KENNEBUNK SERVICE PLAZAS NORTHBOUND AND SOUTHBOUND PARKING EXPANSION

Kennebunk, Maine

Final Geotechnical Design Report

May 14, 2019

PREPARED FOR

The Maine Turnpike
2360 Congress Street
Portland, ME 04102

PREPARED BY

HNTB Corporation
9 Entin Road, Suite 202
Parsippany, NJ 07054
Phone: (973) 434-3100

HNTB

GEOTECHNICAL DESIGN REPORT
KENNEBUNK SERVICE PLAZAS – NORTHBOUND AND SOUTHBOUND
PARKING EXPANSION
KENNEBUNK, MAINE
Contract ID: 2019.02
MM 25.5

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION AND SCOPE 3
1.1 Introduction 3
1.2 Scope of Services 3
1.3 Proposed Improvements Necessitating Geotechnical Assessment 3
1.4 Survey Control 4
2.0 GEOLOGY AND SITE CONDITIONS 4
2.1 Site Geology 4
3.0 SUBSURFACE INVESTIGATION 4
3.1 General 4
3.2 Geotechnical Subsurface Exploration 5
4.0 LABORATORY TEST RESULTS 6
4.1 Soil Testing 6
5.0 SUBSURFACE CONDITIONS 7
5.1 Generalized Subsurface Stratification 7
5.2 Groundwater 9
6.0 PRELIMINARY GEOTECHNICAL ANALYSIS AND DISCUSSION 10
6.1 Discussion of Geotechnical Concerns 10
6.2 Preliminary Design Soil Properties 11
6.3 Global Stability 12
6.4 Settlement 12
7.0 LIMITATIONS OF REPORT 15
8.0 REFERENCES 16

INDEX OF TABLES

Table 3-1: Summary of Subsurface Exploration....6
Table 4-1: Summary of Identification Test Results....7
Table 5-1: Groundwater Depths Encountered During Drilling....9
Table 5-2: Vane Shear Test Summary....10
Table 6-1: Engineering Properties of Soil for Preliminary Design....11
Table 6-2: Consolidation Properties for Preliminary Design....11
Table 6-3: Post-Construction Settlement at Crest of Expansion Pavement Grade....13
Table 6-4: Post-Construction Settlement at Crest of Expansion Beneath Organics....14
Table 6-5: Total Settlement at Crest of Existing Embankment....14
Table 6-6: Total Settlement at an Offset 25 Feet West of New Fill (Existing Parking Area)....14
Table 6-7: Total Settlement at Toe of Expansion....14

INDEX OF FIGURES

Figure 1 Project Site Location Map
Figure 2 Surficial Geology Map
Figure 3 Bedrock Geology Map
Figure 4 Limits of Lightweight Fill Compensation

ATTACHMENTS

Appendix A Geotechnical Data Report

1.0 PROJECT DESCRIPTION AND SCOPE

1.1 Introduction

The Kennebunk Service Plaza, located at Mile 25.5 of Interstate 95 (I-95) in Kennebunk, Maine, has insufficient truck parking capacity given the plaza serves as a vital staging point for deliveries to and from Southern Maine. A project location map is provided as **Figure** 1. The service plaza consists of a Northbound (NB) Plaza located adjacent to the mainline to the east and a Southbound (SB) Plaza located adjacent to the mainline to the west. For both the NB and SB Plazas, the expansion includes separating truck and passenger car parking and expands the capacity for both.

The project involves reconfiguring the parking lot and adding more truck spaces in order to improve capacity. To do so will require widening of the existing pavement. Work will also include lengthening the NB acceleration lane and the SB deceleration lanes as well as reconfiguration of the access road. Three proposed areas require an increase in grade which will be accomplished by the placement of fill material.

1.2 Scope of Services

In completing this evaluation, HNTB has performed the following scope of services:

- Reviewed available geotechnical data for the project site.
- Implemented a subsurface investigation including a geotechnical boring and laboratory testing program.
- Analyzed the resulting data collected to identify subsurface conditions that impact the design and construction of the project.
- Established geotechnical engineering design parameters based on the available borings.
- Conducted geotechnical analyses and provided recommendations for design of plaza expansions.

1.3 Proposed Improvements Necessitating Geotechnical Assessment

The NB Plaza improvements include the expansion of the existing southern parking area by placing up to 9 feet of new fill to expand the existing parking lot embankment. The northern parking area will be expanded, and the northbound acceleration lane will be lengthened and shifted north to accommodate the parking expansion and will require approximately 3 to 4 feet of new fill to be placed adjacent to existing wetlands.

The SB Plaza improvements include the expansion of the existing southern parking area at grade, as well as the expansion of the existing northern parking area by placing approximately 2 to 4 feet of new fill. The southbound exit ramp will be lengthened and shifted north to accommodate the northern parking expansion.

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 Kennebunk 7.5-minute quadrangle in the Seaboard Lowland physiographic province. The region has been subjected to recent glaciation within the last 25,000 years (late Wisonsinan glaciation) resulting in a physiographic surficial geology primarily composed of unconsolidated sediments such as sand and gravel of glacial and nonglacial origin. The bedrock geology is identified as the Kittery Formation which is composed of calcareous feldspathic sandstone.

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

MGS surficial geology mapping identifies soil overburden in the project area primarily as marine deltas, with marine regressive sand deposits located alongside the north and east of the site, as well as swamp wetland located along the northeast edge of the site. The marine deltas which cover the majority of the site are outwash consisting of sand and gravel that were deposited by glacial meltwater streams as ice retreated. These commonly occur as flat to gently sloping surfaces underlain by glacial-marine clay-silt 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 performed 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 and bedrock geology map are presented in **Figures 2** and **3**, respectively.

3.0 SUBSURFACE INVESTIGATION

3.1 General

A subsurface exploration was performed by Schonewald Engineering Associates, Inc. (SchonewaldEA) of Cumberland Maine, under the direction of HNTB. The boring location

plan depicting the location of the borings is presented in the data report provided by SchonewaldEA, included as **Appendix A**. The subsurface investigation 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. 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.

In-situ vane shear testing was completed in accordance with the requirements outlined in ASTM D 2573 and are outlined below. 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 GEC 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 GEC No. 5).

3.2 Geotechnical Subsurface Exploration

Nine borings were performed by New England Boring Contractors under supervision of HNTB's subconsultant SchonewaldEA. Borings were advanced between June 27 and July 12 in 2018. A summary of the borings performed with approximate depths of exploration are included in **Table 3-1**. In borings BB-KBUNK-106, BB-KBUNK-107, and BB-KBUNK-109, rods were pushed to refusal.

For the SB Plaza, two borings were performed near the new ramp from I-95 and one boring was performed near the northerly truck parking expansion area. For the NB Plaza, three borings were performed near the new ramp to I-95 and the northerly truck parking expansion area, and two borings were performed near the southerly truck parking expansion area.

Table 3-1: Summary of Subsurface Exploration

Boring No.	Surveyed Ground Elevation (feet)	Depth of Boring (feet)	Bottom of Exploration Elevation (feet)
BB-KBUNK-102	104.0(1)	22.0	82.0
BB-KBUNK-103	102.6	27.0	75.6
BB-KBUNK-104	96.6	22.0	74.6
BB-KBUNK-105	94.5	27.0	67.5
BB-KBUNK-106	96.2	74.0(2)	22.2
BB-KBUNK-107	86.5(1)	53.3(2)	33.2
BB-KBUNK-108	85.2	27.0	58.2
BB-KBUNK-109	86.6	55.2(3)	31.4
BB-KBUNK-110	89.8	27.0	62.8

(1) Estimated based upon available topographic information.
(2) Rods pushed as hydraulic probe to reach bottom depth. Sampling was discontinued at a depth of 42 feet.
(3) Rods pushed as hydraulic probe to reach bottom depth. Sampling was discontinued at a depth of 27 feet.

4.0 Laboratory Test Results

4.1 Soil Testing

R.W. Gillespie & Associates, Inc. of Biddeford, Maine conducted a series of laboratory tests on selected soil samples to verify classifications as well as to obtain indexes and grain size distributions to correlate with select design parameters. The testing program consisted of the following:

- 4 Sieve analysis tests (ASTM D422)
- 4 Sieve and hydrometer analysis tests (ASTM D422)
- 7 Atterberg Limits tests (ASTM D4318)

Test results are summarized below in **Table 4-1** and are also presented in the data report provided by SchonewaldEA, included as **Appendix A**.

Table 4-1: Summary of Identification Test Results

Boring No.	Sample No.	Depth (feet)	Water Content (%)	Atterberg Limits			Particle Distribution (%)		
				LL	PL	PI	Gravel	Sand	Fines
BB-KBUNK-104	2D	5-7	19.8	-	-	-	2.7	91.5	5.8
BB-KBUNK-104	3D	10-12	27.7	NV	NP	NP	0.0	30.1	69.9
BB-KBUNK-104	5D	20-22	35.9	26.1	15.6	10.5	-	-	-
BB-KBUNK-106	1D	2-4	8.8	-	-	-	23.1	55.3	21.3
BB-KBUNK-106	4D	10-12	22.0	-	-	-	0.0	98.2	1.8
BB-KBUNK-106	6D	20-22	32.1	24.6	16.7	7.9	0.0	15.8	84.2
BB-KBUNK-106	8D	30-32	28.5	NV	NP	NP	0.0	17.7	82.3
BB-KBUNK-106	10D	40-42	41.1	36.7	23.4	13.3	-	-	-
BB-KBUNK-109	2D	5-7	22.2	-	-	-	0.1	97.3	2.6
BB-KBUNK-109	4D	15-17	40.7	27.8	17.7	10.1	0.0	3.2	96.8
BB-KBUNK-109	6D	25-27	46.3	37.5	21.3	16.2	-	-	-

Note: NP- Non-plastic; NV- No value

5.0 SUBSURFACE CONDITIONS

5.1 Generalized Subsurface Stratification

Based on the data collected, the subsurface conditions at the site generally consist of the following strata as encountered from the ground surface:

- Granular Fill
- Organic Silt (original ground)
- Interbedded Sand and Silt
- Marine Silty Clay Crust
- Marine Silty Clay
- Glacial Till

Stratum 1: Granular Fill

The Granular Fill was encountered in all borings except for HB-KBUNK-108 and HB-KBUNK-110 which are located towards the north and south ends of the proposed NB ramp. The Granular Fill generally consists of Medium to Fine SAND with little to trace Silt

and was encountered in a very loose to medium dense condition with SPT N_{60} values ranging from 1 to 16 blows per foot.

Stratum 2: Organic Silt (original ground)

The Organic Silt is comprised of varying amounts of organic silt, medium to fine sand, peat and roots, typical of natural topsoil. This Organic Silt was encountered in a very loose or soft condition. The Organic Silt was encountered beneath the Granular Fill in borings HB-KBUNK-106 and HB-KBUNK-107 with thicknesses of approximately 0.7 and 2.0 feet, respectively. The borings where this was encountered are in the NB southern parking area.

Stratum 3: Interbedded Sand and Silt

The Interbedded Sand and Silt was encountered in borings HB-KBUNK-102, HB-KBUNK-104 and HB-KBUNK-106 underlying the Granular Fill or Organic Silt. In HB-KBUNK-102 and HB-KBUNK-104, located towards both the south and north ends of the proposed SB ramp, this stratum was approximately 5.0 and 9.5 feet thick, respectively. In HB-KBUNK-106, located in the NB southern parking area, this stratum was approximately 28 feet thick. The stratum is layered, with layers either composed of SILT with some to little fine Sand or Fine SAND with some to little Silt. The Interbedded Sand and Silt was encountered in a very soft or very loose to medium dense condition with SPT N_{60} values ranging from 0 to 16.

Stratum 4: Marine Silty Clay Crust

The Marine Silty Clay Crust varies in thickness from 1.0 to 5.0 feet and has a relatively stiff consistency with SPT N_{60} values ranging from weight of hammer to 8 blows per foot. This stratum was encountered in borings HB-KBUNK-103, HB-KBUNK-104, HB-KBUNK-107, HB-KBUNK-108, and HB-KBUNK-109 indicating its presence in all three areas where fill will be placed. The Marine Silty Clay Crust was not encountered in borings where the Interbedded Sand and Silt was encountered, underlying either the Granular Fill or Organic Silt and underlain by the Marine Silty Clay.

Stratum 5: Marine Silty Clay

The Marine Silty Clay was typically encountered underlying the Interbedded Sand and Silt or the Marine Silty Clay Crust, with exceptions being in borings HB-KBUNK-105 and HB-KBUNK-110 where the Marine Silty Clay was encountered directly beneath the Granular Fill. The Marine Silty Clay was encountered in all borings with a soft consistency. Vane shear testing performed indicates peak undrained shear strengths ranging from 302 to 563 psf. The Marine Silty Clay is composed of over 90 percent fines and is typically a low plasticity clay with Atterberg testing indicating liquid limits ranging from 26.1 to 37.5 and plastic limits ranging from 15.6 to 23.4. The natural water content of the Marine Silty Clay is typically above the liquid limit with natural water contents ranging from 35.9% to 46.3%, which is generally an indication of being both soft and high compressible.

Stratum 6: Glacial Till

Glacial Till was not sampled during the subsurface investigation but was sampled in past explorations by Haley and Aldrich beneath the marine silty clay from borings performed at both the northbound and southbound service facilities. Haley and Aldrich encountered thicknesses of the deposit ranging from 2.0 to 7.4 feet. The Glacial Till sampled varied significantly in composition, with major constituents of the three samples taken being Gravel & Silt, Sand & Gravel, and Silt & Sand, with minor components of gravel, sand, and silt where these were not a major component. The Glacial Till was encountered in a very loose to very dense condition.

The firm material encountered beneath the marine silty clay by probing in the borings performed under supervision of SchonewaldEA is likely Glacial Till. The probing encountered the firm material at depths ranging from approximately 53.0 and 74.0 feet.

5.2 Groundwater

Groundwater was typically encountered at shallow depths ranging from 1.7 to 6.3 feet. Depths and approximate elevations at which groundwater was encountered in borings are given in **Table 5-1.**

Table 5-1: Groundwater Depths Encountered During Drilling

Boring No.	Depth of Groundwater (feet)	Approximate Groundwater Elevation (feet)
BB-KBUNK-103	6.1	96.5
BB-KBUNK-104	4.1	92.5
BB-KBUNK-105	5.8	88.7
BB-KBUNK-106	6.3	89.9
BB-KBUNK-108	3.4	81.8
BB-KBUNK-109	1.7	84.9
BB-KBUNK-110	3.6	86.2

Vane shears were performed within the soft marine silty clay which were used to take in-situ measurements of the peak undrained shear strength, s_u, and the remolded undrained shear strength, s_r. A summary of vane shear results is provided in **Table 5-2.**

Table 5-2: Vane Shear Test Summary

Boring No.	Test No.	Test Depth (feet)	Test Elevation (feet)(1)	Peak Undrained Shear Strength, s_u (psf)	Remolded Undrained Shear Strength, s_r (psf)
BB-KBUNK-104	V1	20.8	75.7	440	27
BB-KBUNK-105	V1	20.8	75.2	343	14
BB-KBUNK-105	V2	21.8	74.2	385	0
BB-KBUNK-105	V3	25.8	70.2	563	82
BB-KBUNK-105	V4	26.8	69.2	494	0
BB-KBUNK-107	V1	20.8	65.7	371	27
BB-KBUNK-107	V2	21.8	64.7	316	14
BB-KBUNK-107	V3	25.8	60.7	302	14
BB-KBUNK-107	V4	26.8	59.7	288	14
BB-KBUNK-107	V5	30.8	55.7	426	14
BB-KBUNK-107	V6	31.8	54.7	412	14
BB-KBUNK-107	V7	35.8	50.7	481	27
BB-KBUNK-107	V8	36.8	49.7	385	27
BB-KBUNK-107	V9	40.8	45.7	481	27
BB-KBUNK-107	V10	41.8	44.7	453	14
BB-KBUNK-109	V1	20.8	66.2	302	14
BB-KBUNK-109	V2	21.8	65.2	302	14
BB-KBUNK-109	V3	25.8	61.2	440	27
BB-KBUNK-109	V4	26.8	60.2	522	27
BB-KBUNK-110	V1	15.8	(2)	371	41
BB-KBUNK-110	V2	16.8	(2)	398	41
BB-KBUNK-110	V3	25.8	(2)	481	0
BB-KBUNK-110	V3	26.8	(2)	398	14

(1) Estimated based upon available topographic information.
(2) Unable to estimate due to lack of topographic information.

6.0 GEOTECHNICAL ANALYSIS AND DISCUSSION

6.1 Discussion of Geotechnical Challenges

The borings performed throughout the site indicate the presence of a thick marine silty clay strata which is both compressible and of relatively low shear strength. Therefor, settlement is anticipated and has been evaluated due to the additional load from the proposed fill placement. Settlement is of concern due to the potential impact it may have on the maintenance of proposed pavements. In addition to settlement, global stability of the proposed embankment has been evaluated for factors of safety against both shallow and deep seated slope shear failure due the expansion of the existing embankment.

6.2 Design Soil Properties

Soil properties for design were determined using correlations to in-situ testing including standard penetration tests and vane shear tests, as well as correlations to laboratory index tests. Parameters used as design soil properties are summarized for all soil strata in **Table 6-1**.

Table 6-1: Engineering Properties of Soil for Design

Soil Properties		Strata				
		Granular Fill	Organic Silt	Interbedded Sand & Silt	Marine Silty Clay Crust	Marine Silty Clay
Moist unit weight	γ_m (pcf)	103	109	109	115	-
Saturated unit weight	γ_{sat} (pcf)	115	109	109	115	112
Effective Angle of Internal Friction	ϕ', (deg)	29	15	29	22	22
Undrained Shear Strength	Su, (psf)	-	250	-	1500	390-420
Elastic Modulus	E (ksf)	200	-	300	-	-

Consolidation properties for settlement analysis were established from previous testing and standard correlations. Historical consolidation test data for the Marine Silty Clay, in concert with correlations to testing performed from previous projects in the vicinity were necessary to select properties for design and are presented in **Table 6-2**.

Table 6-2: Consolidation Properties for Design

Soil Properties		Organic Silt	Marine Silty Clay Crust	Marine Silty Clay
Compression Index	C_C	1.5	0.2	0.31
Recompression Index	C_r	0.015	0.015	0.015
Initial Void Ratio	e_O	2.4	0.8	1.4
Overconsolidation Ratio[(1)]	OCR	-	-	1.1-2.8 or 1.2-1.8[(2)]

Soil Properties		Organic Silt	Marine Silty Clay Crust	Marine Silty Clay
Preconsolidation Pressure[(1)]	P_C (psf)	1100 to 1700	1400 to 2100	-
Coefficient of Consolidation	C_V (ft^2/day)	0.1	0.3	0.3
Secondary Compression Index	C_α	0.018	0.018	0.012

[(1)]A range of values are be provided and solutions bounded where multiple correlations were utilized for assessments.
[(2)]OCR varies from its highest value at the top of the layer to its lowest value at the bottom of the layer.

6.3 Global Stability

A global stability assessment of the proposed NB Plaza southern parking area was performed assuming both short-term undrained, and long-term drained soil conditions. Subsurface conditions for global stability analysis were selected based on review and interpretation of the available borings and laboratory testing. The analysis includes a surcharge load of 250 psf applied to the parking area to simulate the vehicular live load.

A global stability resistance factor of 0.75 is required when embankments do not support or contain structural elements. This resistance factor translates to a minimum required factor of safety of approximately 1.3. Results of the analysis indicate that the factor of safety of the NB Plaza southern parking area in the proposed condition when assessed in the short-term undrained condition is approximately 1.4. In the long-term drained condition, the factor of safety is approximately 1.7 which is considered acceptable for this embankment.

6.4 Settlement

Embankment Settlement

Given the presence of soft marine silty clay in the subgrade, settlement is anticipated under the weight of the proposed embankment fill. As such, a settlement assessment has been performed for the NB Plaza southern parking area which is to receive the largest potential fill height of approximately 12 feet.

A settlement analysis was performed using SETTLE3D by Rocscience to assess the magnitude of settlement under placement of normal weight fill. The deformation values reported herein include the immediate settlement that will occur during construction, as well as consolidation settlement after the embankment is placed.

Tables 6-3 through **6-7** are representative of conditions for the NB Plaza parking area expansion. **Table 6-3** addresses the settlement to be experienced by the new embankment

and pavement. Because of the compressible clay soils, the settlement analysis was projected over a 20-year span, as settlement is expected to occur incrementally over the design life of the structure with settlements decreasing with time. Allowing time to pass prior to paving or installing foundations will allow a portion of the predicted settlement to occur first, thereby reducing the settlements experienced by the pavement and foundations. Given the settlement magnitudes, a 5 to 10-year paving cycle is anticipated for the first round of repaving. After the first 10 years it is anticipated the paving cycle can be extended as approximately 1 inch of settlement is anticipated between 10 and 20 years.

The table below summarizes the ranges of anticipated settlement at the crest of the embankment expansion, with the crest being defined as the top edge of the embankment expansion before the side slope at the highest depth of fill. It is recommended that the contractor allows as much time to pass following the placement of the fill as the construction schedule practically allows, preferably placing the fill prior to the winter season during which regional construction typically slows or stops for a period.

Table 6-3: Post-Construction Settlement of the Pavement Surface at the Crest Point

Time from fill placement to paving	Construct Immediately			3-month wait			6-month wait		
Time	5 years	10 years	20 years	5 years	10 years	20 years	5 years	10 years	20 years
Post-Construction Settlement (inches)	2.1-4.8	2.7-6.3	3.7-7.4	1.1-1.9	1.8-3.5	2.8-4.5	1.0-1.6	1.6-3.2	2.6-4.2

In the NB Plaza southern parking area it is recommended that light post foundations be designed to extend beneath the organic silt soils to mitigate settlement. This will require light post foundation pier lengths on the order of 15 feet (the typical design is a 2-foot diameter extending 7 feet). The Authority's Geotechnical Representative should verify the bottom of the light pole foundations penetrates the organic silt layer during construction. It is recommended the contractor allows as much time to pass between placing the new fill and constructing the light pole foundations, preferably with the light pole foundation construction occurring at the end of the project construction. **Table 6-4** provides settlements that would be experienced by a lighting foundation pier assuming it penetrates beneath the organic silt.

Table 6-4: Post-Construction Settlement of the Organics at the Crest Point

Time from fill placement to paving	Construct Immediately			3-month wait			6-month wait		
Time	5 years	10 years	20 years	5 years	10 years	20 years	5 years	10 years	20 years
Post-Construction Settlement (inches)	1.7-2.5	2.3-3.9	3.2-4.9	1.1-1.7	1.7-3.2	2.6-4.2	1.0-1.5	1.5-3.0	2.4-4.0

Table 6-5 provides estimates of total settlement of the existing embankment at the joint of the existing pavement and the new expansion to illustrate the influence on the parking lot pavement in the immediate vicinity of the expansion.

Table 6-5: Total Settlement of Existing Embankment at Joint of Expansion

Time	5 years	10 years	20 years
Total Settlement (inches)	0.7-0.8	0.8-0.9	0.8-0.9

Table 6-6 provides estimates of total settlement at an offset of 25 feet west of the joint into the existing lot to illustrate settlements at a moderate distance from the new fill embankment.

Table 6-6: Total Settlement at an Offset 25 Feet West of New Fill (Existing Parking Area)

Time	5 years	10 years	20 years
Total Settlement (inches)	0.3	0.3	0.3

Table 6-7 provides estimates of total settlement at the toe of the proposed embankment expansion. These settlement estimates are provided for consideration of impacts to pavement, nearby utilities, and proposed drainage in the vicinity of the expansion.

Table 6-7: Total Settlement at the Toe of Proposed Expansion

Time	5 years	10 years	20 years
Total Settlement (inches)	0.2 - 0.3	0.6 – 0.9	1.5 – 1.8

It is anticipated that the above settlement ranges are acceptable for the proposed embankment, however it should be noted that the pavements will require more frequent maintenance and resurfacing than typical, primarily during the earlier stages of the embankment's design life. Several mitigative options were explored including wick drain and surcharge, as well as lightweight fill compensation options consisting of EPS Geofoam, expanded shale aggregate, or foamed glass aggregate fill material. It is understood that minimizing initial construction costs is a priority for this project. Therefore, while all the mitigative options would effectively reduce the amount of anticipated settlement, they were not found to be preferable due to their significantly higher construction costs or potential

delays to the project schedule.

Existing Utility Settlement

At the NB Plaza southern parking area, two existing branches of a gravity sewer owned by the Kennebunk Sewer District traverse the proposed fill area and join at a manhole outside the toe of the proposed embankment expansion. The gravity sewer is understood to be 8 inches in diameter and is known to consist of Asbestos Concrete Pipe (ACP) based on existing utility information. From cross sections along the pipe runs, it is understood that up to 6 feet of new fill will be placed over the existing utility. Settlement beneath the existing utility was analyzed along the length of both segments that traverse the fill area. Results of the analysis show settlement ranging up to approximately 2.5 inches over a 20-year period may occur beneath the crest of the proposed embankment expansion if normal weight fill is used.

To preserve the functionality of the sewer it is recommended that a lightweight fill compensation be used over the sewer lines to limit undesirable settlement and avoid damage to the utility. Both an EPS Geofoam and a foamed glass aggregate solution were evaluated as fill material over the sewer. Both materials are similar in unit cost, however the foamed glass aggregate is significantly easier to install and will allow for easier removal should the utility require future servicing. Therefore, the foamed glass aggregate is the preferred option.

To minimize the risk of potential settlement, the contractor should excavate 2 feet of the existing fill material for 25 feet to either side of the centerline of the pipes. Following the removal of the existing surficial fill, foamed glass aggregate should be used to construct the embankment over the sewer line. The approximate limits of excavation and lightweight fill placement are depicted in **Figure 4**.

7.0 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.

8.0 REFERENCES

1. AASHTO. "LRFD Bridge Design Specifications" 8th Edition, 2017

2. FHWA, "Evaluation of Soil and Rock Properties," Geotechnical Engineering Circular No. 5, FHWA-IF-02-034, 2002.

3. Smith, Geoffrey W., 1999, Surficial geology of the Kennebunk 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-117, 9 p..

4. Smith, Geoffrey W., 1999, Surficial geology of the Kennebunk quadrangle, Maine: Maine Geological Survey, Open-File Map 99-86, map, scale 1:24,000.

5. Haley and Aldrich, Inc. (2005). "Report on Proposed Kennebunk Service Area Facility Improvements, Maine Turnpike, Mile – 25.8 Kennebunk, Maine," prepared for HNTB Corporation, December 2005.

FIGURES

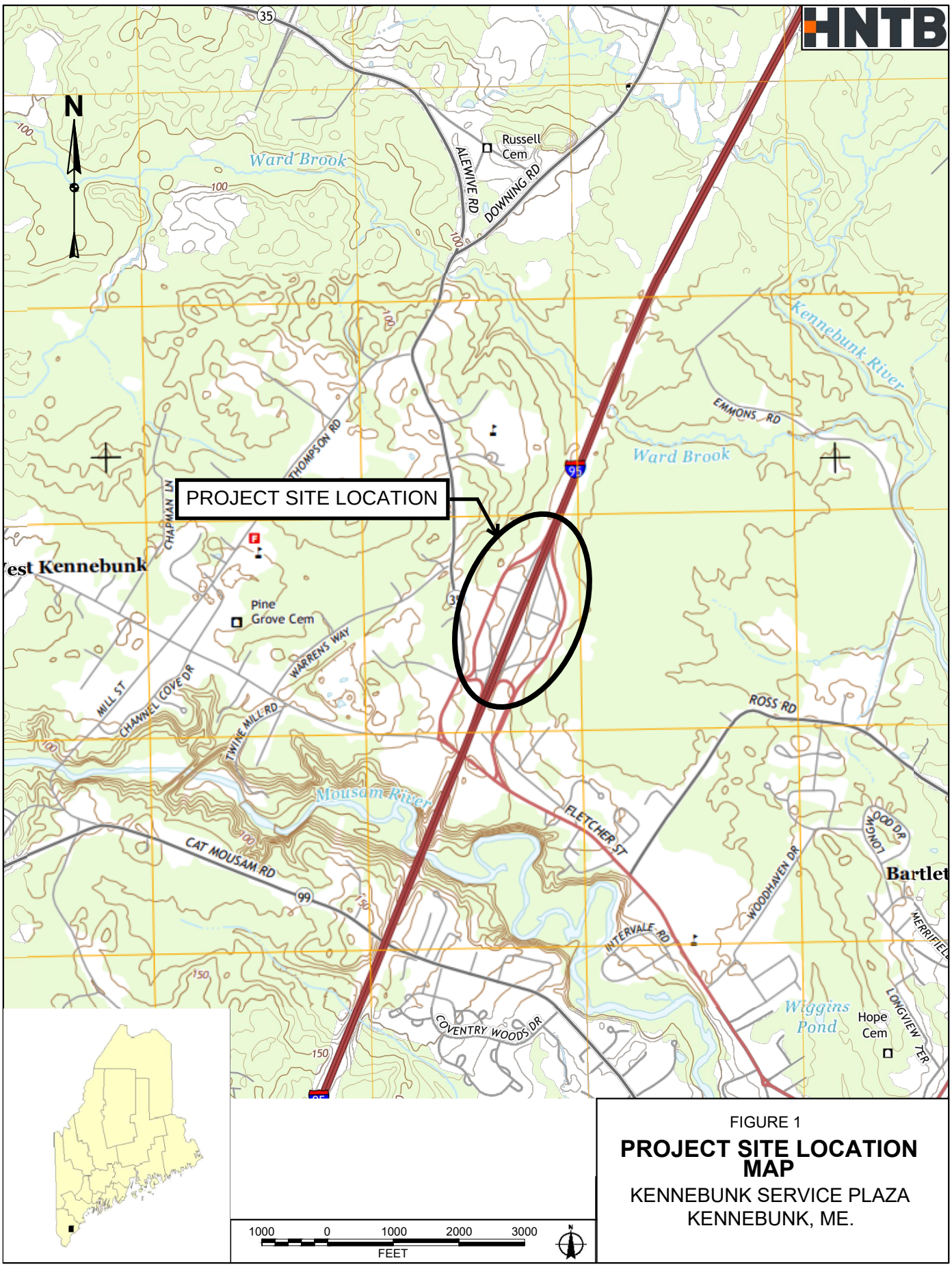


FIGURE 1

PROJECT SITE LOCATION MAP

KENNEBUNK SERVICE PLAZA
KENNEBUNK, ME.

Basemap: U.S.G.S. Kennebunk Quadrangle, US Topo, 2014

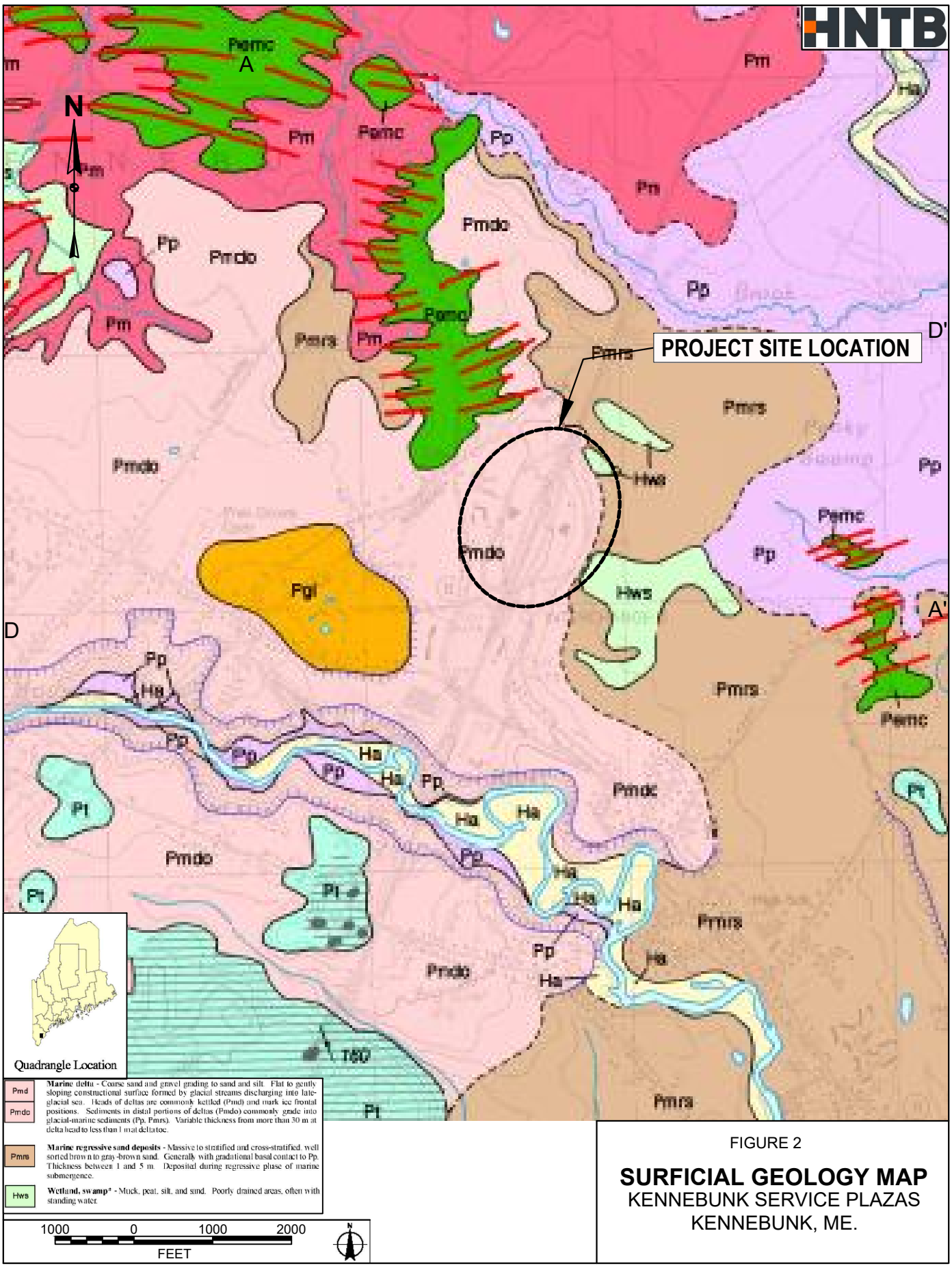
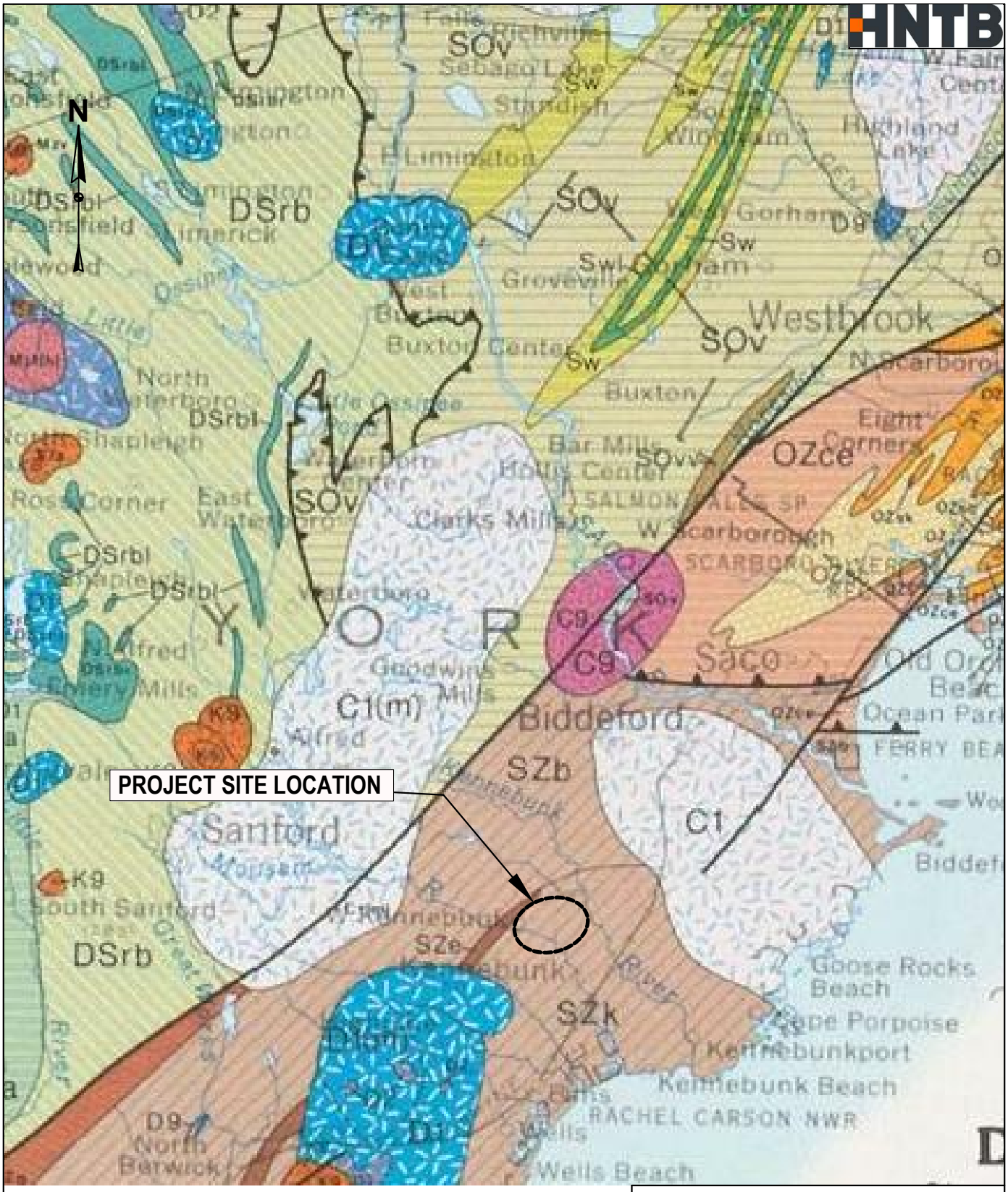


FIGURE 2

SURFICIAL GEOLOGY MAP
KENNEBUNK SERVICE PLAZAS
KENNEBUNK, ME.

Basemap: MGS Surficial Geology Map, Kennebunk Quadrangle, Maine, 1999



SZk – Kittery formation – Named as a formation in the Merrimack group, composed of calcareous feldspathic sandstone, a metasandstone referred to as Greenschist. It is of the Silurian – Precambrian Z geologic age.

2 0 2 4
MILES

FIGURE 3

BEDROCK GEOLOGY MAP

KENNEBUNK SERVICE PLAZAS
KENNEBUNK, ME.

Basemap: MGS Bedrock Geologic Map of Maine, 1985

APPROXIMATE LIMITS OF EXCAVATION
OF EXISTING FILL AND BACKFILL WITH
FOAMED GLASS AGGREGATE FILL

50 ft

50 ft

N

S 46°43'51.71" W

S 22°26'30.2

FIGURE 4

LIMITS OF LIGHTWEIGHT FILL COMPENSATION

KENNEBUNK SERVICE PLAZAS

KENNEBUNK, MAINE

SCALE: 1" = 50'

Appendix A: Geotechnical Data Report

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

FIELD AND LABORATORY DATA REPORT
GEOTECHNICAL PROGRAM
KENNEBUNK SERVICE PLAZA PARKING EXPANSION
MAINE TURNPIKE EXIT 25
KENNEBUNK, 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 2018

SchonewaldEA Project No. 18-018

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

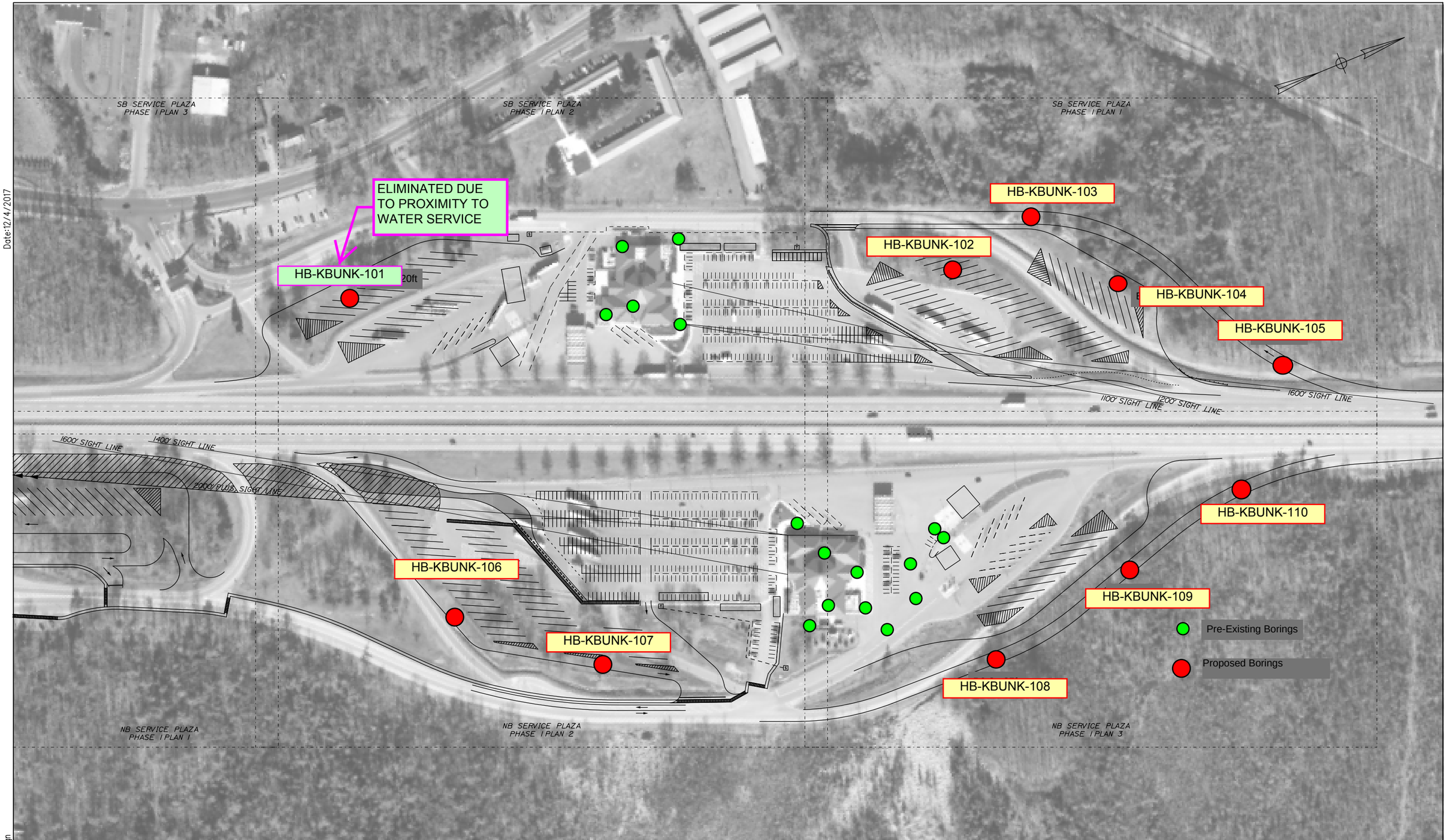
FIELD AND LABORATORY DATA REPORT
GEOTECHNICAL PROGRAM
KENNEBUNK SERVICE PLAZA PARKING EXPANSION
MAINE TURNPIKE EXIT 25
KENNEBUNK, MAINE

TABLE OF CONTENTS

DESCRIPTION	PAGES
SUBSURFACE EXPLORATION LOCATION SKETCHES	**2-3**
LOGS OF SUBSURFACE EXPLORATIONS	**5-23**
RESULTS OF SOILS LABORATORY TESTS ON SOIL SAMPLES	**25-37**

SUBSURFACE EXPLORATION LOCATION SKETCHES

Date:12/4/2017



Filename: 001_Phase 1 Key.dgn

Scale: PLAN
100 0 100 200
Scale of Feet

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Dale A. Mitchell, PE

	By	Date		By	Date
Designed	PEM	12/1	Checked	RWH	12/1
Drawn	SLS	12/1	In Charge of	RAL	12/1

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: ----------

KENNEBUNK SERVICE PLAZA PARKING EXPANSION

PHASE 1 KEY PLAN

SHEET NUMBER: ____

CONTRACT:XXXX.XXX

Date:6/20/2018

ELIMINATED DUE TO PROXIMITY TO WATER SERVICE

HB-KBUNK-101

HB-KBUNK-102
B6-2 - 20FT

HB-KBUNK-103
B6-3 - 25FT

HB-KBUNK-104
B6-4 - 20FT

HB-KBUNK-105
B6-5 - 25FT

HB-KBUNK-106
B6-6 - 40FT

HB-KBUNK-107
B6-7 - 40FT

HB-KBUNK-108
B6-8 - 25FT

HB-KBUNK-109
B6-9 - 25FT

HB-KBUNK-110
B6-10 - 25FT

PLAN SHOWING PROMINENT SITE FEATURES
BASE PLAN FROM 2006
APPEARS ACCURATE IN WORK AREAS

Filename: 001_Phase 1 Key.dgn

Scale: PLAN
100 0 100 200
Scale of Feet

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Dale A. Mitchell, PE

	By	Date		By	Date
Designed	PEM	12/1	Checked	RWH	12/1
Drawn	SLS	12/1	In Charge of	RAL	12/1

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: ----------

KENNEBUNK SERVICE PLAZA PARKING EXPANSION CONCEPT

PHASE 1 KEY PLAN

CONTRACT:XXXX.XXX

LOGS OF SUBSURFACE EXPLORATIONS

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-102 **Proj. No.:** 18-018	

Driller:	New England Boring Contractors	**Elevation (ft.)**	104 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 in
Date Start/Finish:	7/12/18; 0745-0955	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.60
		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
0							SSA				
	1D	24/12	2.0 - 4.0	3-4-7-11	11	11				1D: Tan, dry to damp, m. dense, fine to medium SAND, trace Silt. SAND	
5	2D	24/15	5.0 - 7.0	6-6-7-7	13	13	25			2D: Tan to orange-tan, moist, m. dense, fine to medium SAND, trace Silt, trace coarse Sand.	
							28				
							32				
							48				
							52				
10	3D	24/11	10.0 - 12.0	6-7-10-14	17	17	19			3D: Tan, m. dense, fine to medium SAND, little to some Silt, trace coarse Sand.	
							25				
							35				
							40	90.5		13.5	
							40				
15	4D	24/16	15.0 - 17.0	3-5-5-4	10	10	25			4D: Orange tan, m. dense, interbedded, Silty fine SAND; and Clayey SILT, little very fine Sand. INTERBEDDED MARINE SILT AND SANDS	
							25				
							26				
							27	85.5		18.5	
							28				
20	5D	24/18	20.0 - 22.0	1/18"-1	0	0				5D: Grey with occasional black, v. soft, Silty CLAY, trace very fine Sand, with one 1-inch seam and few partings Silty fine SAND. MARINE SILT-CLAY	
								82.0		22.0	
										Bottom of Exploration at 22.0 feet below ground surface. No refusal.	
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-103
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	100.5 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 in
Date Start/Finish:	7/11/18; 1140-1410	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	6.1 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	24/15	2.0 - 4.0	3-2-2-2	4	4				1D: Orange tan, damp to moist, v. loose, fine to medium SAND, trace to little Silt, trace coarse Sand. SAND	
5	2D	24/17	5.0 - 7.0	5-4-3-3	7	7	PUSH			2D: Orange tan, wet, loose, fine to medium SAND, little Silt, trace coarse Sand.	
							16				
							26				
							26				
10	3D	24/11	10.0 - 12.0	3-4-6-8	10	10	PUSH			3D: Orange tan, loose, fine to medium SAND, some Silt; somewhat layered by silt content.	
							20				
							15	87.0		13.5	
							20				
15	4D	24/24	15.0 - 17.0	1-1/12"-1	1	1	PUSH			Olive brown, Clayey SILT, little very fine Sand, with several partings and layers Silty fine SAND. MARINE SILT-CLAY CRUST Changing at 16.1 ft to:	
								84.4		16.1	
										4D: Grey, Silty CLAY, little very fine SAND with one 1-inch seam Silty fine SAND at 16.1 ft. MARINE SILT-CLAY WITH INTERBEDDED SANDS	
20	5D	24/22	20.0 - 22.0	1-2-2-6	4	4	PUSH			5D: Grey brown, loose, interbedded, Silty fine SAND; Silty CLAY, trace very fine Sand; and fine to medium SAND, little to some Silt; with one piece of gravel in bottom of sample.	
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-103
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	100.5 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 in
Date Start/Finish:	7/11/18; 1140-1410	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	6.1 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/24	25.0 - 27.0	2/18"-3	1	1		73.5		6D: Grey, v. soft, Silty CLAY, trace very fine Sand with three 1-inch seams and few partings Silty fine SAND.	
										27.0	
										Bottom of Exploration at 27.0 feet below ground surface. No refusal.	
30											
35											
40											
45											
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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME		**Boring No.:** HB-KBUNK-104 **Proj. No.:** 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	96.5 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 in
Date Start/Finish:	7/11/18; 0855-1125	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 20'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	4.1 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	5-8-8-9	16	16				1D: Tan, moist to wet, m. dense, fine to medium SAND, trace Silt, trace coarse Sand. SAND	
5	2D	24/18	5.0 - 7.0	1-1-2-4	3	3	3			2D: Tan, wet, v. loose, fine to coarse SAND, trace to little Silt.	A-3 SP-SM -#200=5.8% WC=19.8%
							6				
							12				
							22				
							24	87.5		9.0 9 ft: Silt-clay observed in wash water.	
10	3D	24/24	10.0 - 12.0	1-1-1-1	2	2	PUSH			3D: Olive brown, soft, SILT & CLAY, little very fine Sand with numerous seams, partings, and pockets of fine Sandy SILT; sandier material comprises approx. 40% of sample. INTERBEDDED MARINE SILT AND SANDS	A-4(0) ML -#200=69.9% WC=27.7% LL=NV PL=NP PI=NP
15	4D	24/12	15.0 - 17.0	2-3-2-3	5	5	PUSH			Attempted vane at 15.6 ft; unable to push vane past 15.4 ft. 4D: Olive brown, loose, interbedded, Silty fine SAND; CLAY & SILT, trace very fine Sand; and fine to medium SAND, little Silt.	
								78.0		18.5	
20	5D V1	24/24	20.0 - 22.0 20.6 - 21.0	(VANE/18")-WOR Su= 440/ 27 psf	--					5D: Grey with occasional black, Silty CLAY, trace very fine Sand with few seams Silty fine SAND. MARINE SILT-CLAY V1: Tu=16 / Tr=1 ft-lbs (65 mm x 130 mm vane)	CL WC=35.9% LL=26.1 PL=15.6 PI=10.5
	MV		21.5 - 21.5							MV: Unable to push past 21.5 ft.	
								74.5		22.0 **Bottom of Exploration at 22.0 feet below ground surface.** No refusal.	
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-105
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	96 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 in
Date Start/Finish:	7/10/18; 1340-7/11/18; 0805	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5.8 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	24/19	2.0 - 4.0	3-3-3-3	6	6				1D: Red tan, damp, loose, fine to medium SAND, trace Silt. SAND	
							▽				
5	2D	24/17	5.0 - 7.0	5-7-9-8	16	16	22			2D: Orange tan, moist to wet, m. dense, fine to medium SAND, trace Silt, trace coarse Sand.	
							19				
							34				
							30				
							32				
10	3D	24/11	10.0 - 12.0	2-3-3-4	6	6	12			3D: Orange tan, loose, fine to medium SAND, trace Silt, trace coarse Sand.	
							16				
							21				
							31				
							38	82.0		14.0 ft: Olive brown silt-clay observed in wash water.	
15	4D	24/24	15.0 - 17.0	2-1-1-1	2	2	PUSH	80.5		Olive brown, slightly mottled, Clayey SILT, some fine SAND as partings and seams; changing at 15.5 ft to:	
										4D: Grey, soft, CLAY & SILT, trace very fine Sand with numerous seams and partings of Silty fine SAND and one 1-inch seam black, fine to medium SAND, some Silt.	
							▽				
20	5D V1	24/17	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 343/ 14 psf			PUSH			5D: Grey, Silty CLAY, trace very fine Sand with multiple seams and partings Silty fine SAND. V1: Tu=12.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V2		21.6 - 22.0	Su= 385/ 0 psf						V2: Tu=14 / 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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-105
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	96 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 in
Date Start/Finish:	7/10/18; 1340-7/11/18; 0805	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	5.8 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V3	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 563/ 82 psf						6D: Grey, Silty CLAY with multiple seams fine SAND, some Silt. V3: Tu=20.5 / Tr=3 ft-lbs (65 mm x 130 mm vane)	
	V4		26.6 - 27.0	Su= 494/ 0 psf						V4: Tu=18 / Tr=0 ft-lbs (65 mm x 130 mm vane)	
								69.0		27.0 **Bottom of Exploration at 27.0 feet below ground surface.** No refusal.	
30											
35											
40											
45											
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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-106 **Proj. No.:** 18-018	

Driller:	New England Boring Contractors	**Elevation (ft.)**	96 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 in
Date Start/Finish:	6/27/18; 1015-1650	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	HSA to 15'	**Water Level*:**	6.3 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							HSA				
	1D	24/7	2.0 - 4.0	6-8-3-3	11	11				1D: Brown, dry to damp, Silty fine to medium SAND with two pieces gravel. FILL	A-2-4(0) SM -#200=21.3% WC=8.8%
5	2D	24/17	5.0 - 7.0	2-1/12"-3	1	1				2D: Tan brown grey, mottled, damp to wet, fine to medium SAND, trace to little Silt, trace coarse Sand. FILL Changing at 6.9 ft to:	
	2D-A	--/--									
								89.1		6.9	
	3D	24/16	7.0 - 9.0	1-3-8-8	11	11		88.4		2D-A: Dark brown, PEAT and ORGANIC SILT. Wet, dark brown, PEAT and ORGANIC SILT; changing at 7.6 ft to:	
										7.6	
										3D: Grey, fine SAND, little Silt; grading at 7.9 ft to tan, fine to medium SAND, trace Silt. SAND	
10	4D	24/20	10.0 - 12.0	2-6-8-7	14	14				4D: Tan grading to grey, wet, m. dense, fine to coarse SAND, trace Silt.	A-3 SP -#200=1.8% WC=22.0%
15	5D	24/0	15.0 - 17.0	7-8-11-7	19	19	8			5D: Split-spoon sampler locked in augers by blowing sand. Pull augers; continue as cased wash boring. Unable to retrieve sample.	
							18				
							16				
							16	78.0		18.0	
										18 ft: Olive brown silt-clay observed in wash water.	
							17			19.5 ft: Grey sandy silt-clay observed in wash water.	
20	6D	24/24	20.0 - 22.0	WOR/18"-WOH	0	0	10			6D: Dark, grey with black, v. soft, Silty CLAY, little to some fine to medium Sand as multiple pockets and seams. INTERBEDDED MARINE SILT AND SANDS	A-4(5) CL -#200=84.2% WC=32.1% LL=24.6 PL=16.7 PI=7.9
							11				
							13				
							12				
25							11				

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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-106
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	96 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 in
Date Start/Finish:	6/27/18; 1015-1650	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	HSA to 15'	**Water Level*:**	6.3 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	7D	24/23	25.0 - 27.0	2/12"-2-2	2	2	21			7D: Dark grey, v. loose, interbedded, Silty fine SAND; Silty CLAY, little very fine Sand; and fine to medium SAND, little to some Silt.	
							22				
							26				
							20				
							24				
30	8D	24/20	30.0 - 32.0	2-2-4-2	6	6	27			8D: Dark grey, loose, interbedded, fine SAND, little Silt; Silty fine SAND; and fine to medium SAND, little to some Silt; with two 1-inch seams Silty CLAY.	A-4(0) ML -#200=82.3% WC=28.5% LL=NV PL=NP PI=NP
							24				
							26				
							24				
							28				
35	9D	24/19	35.0 - 37.0	1/24"	0	0	25			9D: Top 10 inches sample: Dark grey, interbedded, fine SAND, little Silt; and Silty fine SAND.	
							23	60.0		36.0 9D (cont'd): Bottom 9 inches of sample: Dark grey, Silty CLAY. MARINE SILT-CLAY	
							20				
							23				
							24				
40	10D	24/18	40.0 - 42.0	WOR/24"	0	0				10D: Olive grey, v. soft, Silty CLAY, with one 1-1/2-inch seam Silty fine SAND.	CL WC=41.1% LL=36.7 PL=23.4 PI=13.3
								54.0		42.0 42.0 ft: Hydraulic push rods as probe to estimate bottom of soft soil.	
45											
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-106
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	96 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 in
Date Start/Finish:	6/27/18; 1015-1650	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	HSA to 15'	**Water Level*:**	6.3 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50											
55											
60											
65											
70											
								22.0		74.0	
75										**Bottom of Exploration at 74.0 feet below ground surface.** Rod probe fetches up; probable bottom of soft soil; no refusal.	

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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-107
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	86.5 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 in
Date Start/Finish:	6/27/18; 1720-6/28/18; 1300	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		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
0							SSA				
										2.0 ft: Unable to drive spoon past 2.5 ft; spoon and augers walking; fill material, including asphalt in spoon. FILL	
5	1D	24/22	5.0 - 7.0	1-1-2-3	3	3	PUSH	81.5		5.0 1D: Dark brown, damp to moist, v. loose, fine Sandy ORGANIC SILT with one tree root. ORIGINAL GROUND	
								79.5		7.0	
							35				
							67				
							58				
10	2D	24/18	10.0 - 12.0	4-6-5-4	11	11	32			2D: Olive brown, damp to moist, stiff, Clayey SILT, little to some fine to medium Sand as seams, partings, and pockets. MARINE SILT-CLAY CRUST Grading at 11.8 ft to:	
							28	74.7		11.8	
							25			2D (cont'd): Grey, Silty CLAY, trace very fine Sand. MARINE SILT-CLAY	
							25				
							23				
15	3D	24/24	15.0 - 17.0	WOR/12"-WOH-1	0	0	PUSH			3D: Dark grey with few black streaks, v. soft, Silty CLAY with numerous seams fine to medium SAND, some Silt.	
20	4D V1	24/16	20.0 - 22.0 20.6 - 21.0	VANE INTERVAL Su= 371/ 27 psf			PUSH			4D: Dark grey with occasional black, Silty CLAY with one seam fine to medium SAND, some Silt. V1: Tu=13.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V2		21.6 - 22.0	Su= 316/ 14 psf						V2: Tu=11.5 / 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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-107 **Proj. No.:** 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	86.5 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 in
Date Start/Finish:	6/27/18; 1720-6/28/18; 1300	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		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
25	5D V3	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 302/ 14 psf			PUSH			5D: Dark grey, Silty CLAY, trace very fine Sand grading to olive grey, Silty CLAY. V3: Tu=11 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V4		26.6 - 27.0	Su= 288/ 14 psf						V4: Tu=10.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
30	6D V5	24/22	30.0 - 32.0 30.6 - 31.0	VANE INTERVAL Su= 426/ 14 psf			PUSH			6D: Olive grey, Silty CLAY. V5: Tu=15.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V6		31.6 - 32.0	Su= 412/ 14 psf						V6: Tu=15 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
35	7D V7	24/0	35.0 - 37.0 35.6 - 36.0	VANE INTERVAL Su= 481/ 27 psf			PUSH			7D: No recovery. V7: Tu=17.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V8		36.6 - 37.0	Su= 385/ 27 psf						V8: Tu=14 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
40	8D V9	24/22	40.0 - 42.0 40.6 - 41.0	VANE INTERVAL Su= 481/ 27 psf						8D: Dark grey, Silty CLAY. V9: Tu=17.5 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
	V10		41.6 - 42.0	Su= 453/ 14 psf				44.5		V10: Tu=16.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane) 42.0 42.0 ft: Hydraulic push rods as probe to estimate bottom of soft soil.	
45											
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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-107 **Proj. No.:** 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	86.5 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 in
Date Start/Finish:	6/27/18; 1720-6/28/18; 1300	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 40'	**Hammer Efficiency:**	0.60
		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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50											
								33.2		53.3	
										Bottom of Exploration at 53.3 feet below ground surface. Rod probe fetches up; probable bottom of soft soil; 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.

SCHONEWALD ENGINEERING ASSOCIATES, INC.	**PROJECT:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-108 **Proj. No.:** 18-018	

Driller:	New England Boring Contractors	**Elevation (ft.)**	89 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 in
Date Start/Finish:	7/9/18; 1005-1255	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	3.4 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	24/15	2.0 - 4.0	1-3-5-5	8	8				1D: Red brown, damp to moist, loose, fine to medium SAND, little Silt. Roots and Organic Silt in upper part of sample. TOPSOIL/ SUBSOIL	
5	2D	24/13	5.0 - 7.0	1-1-7-10	8	8	PUSH			Red brown, wet, loose, interbedded, fine to medium SAND, trace to little Silt; and ORGANIC SILT. Changing at 6.5 ft to:	
								82.5		6.5 2D: Grey tan, wet, fine SAND, trace Silt. Strong petroleum odor. SAND	
							26				
							28				
10	3D	24/14	10.0 - 12.0	3-6-5-8	11	11	15			Grey tan, fine to medium SAND, little Silt, trace coarse Sand; changing at 11. 6 ft to:	
							21	77.4		11.6 3D: Olive brown, mottled, Clayey SILT, little to some fine to medium Sand as seams and partings. MARINE SILT-CLAY CRUST	
							25				
							23				
							26				
15	4D	24/24	15.0 - 17.0	1/12"-1-1	1	1	PUSH			4D: Grey, v. soft, CLAY & SILT, little fine Sand as pockets, partings, and seams.	
								73.0		16.0	
20	5D	24/24	20.0 - 22.0	WOR/24"	0	0	PUSH			5D: Grey with occasional black, v. soft, Silty CLAY with occasional partings of very fine SAND, some Silt. MARINE SILT-CLAY	
25											

Remarks:

Located downgradient from former remediation system.

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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-108 **Proj. No.:** 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	89 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 in
Date Start/Finish:	7/9/18; 1005-1255	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	3.4 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/24	25.0 - 27.0	WOR/24"	0	0		62.0		6D: Grey with occasional black, v. soft, Silty CLAY with multiple partings and seams fine to medium SAND, little Silt.	
										27.0	
										Bottom of Exploration at 27.0 feet below ground surface. No refusal.	
30											
35											
40											
45											
50											

Remarks:

Located downgradient from former remediation system.

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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-109
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	87 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 in
Date Start/Finish:	7/9/18; 1330 - 7/10/18; 0825	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.7 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	3-7-6-9	13	13				1D: Orange tan, wet, m. dense, fine to coarse SAND, trace Silt. SAND	
5	2D	24/19	5.0 - 7.0	2-5-4-6	9	9	3			2D: Orange tan, wet, loose, fine to medium SAND, trace to little Silt, trace coarse Sand.	A-3 SP -#200=2.6% WC=22.2%
							5				
							7				
							8				
							8	77.5		9.5 ft: Olive brown silt-clay observed in wash water.	
10	3D	24/24	10.0 - 12.0	WOH/24"	0	0	PUSH	76.5		3D: Olive grey, v. soft, CLAY & SILT. MARINE SILT-CLAY CRUST Grading at 10.5 ft to:	
										10.5	
										3D (cont'd): Grey with occasional black pockets, v. soft, Silty CLAY, trace to little fine to medium Sand as partings and seams. MARINE SILT-CLAY	
15	4D	24/17	15.0 - 17.0	(VANE)-1/18"	1	1	PUSH			15.0 ft: Attempted vane shear test at 15.6 feet; unable to push past 15.4 ft. 4D: Grey, v. soft, Silty CLAY with one 2-inch pocket black Silty CLAY and one 2-inch seam fine SAND, little Silt at 15.4 ft.	A-4(9) CL -#200=96.8% WC=40.7% LL=27.8 PL=17.7 PI=10.1
20	5D	24/24	20.0 - 22.0	VANE INTERVAL Su= 302/ 14 psf			PUSH			5D: Grey, Silty CLAY with occasional partings fine SAND, little Silt. V1: Tu=11 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
				Su= 302/ 14 psf						V2: Tu=11 / 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:** Kennebunk Service Plaza Expansion Maine Turnpike MM 25 **LOCATION:** Kennebunk, ME	**Boring No.:** HB-KBUNK-109 **Proj. No.:** 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	87 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 in
Date Start/Finish:	7/9/18; 1330 - 7/10/18; 0825	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.7 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D	24/24	25.0 - 27.0	VANE INTERVAL Su= 440/ 27 psf						6D: Olive grey, Silty CLAY. V3: Tu=16 / Tr=1 ft-lbs (65 mm x 130 mm vane)	CL WC=46.3% LL=37.5 PL=21.3 PI=16.2
				Su= 522/ 27 psf						V4: Tu=19 / Tr=1 ft-lbs (65 mm x 130 mm vane)	
								60.0		27.0 27.0 ft: Hydraulic push rods as probe to estimate bottom of soft soil.	
30											
35											
40											
45											
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-109
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	87 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 in
Date Start/Finish:	7/9/18; 1330 - 7/10/18; 0825	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	1.7 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
50											
55								31.8		55.2 **Bottom of Exploration at 55.2 feet below ground surface.** Rod probe fetches up; probable bottom of soft soil; no refusal.	
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.

SCHONEWALD ENGINEERING ASSOCIATES, INC.

PROJECT: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-110
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	no topo-unable to estimate	**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 in
Date Start/Finish:	7/10/18; 0910-1225	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	3.6 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	24/9	2.0 - 4.0	1/12"-1-4	1	1				1D: Dark brown, moist, v. loose, ORGANIC SILT AND PEAT, little fine Sand; sand content increases with depth. TOPSOIL/ SUBSOIL	
										3.5	
5	2D	24/19	5.0 - 7.0	4-7-8-11	15	15	5			2D: Grey tan grading to orange tan, wet, m. dense, fine to coarse SAND, trace to little Silt. SAND	
							13				
							22				
							28				
							28				
10	3D	24/0	10.0 - 12.0	3-4-5-6	9	9	19			3D: No recovery.	
							19				
							16			12.0 ft: sample wash - Orange tan, fine to medium SAND, trace Silt.	
							17			13.0	
							18			13.0 ft: Olive brown silt-clay observed in wash water.	
15	4D V1	24/24	15.0 - 17.0 15.6 - 16.0	VANE INTERVAL Su= 371/ 41 psf			PUSH			14.5	
	V2		16.6 - 17.0	Su= 398/ 41 psf						14.5 FT: Grey silt-clay observed in wash water. 4D: Grey, Silty CLAY, trace very fine Sand with occasional layers and pockets black, Silty fine to medium SAND. MARINE SILT-CLAY V1: Tu=13.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane) V2: Tu=14.5 / Tr=1.5 ft-lbs (65 mm x 130 mm vane)	
20	5D	24/10	20.0 - 22.0	(VANE)-1/18"	1	1	PUSH			20.0 ft: Attempted vane shear test at 20.6 feet; unable to push past 20.4 ft. 5D: Grey, Silty CLAY, trace very fine Sand with one 1-inch seam fine Sandy SILT in tip of spoon.	
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: Kennebunk Service Plaza Expansion
Maine Turnpike MM 25
LOCATION: Kennebunk, ME

Boring No.: HB-KBUNK-110
Proj. No.: 18-018

Driller:	New England Boring Contractors	**Elevation (ft.)**	no topo-unable to estimate	**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 in
Date Start/Finish:	7/10/18; 0910-1225	**Drilling Method:**	cased wash boring	**Hammer Type:**	rope & cathead
Boring Location:	per plan	**Casing ID/OD:**	HW to 25'	**Hammer Efficiency:**	0.60
		Auger ID/OD:	SSA to 5'	**Water Level*:**	3.6 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 Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N-60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Lab. Testing Results
25	6D V3	24/24	25.0 - 27.0 25.6 - 26.0	VANE INTERVAL Su= 481/ 0 psf						6D: Grey, Silty CLAY, trace very fine Sand with seams and partings of fine Sandy SILT throughout and one pocket black, Silty CLAY, some fine Sand. V3: Tu=17.5 / Tr=0 ft-lbs (65 mm x 130 mm vane) V4: Tu=14.5 / Tr=0.5 ft-lbs (65 mm x 130 mm vane)	
	V4		26.6 - 27.0	Su= 398/ 14 psf						27.0 **Bottom of Exploration at 27.0 feet below ground surface.** No refusal.	
30											
35											
40											
45											
50											

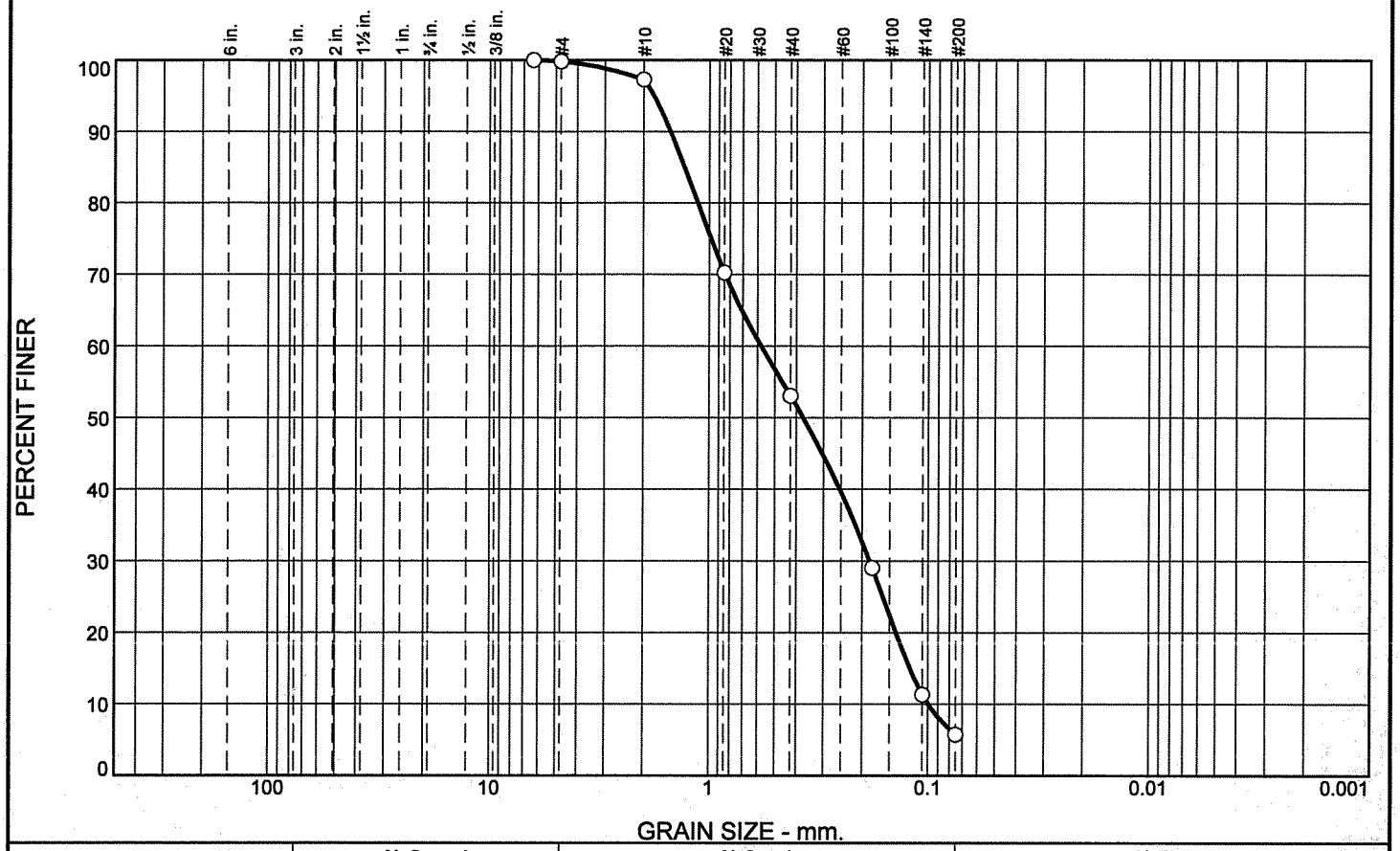
Remarks:

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.

RESULTS OF SOILS LABORATORY TESTS ON SOIL SAMPLES

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	2.5	44.3	47.2	5.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.8		
#10	97.3		
#20	70.2		
#40	53.0		
#80	29.1		
#140	11.3		
#200	5.8		

* (no specification provided)

Soil Description

Poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5071 D_{85}= 1.2983 D_{60}= 0.5787
D_{50}= 0.3728 D_{30}= 0.1849 D_{15}= 0.1210
D_{10}= 0.0997 C_u= 5.80 C_c= 0.59

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Moisture Content: 19.8%

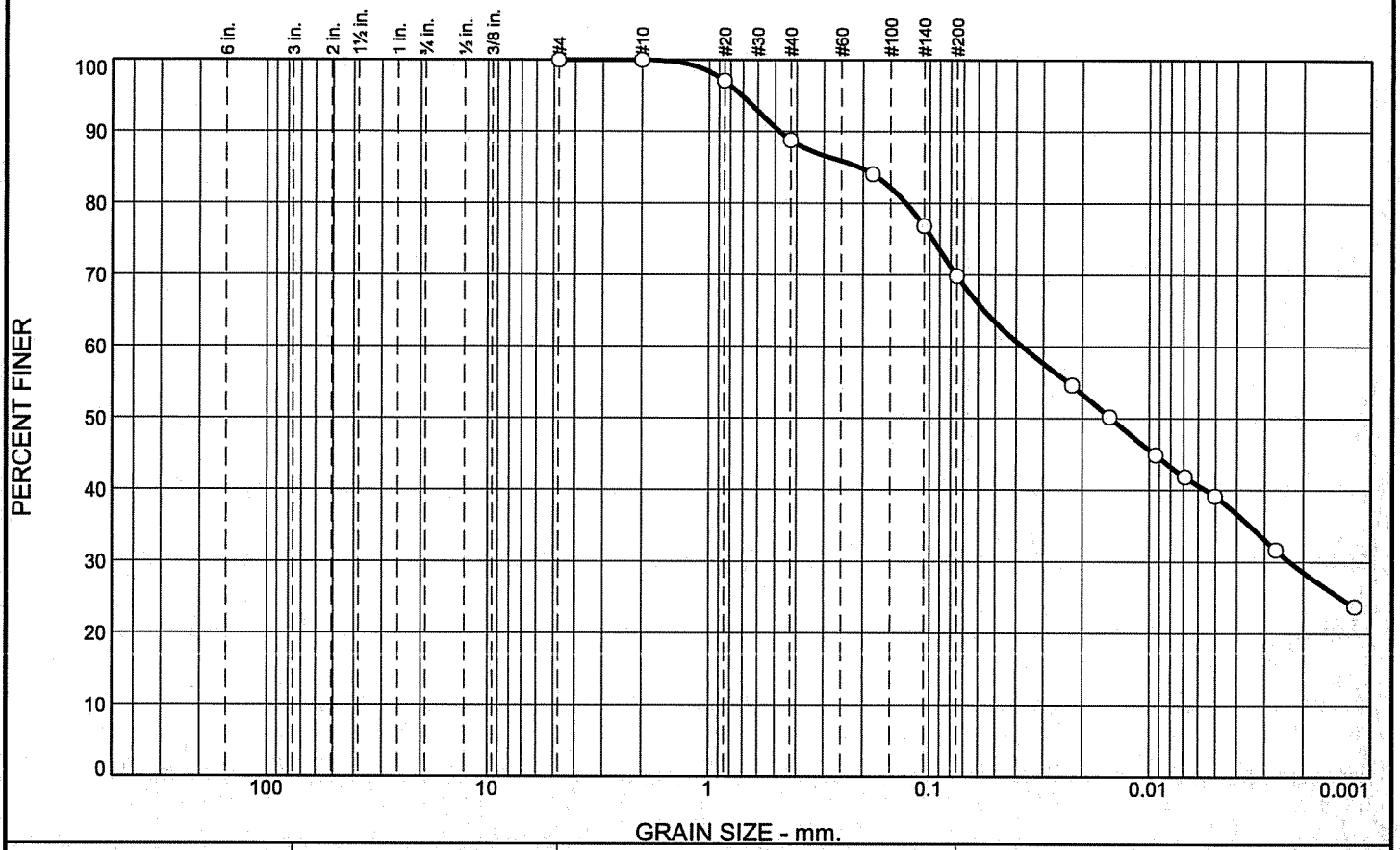
Location: HB-KBNK-104
Sample Number: 2D **Depth:** 5'-7' **Date:** 9/14/2018

R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15225a

Tested By: JJB **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	11.2	18.9	30.8	39.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	97.1		
#40	88.8		
#80	84.1		
#140	76.8		
#200	69.9		
0.0223 mm.	54.6		
0.0151 mm.	50.2		
0.0094 mm.	44.9		
0.0069 mm.	41.9		
0.0050 mm.	39.2		
0.0027 mm.	31.7		
0.0012 mm.	23.8		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4770 D_{85}= 0.2062 D_{60}= 0.0374
D_{50}= 0.0148 D_{30}= 0.0023 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 27.7%

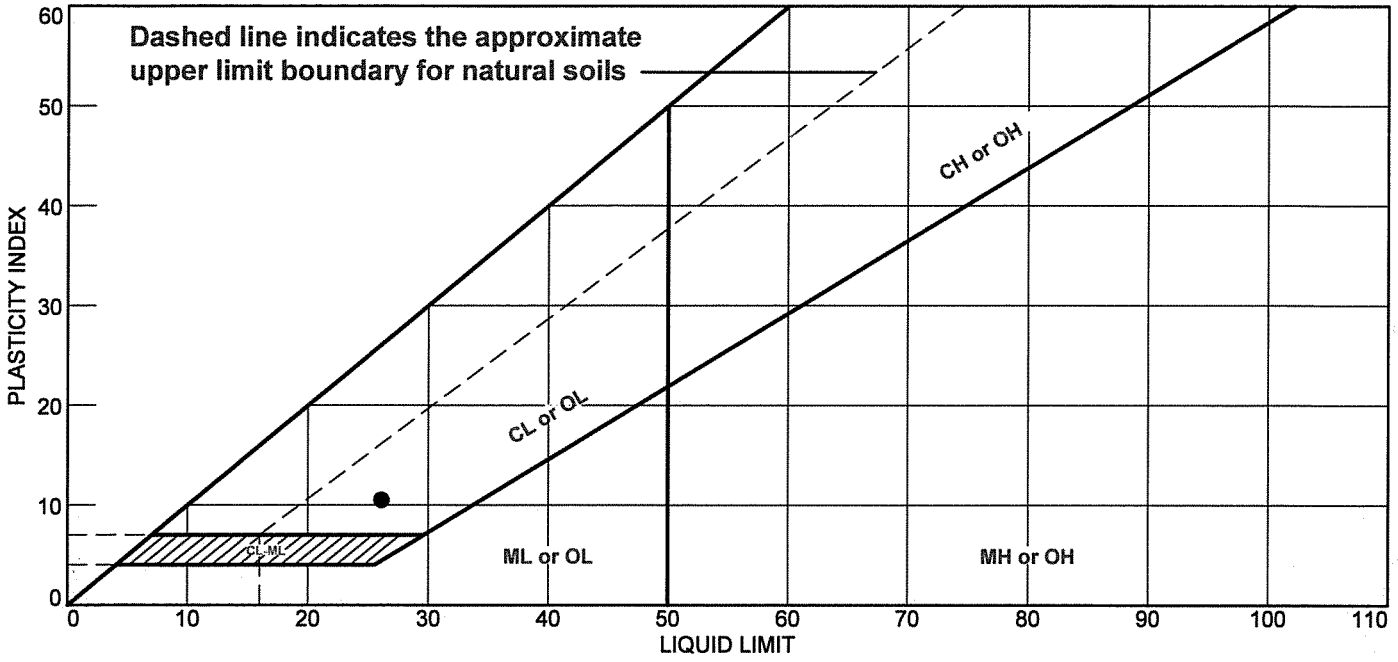
Location: HB-KBNK-104
Sample Number: 3D **Depth:** 10'-12' **Date:** 9/14/2018

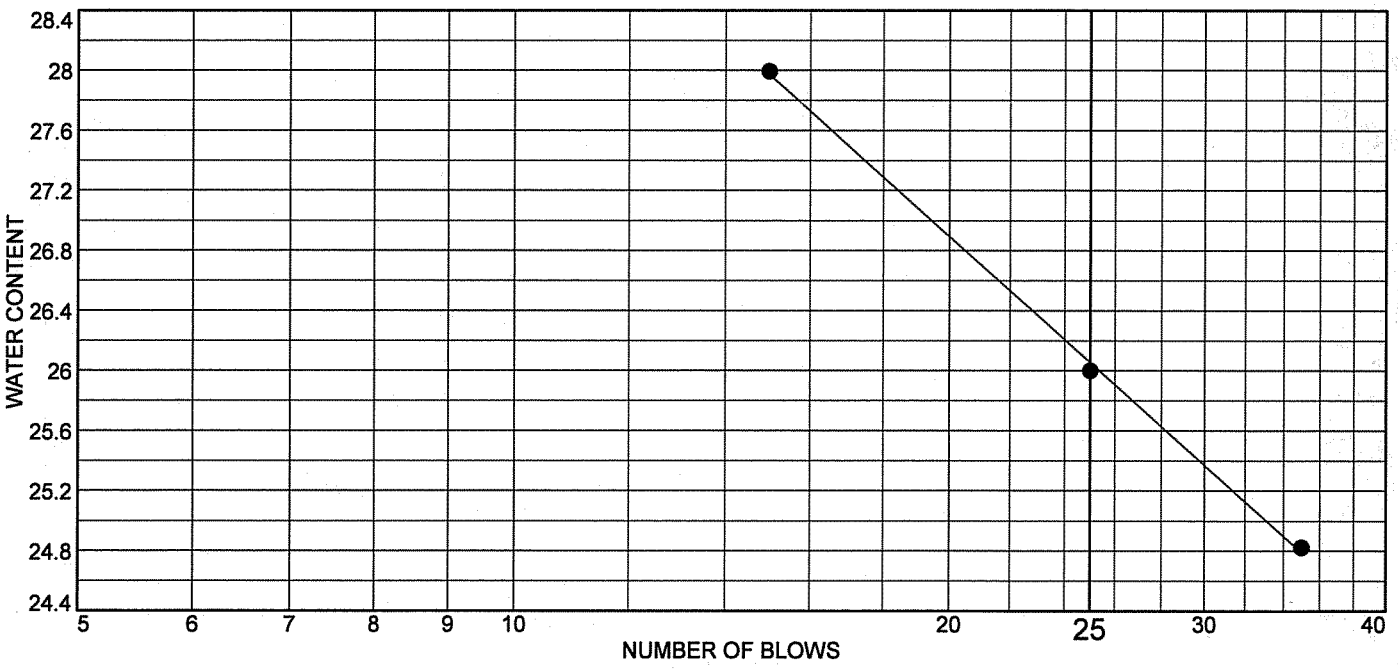
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Figure** 15225b

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

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	26.1	15.6	10.5			

Project No. 1368-014 **Client:** Schonewald Engineering Associates, Inc.

Project: MeTPK Kennebunk Service Plaza (#18-018)

Kennebunk, ME

Location: HB-KBNK-104

Sample Number: 5D **Depth:** 20'-22'

R.W. Gillespie & Associates, Inc.

Biddeford, Maine

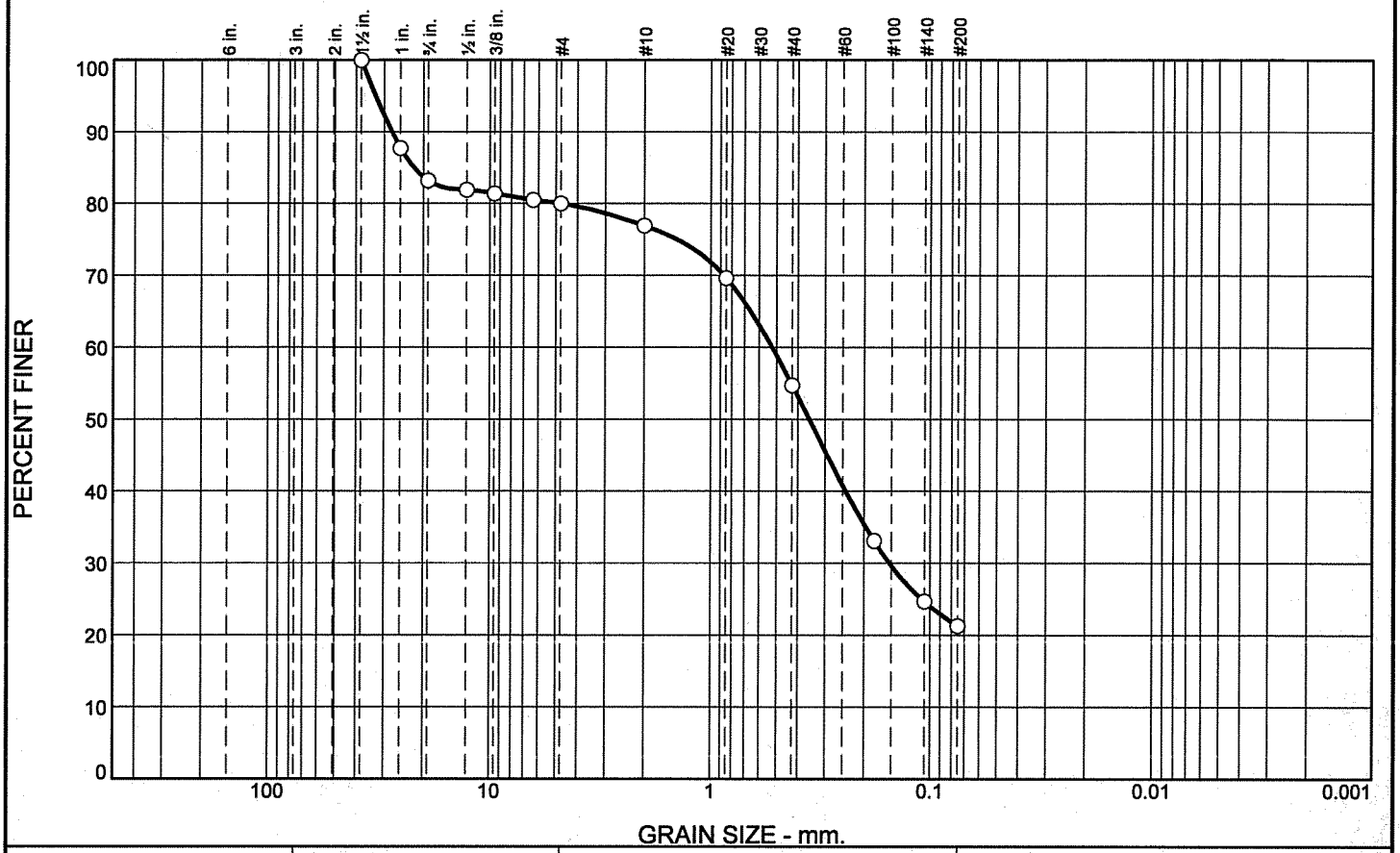
Remarks:

● Moisture Content: 35.9%

Lab No. 15225c

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

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.8	3.2	3.1	22.2	33.4	21.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	87.7		
3/4"	83.2		
1/2"	81.9		
3/8"	81.4		
1/4"	80.5		
#4	80.0		
#10	76.9		
#20	69.6		
#40	54.7		
#80	33.1		
#140	24.7		
#200	21.3		

* (no specification provided)

Soil Description

Silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.8021 D_{85}= 22.0793 D_{60}= 0.5252
D_{50}= 0.3553 D_{30}= 0.1532 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 8.8%

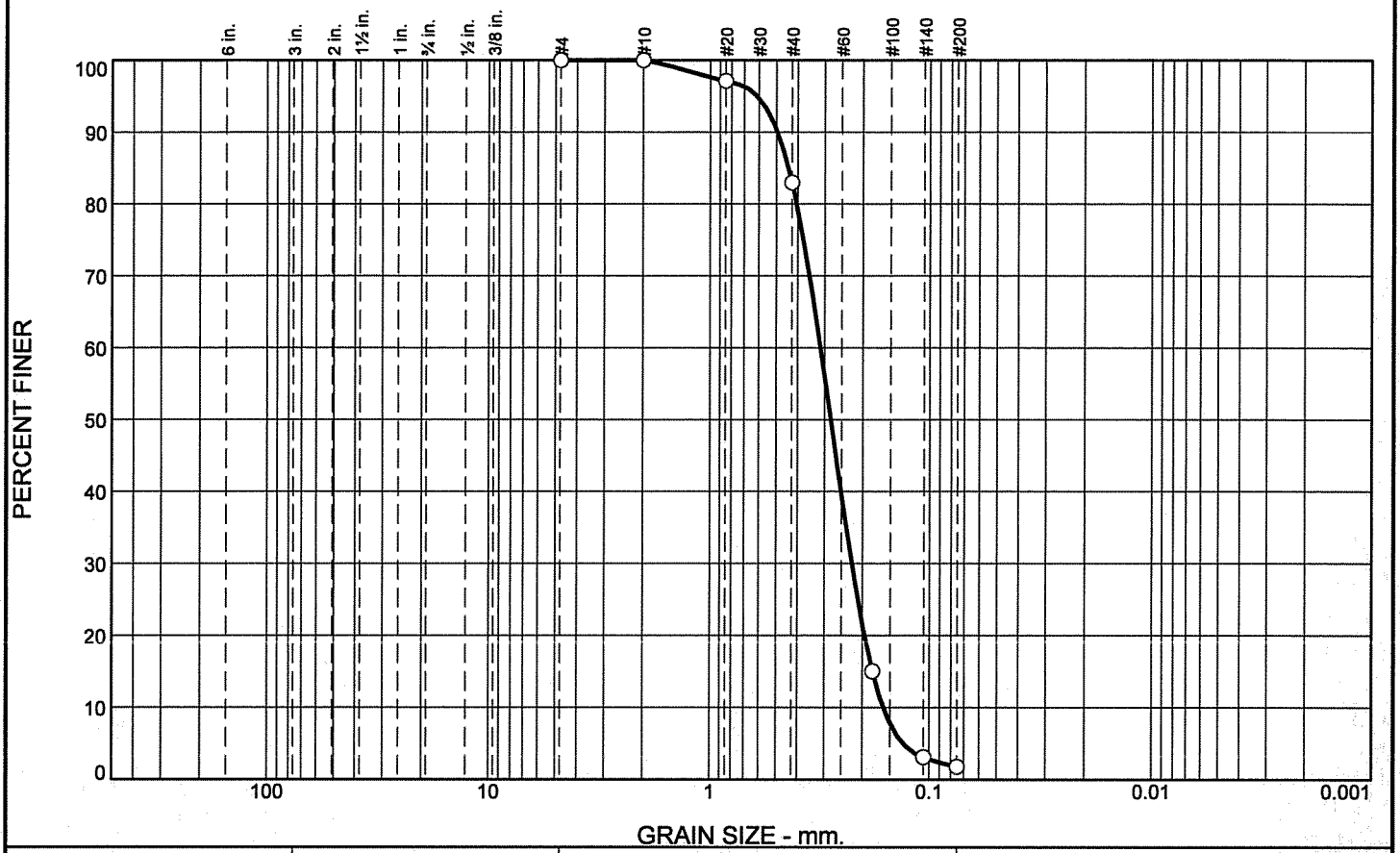
Location: HB-KBNK-106
Sample Number: 1D **Depth:** 2'-4' **Date:** 9/14/2018

R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15226a

Tested By: JJB **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	17.0	81.2	1.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	97.1		
#40	83.0		
#80	15.0		
#140	3.1		
#200	1.8		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4958 D_{85}= 0.4412 D_{60}= 0.3138
D_{50}= 0.2808 D_{30}= 0.2236 D_{15}= 0.1799
D_{10}= 0.1608 C_u= 1.95 C_c= 0.99

Classification

USCS= SP AASHTO= A-3

Remarks

Moisture Content: 22.0%

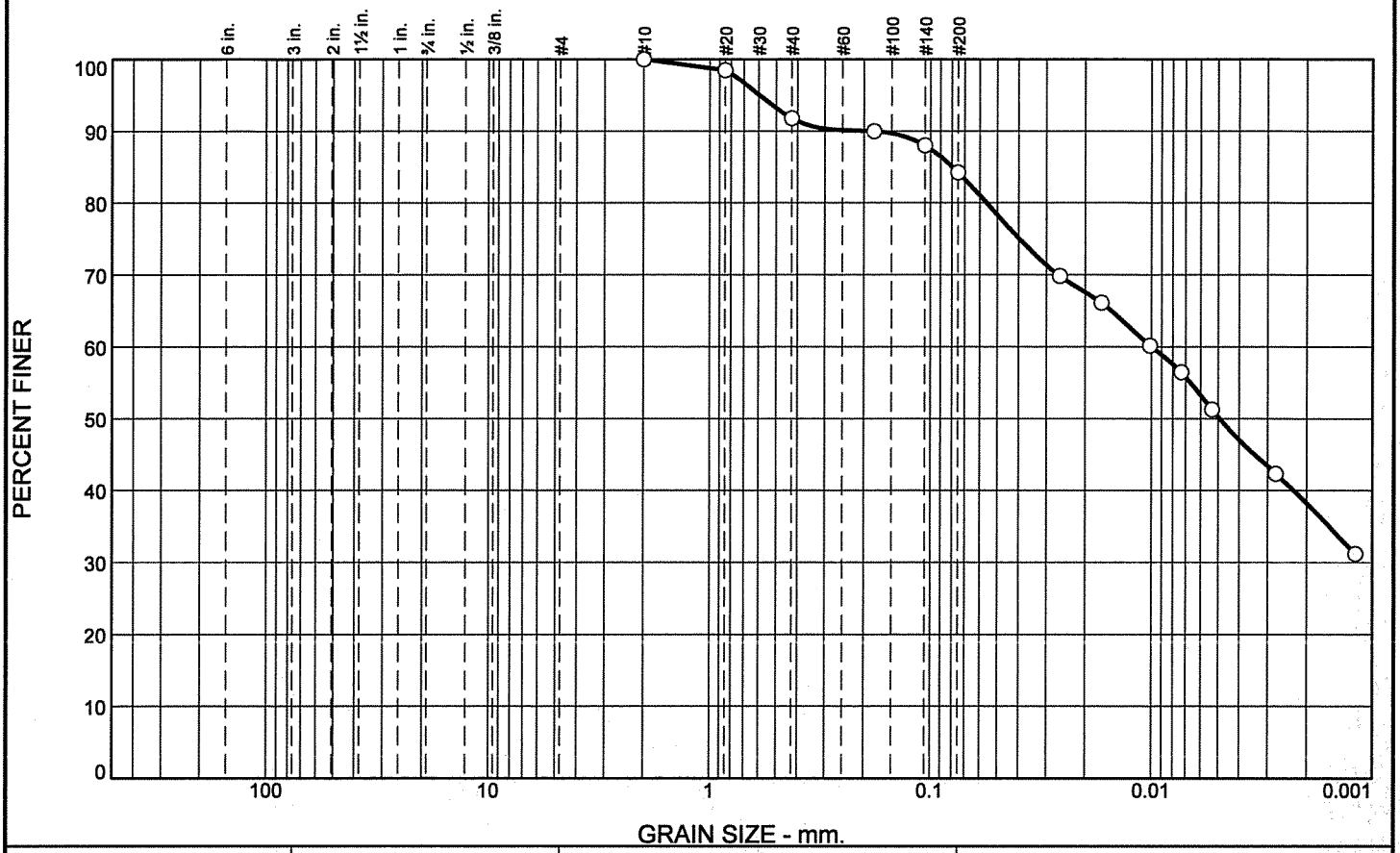
Location: HB-KBNK-106
Sample Number: 4D **Depth:** 10'-12' **Date:** 9/14/2018

R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15226b

Tested By: JJB **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	8.2	7.6	34.0	50.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	98.5		
#40	91.8		
#80	90.0		
#140	88.0		
#200	84.2		
0.0261 mm.	69.8		
0.0169 mm.	66.1		
0.0101 mm.	60.2		
0.0073 mm.	56.5		
0.0053 mm.	51.3		
0.0028 mm.	42.3		
0.0012 mm.	31.2		

* (no specification provided)

Soil Description

Lean clay with sand

Atterberg Limits

PL= 16.7 LL= 24.6 PI= 7.9

Coefficients

D_{90}= 0.1856 D_{85}= 0.0797 D_{60}= 0.0100
D_{50}= 0.0049 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(5)

Remarks

Moisutre Content: 32.1%

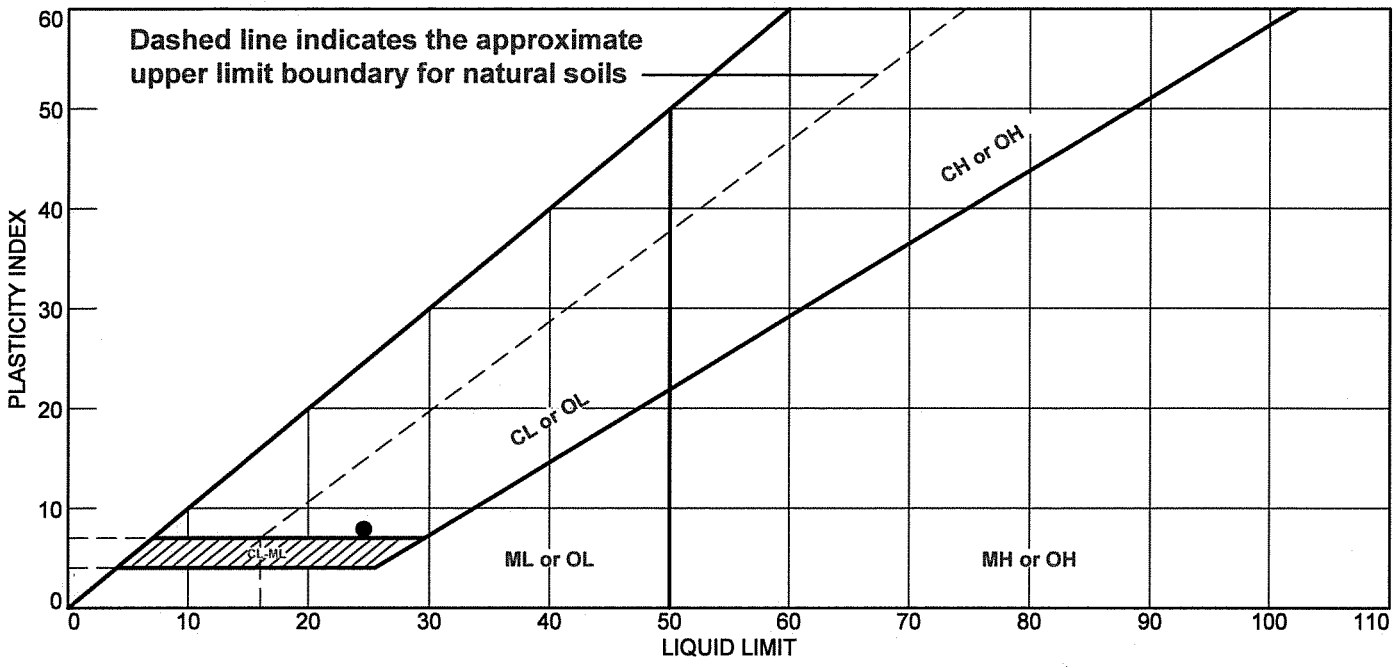
Location: HB-KBNK-106
Sample Number: 6D **Depth:** 20'-22' **Date:** 9/14

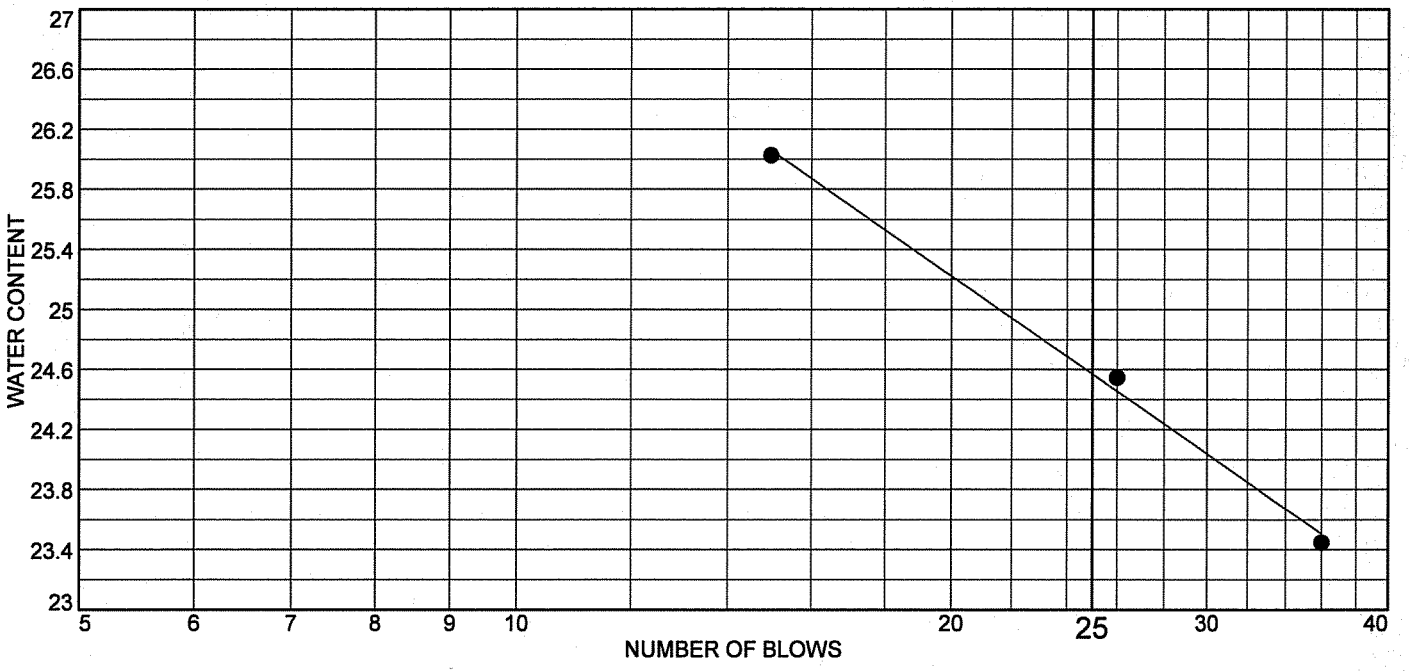
R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15226c

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

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean clay with sand	24.6	16.7	7.9	91.8	84.2	CL

Project No. 1368-014 **Client:** Schonewald Engineering Associates, Inc.

Project: MeTPK Kennebunk Service Plaza (#18-018)

Kennebunk, ME

Location: HB-KBNK-106

Sample Number: 6D **Depth:** 20'-22'

R.W. Gillespie & Associates, Inc.

Biddeford, Maine

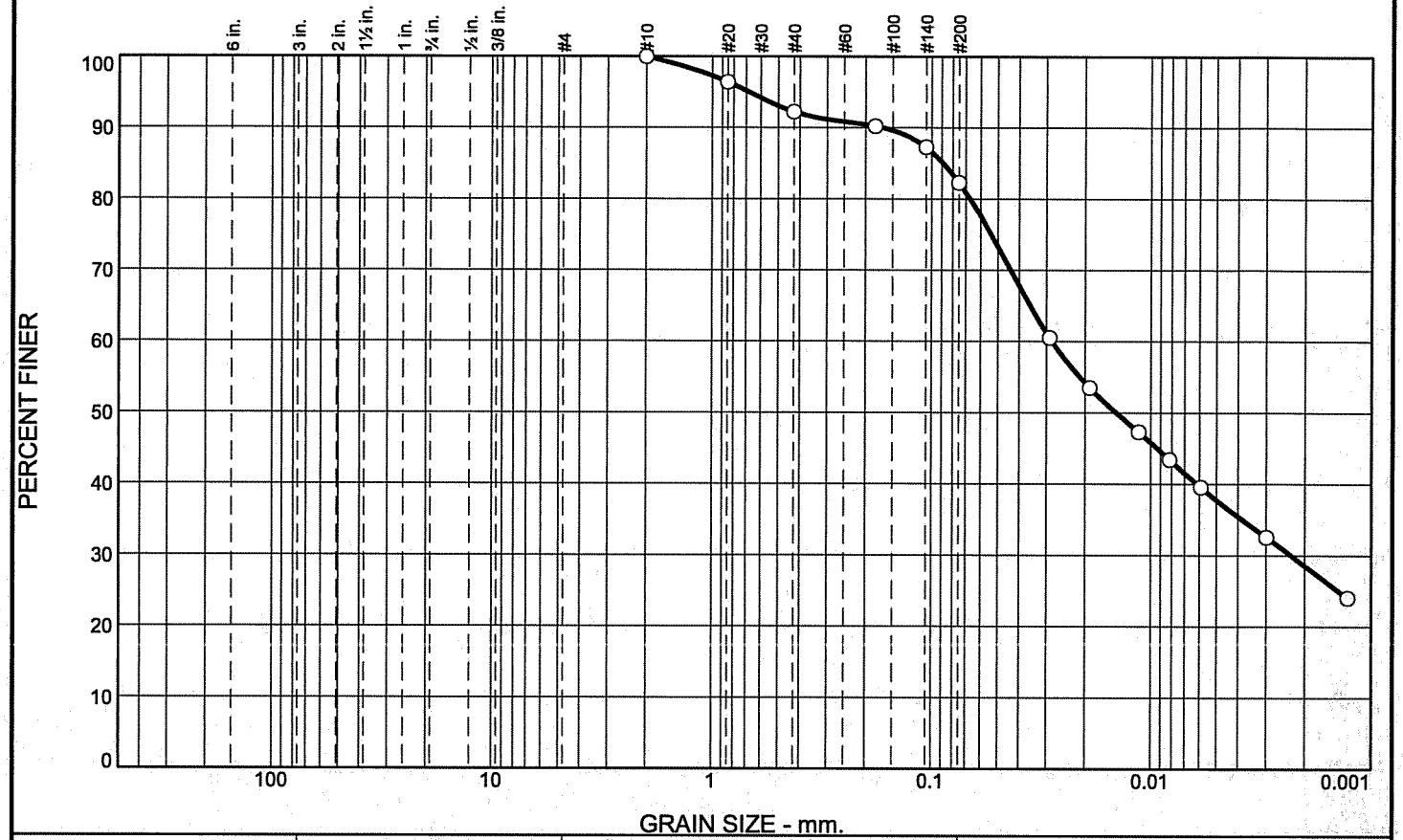
Remarks:

● Moisture Content: 32.1%

Lab No. 15226c

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

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.8	9.9	44.5	37.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	96.4		
#40	92.2		
#80	90.2		
#140	87.3		
#200	82.3		
0.0290 mm.	60.5		
0.0190 mm.	53.5		
0.0113 mm.	47.3		
0.0082 mm.	43.5		
0.0059 mm.	39.6		
0.0030 mm.	32.6		
0.0013 mm.	24.1		

* (no specification provided)

Soil Description

Silt with sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.1660 D_{85}= 0.0882 D_{60}= 0.0282
D_{50}= 0.0143 D_{30}= 0.0023 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 28.5%

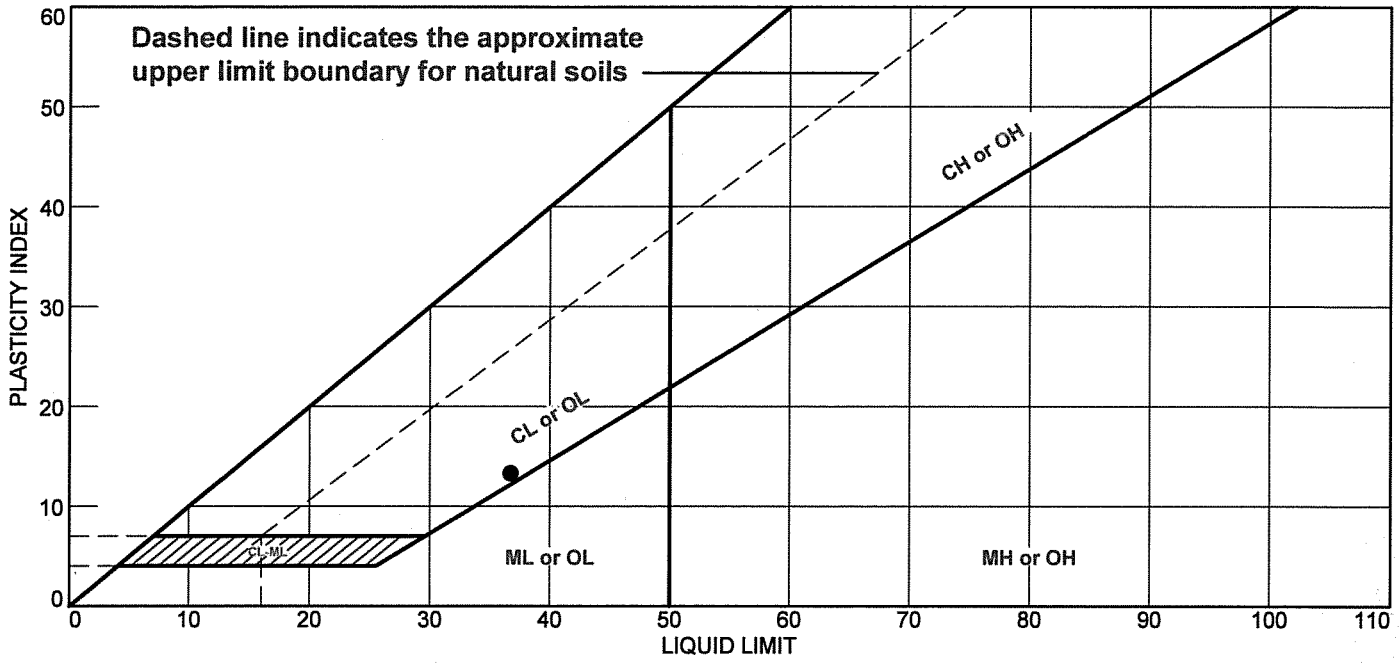
Location: HB-KBNK-106
Sample Number: 8D **Depth:** 30'-32' **Date:** 9/14/2018

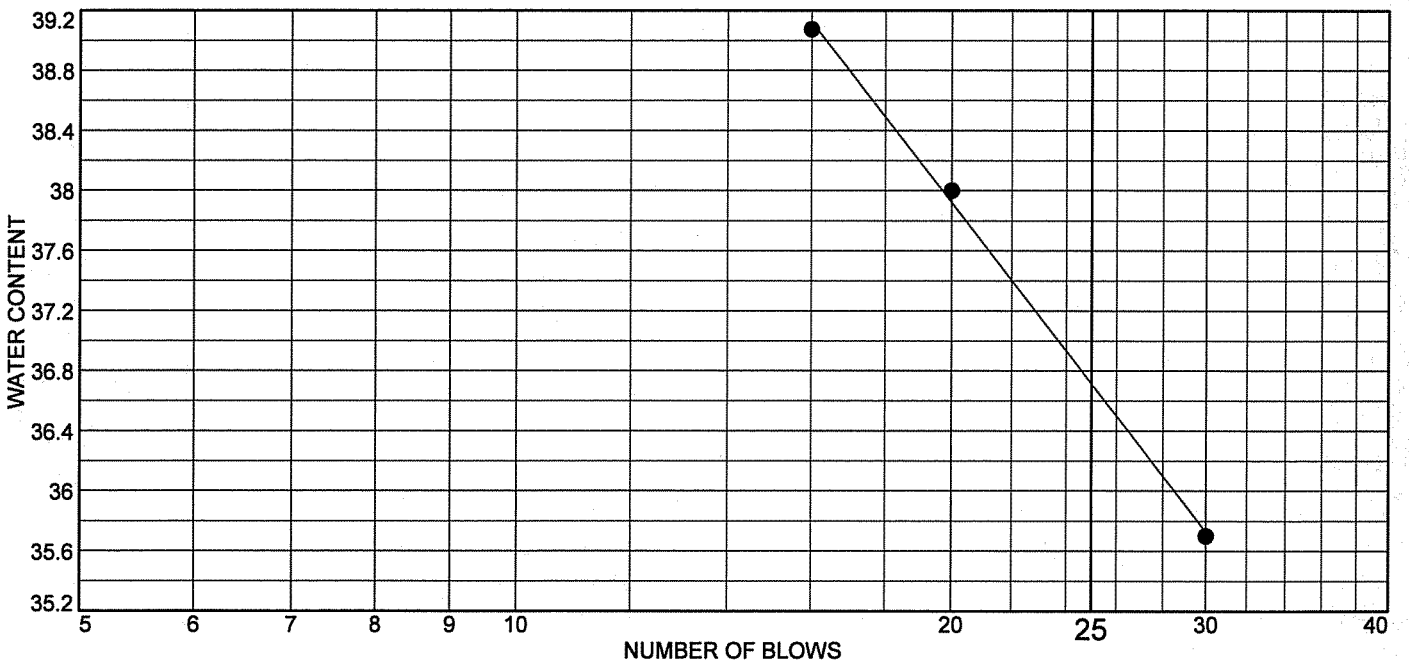
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Figure** 15226d

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

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	36.7	23.4	13.3			

Project No. 1368-014 **Client:** Schonewald Engineering Associates, Inc.

Project: MeTPK Kennebunk Service Plaza (#18-018)

Kennebunk, ME

Location: HB-KBNK-106

Sample Number: 10D **Depth:** 40'-42'

R.W. Gillespie & Associates, Inc.

Biddeford, Maine

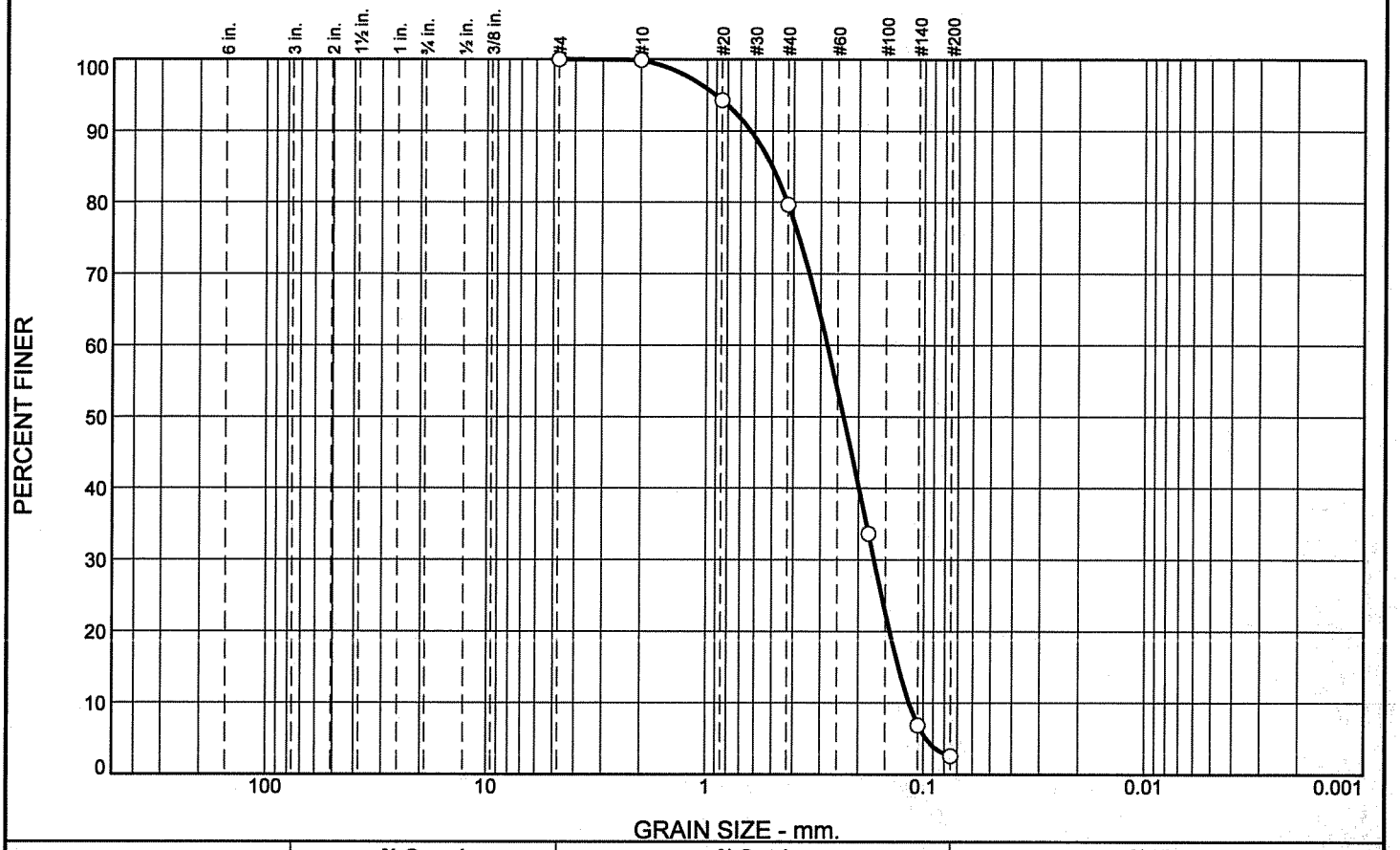
Remarks:

● Moisture Content: 41.1%

Lab No. 15226e

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

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	20.2	77.1	2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	94.3		
#40	79.7		
#80	33.6		
#140	6.9		
#200	2.6		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.6292 D_{85}= 0.5031 D_{60}= 0.2795
D_{50}= 0.2351 D_{30}= 0.1697 D_{15}= 0.1303
D_{10}= 0.1164 C_u= 2.40 C_c= 0.89

Classification

USCS= SP AASHTO= A-3

Remarks

Moisture Content: 22.2%

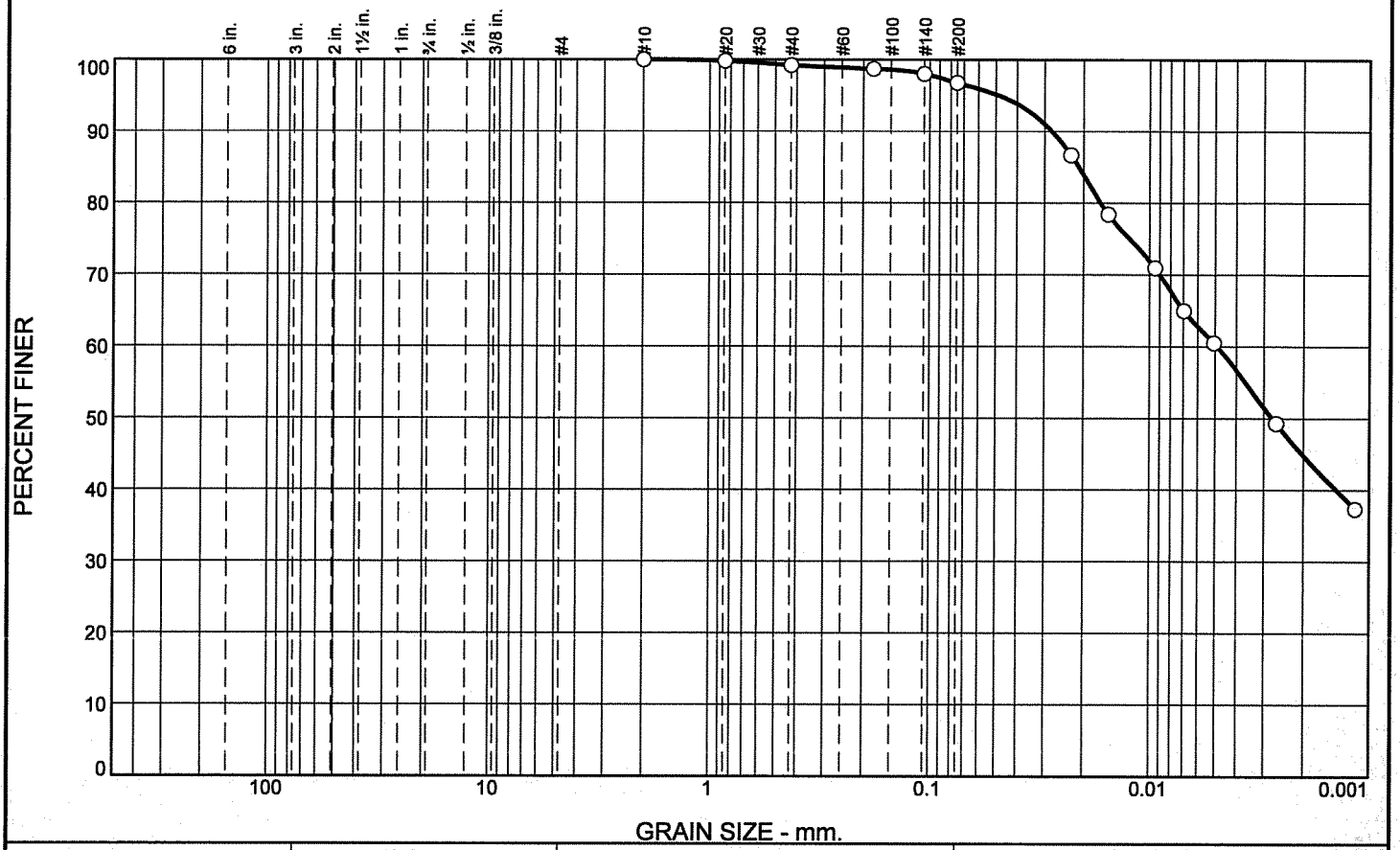
Location: HB-KBNK-109
Sample Number: 2D **Depth:** 5'-7' **Date:** 9/14/2018

R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15227a

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

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	2.4	36.5	60.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.2		
#80	98.7		
#140	98.0		
#200	96.8		
0.0228 mm.	86.7		
0.0155 mm.	78.4		
0.0094 mm.	71.0		
0.0070 mm.	65.0		
0.0051 mm.	60.5		
0.0026 mm.	49.3		
0.0012 mm.	37.4		

* (no specification provided)

Soil Description

Lean Clay

Atterberg Limits

PL= 17.7 LL= 27.8 PI= 10.1

Coefficients

D_{90}= 0.0278 D_{85}= 0.0211 D_{60}= 0.0049
D_{50}= 0.0028 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(9)

Remarks

Moisture Content: 40.7%

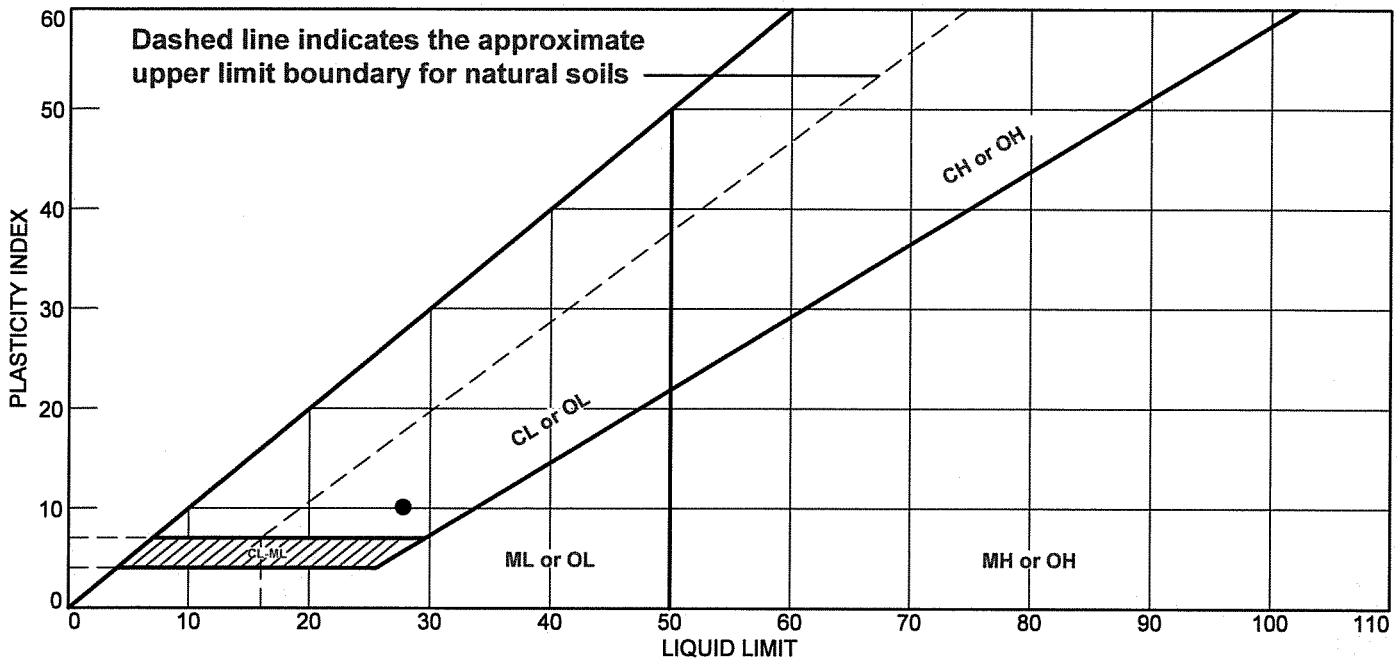
Location: HB-KBNK-109
Sample Number: 4D **Depth:** 15'-17' **Date:** 9/14/2018

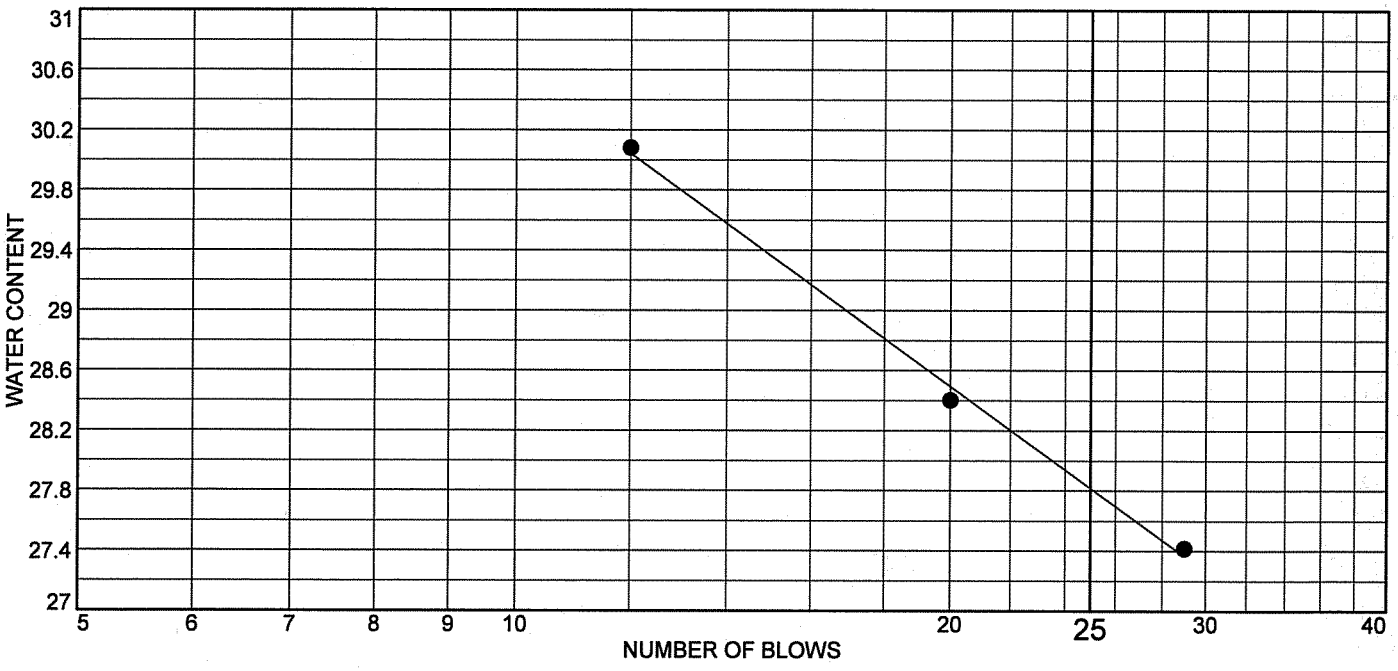
R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Schonewald Engineering Associates, Inc.
Project: MeTPK Kennebunk Service Plaza (#18-018)
Kennebunk, ME
Project No: 1368-014 **Lab No.** 15227b

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

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	27.8	17.7	10.1	99.2	96.8	CL

Project No. 1368-014 **Client:** Schonewald Engineering Associates, Inc.

Project: MeTPK Kennebunk Service Plaza (#18-018)

Kennebunk, ME

Location: HB-KBNK-109

Sample Number: 4D **Depth:** 15'-17'

R.W. Gillespie & Associates, Inc.

Biddeford, Maine

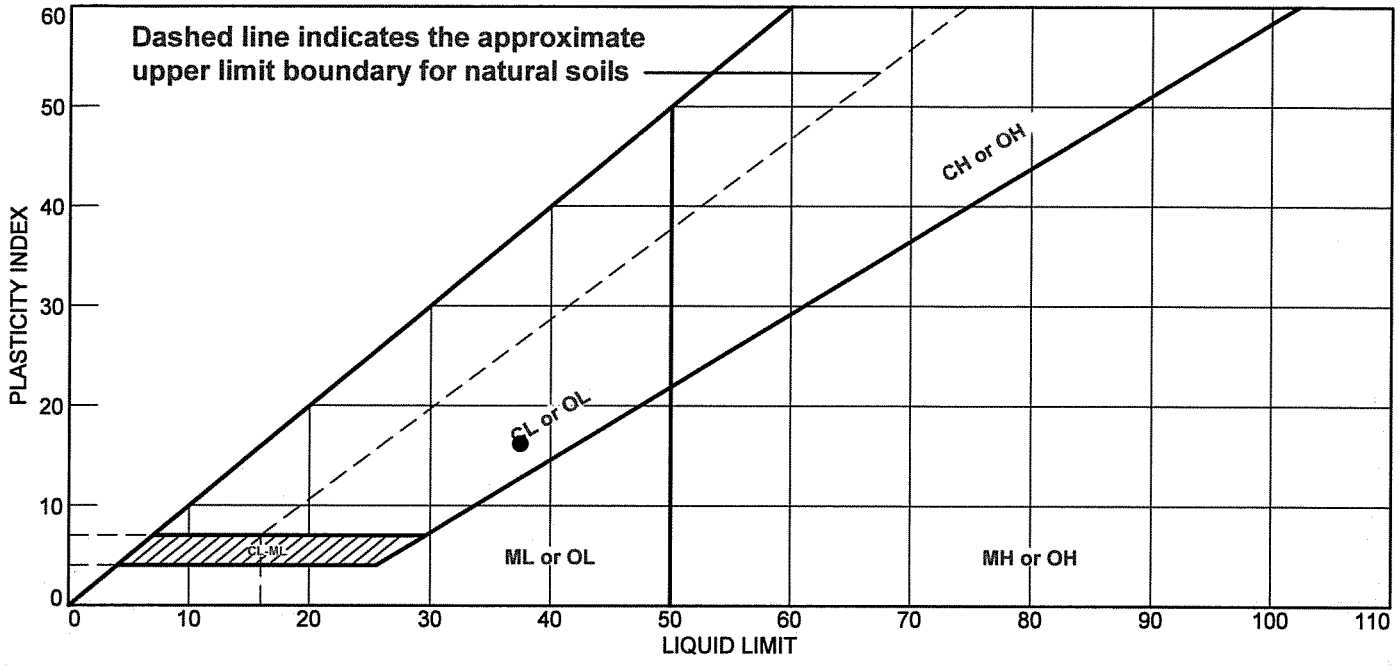
Remarks:

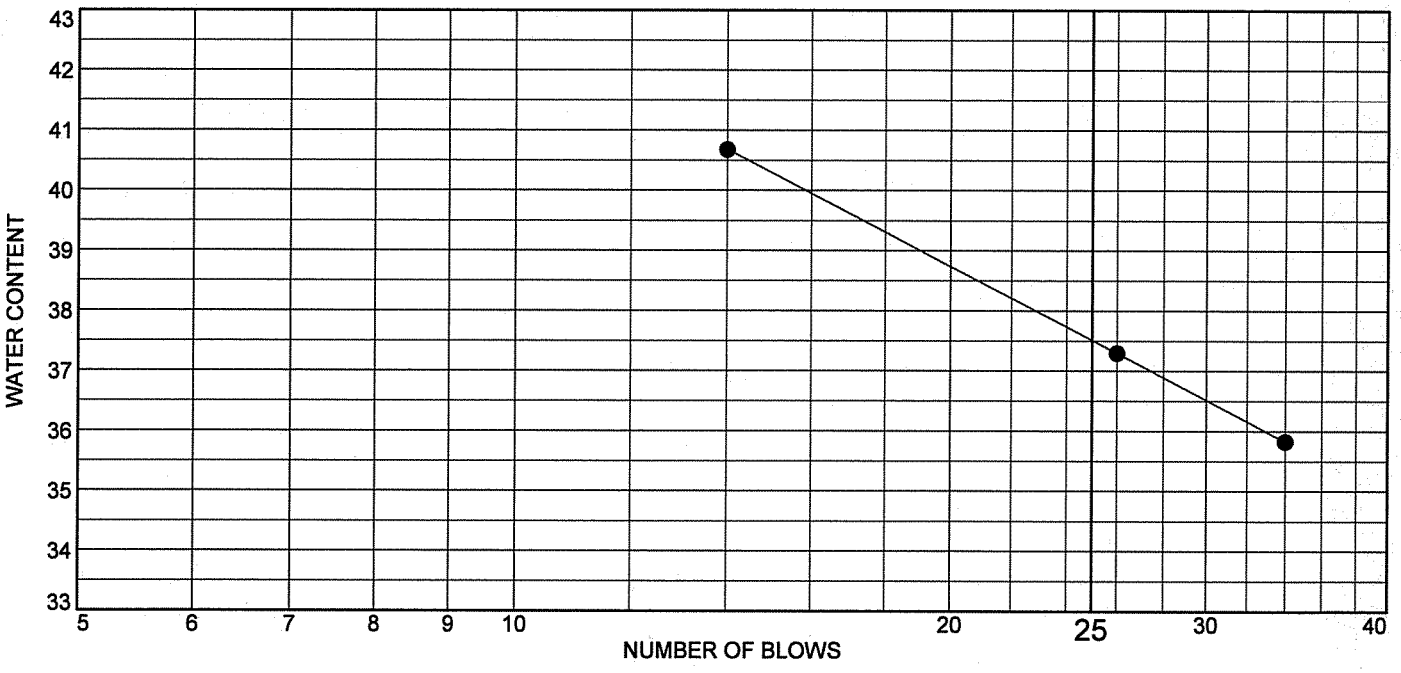
● Moisture Content: 40.7%

Lab No. 15227b

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

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	37.5	21.3	16.2			

Project No. 1368-014 **Client:** Schonewald Engineering Associates, Inc.

Project: MeTPK Kennebunk Service Plaza (#18-018)

Kennebunk, ME

Location: HB-KBNK-109

Sample Number: 6D **Depth:** 25'-27'

R.W. Gillespie & Associates, Inc.

Biddeford, Maine

Remarks:

● Moisture Content: 46.3%

Lab No. 15227c

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