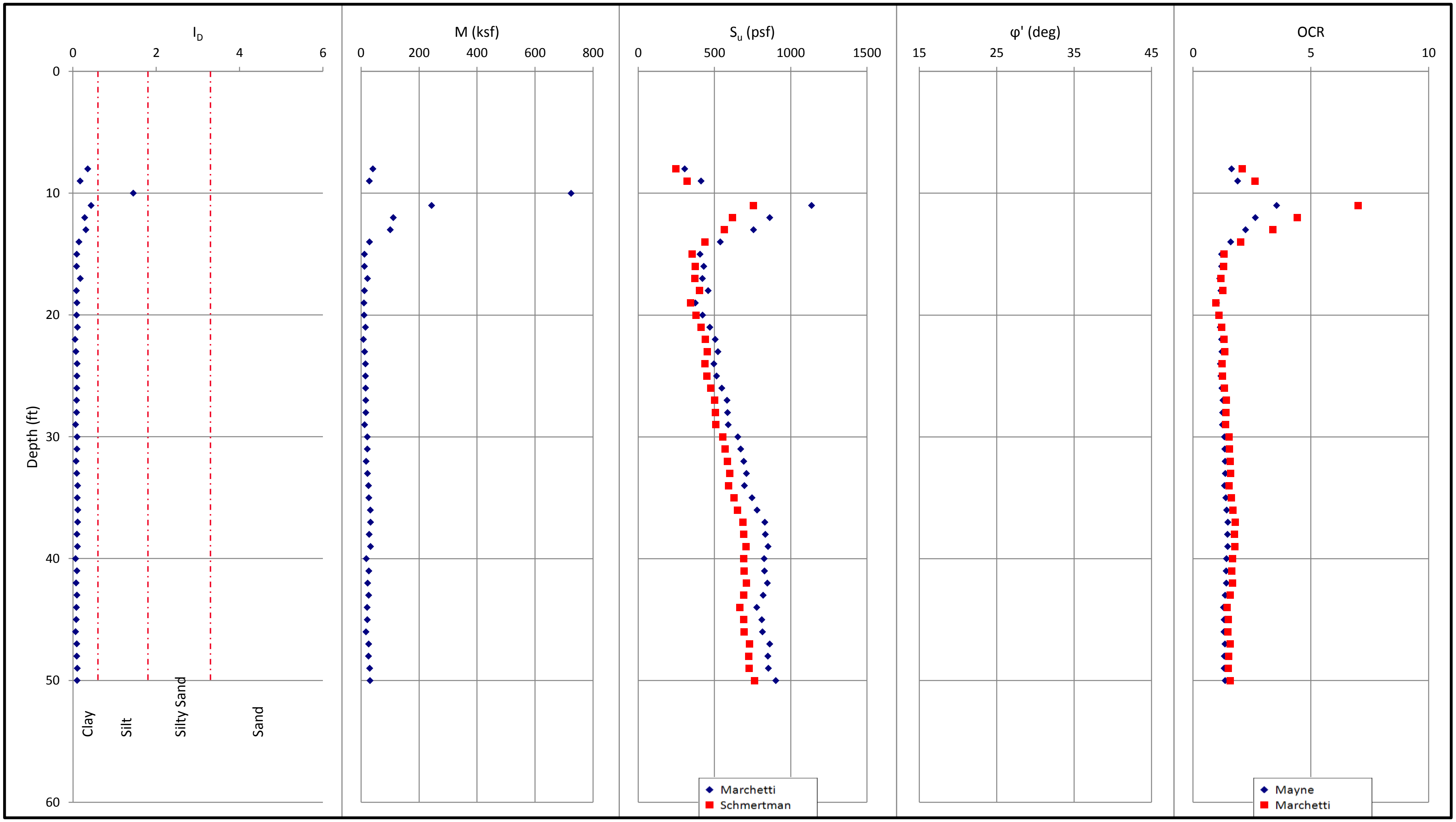
FLAT PLATE DILATOMETER TEST RESULTS

Depth[1] (ft)	A (bar)	B (bar)	C (bar)	ΔA (bar)	ΔB (bar)	p_0 (bar)	p_1 (bar)	p_2 (bar)	u_0 (psf)	γ_T[2] (pcf)	σ_{v0} (psf)	σ_{v0}' (psf)	I_D	K_D	E_D (ksf)	K_0	OCR[3]	OCR[4]	φ'[4] (deg)	R_M	s_u[4] (psf)	s_u[5] (psf)	M (ksf)
8.00	1.05	1.80		0.15	0.20	1.18	1.60		0.00	96.12	768.99	768.99	0.36	3.20	30.44	0.83	1.63	2.09		1.33	305.01	246.45	40.60
9.00	1.40	2.00		0.15	0.20	1.54	1.80		0.00	95.13	864.13	864.13	0.17	3.72	19.02	0.93	1.89	2.63		1.49	412.40	321.11	28.26
10.00	3.30	8.10		0.15	0.20	3.23	7.90		0.00	114.01	978.16	978.16	1.45	6.89	338.63					2.14			724.31
11.00	3.55	5.40		0.15	0.20	3.63	5.20		0.00	108.61	1086.77	1086.77	0.43	6.97	114.14	1.46	3.55	7.01		2.13	1137.73	757.10	243.07
12.00	2.85	4.00		0.15	0.20	2.96	3.80		0.00	104.19	1190.97	1190.97	0.28	5.19	60.88	1.19	2.64	4.43		1.83	863.14	618.21	111.28
13.00	2.60	3.75		0.15	0.20	2.71	3.55		0.00	103.73	1294.71	1294.71	0.31	4.37	60.88	1.05	2.23	3.39		1.65	757.02	566.00	100.56
14.00	1.96	2.60		0.15	0.20	2.10	2.40		0.00	97.34	1392.05	1392.05	0.15	3.14	22.07	0.82	1.60	2.03		1.31	539.06	437.65	29.00
15.00	1.55	2.05		0.15	0.20	1.69	1.85		0.00	93.18	1485.24	1485.24	0.09	2.38	11.41	0.64	1.21	1.31		1.03	406.12	353.49	11.74
16.00	1.65	2.15		0.15	0.20	1.79	1.95		0.00	93.45	1578.70	1578.70	0.09	2.37	11.41	0.64	1.21	1.30		1.03	429.72	374.37	11.70
17.00	1.65	2.30		0.15	0.20	1.79	2.10		0.00	96.72	1675.43	1675.43	0.18	2.23	22.83	0.60	1.13	1.18		0.96	421.17	372.80	21.91
18.00	1.80	2.30		0.15	0.20	1.94	2.10		43.09	93.78	1769.21	1726.12	0.08	2.33	11.41	0.63	1.18	1.27		1.00	458.49	401.39	11.47
19.00	1.55	2.05		0.15	0.20	1.69	1.85		105.53	93.04	1862.26	1756.74	0.10	1.95	11.41	0.53	0.99	0.96		0.85	374.95	342.93	9.70
20.00	1.75	2.25		0.15	0.20	1.89	2.05		167.96	93.50	1955.77	1787.81	0.09	2.12	11.41	0.58	1.08	1.09		0.91	422.26	378.46	10.37
21.00	1.95	2.50		0.15	0.20	2.09	2.30		230.39	95.28	2051.05	1820.67	0.11	2.27	15.22	0.62	1.16	1.22		0.98	469.49	413.47	14.92
22.00	2.10	2.55		0.15	0.20	2.25	2.35		292.82	92.31	2143.37	1850.56	0.05	2.38	7.61	0.64	1.21	1.31		1.03	504.81	439.60	7.81
23.00	2.20	2.70		0.15	0.20	2.34	2.50		355.25	94.35	2237.73	1882.49	0.07	2.41	11.41	0.65	1.23	1.34		1.04	522.92	453.72	11.89
24.00	2.15	2.70		0.15	0.20	2.29	2.50		417.68	95.53	2333.27	1915.60	0.10	2.28	15.22	0.62	1.16	1.23		0.98	496.08	436.51	14.98
25.00	2.25	2.80		0.15	0.20	2.39	2.60		480.11	95.69	2428.97	1948.87	0.10	2.31	15.22	0.63	1.18	1.26		1.00	514.75	451.15	15.22
26.00	2.40	2.95		0.15	0.20	2.54	2.75		542.54	95.95	2524.93	1982.39	0.09	2.40	15.22	0.65	1.22	1.33		1.04	548.42	476.24	15.80
27.00	2.55	3.10		0.15	0.20	2.69	2.90		604.97	96.20	2621.14	2016.17	0.09	2.49	15.22	0.67	1.27	1.40		1.07	582.30	501.32	16.34
28.00	2.60	3.15		0.15	0.20	2.74	2.95		667.40	96.24	2717.38	2049.98	0.09	2.47	15.22	0.66	1.26	1.39		1.07	585.97	505.52	16.21
29.00	2.65	3.15		0.15	0.20	2.79	2.95		729.83	94.91	2812.30	2082.47	0.06	2.45	11.41	0.66	1.25	1.37		1.06	590.49	510.24	12.08
30.00	2.90	3.50		0.15	0.20	3.04	3.30		792.26	97.77	2910.08	2117.82	0.10	2.62	19.02	0.70	1.33	1.53		1.13	653.42	555.17	21.45
31.00	3.00	3.60		0.15	0.20	3.14	3.40		854.69	97.90	3007.99	2153.30	0.10	2.65	19.02	0.71	1.35	1.55		1.14	672.24	569.81	21.64
32.00	3.10	3.65		0.15	0.20	3.24	3.45		917.12	96.94	3104.94	2187.82	0.07	2.67	15.22	0.71	1.36	1.57		1.15	691.92	584.98	17.47
33.00	3.20	3.80		0.15	0.20	3.34	3.60		979.55	98.15	3203.09	2223.55	0.09	2.69	19.02	0.72	1.37	1.59		1.16	709.98	599.10	21.99
34.00	3.20	3.85		0.15	0.20	3.34	3.65		1041.98	98.99	3302.09	2260.11	0.11	2.62	22.83	0.70	1.33	1.52		1.13	697.12	592.33	25.74
35.00	3.40	4.05		0.15	0.20	3.54	3.85		1104.41	99.28	3401.38	2296.97	0.10	2.73	22.83	0.73	1.39	1.63		1.17	746.75	627.86	26.72
36.00	3.55	4.25		0.15	0.20	3.68	4.05		1166.84	100.24	3501.63	2334.79	0.12	2.79	26.63	0.74	1.42	1.68		1.19	780.25	652.42	31.78
37.00	3.75	4.45		0.15	0.20	3.88	4.25		1229.27	100.51	3602.14	2372.87	0.11	2.90	26.63	0.76	1.48	1.78		1.23	830.35	687.95	32.79
38.00	3.80	4.45		0.15	0.20	3.94	4.25		1291.70	99.77	3701.91	2410.21	0.09	2.87	22.83	0.76	1.46	1.76		1.22	834.22	692.67	27.90
39.00	3.90	4.60		0.15	0.20	4.03	4.40		1354.13	100.64	3802.56	2448.43	0.11	2.89	26.63	0.76	1.47	1.77		1.23	852.17	706.79	32.67
40.00	3.85	4.40		0.15	0.20	3.99	4.20		1416.56	97.76	3900.33	2483.77	0.06	2.78	15.22	0.74	1.42	1.68		1.19	826.48	691.67	18.11
41.00	3.90	4.55		0.15	0.20	4.04	4.35		1478.99	99.78	4000.12	2521.13	0.09	2.76	22.83	0.73	1.40	1.65		1.18	828.10	694.83	26.92
42.00	4.00	4.60		0.15	0.20	4.14	4.40		1541.42	98.98	4099.11	2557.69	0.08	2.78	19.02	0.74	1.41	1.67		1.19	847.70	709.99	22.57
43.00	3.95	4.60		0.15	0.20	4.09	4.40		1603.85	99.77	4198.89	2595.04	0.09	2.67	22.83	0.71	1.36	1.57		1.15	819.12	692.79	26.17
44.00	3.85	4.45		0.15	0.20	3.99	4.25		1666.28	98.67	4297.57	2631.29	0.08	2.53	19.02	0.68	1.29	1.44		1.09	777.29	666.18	20.78
45.00	4.00	4.60		0.15	0.20	4.14	4.40		1728.71	98.85	4396.43	2667.72	0.08	2.59	19.02	0.69	1.32	1.50		1.12	811.25	691.26	21.23
46.00	4.05	4.60		0.15	0.20	4.19	4.40		1791.14	97.79	4494.22	2703.08	0.06	2.57	15.22	0.69	1.31	1.48		1.11	815.49	695.99	16.88
47.00	4.25	4.90		0.15	0.20	4.39	4.70		1853.57	100.03	4594.26	2740.69	0.09	2.67	22.83	0.71	1.36	1.57		1.14	863.32	730.47	26.13
48.00	4.25	4.90		0.15	0.20	4.39	4.70		1916.00	99.99	4694.26	2778.26	0.09	2.61	22.83	0.70	1.33	1.51		1.12	851.21	724.23	25.61
49.00	4.30	5.00		0.15	0.20	4.43	4.80		1978.43	100.79	4795.06	2816.63	0.11	2.58	26.63	0.69	1.32	1.49		1.11	853.68	727.90	29.65
50.00	4.50	5.20		0.15	0.20	4.63	5.00		2040.86	101.03	4896.10	2855.23	0.10	2.67	26.63	0.71	1.36	1.57		1.15	903.00	763.43	30.58

1. Depth is referenced below the exisiting ground surface at the time of testing.
2. Mayne et al., 2002
3. Mayne, 1995
4. Marchetti et al., 2001
5. Schmertman, 1991

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831828
Client:	HNTB-Parsippany	Easting (m):	391570
Sounding ID:	DMT18-205	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	17.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

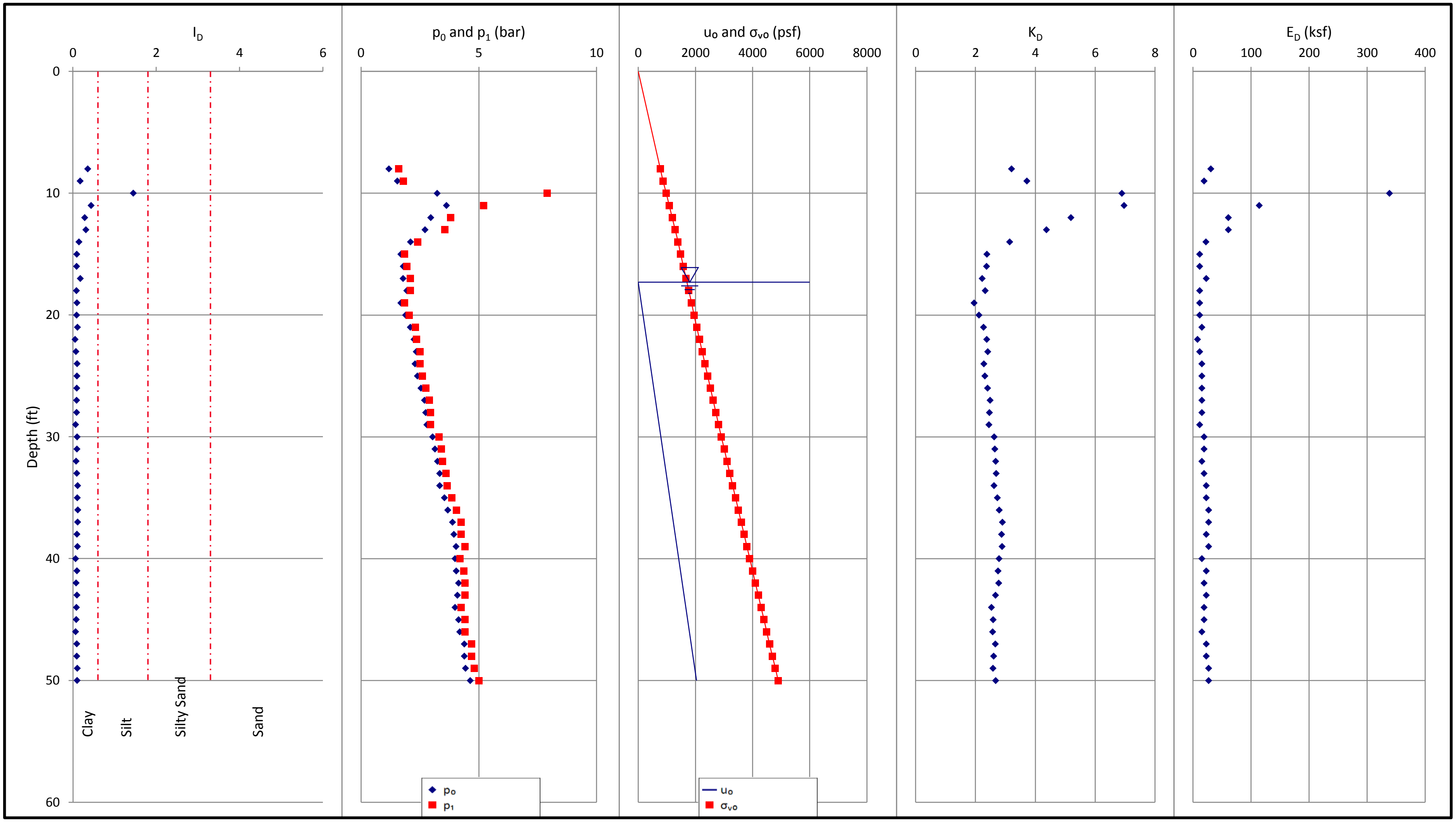
FLAT PLATE DILATOMETER TEST RESULTS



Sheet 2 of 3

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831828
Client:	HNTB-Parsippany	Easting (m):	391570
Sounding ID:	DMT18-205	Elevation (ft):	
Date:	06-Jun-2018	Ground Water Depth (ft):	17.3
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS



Sheet 3 of 3

CONETEC	Job No:	18-53065	Coordinate System: WGS 84 / UTM zone 19N
	Project:	Exit 45, Maine Turnpike	Northing (m): 4831863
	Client:	HNTB-Parsippany	Easting (m): 391418
	Sounding ID:	DMT18-209	Elevation (ft):
	Date:	07-Jun-2018	Ground Water Depth (ft): 19.7
	Job Location:	Scarborough, ME	Gauge Zero Offset (bar): 0

FLAT PLATE DILATOMETER TEST RESULTS

Depth[1]	A	B	C	ΔA	ΔB	p_0	p_1	p_2	u_0	γ_T[2]	σ_{v0}	σ_{v0}'	I_D	K_D	E_D	K_0	OCR[3]	OCR[4]	φ'[4]	R_M	s_u[4]	s_u[5]	M
(ft)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(psf)	(pcf)	(psf)	(psf)			(ksf)				(deg)		(psf)	(psf)	(ksf)
1.00	0.40	1.80		0.15	0.20	0.50	1.60		0.00	96.60	96.61	96.61	2.22	10.75	79.90				40.83	2.57			205.26
4.00	3.45	11.80		0.15	0.20	3.20	11.60		0.00	117.36	448.71	448.71	2.63	14.89	608.77				42.24	2.88			1751.55
5.00	2.60	8.80		0.15	0.20	2.46	8.60		0.00	114.02	562.74	562.74	2.50	9.12	445.16				40.08	2.42			1075.98
6.00	1.85	6.35		0.15	0.20	1.79	6.15		0.00	110.33	673.08	673.08	2.43	5.56	315.80				37.71	1.97			621.72
7.00	2.30	7.60		0.15	0.20	2.20	7.40		0.00	112.45	785.54	785.54	2.36	5.86	376.68				37.97	2.01			758.20
8.00	3.20	9.60		0.15	0.20	3.05	9.40		0.00	115.45	901.00	901.00	2.08	7.06	460.38				38.88	2.18			1002.44
9.00	1.70	4.60		0.15	0.20	1.72	4.40		0.00	107.46	1008.46	1008.46	1.55	3.57	194.04					1.51			292.55
10.00	1.85	5.90		0.15	0.20	1.82	5.70		0.00	109.76	1118.23	1118.23	2.14	3.39	281.56				35.15	1.50			422.28
11.00	4.25	14.20		0.15	0.20	3.92	14.00		0.00	119.64	1237.88	1237.88	2.57	6.61	730.52				38.56	2.13			1555.54
12.93	1.70	4.45		0.15	0.20	1.73	4.25		0.00	107.15	1345.04	1345.04	1.46	2.69	182.63					1.23			223.93
13.00	1.75	3.40		0.15	0.20	1.84	3.20		0.00	104.23	1449.28	1449.28	0.74	2.64	98.92	0.71	1.35	1.55		1.15	452.06	383.25	113.68
14.00	1.35	2.10		0.15	0.20	1.48	1.90		0.00	97.21	1546.50	1546.50	0.28	2.00	30.44	0.54	1.02	1.00		0.85	339.96	309.10	25.87
15.00	1.15	1.70		0.15	0.20	1.29	1.50		0.00	93.26	1639.76	1639.76	0.16	1.64	15.22	0.44	0.84	0.74		0.85	282.15	269.42	12.94
16.00	2.55	7.35		0.15	0.20	2.48	7.15		0.00	112.52	1752.29	1752.29	1.89	2.95	338.63				34.40	1.35			457.82
17.00	1.95	2.65		0.15	0.20	2.08	2.45		0.00	98.23	1850.52	1850.52	0.18	2.35	26.63	0.64	1.20	1.29		1.02	498.14	434.94	27.06
18.00	1.45	2.45		0.15	0.20	1.57	2.25		0.00	99.89	1950.42	1950.42	0.44	1.68	49.46	0.45	0.85	0.76		0.85	344.68	327.38	42.04
19.00	1.85	2.45		0.15	0.20	1.99	2.25		0.00	96.36	2046.79	2046.79	0.13	2.03	19.02	0.55	1.03	1.02		0.86	458.20	415.10	16.45
20.00	2.20	2.60		0.15	0.20	2.35	2.40		18.02	89.64	2136.43	2118.41	0.02	2.31	3.80	0.62	1.17	1.25		1.00	556.79	488.48	3.79
21.00	1.90	2.60		0.15	0.20	2.03	2.40		80.45	98.01	2234.46	2154.00	0.18	1.93	26.63	0.53	0.98	0.95		0.85	454.23	416.45	22.64
22.00	2.05	2.60		0.15	0.20	2.19	2.40		142.88	95.61	2330.07	2187.18	0.10	2.03	15.22	0.55	1.03	1.02		0.86	488.98	443.10	13.14
23.00	2.10	3.50		0.15	0.20	2.20	3.30		205.32	103.82	2433.89	2228.58	0.53	1.97	79.90	0.54	1.00	0.97		0.85	480.28	438.43	67.92
24.00	2.65	3.30		0.15	0.20	2.79	3.10		267.75	98.67	2532.57	2264.82	0.12	2.45	22.83	0.66	1.25	1.37		1.06	642.14	554.88	24.16
25.00	2.80	3.45		0.15	0.20	2.94	3.25		330.18	98.89	2631.46	2301.29	0.11	2.52	22.83	0.68	1.28	1.43		1.09	675.93	579.97	24.82
26.00	2.15	4.45		0.15	0.20	2.20	4.25		392.61	106.86	2738.33	2345.72	1.02	1.79	148.39	0.49	0.91	0.84		0.85	450.39	420.74	126.13
27.00	3.05	3.70		0.15	0.20	3.19	3.50		455.04	99.21	2837.55	2382.51	0.11	2.60	22.83	0.70	1.32	1.51		1.12	727.95	619.70	25.56
28.00	3.30	4.10		0.15	0.20	3.43	3.90		517.47	101.60	2939.15	2421.69	0.15	2.74	34.24	0.73	1.40	1.64		1.17	790.49	664.10	40.20
29.00	2.90	3.40		0.15	0.20	3.04	3.20		579.90	95.50	3034.66	2454.76	0.06	2.35	11.41	0.64	1.20	1.29		1.02	661.49	577.45	11.61
30.00	2.45	3.00		0.15	0.20	2.59	2.80		642.33	95.96	3130.62	2488.30	0.09	1.92	15.22	0.52	0.98	0.94		0.85	518.76	476.70	12.94
31.00	2.60	3.15		0.15	0.20	2.74	2.95		704.76	96.20	3226.83	2522.07	0.09	1.99	15.22	0.54	1.01	0.99		0.85	551.24	501.79	12.94
32.00	2.95	3.45		0.15	0.20	3.09	3.25		767.19	95.43	3322.27	2555.08	0.06	2.23	11.41	0.60	1.13	1.18		0.96	643.18	569.16	10.97
33.00	3.05	3.55		0.15	0.20	3.19	3.35		829.62	95.55	3417.82	2588.21	0.06	2.26	11.41	0.61	1.15	1.21		0.97	661.79	583.81	11.11
34.00	3.40	3.95		0.15	0.20	3.54	3.75		892.05	97.46	3515.29	2623.24	0.07	2.48	15.22	0.67	1.26	1.40		1.07	754.54	650.14	16.29
35.00	3.80	4.45		0.15	0.20	3.94	4.25		954.48	100.00	3615.30	2660.82	0.09	2.73	22.83	0.73	1.39	1.62		1.17	863.67	726.39	26.69
36.00	3.85	4.45		0.15	0.20	3.99	4.25		1016.91	99.13	3714.44	2697.53	0.07	2.71	19.02	0.72	1.38	1.61		1.16	867.71	731.12	22.10
37.00	3.65	4.20		0.15	0.20	3.79	4.00		1079.34	97.70	3812.15	2732.81	0.06	2.50	15.22	0.67	1.27	1.42		1.08	795.25	683.62	16.43
38.00	3.70	4.30		0.15	0.20	3.84	4.10		1141.77	98.82	3910.98	2769.21	0.08	2.48	19.02	0.67	1.26	1.40		1.07	797.96	687.30	20.39
39.00	4.00	4.65		0.15	0.20	4.14	4.45		1204.20	100.12	4011.10	2806.91	0.09	2.65	22.83	0.71	1.35	1.55		1.14	876.91	743.19	25.98
40.00	4.00	4.50		0.15	0.20	4.14	4.30		1266.63	96.68	4107.79	2841.16	0.04	2.60	11.41	0.69	1.32	1.51		1.12	867.38	738.52	12.77
41.00	4.50	5.05		0.15	0.20	4.64	4.85		1329.06	98.69	4206.49	2877.43	0.05	2.91	15.22	0.76	1.48	1.79		1.23	1009.85	836.18	18.77
42.00	4.50	5.25		0.15	0.20	4.63	5.05		1391.49	102.12	4308.62	2917.13	0.11	2.84	30.44	0.75	1.44	1.73		1.21	993.88	827.85	36.80
43.00	4.60	5.25		0.15	0.20	4.74	5.05		1453.92	100.76	4409.38	2955.46	0.08	2.85	22.83	0.75	1.45	1.74		1.21	1014.16	843.53	27.74
44.00	4.60	5.35		0.15	0.20	4.73	5.15		1516.35	102.17	4511.56	2995.21	0.10	2.79	30.44	0.74	1.42	1.68		1.19	999.88	836.25	36.29
45.00	4.60	5.20		0.15	0.20	4.74	5.00		1578.78	99.77	4611.33	3032.56	0.07	2.74	19.02	0.73	1.40	1.64		1.17	989.82	831.57	22.33
46.00	4.60	5.30		0.15	0.20	4.73	5.10		1641.21	101.42	4712.76	3071.55	0.09	2.68	26.63	0.71	1.37	1.58		1.15	975.87	824.28	30.68
47.00	4.60	5.30		0.15	0.20	4.73	5.10		1703.64	101.38	4814.15	3110.51	0.09	2.63	26.63	0.70	1.34	1.53		1.13	963.60	818.04	30.12
48.00	4.60	5.35		0.15	0.20	4.73	5.15		1766.07	102.02	4916.17	3150.10	0.11	2.58	30.44	0.69	1.31	1.48		1.11	950.63	811.27	33.77
49.00	4.65	5.40		0.15	0.20	4.78	5.20		1828.50	102.04	5018.22	3189.72	0.11	2.56	30.44	0.68	1.30	1.47		1.10	953.80	815.47	33.55
50.00	4.70	5.35		0.15	0.20	4.84	5.15		1890.93	100.62	5118.85	3227.92	0.08	2.54	22.83	0.68	1.29	1.45		1.10	958.62	820.72	25.03
51.00	4.75	5.50		0.15	0.20	4.88	5.30		1953.36	102.09	5220.95	3267.59	0.11	2.52	30.44	0.68	1.28	1.44		1.09	960.29	823.87	33.11
52.00	4.80	5.55		0.15	0.20	4.93	5.35		2015.79	102.12	5323.08	3307.29	0.11	2.50	30.44	0.67	1.27	1.42		1.08	963.50	828.07	32.89
53.00	4.85	5.50		0.15	0.20	4.99	5.30		2078.22	100.69	5423.78	3345.56	0.08	2.49	22.83	0.67	1.27	1.41		1.08	968.35	833.32	24.55
54.00	4.85	5.60		0.15	0.20	4.98	5.40		2140.65	102.11	5525.90	3385.25	0.11	2.44	30.44	0.66	1.24	1.36		1.05	954.95	826.03	32.09

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831863
Client:	HNTB-Parsippany	Easting (m):	391418
Sounding ID:	DMT18-209	Elevation (ft):	
Date:	07-Jun-2018	Ground Water Depth (ft):	19.7
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

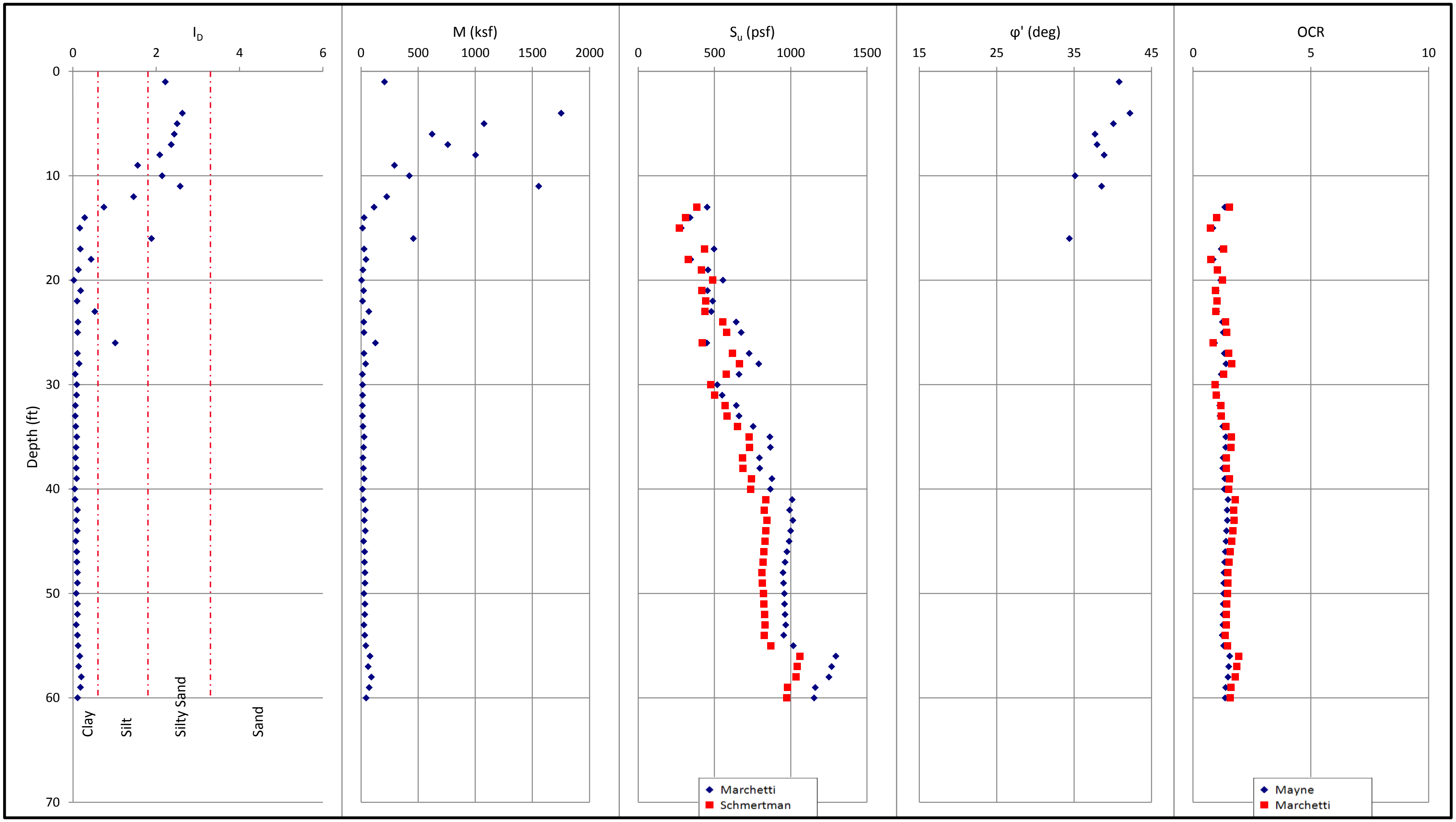
FLAT PLATE DILATOMETER TEST RESULTS

Depth[1] (ft)	A (bar)	B (bar)	C (bar)	ΔA (bar)	ΔB (bar)	p_0 (bar)	p_1 (bar)	p_2 (bar)	u_0 (psf)	γ_T[2] (pcf)	σ_{v0} (psf)	σ_{v0}' (psf)	I_D	K_D	E_D (ksf)	K_0	OCR[3]	OCR[4]	φ'[4] (deg)	R_M	s_u[4] (psf)	s_u[5] (psf)	M (ksf)
55.00	5.10	5.95		0.15	0.20	5.23	5.75		2203.08	103.53	5629.43	3426.35	0.13	2.54	38.05	0.68	1.29	1.45		1.10	1017.24	870.96	41.71
56.00	6.05	7.20		0.15	0.20	6.16	7.00		2265.51	107.04	5736.48	3470.97	0.17	3.05	60.88	0.80	1.55	1.94		1.28	1296.14	1059.99	78.18
57.00	6.00	7.00		0.15	0.20	6.12	6.80		2327.94	105.85	5842.34	3514.40	0.14	2.97	49.46	0.78	1.51	1.86		1.26	1269.12	1044.87	62.16
58.00	6.00	7.30		0.15	0.20	6.10	7.10		2390.37	107.83	5950.18	3559.81	0.20	2.91	72.29	0.77	1.48	1.79		1.23	1250.88	1035.50	89.24
59.00	5.75	6.90		0.15	0.20	5.86	6.70		2452.80	106.61	6056.80	3603.99	0.18	2.72	60.88	0.72	1.38	1.61		1.16	1161.98	978.61	70.85
60.00	5.75	6.60		0.15	0.20	5.88	6.40		2515.23	104.12	6160.92	3645.69	0.11	2.68	38.05	0.71	1.36	1.57		1.15	1154.04	975.50	43.71

1. Depth is referenced below the exisiting ground surface at the time of testing.
2. Mayne et al., 2002
3. Mayne, 1995
4. Marchetti et al., 2001
5. Schmertman, 1991

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831863
Client:	HNTB-Parsippany	Easting (m):	391418
Sounding ID:	DMT18-209	Elevation (ft):	
Date:	07-Jun-2018	Ground Water Depth (ft):	19.7
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS

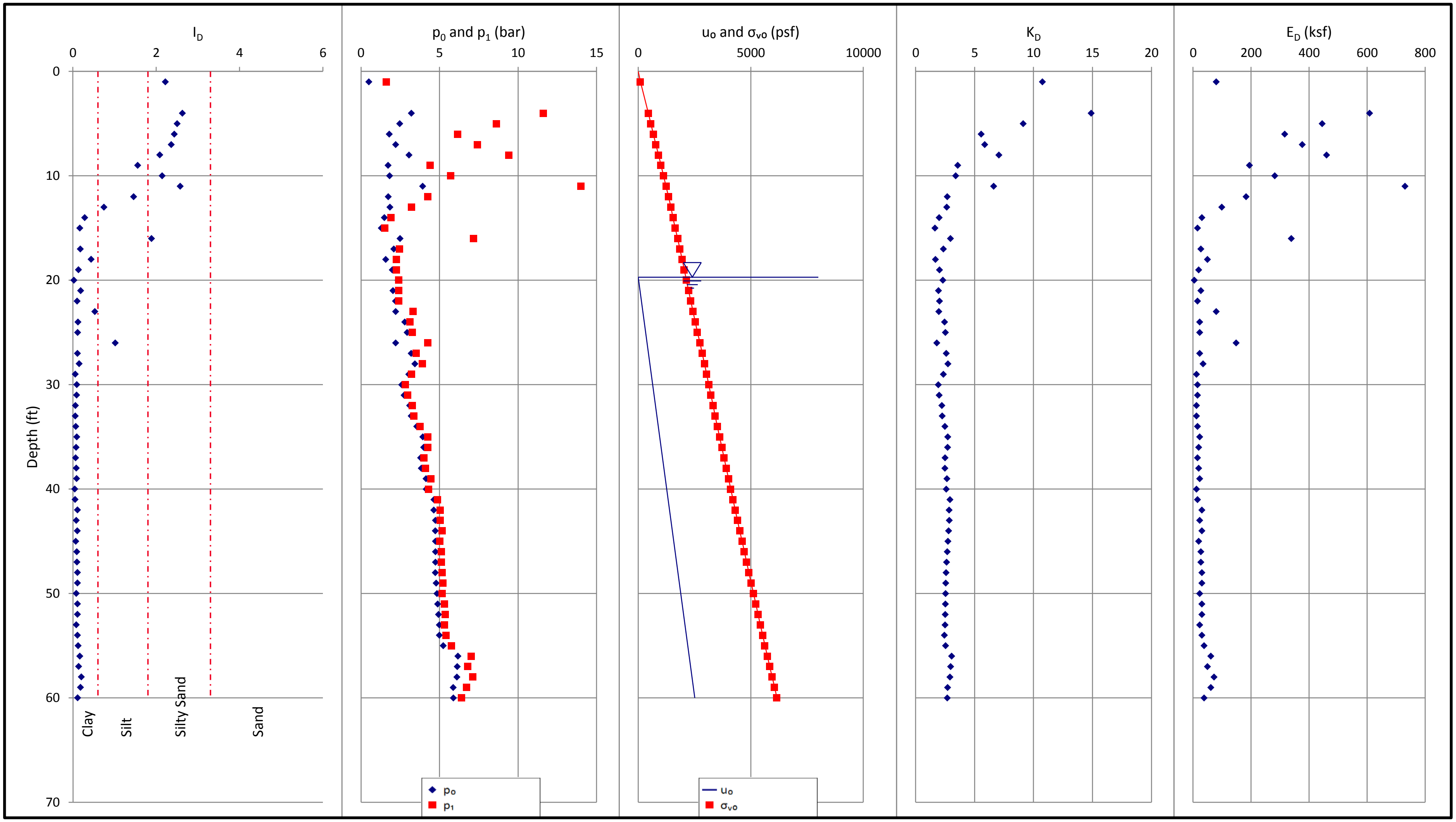


Sheet 3 of 4

CONETEC

Job No:	18-53065	Coordinate System:	WGS 84 / UTM zone 19N
Project:	Exit 45, Maine Turnpike	Northing (m):	4831863
Client:	HNTB-Parsippany	Easting (m):	391418
Sounding ID:	DMT18-209	Elevation (ft):	
Date:	07-Jun-2018	Ground Water Depth (ft):	19.7
Job Location:	Scarborough, ME	Gauge Zero Offset (bar):	0

FLAT PLATE DILATOMETER TEST RESULTS



Sheet 4 of 4

ATTACHMENT 3
GEOTECHNICAL DATA REPORT
(SUPPLEMENTAL EXPLORATION)

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FINAL DESIGN PHASE GEOTECHNICAL DATA REPORT
PROPOSED RECONSTRUCTION OF EXIT 45, MAINE TURNPIKE
SOUTH PORTLAND, MAINE

by
Haley & Aldrich, Inc.
Portland, Maine

for
HNTB Corporation
Westbrook, Maine

File No. 132949-003
March 2019

HALEY & ALDRICH, INC.
75 Washington Avenue
Suite 1A
Portland, ME 04101
207.482.4600

15 March 2019
File No. 132949-003

HNTB Corporation
340 County Road, Suite 6-C
Westbrook, Maine 04092

Attention: Ray Hanf, P.E.

Subject: Final Design Phase Geotechnical Data Report
Proposed Reconstruction of Exit 45 Interchange, Maine Turnpike
South Portland, Maine

Ladies and Gentlemen:

This geotechnical data report (GDR) presents the results of the final design phase subsurface investigation and geotechnical laboratory testing programs (Phase 3) conducted in support of the subject project. This work has been completed in accordance with our proposal dated 21 December 2018 (specifically scope items 1 through 12), and your subsequent authorization.

Project Understanding

It is our understanding that the Maine Turnpike Authority (MTA) has hired HNTB to lead the design effort for the reconstruction of the Exit 45 Interchange, including the reconfiguration of associated on and off ramps. The project generally consists of construction of a new bridge structure over I-95 at Exit 45 and construction of new bridge approach and ramp embankments up to 26 ft above existing site grades. The location of the site is shown on Figure 1.

The Phase 3 subsurface investigation and geotechnical laboratory testing programs were prepared based on the initial plan/program developed by HNTB (provided to Haley & Aldrich on 2 November 2018), the peer review comments provided by Haley & Aldrich on 5 November 2018, and the three additional toll plaza test borings (and drilling requirements) provided by HNTB on 19 December 2018.

The Phase 3 subsurface investigation was needed to fill in gaps in the available subsurface data, including: estimating the extents and properties of the organic deposit; defining the thickness and properties of the interbedded marine deposits; defining the thickness and properties of the marine clay crust; and determining the mid-stratum strength of the marine clay. In addition, three borings were included at proposed toll plaza locations to define the depth of rock for pile design.

Horizontal Coordinate System and Elevation Datum

Test boring locations are reported in feet and reference the North American Datum of 1983 (NAD 83) Maine State Plane West 1802 coordinate system. Elevations are measured in feet and reference North American Vertical Datum of 1988 (NAVD 88).

Coordinates of Phase 3 as-drilled test boring locations are provided in Table I. Ground surface elevations at Phase 3 test boring locations are provided in Table II and on individual test boring logs included in Appendix A. As-drilled locations of the previous and recent test borings are shown on Figure 2.

Subsurface Explorations

PRELIMINARY DESIGN PHASE SUBSURFACE EXPLORATIONS BY SCHONEWALD ENGINEERING

Schonewald Engineering Associates, Inc. (SEA) of Cumberland, Maine conducted two phases of subsurface exploration programs at the site:

- The Phase 1 program was conducted in October 2017. A total of seven test borings (HB-EXIT45-101 through HB-EXIT45-107) were conducted at the site and laboratory testing was conducted on select soil samples from the test borings. The results were presented in a report dated 28 December 2017 prepared by SEA. Haley & Aldrich was not involved in the execution of this program.

- The Phase 2 program was conducted from April to June of 2018. A total of thirteen test borings (HB-EXIT45-201 through HB-EXIT45-212 and HB-EXIT45-211A), two cone penetrometer tests, one seismic cone penetrometer test, and three flat plate dilatometer tests were conducted at the site, and laboratory testing was conducted on select soil samples from the test borings. The results were presented in a report dated 8 October 2018 prepared by SEA. Haley & Aldrich was not involved in the execution of this program.

As-drilled locations of the subsurface explorations from both phases of drilling are shown on Figure 2. Refer to reports listed in the References section of this report for more information relative to the test boring logs, cone penetrometer results, dilatometer test results, and laboratory test results.

FINAL DESIGN PHASE SUBSURFACE EXPLORATIONS BY HALEY & ALDRICH

Phase 3 subsurface explorations were conducted between 4 and 17 January 2018. Haley & Aldrich personnel were present during the exploration program and provided the following services:

- Ensuring that the program is completed safely per the project-specific Health and Safety Plan.
- Observing and documenting conditions encountered in test borings;
- Coordinating the depth of test borings and sampling methods; and
- Ensuring drilling contractor compliance with contract requirements and standard of care drilling/testing practices.

A total of eight test borings, designated HB-EXIT45-301 through HB-EXIT45-307 (including HB-EXIT45-303A and HB-EXIT45-304A) were drilled along the existing Maine Turnpike mainline, entrance/exit ramps and approach embankments. Test boring locations were laid out in the field by Haley & Aldrich using GPS survey equipment. "As-drilled" test boring locations were determined in the field by Haley & Aldrich using GPS survey equipment. Ground surface elevations at test boring locations were estimated by HNTB based on interpolation between ground surface contours. Subsurface conditions are summarized in Table II and logs of the Phase 3 test borings are included in Appendix A.

The following changes were made to the originally proposed program:

- Test boring HB-EXIT45-303A was added while executing the field program to obtain an additional tube in the interbedded marine deposits at a depth of 5 to 7 ft.
- Test boring HB-EXIT45-304A and HB-EXIT45-304B were proposed to obtain information on the marine clay crust and depth to bedrock. However, the desired location of these borings was not accessible due to the site conditions. Therefore, the location was moved closer to HB-EXIT45-305, since this was the closest available location, taking into account the potential impact of the existing mainline on the stress history. Since these three borings were in close proximity, HB-EXIT45-304B was eliminated and the desired data collected from HB-EXIT45-305.

Test borings were drilled using a Diedrich D50 track-mounted drill rig. Test borings were drilled to depths ranging from approximately 9 to 104 ft below ground surface (BGS) using 4.0 in. (HW-size) inside diameter (ID) steel casing using cased-wash drilling methods. Soil samples were generally collected continuously through the fill, interbedded marine deposits and clay crust, and at standard, 5-ft intervals thereafter, by driving a 1 3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. The drill rig was equipped with an automatic hammer with a theoretical hammer efficiency factor of 0.907. All drilling and sampling was performed in accordance with ASTM standards.

The number of hammer blows required to advance the sampler through each 6 in. interval was recorded and is provided on the test boring logs. The uncorrected SPT N-value (N-uncorrected) is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval. The energy-corrected SPT N-value (N60) is equal to N-uncorrected multiplied by the hammer efficiency factor divided by 0.6 (i.e., 60 percent theoretical hammer efficiency).

In-situ vane shear tests were conducted in each of the test borings. In general, the first in-situ vane shear test was conducted in each test boring when soil was encountered that consisted primarily of silt and/or clay. In-situ vane shear tests were conducted with a 55 mm by 110 mm Geonor rectangular vane attached to a 2-ft long, 12-mm diameter rod extension, attached to a string of 5/8-in. outside diameter (OD) hollow chrome-moly rods. At each in-situ vane shear test location, the vane was pushed (by hand) until the bottom of the vane was approximately 1 to 2 ft below the bottom of the borehole. The vane was then rotated at a rate of about 90 degrees per minute using a torque wrench. Results of the vane shear testing, including raw torque values and calculated shear strengths, are summarized in Table III and are provided on the test boring logs in Appendix A.

Multiple relatively undisturbed samples of cohesive soils were obtained in test borings HB-EXIT45-301 through HB-EXIT45-304A. The samples were collected as close as possible to depths/elevations requested by HNTB and were obtained by advancing a 3-in. OD, thin-wall Shelby Tube into the silt/clay/interbedded soils using a piston sampler.

Bedrock core samples were obtained in test borings HB-EXIT45-305 through HB-EXIT45-307. The test borings were advanced approximately 5 to 10.4 ft into bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel.

All soil and bedrock samples were collected and preserved in glass jars and wooden boxes, respectively. The soil and rock samples that were not submitted for laboratory testing are available for review upon request and are currently being stored at the Haley & Aldrich laboratory facility in Portland, Maine. Photographs of the collected rock core samples are presented in Appendix A.

Laboratory Testing Program

A laboratory testing program was undertaken to assist in soil classification and determination of engineering properties of representative soil samples collected during the field investigation. In general, laboratory testing was performed on disturbed soil samples collected during SPT sampling and Shelby tube samples of cohesive soils. Laboratory tests were performed by GeoTesting Express of Acton, Massachusetts. Geotechnical laboratory testing was performed in accordance with applicable American Society for Testing Materials (ASTM) testing procedures.

The following soil tests (type and number of tests) were conducted:

Soil Identification Testing:

- Grain Size Analysis (combined sieve and hydrometer (ASTM D422)) – 8
- Grain Size Analysis (sieve only (ASTM D422)) – 1
- Moisture Content and Organic Matter (ASTM D2974) – 1
- Atterberg Limits (ASTM D 4318) – 15

Shelby Tube Testing:

- Incremental Consolidation Test (ASTM D2435, Method B) – 7
- Consolidated Undrained Triaxial Shear Test, CIUC (ASTM D4767) – 10

In general, the laboratory testing was conducted at the depths/elevations requested by HNTB. A summary of the testing results is provided in Table IV and the detailed laboratory test output is provided in Appendix B of this report.

Limitations

This report is prepared for the exclusive use of HNTB and MTA relative to the proposed reconstruction of the Maine Turnpike Exit 45 Interchange including the replacement bridge and the reconfiguration of the associated on and off ramps in South Portland, Maine. There are no intended beneficiaries other than of HNTB and MTA. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than of HNTB and MTA for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from of HNTB and MTA and from Haley & Aldrich. Use of this report by such other person or entity without the written authorization of HNTB and MTA and Haley & Aldrich shall be at such other person's or entities sole risk and shall be without legal exposure or liability to Haley & Aldrich.

Use of this report by any person or entity, including by of HNTB and MTA, for a purpose other than relative to the proposed reconstruction of the Maine Turnpike Exit 45 Interchange in South Portland Portland, Maine is expressly prohibited unless such person or entity obtains written authorization from Haley & Aldrich indicating that the report is adequate for such other use. Use of this report by any other person or entity for such other purpose without written authorization by Haley & Aldrich shall be at such person's or entities sole risk and shall be without legal exposure or liability to Haley & Aldrich.

The information provided herein is based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

Closure

Except for the change to the location of HB-EXIT45-304A and deletion of HB-EXIT45-304B, as described above, the data requested in the initial plan/program developed by HNTB (provided to Haley & Aldrich on 2 November 2018) was collected. Note that some changes were made to specific sample and test depths based on the actual subsurface conditions encountered.

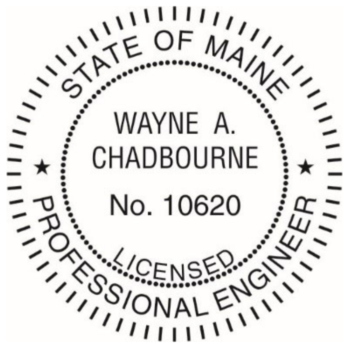
We appreciate the opportunity to provide geotechnical engineering services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

Erin A. Force

Erin A. Force, P.E.
Senior Geotechnical Engineer

Wayne A. Chadbourne, P.E.
Lead Geotechnical Engineer/Senior Associate



Enclosures:

- Table I – Summary of Subsurface Explorations – Location Data (1 sheet)
- Table II – Summary of Subsurface Explorations – Subsurface Data (1 sheet)
- Table III – Summary of In-Situ Vane Shear Test Results (1 sheet)
- Table IV – Summary of Laboratory Soil Test Results (3 sheets)
- Figure 1 – Project Locus
- Figure 2 – Subsurface Exploration Location Plan
- Appendix A – Test Boring Logs
- Appendix B – Laboratory Test Results

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References

1. Schonewald Engineering Associates, Inc., *Field and Laboratory Data Report, Preliminary Geotechnical Program, Maine Turnpike Exit 45 Reconfiguration, South Portland, Maine*, 28 December 2017.

2. Schonewald Engineering Associates, Inc., *Field and Laboratory Data Report, Phase 2 Geotechnical Program, Maine Turnpike Exit 45 Reconfiguration, South Portland – Scarborough, Maine*, 8 October 2018.

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TABLES

TABLE I

Summary of Subsurface Explorations - Location Data

Proposed Reconstruction of Exit 45 Interchange
Maine Turnpike
South Portland, Maine

Haley & Aldrich File No.: 132949-003

Test Boring No.[1]	Coordinates[2]	
	Easting	Northing
HB-EXIT45-301	2,906,089	291,170
HB-EXIT45-302	2,906,137	291,089
HB-EXIT45-303	2,905,426	291,048
HB-EXIT45-303A	2,905,423	291,052
HB-EXIT45-304A	2,905,931	291,660
HB-EXIT45-305	2,905,936	291,665
HB-EXIT45-306	2,906,295	291,566
HB-EXIT45-307	2,905,416	290,450

Notes:

[1] Test boring locations are shown on Figure 2, Subsurface Exploration Location Plan.

[2] As-drilled coordinates of test borings were determined by Haley & Aldrich, Inc. using GPS survey equipment and reference NAD 83, Maine State Plane West 1802 coordinate system.

	Individual	Date
Prepared By:	KAR	3/13/2019
Checked By:	EAF	3/14/2019
Reviewed By:	WAC	3/15/2019

TABLE II
Summary of Subsurface Explorations - Subsurface Data
Proposed Reconstruction of Exit 45 Interchange
Maine Turnpike
South Portland, Maine

Haley & Aldrich File No.: 132949-003

Test Boring No.[1]	Approximate Ground Surface Elevation[2,3]	Approximate Strata Thickness[4,5] (ft)									Approximate Top of Bedrock Depth (ft)[5]	Approximate Elevation of Top of Bedrock[2,3,5]	Approximate Bottom of Exploration Depth (ft)	Approximate Elevation of Bottom of Exploration[2,3]
				Marine Deposits										
		Fill	Organic Deposit	Sand	Interbedded	Clay Crust	Clay	Sand	Glacial Till	Weathered Bedrock				
HB-EXIT45-301	60.3	6.9	0.4	--	4.7	2.2	>5.8	--	--	--	--	--	20.0	40.3
HB-EXIT45-302	60.0	3.1	NE	--	4.9	6.0	>6.0	--	--	--	--	--	20.0	40.0
HB-EXIT45-303	61.4	4.0	NE	--	8.9	NE	>41.1	--	--	--	--	--	54.0	7.4
HB-EXIT45-303A	61.3	NE	NE	--	>9.0	--	--	--	--	--	--	--	9.0	52.3
HB-EXIT45-304A	56.1	NE	2.0	--	--	8.0	>4.0	--	--	--	--	--	14.0	42.1
HB-EXIT45-305	56.1	NE	NE	--	NE	10.0	38.5	27.9	NE	NE	76.4	-20.3	83.0	-26.9
HB-EXIT45-306	58.1	NE	NE	--	NE	15.0	28.1	1.5	NE	NE	44.6	13.5	55.7	2.4
HB-EXIT45-307[6]	63.9	5.0	NE	20.0	10.0	NE	39.7	NE	14.7	1.4	90.8	-26.9	103.6	-39.7

<u>Notes:</u>
1 Test boring locations are shown on Figure 2, Subsurface Exploration Location Plan.
2 Ground surface elevations at as-drilled test boring locations should be considered approximate and were estimated by HNTB based on interpolation between ground surface contours.
3 Elevations are measured in feet and reference the National Geodetic Vertical Datum of 1988 (NAVD 88).
4 "NE" indicates stratum was not encountered in test boring.
5 "--" indicates test boring was not drilled deep enough to determine presence of stratum.

	Individual	Date
Prepared By:	KAR	3/13/2019
Checked By:	EAF	3/14/2019
Reviewed By:	WAC	3/15/2019

TABLE III
Summary of In-Situ Vane Shear Test Results
Proposed Reconstruction of Exit 45 Interchange
Maine Turnpike
South Portland, Maine

Haley & Aldrich File No.: 132949-003

Test Boring No.[1]	Estimated Ground Surface Elevation[2,3]	Test No.	Depth below ground surface (ft)	Approx. Elevation[2,3] (ft)	V_{max} (in-lbs)	$V_{remolded}$ (in-lbs)	S_u (psf)	$S_{u(remolded)}$ (psf)	Sensitivity ($s_u/s_{u(remolded)}$)
HB-EXIT45-301	60.3	V_1	10.1 - 10.5	50.2 - 49.8	430	60	1,670	235	7
		V_2	14.0 - 14.4	46.3 - 45.9	605	110	2,350	425	6
		V_3	18.6 - 19.0	41.7 - 41.3	130	10	505	40	13
		V_4	19.6 - 20.0	40.7 - 40.3	130	20	505	80	6
HB-EXIT45-302	60.0	V_1	14.6 - 15.0	45.4 - 45.0	410	70	1,590	270	6
		V_2	15.6 - 16.0	44.4 - 44.0	410	65	1,590	250	6
		V_3	18.6 - 19.0	41.4 - 41.0	120	15	465	60	8
		V_4	19.6 - 20.0	40.4 - 40.0	120	10	465	40	12
HB-EXIT45-303	61.4	V_1	12.6 - 13.0	48.8 - 48.4	125	15	485	60	8
		V_2	13.6 - 14.0	47.8 - 47.4	115	25	445	95	5
		V_3	14.6 - 15.0	46.8 - 46.4	100	10	390	40	10
		V_4	15.6 - 16.0	45.8 - 45.4	95	10	370	40	9
		V_5	18.6 - 19.0	42.8 - 42.4	160	10	620	40	16
		V_6	19.6 - 20.0	41.8 - 41.4	80	5	310	20	16
		V_7	20.6 - 21.0	40.8 - 40.4	110	10	425	40	11
		V_8	21.6 - 22.0	39.8 - 39.4	80	5	310	20	16
		V_9	24.6 - 25.0	36.8 - 36.4	105	5	405	20	20
		V_{10}	25.6 - 26.0	35.8 - 35.4	70	5	270	20	14
		V_{11}	26.6 - 27.0	34.8 - 34.4	80	10	310	40	8
		V_{12}	27.6 - 28.0	33.8 - 33.4	90	10	350	40	9
		V_{13}	28.6 - 29.0	32.8 - 32.4	120	5	465	20	23
		V_{14}	29.6 - 30.0	31.8 - 31.4	80	5	310	20	16
		V_{15}	43.6 - 44.0	17.8 - 17.4	130	10	505	40	13
		V_{16}	44.6 - 45.0	16.8 - 16.4	110	10	425	40	11
		V_{17}	47.6 - 48.0	13.8 - 13.4	180	10	700	40	18
		V_{18}	48.6 - 49.0	12.8 - 12.4	110	5	425	20	21
		V_{19}	52.6 - 53.0	8.8 - 8.4	170	10	660	40	17
		V_{20}	53.6 - 54.0	7.8 - 7.4	150	5	580	20	29
HB-EXIT45-303A	61.3	V_1	7.1 - 7.5	54.2 - 53.8	190	30	735	115	6
HB-EXIT45-304A	56.1	V_1	8.1 - 8.5	48.0 - 47.6	760	130	2,950	505	6
		V_2	10.6 - 11.0	45.5 - 45.1	130	5	505	20	25
		V_3	11.6 - 12.0	44.5 - 44.1	120	5	465	20	23
		V_4	12.6 - 13.0	43.5 43.1	120	5	465	20	23
		V_5	13.6 - 14.0	42.5 42.1	110	5	425	20	21
HB-EXIT45-305	56.1	V_1	10.6 - 11.0	45.5 - 45.1	210	40	815	155	5
		V_2	11.6 - 12.0	44.5 - 44.1	130	25	505	95	5
		V_3	20.6 21.0	35.5 - 35.1	110	5	425	20	21
		V_4	21.6 22.0	34.5 - 34.1	90	5	350	20	18
		V_5	30.6 31.0	25.5 - 25.1	110	0	425	0	--
		V_6	31.6 32.0	24.5 - 24.1	110	5	425	20	21
		V_7	40.6 41.0	15.5 - 15.1	130	5	505	20	25
		V_8	41.6 42.0	14.5 - 14.1	110	5	425	20	21
HB-EXIT45-306	58.1	V_1	15.6 - 16.0	42.5 - 42.1	180	20	700	80	9
		V_2	16.6 - 17.0	41.5 - 41.1	165	10	640	40	16
		V_3	20.6 - 21.0	37.5 - 37.1	130	10	505	40	13
		V_4	21.6 - 22.0	36.5 - 36.1	120	5	465	20	23
		V_5	25.6 - 26.0	32.5 - 32.1	110	15	425	60	7
		V_6	26.6 - 27.0	31.5 - 31.1	105	5	405	20	20
		V_7	30.6 - 31.0	27.5 - 27.1	110	15	425	60	7
		V_8	31.6 - 32.0	26.5 - 26.1	105	10	405	40	10
		V_9	35.6 - 36.0	22.5 - 22.1	130	25	505	95	5
		V_{10}	36.6 - 37.0	21.5 - 21.1	125	15	485	60	8
HB-EXIT45-307	63.9	V_1	20.1 - 20.5	43.8 - 43.4	310	30	735	70	11
		V_2	25.1 - 25.5	38.8 - 38.4	150	30	580	115	5
		V_3	35.6 - 36.0	28.3 - 27.9	110	5	425	20	21
		V_4	36.6 - 37.0	27.3 - 26.9	110	5	425	20	21
		V_5	45.6 - 46.0	18.3 - 17.9	130	0	505	0	--
		V_6	46.6 - 47.0	17.3 - 16.9	130	0	505	0	--
		V_7	55.6 - 56.0	8.3 - 7.9	180	10	700	40	18
		V_8	56.6 - 57.0	7.3 - 6.9	210	10	815	40	20
		V_9	65.6 - 66.0	-1.7 - -2.1	190	5	735	20	37
		V_{10}	66.6 - 67.0	-2.7 - -3.1	270	5	1,050	20	53

Notes:
1 Test boring locations are shown on Figure 2, Subsurface Exploration Location Plan.
2 Ground surface elevations at as-drilled test boring locations should be considered approximate and were estimated by HNTB based on interpolation between ground surface contours.
3 Elevations are measured in feet and reference the National Geodetic Vertical Datum of 1988 (NAVD 88).

Prepared By:	NLK	1/22/2019
Checked By:	KAR	3/14/2019
Reviewed By:	EAF	3/15/2019
Reviewed By:	WAC	3/15/2019

TABLE IV - SUMMARY OF LABORATORY SOIL TEST RESULTS

Project: Proposed Reconstruction of Exit 45 Interchange, Maine Turnpike
South Portland, Maine

File No. 132949-003
Date March 2019
Datum NAVD88

Boring No. & Sample No.	Description	Depth (ft)	El. (ft)	Test No.	Percent Passing #200 Sieve (%)	Natural Water Content (%)	Atterberg Limits (%)[1]			Total Unit Weight (pcf)[2]	Stress History[3]			Triaxial Test			Remarks
							W_L	W_P	I_P		σ'_p (tsf)	CR	RR	Shear Strength (psf)	Strain (%)	σ'_c (psf)[3]	
HB-EXIT45-301																	
S4B	Organic Deposit	6.9 -7.3	53.4 -53.0	490941	55.4												
				490950		47.0											Organic Content: 5.5%
				490890		47.0	47	31	16								
U2	Marine Deposits (Clay Crust)	12.0 -14.0	48.3 -46.3	IP-1		34.3				118.1	5.8	0.168	0.020				
				490891		31.0	37	23	14								
				CU-6-1A		28.3				119.8				912.2	4.23	589	
HB-EXIT45-302																	
U1	Marine Deposits (Clay Crust)	10.0 -12.0	50.0 -48.0	IP-3		27.8				122.6	6.6	0.132	0.012				
				490892		21.0	35	23	12								
				CU-7-1		29.2				120.5				678.2	1.88	492	
HB-EXIT45-303																	
S4	Interbedded Marine Deposits	6.0 -8.0	55.4 -53.4	490920	14.2												
S5	Interbedded Marine Deposits	8.0 -10.0	53.4 -51.4	490942	62.1												
				490893		26.0	22	14	8								
U1	Interbedded Marine Deposits	10.0 -12.0	51.4 -49.4	490947	71.4												
				490898		27.0		non-plastic									
				IP-2		20.4				128.9		See Note 4.					
				CU-2-1		25.8				120.1				496.9	2.08	520	

\\haleyaldrich.com\share\CF\Projects\132949\003 - Final Design + CD Prep\Deliverables\Data Report\Tables\2019-0315-HAI-Table IV-F.xlsx

HALEY ALDRICH

TABLE IV - SUMMARY OF LABORATORY SOIL TEST RESULTS

Project: Proposed Reconstruction of Exit 45 Interchange, Maine Turnpike
South Portland, Maine

File No. 132949-003
Date March 2019
Datum NAVD88

Boring No. & Sample No.	Description	Depth (ft)	El. (ft)	Test No.	Percent Passing #200 Sieve (%)	Natural Water Content (%)	Atterberg Limits (%)[1]			Total Unit Weight (pcf)[2]	Stress History[3]			Triaxial Test			Remarks
							W_L	W_P	I_P		σ'_p (tsf)	CR	RR	Shear Strength (psf)	Strain (%)	σ'_c (psf)[3]	
HB-EXIT45-303																	
S6	Marine Deposits	12.0	49.4	490943	95.9												
	(Clay)	-14.0	-47.4	490894		40.0	27	15	12								
S7	Marine Deposits	14.0	47.4	490944	98.5												
	(Clay)	-16.0	-45.4	490895		45.0	36	20	16								
U2	Marine Deposits	16.0	45.4	490948	95.4												
	(Clay)	-18.0	-43.4	IP-7		33.4				118.6	See Note 4.						
				490899		38.0	27	16	11								
				CU-5-1A		36.5				115.3				439.2	5.75	701	
S8	Marine Deposits	18.0	43.4	490945	94.3												
	(Clay)	-20.0	-41.4	490896		37.0	26	17	9								
S11	Marine Deposits	26.0	35.4	490946	94.6												
	(Clay)	-28.0	-33.4	490897		36.0	23	16	7								
U4	Marine Deposits	30.0	31.4	IP-4		44.3				111.7	0.9	See Note 5.					
	(Clay)	-32.0	-29.4	490900		41.0	27	18	9								
U5	Marine Deposits	45.0	16.4	490901		37.0	31	19	12								
	(Clay)	-47.0	-14.4	CU-1-1		32.5				119.0				594.7	8.18	1655	
				CU-1-2		39.3				113.1				858.1	5.90	2740	
				CU-1-3		40.8				112.1				2107.0	7.28	3866	

TABLE IV - SUMMARY OF LABORATORY SOIL TEST RESULTS

HALEY ALDRICH

Project: Proposed Reconstruction of Exit 45 Interchange, Maine Turnpike
South Portland, Maine

File No. 132949-003
Date March 2019
Datum NAVD88

Boring No. & Sample No.	Description	Depth (ft)	El. (ft)	Test No.	Percent Passing #200 Sieve (%)	Natural Water Content (%)	Atterberg Limits (%)[1]			Total Unit Weight (pcf)[2]	Stress History[3]			Triaxial Test			Remarks
							W_L	W_P	I_P		σ'_p (tsf)	CR	RR	Shear Strength (psf)	Strain (%)	σ'_c (psf)[3]	
HB-EXIT45-303																	
U6	Marine Deposits	50.0	11.4	490902		35.0	34	20	14								
	(Clay)	-52.0	-9.4	CU-3-1		48.3				106.9				607.7	3.46	1812	
HB-EXIT45-304A																	
U1	Marine Deposits	2.0	54.1	IP-5		27.9				122.2	4.6	0.106	0.013				
	(Clay Crust)	-4.0	-52.1	490903		27.0	31	18	13								
				CU-4-1A		28.9				119.4				248.0	0.63	99	
U2	Marine Deposits	6.0	50.1	IP-6		31.1				119.3	4.1	0.130	0.017				
	(Clay Crust)	-8.0	-48.1	490904		29.0	31	20	11								
				CU-8-1		30.8				121.6				548.9	1.88	231	

Notes:

1. W_L = Liquid Limit
   W_P = Plastic Limit
   I_P = Plasticity Index
2. Total unit weight = dry unit weight * (1 + water content)
3. σ'_p = maximum past pressure
   CR = compression ratio = C_c / $(1+e_0)$
   RR = recompression ratio = C_r / $(1+e_0)$
4. σ'_c = effective consolidation stress = $(\sigma'_{vc} + 2*\sigma'_{hc})/3$, where σ'_{vc} = effective vertical consolidation stress and σ'_{hc} = effective horizontal consolidation stress.
5. Consolidation properties could not be reliably determined from incremental consolidation test on HB-EXIT45-303 U1 and HB-EXIT45-U2 due to shape of curve.
6. CR and RR could not be reliably determined from incremental consolidation test on HB-EXIT45-303 U4 due to shape of curve.
7. Ground surface elevations at as-drilled test boring locations should be considered approximate and were estimated by HNTB based on interpolation between ground surface contours.
8. Elevations are measured in feet and reference the National Geodetic Vertical Datum of 1988 (NAVD 88).

	Individual	Date
Prepared By:	NLK	3/12/2019
Checked By:	EAF	3/14/2019
Reviewed By:	WAC	3/15/2019

FIGURES

MAP SOURCE: ESRI

SITE COORDINATES: 43°37'55"N, 70°20'39"W

HALEY ALDRICH

PROPOSED RECONSTRUCTION OF EXIT 45 INTERCHANGE
MAINE TURNPIKE
SOUTH PORTLAND, MAINE

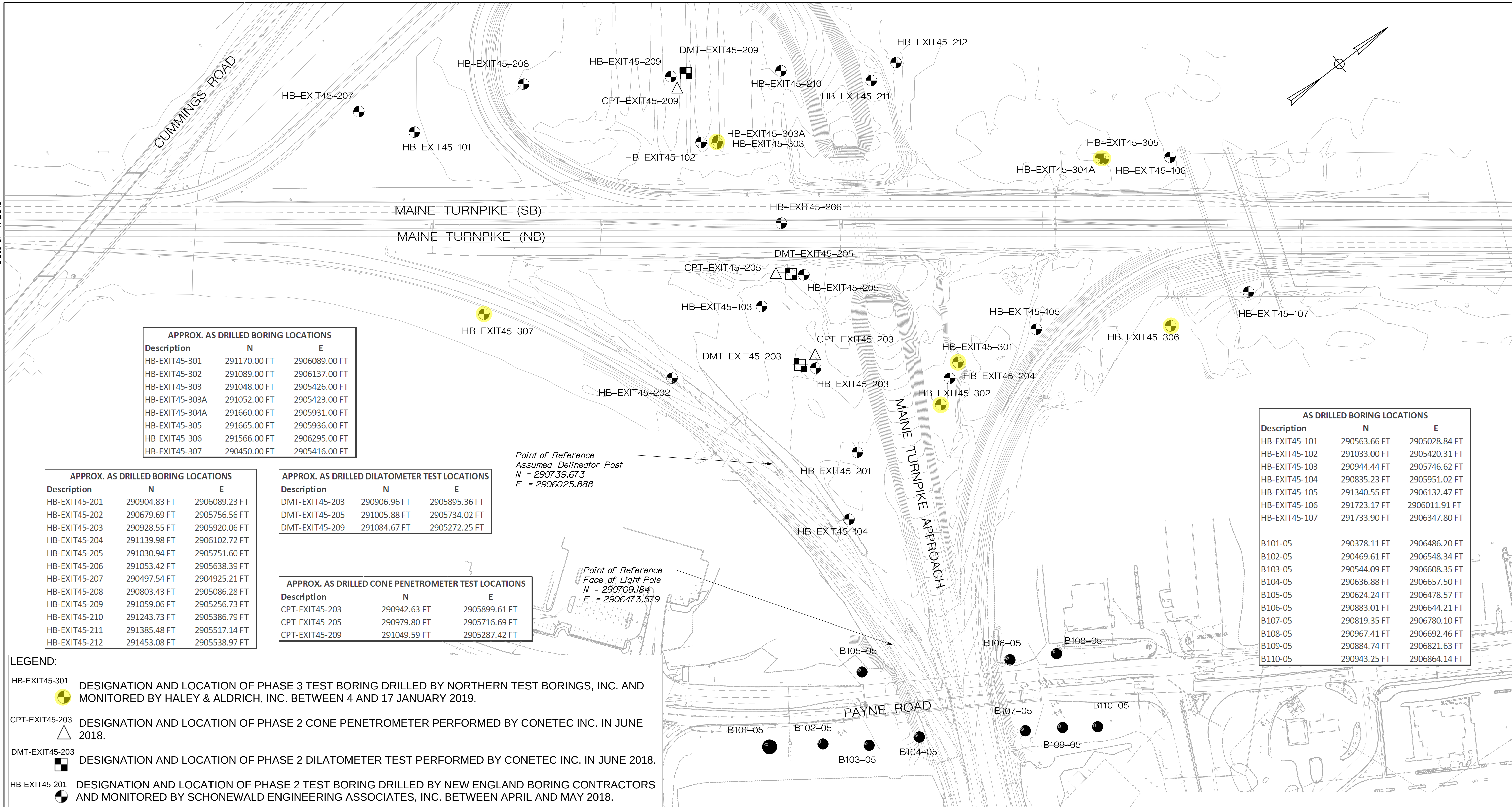
PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
MARCH 2019

FIGURE 1

132949-003_1_LOCUS.PDF

Date:3/14/2019



APPROX. AS DRILLED BORING LOCATIONS		
Description	N	E
HB-EXIT45-301	291170.00 FT	2906089.00 FT
HB-EXIT45-302	291089.00 FT	2906137.00 FT
HB-EXIT45-303	291048.00 FT	2905426.00 FT
HB-EXIT45-303A	291052.00 FT	2905423.00 FT
HB-EXIT45-304A	291660.00 FT	2905931.00 FT
HB-EXIT45-305	291665.00 FT	2905936.00 FT
HB-EXIT45-306	291566.00 FT	2906295.00 FT
HB-EXIT45-307	290450.00 FT	2905416.00 FT

APPROX. AS DRILLED BORING LOCATIONS		
Description	N	E
HB-EXIT45-201	290904.83 FT	2906089.23 FT
HB-EXIT45-202	290679.69 FT	2905756.56 FT
HB-EXIT45-203	290928.55 FT	2905920.06 FT
HB-EXIT45-204	291139.98 FT	2906102.72 FT
HB-EXIT45-205	291030.94 FT	2905751.60 FT
HB-EXIT45-206	291053.42 FT	2905638.39 FT
HB-EXIT45-207	290497.54 FT	2904925.21 FT
HB-EXIT45-208	290803.43 FT	2905086.28 FT
HB-EXIT45-209	291059.06 FT	2905256.73 FT
HB-EXIT45-210	291243.73 FT	2905386.79 FT
HB-EXIT45-211	291385.48 FT	2905517.14 FT
HB-EXIT45-212	291453.08 FT	2905538.97 FT

APPROX. AS DRILLED DILATOMETER TEST LOCATIONS		
Description	N	E
DMT-EXIT45-203	290906.96 FT	2905895.36 FT
DMT-EXIT45-205	291005.88 FT	2905734.02 FT
DMT-EXIT45-209	291084.67 FT	2905272.25 FT

APPROX. AS DRILLED CONE PENETROMETER TEST LOCATIONS		
Description	N	E
CPT-EXIT45-203	290942.63 FT	2905899.61 FT
CPT-EXIT45-205	290979.80 FT	2905716.69 FT
CPT-EXIT45-209	291049.59 FT	2905287.42 FT

AS DRILLED BORING LOCATIONS		
Description	N	E
HB-EXIT45-101	290563.66 FT	2905028.84 FT
HB-EXIT45-102	291033.00 FT	2905420.31 FT
HB-EXIT45-103	290944.44 FT	2905746.62 FT
HB-EXIT45-104	290835.23 FT	2905951.02 FT
HB-EXIT45-105	291340.55 FT	2906132.47 FT
HB-EXIT45-106	291723.17 FT	2906011.91 FT
HB-EXIT45-107	291733.90 FT	2906347.80 FT
B101-05	290378.11 FT	2906486.20 FT
B102-05	290469.61 FT	2906548.34 FT
B103-05	290544.09 FT	2906608.35 FT
B104-05	290636.88 FT	2906657.50 FT
B105-05	290624.24 FT	2906478.57 FT
B106-05	290883.01 FT	2906644.21 FT
B107-05	290819.35 FT	2906780.10 FT
B108-05	290967.41 FT	2906692.46 FT
B109-05	290884.74 FT	2906821.63 FT
B110-05	290943.25 FT	2906864.14 FT

LEGEND:

HB-EXIT45-301 DESIGNATION AND LOCATION OF PHASE 3 TEST BORING DRILLED BY NORTHERN TEST BORINGS, INC. AND MONITORED BY HALEY & ALDRICH, INC. BETWEEN 4 AND 17 JANUARY 2019.

CPT-EXIT45-203 DESIGNATION AND LOCATION OF PHASE 2 CONE PENETROMETER PERFORMED BY CONETEC INC. IN JUNE 2018.

DMT-EXIT45-203 DESIGNATION AND LOCATION OF PHASE 2 DILATOMETER TEST PERFORMED BY CONETEC INC. IN JUNE 2018.

HB-EXIT45-201 DESIGNATION AND LOCATION OF PHASE 2 TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS AND MONITORED BY SCHONEWALD ENGINEERING ASSOCIATES, INC. BETWEEN APRIL AND MAY 2018.

HB-EXIT45-101 DESIGNATION AND LOCATION OF PHASE 1 TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS AND MONITORED BY SCHONEWALD ENGINEERING ASSOCIATES, INC. IN OCTOBER 2017.

B101-05 DESIGNATION AND LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS, INC. AND MONITORED BY HALEY & ALDRICH, INC. BETWEEN 16 FEBRUARY AND 4 MARCH 2005 FOR THE PAYNE ROAD BRIDGE REPLACEMENT

NOTES:

1. PLAN PROVIDED BY HNTB ON 14 MARCH 2019.

2. AS-DRILLED LOCATIONS OF PHASE 3 TEST BORINGS WERE DETERMINED IN THE FIELD BY HALEY & ALDRICH, INC. USING GPS SURVEY EQUIPMENT.

200 0 200 400

Scale in Feet

HALEY ALDRICH

PROPOSED RECONSTRUCTION OF EXIT 45 INTERCHANGE
MAINE TURNPIKE
SOUTH PORTLAND, MAINE

SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
MARCH 2019

FIGURE 2

Scale:

No.	Revision	By	Date

Designed by:

HNTB

CONSULTANT PROJECT MANAGER: ----------

	By	Date		By	Date
Designed	---	--/--	Checked	---	--/--
Drawn	---	--/--	In Charge of	RAL	--/--

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: ------------

Filename: BLPlan.dgn

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eforce

APPENDIX A

Test Boring Logs

IDENTIFICATION AND DESCRIPTION OF SUBSURFACE MATERIALS

SOIL

Soil description on logs of subsurface explorations are based on Standard Penetration Test results, visual–manual examination of exposed soil and soil samples, and the results of laboratory tests on selected samples. The criteria, descriptive terms and definitions are as follows:

DENSITY OR CONSISTENCY

Density of Cohesionless Soils	Penetration Resistance (Blows per ft.)	Consistency of Cohesive Soils	Penetration Resistance (Blows per ft.)
Very Loose	0–4	Very Soft	0–2
Loose	5–10	Soft	3–4
Medium	11–30	Medium	5–8
Dense	31–50	Stiff	9–15
Very Dense	over 50	Very Stiff	16–30
		Hard	over 30

PENETRATION RESISTANCE

Standard Penetration Test (ASTM D–1586) – Number of blows required to drive a standard 2 in. O.D. split spoon sampler 1 ft. with a 140 lb. weight falling freely through 30 in.

COLOR: Basic colors and combinations: black, brown, gray, yellow–brown, etc.

SUPPLEMENTAL SOIL TERMINOLOGY:

Lamina	– 0 to 1/16 in. thick (cohesive)
Parting	– 0 to 1/16 in. thick (granular)
Seam	– 1/16 to 1/2 in. thick
Layer	– 1/2 to 12 in. thick
Stratum	– > 12 in. thick
Pocket	– Small, erratic deposit less than 12 in. size
Lens	– Lenticular deposit larger than a pocket
Occasional	– One or less per 12 in. of thickness
Frequent	– More than one per 12 in. of thickness
Interbedded	– Alternating soil layers of differing composition
Varved	– Alternating thin seams of silt and clay
Mottled	– Variation of color

GEOLOGIC INTERPRETATION

Deposit type – GLACIAL TILL, ALLUVIUM, FILL.....

The natural soils are identified by criteria of Unified Soil Classification System (USCS), with appropriate group symbol in parenthesis for each soil description. Fill materials may not be classified by USCS criteria.

U.S. Standard Series Seive	12"	3"	3/4"	4	10	40	200	Clear Square Sieve Openings
Boulders	Cobbles	Gravel – Coarse	Gravel – Fine	Sand – Coarse	Sand – Medium	Sand – Fine	Silts and Clays	
	305 mm	76 mm	19 mm	4.75 mm	2.00 mm	0.43 mm	0.074 mm	

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			Group Symbol	Graphic Symbol	TYPICAL NAMES
Coarse grained soils: more than half is larger than number 200 sieve	Gravels More than half of coarse fraction is larger than number 4 sieve	Gravels with little or no fines	GW		Well graded gravels, gravel–sand mixtures
			GP		Poorly graded gravels, gravel–sand mixtures
		Gravels with over 12% fines	GM		Silty gravels, poorly graded gravel–sand–silt mixtures
			GC		Clayey gravels, poorly graded gravel–sand–clay mixtures
	Sands More than half of coarse fraction is smaller than number 4 sieve	Sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand–silt mixtures
			SC		Clayey sands, poorly graded sand–clay mixtures
Fined–grained soils: more than half smaller than number 200 sieve	Silts and Clays Liquid limit 50% or less		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH		Inorganic silty, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly organic soils			PT		Peat and other highly organic soils

ROCK

Rock descriptions noted on logs of subsurface explorations are based on visual–manual examination of exposed rock outcrops and core samples. The criteria, descriptive terms and definitions used are as follows:

FIELD HARDNESS: A measure of resistance to scratching.

Very Hard	Cannot be scratched with a knife point or sharp pick.
Hard	Can be scratched with a knife point or sharp pick, only with difficulty.
Moderately Hard	Can be readily scratched with a knife point or pick.
Medium Hard	Can be grooved or gouged 1/16 in. deep with firm pressure on a knife point or sharp pick.
Soft	Can be grooved or gouged easily with a knife point or pick.
Very Soft	Can be carved with a knife and excavated with a pick point.

WEATHERING: The action of organic and inorganic and chemical and physical processes resulting in alteration of color, texture and composition.

Weathering:

Fresh–FR	No visible sign of alteration, except perhaps slight discoloration on major discontinuity surfaces.
Slight–SL	Discoloration of rock material and discontinuity surfaces.
Moderate–MOD	Less than half the rock material decomposed to soil. Some fresh rock; continuous "framework".
High–HIGH	More than half the rock material decomposed and/or disintegrated to soil. Fresh rock corestones or discontinuous "framework".
Complete–COMP	All rock material disintegrated to soil, but mass still intact.
Residual Soil	All rock material converted to soil. Volume of mass changed, but material has not been significantly transported.

COLOR: Basic colors and combinations: gray, light gray, brown, red–brown.

TEXTURE: Size, shape and arrangements of constituents.

Aphanitic	Individual grains invisible.
Fine–grained	Grains barely visible to the unaided eye, up to 1/16 in. diameter.
Medium–grained	Grains between 1/16 and 3/16 in. diameter
Coarse–grained	Grains between 3/16 and 1/4 in. diameter
Very Coarse–grained	Grains larger than 1/4 in.

LITHOLOGY: Rock classification and modifiers; accepted formation names.

DISCONTINUITIES:

Type	Definition
Joint	A natural fracture along which no displacement has occurred. May occur in parallel groups called sets.
Shear	A natural fracture along which displacement has occurred. Surface may be slickensided or striated.
Fault	A natural fracture along which displacement has occurred. Usually lined with gouge and slickensides.
Shear or Fault Zone	Zone of fractured rock and gouge bordering the displacement plane.

ORIENTATION/ATTITUDE:

Term	Angle (degrees)
Horizontal	0–5
Low Angle	6–35
Moderately Dipping	36–55
High Angle	56–85
Vertical	86–100

SPACING:

Term	Inches
Extremely Close	< 3/4
Very Close	3/4 – 2–1/2
Close	2–1/2 – 8
Moderate	8 – 24
Wide	24 – 80
Very Wide	80 – 20 ft.
Extremely Wide	> 20 ft.

PERSISTENCE/CONTINUITY:

Term	Feet
Very Low	0–3
Low	3–10
Medium	10–40
High	40–80
Very High	> 80

SOLUTION CAVITIES:

Term	Size
Pit	Barely visible – 1/4 in.
Vug	1/4 – 2 in.
Cavity	2 in. – 2 ft.
Cave	> 2 ft.

APERTURE/GAP:

Term	Inches
Very Tight	< 0.004
Tight	0.004 – 0.01
Partly Open	0.01 – 0.02
Open	0.02 – 0.1
Moderately Wide	0.1–0.4
Wide	> 0.4
Very Wide	0.4 – 4.0
Extremely Wide	4.0 – 40
Cavernous	> 40

BEDDING:

Term	Inches	Term
Very thin	< 2.5	Thick
Thin	2.5–8	Very thick
Medium	9–24	Massive

GENERAL NOTES

1. Logs of subsurface explorations depict soil, rock and groundwater conditions only at the locations specified on the dates indicated. Subsurface conditions may vary at other locations and at other times.
2. Water levels noted on the logs were measured at the times and under the conditions indicated. During test borings, these water levels could have been affected by the introduction of water into the borehole, extraction of tools on other procedures and thus may not reflect actual groundwater level at the test boring location. Groundwater level fluctuations may also occur as a result of variations in precipitation, temperature, season, tides, adjacent construction activities and pumping of water supply wells and construction dewatering systems.

HALEY ALDRICH

SUBSURFACE EXPLORATION KEY

SCALE: AS SHOWN

G:\29210-002\CAD\DWGS\SUBSURFACE EXP KEY.DWG

HALEY ALDRICH — TEST BORING REPORT

Boring No. HB-Exit 45-301

Project	Exit 45 Interchange, South Portland, Maine
Client	HNTB Corporation
Contractor	Nothern Test Borings, Inc.

File No.	132949-003
Sheet No.	1 of 2
Start	11 January 2019
Finish	11 January 2019
Driller	M. Nadeau
H&A Rep.	N. Klausmeyer
Elevation	60.3
Datum	NAVD88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Toughness	Plasticity	Strength
0	10 7 5 8	S1 16	0.0 2.0	0.2	ML	Note: Frozen soils at ground surface. Stiff dark brown sandy SILT (ML), mps 0.25 in., no structure, no odor, moist -TOPSOIL-	-	-	5	5	40	50				
					SW-SM	Medium dense dark brown well-graded SAND with silt and gravel (SW-SM), mps 1.0 in., no structure, no odor, moist -FILL-	15	15	15	25	20	10				
	8 10 6 2	S2 6	2.0 4.0		SW	Medium dense dark brown well-graded SAND with gravel (SW), mps 1.0 in., no structure, no odor, damp	20	10	10	20	35	5				
	1 1 1 1	S3 11	4.0 6.0	4.0	SW-SM	Very loose brown to red-brown well-graded SAND with silt (SW-SM), mps 0.5 in., no structure, no odor, wet -FILL-	5	5	15	25	40	10				
5				5.6	SW	Very loose brown well-graded SAND (SW), mps 0.25 in., no structure, no odor, wet			10	40	45	5				
	1 1 1 3	S4 19	6.0 8.0		SW	Very loose brown well-graded SAND (SW), mps 0.25 in., no structure, gasoline-like odor, wet -FILL-		5	10	30	50	5				
				6.9	ML	Very soft brown sandy SILT with organics (ML), mps 4.75 mm, fibrous, slight organic odor, moist -ORGANIC DEPOSIT-			1	17	27	55				
				7.3	ML	Very soft olive-gray SILT with sand, trace clay (ML), mps 2.0 mm, moderately bonded, no odor, moist -INTERBEDDED MARINE DEPOSITS-				5	15	80				
		U1 12	9.0 10.0	9.0		U1: Olive-gray lean CLAY (CL) -INTERBEDDED MARINE DEPOSITS- 55x110 mm vane raw torque readings:										
10				10.0												

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
1/11/19	10:00	~20 hrs	10.0	20.0	3.8

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	20
Rock Cored (ft)	-
Samples	7S, 3U

Boring No. HB-Exit 45-301

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

TEST BORING REPORT

HALEY ALDRICH

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10	3 3 3 4	S5 24	10.0 12.0		CL	V1 (10.1-10.5'): 430/60 in-lbs; Su=1,670/235 psf Note: Could only push vane 6 in. below bottom of borehole; refusal. Stiff olive-brown to brown lean CLAY with sand (CL), mps 0.42 mm, infrequent 1.0 in. layers of fine sand, no odor, wet -INTERBEDDED MARINE DEPOSITS-					15	85				
		U2 24	12.0 14.0	12.0	CL	U2: Olive-brown lean CLAY (CL) -MARINE DEPOSITS- (CLAY CRUST) 55x110 mm vane raw torque readings: V2 (14-14.4'): 605/110 in-lbs; Su=2,350/425 psf Note: Vane refusal at 14.4 ft.										
15	2 1 2 2	S6 24	14.0 16.0	14.2	CL	Very stiff olive-brown grading to olive-gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet -MARINE DEPOSITS- (CLAY)						100				
		U3 24	16.0 18.0			U3: Olive-gray lean CLAY (CL)										
20		S7 24	18.0 20.0	20.0	CL	Medium stiff olive-gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet 55x110 mm vane raw torque readings: V3 (18.6-19'): 130/10 in-lbs; Su=505/40 psf 55x110 mm vane raw torque readings: V4 (19.6-20'): 130/20 in-lbs; Su=505/80 psf						100				
						BOTTOM OF EXPLORATION 20.0 FT (No Refusal)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

HALEY ALDRICH

TEST BORING REPORT

Boring No. HB-Exit 45-302

Project	Exit 45 Interchange, South Portland, Maine
Client	HNTB Corporation
Contractor	Nothern Test Borings, Inc.

File No.	132949-003
Sheet No.	1 of 2
Start	11 January 2019
Finish	11 January 2019
Driller	M. Nadeau
H&A Rep.	N. Klausmeyer
Elevation	60
Datum	NAVD88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	1 2 4 5	S1 14	0.0 2.0		SW	Note: Frozen soils at ground surface. Loose brown well-graded SAND (SW), mps 0.5 in., no structure, no odor, moist, roots and wood -FILL-		5	10	40	40	5				
	4 4 8 9	S2 18	2.0 4.0	2.0	SM	Loose brown silty SAND (SM), mps 0.25 in., no structure, no odor, moist -FILL-		5	10	25	40	20				
				3.0	SW	Red-brown well-graded SAND (SW), mps 0.2 in., no structure, no odor, moist -FILL-			15	35	45	5				
				3.1	SP	Medium dense gray-brown poorly-graded SAND (SP), mps 2.0 mm, no structure, no odor, moist -INTERBEDDED MARINE DEPOSITS-				25	70	5				
	8 9 8 10	S3 17	4.0 6.0		SP	Medium dense gray-brown poorly-graded SAND (SP), mps 2.0 mm, no structure, no odor, moist				25	70	5				
5				4.9	ML	Very stiff gray-brown sandy SILT (ML), mps 0.25 in., mottled, no odor, moist -INTERBEDDED MARINE DEPOSITS-			5	5	20	70				
	8 10 10 9	S4 14	6.0 8.0	6.0	SM	Medium dense light brown to gray-brown silty SAND (SM), mps 0.25 in., mottled, no odor, moist -INTERBEDDED MARINE DEPOSITS-				25	55	20				
				6.8	CL/SM	Very stiff gray-brown to dark gray lean CLAY (CL) and silty SAND (SM), mps 4.75 mm, interlayered and mottled, no odor, moist -INTERBEDDED MARINE DEPOSITS-			5	25	45	25				
	3 4 5 7	S5 24	8.0 10.0	8.0	CL	Stiff gray-brown to yellow-brown lean CLAY (CL), mps 0.42 mm, mottled, no odor, moist -MARINE DEPOSITS- (CLAY CRUST)					5	95				
10																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
1/11/19	2:00	-	10.0	20.0	3.3

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	20
Rock Cored (ft)	-
Samples	7S, 2U

Boring No. HB-Exit 45-302

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

TEST BORING REPORT

HALEY ALDRICH

Boring No. HB-Exit 45-302
File No. 132949-003

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10		U1 24	10.0 12.0		CL	U1: Medium stiff olive-gray lean CLAY (CL) -MARINE DEPOSITS- (CLAY CRUST)										
	3 3 4 4	S6 24	12.0 14.0		ML/ CL	Medium stiff gray-brown SILT (ML) and CLAY (CL), mps 0.42 mm, mottled, no odor, moist Note: Attempt vane shear test, refusal at 12.0 ft, no penetration.					5	95				
15		S7 24	14.0 16.0		CL	Stiff gray-brown grading to gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet 55x110 mm vane raw torque readings: V1 (14.6-15'): 410/70 in-lbs; Su=1,590/270 psf 55x110 mm vane raw torque readings: V2 (15.6-16'): 410/65 in-lbs; Su=1,590/250 psf						100				
		U2 24	16.0 18.0	18.0		U2: Stiff olive-gray lean CLAY (CL) -MARINE DEPOSITS- (CLAY CRUST)										
		S8 24	18.0 20.0		CL	Soft olive-gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V3 (18.6-19'): 120/15 in-lbs; Su=465/60 psf 55x110 mm vane raw torque readings: V4 (19.6-20'): 120/10 in-lbs; Su=465/40 psf						100				
20				20.0		BOTTOM OF EXPLORATION 20.0 FT (No Refusal)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

TEST BORING REPORT

Boring No. HB-Exit 45-303

Project	Exit 45 Interchange, South Portland, Maine
Client	HNTB Corporation
Contractor	Nothern Test Borings, Inc.

File No.	132949-003
Sheet No.	1 of 4
Start	16 January 2019
Finish	17 January 2019
Driller	M. Nadeau
H&A Rep.	N. Klausmeyer
Elevation	61.4
Datum	NAVD88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures
Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	5 3 3 4	S1 17	0.0 2.0		SP-SM	Note: Frozen soils at ground surface. Loose dark brown poorly-graded SAND with silt (SP-SM), mps 2.0 mm, no structure, no odor, moist, with organics (roots) -FILL-				10	75	15				
				1.1	SP-SM	Loose gray poorly-graded SAND with silt (SP-SM), mps 0.42 mm, no structure, no odor, moist, with organics (roots)					90	10				
	4 5 6 5	S2 12	2.0 4.0	2.0	SP	Medium dense brown poorly-graded SAND (SP), mps 2.0 mm, no structure, no odor, wet, trace organics (roots) -FILL-				55	40	5				
	1 2 2 3	S3 14	4.0 6.0	4.0	SC	Very loose olive-gray clayey SAND (SC), mps 0.42 mm, infrequent clay layers up to 2.0 in., slight organic odor, wet -INTERBEDDED MARINE DEPOSITS-					60	40				
5																
	2 3 3 3	S4 11	6.0 8.0	6.0	SM	Loose gray-brown silty SAND (SM), mps 0.42 mm, no structure, no odor, wet -INTERBEDDED MARINE DEPOSITS-				6	80	14				
	2 3 1 1	S5 17	8.0 10.0	8.3	CL	Very loose olive-gray sandy lean CLAY (CL), mps 0.42 mm, frequent layers of lean clay up to 3.0 in., slight organic odor, wet -INTERBEDDED MARINE DEPOSITS-				1	37	60				
10																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
		Not Observed			

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 54
Rock Cored (ft) -
Samples 15S, 6U

Boring No. HB-Exit 45-303

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10		U1 24	10.0 12.0		ML	U1: Olive-gray sandy SILT (ML)					29	71				
						-INTERBEDDED MARINE DEPOSITS-										
		S6 24	12.0 14.0			55x110 mm vane raw torque readings: V1 (12.6-13'): 125/15 in-lbs; Su=485/60 psf										
				12.9	CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, lean clay layer beginning at 12.9 ft to bottom of spoon sample (12.0 in. thick), no odor, wet					4	96				
						55x110 mm vane raw torque readings: V2 (13.6-14'): 115/25 in-lbs; Su=445/95 psf										
		S7 24	14.0 16.0		CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, no structure, no odor, wet					1	99				
15						55x110 mm vane raw torque readings: V3 (14.6-15'): 100/10 in-lbs; Su=390/40 psf										
						55x110 mm vane raw torque readings: V4 (15.6-16'): 95/10 in-lbs; Su=370/40 psf										
		U2 13	16.0 18.0		CL	U2: Olive gray lean CLAY (CL)					5	95				
						-MARINE DEPOSITS- (CLAY)										
		S8 24	18.0 20.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), mps 0.42 mm, 1.5 in. sand layer from 18.0-18.2 ft, no odor, wet					6	94				
						55x110 mm vane raw torque readings: V5 (18.6-19'): 160/10 in-lbs; Su=620/40 psf										
						55x110 mm vane raw torque readings: V6 (19.6-20'): 80/5 in-lbs; Su=310/20 psf										
20		S9 24	20.0 22.0		CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, no structure, no odor, wet					5	95				
						55x110 mm vane raw torque readings: V7 (20.6-21'): 110/10 in-lbs; Su=425/40 psf										
						55x110 mm vane raw torque readings: V8 (21.6-22'): 80/5 in-lbs; Su=310/20 psf										
		U3 14	22.0 24.0			U3: Olive gray lean CLAY (CL)										
						-MARINE DEPOSITS- (CLAY)										
		S10 24	24.0 26.0		CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, no structure, no odor, wet, trace shells					5	95				

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25						55x110 mm vane raw torque readings: V9 (24.6-25'): 105/5 in-lbs; Su=405/20 psf 55x110 mm vane raw torque readings: V10 (25.6-26'): 70/5 in-lbs; Su=270/20 psf										
		S11 24	26.0 28.0		CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, 6.0 in. layer of fine and from 27.6 ft to 28.0 ft, no odor, wet 55x110 mm vane raw torque readings: V11 (26.6-27'): 80/10 in-lbs; Su=310/40 psf -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V12 (27.6-28'): 90/10 in-lbs; Su=350/40 psf					25	75				
		S12 24	28.0 30.0		CL	Soft olive-gray lean CLAY (CL), mps 0.42 mm, no structure, no odor, wet 55x110 mm vane raw torque readings: V13 (28.6-29'): 120/5 in-lbs; Su=465/20 psf 55x110 mm vane raw torque readings: V14 (29.6-30'): 80/5 in-lbs; Su=310/20 psf					5	95				
30		U4 24	30.0 32.0		CL	U4: Olive gray lean CLAY (CL) -MARINE DEPOSITS- (CLAY) Note: No sampling or in-situ testing between 32 and 43 ft.										
35																

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
40						-MARINE DEPOSITS- (CLAY)										
		S13 24	43.0 45.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), mps 0.075 mm, frequent black organic streaking, organic odor, wet 55x110 mm vane raw torque readings: V15 (43.6-44'): 130/10 in-lbs; Su=505/40 psf 55x110 mm vane raw torque readings: V16 (44.6-45'): 110/10 in-lbs; Su=425/40 psf						100				
45		U5 24	45.0 47.0			U5: Gray lean CLAY (CL)										
		S14 24	47.0 49.0		CL	Soft to medium stiff gray lean CLAY (CL), mps 0.075 mm, frequent black organic streaking, organic odor, wet 55x110 mm vane raw torque readings: V17 (47.6-48'): 180/10 in-lbs; Su=700/40 psf 55x110 mm vane raw torque readings: V18 (48.6-49'): 110/5 in-lbs; Su=425/20 psf						100				
50		U6 24	50.0 52.0		CL	U6: Gray lean CLAY (CL) -MARINE DEPOSITS- (CLAY)										
		S15 24	52.0 54.0	54.0	CL	Medium stiff gray lean CLAY (CL), mps 0.075 mm, frequent black organic streaking, organic odor, wet 55x110 mm vane raw torque readings: V19 (52.6-53'): 170/10 in-lbs; Su=660/40 psf 55x110 mm vane raw torque readings: V20 (53.6-54'): 150/5 in-lbs; Su=580/20 psf						100				
						BOTTOM OF EXPLORATION 54.0 FT (No Refusal)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

HALEY ALDRICH

TEST BORING REPORT

Boring No. HB-Exit 45-303A

Project	Exit 45 Interchange, South Portland, Maine
Client	HNTB Corporation
Contractor	Nothern Test Borings, Inc.

File No.	132949-003
Sheet No.	1 of 1
Start	17 January 2019
Finish	17 January 2019
Driller	M. Nadeau
H&A Rep.	N. Klausmeyer
Elevation	61.3
Datum	NAVD88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Toughness	Plasticity	Strength
0						Note: Frozen soils at ground surface; no sampling or in-situ testing from 0 to 5 ft.										
5		U1 24	5.0 7.0		SC	U1: Clayey SAND/sandy CLAY (SC)										
		S1 4	7.0 9.0		SP-SM	Very loose gray-brown poorly-graded SAND with silt (SP-SM), mps 0.42 mm, no structure, slight organic odor, wet -INTERBEDDED MARINE DEPOSITS- 55x110 mm vane raw torque readings: V1 (7.1-7.5'): 190/30 in-lbs; Su=735/115 psf Note: Vane refusal at 7.5 ft.					90	10				
				9.0		BOTTOM OF EXPLORATION 9.0 FT (No Refusal)										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
		Not Observed			

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	9
Rock Cored (ft)	-
Samples	1S, 1U

Boring No. HB-Exit 45-303A

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

TEST BORING REPORT

Boring No. HB-Exit 45-304A

Project	Exit 45 Interchange, South Portland, Maine
Client	HNTB Corporation
Contractor	Nothern Test Borings, Inc.

File No.	132949-003
Sheet No.	1 of 2
Start	15 January 2019
Finish	16 January 2019
Driller	M. Nadeau
H&A Rep.	N. Klausmeyer
Elevation	56.1
Datum	NAVD88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	1 1 1 2	S1 12	0.0 2.0	0.3	OL	Note: Frozen soils at ground surface. Very soft dark olive-gray SILT with organics (OL), mps 0.42 mm, roots throughout, organics odor, moist -TOPSOIL-					5	95				
					CL/ ML	Very soft olive-gray lean CLAY (CL) and SILT (ML) with organics, mps 0.042 mm, mottled, slight organic odor, moist -ORGANIC DEPOSIT-					5	95				
		U1 24	2.0 4.0	2.0	CL	U1: Dark gray lean CLAY (CL) -MARINE DEPOSITS- (CLAY CRUST)										
	3 4 4 5	S2 24	4.0 6.0		ML/CL	Medium stiff light brown to olive-gray SILT (ML) and lean CLAY (CL), mps 0.42 mm, mottled, no odor, moist, trace organics 55x110 mm vane raw torque readings: MV1: Attempted vane shear test at 4.0 ft; refusal.					5	95				
5																
		U2 24	6.0 8.0		CL	U2: Gray-brown lean CLAY (CL) -MARINE DEPOSITS- (CLAY CRUST) 55x110 mm vane raw torque readings: V1 (8-8.5'): 760/130 in-lbs; Su=2,950/505 psf										
	2 2 1 1	S3 24	8.0 10.0		ML/CL	Medium stiff to stiff light brown to olive-gray SILT (ML) and lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet, trace organics 55x110 mm vane raw torque readings: V2 (10.6-11'): 130/5 in-lbs; Su=505/20 psf						100				
10				10.0												

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
1/16/19	10:00	-	12.0	14.0	0

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	14
Rock Cored (ft)	-
Samples	5S, 2U

Boring No. HB-Exit 45-304A

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10		S4 24	10.0 12.0		CL	Soft olive-gray to light brown lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V3 (11.6-12'): 120/5 in-lbs; Su=465/20 psf						100				
		S5 15	12.0 14.0		CL	Soft olive-gray lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet 55x110 mm vane raw torque readings: V4 (12.6-13'): 120/5 in-lbs; Su=465/20 psf 55x110 mm vane raw torque readings: V5 (13.6-14'): 110/5 in-lbs; Su=425/20 psf						100				
				14.0		BOTTOM OF EXPLORATION 14.0 FT (No Refusal)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

TEST BORING REPORT

Boring No. HB-Exit 45-305

Project	Exit 45 Interchange, South Portland, Maine	File No.	132949-003
Client	HNTB Corporation	Sheet No.	1 of 7
Contractor	Nothern Test Borings, Inc.	Start	14 January 2019
		Finish	15 January 2019
		Driller	M. Nadeau
		H&A Rep.	N. Klausmeyer
		Elevation	56.1
		Datum	NAVD88
		Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	4 1 WOH WOH	S1 6	0.0 2.0			Note: Frozen soils at ground surface. Very soft olive-gray lean CLAY (CL), mps 0.42 mm, mottled, slight organic odor, moist, with organics -MARINE DEPOSITS- (CLAY CRUST)					5	95				
	4 5 6 5	S2 21	2.0 4.0		CL/ ML	Stiff olive-gray to light brown lean CLAY (CL) and SILT (ML), mps 0.42 mm, mottled, slight organic odor, moist, with roots					10	90				
	3 4 4 4	S3 19	4.0 6.0		CL/ ML	Medium stiff olive-gray with some light brown lean CLAY (CL) and SILT (ML), mps 0.42 mm, mottled, slight organic odor, moist, trace roots -MARINE DEPOSITS- (CLAY CRUST)					10	90				
5																
	4 4 3 3	S4 16	6.0 8.0		CL/ ML	Medium stiff olive-gray to light brown lean CLAY (CL) and SILT (ML), mps 0.42 mm, mottled, no odor, moist, trace roots/plant debris					5	95				
	1 2 1 2	S5 24	8.0 10.0		CL/ ML	Soft olive-gray with trace light brown lean CLAY (CL) and SILT (ML), mps 0.42 mm, mottled, no odor, wet, trace roots/plant debris					5	95				
10				10.0												

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
1/15/19	2:00	1 day	75.0	103.6	0

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft) 78
Rock Cored (ft) 5
Samples 19S, 1C

Boring No. HB-Exit 45-305

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Plasticity**: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10		S6 24	10.0 12.0		CL	Medium stiff gray lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet 55x110 mm vane raw torque readings: V1 (10.6-11.0'): 210/40 in-lbs; Su=815/155 psf -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V2 (11.6-12'): 130/25 in-lbs; Su=505/95 psf						100				
15	WOR WOR WOR WOR	S7 24	15.0 17.0		CL	Soft to medium stiff gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet -MARINE DEPOSITS- (CLAY)						100				
20		S8 24	20.0 22.0		CL	Soft gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet 55x110 mm vane raw torque readings: V3 (20.6-21'): 110/5 in-lbs; Su=425/20 psf 55x110 mm vane raw torque readings: V4 (21.6-22'): 90/5 in-lbs; Su=350/20 psf						100				

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	WOR WOR WOR WOR	S9 24	25.0 27.0		CL	Soft gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet						100				
						-MARINE DEPOSITS- (CLAY)										
30		S10 24	30.0 32.0		CL	Soft olive-gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, organic odor, wet						100				
						55x110 mm vane raw torque readings: V5 (30.6-31'): 110/0 in-lbs; Su=425/0 psf										
						55x110 mm vane raw torque readings: V6 (31.6-32'): 110/5 in-lbs; Su=425/20 psf										
35	WOR WOR WOR WOR	S11 24	35.0 37.0		CL	Soft olive-gray lean CLAY (CL), mps 0.075 mm, infrequent black organic streaking, no odor, wet						100				
						-MARINE DEPOSITS- (CLAY)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
40		S12 24	40.0 42.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet 55x110 mm vane raw torque readings: V7 (40.6-41'): 130/5 in-lbs; Su=505/20 psf -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V8 (41.6-42'): 110/5 in-lbs; Su=425/20 psf						100				
45	WOR WOR WOR WOR	S13 6	45.0 47.0		CL	Soft olive-gray lean CLAY (CL), mps 0.075 mm, no structure, no odor, wet						100				
				48.5		Note: Drill action began to indicate granular material starting at approximately 48.5 ft below ground surface.										
50	9 6 3 5	S14 11	50.0 52.0		SP	Loose gray poorly-graded SAND with gravel (SP), mps 0.5 in., no structure, no odor, wet -MARINE DEPOSITS- (SAND) Note: Drill action and wash continue to indicate granular material.	10	5	5	25	50	5				
				54.3												

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

HALEY ALDRICH

TEST BORING REPORT

Boring No. HB-Exit 45-305
File No. 132949-003
Sheet No. 5 of 7

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
55	14 12 13 14	S15 3	55.0 57.0		SW-SM	Medium dense gray well-graded SAND with silt and gravel (SW-SM), mps 0.5 in., no structure, no odor, wet	5	15	15	25	30	10				
						-MARINE DEPOSITS- (SAND)										
60	17 19 20 33	S16 20	60.0 62.0		SW	Dense gray well-graded SAND with silt and gravel (SW), mps 1.0 in., no structure, no odor, wet	5	10	10	20	45	10				
						Note: Drill action and wash continue to indicate granular material.										
						-MARINE DEPOSITS- (SAND)										
65	23 18 17 18	S17 12	65.0 67.0	65.0	SP	Dense gray poorly-graded SAND (SP), mps 2.0 in., no structure, no odor, wet	5			5	85	5				
						Note: Drill action and wash continue to indicate granular material.										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
70	17 18 19 18	S18 16	70.0 72.0		SP-SM	Dense gray poorly-graded SAND with silt (SP-SM), mps 0.5 in., moderately bonded (fluvial) nodules, no odor, wet -MARINE DEPOSITS- (SAND)			5	5	80	10				
						Note: Drill action and wash continue to indicate granular material.										
75	39 50/5"	S19 11	75.0 75.9		SP	Dense to very dense gray poorly-graded SAND (SP), mps 0.5 in., moderately bonded (fluvial nodules), no odor, wet -MARINE DEPOSITS- (SAND)		5	5	10	75	5				
				76.4		Note: Drill action and wash indicate top of bedrock at 76.4 ft below ground surface. Advanced roller bit to 78.0 ft. -BEDROCK-										
				78.0		SEE CORE BORING REPORT FOR ROCK DETAILS										
80																

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./ Depth (ft)	Visual Description and Remarks
								SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
	0:30	C1	78.0 83.0	23 0	38 0	Slightly-Highly		Hard to moderately hard, slightly weathered to highly weathered, gray, aphanitic, PHYLLITE. Joints dipping at low to high angles, extremely close to close, open, undulating, rough, some fine grained infilled coatings on joint surfaces, majority of run highly fractured. Some noticeable pitting found throughout, some quartz/calcite stringers found throughout the length of the run.
	1:06							
80	1:58							
	2:55							
	3:28							
							83.0	BOTTOM OF EXPLORATION 83.0 FT
85								
90								
95								
100								
105								

HALEY ALDRICH — TEST BORING REPORT

Boring No. HB-Exit 45-306

Project	Exit 45 Interchange, South Portland, Maine	File No.	132949-003
Client	HNTB Corporation	Sheet No.	1 of 5
Contractor	Nothern Test Borings, Inc.	Start	08 January 2019
		Finish	08 January 2019
		Driller	M. Nadeau
		H&A Rep.	N. Klausmeyer
		Elevation	58.1
		Datum	NAVD88
		Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	3 3 1 3	S1 18	0.0 2.0		ML/CL	Note: Frozen soils at ground surface. Soft olive-gray to tan SILT (ML) and lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist, with roots						100				
						-MARINE DEPOSITS- (CLAY CRUST)										
	4 6 7 10	S2 17	2.0 4.0		ML/CL	Stiff olive-gray to tan SILT (ML) and lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist, with roots						100				
	5 7 9 10	S3 24	4.0 6.0		ML/CL	Very stiff olive-gray to tan SILT (ML) and lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist, occasional roots						100				
5																
	10 10 11 12	S4 19	6.0 8.0		ML/CL	Very stiff olive-gray to tan SILT (ML) and lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist, with roots						100				
						-MARINE DEPOSITS- (CLAY CRUST)										
				8.0												
	3 4 4 4	S5 24	8.0 10.0		CL	Medium stiff olive-gray to tan lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist						100				
						-MARINE DEPOSITS- (CLAY CRUST)										
10																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
		Not Observed			

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft) 46
Rock Cored (ft) 9.7
Samples 12S, 2C

Boring No. HB-Exit 45-306

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10	2 2 2 3	S6 24	10.0 12.0		CL	Soft olive-gray to tan lean CLAY (CL), mottled, mps 0.075 mm, no odor, moist						100				
						-MARINE DEPOSITS- (CLAY CRUST)										
15		S7 24	15.0 17.0	15.0	CL	Medium stiff olive-gray lean CLAY (CL), frequent black organic streaking, mps 0.075 mm, slight organic odor, wet 55x110 mm vane raw torque readings: V1 (15.6-16'): 180/20 in-lbs; Su=700/80 psf 55x110 mm vane raw torque readings: V2 (16.6-17'): 165/10 in-lbs; Su=640/40 psf						100				
						-MARINE DEPOSITS- (CLAY)										
20		S8 24	20.0 22.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V3 (20.6-21'): 130/10 in-lbs; Su=505/40 psf 55x110 mm vane raw torque readings: V4 (21.6-22'): 120/5 in-lbs; Su=465/20 psf						100				

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25		S9 24	25.0 27.0		CL	Soft olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V5 (25.6-26'): 110/15 in-lbs; Su=425/60 psf -MARINE DEPOSITS- (CLAY) 55x110 mm vane raw torque readings: V6 (26.6-27'): 105/5 in-lbs; Su=405/20 psf						100				
30		S10 24	30.0 32.0		CL	Soft olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V7 (30.6-31'): 110/15 in-lbs; Su=425/60 psf 55x110 mm vane raw torque readings: V8 (31.6-32'): 105/10 in-lbs; Su=405/40 psf						100				
35		S11 24	35.0 37.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V9 (35.6-36'): 130/25 in-lbs; Su=505/95 psf 55x110 mm vane raw torque readings: V10 (36.6-37'): 125/15 in-lbs; Su=485/60 psf -MARINE DEPOSITS- (CLAY)						100				

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
40	WOR 3 3 3	S12 24	40.0 42.0		CL	Medium stiff olive gray lean CLAY with sand (CL), mps 2.0 mm, occasional 1 in. sand layers, no odor, wet 55x110 mm vane raw torque readings: Note: Attempted vane shear test at 40.0 ft; refusal. -MARINE DEPOSITS- (CLAY)				5	15	80				
				43.1		Note: Drill action and wash began to indicate granular material at 43.1 ft below ground surface. -PROBABLE MARINE DEPOSITS- (SAND)										
45				44.6		Note: Drill action and wash indicate top of bedrock at 44.6 ft below ground surface. Advanced roller bit to 46.0 ft below ground surface into bedrock. -BEDROCK-										
				46.0		SEE CORE BORING REPORT FOR ROCK DETAILS										
50																

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HB-Exit 45-306

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

HALEY ALDRICH

CORE BORING REPORT

Boring No. HB-Exit 45-306
File No. 132949-003

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./Depth (ft)	Visual Description and Remarks
								SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
	4:18	C1	46.0 51.0	42 9	70 15	Slight-Moderate		Hard to moderately hard, slightly weathered grading to moderately weathering, gray, aphanitic, PHYLLITE. Joints dipping at low to high angles, extremely close to close, undulating, rough, open. Frequent calcite/quartz stringers.
	4:51							
	1:09							
	2:25							
50	6:31							
	4:05	C2	51.0 55.7	49 44	87 78	Slight-Moderate		Hard, fresh to slightly weathered, gray, aphanitic PHYLLITE. Solid core stem with single joint at bottom of run dipping at high angle, wide, open, undulating, rough. Frequent calcite/quartz veins/intrusions up to 2.0 in. in width veins occur parallel to high angle foliation.
	4:08							
	4:06							
	4:07							
55	4:10							
							55.7	BOTTOM OF EXPLORATION 55.7 FT
60								
65								
70								
75								

HALEY ALDRICH	TEST BORING REPORT	Boring No. HB-Exit 45-307

Project	Exit 45 Interchange, South Portland, Maine	File No.	132949-003
Client	HNTB Corporation	Sheet No.	1 of 8
Contractor	Nothern Test Borings, Inc.	Start	04 January 2019
		Finish	10 January 2019
		Driller	M. Nadeau
		H&A Rep.	N. Klausmeyer
		Elevation	63.9
		Datum	NAVD88
		Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	-
Inside Diameter (in.)	4.0	1 3/8	-
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Roller Bit
Drill Mud: None
Casing: HW Driven
Hoist/Hammer: Winch/ Automatic Hammer (0.907)
PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	2 1 1 1	S1 15	0.0 2.0		SW-SM	Note: Frozen soils at ground surface. Very loose dark brown well-graded SAND with silt (SW-SM), mps 0.75 in., no structure, no odor, moist -FILL-		5	10	25	50	10				
	2 5 4 6	S2 16	2.0 4.0	2.0	SM	Loose dark brown silty SAND (SM), with organics, roots, mps 0.5 in., no structure, no odor, wet		5	10	25	45	15				
	4 6 5 6	S3 24	4.0 6.0	4.0	SW	Medium dense brown well-graded SAND (SW), mps 4.75 mm, no structure, no odor, wet -FILL-			15	40	40	5				
5				5.0	SM	Medium dense gray silty SAND with gray sandy SILT layer (SM), mps 2.0 mm, no odor, wet				10	50	40				
				5.3	SP	Medium dense light brown poorly-graded SAND (SP), mps 4.75 mm, no structure, no odor, wet -MARINE DEPOSITS- (SAND)			5	45	45	5				
	2 2 3 3	S4 14	6.0 8.0	6.0	SP	Loose light brown poorly-graded SAND (SP), mps 2.0 mm, no structure, no odor, wet				20	75	5				
	2 2 2 4	S5 1	8.0 10.0		SP	Very loose light brown poorly-graded SAND (SP), mps 2.0 mm, no structure, no odor, wet -MARINE DEPOSITS- (SAND)				20	75	5				

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
1/10/19	12:00	~5 days	85 (HW) 90 (NW)	103.6	2.5

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	90.8
Rock Cored (ft)	10.4
Samples	21S, 4C

Boring No. HB-Exit 45-307

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
10	1 2 2 2	S6 17	10.0 12.0		SP	Very loose light brown poorly-graded SAND (SP), mps 4.75 mm, no structure, no odor, wet			5	65	30					
						-MARINE DEPOSITS- (SAND)										
15	2 4 6 7	S7 0	15.0 17.0			No recovery.										
				17.5		Note: Drill wash indicates color change from light brown to gray at approximately 17.5 ft below ground surface.										
20	1 3 5 6	S8 10	20.0 22.0		SM	Loose gray silty SAND (SM), mps 0.42 mm, no structure, no odor, wet 65x130 mm vane raw torque readings: V1 (20.1-20.5'): 310/30 in-lbs; Su=735/70 psf Could only push 6.0 in., vane refusal at 20.5 ft.					85	15				
						-MARINE DEPOSITS- (SAND)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25		S9 24	25.0 27.0	25.0	SM/SC	Medium stiff gray silty SAND (SM) and clayey SAND (SC), mps 0.42 mm, layered, no odor, wet 55x110 mm vane raw torque readings: V2 (25.1-25.5'): 150/30 in-lbs; Su=580/115 psf Could only push 6.0 in., vane refusal at 25.5 ft. -INTERBEDDED MARINE DEPOSITS-					55	45				
				29.0		Note: Strata change based on drill wash.										
30	WOR WOR WOR 1	S10 24	30.0 32.0		CL	Very soft olive-gray lean CLAY with sand (CL), frequent 1.0 in. sand layers, mps 0.42 mm, no odor, wet Note: Attempted vane shear test; vane refusal at 30.0 ft. -INTERBEDDED MARINE DEPOSITS-					20	80				
35		S11 24	35.0 37.0	35.0	CL	Soft olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V3 (35.6-36'): 110/5 in-lbs; Su=425/20 psf 55x110 mm vane raw torque readings: V4 (36.6-37'): 110/5 in-lbs; Su=425/20 psf -MARINE DEPOSITS- (CLAY)						100				

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
40	WOR WOR WOR WOR	S12 14	40.0 42.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet						100				
						-MARINE DEPOSITS- (CLAY)										
45		S13 19	45.0 47.0		CL	Medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V5 (45.6-46'): 130/0 in-lbs; Su=505/0 psf 55x110 mm vane raw torque readings: V6 (46.6-47'): 130/0 in-lbs; Su=505/0 psf						100				
50	WOR WOR WOR WOR	S14 14	50.0 52.0		CL	Soft to medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet						100				
						-MARINE DEPOSITS- (CLAY)										

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
55		S15 24	55.0 57.0		CL	Medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V7 (55.6-56'): 180/10 in-lbs; Su=700/40 psf 55x110 mm vane raw torque readings: V8 (56.6-57'): 210/10 in-lbs; Su=815/40 psf -MARINE DEPOSITS- (CLAY)						100				
60	WOR WOR WOR WOR	S16 24	60.0 62.0		CL	Medium stiff olive-gray lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet -MARINE DEPOSITS- (CLAY)						100				
65		S17 24	65.0 67.0		CL	Medium stiff to stiff olive-gray lean CLAY (CL), occasinal black organic streaking, mps 0.075 mm, no odor, wet 55x110 mm vane raw torque readings: V9 (65.6-66'): 190/5 in-lbs; Su=735/20 psf 55x110 mm vane raw torque readings: V10 (66.6-67'): 270/5 in-lbs; Su=1,050/20 psf Note: Drill action indicates possible sand layer at approximately 68.0 ft below ground surface.						100				

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
70	WOH WOH WOH WOH	S18 24	70.0 72.0		CL	Medium stiff to stiff olive-green lean CLAY (CL), occasional black organic streaking, mps 0.075 mm, no odor, wet						100				
						-MARINE DEPOSITS- (CLAY)										
				74.7												
75	8 10 14 16	S19 1	75.0 77.0			Low recovery-rock in spoon tip Note: Attempted vane shear test; refusal at 75.0 ft.										
						-GLACIAL TILL-										
80	12 15 20 21	S20 24	80.0 82.0		SM	Dense gray silty SAND with gravel (SM), mps 1.5 in., weakly bonded, no odor, moist	20	20	10	10	25	15				

H&A-TEST BORING-07-1 132949_HA-LIB09-POR-REV.GLB HA-TB+CORE+WELL-07-1.GDT G:\GINT\PORTLAND\132949 EXIT 45\132949-003TBC_DATABASE.GPJ 15 Mar 19

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
				84.1		Note: Cored through boulder from 84.1 ft to 85.3 ft.										
85						-GLACIAL TILL-										
						Note: Cored through boulder from 87.9 ft to 89.4 ft.										
				89.4												
90	22 35 50/3"	S21 13	90.0 91.3		GW-GM	Very dense gray well-graded GRAVEL with silt and sand (GW-GM), mps 1.5 in., moderately bonded, no odor, moist -WEATHERED BEDROCK-	40	20	10	10	10	10				
				90.8		Note: Drill action and wash indicate top of bedrock at 90.8 ft below ground surface. Advanced roller bit to 93.2 below ground surface. -BEDROCK-										
				93.2		SEE CORE BORING REPORT FOR ROCK DETAILS										
95																

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./ Depth (ft)	Visual Description and Remarks
								SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
	1:09	C1	93.2 97.4	23 4	46 8	Slight-Moderate		C1: Hard, slightly to moderately weathered, gray, aphanitic, PHYLLITE. Joints dipping at low to high angles, extremely close to close, undulating, rough, open, pitting, frequent calcite/quartz stringers up to 1/8 in.
	1:36							
95	2:57							
	3:21							
	2:16							Note: Core barrel jam and noticeable water loss at 97.4 ft.
	2:48	C2	97.4 97.8	4.8 0	100 0	Slight-Moderate		C2: Hard, slightly to moderately weathered, gray, aphanitic PHYLLITE. Joints dipping at low to high angles, extremely close to very close, undulating, rough, open. Noticeable pitting, calcite/quartz stringers up to 1/2 in. in width throughout core.
	3:47	C3	97.8 98.8	3 0	25 0	Slight-Moderate		C3: Gravel size pieces recovered only. Note: Core barrel jam and noticeable water loss at 97.8 ft. Note: Core barrel jam and noticeable water loss at 98.8 ft.
	2:17	C4	98.8 103.6	55 48	95 83	Slight-Moderate		C4: Hard, fresh to slightly weathered, gray, aphanitic, PHYLLITE. Joints dipping at low to moderate angles, close to wide, undulating to stepped, rough, partly open to open, frequent calcite/quartz veins up to 3/4 in. in width throughout the length of the run.
100	2:05							
	1:48							
	2:02							
	2:34						103.6	BOTTOM OF EXPLORATION 103.6 FT
105								
110								
115								
120								

Top Row: HB-EXIT45-307, Run No. C1 93.2 (left) to 97.4 (middle-left); Run No. C2 97.4 (middle-left) to 97.8 (middle-right); Run No. C3 97.8 (middle-right) to 98.8 (right)
Top Middle Row: HB-EXIT45-307, Run No. C4 98.8 (left) to 103.6 (right)
Bottom Middle Row: HB-EXIT45-305, Run No. C1 78.0 (left) to 83.0 (right)

Top Row: HB-EXIT45-307, Boulders 84/1 (left) to 85.3 (middle), and 87.9 (middle) to 89.4 (right)
Top Middle Row: HB-EXIT45-306, Run No. C1 46.0 (left) to 51.0 (right)
Bottom Middle Row: HB-EXIT45-306, Run No. C2 51.0 (left) to 55.7 (right)

APPENDIX B

Laboratory Test Results

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-301	Sample Type:	jar	Tested By:	GA
Sample ID:	S4B	Test Date:	02/13/19	Checked By:	bfs
Depth :	6.9-7.3 ft	Test Id:	490950		

Test Comment: ---
Visual Description: Moist, dark brown sandy silt with organics
Sample Comment: ---

Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	Sample ID	Depth	Description	Moisture Content,%	Ash Content,%	Organic Matter,%
HB-EXIT45-301	S4B	6.9-7.3 ft	Moist, dark brown sandy silt with organics	47	94.5	5.5

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass; dried to a constant mass at temperature of 105º C
Ash content and organic matter determined by Method C; dried to constant mass at temperature 440º C

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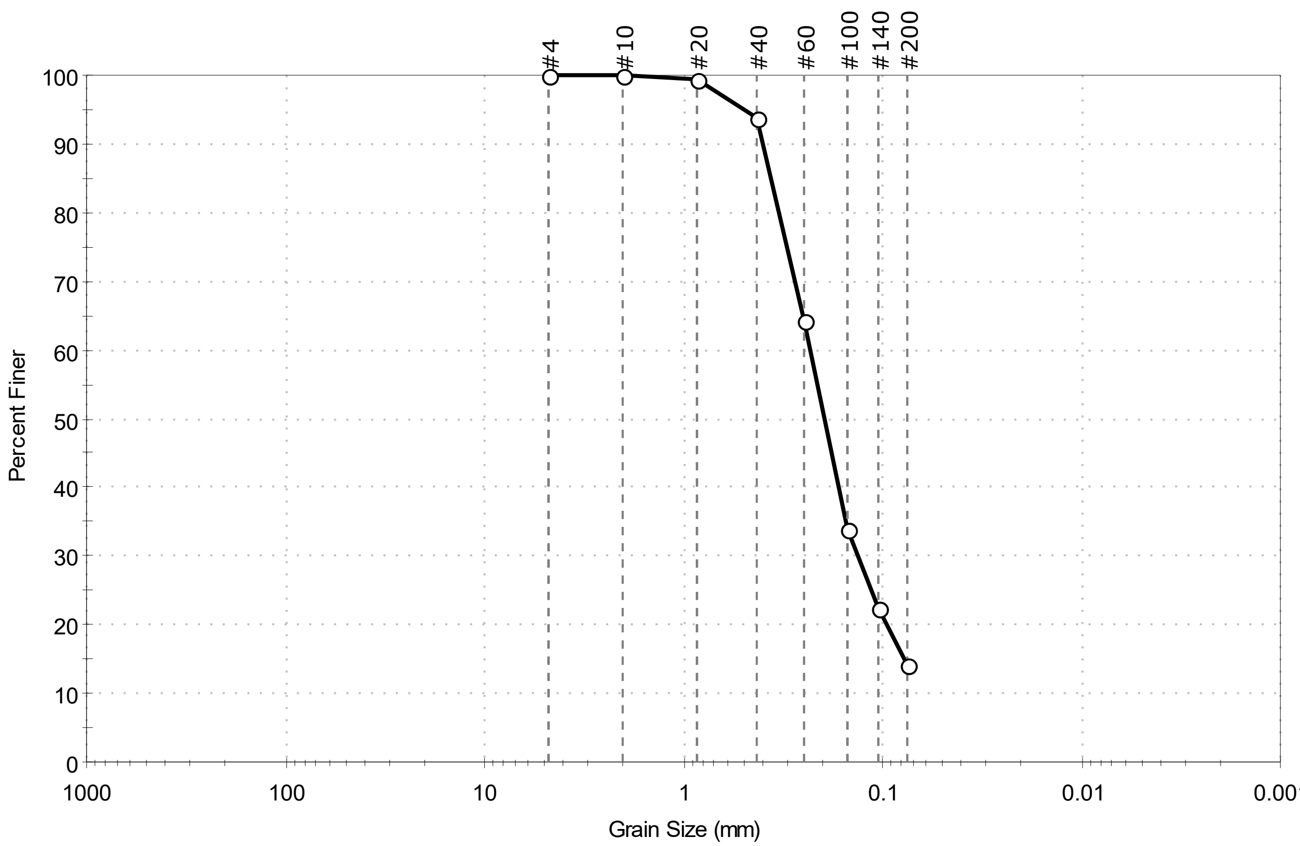
Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: jar	Tested By:	GA
Sample ID: S4	Test Date: 02/13/19	Checked By:	bfs
Depth : 6-8 ft	Test Id: 490920		
Test Comment:	---		
Visual Description:	Moist, grayish brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	85.8	14.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	94		
#60	0.25	64		
#100	0.15	34		
#140	0.11	23		
#200	0.075	14		

Coefficients

D_{85} =0.3630 mm　　D_{30} =0.1334 mm

D_{60} =0.2330 mm　　D_{15} =0.0774 mm

D_{50} =0.1969 mm　　D_{10} =N/A

C_u =N/A　　C_c =N/A

Classification

ASTM　N/A

AASHTO　Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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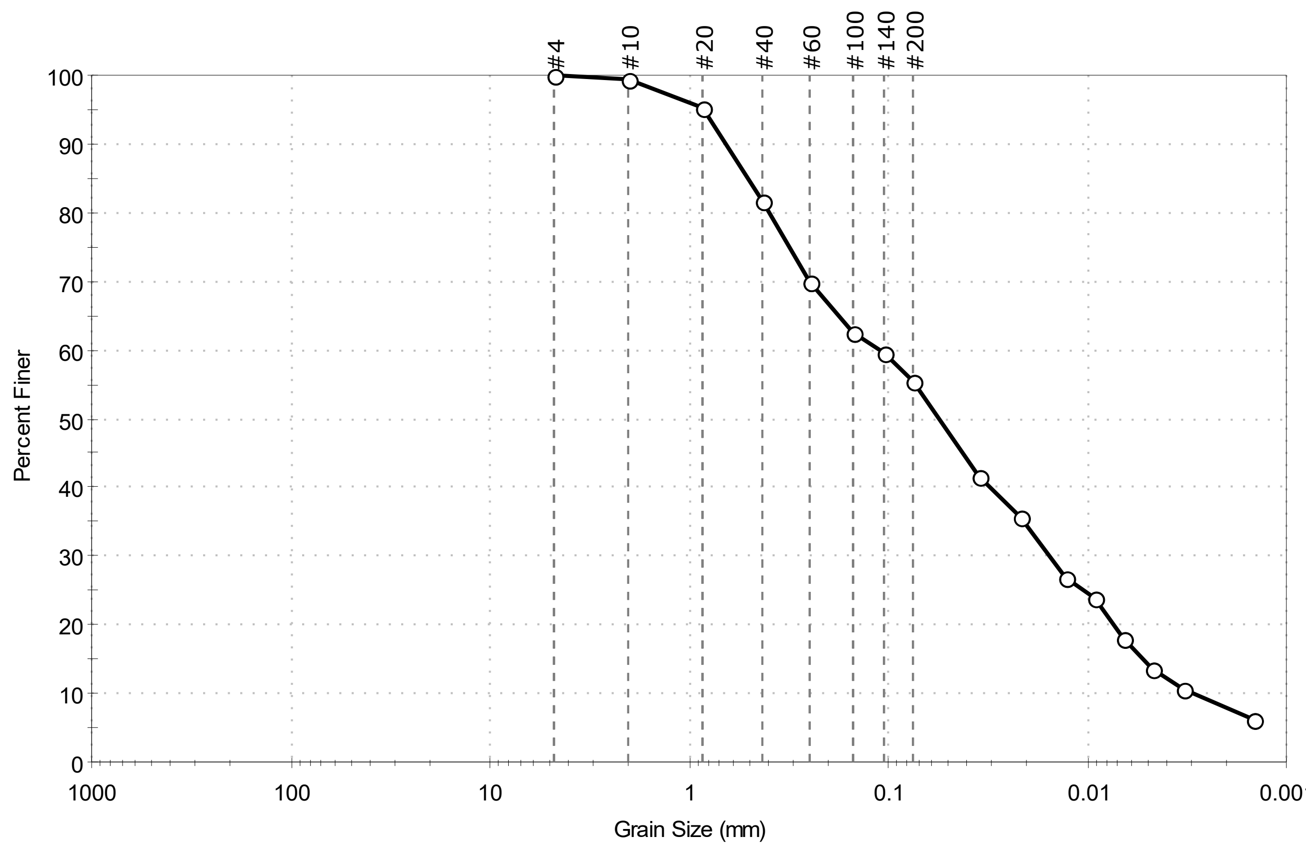
Client:	Haley & Aldrich, Inc.			
Project:	Maine Turnpike Exit 45 Interchange			
Location:	South Portland, ME		Project No:	GTX-309473
Boring ID:	HB-EXIT45-301	Sample Type: jar	Tested By:	GA
Sample ID:	S4B	Test Date: 02/13/19	Checked By:	bfs
Depth :	6.9-7.3 ft	Test Id: 490941		

Test Comment: ---

Visual Description: Moist, dark brown sandy silt with organics

Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	44.6	55.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	95		
#40	0.42	82		
#60	0.25	70		
#100	0.15	63		
#140	0.11	60		
#200	0.075	55		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0349	42		
---	0.0217	36		
---	0.0129	27		
---	0.0092	24		
---	0.0066	18		
---	0.0047	14		
---	0.0033	11		
---	0.0015	6		

Coefficients

D_{85} =0.5005 mm
D_{30} =0.0155 mm
D_{60} =0.1119 mm
D_{15} =0.0052 mm
D_{50} =0.0554 mm
D_{10} =0.0029 mm
C_u =38.586
C_c =0.740

Classification

ASTM Sandy SILT (ML)

AASHTO Clayey Soils (A-7-5 (7))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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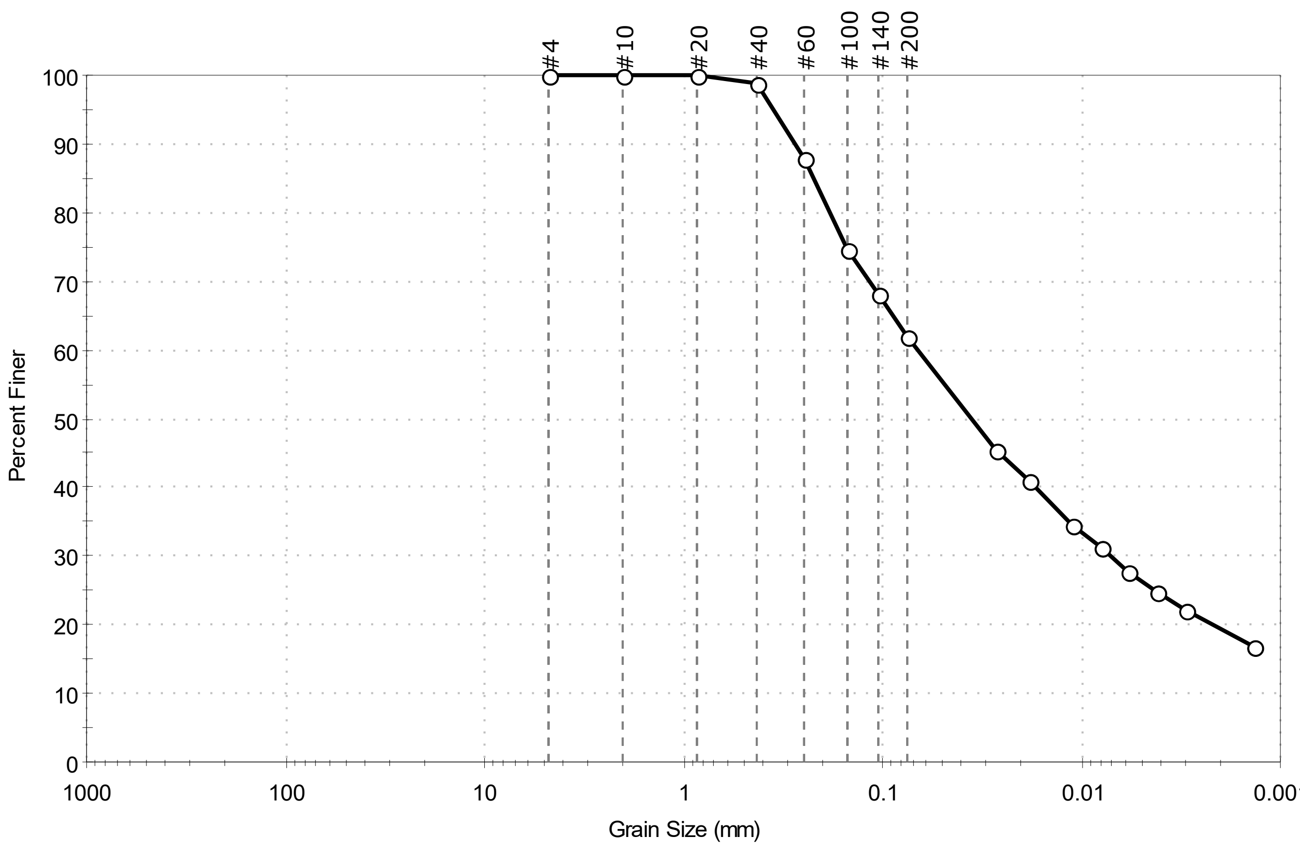
Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: jar	Tested By:	GA
Sample ID: S5	Test Date: 02/12/19	Checked By:	bfs
Depth : 8-10 ft	Test Id: 490942		
Test Comment:	---		
Visual Description:	Moist, dark gray sandy clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	37.9	62.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	88		
#100	0.15	75		
#140	0.11	68		
#200	0.075	62		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0270	46		
---	0.0184	41		
---	0.0111	35		
---	0.0080	31		
---	0.0058	28		
---	0.0042	25		
---	0.0030	22		
---	0.0014	17		

Coefficients

D_{85} =0.2235 mm D_{30} =0.0072 mm

D_{60} =0.0659 mm D_{15} =N/A

D_{50} =0.0355 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM Sandy Lean CLAY (CL)

AASHTO Silty Soils (A-4 (2))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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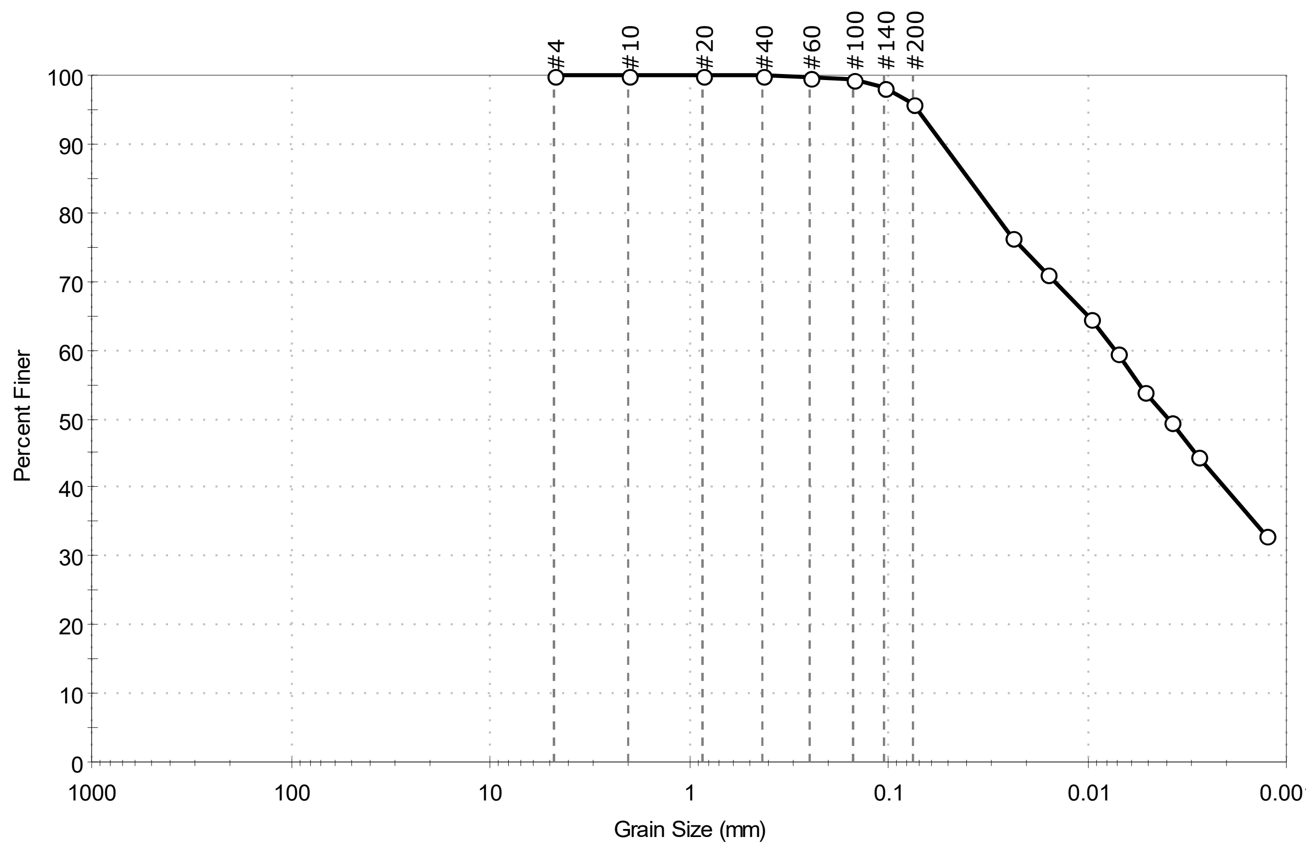
GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type:	jar	Tested By:	GA
Sample ID:	S6	Test Date:	02/13/19	Checked By:	bfs
Depth :	12-14 ft	Test Id:	490943		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	4.1	95.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	98		
#200	0.075	96		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0237	77		
---	0.0159	71		
---	0.0097	65		
---	0.0071	60		
---	0.0052	54		
---	0.0038	50		
---	0.0028	45		
---	0.0013	33		

Coefficients

D_{85} =0.0392 mm — D_{30} =N/A

D_{60} =0.0072 mm — D_{15} =N/A

D_{50} =0.0039 mm — D_{10} =N/A

C_u =N/A — C_c =N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Clayey Soils (A-6 (10))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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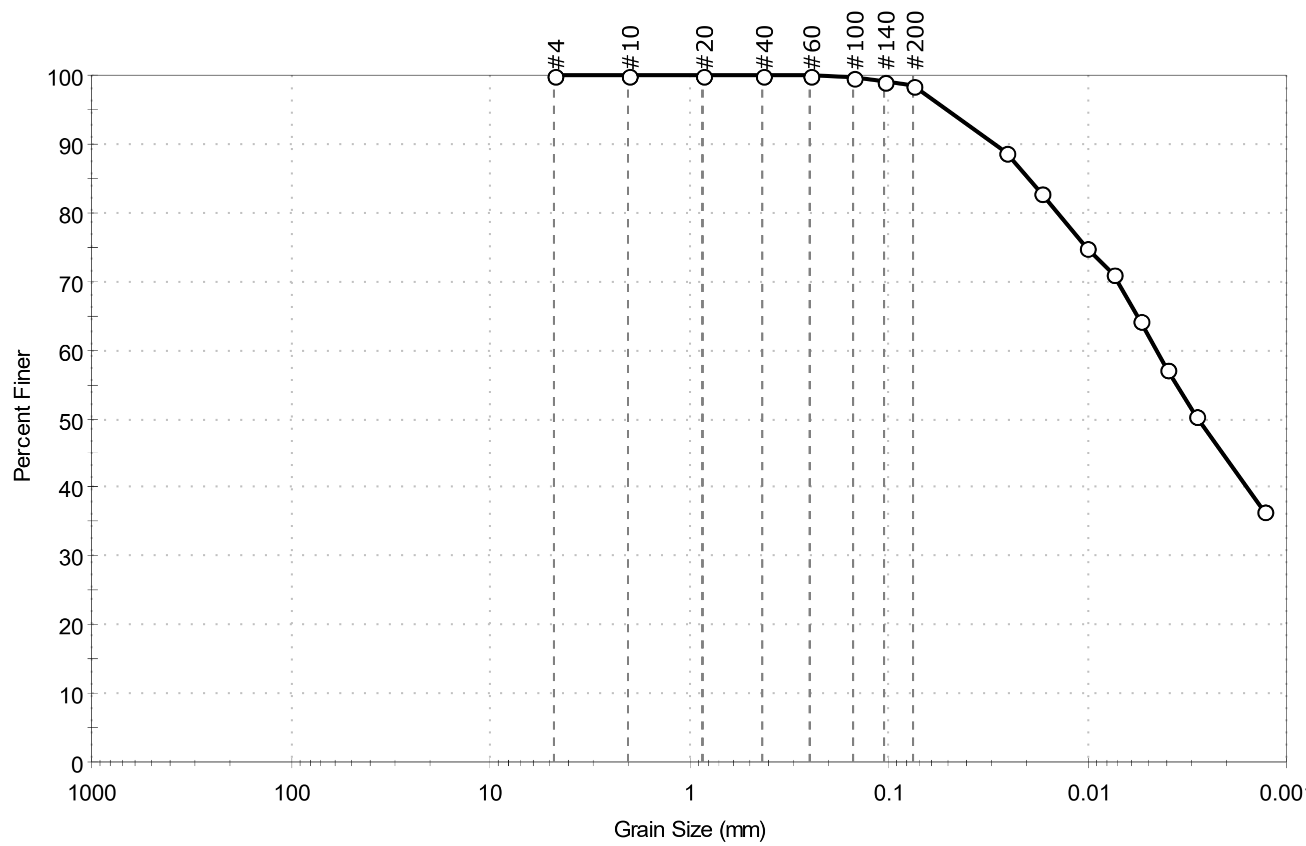
Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: jar	Tested By:	GA
Sample ID: S7	Test Date: 02/13/19	Checked By:	bfs
Depth : 14-16 ft	Test Id: 490944		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	1.5	98.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#140	0.11	99		
#200	0.075	99		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0258	89		
---	0.0169	83		
---	0.0102	75		
---	0.0075	71		
---	0.0055	64		
---	0.0040	57		
---	0.0029	50		
---	0.0013	37		

Coefficients

D_{85} =0.0197 mm　D_{30} =N/A

D_{60} =0.0045 mm　D_{15} =N/A

D_{50} =0.0028 mm　D_{10} =N/A

C_u =N/A　C_c =N/A

Classification

ASTM　Lean CLAY (CL)

AASHTO　Clayey Soils (A-6 (16))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

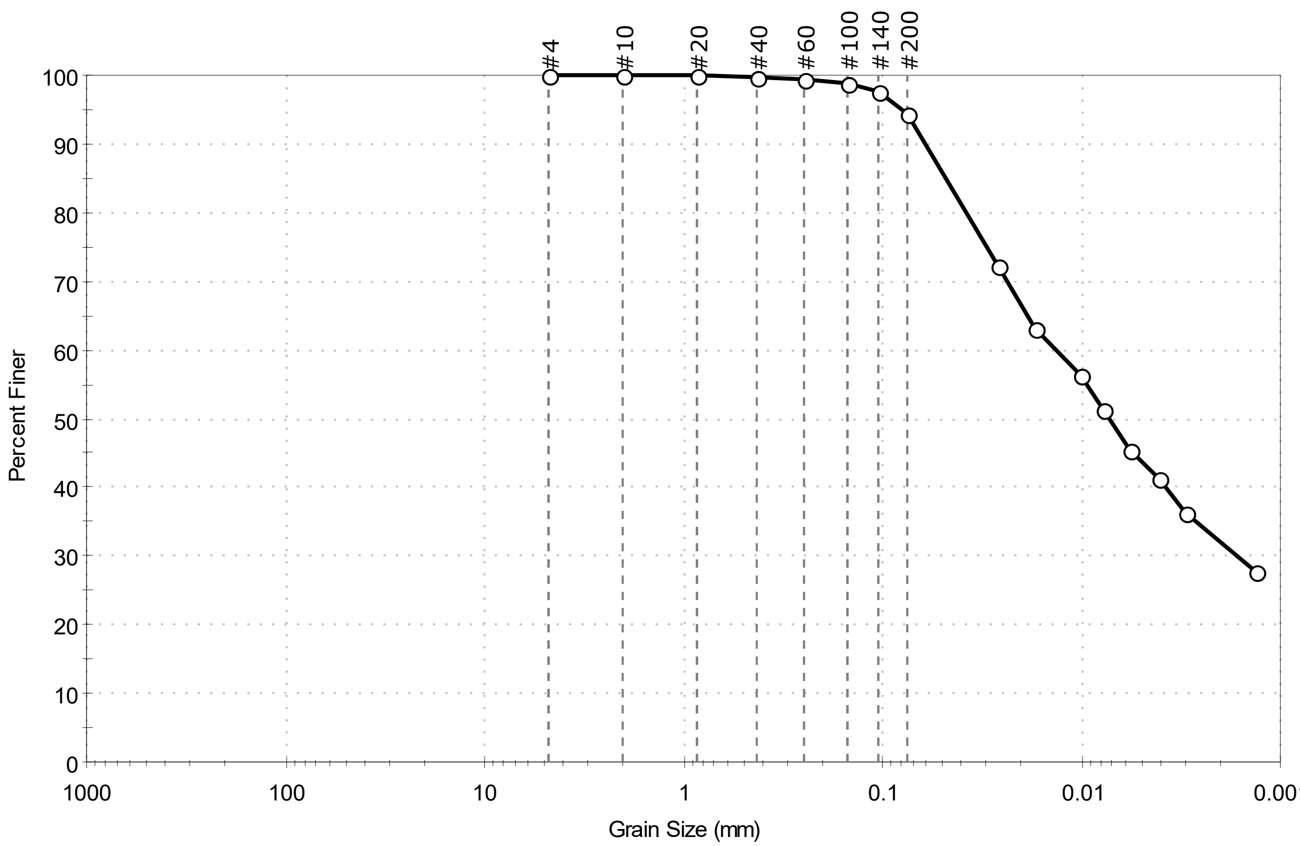
Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

printed 2/22/2019 9:05:41 AM

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type: jar	Tested By: GA
Sample ID:	S8	Test Date: 02/12/19	Checked By: bfs
Depth :	18-20 ft	Test Id: 490945	
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	5.7	94.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	99		
#140	0.11	98		
#200	0.075	94		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0262	72		
---	0.0169	63		
---	0.0102	56		
---	0.0078	51		
---	0.0057	45		
---	0.0041	41		
---	0.0030	36		
---	0.0013	28		

Coefficients

D_{85} =0.0481 mm D_{30} =0.0016 mm

D_{60} =0.0135 mm D_{15} =N/A

D_{50} =0.0073 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM   Lean CLAY (CL)

AASHTO   Silty Soils (A-4 (7))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

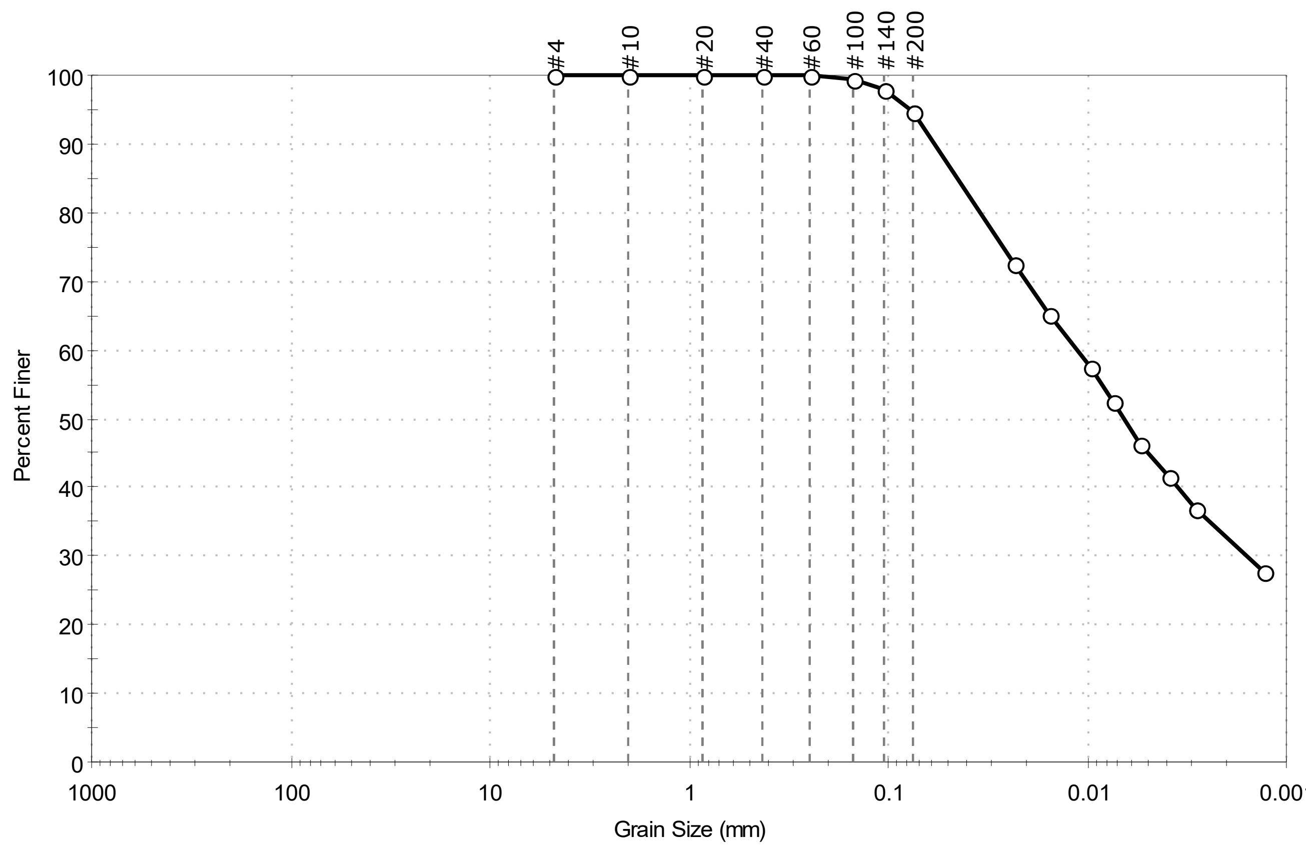
Separation of Sample: #200 Sieve

printed 2/22/2019 9:05:42 AM

GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: tube	Tested By:	GA
Sample ID: S11	Test Date: 02/13/19	Checked By:	bfs
Depth : 26-28 ft	Test Id: 490946		
Test Comment:	---		
Visual Description:	Moist, dark gray silty clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	5.4	94.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	98		
#200	0.075	95		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0236	73		
---	0.0157	65		
---	0.0097	57		
---	0.0073	53		
---	0.0054	46		
---	0.0039	42		
---	0.0029	37		
---	0.0013	28		

Coefficients

D_{85} =0.0453 mm D_{30} =0.0016 mm

D_{60} =0.0114 mm D_{15} =N/A

D_{50} =0.0065 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM Silty CLAY (CL-ML)

AASHTO Silty Soils (A-4 (4))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

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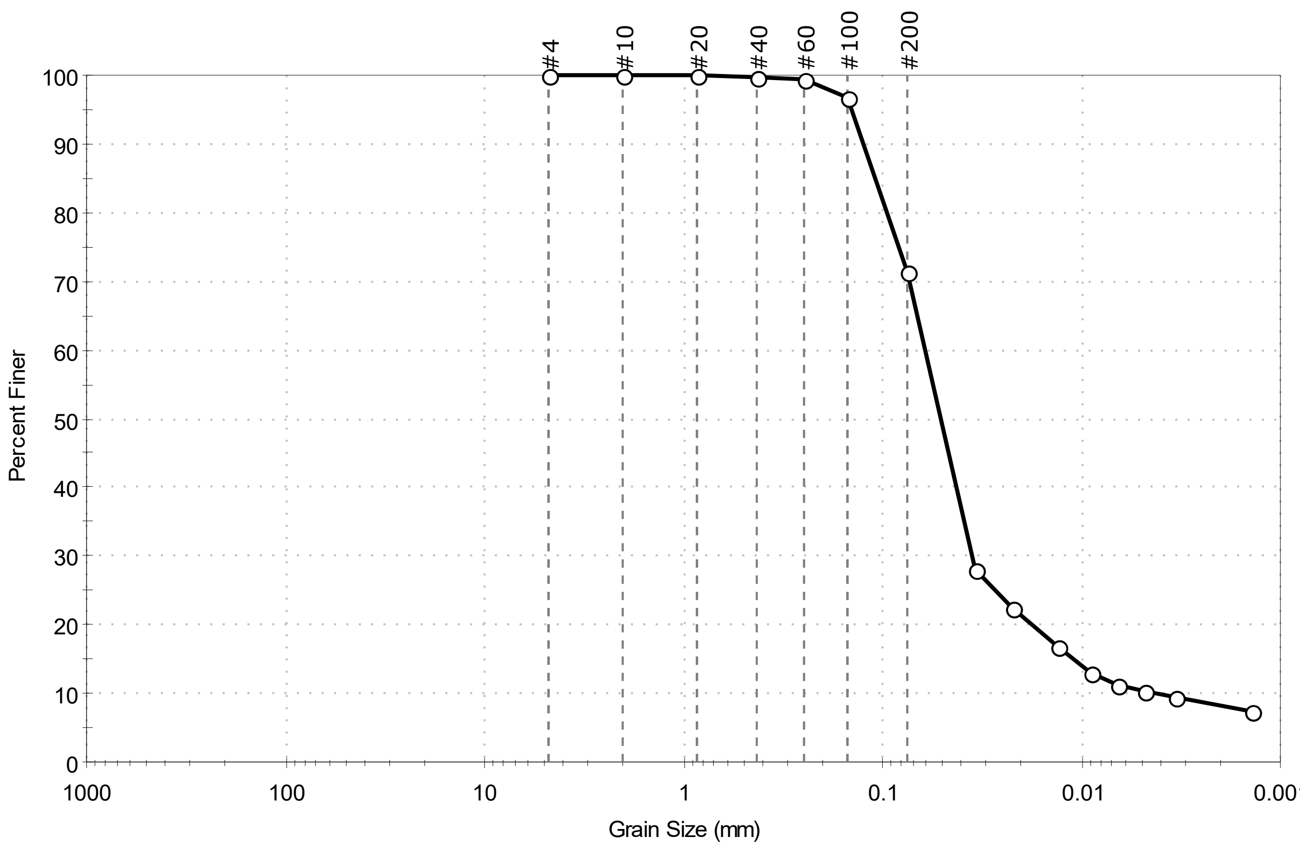
Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type: tube	Tested By: ckg
Sample ID:	U1	Test Date: 02/18/19	Checked By: bfs
Depth :	10-12 ft	Test Id: 490947	
Test Comment:	---		
Visual Description:	Moist, dark gray silt with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	28.6	71.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	97		
#200	0.075	71		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0343	28		
---	0.0224	22		
---	0.0133	17		
---	0.0090	13		
---	0.0066	11		
---	0.0048	10		
---	0.0034	9		
---	0.0014	7		

Coefficients

D_{85} =0.1087 mm D_{30} =0.0356 mm

D_{60} =0.0612 mm D_{15} =0.0110 mm

D_{50} =0.0511 mm D_{10} =0.0044 mm

C_u =13.909 C_c =4.706

Classification

ASTM   SILT with Sand (ML)

AASHTO   Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

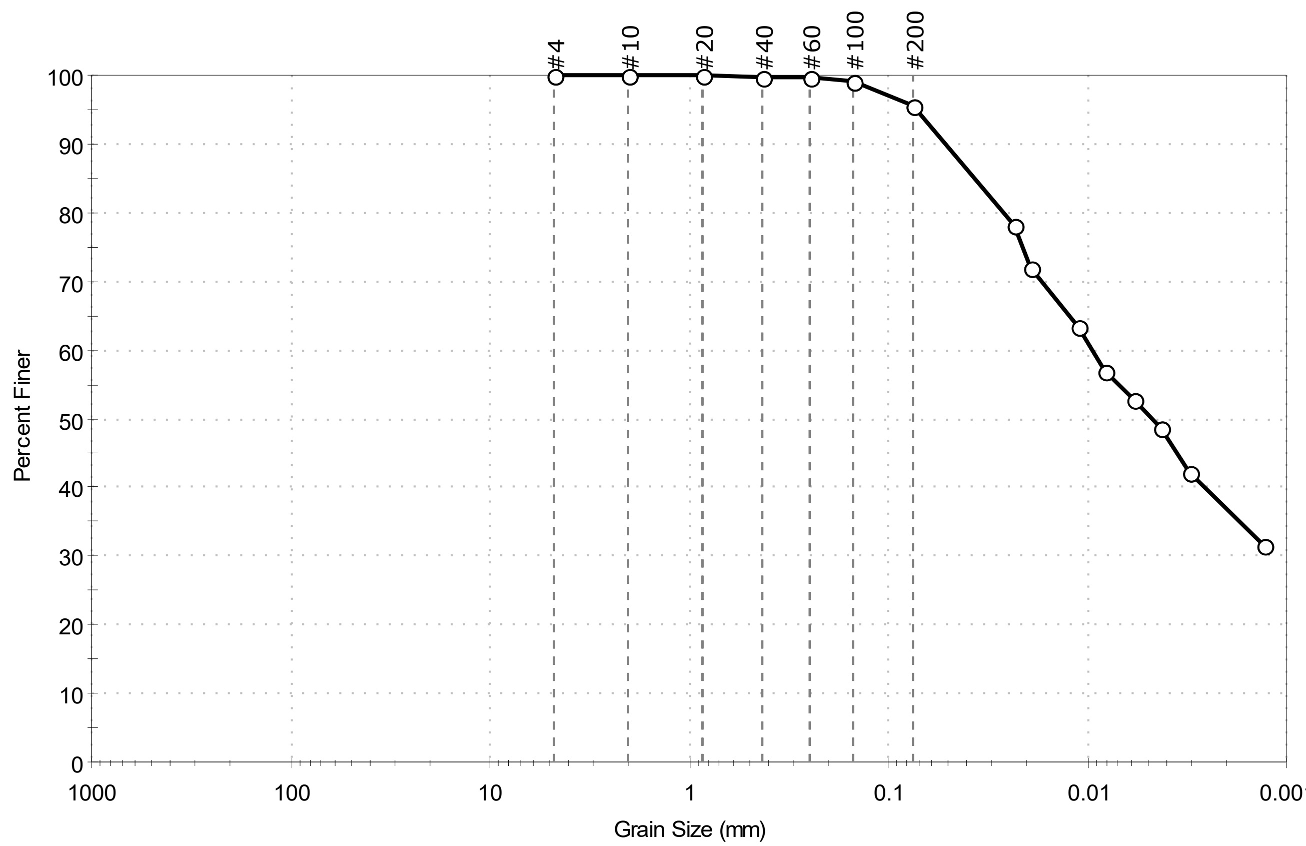
Separation of Sample: #200 Sieve

printed 2/22/2019 9:05:44 AM

GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type: tube	Tested By: ckg
Sample ID:	U2	Test Date: 02/18/19	Checked By: bfs
Depth :	16-18 ft	Test Id: 490948	
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	4.6	95.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#200	0.075	95		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0235	78		
---	0.0195	72		
---	0.0111	63		
---	0.0082	57		
---	0.0059	53		
---	0.0043	49		
---	0.0031	42		
---	0.0013	32		

Coefficients

D_{85} =0.0372 mm	D_{30} =N/A
D_{60} =0.0094 mm	D_{15} =N/A
D_{50} =0.0048 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM Lean CLAY (CL)

AASHTO Clayey Soils (A-6 (9))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

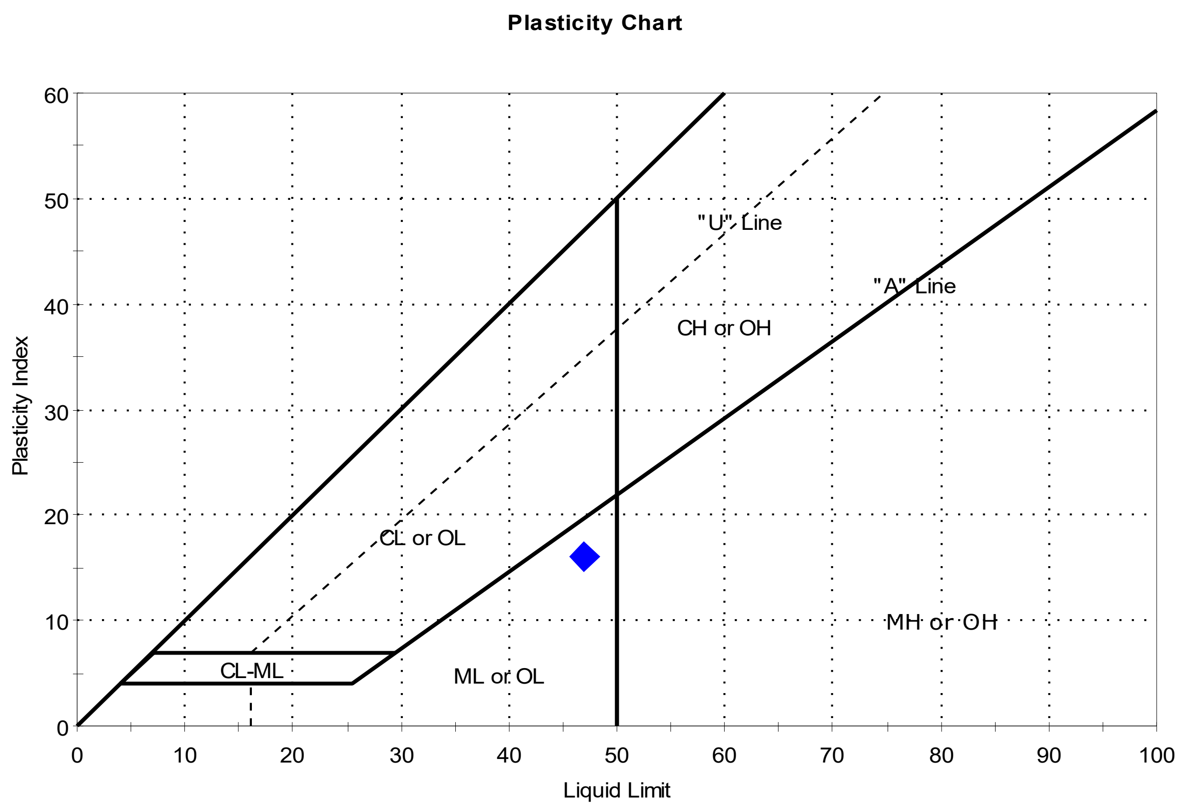
Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

printed 2/22/2019 9:05:46 AM

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-301	Sample Type:	jar	Tested By:	GA
Sample ID:	S4B	Test Date:	02/13/19	Checked By:	bfs
Depth :	6.9-7.3 ft	Test Id:	490890		
Test Comment:	---				
Visual Description:	Moist, dark brown sandy silt with organics				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S4B	-EXIT45-3	6.9-7.3 ft	47	47	31	16	1	Sandy SILT (ML)

Sample Prepared using the WET method

18% Retained on #40 Sieve

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

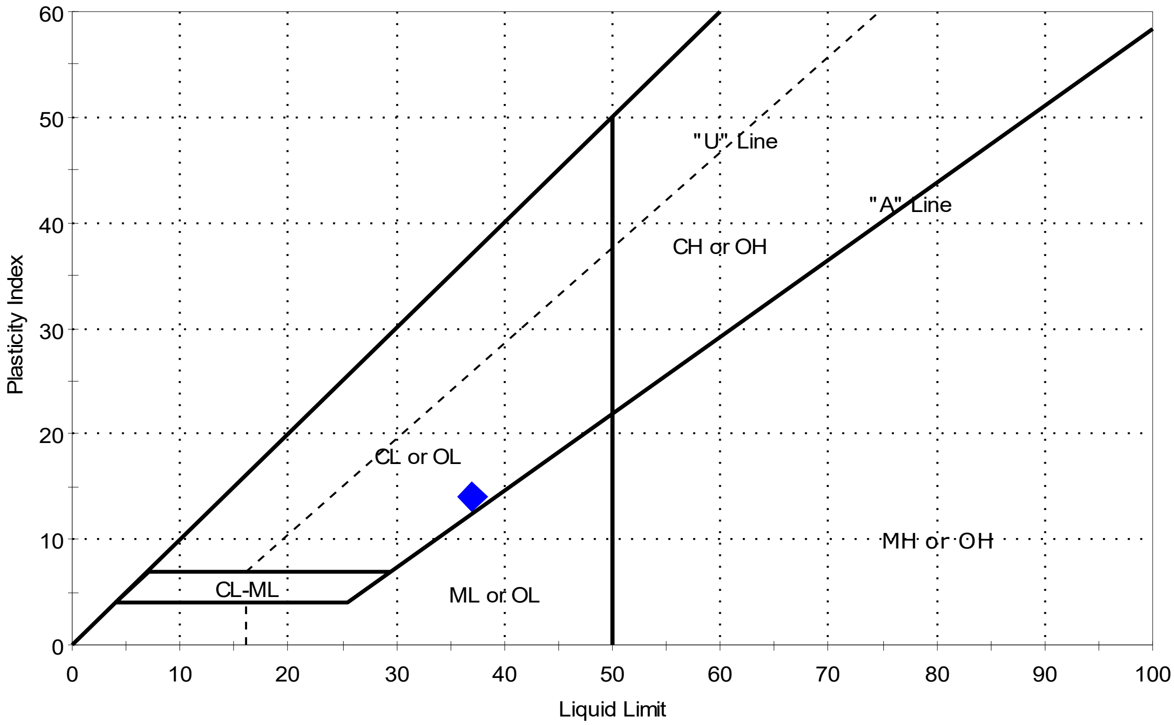
printed 2/22/2019 9:23:43 AM

GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-301	Sample Type: tube	Tested By:	cam
Sample ID: U2	Test Date: 02/20/19	Checked By:	bfs
Depth : 12-14 ft	Test Id: 490891		

Test Comment: ---
Visual Description: Moist, dark gray clay
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-3	12-14 ft	31	37	23	14	0.6	

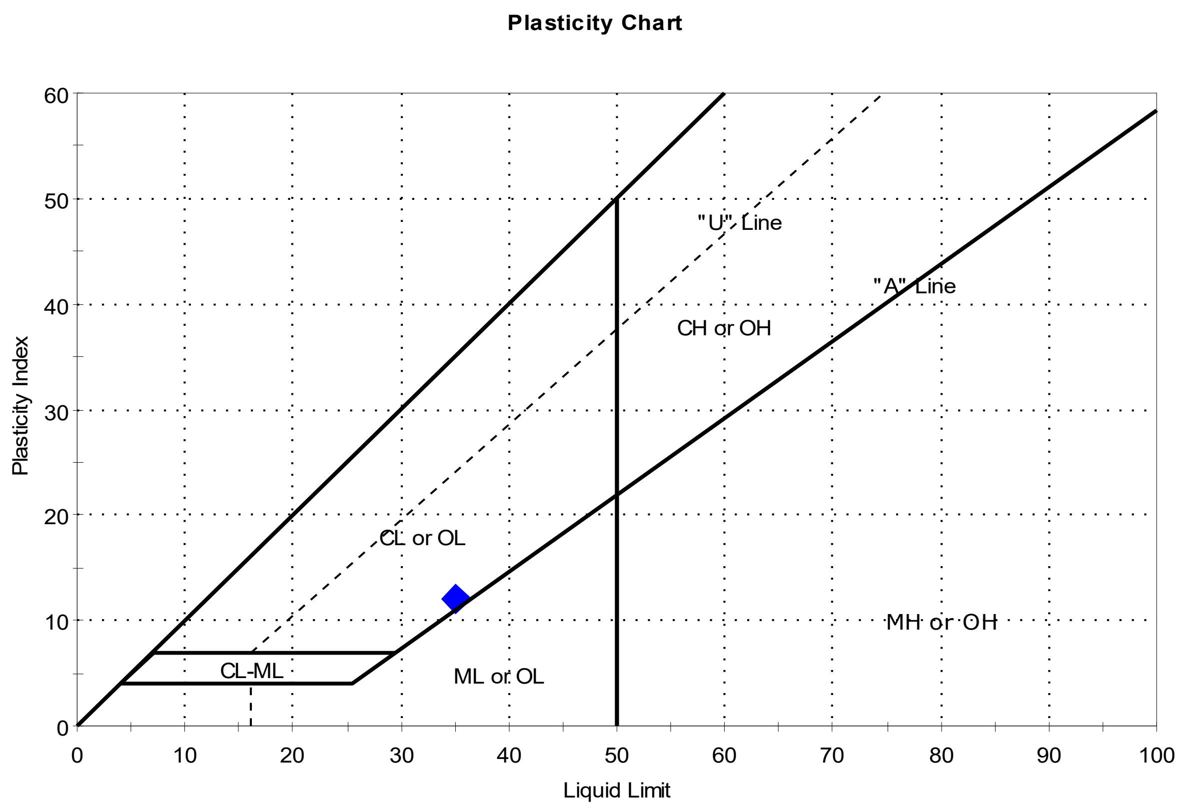
Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

printed 2/22/2019 9:23:44 AM

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-302	Sample Type:	tube	Tested By:	cam
Sample ID:	U1	Test Date:	02/19/19	Checked By:	bfs
Depth :	10-12 ft	Test Id:	490892		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	-EXIT45-3	10-12 ft	21	35	23	12	-0.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

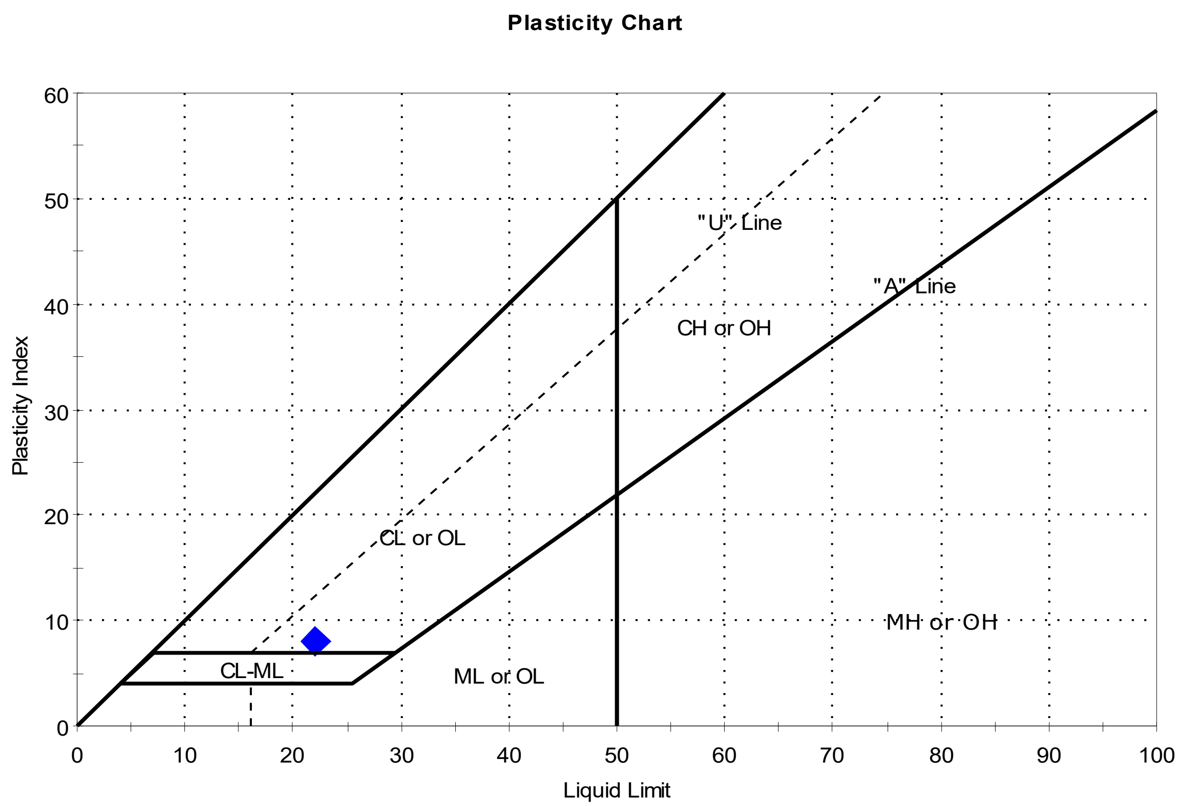
Toughness: LOW

printed 2/22/2019 9:23:44 AM

GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type:	jar	Tested By:	GA
Sample ID:	S5	Test Date:	02/13/19	Checked By:	bfs
Depth :	8-10 ft	Test Id:	490893		
Test Comment:	---				
Visual Description:	Moist, dark gray sandy clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S5	-EXIT45-3	8-10 ft	26	22	14	8	1.5	Sandy Lean CLAY (CL)

Sample Prepared using the WET method

1% Retained on #40 Sieve

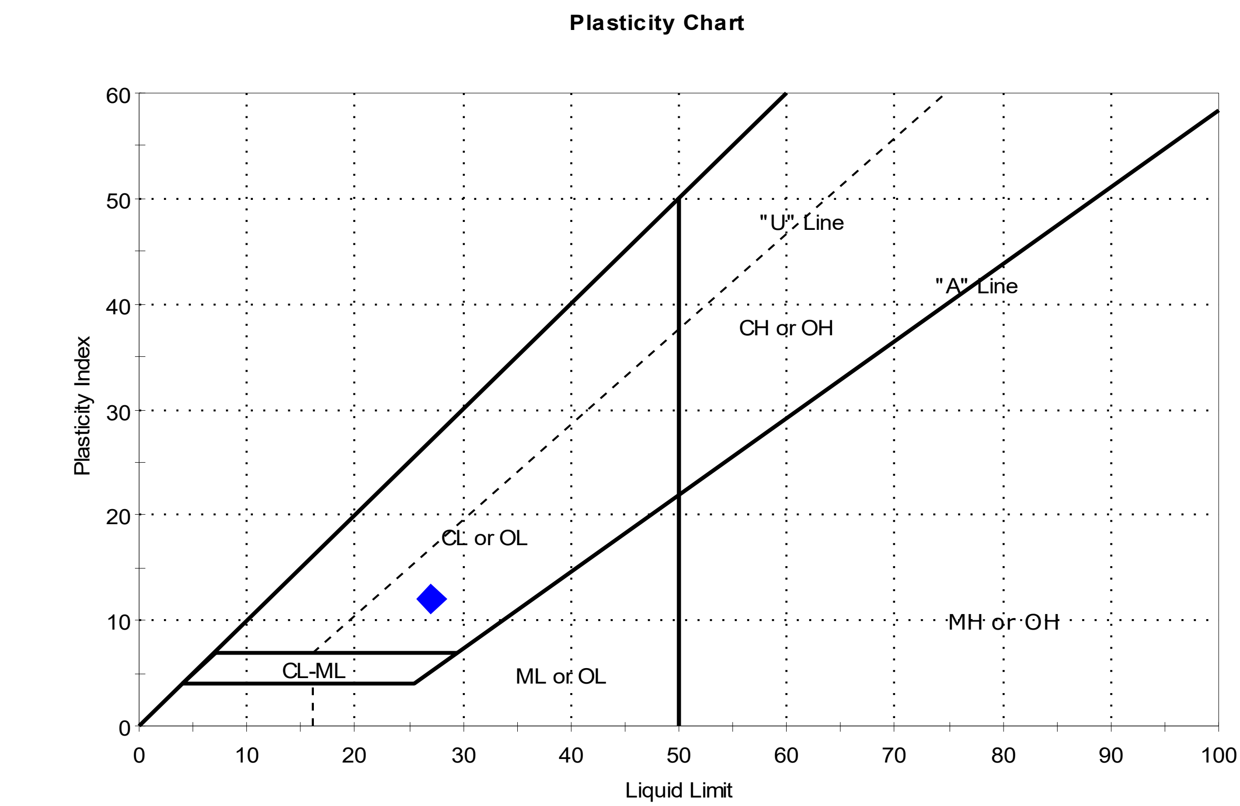
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: jar	Tested By:	GA
Sample ID: S6	Test Date: 02/12/19	Checked By:	bfs
Depth : 12-14 ft	Test Id: 490894		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S6	-EXIT45-3	12-14 ft	40	27	15	12	2.1	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

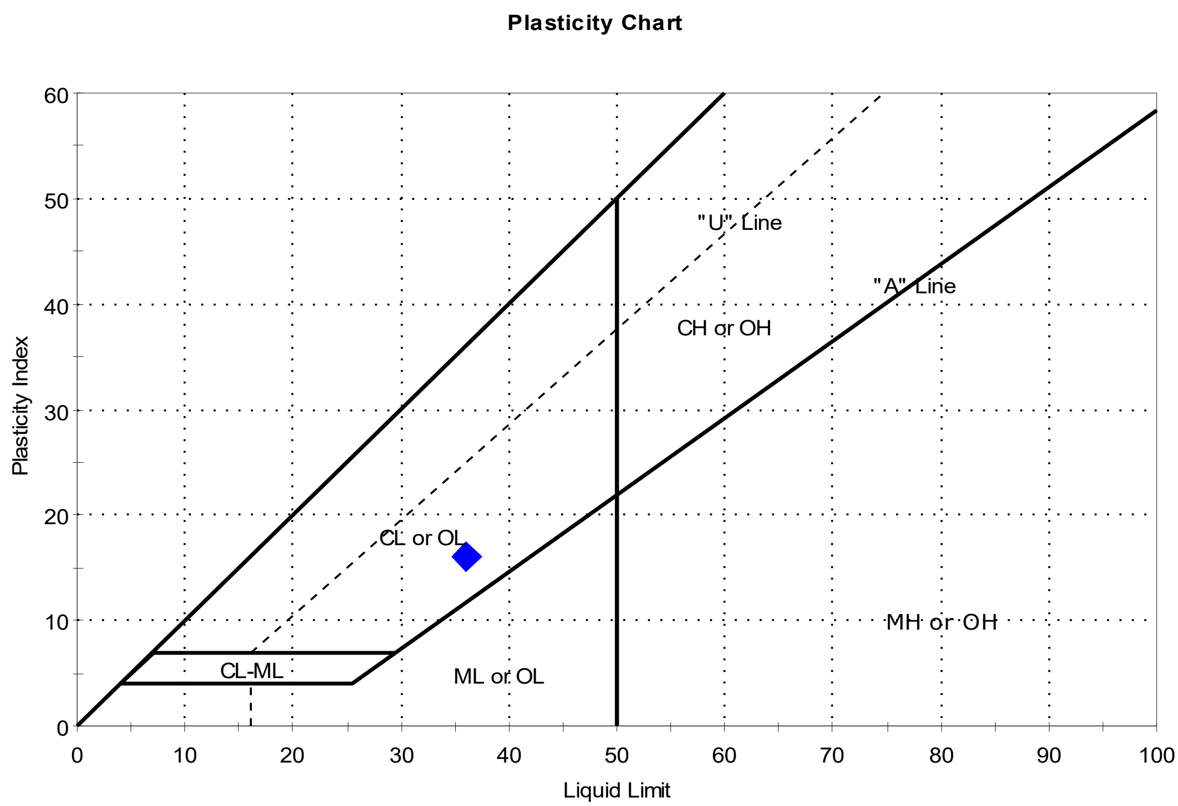
Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type:	jar	Tested By:	GA
Sample ID:	S7	Test Date:	02/12/19	Checked By:	bfs
Depth :	14-16 ft	Test Id:	490895		

Test Comment: ---
Visual Description: Moist, dark gray clay
Sample Comment: ---

Atterberg Limits - ASTM D4318



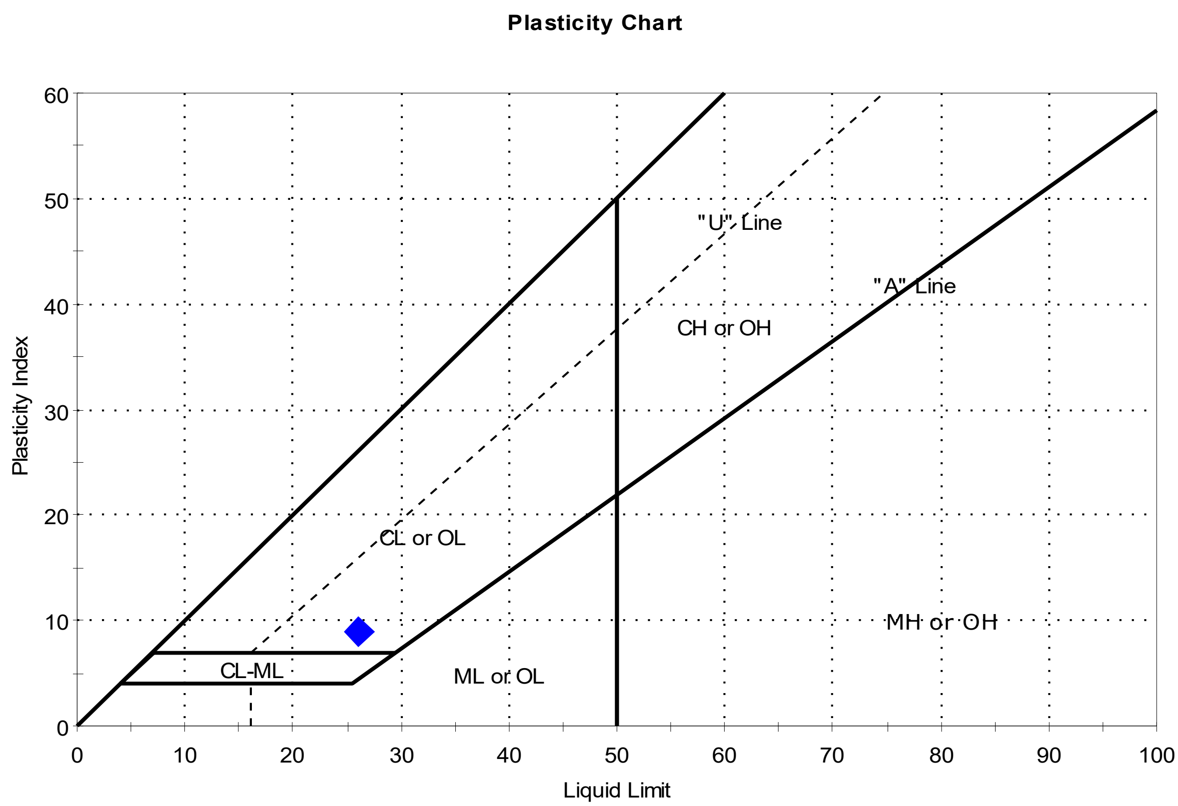
Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S7	-EXIT45-3	14-16 ft	45	36	20	16	1.6	Lean CLAY (CL)

Sample Prepared using the WET method
0% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: MEDIUM

printed 2/22/2019 9:23:48 AM

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type:	jar	Tested By:	GA
Sample ID:	S8	Test Date:	02/13/19	Checked By:	bfs
Depth :	18-20 ft	Test Id:	490896		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S8	-EXIT45-3	18-20 ft	37	26	17	9	2.2	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

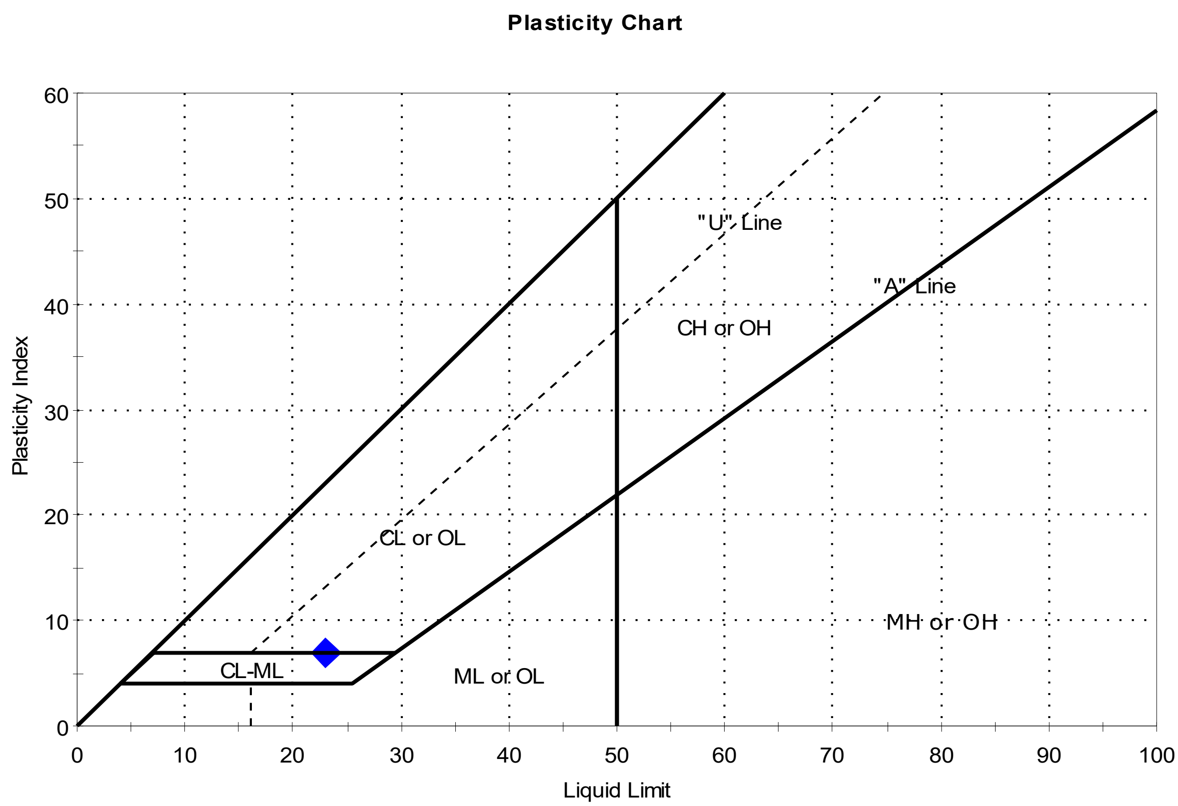
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client: Haley & Aldrich, Inc.
Project: Maine Turnpike Exit 45 Interchange
Location: South Portland, ME   Project No: GTX-309473
Boring ID: HB-EXIT45-303   Sample Type: tube   Tested By: GA
Sample ID: S11   Test Date: 02/13/19   Checked By: bfs
Depth : 26-28 ft   Test Id: 490897
Test Comment: ---
Visual Description: Moist, dark gray silty clay
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S11	-EXIT45-3	26-28 ft	36	23	16	7	2.9	Silty CLAY (CL-ML)

Sample Prepared using the WET method
0% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-303	Sample Type:	tube	Tested By:	cam
Sample ID:	U1	Test Date:	02/20/19	Checked By:	bfs
Depth :	10-12 ft	Test Id:	490898		

Test Comment: ---
Visual Description: Moist, dark gray silt with sand
Sample Comment: ---

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

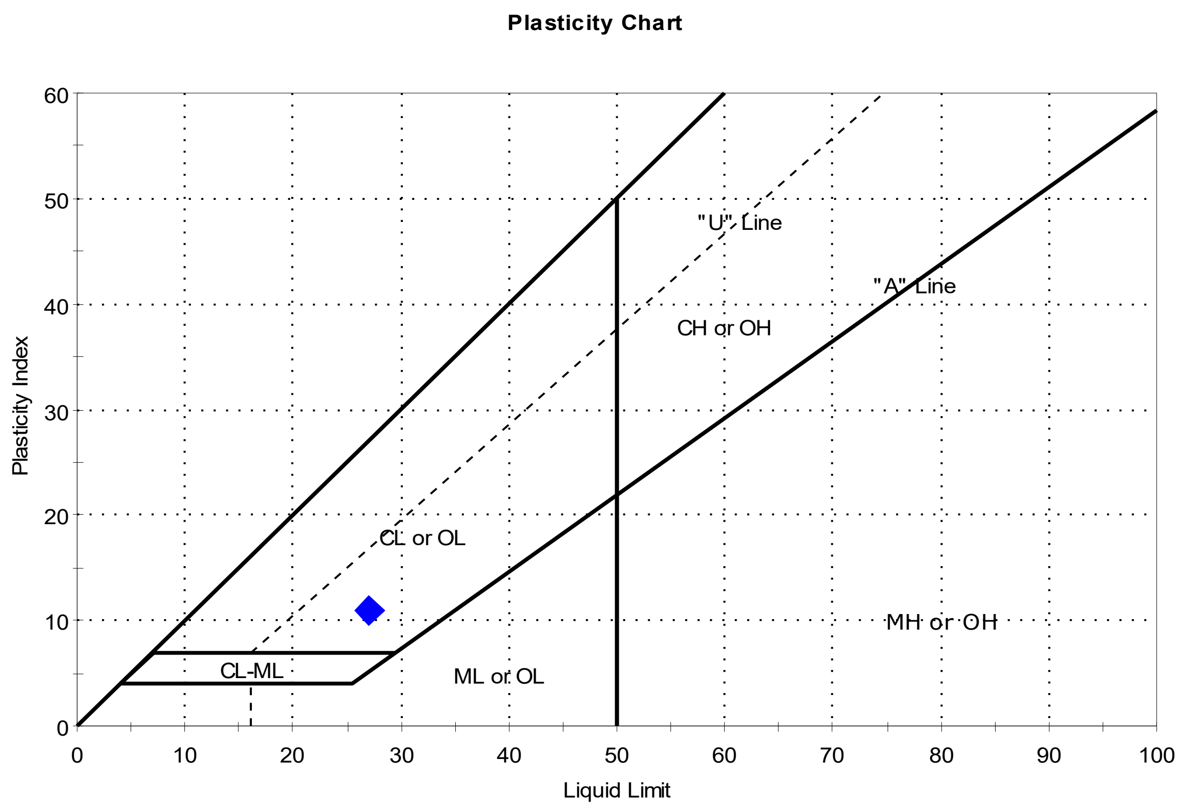
Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	-EXIT45-3	10-12 ft	27	n/a	n/a	n/a	n/a	SILT with Sand (ML)

0% Retained on #40 Sieve
Dry Strength: MEDIUM
Dilatancy: RAPID
Toughness: MEDIUM
The sample was determined to be Non-Plastic

printed 2/22/2019 9:23:51 AM

Client:	Haley & Aldrich, Inc.		
Project:	Maine Turnpike Exit 45 Interchange		
Location:	South Portland, ME	Project No:	GTX-309473
Boring ID: HB-EXIT45-303	Sample Type: tube	Tested By:	cam
Sample ID: U2	Test Date: 02/19/19	Checked By:	bfs
Depth : 16-18 ft	Test Id: 490899		
Test Comment:	---		
Visual Description:	Wet, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	-EXIT45-3	16-18 ft	38	27	16	11	2	Lean CLAY (CL)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

printed 2/22/2019 9:23:52 AM

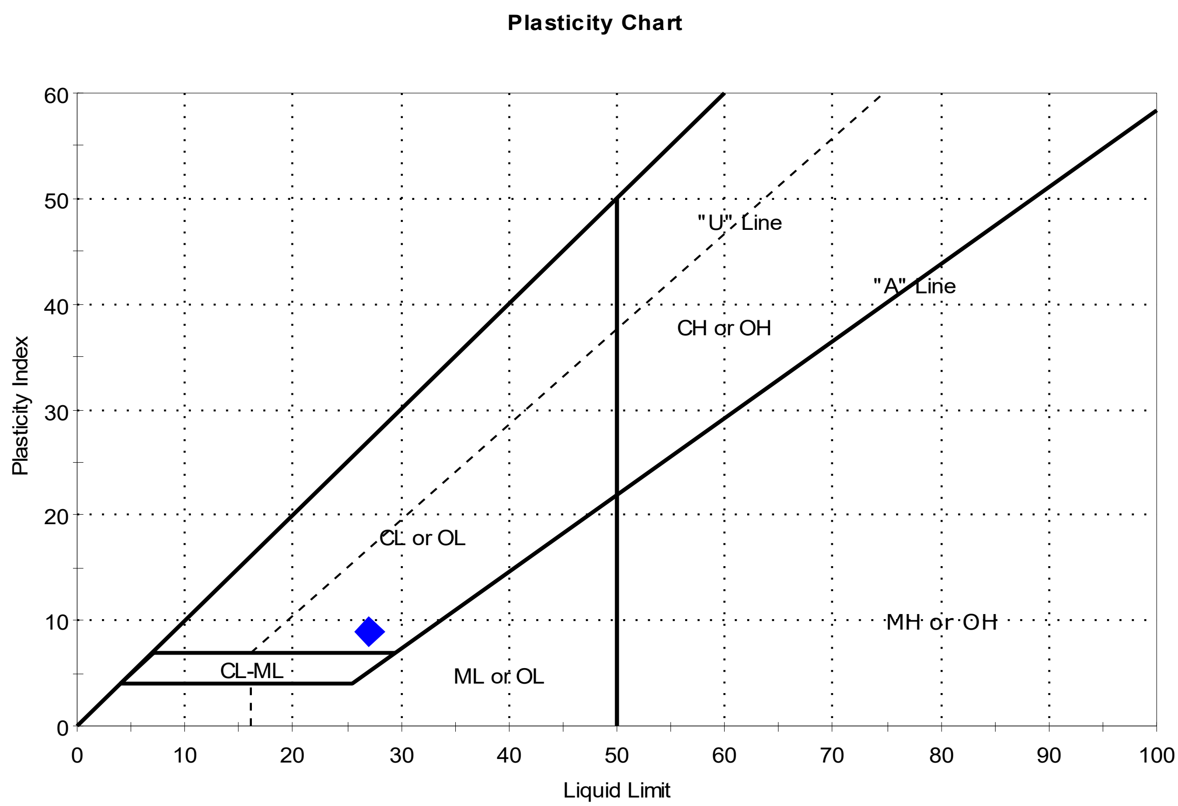
Client:	Haley & Aldrich, Inc.
Project:	Maine Turnpike Exit 45 Interchange
Location:	South Portland, ME

Project No: GTX-309473

Boring ID:	HB-EXIT45-303	Sample Type:	tube	Tested By:	cam
Sample ID:	U4	Test Date:	02/19/19	Checked By:	bfs
Depth :	30-32 ft	Test Id:	490900		

Test Comment: ---
Visual Description: Wet, dark gray clay
Sample Comment: ---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U4	-EXIT45-3	30-32 ft	41	27	18	9	2.5	

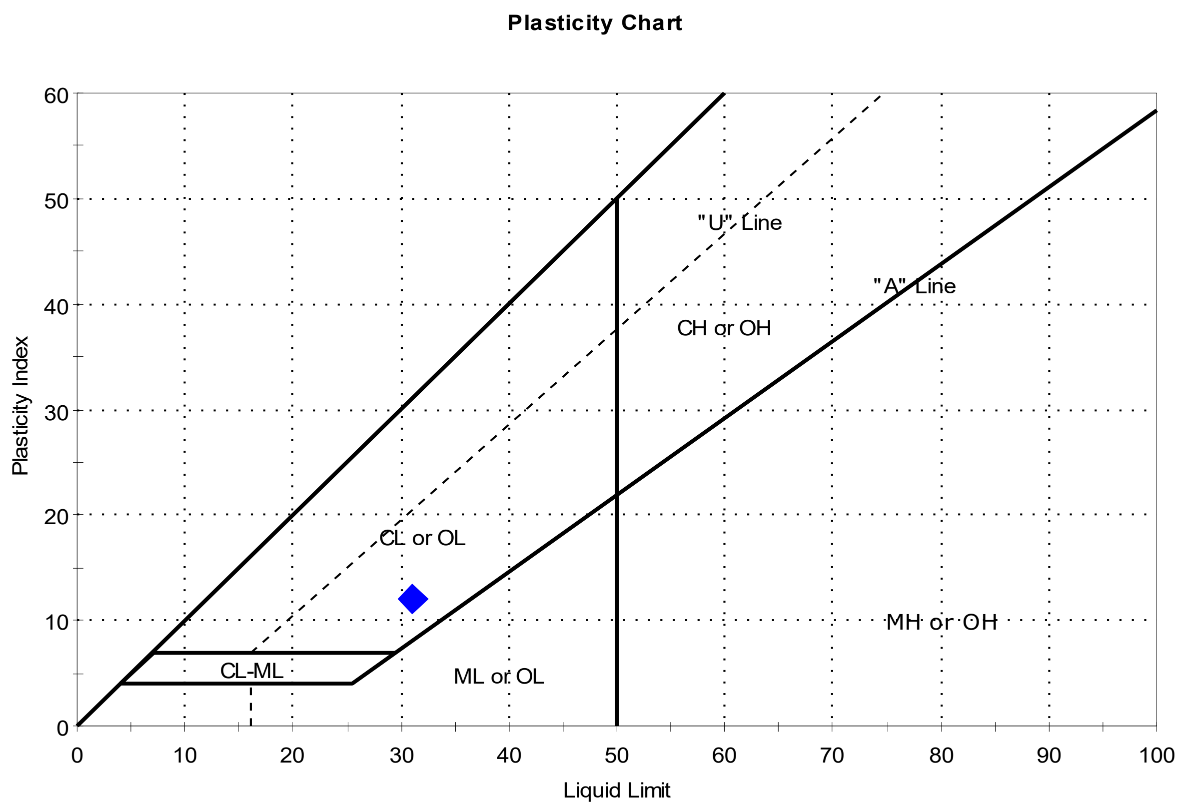
Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

printed 2/22/2019 9:23:52 AM

Client:	Haley & Aldrich, Inc.
Project:	Maine Turnpike Exit 45 Interchange
Location:	South Portland, ME
Project No:	GTX-309473
Boring ID:	HB-EXIT45-303
Sample Type:	tube
Tested By:	cam
Sample ID:	U5
Test Date:	02/22/19
Checked By:	bfs
Depth :	45-47 ft
Test Id:	490901
Test Comment:	---
Visual Description:	Wet, dark gray clay
Sample Comment:	---

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U5	-EXIT45-3	45-47 ft	37	31	19	12	1.5	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

printed 2/22/2019 9:23:53 AM

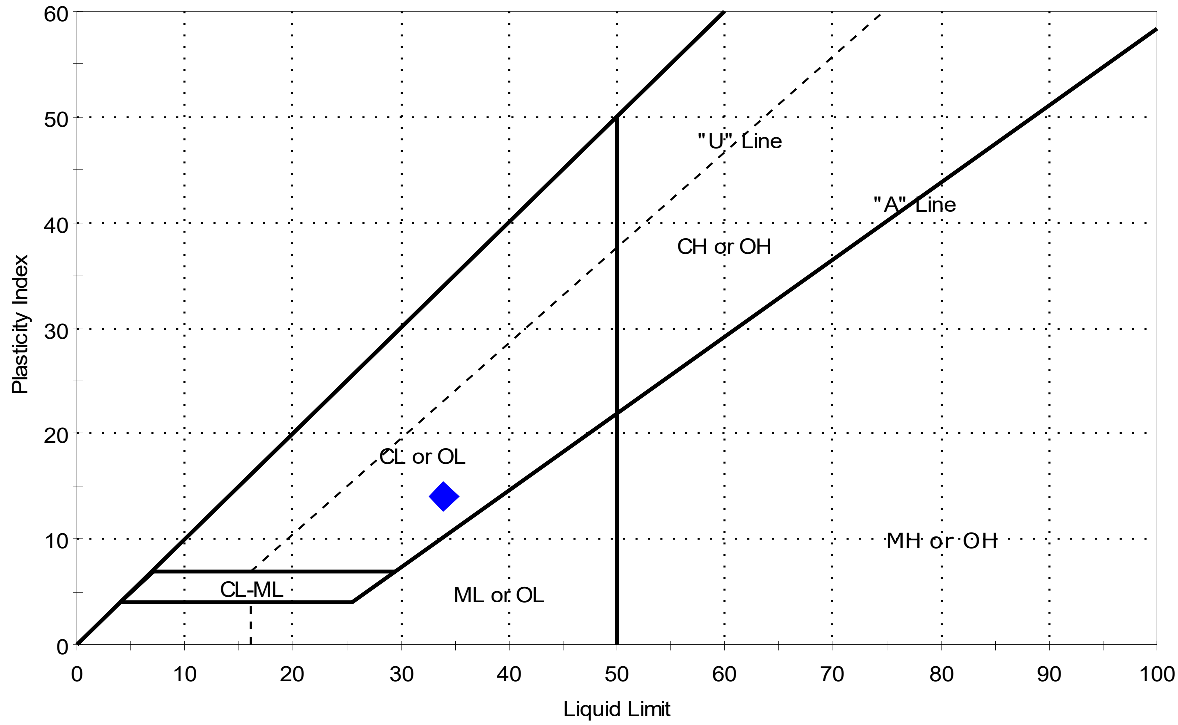
Client: Haley & Aldrich, Inc.
Project: Maine Turnpike Exit 45 Interchange
Location: South Portland, ME
Project No: GTX-309473

Boring ID: HB-EXIT45-303
Sample Type: tube
Tested By: cam
Sample ID: U6
Test Date: 02/22/19
Checked By: bfs
Depth : 50-52 ft
Test Id: 490902

Test Comment: ---
Visual Description: Moist, dark gray clay
Sample Comment: ---

Atterberg Limits - ASTM D4318

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U6	-EXIT45-3	50-52 ft	35	34	20	14	1.1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

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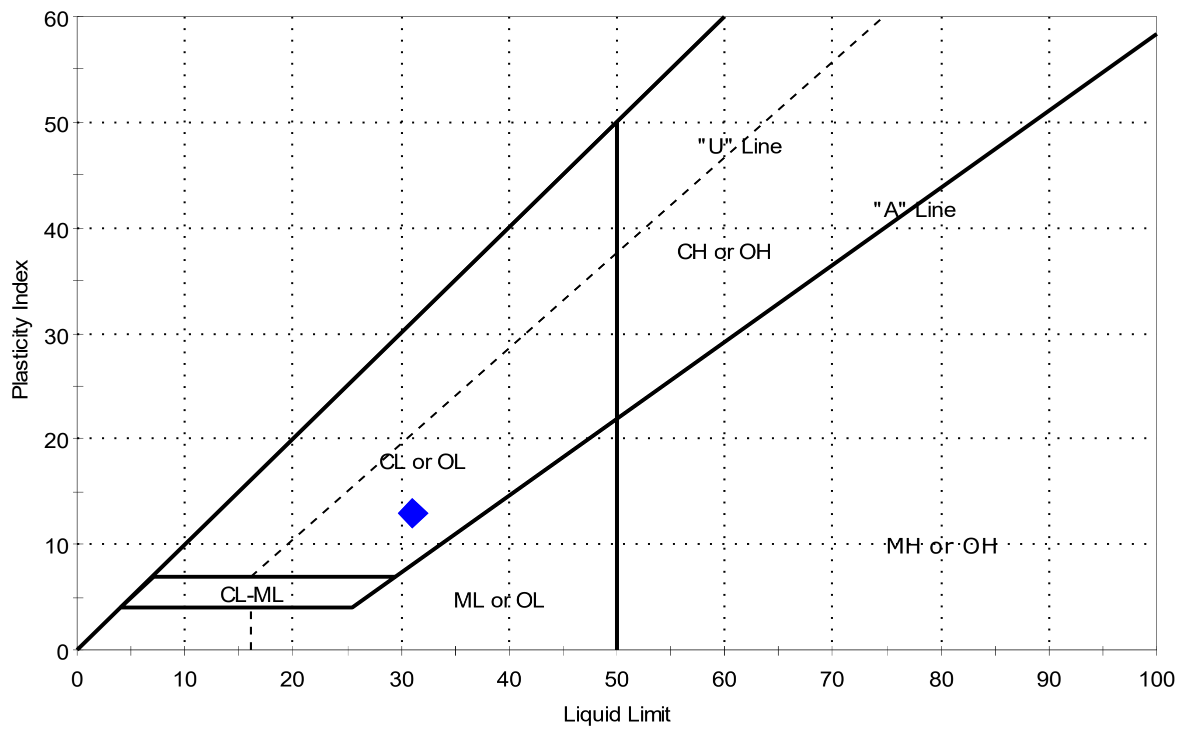
Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-304A	Sample Type:	tube	Tested By:	cam
Sample ID:	U1	Test Date:	02/19/19	Checked By:	bfs
Depth :	2-4 ft	Test Id:	490903		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	EXIT45-3	2-4 ft	27	31	18	13	0.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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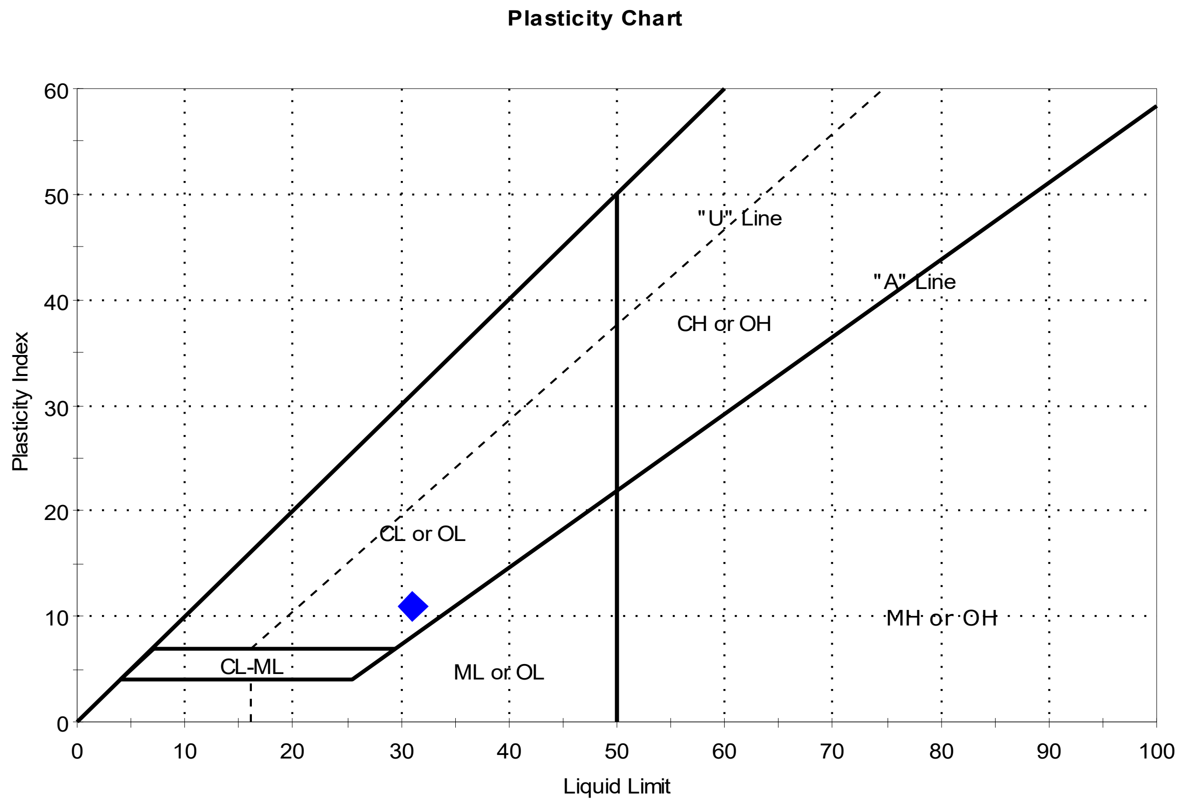
Client:	Haley & Aldrich, Inc.				
Project:	Maine Turnpike Exit 45 Interchange				
Location:	South Portland, ME			Project No:	GTX-309473
Boring ID:	HB-EXIT45-304A	Sample Type:	tube	Tested By:	cam
Sample ID:	U2	Test Date:	02/19/19	Checked By:	bfs
Depth :	6-8 ft	Test Id:	490904		
Test Comment:	---				
Visual Description:	Moist, dark grayish brown clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	EXIT45-3	6-8 ft	29	31	20	11	0.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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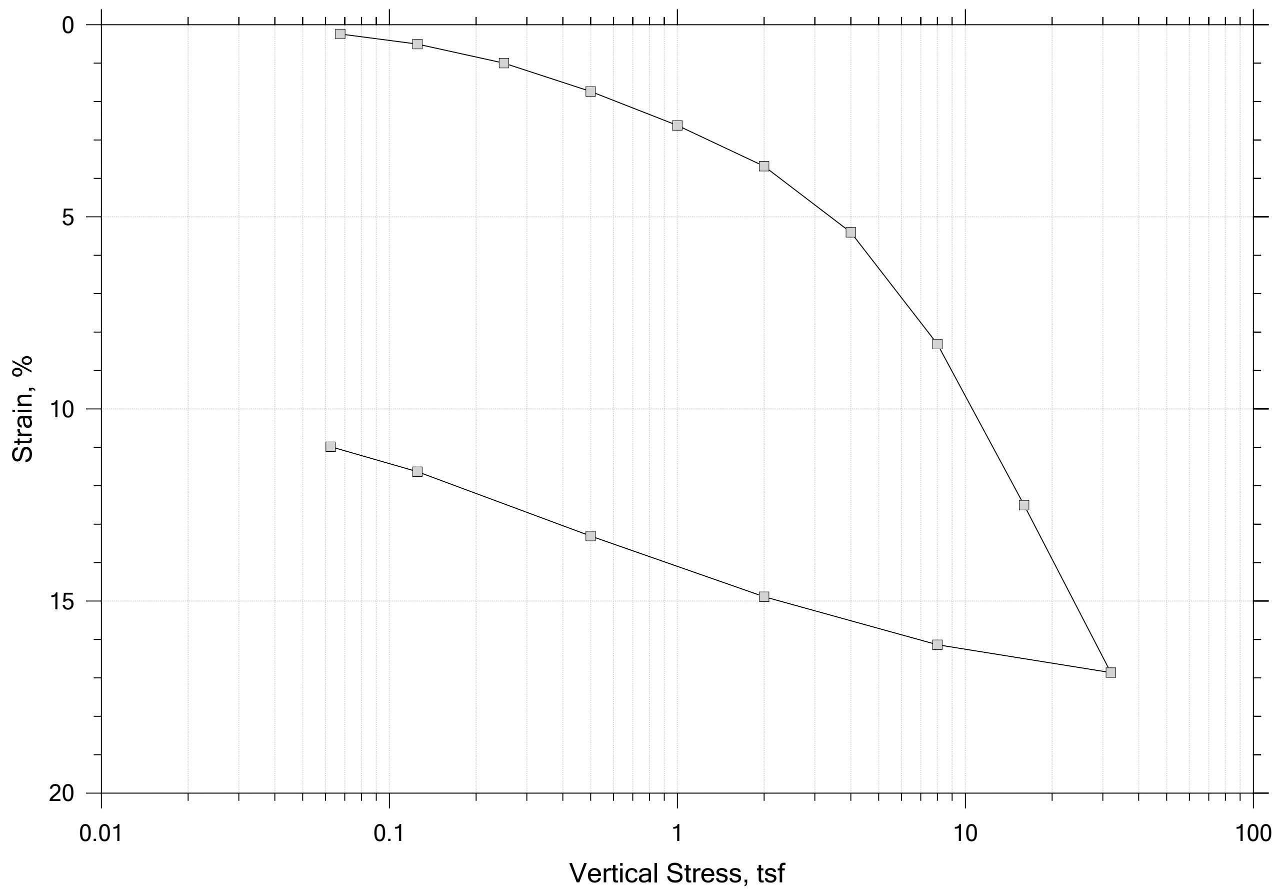
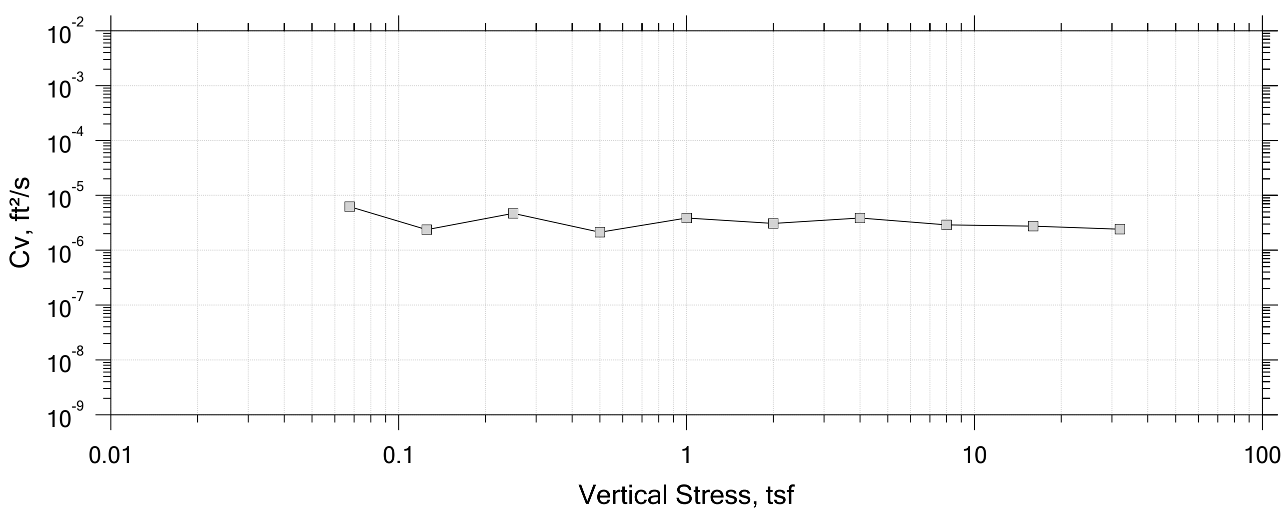
One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





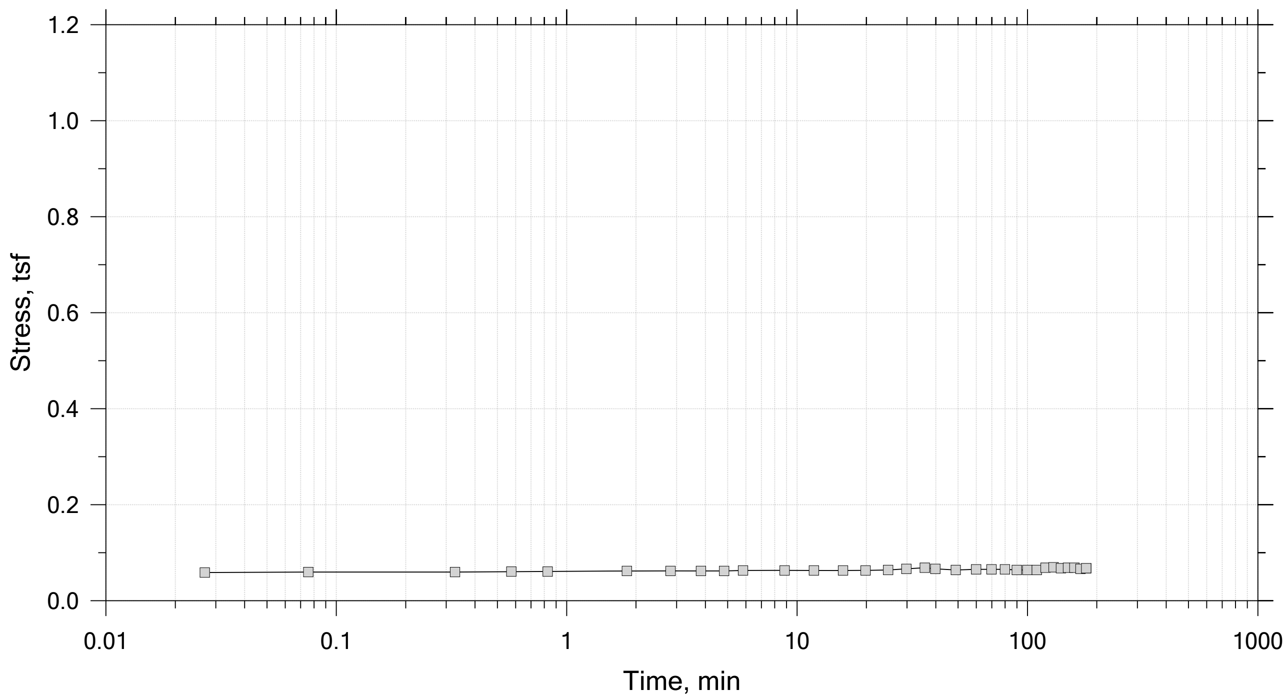
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		
	Displacement at End of Increment		

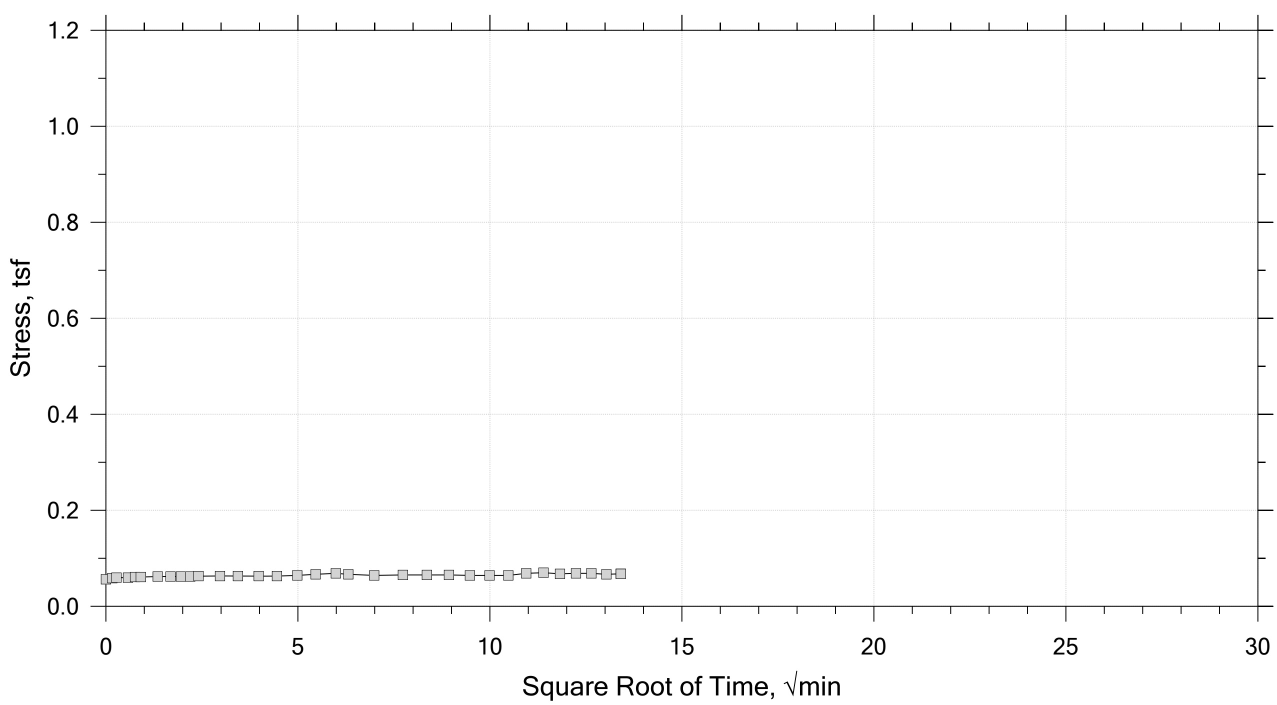
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0675 tsf





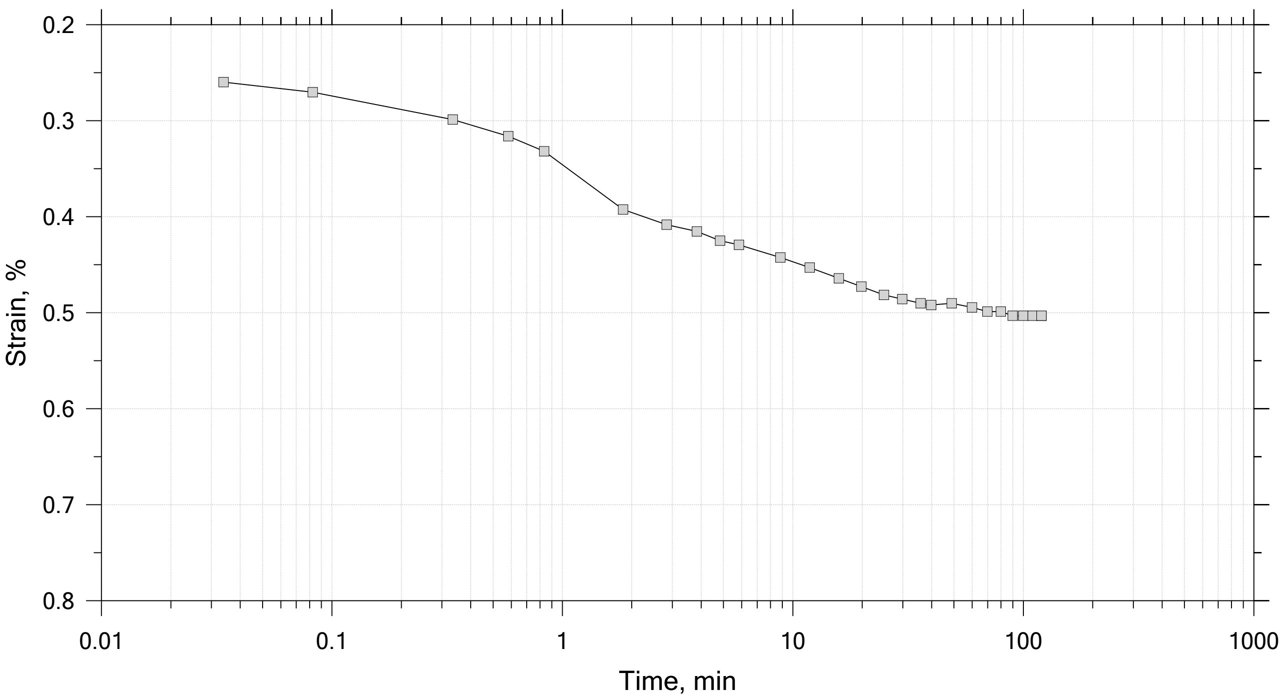
Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System Y, Swell Pressure = 0.0675 tsf		

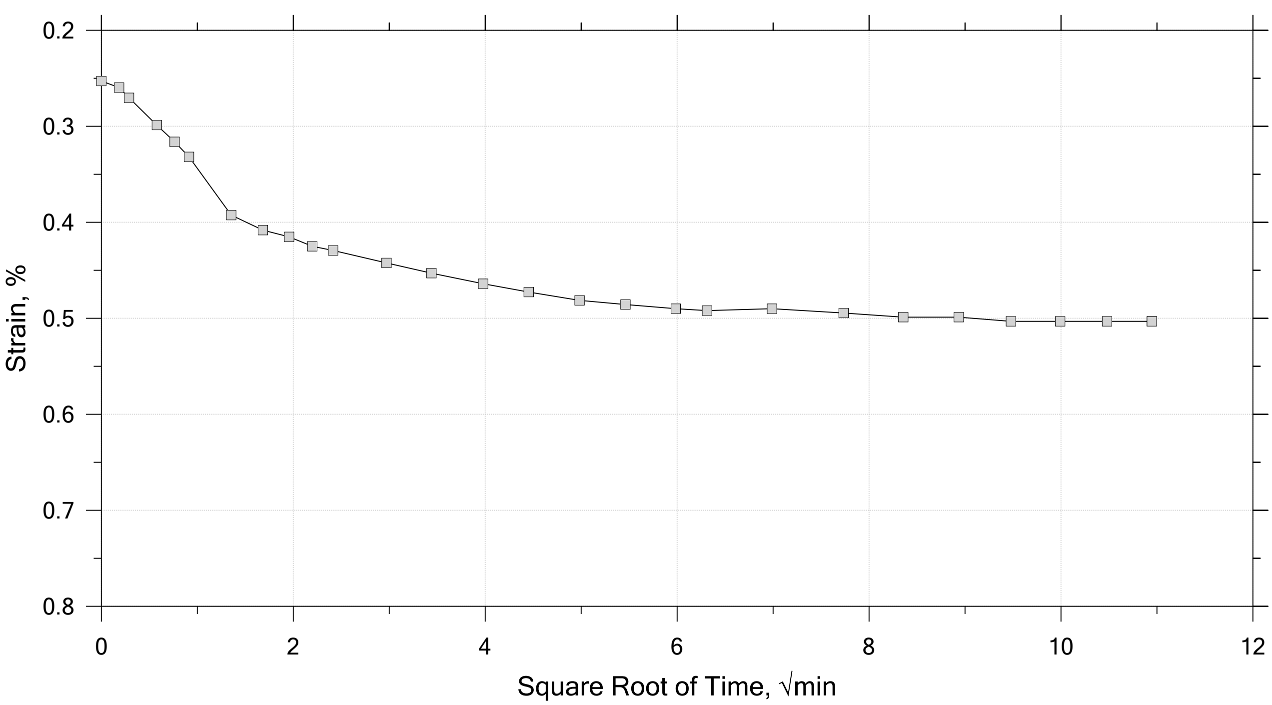
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf





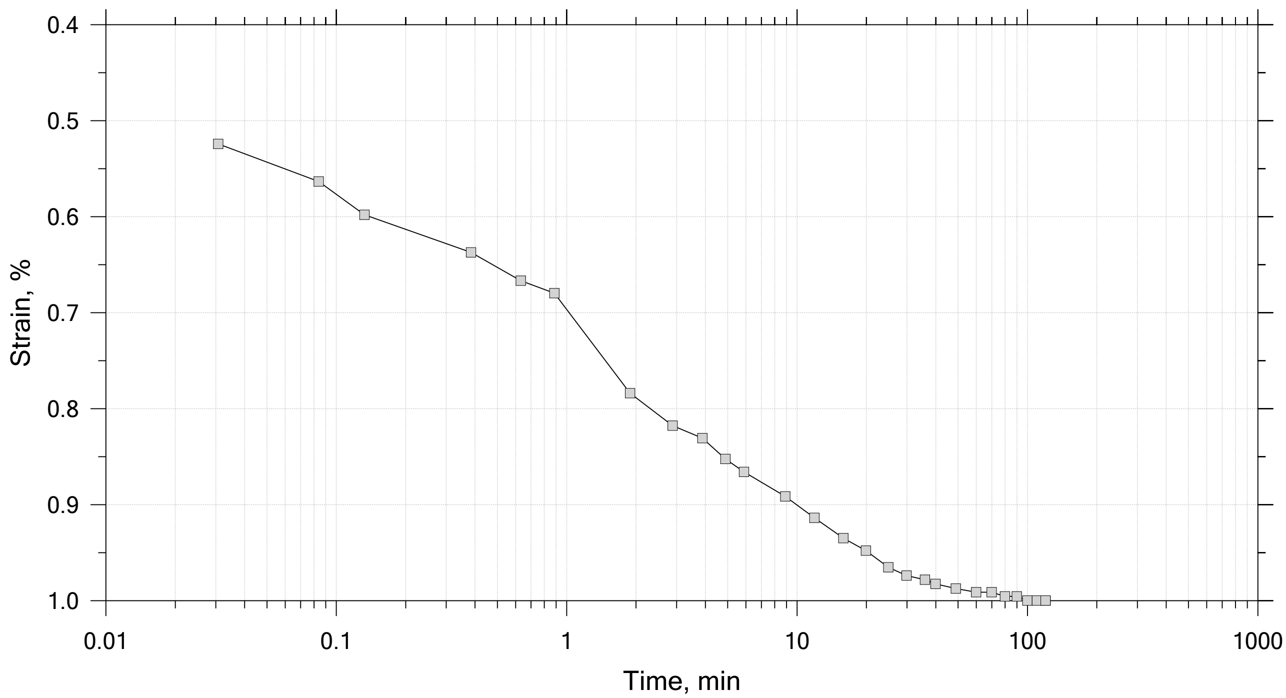
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

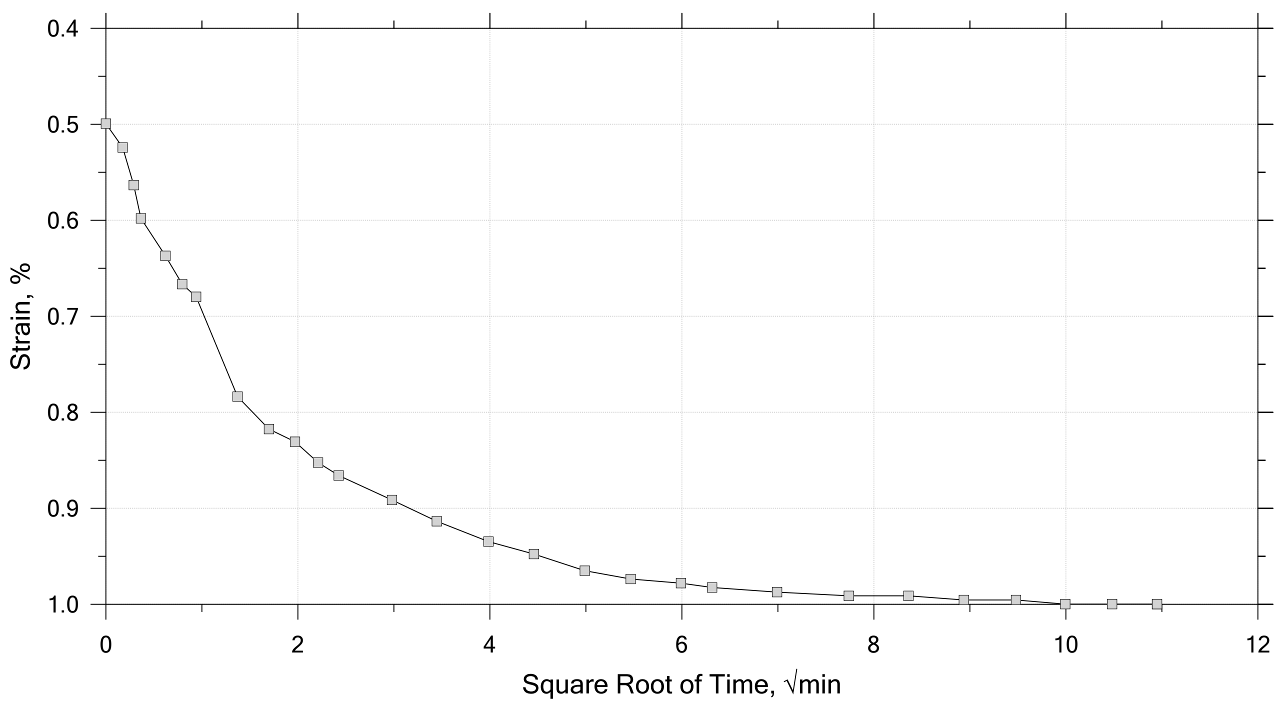
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf





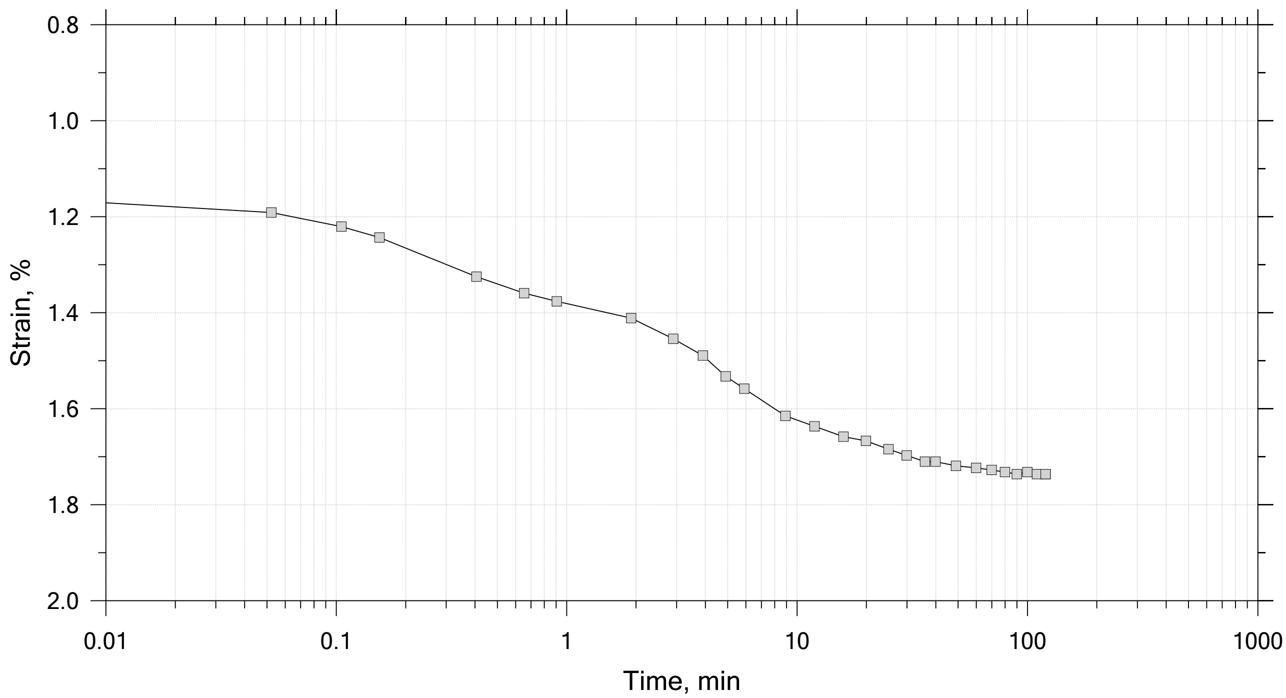
Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System Y, Swell Pressure = 0.0675 tsf		

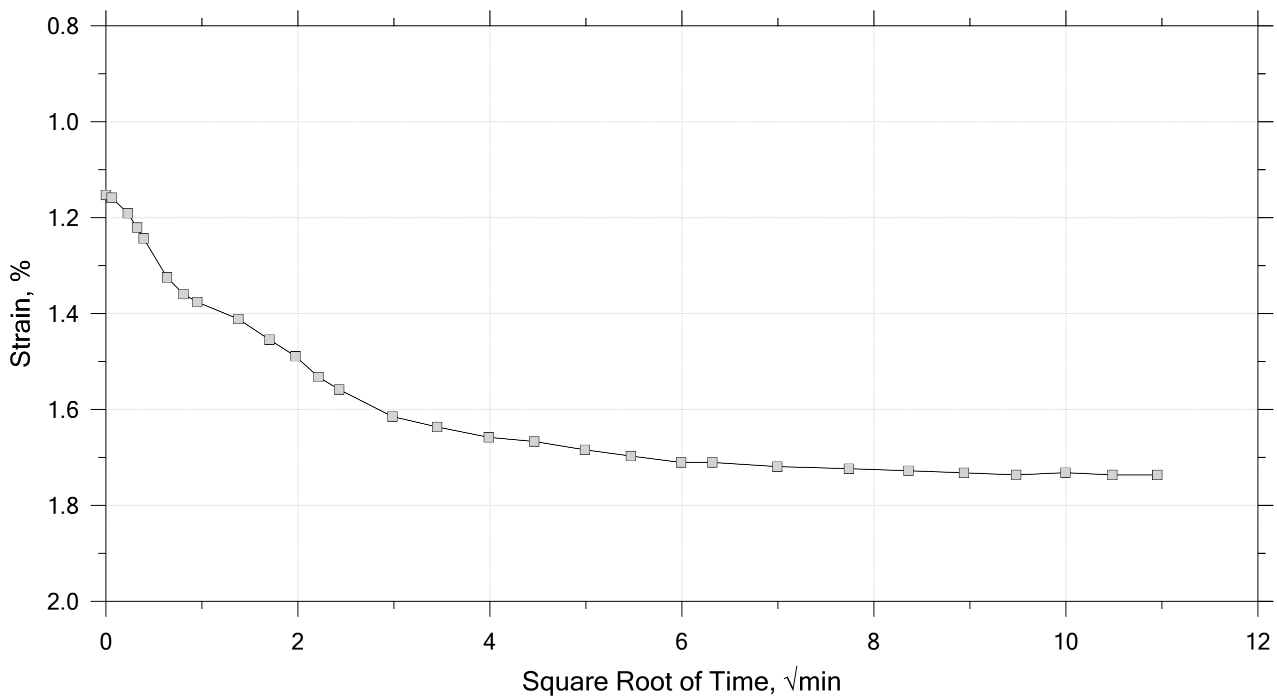
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





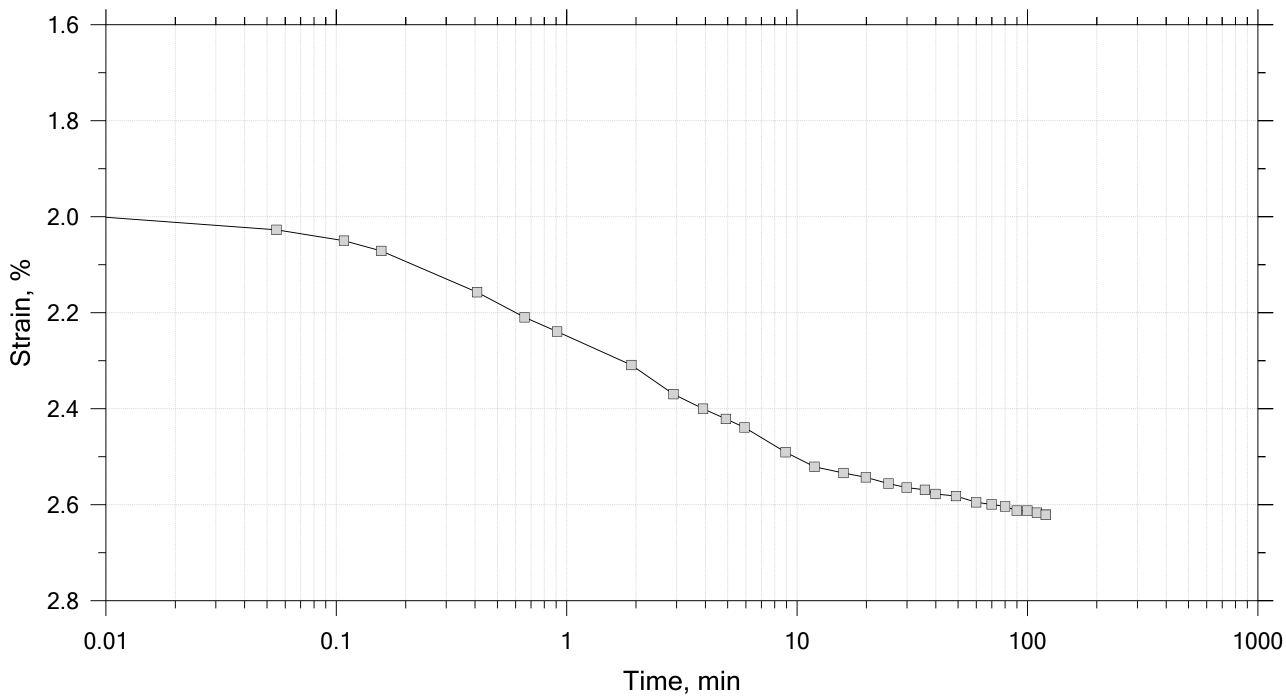
Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System Y, Swell Pressure = 0.0675 tsf		

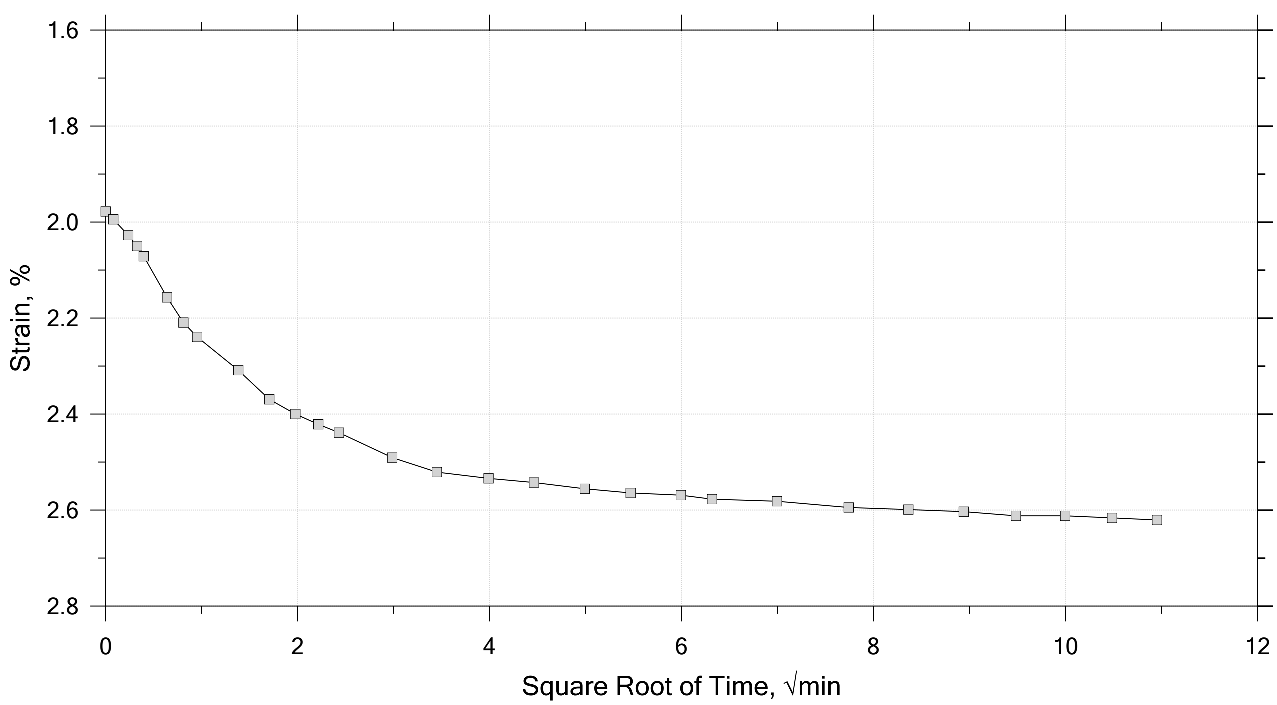
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





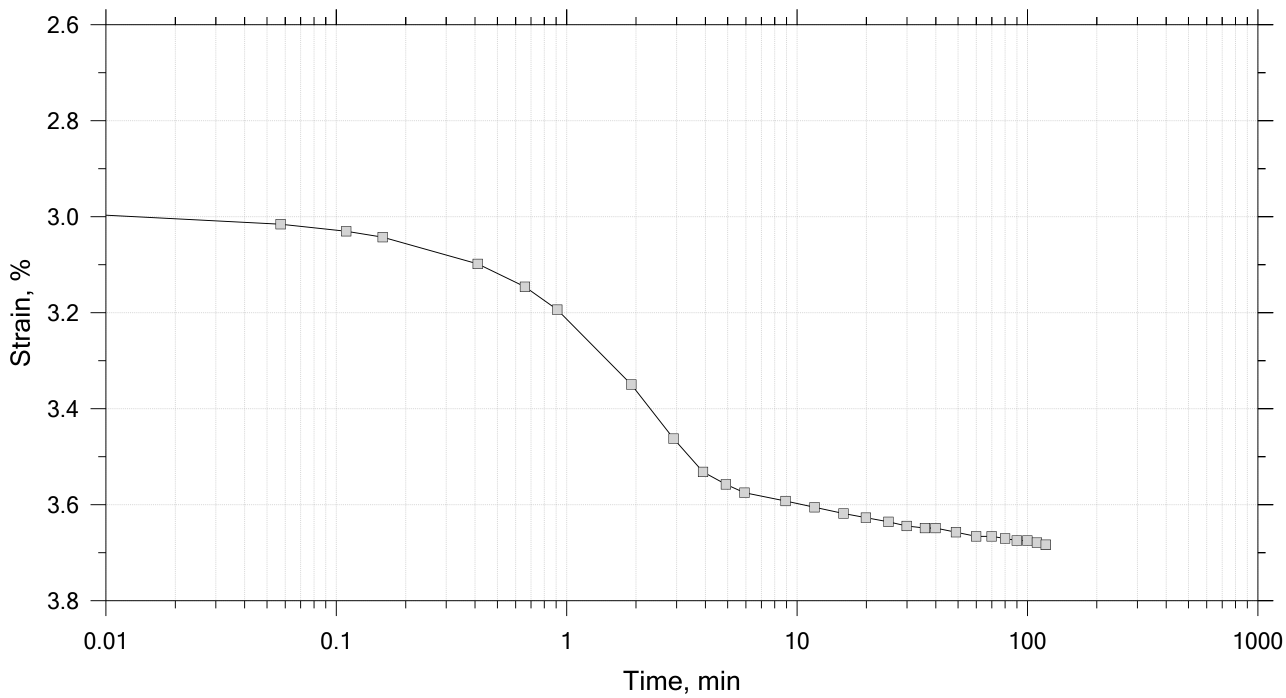
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

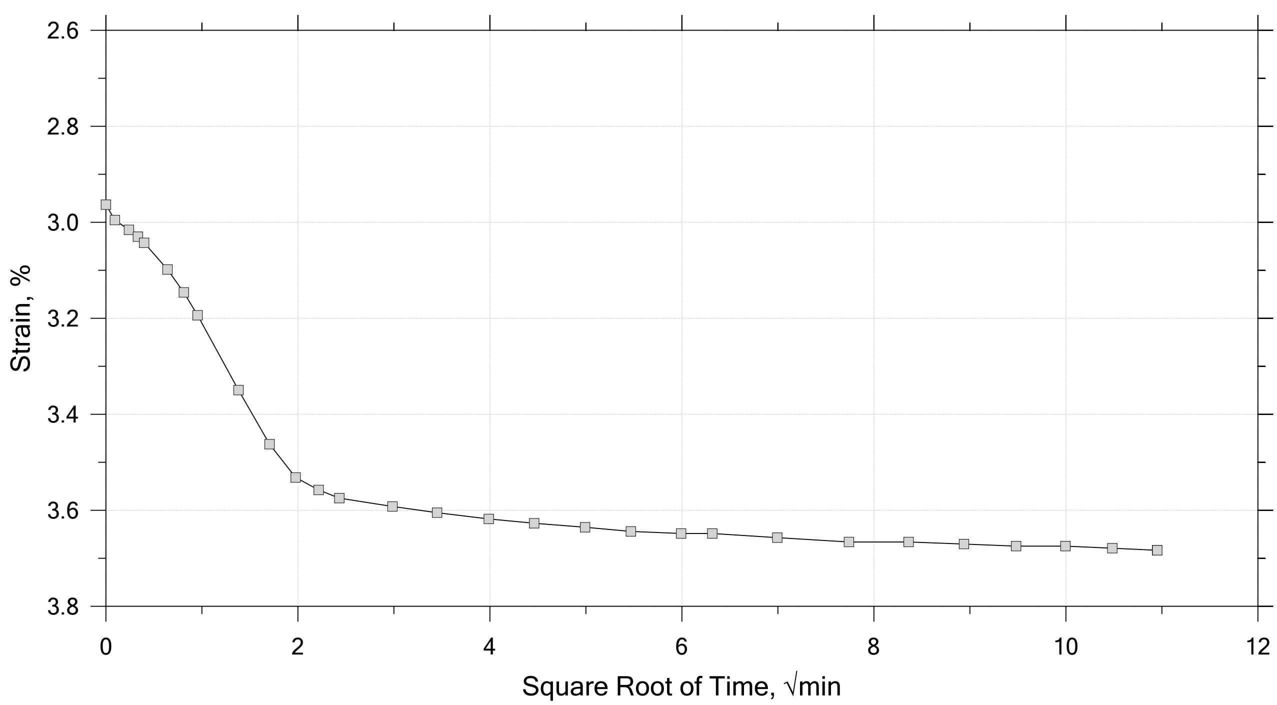
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





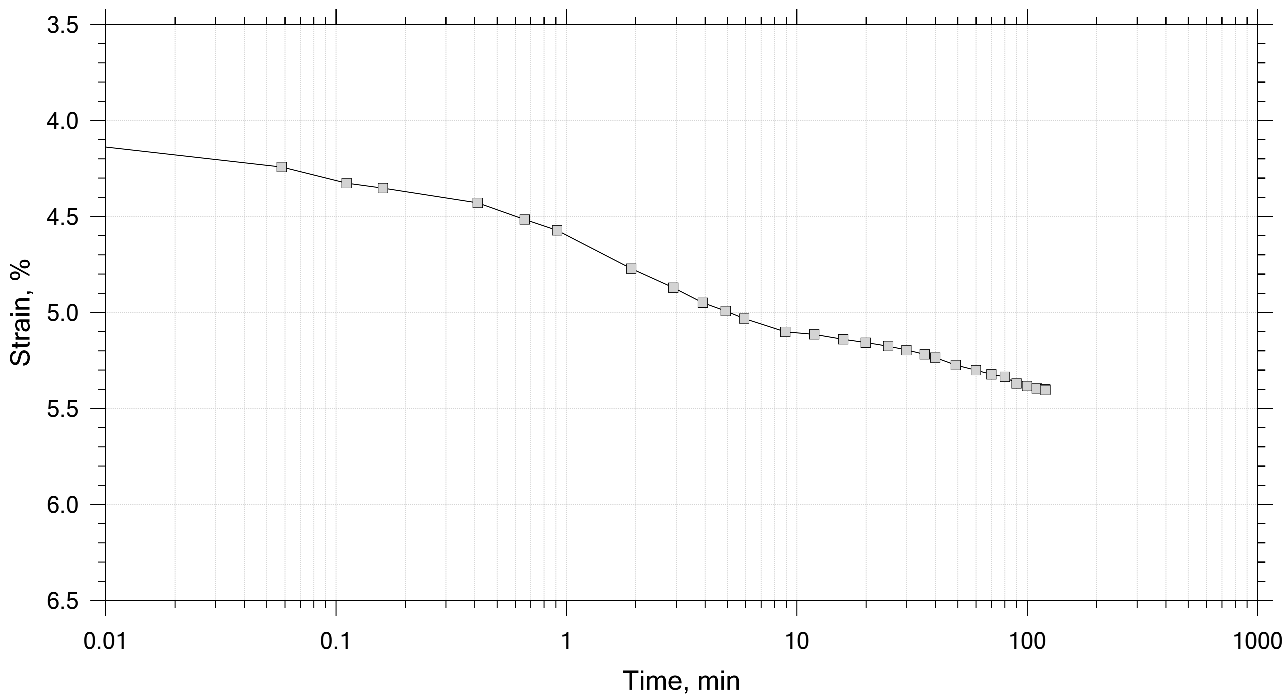
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

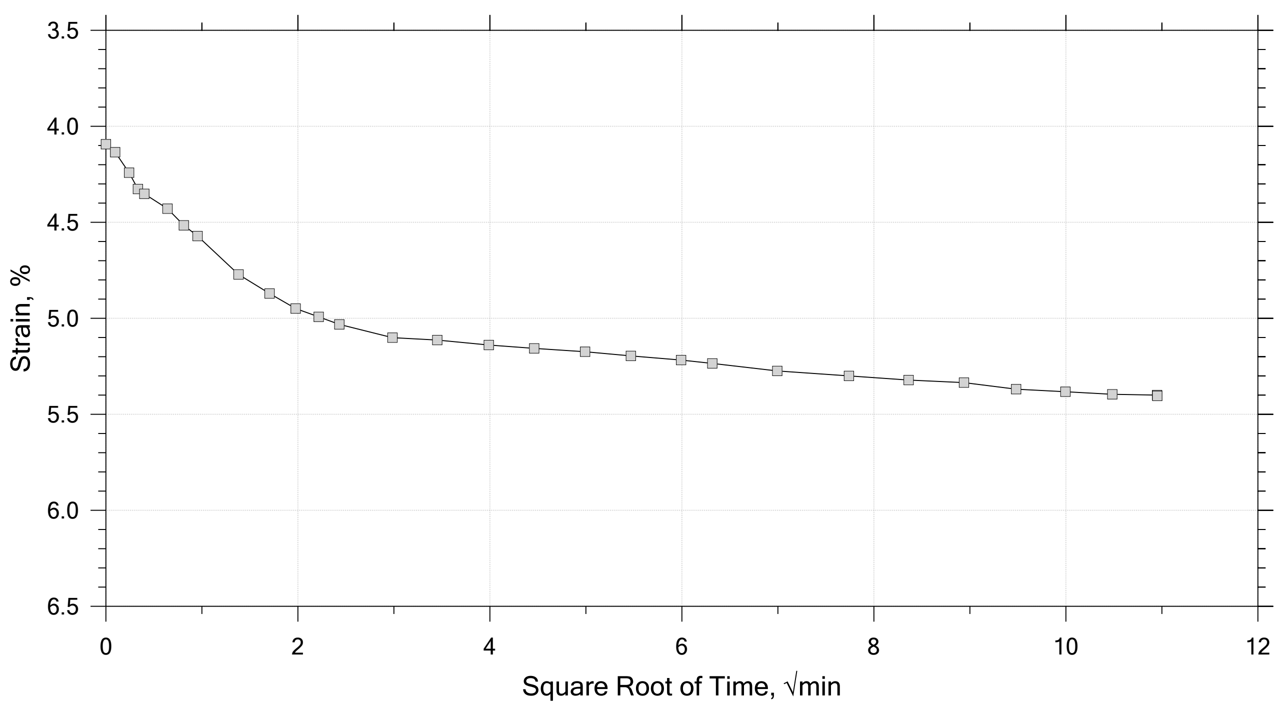
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf

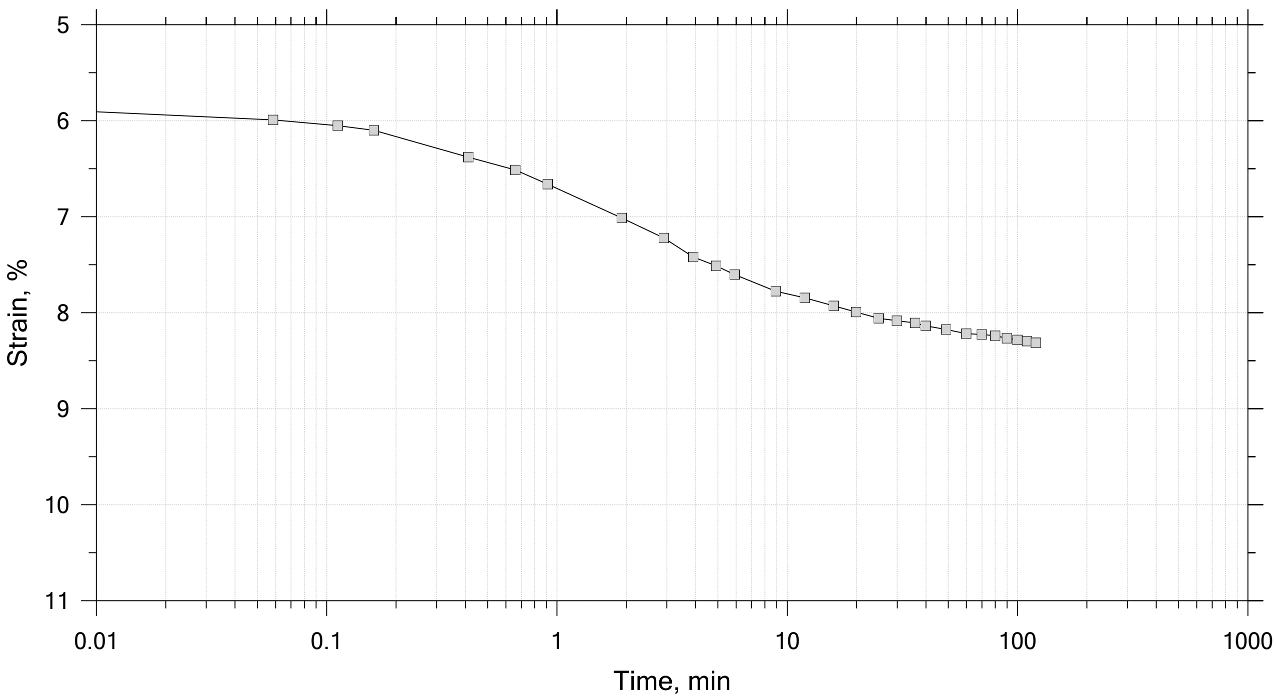


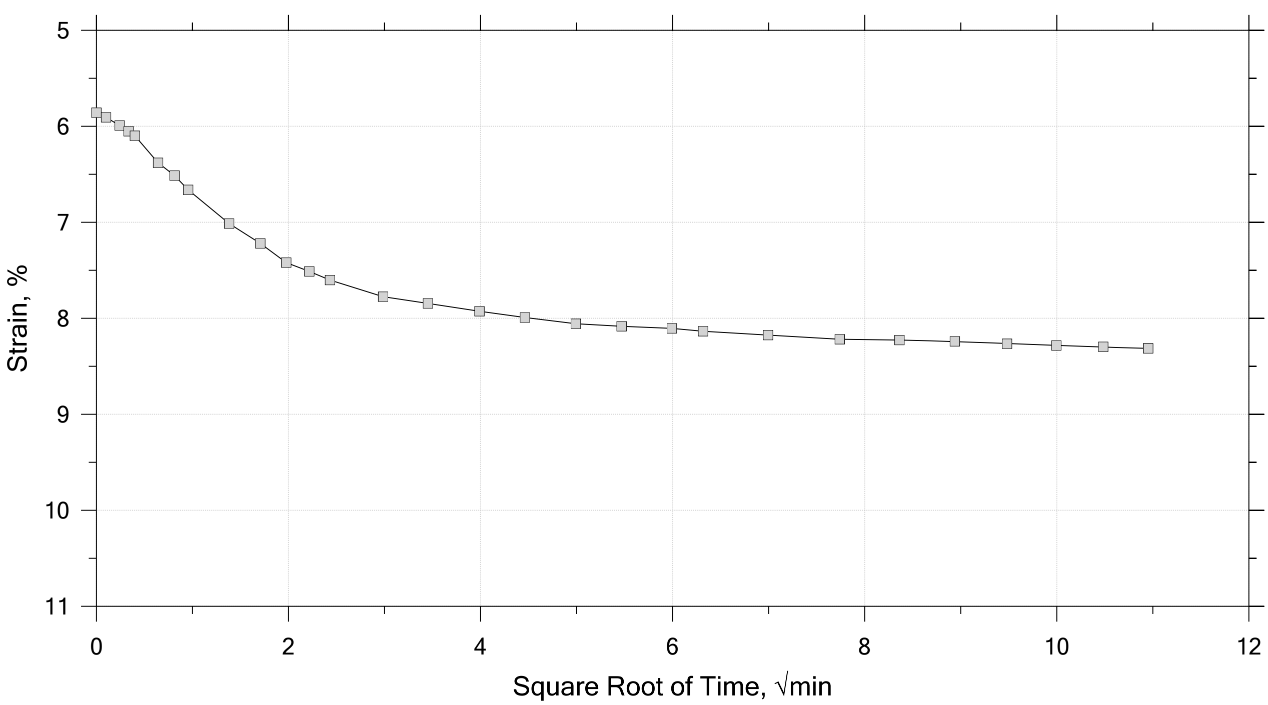


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15
Constant Load Step
Stress: 8 tsf





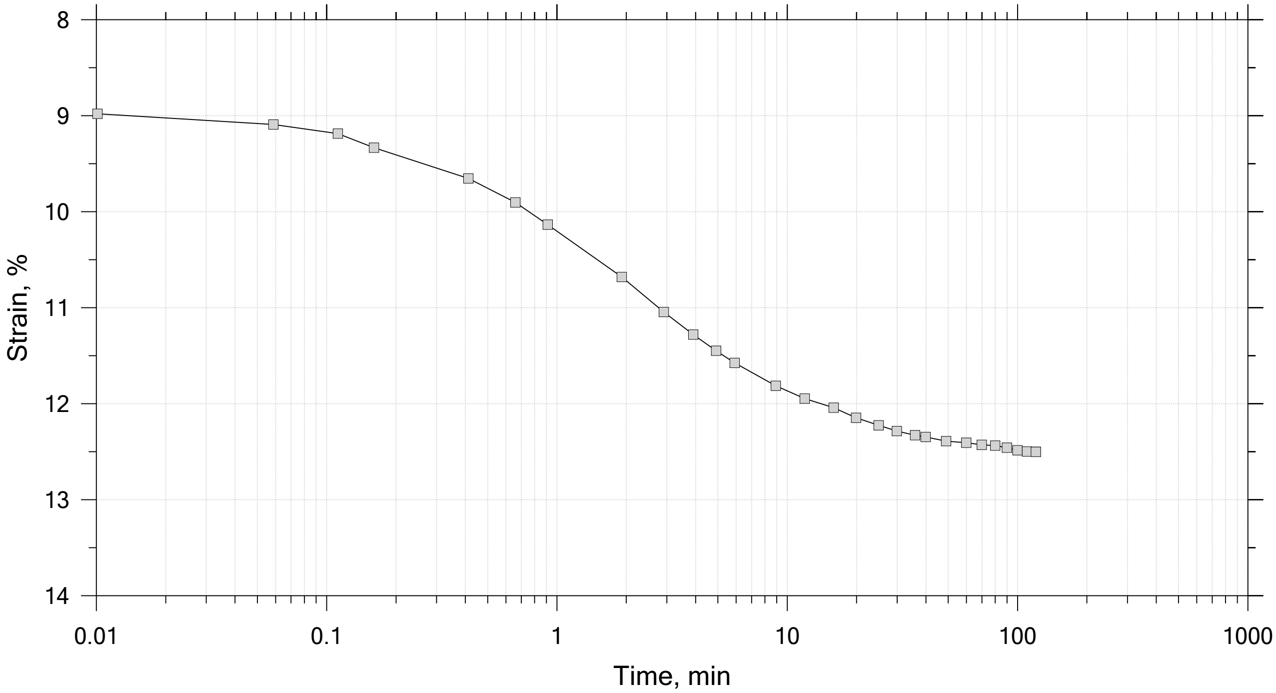
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

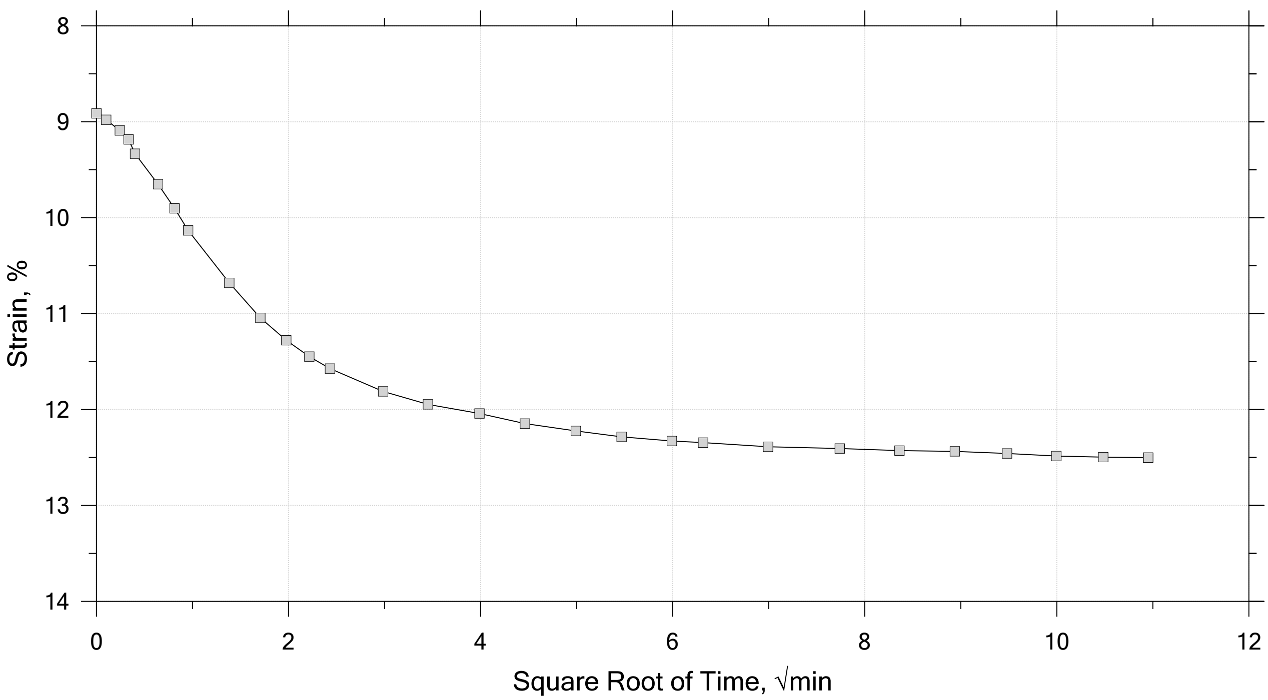
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

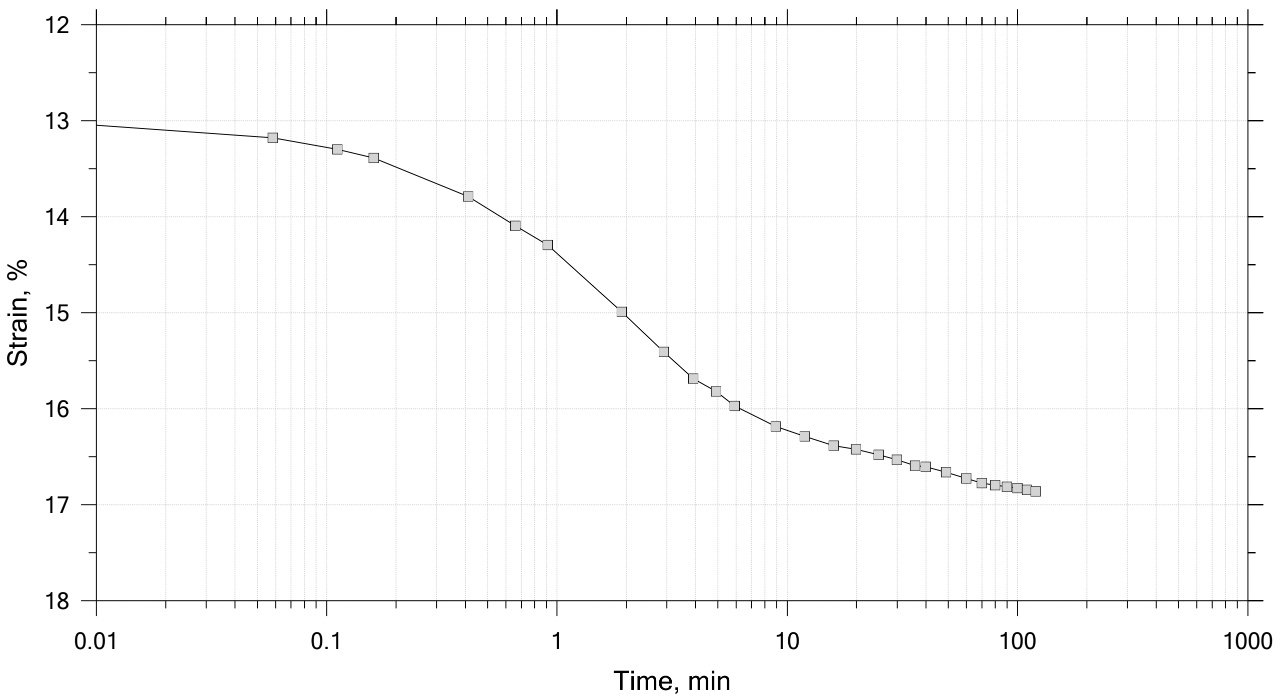


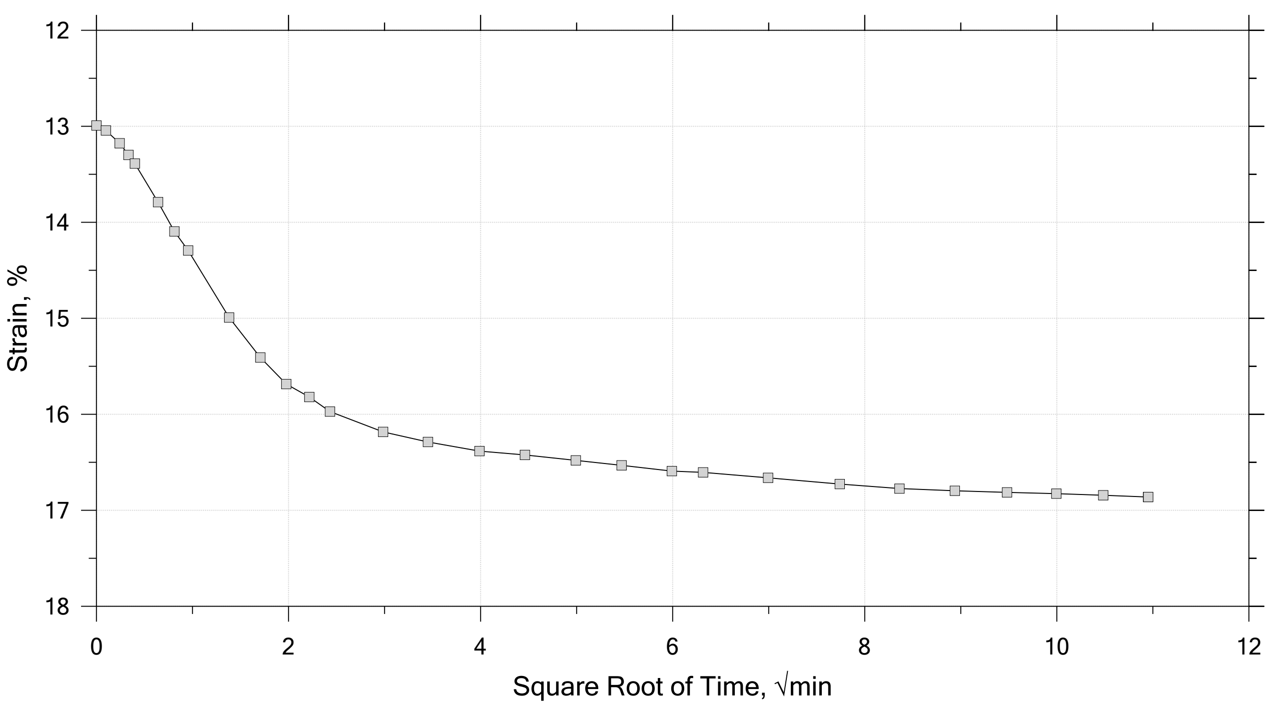


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf





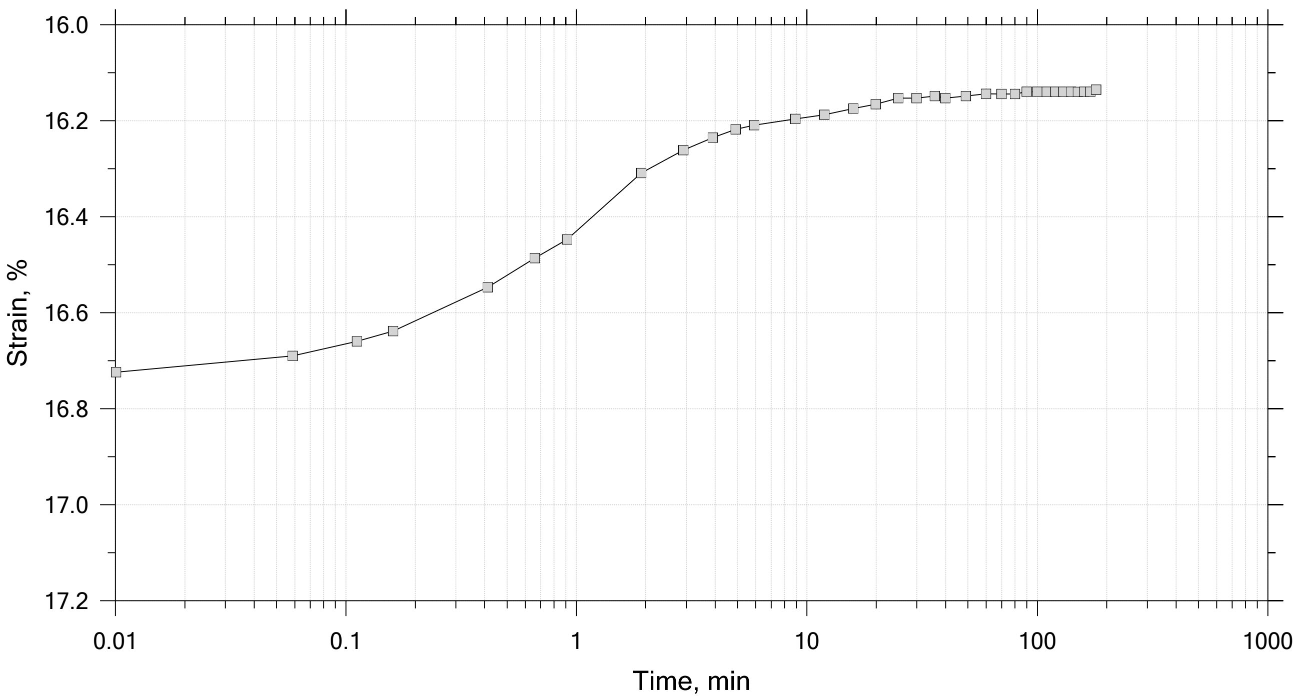
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

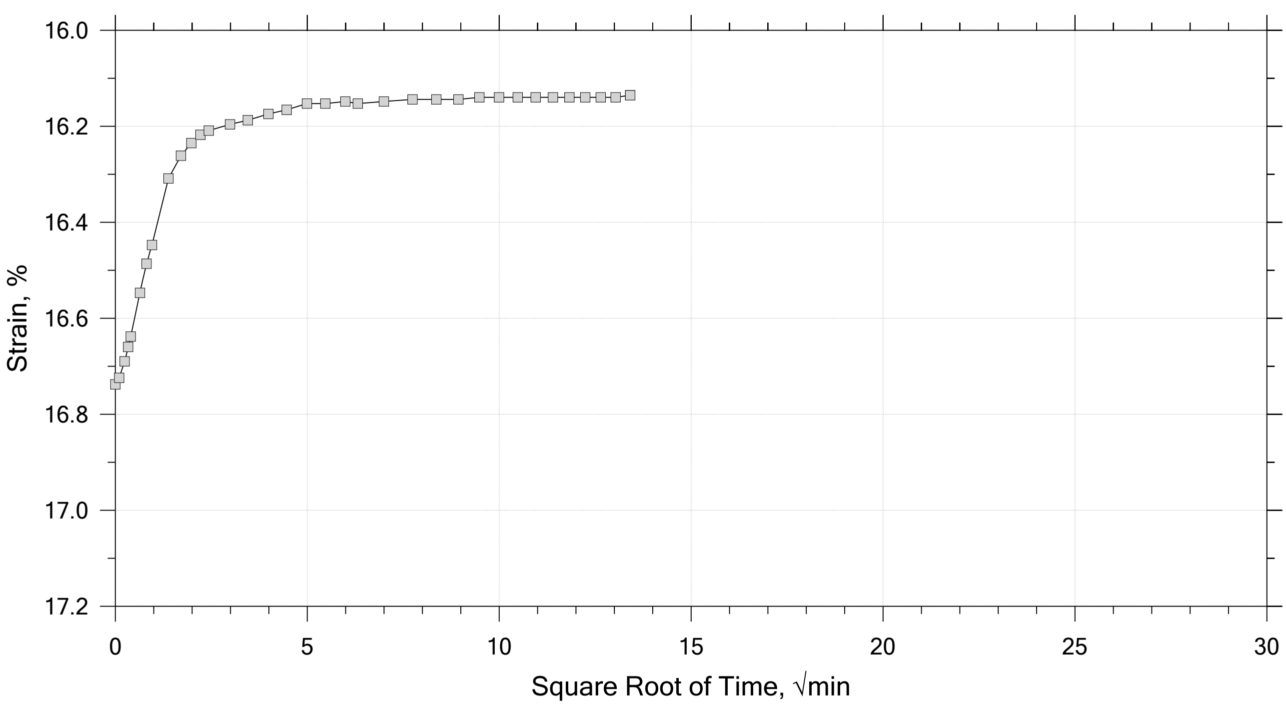
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf





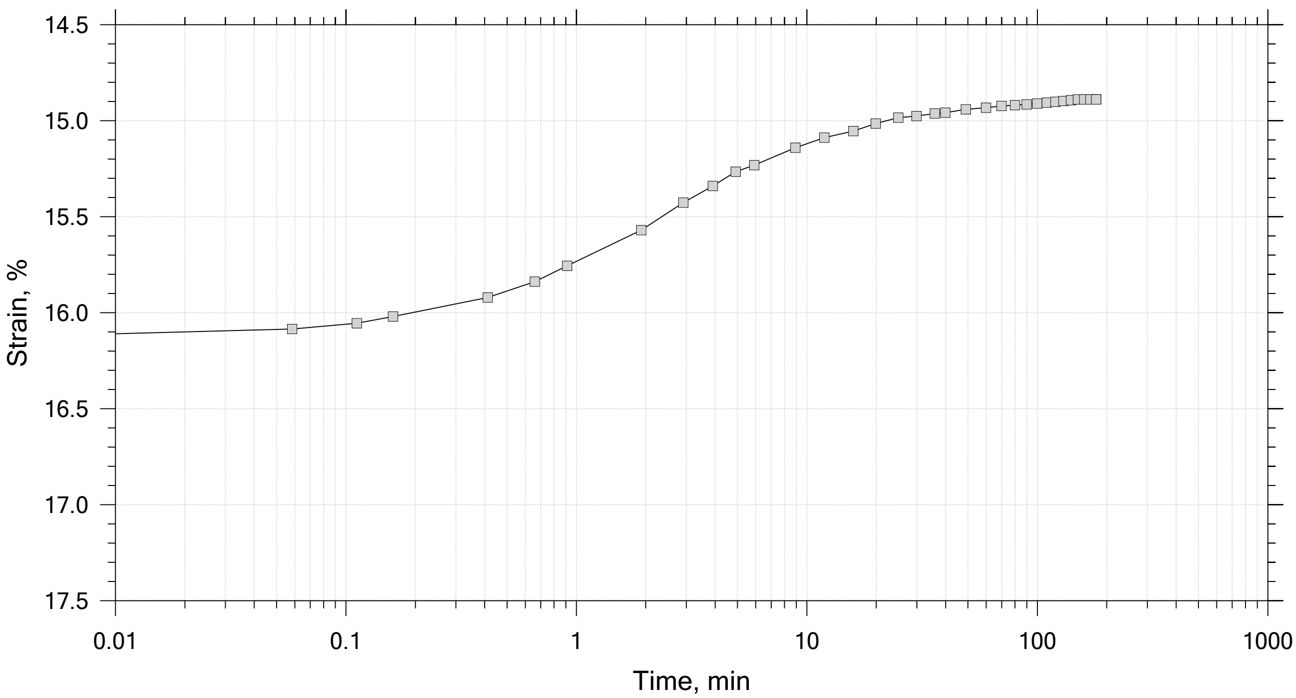
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

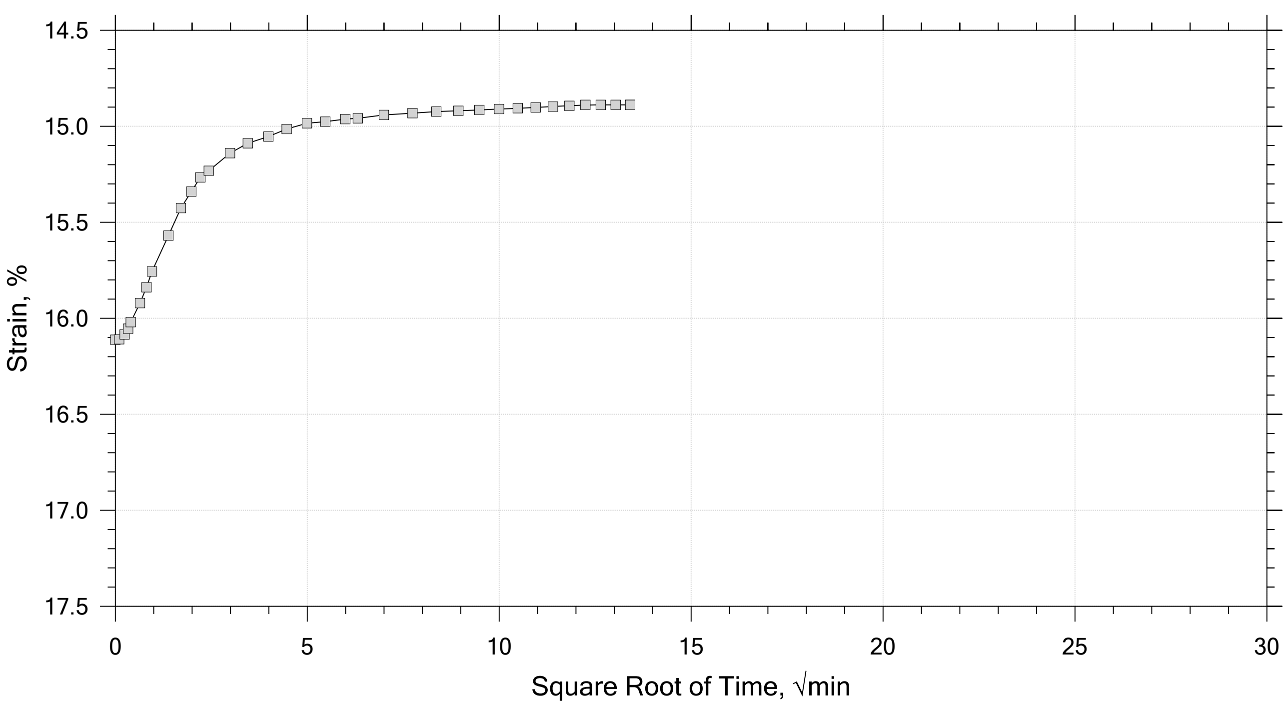
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf





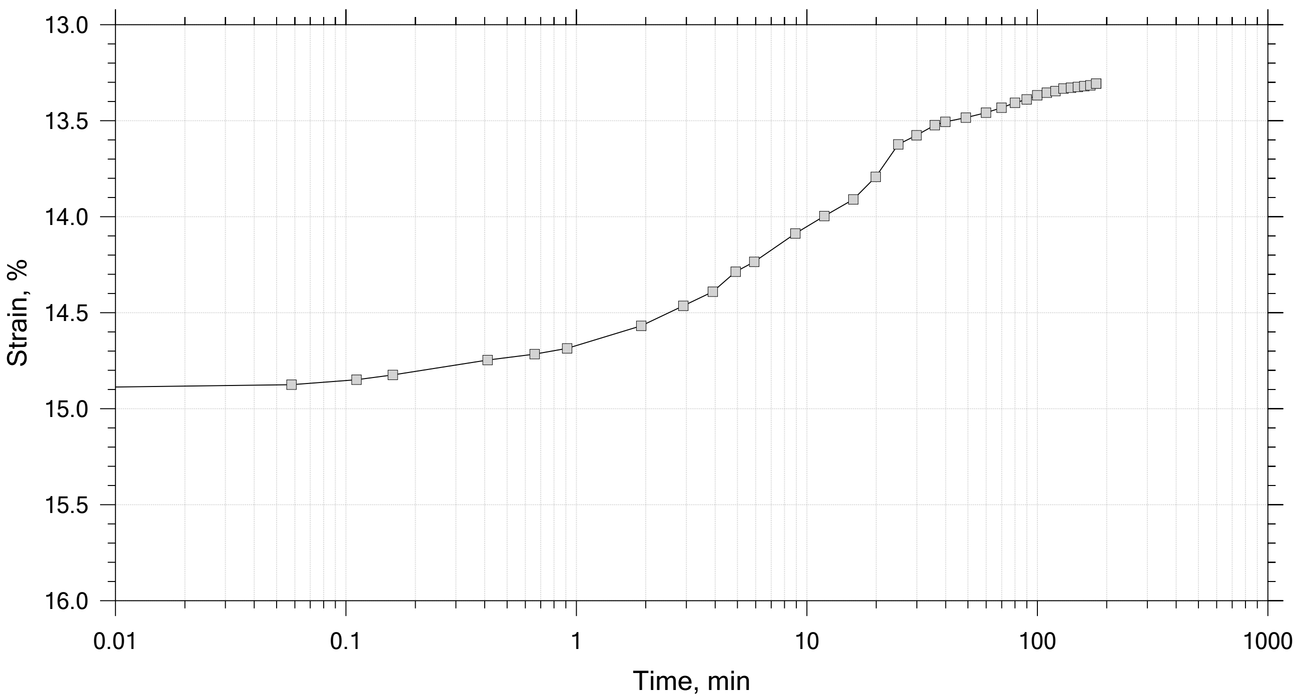
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

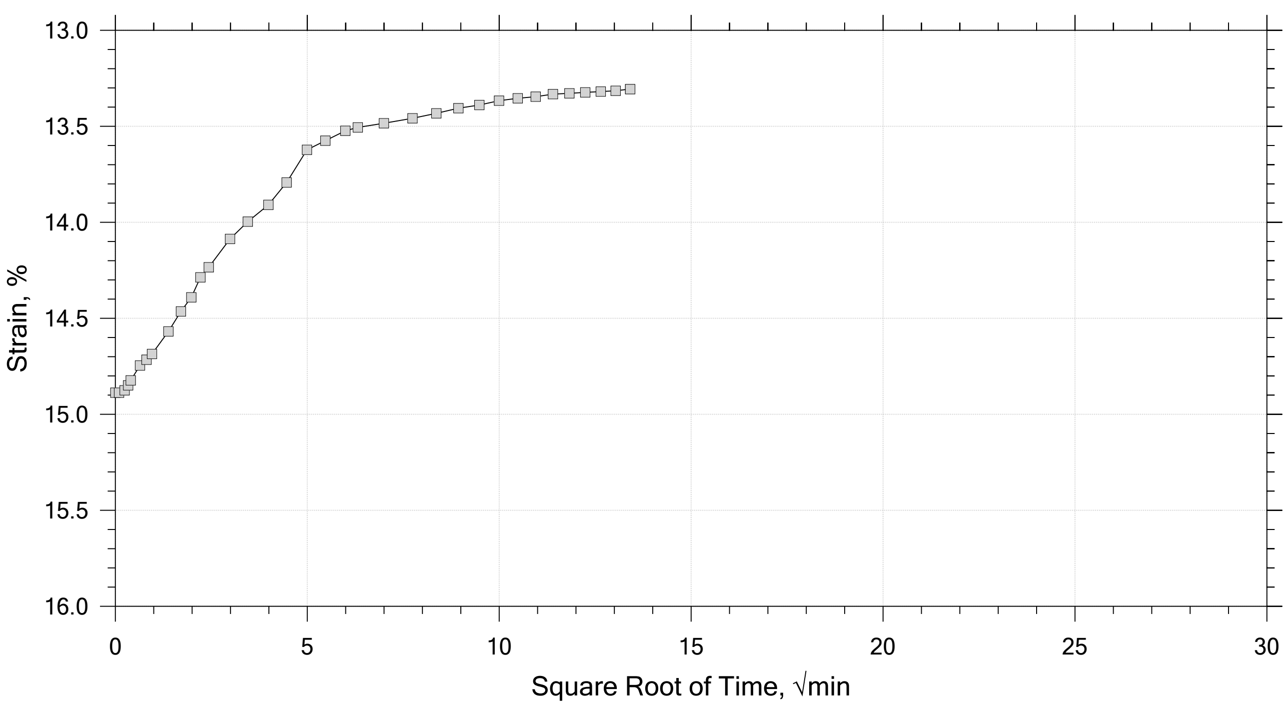
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf





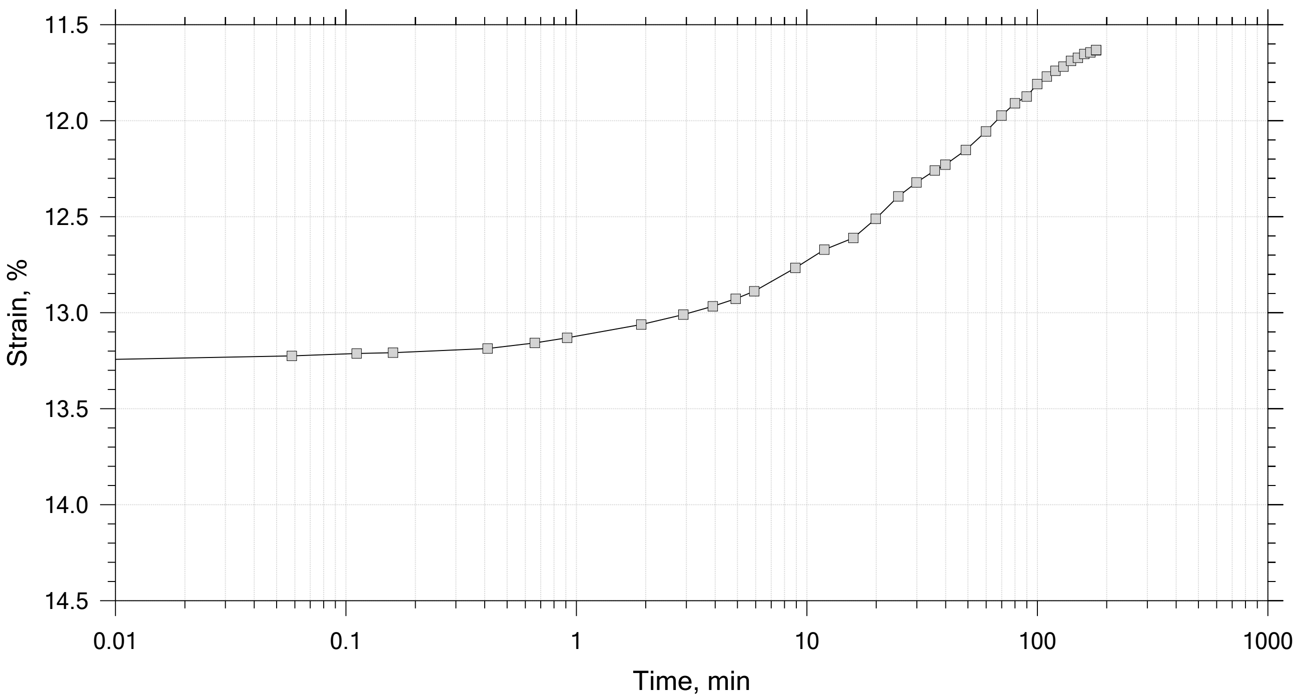
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

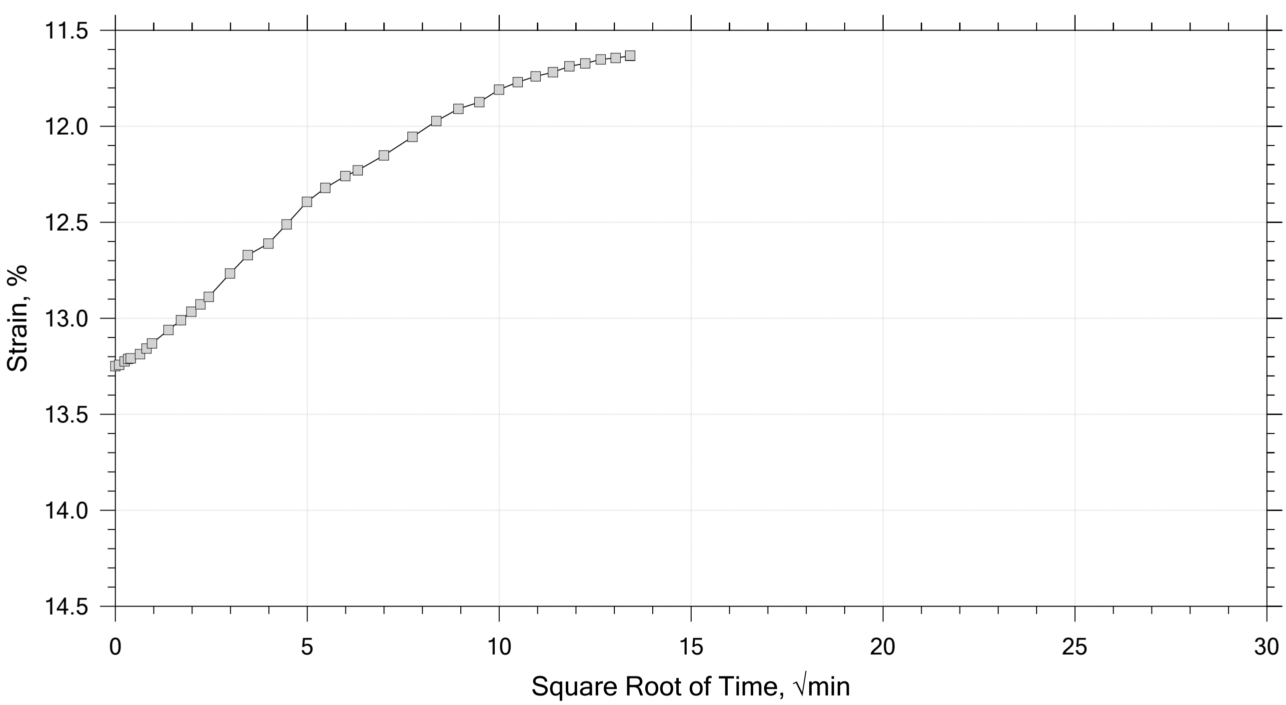
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf





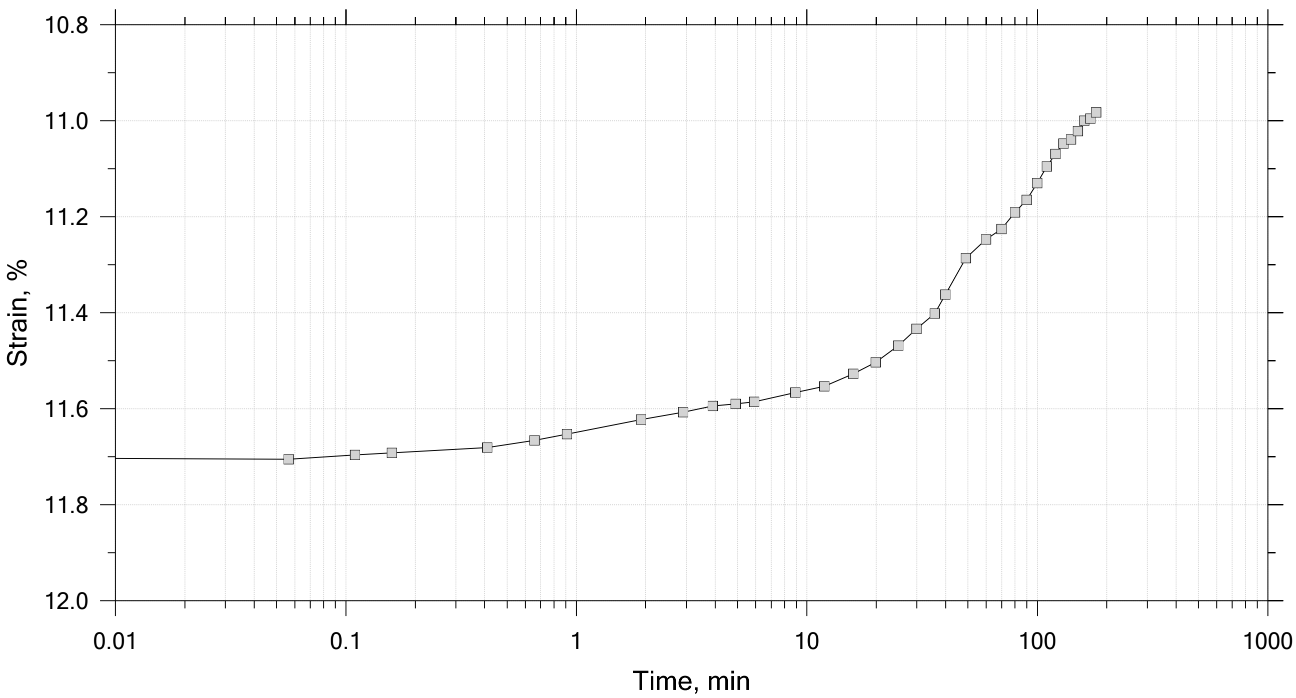
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

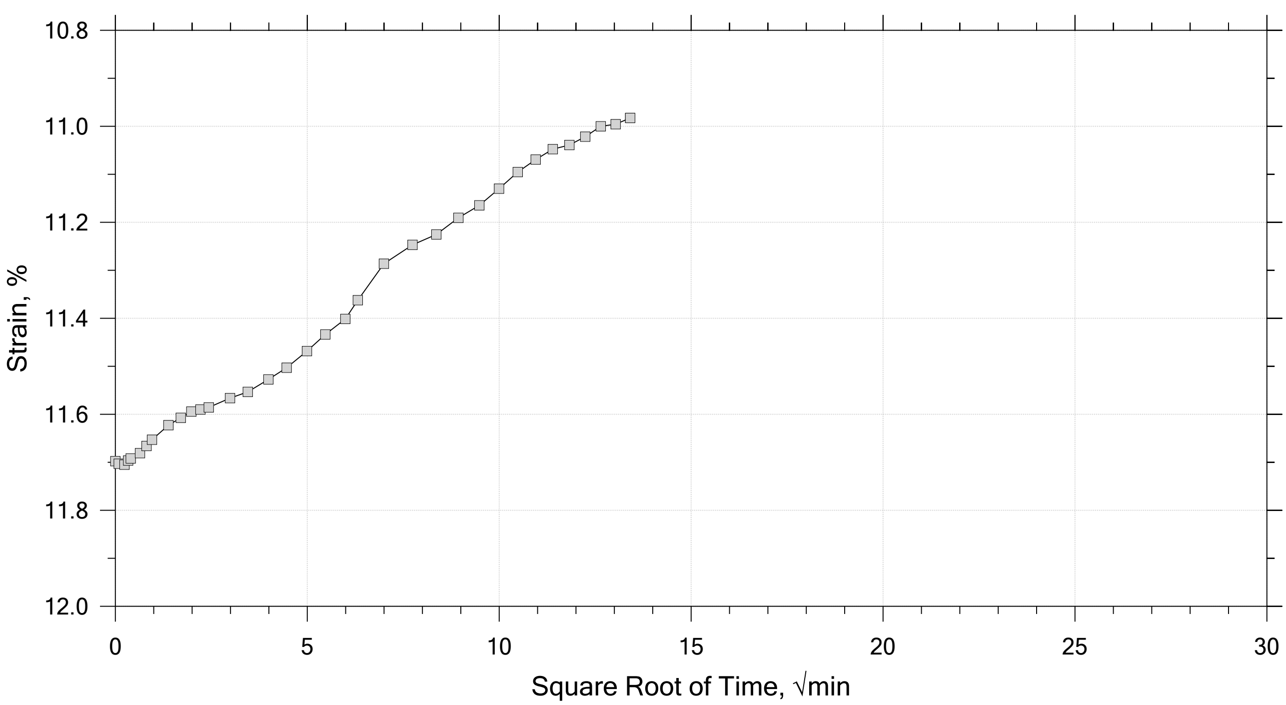
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 37
Initial Height: 1.00 in	Initial Void Ratio: 0.952	Plastic Limit: 23
Final Height: 0.91 in	Final Void Ratio: 0.776	Plasticity Index: 14

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	A2912	RING		A-2457
Mass Container, gm	8.28	109	109	8.26
Mass Container + Wet Soil, gm	108.78	261.16	254.28	153.38
Mass Container + Dry Soil, gm	84.86	222.29	222.29	121.43
Mass Dry Soil, gm	76.58	113.29	113.29	113.17
Water Content, %	31.24	34.30	28.23	28.23
Void Ratio	---	0.95	0.78	---
Degree of Saturation, %	---	99.08	100.00	---
Dry Unit Weight, pcf	---	87.926	96.622	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0675	0.002405	0.947	0.241	0.000	0.00e+00	3.56e-02	0.00e+00	0.00e+00
2	0.125	0.005031	0.942	0.503	0.000	0.00e+00	4.57e-02	0.00e+00	0.00e+00
3	0.250	0.009998	0.932	1.00	1.099	5.11e-06	3.97e-02	5.48e-04	0.00e+00
4	0.500	0.01736	0.918	1.74	2.629	2.11e-06	2.95e-02	1.68e-04	0.00e+00
5	1.00	0.02621	0.901	2.62	1.463	3.73e-06	1.77e-02	1.78e-04	0.00e+00
6	2.00	0.03683	0.880	3.68	1.731	3.09e-06	1.06e-02	8.85e-05	0.00e+00
7	4.00	0.05404	0.846	5.40	1.266	4.10e-06	8.61e-03	9.52e-05	0.00e+00
8	8.00	0.08314	0.789	8.31	1.811	2.73e-06	7.27e-03	5.36e-05	0.00e+00
9	16.0	0.1250	0.708	12.5	1.766	2.59e-06	5.24e-03	3.66e-05	0.00e+00
10	32.0	0.1686	0.623	16.9	1.451	2.86e-06	2.72e-03	2.10e-05	0.00e+00
11	8.00	0.1614	0.637	16.1	0.000	0.00e+00	3.02e-04	0.00e+00	0.00e+00
12	2.00	0.1489	0.661	14.9	1.967	2.07e-06	2.08e-03	1.16e-05	0.00e+00
13	0.500	0.1331	0.692	13.3	0.000	0.00e+00	1.05e-02	0.00e+00	0.00e+00
14	0.125	0.1163	0.725	11.6	0.000	0.00e+00	4.47e-02	0.00e+00	0.00e+00
15	0.0625	0.1098	0.737	11.0	0.000	0.00e+00	1.04e-01	0.00e+00	0.00e+00

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
	Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Y, Swell Pressure = 0.0675 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

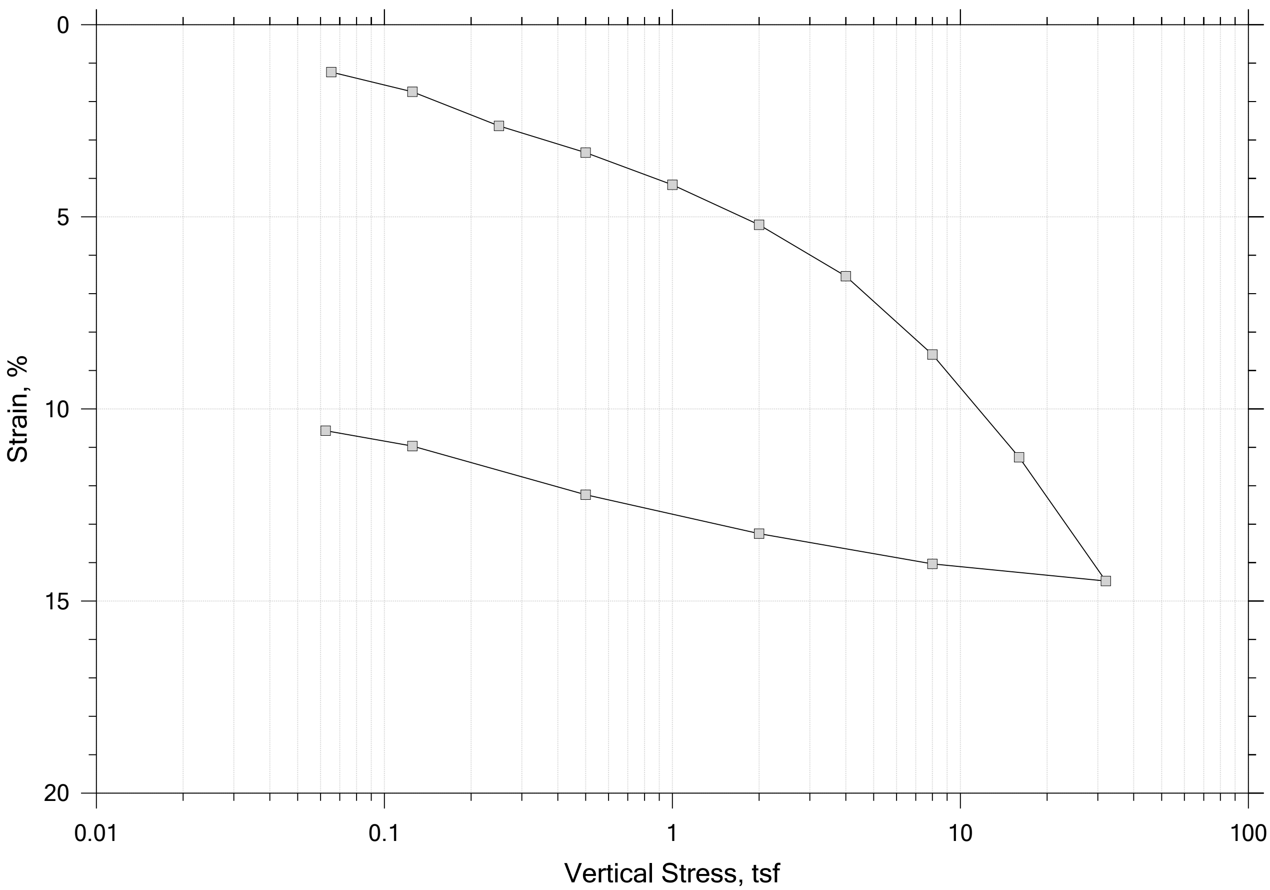
Square Root of Time Coefficients

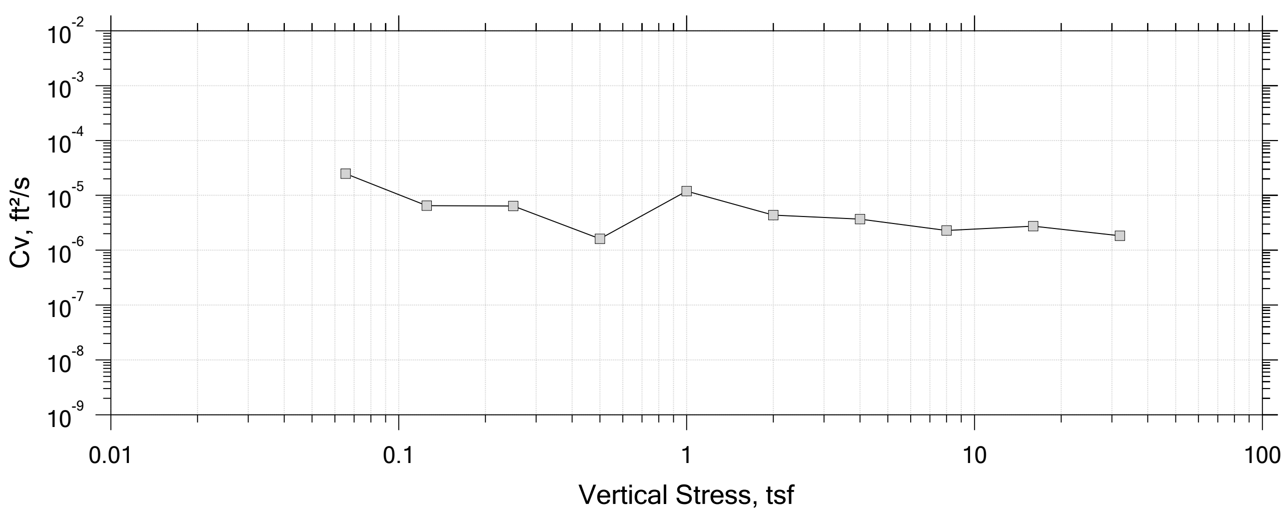
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0675	0.002405	0.947	0.241	5.069	4.83e-06	3.56e-02	4.64e-04
2	0.125	0.005031	0.942	0.503	10.571	2.30e-06	4.57e-02	2.84e-04
3	0.250	0.009998	0.932	1.00	5.694	4.24e-06	3.97e-02	4.55e-04
4	0.500	0.01736	0.918	1.74	11.289	2.11e-06	2.95e-02	1.68e-04
5	1.00	0.02621	0.901	2.62	5.817	4.04e-06	1.77e-02	1.93e-04
6	2.00	0.03683	0.880	3.68	6.567	3.50e-06	1.06e-02	1.00e-04
7	4.00	0.05404	0.846	5.40	6.329	3.53e-06	8.61e-03	8.20e-05
8	8.00	0.08314	0.789	8.31	7.093	3.00e-06	7.27e-03	5.89e-05
9	16.0	0.1250	0.708	12.5	6.838	2.88e-06	5.24e-03	4.07e-05
10	32.0	0.1686	0.623	16.9	8.044	2.22e-06	2.72e-03	1.63e-05
11	8.00	0.1614	0.637	16.1	4.892	3.50e-06	3.02e-04	2.85e-06
12	2.00	0.1489	0.661	14.9	8.705	2.01e-06	2.08e-03	1.13e-05
13	0.500	0.1331	0.692	13.3	41.612	4.35e-07	1.05e-02	1.24e-05
14	0.125	0.1163	0.725	11.6	137.411	1.37e-07	4.47e-02	1.65e-05
15	0.0625	0.1098	0.737	11.0	140.921	1.37e-07	1.04e-01	3.83e-05

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-301	Tested By: md	Checked By: nh
Sample No.: U2	Test Date: 2/8/19	Depth: 12-14 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System Y, Swell Pressure = 0.0675 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

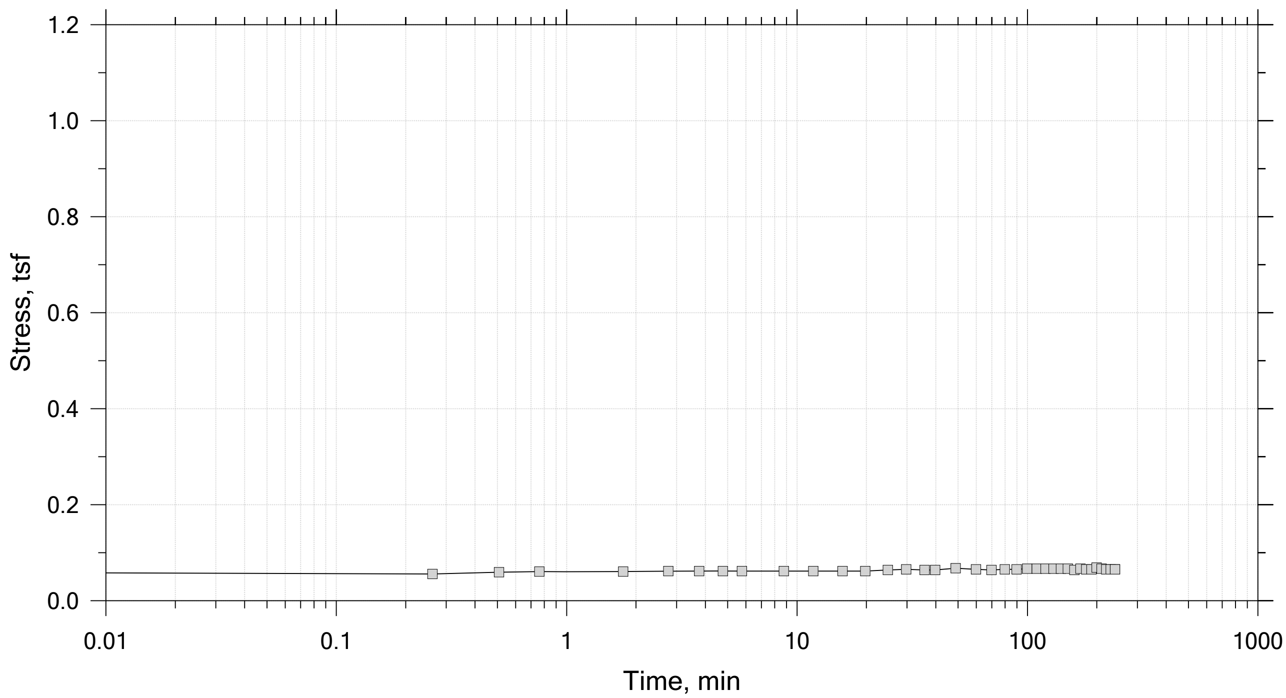


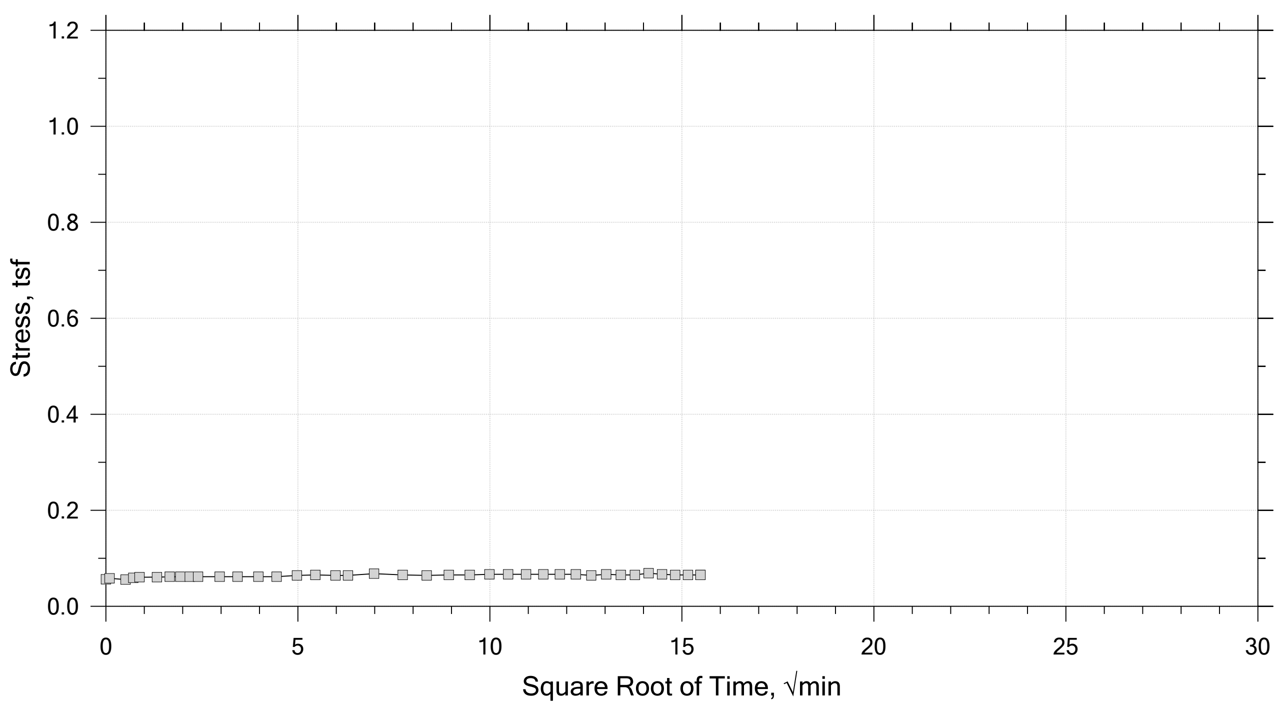


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0654 tsf

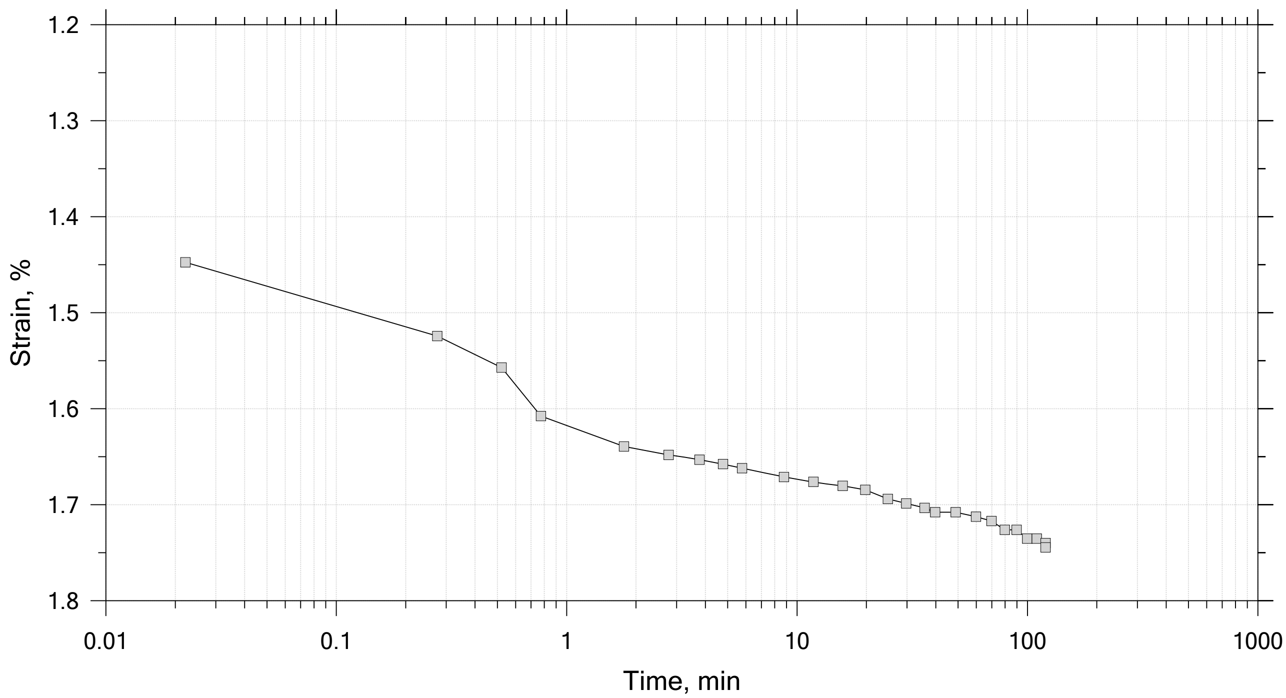


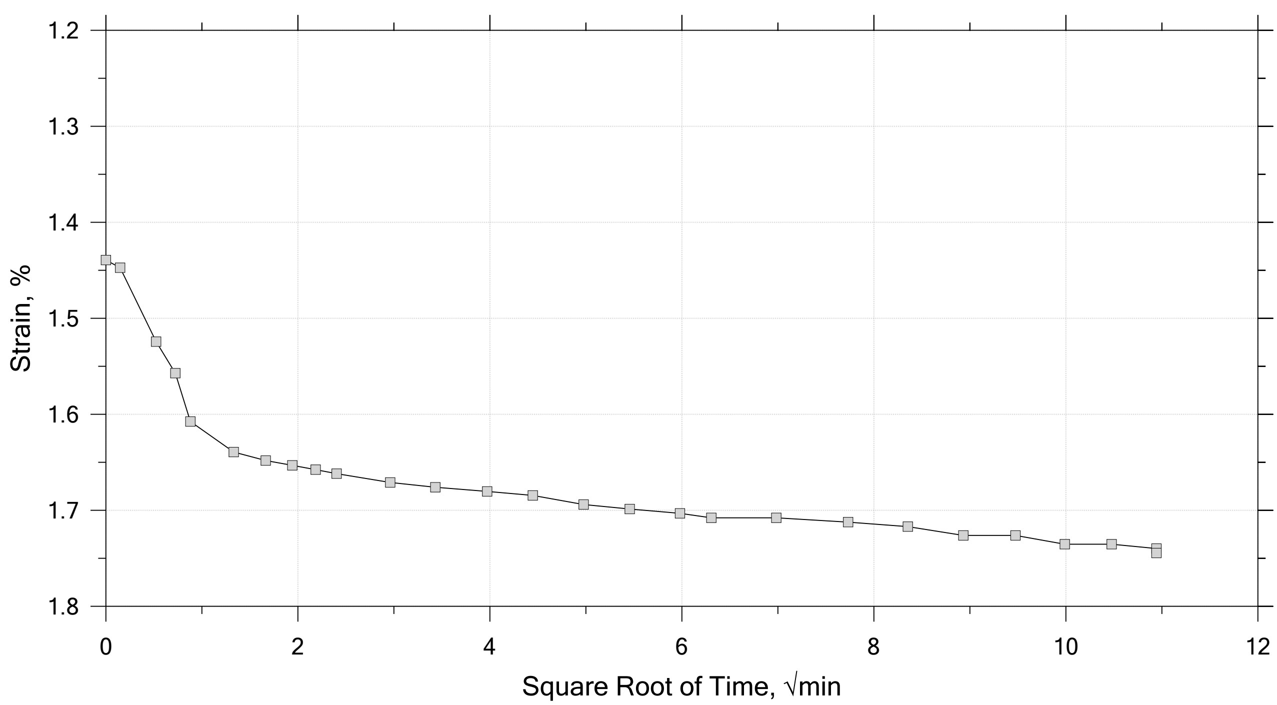


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

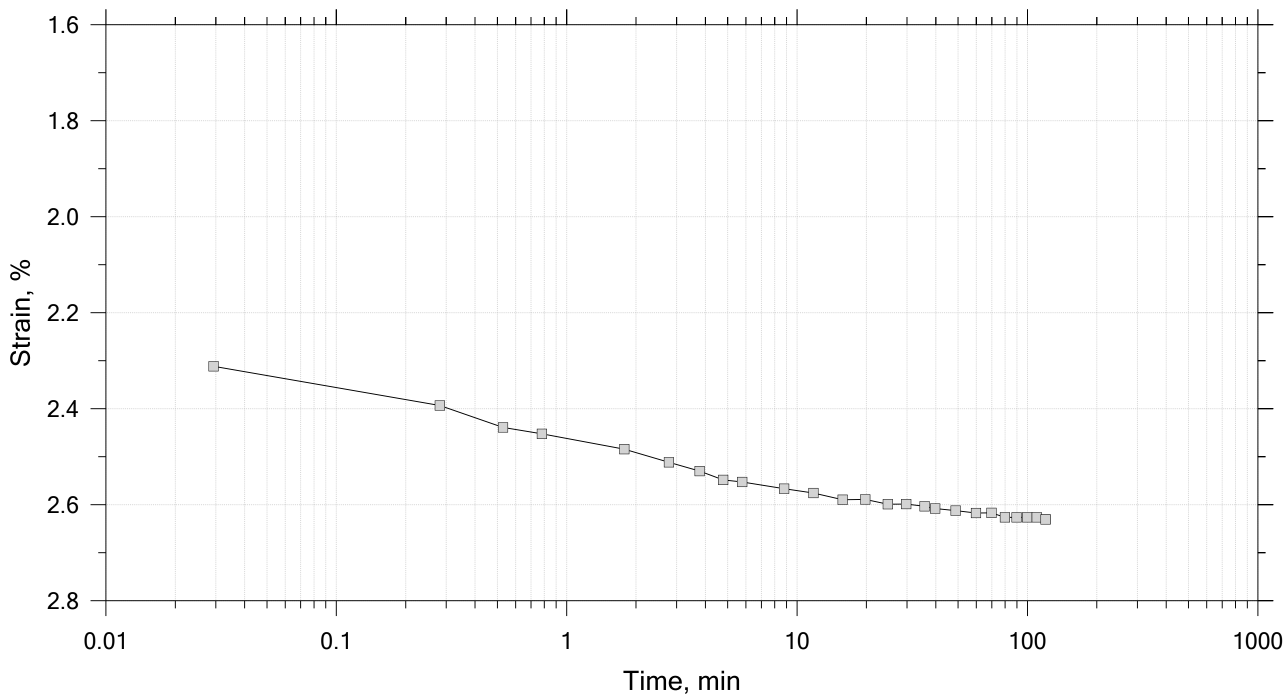


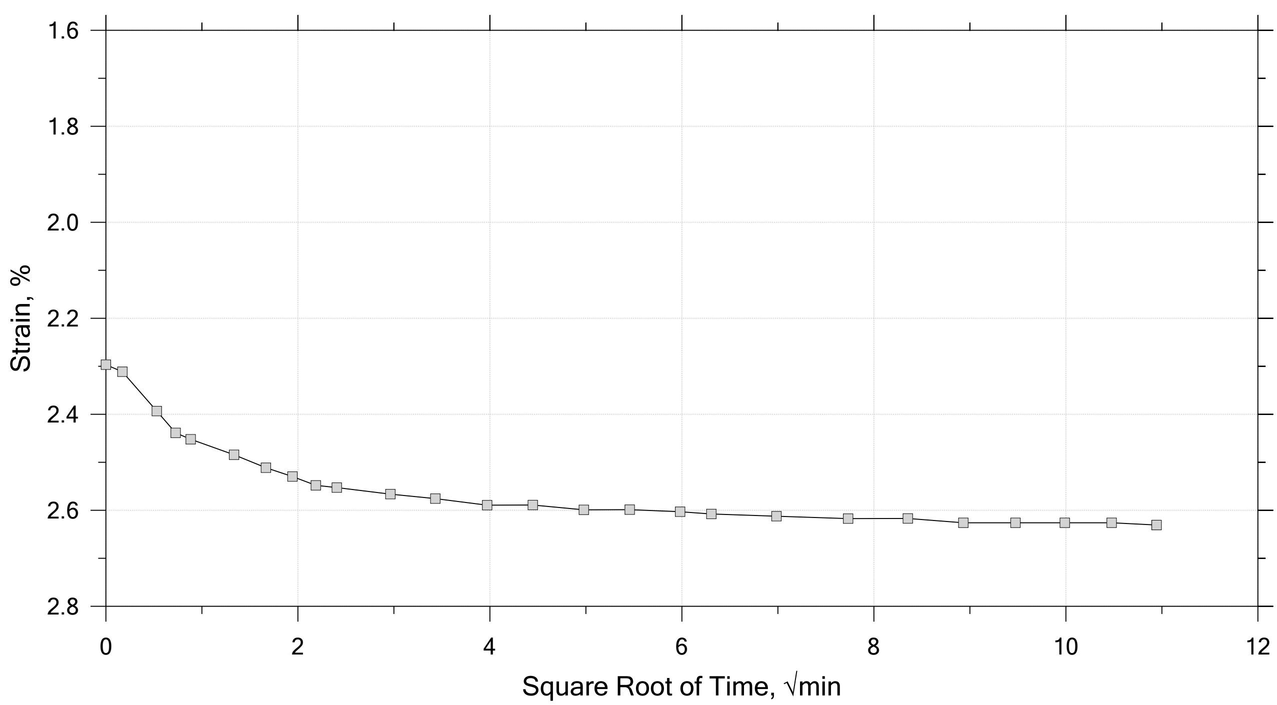


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





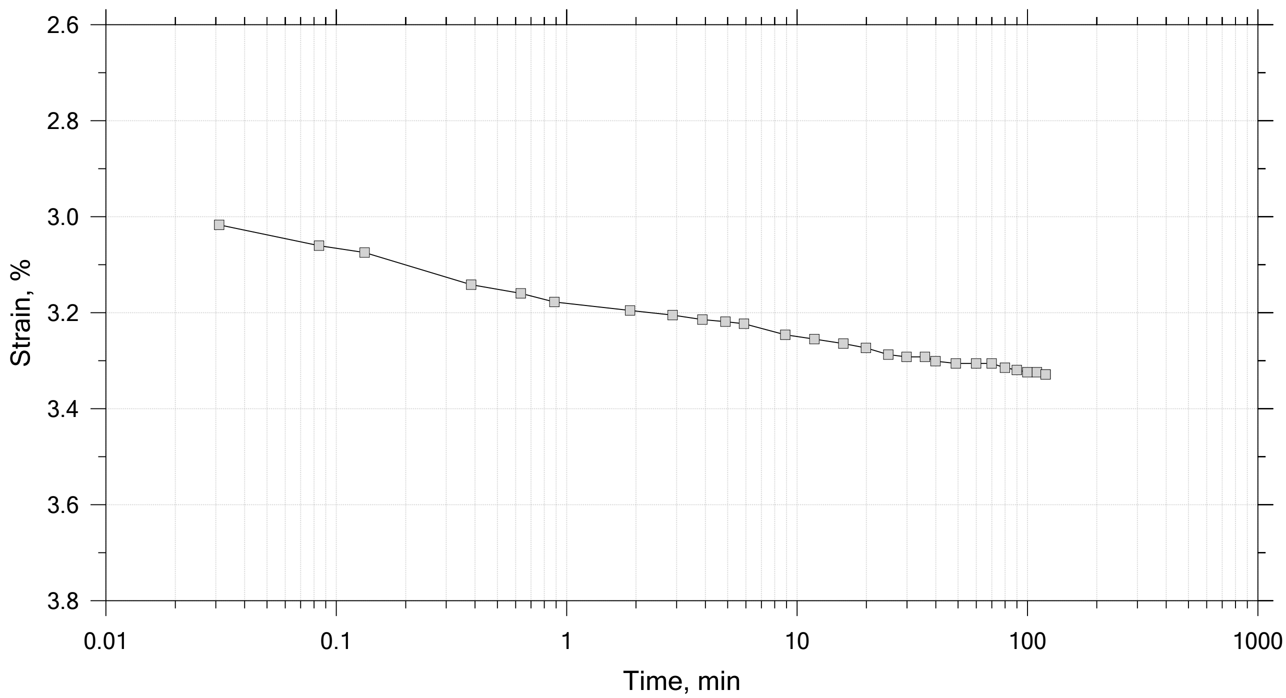
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

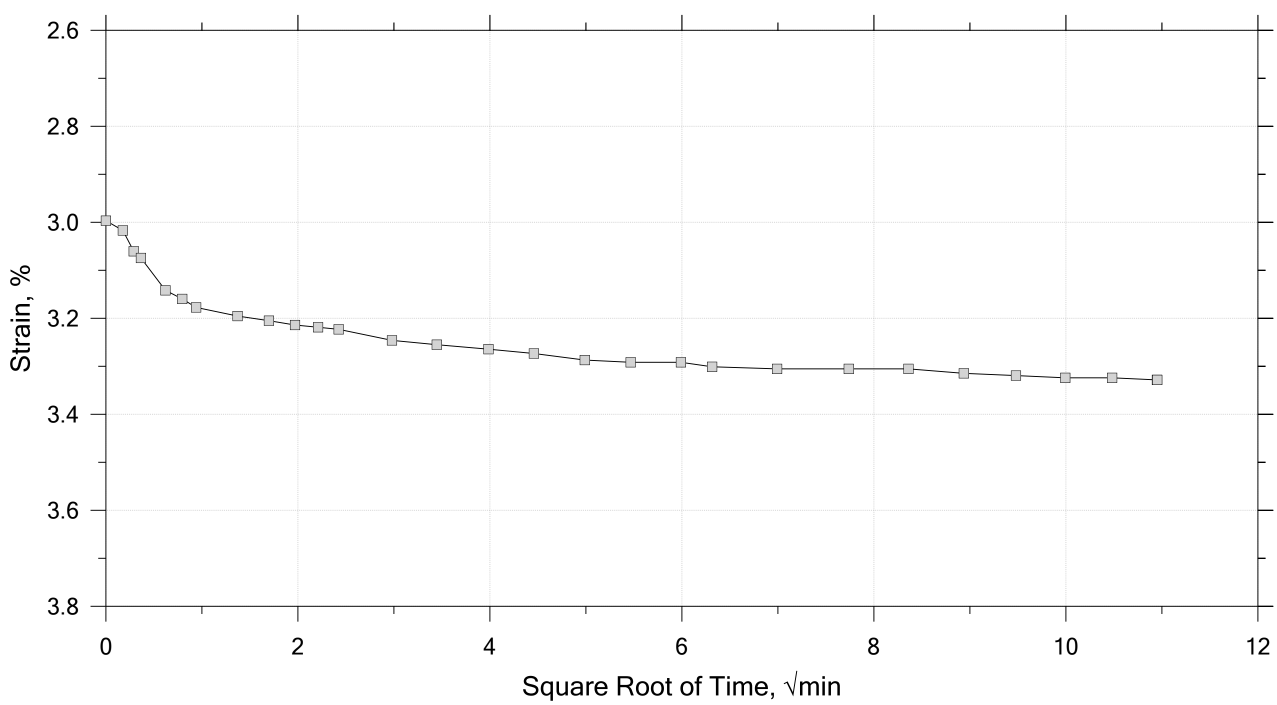
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





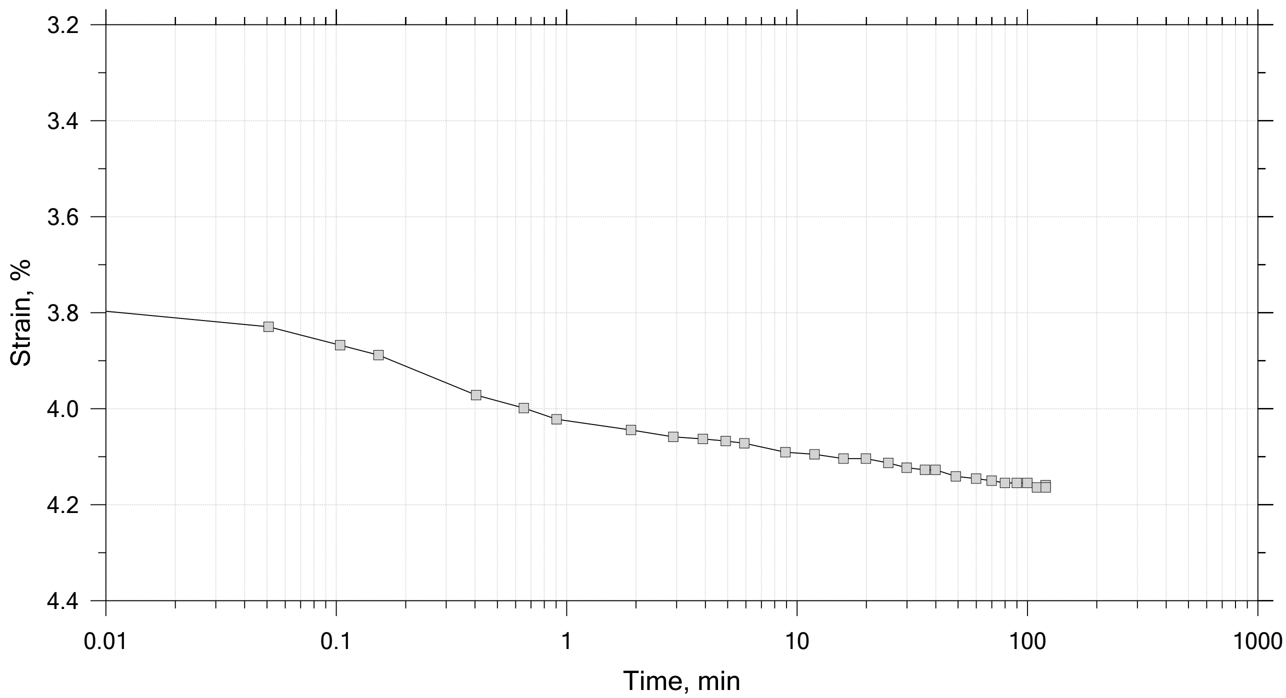
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

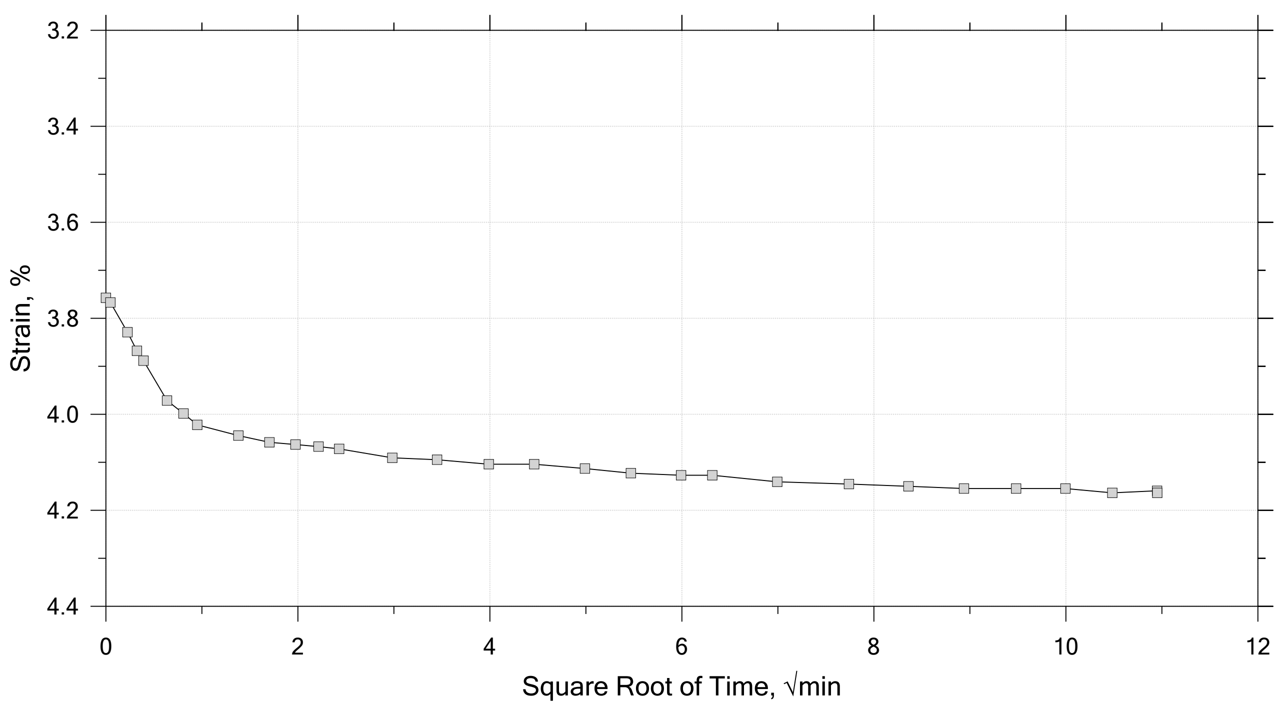
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





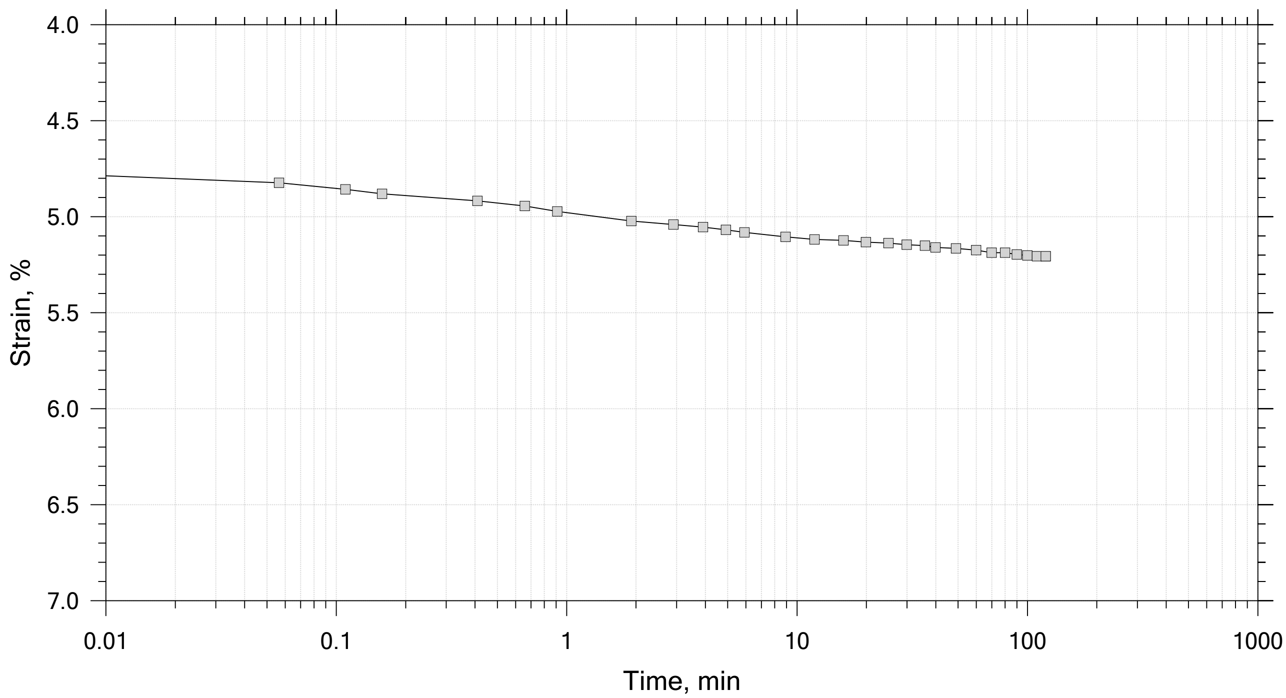
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

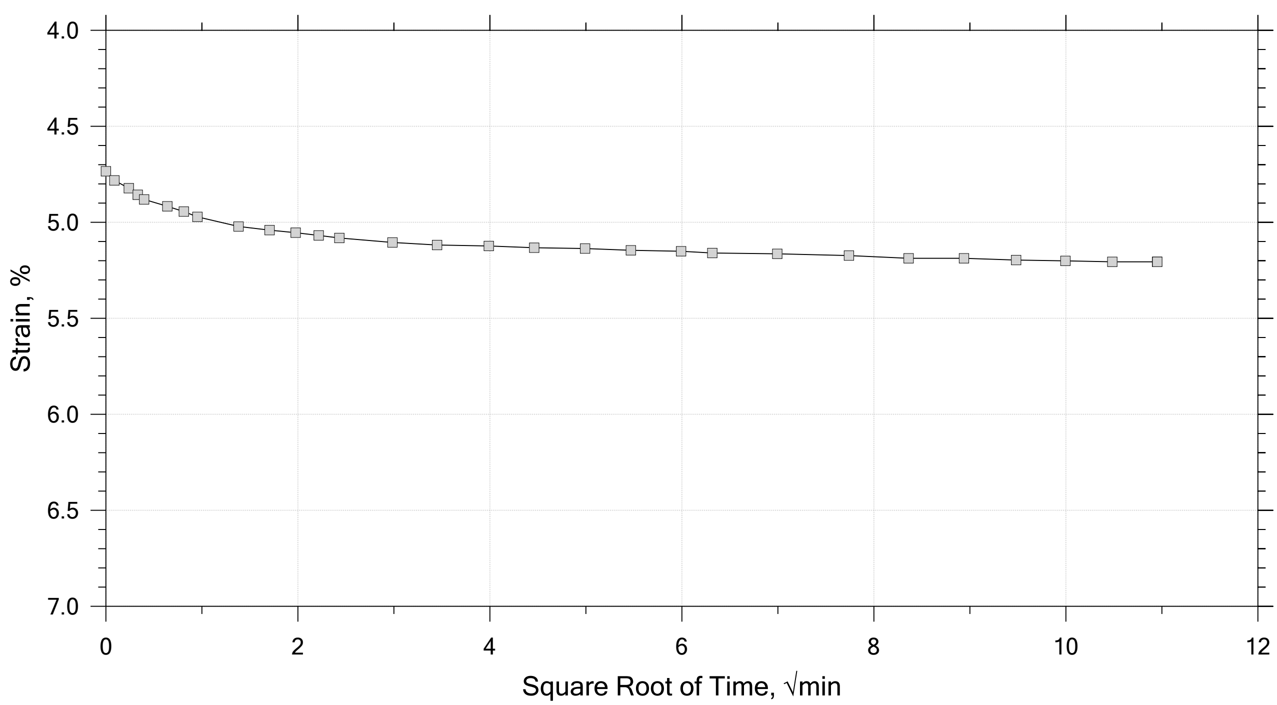
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





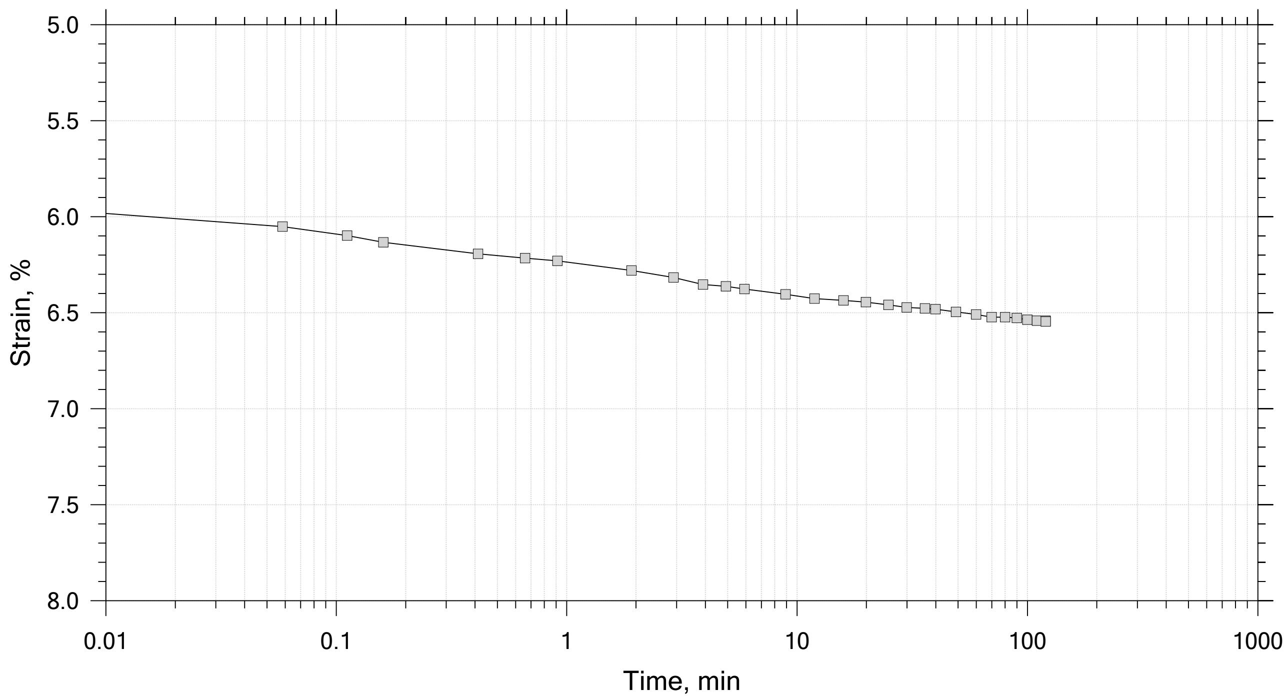
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

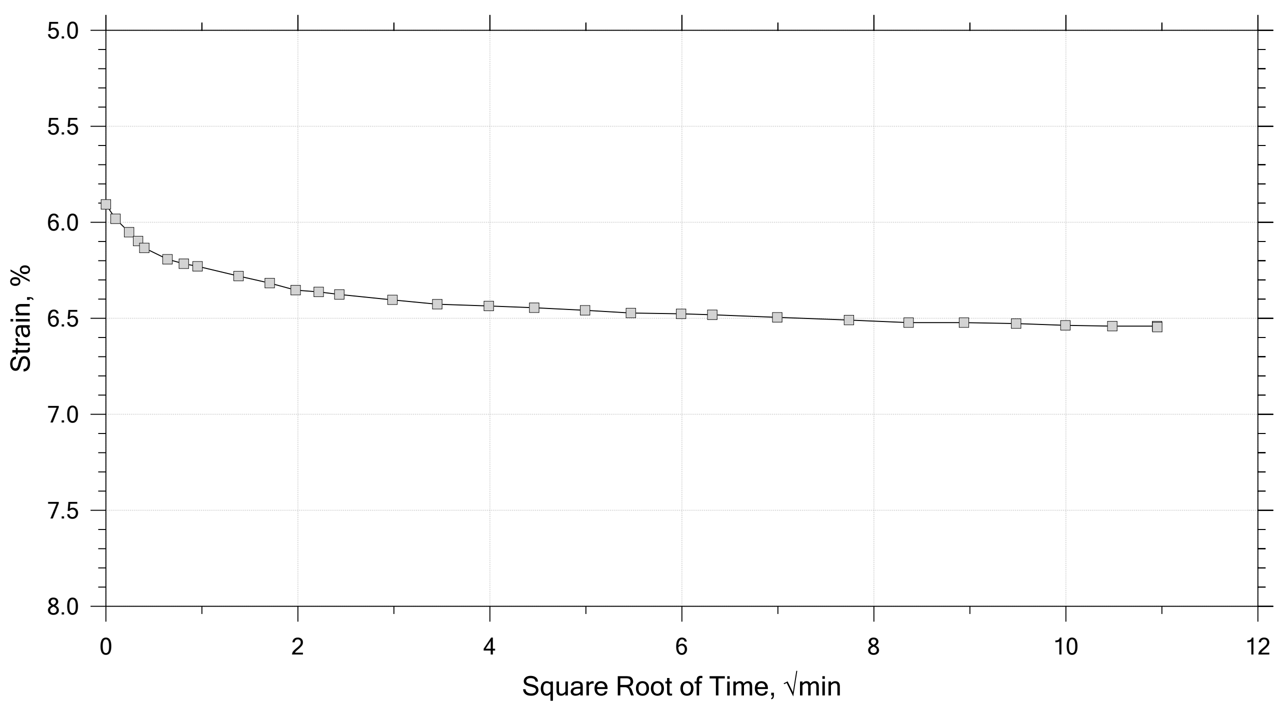
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





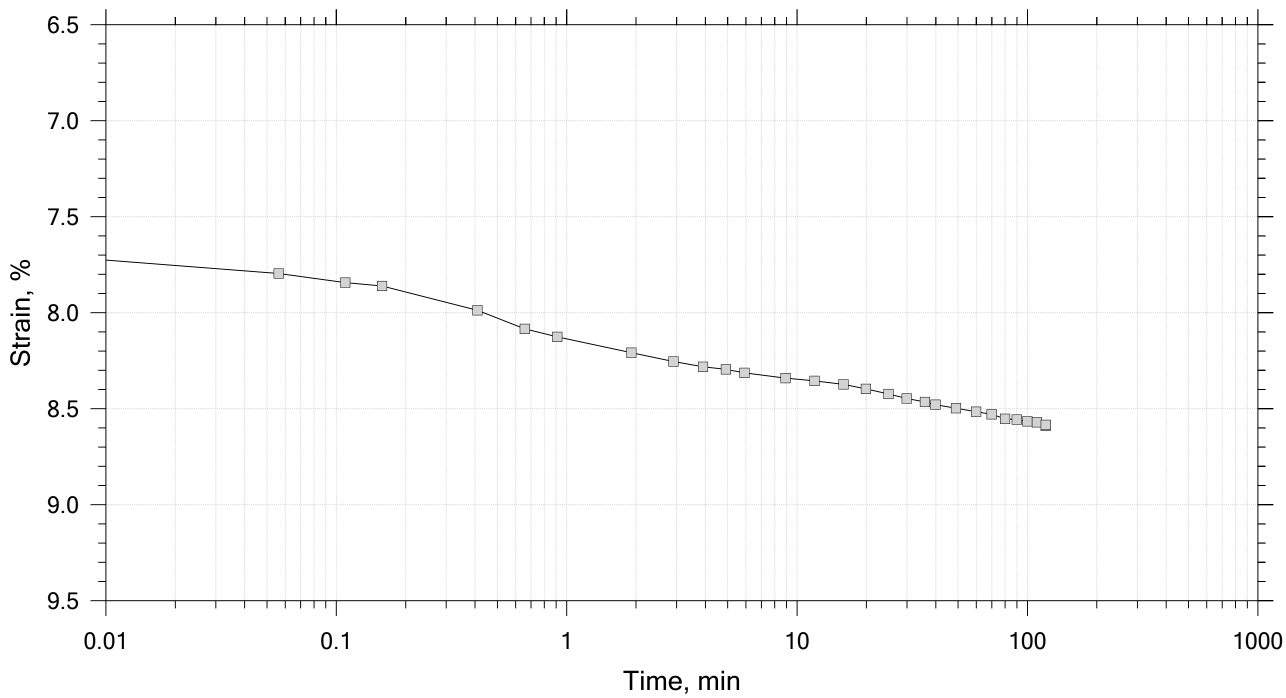
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

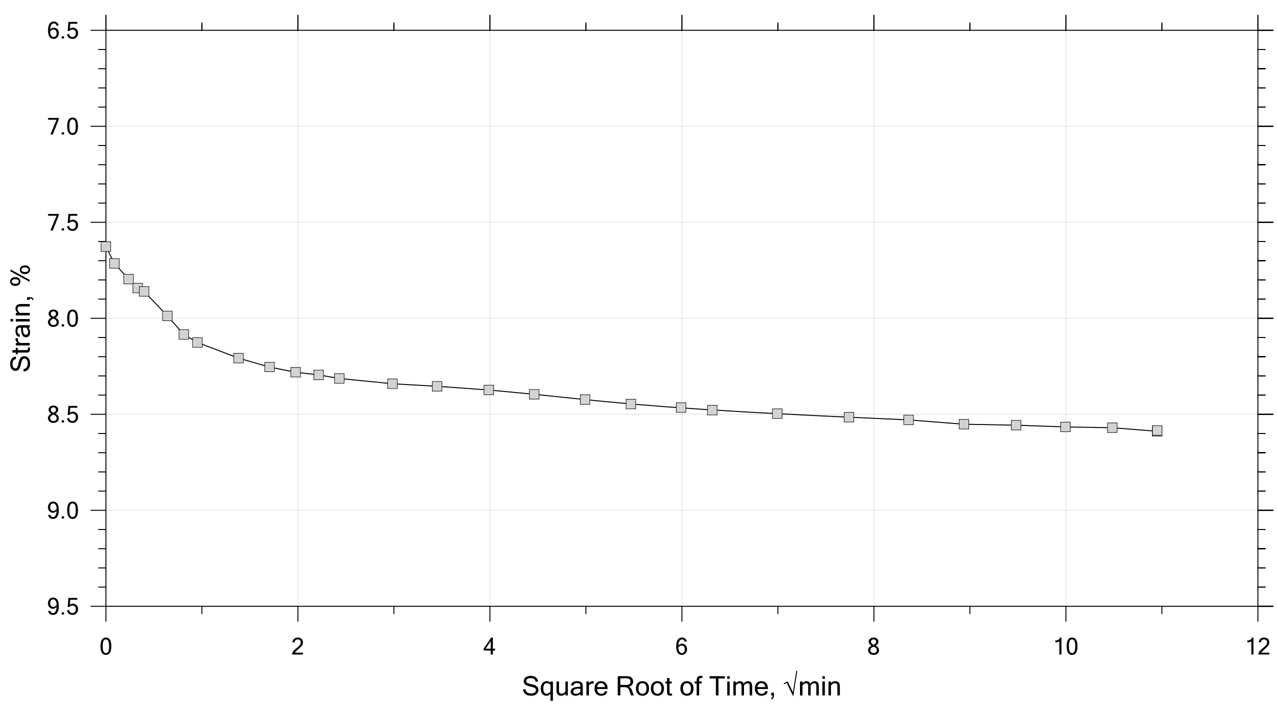
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf

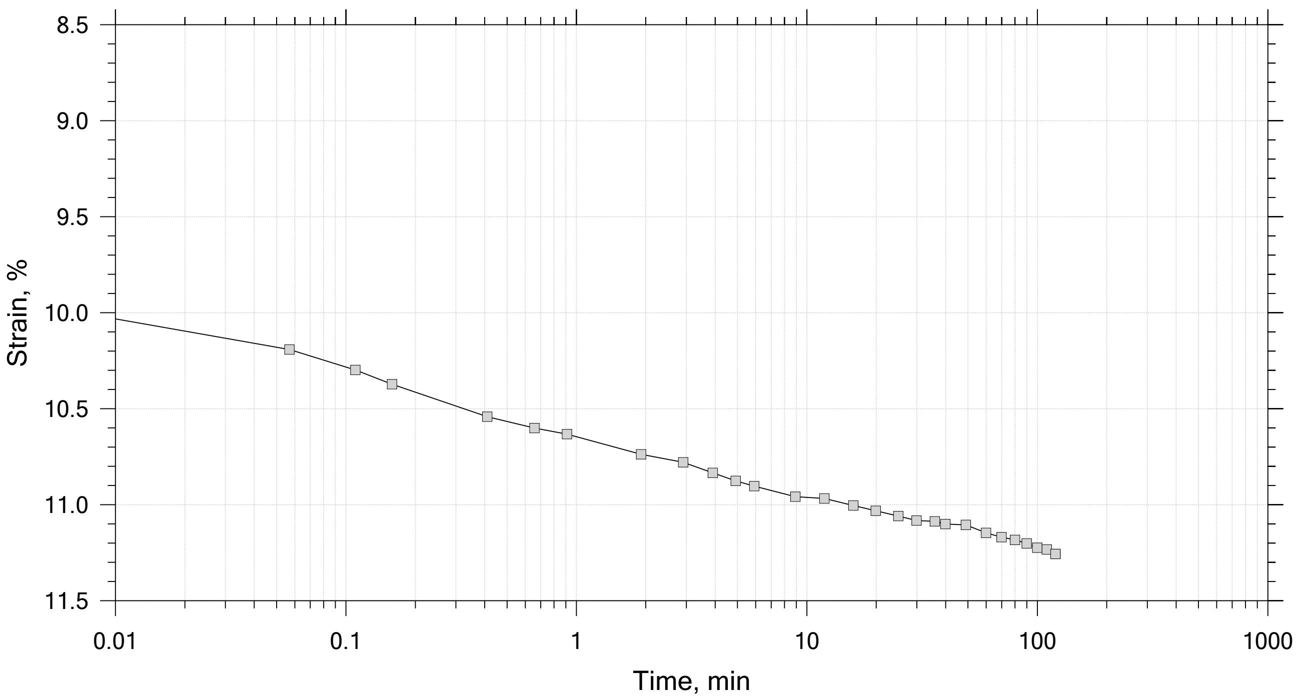


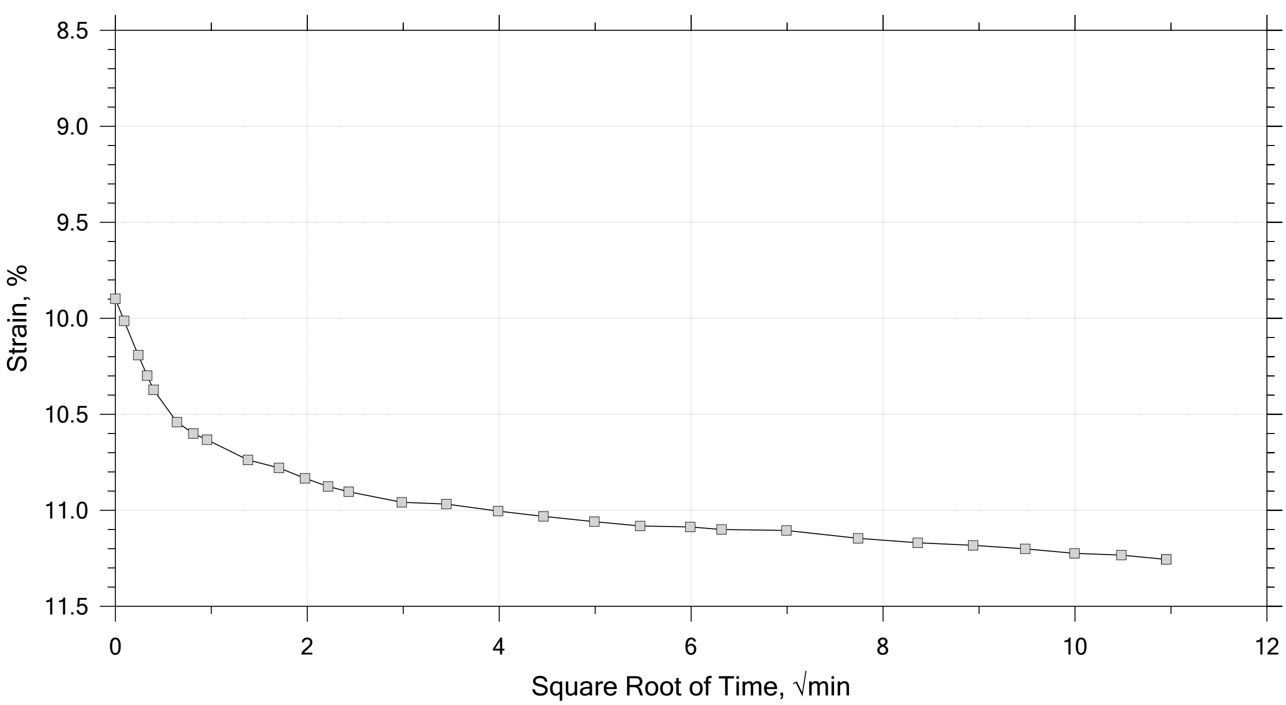


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15
Constant Load Step
Stress: 16 tsf





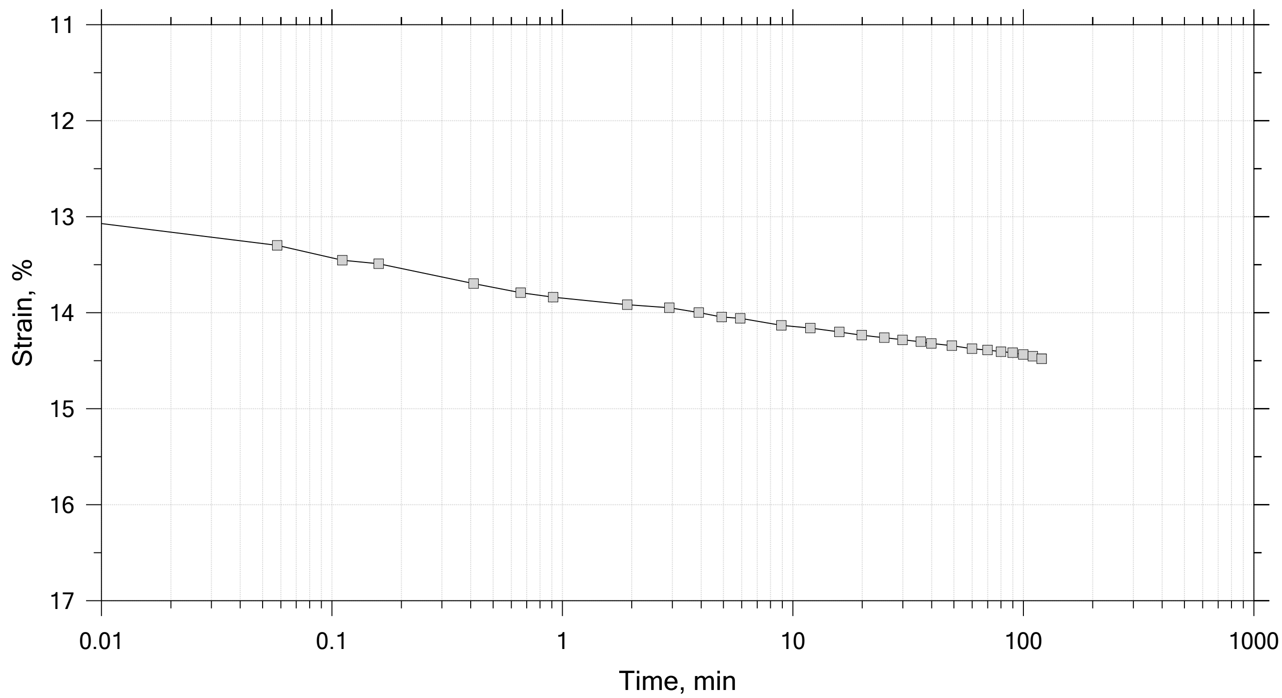
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

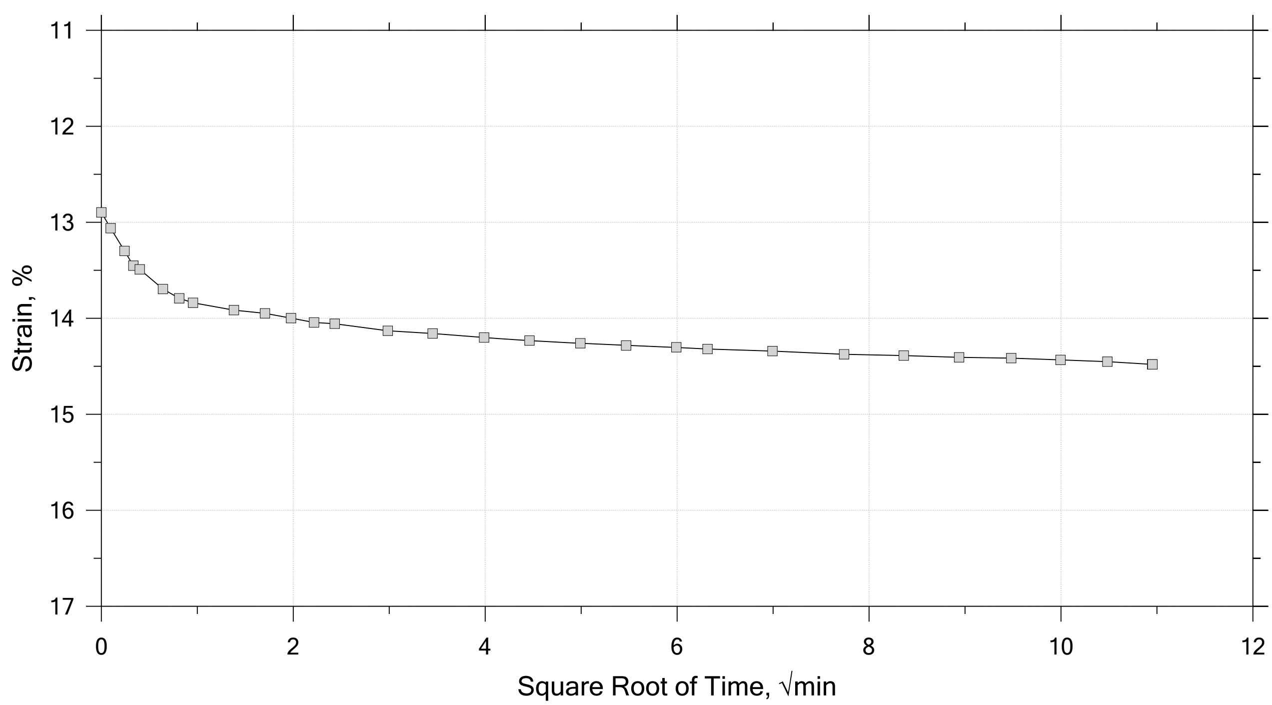
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf

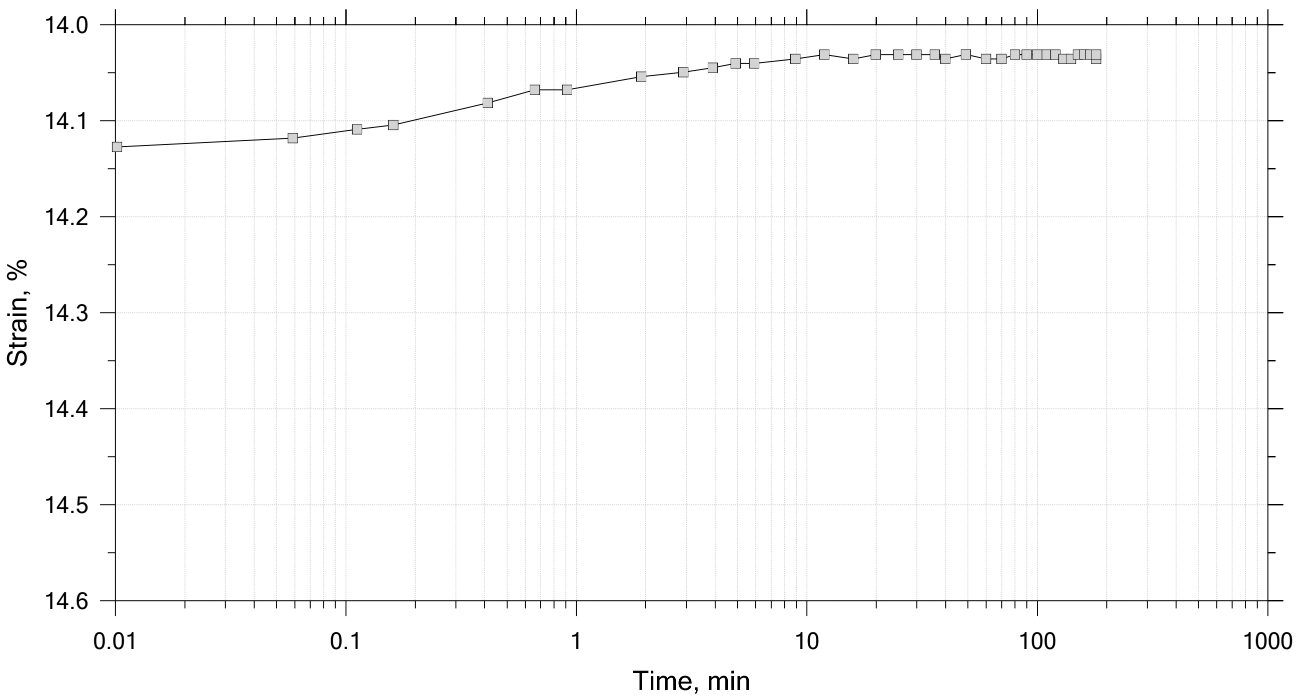


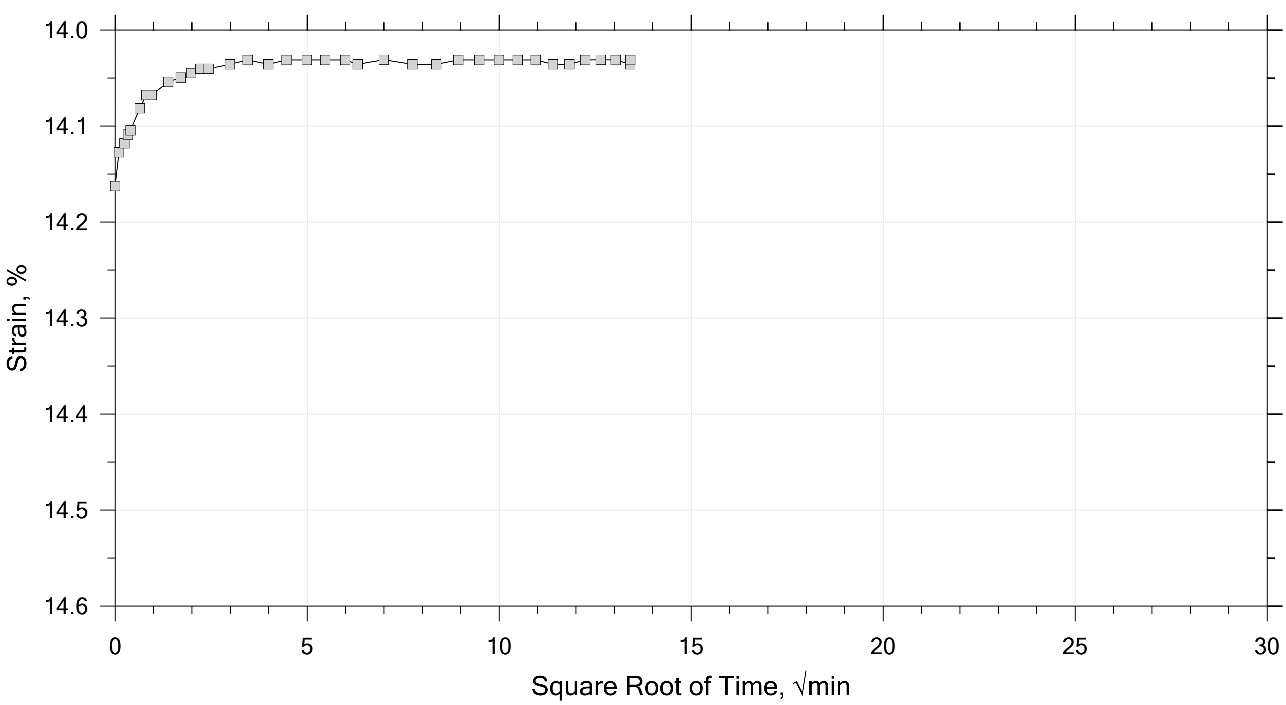


Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





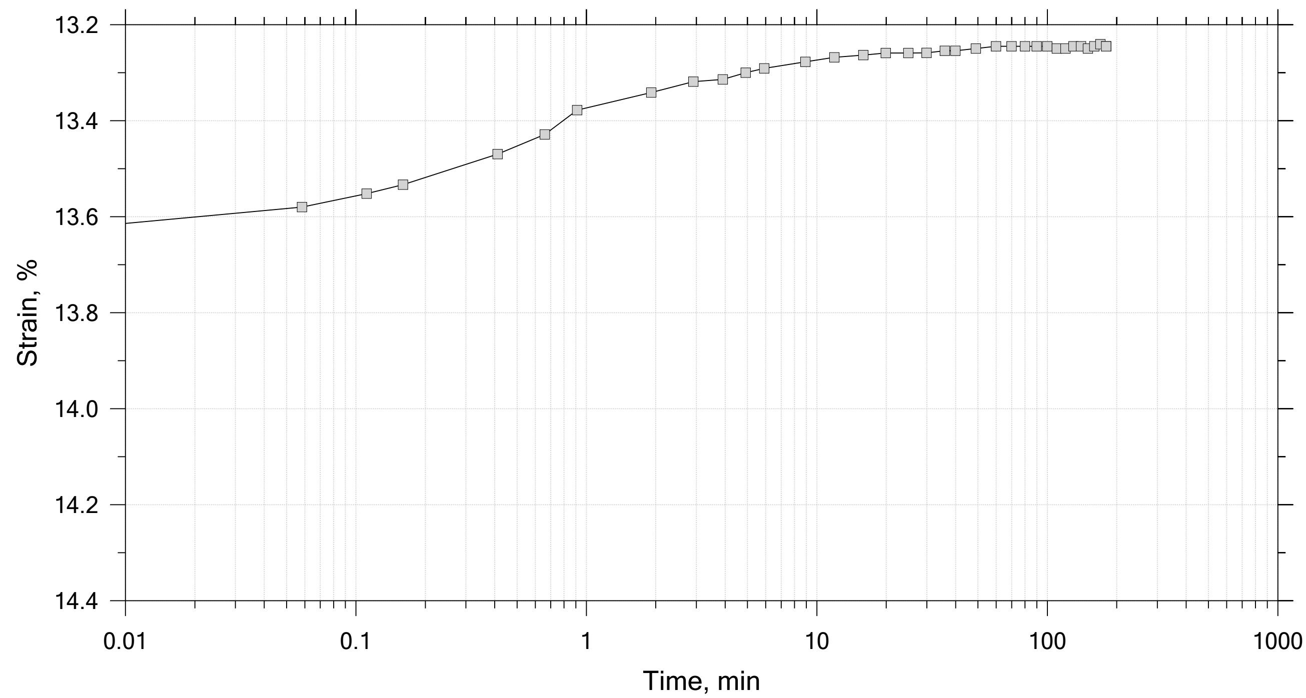
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

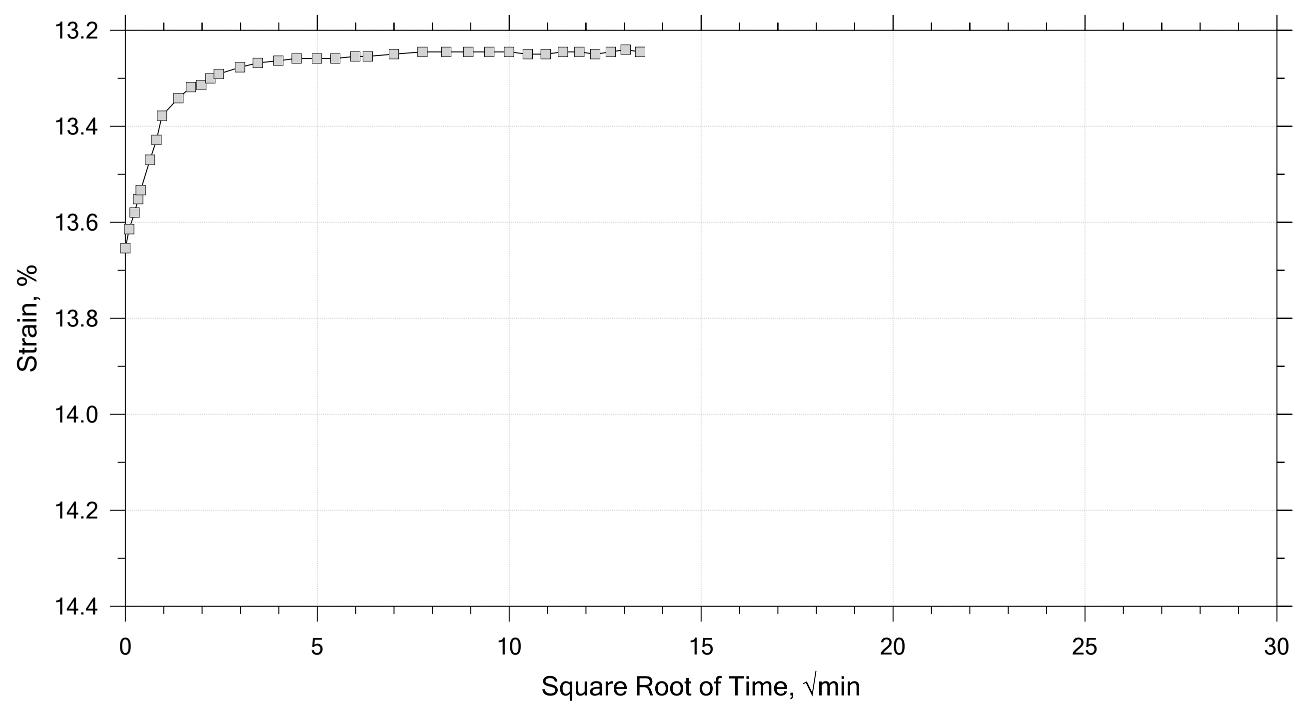
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf





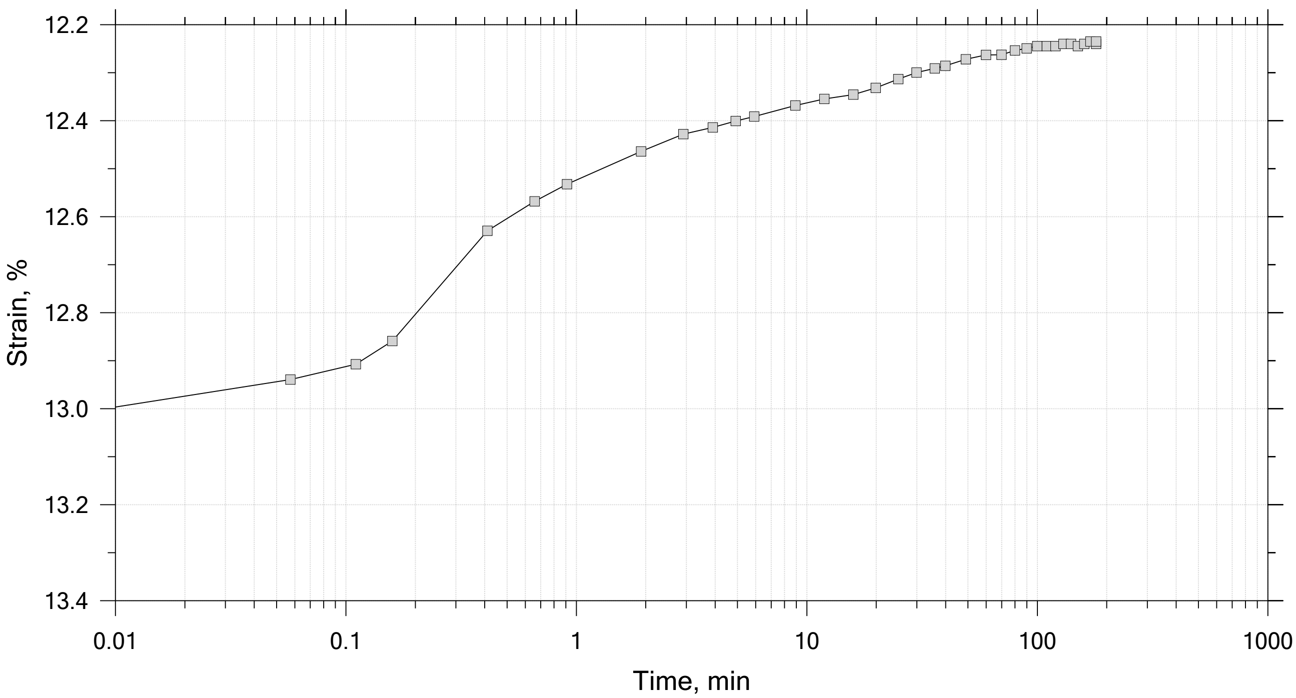
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

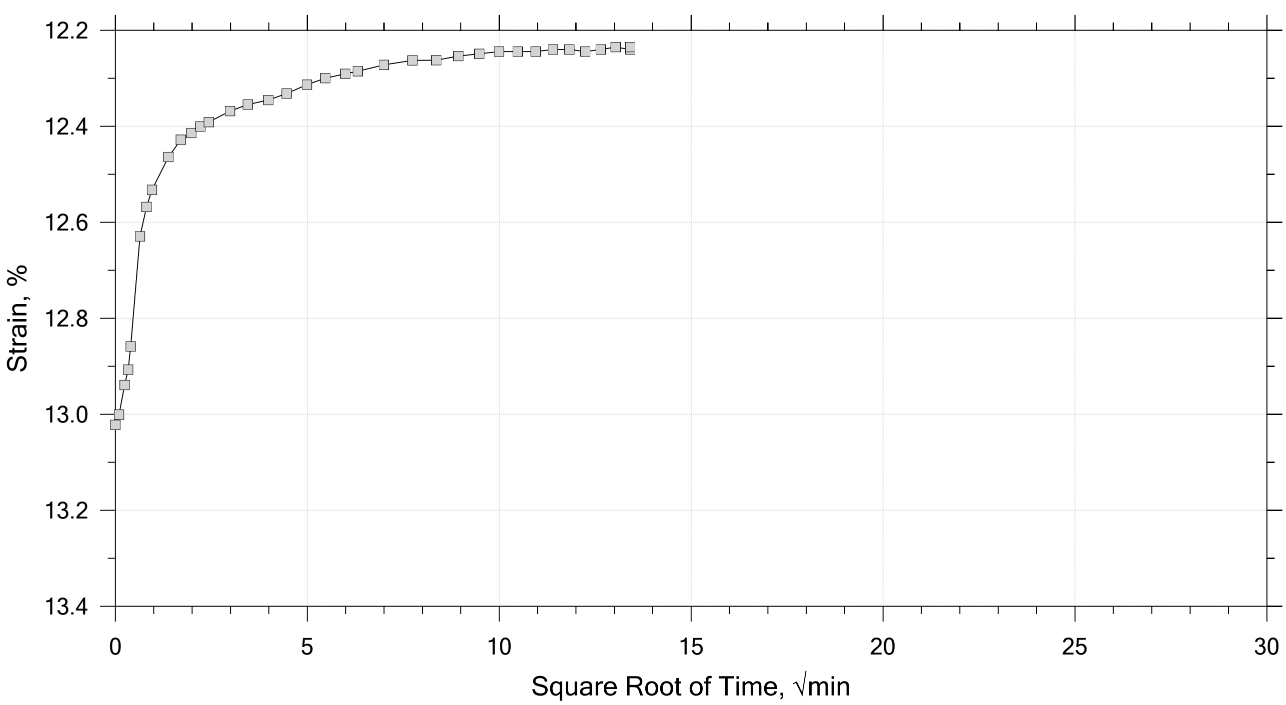
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf

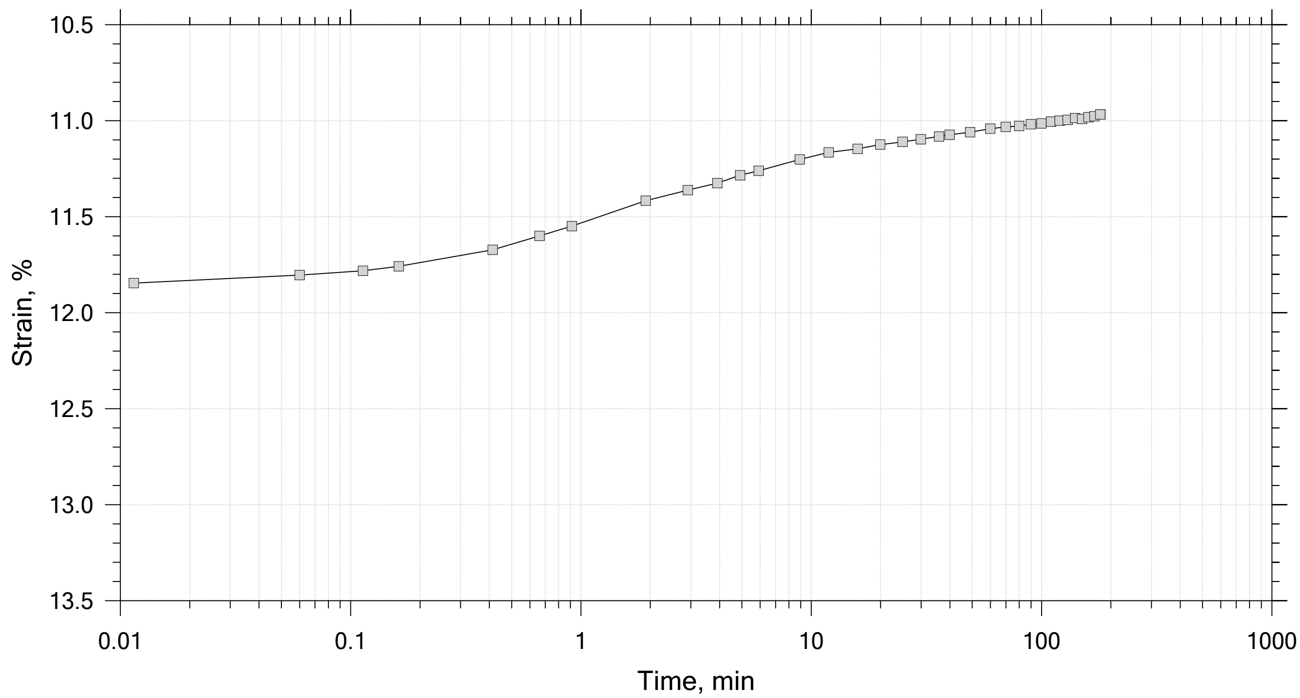


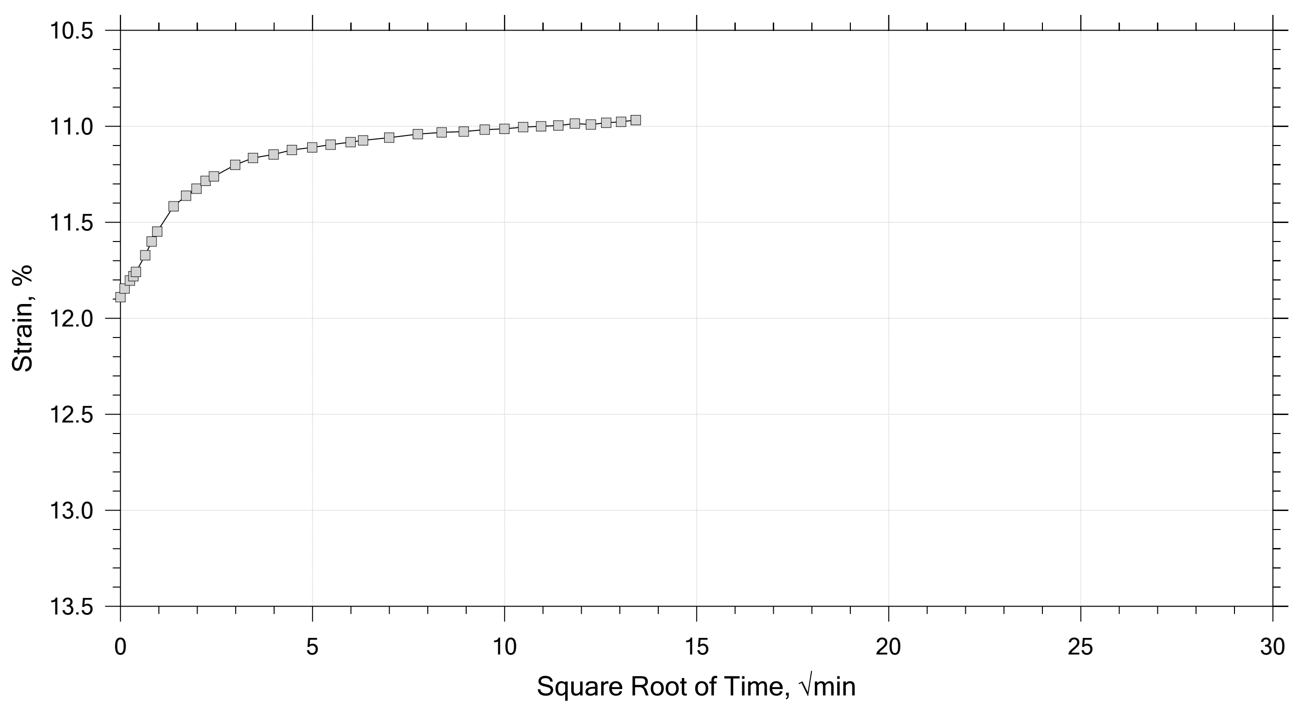


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

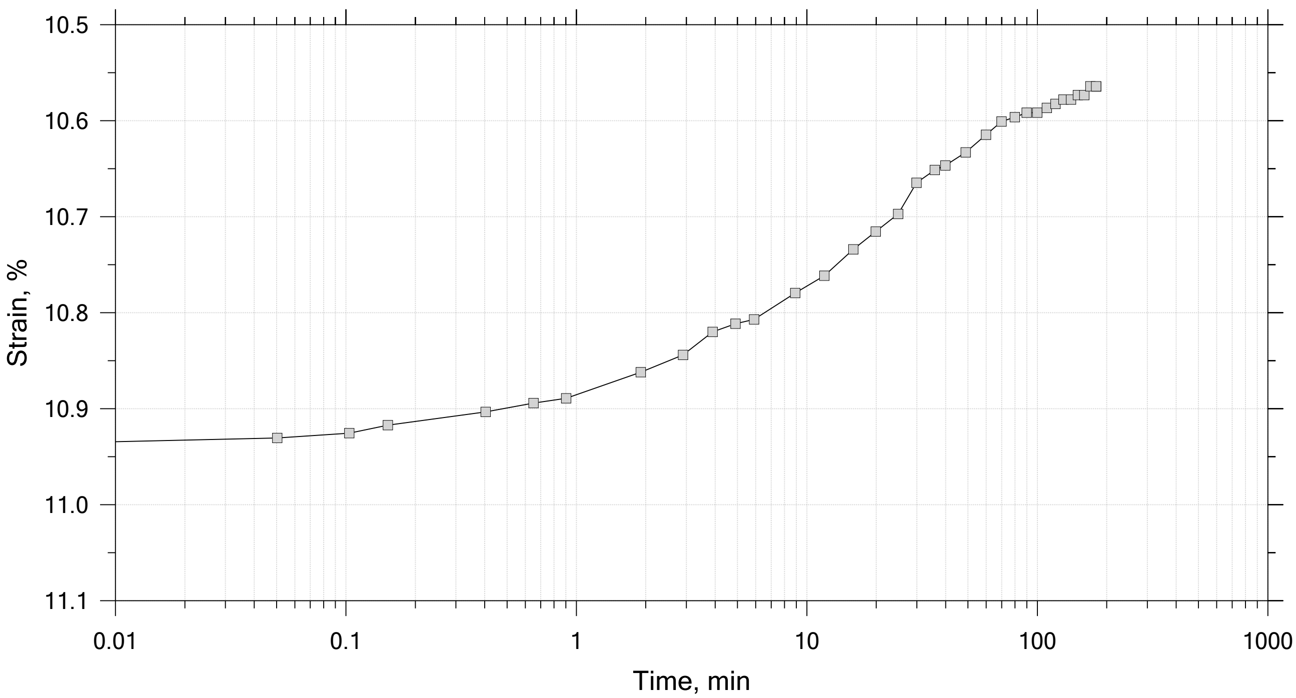


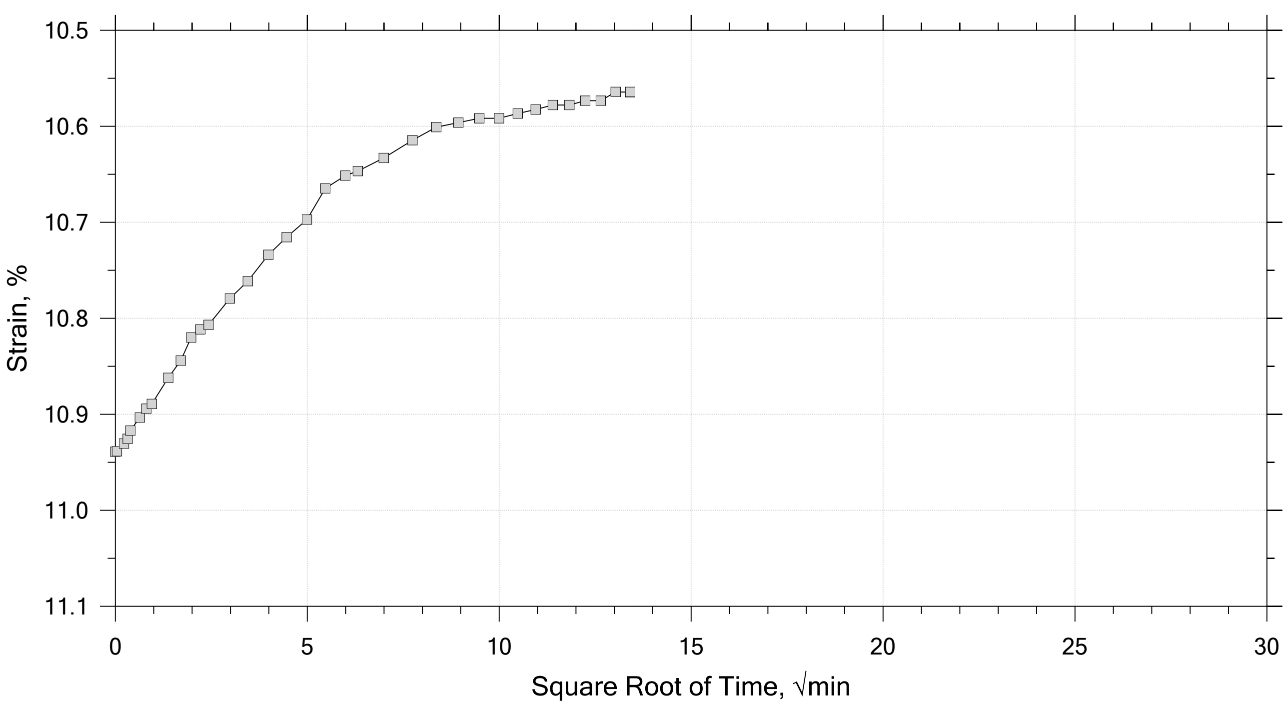


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.41 in	Estimated Specific Gravity: 2.74	Liquid Limit: 35
Initial Height: 1.00 in	Initial Void Ratio: 0.786	Plastic Limit: 23
Final Height: 0.92 in	Final Void Ratio: 0.643	Plasticity Index: 12

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D-2474	RING		B-1881
Mass Container, gm	8.67	107.65	107.65	8.44
Mass Container + Wet Soil, gm	81.53	254.49	249.43	149.91
Mass Container + Dry Soil, gm	66.17	222.52	222.52	123.06
Mass Dry Soil, gm	57.5	114.87	114.87	114.62
Water Content, %	26.71	27.83	23.43	23.43
Void Ratio	---	0.79	0.64	---
Degree of Saturation, %	---	97.20	100.00	---
Dry Unit Weight, pcf	---	95.932	104.27	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0654	0.01230	0.764	1.23	0.000	0.00e+00	1.88e-01	0.00e+00	0.00e+00
2	0.125	0.01745	0.754	1.74	0.541	1.02e-05	8.62e-02	2.38e-03	0.00e+00
3	0.250	0.02631	0.739	2.63	0.000	0.00e+00	7.09e-02	0.00e+00	0.00e+00
4	0.500	0.03328	0.726	3.33	0.000	0.00e+00	2.79e-02	0.00e+00	0.00e+00
5	1.00	0.04164	0.711	4.16	0.255	2.07e-05	1.67e-02	9.31e-04	0.00e+00
6	2.00	0.05206	0.693	5.21	0.733	7.07e-06	1.04e-02	1.99e-04	0.00e+00
7	4.00	0.06546	0.669	6.55	1.183	4.27e-06	6.70e-03	7.71e-05	0.00e+00
8	8.00	0.08584	0.632	8.58	0.000	0.00e+00	5.10e-03	0.00e+00	0.00e+00
9	16.0	0.1126	0.585	11.3	0.000	0.00e+00	3.34e-03	0.00e+00	0.00e+00
10	32.0	0.1448	0.527	14.5	0.000	0.00e+00	2.01e-03	0.00e+00	0.00e+00
11	8.00	0.1403	0.535	14.0	0.000	0.00e+00	1.87e-04	0.00e+00	0.00e+00
12	2.00	0.1325	0.549	13.2	0.000	0.00e+00	1.31e-03	0.00e+00	0.00e+00
13	0.500	0.1223	0.567	12.2	0.318	1.37e-05	6.73e-03	2.48e-04	0.00e+00
14	0.125	0.1097	0.590	11.0	1.201	3.71e-06	3.38e-02	3.38e-04	0.00e+00
15	0.0625	0.1056	0.597	10.6	14.453	3.14e-07	6.46e-02	5.47e-05	0.00e+00

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

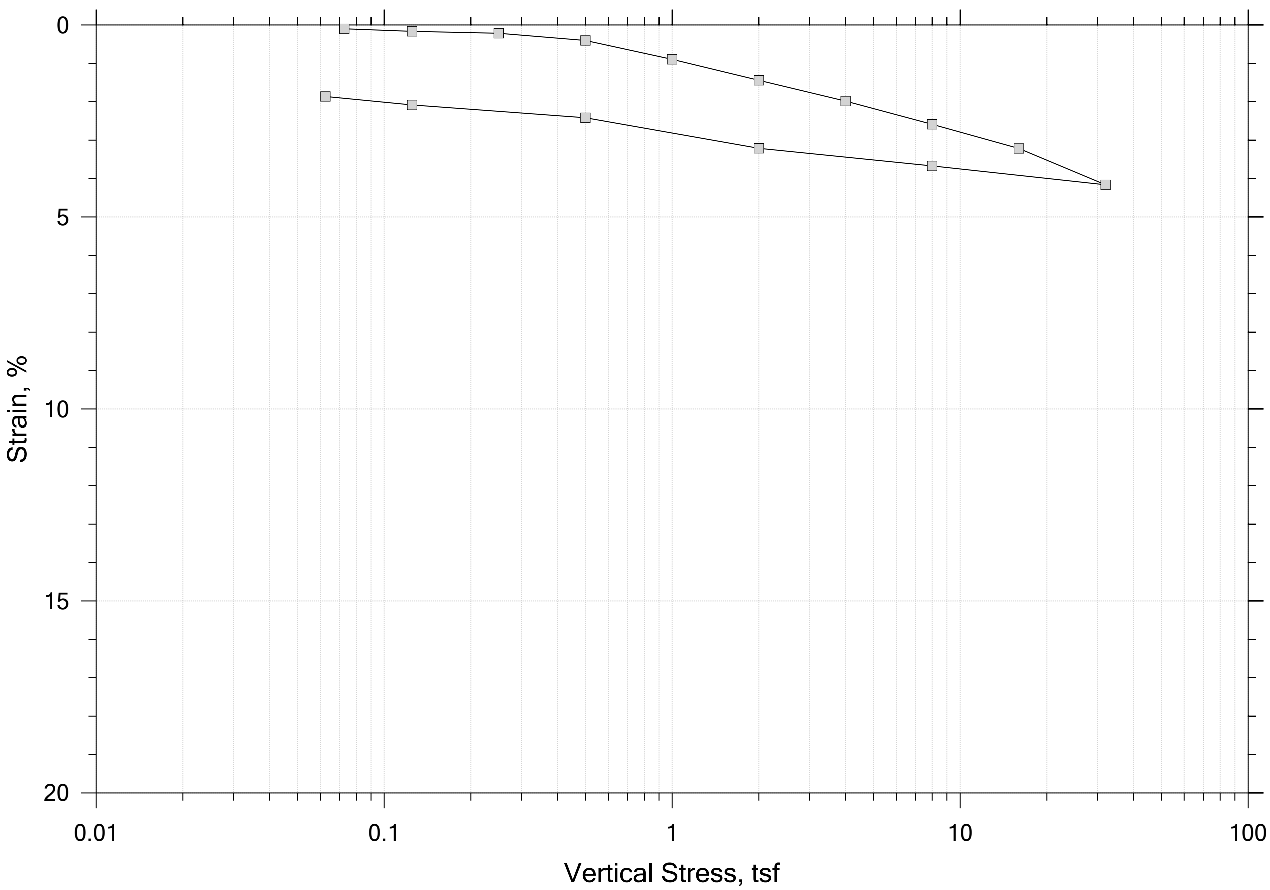
Square Root of Time Coefficients

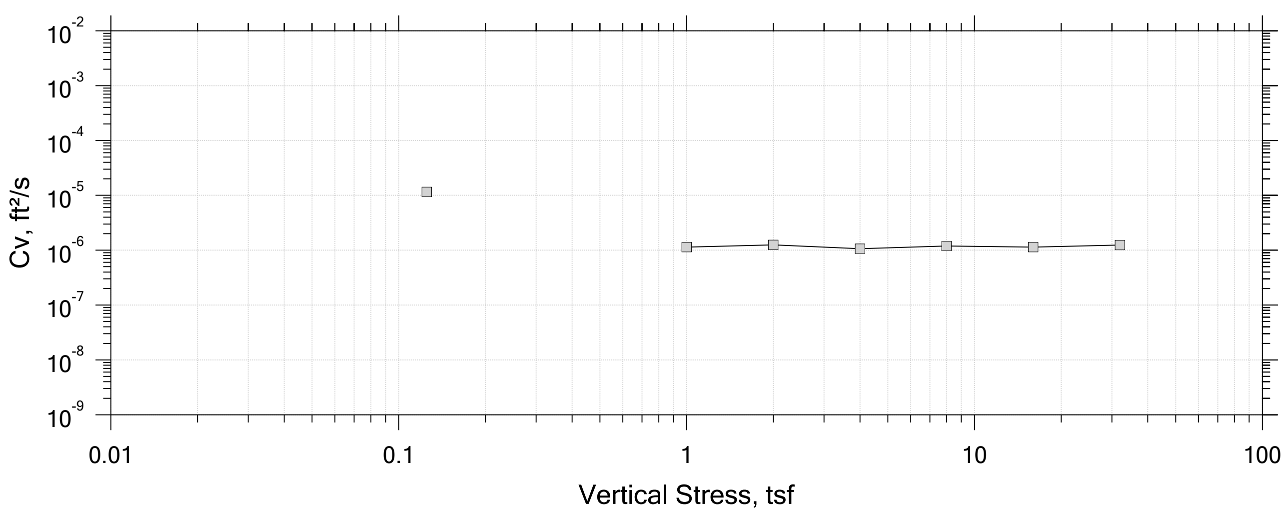
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0654	0.01230	0.764	1.23	2.193	1.11e-05	1.88e-01	5.61e-03
2	0.125	0.01745	0.754	1.74	5.176	4.60e-06	8.62e-02	1.07e-03
3	0.250	0.02631	0.739	2.63	4.217	5.57e-06	7.09e-02	1.06e-03
4	0.500	0.03328	0.726	3.33	14.054	1.64e-06	2.79e-02	1.24e-04
5	1.00	0.04164	0.711	4.16	2.797	8.13e-06	1.67e-02	3.66e-04
6	2.00	0.05206	0.693	5.21	7.934	2.81e-06	1.04e-02	7.89e-05
7	4.00	0.06546	0.669	6.55	6.664	3.26e-06	6.70e-03	5.89e-05
8	8.00	0.08584	0.632	8.58	8.831	2.37e-06	5.10e-03	3.26e-05
9	16.0	0.1126	0.585	11.3	7.915	2.52e-06	3.34e-03	2.27e-05
10	32.0	0.1448	0.527	14.5	10.288	1.81e-06	2.01e-03	9.84e-06
11	8.00	0.1403	0.535	14.0	2.139	8.43e-06	1.87e-04	4.26e-06
12	2.00	0.1325	0.549	13.2	2.293	7.98e-06	1.31e-03	2.82e-05
13	0.500	0.1223	0.567	12.2	1.936	9.65e-06	6.73e-03	1.75e-04
14	0.125	0.1097	0.590	11.0	7.538	2.54e-06	3.38e-02	2.32e-04
15	0.0625	0.1056	0.597	10.6	41.120	4.75e-07	6.46e-02	8.27e-05

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-302	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0654 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

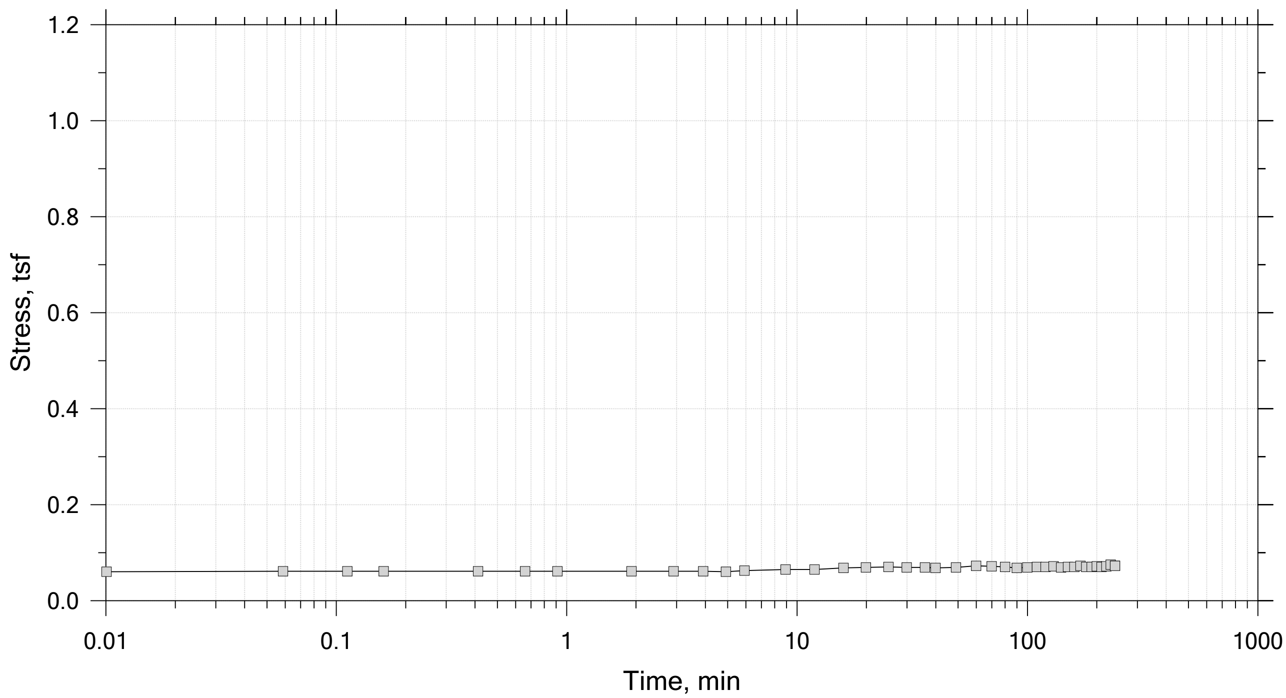


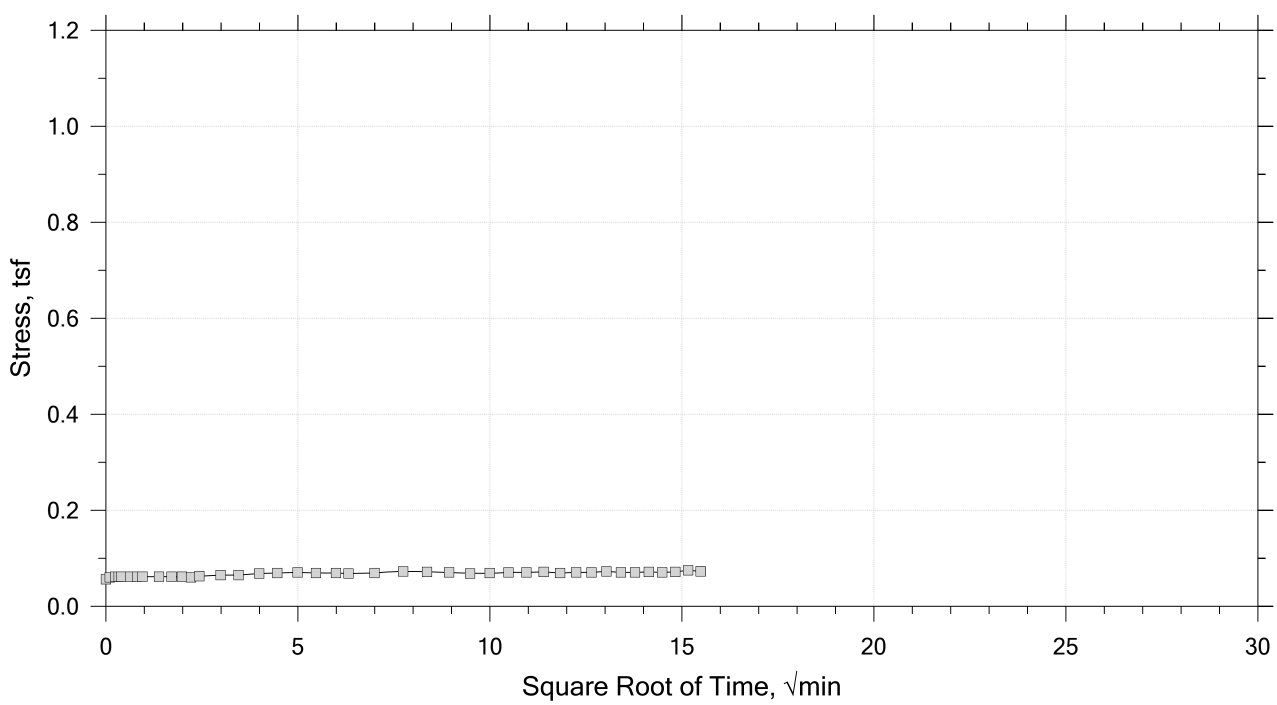


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0727 tsf





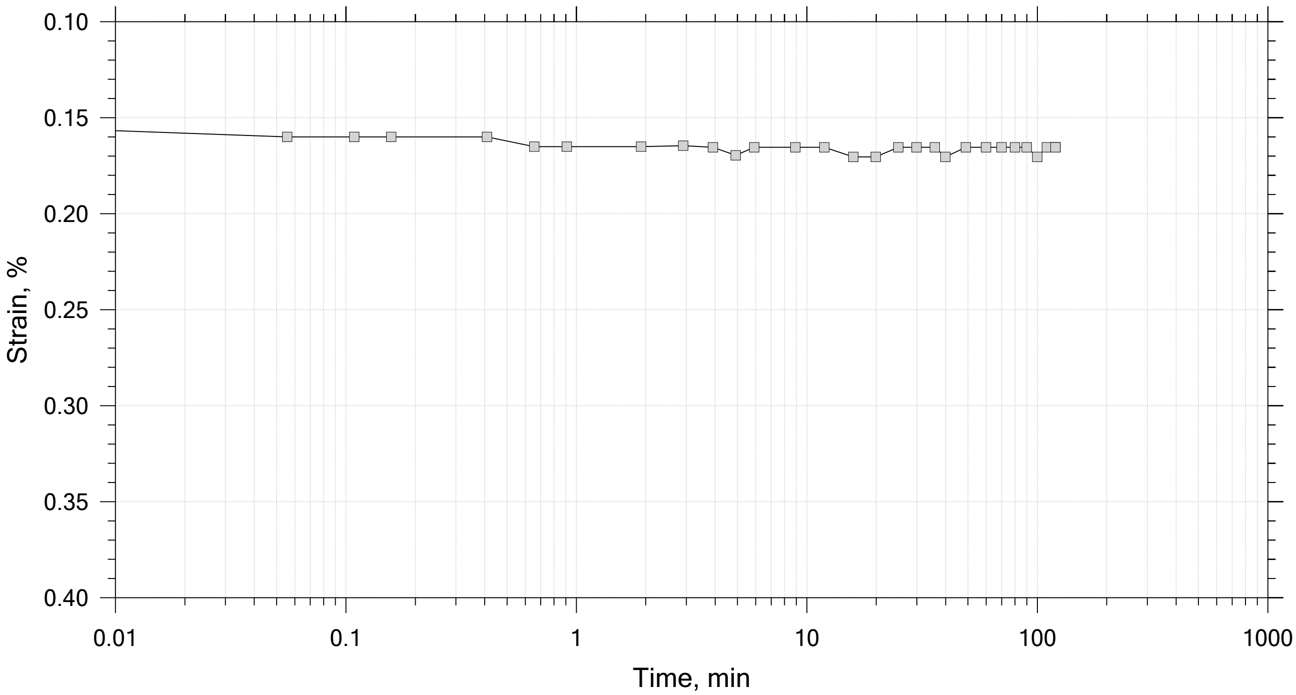
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

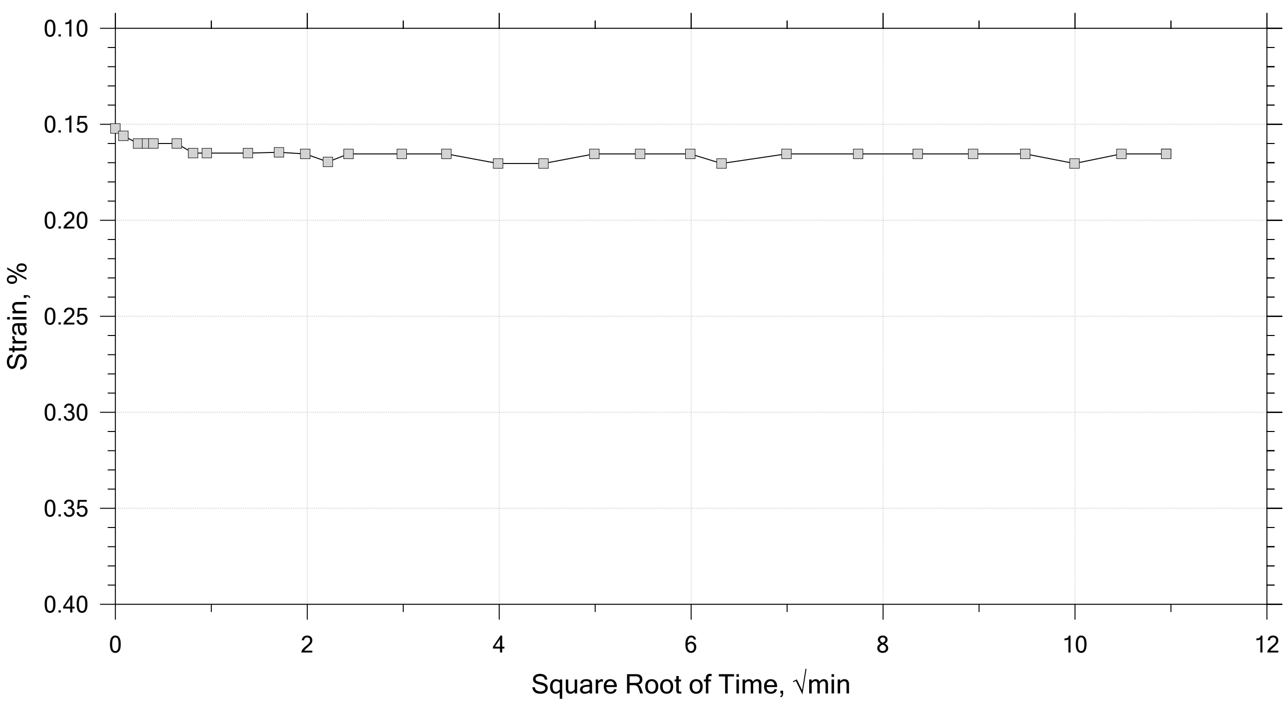
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

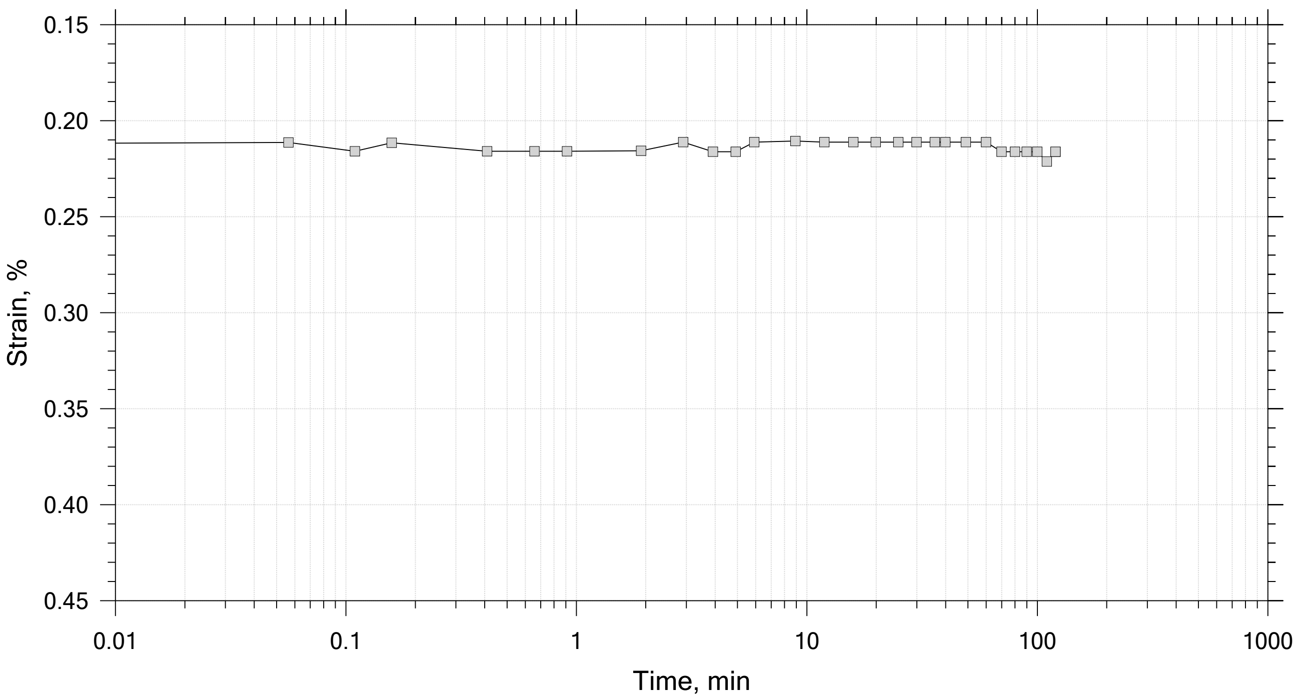


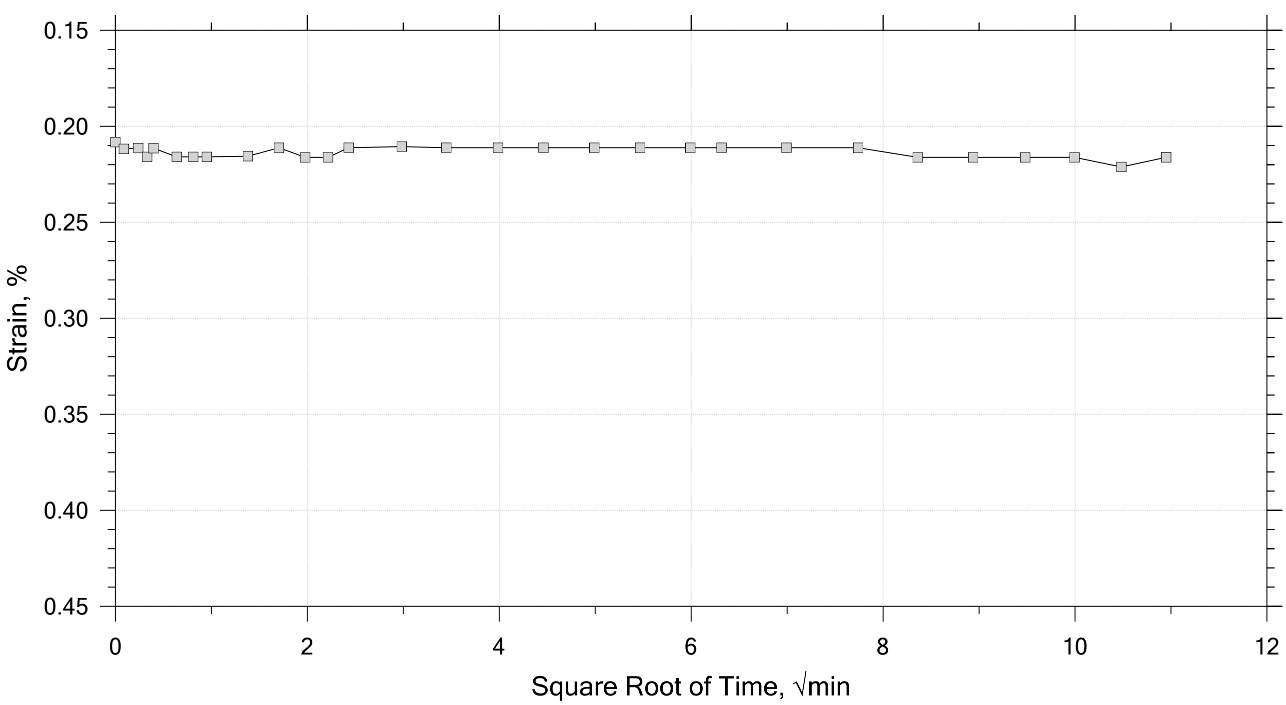


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

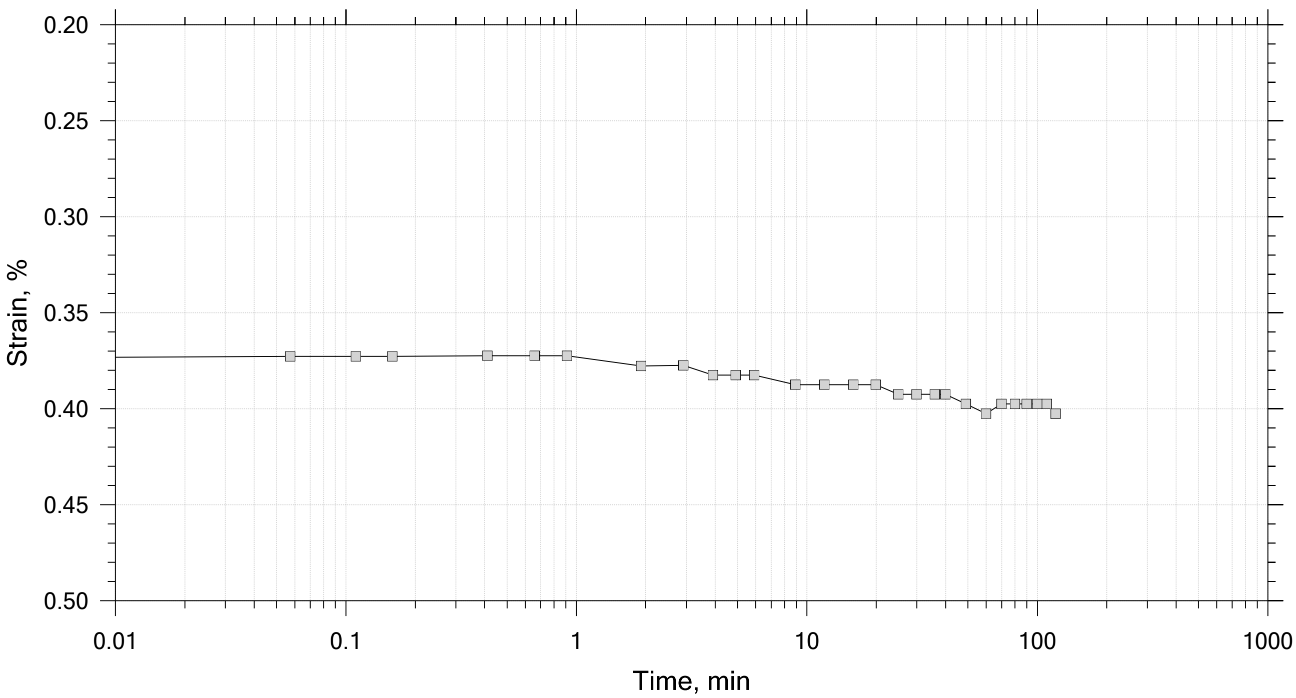


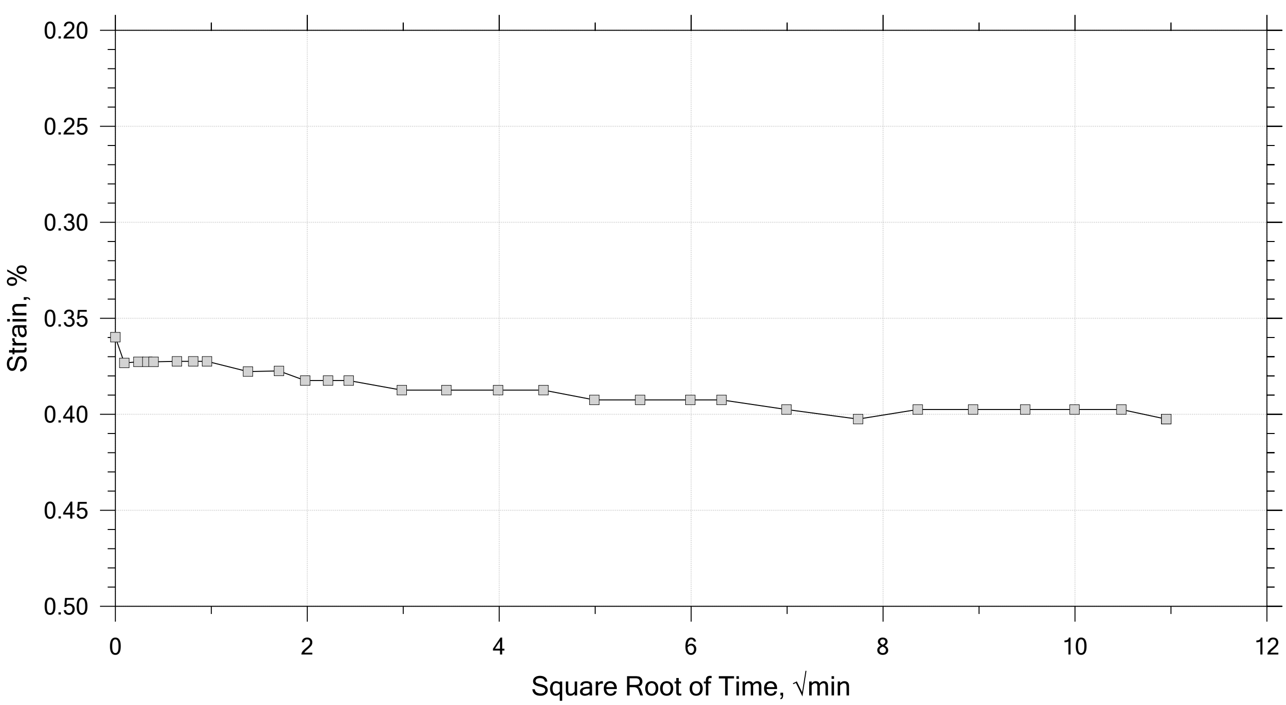


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





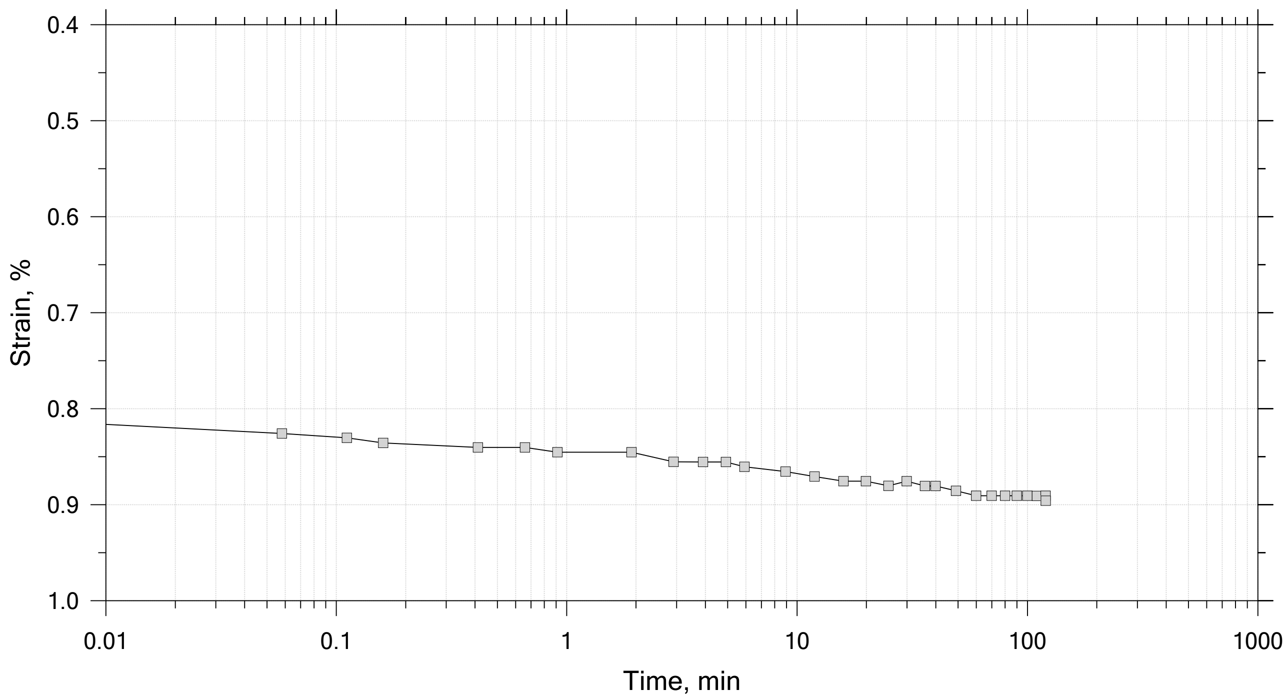
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

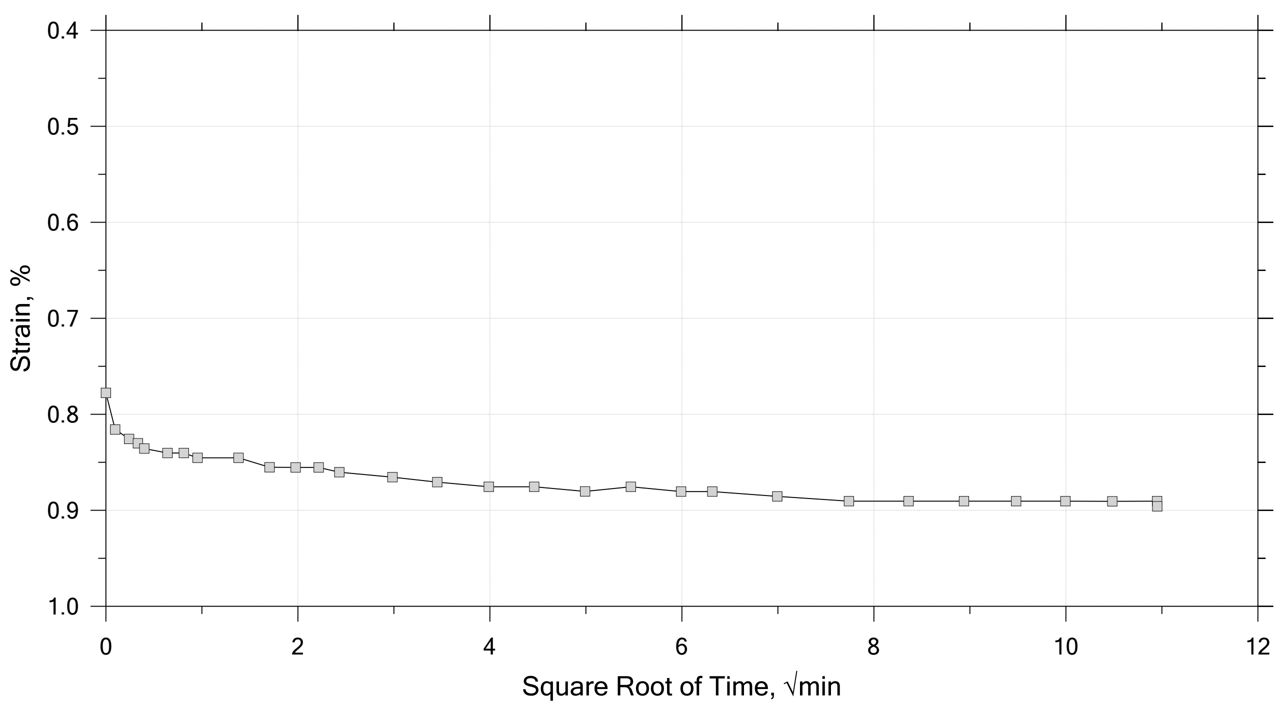
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





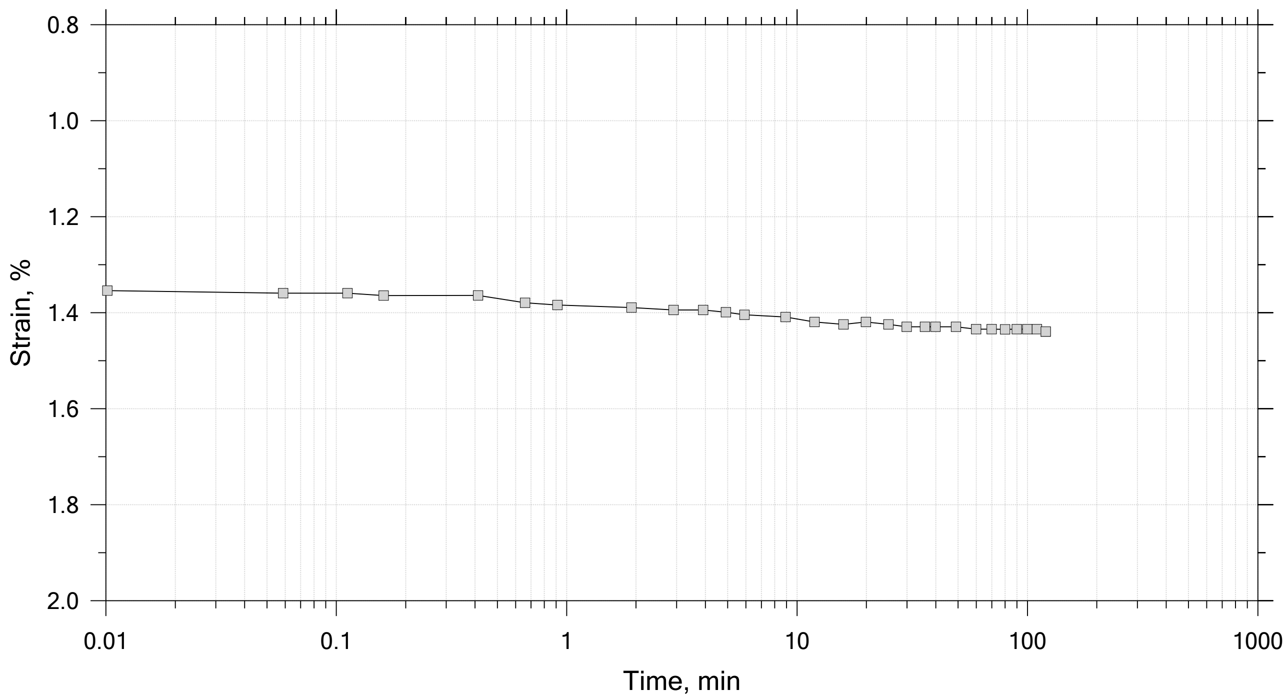
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

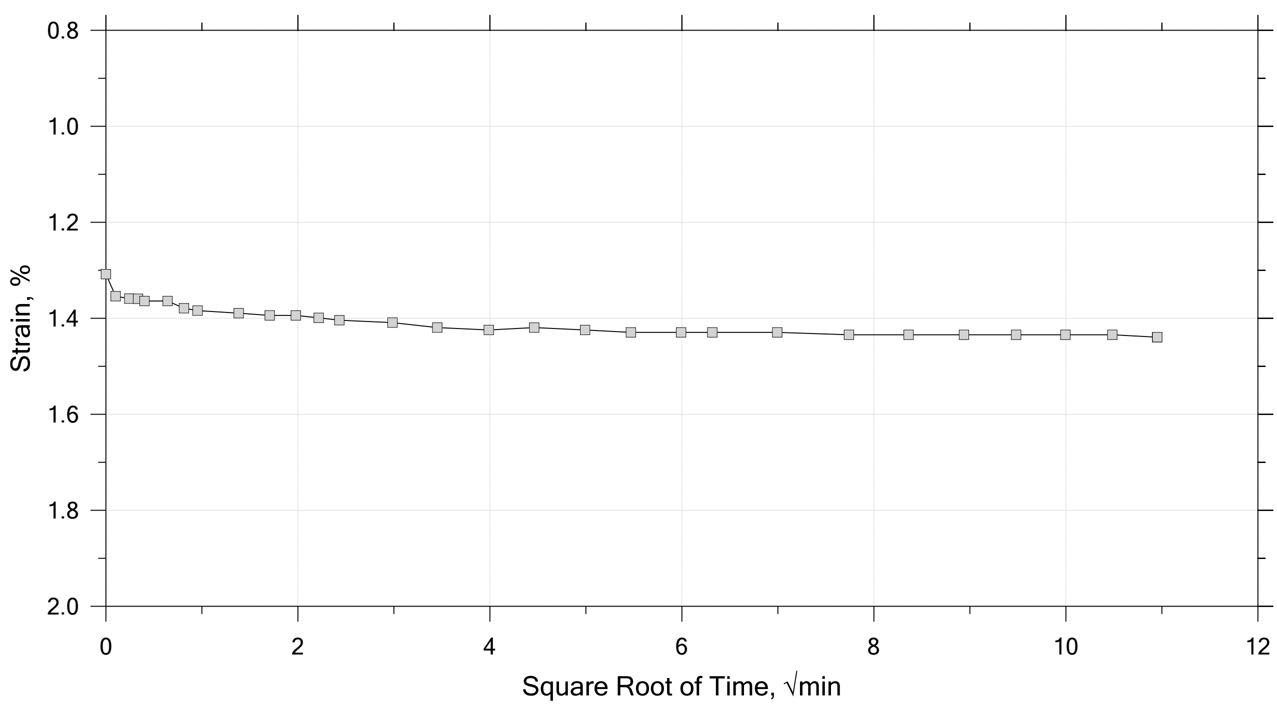
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





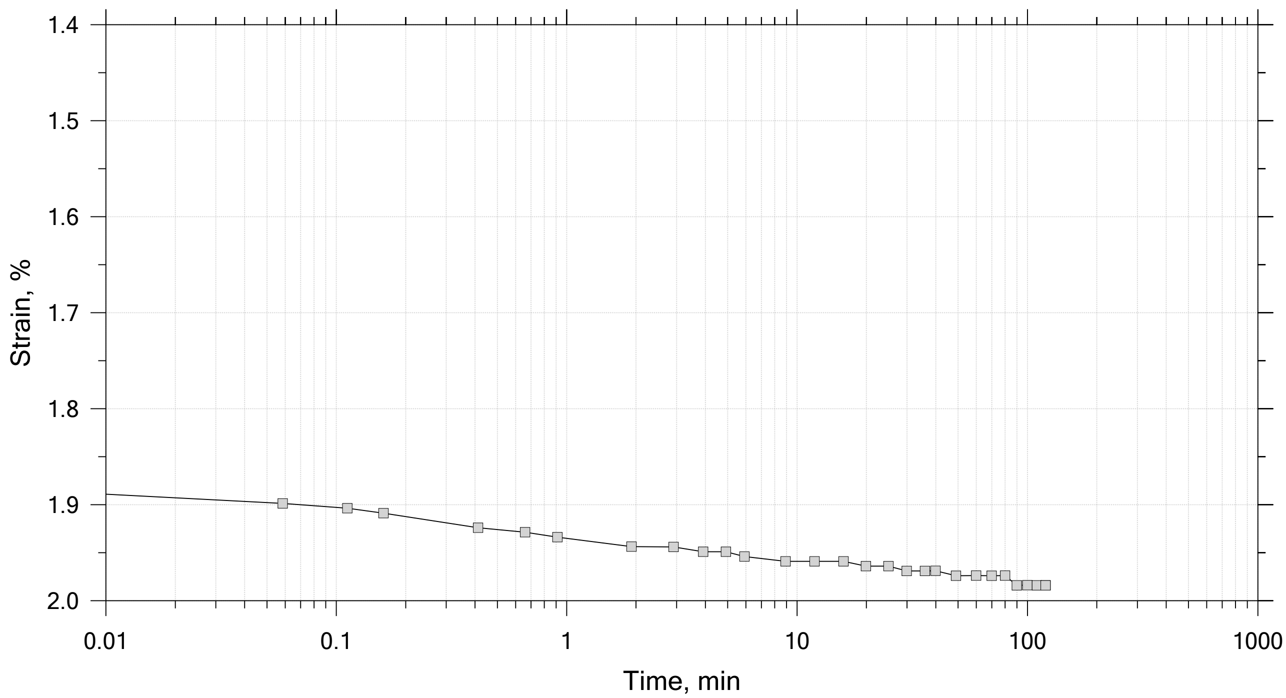
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

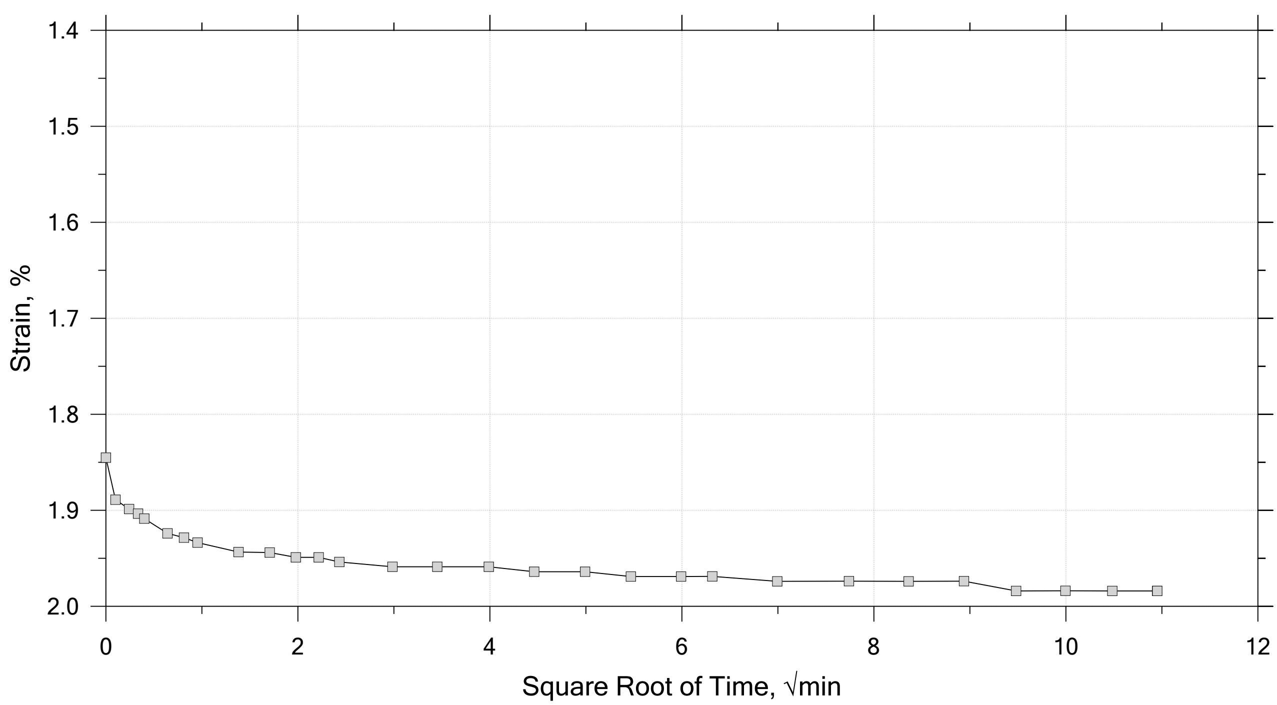
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





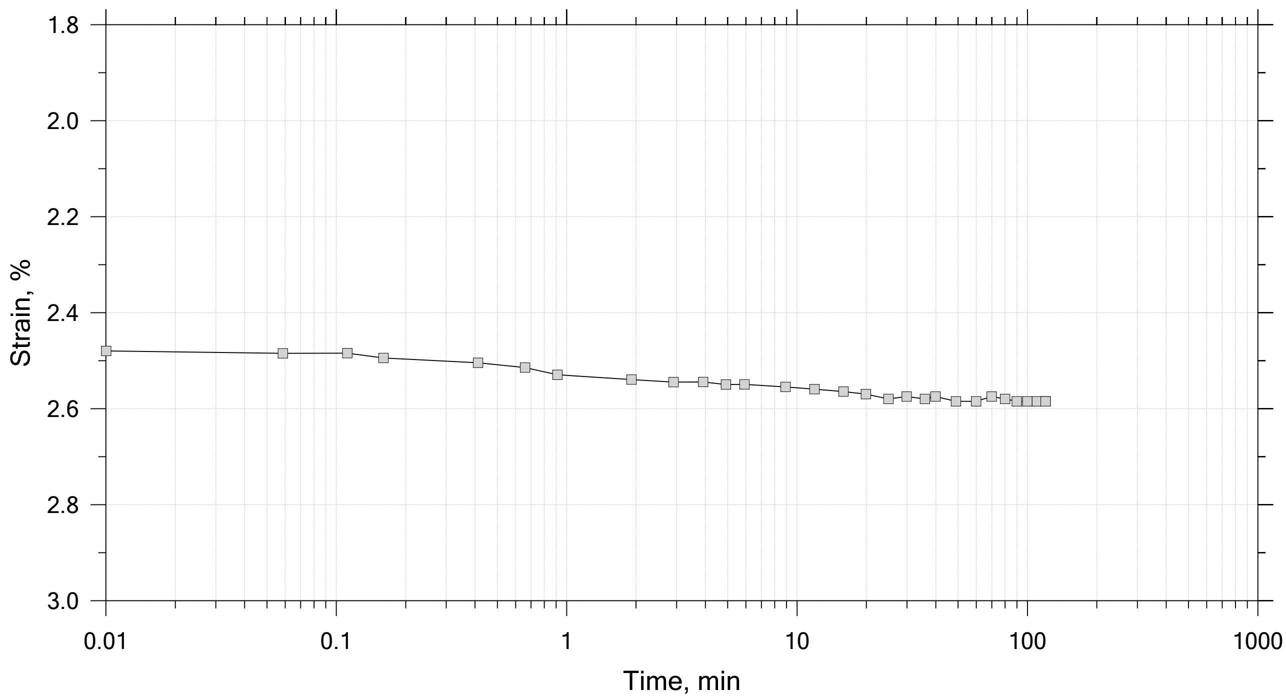
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

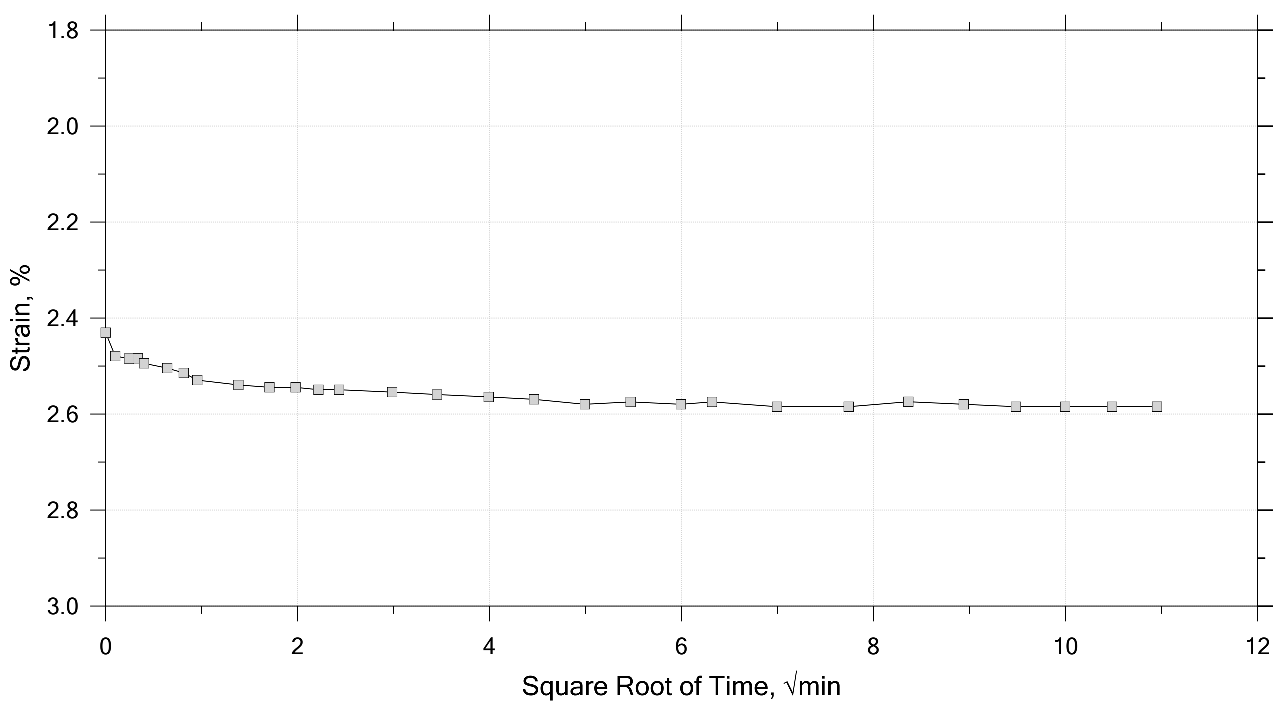
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





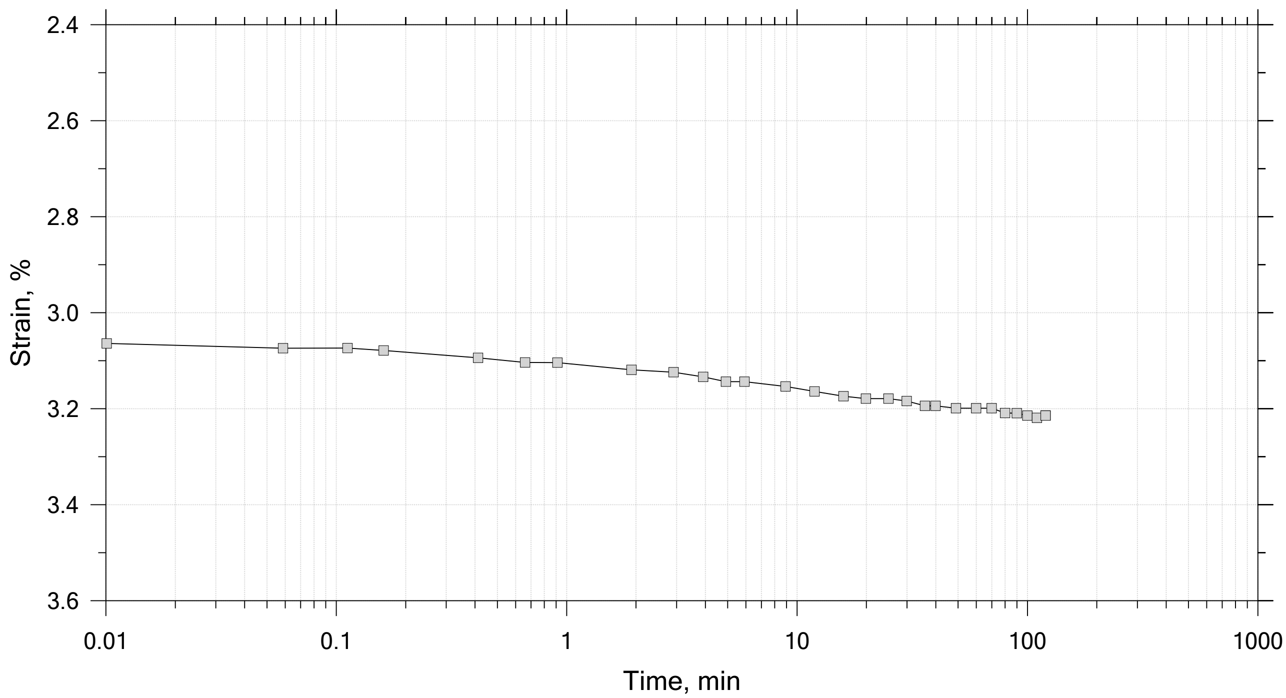
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

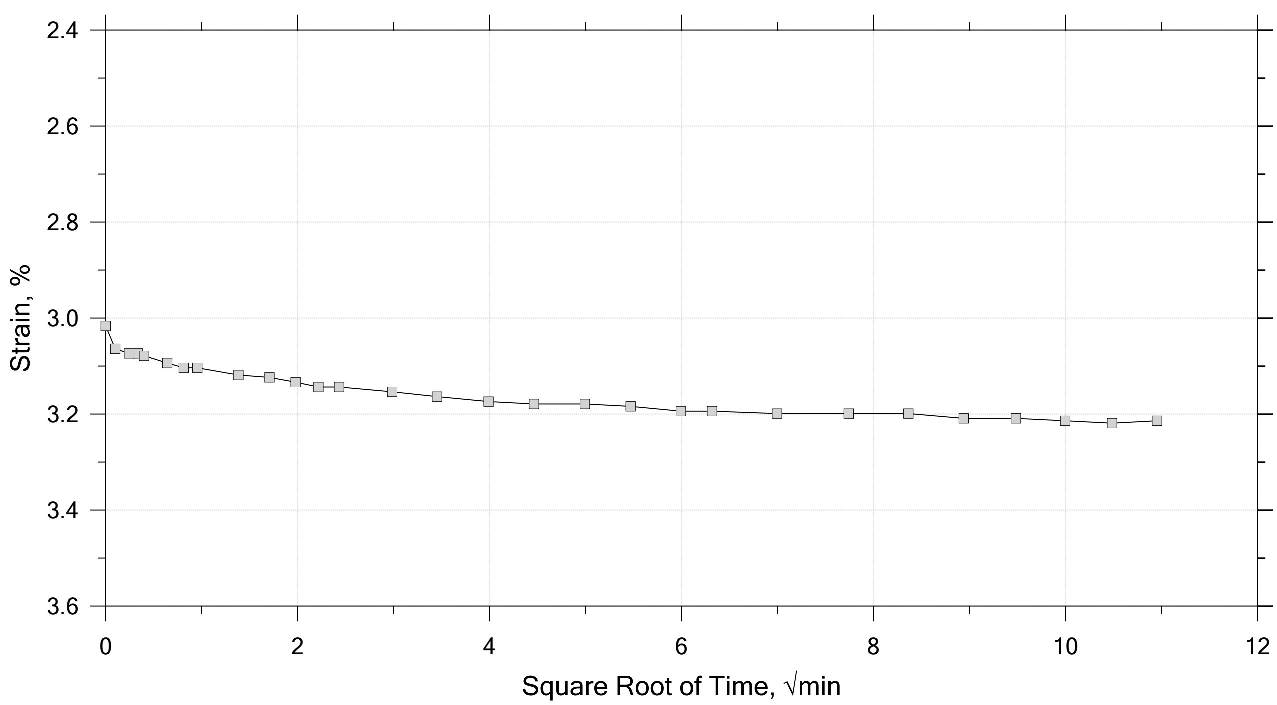
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf





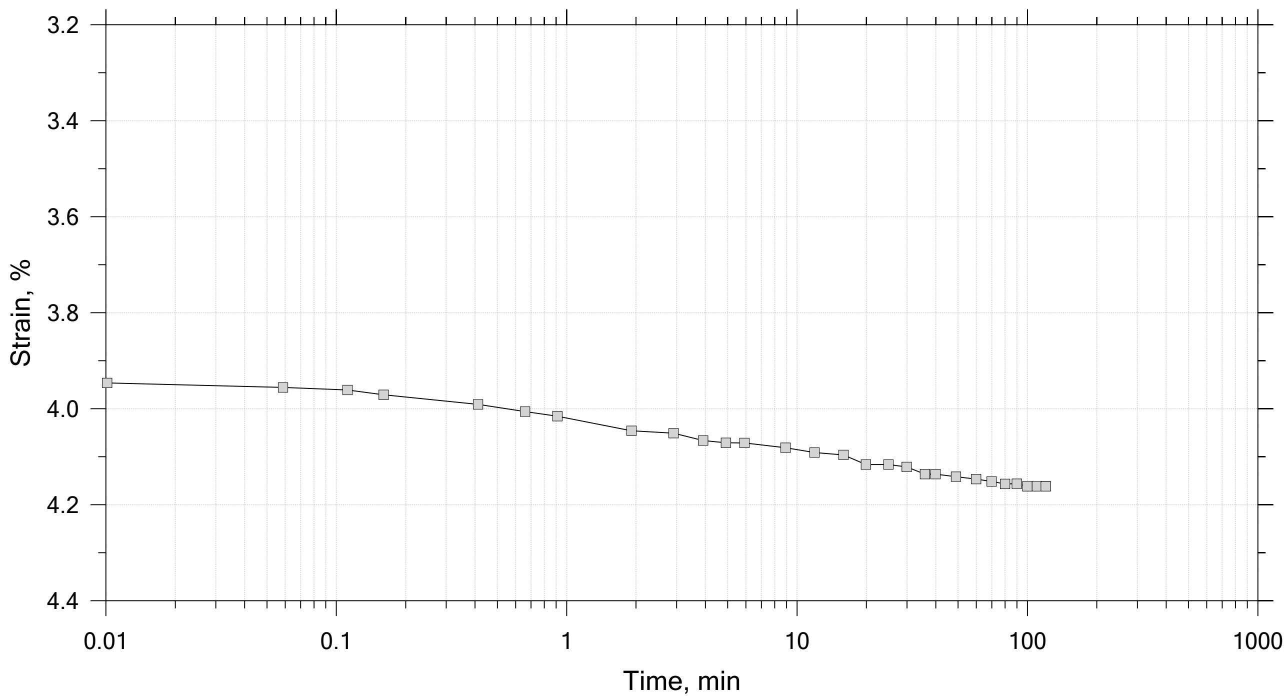
Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, dark gray silt with sand		
Remarks: System Q, Swell Pressure = 0.0727 tsf		

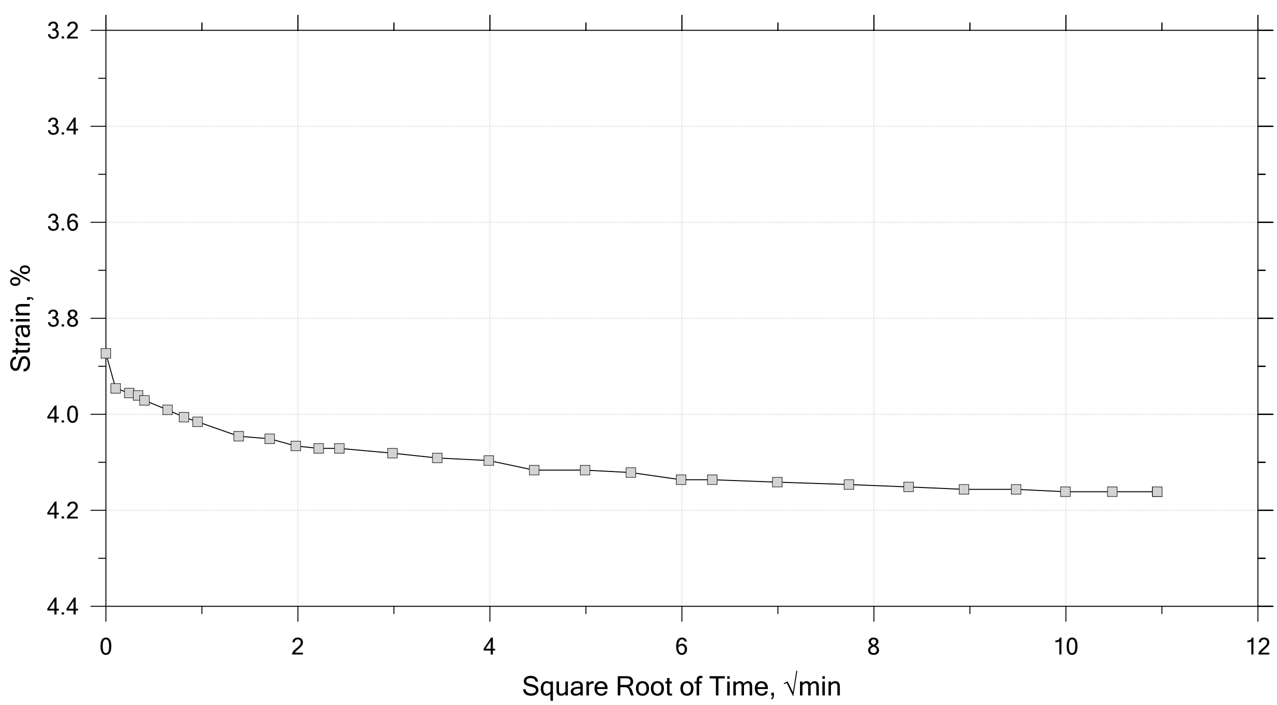
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf





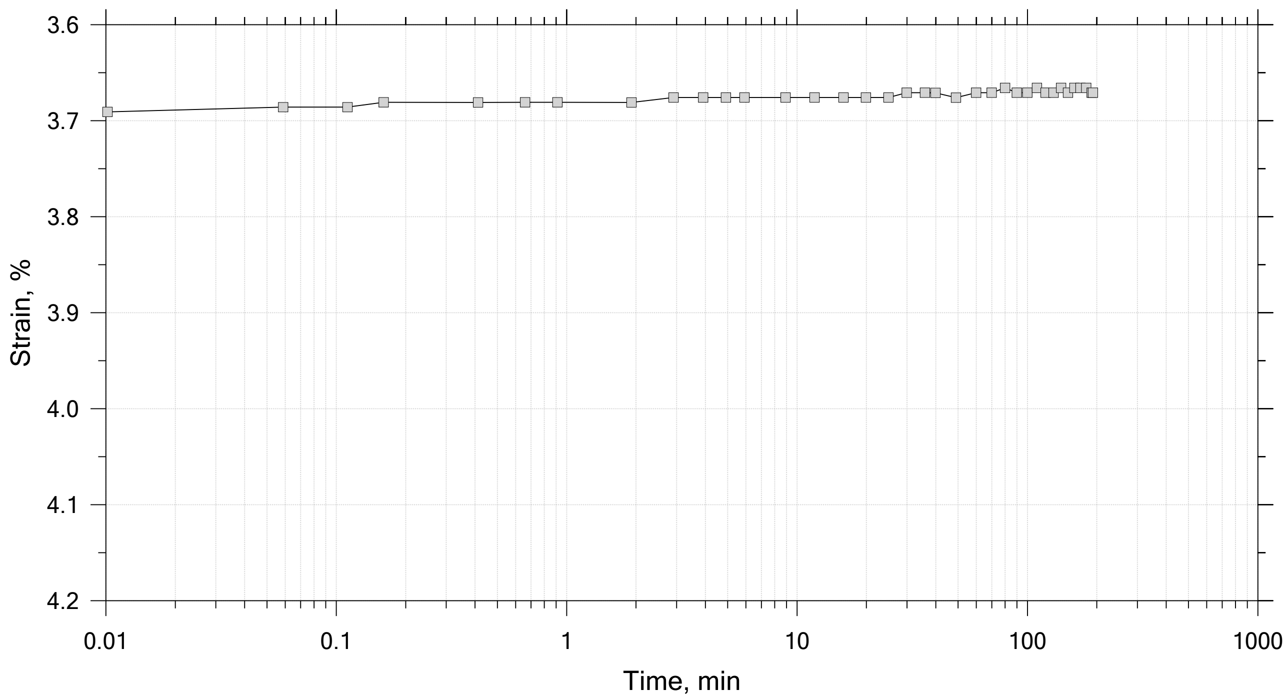
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

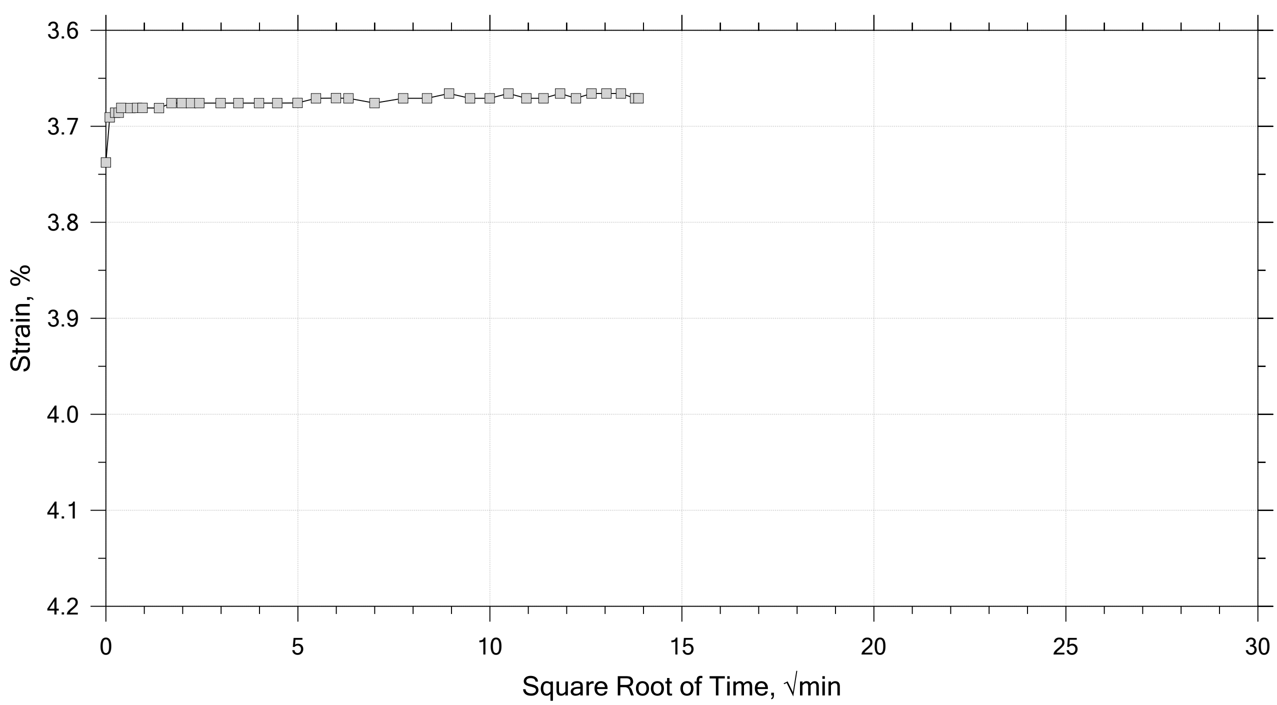
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf

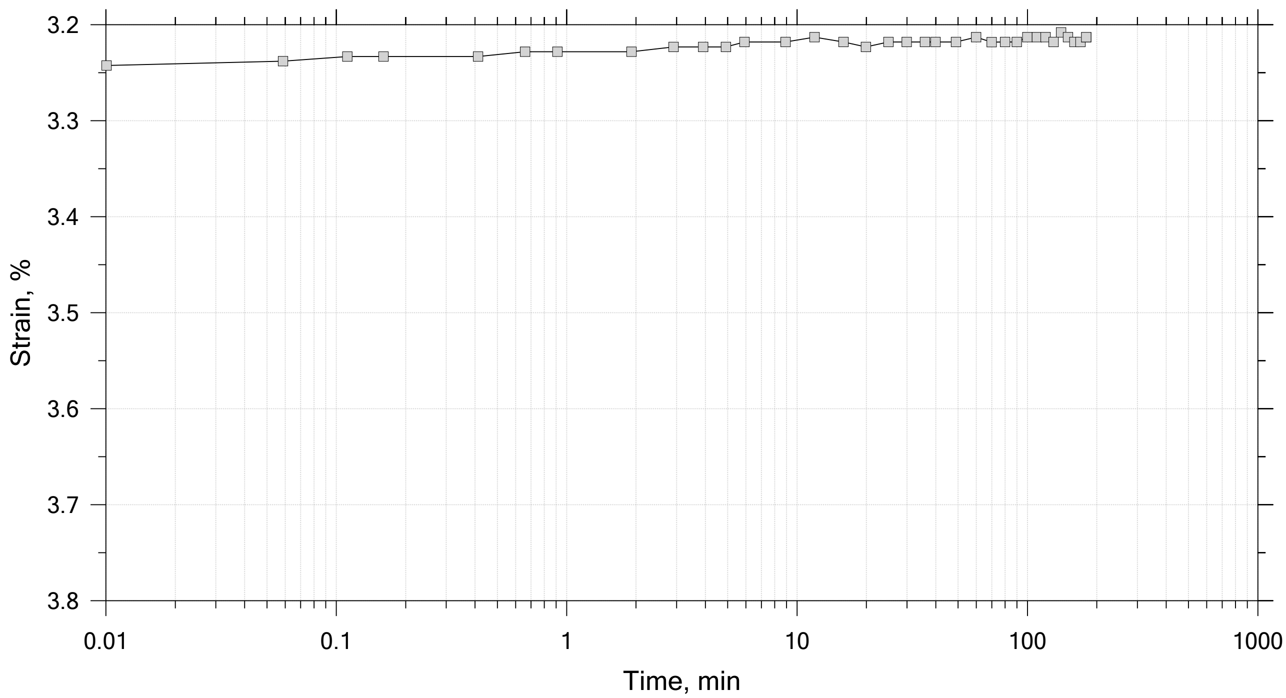


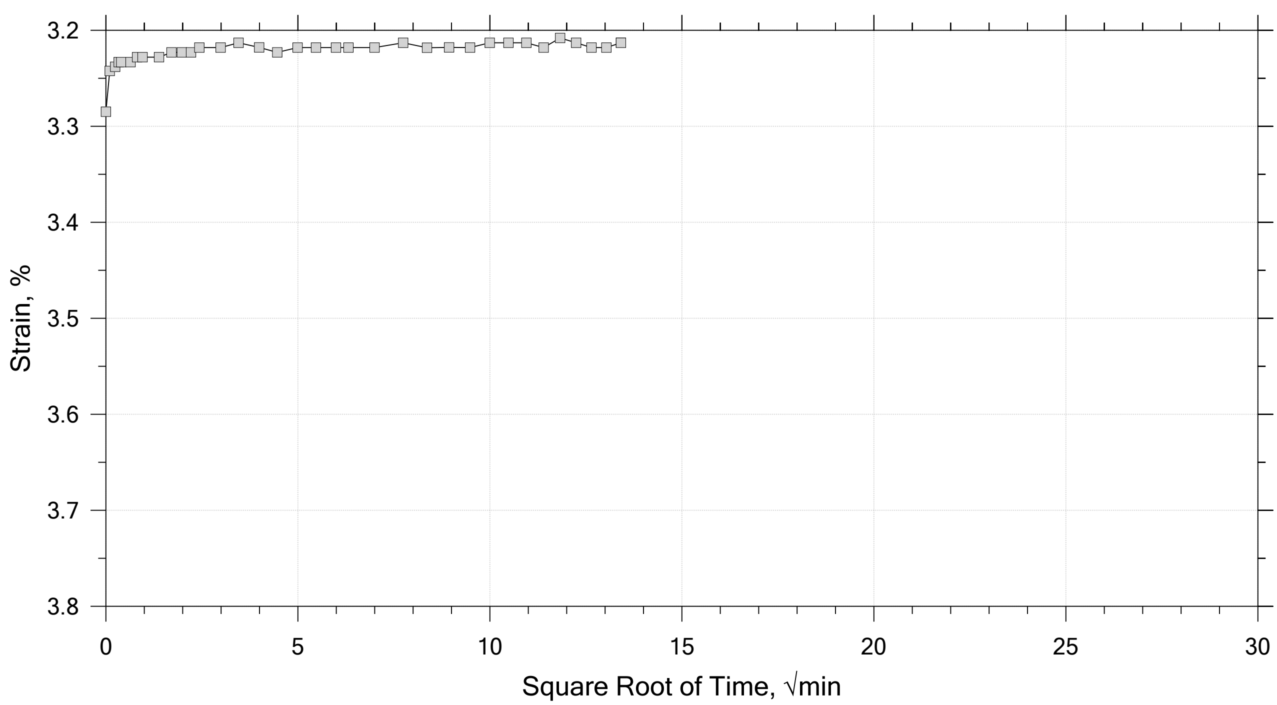


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf





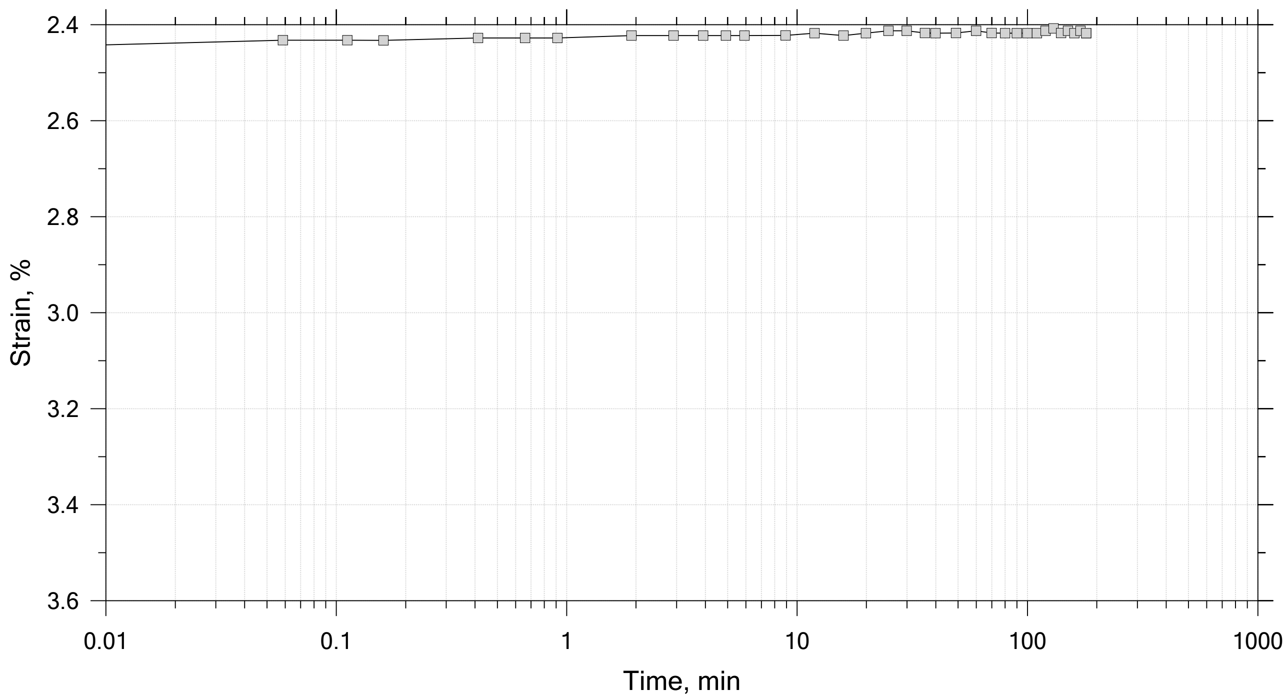
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

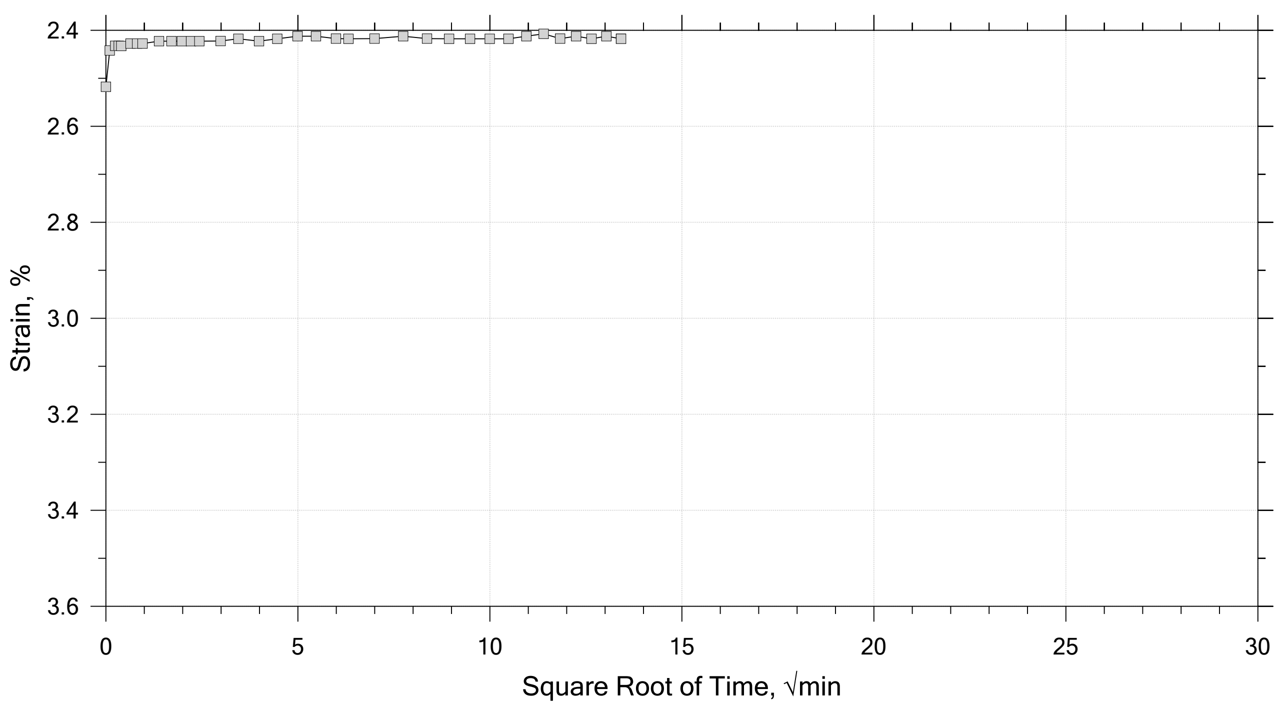
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf

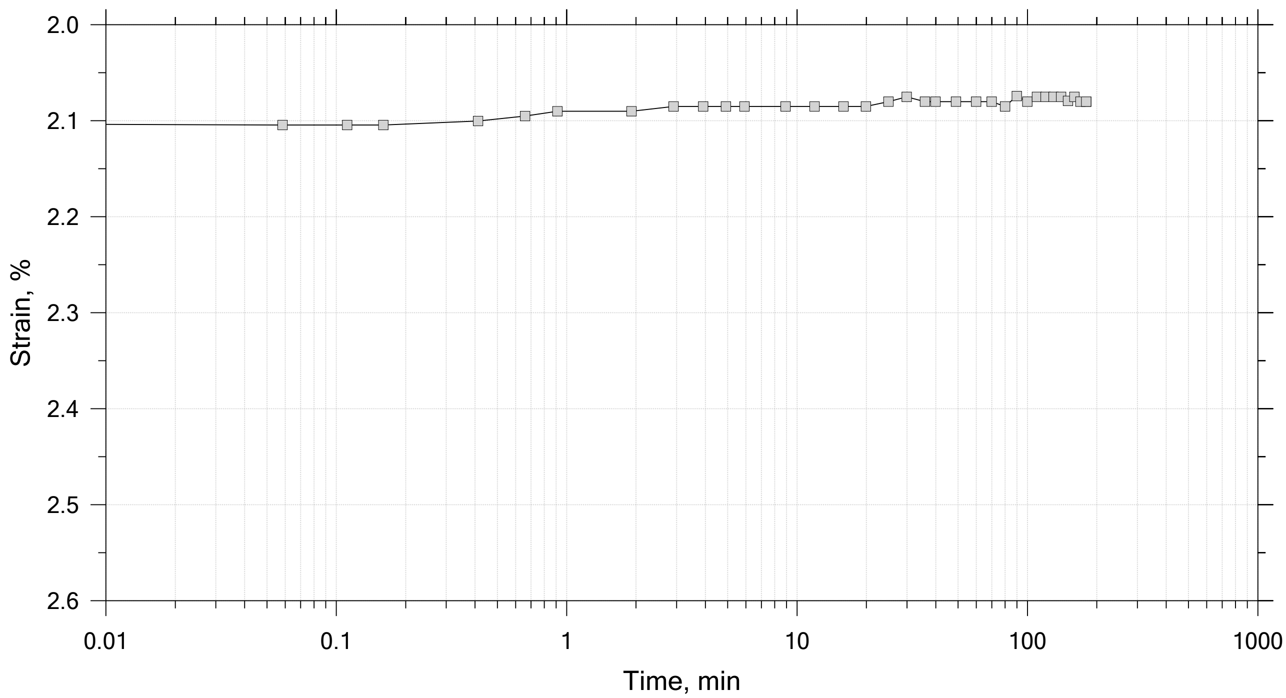


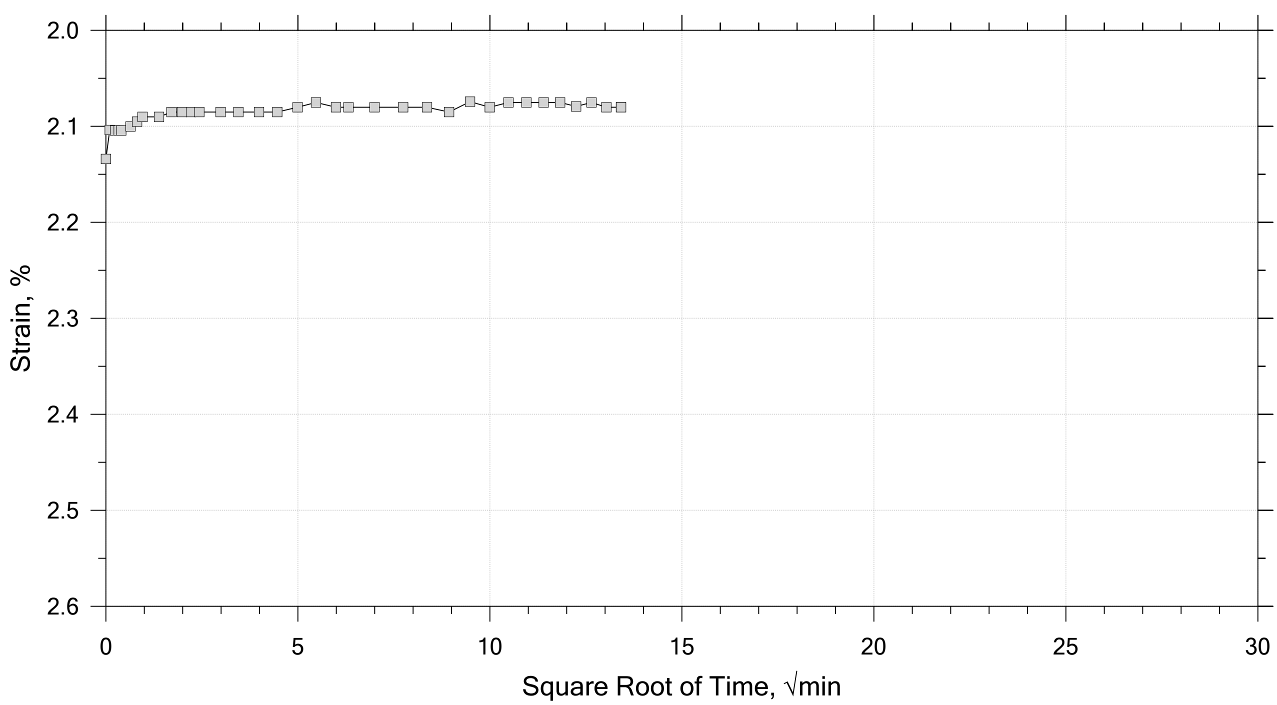


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

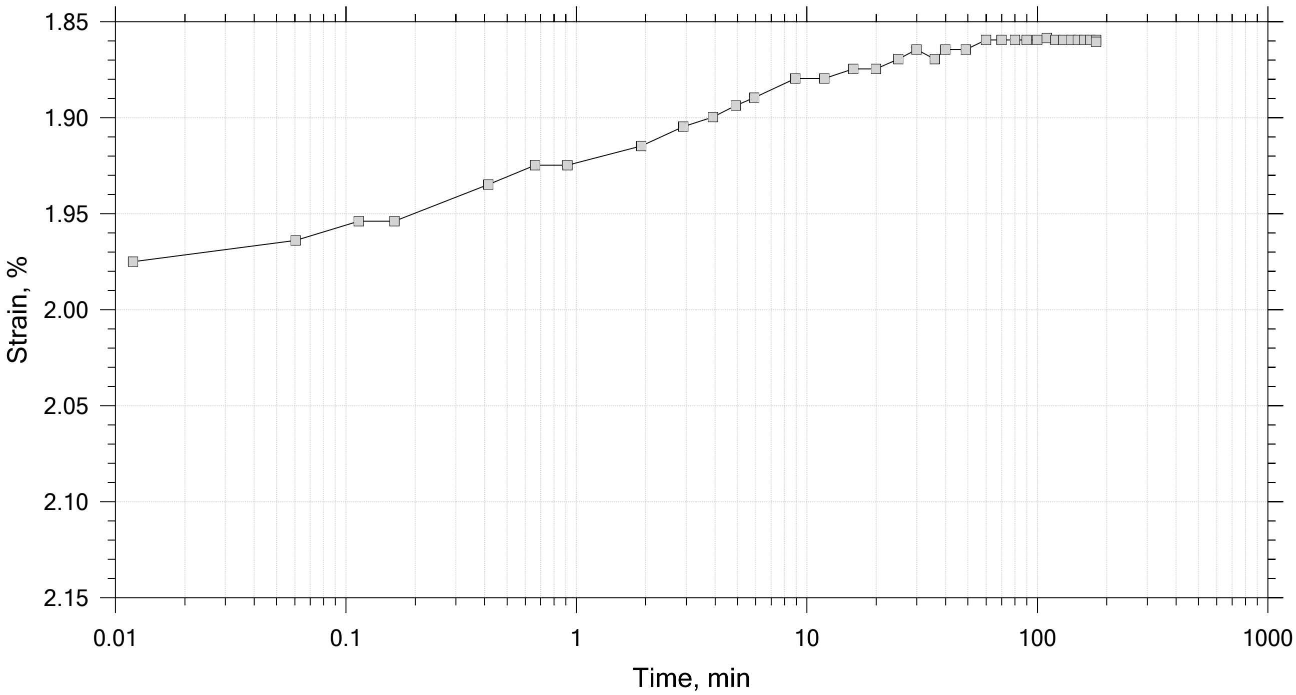


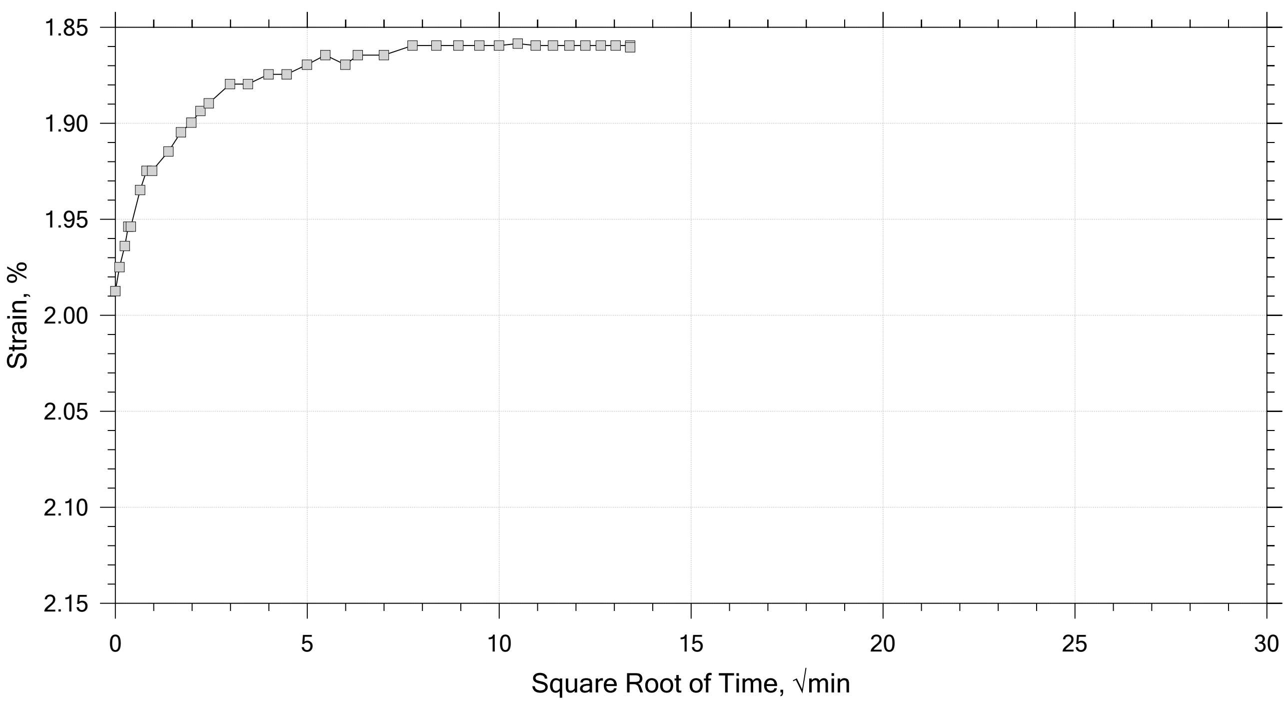


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.64	Liquid Limit: NP
Initial Height: 1.00 in	Initial Void Ratio: 0.539	Plastic Limit: NP
Final Height: 0.98 in	Final Void Ratio: 0.508	Plasticity Index: NP

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D-1596	RING		D-2312
Mass Container, gm	8.22	109.13	109.13	8.42
Mass Container + Wet Soil, gm	88.52	275.2	273.59	171.56
Mass Container + Dry Soil, gm	74.79	247.04	247.04	145.22
Mass Dry Soil, gm	66.57	137.91	137.91	136.8
Water Content, %	20.62	20.42	19.25	19.25
Void Ratio	---	0.54	0.51	---
Degree of Saturation, %	---	100.00	100.00	---
Dry Unit Weight, pcf	---	107.03	109.21	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, dark gray silt with sand		
Remarks: System Q, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0727	0.001004	0.537	0.100	0.000	0.00e+00	1.38e-02	0.00e+00	0.00e+00
2	0.125	0.001654	0.536	0.165	0.000	0.00e+00	1.24e-02	0.00e+00	0.00e+00
3	0.250	0.002162	0.535	0.216	0.000	0.00e+00	4.06e-03	0.00e+00	0.00e+00
4	0.500	0.004025	0.533	0.403	0.000	0.00e+00	7.45e-03	0.00e+00	0.00e+00
5	1.00	0.008958	0.525	0.896	0.000	0.00e+00	9.87e-03	0.00e+00	0.00e+00
6	2.00	0.01439	0.517	1.44	0.000	0.00e+00	5.44e-03	0.00e+00	0.00e+00
7	4.00	0.01984	0.508	1.98	0.000	0.00e+00	2.72e-03	0.00e+00	0.00e+00
8	8.00	0.02585	0.499	2.58	0.000	0.00e+00	1.50e-03	0.00e+00	0.00e+00
9	16.0	0.03214	0.489	3.21	0.000	0.00e+00	7.87e-04	0.00e+00	0.00e+00
10	32.0	0.04161	0.475	4.16	0.000	0.00e+00	5.92e-04	0.00e+00	0.00e+00
11	8.00	0.03671	0.482	3.67	0.000	0.00e+00	2.04e-04	0.00e+00	0.00e+00
12	2.00	0.03213	0.489	3.21	0.000	0.00e+00	7.63e-04	0.00e+00	0.00e+00
13	0.500	0.02418	0.501	2.42	0.000	0.00e+00	5.30e-03	0.00e+00	0.00e+00
14	0.125	0.02080	0.507	2.08	0.000	0.00e+00	9.00e-03	0.00e+00	0.00e+00
15	0.0625	0.01860	0.510	1.86	0.000	0.00e+00	3.51e-02	0.00e+00	0.00e+00

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

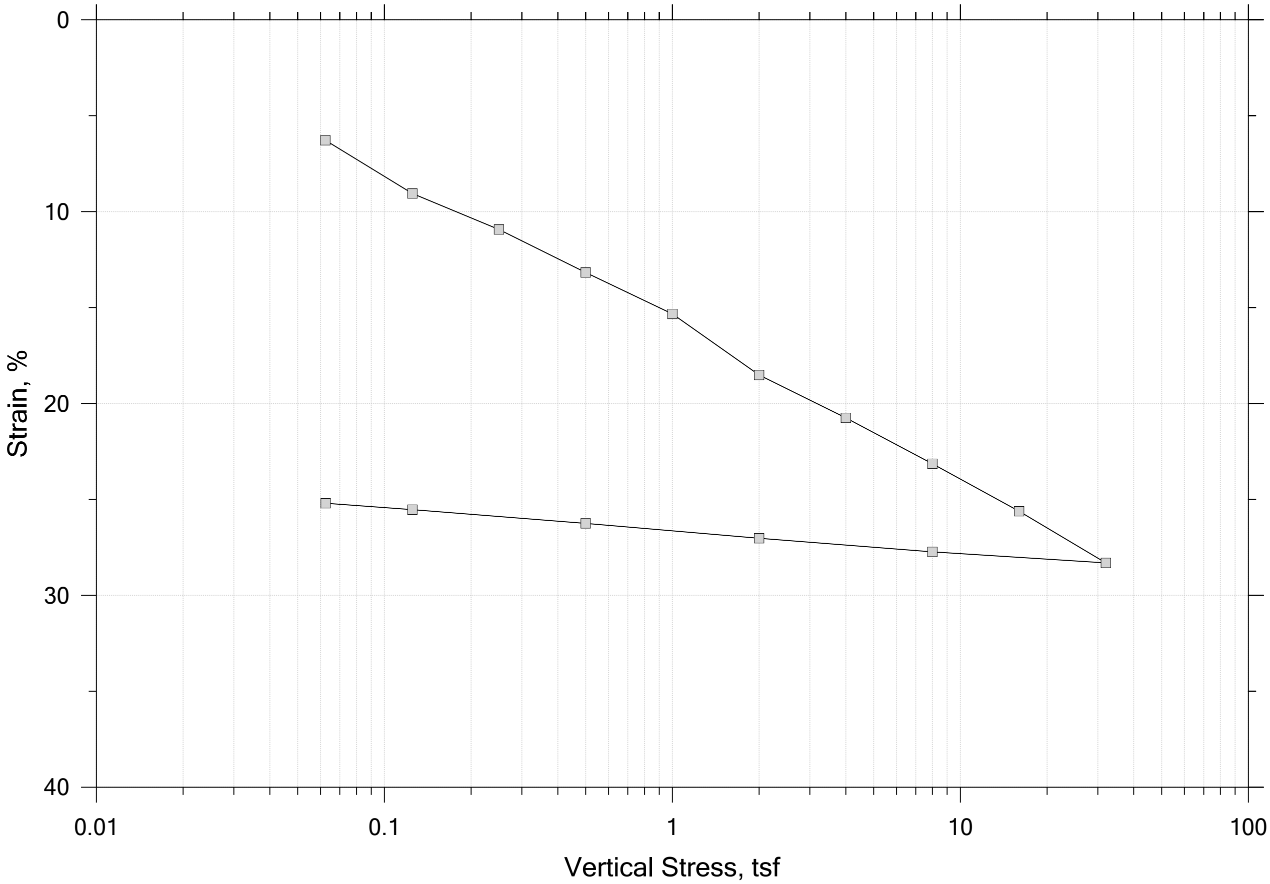
Square Root of Time Coefficients

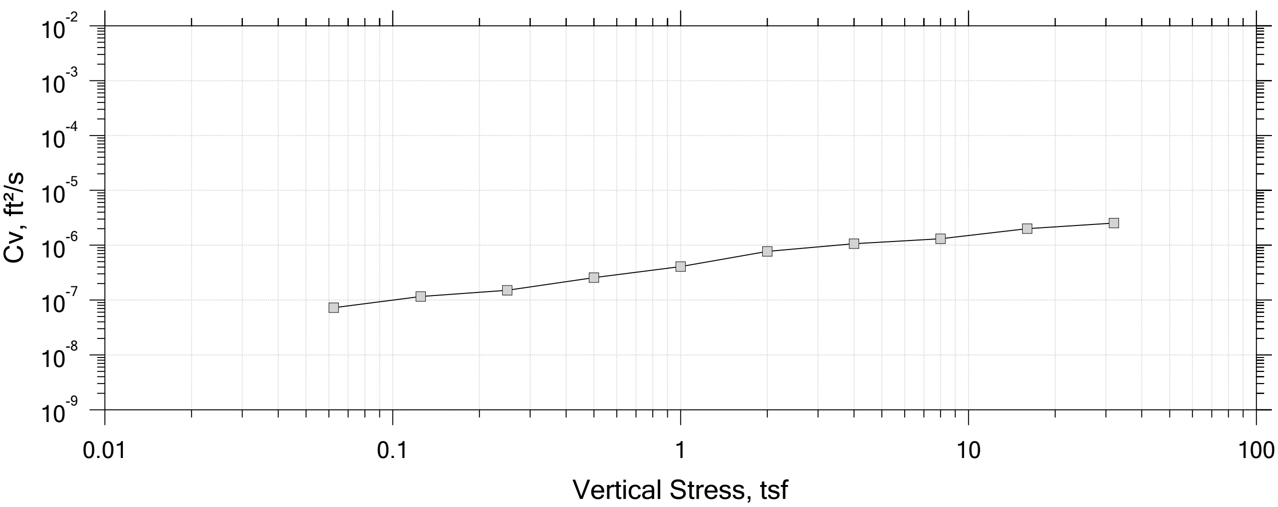
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0727	0.001004	0.537	0.100	0.000	0.00e+00	1.38e-02	0.00e+00
2	0.125	0.001654	0.536	0.165	4.041	6.06e-06	1.24e-02	2.03e-04
3	0.250	0.002162	0.535	0.216	0.000	0.00e+00	4.06e-03	0.00e+00
4	0.500	0.004025	0.533	0.403	0.000	0.00e+00	7.45e-03	0.00e+00
5	1.00	0.008958	0.525	0.896	15.908	1.52e-06	9.87e-03	4.05e-05
6	2.00	0.01439	0.517	1.44	13.781	1.74e-06	5.44e-03	2.55e-05
7	4.00	0.01984	0.508	1.98	87.212	2.72e-07	2.72e-03	2.00e-06
8	8.00	0.02585	0.499	2.58	22.472	1.04e-06	1.50e-03	4.22e-06
9	16.0	0.03214	0.489	3.21	19.909	1.16e-06	7.87e-04	2.47e-06
10	32.0	0.04161	0.475	4.16	19.909	1.14e-06	5.92e-04	1.83e-06
11	8.00	0.03671	0.482	3.67	0.000	0.00e+00	2.04e-04	0.00e+00
12	2.00	0.03213	0.489	3.21	11.837	1.93e-06	7.63e-04	3.98e-06
13	0.500	0.02418	0.501	2.42	0.000	0.00e+00	5.30e-03	0.00e+00
14	0.125	0.02080	0.507	2.08	0.000	0.00e+00	9.00e-03	0.00e+00
15	0.0625	0.01860	0.510	1.86	5.417	4.35e-06	3.51e-02	4.13e-04

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U1	Test Date: 02/09/19	Depth: 10-12 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray silt with sand		
	Remarks: System Q, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





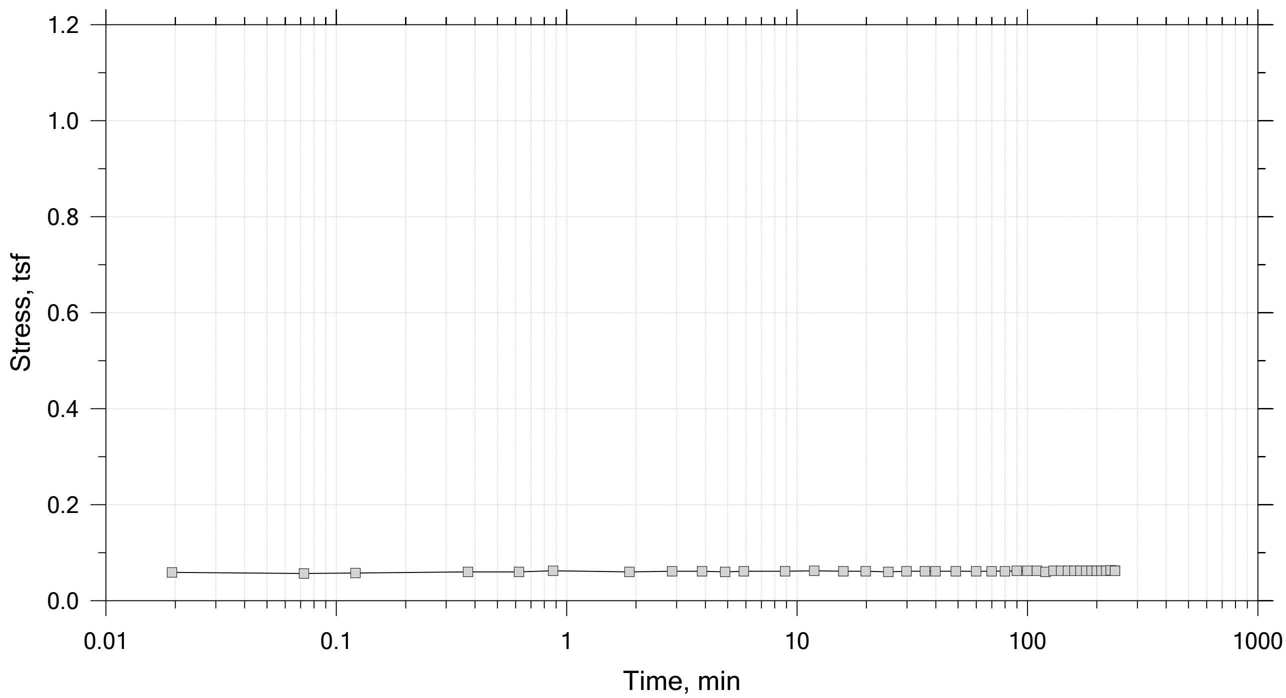
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		
	Displacement at End of Increment		

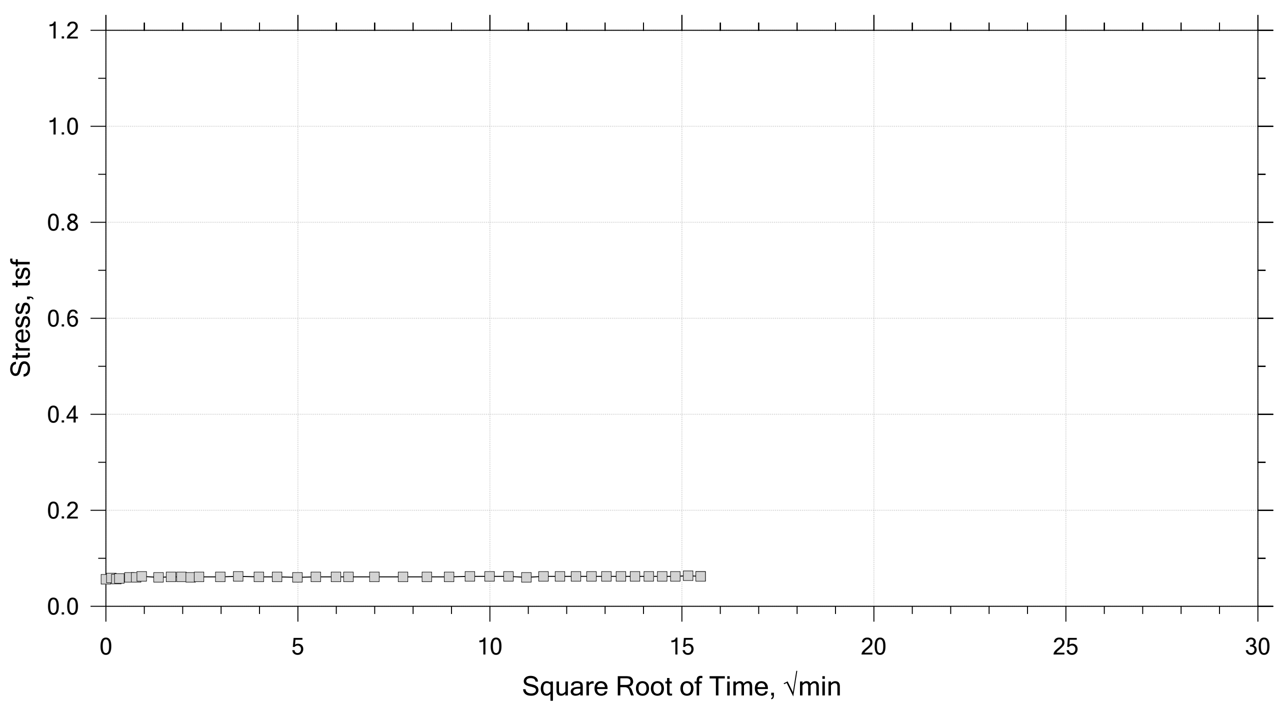
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0624 tsf





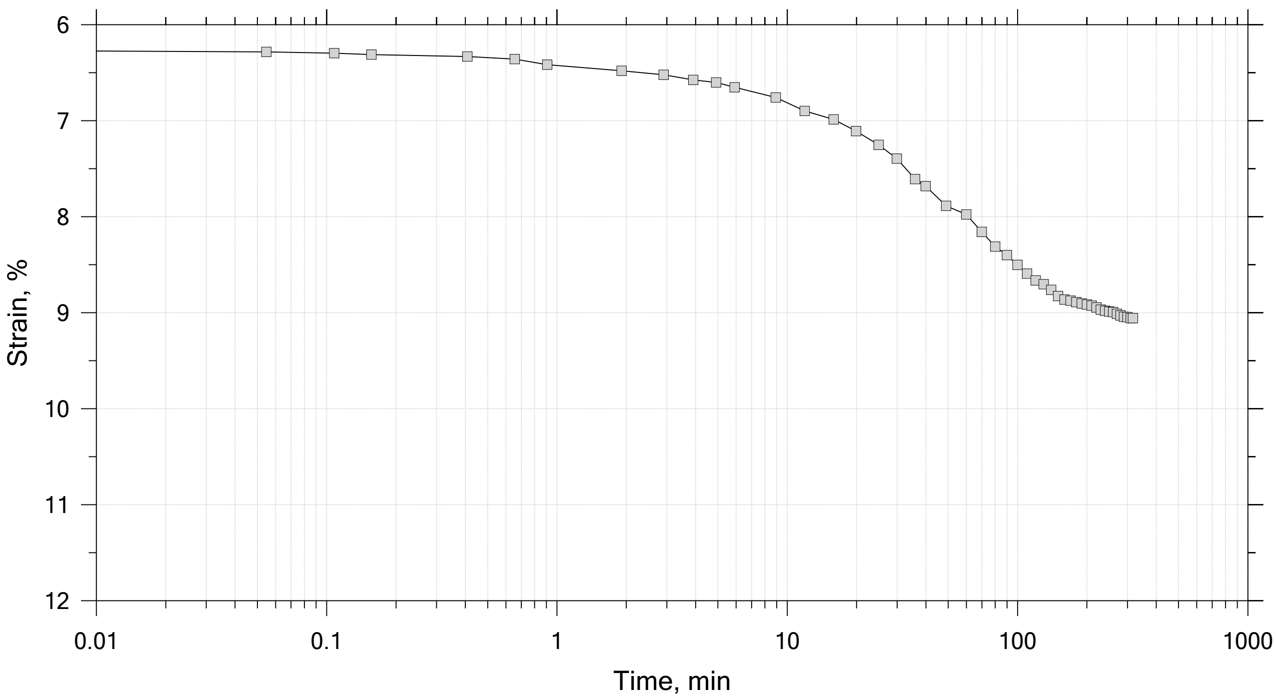
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

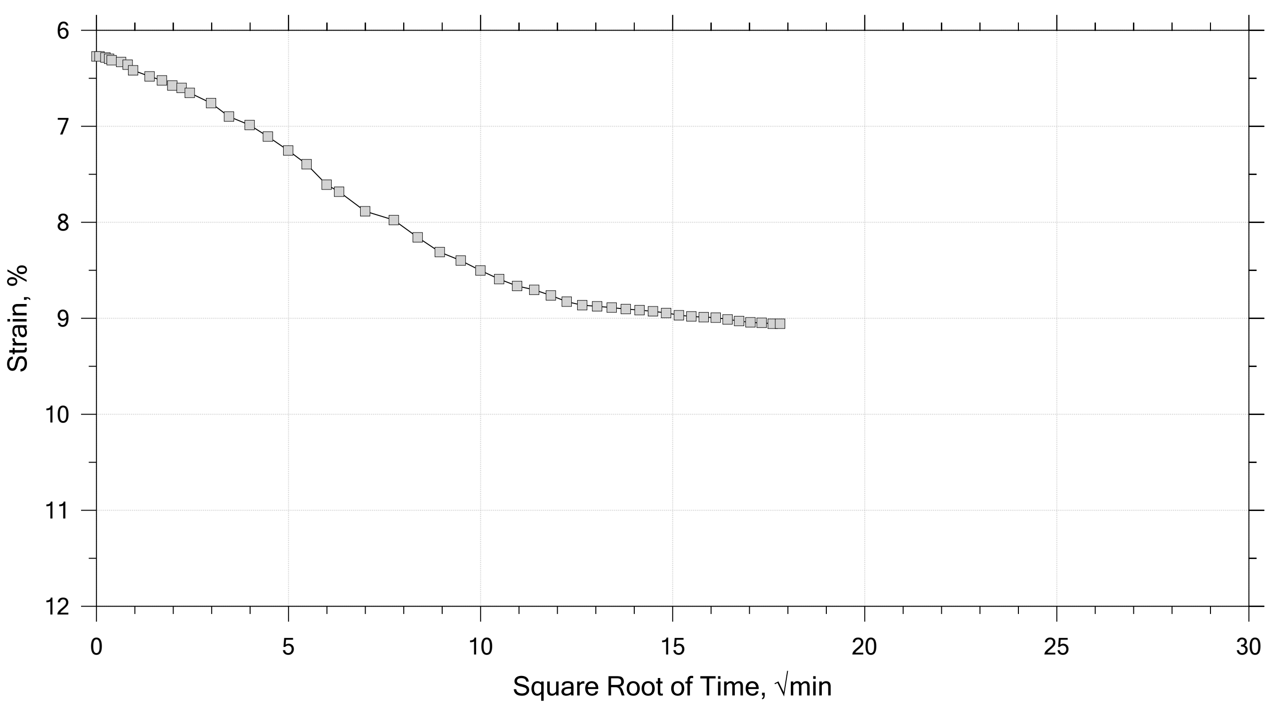
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf





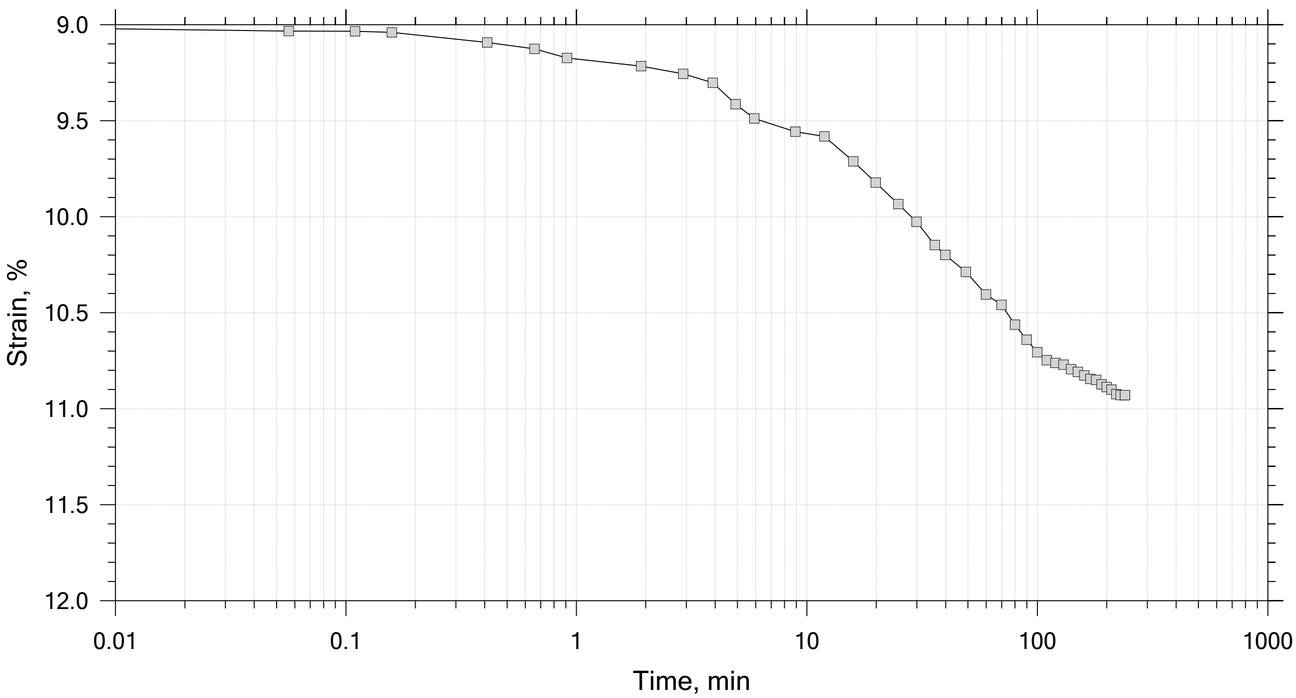
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
GeoTesting EXPRESS	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

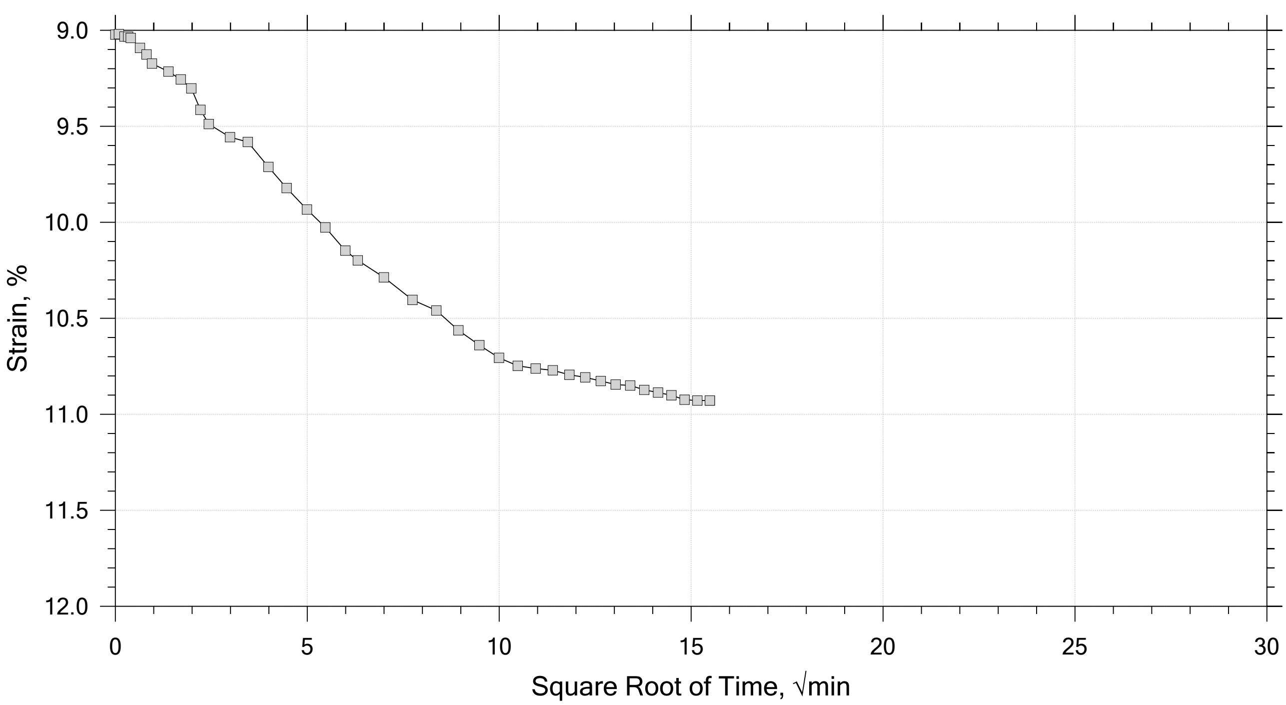
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf





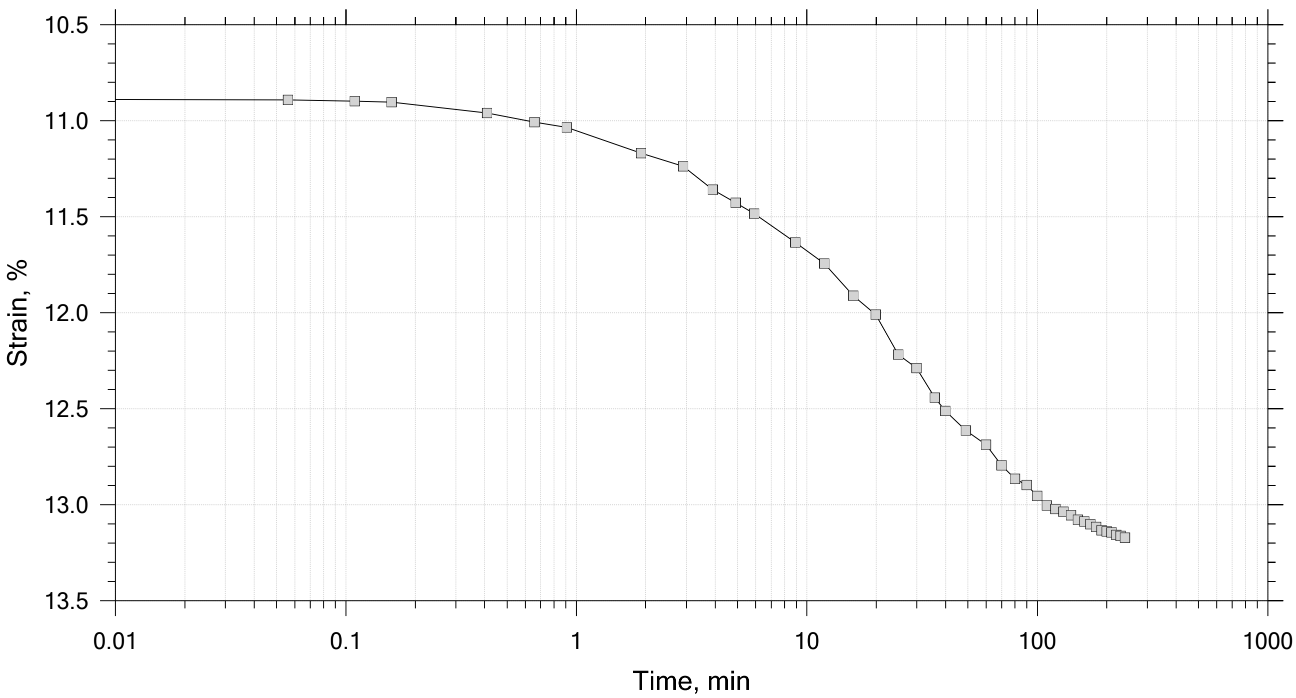
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

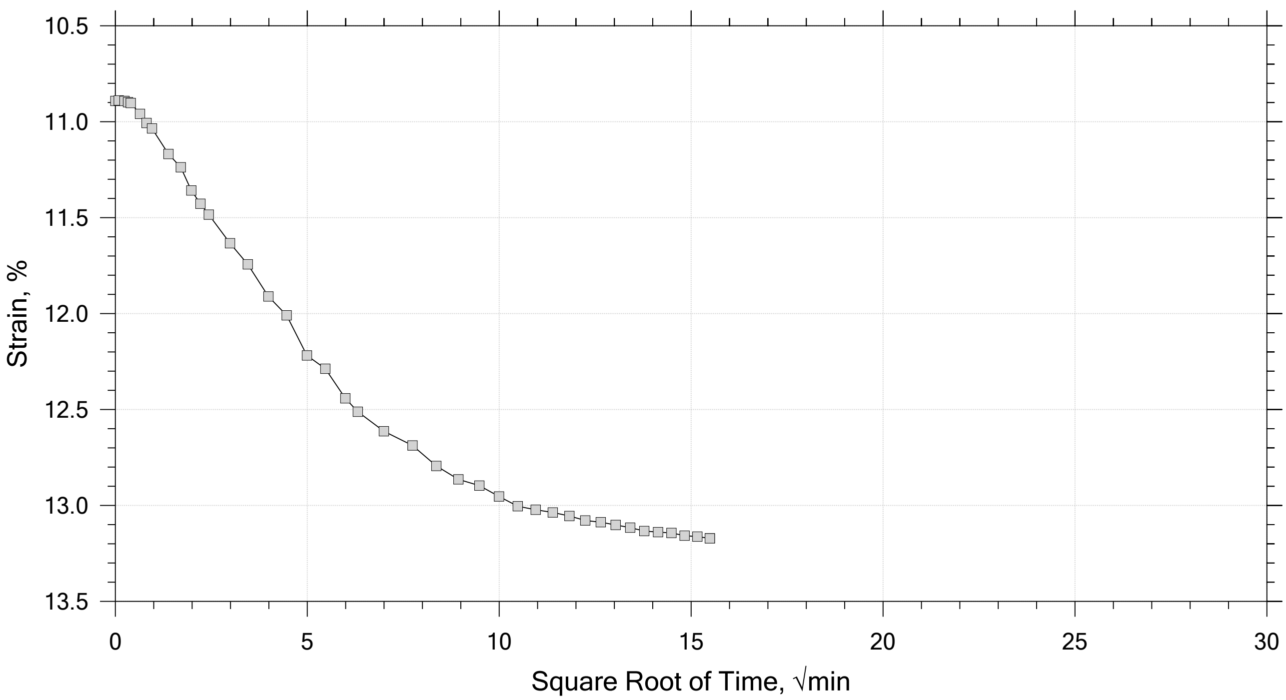
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





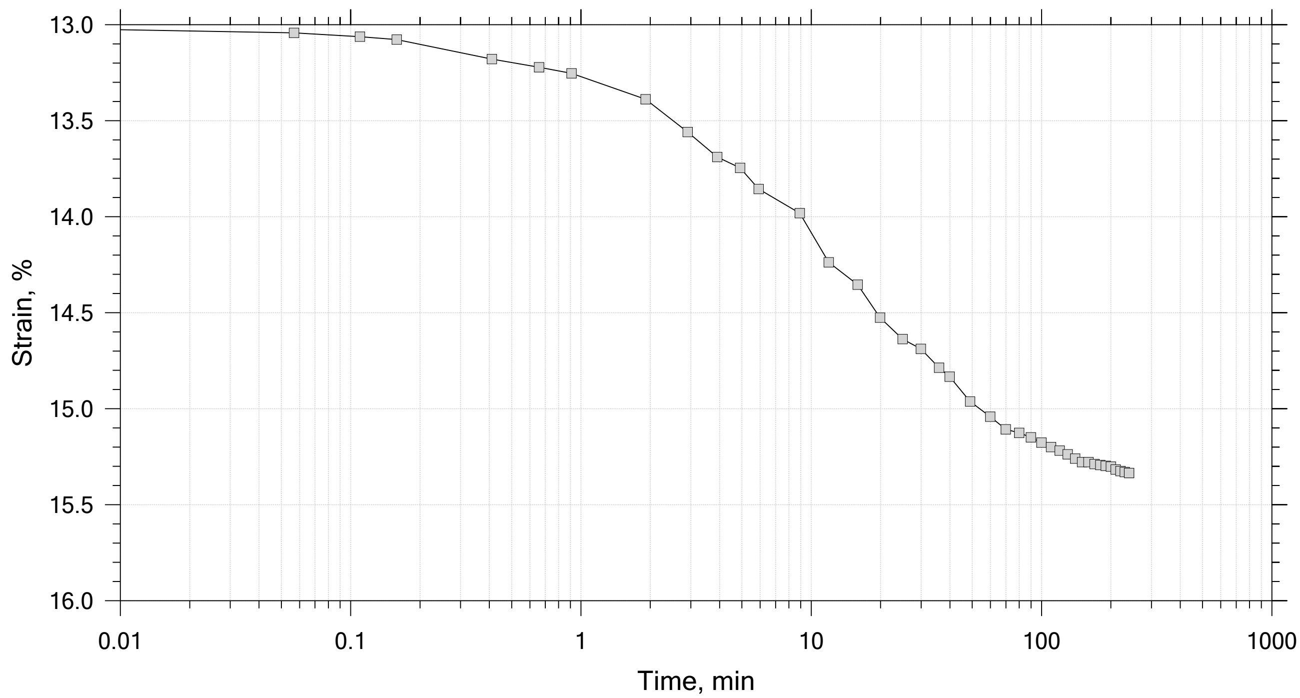
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

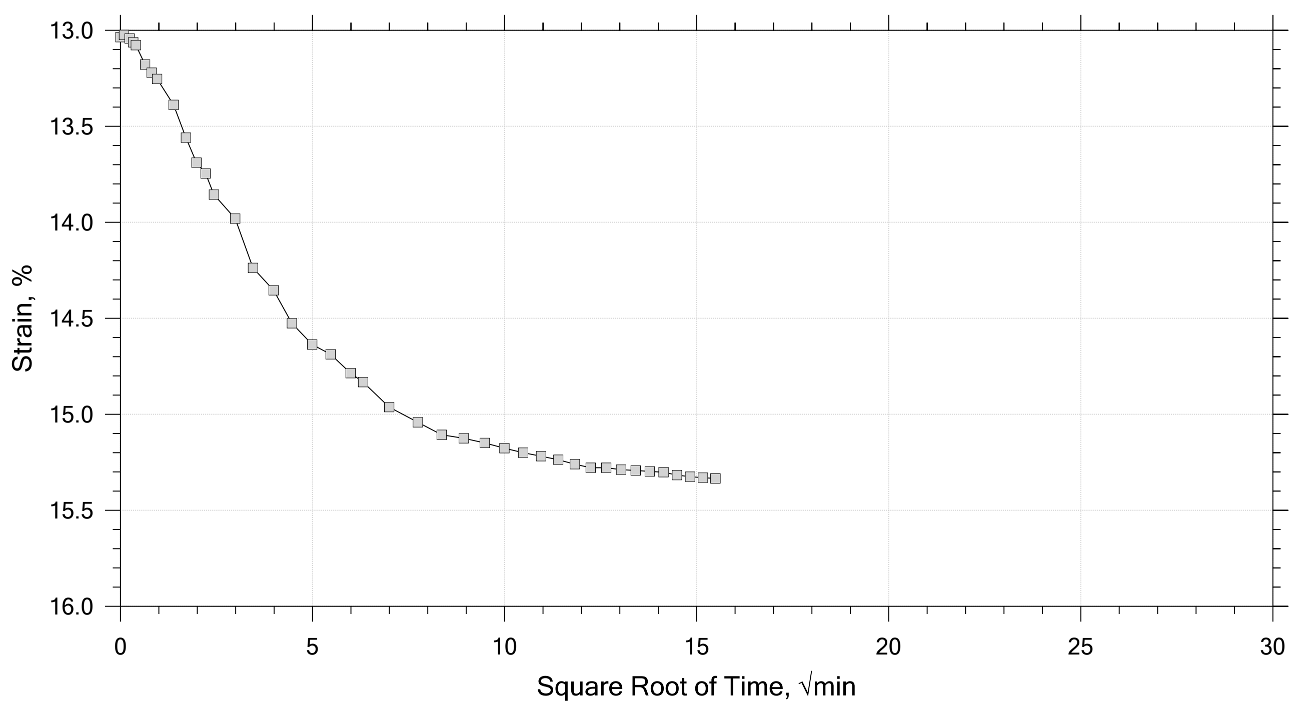
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf

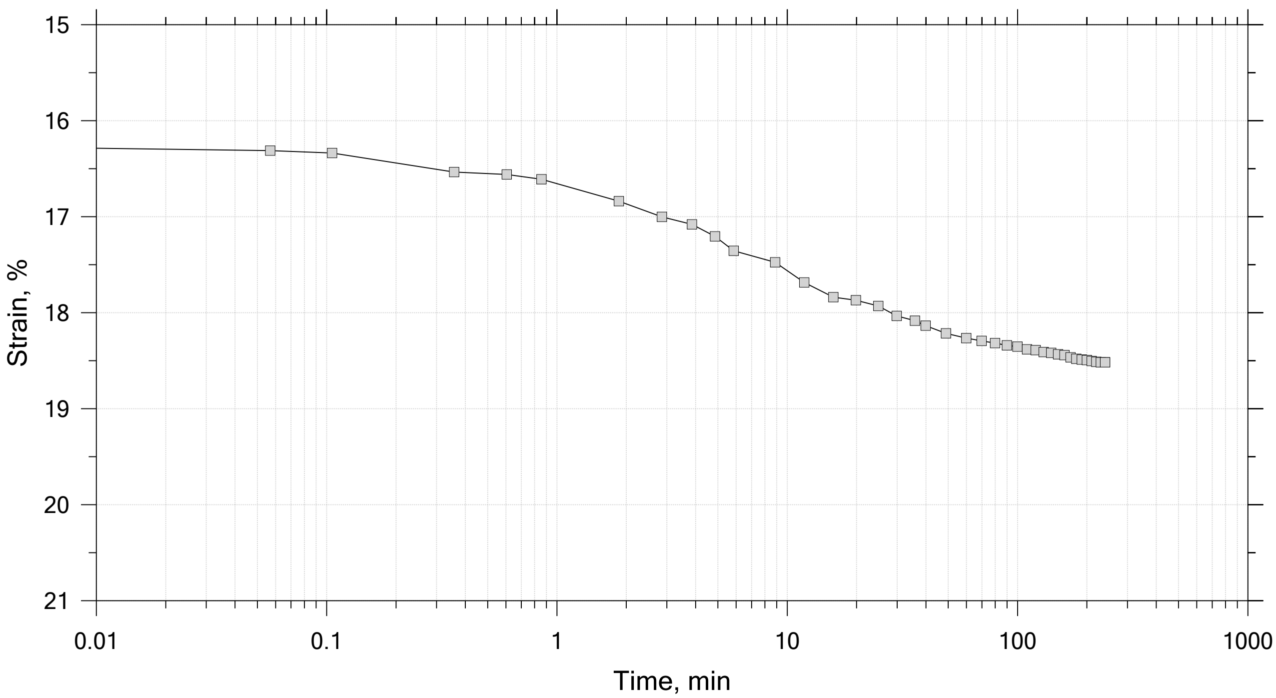


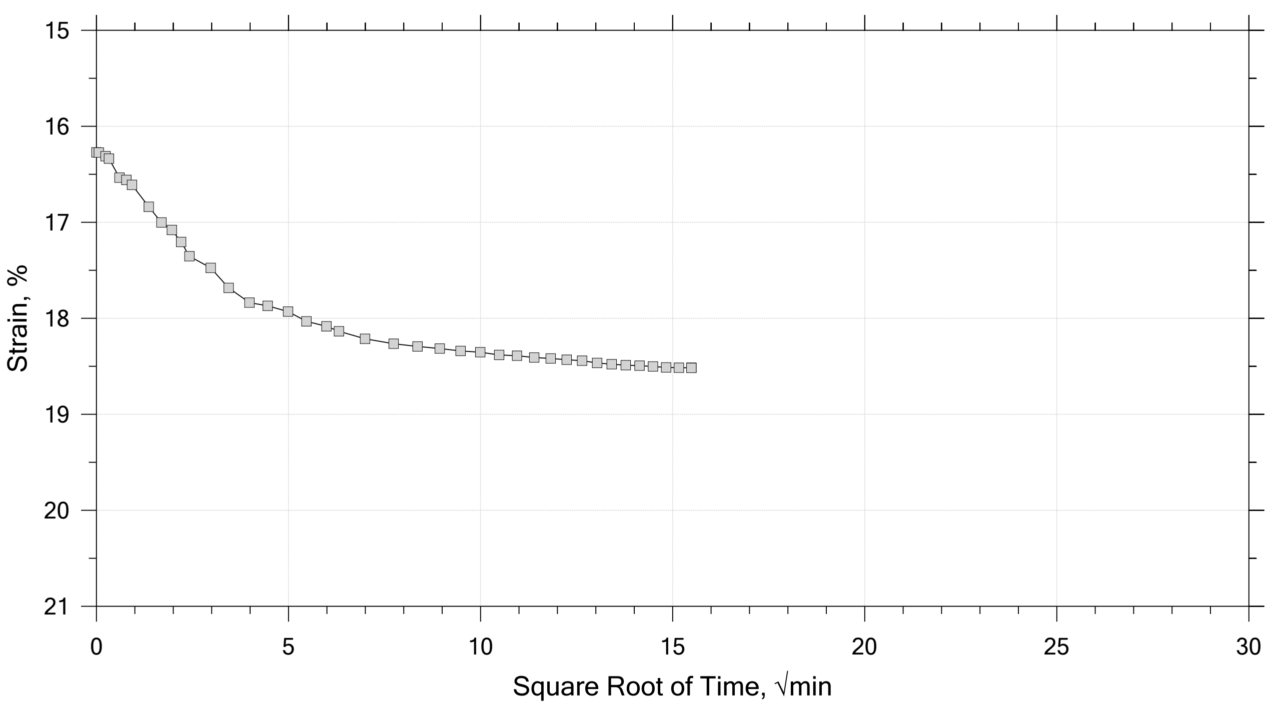


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15
Constant Load Step
Stress: 2 tsf





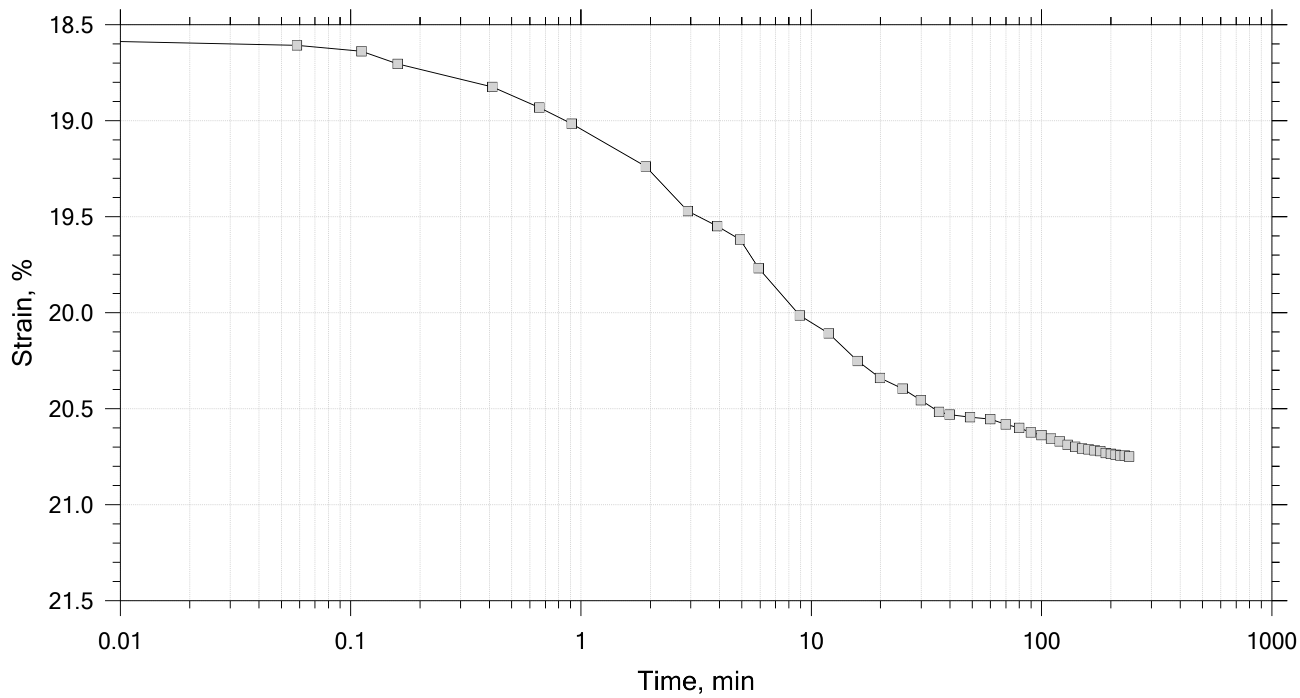
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

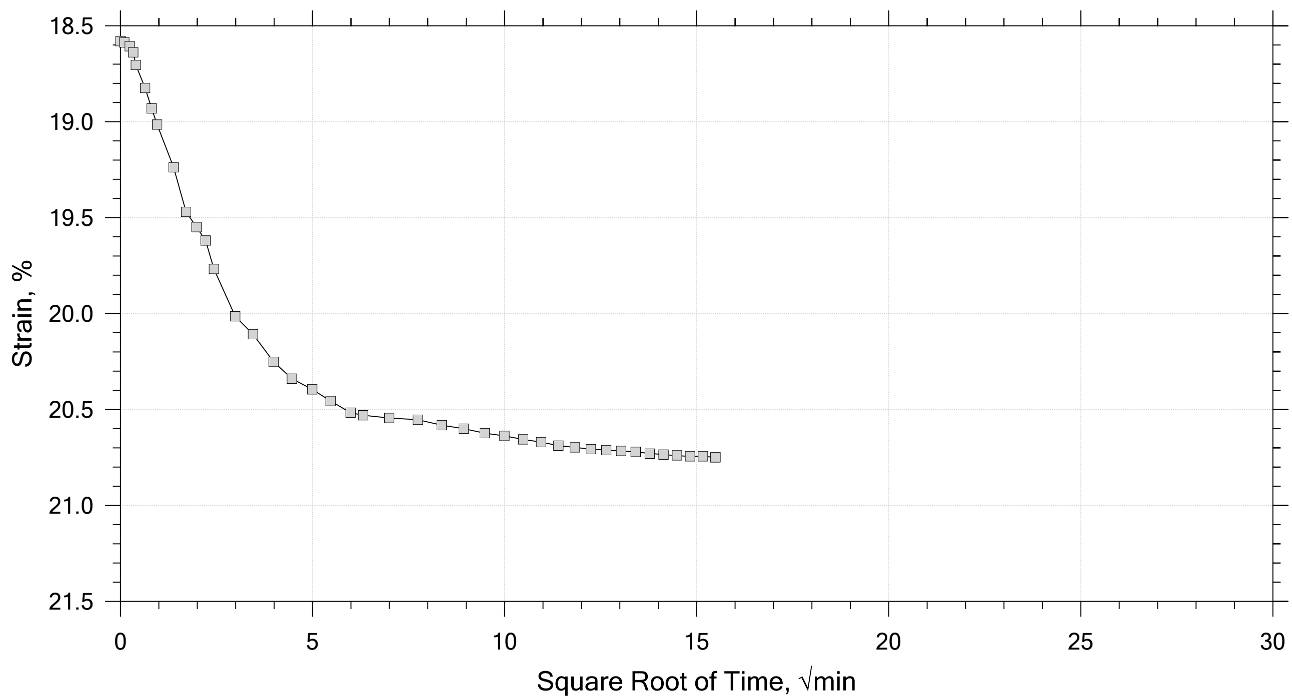
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





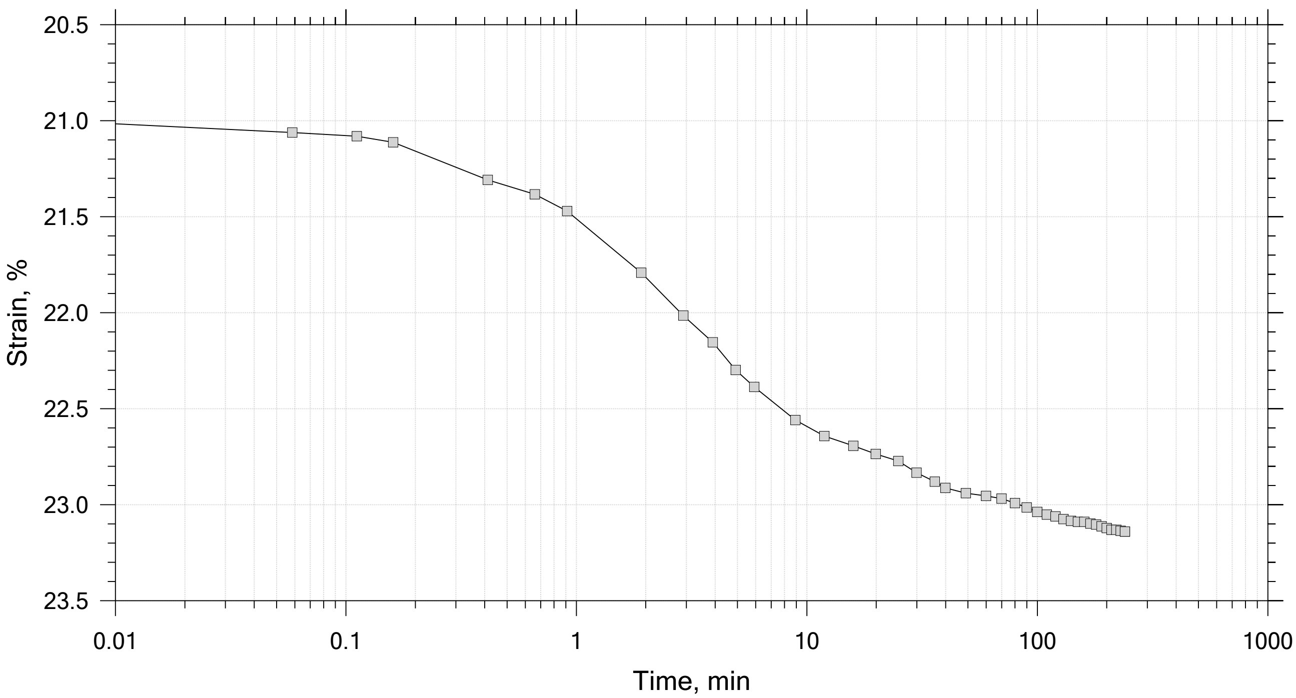
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

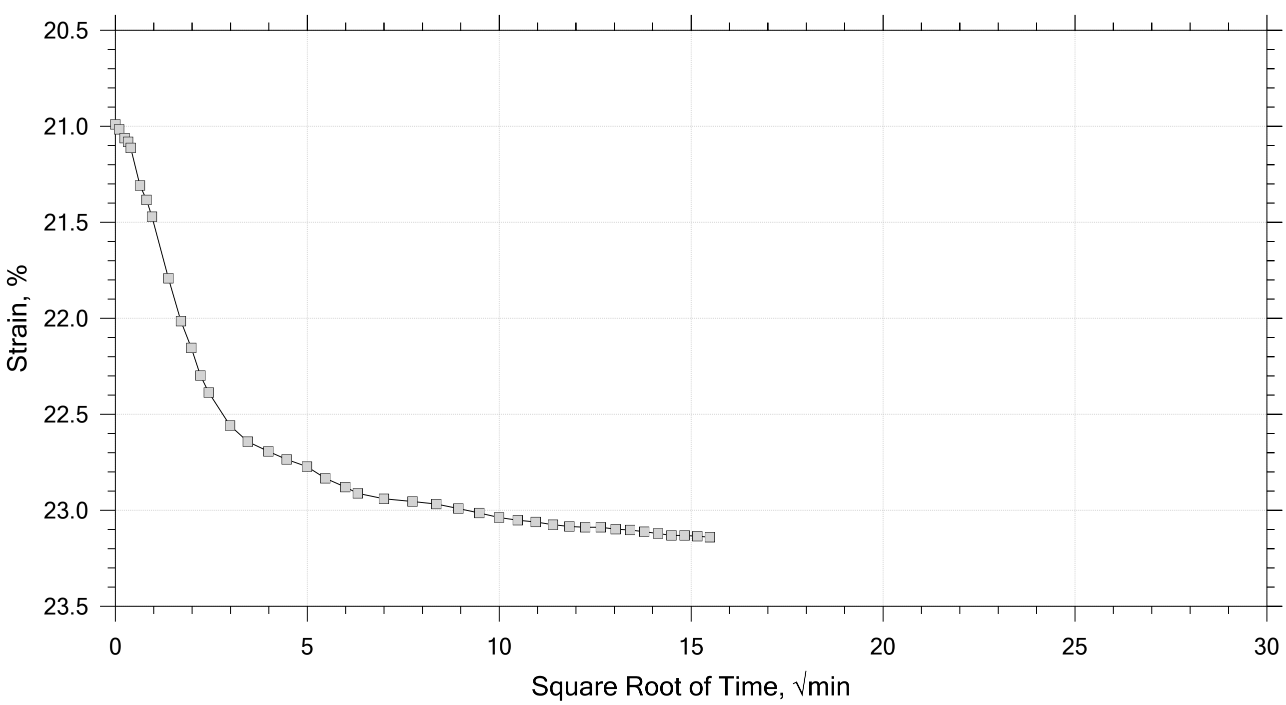
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





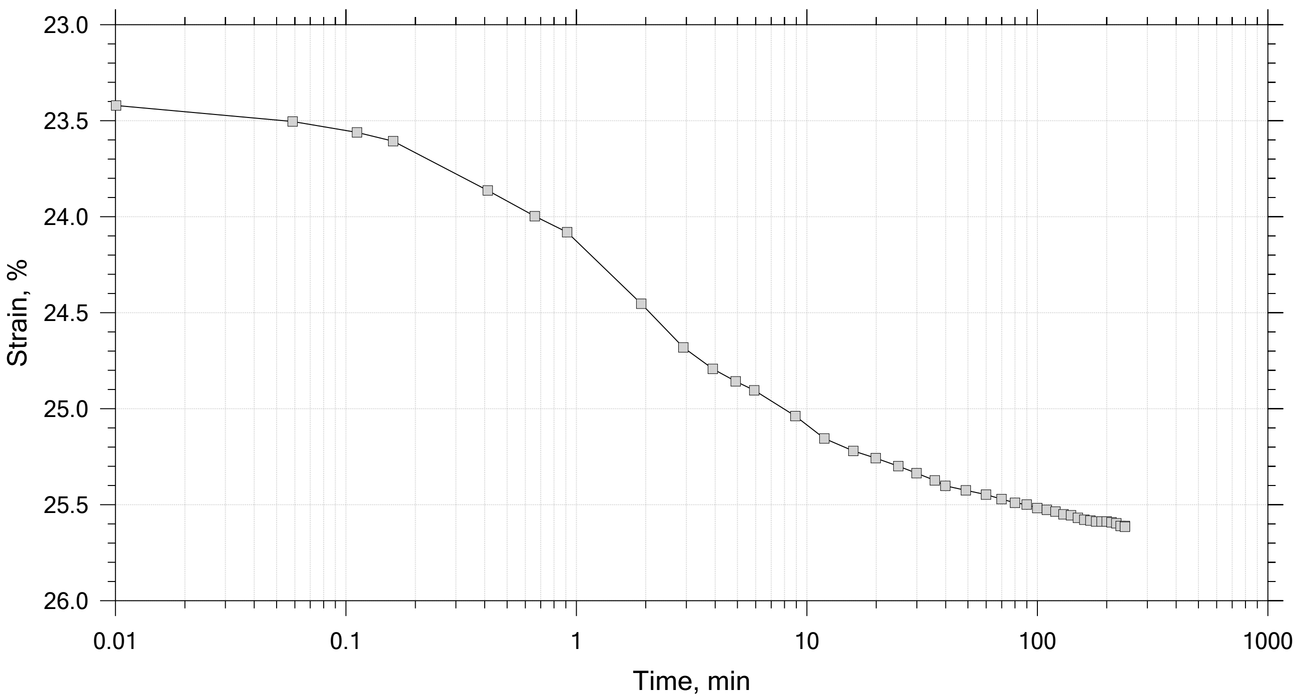
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

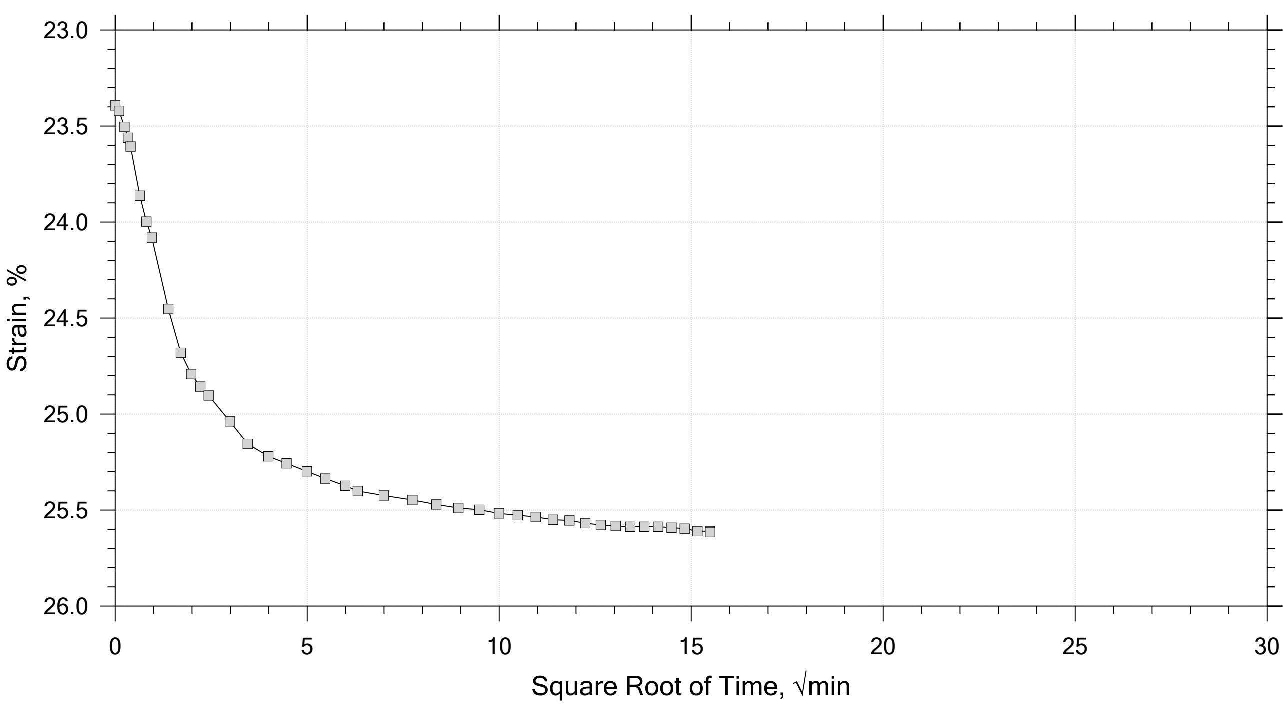
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

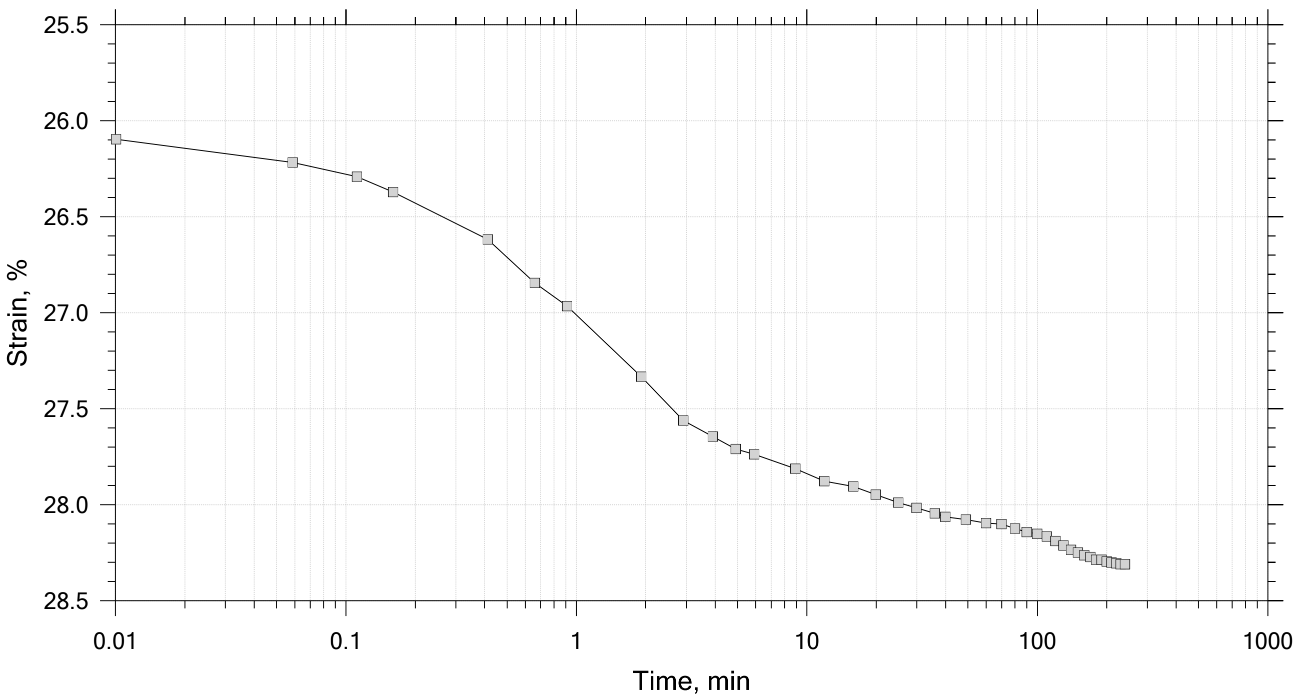


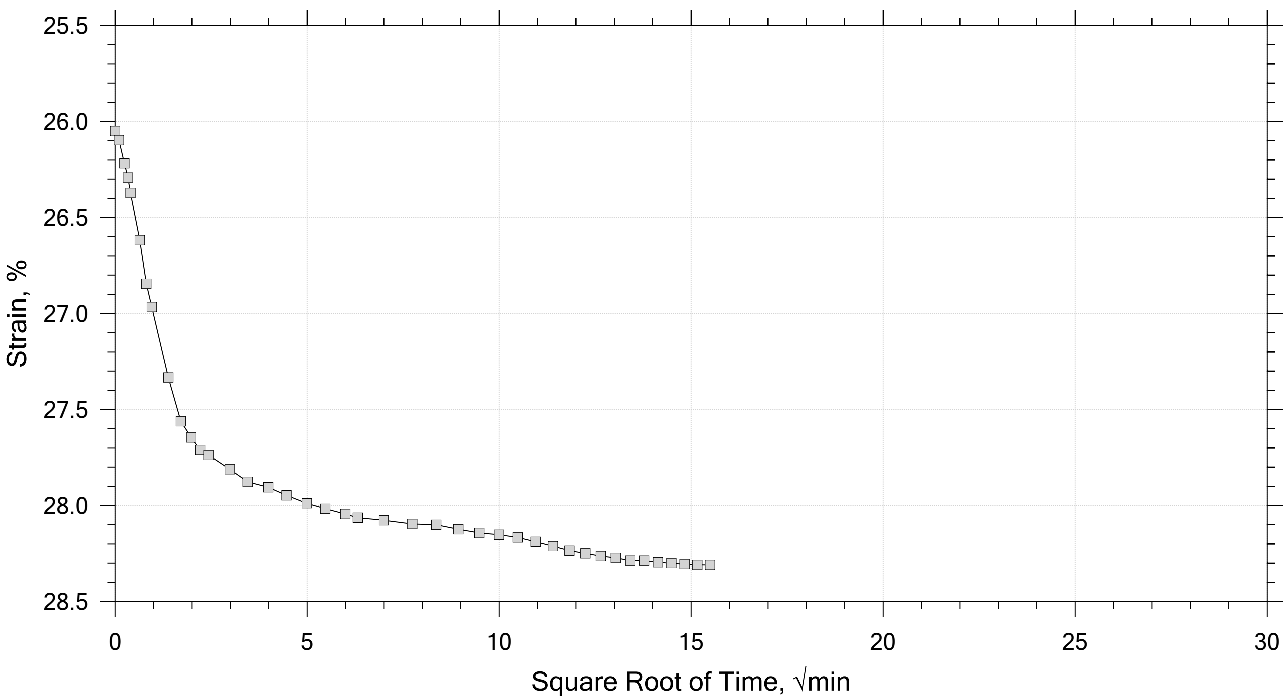


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf





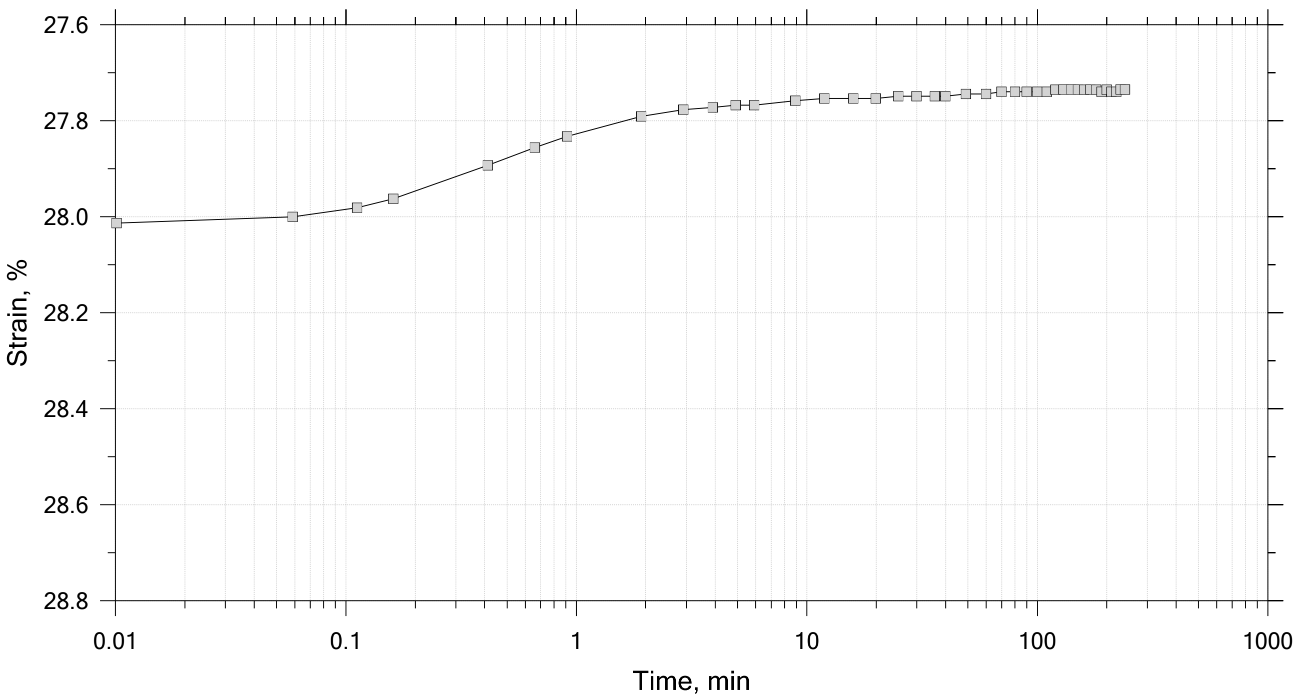
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

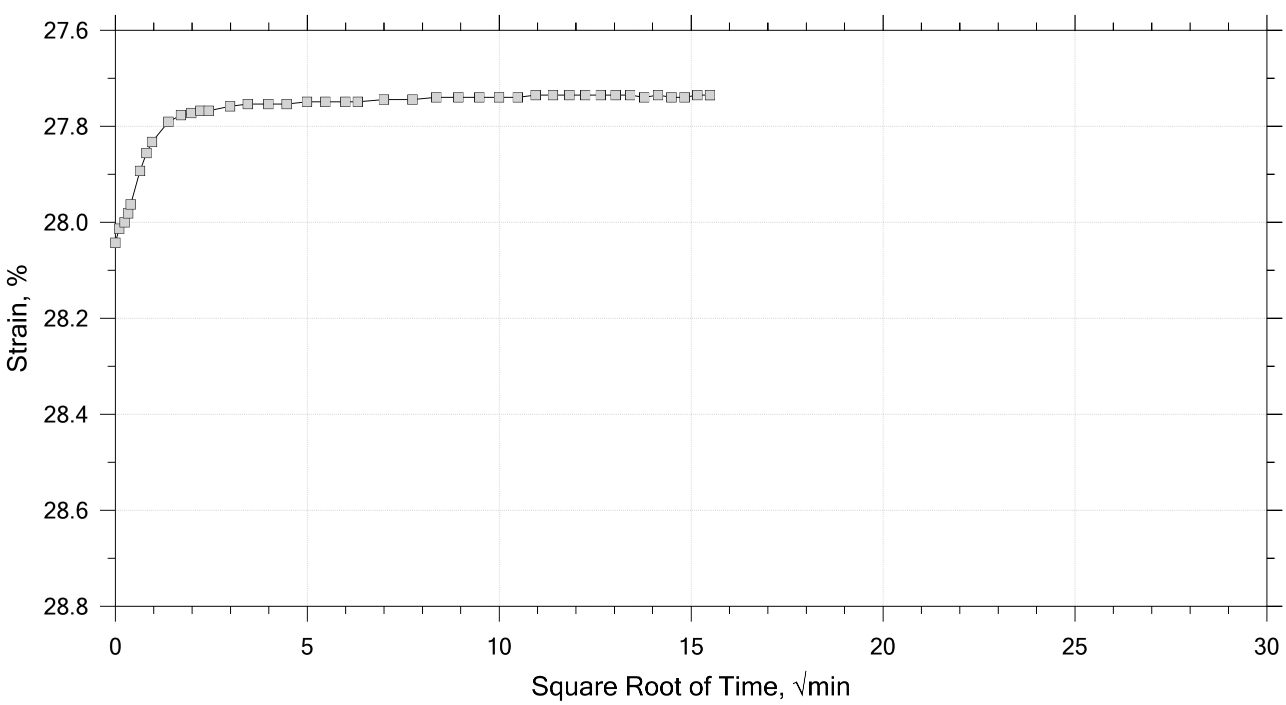
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf





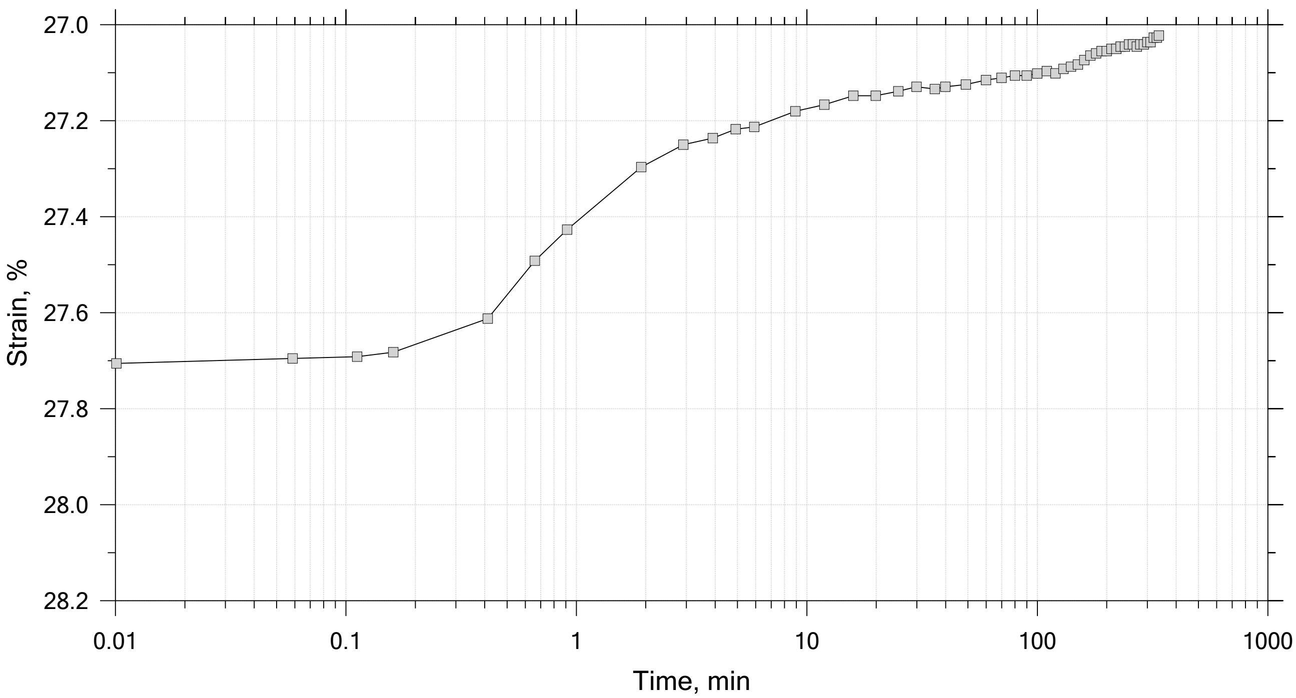
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

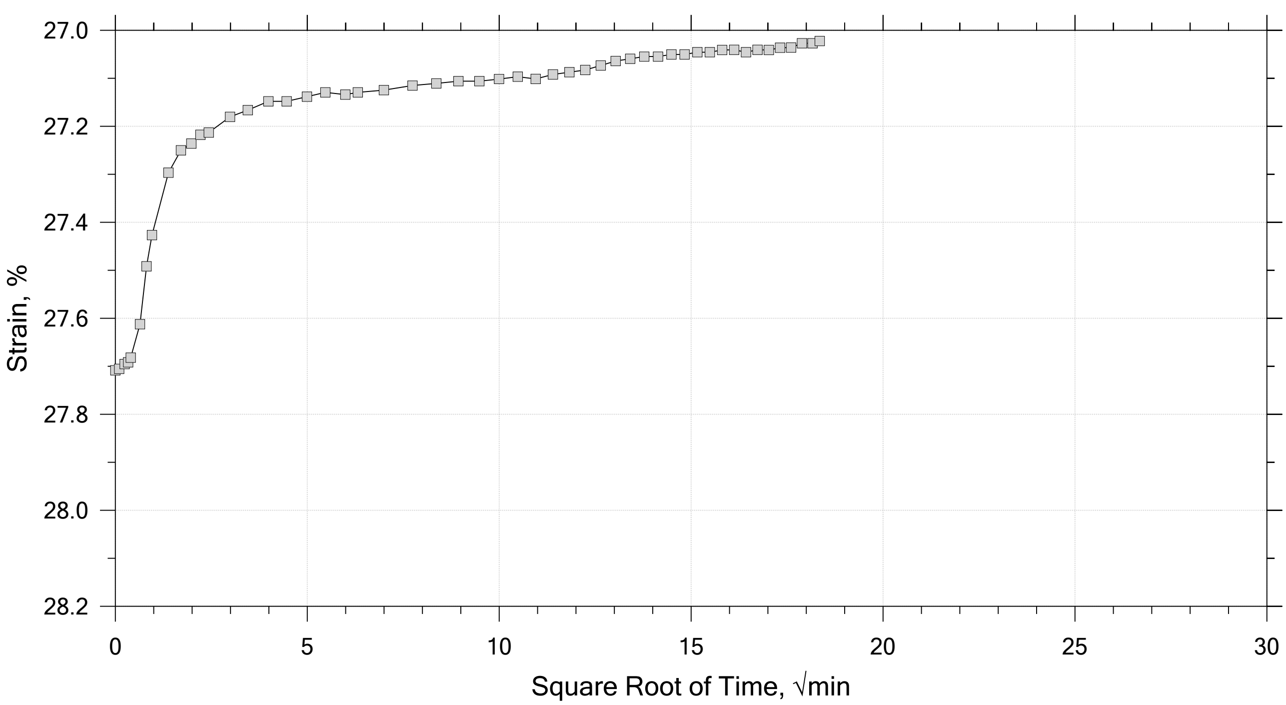
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf





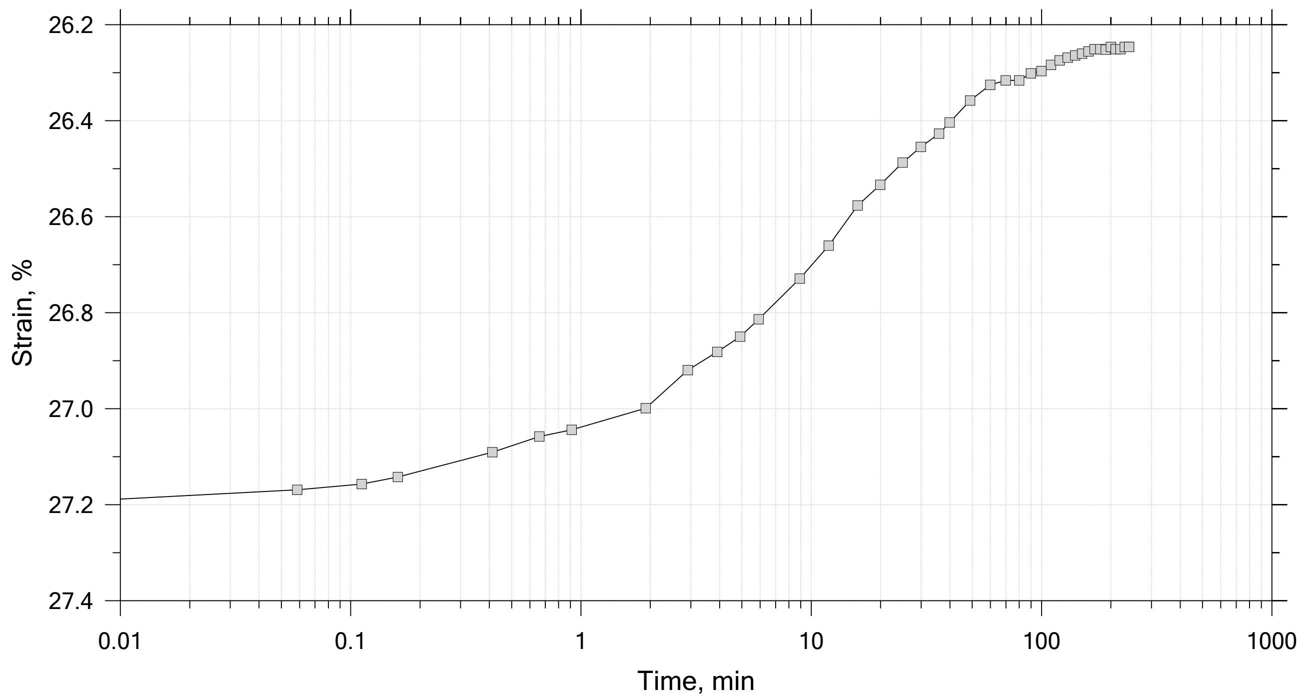
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

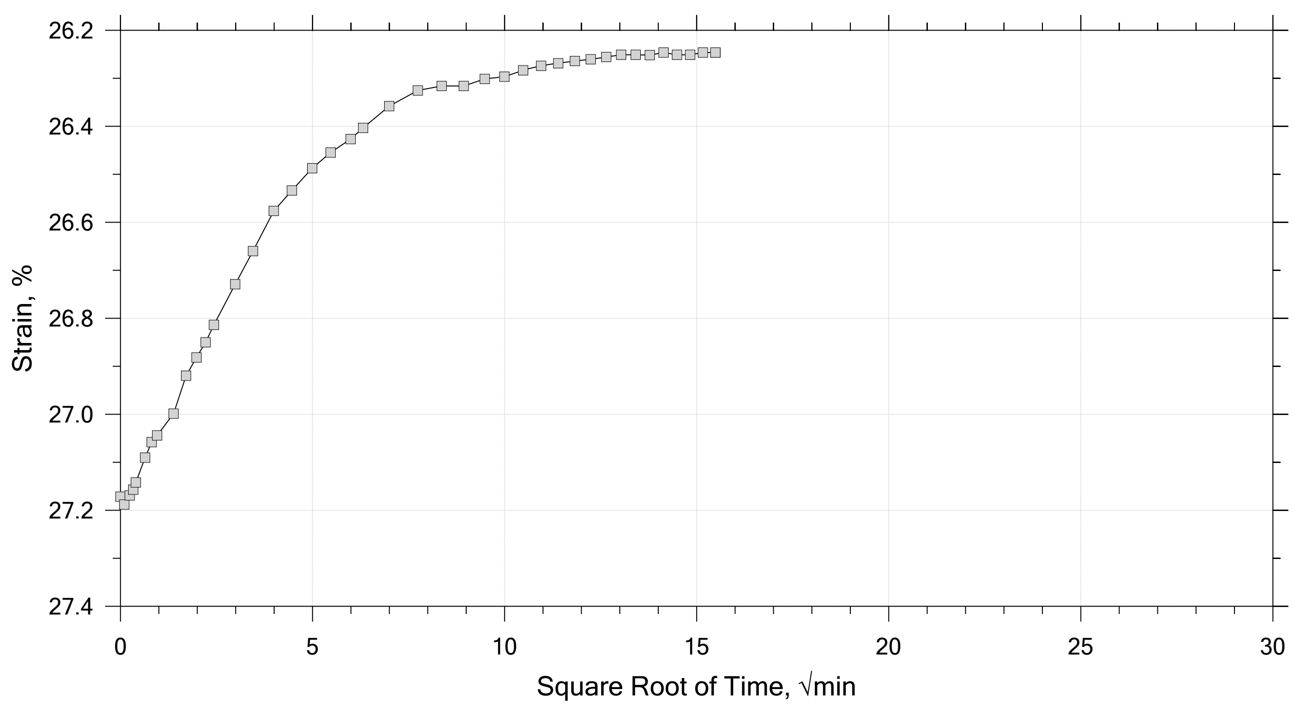
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf

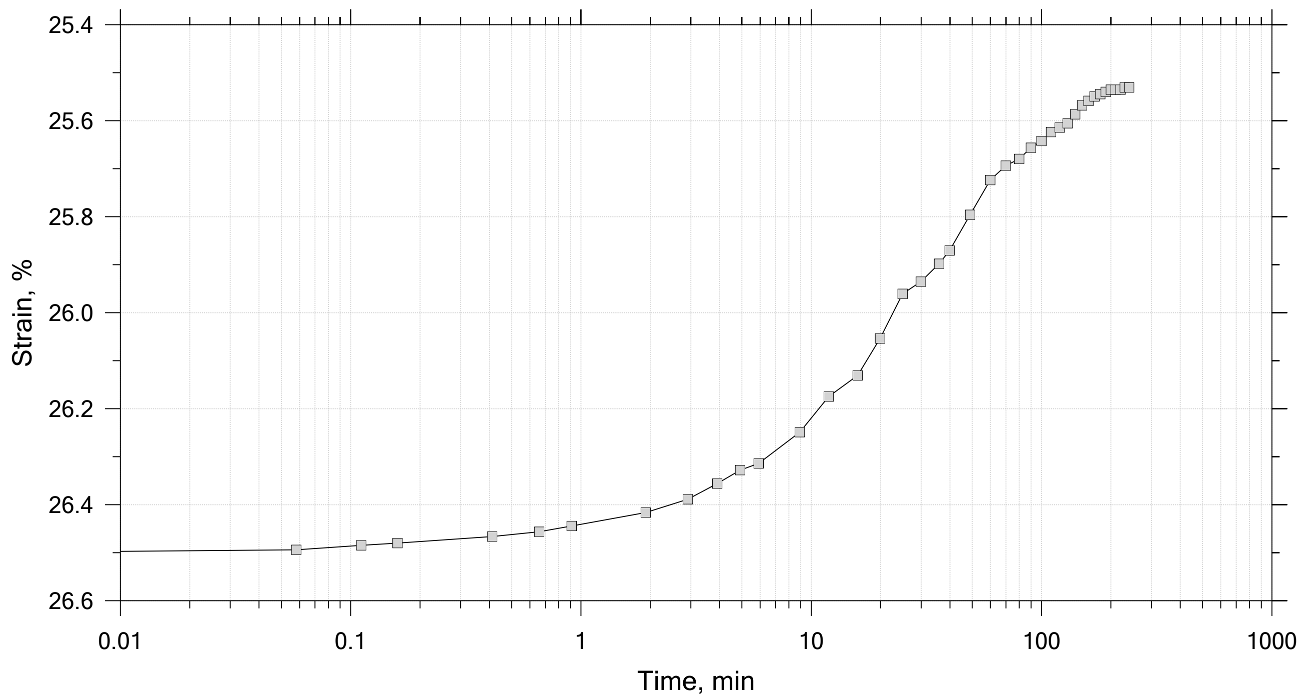


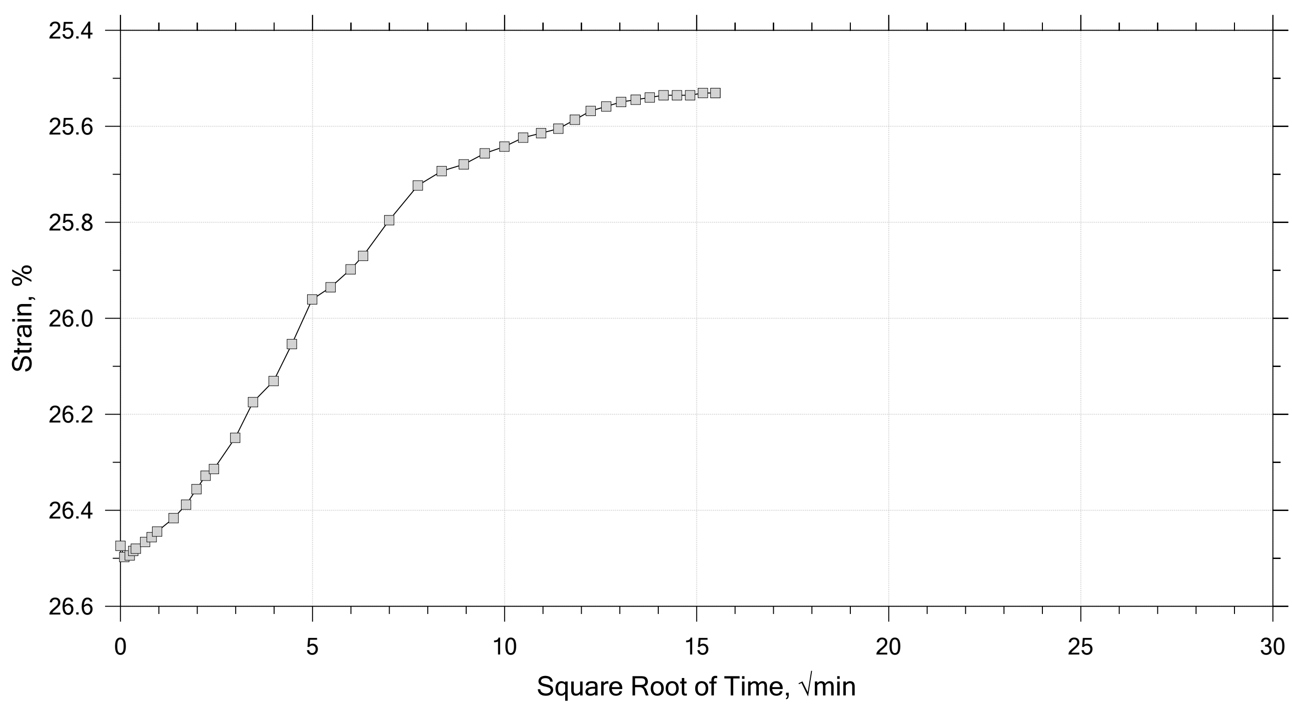


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf





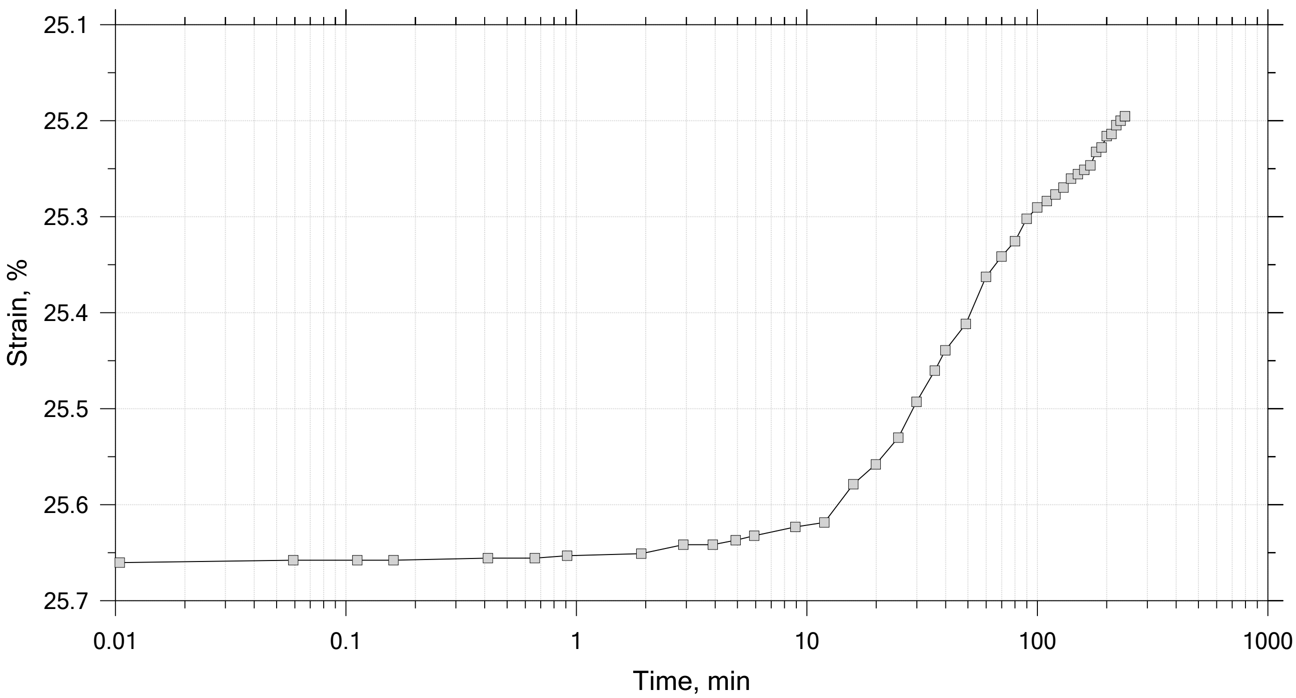
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

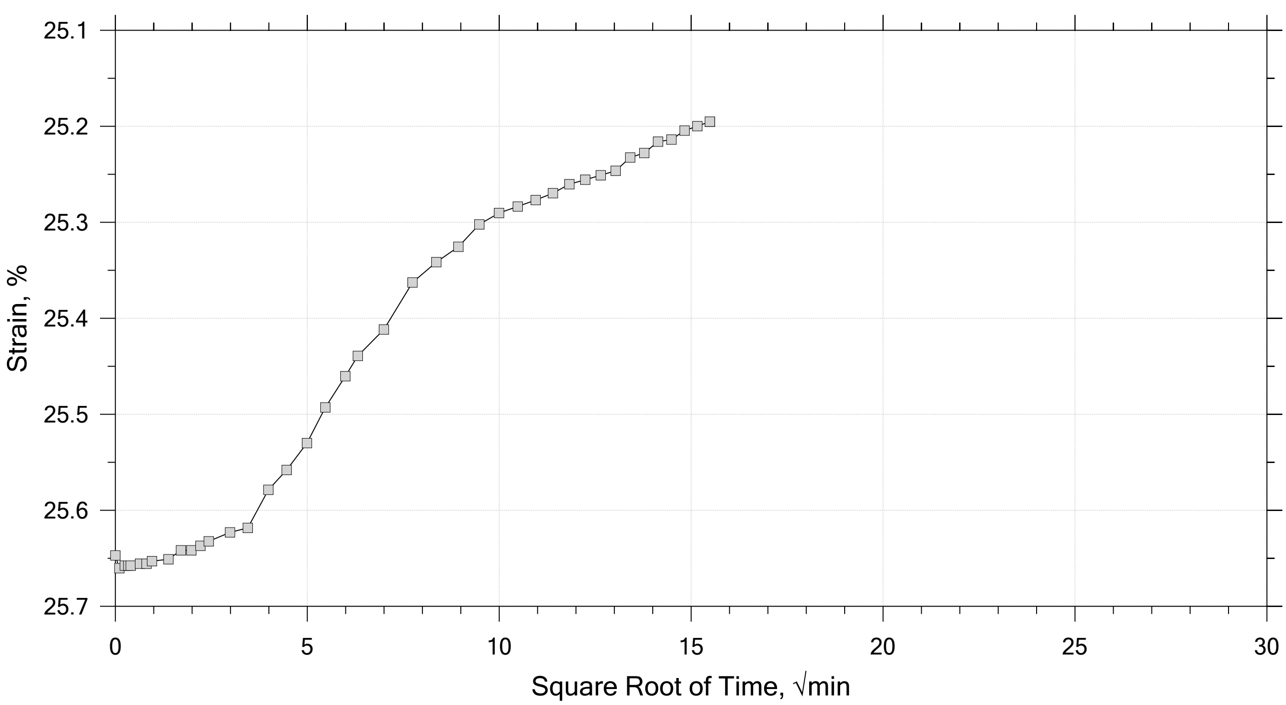
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.72	Liquid Limit: 27
Initial Height: 1.00 in	Initial Void Ratio: 0.914	Plastic Limit: 16
Final Height: 0.77 in	Final Void Ratio: 0.474	Plasticity Index: 11

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D2441	RING		D1581
Mass Container, gm	8.37	112.41	112.41	8.72
Mass Container + Wet Soil, gm	150.77	265.2	246.84	139.34
Mass Container + Dry Soil, gm	111.43	226.94	226.94	120
Mass Dry Soil, gm	103.06	114.53	114.53	111.28
Water Content, %	38.17	33.41	17.38	17.38
Void Ratio	---	0.91	0.47	---
Degree of Saturation, %	---	99.63	100.00	---
Dry Unit Weight, pcf	---	88.882	115.43	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0624	0.06285	0.793	6.28	0.000	0.00e+00	1.01e+00	0.00e+00	0.00e+00
2	0.125	0.09056	0.740	9.06	0.000	0.00e+00	4.42e-01	0.00e+00	0.00e+00
3	0.250	0.1093	0.705	10.9	0.000	0.00e+00	1.50e-01	0.00e+00	0.00e+00
4	0.500	0.1317	0.662	13.2	15.286	2.88e-07	8.97e-02	6.98e-05	0.00e+00
5	1.00	0.1533	0.620	15.3	11.108	3.77e-07	4.33e-02	4.40e-05	0.00e+00
6	2.00	0.1852	0.559	18.5	5.341	7.37e-07	3.18e-02	6.32e-05	0.00e+00
7	4.00	0.2075	0.517	20.7	2.707	1.36e-06	1.12e-02	4.10e-05	0.00e+00
8	8.00	0.2314	0.471	23.1	2.488	1.40e-06	5.98e-03	2.25e-05	0.00e+00
9	16.0	0.2562	0.423	25.6	1.720	1.89e-06	3.09e-03	1.58e-05	0.00e+00
10	32.0	0.2831	0.372	28.3	1.302	2.34e-06	1.68e-03	1.06e-05	0.00e+00
11	8.00	0.2774	0.383	27.7	0.000	0.00e+00	2.39e-04	0.00e+00	0.00e+00
12	2.00	0.2702	0.397	27.0	1.189	2.53e-06	1.19e-03	8.10e-06	0.00e+00
13	0.500	0.2625	0.411	26.2	8.002	3.83e-07	5.17e-03	5.35e-06	0.00e+00
14	0.125	0.2553	0.425	25.5	19.020	1.65e-07	1.91e-02	8.47e-06	0.00e+00
15	0.0625	0.2520	0.432	25.2	38.248	8.30e-08	5.37e-02	1.20e-05	0.00e+00

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Wet, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0624 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

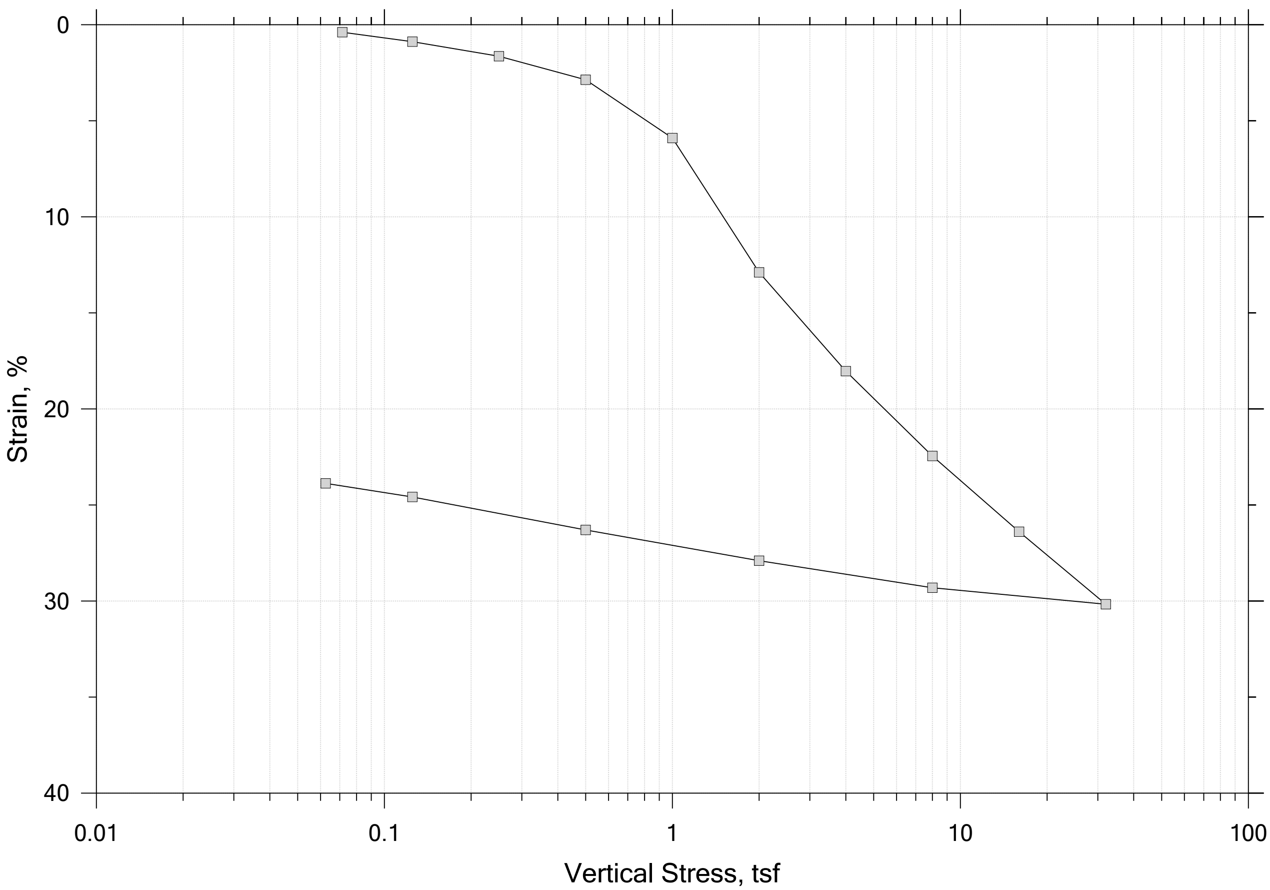
Square Root of Time Coefficients

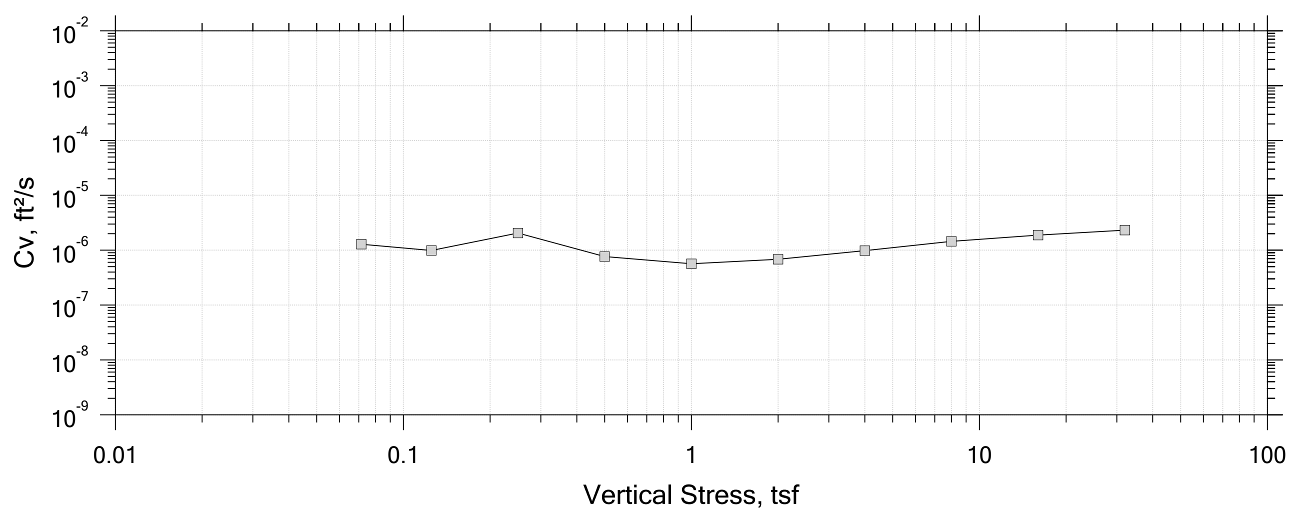
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0624	0.06285	0.793	6.28	182.043	1.26e-07	1.01e+00	3.44e-04
2	0.125	0.09056	0.740	9.06	179.274	1.17e-07	4.42e-01	1.39e-04
3	0.250	0.1093	0.705	10.9	133.552	1.49e-07	1.50e-01	6.01e-05
4	0.500	0.1317	0.662	13.2	80.052	2.37e-07	8.97e-02	5.74e-05
5	1.00	0.1533	0.620	15.3	39.176	4.61e-07	4.33e-02	5.37e-05
6	2.00	0.1852	0.559	18.5	21.478	7.88e-07	3.18e-02	6.77e-05
7	4.00	0.2075	0.517	20.7	18.484	8.57e-07	1.12e-02	2.58e-05
8	8.00	0.2314	0.471	23.1	13.610	1.10e-06	5.98e-03	1.77e-05
9	16.0	0.2562	0.423	25.6	7.397	1.90e-06	3.09e-03	1.58e-05
10	32.0	0.2831	0.372	28.3	5.621	2.33e-06	1.68e-03	1.06e-05
11	8.00	0.2774	0.383	27.7	3.851	3.30e-06	2.39e-04	2.13e-06
12	2.00	0.2702	0.397	27.0	7.698	1.68e-06	1.19e-03	5.38e-06
13	0.500	0.2625	0.411	26.2	33.349	3.96e-07	5.17e-03	5.53e-06
14	0.125	0.2553	0.425	25.5	103.435	1.30e-07	1.91e-02	6.71e-06
15	0.0625	0.2520	0.432	25.2	204.804	6.67e-08	5.37e-02	9.66e-06

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 16-18 ft
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Wet, dark gray clay		
Remarks: System V, Swell Pressure = 0.0624 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

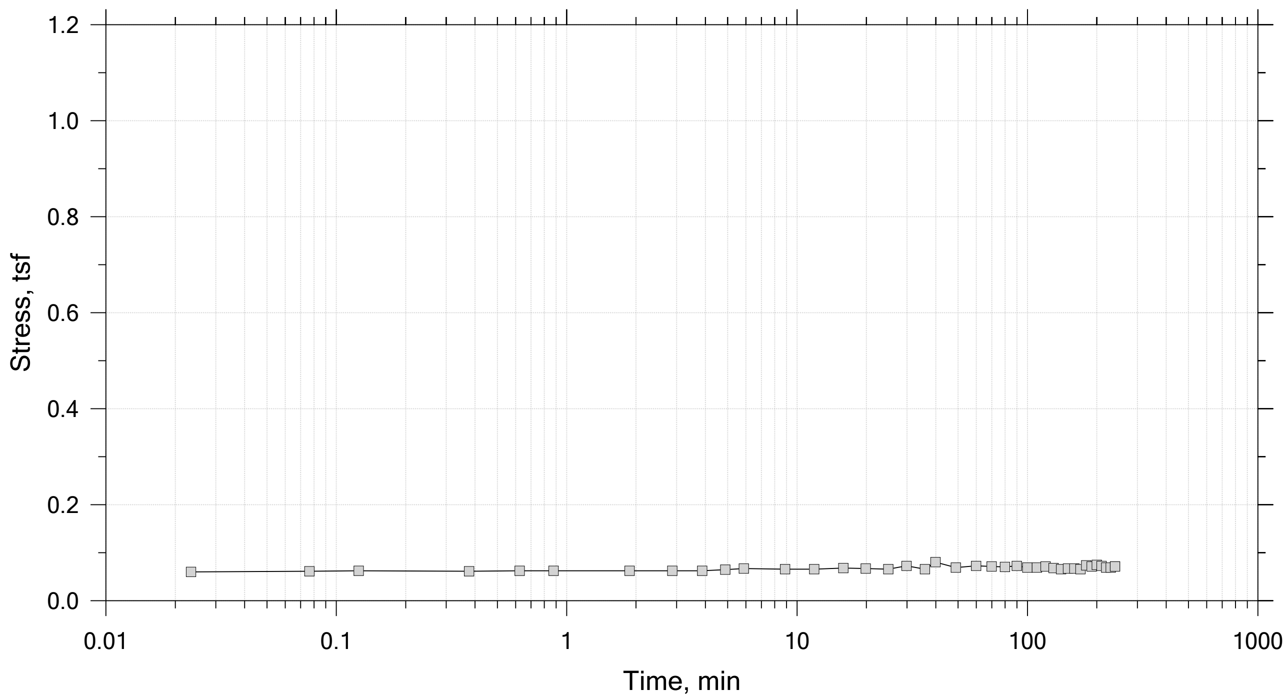


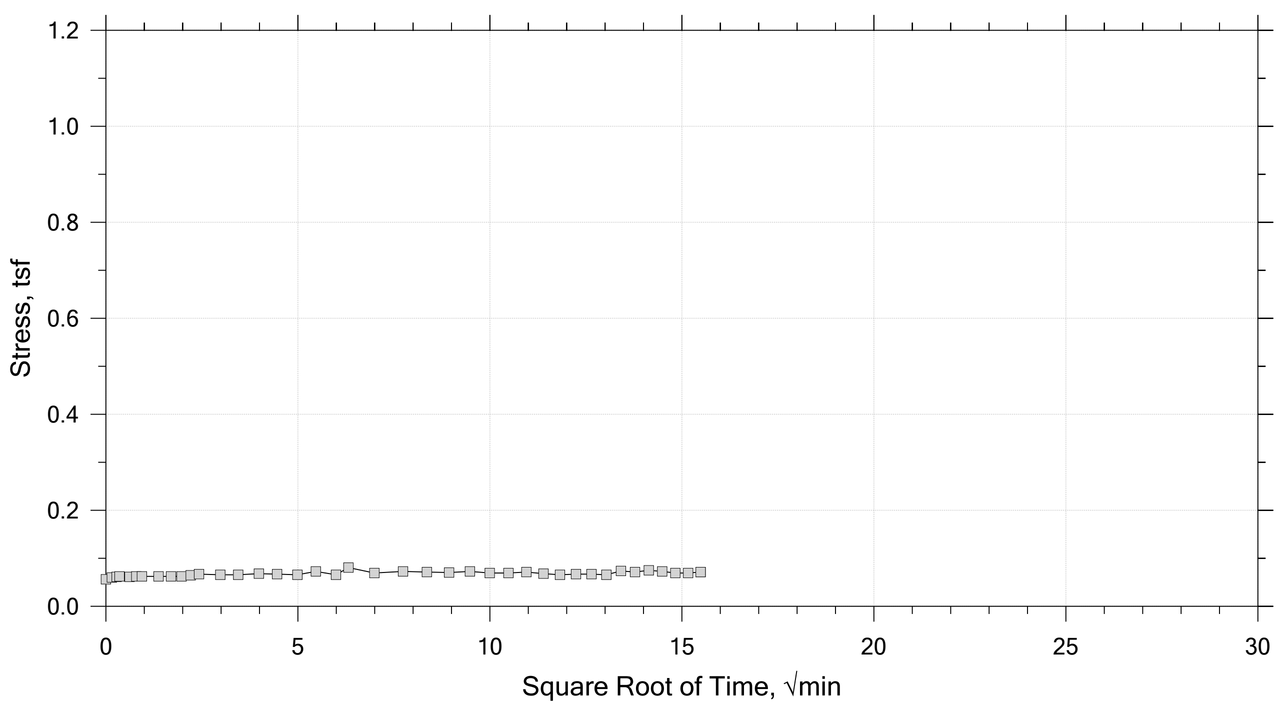


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0714 tsf

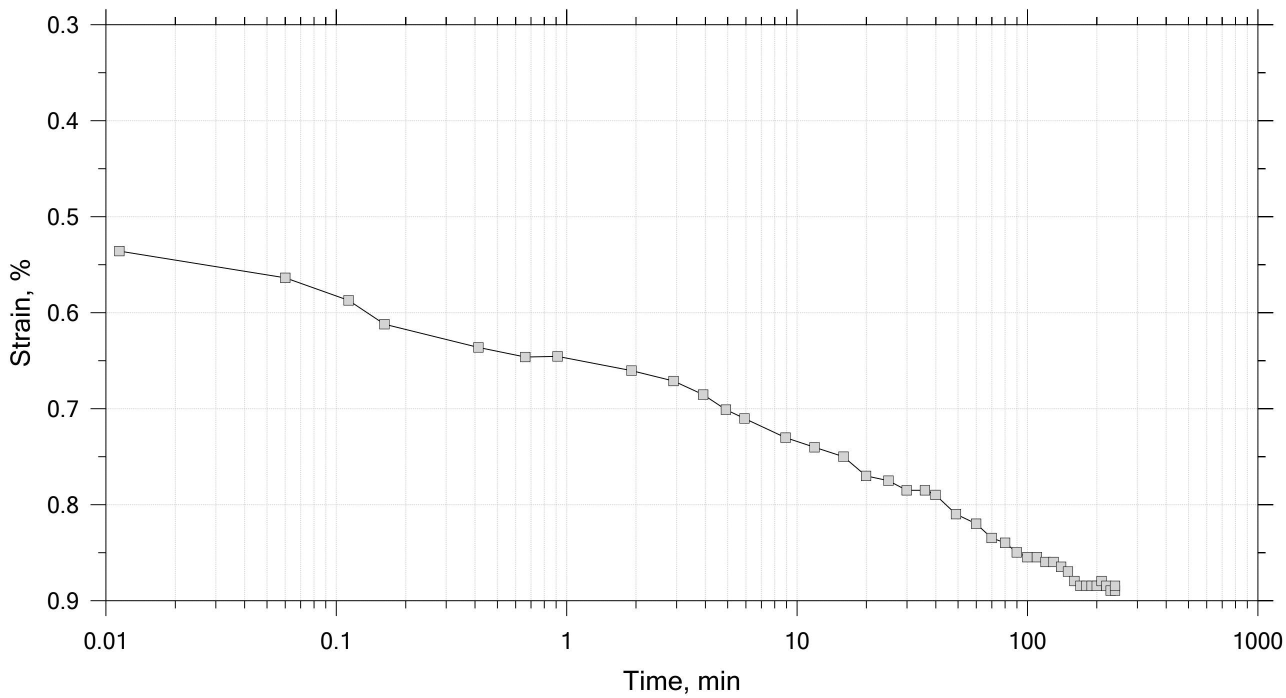


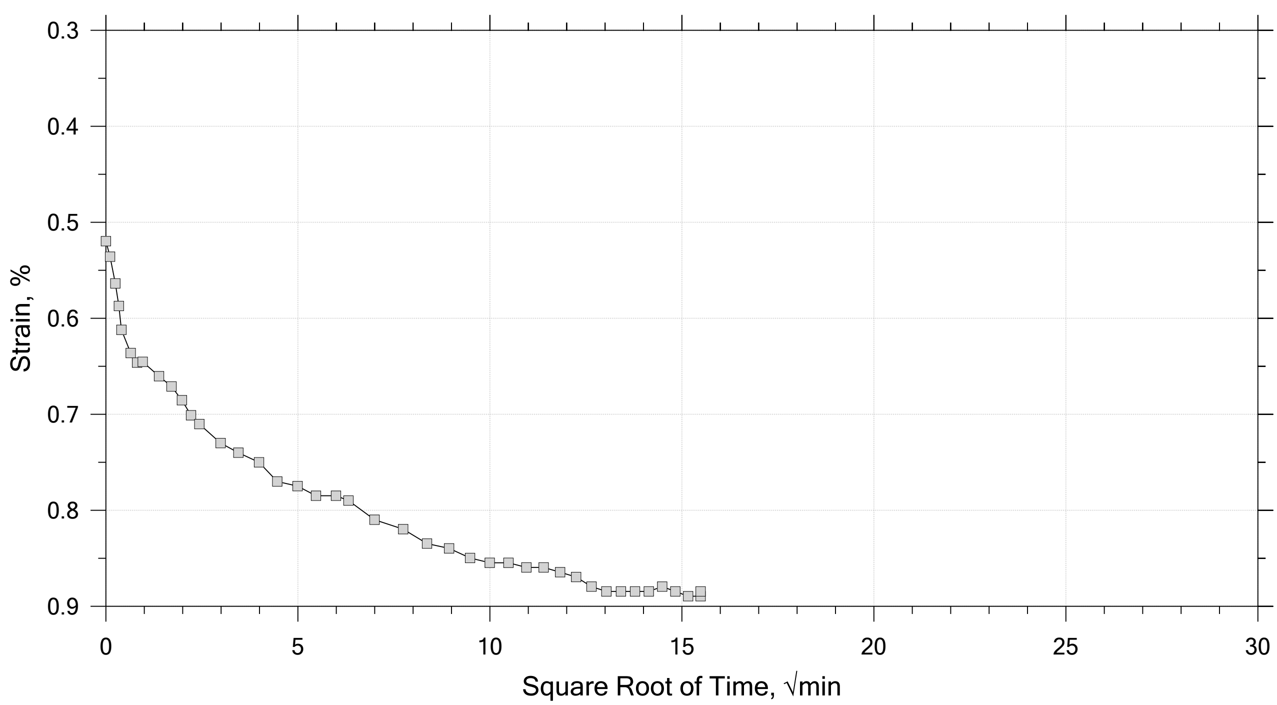


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

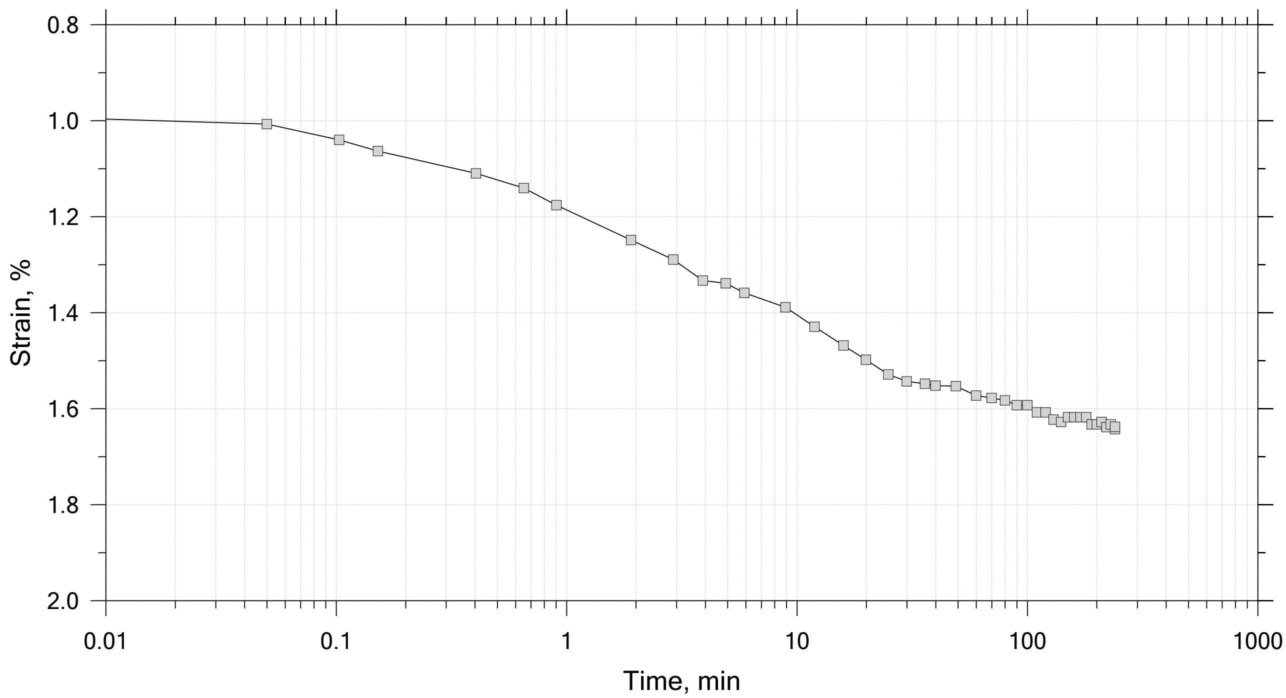


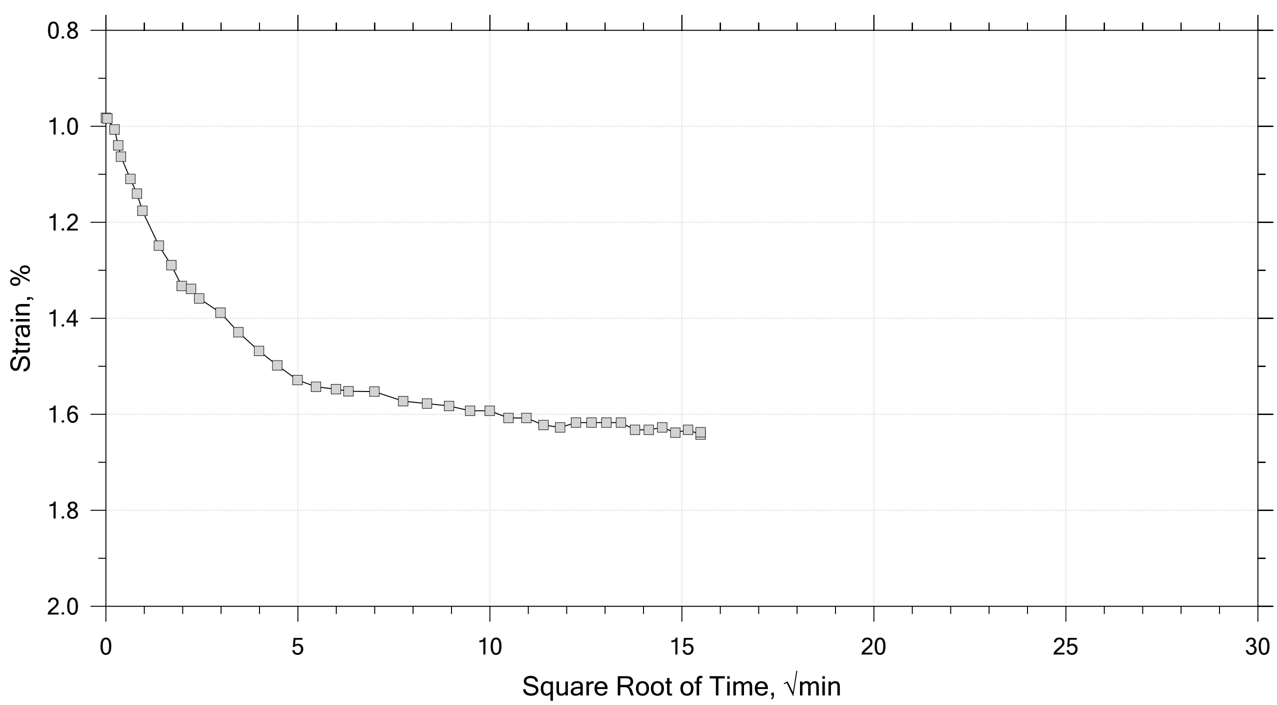


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





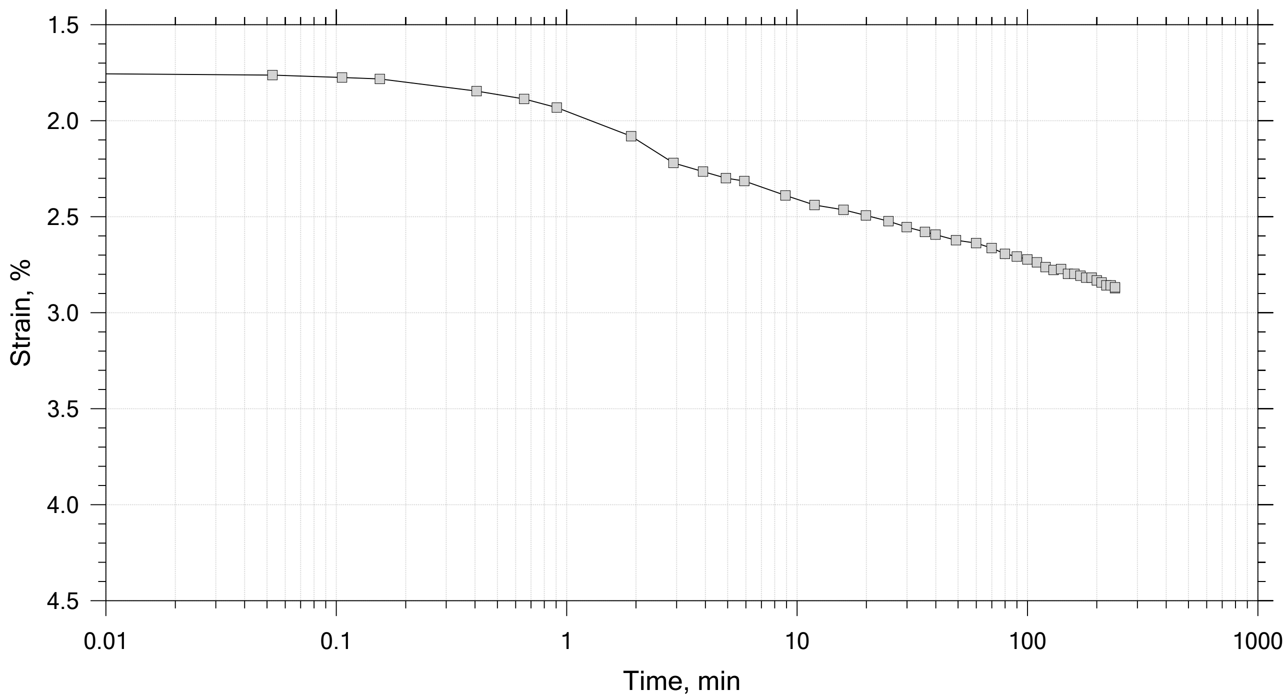
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

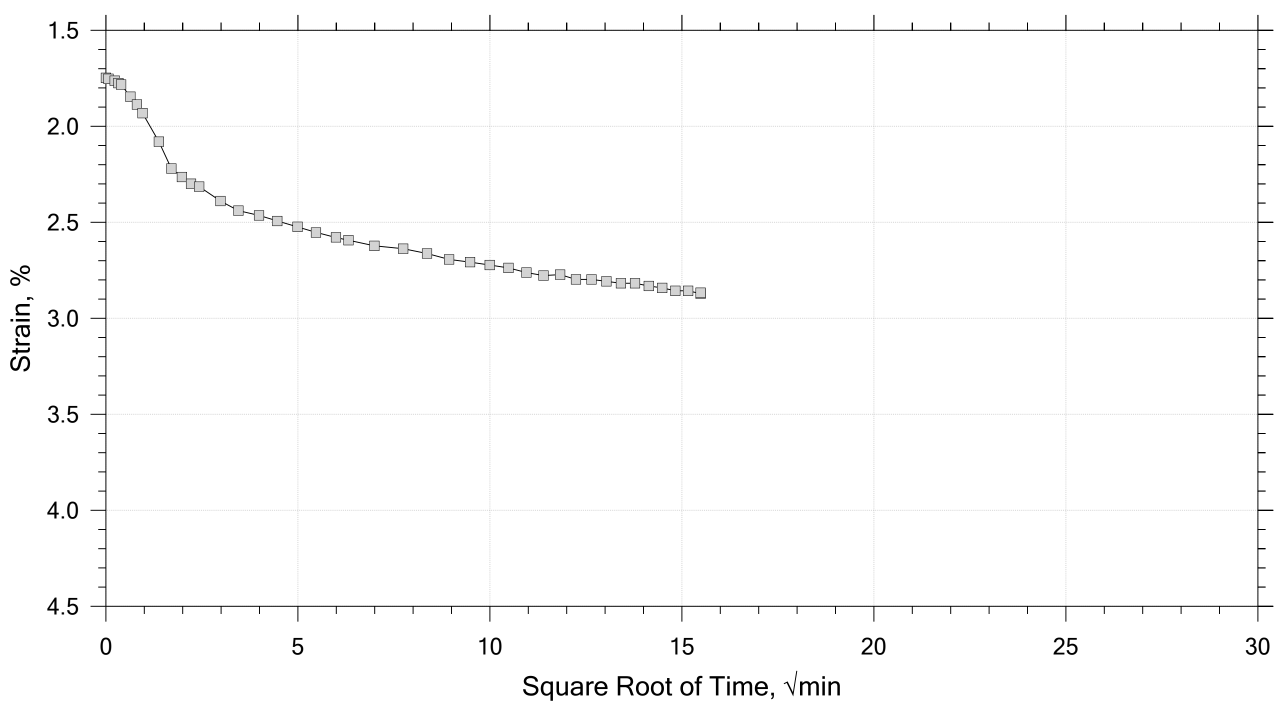
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf

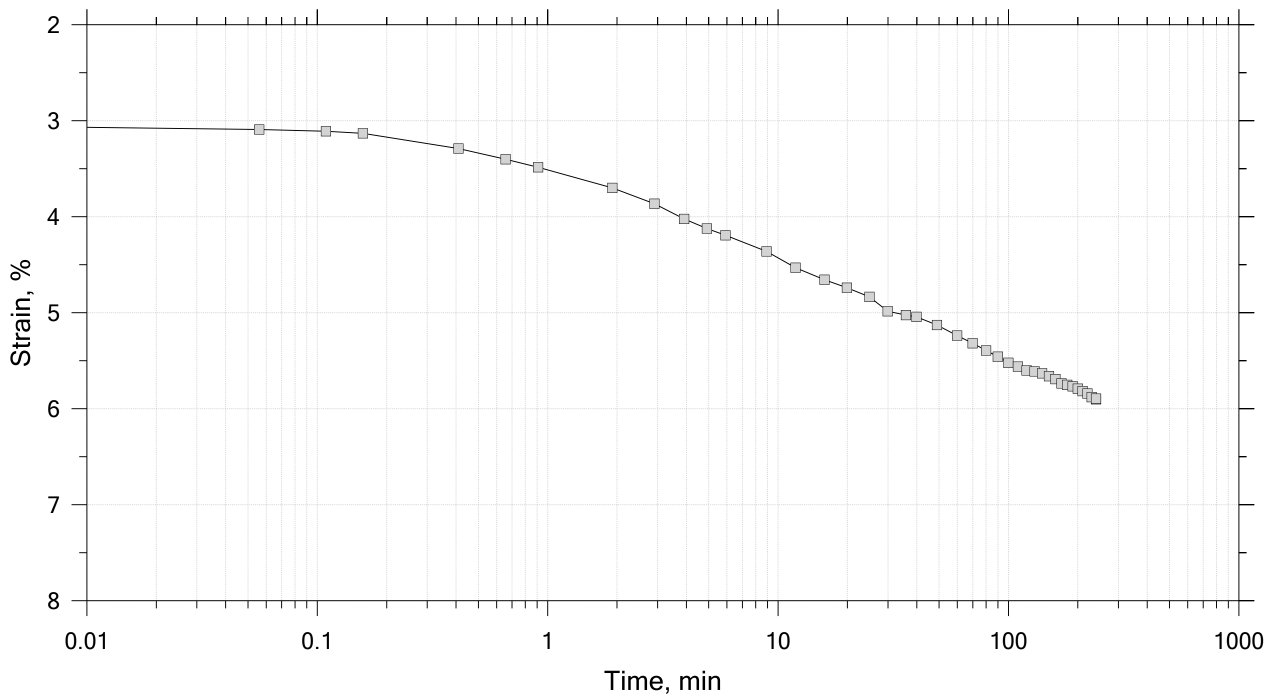


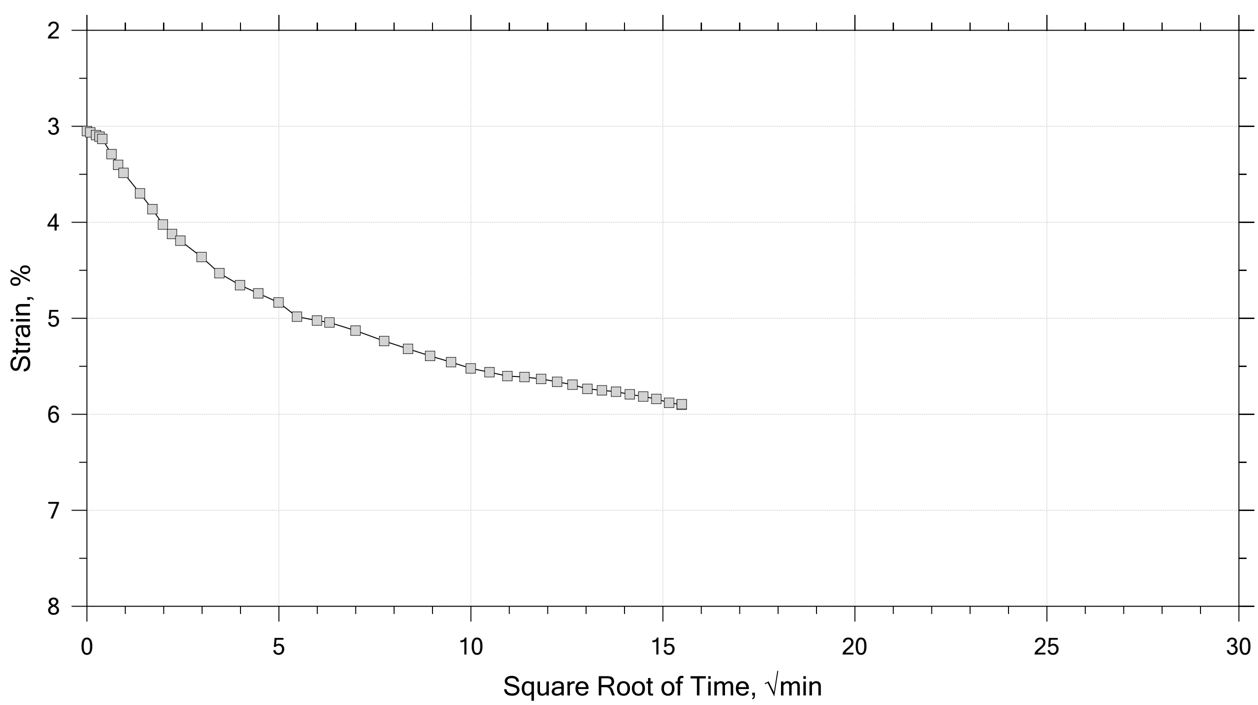


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15
Constant Load Step
Stress: 1 tsf





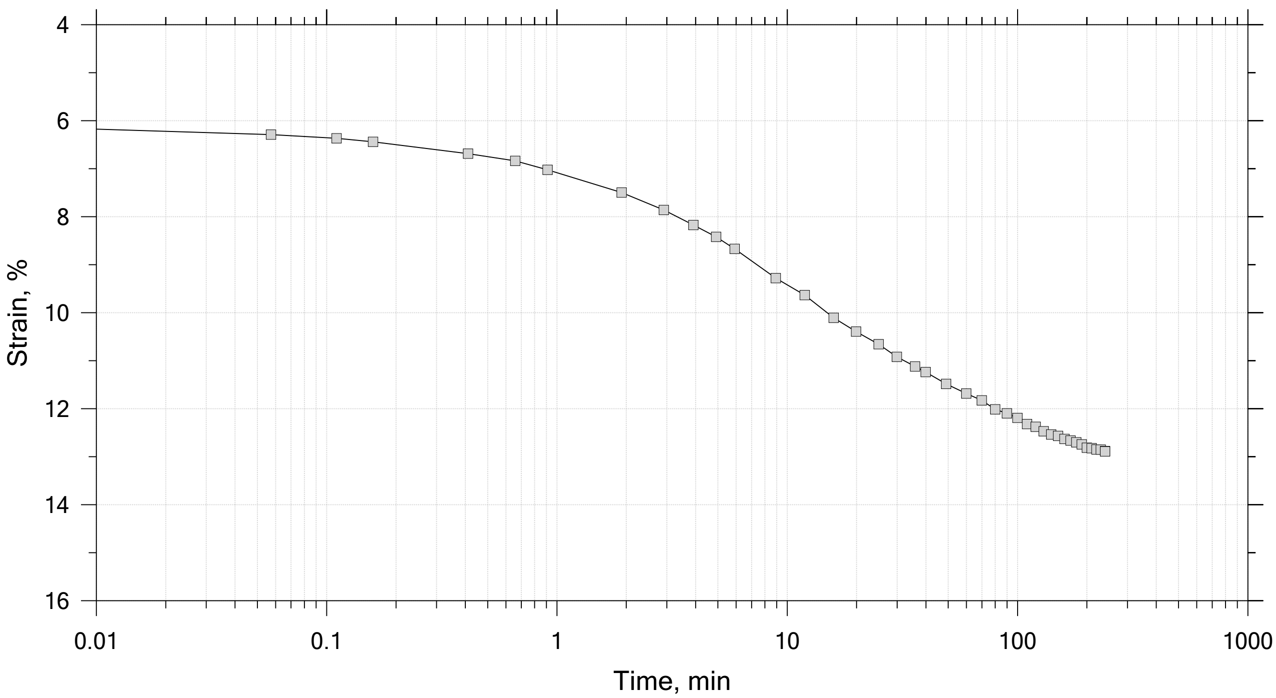
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

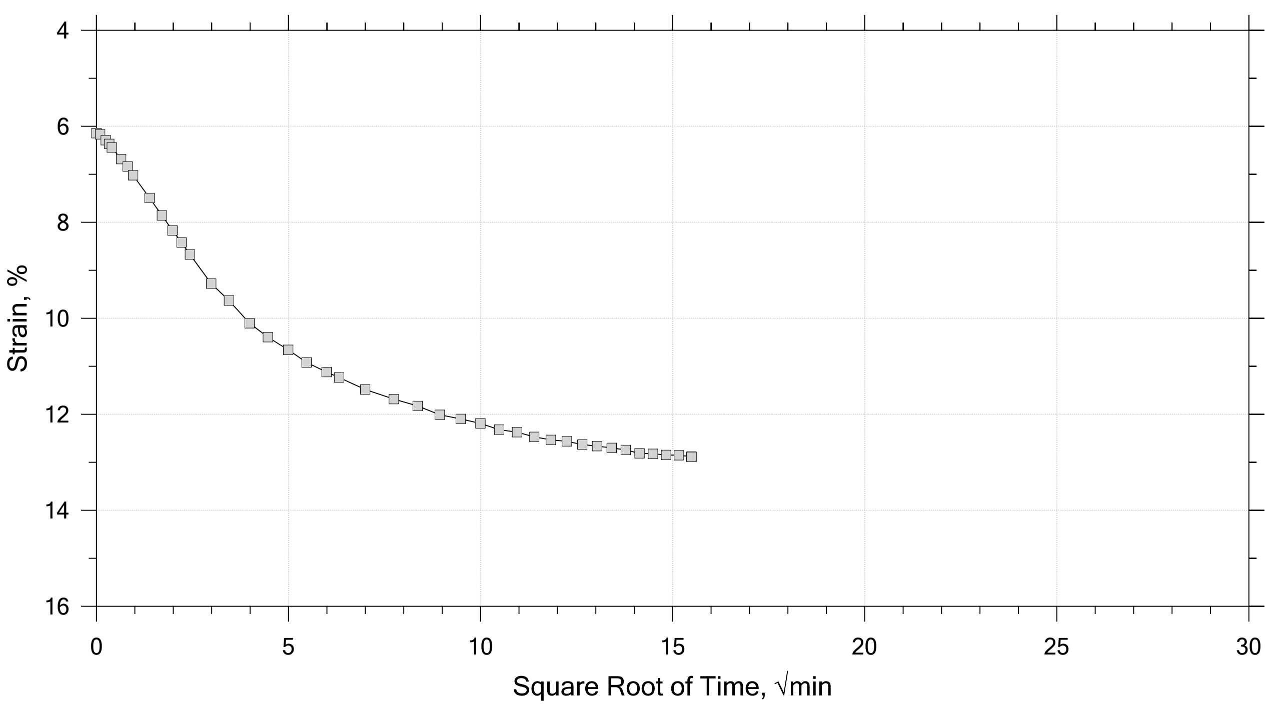
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





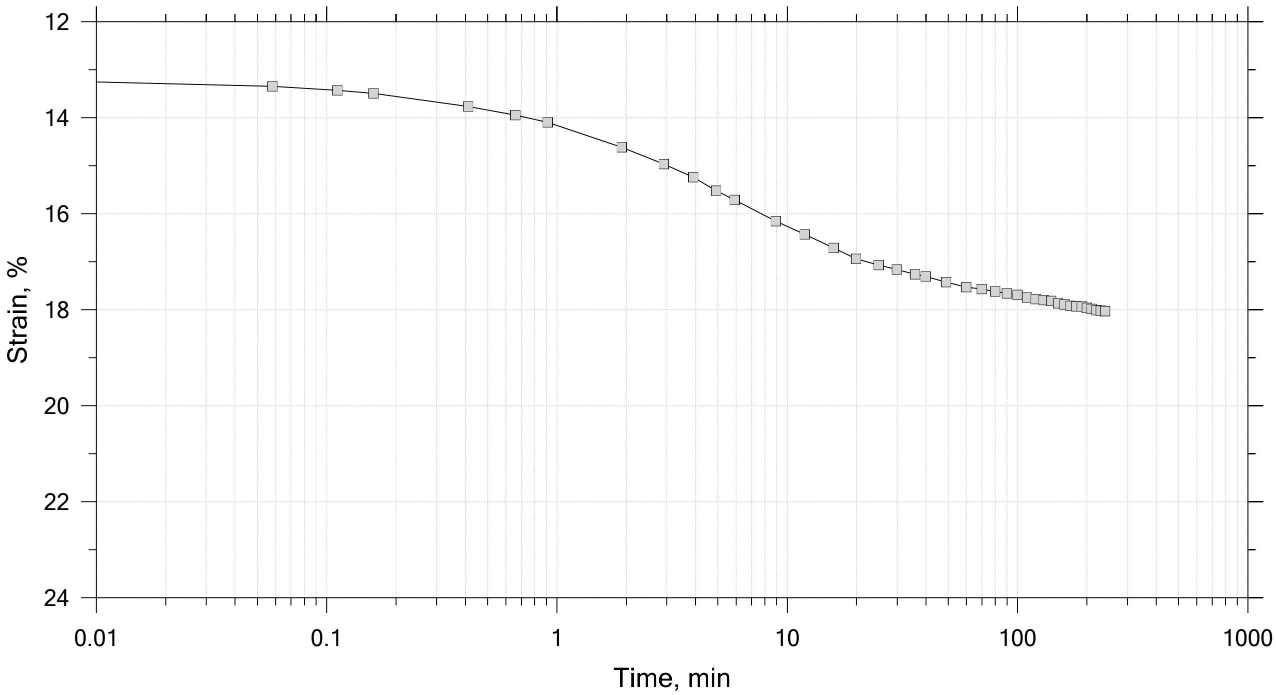
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

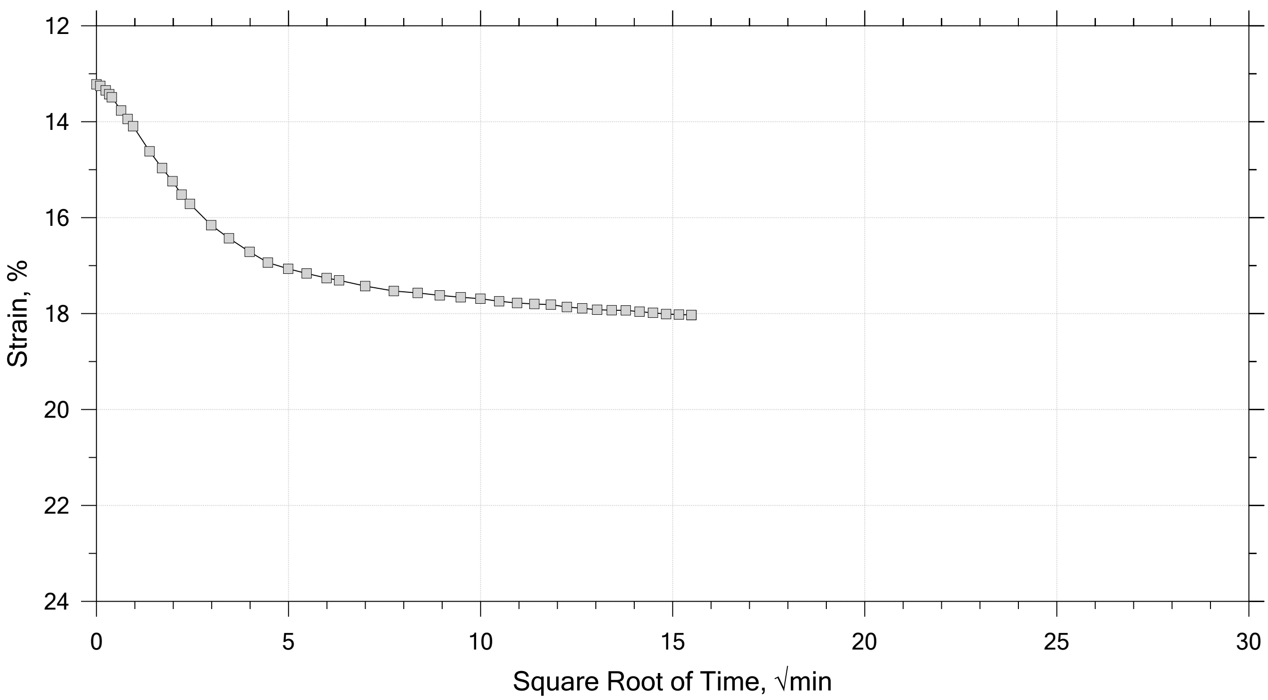
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf

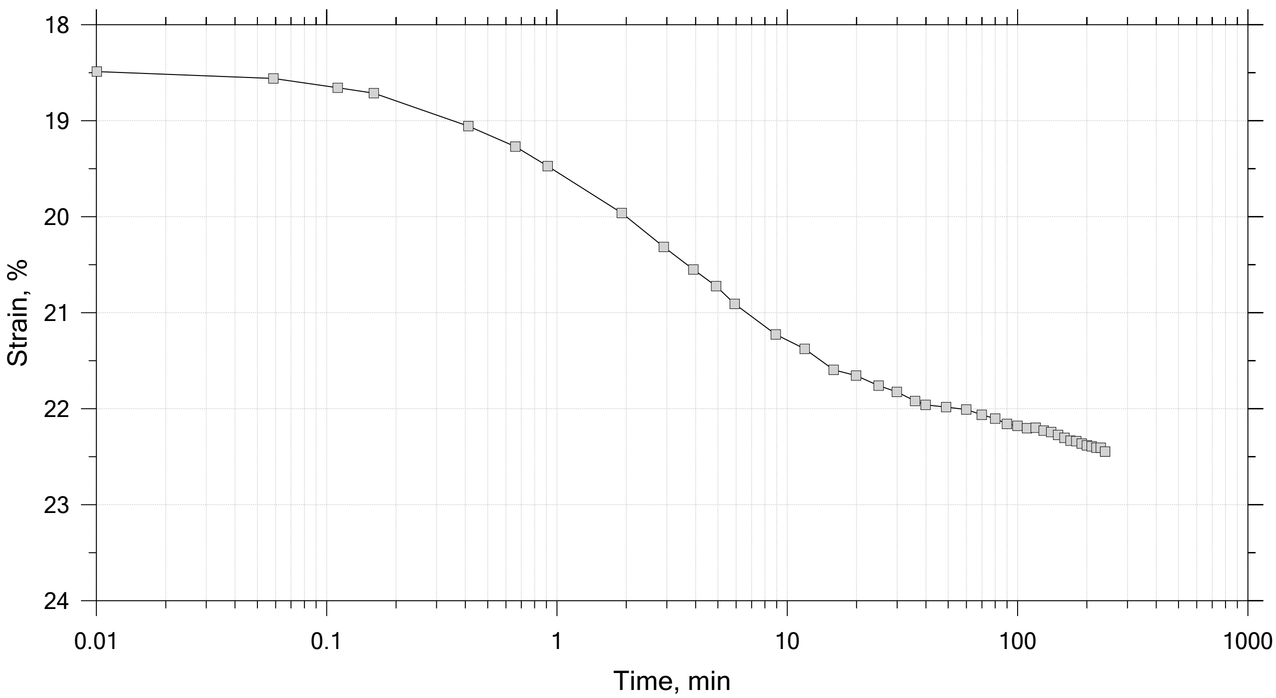


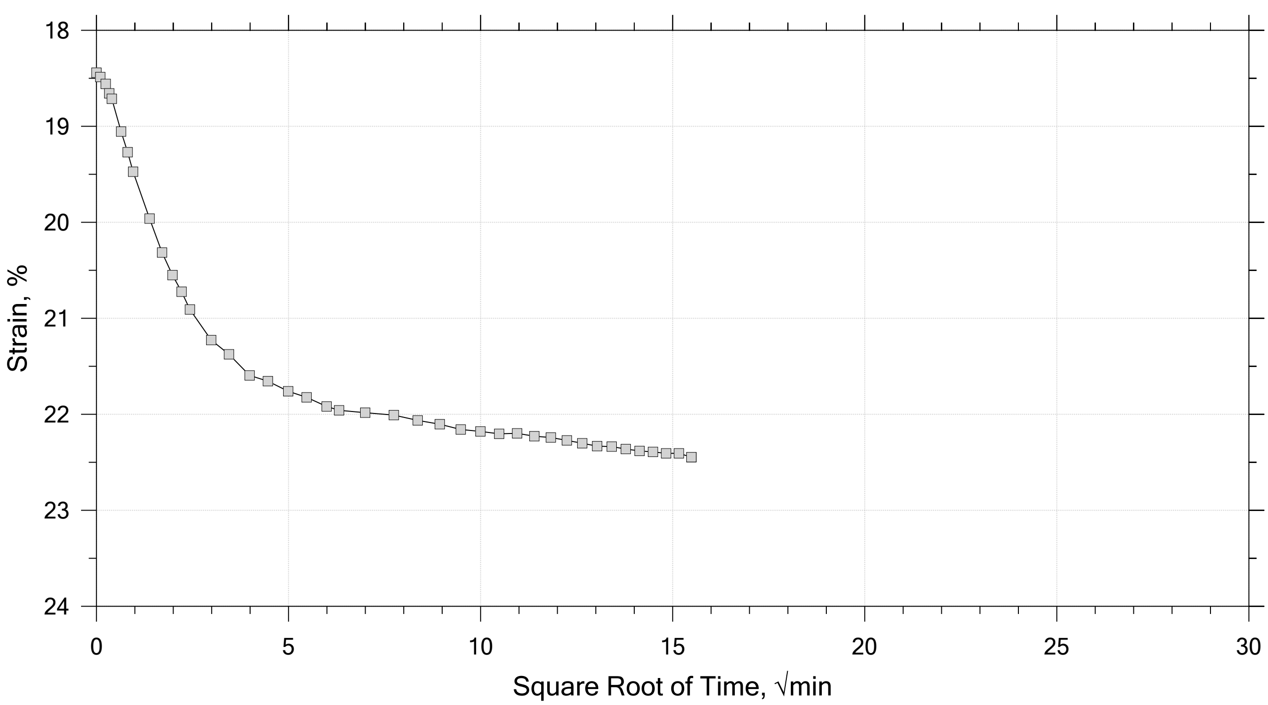


Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Wet grey clay and silt		
Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15
Constant Load Step
Stress: 8 tsf





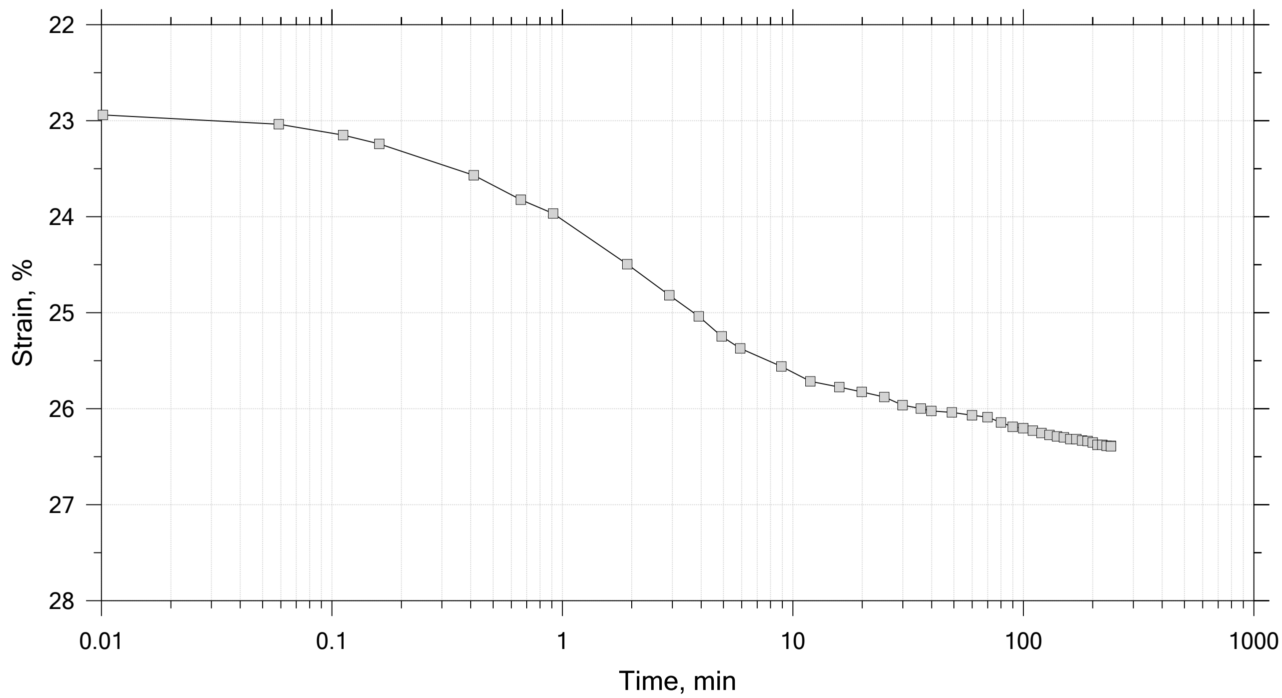
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

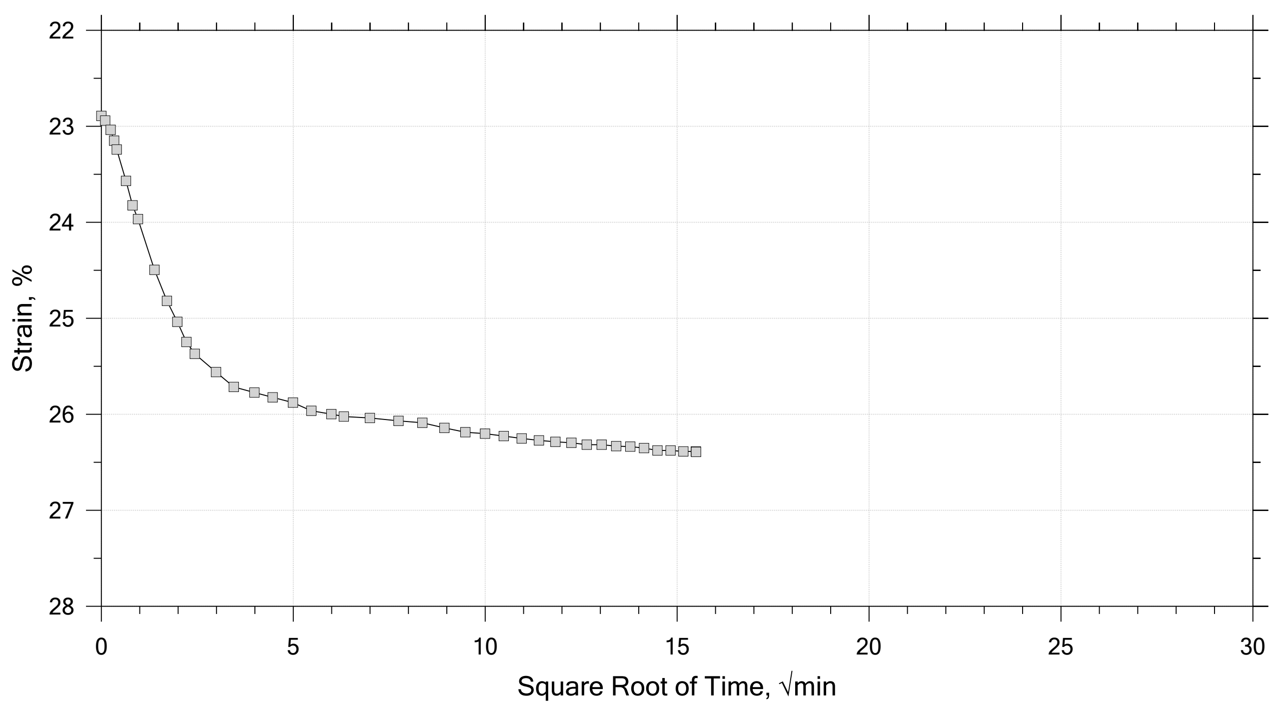
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

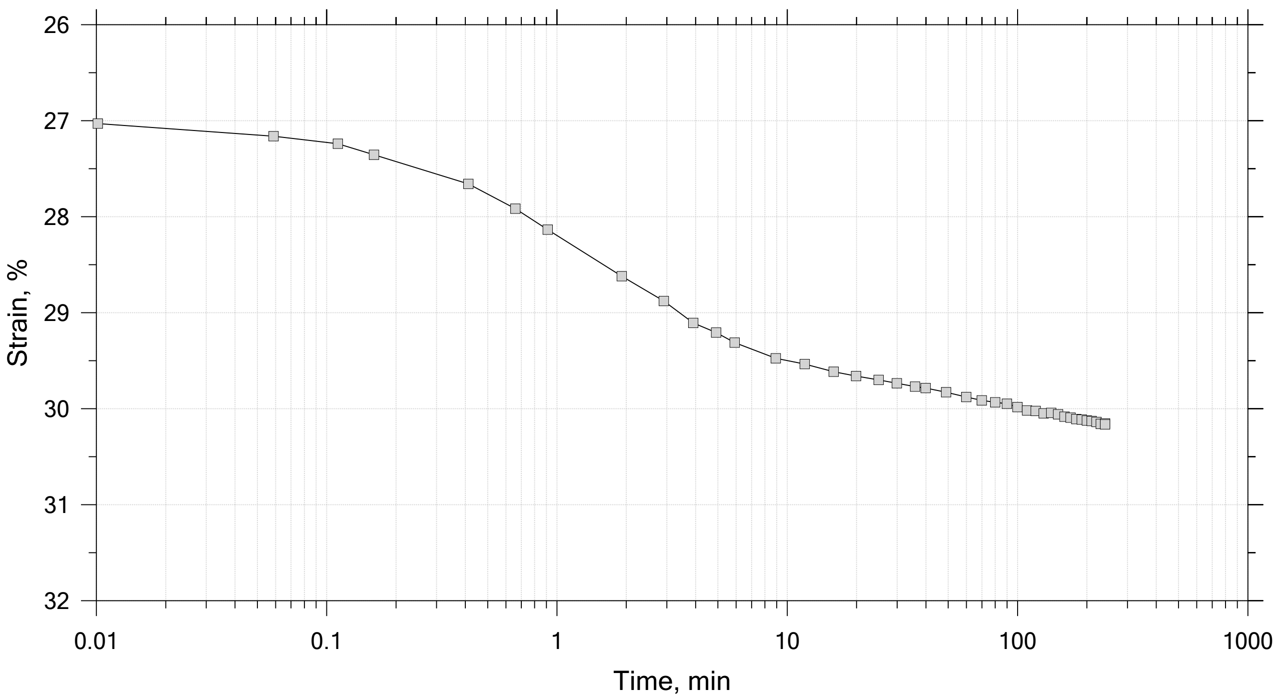


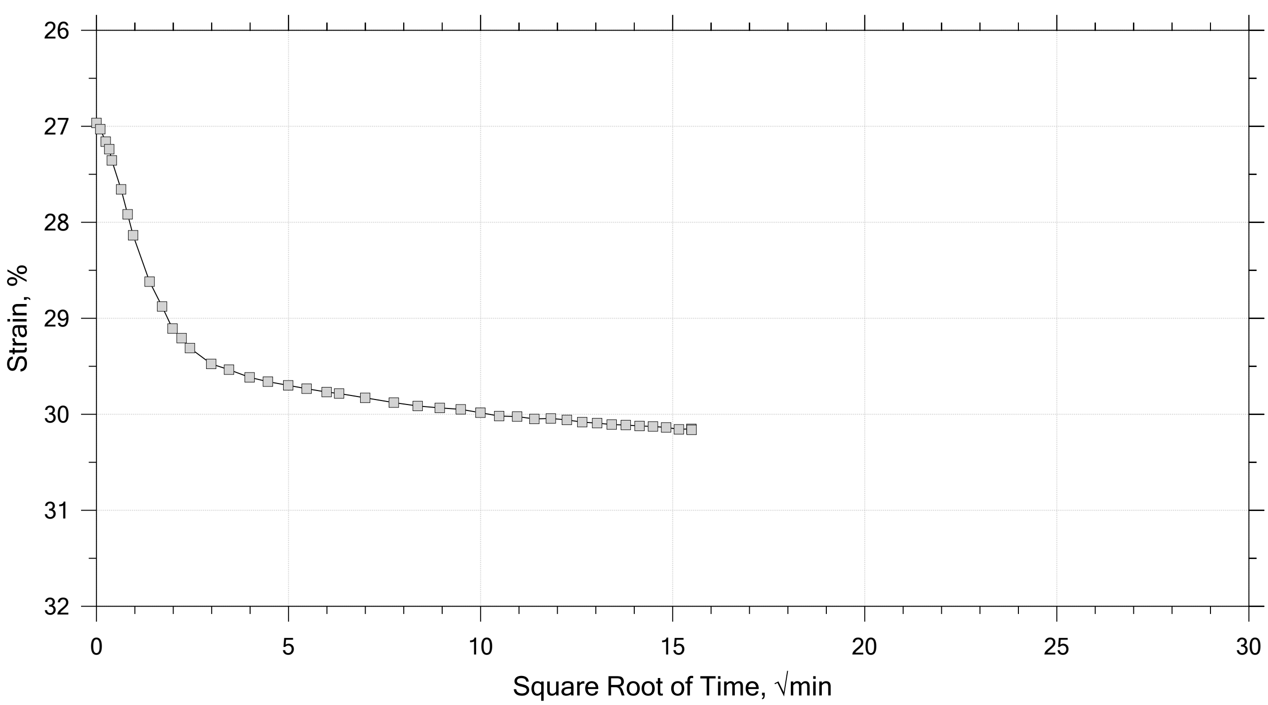


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf





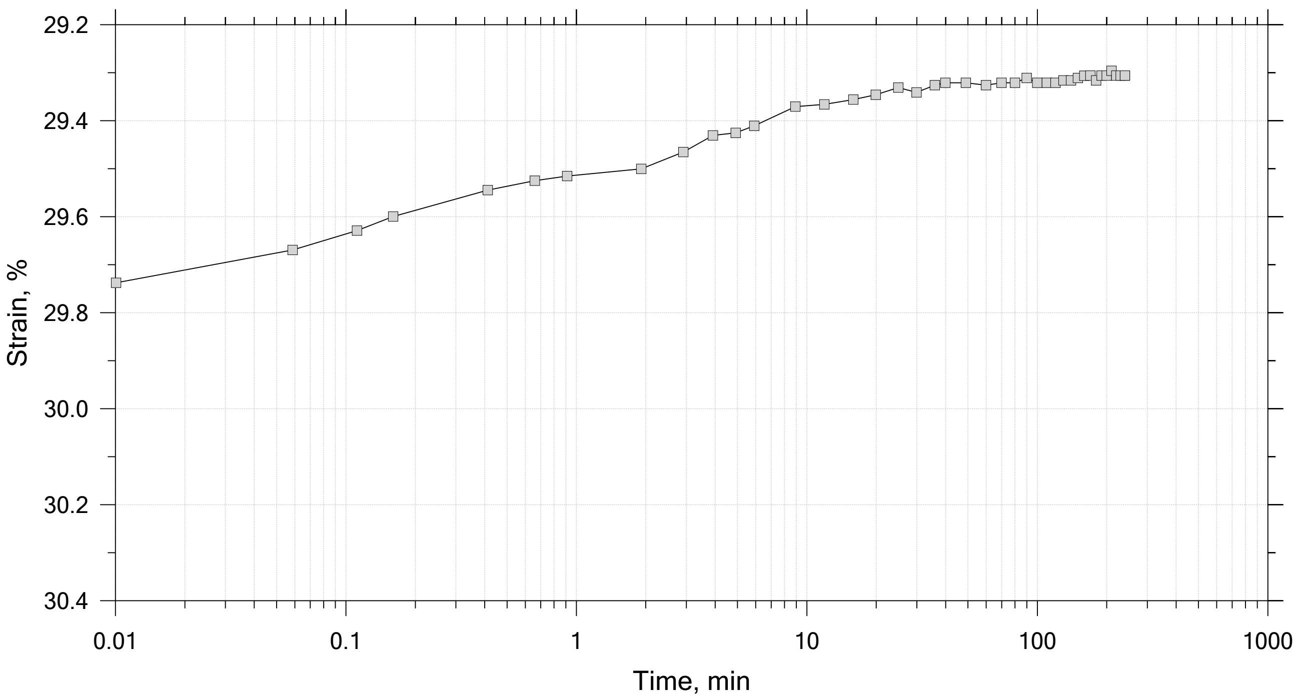
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

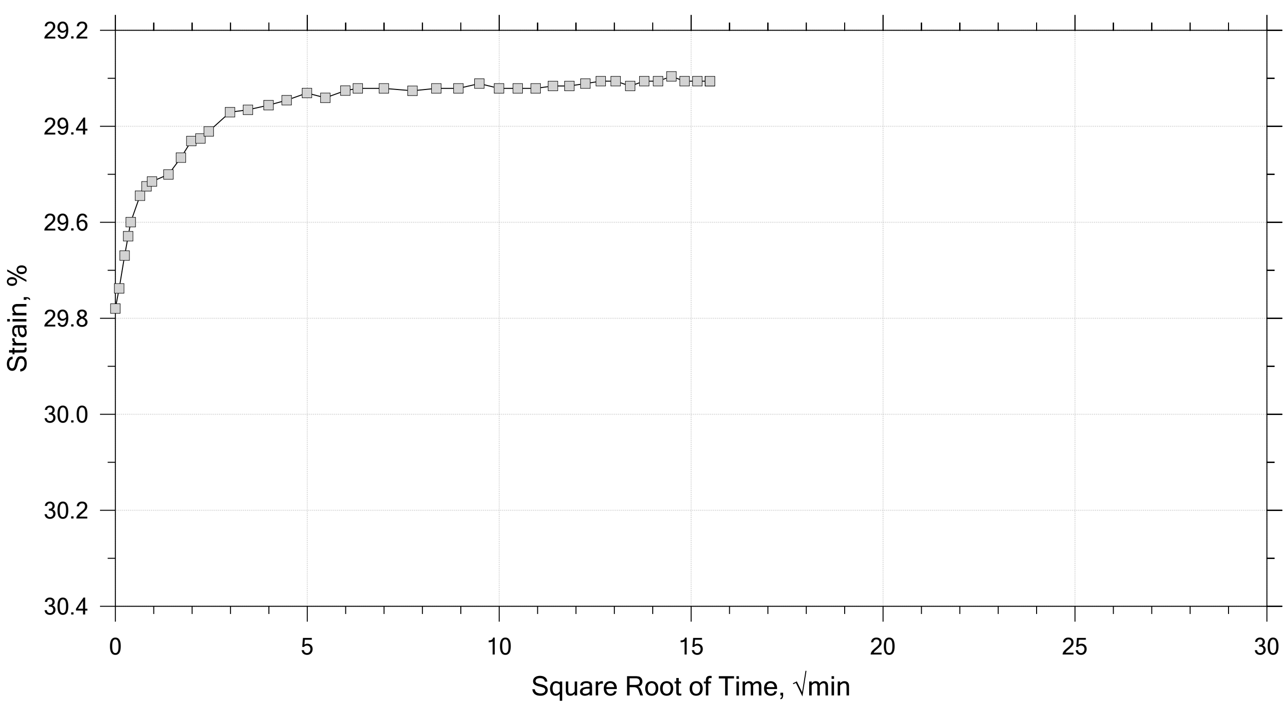
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf





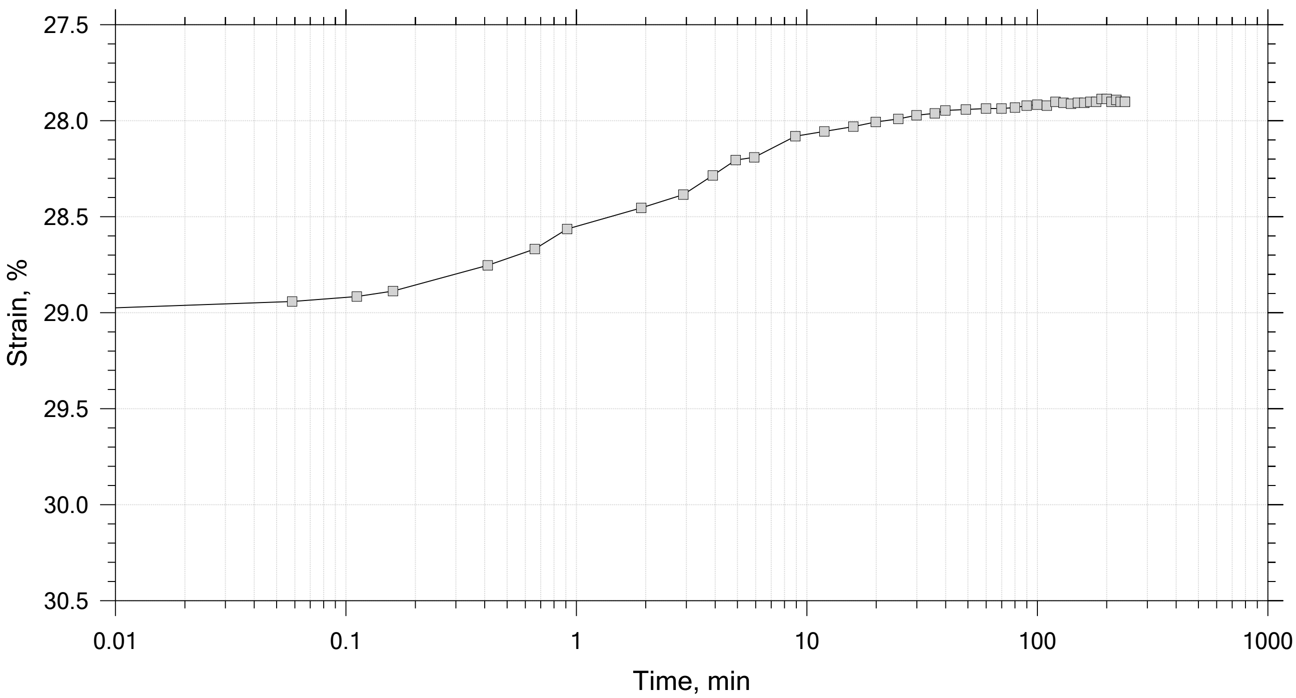
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

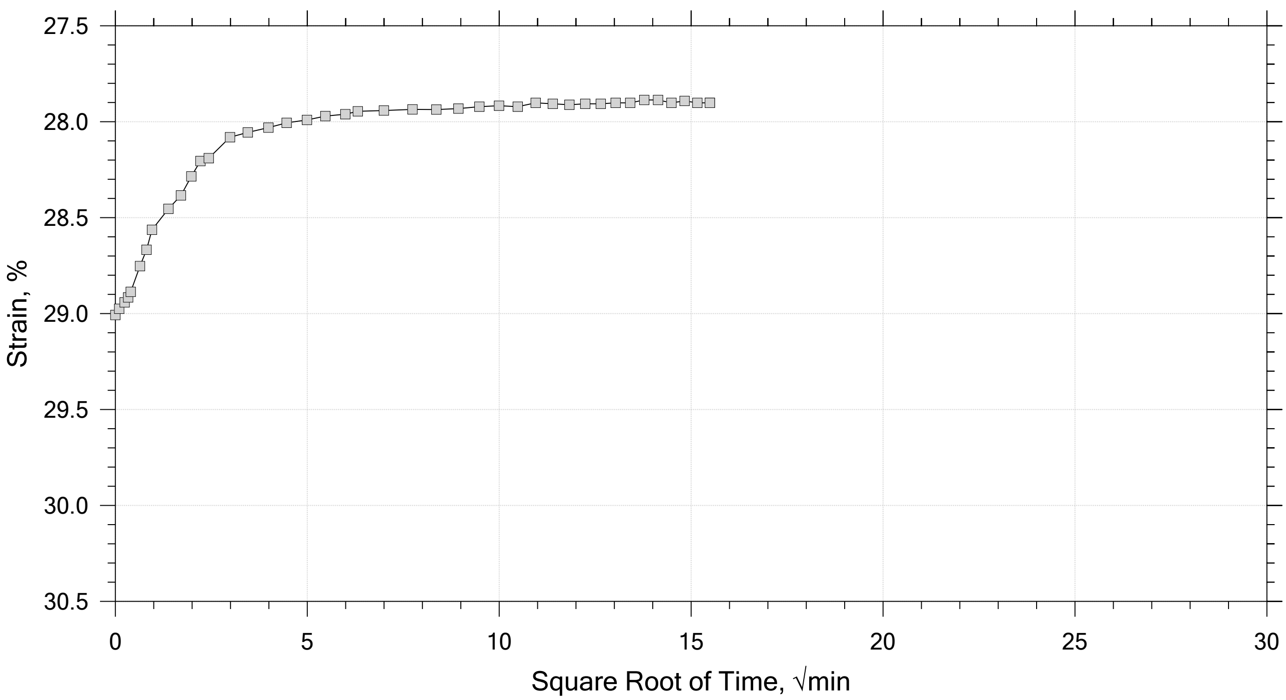
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

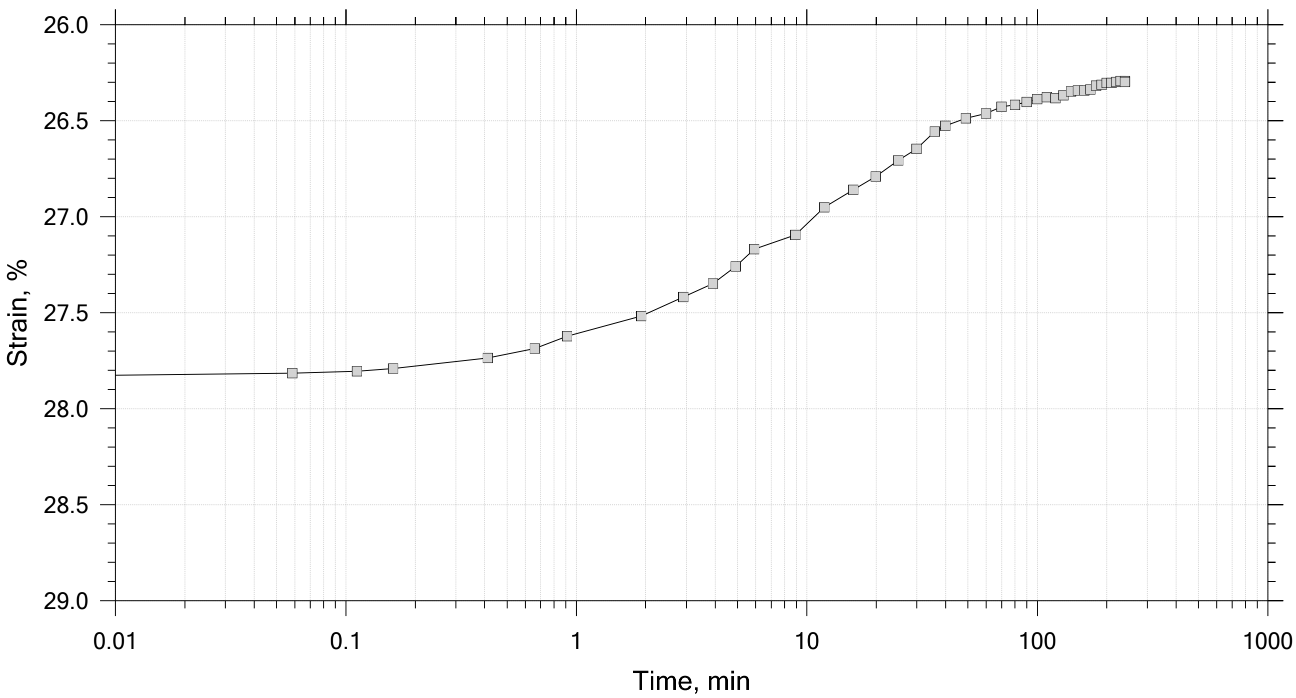


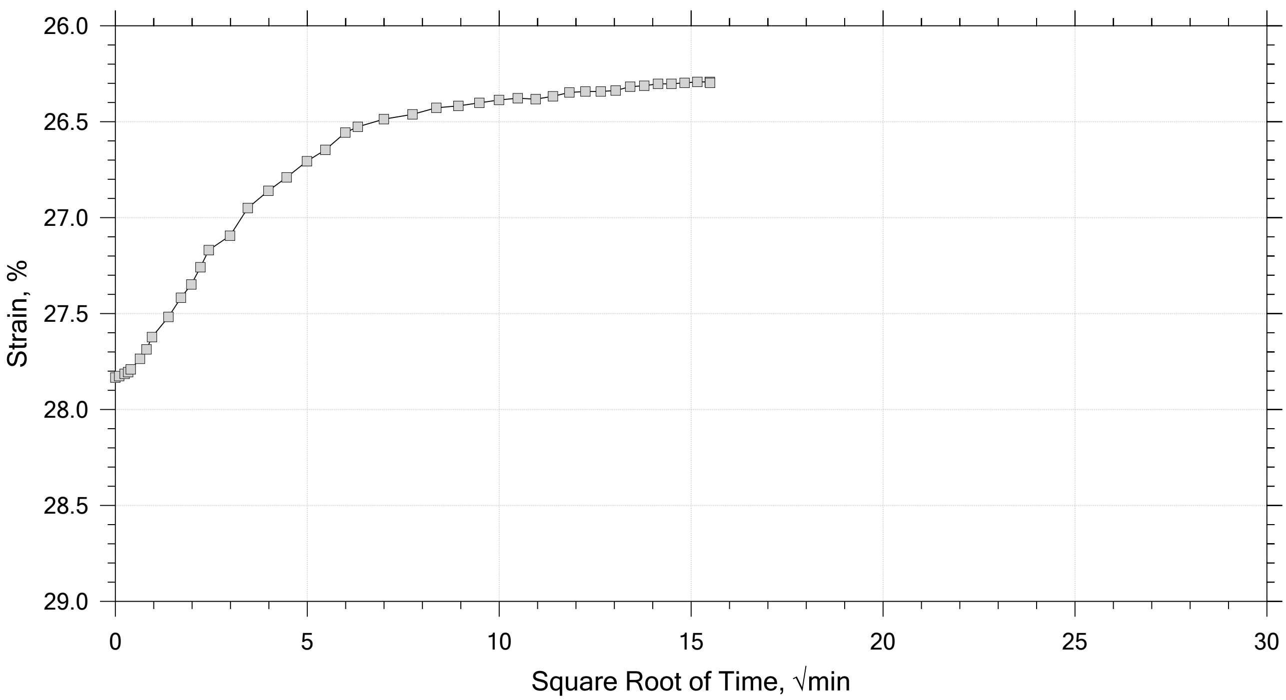


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

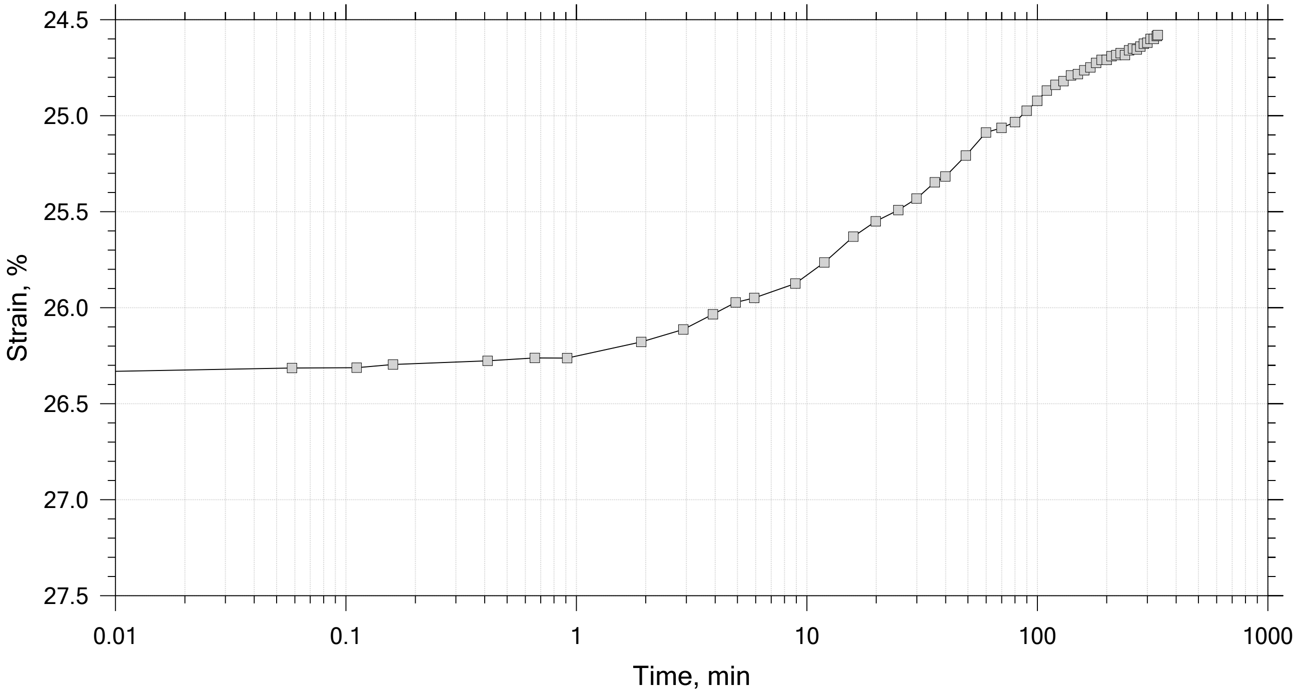


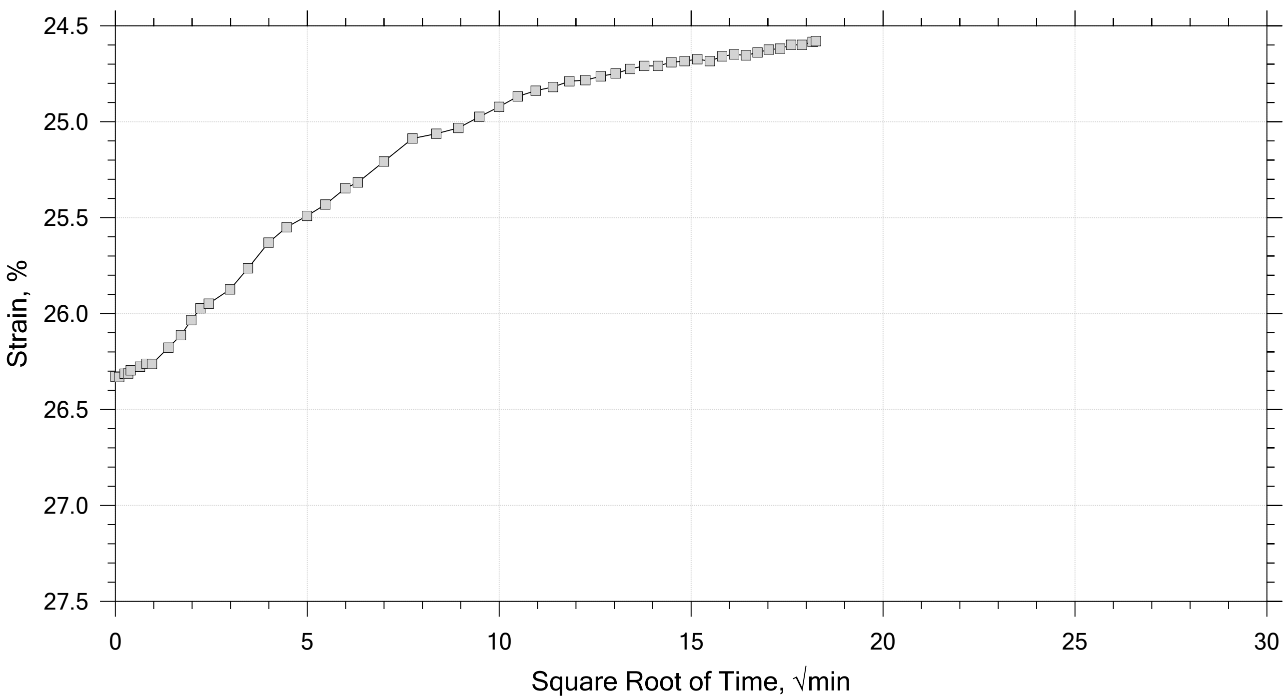


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

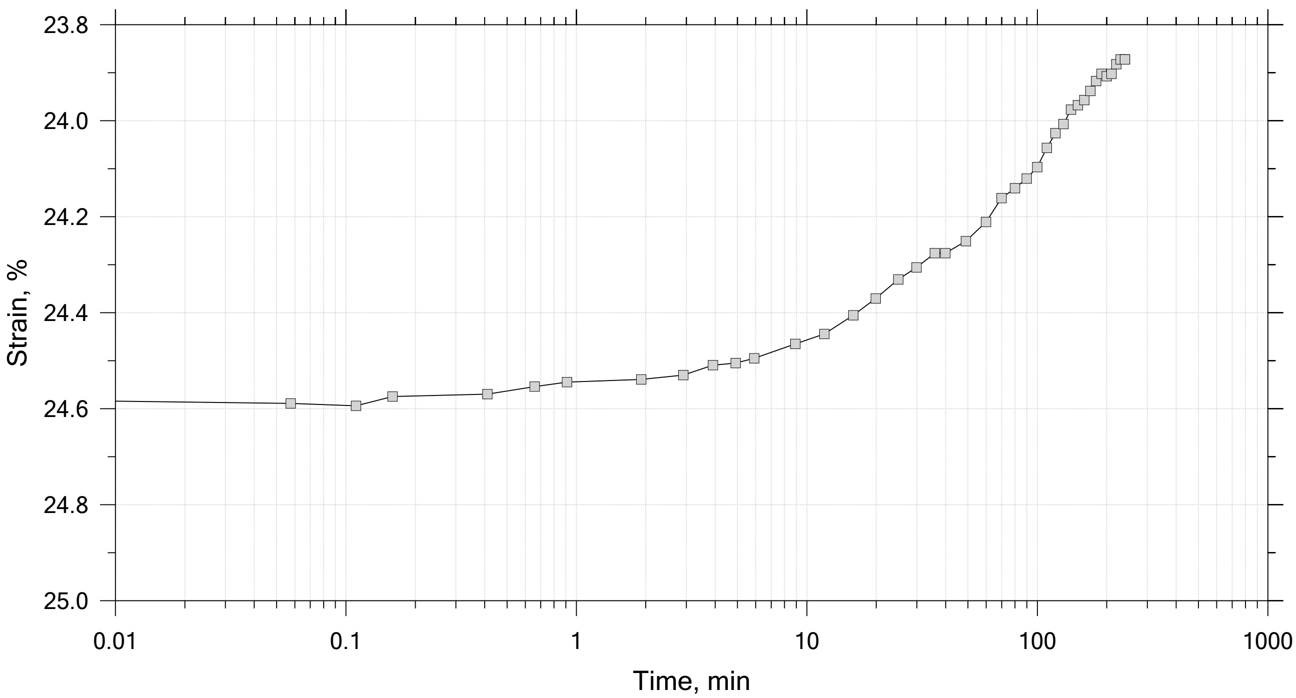


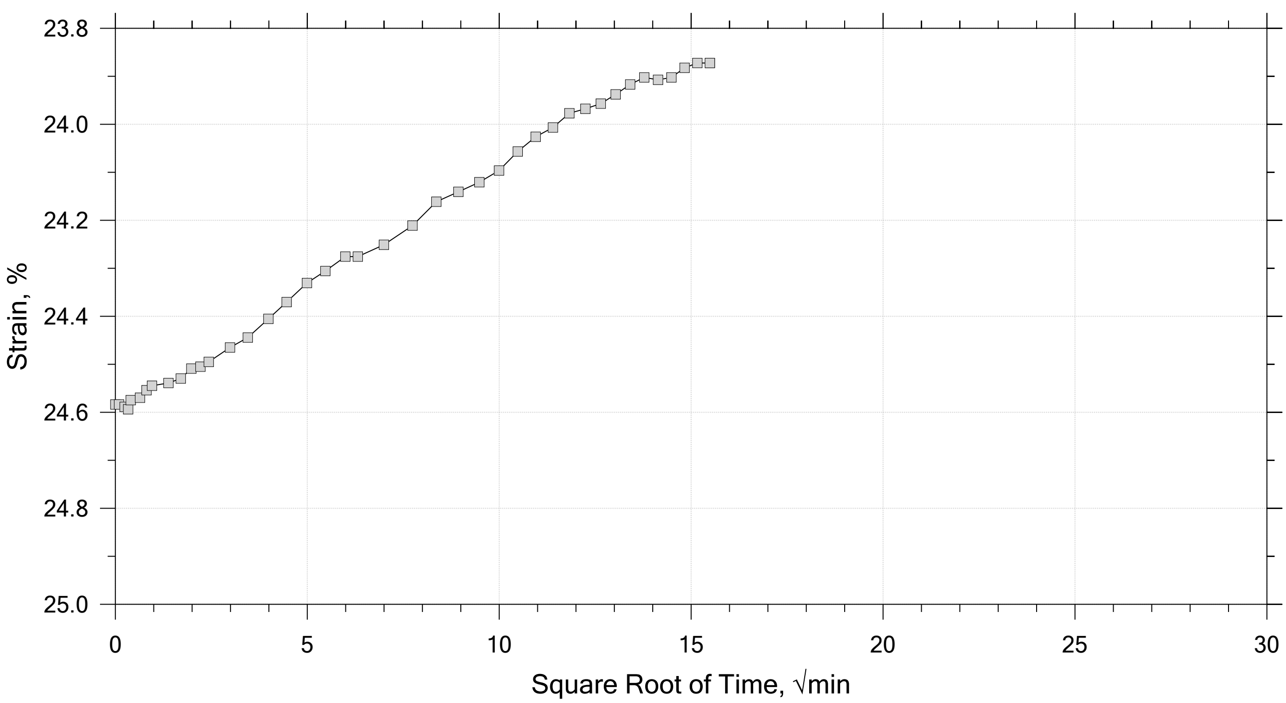


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Wet grey clay and silt		
Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.77	Liquid Limit: 28
Initial Height: 1.00 in	Initial Void Ratio: 1.23	Plastic Limit: 18
Final Height: 0.79 in	Final Void Ratio: 0.762	Plasticity Index: 10

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D-2683	RING		B-2005
Mass Container, gm	8.4	109.48	109.48	8.23
Mass Container + Wet Soil, gm	112.2	253.39	236.72	132.86
Mass Container + Dry Soil, gm	82.15	209.25	209.25	105.95
Mass Dry Soil, gm	73.75	99.766	99.766	97.72
Water Content, %	40.75	44.25	27.54	27.54
Void Ratio	---	1.23	0.76	---
Degree of Saturation, %	---	99.50	100.00	---
Dry Unit Weight, pcf	---	77.427	98.009	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0714	0.003929	1.22	0.393	4.872	1.17e-06	5.50e-02	1.73e-04	0.00e+00
2	0.125	0.008845	1.21	0.885	0.000	0.00e+00	9.17e-02	0.00e+00	0.00e+00
3	0.250	0.01637	1.19	1.64	0.000	0.00e+00	6.02e-02	0.00e+00	0.00e+00
4	0.500	0.02867	1.17	2.87	0.000	0.00e+00	4.92e-02	0.00e+00	0.00e+00
5	1.00	0.05895	1.10	5.90	0.000	0.00e+00	6.06e-02	0.00e+00	0.00e+00
6	2.00	0.1289	0.942	12.9	7.281	6.43e-07	6.99e-02	1.21e-04	0.00e+00
7	4.00	0.1803	0.828	18.0	4.195	9.71e-07	2.57e-02	6.73e-05	0.00e+00
8	8.00	0.2245	0.729	22.4	2.587	1.40e-06	1.10e-02	4.18e-05	0.00e+00
9	16.0	0.2639	0.641	26.4	1.766	1.84e-06	4.93e-03	2.45e-05	0.00e+00
10	32.0	0.3016	0.557	30.2	1.265	2.32e-06	2.36e-03	1.47e-05	0.00e+00
11	8.00	0.2931	0.576	29.3	0.000	0.00e+00	3.57e-04	0.00e+00	0.00e+00
12	2.00	0.2790	0.608	27.9	0.000	0.00e+00	2.34e-03	0.00e+00	0.00e+00
13	0.500	0.2630	0.643	26.3	10.228	2.96e-07	1.07e-02	8.54e-06	0.00e+00
14	0.125	0.2458	0.682	24.6	30.310	1.05e-07	4.58e-02	1.29e-05	0.00e+00
15	0.0625	0.2387	0.698	23.9	0.000	0.00e+00	1.13e-01	0.00e+00	0.00e+00

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
	Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Wet grey clay and silt		
	Remarks: System K, Swell Pressure = 0.0714 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

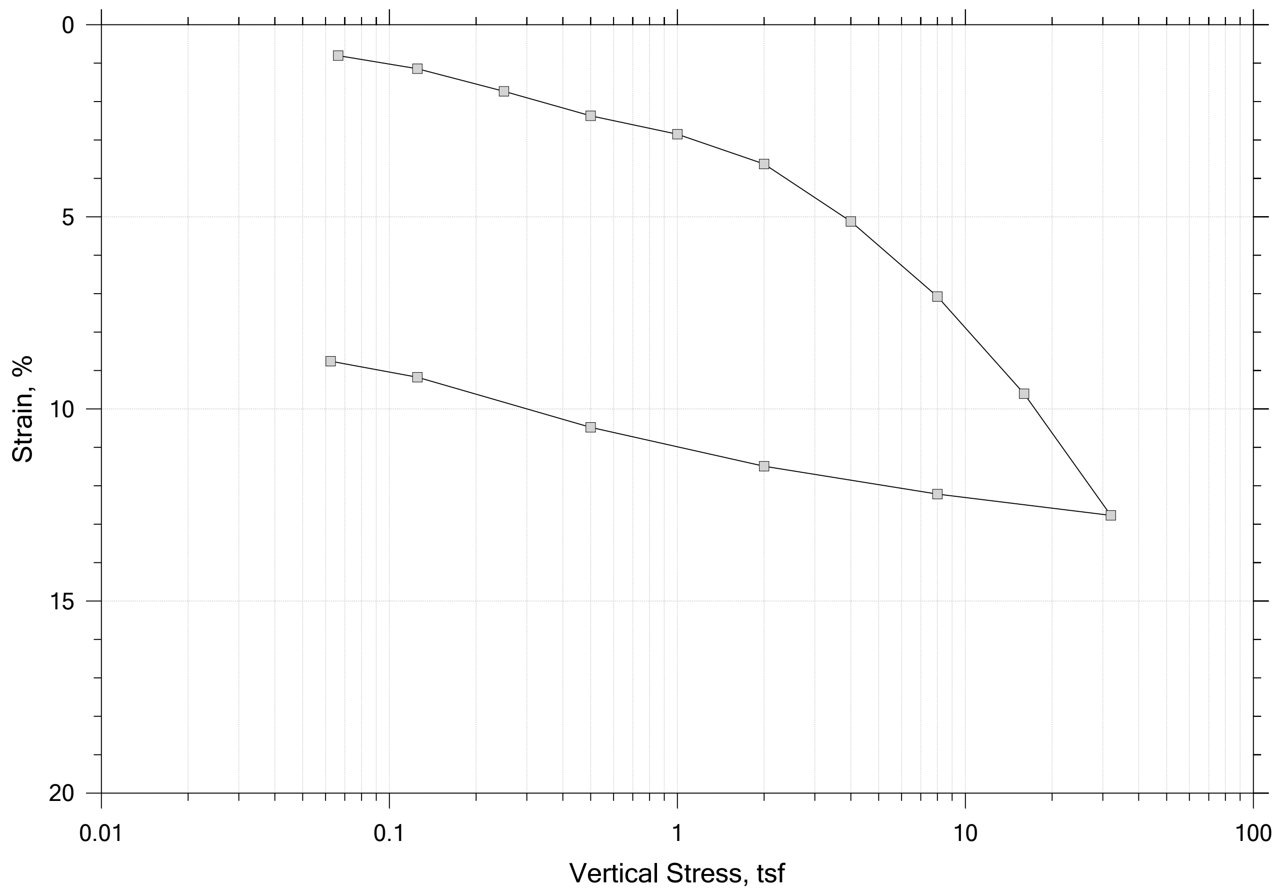
Square Root of Time Coefficients

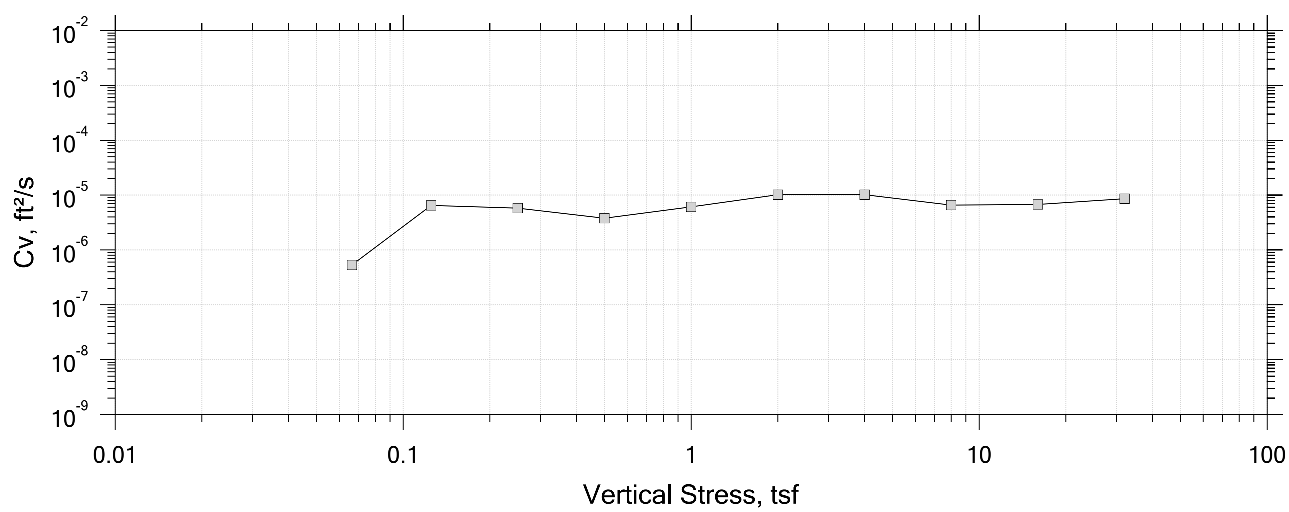
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0714	0.003929	1.22	0.393	16.752	1.46e-06	5.50e-02	2.17e-04
2	0.125	0.008845	1.21	0.885	28.528	8.49e-07	9.17e-02	2.10e-04
3	0.250	0.01637	1.19	1.64	13.647	1.75e-06	6.02e-02	2.85e-04
4	0.500	0.02867	1.17	2.87	32.552	7.20e-07	4.92e-02	9.55e-05
5	1.00	0.05895	1.10	5.90	41.757	5.37e-07	6.06e-02	8.78e-05
6	2.00	0.1289	0.942	12.9	28.705	7.02e-07	6.99e-02	1.32e-04
7	4.00	0.1803	0.828	18.0	18.770	9.34e-07	2.57e-02	6.48e-05
8	8.00	0.2245	0.729	22.4	11.606	1.34e-06	1.10e-02	4.01e-05
9	16.0	0.2639	0.641	26.4	8.066	1.74e-06	4.93e-03	2.31e-05
10	32.0	0.3016	0.557	30.2	6.458	1.95e-06	2.36e-03	1.24e-05
11	8.00	0.2931	0.576	29.3	4.534	2.67e-06	3.57e-04	2.57e-06
12	2.00	0.2790	0.608	27.9	7.540	1.66e-06	2.34e-03	1.05e-05
13	0.500	0.2630	0.643	26.3	38.970	3.35e-07	1.07e-02	9.65e-06
14	0.125	0.2458	0.682	24.6	93.391	1.46e-07	4.58e-02	1.80e-05
15	0.0625	0.2387	0.698	23.9	185.942	7.58e-08	1.13e-01	2.31e-05

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Tested By: md	Checked By: njh
Sample No.: U4	Test Date: 02/09/19	Depth: 30-32 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Wet grey clay and silt		
Remarks: System K, Swell Pressure = 0.0714 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





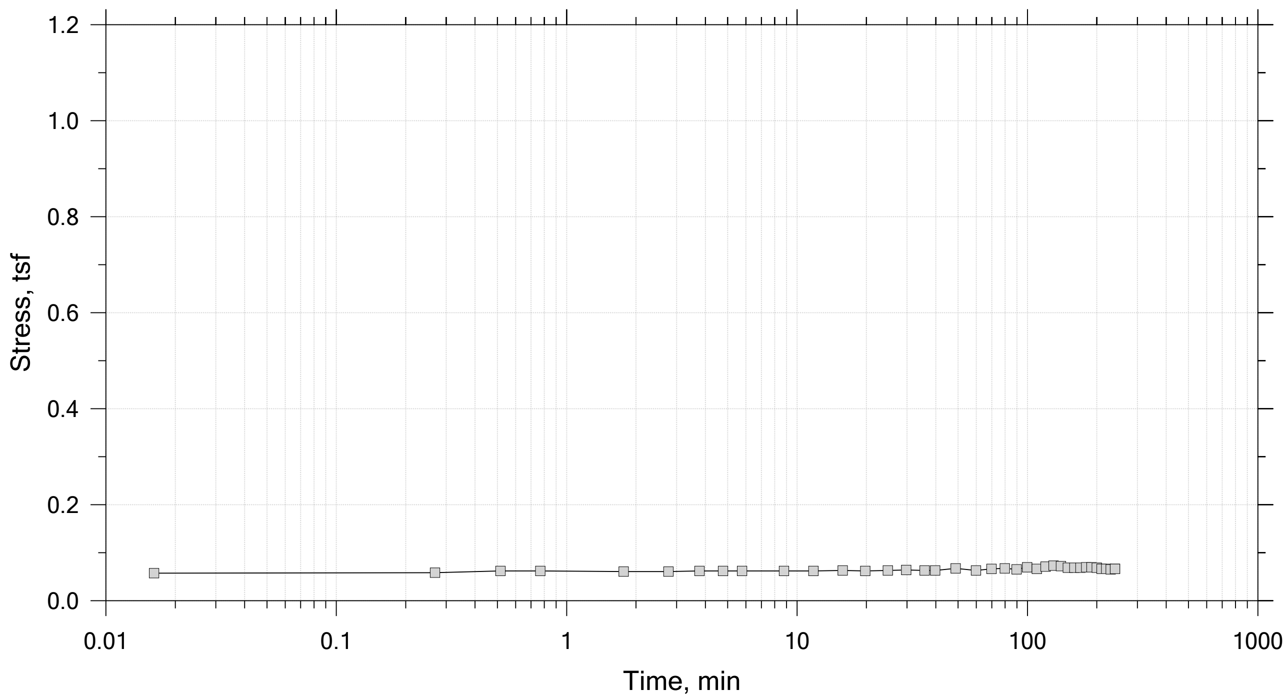
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		
	Displacement at End of Increment		

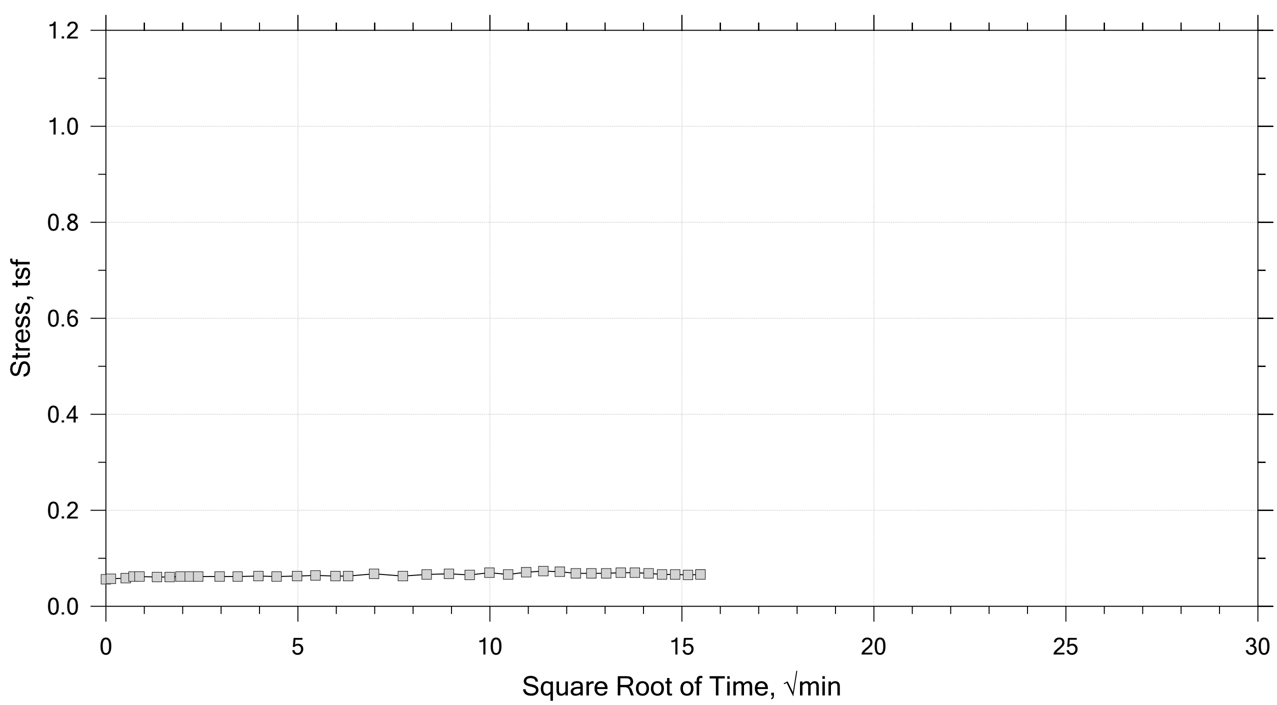
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0664 tsf

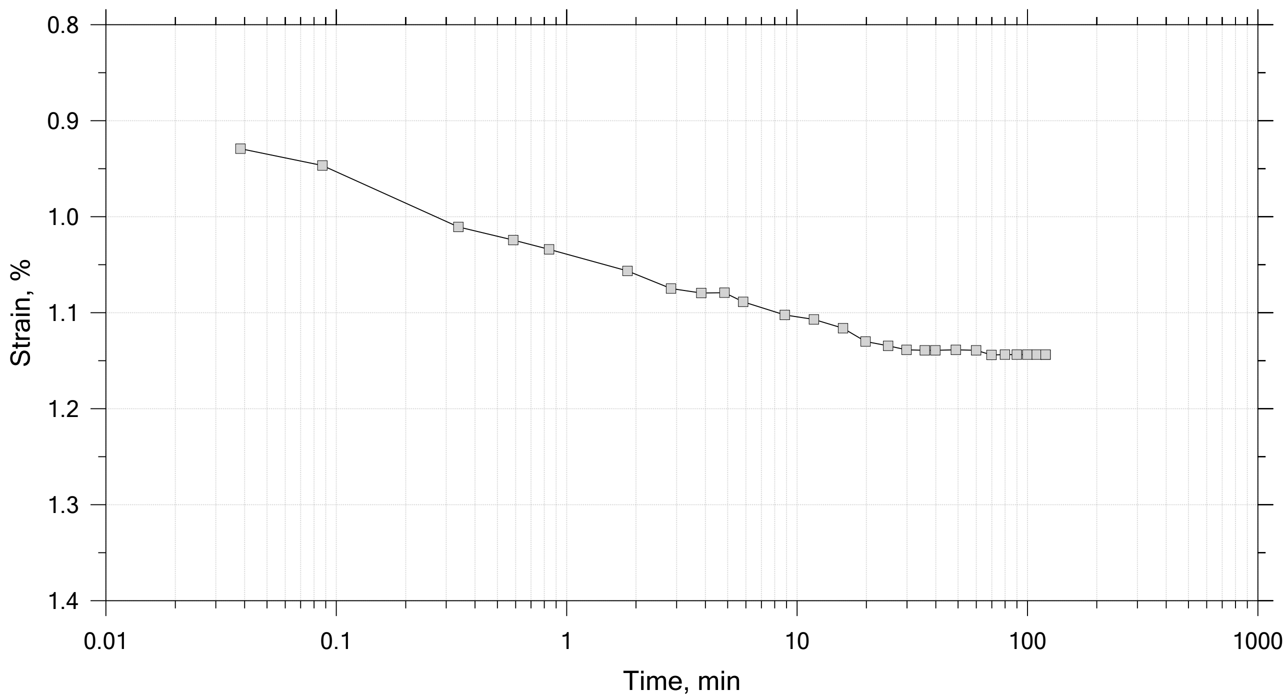


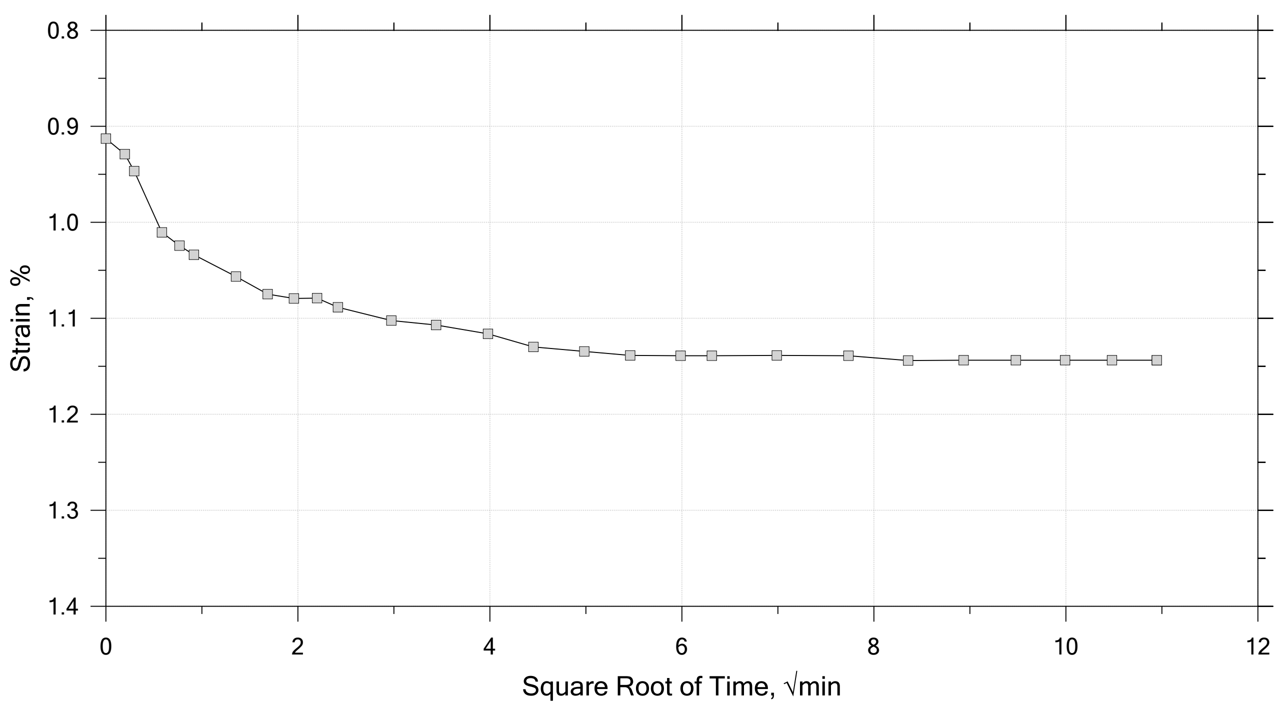


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf





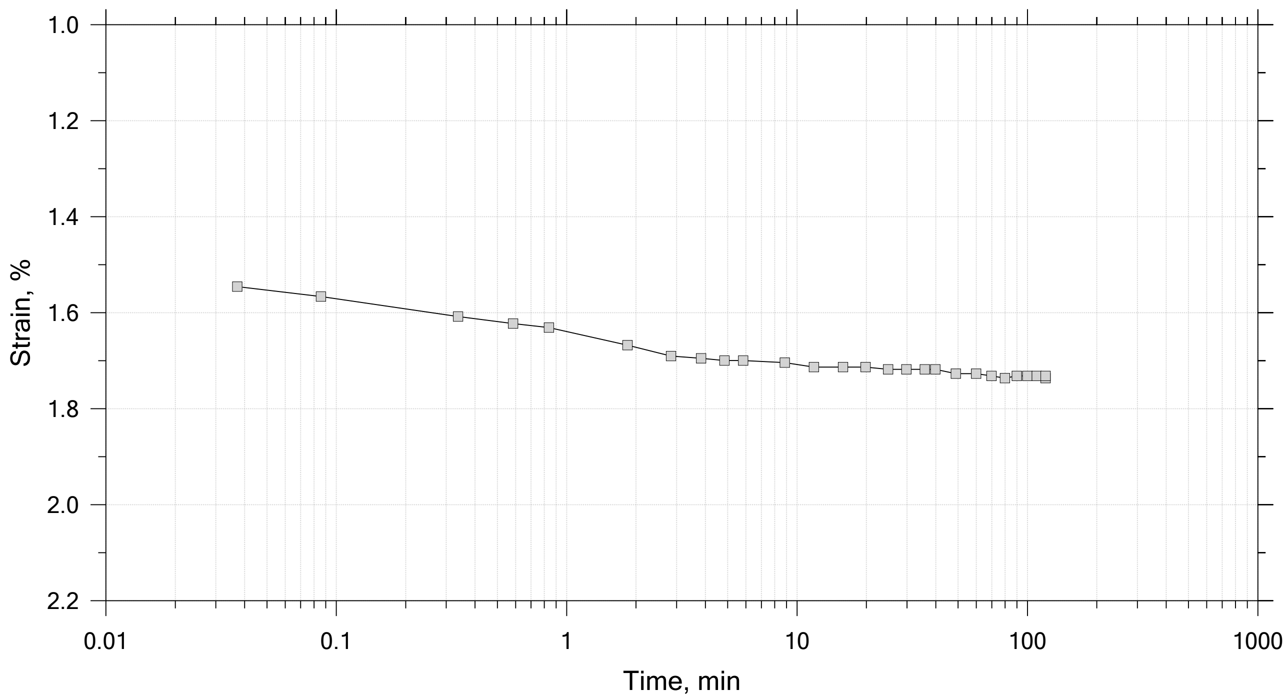
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

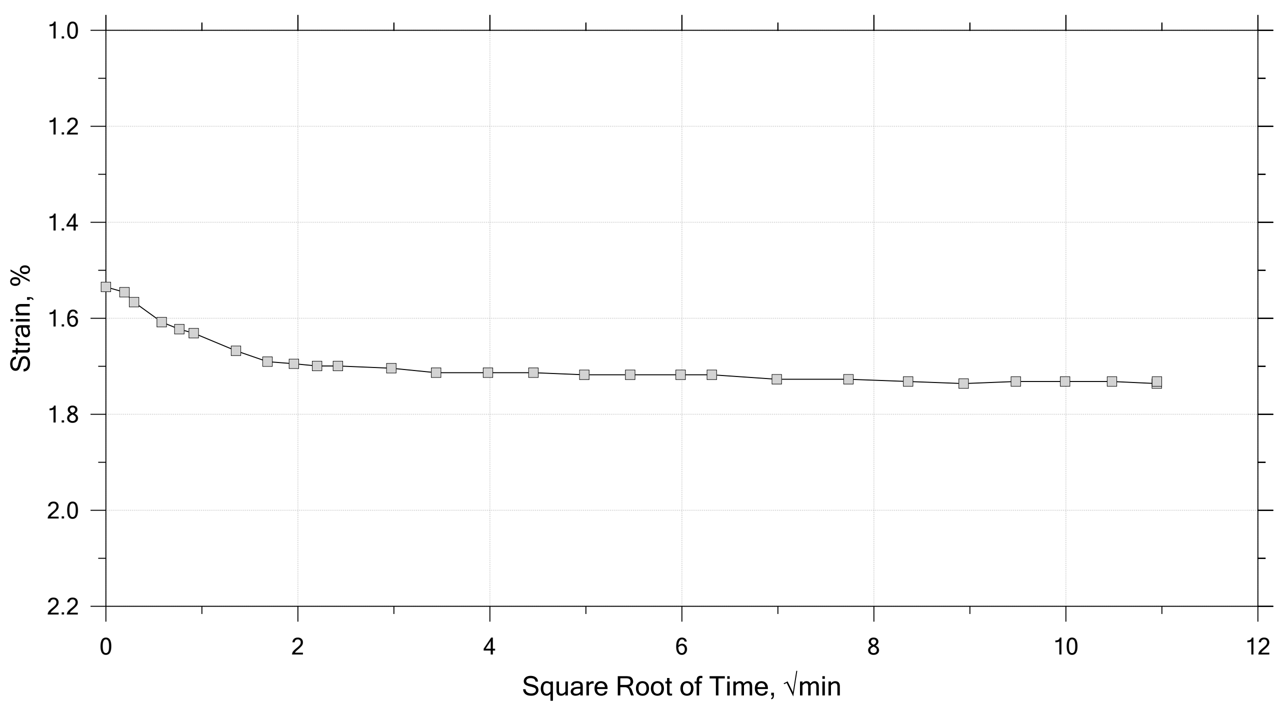
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf

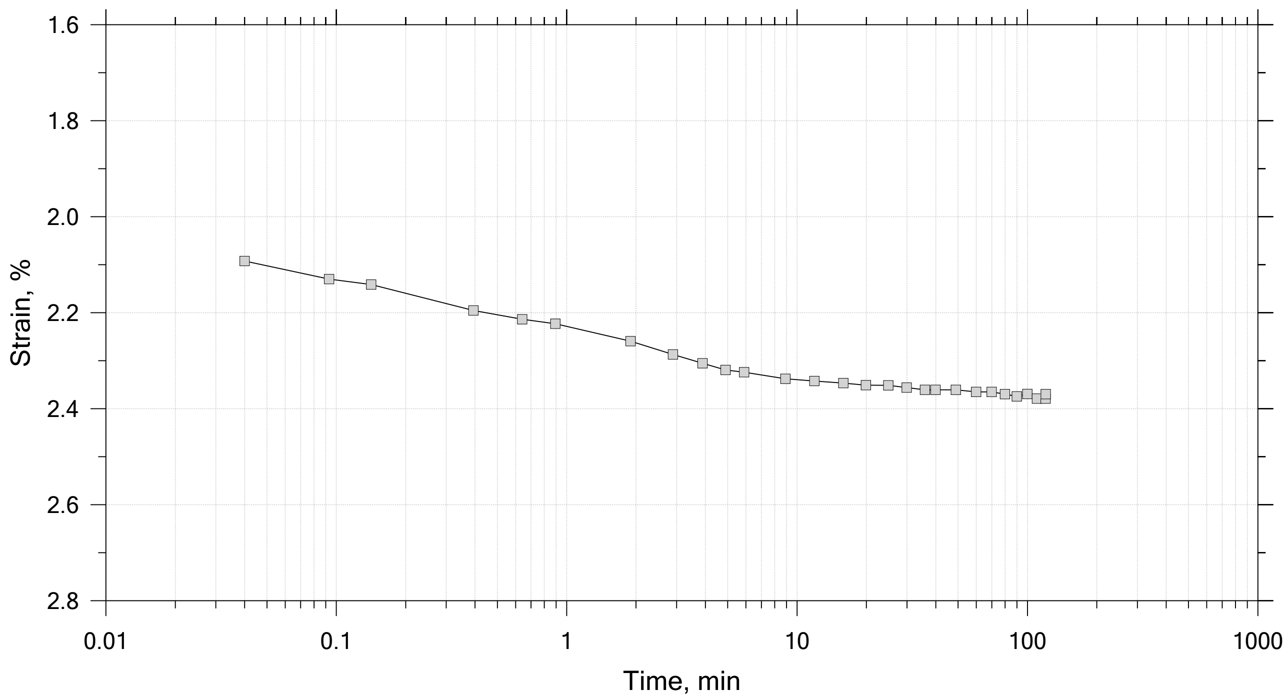


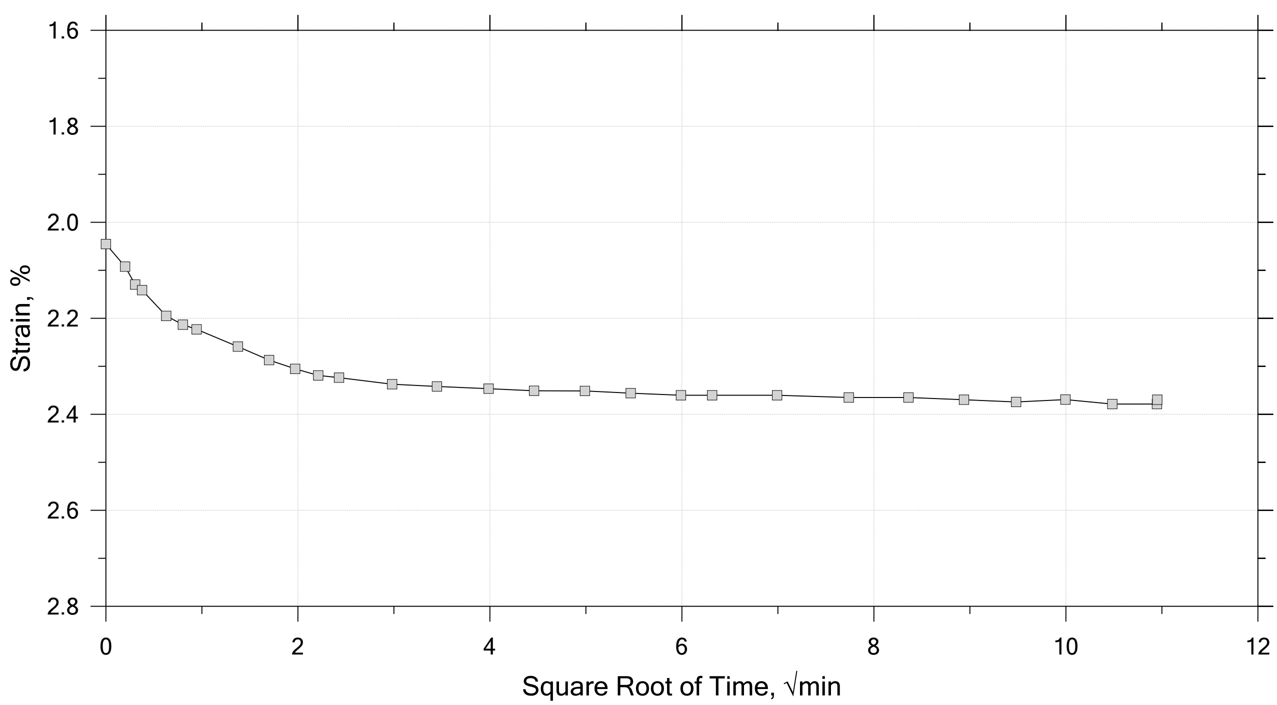


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





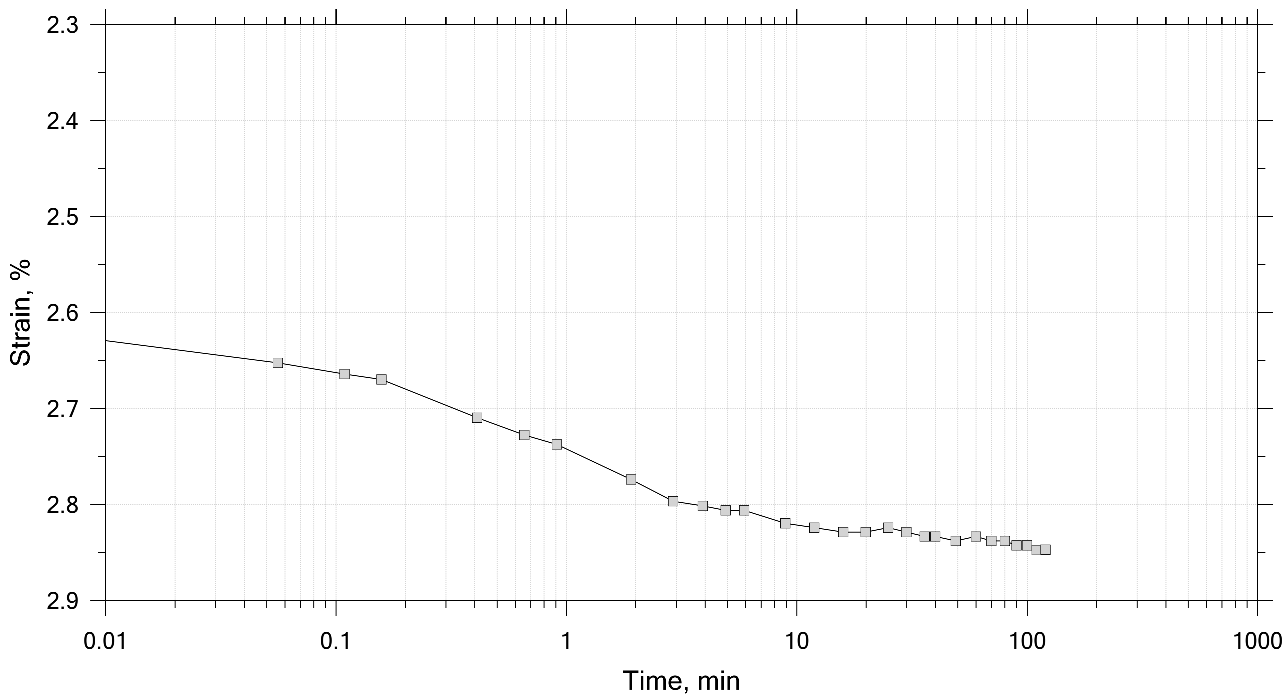
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

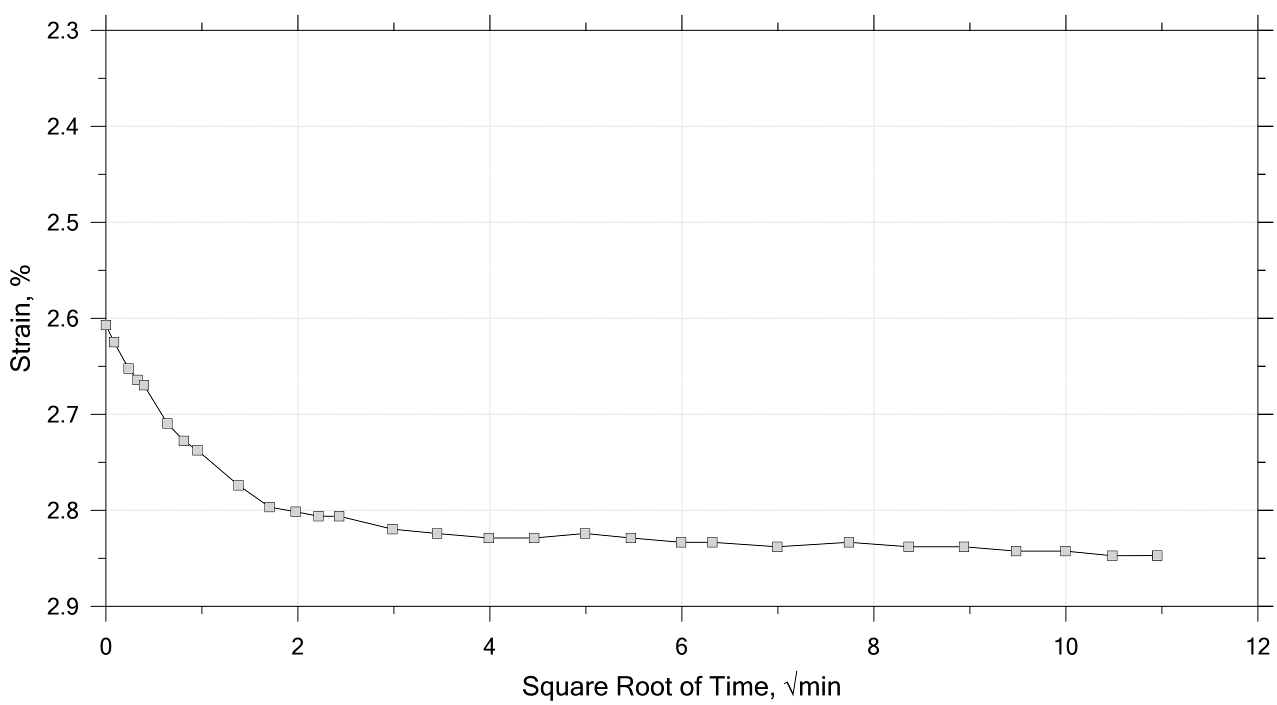
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf

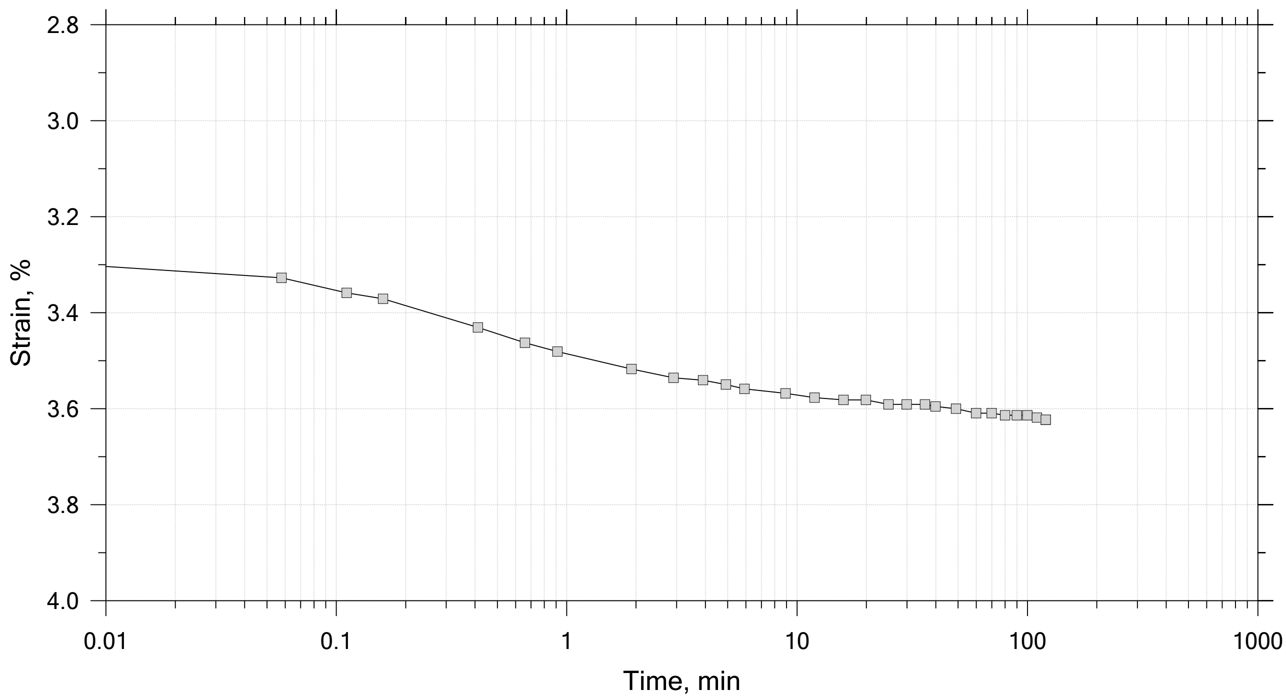


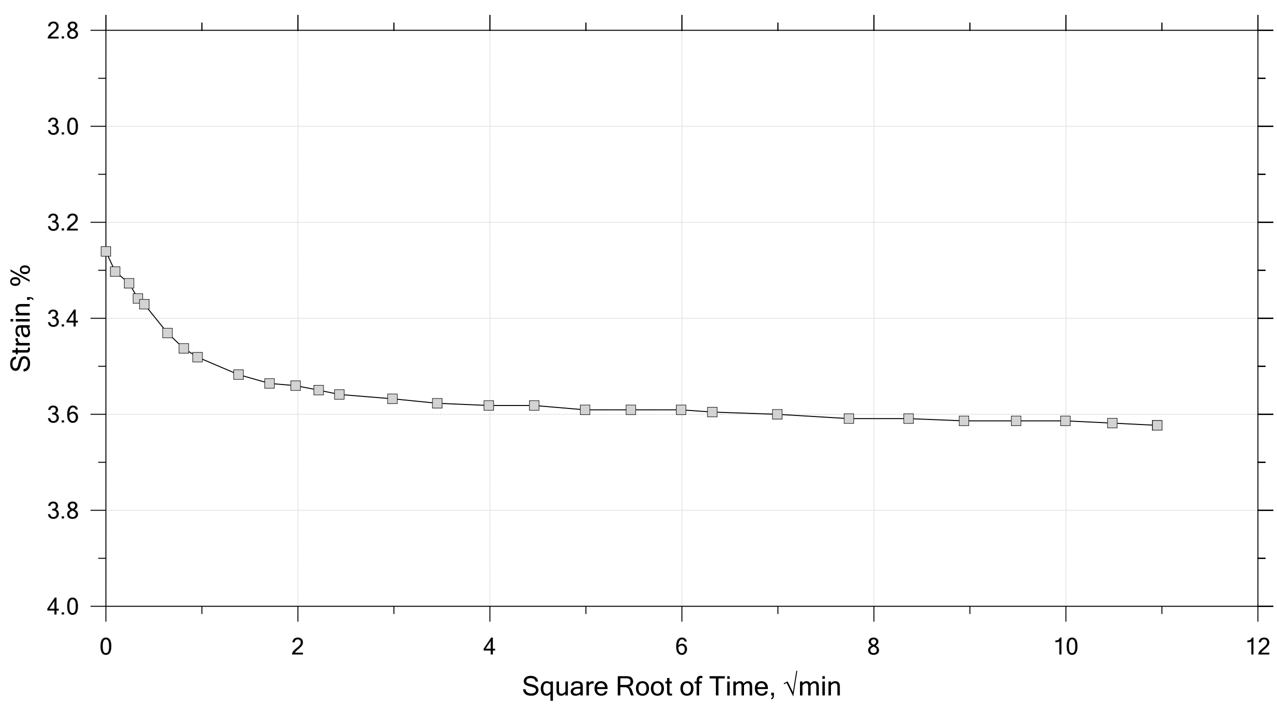


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15
Constant Load Step
Stress: 2 tsf

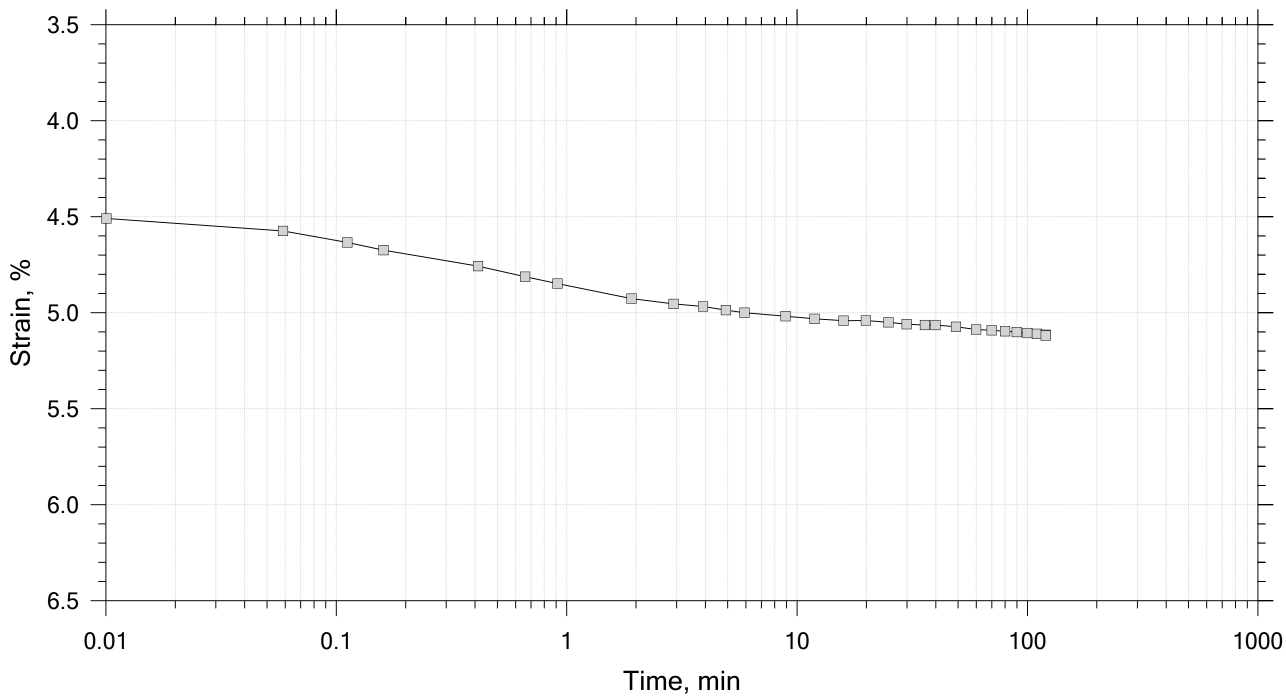


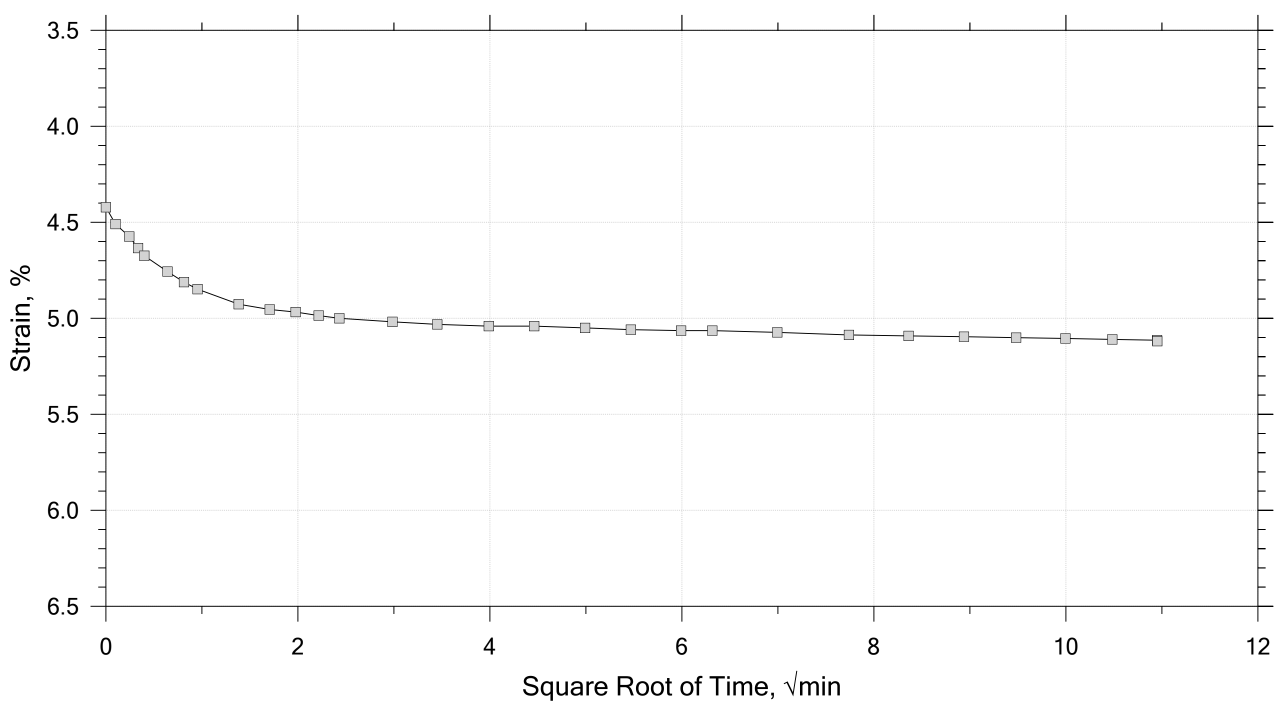


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15
Constant Load Step
Stress: 4 tsf

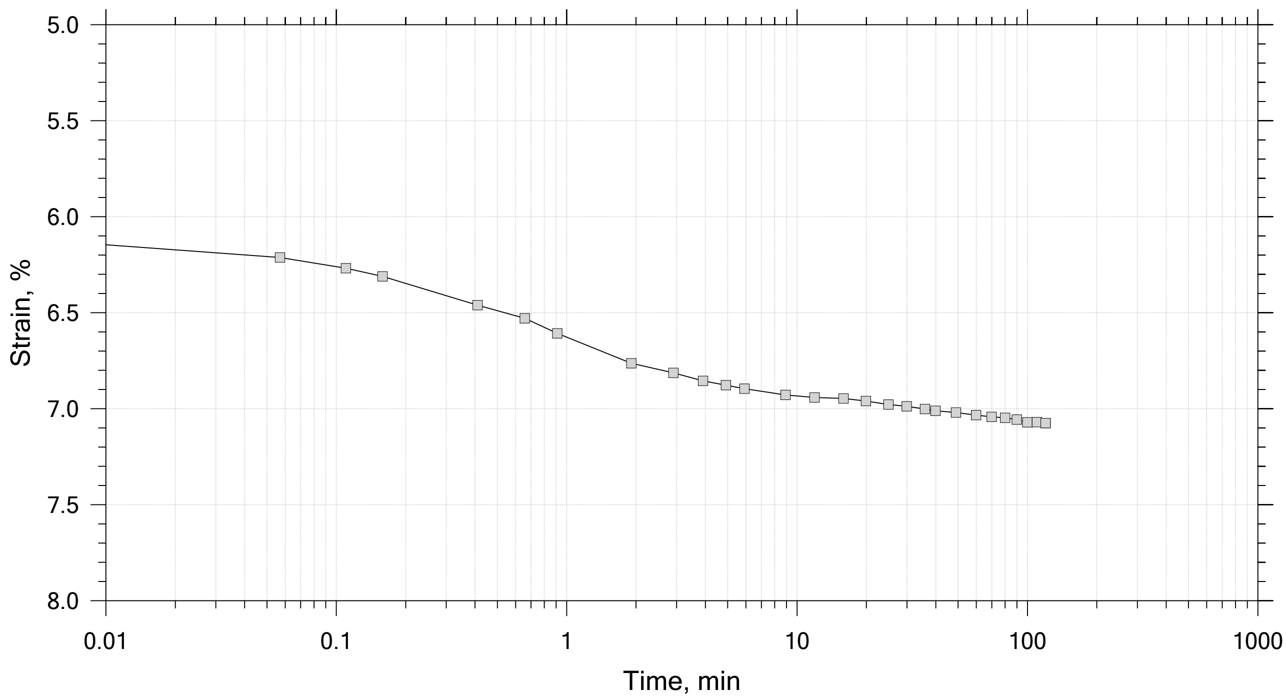


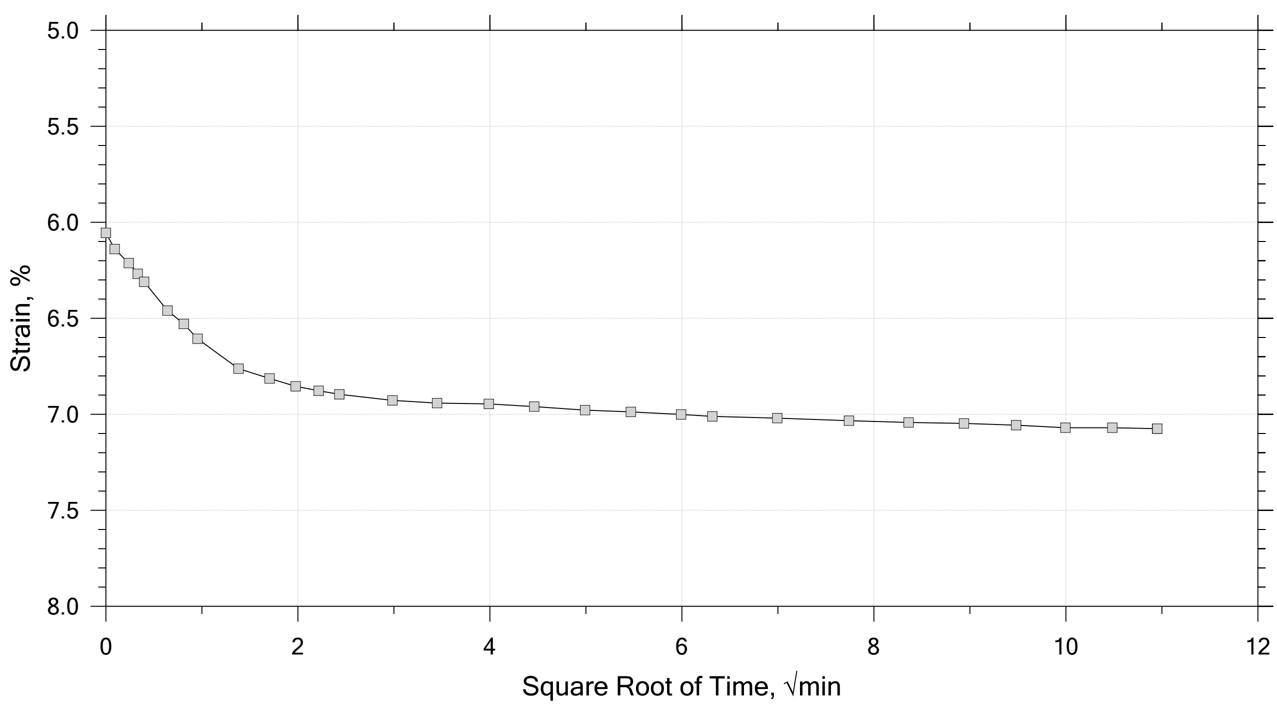


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15
Constant Load Step
Stress: 8 tsf





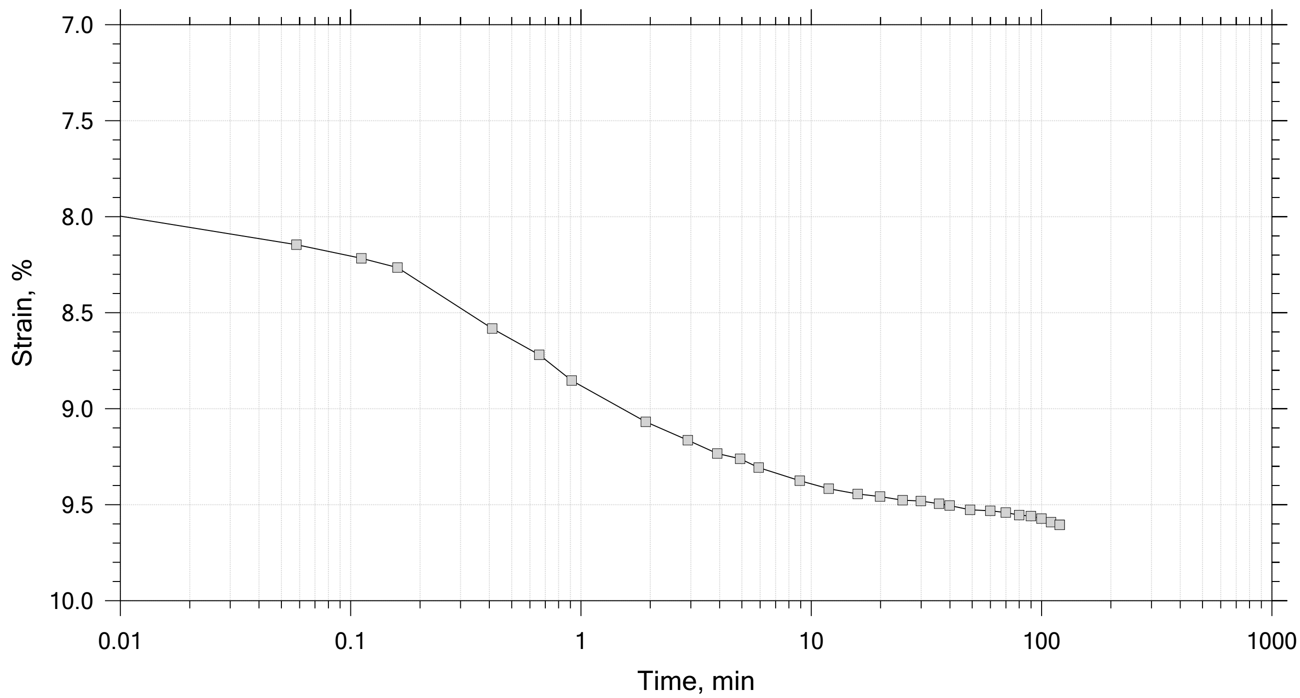
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

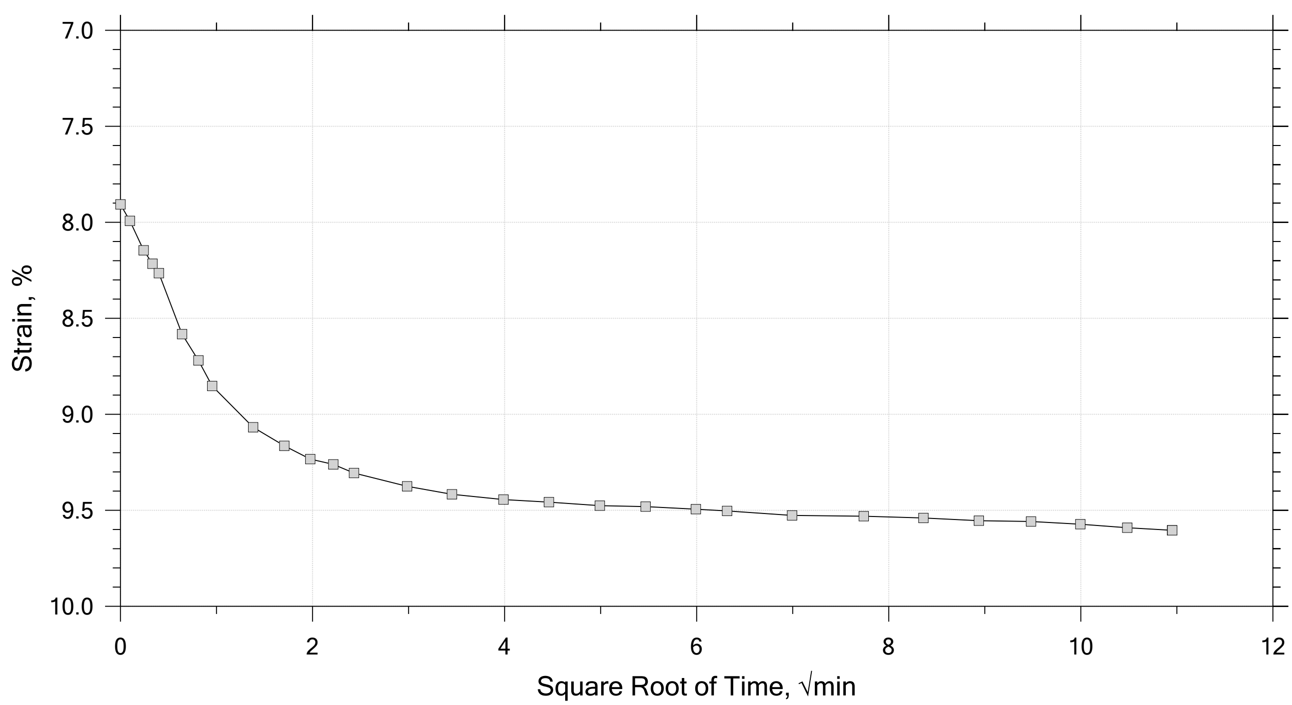
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

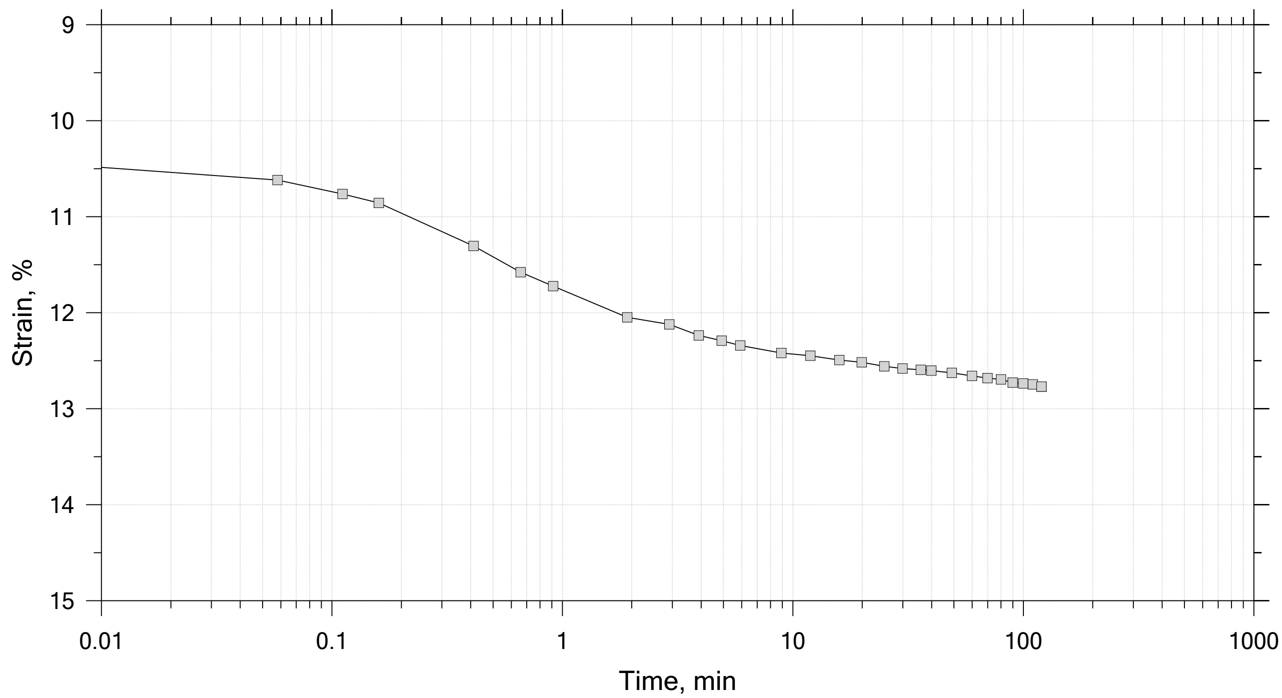


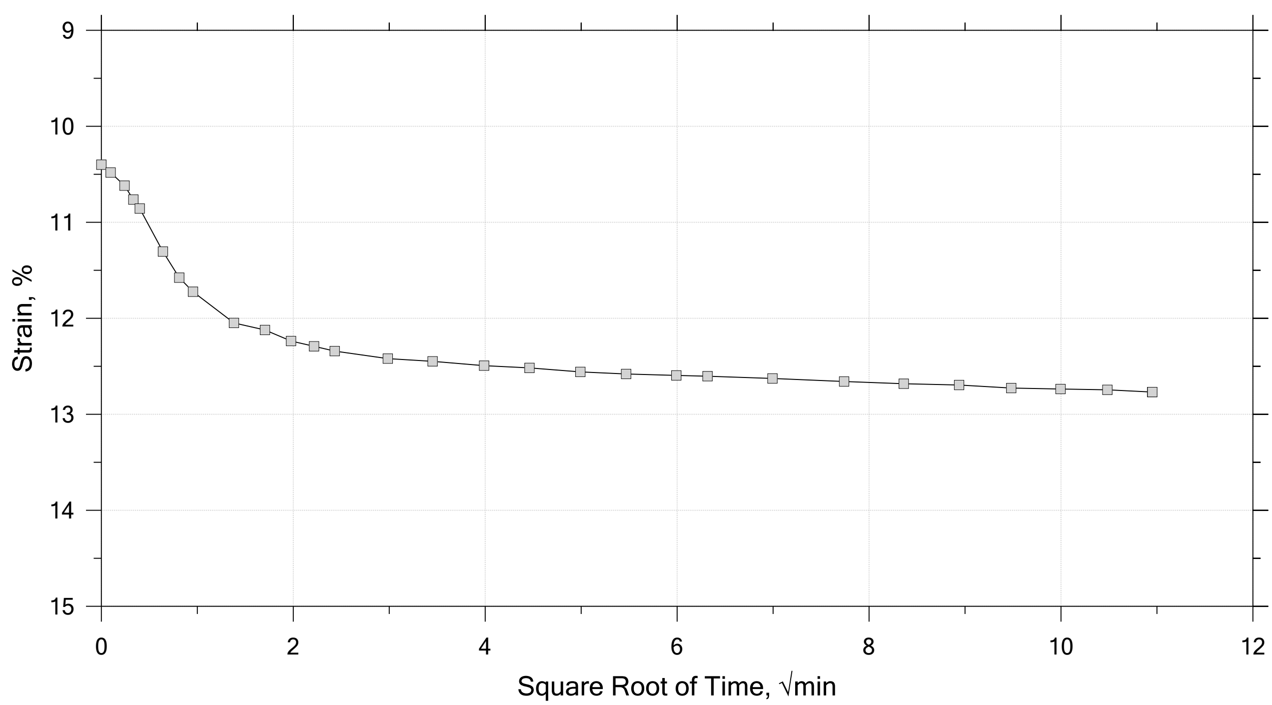


Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf





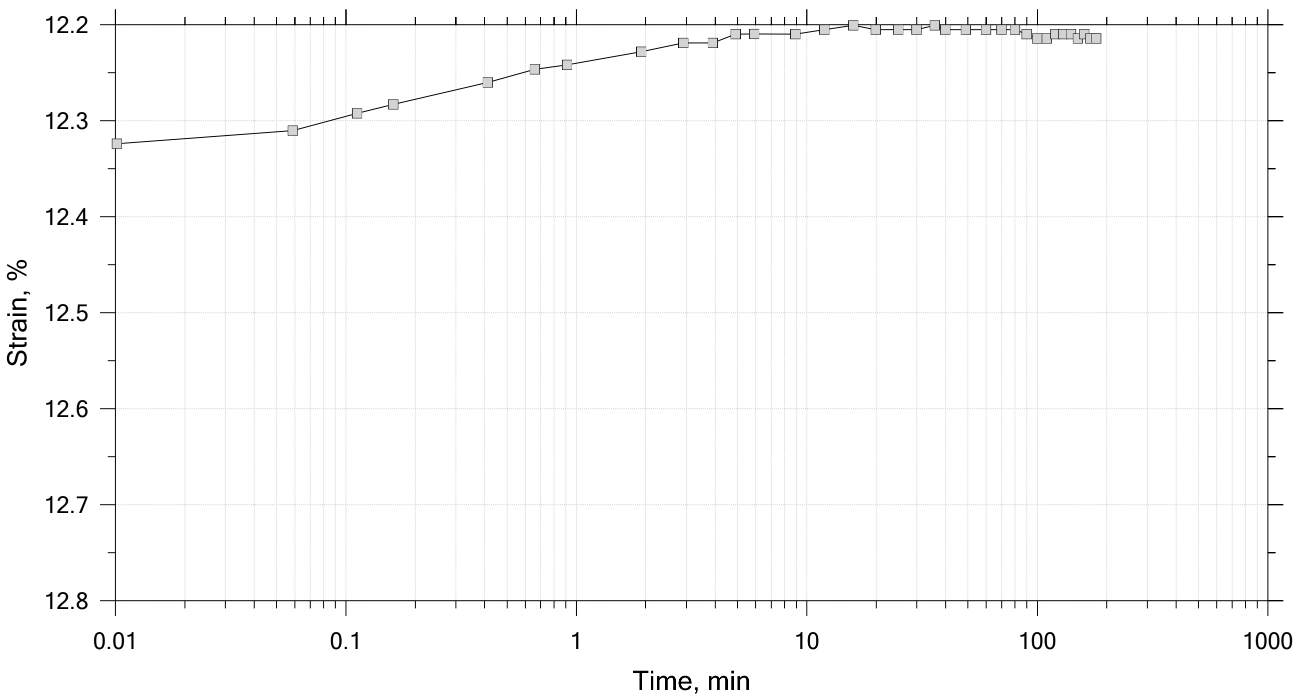
Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0664 tsf		

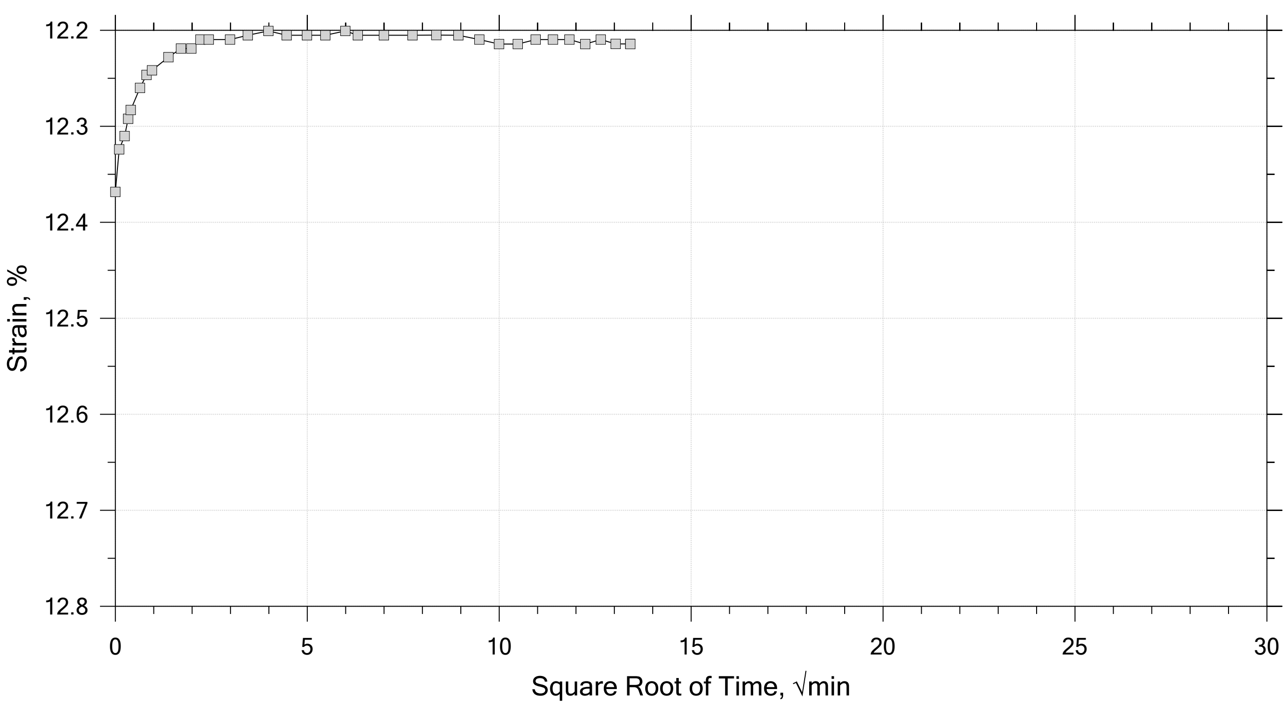
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf

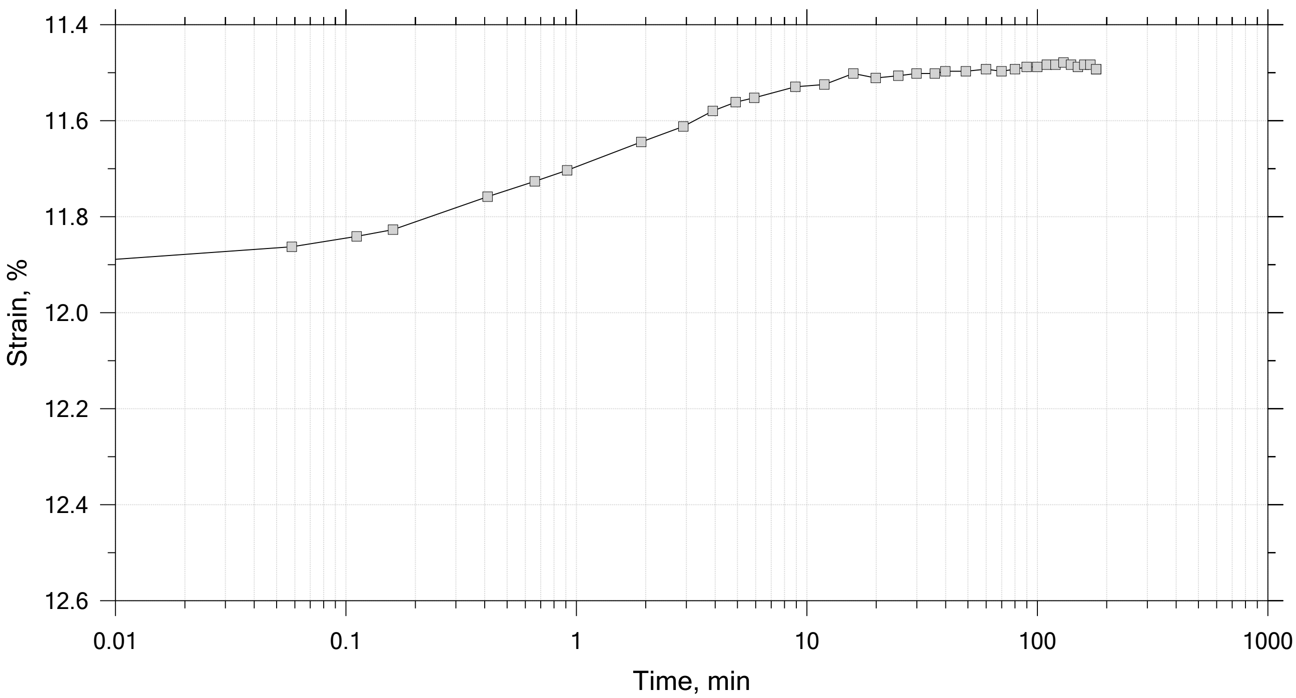


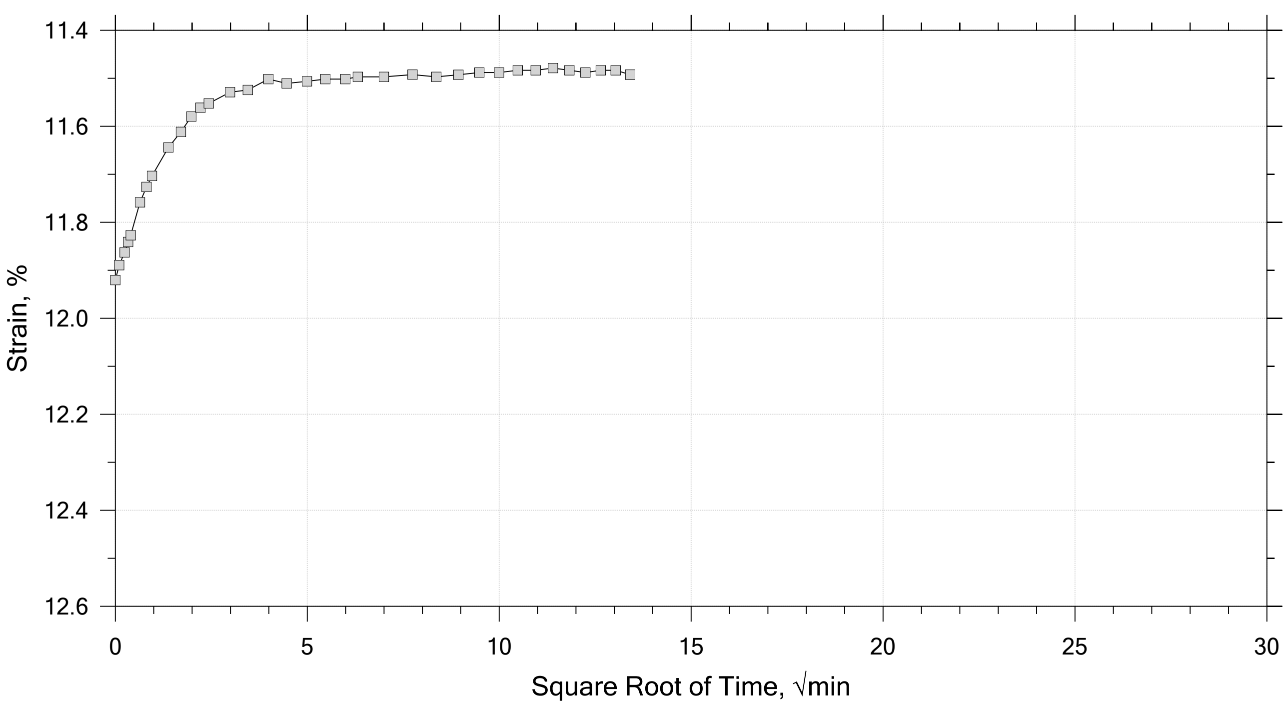


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

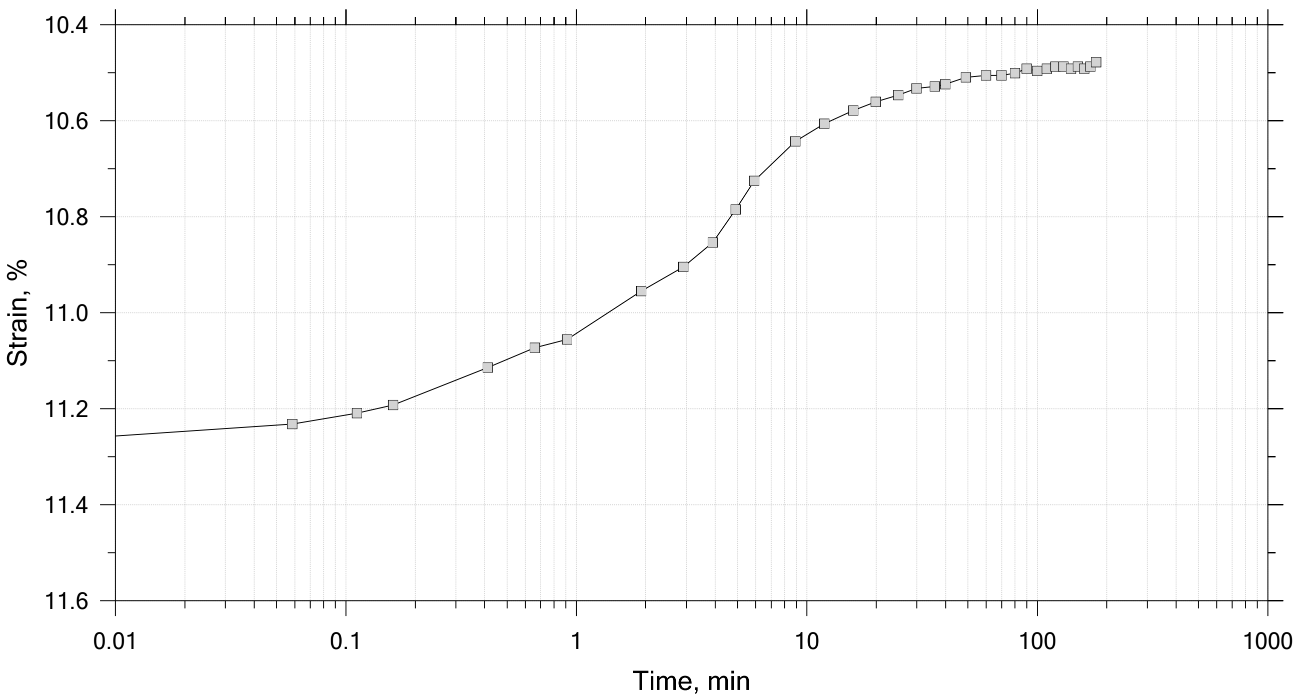


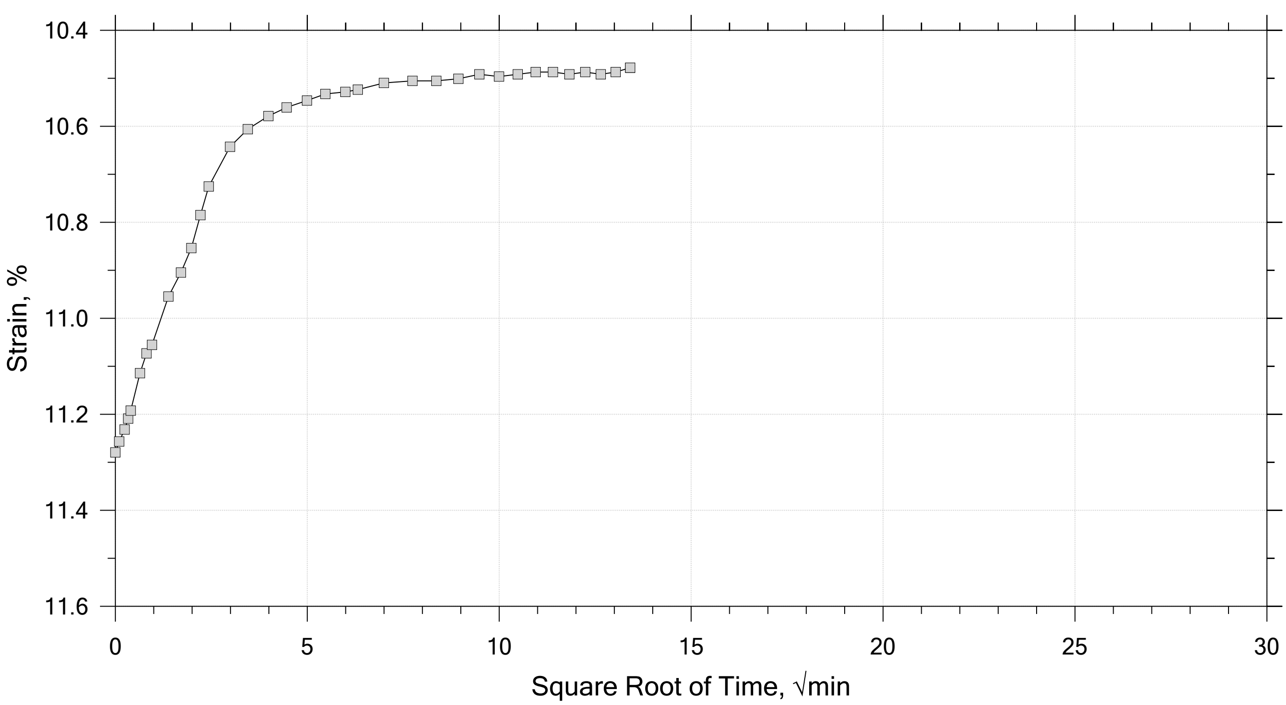


GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf





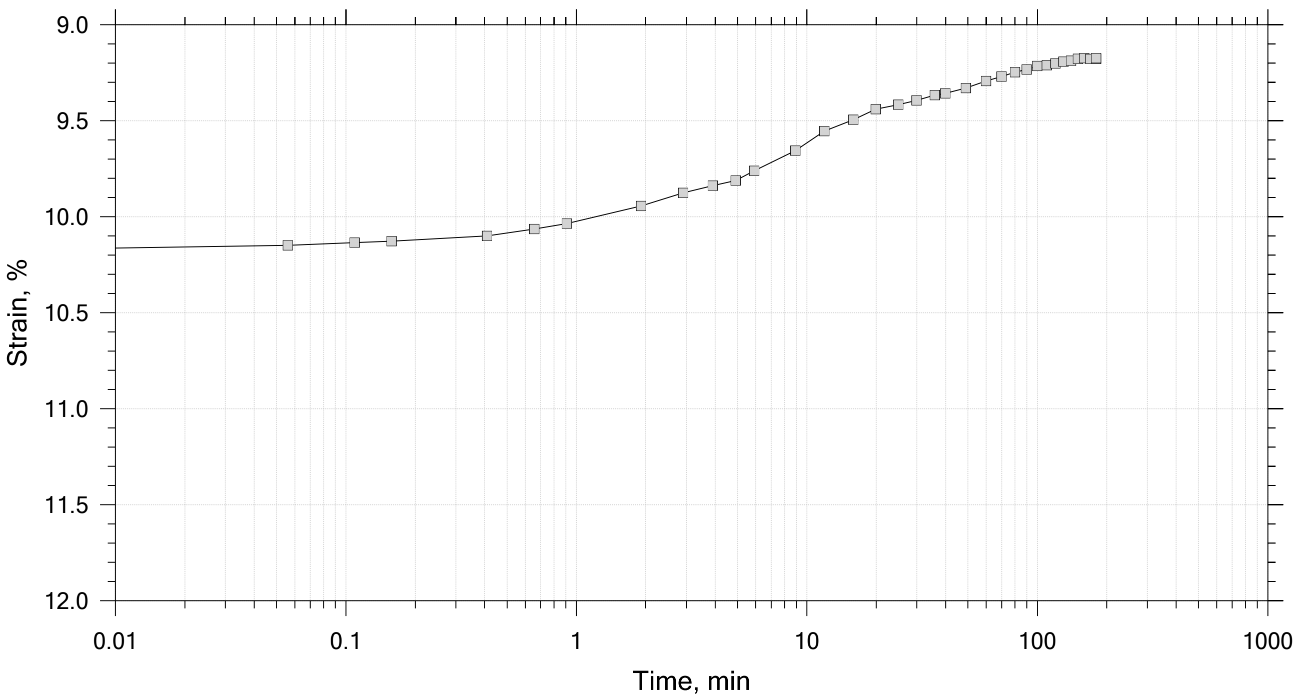
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

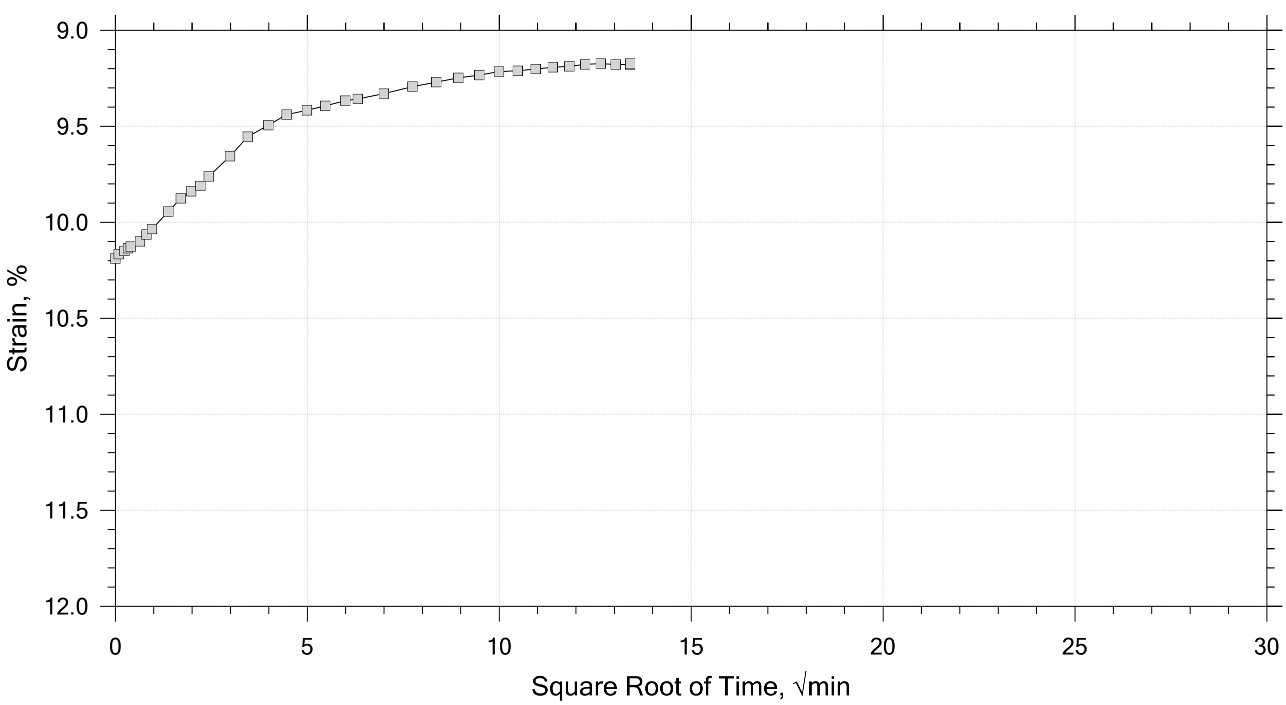
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf





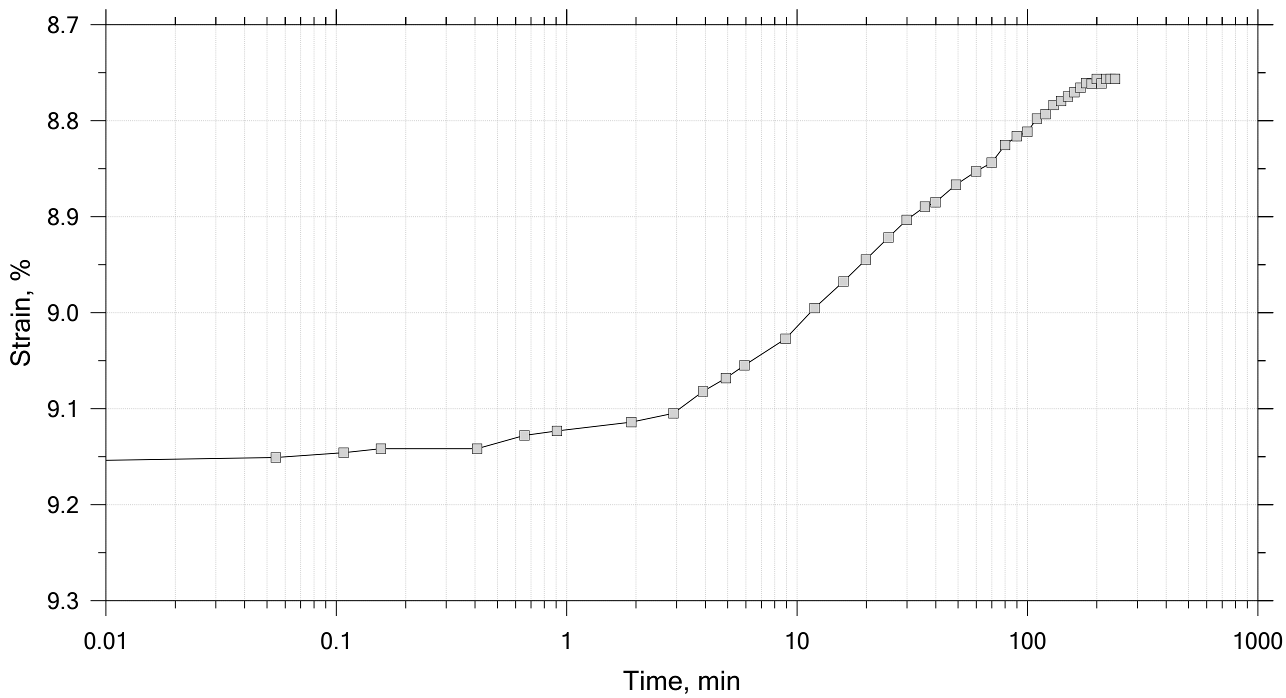
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

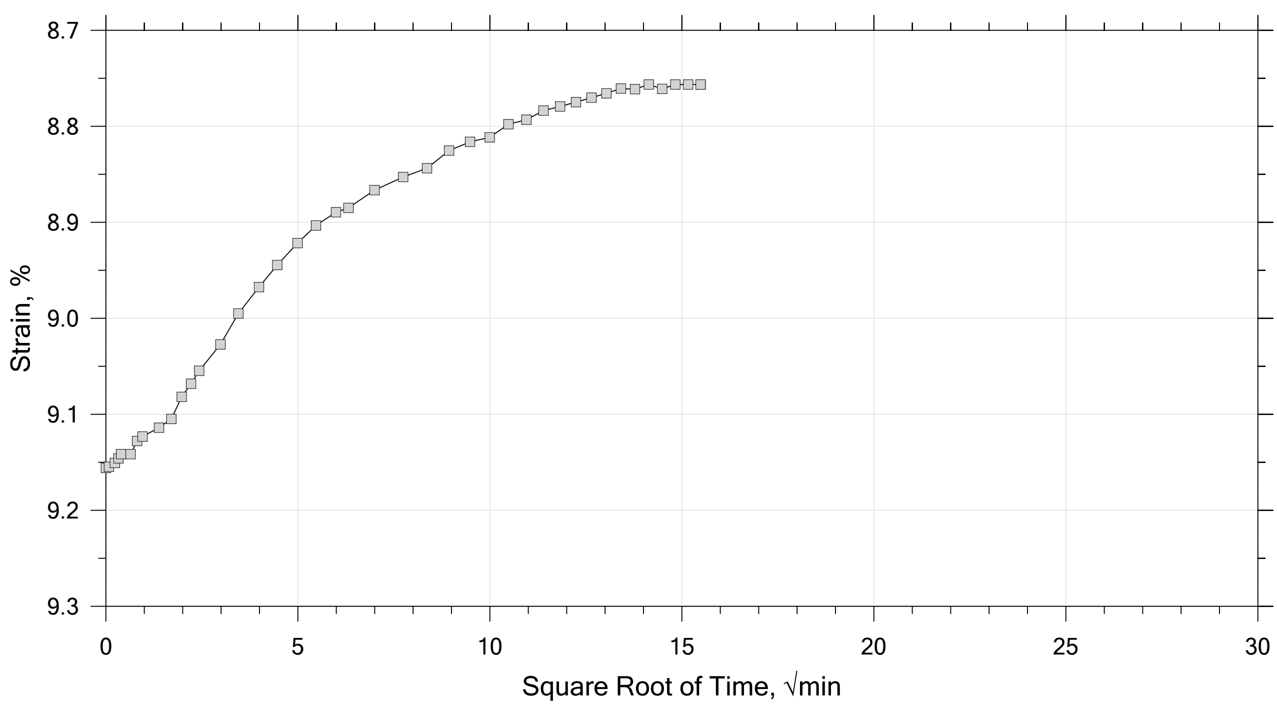
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf





Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 31
Initial Height: 1.00 in	Initial Void Ratio: 0.788	Plastic Limit: 18
Final Height: 0.92 in	Final Void Ratio: 0.645	Plasticity Index: 13

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D2470	RING		A-2519
Mass Container, gm	8.36	108.02	108.02	8.37
Mass Container + Wet Soil, gm	125.18	265.49	260.16	161.32
Mass Container + Dry Soil, gm	100.4	231.13	231.13	132.14
Mass Dry Soil, gm	92.04	123.11	123.11	123.77
Water Content, %	26.92	27.91	23.58	23.58
Void Ratio	---	0.79	0.65	---
Degree of Saturation, %	---	96.88	100.00	---
Dry Unit Weight, pcf	---	95.547	103.86	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0664 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0664	0.008039	0.774	0.804	0.000	0.00e+00	1.21e-01	0.00e+00	0.00e+00
2	0.125	0.01144	0.768	1.14	0.000	0.00e+00	5.80e-02	0.00e+00	0.00e+00
3	0.250	0.01732	0.757	1.73	0.000	0.00e+00	4.70e-02	0.00e+00	0.00e+00
4	0.500	0.02370	0.746	2.37	0.000	0.00e+00	2.55e-02	0.00e+00	0.00e+00
5	1.00	0.02847	0.737	2.85	0.000	0.00e+00	9.55e-03	0.00e+00	0.00e+00
6	2.00	0.03623	0.724	3.62	0.407	1.31e-05	7.76e-03	2.75e-04	0.00e+00
7	4.00	0.05119	0.697	5.12	0.388	1.34e-05	7.48e-03	2.71e-04	0.00e+00
8	8.00	0.07075	0.662	7.07	0.829	6.06e-06	4.89e-03	7.99e-05	0.00e+00
9	16.0	0.09605	0.617	9.60	0.729	6.57e-06	3.16e-03	5.60e-05	0.00e+00
10	32.0	0.1277	0.560	12.8	0.459	9.80e-06	1.98e-03	5.22e-05	0.00e+00
11	8.00	0.1221	0.570	12.2	0.000	0.00e+00	2.31e-04	0.00e+00	0.00e+00
12	2.00	0.1149	0.583	11.5	0.000	0.00e+00	1.20e-03	0.00e+00	0.00e+00
13	0.500	0.1048	0.601	10.5	0.000	0.00e+00	6.76e-03	0.00e+00	0.00e+00
14	0.125	0.09174	0.624	9.17	6.688	6.93e-07	3.48e-02	6.50e-05	0.00e+00
15	0.0625	0.08756	0.632	8.76	12.793	3.69e-07	6.68e-02	6.65e-05	0.00e+00

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0664 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

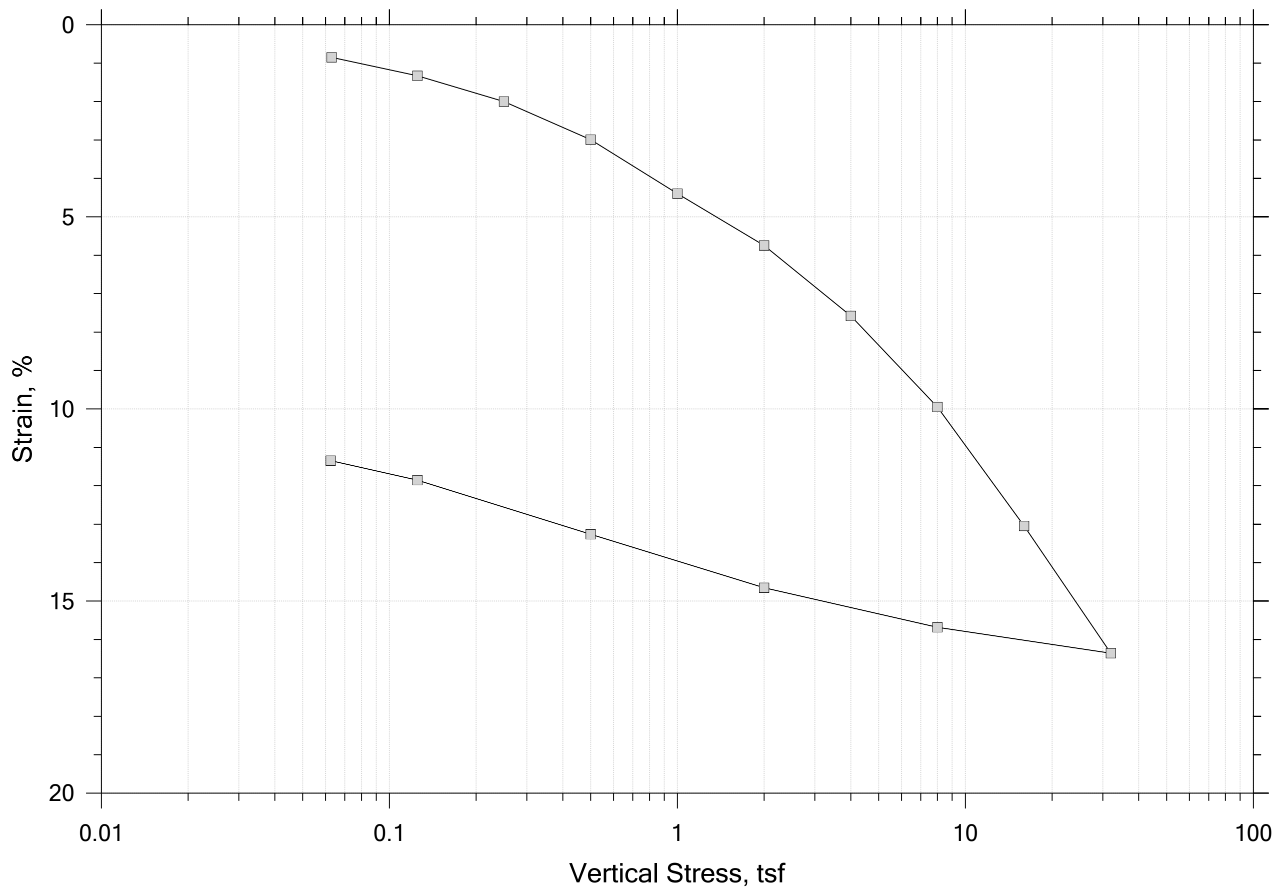
Square Root of Time Coefficients

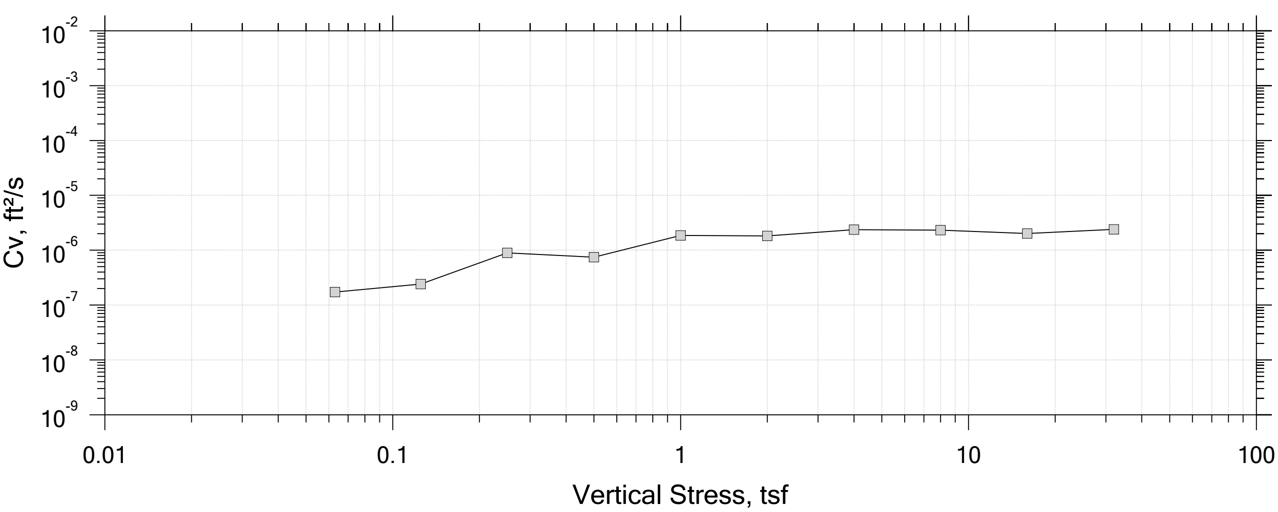
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0664	0.008039	0.774	0.804	40.175	6.06e-07	1.21e-01	1.98e-04
2	0.125	0.01144	0.768	1.14	3.824	6.29e-06	5.80e-02	9.83e-04
3	0.250	0.01732	0.757	1.73	3.930	6.06e-06	4.70e-02	7.69e-04
4	0.500	0.02370	0.746	2.37	6.137	3.84e-06	2.55e-02	2.64e-04
5	1.00	0.02847	0.737	2.85	3.791	6.14e-06	9.55e-03	1.58e-04
6	2.00	0.03623	0.724	3.62	3.040	7.56e-06	7.76e-03	1.58e-04
7	4.00	0.05119	0.697	5.12	2.876	7.80e-06	7.48e-03	1.57e-04
8	8.00	0.07075	0.662	7.07	2.976	7.27e-06	4.89e-03	9.59e-05
9	16.0	0.09605	0.617	9.60	3.055	6.75e-06	3.16e-03	5.76e-05
10	32.0	0.1277	0.560	12.8	2.602	7.44e-06	1.98e-03	3.97e-05
11	8.00	0.1221	0.570	12.2	2.260	8.31e-06	2.31e-04	5.18e-06
12	2.00	0.1149	0.583	11.5	4.974	3.83e-06	1.20e-03	1.24e-05
13	0.500	0.1048	0.601	10.5	13.246	1.47e-06	6.76e-03	2.68e-05
14	0.125	0.09174	0.624	9.17	27.120	7.36e-07	3.48e-02	6.90e-05
15	0.0625	0.08756	0.632	8.76	61.825	3.29e-07	6.68e-02	5.92e-05

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U1	Test Date: 2/11/19	Depth: 2-4 ft
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0664 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





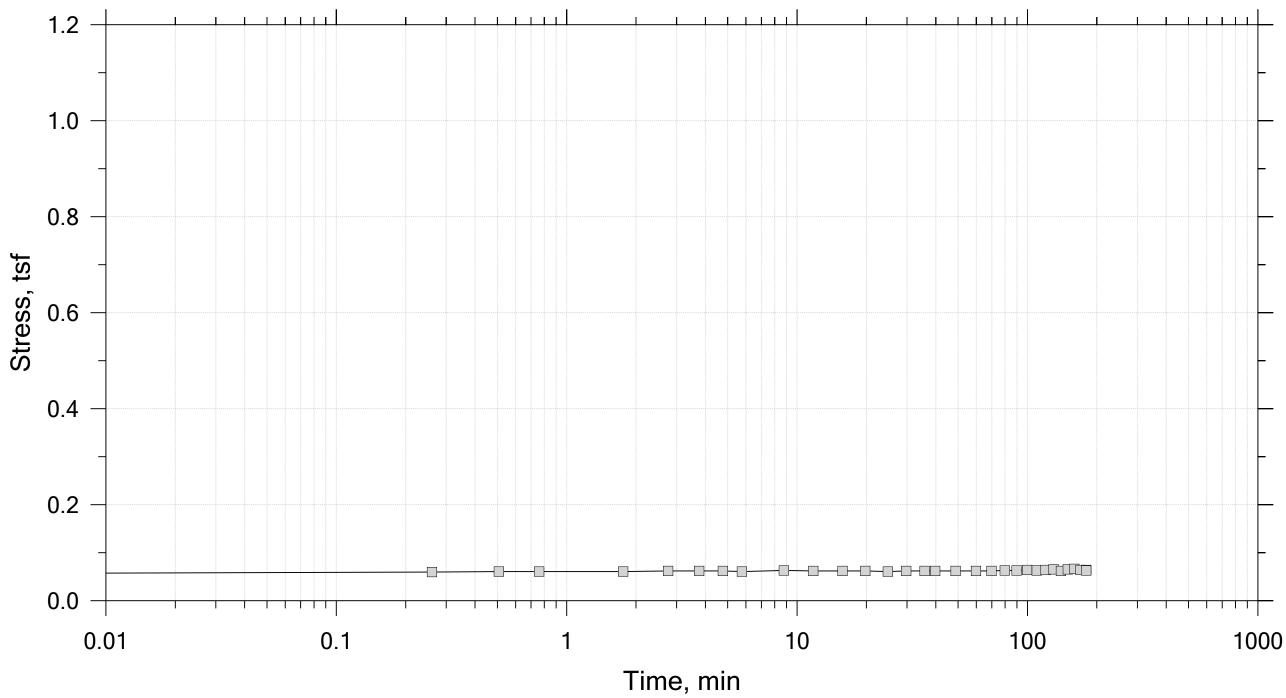
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		
	Displacement at End of Increment		

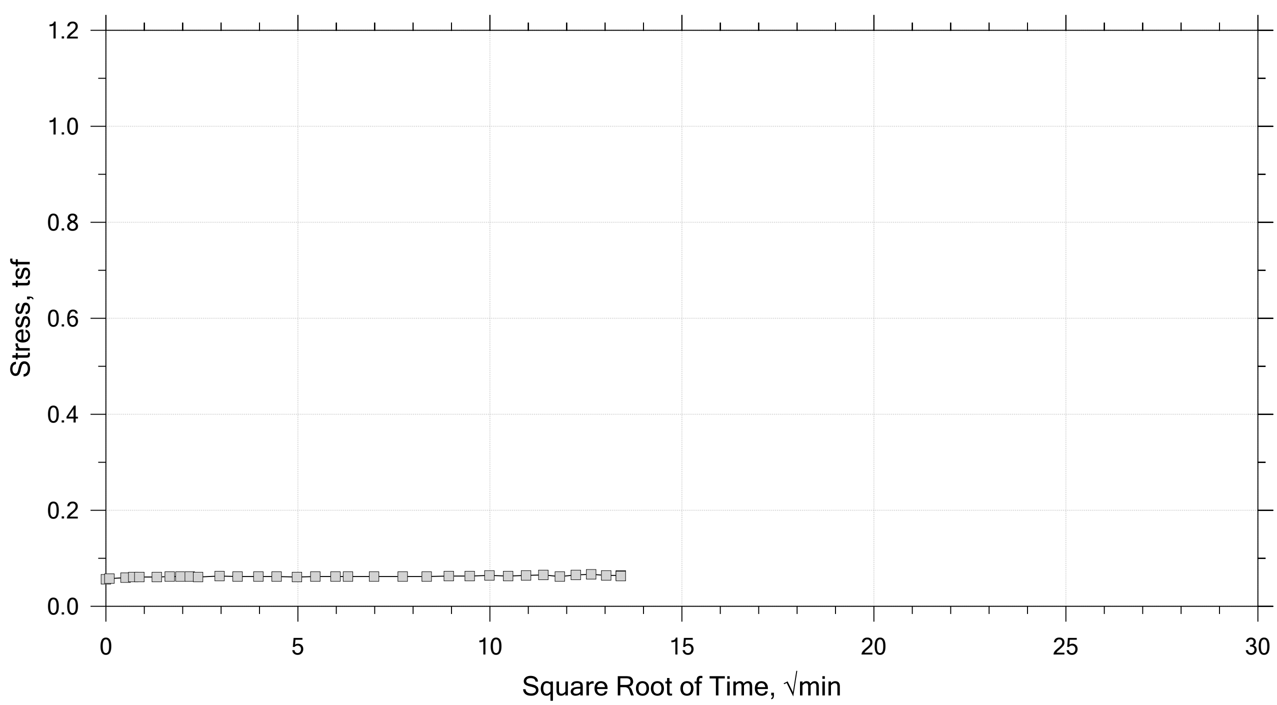
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.063 tsf





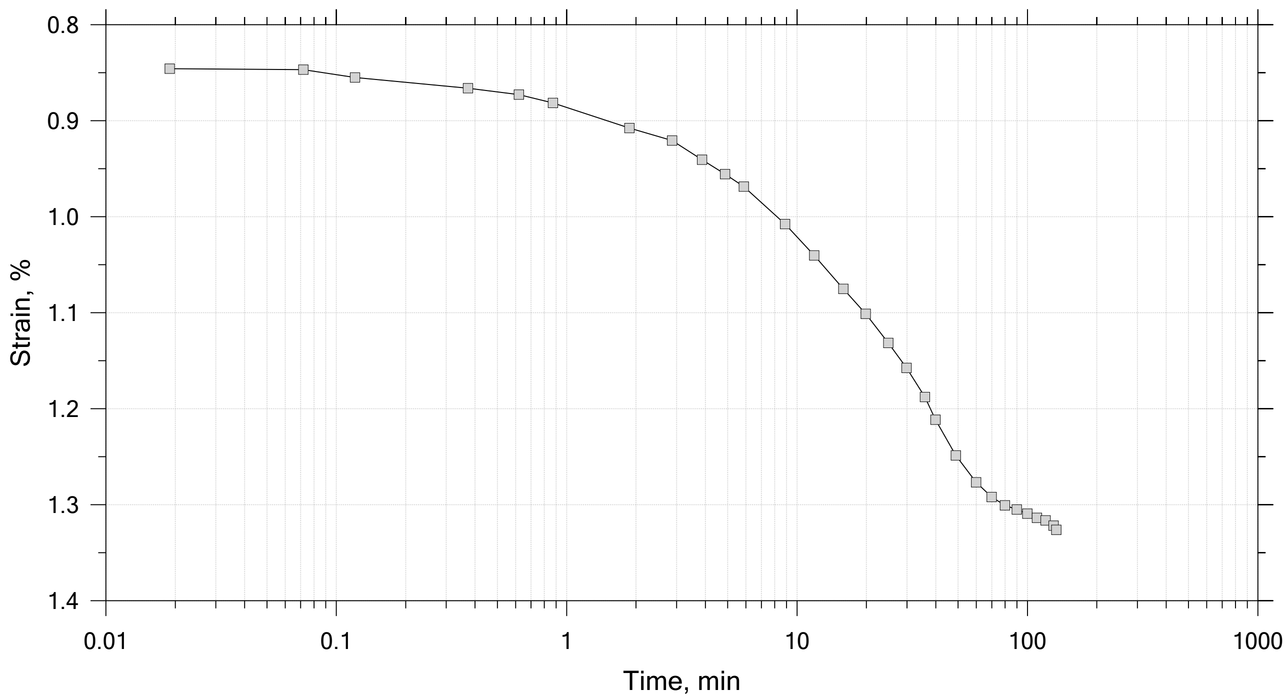
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

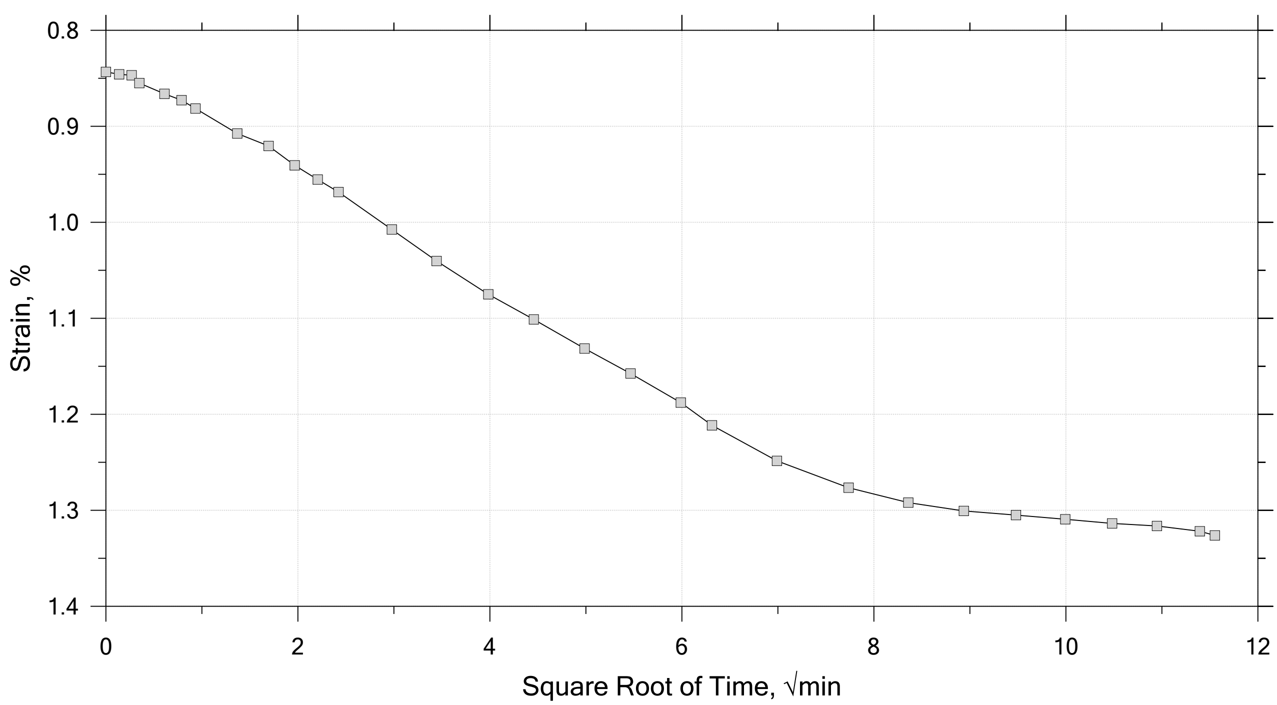
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

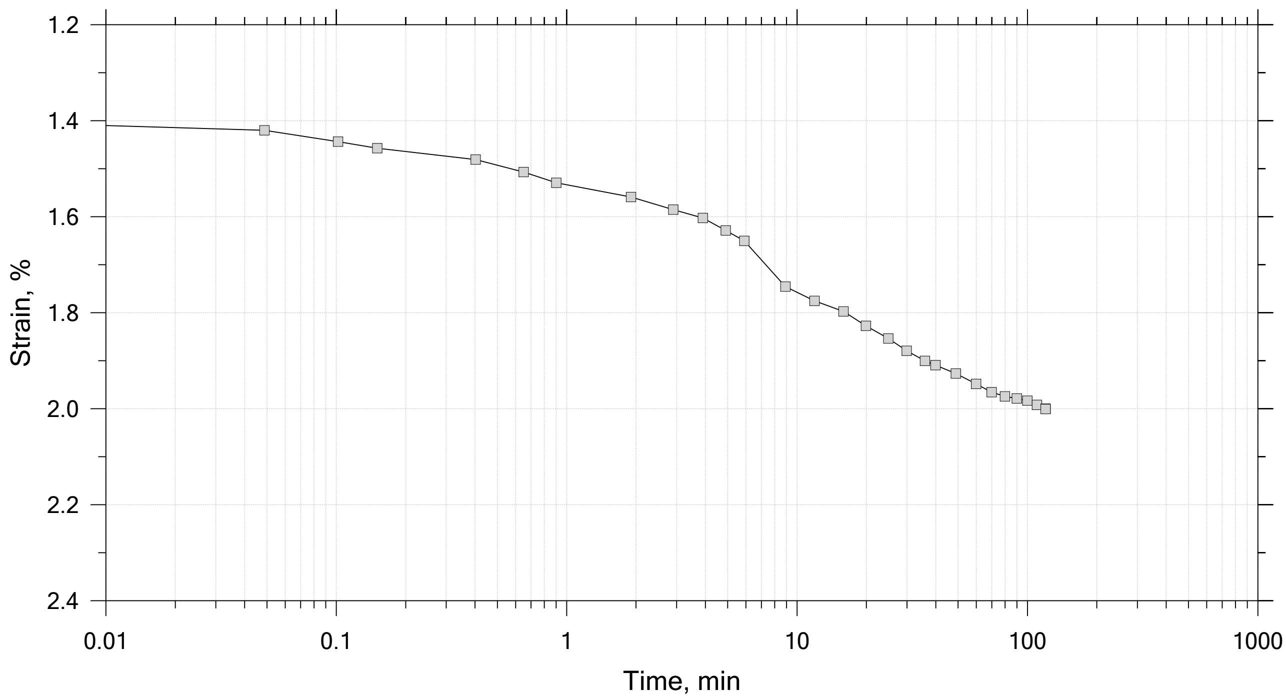


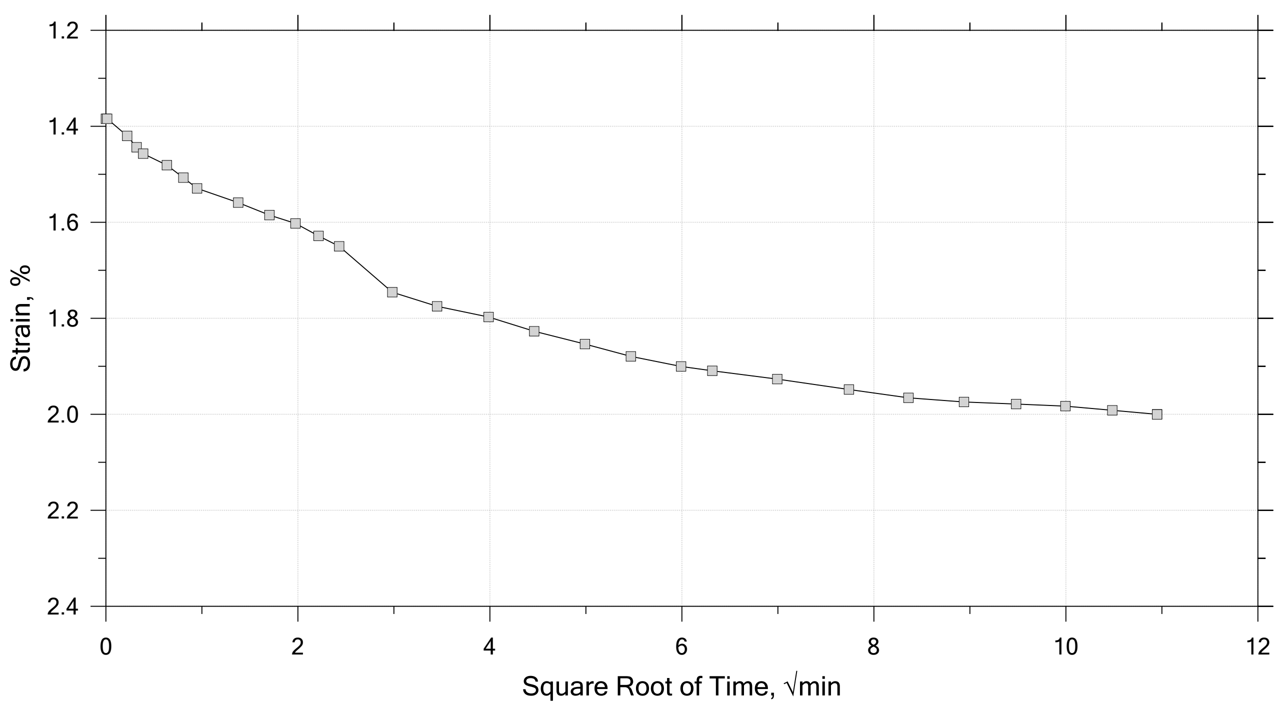


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

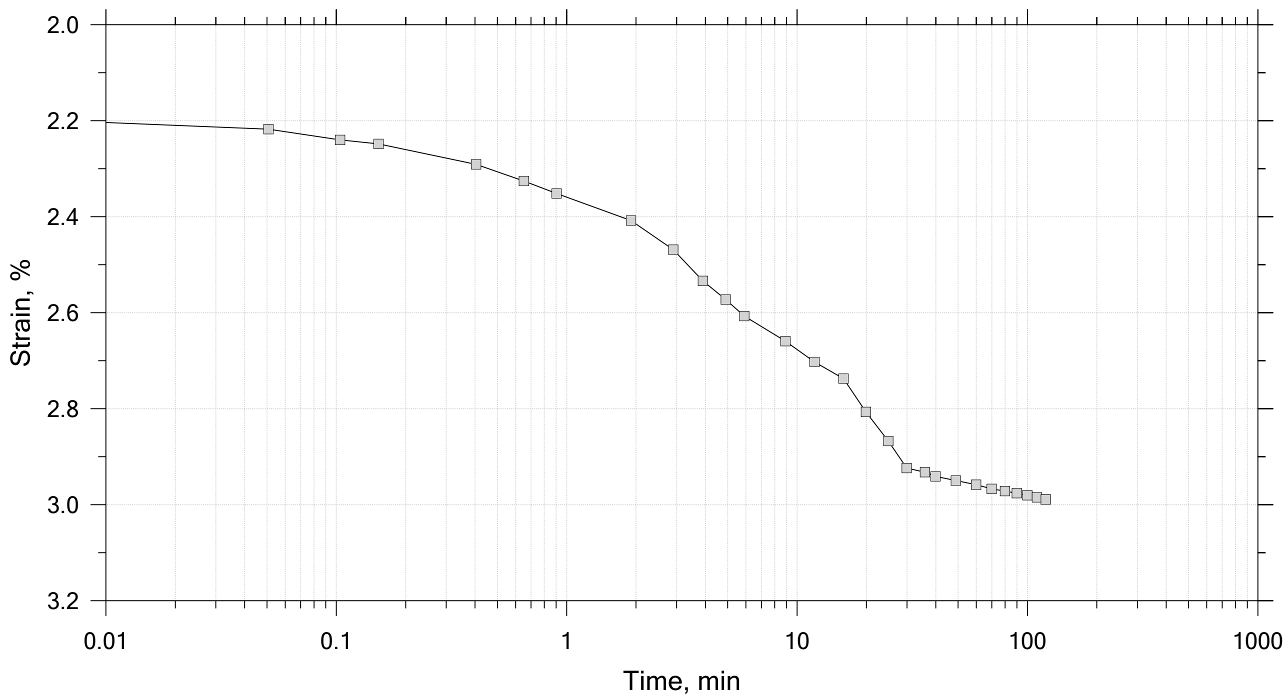


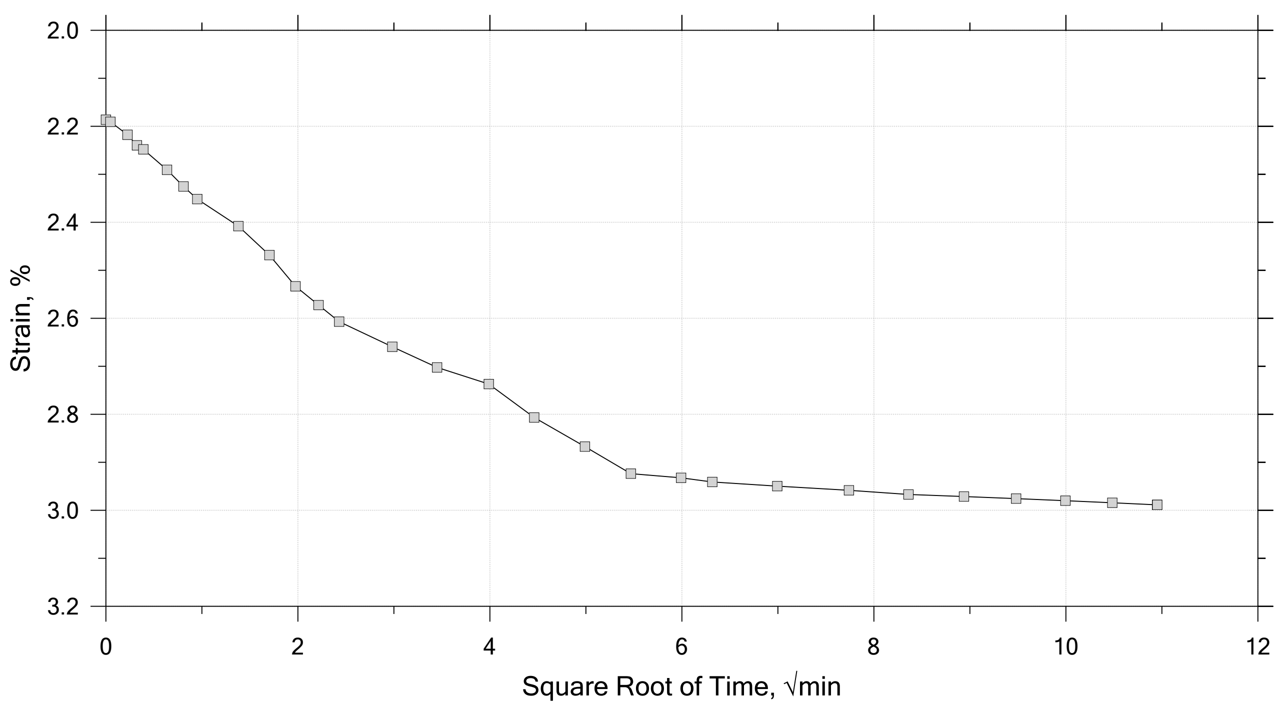


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





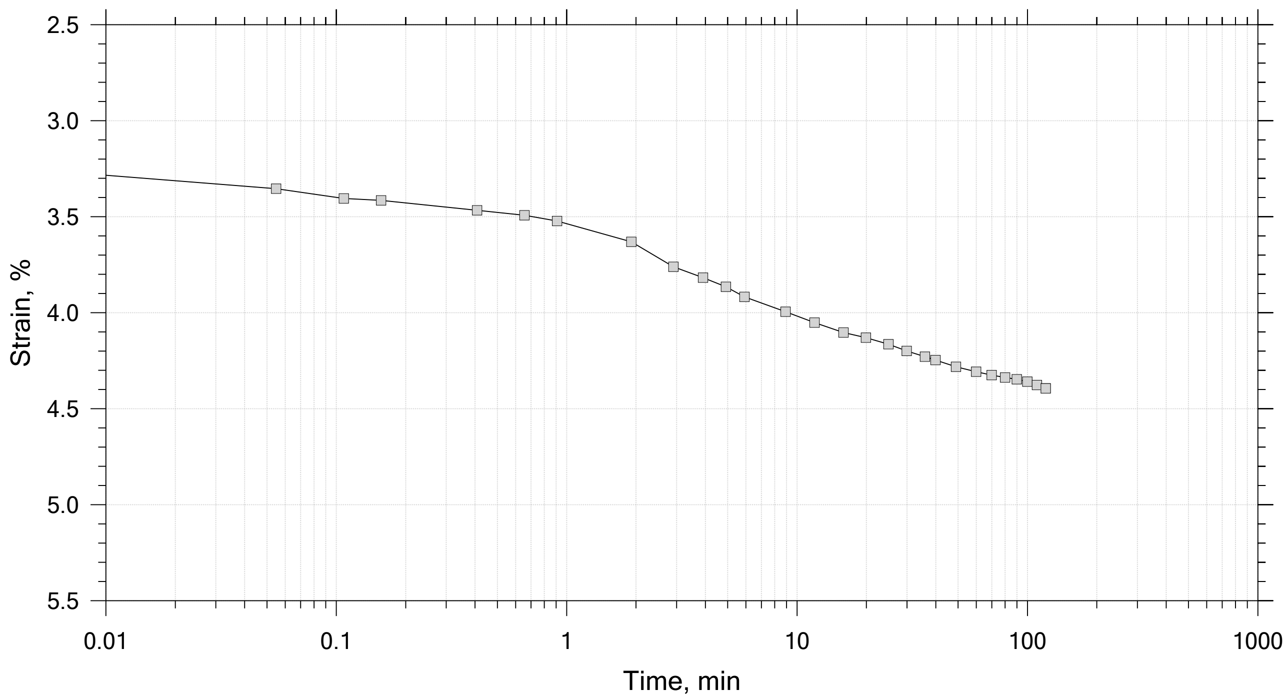
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

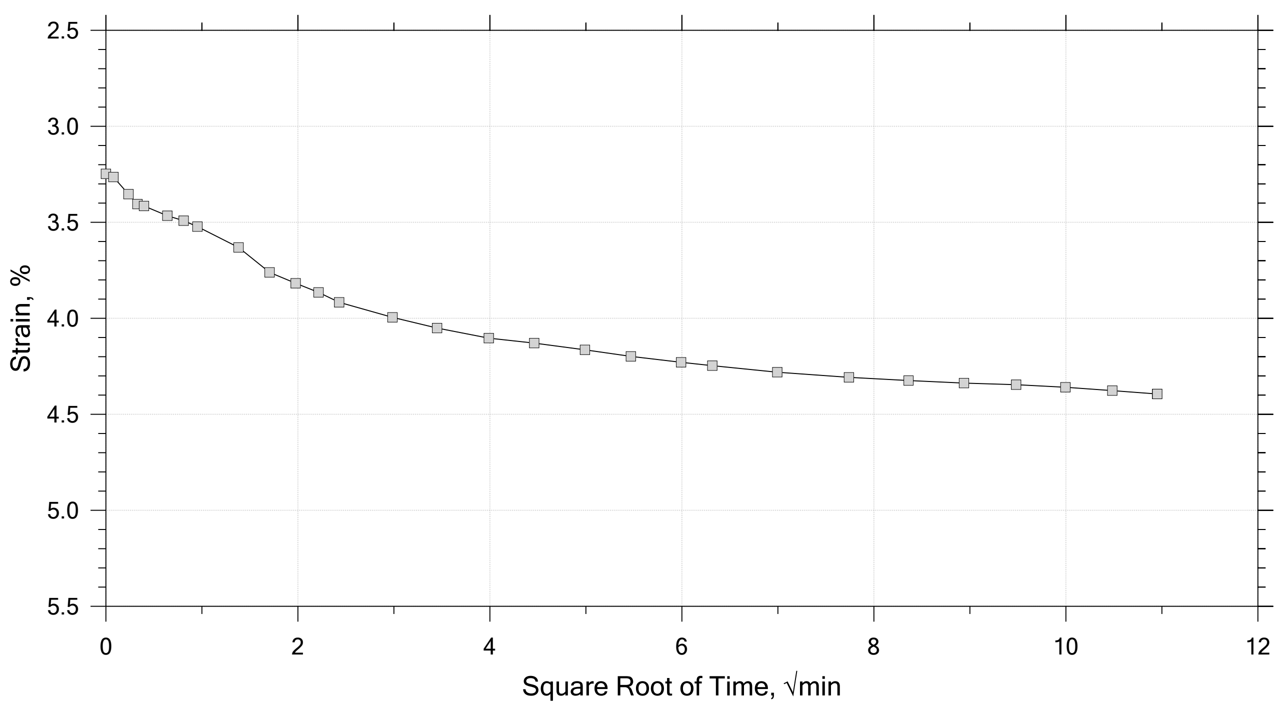
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





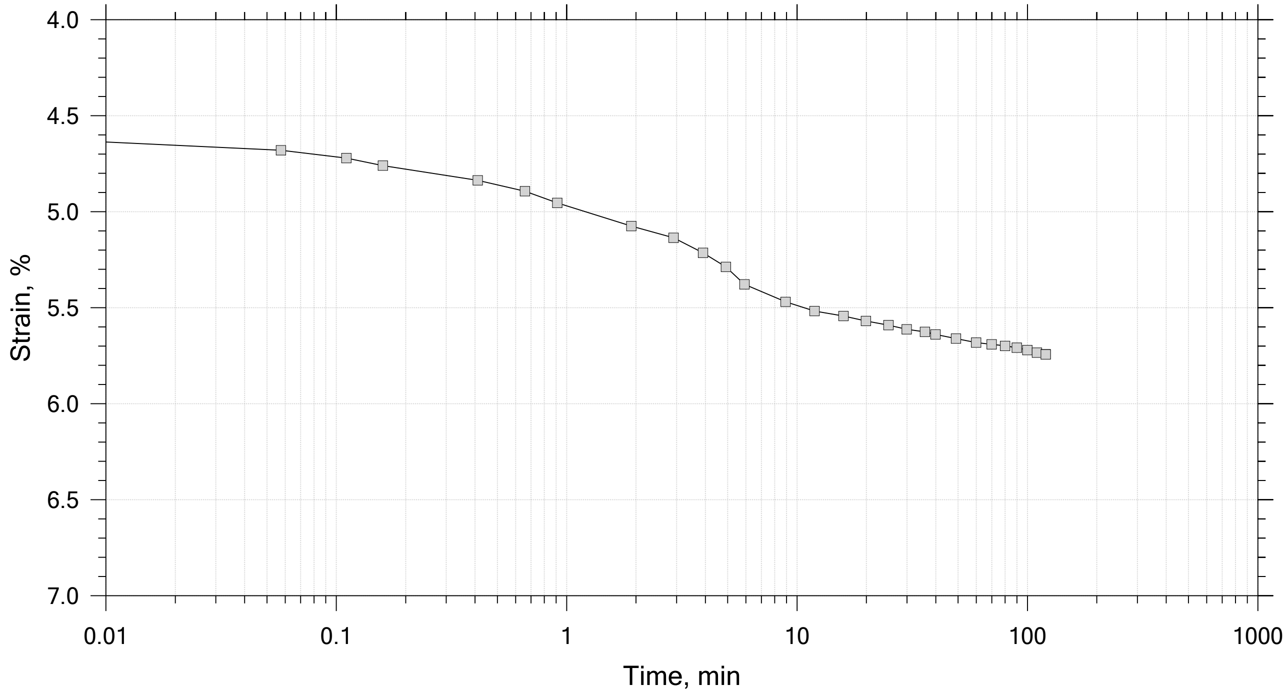
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

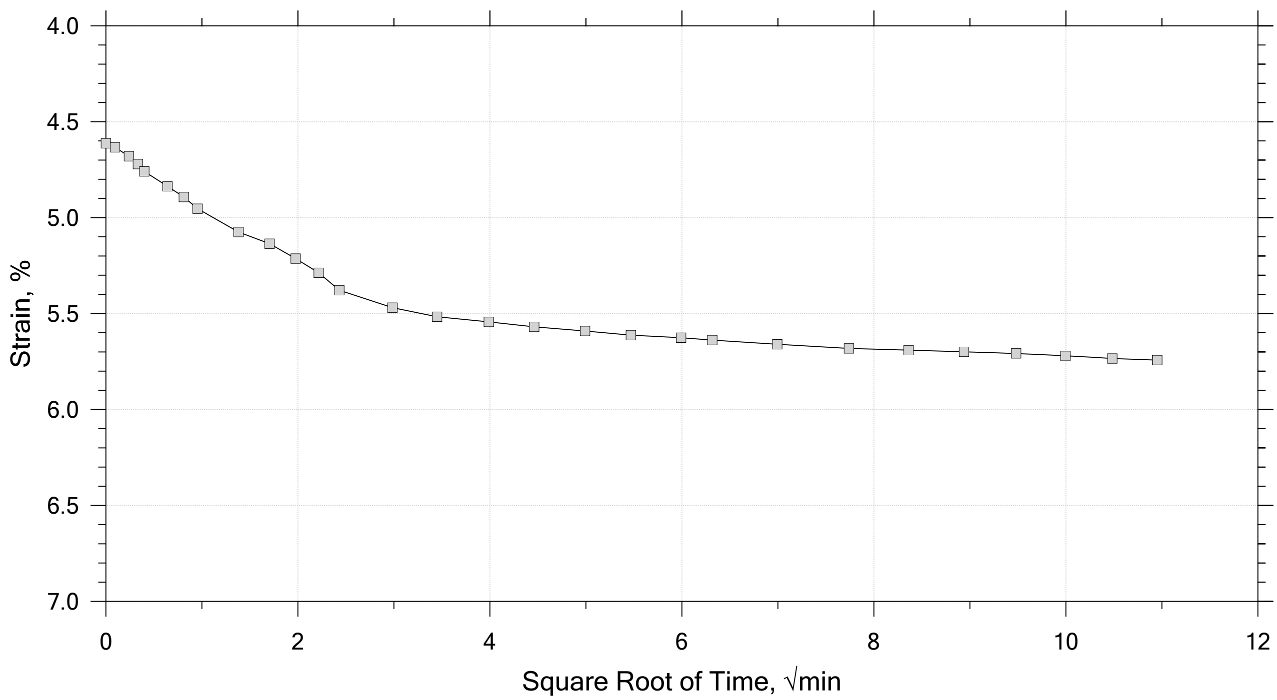
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





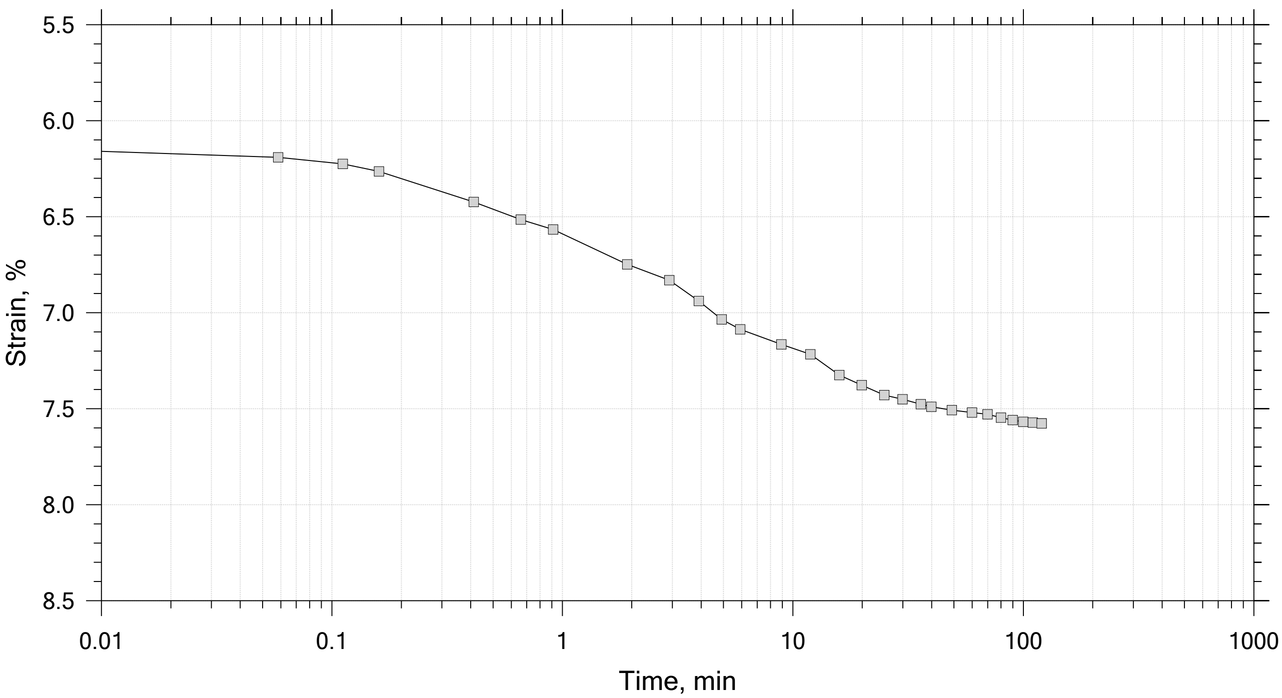
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

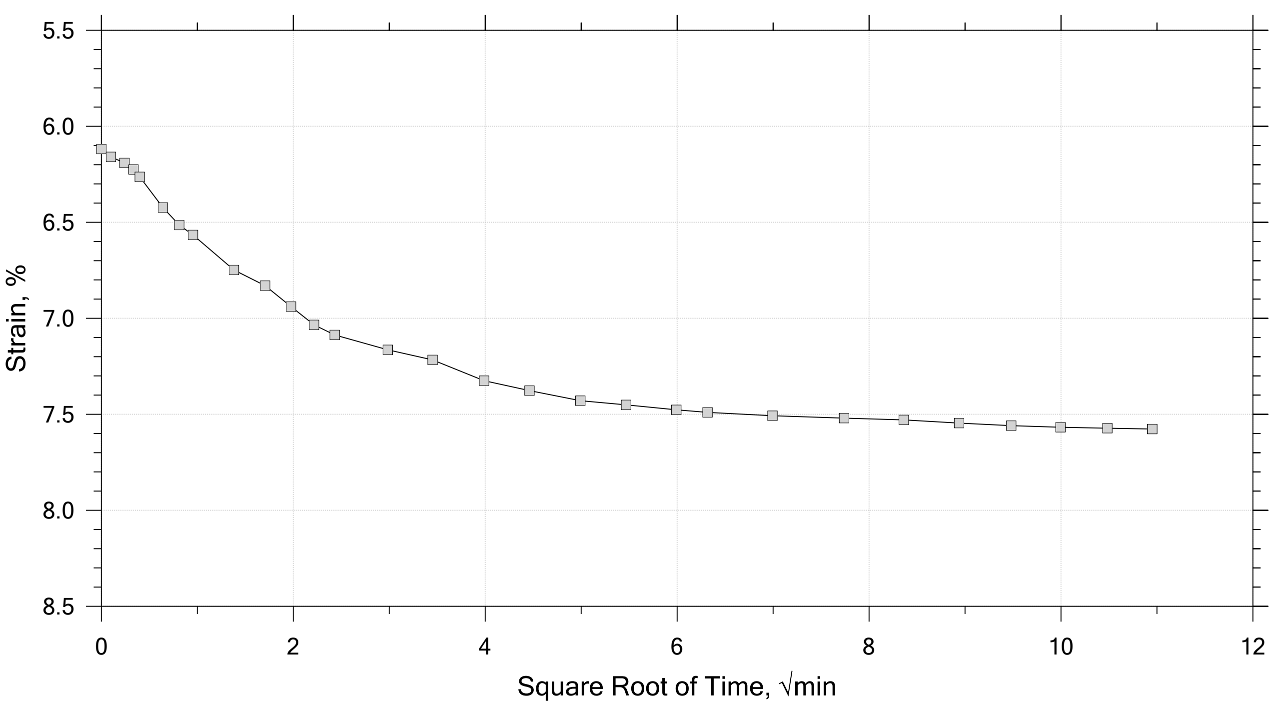
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf

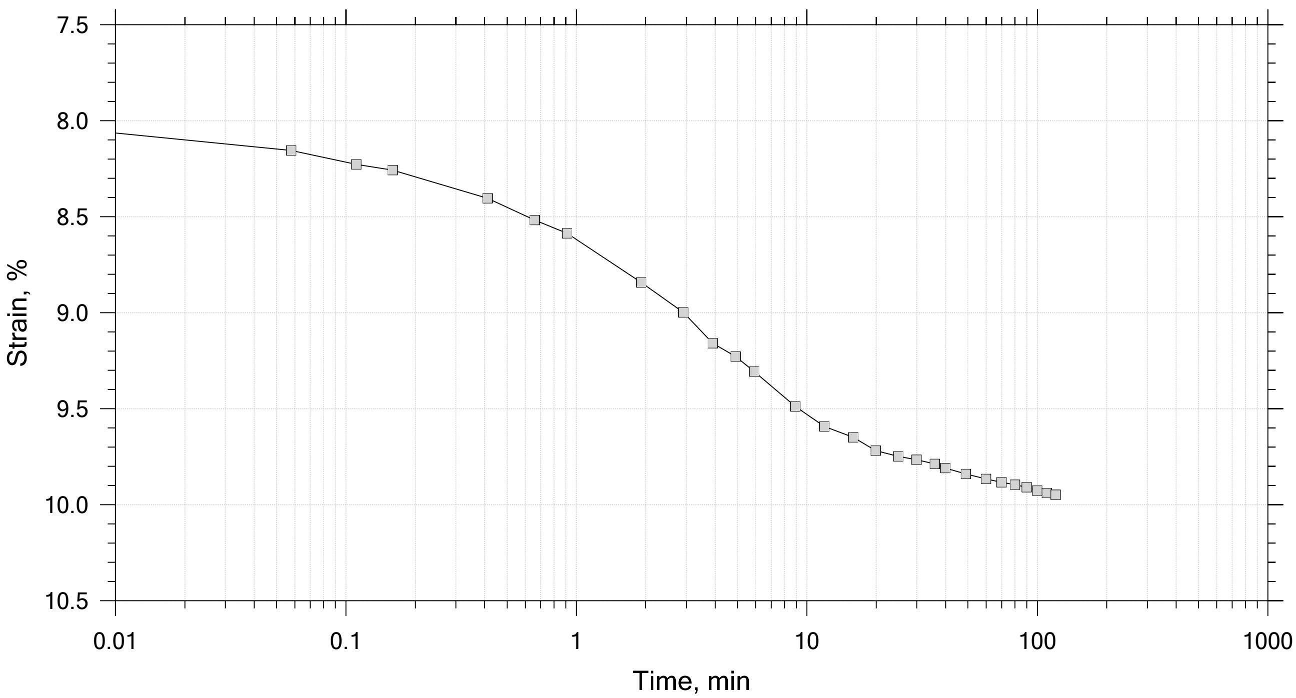


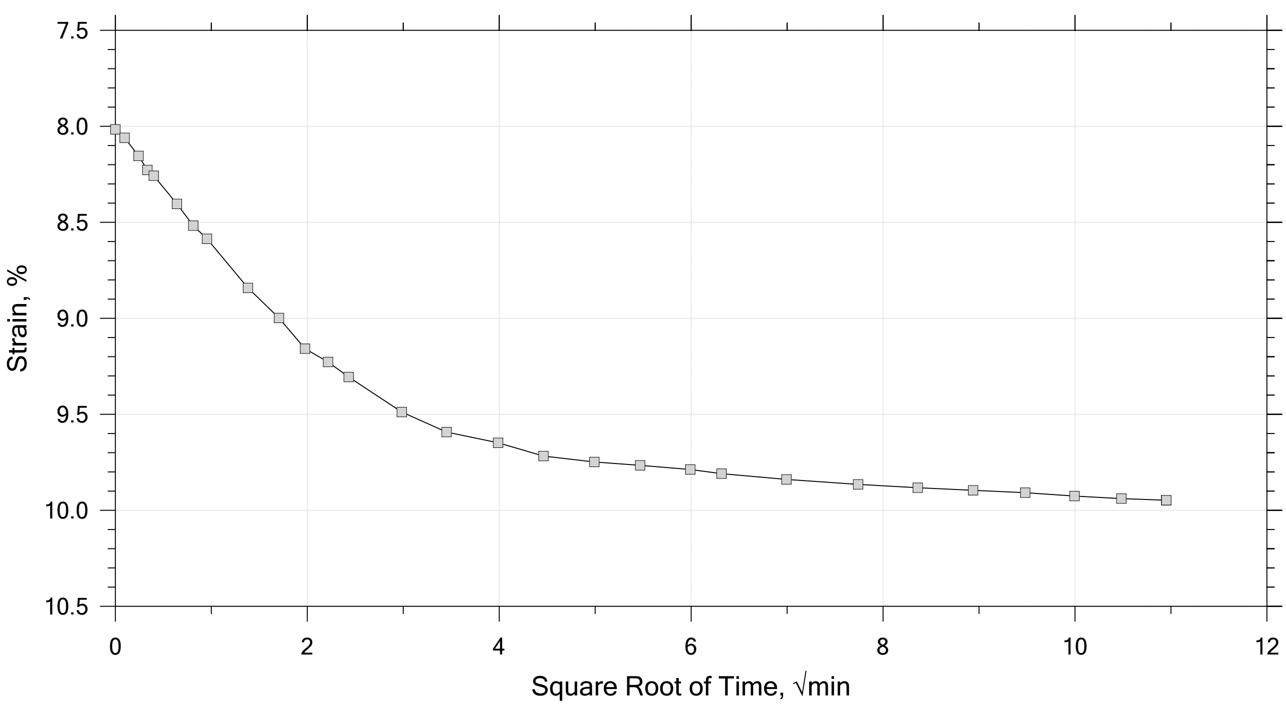


GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15
Constant Load Step
Stress: 8 tsf





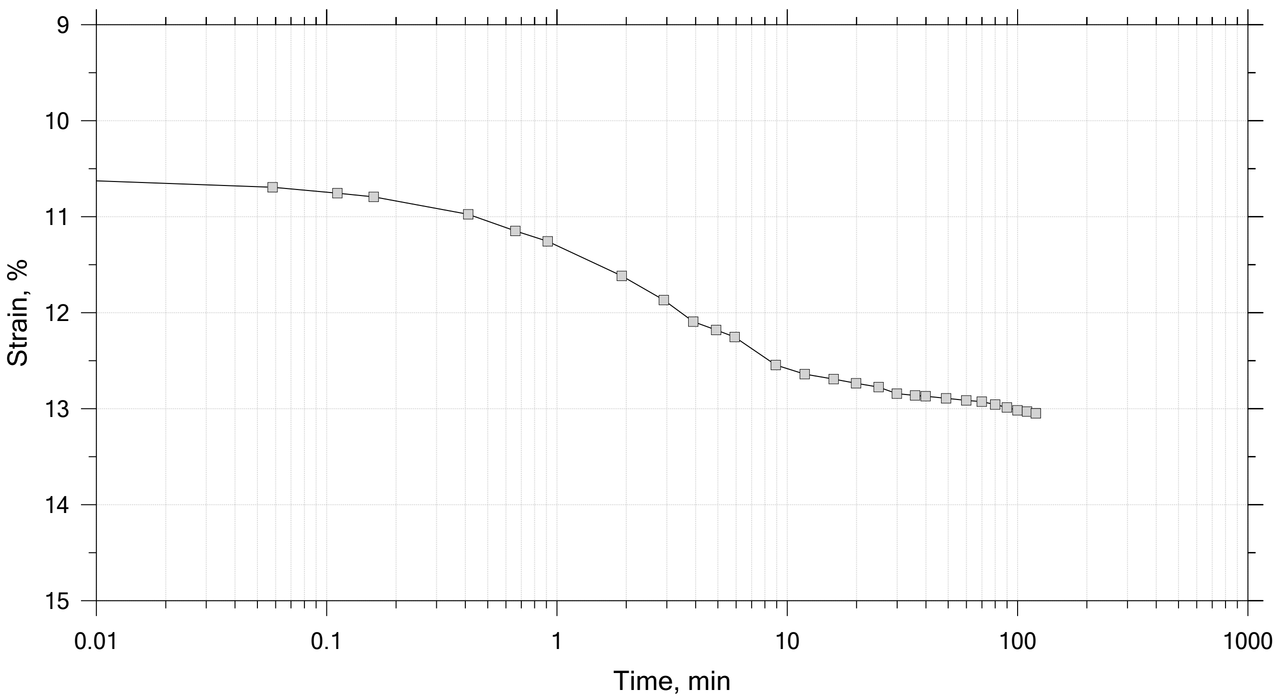
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

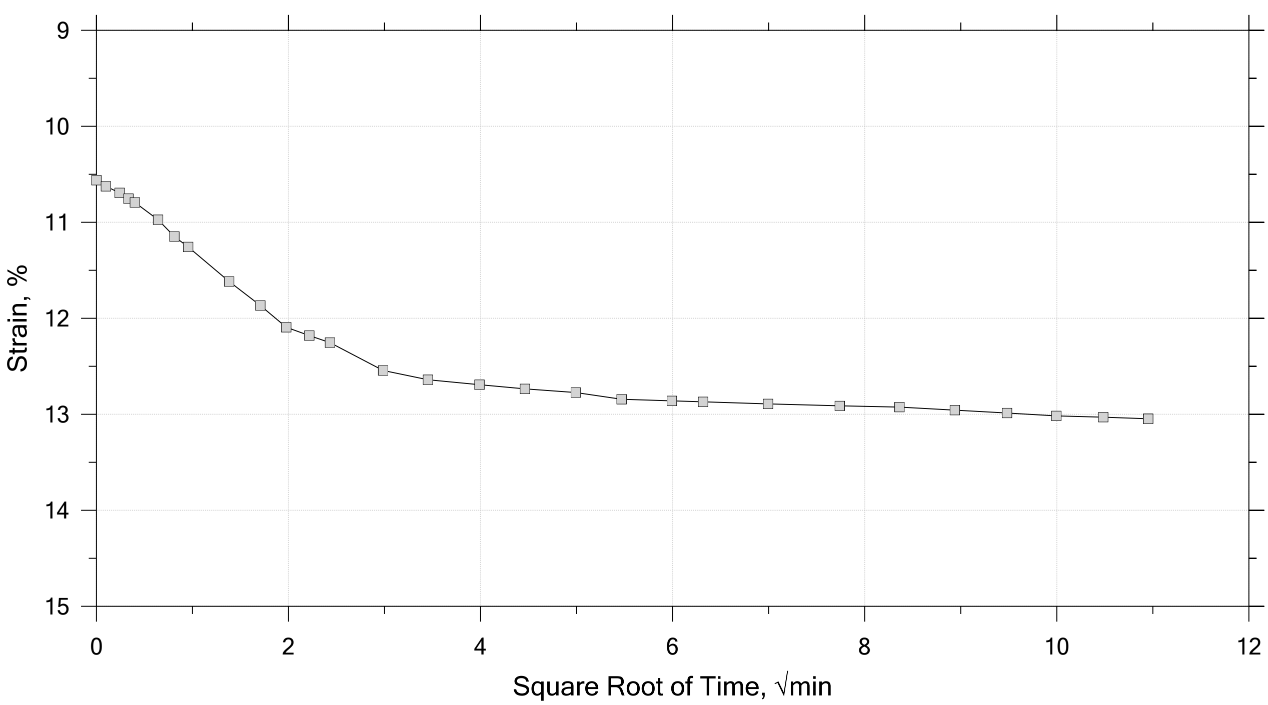
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf





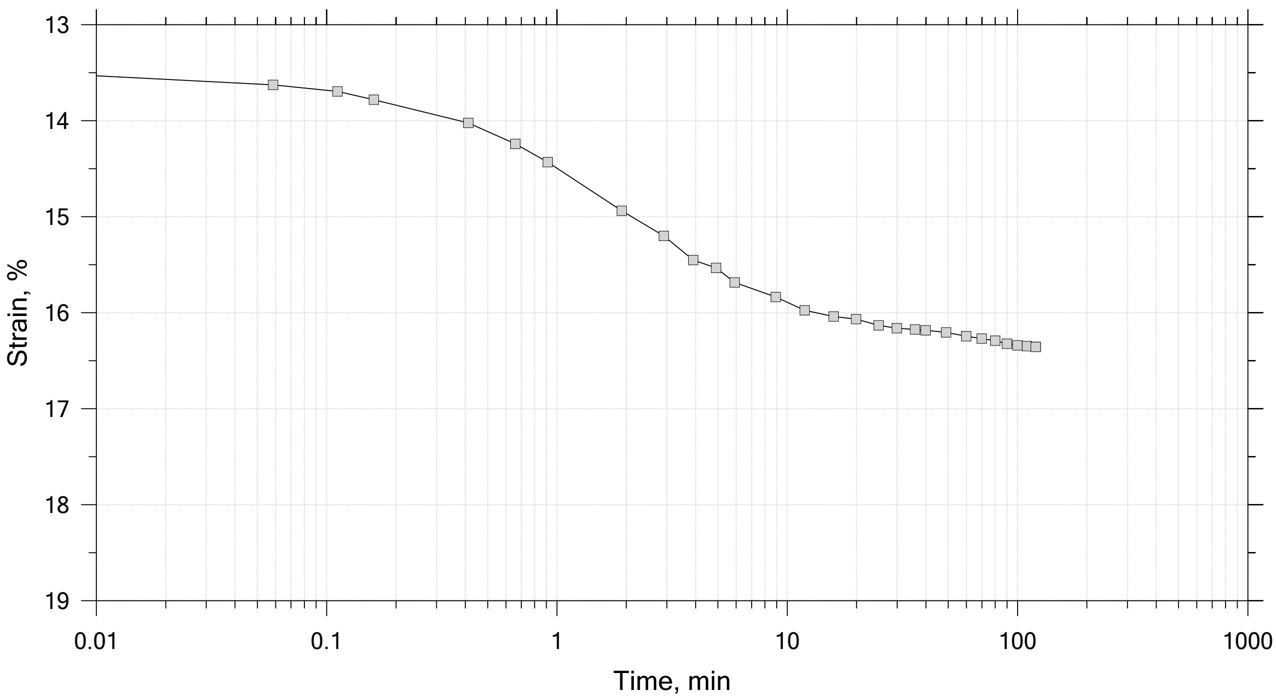
Project: Maine Turnpike Exit 45	Location: South Portlland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, dark grayish brown clay		
Remarks: System Y, Swell Pressure = 0.063 tsf		

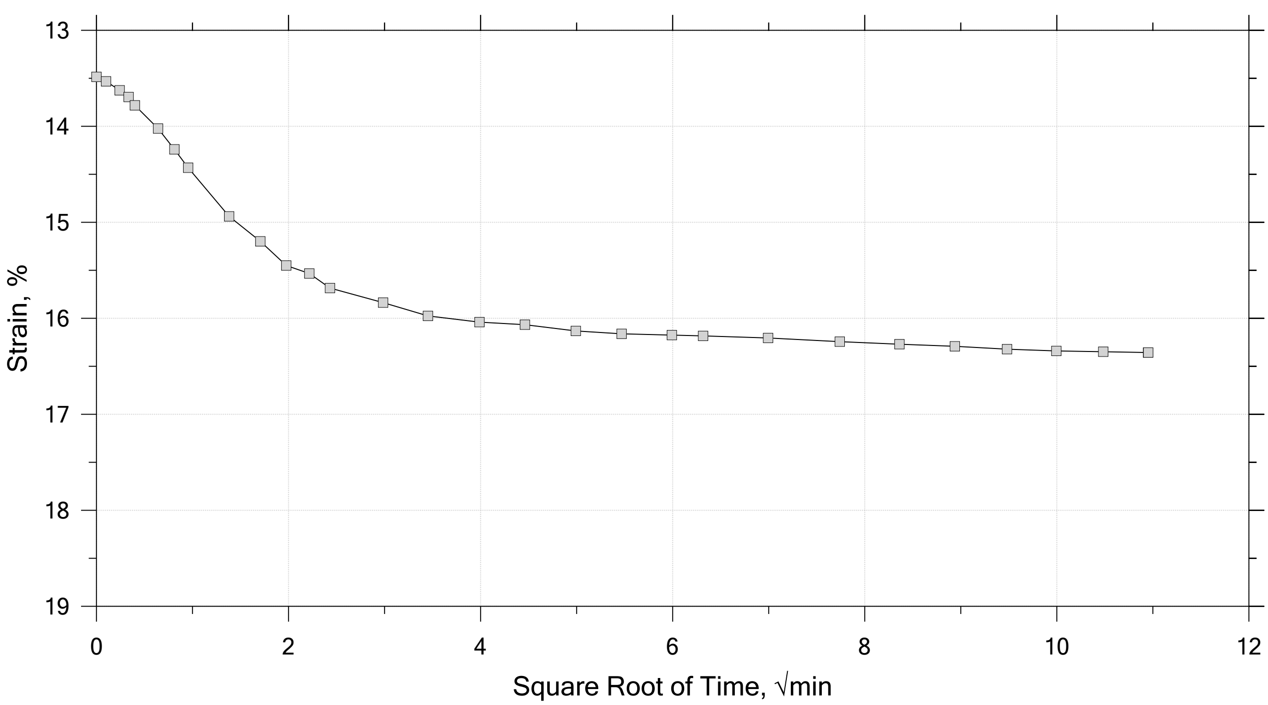
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf





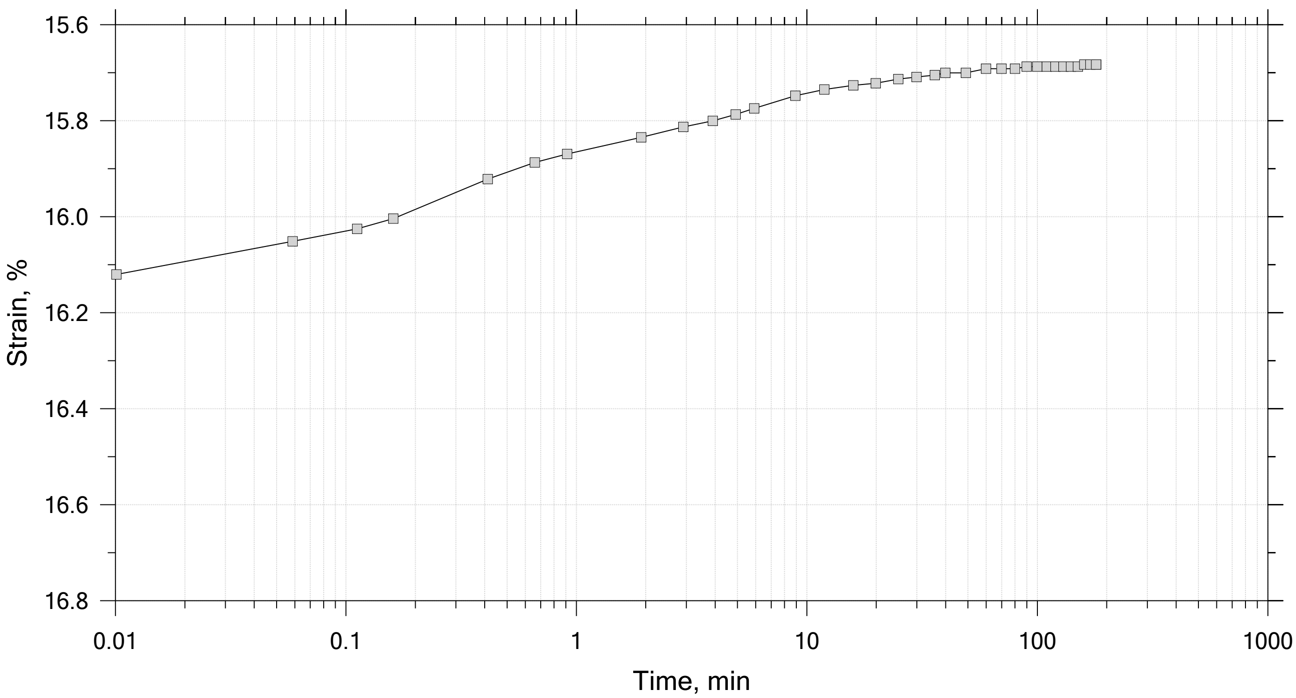
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

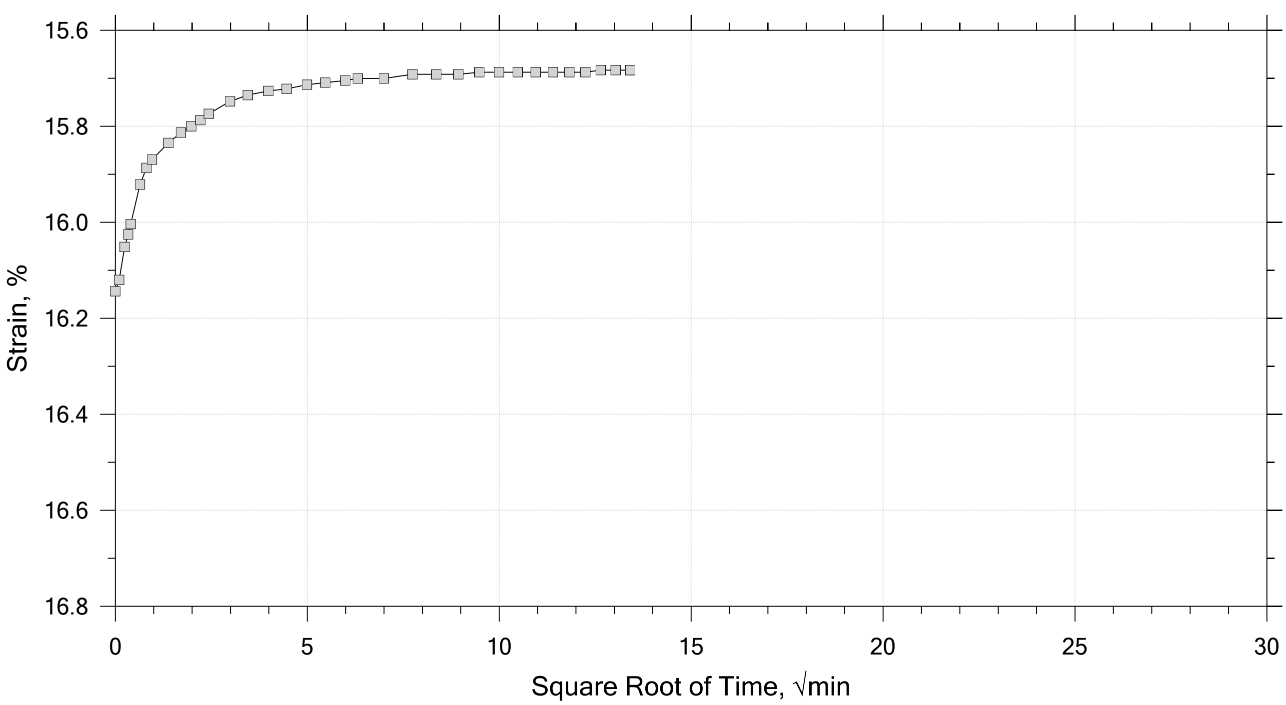
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf





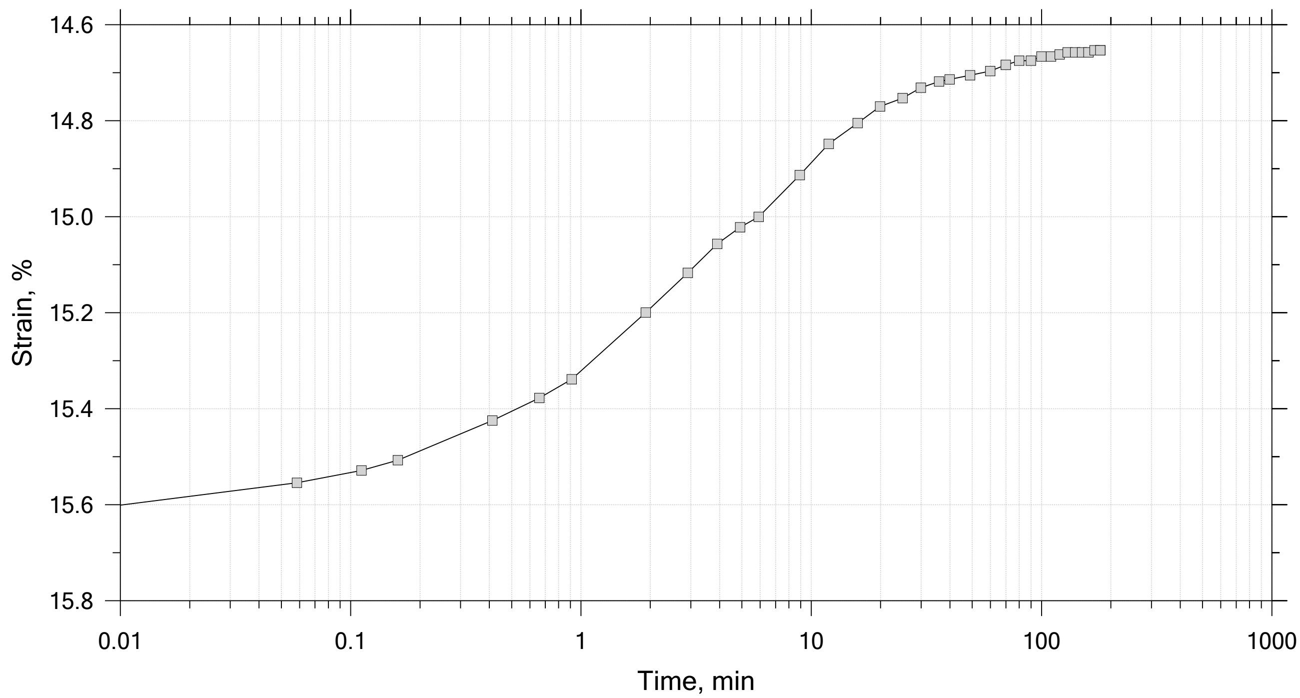
Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, dark grayish brown clay		
Remarks: System Y, Swell Pressure = 0.063 tsf		

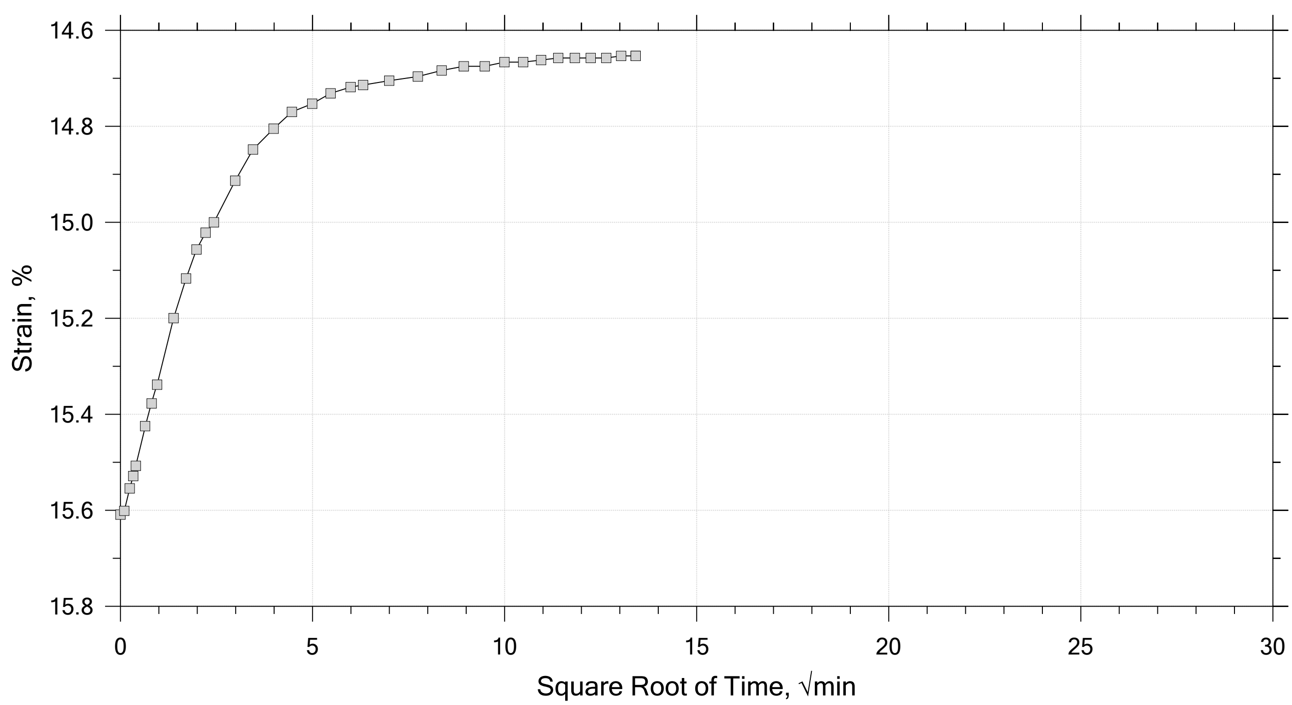
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf





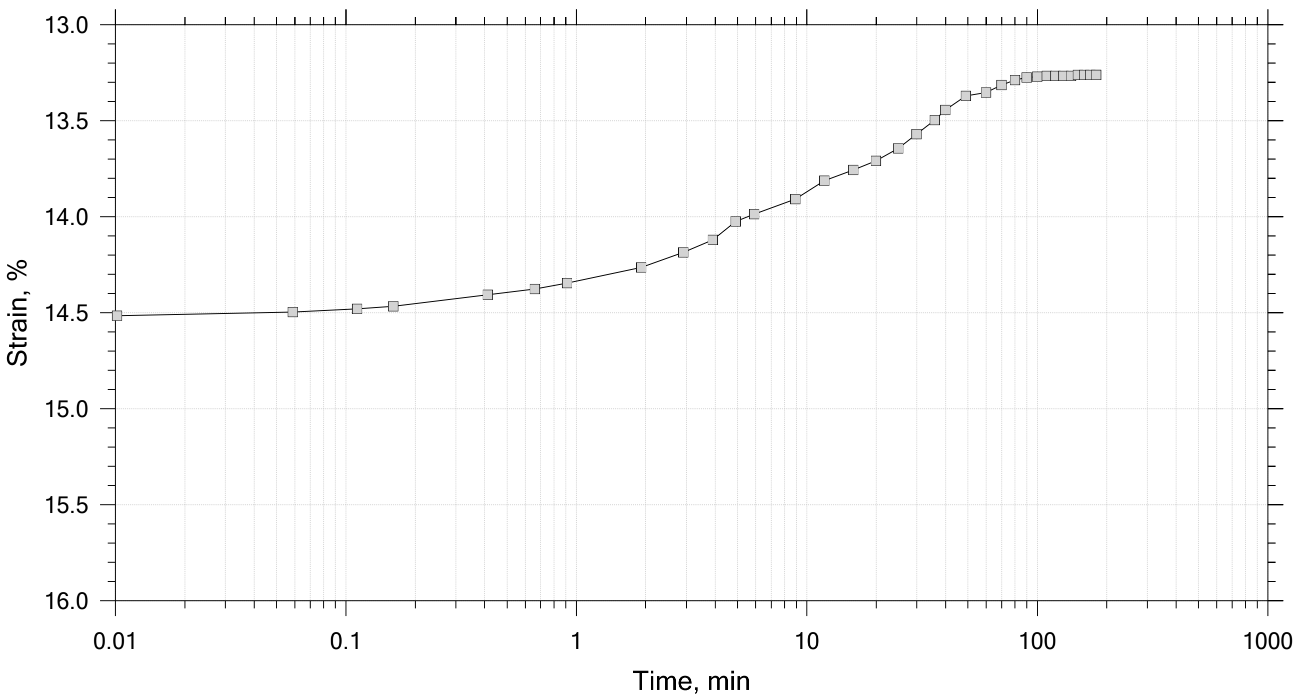
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

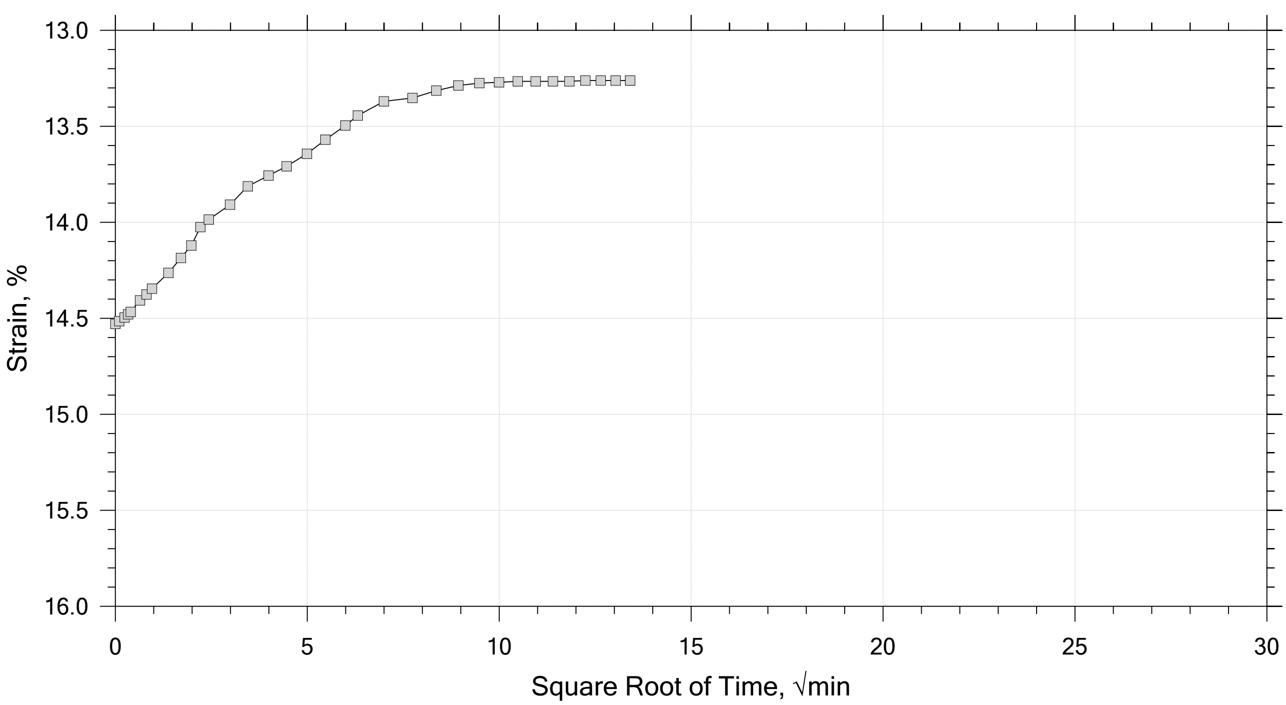
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf





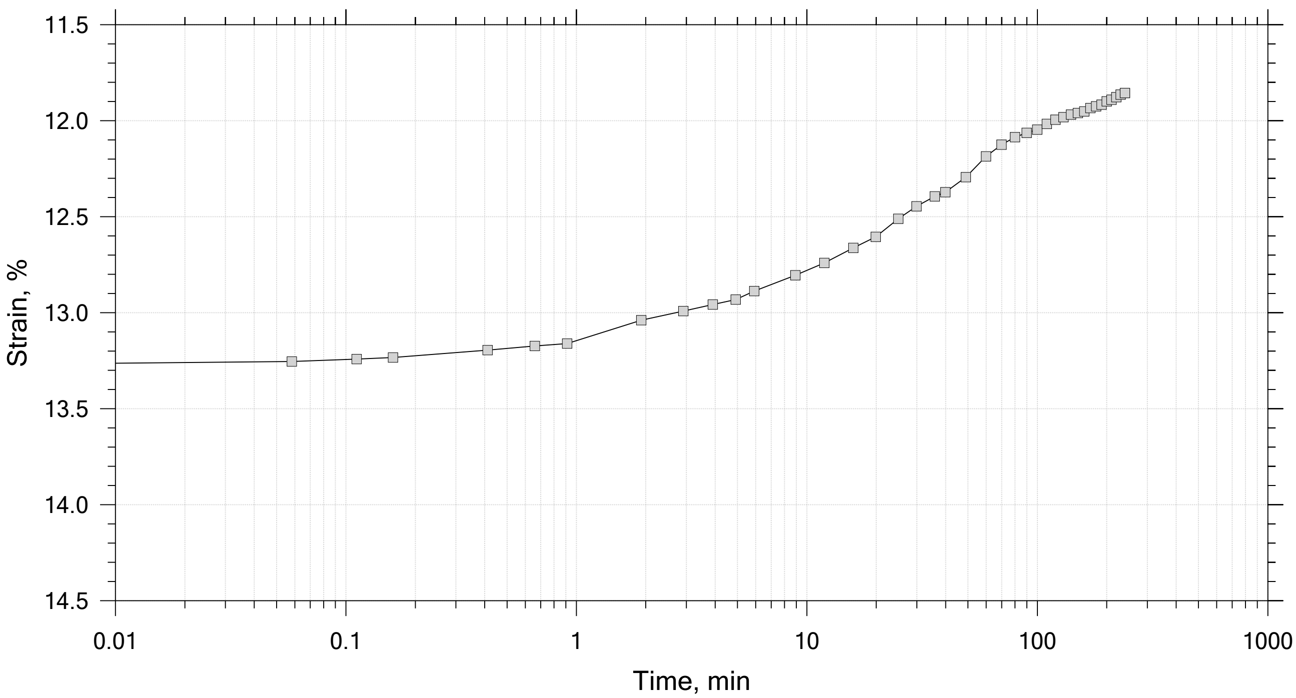
GeoTesting EXPRESS	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

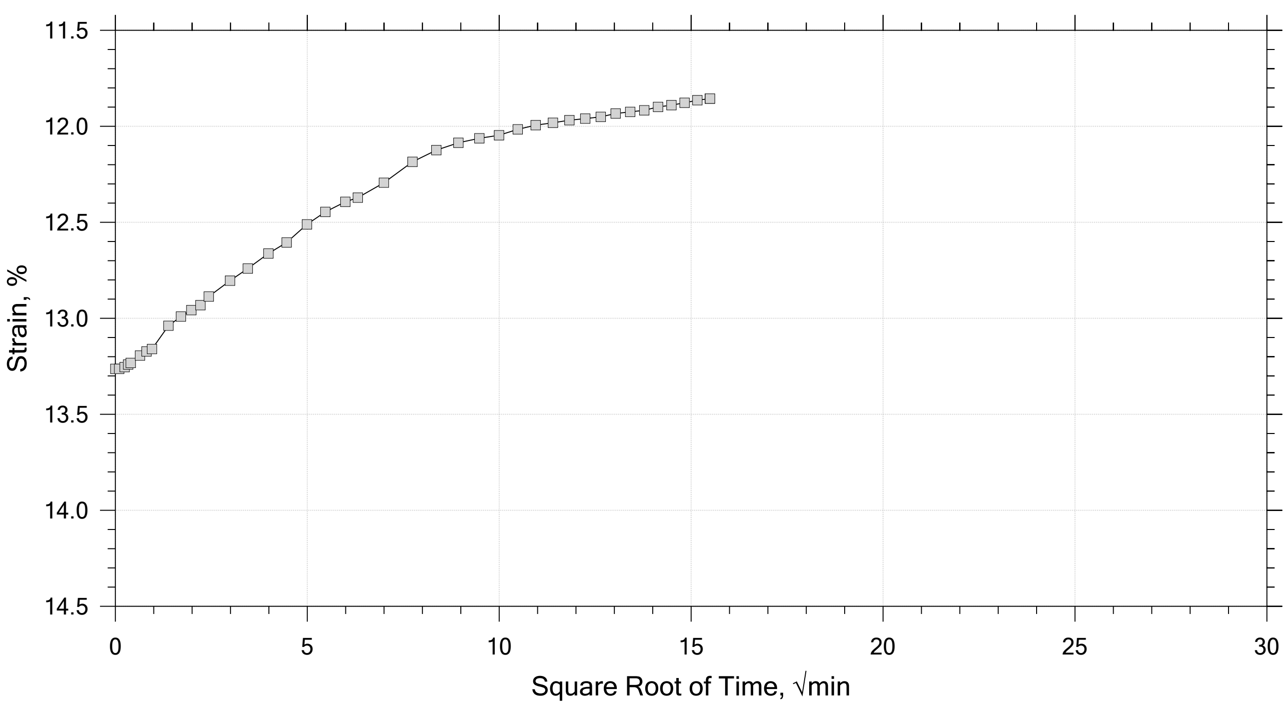
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf





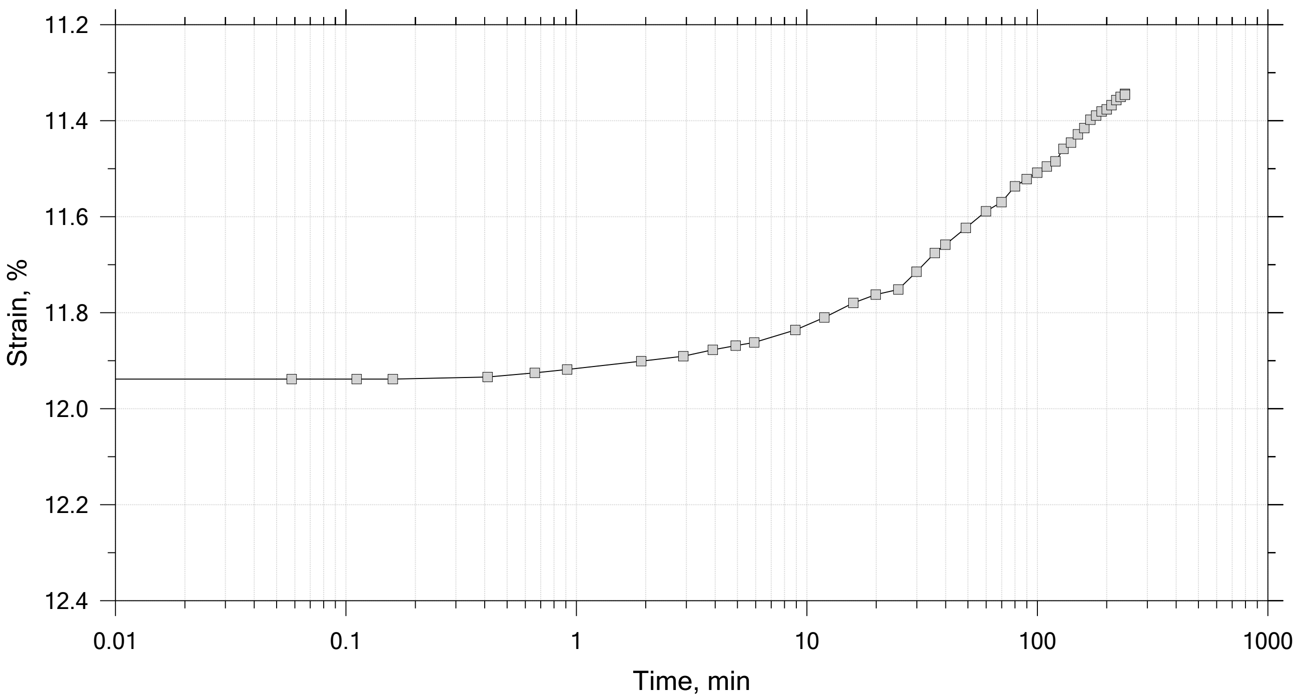
GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		

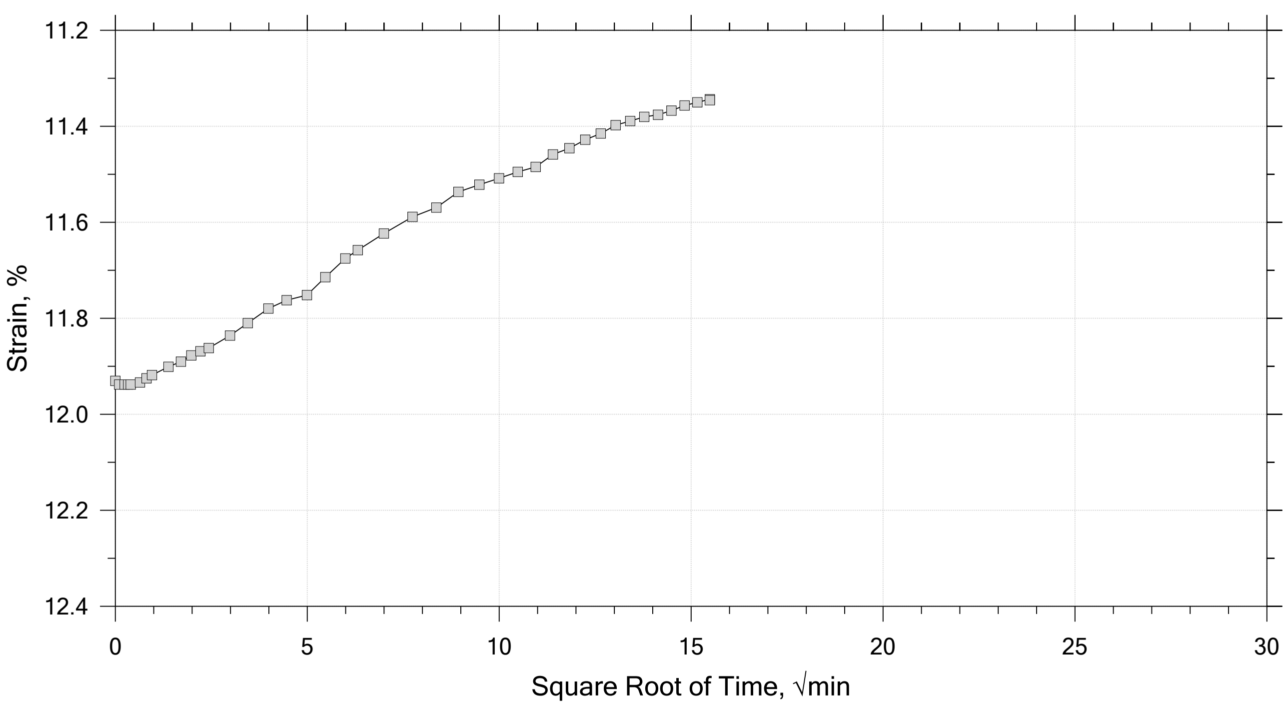
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf





Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, dark grayish brown clay		
Remarks: System Y, Swell Pressure = 0.063 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 31
Initial Height: 1.00 in	Initial Void Ratio: 0.877	Plastic Limit: 20
Final Height: 0.89 in	Final Void Ratio: 0.671	Plasticity Index: 11

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	A1133	RING		D-1669
Mass Container, gm	8.78	109.82	109.82	8.4
Mass Container + Wet Soil, gm	122.89	263.53	255.81	155.12
Mass Container + Dry Soil, gm	97.08	227.07	227.07	126.24
Mass Dry Soil, gm	88.3	117.25	117.25	117.84
Water Content, %	29.23	31.09	24.51	24.51
Void Ratio	---	0.88	0.67	---
Degree of Saturation, %	---	97.00	100.00	---
Dry Unit Weight, pcf	---	90.999	102.25	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test.
Therefore, values may not represent actual values for the specimen.

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, dark grayish brown clay		
Remarks: System Y, Swell Pressure = 0.063 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0630	0.008493	0.861	0.849	0.000	0.00e+00	1.35e-01	0.00e+00	0.00e+00
2	0.125	0.01326	0.852	1.33	0.000	0.00e+00	7.70e-02	0.00e+00	0.00e+00
3	0.250	0.02000	0.839	2.00	5.522	9.98e-07	5.39e-02	1.45e-04	0.00e+00
4	0.500	0.02989	0.821	2.99	0.000	0.00e+00	3.95e-02	0.00e+00	0.00e+00
5	1.00	0.04394	0.795	4.39	2.633	2.01e-06	2.81e-02	1.52e-04	0.00e+00
6	2.00	0.05743	0.769	5.74	2.280	2.25e-06	1.35e-02	8.19e-05	0.00e+00
7	4.00	0.07577	0.735	7.58	2.299	2.16e-06	9.17e-03	5.34e-05	0.00e+00
8	8.00	0.09948	0.690	9.95	2.196	2.16e-06	5.93e-03	3.45e-05	0.00e+00
9	16.0	0.1305	0.632	13.0	2.103	2.12e-06	3.87e-03	2.22e-05	0.00e+00
10	32.0	0.1636	0.570	16.4	1.394	2.97e-06	2.07e-03	1.66e-05	0.00e+00
11	8.00	0.1568	0.583	15.7	0.330	1.22e-05	2.81e-04	9.23e-06	0.00e+00
12	2.00	0.1465	0.602	14.7	0.000	0.00e+00	1.72e-03	0.00e+00	0.00e+00
13	0.500	0.1326	0.628	13.3	0.000	0.00e+00	9.28e-03	0.00e+00	0.00e+00
14	0.125	0.1186	0.654	11.9	0.000	0.00e+00	3.75e-02	0.00e+00	0.00e+00
15	0.0625	0.1135	0.664	11.3	0.000	0.00e+00	8.16e-02	0.00e+00	0.00e+00

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, dark grayish brown clay		
Remarks: System Y, Swell Pressure = 0.063 tsf		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

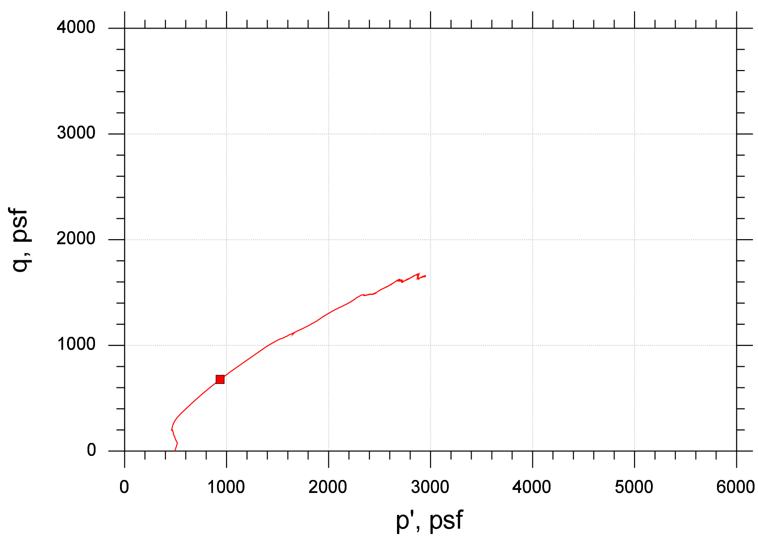
Square Root of Time Coefficients

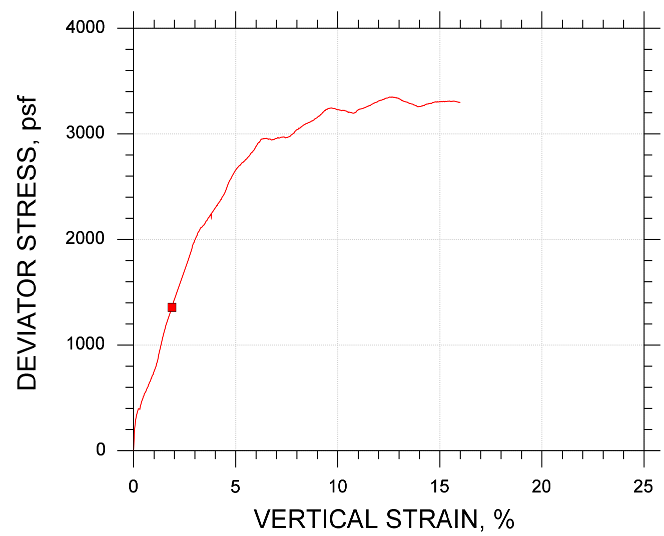
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0630	0.008493	0.861	0.849	131.851	1.85e-07	1.35e-01	6.70e-05
2	0.125	0.01326	0.852	1.33	89.454	2.68e-07	7.70e-02	5.57e-05
3	0.250	0.02000	0.839	2.00	27.914	8.50e-07	5.39e-02	1.24e-04
4	0.500	0.02989	0.821	2.99	41.485	5.62e-07	3.95e-02	6.00e-05
5	1.00	0.04394	0.795	4.39	13.156	1.73e-06	2.81e-02	1.31e-04
6	2.00	0.05743	0.769	5.74	13.119	1.69e-06	1.35e-02	6.13e-05
7	4.00	0.07577	0.735	7.58	8.815	2.43e-06	9.17e-03	6.00e-05
8	8.00	0.09948	0.690	9.95	8.443	2.42e-06	5.93e-03	3.87e-05
9	16.0	0.1305	0.632	13.0	9.903	1.94e-06	3.87e-03	2.03e-05
10	32.0	0.1636	0.570	16.4	8.631	2.07e-06	2.07e-03	1.15e-05
11	8.00	0.1568	0.583	15.7	3.405	5.08e-06	2.81e-04	3.85e-06
12	2.00	0.1465	0.602	14.7	7.864	2.25e-06	1.72e-03	1.04e-05
13	0.500	0.1326	0.628	13.3	49.415	3.68e-07	9.28e-03	9.20e-06
14	0.125	0.1186	0.654	11.9	84.586	2.22e-07	3.75e-02	2.24e-05
15	0.0625	0.1135	0.664	11.3	226.967	8.45e-08	8.16e-02	1.86e-05

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Tested By: trm	Checked By: njh
	Sample No.: U2	Test Date: 2/11/19	Depth: 6-8 ft
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, dark grayish brown clay		
	Remarks: System Y, Swell Pressure = 0.063 tsf		
	Displacement at End of Increment		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: trm	Checked By: njh
Boring ID: HB-EXIT 45-302	
Preparation: Intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 35	Plastic Limit: 23
Plasticity Index: 12	Estimated Specific Gravity: 2.7

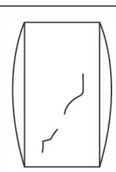
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■			
Sample ID		U1			
Depth, ft		10-12			
Test Number		CU-7-1			
Initial	Height, in	6.170			
	Diameter, in	2.860			
	Moisture Content (from Cuttings), %	29.2			
	Dry Density, pcf	93.3			
	Saturation (Wet Method), %	97.7			
	Void Ratio	0.807			
Before Shear	Moisture Content, %	29.1			
	Dry Density, pcf	94.4			
	Cross-sectional Area (Method A), in²	6.360			
	Saturation, %	100.0			
	Void Ratio	0.785			
	Back Pressure, psf	2.462e+004			
Vertical Effective Consolidation Stress, psf		492.6			
Horizontal Effective Consolidation Stress, psf		492.4			
Vertical Strain after Consolidation, %		-0.003022			
Volumetric Strain after Consolidation, %		0.5228			
Time to 50% Consolidation, min		0.8100			
Shear Strength, psf		678.2			
Strain at Failure, %		1.88			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1356.			
Effective Minor Principal Stress at Failure, psf		258.2			
Effective Major Principal Stress at Failure, psf		1615.			
B-Value		0.95			

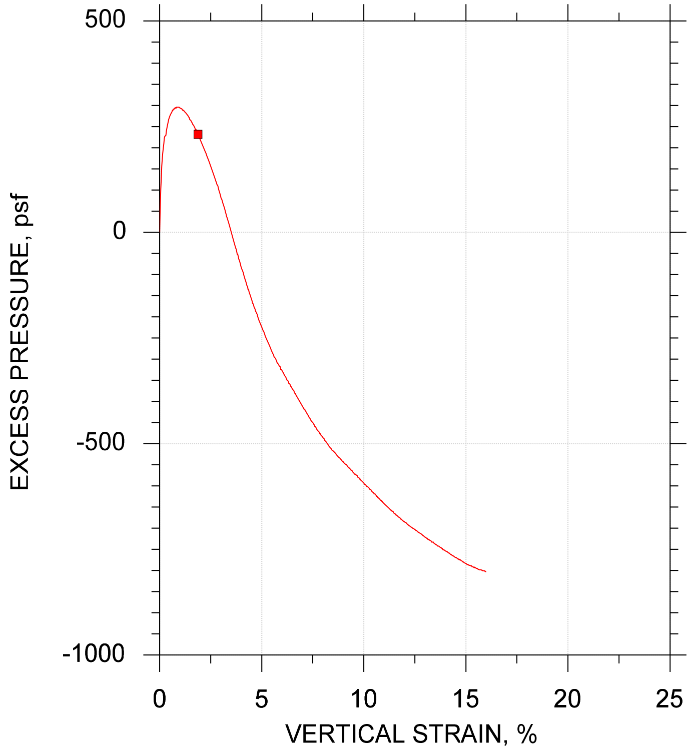
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

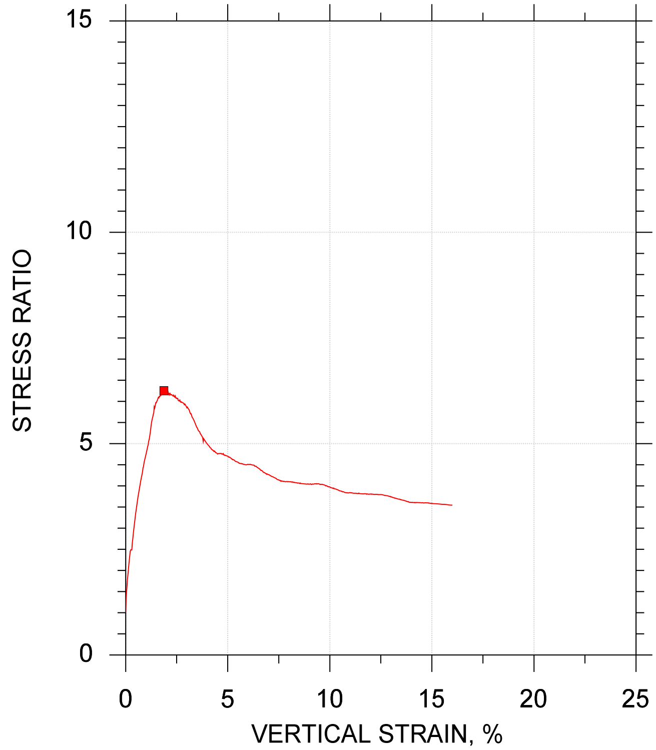


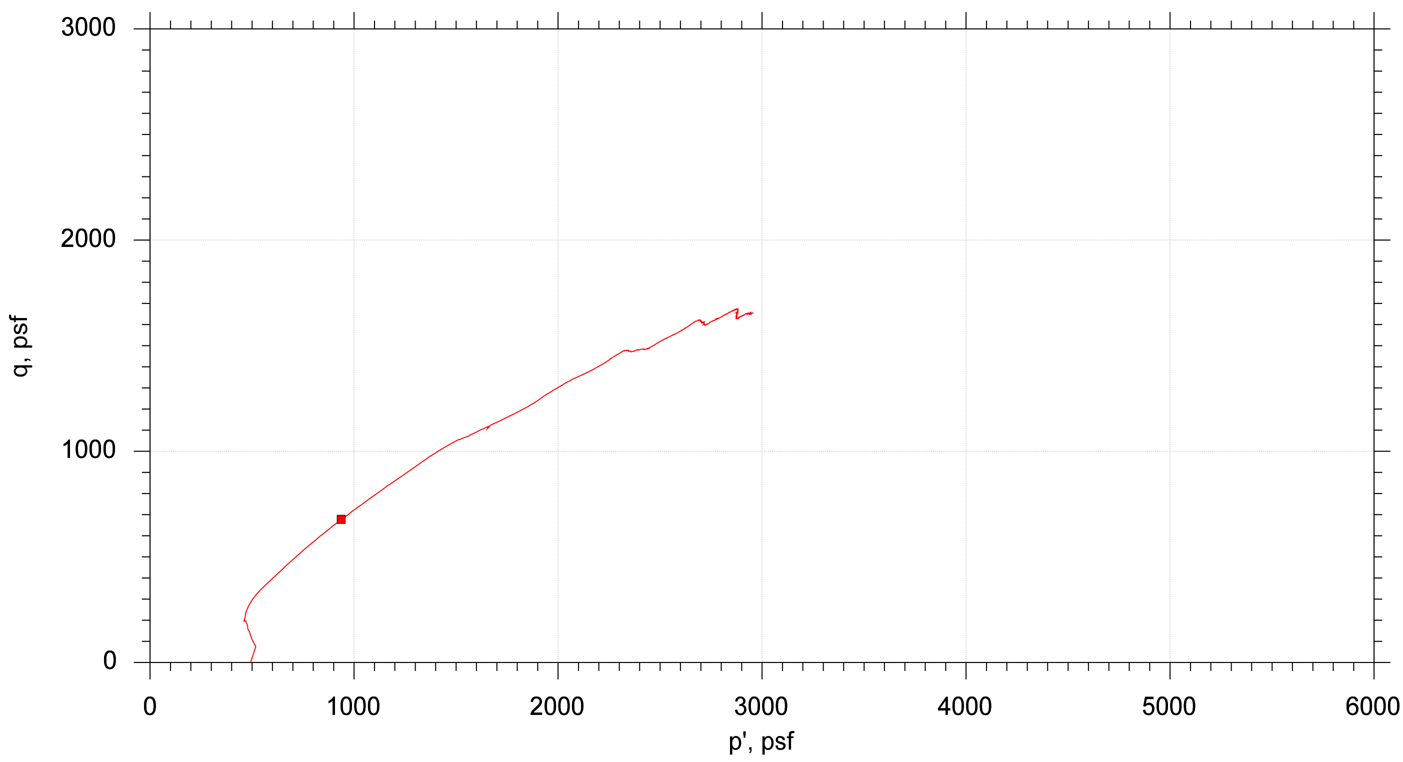
Remarks:

System V

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







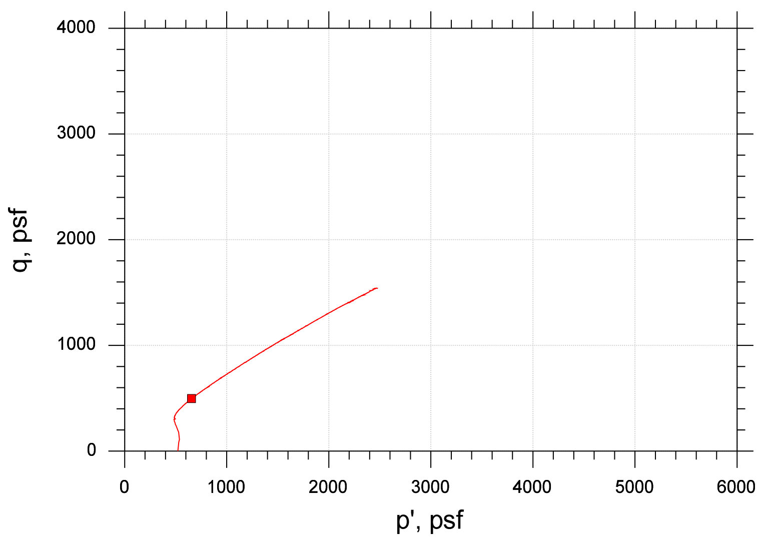
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U1	CU-7-1	10-12	trm	2/25/19	njh	3/1/19	309473-CU-7-1n.dat

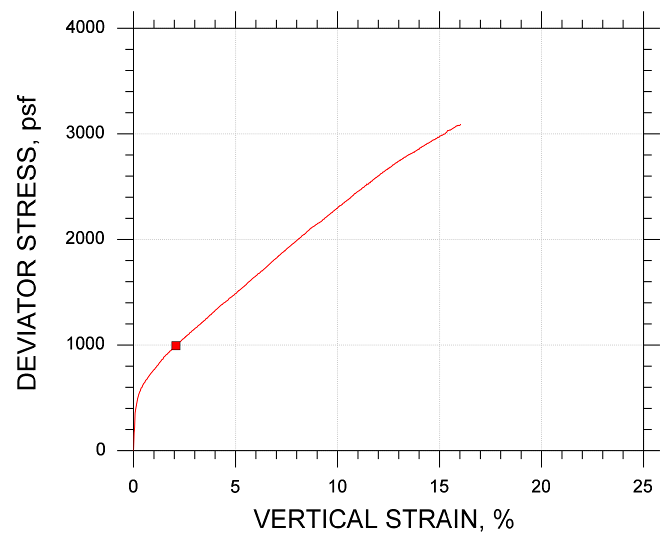
GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-302	Sample Type: Intact	
Description: Moist, dark gray clay		
Remarks: System V		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: md/ trm	Checked By: njh
Boring ID: HB-EXIT 45-303	
Preparation: Intact	
Description: Wet, dark gray silt with sand	
Classification: ---	
Group Symbol: ---	
Liquid Limit: NP	Plastic Limit: NP
Plasticity Index: NP	Estimated Specific Gravity: 2.65

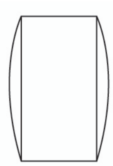
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■ (red)			
Sample ID		U1			
Depth, ft		10-12			
Test Number		CU-2-1			
Initial	Height, in	4.320			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	25.8			
	Dry Density, pcf	95.5			
	Saturation (Wet Method), %	93.4			
	Void Ratio	0.732			
Before Shear	Moisture Content, %	28.1			
	Dry Density, pcf	94.9			
	Cross-sectional Area (Method A), in²	2.946			
	Saturation, %	100.0			
	Void Ratio	0.744			
	Back Pressure, psf	2.222e+004			
Vertical Effective Consolidation Stress, psf		517.6			
Horizontal Effective Consolidation Stress, psf		520.6			
Vertical Strain after Consolidation, %		0.2824			
Volumetric Strain after Consolidation, %		0.05579			
Time to 50% Consolidation, min		0.8100			
Shear Strength, psf		496.9			
Strain at Failure, %		2.08			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		993.9			
Effective Minor Principal Stress at Failure, psf		159.2			
Effective Major Principal Stress at Failure, psf		1153.			
B-Value		0.95			

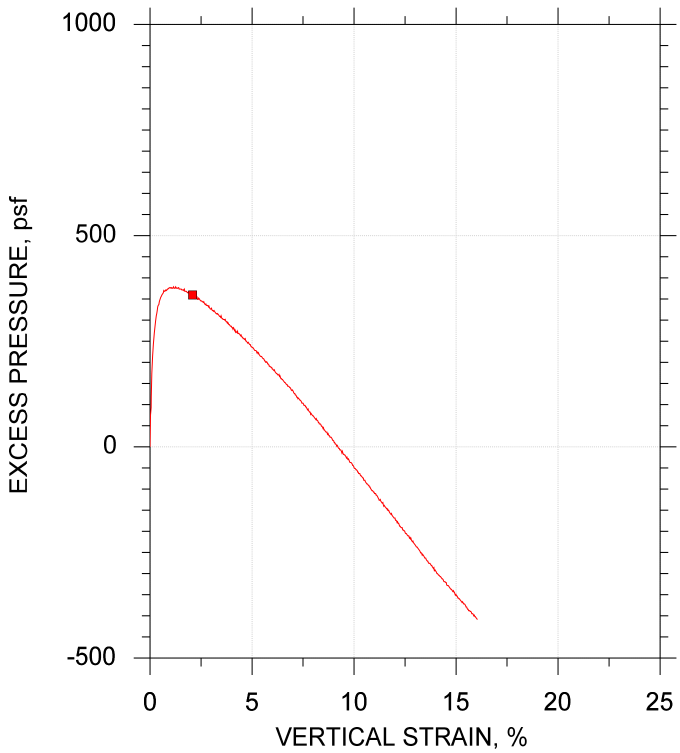
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

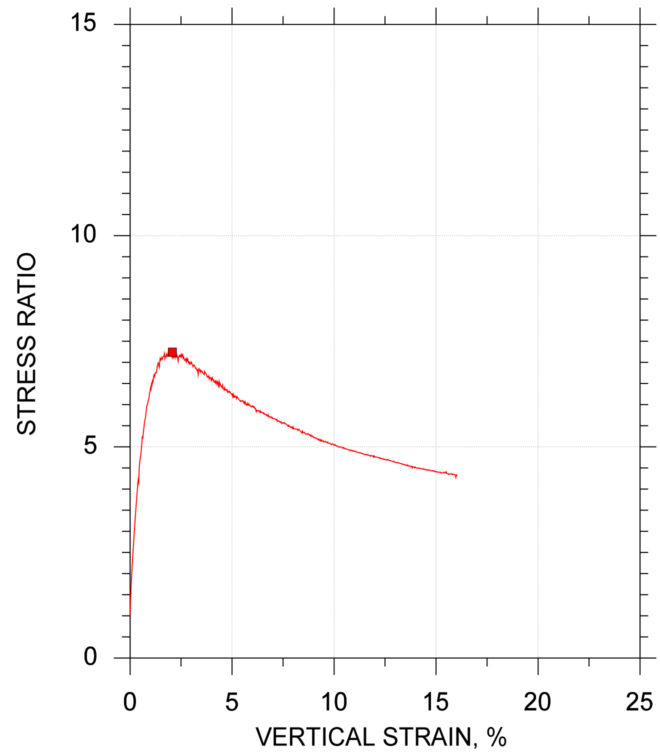


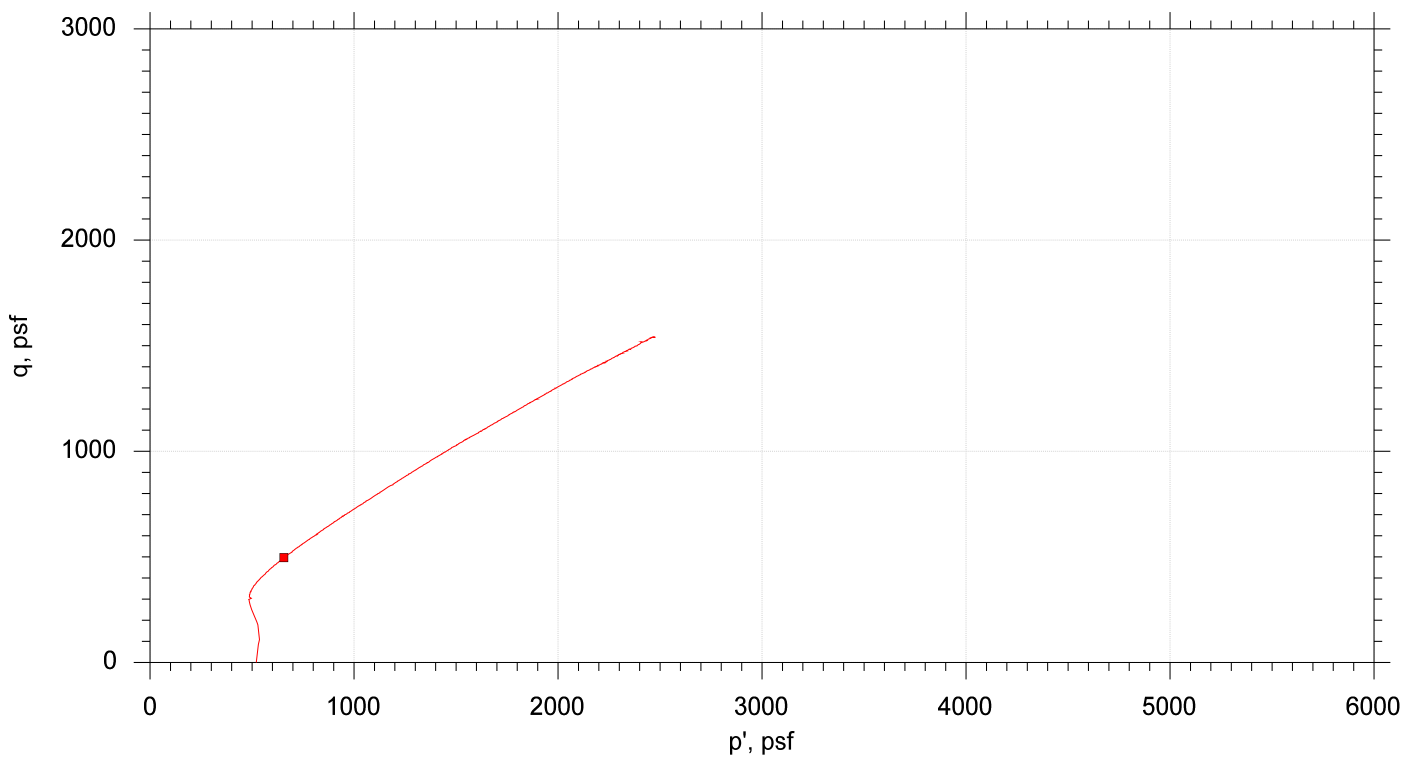
Remarks:

System E

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





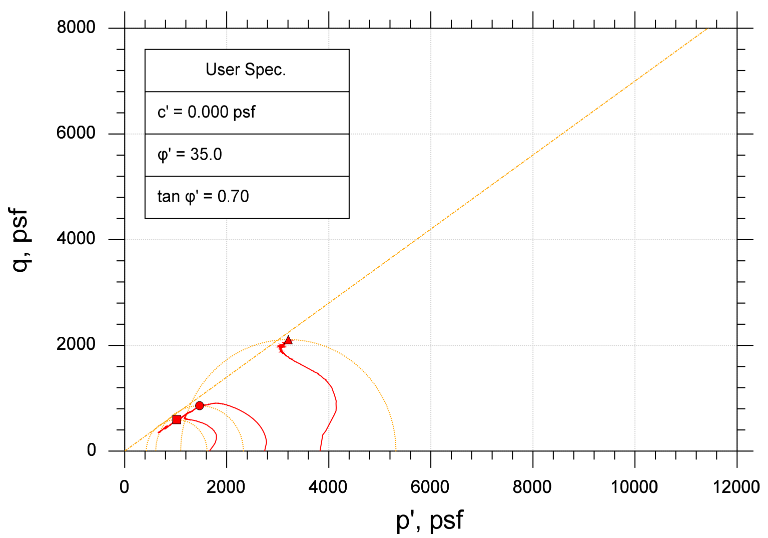


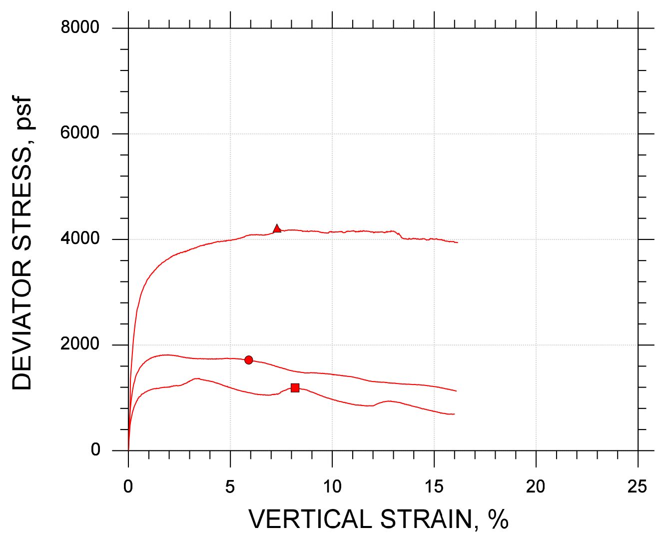
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U1	CU-2-1	10-12	md/ trm	2/22/19	njh	3/1/19	309473-CU-2-1n.dat

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Sample Type: Intact	
Description: Wet, dark gray silt with sand		
Remarks: System E		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: trm	Checked By: njh
Boring ID: HB-EXIT 45-303	
Preparation: intact	
Description: Wet, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 31	Plastic Limit: 19
Plasticity Index: 12	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

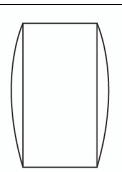


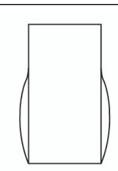


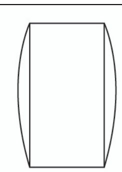
Symbol		■	●	▲	
Sample ID		U5	U5	U5	
Depth, ft		45-47	45-47	45-47	
Test Number		CU-1-1	CU-1-2	CU-1-3	
Initial	Height, in	4.400	4.600	4.300	
	Diameter, in	1.930	1.930	1.930	
	Moisture Content (from Cuttings), %	32.5	39.3	40.8	
	Dry Density, pcf	89.8	81.2	79.6	
	Saturation (Wet Method), %	100.0	98.4	98.5	
	Void Ratio	0.876	1.08	1.12	
Before Shear	Moisture Content, %	29.2	33.7	40.9	
	Dry Density, pcf	94.2	88.3	80.2	
	Cross-sectional Area (Method A), in²	2.822	2.705	2.648	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.789	0.909	1.10	
	Back Pressure, psf	2.447e+004	2.203e+004	1.684e+004	
Vertical Effective Consolidation Stress, psf		1646.	2735.	3942.	
Horizontal Effective Consolidation Stress, psf		1659.	2743.	3828.	
Vertical Strain after Consolidation, %		1.042	0.7392	-8.985	
Volumetric Strain after Consolidation, %		4.324	8.492	2.694	
Time to 50% Consolidation, min		0.0000	0.0000	256.0	
Shear Strength, psf		594.7	858.1	2107.	
Strain at Failure, %		8.18	5.90	7.28	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, psf		1189.	1716.	4215.	
Effective Minor Principal Stress at Failure, psf		423.6	609.5	1099.	
Effective Major Principal Stress at Failure, psf		1613.	2326.	5314.	
B-Value		0.96	0.97	0.96	

Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

Remarks:

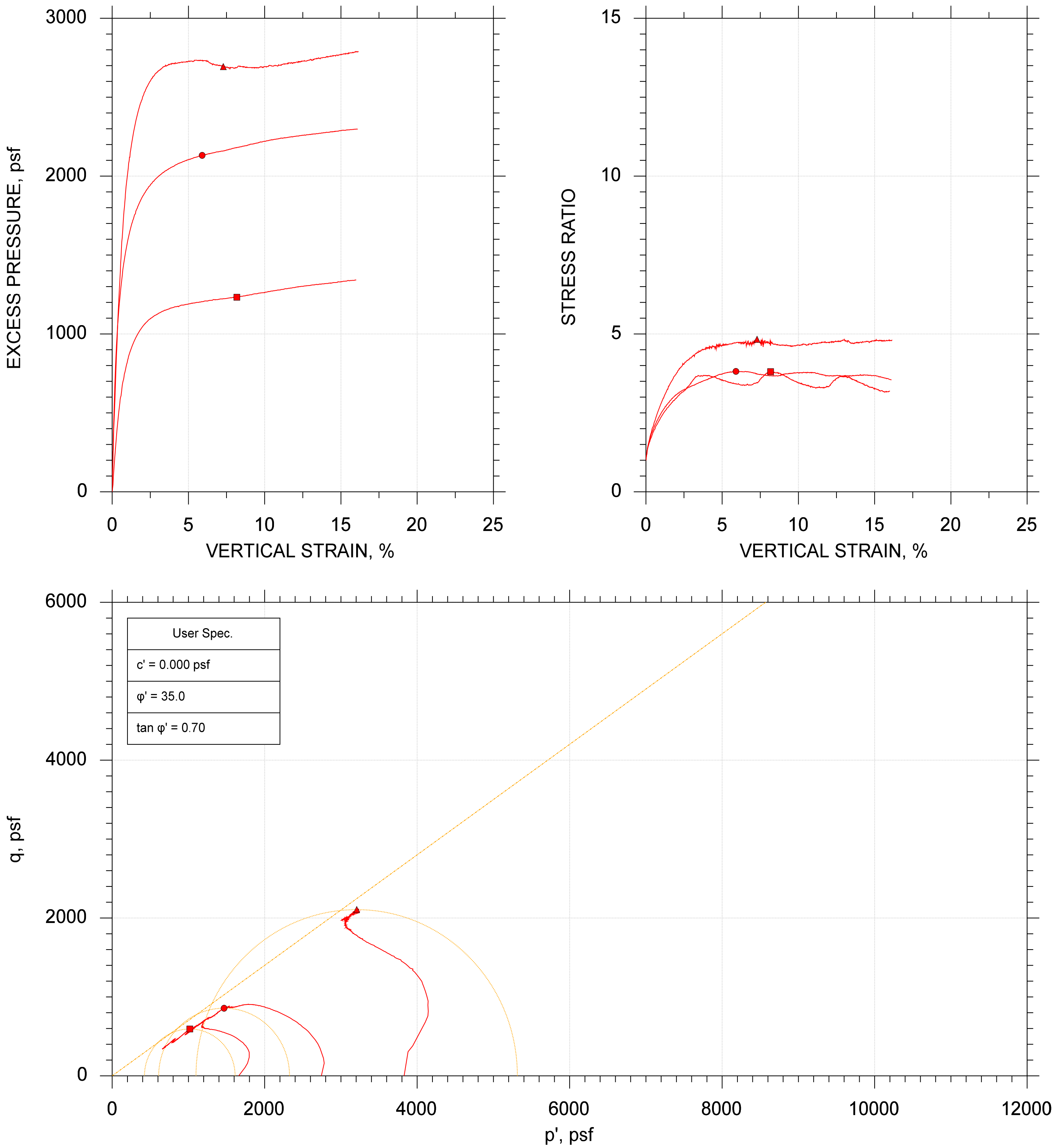






System V

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



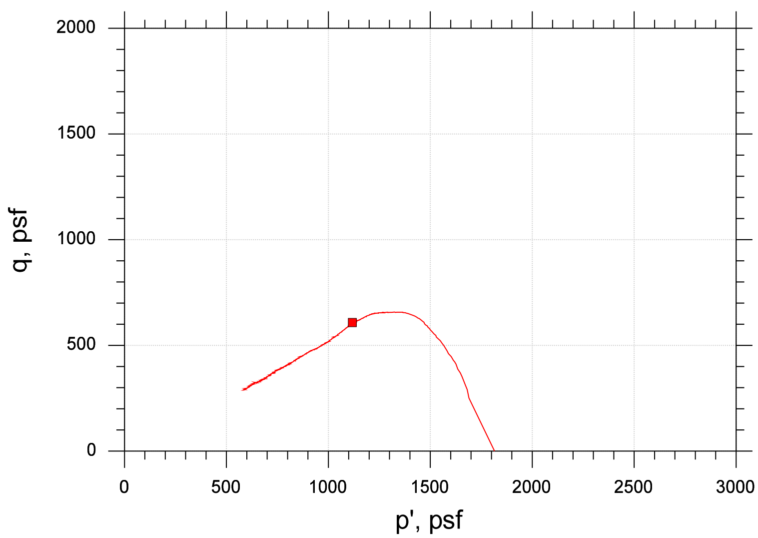
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U5	CU-1-1	45-47	trm	2/21/19	njh	3/1/19	309473-CU-1-1n.dat
●	U5	CU-1-2	45-47	trm	2/21/19	njh	3/1/19	309473-CU-1-2n.dat
▲	U5	CU-1-3	45-47	trm	2/21/19	njh	3/1/19	309473-CU-1-3n.dat

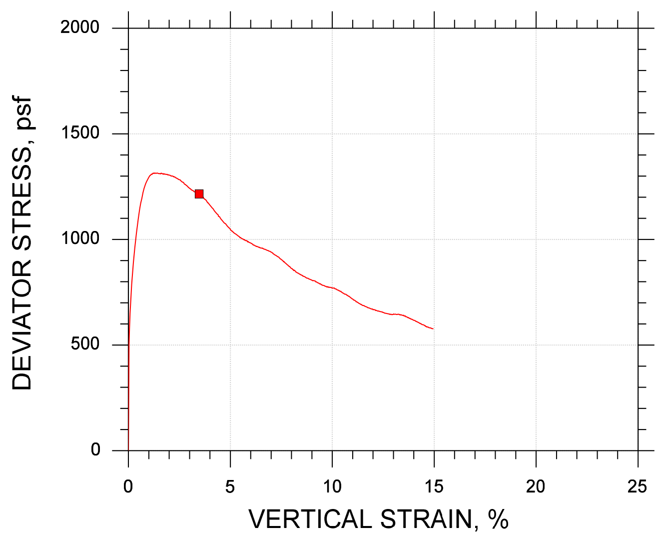
GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Sample Type: intact	
Description: Wet, dark gray clay		
Remarks: System V		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: md/trm	Checked By: njh
Boring ID: HB-EXIT 45-303	
Preparation: intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 34	Plastic Limit: 20
Plasticity Index: 14	Estimated Specific Gravity: 2.7

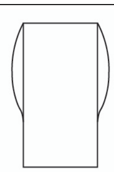
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■			
Sample ID		U-6			
Depth, ft		50-52			
Test Number		CU-3-1			
Initial	Height, in	6.280			
	Diameter, in	2.860			
	Moisture Content (from Cuttings), %	48.3			
	Dry Density, pcf	72.1			
	Saturation (Wet Method), %	97.6			
	Void Ratio	1.34			
Before Shear	Moisture Content, %	47.8			
	Dry Density, pcf	73.6			
	Cross-sectional Area (Method A), in²	6.370			
	Saturation, %	100.0			
	Void Ratio	1.29			
	Back Pressure, psf	2.373e+004			
Vertical Effective Consolidation Stress, psf		1807.			
Horizontal Effective Consolidation Stress, psf		1815.			
Vertical Strain after Consolidation, %		1.065			
Volumetric Strain after Consolidation, %		1.650			
Time to 50% Consolidation, min		240.0			
Shear Strength, psf		607.7			
Strain at Failure, %		3.46			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1215.			
Effective Minor Principal Stress at Failure, psf		509.8			
Effective Major Principal Stress at Failure, psf		1725.			
B-Value		0.95			

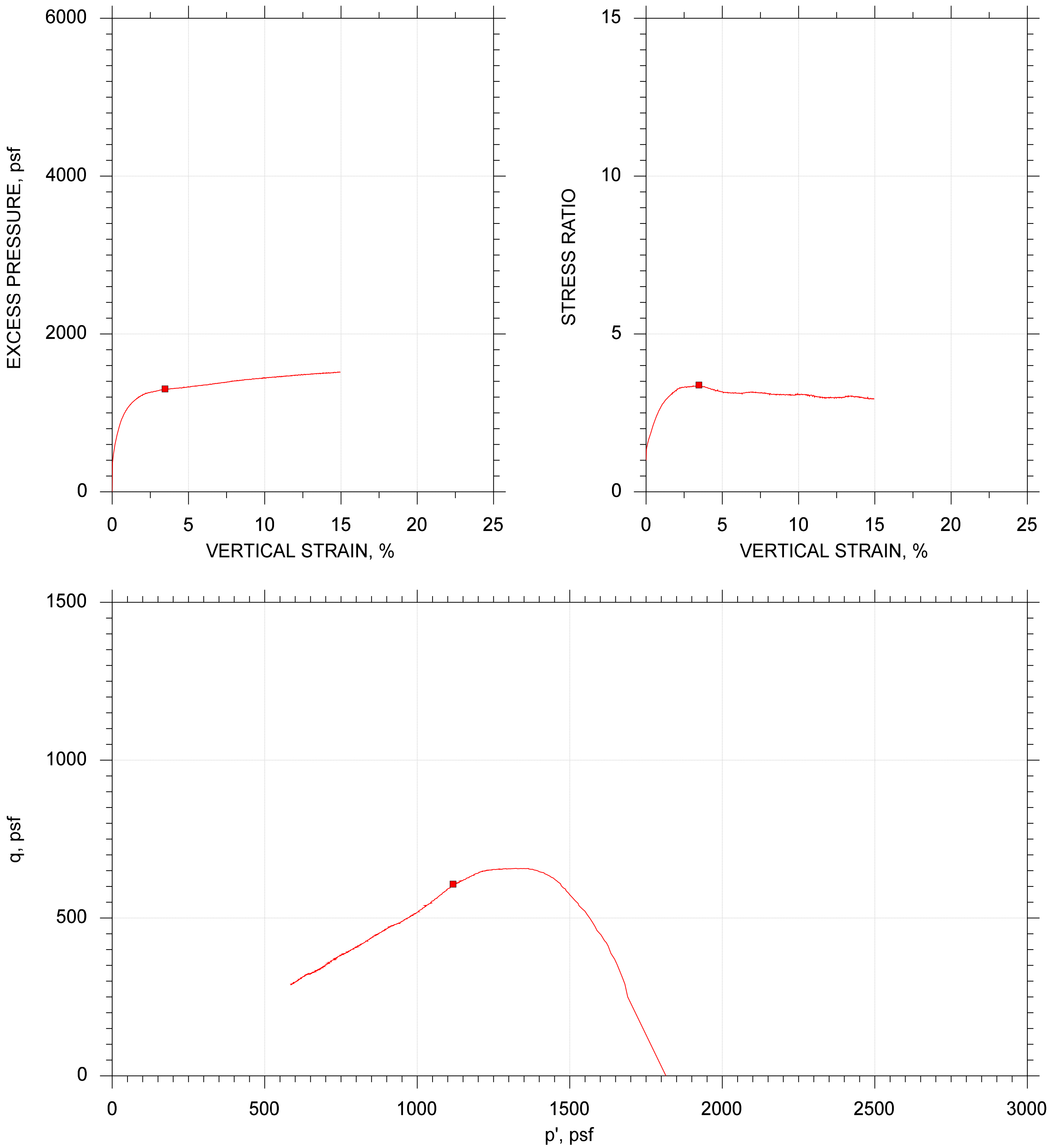
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System JJ

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



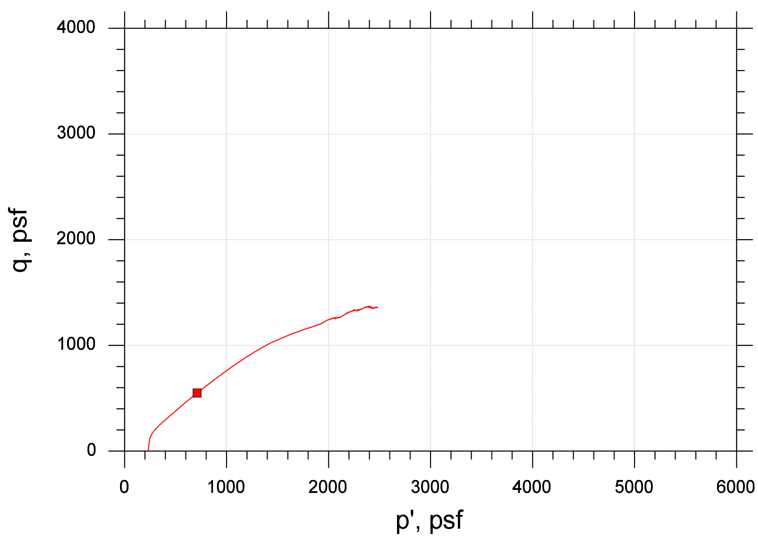
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-6	CU-3-1	50-52	md/trm	2/22/19	njh	3/1/19	309473-CU-3-1n.dat

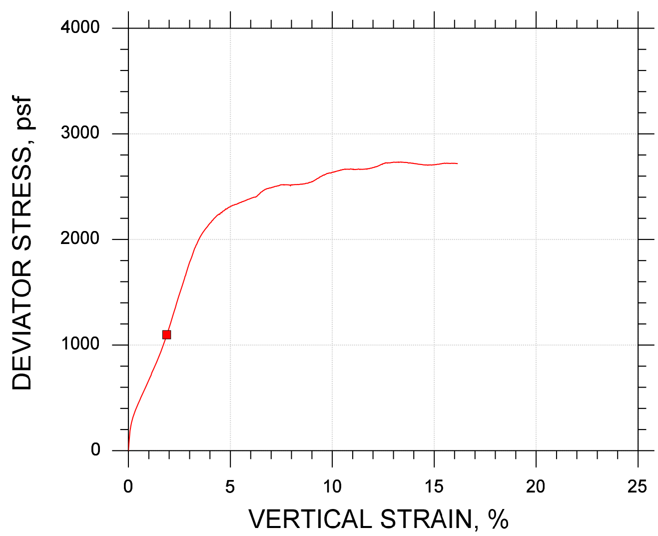
GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Sample Type: intact	
Description: Moist, dark gray clay		
Remarks: System JJ		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: md	Checked By: njh
Boring ID: HB-EXIT 45-304A	
Preparation: intact	
Description: Moist, dark grayish brown clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 31	Plastic Limit: 20
Plasticity Index: 11	Estimated Specific Gravity: 2.7

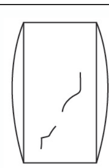
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■				
Sample ID		U2				
Depth, ft		6-8				
Test Number		CU-8-1				
Initial	Height, in	6.580				
	Diameter, in	2.870				
	Moisture Content (from Cuttings), %	30.8				
	Dry Density, pcf	93.0				
	Saturation (Wet Method), %	102.2				
	Void Ratio	0.812				
Before Shear	Moisture Content, %	29.9				
	Dry Density, pcf	93.2				
	Cross-sectional Area (Method A), in²	6.460				
	Saturation, %	100.0				
	Void Ratio	0.808				
	Back Pressure, psf	1.267e+004				
Vertical Effective Consolidation Stress, psf		230.9				
Horizontal Effective Consolidation Stress, psf		231.6				
Vertical Strain after Consolidation, %		0.1107				
Volumetric Strain after Consolidation, %		0.3215				
Time to 50% Consolidation, min		2.560				
Shear Strength, psf		548.9				
Strain at Failure, %		1.88				
Strain Rate, %/min		0.01600				
Deviator Stress at Failure, psf		1098.				
Effective Minor Principal Stress at Failure, psf		161.3				
Effective Major Principal Stress at Failure, psf		1259.				
B-Value		0.95				

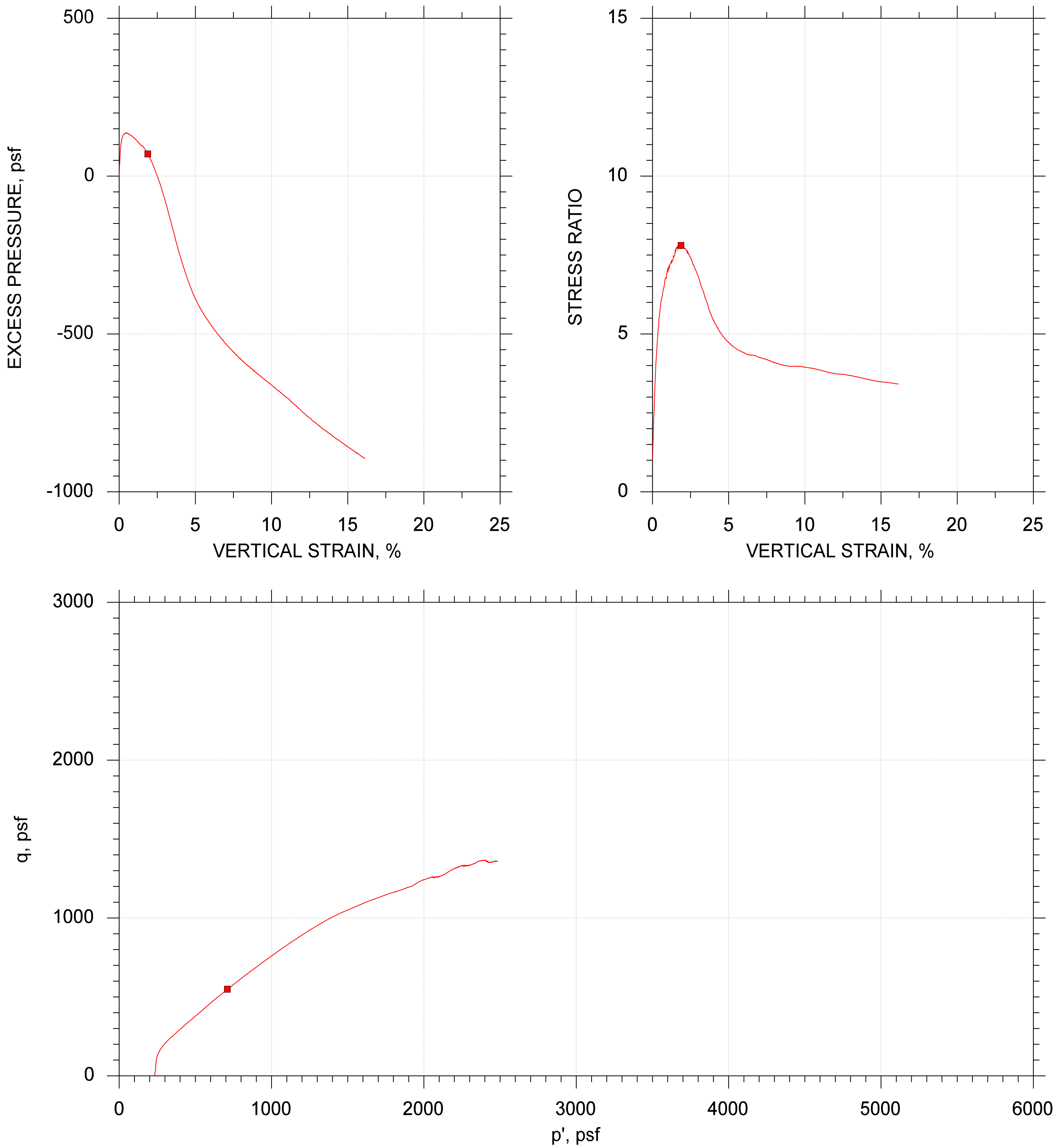
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System Y

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



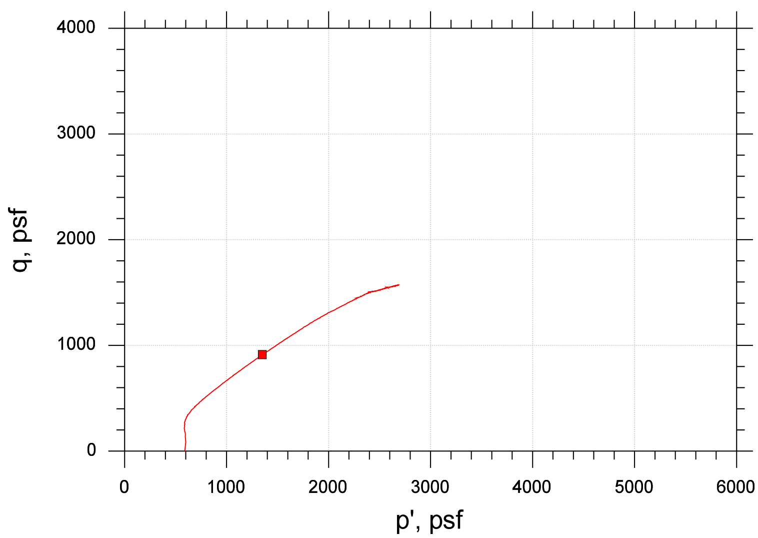
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CU-8-1	6-8	md	2/25/19	njh	3/1/19	309473-CU-8-1n.dat

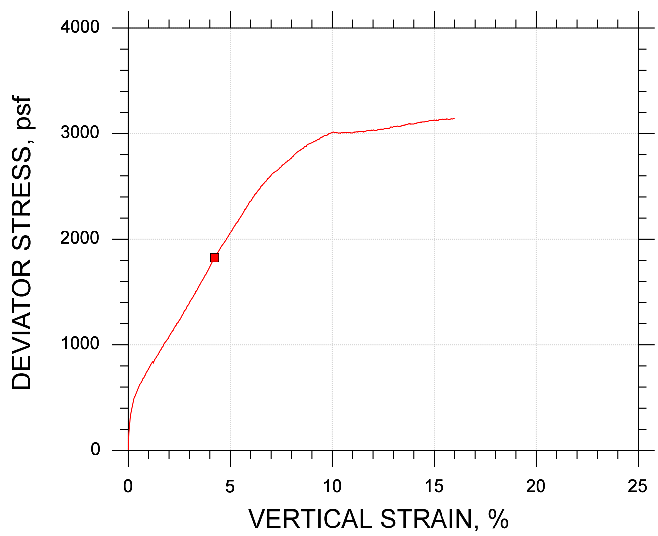
GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-304A	Sample Type: intact	
Description: Moist, dark grayish brown clay		
Remarks: System Y		

Client: -Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: trm	Checked By: njh
Boring ID: HB-EXIT 45-301	
Preparation: intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 37	Plastic Limit: 23
Plasticity Index: 14	Estimated Specific Gravity: 2.7

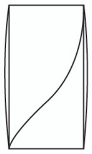
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■			
Sample ID		U2			
Depth, ft		12-14			
Test Number		CU-6-1A			
Initial	Height, in	3.950			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	28.3			
	Dry Density, pcf	93.4			
	Saturation (Wet Method), %	95.1			
	Void Ratio	0.804			
Before Shear	Moisture Content, %	28.8			
	Dry Density, pcf	94.8			
	Cross-sectional Area (Method A), in²	2.894			
	Saturation, %	100.0			
	Void Ratio	0.777			
	Back Pressure, psf	2.073e+004			
Vertical Effective Consolidation Stress, psf		587.1			
Horizontal Effective Consolidation Stress, psf		590.4			
Vertical Strain after Consolidation, %		0.3155			
Volumetric Strain after Consolidation, %		1.174			
Time to 50% Consolidation, min		12.25			
Shear Strength, psf		912.2			
Strain at Failure, %		4.23			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		1824.			
Effective Minor Principal Stress at Failure, psf		437.8			
Effective Major Principal Stress at Failure, psf		2262.			
B-Value		0.95			

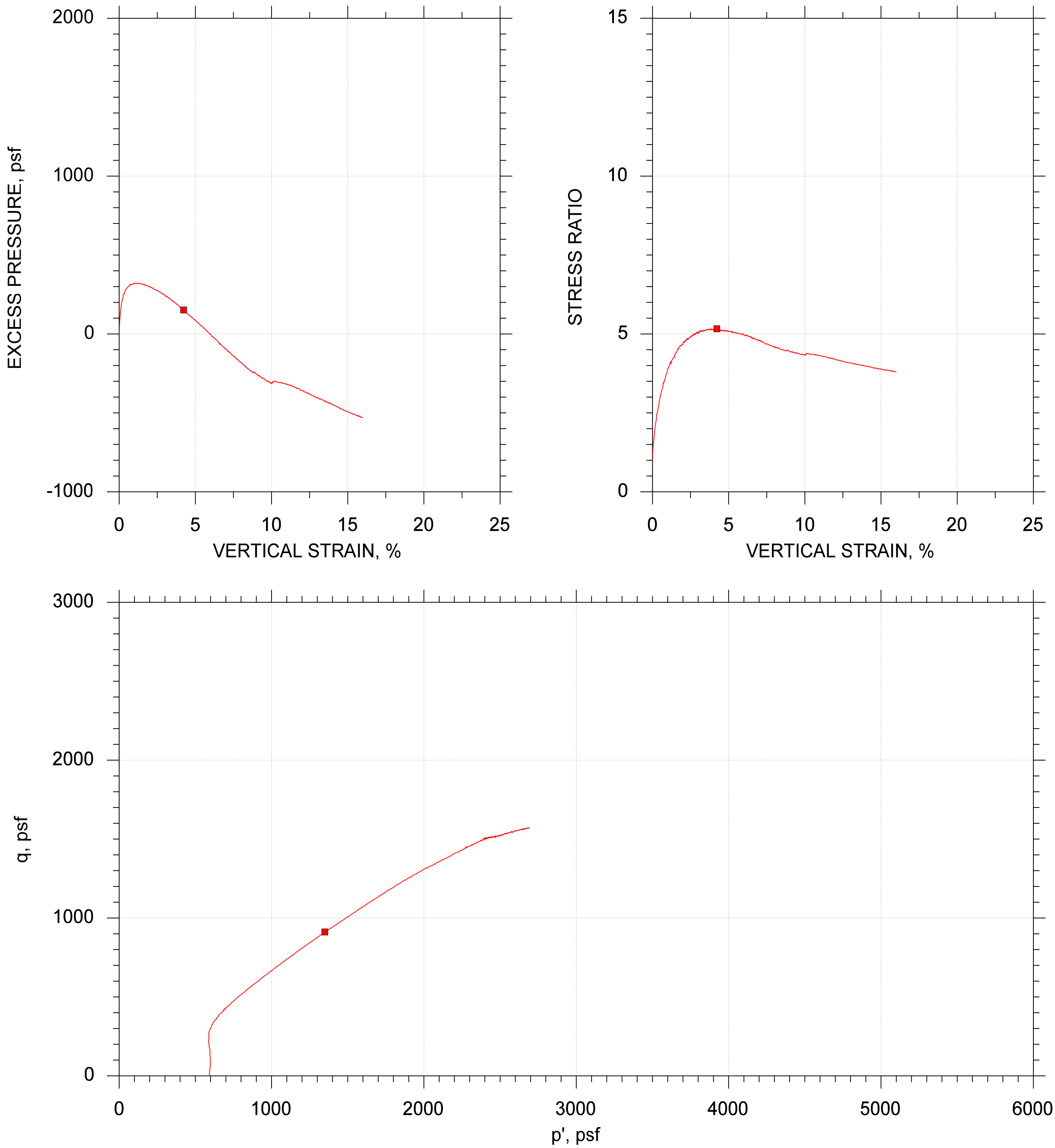
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System T

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



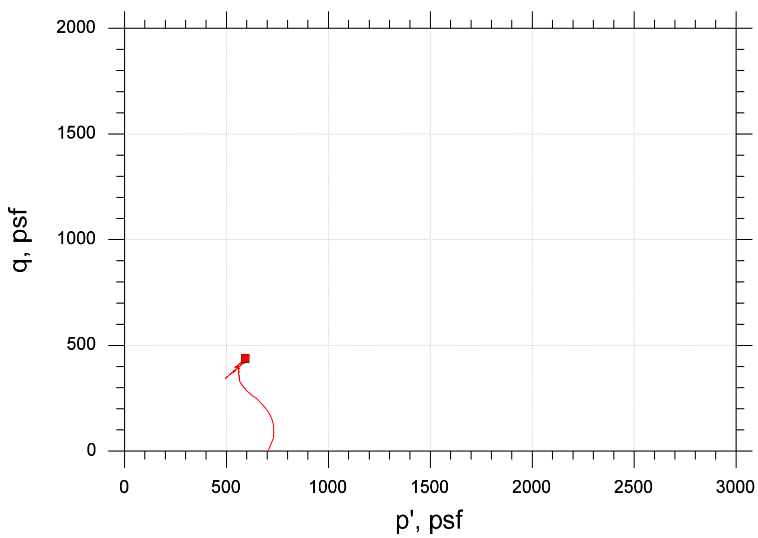
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CU-6-1A	12-14	trm	3/4/19	njh	3/11/19	309473-CU-6-1-An.dat

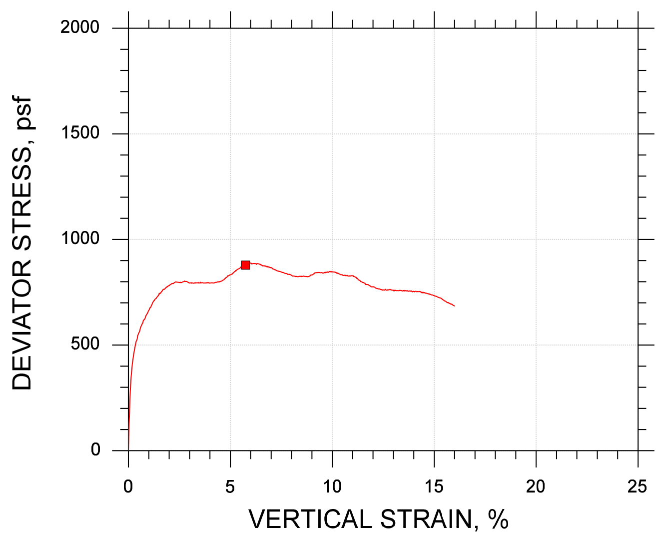
GeoTesting EXPRESS

Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-301	Sample Type: intact	
Description: Moist, dark gray clay		
Remarks: System T		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: trm	Checked By: njh
Boring ID: HB-EXIT 45-303	
Preparation: intact	
Description: Wet, dark gray clay	
Classification: Lean CLAY	
Group Symbol: CL	
Liquid Limit: 27	Plastic Limit: 16
Plasticity Index: 11	Estimated Specific Gravity: 2.7

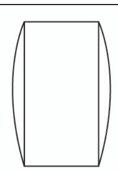
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol					
Sample ID		U2			
Depth, ft		16-18 ft			
Test Number		CU-5-1A			
Initial	Height, in	4.500			
	Diameter, in	1.930			
	Moisture Content (from Cuttings), %	36.5			
	Dry Density, pcf	84.5			
	Saturation (Wet Method), %	99.1			
	Void Ratio	0.995			
Before Shear	Moisture Content, %	34.1			
	Dry Density, pcf	87.8			
	Cross-sectional Area (Method A), in²	2.837			
	Saturation, %	100.0			
	Void Ratio	0.920			
	Back Pressure, psf	6767.			
Vertical Effective Consolidation Stress, psf		694.4			
Horizontal Effective Consolidation Stress, psf		704.9			
Vertical Strain after Consolidation, %		0.8412			
Volumetric Strain after Consolidation, %		3.971			
Time to 50% Consolidation, min		116.0			
Shear Strength, psf		439.2			
Strain at Failure, %		5.75			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		878.3			
Effective Minor Principal Stress at Failure, psf		152.8			
Effective Major Principal Stress at Failure, psf		1031.			
B-Value		0.95			

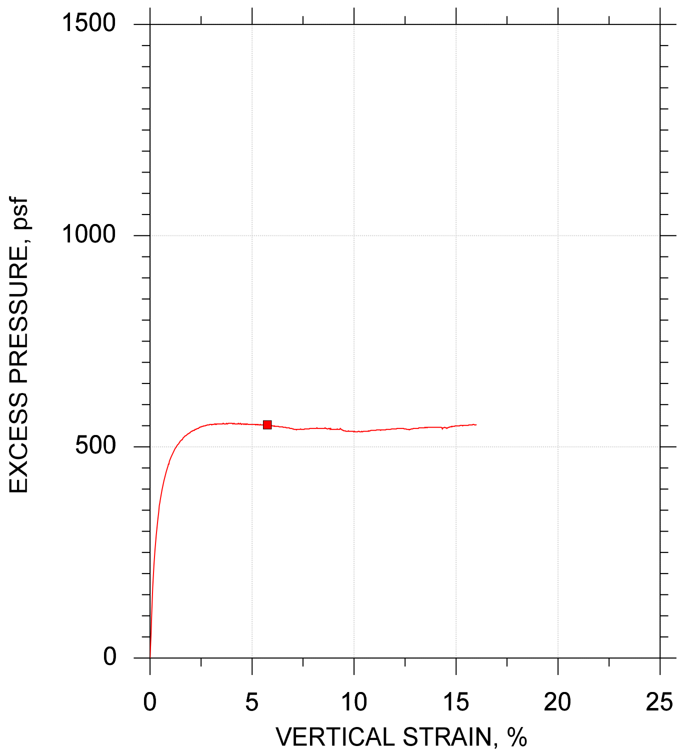
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

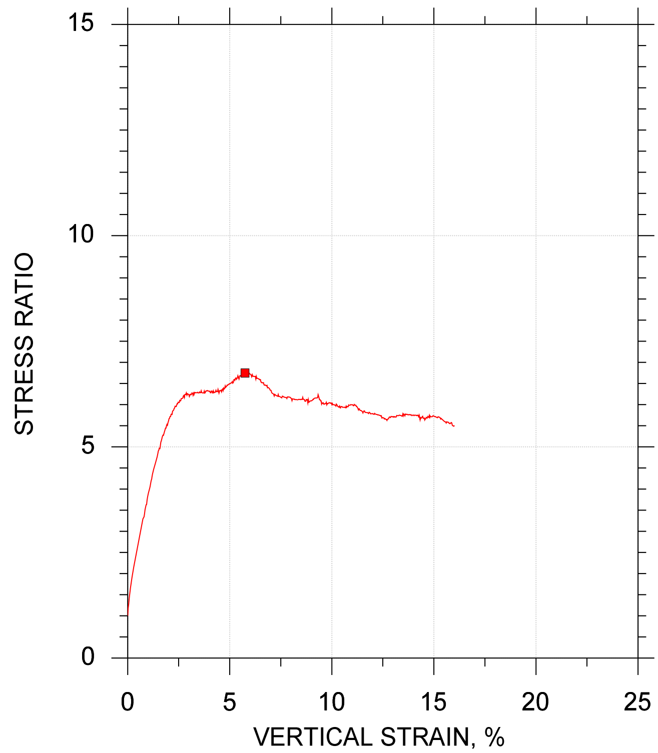


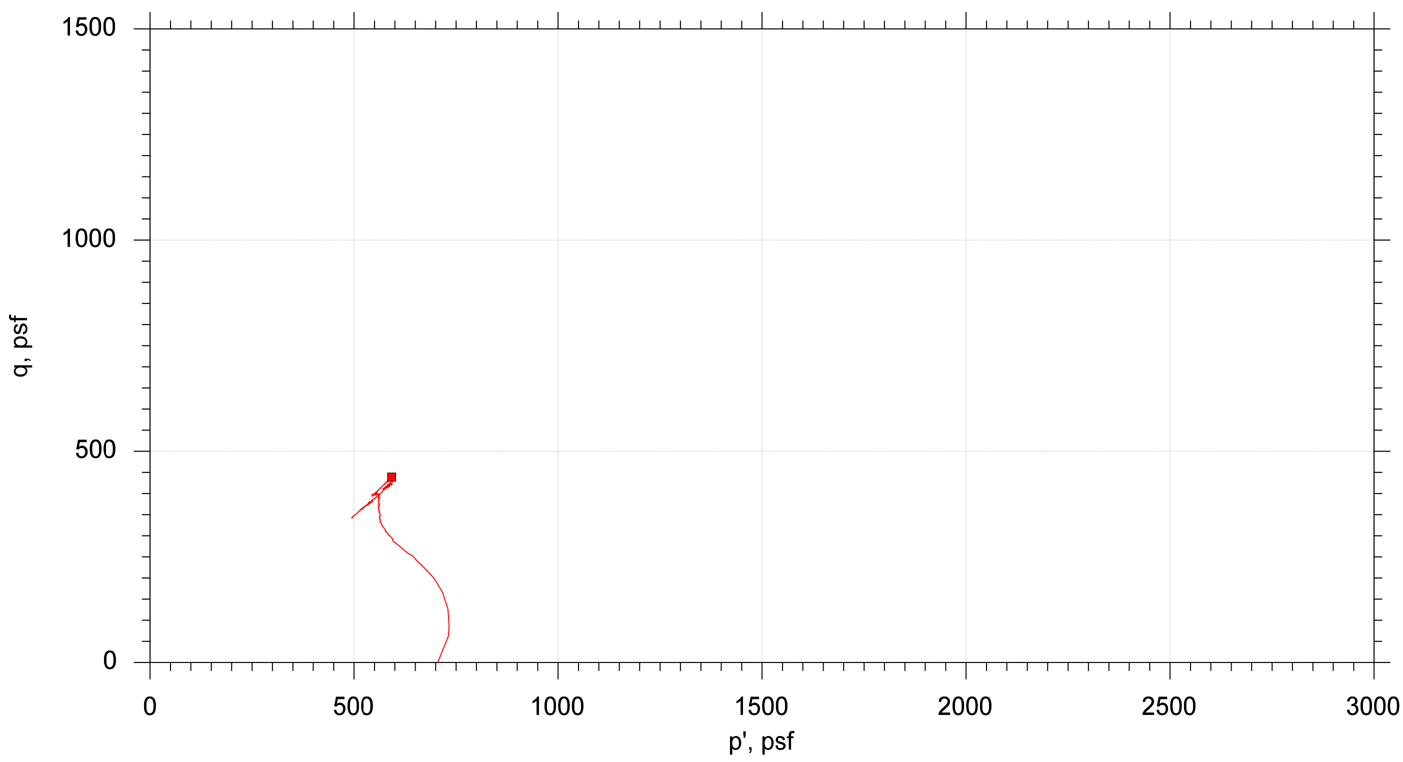
Remarks:

System S

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







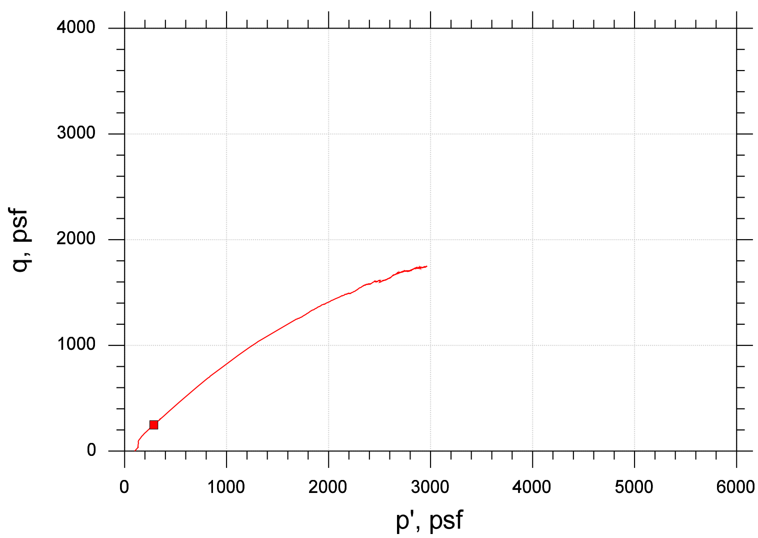
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CU-5-1A	16-18 ft	trm	3/4/19	njh	3/11/19	309473-CU-5-1-An.dat

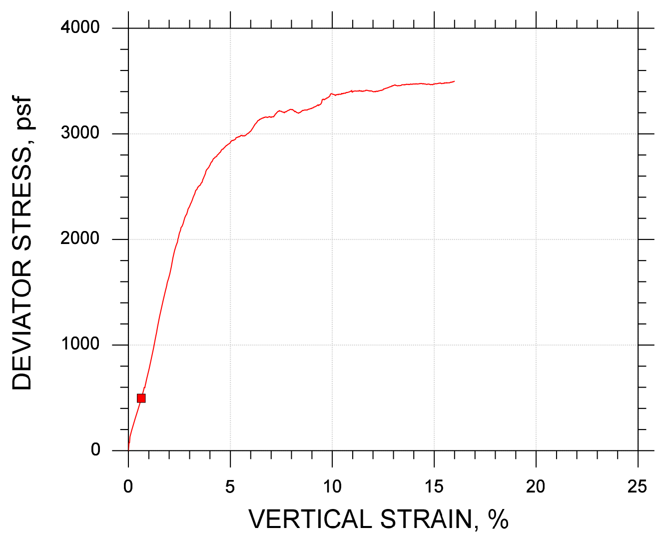
GeoTesting EXPRESS

Project: Maine Turnpike	Location: South Portland, ME	Project No.: GTX-309473
Boring No.: HB-EXIT 45-303	Sample Type: intact	
Description: Wet, dark gray clay		
Remarks: System S		

Client: Haley & Aldrich, Inc.	
Project Name: Maine Turnpike Exit 45	
Project Location: South Portland, ME	
Project Number: GTX-309473	
Tested By: trm	Checked By: njh
Boring ID: HB-EXIT 45-304A	
Preparation: Intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 31	Plastic Limit: 18
Plasticity Index: 13	Estimated Specific Gravity: 2.7

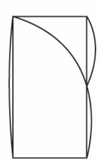
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		■			
Sample ID		U1			
Depth, ft		2-4			
Test Number		CU-4-1A			
Initial	Height, in	6.050			
	Diameter, in	2.860			
	Moisture Content (from Cuttings), %	28.9			
	Dry Density, pcf	92.6			
	Saturation (Wet Method), %	95.2			
	Void Ratio	0.820			
Before Shear	Moisture Content, %	26.7			
	Dry Density, pcf	97.9			
	Cross-sectional Area (Method A), in²	6.186			
	Saturation, %	100.0			
	Void Ratio	0.721			
	Back Pressure, psf	9610.			
Vertical Effective Consolidation Stress, psf		99.27			
Horizontal Effective Consolidation Stress, psf		99.04			
Vertical Strain after Consolidation, %		-0.0008394			
Volumetric Strain after Consolidation, %		0.08398			
Time to 50% Consolidation, min		0.8100			
Shear Strength, psf		248.0			
Strain at Failure, %		0.625			
Strain Rate, %/min		0.01600			
Deviator Stress at Failure, psf		496.0			
Effective Minor Principal Stress at Failure, psf		38.03			
Effective Major Principal Stress at Failure, psf		534.0			
B-Value		0.95			

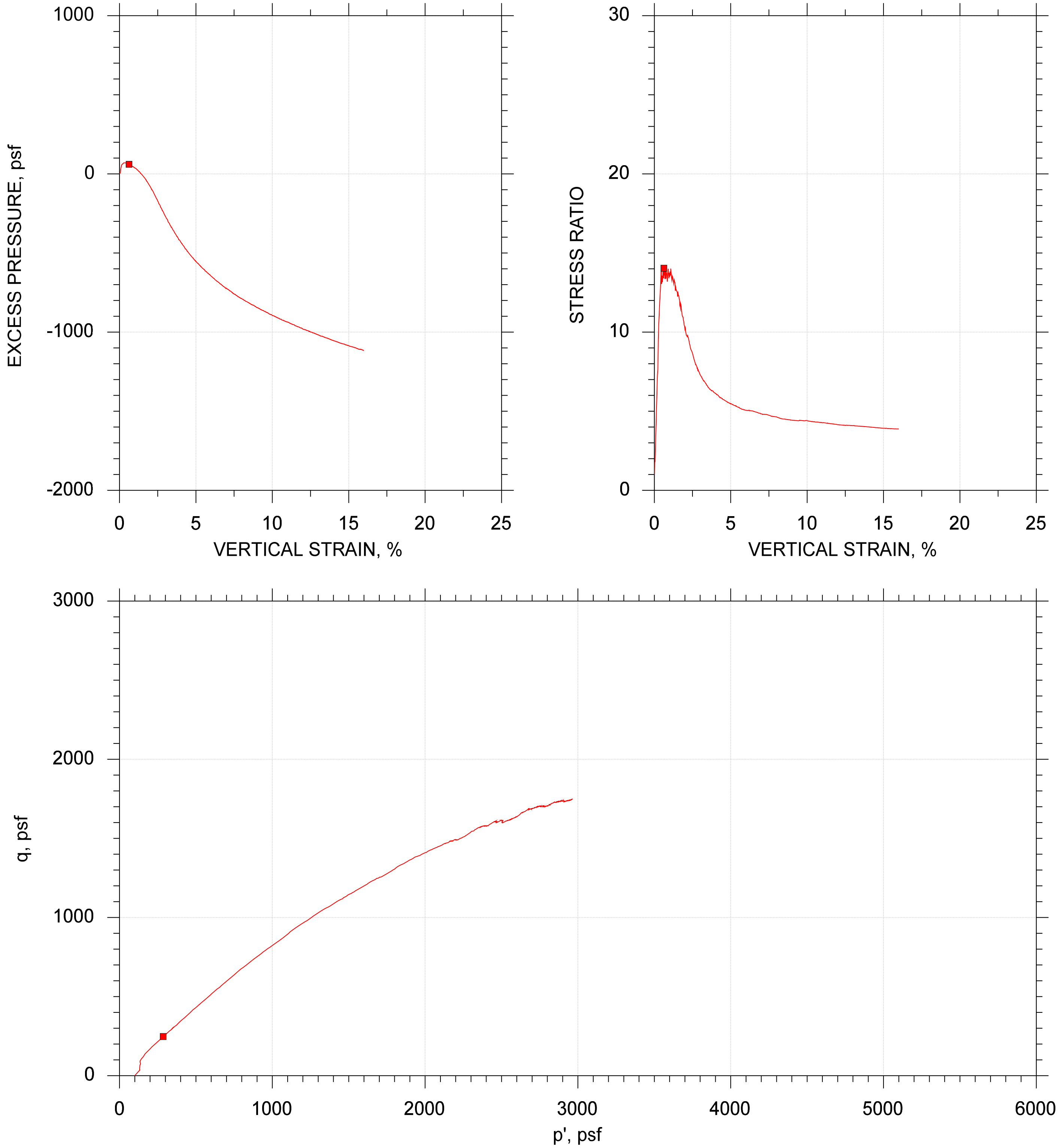
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.



Remarks:

System K

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U1	CU-4-1A	2-4	trm	3/4/19	njh		309473-CU-4-1-An.dat

GeoTesting EXPRESS			
	Project: Maine Turnpike Exit 45	Location: South Portland, ME	Project No.: GTX-309473
	Boring No.: HB-EXIT 45-304A	Sample Type: Intact	
	Description: Moist, dark gray clay		
	Remarks: System K		

ATTACHMENT 4
STRUCTURAL LOADS FOR FOUNDATION ANALYSIS

ABUTMENTS LOADS

HNTB

Client: Maine Turnpike Authority
HNTB Job Number: 63738-DS-915

Exit 45 Bridge

Final Design

Made By: HJW 02/28/20
Checked By:
Backchecked By:
Sheet: 1 of 1

Service Pile Demand Summary (Abutment 1)
(kips)

	N. End P1	P2	P3	P4	P5	P6	P7	P8	S. End P9
Fluid Weight	32.8	23.6	23.6	23.6	23.6	23.6	23.6	23.6	31.9
Non-Composite Dead	67.0	77.9	86.4	91.2	92.7	91.0	85.8	76.6	64.9
Composite Dead									
Composite Section	28.5	32.9	36.5	38.8	39.6	38.8	36.5	32.9	28.5
Non-Composite Section	18.7	31.2	39.8	44.2	45.5	44.2	39.7	31.2	18.6
Live Load									
1-Lane	57.9	49.1	38.8	32.8	32.0	32.8	38.8	49.2	57.9
2-Lanes	74.4	69.2	61.4	53.1	51.8	53.1	61.5	69.2	74.4
3-Lanes	70.0	71.1	69.6	64.1	62.0	64.2	68.6	69.0	66.9
4-Lanes	52.0	57.1	60.2	60.0	58.1	59.6	58.4	54.2	48.2
TOTAL:	202.7	205.6	219.4	223.2	**223.8**	223.0	217.8	202.4	199.7

Note: Out of plane moments were not computed as part of this load development. Out of plane moments are small, and the effect will be insignificant due to thermal movement and resulting stresses,

Fluid Weight (Fluid load of the bottom 5'-0" of the abutments, applied tributary to piles)

Non-Composite Dead (Weight of superstructure applied as points at girder locations, from BDGS, and top fluid weight of concrete. Applied to 5' deep beam)

Composite Dead (Wearing surface and curb/rail weight from BDGS. Approach Slab separate. Applied to both the non-composite 5' abutment and the full 10.5' (min depth) abutment). The larger pile reaction for the two cases is selected for the controlling abutment. (NC section applicable for redecking)

Live Load Maximum of the 1-lane through 4-lane loaded case. Center lane on the truck. Moving load - 2' from curb on the G1 side, 2' from curb on G7 side.)

Total Abutment Forces - Service 1

	Axial Force kip	Moment ft-kip
Fluid Weight	230	31
Non-Composite Dead	734	125
Composite Dead	313	1
Live Load		
1-Lane	187	4721
2-Lanes	312	6157
3-Lanes	398	5336
4-Lanes	334	3212
TOTAL:		
1-Lane	1464	4878
2-Lanes	1589	6315
3-Lanes	1675	5494
4-Lanes	1611	3369

Abutment Movement - Per AASHTO Procedure A Temperatures based on Table 3.12.2.1-1, Cold Climate

Max Temp:	120 deg F	Coeff. of Thermal Exp.:	6.50E-06 in/in	Skew - Girders to Piles:	24.164 deg
Min Temp:	-30 deg F	Expansion Length:	137 ft	Weak* Axis Displacement:	1.462 in
Temp Range:	150 deg F	Total Movement:	1.60 in	Strong* Axis Displacement:	0.656 in

*The Weak and Strong directions refer to pile axis. Piles are detailed as weak axis (webs) parallel to centerline of bearing.

HNTB

Exit 45 Bridge

Final Design

Made By: HJW 02/28/20
Checked By: KEB 03/11/20
Backchecked By:____________
Sheet: 1 of 1

Client: Maine Turnpike Authority
HNTB Job Number: 63738-DS-915

Strength I Factored Pile Demand Summary (Abutment 1)
(kips)

	N. End P1	P2	P3	P4	P5	P6	P7	P8	S. End P9
Fluid Weight	41.0	29.5	29.5	29.5	29.5	29.5	29.5	29.5	39.9
Non-Composite Dead	83.8	97.4	108.0	114.0	115.8	113.8	107.2	95.8	81.1
Composite Dead									
Composite Section	38.7	44.7	49.6	52.7	53.7	52.7	49.5	44.7	38.7
Non-Composite Section	25.5	42.4	53.9	59.9	61.7	59.9	53.9	42.3	25.5
Live Load									
1-Lane	101.3	86.0	67.9	57.3	56.0	57.3	67.9	86.0	101.4
2-Lanes	130.2	121.1	107.5	93.0	90.6	93.0	107.5	121.2	130.3
3-Lanes	122.6	124.5	121.9	112.2	108.5	112.3	120.1	120.7	117.1
4-Lanes	91.0	99.8	105.3	105.1	101.8	104.3	102.2	94.8	84.4
AXIAL TOTAL:	293.7	296.1	313.3	**315.7**	315.6	315.5	310.8	291.2	290.0

Note: Out of plane moments were not computed as part of this load development. Out of plane moments are small, and the effect will be insignificant due to thermal movement and resulting stresses,

Fluid Weight (Fluid load of the bottom 5'-0" of the abutments, applied tributary to piles)

Non-Composite Dead (Weight of superstructure applied as points at girder locations, from BDGS, and top fluid weight of concrete. Applied to 5' deep beam)

Composite Dead (Wearing surface and curb/rail weight from BDGS. Approach Slab separate. Applied to both the non-composite 5' abutment and the full 10.5' (min depth) abutment). The larger pile reaction for the two cases is selected for the controlling abutment. (NC section applicable for redecking)

Live Load Maximum of the 1-lane through 4-lane loaded case. Center lane on the truck. Moving load - 2' from curb on the G1 side, 2' from curb on G7 side.)

Total Abutment Forces - Strength 1

	Axial Force kip	Moment ft-kip
Fluid Weight	288	39
Non-Composite Dead	917	157
Composite Dead	425	1
Live Load		
1-Lane	328	8261
2-Lanes	546	10774
3-Lanes	697	9338
4-Lanes	710	5620
TOTAL:		
1-Lane	1957	8458
2-Lanes	2176	10971
3-Lanes	2326	9535
4-Lanes	2340	5817

Abutment Movement - Per AASHTO Procedure A Temperatures based on Table 3.12.2.1-1, Cold Climate

Max Temp:	120 deg F	Coeff. of Thermal Exp.:	6.50E-06 in/in	Skew - Girders to Piles:	24.164 deg
Min Temp:	-30 deg F	Expansion Length:	137 ft	Weak* Axis Displacement:	1.462 in
Temp Range:	150 deg F	Total Movement:	1.60 in	Strong* Axis Displacement:	0.656 in

*The Weak and Strong directions refer to pile axis. Piles are detailed as weak axis (webs) parallel to centerline of bearing.

CENTER PIER

Calc. for	Exit 45 Interchange	Job No.	63272-915 Sheet No.
Made by	HJW	Date	03/11/20
Chkd by	KEB	Date	03/18/20

HNTB

DESIGN LOADS

hD =	1.00	Ductility factor
hR =	1.00	Redundancy factor (did not consider substructure non-redundant)
hI =	1.00	Operational Importance factor
h =	1.00	

Lg_{Ext} = 5.59 ft. = Distance along pier cap from *exterior girder* to pier stem

Lg_{Int} = 0.00 ft. = Distance along pier cap from *interior girder* to pier stem

UNFACTORED* VERTICAL REACTIONS ON PIER CAP:

	(kips)	(kips)	(kips)	(kips)				(kips)	(kip-ft)
	G1	G2	G3	G4	G5	G6	G7	S	Moment
DC =	254.6	289.7	289.7	289.7	289.7	289.7	254.6	1957.7	0.0
DW =	58.9	58.8	58.8	58.8	58.8	58.8	58.9	411.8	0.0
(1a) LL+I =	194.6	155.7	0.0	0.0	0.0	0.0	0.0	350.2	8055.6
(2a) LL+I =	162.1	259.4	162.1	0.0	0.0	0.0	0.0	583.7	10507.3
(3a) LL+I =	0.0	0.0	162.1	259.4	162.1	0.0	0.0	583.7	0.0
(4a) LL+I =	137.8	220.5	193.0	165.4	27.6	0.0	0.0	744.3	9179.3
(5a) LL+I =	0.0	68.9	206.7	193.0	206.7	68.9	0.0	744.3	0.0
(6a) LL+I =	105.4	168.6	147.6	137.0	147.6	52.7	0.0	758.9	4932.6
(7a) LL+I =	21.1	126.5	147.6	168.6	147.6	126.5	21.1	758.9	0.0
(1b) LL =	162.8	130.2	0.0	0.0	0.0	0.0	0.0	293.0	6739.1
(2b) LL =	135.7	217.0	135.7	0.0	0.0	0.0	0.0	488.3	8790.1
(3b) LL =	0.0	0.0	135.7	217.0	135.7	0.0	0.0	488.3	0.0
(4b) LL =	115.3	184.5	161.4	138.4	23.1	0.0	0.0	622.6	7679.1
(5b) LL =	0.0	57.7	173.0	161.4	173.0	57.7	0.0	622.6	0.0
(6b) LL =	88.2	141.1	123.4	114.6	123.4	44.1	0.0	634.8	4126.5
(7b) LL =	17.6	105.8	123.4	141.1	123.4	105.8	17.6	634.8	0.0
WS_{super_Vert} =	-4.6	-3.0	-1.5	0.0	1.5	3.0	4.6	0.0	384.0
WL_{Vert} =	-2.4	-1.6	-0.8	0.0	0.8	1.6	2.4	0.0	198.0
WS_{super_Up3} =	-64.4	-52.5	-40.7	-28.9	-17.0	-5.2	6.6	-202.1	2980.6
H_{arm} to CL bridge (ft)=	27.00	18.00	9.00	0.00	9.00	18.00	27.00	18.00	

** LL includes multiple presence factor and impact (where applicable)*

Moment is in the strong axis (z-z moment)

UNFACTORED PIER SELF-WEIGHT DEAD LOADS:

DL pier cap =	222.0	kips	M overhang_DL =	92.8	kip-ft
DL pier stem =	460.7	kips			
DL pier footing =	367.2	kips			
DL soil on footing =	111.0	kips			
	1160.9	kips			

Calc. for	Exit 45 Interchange	Job No.	63272-915	Sheet No.
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Chkd by	KEB	Date	03/18/20	

HNTB

UNFACTORED HORIZ. LOADS ON PIER CAP: Y-Direction Forces (Braking and Elastomer Rotation)

	G1 (kips)	G2 (kips)	G3 (kips)	G4 (kips)	G5 (kips)	G6 (kips)	G7 (kips)	S (kips)	Torsion (kip-ft)	Moment* (kip-ft)
(1a) LL+I =	13.7	10.9	0.0	0.0	0.0	0.0	0.0	24.6	566.6	651.1
(2a) LL+I =	11.4	18.2	11.4	0.0	0.0	0.0	0.0	41.1	739.0	1089.1
(3a) LL+I =	0.0	0.0	11.4	18.2	11.4	0.0	0.0	41.1	0.0	1099.1
(4a) LL+I =	9.7	15.5	13.6	11.6	1.9	0.0	0.0	52.3	645.6	1393.6
(5a) LL+I =	0.0	4.8	14.5	13.6	14.5	4.8	0.0	52.3	0.0	1397.8
(6a) LL+I =	7.4	11.9	10.4	9.6	10.4	3.7	0.0	53.4	346.9	1421.1
(7a) LL+I =	1.5	8.9	10.4	11.9	10.4	8.9	1.5	53.4	0.0	1422.3
(1b) LL =	13.7	10.9	0.0	0.0	0.0	0.0	0.0	24.6	566.6	651.1
(2b) LL =	11.4	18.2	11.4	0.0	0.0	0.0	0.0	41.1	739.0	1089.1
(3b) LL =	0.0	0.0	11.4	18.2	11.4	0.0	0.0	41.1	0.0	1099.1
(4b) LL =	9.7	15.5	13.6	11.6	1.9	0.0	0.0	52.3	645.6	1393.6
(5b) LL =	0.0	4.8	14.5	13.6	14.5	4.8	0.0	52.3	0.0	1397.8
(6b) LL =	7.4	11.9	10.4	9.6	10.4	3.7	0.0	53.4	346.9	1421.1
(7b) LL =	1.5	8.9	10.4	11.9	10.4	8.9	1.5	53.4	0.0	1422.3

	G1 (kip-ft)	G2 (kip-ft)	G3 (kip-ft)	G4 (kip-ft)	G5 (kip-ft)	G6 (kip-ft)	G7 (kip-ft)	Moment (kip-ft)
DC Elastomer =	142.9	164.1	185.3	206.5	227.7	248.8	270.0	1445.4
LL Elastomer =	43.4	43.4	43.4	43.4	43.4	43.4	43.4	303.9

Pier Footing CL EL:	55.0						
Pier Cap Elevations:	81.35	81.53	81.7	81.87	81.68	81.48	81.28
Height Above Mid EL:	26.4	26.5	26.7	26.9	26.7	26.5	26.3

*Moment is in the weak axis direction (x-x moment)

Torsion is about the vertical axis (z-z moment)

Per AASHTO LRFD 6.3.4, braking forces are applied 6' above the roadway surface. However, the bearings serve as a hinge and prevent the transfer of moment through the girders. As a result, the elastomer rotation force of the bearings under live load is considered, and the braking force is applied at the top of the pier cap.

UNFACTORED HORIZ. LOADS ON PIER CAP: X-Direction Forces (Braking Elastomer and Rotation)

	G1 (kips)	G2 (kips)	G3 (kips)	G4 (kips)	G5 (kips)	G6 (kips)	G7 (kips)	S (kips)	Torsion* (kip-ft)	Moment* (kip-ft)
(1a) LL+I =	6.1	4.9	0.0	0.0	0.0	0.0	0.0	11.1	0	292.1
(2a) LL+I =	5.1	8.2	5.1	0.0	0.0	0.0	0.0	18.4	0	488.6
(3a) LL+I =	0.0	0.0	5.1	8.2	5.1	0.0	0.0	18.4	0	493.1
(4a) LL+I =	4.3	7.0	6.1	5.2	0.9	0.0	0.0	23.5	0	625.3
(5a) LL+I =	0.0	2.2	6.5	6.1	6.5	2.2	0.0	23.5	0	627.1
(6a) LL+I =	3.3	5.3	4.7	4.3	4.7	1.7	0.0	23.9	0	637.6
(7a) LL+I =	0.7	4.0	4.7	5.3	4.7	4.0	0.7	23.9	0	638.1
(1b) LL =	6.1	4.9	0.0	0.0	0.0	0.0	0.0	11.1	0	292.1
(2b) LL =	5.1	8.2	5.1	0.0	0.0	0.0	0.0	18.4	0	488.6
(3b) LL =	0.0	0.0	5.1	8.2	5.1	0.0	0.0	18.4	0	493.1
(4b) LL =	4.3	7.0	6.1	5.2	0.9	0.0	0.0	23.5	0	625.3
(5b) LL =	0.0	2.2	6.5	6.1	6.5	2.2	0.0	23.5	0	627.1
(6b) LL =	3.3	5.3	4.7	4.3	4.7	1.7	0.0	23.9	0	637.6
(7b) LL =	0.7	4.0	4.7	5.3	4.7	4.0	0.7	23.9	0	638.1

*Moment is in the strong axis direction (z-z moment)

	G1 (kip-ft)	G2 (kip-ft)	G3 (kip-ft)	G4 (kip-ft)	G5 (kip-ft)	G6 (kip-ft)	G7 (kip-ft)	Moment (kip-ft)
DC Elastomer =	64.1	73.6	83.1	92.6	102.1	111.6	121.1	648.5
LL Elastomer =	19.5	19.5	19.5	19.5	19.5	19.5	19.5	136.3

UNFACTORED HORIZONTAL LOADS ON PIER: (Wind and Collision)

Axis	ALONG Z-Z AXIS: Shear Z (kips)	Moment About X (kip-ft)		ALONG X-X AXIS: Shear X (kips)	Moment About Z (kip-ft)	$V\text{-}Mid_{arm}$ (ft)
WS_{super_Y} =	60.3	1585.9	WS_{super_X} =	83.9	2204.1	26.3
WS_{subcap_Y} =	3.6	83.9	WS_{subcap_X} =	8.0	187.1	23.3
$WS_{substem\_Y}$ =	8.68	96.7	$WS_{substem\_X}$ =	19.35	215.6	11.14
WL_{super_Y} =	17.01	447.0	WL_{super_X} =	20.11	528.5	26.3
CT_{pier_Y} =	155.29	1863.5	CT_{pier_X} =	579.56	6954.7	12

V-Mid = Vertical arm from location of force to center of footing

Note: Moments about X axis are weak axis, moments about Z axis are strong axis

LOAD FACTORS:

	STR-I	STR-III	STR-IV	STR-V	SERV I	SERV IV	EE II
DC_{MAX}	1.25	1.25	1.50	1.25	1.00	1.00	1.00
DC_{MIN}	0.90	0.90	-	0.90	1.00	1.00	-
DW_{MAX}	1.50	1.50	1.50	1.50	1.00	1.00	1.00
DW_{MIN}	0.65	0.65	-	0.65	1.00	1.00	-
LL	1.75	-	-	1.35	1.00	-	0.50
BR	1.75	-	-	1.35	1.00	-	0.50
WS*	-	1.00	-	0.42	0.32	0.56	-
WL	-	-	-	1.00	1.00	-	-
CT	-	-	-	-	-	-	1.00

m
1.2
1
0.85
0.65

*Wind on Structure computed for Strength III. A relative factor is computed for all other cases, see page 9.

PIER FOOTING DESIGN LOADS:

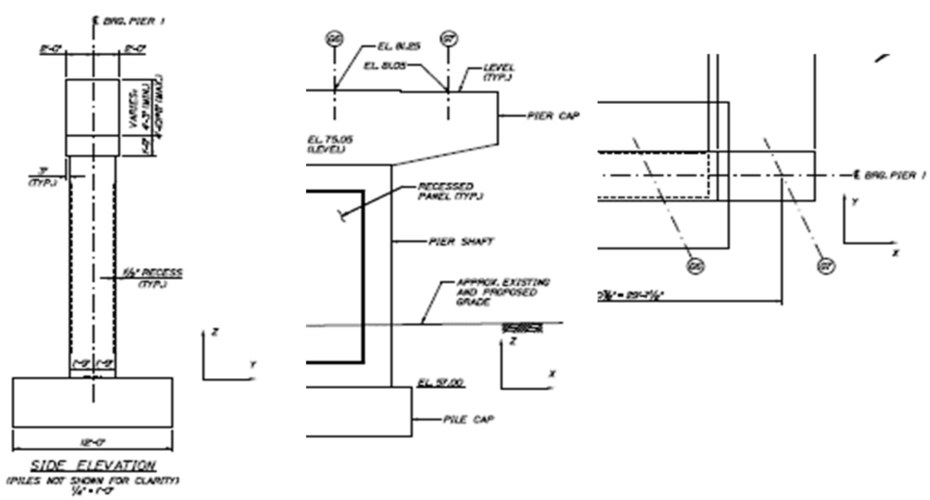
Unfactored Force Summary:

	Axial Compress	Shear X Strong	Shear Y Weak	Moment X Weak	Moment Y Strong	Moment Z Torsion
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft
DC*	3118.6	0	0	1445.4	648.5	0
DW	411.8	0	0	0	0	0
WS	-202.1	111.3	72.6	1766.6	5971.4	0
WL	0	20	17.01	447.0	528.5	0
CT	0	580	155.29	1863.5	6954.7	0
LL 1a	350.2	11	24.6	955.0	8484.0	566.6
LL 2a	583.7	18	41.1	1393.0	11132.3	739.0
LL 3a	583.7	18	41.1	1403.0	629.5	0.0
LL 4a	744.3	23	52.3	1697.5	9940.9	645.6
LL 5a	744.3	23	52.3	1701.7	763.5	0.0
LL 6a	758.9	24	53.4	1725.0	5706.5	346.9
LL 7a	758.9	24	53.4	1726.2	774.5	0.0
LL 1b	293.0	11	24.6	955.0	7167.6	566.6
LL 2b	488.3	18	41.1	1393.0	9415.1	739.0
LL 3b	488.3	18	41.1	1403.0	629.5	0.0
LL 4b	622.6	23	52.3	1697.5	8440.7	645.6
LL 5b	622.6	23	52.3	1701.7	763.5	0.0
LL 6b	634.8	24	53.4	1725.0	4900.4	346.9
LL 7b	634.8	24	53.4	1726.2	774.5	0.0
LL 1 b/o	0.0	11	24.6	651.1	292.1	566.6
LL 2 b/o	0.0	18	41.1	1089.1	488.6	739.0
LL 3 b/o	0.0	18	41.1	1099.1	493.1	0.0
LL 4 b/o	0.0	23	52.3	1393.6	625.3	645.6
LL 5 b/o	0.0	23	52.3	1397.8	627.1	0.0
LL 6 b/o	0.0	24	53.4	1421.1	637.6	346.9
LL 7 b/o	0.0	24	53.4	1422.3	638.1	0.0

A-Cases not applicable for pile design

*Vertical reactions and self weight

Diagrams - Indicating Diretionality of X and Y Axes



Strength I Load Combinations

	Axial	Shear X	Shear Y	Weak M	Strong M	Torsion	Description of Case
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
1	5028.7	19.3	43.1	3477.9	13353.8	991.5	Max Live, Live 1, Max Dead
2	5370.5	32.2	71.8	4244.5	17287.1	1293.3	Max Live, Live 2, Max Dead
3	5370.5	32.2	71.8	4262.0	1912.2	0.0	Max Live, Live 3, Max Dead
4	5605.5	41.1	91.6	4777.3	15581.9	1129.8	Max Live, Live 4, Max Dead
5	5605.5	41.1	91.6	4784.7	2146.7	0.0	Max Live, Live 5, Max Dead
6	5626.9	41.9	93.4	4825.5	9386.3	607.1	Max Live, Live 6, Max Dead
7	5626.9	41.9	93.4	4827.5	2165.9	0.0	Max Live, Live 7, Max Dead
8	3587.1	19.3	43.1	2972.1	13126.9	991.5	Max Live, Live 1, Min Dead
9	3929.0	32.2	71.8	3738.6	17060.1	1293.3	Max Live, Live 2, Min Dead
10	3929.0	32.2	71.8	3756.1	1685.2	0.0	Max Live, Live 3, Min Dead
11	4164.0	41.1	91.6	4271.5	15354.9	1129.8	Max Live, Live 4, Min Dead
12	4164.0	41.1	91.6	4278.8	1919.7	0.0	Max Live, Live 5, Min Dead
13	4185.3	41.9	93.4	4319.6	9159.4	607.1	Max Live, Live 6, Min Dead
14	4185.3	41.9	93.4	4321.7	1939.0	0.0	Max Live, Live 7, Min Dead
15	4515.9	19.3	43.1	2946.1	1321.8	991.5	Min Live + Braking, Live 1, Max Dead
16	4515.9	32.2	71.8	3712.7	1665.7	1293.3	Min Live + Braking, Live 2, Max Dead
17	4515.9	32.2	71.8	3730.1	1673.6	0.0	Min Live + Braking, Live 3, Max Dead
18	4515.9	41.1	91.6	4245.5	1904.8	1129.8	Min Live + Braking, Live 4, Max Dead
19	4515.9	41.1	91.6	4252.9	1908.1	0.0	Min Live + Braking, Live 5, Max Dead
20	4515.9	41.9	93.4	4293.6	1926.4	607.1	Min Live + Braking, Live 6, Max Dead
21	4515.9	41.9	93.4	4295.7	1927.3	0.0	Min Live + Braking, Live 7, Max Dead
22	3074.4	19.3	43.1	2440.2	1094.8	991.5	Min Live + Braking, Live 1, Min Dead
23	3074.4	32.2	71.8	3206.8	1438.8	1293.3	Min Live + Braking, Live 2, Min Dead
24	3074.4	32.2	71.8	3224.3	1446.6	0.0	Min Live + Braking, Live 3, Min Dead
25	3074.4	41.1	91.6	3739.6	1677.8	1129.8	Min Live + Braking, Live 4, Min Dead
26	3074.4	41.1	91.6	3747.0	1681.1	0.0	Min Live + Braking, Live 5, Min Dead
27	3074.4	41.9	93.4	3787.8	1699.4	607.1	Min Live + Braking, Live 6, Min Dead
28	3074.4	41.9	93.4	3789.8	1700.4	0.0	Min Live + Braking, Live 7, Min Dead

Strength III Load Combinations

	Axial	Shear X	Shear Y	Moment X	Moment Y	Torsion	
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
29	4313.8	111.3	72.6	3573.3	6782.0	0.0	Wind, Max Dead
30	2872.3	111.3	72.6	3067.4	6555.0	0.0	Wind, Min Dead

Strength IV Load Combinations

31	5295.5	0.0	0.0	2168.1	972.7	0.0	Max Dead

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Strength V Load Combinations

	Axial	Shear X	Shear Y	Moment X	Moment Y	Torsion	Description
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
32	4826.7	81.7	80.7	4283.6	13518.8	764.9	Max Live, Live 1, Max Dead, WS V, WL
33	5090.4	91.6	102.9	4875.0	16553.0	997.7	Max Live, Live 2, Max Dead, WS V, WL
34	5090.4	91.6	102.9	4888.4	4692.4	0.0	Max Live, Live 3, Max Dead, WS V, WL
35	5271.7	98.5	118.1	5286.0	15237.6	871.6	Max Live, Live 4, Max Dead, WS V, WL
36	5271.7	98.5	118.1	5291.7	4873.3	0.0	Max Live, Live 5, Max Dead, WS V, WL
37	5288.2	99.1	119.5	5323.1	10458.2	468.4	Max Live, Live 6, Max Dead, WS V, WL
38	5288.2	99.1	119.5	5324.7	4888.2	0.0	Max Live, Live 7, Max Dead, WS V, WL
39	3385.2	81.7	80.7	3777.7	13291.9	764.9	Max Live, Live 1, Min Dead, WS V, WL
40	3648.9	91.6	102.9	4369.1	16326.1	997.7	Max Live, Live 2, Min Dead, WS V, WL
41	3648.9	91.6	102.9	4382.5	4465.4	0.0	Max Live, Live 3, Min Dead, WS V, WL
42	3830.2	98.5	118.1	4780.1	15010.7	871.6	Max Live, Live 4, Min Dead, WS V, WL
43	3830.2	98.5	118.1	4785.8	4646.4	0.0	Max Live, Live 5, Min Dead, WS V, WL
44	3846.7	99.1	119.5	4817.2	10231.2	468.4	Max Live, Live 6, Min Dead, WS V, WL
45	3846.7	99.1	119.5	4818.8	4661.2	0.0	Max Live, Live 7, Min Dead, Wind, WS V, WL
46	4431.2	81.7	80.7	3873.3	4237.0	764.9	Min Live + Braking, Live 1, Max Dead, WS V, WL
47	4431.2	91.6	102.9	4464.7	4502.3	997.7	Min Live + Braking, Live 2, Max Dead, WS V, WL
48	4431.2	91.6	102.9	4478.2	4508.3	0.0	Min Live + Braking, Live 3, Max Dead, WS V, WL
49	4431.2	98.5	118.1	4875.7	4686.7	871.6	Min Live + Braking, Live 4, Max Dead, WS V, WL
50	4431.2	98.5	118.1	4881.4	4689.3	0.0	Min Live + Braking, Live 5, Max Dead, WS V, WL
51	4431.2	99.1	119.5	4912.9	4703.4	468.4	Min Live + Braking, Live 6, Max Dead, WS V, WL
52	4431.2	99.1	119.5	4914.5	4704.1	0.0	Min Live + Braking, Live 7, Max Dead, WS V, WL
53	2989.7	81.7	80.7	3367.5	4010.0	764.9	Min Live + Braking, Live 1, Min Dead, WS V, WL
54	2989.7	91.6	102.9	3958.8	4275.3	997.7	Min Live + Braking, Live 2, Min Dead, WS V, WL
55	2989.7	91.6	102.9	3972.3	4281.4	0.0	Min Live + Braking, Live 3, Min Dead, WS V, WL
56	2989.7	98.5	118.1	4369.8	4459.7	871.6	Min Live + Braking, Live 4, Min Dead, WS V, WL
57	2989.7	98.5	118.1	4375.5	4462.3	0.0	Min Live + Braking, Live 5, Min Dead, WS V, WL
58	2989.7	99.1	119.5	4407.0	4476.4	468.4	Min Live + Braking, Live 6, Min Dead, WS V, WL
59	2989.7	99.1	119.5	4408.6	4477.1	0.0	Min Live + Braking, Live 7, Min Dead, WS V, WL

Service I Load Combinations

	Axial	Shear X	Shear Y	Moment X	Moment Y	Torsion	Description
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
60	3758.5	66.9	65.0	3414.4	10261.3	566.6	Live, Live 1, Dead, WS Ser I
61	3953.8	74.2	81.4	3852.5	12508.9	739.0	Live, Live 2, Dead, WS Ser I
62	3953.8	74.2	81.4	3862.4	3723.2	0.0	Live, Live 3, Dead, WS Ser I
63	4088.1	79.3	92.7	4156.9	11534.5	645.6	Live, Live 4, Dead, WS Ser I
64	4088.1	79.3	92.7	4161.2	3857.2	0.0	Live, Live 5, Dead, WS Ser I
65	4100.3	79.8	93.7	4184.4	7994.2	346.9	Live, Live 6, Dead, WS Ser I
66	4100.3	79.8	93.7	4185.6	3868.2	0.0	Live, Live 7, Dead, WS Ser I
67	3465.5	66.9	65.0	3110.5	3385.9	566.6	Braking, Live 1, Dead, WS Ser I
68	3465.5	74.2	81.4	3548.6	3582.4	739.0	Braking, Live 2, Dead, WS Ser I
69	3465.5	74.2	81.4	3558.5	3586.9	0.0	Braking, Live 3, Dead, WS Ser I
70	3465.5	79.3	92.7	3853.0	3719.0	645.6	Braking, Live 4, Dead, WS Ser I
71	3465.5	79.3	92.7	3857.3	3720.9	0.0	Braking, Live 5, Dead, WS Ser I
72	3465.5	79.8	93.7	3880.5	3731.3	346.9	Braking, Live 6, Dead, WS Ser I
73	3465.5	79.8	93.7	3881.7	3731.9	0.0	Braking, Live 7, Dead, WS Ser I

Service IV Load Combinations

	Axial	Shear X	Shear Y	Moment X	Moment Y	Torsion	Description
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
74	3416.7	62.6	40.9	2439.1	4007.4	0.0	Only Service IV Case

Extreme Event II Load Combinations

	Axial	Shear X	Shear Y	Moment X	Moment Y	Torsion	Description
Units	kip	kip	kip	kip-ft	kip-ft	kip-ft	
75	3530.4	579.6	155.3	3308.9	7603.1	0.0	Collision, No Live, Max Dead
76	3676.9	585.1	167.6	3786.4	11186.9	283.3	Collision, Live 1, Max Dead
77	3774.5	588.8	175.8	4005.4	12310.7	369.5	Collision, Live 2, Max Dead
78	3774.5	588.8	175.8	4010.4	7917.9	0.0	Collision, Live 3, Max Dead
79	3841.7	591.3	181.5	4157.6	11823.5	322.8	Collision, Live 4, Max Dead
80	3841.7	591.3	181.5	4159.7	7984.9	0.0	Collision, Live 5, Max Dead
81	3847.8	591.5	182.0	4171.4	10053.4	173.5	Collision, Live 6, Max Dead
82	3847.8	591.5	182.0	4172.0	7990.4	0.0	Collision, Live 7, Max Dead
83	3530.4	585.1	167.6	3634.4	7749.2	283.3	Collision, Braking 1, Max Dead
84	3530.4	588.8	175.8	3853.4	7847.5	369.5	Collision, Braking 2, Max Dead
85	3530.4	588.8	175.8	3858.4	7849.7	0.0	Collision, Braking 3, Max Dead
86	3530.4	591.3	181.5	4005.7	7915.8	322.8	Collision, Braking 4, Max Dead
87	3530.4	591.3	181.5	4007.8	7916.7	0.0	Collision, Braking 5, Max Dead
88	3530.4	591.5	182.0	4019.4	7921.9	173.5	Collision, Braking 6, Max Dead
89	3530.4	591.5	182.0	4020.0	7922.2	0.0	Collision, Braking 7, Max Dead

TOLL PLAZAS LOADS

Margarita Restrepo

From:	John Schuring
Sent:	Friday, March 6, 2020 12:05 PM
To:	Margarita Restrepo; Joseph Zwetchkenbaum
Subject:	FW: Exit 45 - Geotechnical Coordination
Attachments:	Exit 45 Toll Plaza Pile Layout.pdf

Margarita, here's the loads for the toll structures. As mentioned, we won't need Mulitpier for this analysis. Thanks,
john

From: Bret Grenier <bgrenier@HNTB.com>
Sent: Friday, March 6, 2020 10:55 AM
To: John Schuring <jschuring@HNTB.com>
Cc: Raymond Hanf <rhanf@HNTB.com>
Subject: RE: Exit 45 - Geotechnical Coordination

John,

The maximum axial pile forces for the Toll Plaza are:

Entry Plaza:

- Strength I – 481 Kips
- Service I – 323 Kips

Exit Plaza:

- Strength I – 355 Kips
- Service I – 222 Kips

As discussed this morning, we anticipate modeling a single pile with these forces applied. We can then come up with an optimized pile size from a geotechnical perspective and then check that pile structurally and iterate the design from there.

I have also attached the pile layout sheets for your information. I will be sending gantry foundation loads next week and sign structure foundation loads at a future date.

If you need anything else please let me know.

Thank you,

Bret Grenier, PE
Bridge Engineer
Tel (207) 228-0895 **Email** bgrenier@hntb.com

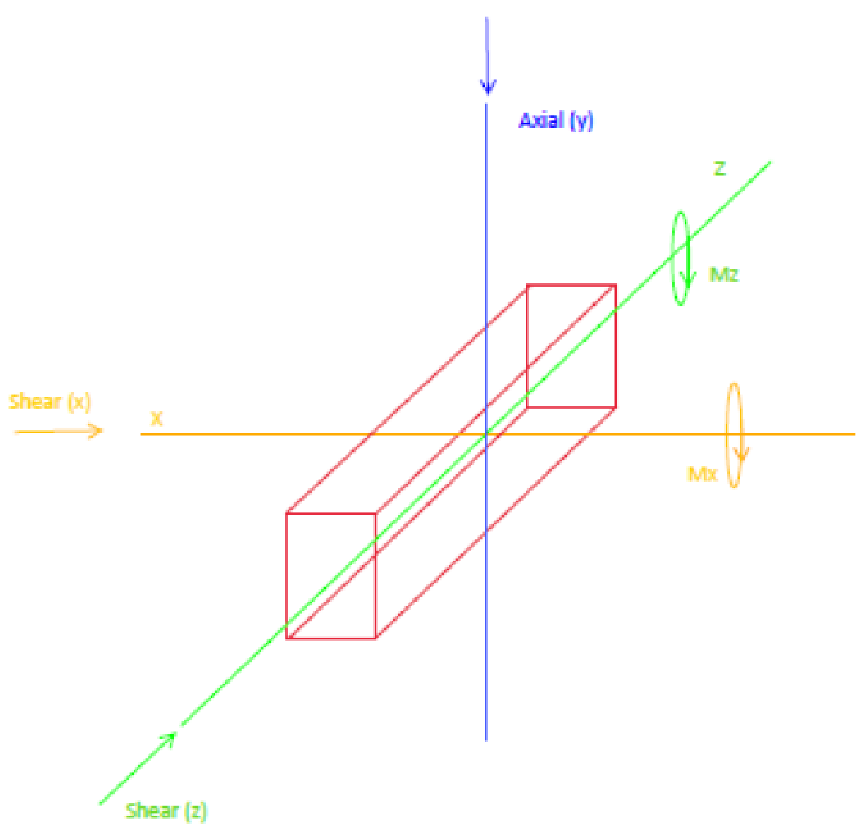
From: Raymond Hanf <rhanf@HNTB.com>
Sent: Wednesday, March 4, 2020 1:49 PM
To: Harold Walton <hwalton@HNTB.com>; Gregory Standley <gstandley@HNTB.com>; Bret Grenier <bgrenier@HNTB.com>
Cc: Joseph Howe <jhowe@HNTB.com>; Ashley Stephens <astephens@hntb.com>; John Schuring

TOLL MAST ARM LOADS

Exit 45 Interchange Reconfiguration

Exit Slab Mast Arm Foundation Loads

Loading	Load Combination	Load	
Axial	Service	9.0	kip
	Extreme Event	13.0	kip
	Strength V	11.25	kip
Shear (x)	Service	1.4	kip
	Extreme Event	1.4	kip
	Strength V	1.4	kip
Shear (z)	Service	4.3	kip
	Extreme Event	4.3	kip
	Strength V	4.3	kip
Moment (x)	Service	79.9	kip-ft
	Extreme Event	79.9	kip-ft
	Strength V	79.9	kip-ft
Moment (z)	Service	48.2	kip-ft
	Extreme Event	96.0	kip-ft
	Strength V	56.3	kip-ft
Torsion (y)	Service	79.8	kip-ft
	Extreme Event	79.8	kip-ft
	Strength V	79.8	kip-ft



For:	Maine Turnpike Exit 45 - Phase 2	Job Number:	63272	Sheet No.	1	HNTB
By:	MRR	Check By:	BTF	Check by:	MRR	
Date:	4/15/2020	Date:	4/17/2020	Date:	4/17/2020	

GEOTECHNICAL LOADS FOR TOLL MAST FOUNDATION SYSTEMS

Loads Applied from CL of Pile Cap	1.5	ft

Loads Applied at the Point of Load Application (Top of Pile Cap)

	X	Y	Z	Mx	My	Mz
Service	1.4	4.3	9.0	79.9	48.2	78.9
Strength	1.4	4.3	11.25	79.9	56.3	78.9
Extreme 1	1.4	4.3	13.0	79.9	96.0	78.9

Loads Applied at the Centerline of the Pile Cap

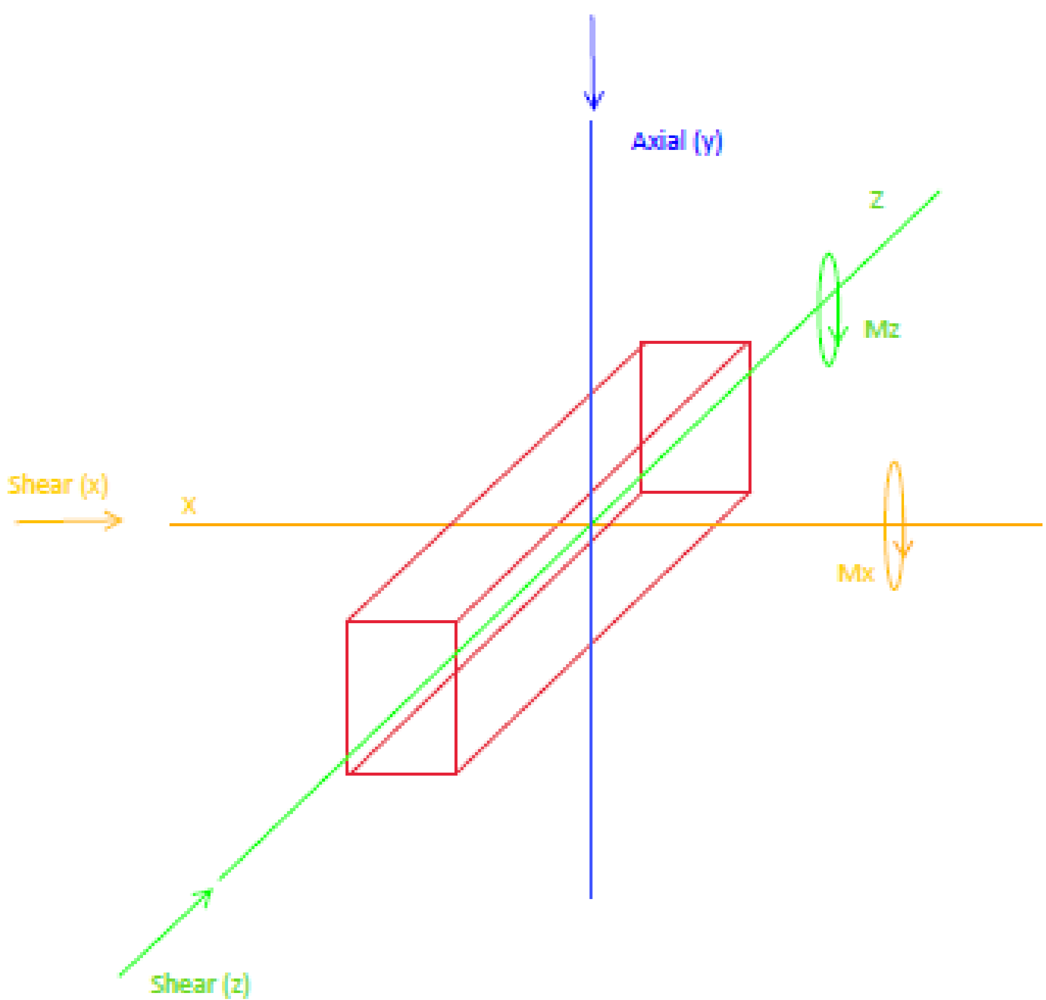
	X	Y	Z	Mx	My	Mz
Service	1.4	4.3	9.0	86.4	-50.3	78.9
Strength	1.4	4.3	11.3	86.4	-58.4	78.9
Extreme 1	1.4	4.3	13.0	86.4	-98.1	78.9

OVERHEAD SIGN STRUCTURE LOADS

Made By: GLS 03/20/20
Checked By: BRG 03/30/30

Exit 45
Unfactored OHSS Foundation Design Loads
Rt. 703 @ Sta. 1062+50

Load	Loading Type	Load	
Axial	Dead	26.4	kip
	Ice	73.9	kip
	Wind	0.0	kip
Shear (z)	Wind	66.1	kip
Shear (x)	Wind	13.0	kip
Moment (x)	Wind	1662.3	kip-ft
Moment (z)	Dead	147.4	kip-ft
	Ice	161.9	kip-ft
	Wind	271.5	kip-ft



For:	Maine Turnpike Exit 45 - Phase 2	Job Number:	63272	Sheet No.	1	HNTB
By:	MRR	Check By:	BTF	Check by:	MRR	
Date:	4/10/2020	Date:	4/15/2020	Date:	4/16/2020	

GEOTECHNICAL LOADS FOR OVERHEAD SIGN STRUCTURE FOUNDATION - STATION 1062+50

		Loads	Total	Service Load Factor	Strength Load Factor	Extreme_1 Load Factor	Extreme_2 Load Factor	Extreme_3 Load Factor
Axial	Dead	16.7	16.70	1.00	1.25	1.1	0.9	1.0
	Ice	73.9	73.90	1.00	1.25	1.1	0.9	0.0
	Wind	0	0.00	1.00	0.00	1.0	1.0	0.0
	Collision	0	0.00	0.00	0.00	0.0	0.0	1.0
Shear (y)	Wind	66	66.00	1.00	0.00	1.0	1.0	0.0
	Collision	0	0.00	0.00	0.00	0.0	0.0	1.0
Shear (x)	Wind	13	13.00	1.00	0.00	1.0	1.0	0.0
	Collision	0	0.00	0.00	0.00	0.0	0.0	1.0
Moment (x)	Wind	1662.3	1662.30	1.00	0.00	1.0	1.0	0.0
	Collision	0	0.00	0.00	0.00	0.0	0.0	1.0
Moment (y)	Dead	147.4	147.40	1.00	1.25	1.1	0.9	1.0
	Ice	161.9	161.90	1.00	1.25	1.1	0.9	0.0
	Wind	271.5	271.50	1.00	0.00	1.0	1.0	0.0
	Collision	0	0.00	0.00	0.00	0.0	0.0	1.0

Loads Applied from CL of Pile Cap	1.5	ft	Loads applied at center of footing in FB Pier

Loads Applied at the Point of Load Application (Top of Pile Cap)

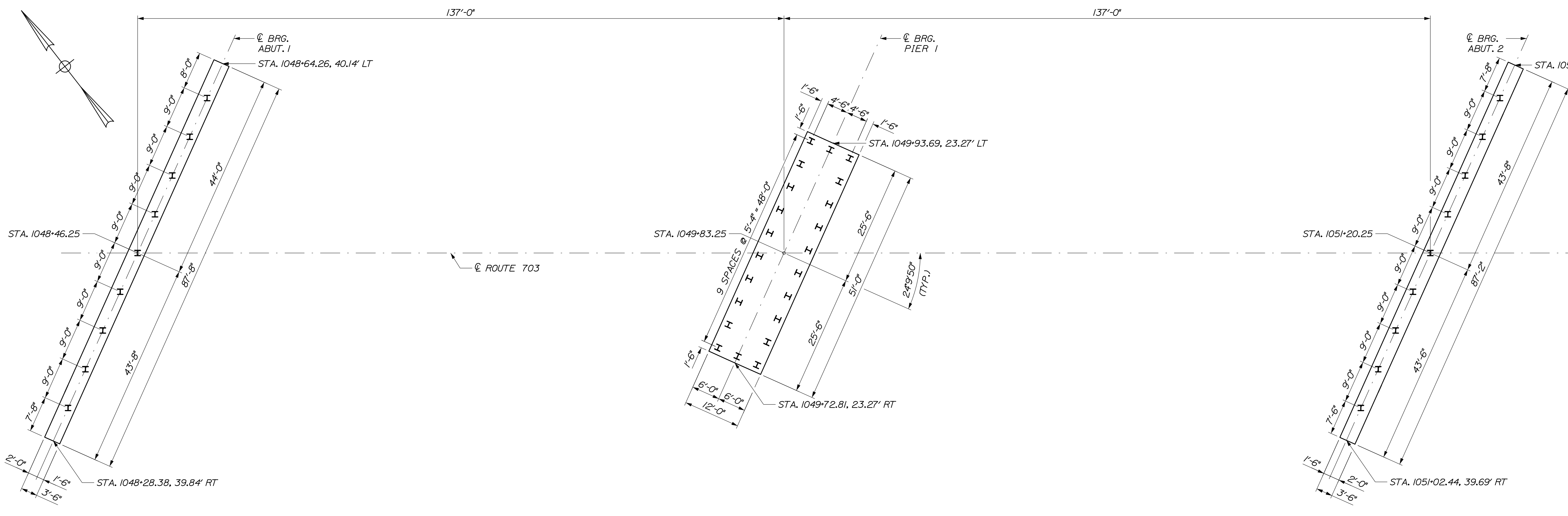
	X	Y	Z	Mx	My	Mz
Service	13.0	66.0	90.6	1662.3	580.8	0.0
Strength	0.0	0.0	113.3	0.0	386.6	0.0
Extreme 1	13.0	66.0	99.7	1662.3	611.7	0.0
Extreme 2	13.0	66.0	81.5	1662.3	549.9	0.0
Extreme 3	0.0	0.0	16.7	0.0	147.4	0.0

Loads Applied at the Centerline of the Pile Cap

	X	Y	Z	Mx	My	Mz
Service	13.0	66.0	90.6	1761.3	-600.3	0.0
Strength	0.0	0.0	113.3	0.0	-386.6	0.0
Extreme 1	13.0	66.0	99.7	1761.3	-631.2	0.0
Extreme 2	13.0	66.0	81.5	1761.3	-569.4	0.0
Extreme 3	0.0	0.0	16.7	0.0	-147.4	0.0

Reference AASHTO AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, Table 3.4-1.

ATTACHMENT 5
PILE GEOMETRY AND PLAN LAYOUT



FOUNDATION PLAN

3/32" = 1'-0"

PILE NOTES:

1. THE MAXIMUM CALCULATED FACTORED AXIAL PILE LOADS ARE:

ABUTMENTS: 511 KIPS (INCLUDING 193 KIPS ALLOWED FOR DOWNDRAG)
PIER NO. 1: 372 KIPS

2. PILES SHALL BE DRIVEN TO THE FOLLOWING NOMINAL DRIVING RESISTANCES:

ABUTMENTS: 786 KIPS
PIER NO. 1: 572 KIPS

3. ESTIMATE OF PILES REQUIRED:

ABUTMENT NO. 1: 9 ~ HP 14x102 @ 95 FEET (-16 MIN TIP ELEV.)
ABUTMENT NO. 2: 9 ~ HP 14x102 @ 105 FEET (-17 MIN TIP ELEV.)
PIER NO. 1: 22 ~ HP 14x102 @ 75 FEET (-15 MIN TIP ELEV.)

4. ALL PILES SHALL BE EQUIPPED WITH A PILE TIP IN ACCORDANCE WITH STANDARD SPECIFICATIONS SUBSECTION 501.048, PREFABRICATED PILE TIPS.

5. THE CONTRACTOR SHALL PERFORM AND SUBMIT A WAVE EQUATION ANALYSIS FOR REVIEW AND ACCEPTANCE BY THE RESIDENT. THE MAXIMUM ALLOWABLE DRIVING STRESS IS 0.90 TIMES Fy. THE SUBMITTAL ANALYSES SHALL INCLUDE THE PROPOSED STOPPING CRITERIA BASED ON THE WAVE EQUATION ANALYSIS AND THE PROPOSED DRIVING SYSTEM. THE STOPPING CRITERIA SHALL INCLUDE THE BLOWS PER INCH AND THE NUMBER OF 1-IN. INTERVALS AT WHICH PILE INSTALLATION MAY BE TERMINATED. THE COST OF PERFORMING THE WAVE EQUATION ANALYSIS WILL BE CONSIDERED INCIDENTAL TO ITEM NO. 501.92, PILE DRIVING EQUIPMENT MOBILIZATION.

6. THE CONTRACTOR SHALL PERFORM 3 DYNAMIC LOAD TESTS, ONE AT EACH SUBSTRUCTURE LOCATION, TO CONFIRM THE NOMINAL DRIVING RESISTANCES HAVE BEEN MET. THE DYNAMIC TESTS SHALL BE PERFORMED ON THE FIRST PRODUCTION PILE DRIVEN AT EACH SUBSTRUCTURE. MINIMUM 24 HOUR PILE RESTRIKES SHALL BE CONDUCTED ON ALL TEST PILES IN ORDER TO ENSURE THE REQUIRED NOMINAL RESISTANCE HAS BEEN ACHIEVED AND VERIFY PILE RELAXATION HAS NOT OCCURRED. THE CONTRACTOR MAY DRIVE PRODUCTION PILES TO THE PRELIMINARY DRIVING CRITERIA, HOWEVER PILE CUT-OFF WILL NOT BE PERMITTED UNTIL COMPLETION OF RESTRIKE TESTING AND ESTABLISHMENT OF FINAL DRIVING CRITERIA.

7. FURNISH PILES MANUFACTURED IN ACCORDANCE WITH ASTM A572 GRADE 50, WITH A MINIMUM YIELD STRENGTH OF 50 KSI.

8. PILES SHALL BE DRIVEN TO AT LEAST THE MINIMUM TIP ELEVATION SHOWN IN NOTE 3. CEASE PILE INSTALLATION AND NOTIFY THE RESIDENT IF MINIMUM TIP ELEVATION CANNOT BE REACHED.

9. WELDING OF PILES AND NONDESTRUCTIVE WELD TESTING FOR PILE SPLICES SHALL BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY D1.5 AND MAINE TURNPIKE AUTHORITY REQUIREMENTS.

10. LOCATE PILE SPLICES 30 FEET OR LOWER BELOW THE PILE CUTOFF ELEVATION AND INCLUDE PILE SPLICE DETAILS IN SHOP DRAWINGS SUBMITTED TO THE RESIDENT AND APPROVED PRIOR TO PILE DRIVING.

11. THE ORIENTATION OF THE PILES SHALL BE WITHIN 10 DEGREES OF THE ORIENTATION SHOWN ON THE PLANS. ALL ABUTMENT PILES ARE ORIENTED WITH THE WEAK AXIS OF THE PILE PARALLEL TO THE LONGITUDINAL DIRECTION OF THE BRIDGE.

100% PS&E
DECEMBER 4, 2020

Date:12/4/2020

Filename: 273_Foundation Plan.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	HJW	05\20	Checked	KEB	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

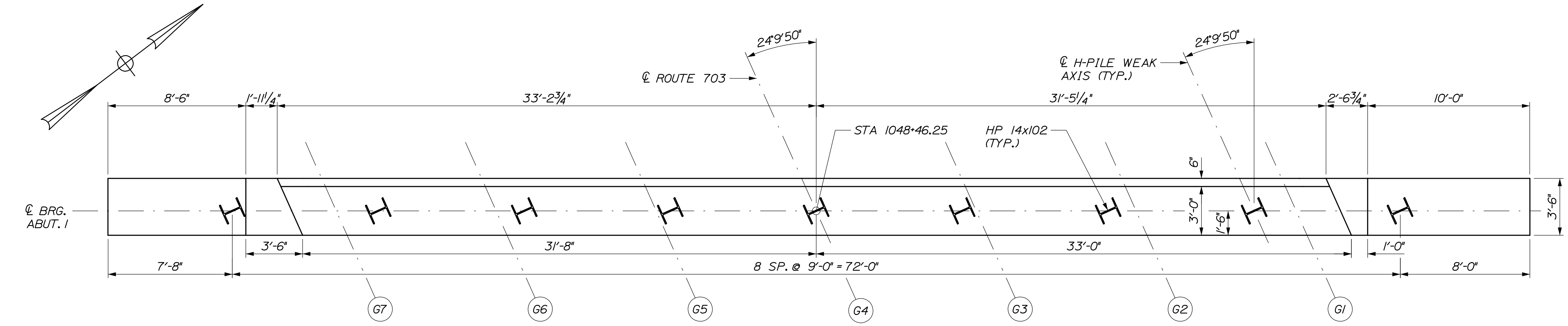
MTA PROJECT MANAGER: Ralph C. Norwood, IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION

FOUNDATION PLAN

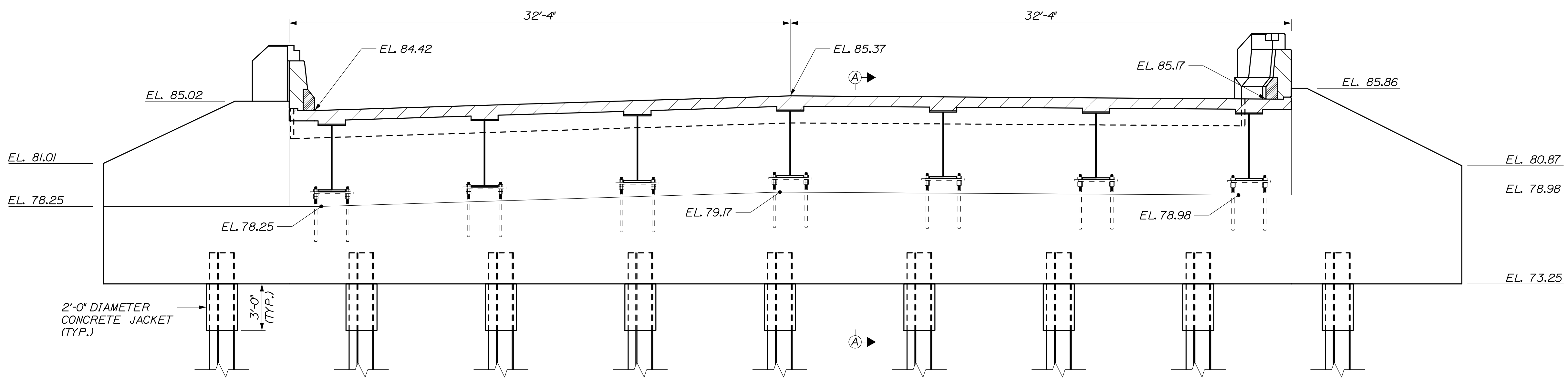
SHEET NUMBER: S-09

CONTRACT:2021.07



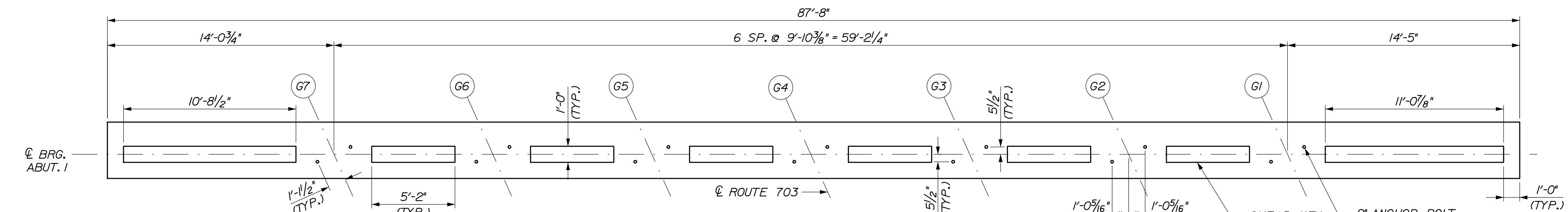
ABUTMENT 1 PLAN

¼" = 1'-0"



ABUTMENT 1 ELEVATION

¼" = 1'-0"



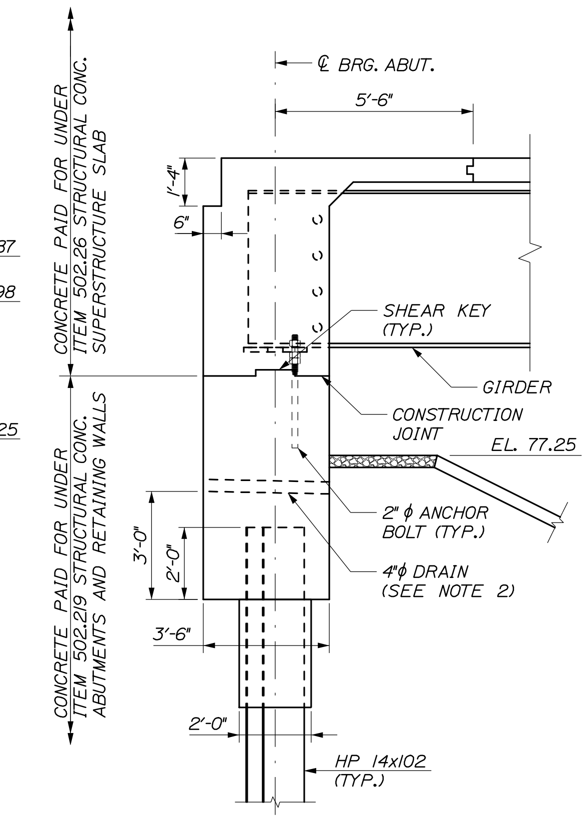
CONSTRUCTION JOINT PLAN

¼" = 1'-0"

ABUTMENT NOTES:

1. ALL ABUTMENT ELEVATIONS APPLY AT CENTERLINE OF BEARING.
2. PLACE 4 INCH DIAMETER DRAINS IN BREASTWALL AND WINGWALLS AT 8 FEET MAXIMUM SPACING. EXACT LOCATION TO BE DETERMINED BY THE RESIDENT.
3. PAYMENT FOR CONCRETE JACKET AROUND THE TOPS OF THE H-PILES WILL NOT BE PAID FOR DIRECTLY. PAYMENT SHALL BE INCIDENTAL TO PAY ITEM 502.219. FILL CONCRETE MAY BE USED FOR THE CONCRETE JACKETS.
4. ALL EXPOSED SURFACES OF ABUTMENT SHALL BE COATED WITH CLEAR PROTECTIVE COATING FOR CONCRETE SURFACES, ITEM 515.202.
5. PAYMENT FOR ANCHOR RODS AND THE ANCHOR PLATE FOR THE MAST ARM FOUNDATION ON THE ABUTMENT 2 NORTH WINGWALL SHALL NOT BE PAID FOR DIRECTLY. PAYMENT SHALL BE INCIDENTAL TO PAY ITEM 502.219.
6. GREASE THE SURFACE BETWEEN THE GIRDER LEVELING PLATE AND THE ANCHOR ROD ASSEMBLY PRIOR TO ERECTING THE GIRDERS.

BOTTOM OF GIRDER ELEVATIONS							
	G1	G2	G3	G4	G5	G6	G7
ABUT. 1	79.92	79.99	80.05	80.11	79.81	79.50	79.19



SECTION A-A

⅜" = 1'-0"

100% PS&E
DECEMBER 4, 2020

Date:12/4/2020

Filename: 274_Abutment 1 Plan and Elevation.dgn

Scale: AS NOTED			
No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	HJW	05\20	Checked	KEB	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

HNTB CORPORATION
340 County Road, Suite 6-C
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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood, IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION

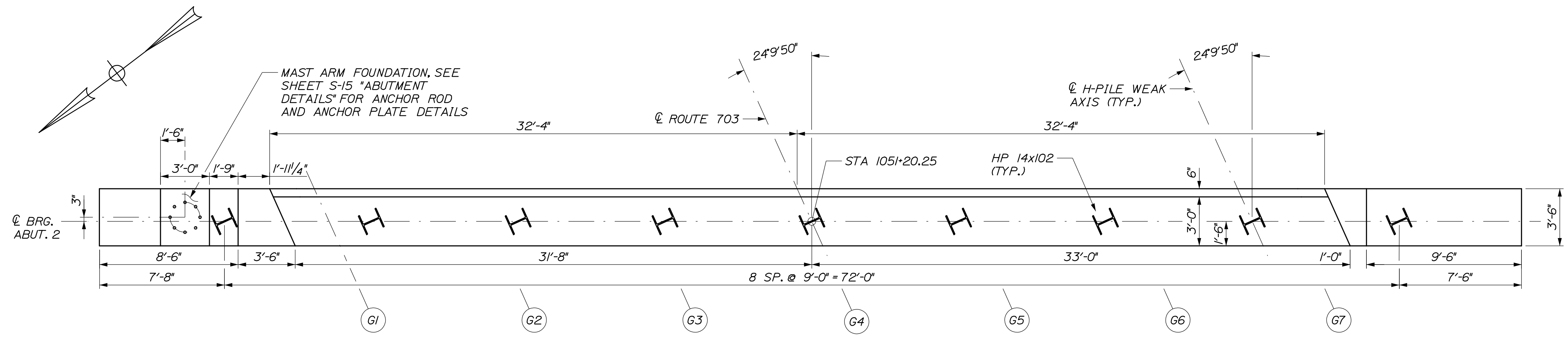
ABUTMENT 1 PLAN AND ELEVATION

SHEET NUMBER: S-10

CONTRACT:2021.07

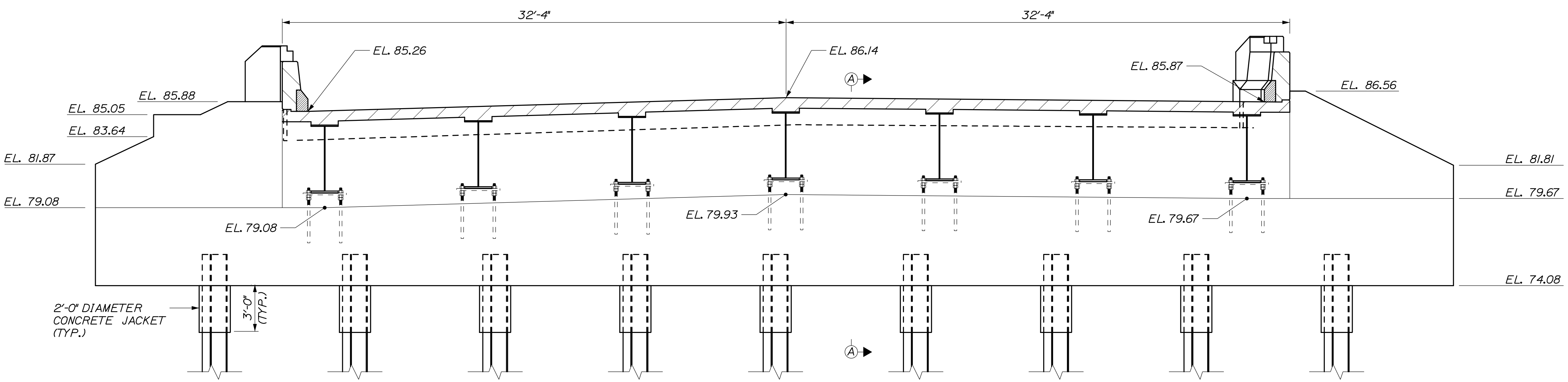
302 OF 431

BOTTOM OF GIRDER ELEVATIONS							
	G1	G2	G3	G4	G5	G6	G7
ABUT. 2	80.03	80.32	80.60	80.88	80.80	80.71	80.62



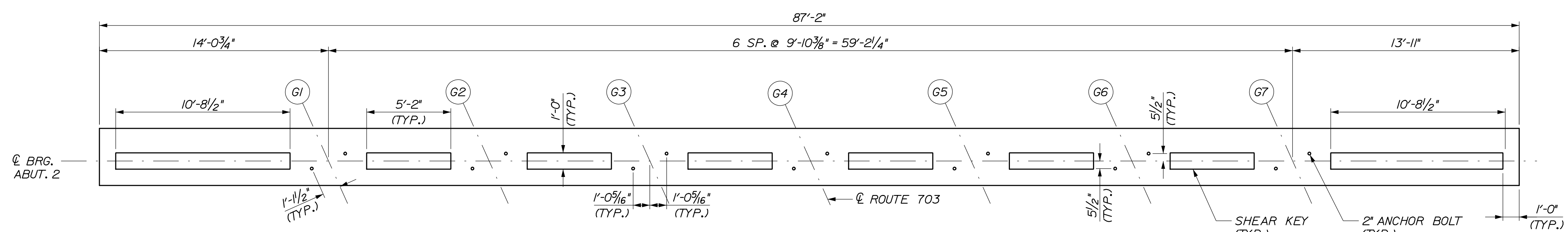
ABUTMENT 2 PLAN

1/4" = 1'-0"



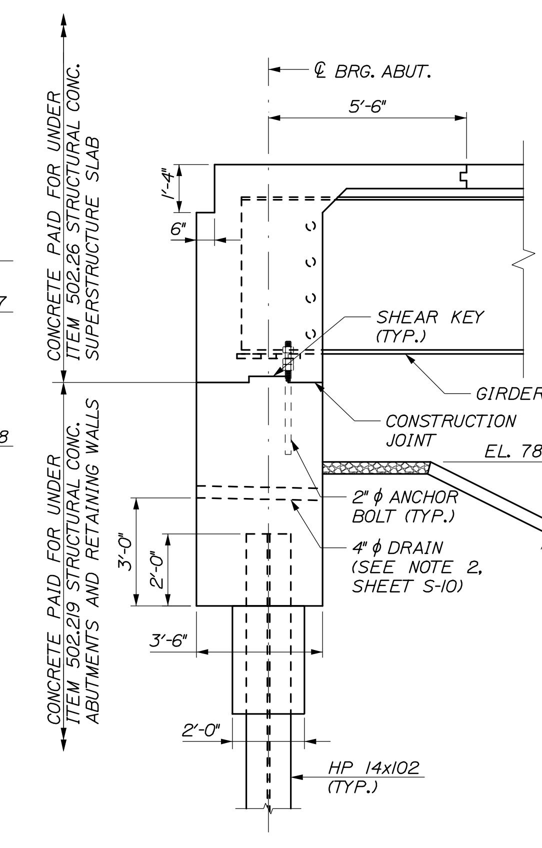
ABUTMENT 2 ELEVATION

1/4" = 1'-0"



CONSTRUCTION JOINT PLAN

1/4" = 1'-0"



SECTION A-A

3/8" = 1'-0"

100% PS&E
DECEMBER 4, 2020

Date:12/4/2020

Filename: 275_Abutment 2 Plan and Elevation.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	HJW	05\20	Checked	KEB	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood, IV, P.E., P.T.O.E.

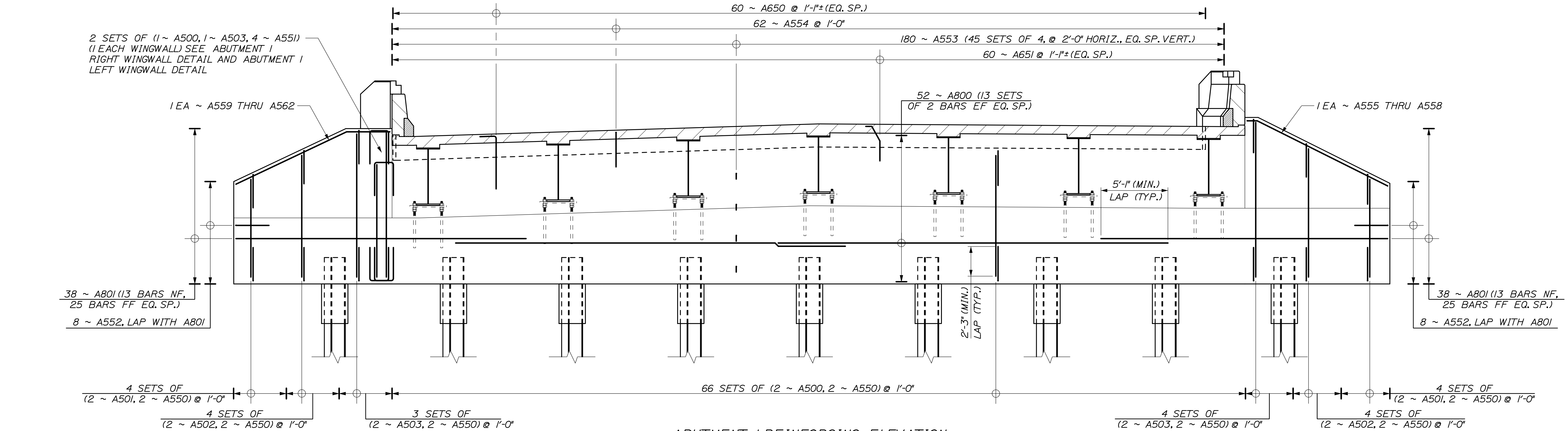
EXIT 45 INTERCHANGE RECONFIGURATION

ABUTMENT 2 PLAN AND ELEVATION

SHEET NUMBER: S-11

CONTRACT:2021.07

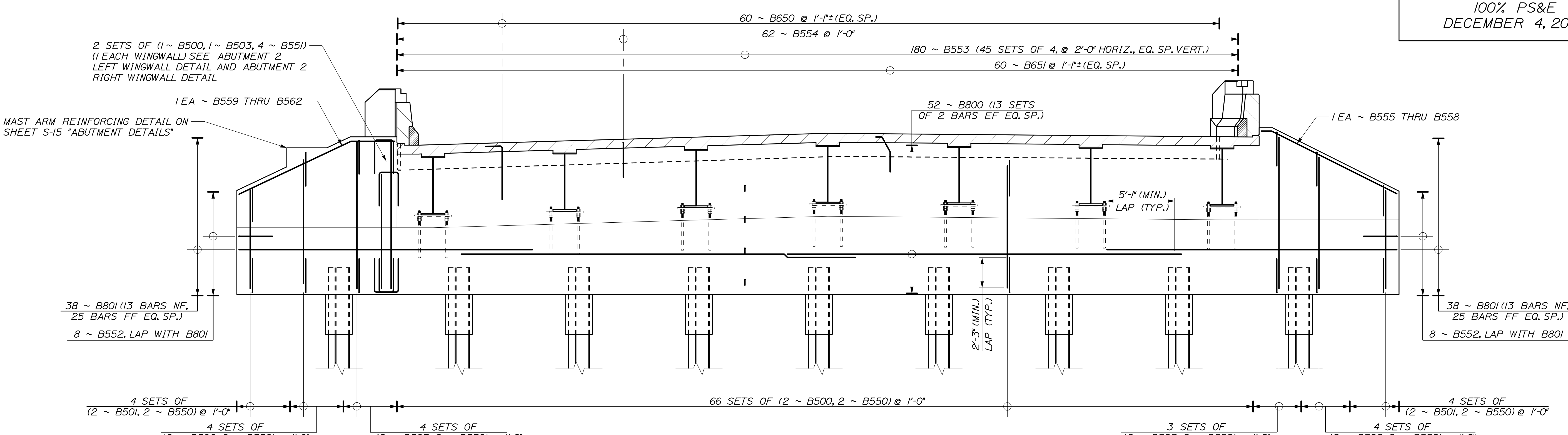
Date:12/4/2020



ABUTMENT 1 REINFORCING ELEVATION

1/4" = 1'-0"

100% PS&E
DECEMBER 4, 2020



ABUTMENT 2 REINFORCING ELEVATION

1/4" = 1'-0"

Filename: 276_Abutment Reinforcing.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	HJW	05\20	Checked	KEB	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood, IV, P.E., P.T.O.E.

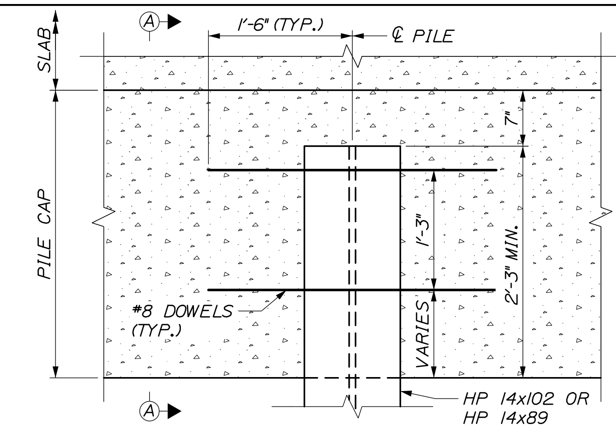
EXIT 45
INTERCHANGE RECONFIGURATION

ABUTMENT REINFORCING

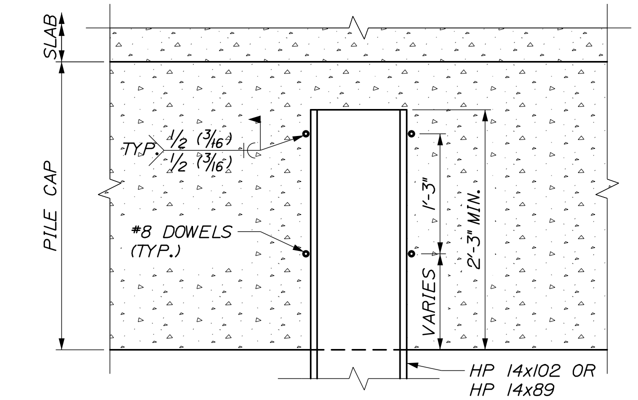
SHEET NUMBER: S-12

CONTRACT:2021.07

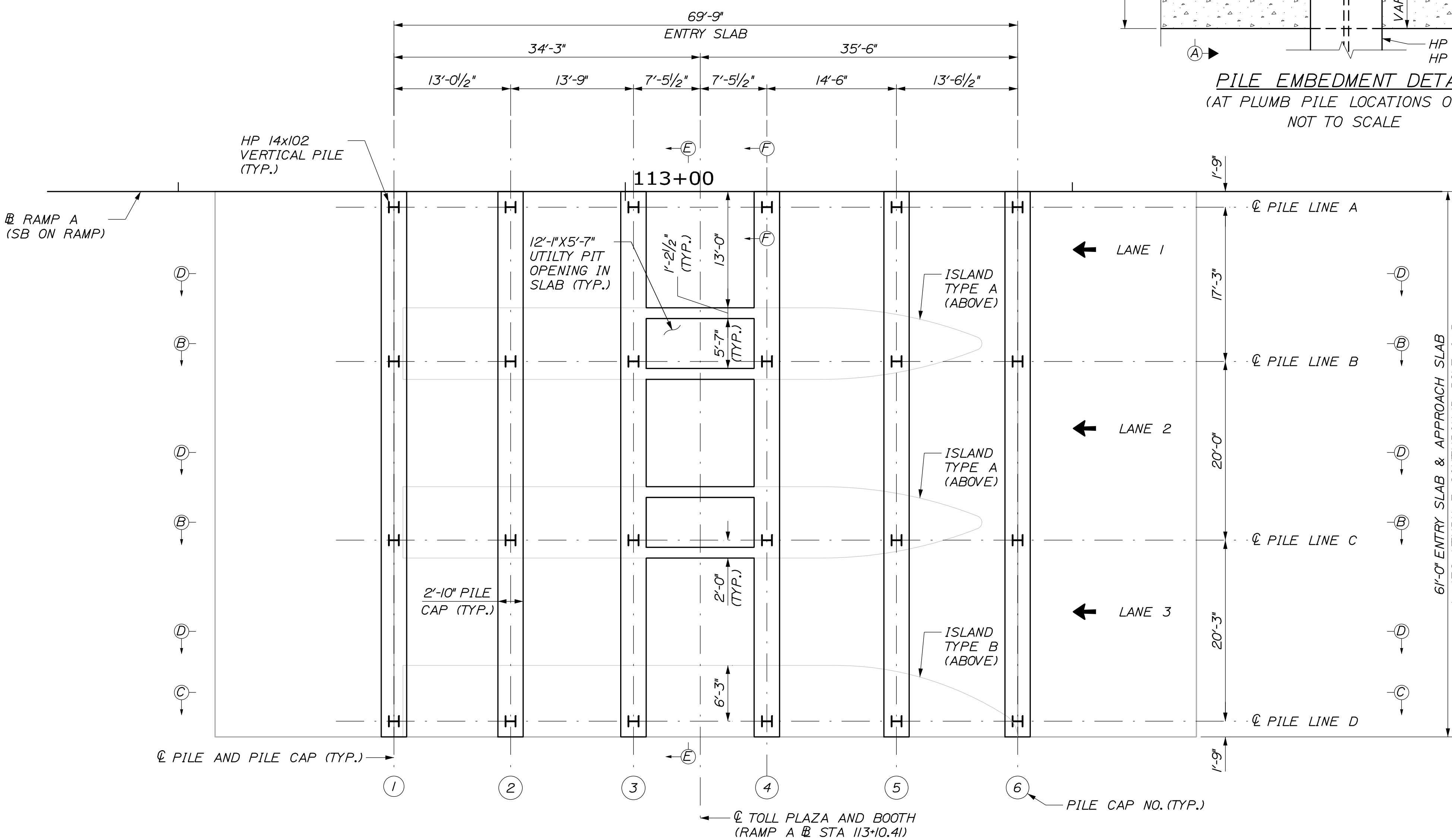
Date:12/4/2020



PILE EMBEDMENT DETAIL
(AT PLUMB PILE LOCATIONS ONLY)
NOT TO SCALE



SECTION A-A
NOT TO SCALE



PLAN
1/8" = 1'-0"

PILE NOTES:

1. PILES SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 501, FOUNDATION PILES.

2. THE MAXIMUM CALCULATED FACTORED AXIAL PILE LOADS ARE:

NB TOLL PLAZA SLABS:	553 KIPS (INCLUDING 72 KIPS ALLOWED FOR DOWNDRAG)
NB EXIT SLABS:	467 KIPS (INCLUDING 112 KIPS ALLOWED FOR DOWNDRAG)
NB MAST ARM PEDESTAL:	33 KIPS
SB TOLL PLAZA SLABS:	690 KIPS (INCLUDING 209 KIPS ALLOWED FOR DOWNDRAG)
SB EXIT SLABS:	430 KIPS (INCLUDING 75 KIPS ALLOWED FOR DOWNDRAG)
SB MAST ARM PEDESTAL:	35 KIPS

3. PILES SHALL BE DRIVEN TO THE FOLLOWING NOMINAL DRIVING RESISTANCES:

NB TOLL PLAZA SLABS:	851 KIPS
NB EXIT SLABS AND MAST ARM PEDESTAL:	719 KIPS
SB TOLL PLAZA SLABS:	1062 KIPS
SB EXIT SLABS AND MAST ARM PEDESTAL:	662 KIPS

4. ESTIMATE OF PILES REQUIRED:

NB TOLL PLAZA SLABS:	24 ~ HP 14x89 @ 50 FEET (MIN. TIP EL. = 23 FT)
NB EXIT SLABS:	8 ~ HP 14x89 @ 95 FEET (MIN. TIP EL. = -17 FT)
NB MAST ARM PEDESTAL:	4 ~ HP 14X89 @ 90 FEET (MIN. TIP EL. = -14 FT)
SB TOLL PLAZA SLABS:	24 ~ HP 14x102 @ 105 FEET (MIN. TIP EL. = -34 FT)
SB EXIT SLABS:	8 ~ HP 14x89 @ 83 FEET (MIN. TIP EL. = -11 FT)
SB MAST ARM PEDESTAL:	4 ~ HP 14X89 @ 78 FEET (MIN. TIP EL. = -9 FT)

5. ALL PILES SHALL BE EQUIPPED WITH A PILE TIP IN ACCORDANCE WITH STANDARD SPECIFICATIONS SUBSECTION 501.048, PREFABRICATED PILE TIPS.

6. THE CONTRACTOR SHALL PERFORM AND SUBMIT A WAVE EQUATION ANALYSIS FOR REVIEW AND ACCEPTANCE BY THE RESIDENT. THE MAXIMUM ALLOWABLE DRIVING STRESS IS 0.90 TIMES FY. THE SUBMITTAL ANALYSES SHALL INCLUDE THE PROPOSED STOPPING CRITERIA BASED ON THE WAVE EQUATION ANALYSIS AND THE PROPOSED DRIVING SYSTEM. THE STOPPING CRITERIA SHALL INCLUDE THE BLOWS PER INCH AND THE NUMBER OF 1-IN. INTERVALS AT WHICH PILE INSTALLATION MAY BE TERMINATED. THE COST OF PERFORMING THE WAVE EQUATION ANALYSIS WILL BE CONSIDERED INCIDENTAL TO ITEM NO. 501.92, PILE DRIVING EQUIPMENT MOBILIZATION.

7. THE CONTRACTOR SHALL PERFORM 4 DYNAMIC LOAD TESTS, ONE AT EACH ENTRY TOLL PLAZA AND EXIT TOLL POINT LOCATION, TO CONFIRM THE NOMINAL DRIVING RESISTANCES INDICATED IN NOTE 3 HAVE BEEN MET. THE DYNAMIC LOAD TESTS SHALL BE PERFORMED ON THE FIRST PRODUCTION PILE DRIVEN AT EACH FOUNDATION. MINIMUM 72 HOUR PILE RESTRIKES SHALL BE CONDUCTED ON ALL TEST PILES IN ORDER TO ENSURE THE REQUIRED NOMINAL RESISTANCE HAS BEEN ACHIEVED AND VERIFY PILE RELAXATION HAS NOT OCCURRED. THE CONTRACTOR MAY DRIVE PRODUCTION PILES TO THE PRELIMINARY DRIVING CRITERIA, HOWEVER PILE CUT-OFF WILL NOT BE PERMITTED UNTIL COMPLETION OF RESTRIKE TESTING AND ESTABLISHMENT OF FINAL DRIVING CRITERIA.

8. SPLICING OF PILES SHALL NOT BE PERMITTED WITHIN 30 FEET OF DESIGN PILE CUT-OFF (TOP OF PILE ELEVATION) WITHOUT THE APPROVAL OF THE ENGINEER. WELDING OF PILE SPLICES AND ASSOCIATED NONDESTRUCTIVE TESTING SHALL BE PERFORMED BY PREQUALIFIED WELDERS IN ACCORDANCE WITH THE REQUIREMENTS OF STANDARD SPECIFICATIONS SECTION 504, STRUCTURAL STEEL, AND AMERICAN WELDING SOCIETY (AWS) D1.5 CODE.

9. PILES SHALL BE DRIVEN TO AT LEAST THE MINIMUM PILE TIP ELEVATION SPECIFICED IN NOTE 4. CEASE PILE INSTALLATION AND NOTIFY THE RESIDENT IF MINIMUM PILE TIP ELEVATION CANNOT BE REACHED.

GENERAL NOTES:

1. FOR SECTIONS B-B, C-C, AND D-D SEE SHEET TP-18.

2. FOR SECTIONS E-E AND F-F SEE SHEET TP-19.

100% PS&E
DECEMBER 4, 2020

Filename: 247_SB Entry Foundation Plan.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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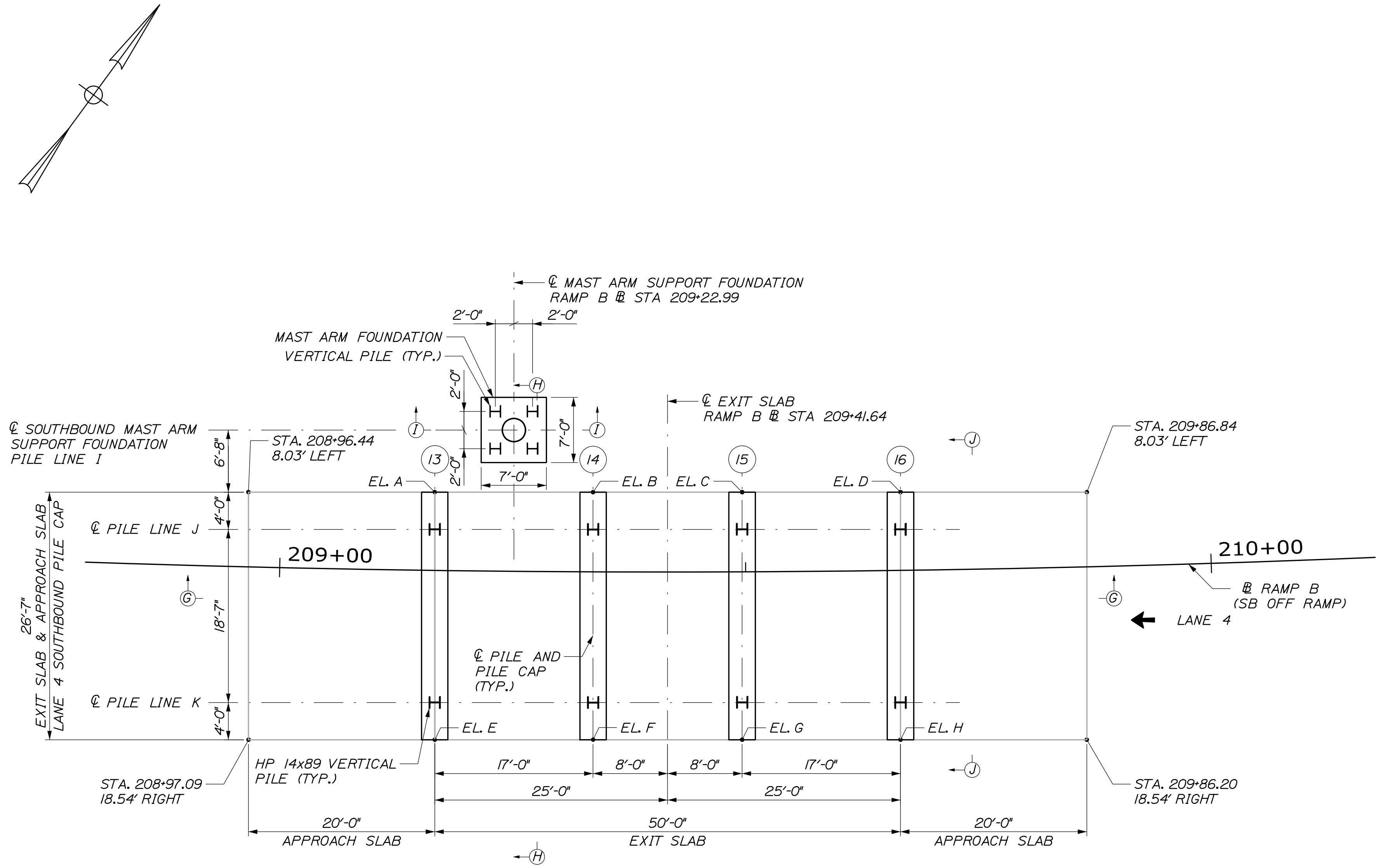
MAINE TURNPIKE
THE GOLD STAR MEMORIAL HIGHWAY
MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION
SOUTHBOUND ENTRY TOLL PLAZA
FOUNDATION LAYOUT PLAN
SHEET NUMBER: TP-02
CONTRACT: 2021.07

Date:12/4/2020

BOTTOM OF PILE CAP ELEVATIONS	
A	56.97
B	56.78
C	56.63
D	56.50
E	58.03
F	57.84
G	57.69
H	57.57



PLAN

1/8" = 1'-0"

PILE NOTES:

1. SEE SHEET TP-02 FOR NOTES ON H-PILE INSTALLATION, LOADING, TESTING, AND MATERIALS.

GENERAL NOTES:

1. FOR SECTIONS G-G, H-H, I-I, AND J-J SEE SHEET TP-20.

100% PS&E
DECEMBER 4, 2020

Filename: 251_SB Exit Foundation Plan.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE

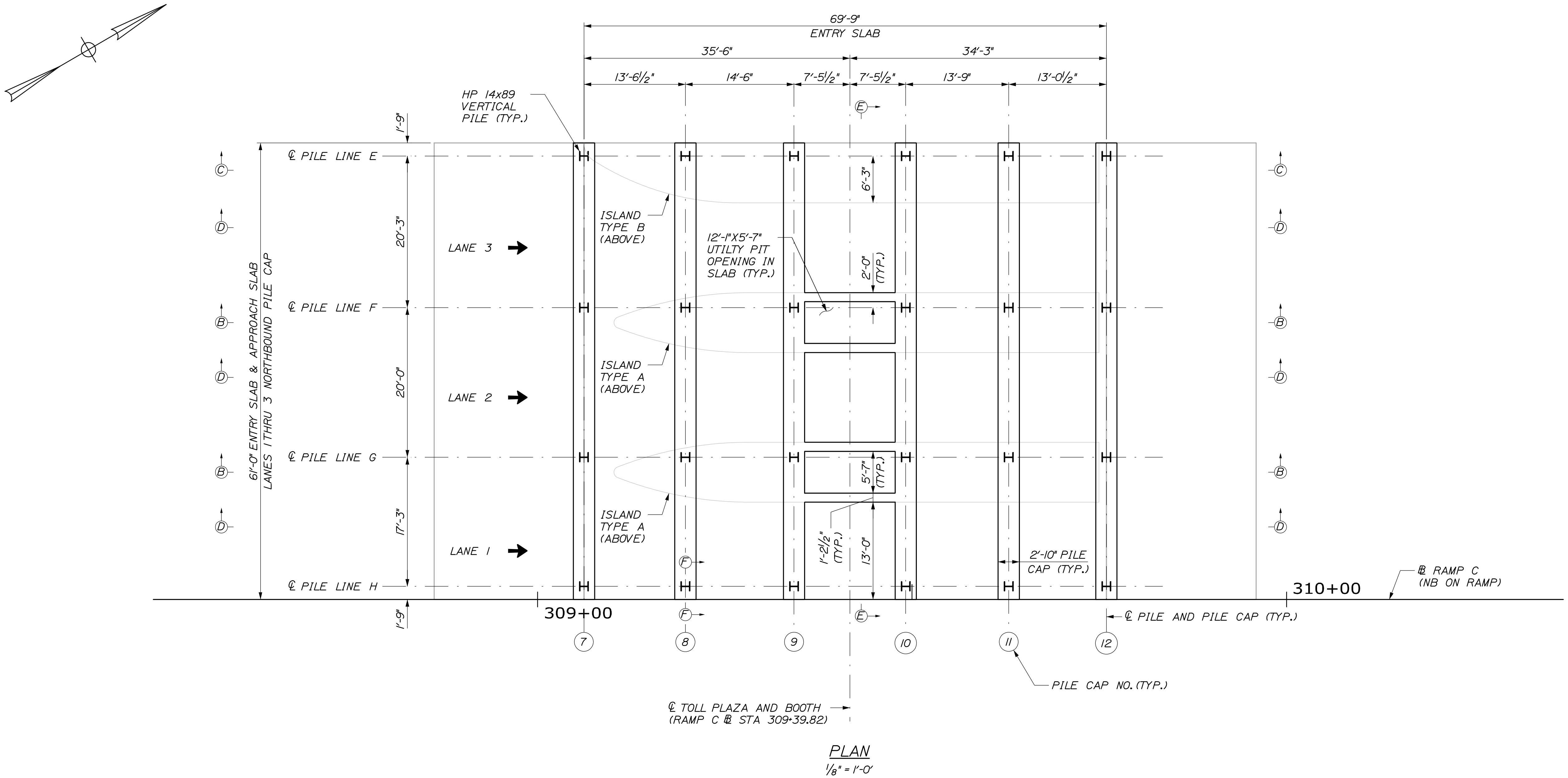
THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION
SOUTHBOUND EXIT TOLL POINT
FOUNDATION LAYOUT PLAN

SHEET NUMBER: TP-06

CONTRACT:2021.07



PLAN
1/8" = 1'-0"

Date:12/4/2020

PILE NOTES:

1. SEE SHEET TP-02 FOR NOTES ON H-PILE INSTALLATION, LOADING, TESTING, AND MATERIALS.

GENERAL NOTES:

1. FOR SECTIONS B-B, C-C, AND D-D SEE SHEET TP-18.
2. FOR SECTIONS E-E AND F-F SEE SHEET TP-19.

100% PS&E
DECEMBER 4, 2020

Filename: 255_NB Entry Foundation Plan.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE
THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

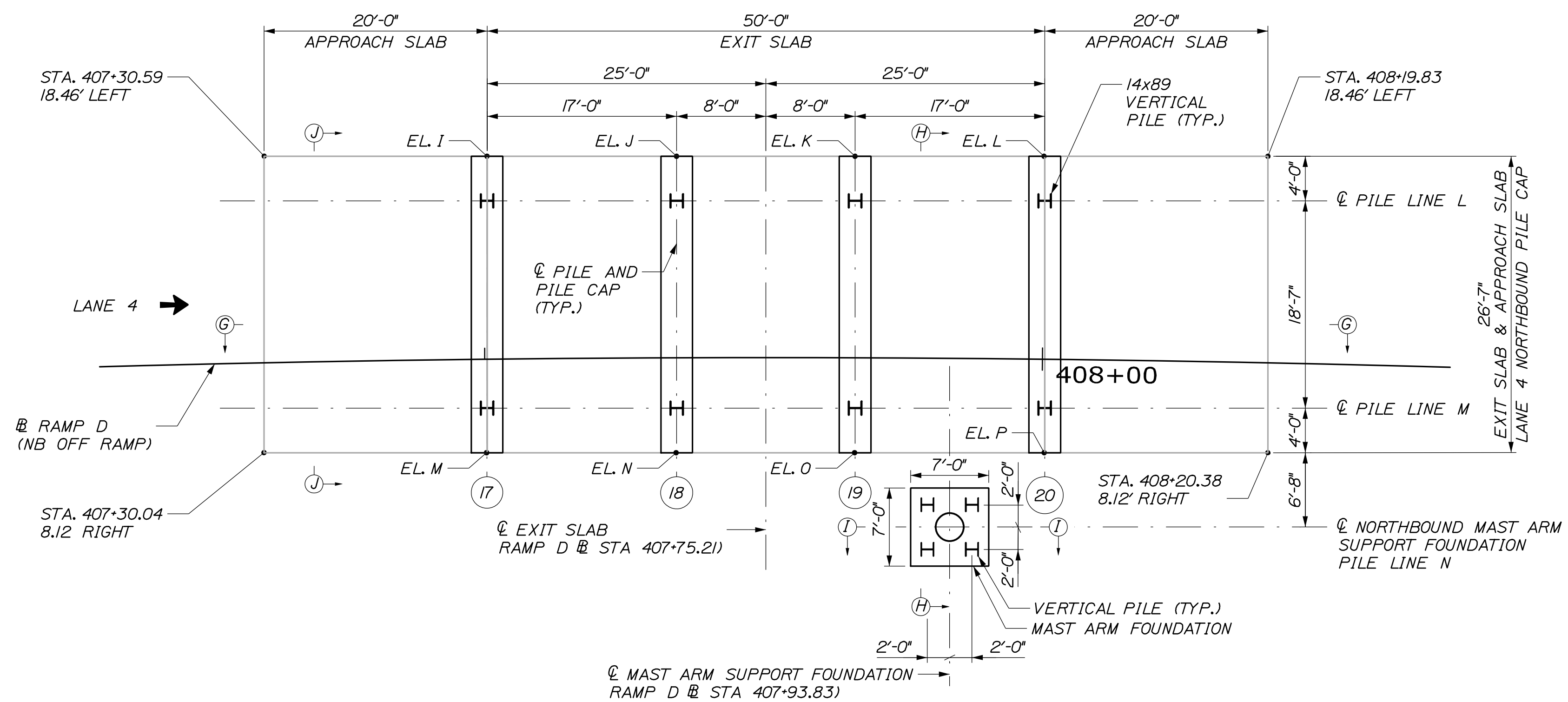
EXIT 45
INTERCHANGE RECONFIGURATION
NORTHBOUND ENTRY TOLL PLAZA
FOUNDATION LAYOUT PLAN

SHEET NUMBER: TP-10

CONTRACT:2021.07

Date:12/4/2020

BOTTOM OF PILE CAP ELEVATIONS	
I	62.21
J	62.41
K	62.63
L	62.89
M	61.20
N	61.40
O	61.62
P	61.88



PLAN
1/8" = 1'-0'

PILE NOTES:

1. SEE SHEET TP-02 FOR NOTES ON H-PILE INSTALLATION, LOADING, TESTING, AND MATERIALS.

GENERAL NOTES:

1. FOR SECTIONS G-G, H-H, I-I, AND J-J SEE SHEET TP-20.

100% PS&E
DECEMBER 4, 2020

Filename: 259_NB Exit Foundation Plan.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE
THE GOLD STAR MEMORIAL HIGHWAY

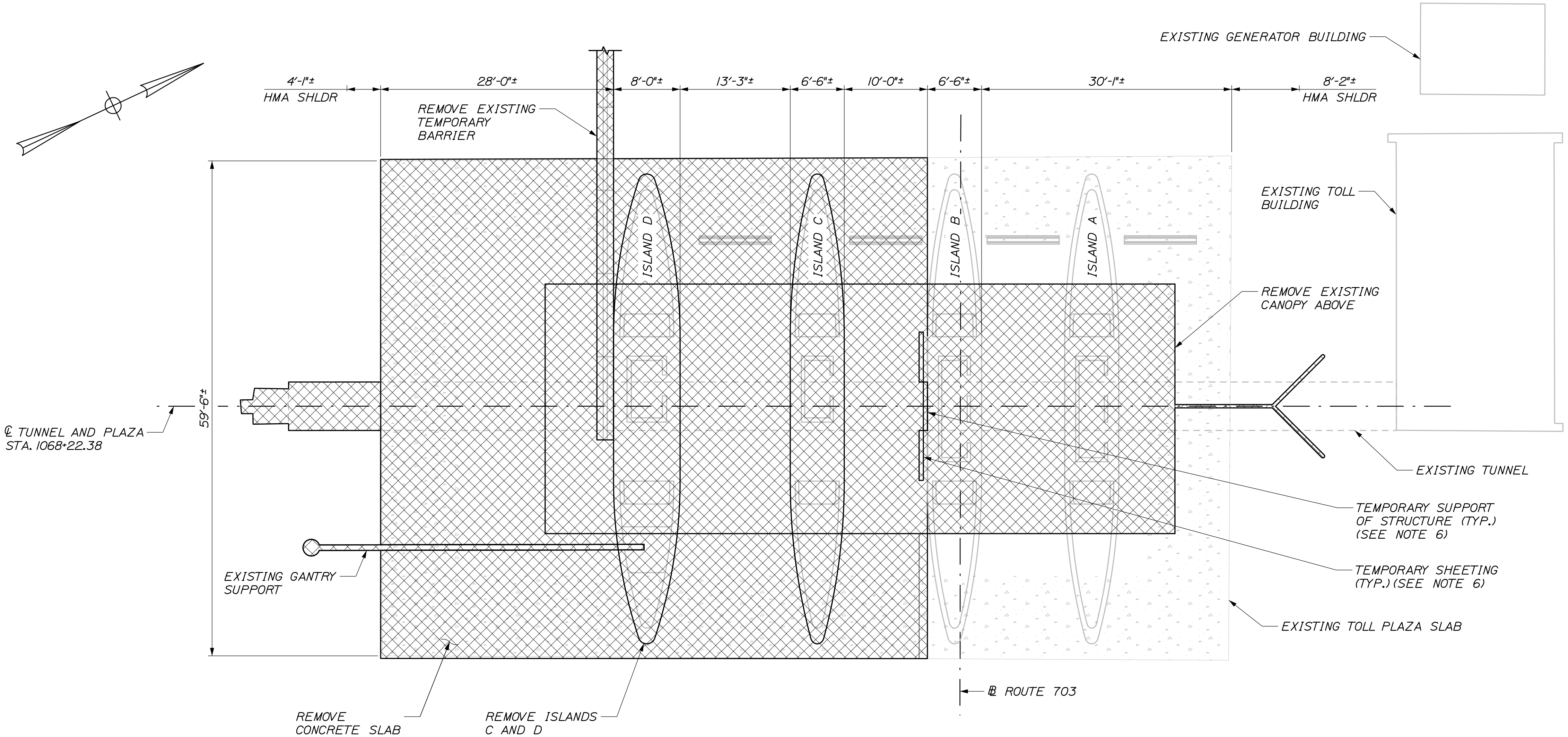
MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45 INTERCHANGE RECONFIGURATION

NORTHBOUND EXIT TOLL POINT FOUNDATION LAYOUT PLAN

SHEET NUMBER: TP-14

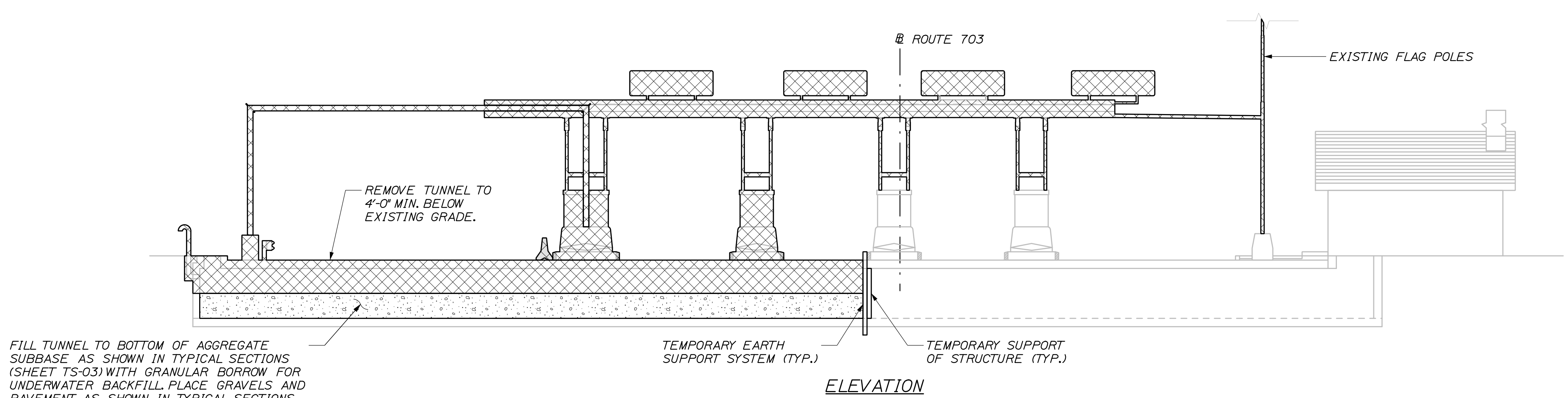
CONTRACT:2021.07



PLAN

(LOOKING WESTWARD)

1/8" = 1'-0"



ELEVATION

1/8" = 1'-0"

NOTES:

1. CONTRACTOR SHALL DEMOLISH THE FOLLOWING:
   - TOLL CANOPY;
   - TOLL GANTRY;
   - TOLL BOOTHS;
   - GRANITE CURB AROUND TOLL ISLAND;
   - TOLL ISLANDS;
   - STRUCTURAL SLAB;
   - CONCRETE TUNNEL;
   - ALL MECHANICAL AND ELECTRICAL SYSTEMS IN THE TUNNEL, TOLL BOOTHS AND GANTRY;
   - EXISTING FLAG POLE;
   - TOLL BUILDING

   DEMOLITION SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION SECTION 800.

2. DEMOLITION OF THE TOLL BOOTHS, CANOPY, GANTRY, AND FLAG POLL SHALL BE PAID UNDER PAY ITEM 800.30 TOLL PLAZA BOOTHS, CANOPY, AND GANTRY DEMOLITION. DEMOLITION OF THE TOLL SLAB, TUNNEL, AND ISLANDS SHALL BE PAID FOR UNDER PAY ITEM 202.121 REMOVING EXISTING CONCRETE. DEMOLITION OF THE TOLL BUILDING AND GENERATOR BUILDING SHALL BE PAID FOR UNDER PAY ITEM 202.081 REMOVING BUILDING.

3. SEE SPECIAL PROVISIONS AND GENERAL NOTES FOR ITEMS TO SALVAGE.

4. BEFORE BEGINNING PLAZA DEMOLITION THE CONTRACTOR SHALL SUBMIT A DEMOLITION PLAN TO THE RESIDENT FOR APPROVAL.

5. REMOVAL OF LOOPS, CONDUIT, AND ASSOCIATED WIRING IN EXISTING CONCRETE SHALL BE INCIDENTAL TO ITEM 202.17, REMOVING EXISTING STRUCTURAL CONCRETE.

6. CONTRACTOR SHALL BREAK OR CUT TUNNEL FLOOR TO PROVIDE A MINIMUM 1 SF OPENING FOR EVERY 10 FT TUNNEL LENGTH TO ALLOW FOR DRAINAGE THROUGH THE FLOOR SLAB TO REMAIN.

7. SEE MOT PLANS FOR ADDITIONAL INFORMATION.

8. TEMPORARY EARTH SUPPORT FOR TUNNEL DEMOLITION SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION 511 AND PAID UNDER ITEM 511.091 TEMPORARY STRUCTURAL SUPPORT.

9. TEMPORARY STRUCTURAL SUPPORT FOR TUNNEL DEMOLITION SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 524 AND PAID UNDER ITEM 524.30 TEMPORARY STRUCTURAL SUPPORT.

LEGEND:

LIMIT OF DEMOLITION

100% PS&E
DECEMBER 4, 2020

Date:12/4/2020

Filename: 279_Existing TollBooth Demolition Phase 1.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE

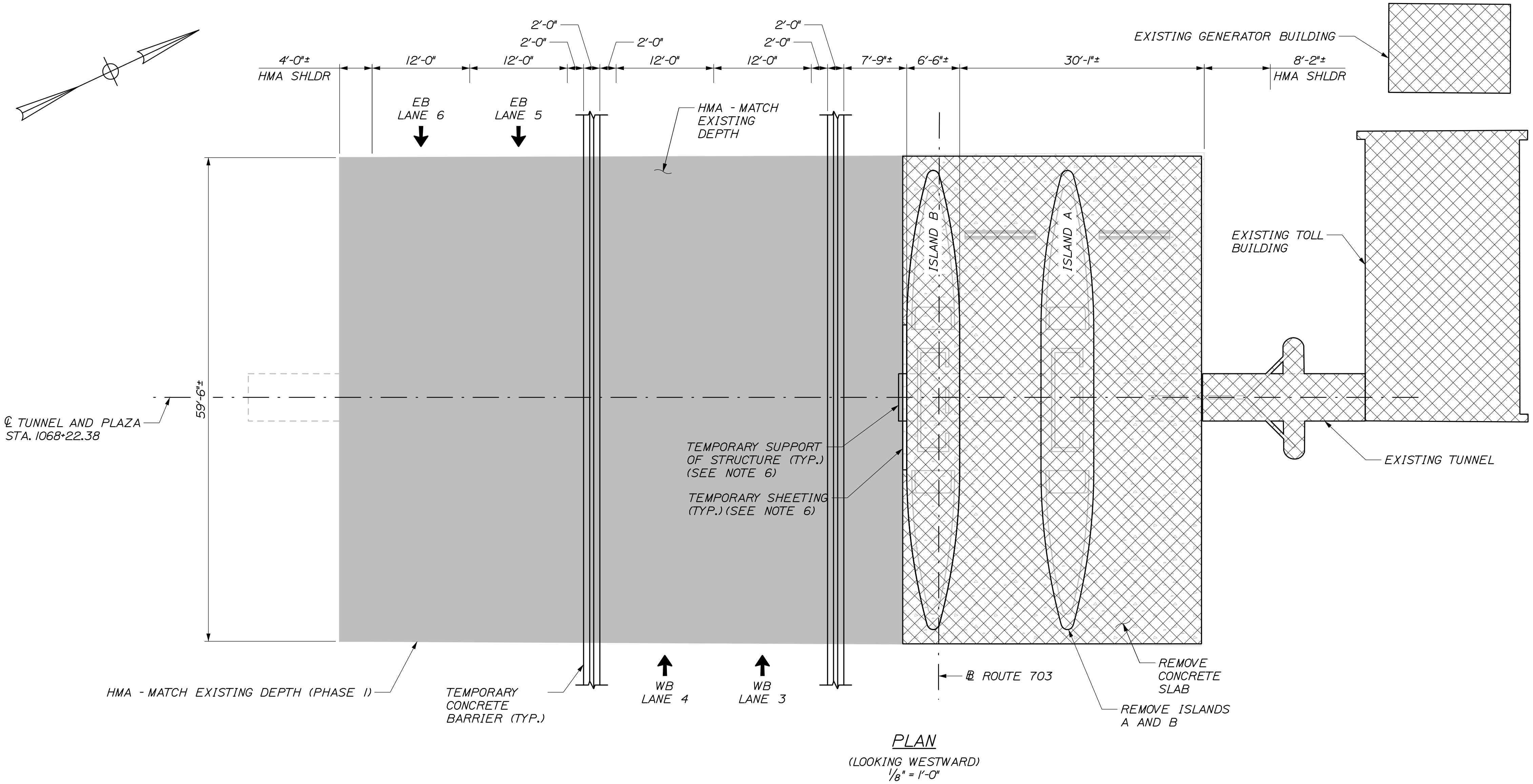
THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION
EXISTING TOLL PLAZA DEMOLITION
PHASE 1

SHEET NUMBER: TP-34

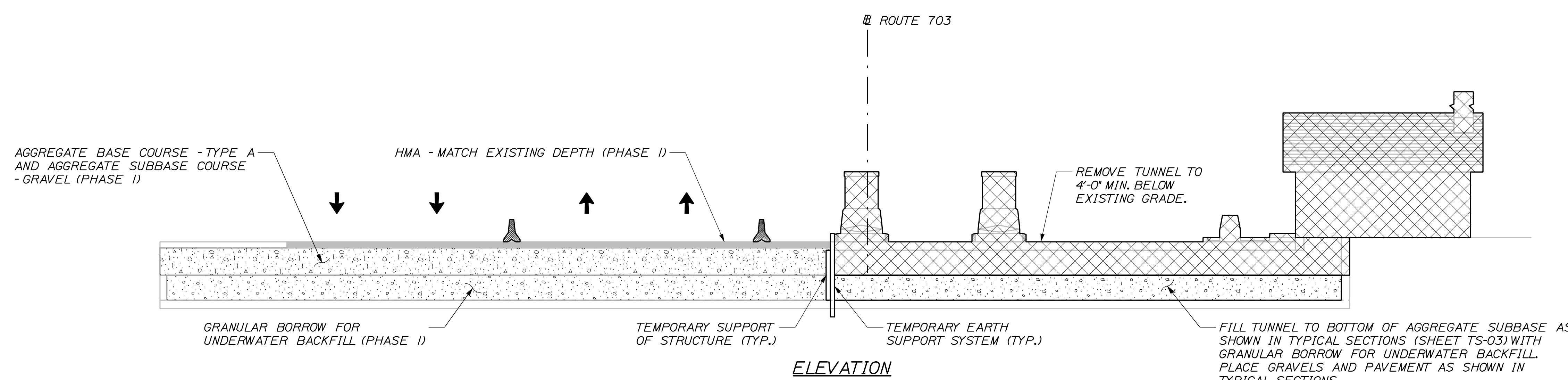
CONTRACT: 2021.07



PLAN

(LOOKING WESTWARD)

1/8" = 1'-0"



ELEVATION

1/8" = 1'-0"

NOTES:

1. CONTRACTOR SHALL DEMOLISH THE FOLLOWING:
   - TOLL CANOPY;
   - TOLL GANTRY;
   - TOLL BOOTHS;
   - GRANITE CURB AROUND TOLL ISLAND;
   - TOLL ISLANDS;
   - STRUCTURAL SLAB;
   - CONCRETE TUNNEL;
   - ALL MECHANICAL AND ELECTRICAL SYSTEMS IN THE TUNNEL, TOLL BOOTHS AND GANTRY;
   - EXISTING FLAG POLE;
   - TOLL BUILDING AND GENERATOR BUILDING

   DEMOLITION SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION SECTION 800.

2. DEMOLITION OF THE TOLL BOOTHS, CANOPY, GANTRY, AND FLAG POLL SHALL BE PAID UNDER PAY ITEM 800.30 TOLL PLAZA BOOTHS, CANOPY, AND GANTRY DEMOLITION. DEMOLITION OF THE TOLL SLAB, TUNNEL, AND ISLANDS SHALL BE PAID FOR UNDER PAY ITEM 202.121 REMOVING EXISTING CONCRETE. DEMOLITION OF THE TOLL BUILDING AND GENERATOR BUILDING SHALL BE PAID FOR UNDER PAY ITEM 202.081 REMOVING BUILDING.

3. SEE SPECIAL PROVISIONS AND GENERAL NOTES FOR ITEMS TO SALVAGE.

4. BEFORE BEGINNING PLAZA DEMOLITION THE CONTRACTOR SHALL SUBMIT A DEMOLITION PLAN TO THE RESIDENT FOR APPROVAL.

5. REMOVAL OF LOOPS, CONDUIT, AND ASSOCIATED WIRING IN EXISTING CONCRETE SHALL BE INCIDENTAL TO ITEM 202.17, REMOVING EXISTING STRUCTURAL CONCRETE.

6. CONTRACTOR SHALL BREAK OR CUT TUNNEL FLOOR TO PROVIDE A MINIMUM 1 SF OPENING FOR EVERY 10 FT TUNNEL LENGTH TO ALLOW FOR DRAINAGE THROUGH THE FLOOR SLAB TO REMAIN.

7. SEE MOT PLANS FOR ADDITIONAL INFORMATION.

8. TEMPORARY EARTH SUPPORT FOR TUNNEL DEMOLITION SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION 511 AND PAID UNDER ITEM 511.091 TEMPORARY STRUCTURAL SUPPORT.

9. TEMPORARY STRUCTURAL SUPPORT FOR TUNNEL DEMOLITION SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 524 AND PAID UNDER ITEM 524.30 TEMPORARY STRUCTURAL SUPPORT.

LEGEND:

LIMIT OF DEMOLITION

100% PS&E
DECEMBER 4, 2020

Date:12/4/2020

Filename: 280_Existing TollBooth Demolition Phase 2.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE

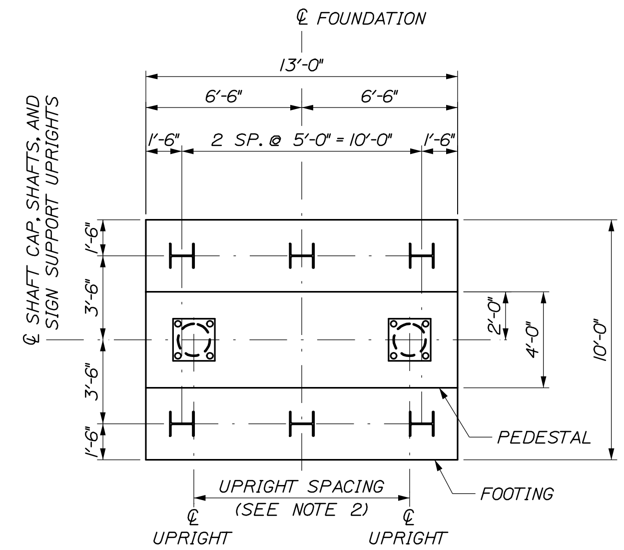
THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION
EXISTING TOLL PLAZA DEMOLITION
PHASE 2

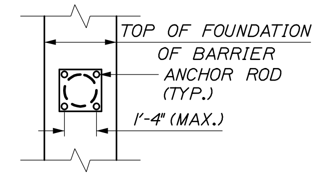
SHEET NUMBER: TP-35

CONTRACT:2021.07



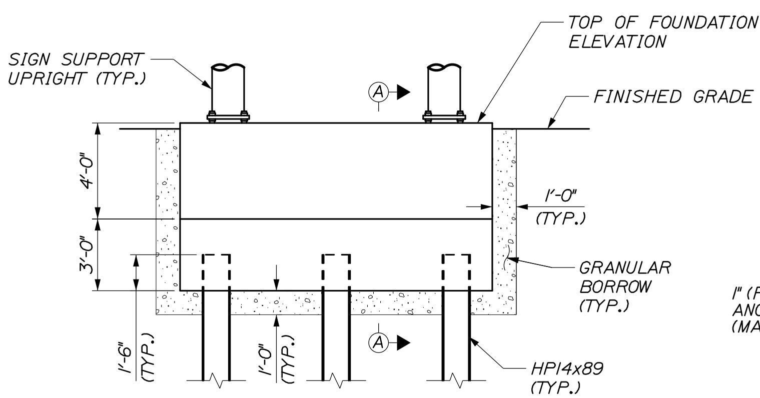
FOUNDATION - MASONRY PLAN

SCALE= 1/4"= 1'-0"



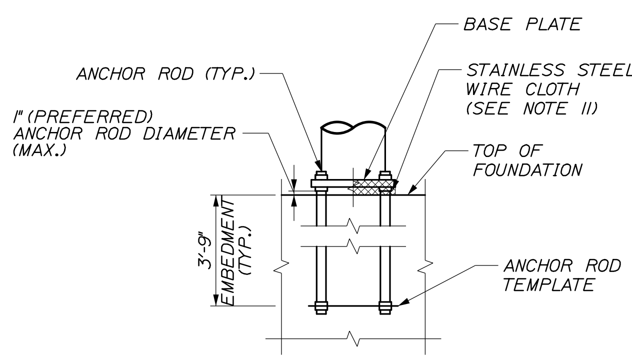
ASSUMED ANCHOR ROD PATTERN

NOT TO SCALE



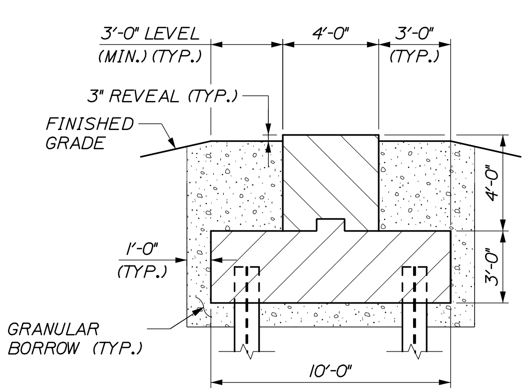
FOUNDATION - MASONRY ELEVATION

SCALE= 1/4"= 1'-0"



ANCHOR ROD DETAIL

NOT TO SCALE



SECTION A-A

SCALE= 1/4"= 1'-0"

ASSUMED OVERHEAD SIGN STRUCTURE DESIGN CRITERIA

1. THESE FOUNDATIONS HAVE BEEN DESIGNED USING THE ASSUMED MAXIMUM TOP OF FOUNDATION LOADS SHOWN IN THE TABLE BELOW. THE LOADS FROM THE OVERHEAD SIGN STRUCTURE SHALL NOT EXCEED THE LOADS SHOWN.

2. THESE FOUNDATIONS HAVE BEEN DESIGNED USING AN ASSUMED OVERHEAD SIGN STRUCTURE UPRIGHT SPACING BETWEEN 6'-0" TO 9'-0". THE OVERHEAD SIGN STRUCTURE SHALL HAVE AN UPRIGHT SPACING BETWEEN 6'-0" TO 9'-0" UNLESS OTHERWISE APPROVED BY THE ENGINEER.

3. THESE FOUNDATIONS HAVE BEEN DESIGNED ASSUMING A 4 ANCHOR ROD PATTERN WITH AN ASSUMED MAXIMUM ROD SPACING OF 1'-6" AND AN ASSUMED ANCHOR ROD EMBEDMENT OF 3'-9". AS SHOWN BELOW. THE ANCHOR ROD SPACING SHALL NOT EXCEED 1'-6", NOR SHALL THE ANCHOR ROD EMBEDMENT BE LESS THAN 3'-9" AND ANCHOR RODS SHALL BE INSTALLED AS SHOWN IN THE ANCHOR ROD DETAIL.

4. IF CONTRACTOR DESIGNS SIGN STRUCTURE THAT DOES NOT MEET THE REQUIREMENTS STATED IN NOTES 1 THROUGH 3, THE ENGINEER SHALL BE NOTIFIED AND FOUNDATION DESIGN SHALL BE REEVALUATED.

LOAD TYPE		MAXIMUM TOP OF FOUNDATION LOADS MM 1062+50 LEFT	RIGHT
AXIAL DEAD LOADS		100 K	100 K
HORIZONTAL FORCE	WIND NORMAL TO SIGNS	66 K	66 K
	WIND PARALLEL TO SIGNS	13 K	13 K
OVERTURNING MOMENT	WIND NORMAL TO SIGNS	1660 K-FT	1660 K-FT
	WIND PARALLEL TO SIGNS	580 K-FT	580 K-FT

100% PS&E
DECEMBER 4, 2020

FOUNDATION NOTES

1. ALL FOUNDATIONS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH MAINEDOT STANDARD SPECIFICATION 626 AND SHALL BE PAID UNDER 626.701 PAY ITEM.

2. OVERHEAD SIGN STRUCTURE COMPLETE AND IN PLACE ACCORDING TO THESE PLANS, SHALL BE PAID UNDER 645.123 ITEM.

3. ALL CONCRETE FOR THE FOOTING, PEDESTAL, AND BARRIER SHALL BE CLASS 'AA' OR 'AAA' CONCRETE (F'C = 4000PSI) AND SHALL CONFORM TO MTA SUPPLEMENTAL SPECIFICATION 502. ALL PORTIONS OF THE FOUNDATION ABOVE FINISH GRADE SHALL BE LIGHT COLORED AND HAVE A SMOOTH UNIFORM SURFACE FREE OF DEFECTS AND IRREGULARITIES. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1-INCH.

4. A CLEAR PROTECTIVE COATING FOR CONCRETE SURFACES, CONFORMING TO SPECIAL PROVISION 515, SHALL BE APPLIED ON ALL CONCRETE SURFACES ABOVE FINISHED GRADE TO 1 FOOT BELOW FINISHED GRADE. COATING SHALL BE INCIDENTAL TO ITEM 626.701.

5. ALL REINFORCING STEEL SHALL BE AASHTO M31 (ASTM A615) GRADE 60, EPOXY COATED AND SHALL CONFORM TO MAINEDOT STANDARD SPECIFICATION 503. REINFORCING STEEL SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL. REINFORCING STEEL SHALL BE INCIDENTAL TO ITEM 626.701.

6. ALL BACKFILL SHALL BE GRANNULAR BORROW MEETING THE REQUIREMENTS OF MAINEDOT STANDARD SPECIFICATION 203 AND SHALL BE INCIDENTAL TO ITEM 626.701.

7. STRUCTURAL EXCAVATION, BACKFILLING AND COMPACTION SHALL BE IN ACCORDANCE WITH MAINEDOT STANDARD SPECIFICATION 206 AND SHALL BE INCIDENTAL TO ITEM 626.701.

8. DESIGN OF COFFERDAMS OR SUPPORT OF EXCAVATION IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUBMITTED FOR APPROVAL. ALL COSTS SHALL BE INCIDENTAL TO ITEM 626.701.

9. PAYMENT FOR REMOVAL AND RESTORATION OF GRASS AND VEGETATION DISTURBED BY THE CONSTRUCTION OF THE FOUNDATIONS SHALL BE INCIDENTAL TO ITEM 626.701. RESTORATION OF GRASS AND VEGETATION SHALL BE AS DIRECTED BY THE RESIDENT.

10. THE GAP BETWEEN THE BASE PLATE AND TOP OF FOUNDATION SHALL BE WRAPPED IN AWG #16 STAINLESS STEEL WIRE CLOTH, WITH A 1/4" MAXIMUM OPENING AND A 2" LAP. SECURE WITH 3/4" STAINLESS STEEL BANDING AFTER ANCHOR RODS ARE INSTALLED. ALL COSTS SHALL BE INCIDENTAL TO ITEM 626.701.

PILE NOTES

1. PILES SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 501, FOUNDATION PILES AND PAID FOR UNDER RELATED 501 ITEMS.

2. THE MAXIMUM CALCULATED FACTORED AXIAL PILE LOADS ARE:
   OHSS: 148 KIPS

3. PILES SHALL BE DRIVEN TO THE FOLLOWING NOMINAL DRIVING RESISTANCES:
   OHSS: 228 KIPS

4. ESTIMATE OF PILES REQUIRED:
   OHSS: 12 ~ HP 14x89 @ 80 FEET (MIN. TIP ELEVATION -15 FT)

5. ALL PILES SHALL BE EQUIPPED WITH A PILE TIP IN ACCORDANCE WITH STANDARD SPECIFICATIONS SUBSECTION 501.048, PREFABRICATED PILE TIPS.

6. THE CONTRACTOR SHALL PERFORM AND SUBMIT A WAVE EQUATION ANALYSIS FOR REVIEW AND ACCEPTANCE BY THE RESIDENT. THE MAXIMUM ALLOWABLE DRIVING STRESS IS 0.90 TIMES FY. THE SUBMITTAL ANALYSES SHALL INCLUDE THE PROPOSED STOPPING CRITERIA BASED ON THE WAVE EQUATION ANALYSIS AND THE PROPOSED DRIVING SYSTEM. THE STOPPING CRITERIA SHALL INCLUDE THE BLOWS PER INCH AND THE NUMBER OF 1-IN. INTERVALS AT WHICH PILE INSTALLATION MAY BE TERMINATED. THE COST OF PERFORMING THE WAVE EQUATION ANALYSIS WILL BE CONSIDERED INCIDENTAL TO ITEM NO. 501.92, PILE DRIVING EQUIPMENT MOBILIZATION.

7. THE CONTRACTOR SHALL PERFORM 1 DYNAMIC LOAD TEST AT THE SOUTH FOUNDATION TO CONFIRM THE NOMINAL DRIVING RESISTANCE INDICATED IN NOTE 3 HAVE BEEN MET. THE DYNAMIC TESTS SHALL BE PERFORMED ON THE FIRST PRODUCTION PILE DRIVEN AT EACH SUBSTRUCTURE. MINIMUM 72 HOUR PILE RESTRIKES SHALL BE CONDUCTED ON ALL TEST PILES IN ORDER TO ENSURE THE REQUIRED NOMINAL RESISTANCE HAS BEEN ACHIEVED AND VERIFY PILE RELAXATION HAS NOT OCCURRED. THE CONTRACTOR MAY DRIVE PRODUCTION PILES TO THE PRELIMINARY DRIVING CRITERIA, HOWEVER PILE CUT-OFF WILL NOT BE PERMITTED UNTIL COMPLETION OF RESTRIKE TESTING AND ESTABLISHMENT OF FINAL DRIVING CRITERIA.

8. SEE SHEET TP-02 FOR NOTES ON H-PILE MATERIAL, SPLICING, AND MINIMUM TIP.

Date:12/4/2020

Filename: 284_Overhead Sign Structure Foundation Details 1.dgn

Scale: AS NOTED

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Raymond W. Hanf, P.E.

	By	Date		By	Date
Designed	GLS	05\20	Checked	BRG	05\20
Drawn	ERB	05\20	In Charge of	RAL	05\20

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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Ralph C. Norwood IV, P.E., P.T.O.E.

EXIT 45
INTERCHANGE RECONFIGURATION
OVERHEAD SIGN STRUCTURE II
STA. 1062+50

SHEET NUMBER: TP-37

CONTRACT: 2021.07