Maine Department of Transportation
Highway Program

GEOTECHNICAL SERIES 100 REPORT

Route 17
Roxbury, Byron, Maine

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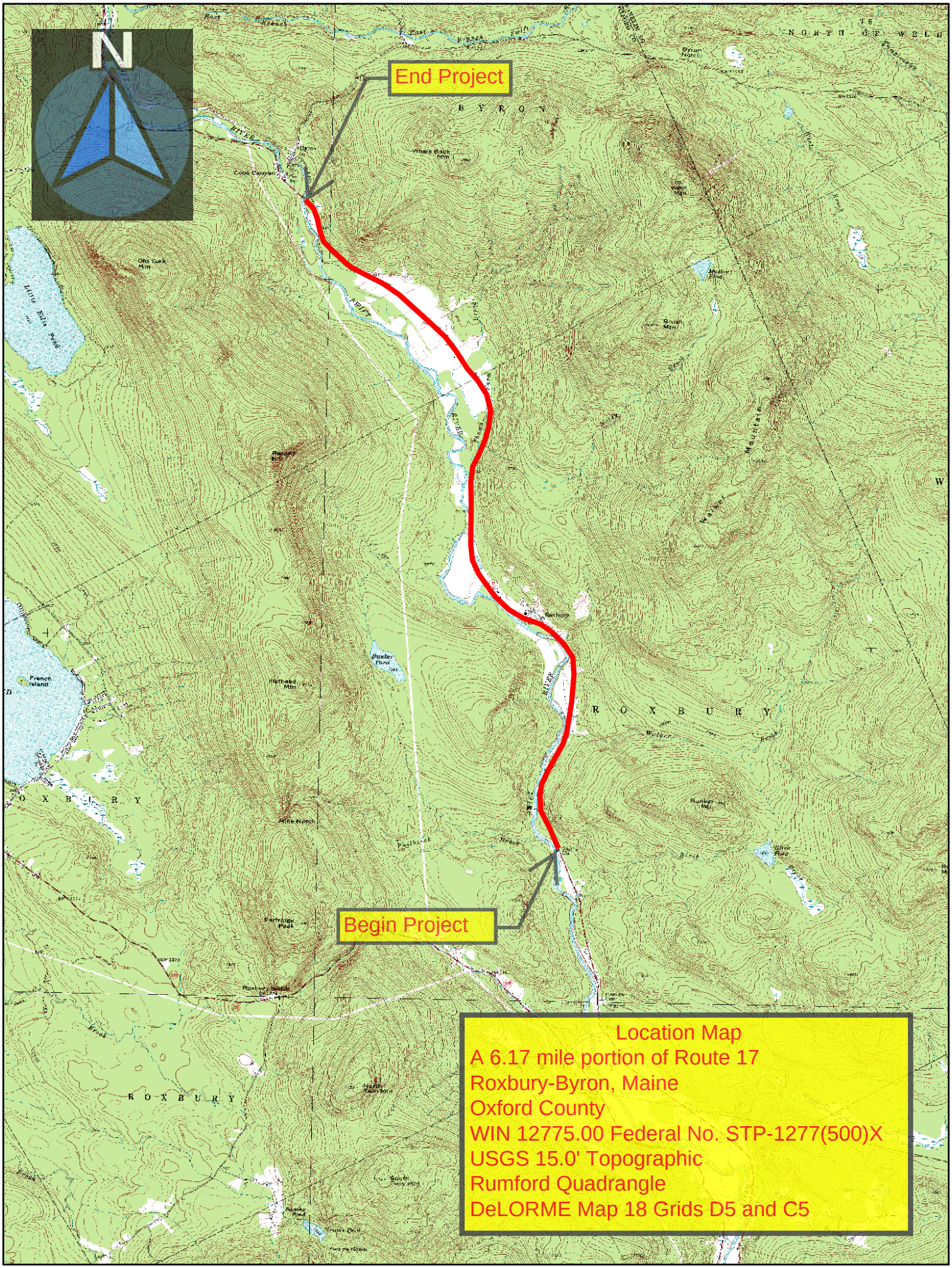
Oxford County

WIN 012775.00
Fed Project #: STP-1277(500)X
May 22, 2014

Soils Report No. 2014-130
TEDOCS # 1371330



Map Scale 1:64000

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Highway Program

Brad Foley, Program Manager

Memorandum

DATE: May 22, 2014

TO: Paul Macdonald **DEPT:** Highway Program

FROM: Scott A. Hayden **DEPT:** Highway Program

SUBJECT: Roxbury - Byron, Route 17, WIN 012775.00
100 Series Soils Report No. 2014-130

Project Information

A subsurface investigation has been completed for the rehabilitation/reconstruction of a 6.17 mile portion of Route 17 in the towns of Roxbury and Byron. The purpose of this investigation was to determine the existing pavement structure information and subsurface soil conditions. The investigation included the use of a drill rig, falling weight deflectometer (FWD) and ground penetrating radar (GPR).

The project begins 2.4 miles north of the Mexico/Roxbury town line and extends north 6.17 miles to the Swift River Bridge. Project stationing was not provided in the field. Stationing was determined using a distance measuring instrument (DMI) and Route Log Mile information. A starting station of 433+00 (RLM 102.06) was designated for this project by the designer. This starting point corresponds to the pavement joint between this project (gravel shoulders) and the newer project to the south (paved shoulders). All references to stationing are based on approximate stationing determined in the field using a vehicle mounted distance measuring instrument (DMI).

At the time of this investigation and the writing of this report there is no detailed design information available with respect to specific rehabilitation/reconstruction scope, vertical alignment, or horizontal alignment. If additional geotechnical information is needed as the proposed design proceeds, the Geotechnical team Member should be notified.

Existing Pavement Data

<u>ARAN Data Summary</u>

The existing pavement consists of two 10-foot travel lanes with variable width (4’ to 6’) gravel shoulders. Current pavement distress varies from slight to severe with cracking (fatigue, block, transverse, longitudinal, edge) and rutting. During the winter and spring thaw differential frost heaving is present at many cross pipe locations. In addition, water seepage/soil pumping was observed (4.10.2014) at several locations. It is anticipated that pavement distress is due to a general lack of surficial and subsurface drainage, seasonal moist to wet subgrade soil conditions, frost effects, traffic loading, and fatigue.

A summary of the 2012 ARAN data is presented in Table 1 below. It should be noted that this data was collected shortly after the project received a Maintenance Surface Treatment (MST) preservation treatment. A complete listing of the ARAN data is presented in the Pavement Performance Assessment Summary (PCAS) found at the back of this report.

Table 1: Summary of 2012 ARAN Pavement Data

ARAN Pavement Data	Range	Average
Pavement Condition Rating (PCR)	3.27 – 4.29	3.52
International Roughness Index (IRI)	72 - 165	126
Rut Depth (left)	0”	0”
Rut Depth (right)	0.1” – 0.2”	0.13”

Pavement Condition Rating (PCR)

PCR is defined as the composite condition of the pavement on a roadway. The PCR is compiled from the severity and extent of pavement distresses such as cracking, rutting, and ride quality. The rating system uses a scale of 5.00 (perfect) to 0.00 (fully deteriorated). The PCR is the condition of the pavement only, not necessarily a reflection of the condition of the roadway base structure. A description PCR rating follows:

Scale Value	Scale Rating	Description
5	Excellent	New or nearly new pavements. Free of cracks, patches or rutting.
4	Good	Pavements exhibit little to no visible signs of surface deterioration. Evidence of initial cracking or rutting.
3	Fair	Visible defects including moderate cracking, distortion and rutting. Some patching may now be present.
2	Poor	Pavement deterioration consisting of advanced cracking and severe distortion. Extensive patching and rutting also present.
1	Very Poor	Extremely deteriorated pavements. Defects include severe cracking, distortion, rutting and typically very extensive patching.

The PCR rating for this project ranges from 3.27 – 4.29 with an average PCR of 3.52. The poorest values (3.27) were encountered between stations 595+00 and 626+00.

International Roughness Index (IRI)

Ride quality is expressed in terms of International Roughness Index (IRI) and is measured in inches per mile. IRI is a measurement of the inches of vertical displacement experienced by a vehicle in a mile of roadway. The lower the IRI, the smoother the ride will be. A description IRI scale follows:

IRI Value (In./mile)	**Ride Rating**
< 100	Good Ride
100 - 170	Fair Ride
> 170	Poor Ride

The IRI value for this project ranged between 72 - 165 in/mile with an average IRI value of 126 in/mile. The poorest IRI value (165) was encountered between stations 501+00 and 531+00.

Wheel Path Rutting Values

Wheel path rutting is minimal throughout the project site. Rutting is more pronounced in the outside wheel path. Rut depths varied from 0" – 0.2". The greatest rut depth (0.2") was encountered between stations 595+00 and 732+00.

Existing HMA Thickness

This project received a thin maintenance surface treatment overlay in 2011. The power auger borings and the cutting of the 2" pavement cores were conducted prior to this overlay. The cutting of the 4" pavement cores were conducted after the time of this overlay.

Accurately estimating the existing HMA thickness for this project is difficult due to the deterioration of the HMA layer(s). Power auger borings, pavement coring and ground penetrating radar (GPR) all indicate that the HMA layer(s) is deteriorated and in poor condition. Pavement cores consisted of multiple broken HMA segments and pieces (See the attached HMA core pictures included with the GPR pavement thickness data). In addition, an unbound pavement layer at the base of the HMA layer(s) was described at many core hole and power auger locations. It is anticipated that the actual thickness and condition of the existing HMA will be variable and may vary from the reported information in this report.

Power Auger Boring Data – In 2007 thirty power auger borings were conducted through the existing pavement. In eight of the borings an unbound pavement layer was described underlying the HMA layer. It is not known if this unbound HMA layer is the result of the destructive nature of the boring process or due the complete deterioration of the lower layers of the HMA, or both. Please refer to the power auger boing logs included at the back of this report for specific pavement thicknesses and boring locations.

Coring Data – Pavement coring was first conducted in 2007 when this project was originally scheduled and then again in 2013 to ground truth the ground penetrating radar data. In 2007 forty-one 2-inch pavement cores were cut to determine the pavement thickness. Coring notes indicated the presence of unbound HMA pieces at the bottom of the core hole in more than half (59%) of the coring locations. In 2013 sixteen 4-inch pavement cores were cut. Coring notes for these cores make no mention of unbound HMA pieces at the bottom of the core hole. The 2013 4-inch cores were photographed and are included at the back of this report with the ground penetrating radar data. The majority of these cores (62%) consisted of broken HMA segments rather than a single solid pavement core.

GPR Data – GPR data was collected at 1 foot intervals in the left and right wheel path of both the south and north bound lanes. However, the GPR data confidence level is poor. Reflection layers are weak and jumbled and layer depths do not correlate well with known pavement depths obtained from pavement cores. These weak and jumbled GPR reflections are likely an indication that the existing HMA layer(s) is deteriorated. Pavement thickness estimates were developed using Geophysical Survey Systems Inc. (GSSI) RADAN GPR Data Processing Software. Where available, pavement core thicknesses were used to ground truth the GPR data. The GPR pavement estimate data is presented on the attached GPR Estimated Pavement Thickness summary sheets as an average pavement thickness every 50' for each travel lane. A spread sheet containing GPR data at 1 foot intervals is also available at Y:\12775\00\GEOTECH\MSTA\GPR Data.

A summary comparison of the existing HMA thickness information based on the power auger borings, pavement coring and GPR data is shown in Table 2 on the following page.

Table 2: Existing HMA Thickness Summary/Comparison

	Solid HMA (Thickness measured in boring wall or obtained in core)	**Unbound HMA**	**Total HMA (Solid+Unbound)**
Power Auger Data (2007)			
Range of Thickness	2.4” - 10.2”	1.2” - 2.4”	3.6” - 10.2”
Average Thickness	5.6”	1.4”	6.0”
Pavement Core Data (2007)			
Range of Thickness	2.4” - 7.8”	.8.0” - 4.2”	3.6” - 10.8”
Average Thickness	3.9”	2.1”	6.0”
Pavement Core Data (2013)			
Range of Thickness	4.5” – 11.3”		4.5” – 11.3”
Average Thickness	7.0”		7.0”
GPR Data	**Left**	**Right**	
Range of Thickness	2.5” - 11.7”	3.0” - 14.2”	
Average Thickness	5.8”	7.5”	

Note: The actual HMA thickness may vary from the above reported information.

FWD Results

FWD Analysis Summary

An FWD analysis was conducted using the following variables:

Design Life: 20
Initial Serviceability: 4.5
Reliability Level: 90

Future 18-kip P2.5 ESALs (Design Life): 620,500
Terminal Serviceability: 2.5
Overall Standard Deviation: .45

Pavement depths used for DARWin analysis were taken from Ground Penetrating Radar Summary sheet included at the back of this report. Gravel depths are based on subsurface exploration data. A summary of the FWD Analysis is shown below. The full analysis can be found in the attachment section located at the back of this report.

Table 3: Summary of FWD Analysis

Design Variables	**% Failing**	**Range**	**Average**	**75th Percentile**
Existing SN fails to exceed Future SN	48%			
Pavement Modulus (psi)		26,564 – 111,882	54,258	42,800
Subgrade Resilient Modulus (psi)		2,618 – 24,145	8,366	5,090

Existing Structural Number - The existing structural number along the project site general fails to meet the future traffic structural number for approximately half the project site. It should be noted that the existing structural number may be artificially high due to high subgrade resilient modulus values encountered throughout the project area.

High Subgrade Resilient Modulus Values – Very high (>12,000psi), non-typical, subgrade resilient modulus values (M_r) were encountered in many locations along the project site (See attached FWD analysis). This could indicate the possible presence of a relatively shallow bedrock surface or may indicate the presence of cobbly till soils and/or dense till soils.

Low Subgrade Modulus Values - Low subgrade resilient modulus values were encountered between stations 534+00 – 537+00, 542+00 – 549+00, 569+00 – 571+50, and 601+00 – 604+00. It is anticipated that these low values are due to moist to wet silty subgrade soil conditions. Depending on subgrade conditions at the time of construction these areas may have difficulties supporting traffic if the existing pavement surface is removed. Additional base material may be necessary to support traffic during construction.

FWD Deflection Plots and Interpretation

FWD deflection plots are a graphical presentation of the numerical deflection values (measured in mils (thousandth of an inch)) obtained from the 7 recording sensors during FWD testing. Variations in the uniformity and/or height of the deflection plots can be used as a potential indicator of existing and future pavement performance.

Pavement performance generally decreases in high deflection areas and/or in areas where deflection spikes (non-uniform deflection areas) are present. Higher deflections and/or less uniform deflections can be an indication of less favorable subsurface soil conditions. These variations in the height and/or uniformity of the deflection plots can indicate changes in subsurface soil conditions such as soil type, silt content, water content, plasticity and the general uniformity of the subgrade soil conditions.

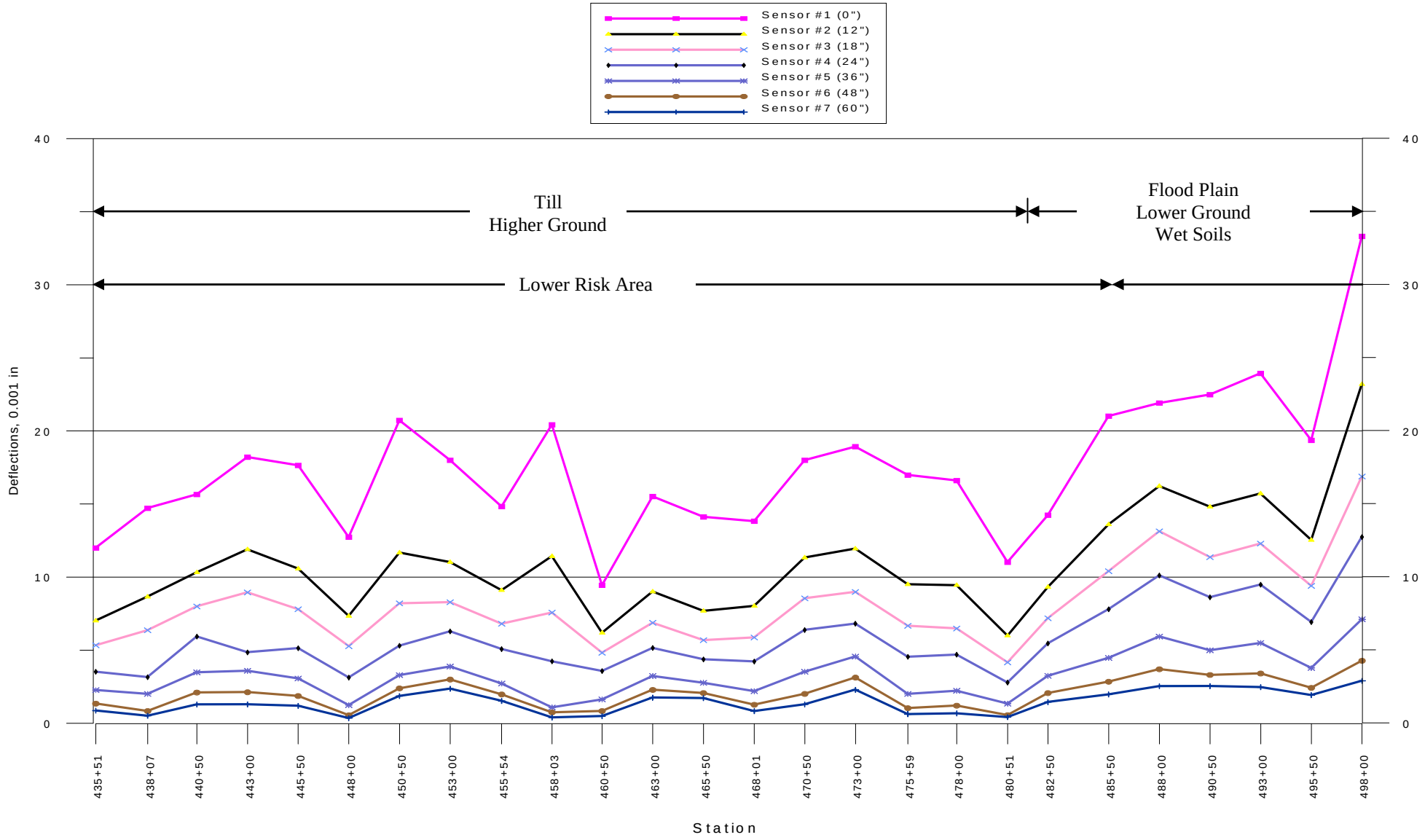
The FWD deflections along this project are quite erratic. Deflections vary considerably with respect to height and uniformity. The deflections tend to be lower and more uniform at higher elevations. Elevation changes are common along this project. These elevation changes are the result of the roadway transitioning between one of three different surficial deposits (glacial till, river terrace deposits, alluvium/flood plain deposits) previously described in the Geology/ Subgrade Soil Deposits section of this report. The till and river terrace deposits tend to be at the higher elevations and the flood plain deposits at the lowest elevations. As elevation increases locally within each specific surficial deposit, FWD deflections tend to become relatively lower and pavement performance tends to improve slightly.

The deflection plots for this project are included on the following page(s).

MaineDOT

FWD DEFLECTION DATA

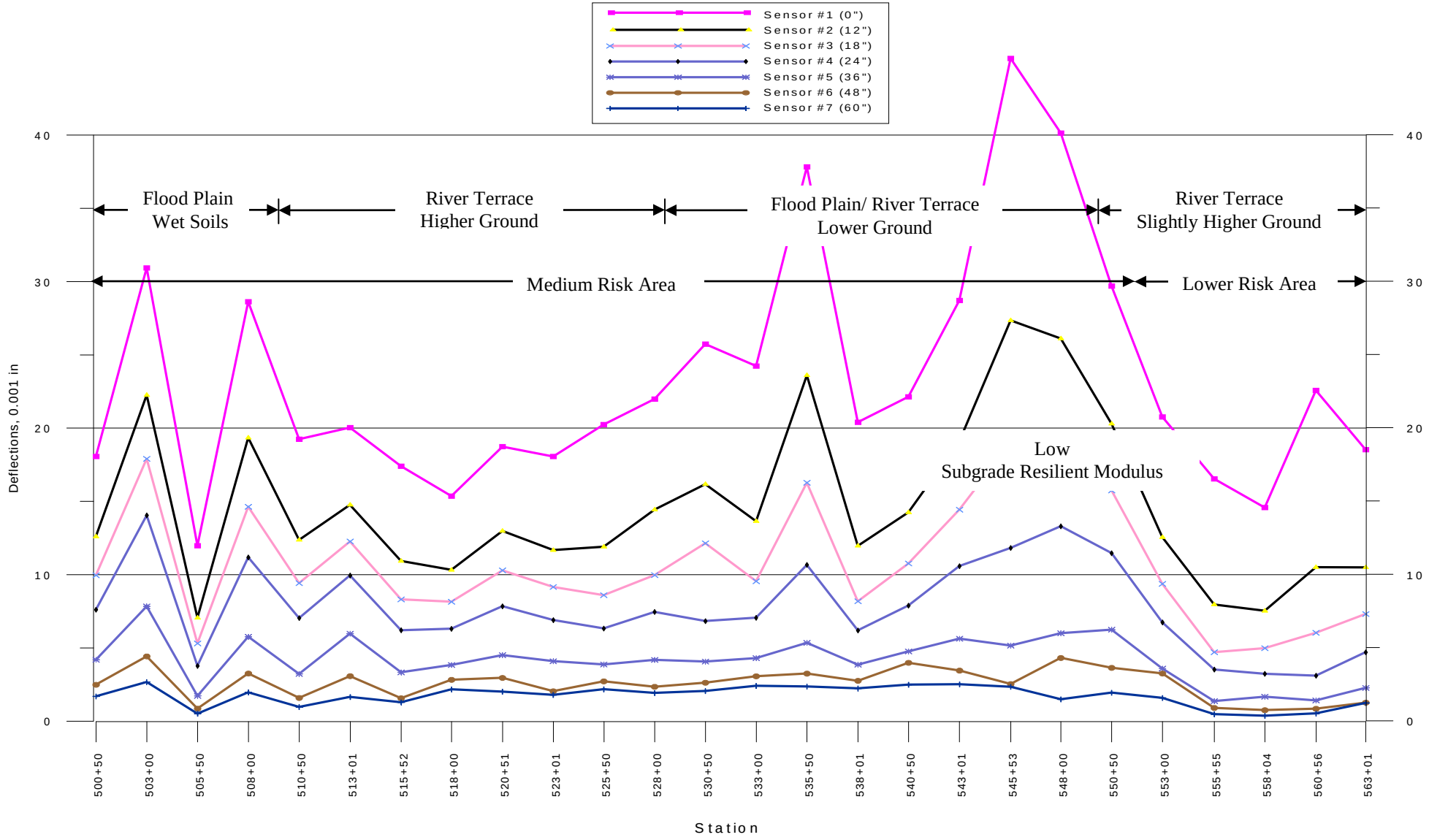
WIN/Town:	012775.00 - Roxbury, Byron			Reported By:	COLSON, STEPHEN W		
Route:	17	PMS Route Code:		Tested:	9/3/2013	Reported:	
Comments:	FWD Deflection Comments provided by Scott Hayden						



MaineDOT

FWD DEFLECTION DATA

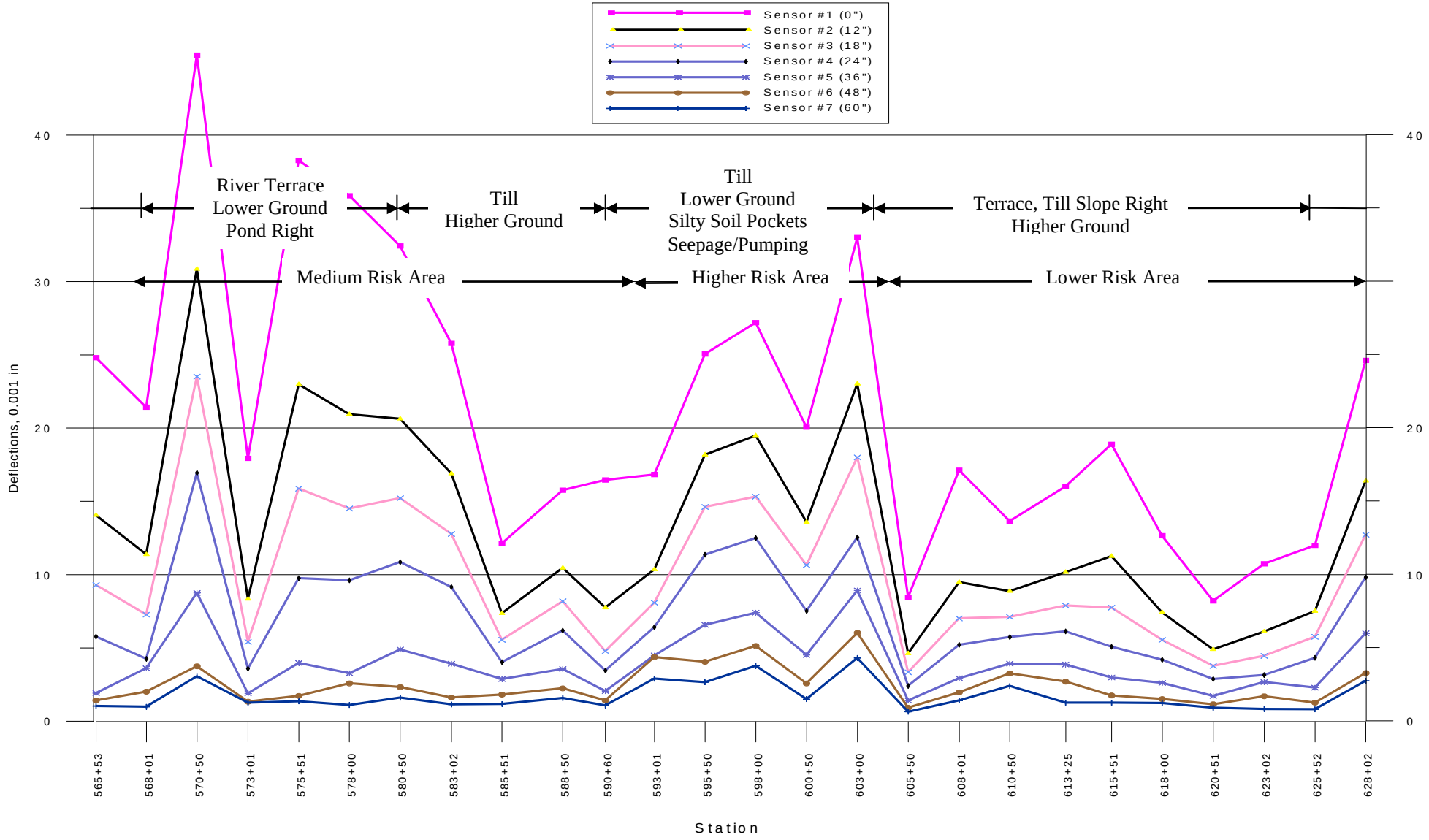
WIN/Town:	012775.00 - Roxbury, Byron			Reported By:	COLSON, STEPHEN W		
Route:	17	PMS Route Code:		Tested:	9/3/2013	Reported:	
Comments:	FWD Deflection Comments provided by Scott Hayden						



MaineDOT

FWD DEFLECTION DATA

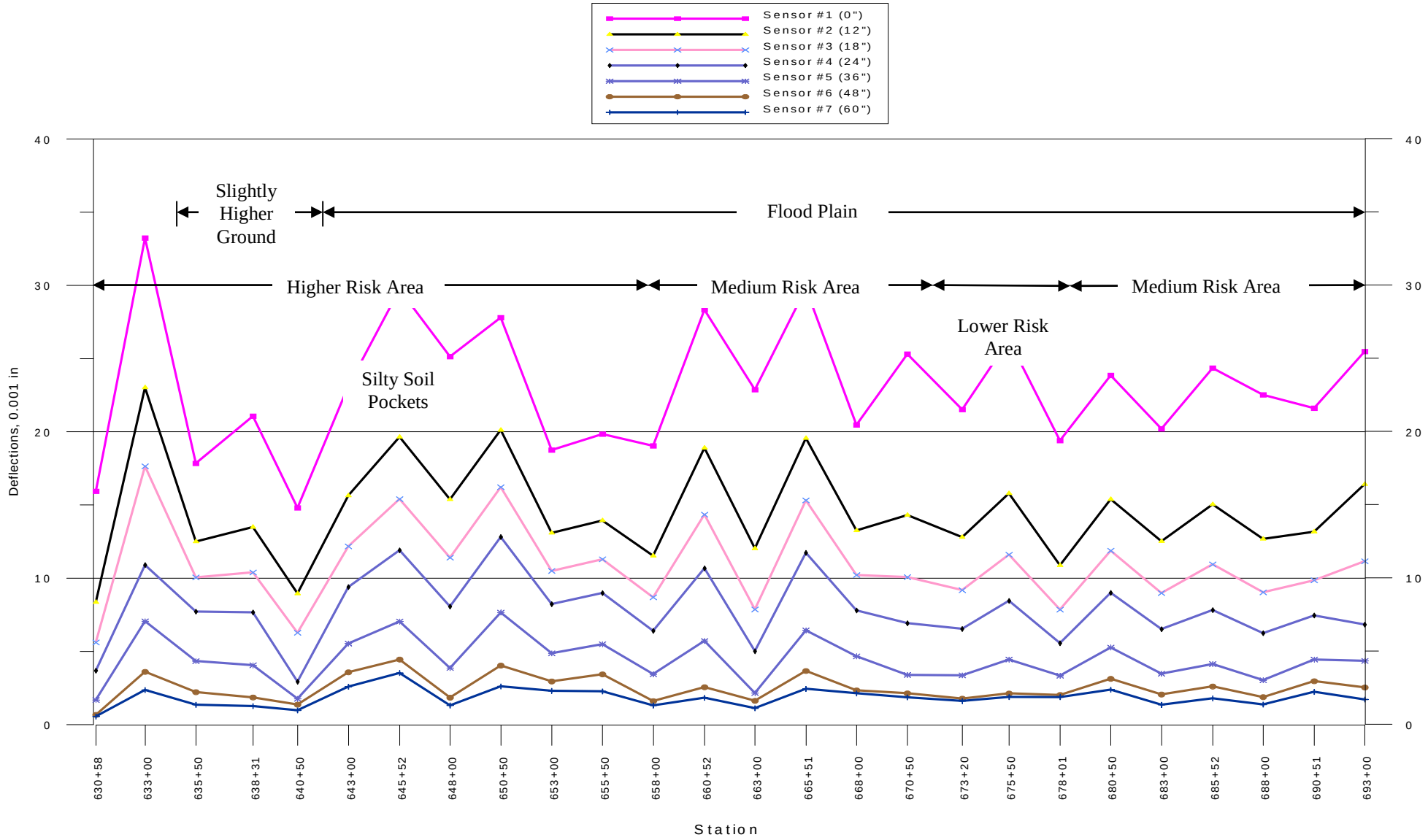
WIN/Town:	012775.00 - Roxbury, Byron			Reported By:	COLSON, STEPHEN W		
Route:	17	PMS Route Code:		Tested:	9/3/2013	Reported:	
Comments:	FWD Deflection Comments provided by Scott Hayden						



MaineDOT

FWD DEFLECTION DATA

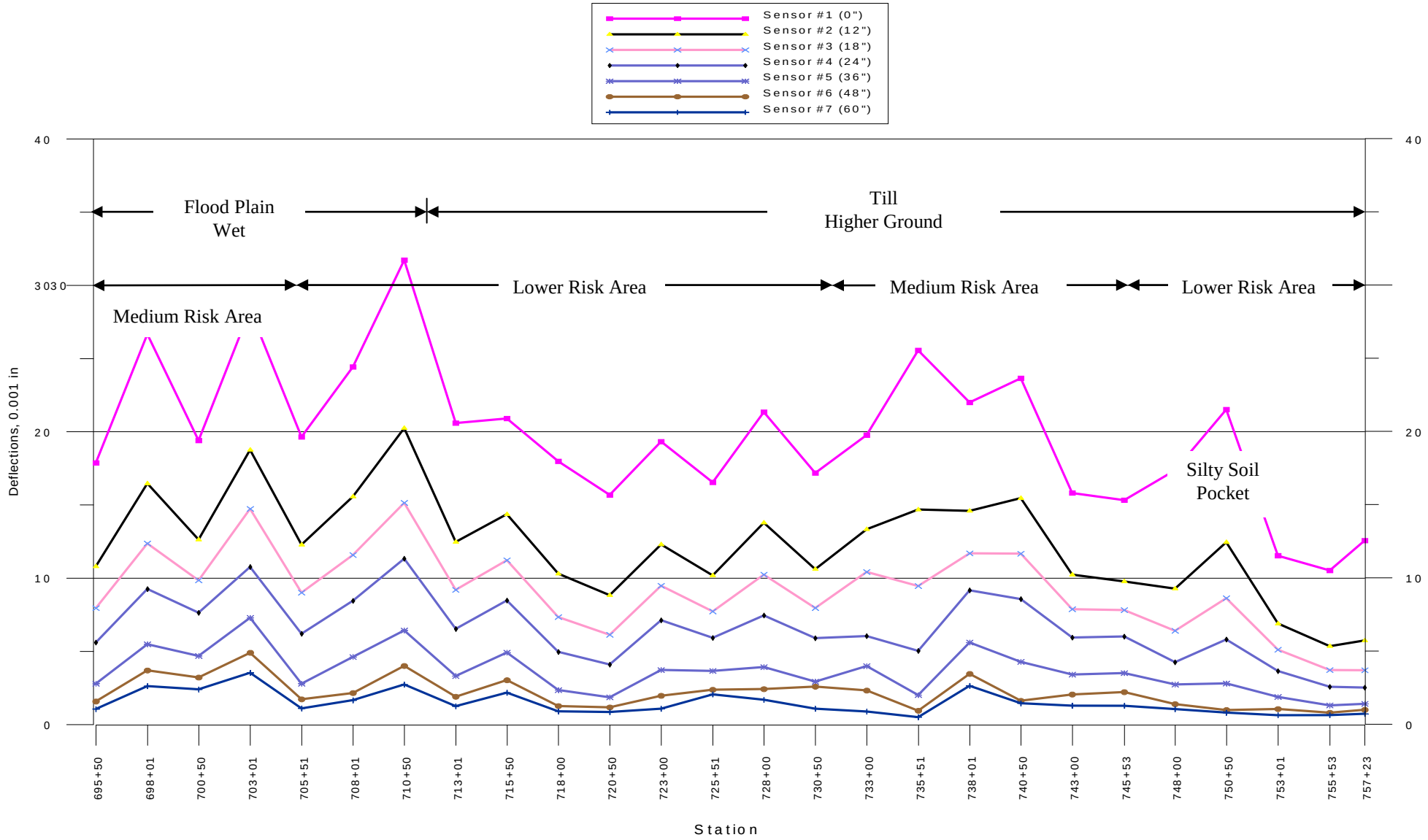
WIN/Town:	012775.00 - Roxbury, Byron			Reported By:	COLSON, STEPHEN W		
Route:	17	PMS Route Code:		Tested:	9/3/2013	Reported:	1/24/2014
Comments:	FWD Deflection Comments provided by Scott Hayden						



MaineDOT

FWD DEFLECTION DATA

WIN/Town:	012775.00 - Roxbury, Byron			Reported By:	COLSON, STEPHEN W		
Route:	17	PMS Route Code:		Tested:	9/3/2013	Reported:	1/24/2014
Comments:	FWD Deflection Comments provided by Scott Hayden						



Geology – Subgrade Soil Deposits

The project area is located within the Swift River valley. The Swift River occupies the valley floor and the project generally follows along the east shore of the river. The valley is surrounded by steep hills to the west and east. The steep hills on the east side of the river closely border the project in several areas. Native soils generally consist of glacial till, river terrace deposits, and flood plain deposits. Due to complex environmental conditions existing at the time of deposition the exact extent and composition of these deposits is unknown and can vary abruptly laterally and with depth. Brief descriptions of these deposit types and an estimate of their possible extent follows below.

Glacial Till

These soils consist primarily of an unsorted heterogeneous mixture of clay, silt, sand, gravel and boulders ranging widely in size and shape. They are deposited directly by or beneath the glacier. As a result this material can be loose or very dense (hardpan). These soils tend to be moderately to poorly drained. These soils can be highly frost susceptible and have an affinity to water and will lose much of their stability unless properly drained and compacted. Potential deposit location areas may include stations 435+00 – 482+00, 580+00 – 605+00 and 715+00 – 757+00.

River Terrace Deposits These soils consist mostly of sorted sands and gravels deposited from melt water streams flowing from wasting glacial ice along the flanks of the valley. They are located at elevations above the existing valley floor. These soils tend to be adequately drained and generally perform well as a subgrade soil. Potential deposit location areas may include stations 510+00 – 528+00, 550+00 – 580+00 and 605+00 – 625+00.

Alluvium/Flood Plain Deposits These deposits generally pertain to soils of a sorted or semi sorted mixture of clay, silt, sand, gravel deposited in the bed of a stream or on its flood plain or cone or fan at the base of a mountain slope. These soils tend to be moderately to poorly drained. These soils can be highly frost susceptible and can have an affinity to water and will lose stability unless properly drained and compacted. Potential deposit location areas may include stations 483+00 – 510+00, 528+00 – 550+00 and 641+00 – 715+00.

Subsurface Explorations

Power Auger Borings

A total of 37 power augers borings were conducted in 2007 to determine the existing roadway structure and underlying subgrade soil conditions (See included boring logs located in the attachment section at the back of this report). Power auger borings were conducted by Maine DOT using 5” solid stem augers. Bore hole logging was performed by Maine DOT. Soil sampling was conducted directly from the auger flights.

The majority of the power auger borings were conducted in the travel lanes. At seven specific locations (463+00, 568+00, 595+60, 628+00, 658+07, 693+00 and 715+50) power augers were conducted in both the travel lane and immediate adjacent gravel shoulder area to provide a side by side comparison between the travel lane structure and adjacent shoulder structure.

Soil Sampling

A total of 23 soil samples were collected and tested at the Maine DOT Materials and Testing laboratory, located in Bangor Maine. Grain size and water content testing was conducted on each sample. Based upon laboratory test results, soil samples were classified according to the Unified Classification System, AASHTO Soil Classification and Maine DOT Frost Susceptibility Rating. Testing results are summarized on the Laboratory Testing Summary Sheet located in the attachment section at the back of this report.

Existing Roadway Base

Existing Base Material Type:	silty gravelly SAND, damp to moist
AASHTO Classification/Sample #:	A-1-a / S1, S13, S15
	A-1-b / S2, S8, S11, S19, S21
Percent Passing #200 Sieve:	6% - 19%
Range of Base Material Thickness:	4” – 50”
Average Base Thickness:	17”
Quality of Drainage (AASHTO):	fair
Permeability:	11’ – 64’ per day

Based on power auger borings and sample data there are numerous areas along the project where the existing base thickness is anticipated to be less than 18 inches. In the majority of these areas the existing structural number fails to meet the future traffic structural number.

Existing Shoulder Base Material

Existing Base Material Type:	silty gravelly SAND, damp
AASHTO Classification/Sample #:	A-1-a / S1, S13
	A-1-b / S11
Percent Passing #200 Sieve:	6% - 13%
Range of Base Material Thickness:	7” – 25”
Average Base Thickness:	15”
Quality of Drainage (AASHTO):	fair
Permeability:	10’ – 64’ per day

Based on limited testing, the existing shoulder structure appears to be similar to the travel lane structure with respect to base quality and thickness. A summary comparison of the existing travel lane structure and adjacent shoulder structure is provided in Table 4 on the following page.

Table 4: Existing Base and Shoulder Material Comparison Summary

	Travel Lane		Gravel Shoulder	
	Base	Subgrade	Base	Subgrade
463+00	5” Pavement			
	25” SiGSa	GSiSa	25” SiGSa	GSiSa
	A-1-a, 6% fines	A-1-b, 18% fines	A-1-a, 6% fines	A-1-b, 18% fines
	Damp	Damp	Damp	Damp
568+00	5” Pavement			
	50” SiGSa	SiGSa	17” SiGSa	SiGSa
	A-1-b, 13% fines	A-1-a, 12% fines	A-1-b, 13% fines	A-1-a, 12% fines
	Damp	Damp	Damp	Damp
595+60	9” Pavement			
	6” SiGSa	SiSa	8” SiGSa	SiSa
	A-1-b, 13% fines	A-2-4, 28% fines	A-1-b, 13% fines	A-2-4, 28% fines
	Damp	Moist	Damp	Moist
628+00	5” Pavement			
	20” SiGSa	SiSa	24” SiGSa	SiSa
	A-1-a, 10% fines	A-2-4, 28% fines	A-1-a, 10% fines	A-2-4, 28% fines
	Damp	Moist	Damp	Moist
658+07	4” Pavement			
	17” SiGSa	SiSa	14” SiGSa	SiSa
	A-1-a, 10% fines	A-2-4, 28% fines	A-1-a, 10% fines	A-2-4, 28% fines
	Damp	Moist	Damp	Moist
693+00	5” Pavement			
	13” SiGSa	SaSi	7” SiGSa	SiSa
	A-1-a, 10% fines	A-4, 72% fines	A-1-a, 10% fines	A-2-4, 28% fines
	Damp	Moist	Damp	Moist
715+50	5” Pavement			
	25” SiGSa	SiSa	7” SiGSa	SiSa
	A-1-a, 10% fines	A-2-4, 28% fines	A-1-a, 10% fines	A-2-4, 28% fines
	Damp	Moist	Damp	Moist

Subgrade Soils

Based on power auger borings subgrade soils are anticipated to consist primarily of damp to wet silty SAND similar to sample S4. This material is classified (AASHTO/Unified) as an A-2-4/SM soil with 28% passing the # 200 sieve. This material is moderately frost susceptible. With proper drainage and compaction this material should perform adequately as a subgrade soil type.

Subgrade Soil Concerns

There are multiple areas along this project where existing subgrade soil conditions present some concern. Drainage will be very important in each of these areas. A description of these areas and concerns follows below:

- Wet Subgrade Conditions: Wet subgrade conditions were encountered in power auger borings/probes conducted in July at stations 496+50, 508+00 - 511+00, 533+00, 629+35 – 632+35, 650+50, and 675+50. At stations 632+35, 650+50 and 675+50 borings encountered wet soil conditions at 3.0' or less below the top of pavement. See attached boring logs and Performance Data Summary sheets.

- Highly Silty Subgrade Soils: Highly silty subgrade soils were encountered at stations 603+00, 645+50, 693+00, and 750+50. These soils consist of sandy SILT similar to sample S14. This material is very silty with 72% passing the # 200 sieve and has a high water content of 33%. This material is classified (AASHTO/Unified) as an A-4/ML soil. These sandy SILT soils are highly frost susceptible. They are poorly drained and have an affinity to water and will lose much of their stability unless properly drained and compacted. These soils may be encountered as isolated soil pockets. Depending on the scope of the project and subgrade conditions at the time of construction, the resident engineer may want to consider removing this material.

- Water Seepage/Soil Pumping through Pavement: Water seepage and soil pumping through the pavement was observed during the 2014 spring thaw in the vicinity of stations 595+50, 646+00, and 651+50.

  At station 595+50 the seepage/pumping problem is likely due to soil saturation and the lack of drainage. Soil pocket(s) containing highly silty soils could be encountered. A boring located at station 603+00 encountered a 2-foot thick moist sandy SILT (72% fines) layer directly underlying the existing base material.

  At stations 646+00 and 651+50 the seepage/pumping problem is likely due to soil saturation, lack of drainage, high (shallow) ground water table and wet silty subgrade soil conditions. A boring at 645+50 encountered a sandy SILT (72% fines, S14) layer at a depth of 2.7'. A boring located at station 650+50 encountered wet soil conditions 1.2' below the top of the existing pavement. Silty subgrade soils (43% fines, S16) were encountered at a depth of 1.9'.

  These areas should be investigated during the summer for possible spring activity. If spring activity is present additional drainage measures (stone weepers) may be necessary. These water seepage/soil pumping areas are located within project segments identified as higher risk/poorer performing areas (592+00 – 605+00, 630+00 – 655+00). Full reconstruction should be considered within these areas.

- Low Subgrade Resilient Modulus Values: Low subgrade resilient modulus values were encountered between stations 534+00 – 537+00, 542+00 – 549+00, 569+00 – 571+50, and 601+00 – 604+00. It is anticipated that these low values are due to moist to wet subgrade subsurface soil conditions. Depending on subgrade conditions at the time of construction these areas may have difficulties supporting traffic if the existing pavement surface is removed. Additional base material may be necessary to support traffic during construction.

Drainage

Drainage below the pavement structure is critical if long term pavement performance expectations are to be realized. Moist subgrade conditions were encountered throughout the project area. Wet subgrade conditions were encountered at stations 496+50, 508+00 - 511+00, 533+00, 629+35 – 632+35, 650+50, and 675+50. These moist to wet subgrade conditions were encountered in July and will likely vary seasonally due to temperature, precipitation, and construction activities.

Currently, ditching is marginal to non-existent throughout the project area. The construction of drainage ditches/underdrain is recommended in all cut sections or anywhere the natural ground is within 2 feet below finished grade. Ditches should be constructed with a minimum depth of 3 feet below finished grade when possible. Ditching may not be possible in areas where steep ascending slopes are in close proximity to the roadway (cannot daylight ditch backslopes). In these areas the installation of underdrain may be necessary.

Differential frost heaving during the winter/spring thaw is problematic at the majority of cross pipe locations. Some of the worse locations include stations 497+50, 501+63, 522+22, 524+50, 540+00, 542+50, 597+10, 601+67, 605+04, 631+18, 633+04, 634+98, 637+86, and 641+60. Cross pipes at these locations should be replaced/reinstalled utilizing the frost susceptible soil installation schematic provided on the recommendation page. (See Recommendation 2.)

Bedrock

Shallow bedrock (< 10’) is anticipated at several locations along the project site. In addition, there are many large glacial erratics on the surface or partially buried. Many of these erratics may exceed 2 cubic yards in size. Due to the cobbly/boulder nature of the till soils, power auger probe refusals may be unreliable in identifying potential bedrock surfaces.

The subgrade resilient modulus is very high (> 12,000 psi) throughout many locations along the project site. This could indicate the possible presence of a relatively shallow bedrock surface or may indicate the presence of cobbly till soils and/or dense till soils.

Based on power auger borings/probes, FWD deflection data, subgrade resilient modulus values and field observations, shallow bedrock is anticipated (< 10’) at the locations listed in Table 5 on the following page.

Table 5. Possible Shallow Bedrock (< 10') Locations

Station	Source
435+00 – 438+00	Subgrade Resilient Modulus, FWD Deflections
447+00 – 449+50	Outcrop, Subgrade Resilient Modulus, FWD Deflections
456+00 – 461+50	Outcrop, Subgrade Resilient Modulus, FWD Deflections
468+00	Outcrop ?, Subgrade Resilient Modulus
475+00 – 478+00	Outcrop, Subgrade Resilient Modulus, FWD Deflections
501+00	Power Auger Boring
505+00 – 510+00	Outcrop, Probes, Subgrade Resilient Modulus, FWD Deflections
555+00 - 565+00	Power Auger Boring, Subgrade Resilient Modulus, FWD Deflections
605+50	Subgrade Resilient Modulus, FWD Deflections
620+50 - 625+50	Subgrade Resilient Modulus, FWD Deflections
630+35 – 631+35	Probes, Subgrade Resilient Modulus
630+58, 663+00	Subgrade Resilient Modulus, FWD Deflections
718+00 – 720+50	Subgrade Resilient Modulus, FWD Deflections
748+00 – 757+00	Subgrade Resilient Modulus, FWD Deflections

If the installation of underdrain or any substantial lowering of the vertical grade is proposed in any of these areas listed above, additional borings should be conducted to determine if shallow bedrock exist.

Soil/Rock transition zones are recommended where frost susceptible soils and ledge meet within the frost zone. It is recommended that the frost susceptible soils be undercut with a 20:1 longitudinal transition and replaced with non-frost susceptible soils. A bedrock subgrade should be fractured blasted to promote drainage of the pavement structure. A typical section for transitions in frost susceptible soils is provided on the recommendation page. (See Recommendation 5.)

Frost Susceptible Soils / Frost Penetration

The subgrade soils along the project site are anticipated to be moderately frost susceptible. It is anticipated that frost action is a contributing factor to the declining pavement conditions. Frost action in soils requires the presence of frost susceptible soils, ground temperatures below 32° F, and water. Proper drainage of the pavement structure and the lowering or draw down of the ground table through ditching and/or under drain is critical in minimizing the damaging effects of frost action throughout this project.

The Maine Design Freezing Index for this project is approximately 1900. Frost penetration depth beneath a snow free pavement is anticipated to be between 39" (silt or clay) and 93" (sand or gravel) based on the 1955 Army Corps of Engineers, "Prediction of Freezing Temperature Penetration in New England".

Performance Data Summary

A Performance Data Summary (PDS) is included on the next pages. The purpose of the (PDS) is to identify potential performance differences along the project site based on the existing pavement structure and subsurface soil conditions as determined by subsurface explorations and falling weight deflectometer data collection. Performance differences are identified by meeting, or failing to meet, the four minimum performance criteria listed below:

- Existing pavement thickness is ≥ 4 inches (Boring Data)
- Existing base thickness is ≥ 18 inches (Boring Data)
- Subgrade resilient modulus is ≥ 3000 psi (FWD Data)
- Existing structural number exceeds future structural number (FWD Data)

The PDS sheets are color coded and should be printed in color to fully utilize the information. Green indicates the minimum performance criterion has been met. Red indicates the minimum performance criterion has failed to be met. The total number of failed performance criteria is presented in the deficient column (DEF). If a station location fails to meet 2 or more minimal performance criteria the deficiency (DEF) box will be shaded corresponding to the adjacent station column box.

Based on the Performance Data Summary (PDS), 32% of the project fails to meet 2 or more of the four minimum performance data criteria. Existing/Future pavement performance may be lower in these areas.

Performance Data Summary

Roxbury – Byron,
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Station (FWD)	DEF	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
435+51	0	Pavement Thickness (4 inches)	Base Thickness (18 inches)	Subgrade Modulus (3000 psi)	Structural Number						
438+07	0										
440+50	0										
443+00	0										
445+50	0										
448+00	0										
450+50	0										
453+00	0						4” SP - 35”	SiGSa A-1-a S1	6.3% 0 Damp	SiGSa A-1-b S2	19.0% II Damp
455+54	0										
458+03	0							Bedrock Outcrop Right			
460+50	0										
463+00	0						5”SP - 25”	SiGSa A-1-a S1	6.3% 0 Damp	GSiSa A-1-b S3	18.1% II Damp
465+50	0										
468+01	0										
470+50	0										
473+00	0						3”SP 2”UP 34”	SiGSa A-1-a S1	6.3% 0 Damp	SiSa A-2-4 S4	27.9% II Moist
475+59	0										
478+00	0										
480+51	0										
482+50	0										
485+50	0										
488+00	0							7”SP - 13”	SiGSa A-1-a S1	6.3% 0 Damp	SiSa A-2-4 S4
490+50	0										
493+00	1										

* SP = Solid Pavement Layer
* UP = Unbound Pavement Layer
SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Performance Data Summary

Roxbury – Byron,
Route 17, Highway Rehabilitation
12775.00

Station (FWD)	DEF	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
495+50	1						5”SP - 31”	SiSa A-2-4 S5	18.9% II Damp	SiSa A-2-4 S4	27.9% II Wet7.8’
497+50	1							497+50 low pipe heave sign			
498+00	1						7”SP - 17”	SiGSa A-1-b S2	19.0% II Damp	SiSa A-2-4 S4	27.9% II Moist
500+50	2							501+63 low pipe heave sign			
503+00	2						7”SP - 6”	SiGSa A-1-b S2	19.0% II Damp	SiSa A-2-4 S4	27.9% II Moist
505+50	1										
508+00	2										
510+50	1						8”SP - 4”	SiGSa A-1-b S2	19.0% II Damp	SiSa A-2-4 S4	27.9% II Wet 6.7’ Ref 9.4’
513+01	1										
515+52	1										
518+00	1										
520+51	1						7”SP - 11”	SiGSa A-1-b S8	13.6% II Damp	SiSa A-2-4 S4	27.9% II Moist
523+01	2							522+22 low pipe heave sign			
525+50	2							524+50 low pipe heave sign			
528+00	2										
530+50	2										
533+00	2						4”SP - 4”	SiGSa A-1-b S8	13.6% II Damp	SiSa A-2-4 S9	26.8% II Wet 7.4’
535+50	3										
538+01	2						5”SP 1”UP 4”	SiGSa A-1-b S8	13.6% II Damp	SiSa A-2-4 S9	26.8% II Damp
	2										

Pavement Thickness (4 inches)
Base Thickness (18 inches)
Subgrade Modulus (3000 psi)
Structural Number

* SP = Solid Pavement Layer
* UP = Unbound Pavement Layer
SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Performance Data Summary

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Station (FWD)	D E F	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
538+01	2						5”SP 1”UP 4”	SiGSa A-1-b S8	13.6% II Damp	SiSa A-2-4 S9	26.8% II Damp
540+50	2							540+00 low pipe heave sign			
543+01	3							542+50 low pipe heave sign			
545+53	3										
548+00	3						7”SP - 11”	SiGSa A-1-b S8	13.6% II Damp	SiSa A-2-4 S4	27.9% II Moist
550+50	2										
553+00	1										
555+55	0	Pavement Thickness (4 inches)	Base Thickness (18 inches)	Subgrade Modulus (3000 psi)	Structural Number						
558+04	0										
560+56	0						5”SP - 30”	SiGSa A-1-b S8	13.6% II Damp	SiGSa A-1-b S7	14.8% II Damp
563+01	0										
565+53	0										
568+01	2						4”SP 1”UP 50”	SiGSa A-1-b S11	13.1% II Damp	SiGSa A-1-a S12	12.0% 0 Damp
570+50	1										
573+01	1										
575+51	2										
578+00	2										
580+50	2						9”SP - 8”	SiGSa A-1-b S11	13.1% II Damp	SiSa A-2-4 S4	27.9% II Moist
583+02	2										
585+51	1										
588+50	2										
590+60	2										
593+01	1										

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SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Performance Data Summary

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Station (FWD)	D E F	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
595+50	2						7”SP 2”UP 6”	SiGSa A-1-b S11	13.1% II Damp	SiSa A-2-4 S4	27.9% II Moist
595+50	2							Water Seepage/Soil Pumping through roadway			
598+00 to 600+50	3							Multiple Heave signs present at existing cross pipe locations			
600+50	3										
603+00	3						4”SP - 12”	SiGSa A-1-a S13	9.5% 0 Damp	SaSi A-4 S14	72.6% IV Moist
605+50	1										
608+01	1										
610+50	1										
613+25	1						2”SP 1”UP 22”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa A-2-4 S4	27.9% II Moist
615+51	1										
618+00	1										
620+51	0										
623+02	0										
625+52	0										
628+02	1						5”SP - 20”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa A-2-4 S4	27.9% II Moist
630+58	0						Probes wet 3.0’	631+00 low pipe heave sign			
633+00	2							633+00, 635+00 low pipe heave signs			
635+50	1										
638+31	2							638+00 low pipe heave sign			
640+50	1							641+60 low pipe heave sign			
643+00	2										
	2										

Pavement Thickness (4 inches)
Base Thickness (18 inches)
Subgrade Modulus (3000 psi)
Structural Number

* SP = Solid Pavement Layer
* UP = Unbound Pavement Layer
SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Performance Data Summary

Roxbury – Byron,
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Station (FWD)	D E F	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
645+52	2						6”SP 1”UP 14”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa/SaSi A-2-4 / A-4 S4/14	27/72% II/ IV Moist
646+00	2							Water Seepage/Soil Pumping through roadway			
648+00	2										
650+50	2						10”SP - 13”	SiGSa A-1-a S15	6.5% 0 Wet 1.2’	SiSa A-4 S16	43.2% III Wet 1.2’
651+50	2							Water Seepage/Soil Pumping through roadway			
653+00	2										
655+50	2										
658+00	1						4”SP - 17”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa A-2-4 S4	27.9% II Moist
660+52	2										
663+00	1										
665+51	2										
668+00	1										
670+50	1										
673+20	1										
675+50	1						5”SP - 11”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa A-4 S16	43.2% III Wet 1.3’
678+01	1										
680+50	2										
683+00	2										
685+52	2										
688+00	2										
690+51	2										
693+00	2						5”SP - 13”	SiGSa A-1-a S13	9.5% 0 Damp	SaSi A-4 S14	72% IV Moist
695+50	1										
698+01	2										

Pavement Thickness (4 inches)
Base Thickness (18 inches)
Subgrade Modulus (3000 psi)
Structural Number

* SP = Solid Pavement Layer
* UP = Unbound Pavement Layer
SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Performance Data Summary

Roxbury – Byron,
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Station (FWD)	D E F	Minimum Performance Data Criteria				Boring Location (Plan View)		Base Material		Subgrade Soils	
								AASHTO Class	% #200	AASHTO Class	% #200
						KEY					
Station		Red – Fail Green - Met				Solid Pave Thick Unbound Pave - UP Base Thickness (inches)		Soil Type AASHTO Sample #	% 200 Frost Moisture	Soil Type AASHTO Sample #	% 200 Frost Moisture
						CL					
700+50	2										
703+01	2						5”SP 1”UP 14”	SiGSa A-1-a S13	9.5% 0 Damp	SiSa A-2-4 S4	27.9% II Moist
705+51	1										
708+01	1										
710+50	1										
713+01	1										
715+50	0						5”SP - 25”	SiGSa A-1-b S19	15.5% II Damp	SiSa A-2-4 S4	27.9% II Moist
718+00	0	Pavement Thickness (4 inches)	Base Thickness (18 inches)	Subgrade Modulus (3000 psi)	Structural Number						
720+50	0										
723+00	0										
725+51	0										
728+00	0										
730+50	1						5”SP - 16”	SiGSa A-1-b S21	9.5% 0 Damp	SiGSa A-1-b S22	21.4% II Damp
733+00	2										
735+51	2										
738+01	2										
740+50	2						8”SP - 6”	SiGSa A-1-b S21	9.5% 0 Damp	SiSa A-4 S23	39.2% III Moist
743+00	2										
745+53	0										
748+00	0										
750+50	0						4”SP - 23”	SiGSa A-1-a S13	9.5% 0 Damp	SaSi A-4 S14	72.6% IV Moist
753+01	0										
755+53	0										

* SP = Solid Pavement Layer
* UP = Unbound Pavement Layer
SP+UP = Total Pavement Thickness
* Base Thickness = Red indicates presence of “treated base”

Pavement Condition Assessment Summary

A Pavement Condition Assessment Summary (PCAS) is provided on the next page. The PCAS is a relative pavement condition evaluation tool utilizing data obtained from the FWD and ARAN testing. The purpose of the PCAS is to highlight relative differences in the existing pavement conditions.

The data utilized from the FWD includes the deflections, existing structural number, and future structural number. The data utilized from the ARAN include the Pavement Condition Rating (PCR), International Roughness Index (IRI), and rutting depths from both wheel paths.

Six potential condition criteria are used to develop the PCAS. An explanation of the six criteria follows:

1. Existing Structural Number (SN) is less than the Future Structural Number (FWD Data) - If the existing SN is less than the future SN at any station along the project an X will be placed in the corresponding column and the box will be shaded.

2. Increased and/or Non Uniform FWD Deflections (FWD Data) – An X is placed in this column anytime the pavement deflection (1st sensor) is greater than 15 mils.

3. IRI ≥ 150 (ARAN Data) – A complete listing of all ARAN IRI values collected for the project are listed on the PCAS in the IRI column. If the IRI value becomes ≥ 150 (indicating a reduction in ride performance) for any station the box will be shaded on the PCAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx.

4. PCR ≤ 3.5 (ARAN Data) – A complete listing of all ARAN PCR values collected for the project are listed on the PCAS in the PCR column. If the PCR value becomes ≤ 3.5 (indicating increased pavement deterioration) for any station the box will be shaded on the PCAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx..

5 & 6. Left Rut Depth / Right Rut Depth (ARAN Data) – A complete listing of all left and right rut depth values collected along the project are listed on the PCAS in the rut depth columns. If the rut depth becomes 0.5" or greater the box will be shaded on the PCAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx..

Deficiency Column - The total number of deficient performance criteria (0 – 6) are totaled and placed in the deficient column (Def) for each station identified in the PCAS. If the total listed becomes 3 or greater the box will then be shaded. Existing and future pavement performance is likely to be reduced in areas exhibiting a greater number in the deficiency column. Additional reclamation measures may want to be considered in these poorly performing areas.

Pavement Condition Assessment Summary

(PCAS)

Roxbury - Byron

Route 17

012775.00

LOCATION		DEFICIENCIES	PERFORMANCE MEASURESUREMENTS							GENERAL PAVEMENT INFORMATION					
			GPR	FWD Data		ARAN Performance Data				ARAN Supplemental Data					
Station	RLM	# of Performance Deficiencies (0 - 6)	HMA Thck (in.)	Existing SN < Future SN	Increased FWD Pavement Deflections	PCR ≤ 3.5	IRI ≥ 150	Wheel Path Rutting ≥ 0.5"		Shoulder Type and Width				Inv Yr	Yr. Resurf.
								Left	Right	Left		Right			
								(in.)	(in.)		ft		ft		
433+00	102.06	1	8		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
434+06	102.08	1	8		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
434+58	102.09	1	6		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
435+11	102.1	1	6		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
435+64	102.11	1	7		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
436+70	102.13	1	8		X	4.29	73	0	0.1	Gravel	6	Gravel	6	2012	2011
437+75	102.15	1	7		X	3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
446+73	102.32	1	8		X	3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
447+26	102.33	1	7		X	3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
448+00	102.34	0	8			3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
450+95	102.4	1	8		X	3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
460+50	102.58	0	7			3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
466+79	102.7	0	4			3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
467+32	102.71	0	4			3.69	72	0	0.1	Gravel	6	Gravel	6	2012	2011
469+43	102.75	1	5		X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
479+00	102.93	0	5			3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
482+00	102.99	0	6			3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
482+63	103	1	6		X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
483+69	103.02	1	10		X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
484+22	103.03	1	11		X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
484+74	103.04	1	10		X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
491+00	103.16	2	10	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
496+36	103.26	2	12	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
496+89	103.27	2	12	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
498+47	103.3	2	10	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
499+00	103.31	2	15	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
500+06	103.33	2	12	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
500+58	103.34	2	11	X	X	3.55	111	0	0.1	Gravel	6	Gravel	6	2012	2011
501+11	103.35	4	12	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
508+00	103.48	4	10	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
520+51	103.72	3	12		X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
521+00	103.73	4	9	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
523+82	103.78	4	13	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
524+34	103.79	4	12	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
525+93	103.82	4	11	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
526+98	103.84	4	8	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
527+51	103.85	4	10	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
528+04	103.86	4	11	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
530+15	103.9	4	13	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011

Note: Dates provided for "Year Resurfaced" are provided from ARAN data and have not been verified.
GPR pavement thickness taken from outside wheel path, rounded to the nearest inch.

Roxbury - Byron
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LOCATION		DEFICIENCIES	PERFORMANCE MEASURESUREMENTS							GENERAL PAVEMENT INFORMATION					
			GPR	FWD Data		ARAN Performance Data				ARAN Supplemental Data					
Station	RLM	# of Performance Deficiencies (0 - 6)	HMA Thck (in.)	Existing SN < Future SN	Increased FWD Pavement Deflections	PCR ≤ 3.5	IRI ≥ 150	Wheel Path Rutting ≥ 0.5"		Shoulder Type and Width				Inv Yr	Yr. Resurf.
								Left	Right	Left		Right			
								(in.)	(in.)		ft		ft		
530+68	103.91	4	13	X	X	3.35	165	0	0.1	Gravel	6	Gravel	6	2012	2011
532+79	103.95	3	14	X	X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
541+77	104.12	3	10	X	X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
552+00	104.31	3	12	X	X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
553+00	104.33	2	10		X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
560+25	104.47	2	5		X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
560+78	104.48	2	8		X	3.48	143	0	0.1	Gravel	6	Gravel	6	2012	2011
563+94	104.54	2	9		X	3.4	142	0	0.1	Gravel	6	Gravel	6	2012	2011
568+17	104.62	3	5	X	X	3.4	142	0	0.1	Gravel	6	Gravel	6	2012	2011
585+51	104.95	3	9	X	X	3.4	142	0	0.1	Gravel	6	Gravel	6	2012	2011
591+40	105.06	3	7	X	X	3.4	142	0	0.1	Gravel	6	Gravel	6	2012	2011
591+93	105.07	3	6	X	X	3.4	142	0	0.1	Gravel	6	Gravel	8	2012	2011
595+10	105.13	3	7	X	X	3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
601+96	105.26	3	7	X	X	3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
603+00	105.28	3	4	X	X	3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
605+50	105.33	1	4			3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
613+00	105.47	1	4			3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
613+05	105.47	2	5		X	3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
616+50	105.53	2	5		X	3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
617+00	105.7	1	4			3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
622+55	105.65	1	5			3.27	127	0	0.2	Gravel	6	Gravel	8	2012	2011
623+08	105.66	1	6			3.27	127	0	0.2	Gravel	6	Gravel	6	2012	2011
624+14	105.68	1	4			3.27	127	0	0.2	Gravel	6	Gravel	6	2012	2011
624+66	105.69	1	6			3.27	127	0	0.2	Gravel	6	Gravel	6	2012	2011
625+00	105.7	1	5			3.27	127	0	0.2	Gravel	6	Gravel	6	2012	2011
625+72	105.71	2	8		X	3.27	127	0	0.2	Gravel	6	Gravel	6	2012	2011
626+25	105.72	2	8		X	3.57	156	0	0.1	Gravel	6	Gravel	6	2012	2011
627+83	105.75	2	7		X	3.57	156	0	0.1	Gravel	6	Gravel	6	2012	2011
628+36	105.76	3	8	X	X	3.57	156	0	0.1	Gravel	6	Gravel	6	2012	2011
653+70	106.24	3	6	X	X	3.57	156	0	0.1	Gravel	6	Gravel	6	2012	2011
654+23	106.25	3	7	X	X	3.57	156	0	0.1	Gravel	6	Gravel	6	2012	2011
657+93	106.32	2	6	X	X	3.52	143	0	0.2	Gravel	6	Gravel	6	2012	2011
667+96	106.51	2	10	X	X	3.52	143	0	0.2	Gravel	6	Gravel	6	2012	2011
668+49	106.52	1	8		X	3.52	143	0	0.2	Gravel	6	Gravel	6	2012	2011
672+18	106.59	1	10		X	3.52	143	0	0.2	Gravel	6	Gravel	6	2012	2011
679+58	106.73	2	5	X	X	3.52	143	0	0.2	Gravel	4	Gravel	6	2012	2011
680+10	106.74	2	9	X	X	3.52	143	0	0.2	Gravel	4	Gravel	6	2012	2011
683+27	106.8	3	6	X	X	3.49	142	0	0.2	Gravel	4	Gravel	6	2012	2011
701+75	107.15	3	6	X	X	3.49	142	0	0.2	Gravel	4	Gravel	6	2012	2011
705+45	107.22	3	7	X	X	3.49	142	0	0.2	Gravel	4	Gravel	6	2012	2011
705+98	107.23	2	8		X	3.49	142	0	0.2	Gravel	4	Gravel	6	2012	2011
709+14	107.29	1	10		X	3.6	133	0	0.2	Gravel	4	Gravel	6	2012	2011
731+32	107.71	2	7	X	X	3.6	133	0	0.2	Gravel	4	Gravel	6	2012	2011

Note: Dates provided for "Year Resurfaced" are provided from ARAN data and have not been verified.
GPR pavement thickness taken from outside wheel path, rounded to the nearest inch.

Roxbury - Byron
Route 17
012775.00

LOCATION		DEFICIENCIES	PERFORMANCE MEASURESUREMENTS							GENERAL PAVEMENT INFORMATION					
			GPR	FWD Data		ARAN Performance Data				ARAN Supplemental Data					
Station	RLM	# of Performance Deficiencies (0 - 6)	HMA Thck (in.)	Existing SN < Future SN	Increased FWD Pavement Deflections	PCR ≤ 3.5	IRI ≥ 150	Wheel Path Rutting ≥ 0.5"		Shoulder Type and Width				Inv Yr	Yr. Resurf.
								Left	Right	Left		Right			
								(in.)	(in.)		ft		ft		
731+85	107.72	2	5	X	X	3.6	133	0	0.2	Gravel	4	Gravel	6	2012	2011
735+02	107.78	3	7	X	X	3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
745+00	10797	3	7	X	X	3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
746+10	107.99	2	9		X	3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
746+63	108	2	8		X	3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
753+00	108.12	1	4			3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
754+02	108.14	1	5			3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
758+78	108.23	1	5			3.43	123	0	0.1	Gravel	4	Gravel	6	2012	2011
Average		**2.0**	**7.9**			**3.52**	**126**	**0.00**	**0.13**						

Note: Dates provided for "Year Resurfaced" are provided from ARAN data and have not been verified.
GPR pavement thickness taken from outside wheel path, rounded to the nearest inch.

Recommendations

1. Based on the Performance Data Summary (PDS), Pavement Condition Assessment Summary (PCAS), and April 10, 2014 field review the following relative project condition summary is made. Full reconstruction should be considered for the higher risk/poor condition project segments.

- Higher Risk Areas / Poorest Condition Areas

592+00	to	605+00	1,300 ft
630+00	to	655+00	2,500 ft
			3,800 ft

- Medium Risk Areas / Marginal Condition Areas

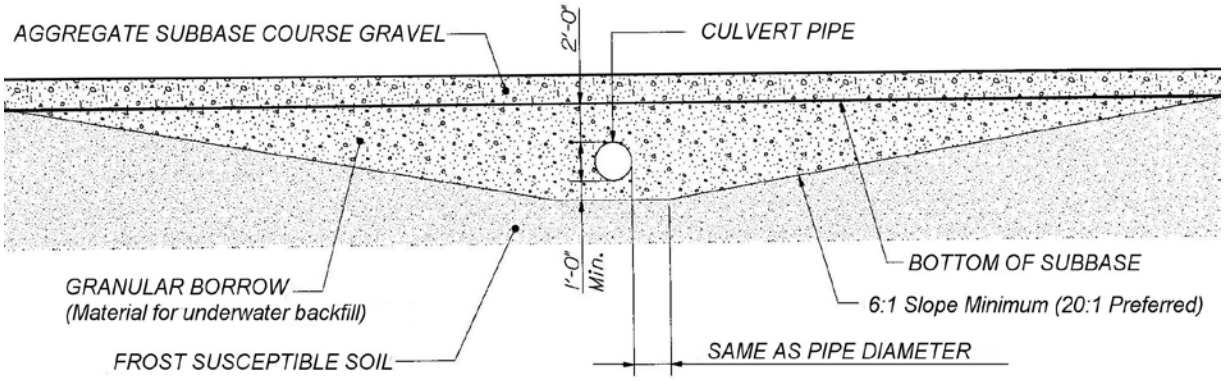
500+00	to	553+00	5,300 ft
567+00	to	592+00	2,500 ft
655+00	to	672+00	1,700 ft
679+00	to	705+00	2,600 ft
731+00	to	746+00	1,500 ft
			13,600 ft

- Lower Risk Areas / Best Condition Areas

433+00	to	500+00	6,700 ft
553+00	to	567+00	1,400 ft
605+00	to	630+00	2,500 ft
672+00	to	679+00	700 ft
705+00	to	731+00	2,600 ft
746+00	to	758+00	1,200 ft
			15,100 ft

2. Differential frost heaving during the winter/spring thaw is problematic at the majority of cross pipe locations. Some of the worse locations include stations 497+50, 501+63, 522+22, 524+50, 540+00, 542+50, 597+10, 601+67, 605+04, 631+18, 633+04, 634+98, 637+86, and 641+60. Cross pipes at these locations should be reinstalled utilizing the frost susceptible soil installation schematic below.

CROSS CULVERT INSTALLATION IN FROST SUSCEPTIBLE SOILS



3. The construction of drainage ditches/underdrain is recommended in all cut sections or anywhere the natural ground is within 2 feet below finished grade. Ditches should be constructed with a minimum depth of 3 feet below finished grade when possible. Ditching may not be possible in areas where steep ascending slopes are in close proximity to the roadway (cannot daylight ditch backslopes). In these areas the installation of underdrain may be necessary.

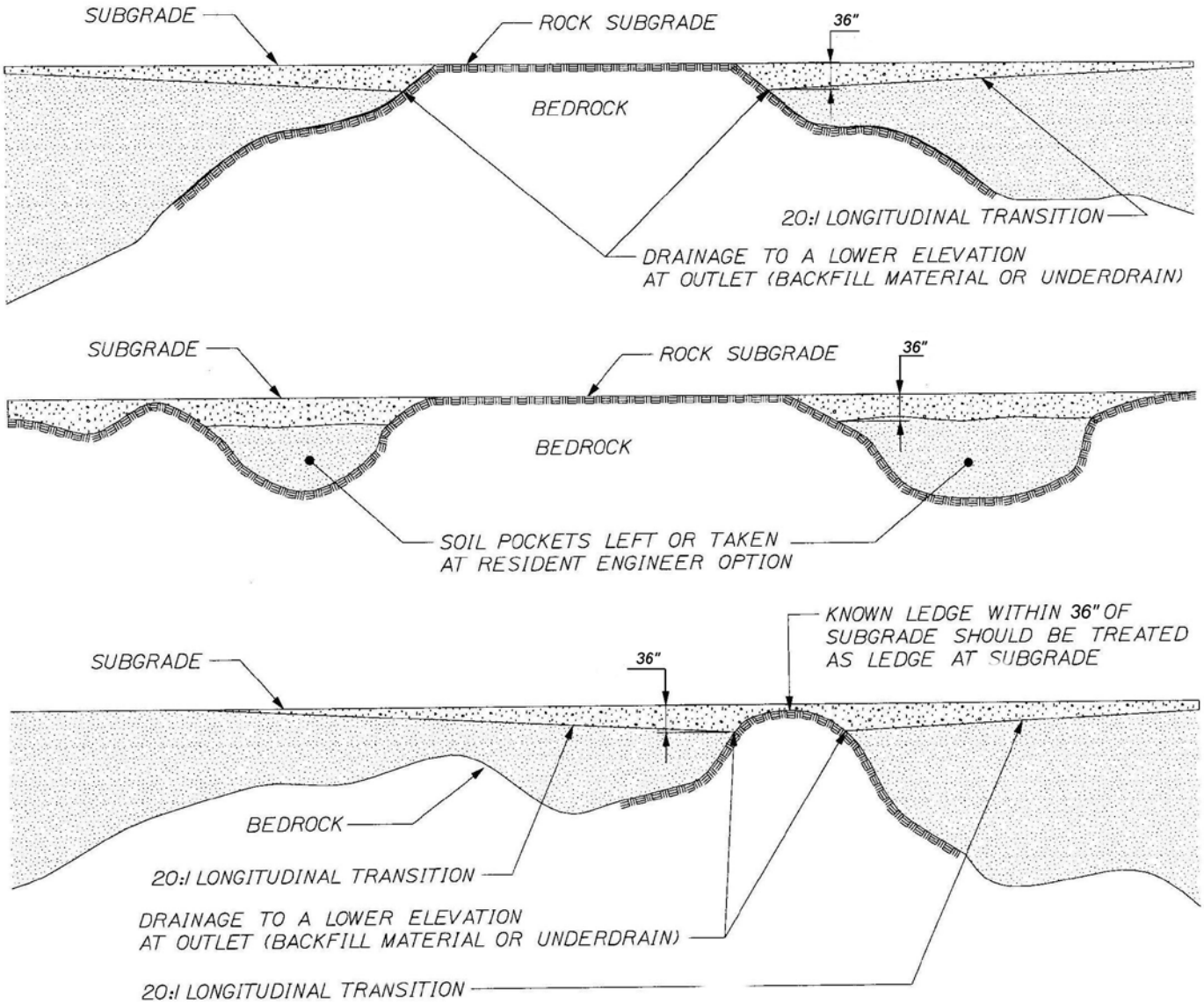
4. Water seepage and soil pumping through the pavement was observed during the 2014 spring thaw in the vicinity of stations 595+50, 646+00, and 651+50. It is anticipated that the seepage is due to spring thaw soil saturation, lack of adequate pavement structure drainage, shallow water table and silty soil conditions. It is recommended that these areas be investigated by the resident engineer/designer in early summer for possible spring activity. If spring activity/continual seepage are present additional drainage measures (stone weepers) may be necessary.

   Each of these water seepage/soil pumping areas are located within project segments identified as higher risk/poorer performing areas (592+00 – 605+00, 630+00 – 655+00). Full reconstruction should be considered within these poorly performing, higher risk project segments.

5. Bedrock could be relatively shallow in several areas along the project area. A listing of these potential areas has been provided in Table 4 in the Bedrock section of this report. Soil/Rock transition zones are recommended where frost susceptible soils and ledge meet within the frost zone. It is recommended that the frost susceptible soils be undercut with a 20:1 longitudinal transition and replaced with non-frost susceptible soils. A bedrock subgrade should be fractured blasted to promote drainage of the pavement structure.

   The specific need and/or location of any potential transition zones cannot be identified at this time due to the preliminary nature of the proposed design. A typical section for transitions in frost susceptible soils is provided on the next page.

PROFILE OF UNDERCUT OF FROST SUSCEPTIBLE SOILS OVER LEDGE



FROST SUSCEPTIBLE SOIL TO BE UNDERCUT AND REPLACED WITH NON FROST SUSCEPTIBLE MATERIAL

IF A SOIL SECTION BETWEEN LEDGE SUBGRADE IS OF SUCH LENGTH THAT THE TRANSITION FROM EACH EDGE WOULD MEET, IT SHOULD BE TREATED AS AN EARTH POCKET

6. Low subgrade resilient modulus values were encountered between stations 534+00 – 537+00, 542+00 – 549+00, 569+00 – 571+50, and 601+00 – 604+00. It is anticipated that these low values are due to moist to wet subgrade soil conditions. Depending on subgrade conditions at the time of construction these areas may have difficulties supporting traffic if the existing pavement surface is removed. Additional base material may be necessary to support traffic during construction.

7. Highly silty subgrade soils were encountered at stations 603+00, 645+50, 693+00, and 750+50. This material is very silty with 72% passing the # 200 sieve and has a high water content of 33%. Depending on the project scope and subgrade conditions at the time of construction, the resident engineer should monitor these areas. These materials may need undercutting. In addition, these areas may have difficulties supporting traffic if the existing pavement surface is removed. Additional base material may be necessary to support traffic during construction.

ATTACHMENTS

STATE OF MAINE

FILE: RTE 17

INTERDEPARTMENTAL MEMORANDUM

Date of Request: 12.17.13 Return: 2/06/2014

Latest Date Needed By 12/17/2013

To: **Ed Hanscom** Dept.: MDOT, Bureau of Planning

From: **Rhobe Moulton** Dept.: Highway

Subject: **Request for Traffic Information** Project Manager: **Paul MacDonald**

TOWN(S): Roxbury-Byron P.I.N. **12775.00** Consultant Proj

COUNTY: Oxford ROUTE: 17

LOCATION/ DESCRIPTION: Starting 2.4 mi north of the Mexico/Roxbury t.l. extending northerly 6.17 mi to the Swift River Bridge

	Roadway Changes or Relocation (Attach Sketch)	Turning Movement needed (Provide Locations under Comments)	Other Please Describe Under Comments
Please Check Box if Applicable:			

Prep By: JG/MAM

	Sec. 1	Sec. 2	Sec. 3	Sec. 4	Sec. 5
Description of Sections	Roxbury - SR 17 @ Walker Brook Bridge # 3205	Roxbury - SR 17 @ Walker Brook Bridge # 3205			
1 Latest AADT (Year)	830(2011)	830(2011)			
2 Current **2015** AADT	830	830			
3 Future **2027** AADT	930				
4 Future **2035** AADT		1000			
5 DHV - % of AADT	13%	13%	%	%	%
6 Design Hourly Volume	121	130			
7 % Heavy Trucks (AADT)	12%	12%	%	%	%
8 % Heavy Trucks (DHV)	9%	9%	%	%	%
9 Direct.Dist. (DHV)	56%	56%	%	%	%
10 18-KIP Equivalent P 2.0	80	90			
11 18-KIP Equivalent P 2.5	77	85			
	2015-2027	2015-2035			

Notes or Remarks: 18-Kip ESALS is based on 12 & 20 year life or highest Future year

PLEASE PROVIDE: (1) PIN NUMBER, (2) THE CURRENT & FUTURE YEARS FOR WHICH YOU WANT AADT CALCULATED, AND SEND TO MIKE MORGAN. (A LOCATION MAP IS NO LONGER NEEDED.)

RAFFIC REQUESTS WILL BE FILLED ON A FIRST COME / SERVE BASIS. PLEASE SEND WHEN PROJECT KICKS OFF!

Need Only Data Items Numbered

Comments: 2011 AADTs range from 690 to 830 for the project.

12775.00 Roxbury FWD Analysis
Route # 17

January 24, 2014

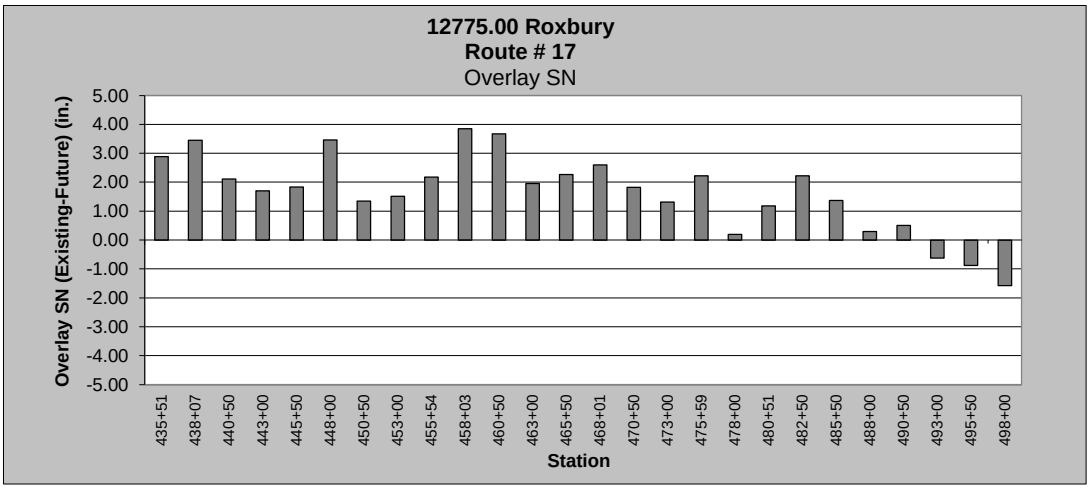
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
435+51	5.45	2.57	2.88	-	65,852	**12,934**	6.4	30.0
438+07	5.60	2.15	3.45	-	71,195	**20,855**	6.6	30.0
440+50	5.13	3.02	2.11	-	54,882	**8,275**	7.2	30.0
443+00	4.73	3.03	1.70	-	43,092	**8,204**	6.8	30.0
445+50	4.72	2.89	1.83	-	42,704	**9,382**	6.1	30.0
448+00	5.60	2.14	3.46	-	71,560	**20,962**	7.4	30.0
450+50	4.51	3.16	1.35	-	37,285	7,306	7.5	30.0
453+00	4.95	3.44	1.51	-	49,210	5,809	6.2	30.0
455+54	5.13	2.95	2.18	-	54,790	**8,844**	7.4	30.0
458+03	5.88	2.03	3.85	-	82,428	**24,145**	6.2	30.0
460+50	5.81	2.14	3.67	-	79,814	**21,044**	5.9	30.0
463+00	5.08	3.12	1.96	-	53,131	7,615	5.3	30.0
465+50	5.26	3.00	2.26	-	58,988	**8,441**	5.6	30.0
468+01	5.11	2.51	2.60	-	54,091	**13,800**	3.9	30.0
470+50	4.79	2.97	1.82	-	44,616	**8,703**	4.3	30.0
473+00	4.80	3.49	1.31	-	45,002	5,569	5.3	30.0
475+59	4.78	2.56	2.22	-	44,458	**13,023**	6.5	30.0
478+00	2.97	2.78	0.19	-	47,049	**10,376**	5.3	**18.3**
480+51	3.78	2.60	1.18	-	83,981	**12,532**	6.2	**19.2**
482+50	5.22	3.00	2.22	-	57,894	**8,451**	10.4	30.0
485+50	4.74	3.37	1.37	-	43,262	6,140	8.1	30.0
488+00	3.99	3.70	0.29	-	48,440	4,714	7.3	24.3
490+50	4.06	3.55	0.51	-	42,339	5,277	8.9	25.9
493+00	3.06	3.69	**-0.63**	**1.43**	54,134	4,757	12.0	**18.0**
495+50	2.73	3.61	**-0.88**	**2.00**	66,338	5,031	9.0	**15.0**
498+00	2.45	4.03	**-1.58**	**3.59**	37,133	3,671	10.3	**16.3**

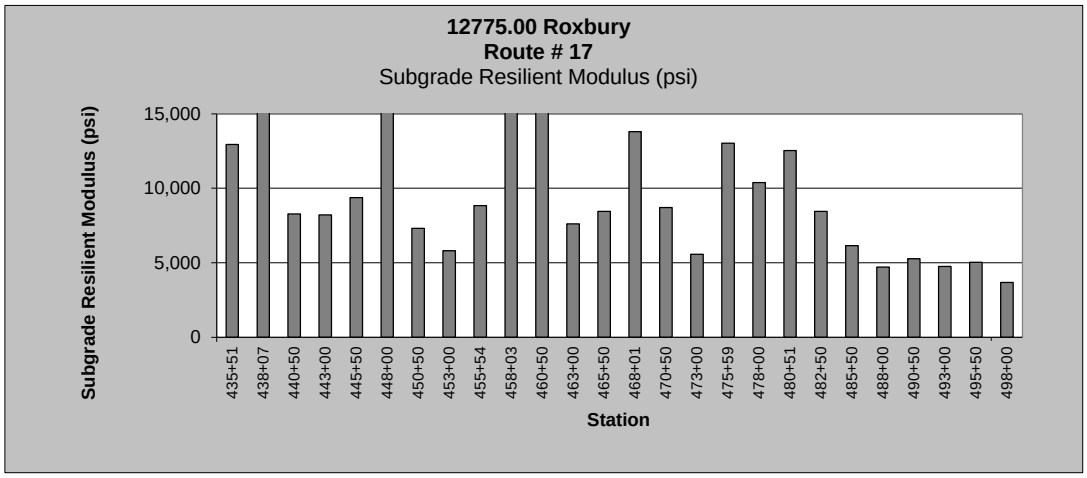
Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet - Northbound Outer Wheel Path.

*** For actual Gravel Depths, see logdraft forms**





12775.00 Roxbury
Route # 17

January 24, 2014

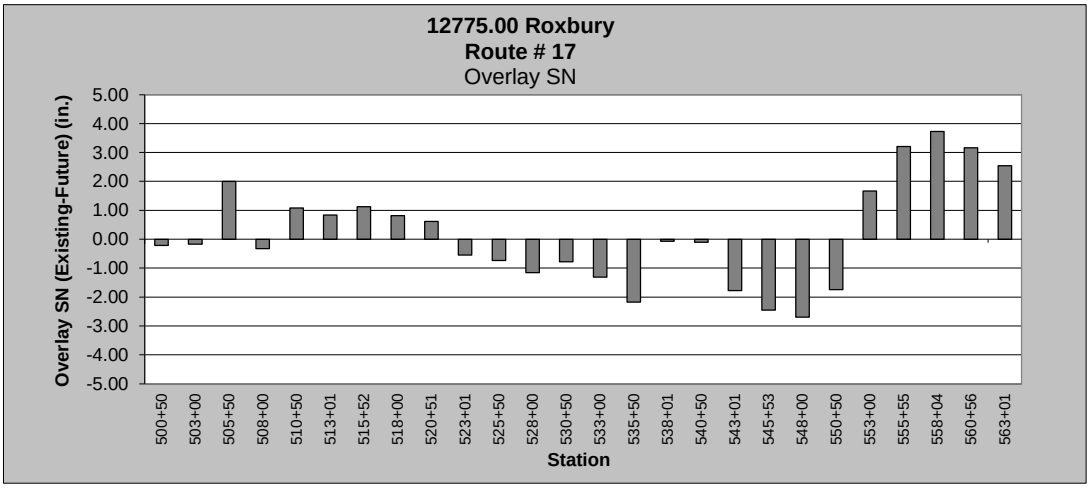
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
500+50	3.13	3.35	**-0.22**	**0.50**	63,879	6,230	11.4	**17.4**
503+00	3.77	3.94	**-0.17**	**0.39**	34,206	3,936	11.8	25.8
505+50	4.42	2.42	2.00	-	63,755	**15,155**	10.6	24.6
508+00	3.42	3.75	**-0.33**	**0.75**	29,145	4,528	10.7	24.7
510+50	4.13	3.05	1.08	-	46,643	**8,100**	11.5	25.5
513+01	4.30	3.46	0.84	-	49,794	5,678	12.0	26.0
515+52	4.21	3.08	1.13	-	52,445	7,853	11.0	25.0
518+00	4.06	3.24	0.82	-	69,224	6,813	8.0	22.0
520+51	4.06	3.44	0.62	-	57,382	5,791	9.4	23.4
523+01	2.77	3.32	**-0.55**	**1.25**	75,110	6,381	10.6	**14.6**
525+50	2.76	3.50	**-0.74**	**1.68**	77,671	5,507	10.4	**14.4**
528+00	2.55	3.71	**-1.16**	**2.64**	72,680	4,673	9.6	**13.6**
530+50	2.62	3.40	**-0.78**	**1.77**	48,380	5,989	12.0	**16.0**
533+00	2.33	3.64	**-1.31**	**2.98**	64,835	4,935	8.9	**12.9**
535+50	2.02	4.20	**-2.18**	**4.95**	38,616	3,265	9.3	**13.3**
538+01	3.18	3.25	**-0.07**	**0.16**	54,721	6,791	7.6	**18.6**
540+50	3.40	3.51	**-0.11**	**0.25**	56,366	5,485	8.7	**19.7**
543+01	2.41	4.19	**-1.78**	**4.05**	72,806	3,289	9.8	**12.8**
545+53	1.90	4.35	**-2.45**	**5.57**	33,612	**2,945**	10.1	**13.1**
548+00	1.82	4.52	**-2.70**	**6.14**	37,405	**2,618**	9.1	**12.1**
550+50	2.24	3.98	**-1.74**	**3.95**	45,136	3,821	11.0	**14.0**
553+00	5.20	3.53	1.67	-	57,260	5,386	9.3	30.0
555+55	5.43	2.22	3.21	-	64,980	**19,034**	10.0	30.0
558+04	5.79	2.06	3.73	-	78,884	**23,107**	7.4	30.0
560+56	5.40	2.24	3.16	-	63,964	**18,737**	6.8	30.0
563+01	5.05	2.51	2.54	-	52,369	**13,809**	8.7	30.0

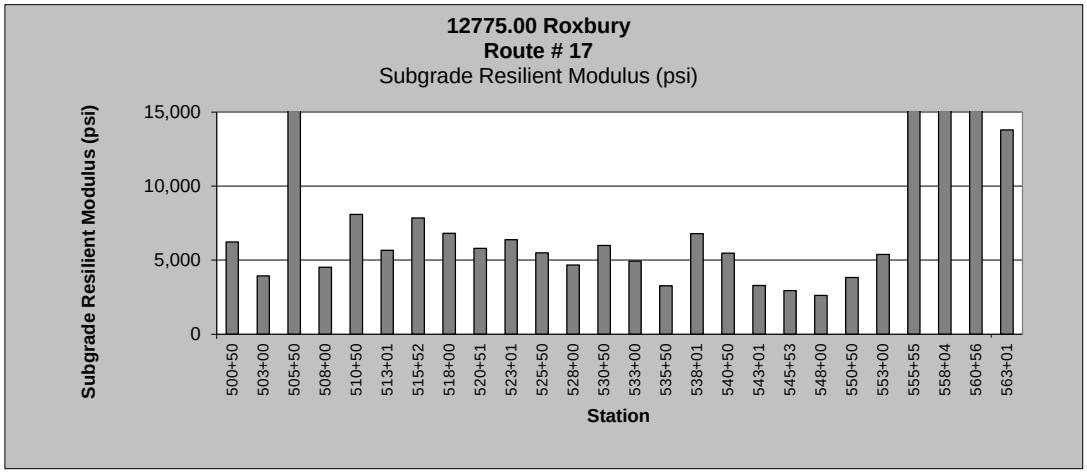
Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet - Northbound Outer Wheel Path.

*** For actual Gravel Depths, see logdraft forms**





12775.00 Roxbury
Route # 17

January 24, 2014

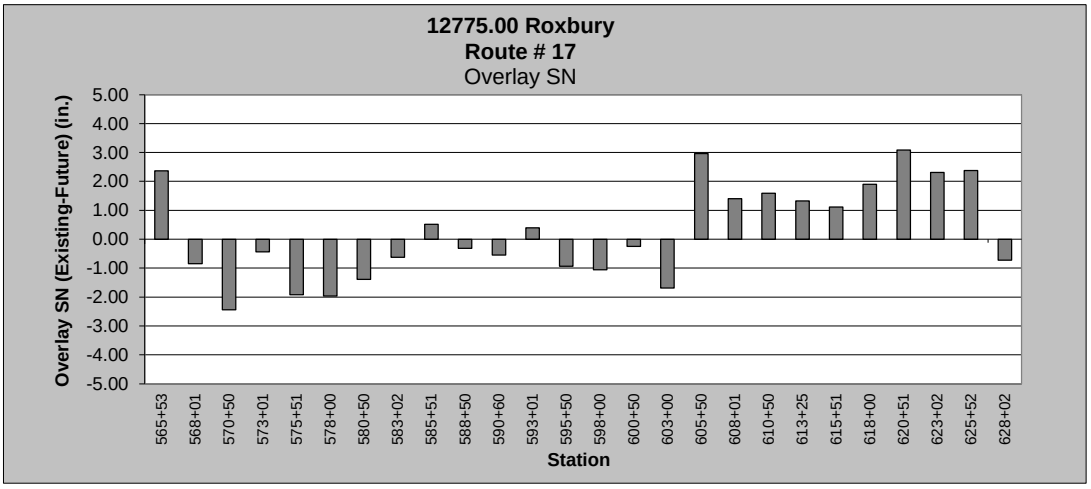
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
565+53	4.87	2.51	2.36	-	46,820	**13,715**	6.3	30.0
568+01	2.19	3.04	**-0.85**	**1.93**	49,220	**8,171**	5.3	**13.3**
570+50	1.89	4.33	**-2.44**	**5.55**	28,005	**2,982**	5.8	**13.8**
573+01	2.41	2.85	**-0.44**	**1.00**	60,817	**9,708**	5.6	**13.6**
575+51	2.15	4.07	**-1.92**	**4.36**	33,592	3,568	6.8	**14.8**
578+00	2.08	4.05	**-1.97**	**4.48**	35,959	3,621	6.0	**14.0**
580+50	2.15	3.54	**-1.39**	**3.16**	33,878	5,339	6.8	**14.8**
583+02	2.65	3.27	**-0.62**	**1.41**	46,460	6,659	8.4	**16.4**
585+51	3.44	2.92	0.52	-	109,330	**9,086**	8.0	**16.0**
588+50	2.84	3.16	**-0.32**	**0.73**	62,847	7,339	7.9	**15.9**
590+60	2.27	2.82	**-0.55**	**1.25**	50,171	**10,057**	5.7	**13.7**
593+01	3.82	3.43	0.39	-	79,743	5,830	7.7	**19.7**
595+50	3.00	3.93	**-0.93**	**2.11**	38,088	3,968	7.8	**19.8**
598+00	3.03	4.09	**-1.06**	**2.39**	38,696	3,529	7.9	**19.9**
600+50	3.19	3.44	**-0.25**	**0.57**	50,492	5,772	7.2	**19.2**
603+00	2.67	4.36	**-1.69**	**3.84**	38,162	**2,928**	5.6	**17.6**
605+50	5.21	2.25	2.96	-	100,809	**18,504**	3.9	24.9
608+01	4.34	2.94	1.40	-	56,804	**8,904**	4.1	25.1
610+50	5.13	3.54	1.59	-	88,136	5,336	4.6	25.6
613+25	4.63	3.31	1.32	-	62,491	6,434	4.9	25.9
615+51	4.07	2.96	1.11	-	43,155	**8,752**	4.8	25.8
618+00	4.72	2.82	1.90	-	67,174	**10,007**	4.8	25.8
620+51	5.50	2.42	3.08	-	102,856	**15,193**	5.1	26.1
623+02	5.11	2.80	2.31	-	80,477	**10,225**	5.3	26.3
625+52	4.88	2.50	2.38	-	63,343	**13,856**	6.2	27.2
628+02	3.08	3.81	**-0.73**	**1.66**	38,250	4,350	6.3	20.3

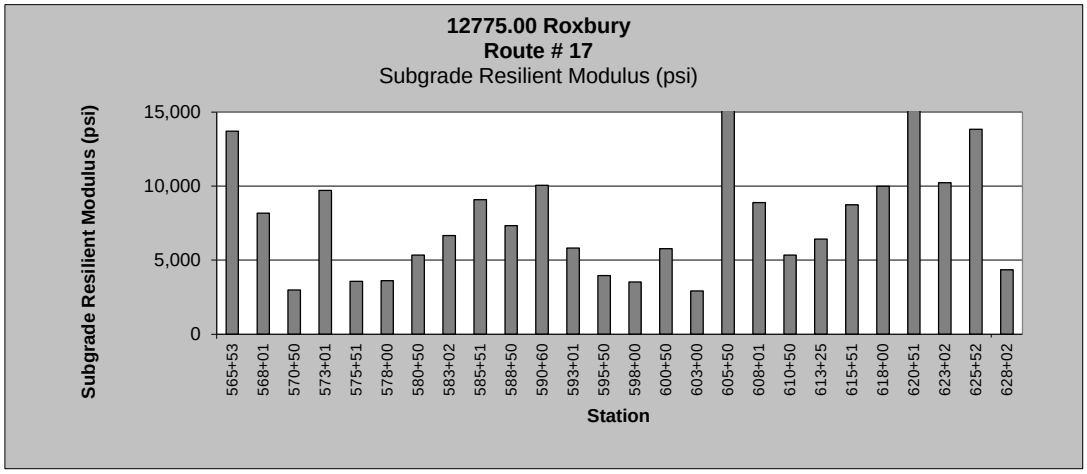
Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet - Northbound Outer Wheel Path.

*** For actual Gravel Depths, see logdraft forms**





12775.00 Roxbury
Route # 17

January 24, 2014

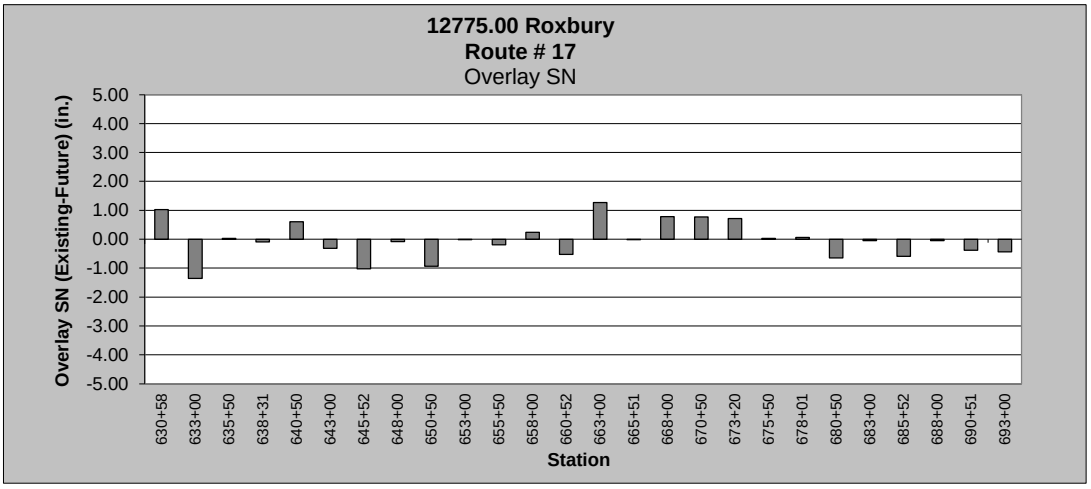
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
630+58	3.43	2.40	1.03	-	53,057	**15,542**	6.3	20.3
633+00	2.66	4.02	**-1.36**	**3.09**	26,564	3,704	5.8	**19.8**
635+50	3.42	3.39	0.03	-	50,098	6,028	6.6	20.6
638+31	3.22	3.31	**-0.09**	**0.20**	40,866	6,452	6.8	20.8
640+50	3.24	2.64	0.60	-	51,946	**11,938**	5.3	**19.3**
643+00	3.39	3.70	**-0.31**	**0.70**	50,154	4,717	6.4	20.4
645+52	3.00	4.02	**-1.02**	**2.32**	40,096	3,707	5.5	**19.5**
648+00	3.17	3.25	**-0.08**	**0.18**	40,533	6,755	6.5	20.5
650+50	3.21	4.14	**-0.93**	**2.11**	44,547	3,412	6.1	20.1
653+00	3.51	3.53	**-0.02**	**0.05**	62,071	5,363	5.7	**19.7**
655+50	3.50	3.69	**-0.19**	**0.43**	60,859	4,753	5.8	**19.8**
658+00	3.36	3.12	0.24	-	53,776	7,583	5.8	**19.8**
660+52	3.17	3.69	**-0.52**	**1.18**	37,141	4,743	7.1	21.1
663+00	3.90	2.63	1.27	-	43,361	**12,169**	10.7	24.7
665+51	3.67	3.69	**-0.02**	**0.05**	41,170	4,763	9.6	23.6
668+00	3.92	3.14	0.78	-	58,248	7,466	8.5	22.5
670+50	3.88	3.11	0.77	-	42,440	7,692	10.7	24.7
673+20	3.80	3.09	0.71	-	47,457	7,775	9.3	23.3
675+50	3.45	3.42	0.03	-	38,960	5,874	8.6	22.6
678+01	3.15	3.09	0.06	-	51,608	7,822	4.8	**18.8**
680+50	2.98	3.63	**-0.65**	**1.48**	45,099	4,960	4.6	**18.6**
683+00	3.08	3.13	**-0.05**	**0.11**	48,474	7,517	4.8	**18.8**
685+52	2.74	3.33	**-0.59**	**1.34**	39,417	6,315	3.9	**17.9**
688+00	2.93	2.98	**-0.05**	**0.11**	40,368	**8,608**	5.0	**19.0**
690+51	3.04	3.42	**-0.38**	**0.86**	49,702	5,875	4.4	**18.4**
693+00	2.95	3.39	**-0.44**	**1.00**	39,680	6,004	5.2	**19.2**

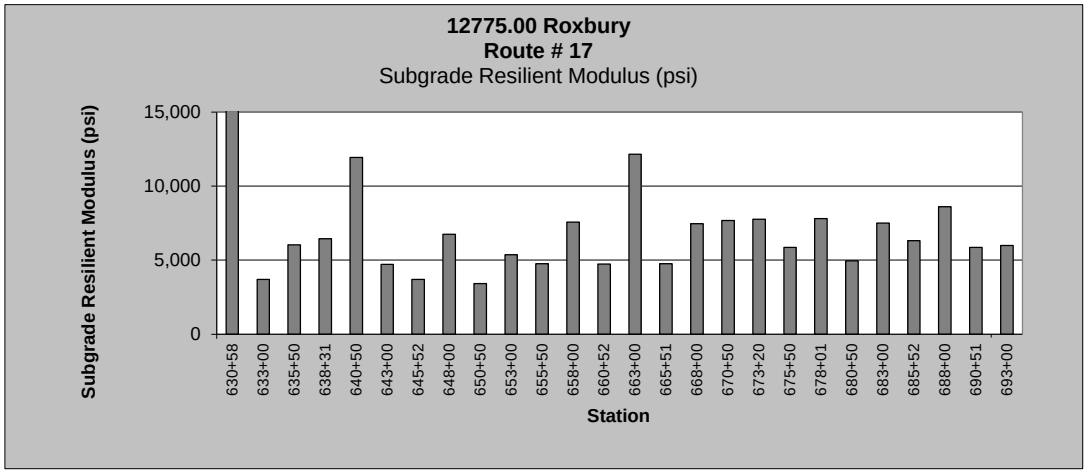
Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet - Northbound Outer Wheel Path.

*** For actual Gravel Depths, see logdraft forms**





12775.00 Roxbury
Route # 17

January 24, 2014

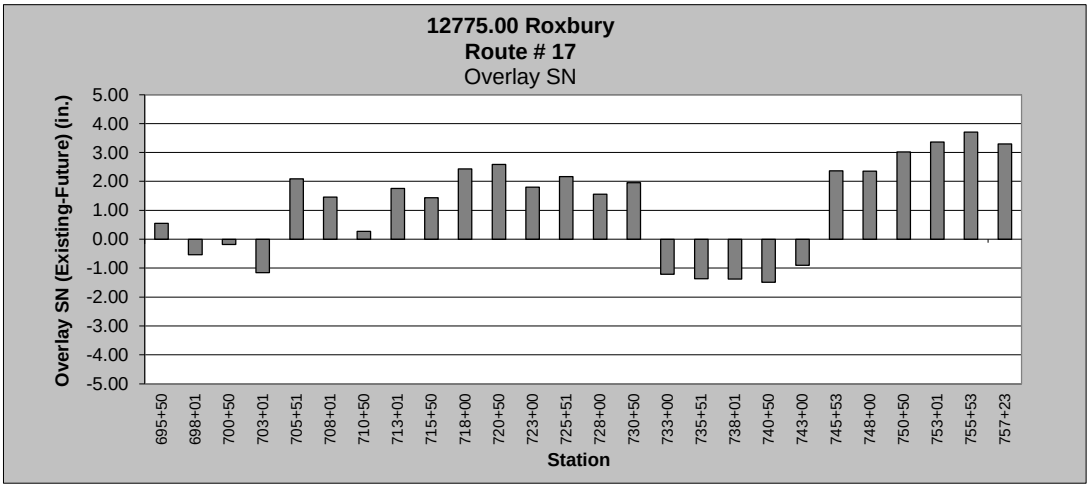
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
695+50	3.44	2.89	0.55	-	55,689	**9,335**	6.0	20.0
698+01	3.15	3.69	**-0.54**	**1.23**	42,292	4,760	6.1	20.1
700+50	3.31	3.49	**-0.18**	**0.41**	62,907	5,573	4.5	**18.5**
703+01	2.91	4.07	**-1.16**	**2.64**	44,148	3,583	4.3	**18.3**
705+51	4.90	2.81	2.09	-	47,702	**10,098**	7.7	30.0
708+01	4.51	3.05	1.46	-	37,292	**8,093**	7.5	30.0
710+50	4.08	3.81	0.27	-	27,597	4,350	6.2	30.0
713+01	4.67	2.91	1.76	-	41,482	**9,183**	7.9	30.0
715+50	4.88	3.45	1.43	-	47,261	5,735	8.8	30.0
718+00	4.94	2.51	2.43	-	49,040	**13,807**	7.1	30.0
720+50	5.03	2.44	2.59	-	51,839	**14,835**	9.7	30.0
723+00	4.75	2.95	1.80	-	43,457	**8,854**	7.8	30.0
725+51	5.32	3.16	2.16	-	61,343	7,353	6.9	30.0
728+00	4.74	3.18	1.56	-	43,368	7,187	5.0	30.0
730+50	5.21	3.26	1.95	-	57,427	6,733	6.0	30.0
733+00	2.22	3.43	**-1.21**	**2.75**	68,133	5,838	6.1	**12.1**
735+51	1.86	3.23	**-1.37**	**3.11**	39,629	6,924	6.1	**12.1**
738+01	2.42	3.80	**-1.38**	**3.14**	69,009	4,366	7.1	**13.1**
740+50	2.41	3.90	**-1.49**	**3.39**	51,375	4,063	8.4	**14.4**
743+00	2.52	3.42	**-0.90**	**2.05**	111,882	5,857	5.6	**11.6**
745+53	5.45	3.08	2.37	-	65,679	7,871	7.6	30.0
748+00	4.95	2.60	2.35	-	49,694	**12,499**	5.4	30.0
750+50	5.30	2.28	3.02	-	60,529	**17,731**	4.5	30.0
753+01	5.71	2.35	3.36	-	75,574	**16,482**	4.3	30.0
755+53	5.81	2.11	3.70	-	79,726	**21,701**	4.3	30.0
757+23	5.59	2.29	3.30	-	71,105	**17,659**	5.1	30.0

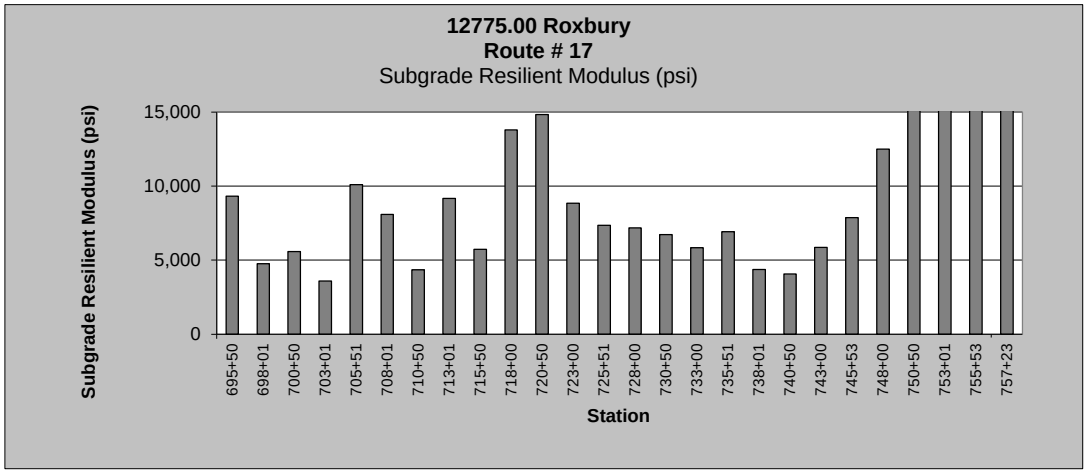
Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet - Northbound Outer Wheel Path.

*** For actual Gravel Depths, see logdraft forms**





State of Maine - Department of Transportation

Pavement Core Summary Sheet

Town(s): Roxbury-Byron Project Number: 12775.00

Station (Feet)	Offset (Feet)	Pavement Depth (inches)	Unbound Pavement	PC-Number	Saved Core	Comments / Date 7/10-12/07
463+00	CL	3.0	0.25-0.40			
463+00	5.0 Rt.	4.8				
463+00	10.0 Lt.	3.0				
463+00	5.0 Lt.	3.0				
488+00	5.0 Rt.	6.0				
488+00	CL	5.4				
488+00	5.0 Lt.	5.8				
488+00	10.0 Lt.	2.8	0.23-0.30			
520+50	5.0 Rt.	8.4				
520+50	CL	3.2	0.27-0.60			
520+50	5.0 Lt.	7.2				
520+50	10.0 Lt.	4.2	0.35-0.60			
548+00	5.0 Rt.	4.8	0.40-0.50			
548+00	CL	3.0	0.25-0.60			
548+00	5.0 Lt.	3.0	0.25-0.55			
548+00	10.0 Lt.	3.8	0.32-0.50			
568+00	CL	3.6	0.30-0.40			
568+00	5.0 Lt.	3.0	0.25-0.40			
568+00	10.0 Lt.	4.2	0.35-0.45			
568+00	5.0 Rt.	3.2	0.27-0.40			
595+60	3.0 Rt.	4.8	0.40-0.70			
595+60	CL	2.4	0.20-0.50			
595+60	5.0 Lt.	5.4	0.45-0.60			
595+60	10.0 Lt.	4.8	0.40-0.70			
595+60	10.0 Rt.	7.8	0.65-0.90			
628+00	5.0 Rt.	4.2				
628+00	CL	4.2	0.35-0.45			
628+00	5.0 Lt.	6.6				
628+00	10.0 Lt.	4.2	0.35-0.50			
658+07	5.0 Rt.	4.2				
658+07	CL	4.8				
658+07	5.0 Lt.	4.8				
658+07	10.0 Lt.	4.8				
693+00	5.0 Rt.	3.4	0.28-0.35			
693+00	CL	4.8				
693+00	5.0 Lt.	3.6	0.30-0.40			
693+00	10.0 Lt.	3.6	0.30-0.40			
715+50	3.5 Rt.	3.6	0.30-0.40			
715+50	CL	3.6				
715+50	5.0 Lt.	3.0	0.25-0.35			
715+50	10.0 Lt.	2.4				

Logged By: G. Lidstone

2" Thinwall Core

State of Maine - Maine Department of Transportation

Pavement Core Summary Sheet

Town(s): Roxbury-Byron Work Number: 12775.00

Station (Feet)	Offset (Feet)	Pavement Depth (Inches)	Unbound Pavement	PC-Number	Saved Core	Comments / Date 9/23/2013
458+00	9.0 Rt.	6.0		1		
458+00	9.0 Lt.	5.0		2		
508+00	9.0 Rt.	11.25		3		
508+00	9.0 Lt.	11.0		4		
548+00	9.0 Rt.	10.0		5		
548+00	9.0 Lt.	8.25		6		
583+00	9.0 Rt.	8.0		7		
583+00	9.0 Lt.	7.75		8		
613+00	9.0 Rt.	4.5		9		
613+00	9.0 Lt.	4.75		10		
658+00	9.0 Rt.	6.0		11		
658+00	9.0 Lt.	7.5		12		
703+00	9.0 Rt.	6.5		13		
703+00	9.0 Lt.	6.25		14		
748+00	9.0 Rt.	5.0		15		
748+00	9.0 Lt.	4.5		16		

Logged By: S. Colson

4" Thinwall Core

MaineDOT

Ground Penetrating Radar (GPR)
Estimated Pavement Thickness
012775.00 - Roxbury, Byron

Explanation of Ground Penetrating (GPR) Data Collection and Analysis:

GPR data was collected at the inner and outer wheel path of the lane at 1 foot intervals along the entire section. Pavement thickness estimates were developed using Geophysical Survey Systems, Inc. (GSSI) RADAN7 GPR data processing software. Where available, pavement thickness values from Geotechnical borings and/or pavement cores collected by MaineDOT personnel were used in developing the estimated GPR pavement thicknesses.

Data Confidence Level:

Poor - Reflection layers are weak and 'jumbled' throughout much of the project. Layer depths do not correlate well with known pavement depths obtained from pavement cores.

GPR pavement thickness averages are to be considered for estimating purposes only. Actual pavement thickness may vary.

Additional Comments

Project Manager	Reported By	Test Date	Reported Date
MACDONALD, PAUL	**VOSE, RYAN K**	**11/6/2013**	**1/24/2014**

Lane Tested	Route	PMS Route Code	Analysis Distance, ft.
NORTHBOUND LANE	**17**		**50**

Overall Average Thickness, in.	Overall Minimum Thickness, in.	Overall Maximum Thickness, in.
7.5	**3**	**14.2**

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
433+50	8.3	8.2	434+00	8.7	8.4	434+50	9.0	7.7	435+00	9.1	6.4
435+50	9.0	6.4	436+00	10.3	7.4	436+50	10.4	7.9	437+00	9.2	7.8
437+50	9.0	7.0	438+00	9.3	7.0	438+50	8.1	6.6	439+00	10.0	7.0
439+50	9.2	7.3	440+00	8.9	7.9	440+50	8.7	8.9	441+00	7.6	7.2
441+50	6.6	6.8	442+00	6.7	6.9	442+50	7.0	7.2	443+00	7.9	6.8
443+50	7.7	6.8	444+00	6.6	6.8	444+50	6.6	6.9	445+00	6.9	7.0
445+50	7.9	6.1	446+00	7.4	6.8	446+50	7.4	7.2	447+00	7.5	7.3
447+50	8.3	7.1	448+00	8.6	8.1	448+50	7.9	7.4	449+00	8.5	6.7
449+50	8.0	6.6	450+00	7.4	7.5	450+50	7.6	7.5	451+00	7.9	7.6
451+50	7.8	8.6	452+00	7.7	7.5	452+50	7.2	6.9	453+00	7.2	6.2
453+50	6.9	6.6	454+00	7.1	6.8	454+50	7.9	7.7	455+00	8.1	7.5
455+50	8.4	7.4	456+00	7.7	7.6	456+50	7.8	7.6	457+00	6.9	7.7
457+50	6.0	7.2	458+00	6.4	7.4	458+50	6.2	6.2	459+00	5.7	5.3

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
459+50	6.3	5.0	460+00	7.6	5.8	460+50	6.8	5.9	461+00	7.5	7.2
461+50	7.2	7.7	462+00	6.9	6.4	462+50	7.7	5.8	463+00	6.6	5.3
463+50	5.7	5.8	464+00	6.5	5.7	464+50	6.5	6.3	465+00	6.1	6.0
465+50	5.8	5.6	466+00	5.4	5.9	466+50	5.3	4.7	467+00	5.1	4.3
467+50	5.4	3.7	468+00	5.3	3.9	468+50	5.6	4.0	469+00	5.4	4.4
469+50	5.7	5.2	470+00	5.1	4.5	470+50	5.1	4.3	471+00	6.2	4.3
471+50	7.1	4.8	472+00	6.3	4.5	472+50	7.5	4.9	473+00	7.4	5.3
473+50	6.7	5.3	474+00	6.9	5.5	474+50	7.3	7.2	475+00	7.1	7.0
475+50	5.8	6.7	476+00	6.4	6.5	476+50	6.9	6.1	477+00	6.5	5.7
477+50	6.0	5.6	478+00	5.2	5.3	478+50	6.8	5.9	479+00	6.8	5.6
479+50	6.4	5.6	480+00	6.5	5.4	480+50	6.3	6.2	481+00	6.0	6.2
481+50	5.9	6.6	482+00	6.3	5.8	482+50	6.1	6.3	483+00	5.5	5.5
483+50	10.3	9.4	484+00	10.6	10.7	484+50	10.9	11.3	485+00	10.2	10.4
485+50	10.8	8.1	486+00	11.6	9.7	486+50	10.0	10.0	487+00	10.9	8.7
487+50	10.7	8.7	488+00	9.8	7.3	488+50	8.4	10.2	489+00	10.6	8.9
489+50	9.6	7.1	490+00	10.6	8.1	490+50	12.1	8.9	491+00	11.3	10.5
491+50	7.7	10.1	492+00	7.5	8.5	492+50	9.4	12.9	493+00	9.9	14.1
493+50	11.8	12.1	494+00	9.8	9.2	494+50	9.6	9.2	495+00	10.8	9.0
495+50	13.2	11.9	496+00	11.9	11.6	496+50	10.8	11.8	497+00	11.3	12.6
497+50	10.3	11.7	498+00	12.7	10.3	498+50	10.4	11.2	499+00	11.4	13.0
499+50	11.5	11.6	500+00*	12.4	15.0	500+50	13.3	12.6	501+00	12.3	11.4
501+50	12.2	11.9	502+00	11.1	10.5	502+50	10.9	11.0	503+00	11.5	12.1
503+50	11.7	11.8	504+00	9.3	10.8	504+50	11.0	8.4	505+00	10.9	9.0
505+50	11.4	10.6	506+00	11.9	12.0	506+50	12.8	11.7	507+00	13.1	12.9
507+50	12.9	12.1	508+00	11.7	11.2	508+50	10.7	10.7	509+00	11.0	11.2
509+50	11.9	10.2	510+00	11.7	11.5	510+50	11.0	11.5	511+00	9.6	12.3
511+50	10.6	11.4	512+00	10.3	11.9	512+50	10.0	14.2	513+00	11.4	12.8
513+50	11.1	12.6	514+00	10.1	11.1	514+50	10.0	9.3	515+00	12.1	10.1
515+50	14.1	11.4	516+00	10.4	11.0	516+50	10.2	10.4	517+00	11.9	11.0
517+50	11.1	10.9	518+00	11.1	8.0	518+50	8.0	9.8	519+00	12.4	12.9
519+50	12.0	10.6	520+00	11.0	9.5	520+50	11.4	9.4	521+00	12.1	9.8
521+50	12.7	9.2	522+00	9.2	10.1	522+50	10.6	10.7	523+00	13.2	11.1
523+50	12.2	10.6	524+00	11.2	11.7	524+50	8.5	12.2	525+00	9.2	10.4
525+50	8.7	11.1	526+00	10.2	10.9	526+50	9.6	10.0	527+00	8.4	8.5
527+50	8.5	9.1	528+00	8.7	9.6	528+50	10.3	11.5	529+00	9.9	12.2
529+50	9.7	11.2	530+00	12.6	12.1	530+50	9.6	12.8	531+00*	9.9	15.0
531+50	10.1	13.6	532+00	12.2	12.6	532+50	10.1	12.1	533+00	10.0	12.1
533+50	8.8	8.9	534+00	8.1	7.8	534+50	10.2	9.7	535+00	8.7	9.8
535+50	10.1	9.3	536+00	9.2	9.4	536+50	9.7	9.3	537+00	10.7	7.7
537+50	10.5	8.7	538+00	7.2	7.6	538+50	6.3	7.6	539+00	8.3	8.6
539+50	8.1	8.6	540+00	9.8	10.2	540+50	9.0	8.7	541+00	10.2	9.3
541+50	11.3	9.4	542+00	10.9	10.2	542+50	10.2	9.4	543+00	10.8	9.8
543+50	9.6	11.2	544+00	10.9	10.7	544+50	9.5	10.6	545+00	9.1	10.9
545+50	8.6	10.7	546+00	9.9	10.1	546+50	9.9	10.0	547+00	9.9	10.2

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
547+50	11.8	8.7	548+00	10.8	9.1	548+50	10.8	9.2	549+00	9.5	8.4
549+50	8.5	10.0	550+00	9.4	11.2	550+50	9.4	11.0	551+00	9.5	10.1
551+50	9.8	11.1	552+00	10.4	12.1	552+50	10.9	12.9	553+00	11.4	10.0
553+50	10.0	9.3	554+00	7.7	10.3	554+50	8.6	8.7	555+00	9.1	9.5
555+50	9.4	8.1	556+00	10.4	10.0	556+50	10.1	11.2	557+00	8.5	9.5
557+50	8.1	9.1	558+00	10.0	9.1	558+50	8.4	7.5	559+00	10.4	7.7
559+50	7.4	6.9	560+00	7.8	8.7	560+50	7.0	5.5	561+00	7.8	6.8
561+50	9.3	8.0	562+00	10.3	8.5	562+50	9.3	8.0	563+00	6.5	8.8
563+50	5.8	8.7	564+00	8.2	8.2	564+50	7.4	8.5	565+00	7.2	8.5
565+50	7.4	9.3	566+00	6.1	6.3	566+50	5.3	6.9	567+00	7.3	5.9
567+50	7.6	6.7	568+00	6.7	7.0	568+50	7.0	5.3	569+00	6.5	5.0
569+50	6.1	6.0	570+00	6.7	5.2	570+50	7.8	5.8	571+00	8.7	6.5
571+50	8.6	6.6	572+00	8.8	6.6	572+50	8.4	5.9	573+00	8.4	5.6
573+50	7.3	6.9	574+00	8.2	8.3	574+50	7.3	6.0	575+00	6.1	6.7
575+50	5.0	6.8	576+00	8.7	8.7	576+50	7.5	9.4	577+00	6.2	8.2
577+50	6.5	8.5	578+00	7.0	7.2	578+50	6.8	6.0	579+00	6.1	6.0
579+50	7.3	6.8	580+00	6.0	7.7	580+50	5.5	6.8	581+00	6.7	7.6
581+50	6.9	7.7	582+00	7.0	8.1	582+50	6.8	8.4	583+00	7.2	9.2
583+50	8.3	8.4	584+00	8.6	8.4	584+50	8.9	8.7	585+00	8.6	8.6
585+50	10.1	8.0	586+00	9.5	9.8	586+50	7.9	7.6	587+00	9.0	9.3
587+50	7.7	7.7	588+00	8.4	8.9	588+50	9.2	9.2	589+00	7.1	7.9
589+50	6.6	9.2	590+00	7.6	8.9	590+50	9.2	9.7	591+00	6.5	5.7
591+50	7.5	7.2	592+00	7.0	6.6	592+50	7.5	7.4	593+00	6.1	7.7
593+50	6.7	9.3	594+00	6.3	6.8	594+50	6.3	8.1	595+00	5.9	7.8
595+50	8.1	7.8	596+00	8.6	8.0	596+50	9.3	9.6	597+00	10.2	10.3
597+50	9.1	9.3	598+00	8.9	9.9	598+50	6.6	7.9	599+00	5.2	7.0
599+50	6.0	6.1	600+00	5.4	7.6	600+50	5.3	8.0	601+00	5.7	7.2
601+50	5.2	7.0	602+00	5.0	7.0	602+50	5.7	6.7	603+00	6.9	5.6
603+50	6.3	5.9	604+00	5.6	6.5	604+50	6.5	7.0	605+00	4.5	4.0
605+50	4.6	3.9	606+00	4.8	4.0	606+50	4.3	3.4	607+00	4.0	3.4
607+50	4.2	4.1	608+00	4.9	3.7	608+50	5.1	4.1	609+00	4.7	3.8
609+50	4.7	4.5	610+00	5.5	5.3	610+50	5.8	5.2	611+00	5.2	4.6
611+50	5.1	4.6	612+00	5.2	4.5	612+50	5.0	4.1	613+00	4.6	4.2
613+50	5.5	4.9	614+00	5.6	5.3	614+50	4.9	4.1	615+00	5.0	4.7
615+50	5.5	4.8	616+00	4.9	4.8	616+50	5.1	4.9	617+00	5.6	5.6
617+50	4.7	5.5	618+00	5.1	5.7	618+50	5.5	4.8	619+00	5.1	5.0
619+50	5.6	5.2	620+00	5.8	6.0	620+50	5.5	5.1	621+00	5.9	5.7
621+50	6.5	5.6	622+00	6.7	6.1	622+50	6.3	5.6	623+00	5.6	5.3
623+50	5.8	6.0	624+00	6.2	5.3	624+50	5.8	5.0	625+00	5.0	4.7
625+50	7.3	6.2	626+00	6.4	8.5	626+50	5.8	7.3	627+00	5.3	5.8
627+50	6.1	6.0	628+00	6.6	6.5	628+50	6.4	6.3	629+00	6.7	6.3
629+50	7.9	6.2	630+00	6.7	6.6	630+50	6.9	6.2	631+00	8.7	6.3
631+50	10.3	8.2	632+00	7.4	6.9	632+50	8.4	6.1	633+00	8.0	5.8
633+50	7.4	7.4	634+00	7.2	7.6	634+50	7.2	6.8	635+00	7.2	8.3

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
635+50	7.1	7.6	636+00	6.6	6.6	636+50	6.3	6.4	637+00	6.6	7.6
637+50	6.4	7.1	638+00	6.2	6.8	638+50	6.8	8.5	639+00	6.4	6.7
639+50	5.9	6.8	640+00	5.5	6.3	640+50	4.8	5.3	641+00	4.8	6.1
641+50	4.8	6.6	642+00	4.8	5.5	642+50	5.3	6.0	643+00	5.1	6.4
643+50	6.5	6.6	644+00	6.5	6.4	644+50	6.7	5.0	645+00	6.6	5.0
645+50	6.2	5.5	646+00	6.8	6.2	646+50	5.8	6.3	647+00	5.1	7.0
647+50	5.7	6.9	648+00	5.5	6.5	648+50	7.4	8.0	649+00	6.9	6.8
649+50	6.9	7.1	650+00	6.4	5.9	650+50	6.6	6.1	651+00	5.7	6.1
651+50	6.0	5.7	652+00	5.6	5.7	652+50	6.4	7.0	653+00	6.8	5.7
653+50	6.9	5.9	654+00	5.7	6.2	654+50	5.7	6.2	655+00	6.0	7.0
655+50	5.5	5.8	656+00	5.0	6.0	656+50	5.3	5.2	657+00	5.3	5.8
657+50	4.6	5.4	658+00	4.2	5.8	658+50	6.7	9.5	659+00	6.5	8.1
659+50	6.7	7.5	660+00	8.1	8.0	660+50	8.5	7.4	661+00	9.2	7.1
661+50	9.0	8.3	662+00	7.7	8.3	662+50	8.3	8.2	663+00	8.3	10.7
663+50	9.3	11.1	664+00	9.0	11.2	664+50	9.7	9.2	665+00	7.4	9.9
665+50	7.6	9.7	666+00	7.9	9.6	666+50	8.5	9.4	667+00	8.3	7.5
667+50	8.4	8.9	668+00	7.7	9.1	668+50	7.5	8.5	669+00	7.3	8.1
669+50	7.1	8.4	670+00	7.5	6.9	670+50	7.9	10.8	671+00	7.6	10.7
671+50	7.7	11.5	672+00	6.3	10.5	672+50	5.9	10.2	673+00	7.0	10.3
673+50	7.2	9.3	674+00	7.7	9.4	674+50	6.4	8.4	675+00	7.1	9.7
675+50	6.0	8.6	676+00	8.6	8.8	676+50	8.4	7.6	677+00	7.3	7.4
677+50	6.0	4.1	678+00	6.8	4.8	678+50	6.6	6.6	679+00	6.6	5.6
679+50	6.3	5.1	680+00	5.7	5.7	680+50	8.1	7.9	681+00	5.4	4.6
681+50	4.8	4.6	682+00	4.9	5.4	682+50	3.8	5.0	683+00	4.1	4.8
683+50	4.0	4.9	684+00	3.8	6.0	684+50	3.0	5.4	685+00	3.9	4.7
685+50	4.8	3.9	686+00	5.0	4.3	686+50	4.8	4.6	687+00	5.5	5.4
687+50	6.4	4.7	688+00	5.7	5.0	688+50	6.0	5.9	689+00	5.7	4.7
689+50	5.2	4.0	690+00	5.4	4.0	690+50	5.6	4.4	691+00	5.7	4.9
691+50	5.7	5.1	692+00	5.7	4.8	692+50	6.0	4.8	693+00	6.5	5.2
693+50	6.7	5.5	694+00	5.5	5.0	694+50	5.6	5.7	695+00	5.5	6.0
695+50	5.8	6.0	696+00	6.9	6.7	696+50	5.2	5.6	697+00	6.4	4.9
697+50	7.0	5.3	698+00	6.5	6.1	698+50	6.1	6.2	699+00	6.2	5.7
699+50	6.7	5.9	700+00	7.3	5.2	700+50	6.8	4.5	701+00	6.6	5.3
701+50	5.5	4.2	702+00	6.0	5.2	702+50	6.5	4.2	703+00	6.6	4.3
703+50	10.6	8.3	704+00	9.6	8.6	704+50	9.3	7.0	705+00	9.0	8.8
705+50	8.8	8.0	706+00	10.9	7.7	706+50	10.6	5.9	707+00	11.9	5.9
707+50	10.2	5.8	708+00	10.2	7.5	708+50	10.7	8.7	709+00	10.9	8.2
709+50	9.2	8.9	710+00	7.9	6.9	710+50	10.1	6.2	711+00	10.2	6.8
711+50	9.5	7.4	712+00	9.5	7.8	712+50	10.3	8.4	713+00	9.2	7.9
713+50	10.4	7.9	714+00	10.5	8.3	714+50	9.5	8.9	715+00	9.7	7.4
715+50	9.2	9.0	716+00	10.2	8.8	716+50	12.0	8.4	717+00	11.2	8.0
717+50	10.6	8.3	718+00	7.4	8.2	718+50	7.1	7.1	719+00	7.6	8.1
719+50	7.3	8.7	720+00	7.8	9.8	720+50	8.8	9.7	721+00	8.7	10.0
721+50	9.7	10.8	722+00	8.3	8.4	722+50	9.8	8.8	723+00	7.7	7.8

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
723+50	9.7	9.9	724+00	8.7	8.0	724+50	8.6	8.0	725+00	9.8	10.1
725+50	9.2	10.5	726+00	5.8	6.9	726+50	6.1	5.8	727+00	6.1	5.9
727+50	4.7	4.5	728+00	5.6	5.0	728+50	5.5	5.5	729+00	4.8	6.2
729+50	6.0	6.2	730+00	4.9	6.5	730+50	4.9	6.5	731+00	3.8	6.0
731+50	4.6	6.7	732+00	5.1	6.3	732+50	3.9	5.6	733+00	4.2	6.9
733+50	3.5	6.1	734+00	3.3	7.0	734+50	3.7	5.9	735+00	4.3	6.3
735+50	4.9	6.1	736+00	5.0	7.0	736+50	4.2	7.2	737+00	4.9	7.2
737+50	4.4	6.8	738+00	4.8	7.1	738+50	5.1	7.7	739+00	5.5	5.8
739+50	5.6	6.2	740+00	5.5	6.7	740+50	5.0	8.4	741+00	4.4	8.9
741+50	5.0	8.4	742+00	5.9	7.9	742+50	6.0	6.0	743+00	5.3	5.6
743+50	4.6	6.2	744+00	4.7	6.3	744+50	4.1	6.9	745+00	4.2	7.8
745+50	5.1	7.6	746+00	6.8	8.8	746+50	7.7	8.4	747+00	7.2	7.6
747+50	7.0	7.8	748+00	6.1	6.5	748+50	4.6	5.4	749+00	4.7	5.8
749+50	4.7	5.2	750+00	4.3	4.8	750+50	4.1	4.5	751+00	4.5	4.6
751+50	4.1	4.1	752+00	4.4	3.9	752+50	4.7	4.0	753+00	4.9	4.3
753+50	5.0	4.9	754+00	5.5	4.7	754+50	4.2	4.6	755+00	3.9	4.2
755+50	4.5	4.3	756+00	5.3	4.7	756+50	4.7	5.5	757+00	4.0	4.9
757+50	3.8	5.1	758+00	4.0	4.7	758+50	4.5	4.7	759+00	4.9	5.1
759+50	5.0	5.0	760+00	4.7	4.9	760+34	4.1	4.9			

MaineDOT

Ground Penetrating Radar (GPR)

Estimated Pavement Depths at Transverse Locations

012775.00 - Roxbury, Byron

Station	Left Offset, ft					CL	Right Offset, ft					Comments
							9					
458+00							6					
508+00							11.25					
548+00							10					
583+00							8					
613+00							4.5					
658+00							6					
703+00							6.5					
748+00							5					

Highlighted areas indicate pavement cores were taken at this location.

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 458+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 508+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 548+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 583+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 613+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 658+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 703+00, 9' RT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 748+00, 9' RT

MaineDOT

Ground Penetrating Radar (GPR)
Estimated Pavement Thickness
012775.00 - Roxbury, Byron

Explanation of Ground Penetrating (GPR) Data Collection and Analysis:

GPR data was collected at the inner and outer wheel path of the lane at 1 foot intervals along the entire section. Pavement thickness estimates were developed using Geophysical Survey Systems, Inc. (GSSI) RADAN7 GPR data processing software. Where available, pavement thickness values from Geotechnical borings and/or pavement cores collected by MaineDOT personnel were used in developing the estimated GPR pavement thicknesses.

Data Confidence Level:

Poor - Reflection layers are weak and 'jumbled' throughout much of the project. Layer depths do not correlate well with known pavement depths obtained from pavement cores.

GPR pavement thickness averages are to be considered for estimating purposes only. Actual pavement thickness may vary.

Additional Comments

Project Manager	Reported By	Test Date	Reported Date
MACDONALD, PAUL	**VOSE, RYAN K**	**11/6/2013**	**1/24/2014**

Lane Tested	Route	PMS Route Code	Analysis Distance, ft.
SOUTHBOUND LANE	**17**		**50**

Overall Average Thickness, in.	Overall Minimum Thickness, in.	Overall Maximum Thickness, in.
5.8	**2.5**	**11.7**

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
433+50	4.8	5.0	434+00	4.6	4.2	434+50	4.8	3.7	435+00	5.0	4.0
435+50	4.7	4.4	436+00	4.7	4.1	436+50	4.6	4.5	437+00	4.6	4.3
437+50	5.1	4.6	438+00	5.0	4.3	438+50	4.3	4.5	439+00	4.4	4.5
439+50	4.8	4.4	440+00	4.0	4.2	440+50	4.4	3.7	441+00	4.3	4.4
441+50	4.1	4.2	442+00	4.3	4.4	442+50	4.3	4.2	443+00	4.3	3.8
443+50	4.0	3.9	444+00	4.2	3.7	444+50	4.4	3.6	445+00	5.6	3.7
445+50	4.9	4.1	446+00	4.5	4.5	446+50	4.1	4.3	447+00	4.9	4.7
447+50	5.1	5.0	448+00	5.2	5.2	448+50	4.4	4.1	449+00	4.8	4.1
449+50	4.9	3.8	450+00	4.5	4.5	450+50	4.4	4.5	451+00	4.8	4.3
451+50	4.9	3.7	452+00	4.7	3.7	452+50	4.6	3.8	453+00	4.4	4.0
453+50	4.6	4.1	454+00	4.6	4.5	454+50	4.9	4.8	455+00	5.6	5.3
455+50	5.3	4.1	456+00	5.2	4.2	456+50	5.0	4.7	457+00	5.1	4.6
457+50	5.2	5.0	458+00	4.4	4.8	458+50	5.1	5.0	459+00	4.7	4.4

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
459+50	4.6	3.6	460+00	4.2	3.5	460+50	4.2	3.4	461+00	3.9	3.0
461+50	4.2	3.1	462+00	4.5	3.2	462+50	4.0	3.1	463+00	3.8	2.8
463+50	3.9	3.6	464+00	3.8	3.5	464+50	4.0	3.6	465+00	4.0	4.1
465+50	3.8	4.4	466+00	4.1	3.9	466+50	4.0	3.3	467+00	4.2	4.3
467+50	4.4	4.4	468+00	4.5	4.6	468+50	4.4	3.9	469+00	4.4	4.4
469+50	4.3	4.5	470+00	4.2	4.3	470+50	4.2	4.4	471+00	4.4	4.3
471+50	5.1	3.8	472+00	4.6	4.2	472+50	4.8	3.9	473+00	4.7	4.2
473+50	4.4	3.9	474+00	4.7	4.3	474+50	4.8	4.4	475+00	5.2	4.4
475+50	4.4	4.8	476+00	4.4	4.7	476+50	4.4	4.9	477+00	4.6	4.8
477+50	5.3	5.0	478+00	5.1	4.4	478+50	4.9	3.6	479+00	4.1	3.1
479+50	4.0	2.9	480+00	3.8	2.6	480+50	4.3	2.9	481+00	5.5	4.2
481+50	6.0	5.2	482+00	6.0	5.4	482+50	5.4	5.2	483+00	5.7	5.6
483+50	6.5	6.0	484+00	6.2	5.7	484+50	5.3	5.8	485+00	5.7	4.7
485+50	6.1	5.1	486+00	6.5	5.2	486+50	6.3	6.9	487+00	7.0	6.0
487+50	4.8	5.4	488+00	5.1	5.4	488+50	5.6	5.3	489+00	6.1	4.8
489+50	5.9	5.3	490+00	7.1	4.8	490+50	7.2	4.7	491+00	6.5	5.9
491+50	6.8	5.5	492+00	6.6	6.6	492+50	7.3	6.4	493+00	7.6	8.7
493+50	7.7	6.8	494+00	7.1	7.6	494+50	6.3	7.1	495+00	6.4	7.0
495+50	7.4	7.2	496+00	7.5	6.7	496+50	7.5	7.2	497+00	5.5	6.6
497+50	6.8	6.4	498+00	8.6	7.3	498+50	6.5	6.8	499+00	7.6	6.6
499+50	7.9	7.8	500+00	9.2	6.9	500+50	8.3	6.9	501+00	7.0	6.6
501+50	8.5	6.9	502+00	6.2	6.9	502+50	7.1	6.9	503+00	8.0	6.9
503+50	9.0	8.0	504+00	8.7	8.4	504+50	7.0	9.6	505+00	9.0	9.5
505+50	8.6	7.6	506+00	8.3	8.2	506+50	6.9	7.8	507+00	8.5	7.6
507+50	8.2	8.7	508+00	7.4	6.9	508+50	6.4	9.7	509+00	8.1	9.0
509+50	9.4	9.4	510+00	8.5	7.2	510+50	7.9	8.3	511+00	8.4	9.7
511+50	8.3	10.7	512+00	7.8	10.7	512+50	7.8	10.5	513+00	9.2	11.5
513+50	8.9	10.1	514+00	8.3	10.3	514+50	6.5	10.3	515+00	9.3	10.6
515+50	10.8	8.8	516+00	8.6	7.9	516+50	6.6	8.7	517+00	8.3	8.4
517+50	10.6	9.0	518+00	8.7	7.1	518+50	8.2	6.9	519+00	6.1	8.3
519+50	7.5	8.6	520+00	7.3	7.7	520+50	7.5	7.5	521+00	7.4	7.0
521+50	8.7	7.6	522+00	9.2	6.7	522+50	8.2	7.2	523+00	8.7	6.7
523+50	8.0	7.8	524+00	6.3	7.2	524+50	5.5	7.5	525+00	8.3	8.0
525+50	5.4	7.2	526+00	5.1	8.8	526+50	10.0	9.3	527+00	10.4	9.8
527+50	9.2	10.7	528+00	9.3	10.9	528+50	6.5	6.9	529+00	6.7	6.5
529+50	8.0	8.9	530+00	8.3	9.4	530+50	6.8	7.7	531+00	6.8	6.5
531+50	5.7	6.9	532+00	6.8	6.1	532+50	4.0	6.5	533+00	4.9	7.2
533+50	7.2	7.4	534+00	8.1	7.1	534+50	7.3	7.6	535+00	8.1	7.9
535+50	6.3	7.5	536+00	7.1	9.8	536+50	6.2	7.3	537+00	5.1	7.2
537+50	4.9	7.7	538+00	4.3	7.5	538+50	6.2	6.8	539+00	8.1	8.9
539+50	7.3	9.1	540+00	7.7	8.9	540+50	8.0	8.4	541+00	9.1	11.7
541+50	9.5	10.5	542+00	7.6	9.0	542+50	7.5	9.2	543+00	6.4	10.4
543+50	6.9	9.0	544+00	7.0	6.3	544+50	7.9	7.4	545+00	6.3	8.3
545+50	6.1	8.1	546+00	6.8	7.8	546+50	7.6	7.6	547+00	7.7	8.7

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
547+50	9.1	8.7	548+00	8.4	8.8	548+50	6.7	8.5	549+00	5.6	6.2
549+50	5.9	7.9	550+00	5.6	8.3	550+50	5.3	6.8	551+00	5.6	6.3
551+50	5.1	5.7	552+00	7.0	5.2	552+50	5.2	5.5	553+00	6.1	7.6
553+50	5.7	7.5	554+00	4.7	6.3	554+50	4.2	6.4	555+00	4.3	7.1
555+50	5.7	6.1	556+00	5.5	6.0	556+50	5.3	6.7	557+00	5.8	6.5
557+50	4.6	6.9	558+00	5.8	6.7	558+50	6.1	7.1	559+00	5.2	6.0
559+50	6.0	7.1	560+00	6.3	5.5	560+50	4.5	5.2	561+00	4.6	6.7
561+50	4.2	5.6	562+00	3.7	6.0	562+50	3.4	5.0	563+00	3.8	4.8
563+50	4.3	6.1	564+00	5.1	6.0	564+50	7.1	7.0	565+00	5.3	6.5
565+50	5.6	6.2	566+00	5.4	5.4	566+50	5.0	4.7	567+00	4.1	5.5
567+50	5.5	6.0	568+00	5.5	5.8	568+50	4.7	6.3	569+00	4.6	6.6
569+50	4.0	5.3	570+00	3.2	5.4	570+50	3.7	5.5	571+00	3.1	4.7
571+50	4.8	6.2	572+00	4.4	5.4	572+50	4.3	5.2	573+00	3.5	4.6
573+50	3.7	5.4	574+00	5.0	5.5	574+50	4.5	5.7	575+00	4.2	6.0
575+50	4.1	5.4	576+00	4.5	5.2	576+50	3.6	6.4	577+00	4.9	7.1
577+50	3.8	5.0	578+00	5.3	5.9	578+50	5.0	5.9	579+00	5.9	5.9
579+50	6.5	5.4	580+00	6.1	4.8	580+50	5.6	6.3	581+00	6.5	7.2
581+50	6.0	8.0	582+00	5.0	8.1	582+50	5.0	7.0	583+00	5.6	7.0
583+50	6.8	7.6	584+00	6.9	7.3	584+50	7.3	8.4	585+00	5.5	7.8
585+50	6.3	8.0	586+00	6.7	8.4	586+50	7.3	6.3	587+00	7.3	7.2
587+50	7.3	6.3	588+00	5.8	7.3	588+50	7.3	7.8	589+00	6.4	7.6
589+50	5.9	7.0	590+00	7.3	9.3	590+50	7.9	8.2	591+00	6.3	7.1
591+50	8.9	6.9	592+00	8.1	6.8	592+50	8.5	8.8	593+00	9.8	8.0
593+50	8.1	7.8	594+00	7.3	8.4	594+50	6.2	7.9	595+00	8.3	8.3
595+50	8.9	9.2	596+00	7.6	7.2	596+50	7.5	7.5	597+00	8.0	10.3
597+50	7.8	10.0	598+00	8.9	9.5	598+50	6.4	8.1	599+00	4.6	7.6
599+50	4.3	7.0	600+00	7.0	7.6	600+50	7.5	7.0	601+00	8.1	8.6
601+50	6.8	7.7	602+00	7.3	8.1	602+50	7.5	8.5	603+00	6.4	8.9
603+50	6.0	8.0	604+00	6.5	7.8	604+50	5.4	6.9	605+00	5.4	4.3
605+50	4.8	3.7	606+00	5.4	4.2	606+50	4.2	3.8	607+00	3.5	3.7
607+50	4.8	4.6	608+00	5.1	5.1	608+50	5.2	4.6	609+00	4.8	4.8
609+50	5.2	3.9	610+00	5.6	4.2	610+50	5.3	4.4	611+00	5.3	4.4
611+50	5.1	4.0	612+00	4.7	4.1	612+50	4.7	4.1	613+00	4.6	4.1
613+50	5.1	4.2	614+00	5.1	4.8	614+50	4.2	4.5	615+00	4.4	4.4
615+50	4.4	4.1	616+00	3.8	4.5	616+50	3.9	4.0	617+00	4.3	3.6
617+50	3.2	4.0	618+00	3.9	4.1	618+50	3.8	4.0	619+00	4.1	4.3
619+50	4.7	4.1	620+00	5.0	3.8	620+50	5.2	4.0	621+00	5.7	4.6
621+50	5.5	5.3	622+00	5.2	5.2	622+50	5.7	5.0	623+00	5.1	5.0
623+50	5.3	5.2	624+00	5.9	5.3	624+50	5.8	6.0	625+00	5.8	5.3
625+50	5.8	6.4	626+00	5.9	7.0	626+50	5.7	6.1	627+00	6.4	6.2
627+50	6.7	5.5	628+00	7.1	6.5	628+50	5.5	5.7	629+00	5.7	6.4
629+50	6.2	6.6	630+00	7.8	6.6	630+50	6.5	5.4	631+00	7.3	5.9
631+50	8.0	7.5	632+00	6.6	7.5	632+50	6.2	8.1	633+00	6.1	5.9
633+50	6.8	6.0	634+00	7.6	7.3	634+50	8.7	7.3	635+00	6.3	6.7

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
635+50	6.9	6.4	636+00	6.5	5.6	636+50	6.4	6.4	637+00	6.7	6.5
637+50	6.6	6.2	638+00	6.3	5.8	638+50	6.8	4.6	639+00	6.0	5.8
639+50	5.2	7.2	640+00	4.9	5.9	640+50	4.4	5.0	641+00	4.4	5.7
641+50	4.4	4.8	642+00	4.4	5.7	642+50	5.3	7.1	643+00	5.5	7.6
643+50	6.9	6.4	644+00	6.6	5.5	644+50	5.6	5.6	645+00	6.4	6.0
645+50	5.6	5.6	646+00	5.1	5.8	646+50	6.0	5.1	647+00	6.2	5.2
647+50	5.9	6.0	648+00	5.5	5.5	648+50	6.4	7.4	649+00	6.4	6.6
649+50	5.8	6.8	650+00	6.0	7.3	650+50	6.3	8.3	651+00	6.7	6.5
651+50	6.5	6.5	652+00	5.6	5.7	652+50	4.4	7.8	653+00	5.6	8.0
653+50	5.5	7.5	654+00	4.3	5.3	654+50	5.3	5.9	655+00	7.2	6.3
655+50	5.3	5.8	656+00	5.9	6.0	656+50	6.2	5.0	657+00	5.2	5.1
657+50	4.6	5.1	658+00	4.2	5.3	658+50	3.6	3.6	659+00	4.5	3.1
659+50	3.8	3.5	660+00	3.7	3.4	660+50	3.9	3.4	661+00	4.3	3.0
661+50	3.9	3.7	662+00	4.1	3.9	662+50	4.0	3.5	663+00	4.3	3.8
663+50	4.2	4.0	664+00	5.0	4.6	664+50	4.4	4.1	665+00	3.5	4.4
665+50	3.6	4.4	666+00	3.7	4.6	666+50	4.1	4.5	667+00	3.4	4.2
667+50	3.8	5.3	668+00	3.6	6.2	668+50	3.7	5.2	669+00	4.1	5.1
669+50	5.0	4.4	670+00	4.1	4.3	670+50	3.7	4.6	671+00	3.7	5.0
671+50	3.9	5.1	672+00	3.6	4.8	672+50	3.3	4.5	673+00	3.4	3.9
673+50	2.9	4.8	674+00	3.4	5.1	674+50	3.2	4.0	675+00	3.6	3.7
675+50	3.4	4.0	676+00	4.0	4.6	676+50	3.0	5.8	677+00	2.8	4.6
677+50	3.0	5.3	678+00	3.0	5.4	678+50	3.3	4.5	679+00	2.9	4.6
679+50	3.4	4.1	680+00	3.5	4.5	680+50	3.5	4.5	681+00	3.4	3.9
681+50	3.0	4.1	682+00	3.6	5.5	682+50	3.2	5.6	683+00	3.3	5.5
683+50	3.1	5.9	684+00	3.3	6.2	684+50	3.1	5.4	685+00	3.0	4.4
685+50	3.4	4.6	686+00	3.5	4.8	686+50	2.9	4.8	687+00	3.5	4.7
687+50	3.0	5.3	688+00	3.4	5.7	688+50	2.8	5.5	689+00	3.5	5.6
689+50	3.3	4.6	690+00	3.2	5.0	690+50	3.0	4.3	691+00	2.8	3.7
691+50	3.2	3.9	692+00	3.4	3.2	692+50	3.5	4.6	693+00	2.7	4.1
693+50	3.6	4.9	694+00	3.5	4.9	694+50	3.6	4.4	695+00	3.4	4.5
695+50	3.0	4.4	696+00	3.1	5.2	696+50	3.4	5.2	697+00	3.5	5.5
697+50	3.2	5.6	698+00	3.6	5.6	698+50	3.4	5.1	699+00	3.9	5.1
699+50	4.1	4.7	700+00	2.9	5.2	700+50	2.9	5.3	701+00	3.3	4.4
701+50	2.5	3.3	702+00	3.3	4.3	702+50	2.8	3.8	703+00	3.3	5.0
703+50	5.5	9.5	704+00	6.4	8.4	704+50	6.6	8.3	705+00	6.5	9.3
705+50	6.3	8.9	706+00	6.7	9.3	706+50	5.4	6.9	707+00	5.1	6.5
707+50	5.4	8.6	708+00	6.3	10.9	708+50	6.7	9.3	709+00	5.7	9.4
709+50	6.8	8.9	710+00	6.0	9.3	710+50	5.7	8.4	711+00	6.3	10.3
711+50	6.5	8.6	712+00	5.7	8.2	712+50	5.8	8.6	713+00	6.5	10.5
713+50	5.8	9.2	714+00	6.6	9.8	714+50	5.8	9.1	715+00	5.9	8.9
715+50	6.6	8.8	716+00	5.6	8.7	716+50	5.9	8.7	717+00	5.7	7.3
717+50	5.8	8.6	718+00	6.0	8.1	718+50	6.4	9.4	719+00	8.0	8.3
719+50	7.3	9.2	720+00	7.7	9.8	720+50	6.9	9.1	721+00	7.4	9.1
721+50	6.8	9.5	722+00	7.0	8.8	722+50	5.6	7.2	723+00	5.7	7.0

***Depth at this location may be impacted by a bridge deck or other pavement anomaly.**

Highlighted inches indicate either the Overall Minimum or Overall Maximum thickness.

Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.	Station	Inner Average Thickness, in.	Outer Average Thickness, in.
723+50	5.6	7.7	724+00	6.1	7.1	724+50	5.0	7.7	725+00	6.7	7.0
725+50	5.8	6.1	726+00	3.0	3.6	726+50	2.8	3.8	727+00	2.7	4.2
727+50	3.0	4.5	728+00	3.0	4.2	728+50	3.2	4.6	729+00	3.4	3.8
729+50	3.9	3.9	730+00	3.4	4.9	730+50	3.2	4.3	731+00	3.7	4.1
731+50	3.6	4.3	732+00	2.9	4.1	732+50	3.2	3.8	733+00	3.6	4.5
733+50	2.9	5.0	734+00	2.6	4.4	734+50	2.8	4.7	735+00	4.0	5.2
735+50	4.0	4.7	736+00	3.1	4.7	736+50	3.6	4.4	737+00	3.7	4.6
737+50	4.8	4.5	738+00	3.8	4.2	738+50	4.1	4.2	739+00	4.5	3.9
739+50	4.3	4.4	740+00	3.4	3.5	740+50	3.2	3.7	741+00	3.6	4.6
741+50	4.0	4.8	742+00	4.0	4.8	742+50	4.3	4.5	743+00	3.0	4.7
743+50	3.1	4.8	744+00	3.0	5.0	744+50	3.1	5.0	745+00	3.6	3.9
745+50	4.2	3.9	746+00	4.4	4.3	746+50	3.9	3.6	747+00	4.4	4.2
747+50	4.7	4.6	748+00	5.0	4.2	748+50	7.6	6.6	749+00	6.8	6.8
749+50	6.3	6.9	750+00	6.7	7.5	750+50	7.7	7.8	751+00	7.2	8.0
751+50	7.1	7.1	752+00	8.5	7.3	752+50	7.7	7.8	753+00	8.0	7.2
753+50	8.1	6.3	754+00	6.8	5.3	754+50	6.4	6.2	755+00	7.1	6.1
755+50	7.2	7.4	756+00	8.1	6.2	756+50	7.2	6.1	757+00	6.7	5.6
757+50	6.6	6.0	758+00	6.5	5.9	758+50	6.4	6.3	759+00	7.5	7.7
759+50	7.2	7.4	760+00	6.5	6.2	760+07	6.3	8.3			

MaineDOT

Ground Penetrating Radar (GPR)

Estimated Pavement Depths at Transverse Locations

012775.00 - Roxbury, Byron

Station	Left Offset, ft					CL	Right Offset, ft					Comments
					9							
458+00					5							
508+00					11							
548+00					8.25							
583+00					7.75							
613+00					4.75							
658+00					7.5							
703+00					6.25							
748+00					4.5							

Highlighted areas indicate pavement cores were taken at this location.

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 458+00, 9' LT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 508+00, 9' LT

MaineDOT

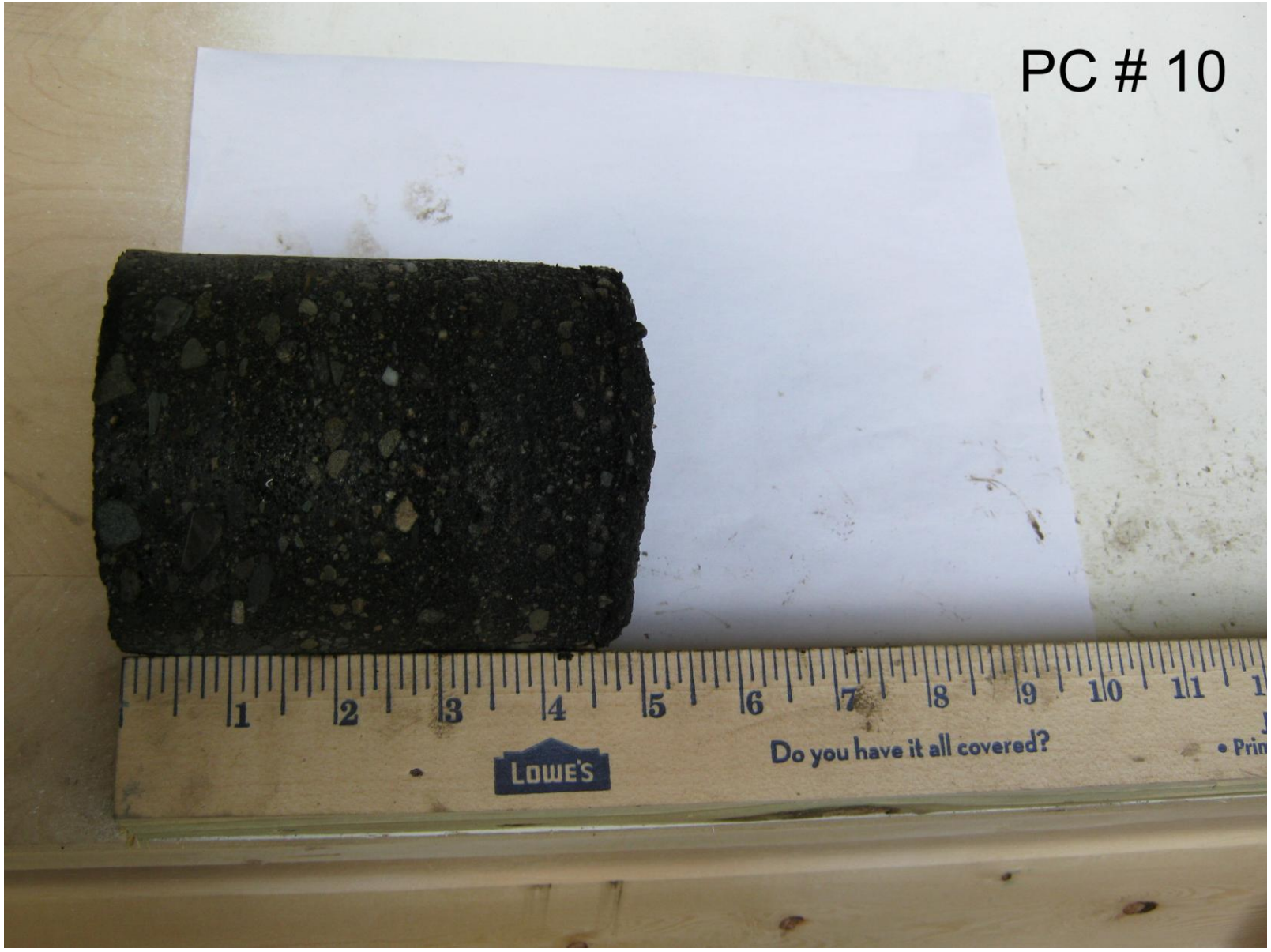
Pavement Cores
012775.00 - Roxbury, Byron
STATION 548+00, 9' LT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 583+00, 9' LT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 613+00, 9' LT



MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 658+00, 9' LT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 703+00, 9' LT

MaineDOT

Pavement Cores
012775.00 - Roxbury, Byron
STATION 748+00, 9' LT

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Roxbury-Byron Project Number: 12775.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	% Passing 200 Sieve	Classification		
								Unified	AASHTO	Frost
HB-ROBY-101, S1	453+00	8.0 Rt.	0.30-3.2	207483	1	2.3	6.3	SW-SM	A-1-a	0
HB-ROBY-101, S2	453+00	8.0 Rt.	3.2-5.0	207484	1	11.5	19.0	SM	A-1-b	II
HB-ROBY-102, S3	463+00	8.5 Rt.	2.5-3.5	207485	1	5.7	18.1	SM	A-1-b	II
HB-ROBY-104, S4	473+00	9.0 Rt.	3.2-5.0	207486	1	15.6	27.9	SM	A-2-4	II
HB-ROBY-106, S5	496+50	8.0 Rt.	0.40-3.0	207487	1	8.4	18.9	SM	A-2-4	II
HB-ROBY-106, S6	496+50	8.0 Rt.	7.8-10.0	207488	1	22.8	26.8	SM	A-2-4	II
HB-ROBY-109, S7	511+00	8.5 Rt.	2.0-3.1	207489	2	5.4	14.8	SM	A-1-b	II
HB-ROBY-110, S8	520+50	8.7 Rt.	0.60-1.8	207490	2	4.7	13.6	SM	A-1-b	II
HB-ROBY-112, S9	533+00	8.5 Rt.	0.60-7.4	207491	2	5.0	26.8	SM	A-2-4	II
HB-ROBY-112, S10	533+00	8.5 Rt.	7.4-10.0	207492	2	14.9	20.8	SM	A-2-4	II
HB-ROBY-116, S11	568+00	8.5 Rt.	0.40-2.1	207493	2	5.9	13.1	SM	A-1-b	II
HB-ROBY-116, S12	568+00	8.5 Rt.	2.1-4.6	207494	2	2.4	12.0	SW-SM	A-1-a	0
HB-ROBY-121, S13	603+00	8.0 Rt.	0.30-1.3	207495	3	3.4	9.5	SW-SM	A-1-a	0
HB-ROBY-121, S14	603+00	8.0 Rt.	1.3-3.5	207496	3	32.6	72.6	ML	A-4	IV
HB-ROBY-126, S15	650+50	7.5 Rt.	1.2-1.9	207497	3	12.1	6.5	SW-SM	A-1-a	0
HB-ROBY-126, S16	650+50	7.5 Rt.	1.9-3.8	207498	3	28.3	43.2	SM	A-4	III
HB-ROBY-126, S17	650+50	7.5 Rt.	3.8-5.0	207499	3	16.5	15.0	SM	A-1-b	II
HB-ROBY-128, S18	658+07	13.0 Rt.	1.9-5.0	207500	3	4.0	15.0	SM	A-1-b	II
HB-ROBY-133, S19	715+50	7.0 Rt.	1.0-2.5	207994	4	4.0	15.5	SM	A-1-b	II
HB-ROBY-134, S20	715+50	12.0 Rt.	0.0-2.1	207995	4	6.6	11.9	SW-SM	A-1-b	0
HB-ROBY-135, S21	730+50	7.3 Rt.	0.40-1.7	207996	4	5.5	9.5	SW-SM	A-1-b	0
HB-ROBY-135, S22	730+50	7.3 Rt.	1.7-5.0	207997	4	11.3	21.4	SM	A-1-b	II
HB-ROBY-136, S23	740+50	8.0 Rt.	1.2-3.7	207998	4	16.5	39.2	SM	A-4	III

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

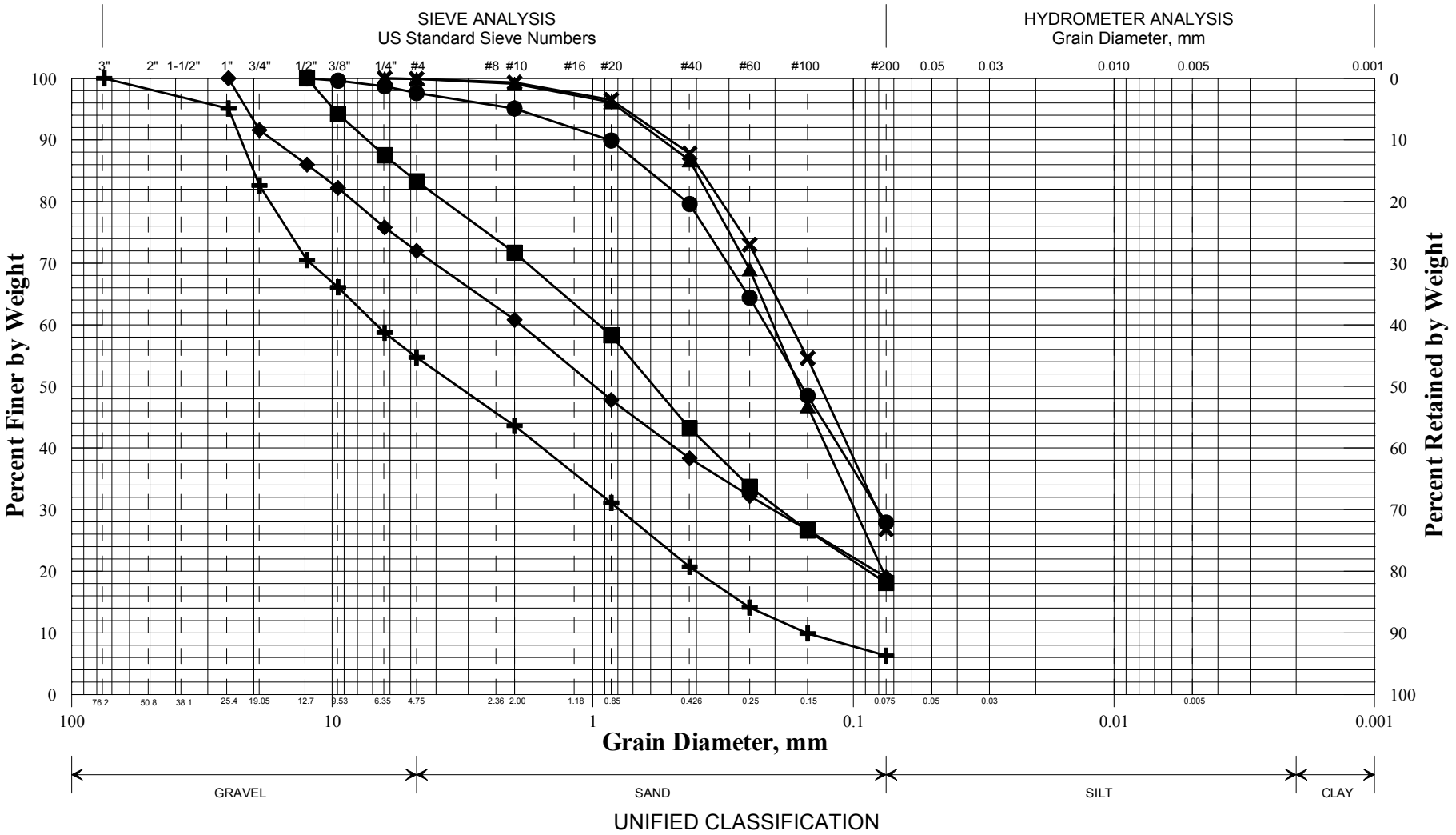
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

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

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-ROBY-101-S1	453+00	8.0 RT	0.3-3.2	Gravelly SAND, trace silt.	2.3			
◆	HB-ROBY-101-S2	453+00	8.0 RT	3.2-5.0	SAND, some gravel, little silt.	11.5			
■	HB-ROBY-102-S3	463+00	8.3 RT	2.5-3.5	SAND, little silt, little gravel.	5.7			
●	HB-ROBY-104-S4	473+00	9.0 RT	3.2-5.0	SAND, some silt, trace gravel.	15.6			
▲	HB-ROBY-106/S5	496+50	8.0 RT	0.4-3.0	SAND, little silt, trace gravel.	8.4			
✖	HB-ROBY-106/S6	496+50	8.0 RT	7.8-10.0	SAND, some silt, trace gravel.	22.8			

WIN
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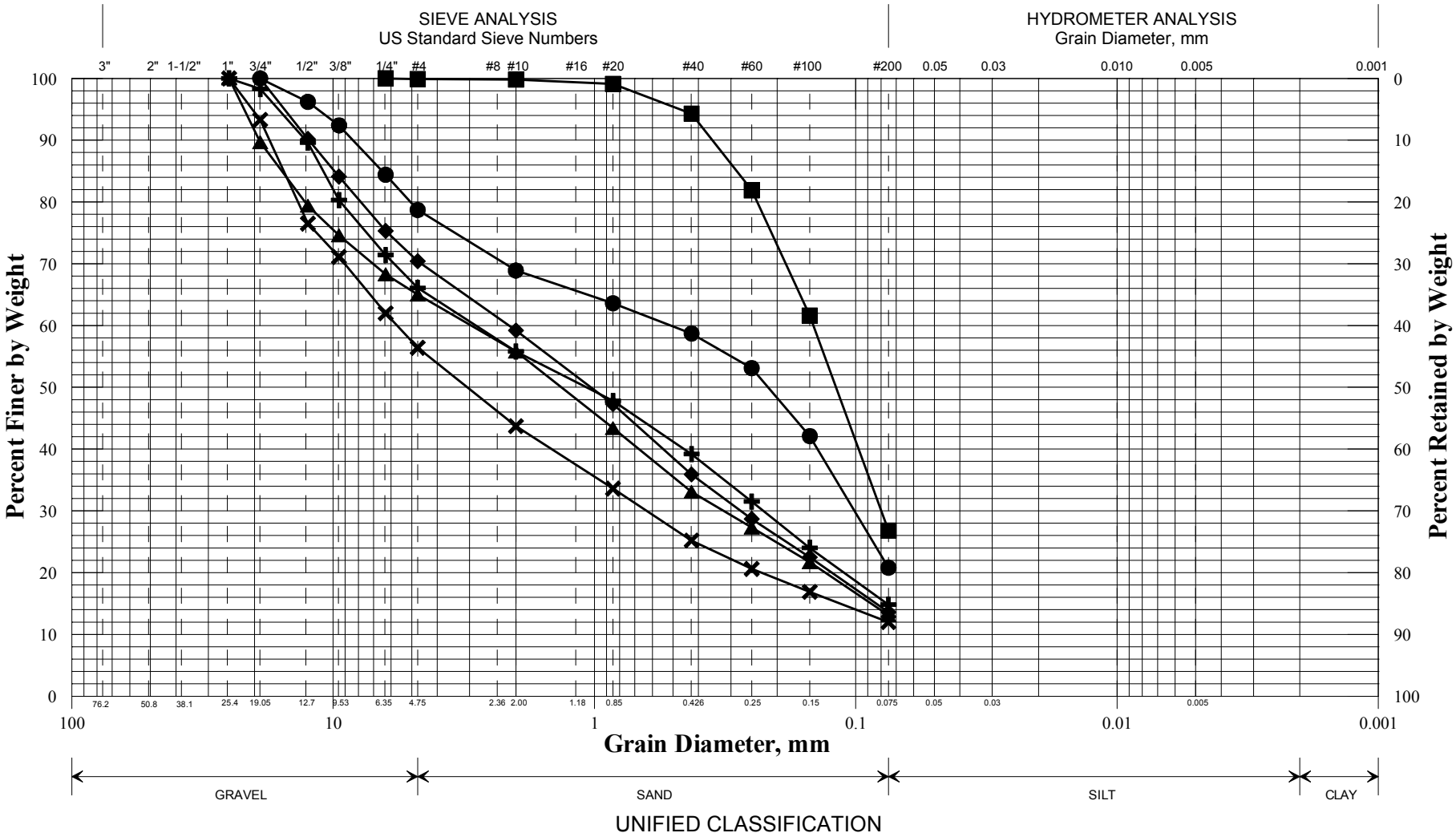
SHEET 1

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-ROBY-109/S7	511+00	8.5 RT	2.0-3.1	SAND, some gravel, little silt.	5.4			
◆	HB-ROBY-110-S8	520+50	8.7 RT	0.6-1.8	SAND, some gravel, little silt.	4.7			
■	HB-ROBY-112-S9	533+00	8.5 RT	0.6-7.4	SAND, some silt, trace gravel.	5.0			
●	HB-ROBY-112-S10	533+00	8.5 RT	7.4-10.0	SAND, some gravel, some silt.	14.9			
▲	HB-ROBY-116/S11	568+00	8.5 RT	0.4-2.1	SAND, some garvel, little silt.	5.9			
✖	HB-ROBY-116/S12	568+00	8.5 RT	2.1-4.6	Gravelly SAND, little silt.	2.4			

WIN
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Town
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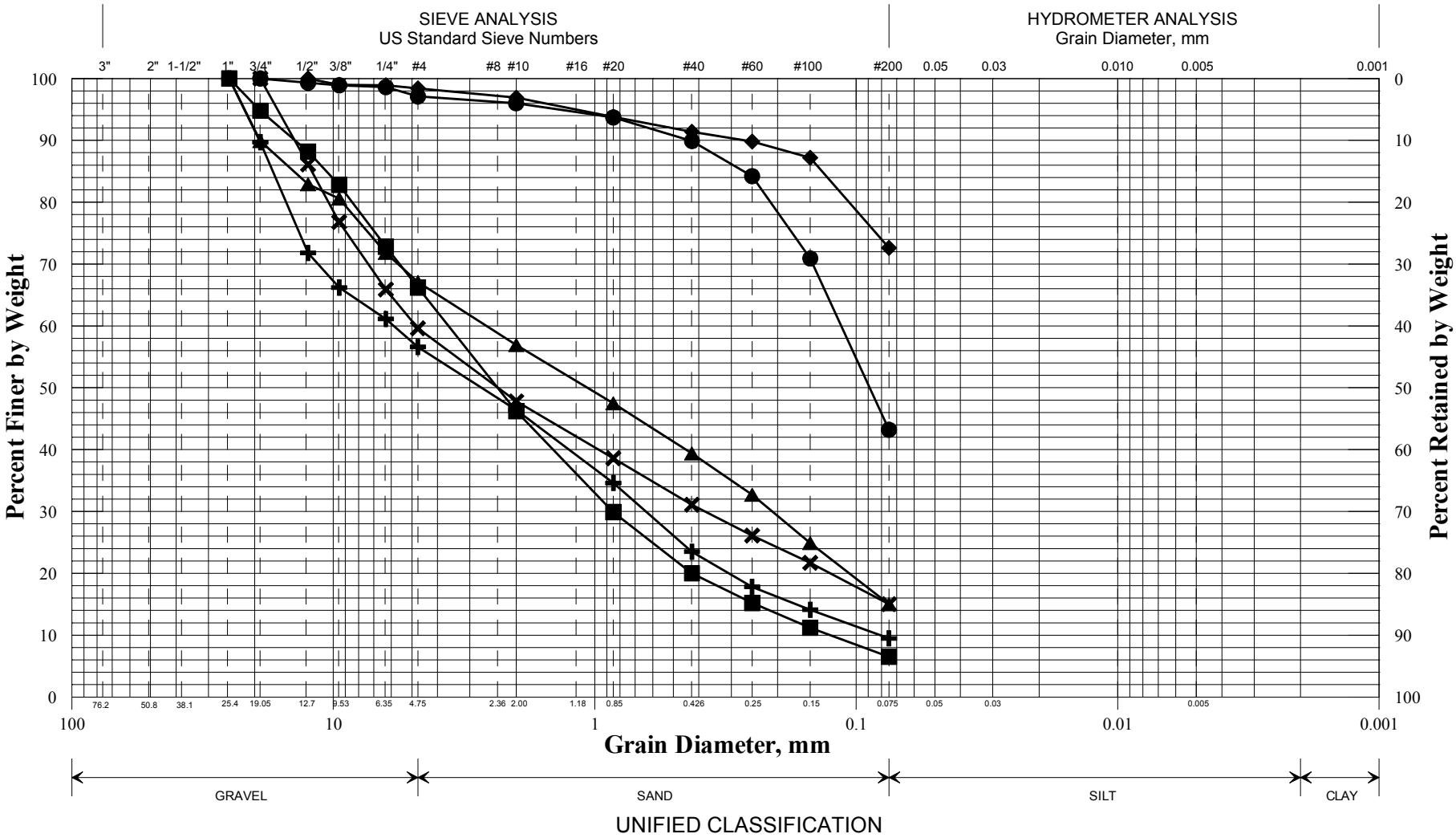
WHITE, TERRY A 11/15/2007

SHEET 2

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-ROBY-121/S13	603+00	8.0 RT	0.3-1.3	Gravelly SAND, trace silt.	3.4			
◆	HB-ROBY-121/S14	603+00	8.0 RT	1.3-3.5	SILT, some sand, trace gravel.	32.6			
■	HB-ROBY-126/S15	650+50	7.5 RT	1.2-1.9	SAND, some gravel, trace silt.	12.1			
●	HB-ROBY-126/S16	650+50	7.5 RT	1.9-3.8	Silty SAND, trace gravel.	28.3			
▲	HB-ROBY-126/S17	650+50	7.5 RT	3.8-5.0	SAND, some gravel, little silt.	16.5			
✖	HB-ROBY-128/S18	658+07	13.0 RT	1.9-5.0	Gravelly SAND, little silt.	4.0			

WIN
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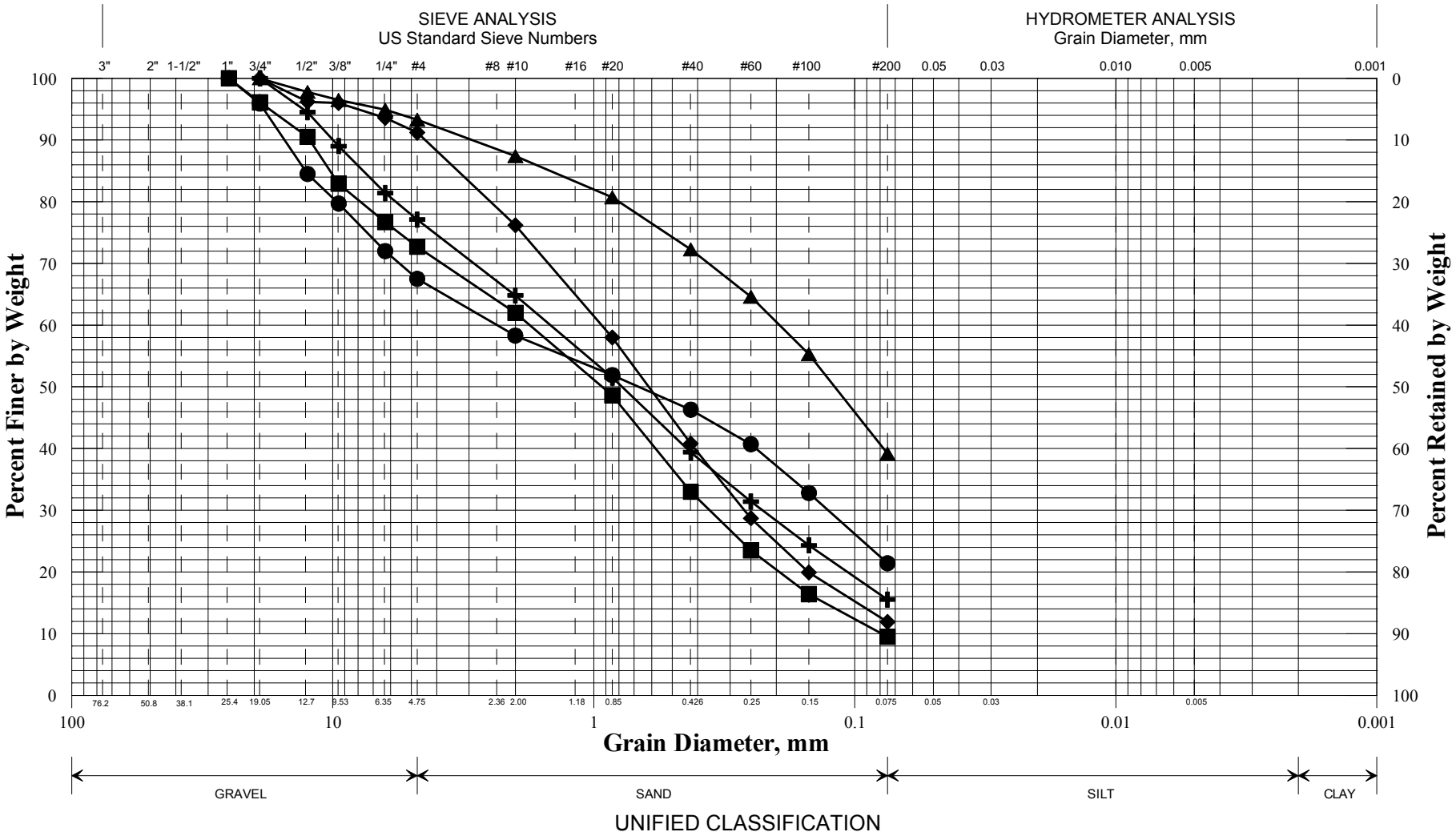
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-ROBY-133/S19	715+50	7.0 RT	1.0-2.5	SAND, some gravel, little silt.	4.0			
◆	HB-ROBY-134/S20	715+50	12.0 RT	0.0-2.1	SAND, little silt, trace gravel.	6.6			
■	HB-ROBY-135/S21	730+50	7.3 RT	0.4-1.7	SAND, some gravel, trace silt.	5.5			
●	HB-ROBY-135/S22	730+50	7.3 RT	1.7-5.0	SAND, some gravel, some silt.	11.3			
▲	HB-ROBY-136/S23	740+50	8.0 RT	1.2-3.7	Silty SAND, trace gravel.	16.5			
✖									

WIN
012775.00
Town
Roxbury,Byron
Reported by/Date
WHITE, TERRY A 11/15/2007

State of Maine - Department of Transportation

Power Auger Probe Summary Sheet

Town(s): Roxbury-Byron Project Number: 12775.00

Station (Feet)	Offset (Feet)	Augered in Rock (Feet)	Refusal (Feet)	No Refusal (Feet)	Water Depth (Ft.)	Comments / Date 7/10-11/2007
508+00	9.0 Rt.			10.0	4.2	
508+50	6.5 Lt.			10.0	3.8	
509+00	7.8 Rt.	3.4	4.5		2.5	
509+50	6.8 Lt.			10.0	4.7	
510+00	8.0 Rt.	7.1	8.9		4.0	1.9-4.6' Boulder
510+50	8.0 Lt.			10.0	7.0	
511+00	7.0 Rt.			10.0	5.8	
562+43	13.5 Rt.			10.0		2.3-3.4' Boulder
						4.2-6.0' Boulder
584+50	8.3 Rt.			10.0		Frequent Cobbles
590+00	7.5 Rt.			11.0		Frequent Cobbles
629+35	11.5 Rt.			10.0	5.7	
629+85	12.5 Lt.			10.0		Cobbles
630+35	8.0 Rt.	8.8	9.6		5.2	Cobbles & Boulders
630+85	13.5 Lt.		8.4		7.0	Cobbles & Boulders
631+35	8.0 Rt.	6.4	7.0			
631+85	13.0 Lt.			10.0	4.5	Cobbles
632+35	8.0 Rt.			10.0	3.0	3.0-6.0' loose wet sand
638+75	7.5 Rt.			10.0		Cobbles
						2.0-3.4' Boulder

MaineDOT Drill Crew
Logged By: G. Lidstone
Drill Rig: CME 45C

5" Solid Stem Auger

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-101
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	453+00, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S1		0.30 - 3.20			SSA	-0.30		PAVEMENT.	
									0.30 GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill).	G#207483 A-1-a, SW-SM WC=2.3%
	S2		3.20 - 5.00				-3.20		3.20 Brown, damp, silty fine to coarse SAND, some gravel, (Fill).	G#207484 A-1-b, SM WC=11.5%
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-101

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-102
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	463+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT.	
									0.40 GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill). ≅S1	
	S3		2.50 - 3.50				-2.50		2.50 Dark brown, silty fine to medium SAND, little gravel, trace coarse sand, (Fill) .	G#207485 A-1-b, SM WC=5.7%
							-3.50		3.50 GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill). ≅S1	
							-4.20		4.20 Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-102

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-103
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	463+00, 13.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill). ≅S1	
							-2.10		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2	
							-3.40		Dark brown, silty fine to medium SAND, little gravel, trace coarse sand, (Fill). ≅S3	
							-4.70			
5							-5.00		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-104
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	473+00, 9.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.25		PAVEMENT.	
							-0.40		0.25 Unbound Pavement.	
									0.40 GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill). ≅S1	
	S4		3.20 - 5.00				-3.20		3.20 Brown, moist, silty fine SAND.	G#207486 A-2-4, SM WC=15.6%
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-104

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-105
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	488+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
							-1.70		GRAVEL, some brown, damp, fine to coarse sand, little silt, cobbles, (Fill). ≅S1 1.70	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-106
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	496+50, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	7.8' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S5		0.40 - 3.00			SSA	-0.40		PAVEMENT.	
									0.40 Brown, damp, silty fine SAND, trace medium sand.	G#207487 A-2-4, SM WC=8.4%
							-3.00		3.00 Brown, moist, silty fine SAND. ≅S4	
5										
	S6		7.80 - 10.00				-7.80		7.80 Brown, wet, fine SAND, trace medium sand, trace silt.	G#207488 A-2-4, SM WC=22.8%
10							-10.00		10.00 **Bottom of Exploration at 10.00 feet below ground surface.** NO REFUSAL	
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-107
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	498+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.55		PAVEMENT. 0.55	
									Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2	
							-2.00		2.00 Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-108
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	502+93, 5.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
							-1.10		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2 1.10	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-109
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	511+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	6.7' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.65	PAVEMENT.	
							-1.00	Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S2 (0.65)	
							-2.00	Brown, moist, silty fine SAND. ≅S4 (1.00)	
	S7		2.00 - 3.10					Brown, damp, fine to medium SAND, some gravel, little silt, trace coarse sand. (2.00)	G#207489 A-1-b, SM WC=5.4%
							-3.10	≅S7, but with cobbles. (3.10)	
5							-6.70	≅S7, but wet. (6.70)	
							-8.60	Augered into Rock. (8.60)	
							-9.40	**Bottom of Exploration at 9.40 feet below ground surface.** REFUSAL (9.40)	
10									
15									
20									
25									

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-109

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-110
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	520+50, 8.7' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S8		0.60 - 1.80			SSA	-0.50		PAVEMENT. 0.50	G#207490 A-1-b, SM WC=4.7%
							-0.60		Unbound Pavement. 0.60	
							-1.80		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). 1.80	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-111
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	520+50, 12.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
							-1.50		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). ≅S8 1.50	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-112
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	533+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	7.4' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S9		0.60 - 7.40			SSA	-0.30		PAVEMENT.	
							-0.60		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). ≅S8 (0.30)	G#207491 A-2-4, SM WC=5.0%
									Brown, damp, fine SAND. (0.60)	
5										
	S10		7.40 - 10.00				-7.40		Brown, wet, fine SAND, little gravel, trace medium to coarse sand, trace silt. (7.40)	G#207492 A-2-4, SM WC=14.9%
10							-10.00		**Bottom of Exploration at 10.00 feet below ground surface.** NO REFUSAL (10.00)	
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-112

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-113
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	538+00, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT. 0.40	
							-0.50		Unbound Pavement. 0.50	
							-0.80		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). ≅S8 0.80	
									Brown, damp, fine SAND. ≅S9	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-114
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	548+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
							-1.50		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). ≅S8 1.50	
							-3.00		Brown, moist, silty fine SAND. ≅S4 3.00	
							-5.00		Brown, damp, fine to medium SAND, some gravel, little silt, trace coarse sand. ≅S7 5.00	
5									**Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-114

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-115
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/10/07-7/10/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	560+58, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT.	
							-0.70		0.40 — Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). ≅S8	
									0.70 — Brown, damp, fine to medium SAND, some gravel, little silt, trace coarse sand. ≅S7	
							-3.20		3.20 — BOULDER.	
							-4.50		4.50 — Brown, damp, fine to medium SAND, some gravel, little silt, trace coarse sand. ≅S7	
5							-5.00		5.00 — **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.
Overhead wires at Sta. 127+50

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

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

Boring No.: HB-ROBY-115

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-116
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	568+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S11		0.40 - 2.10			SSA	-0.30	PAVEMENT. (0.30)	
							-0.40	Unbound Pavement. (0.40)	G#207493 A-1-b, SM WC=5.9%
							-2.10	Brown, damp, silty fine to coarse SAND, some gravel, (Fill). (2.10)	
	S12		2.10 - 4.60					GRAVEL, cobbles, some brown, damp, fine to coarse sand, (Esker?)	G#207494 A-1-a, SW-SM WC=2.4%
							-4.60	Augered into Rock. (4.60)	
5							-5.80	(5.80)	
								Bottom of Exploration at 5.80 feet below ground surface. Boulder ? REFUSAL	
10									
15									
20									
25									

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-116

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-117
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	568+00, 13.3' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S11	
							-1.40		1.40 GRAVEL, cobbles, some brown, damp, fine to coarse sand, (Esker?) ≅S12	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-118
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	580+50, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.75		PAVEMENT. 0.75	
							-1.40		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S11 1.40	
									Brown, moist, silty fine SAND. ≅S4	
							-4.20		4.20	
5							-5.00		Brown, damp, fine to medium SAND, some gravel, little silt, trace coarse sand. ≅S7 5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-118

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-119
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	595+60, 6.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
							-0.80		Unbound Pavement. 0.80	
							-1.30		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S11 1.30	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-120
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	595+60, 12.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.70		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S11 — 0.70	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-121
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	603+00, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S13		0.30 - 1.30			SSA	-0.30		PAVEMENT. 0.30	G#207495 A-1-a, SW-SM WC=3.4%
	S14		1.30 - 3.50				-1.30		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). 1.30	G#207496 A-4, ML WC=32.6%
									Brown, moist, fine sandy SILT.	
							-3.50		3.50	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-122
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	613+00, 7.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.20		PAVEMENT. 0.20	
							-0.30		Unbound Pavement. 0.30	
							-2.10		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 2.10	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-123
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	628+00, 7.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.45		PAVEMENT.	
									0.45 GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13	
							-2.10		2.10 Brown, moist, silty fine SAND. ≅S4	
							-3.40		3.40 Brown, moist, fine sandy SILT. ≅S14	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-124
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	628+00, 12.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.30		Brown, damp, fine to coarse SAND, trace silt.	
									GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13	
							-2.00		Brown, moist, silty fine SAND. ≅S4	
							-3.00		Brown, moist, fine sandy SILT. ≅S14	
							-4.20		Brown, moist, silty fine SAND. ≅S4	
5							-5.00		**Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-125
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/11/07-7/11/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	645+50, 7.8' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.50		PAVEMENT. 0.50	
							-0.60		Unbound Pavement. 0.60	
							-1.80		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 1.80	
							-2.70		Brown, moist, silty fine SAND. ≅S4 2.70	
							-3.30		Brown, moist, fine sandy SILT. ≅S14 3.30	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-126
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	650+50, 7.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	1.2' bgs

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			PAVEMENT.	
							-0.85		0.85	
	S15		1.20 - 1.90				-1.20		Brown, damp, silty fine to coarse SAND, some gravel, (Fill). ≅S11	G#207497
	S16		1.90 - 3.80				-1.90		1.20	A-1-a, SW-SM
									Dark brown, wet, fine to coarse SAND, some gravel, little silt, (Fill).	WC=12.1%
									1.90	G#207498
									Olive, wet, silty fine SAND.	A-4, SM
	S17		3.80 - 5.00							WC=28.3%
							-3.80		3.80	G#207499
									Brown, wet, silty fine to coarse SAND, some gravel.	A-1-b, SM
5							-5.00		5.00	WC=16.5%
									Bottom of Exploration at 5.00 feet below ground surface.	
									NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-127
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	658+07, 9.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.35		PAVEMENT. 0.35	
									GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13	
							-1.80		1.80	
									Brown, moist, silty fine SAND. ≅S4	
							-2.70		2.70	
									GRAVEL, some brown, damp, fine to coarse sand, trace silt. ≅S18	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.
Overhead wires at 225+00.

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

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Boring No.: HB-ROBY-127

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-128
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	658+07, 13.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13	
	S18		1.90 - 5.00				-1.20		1.20	
							-1.90		Brown, moist, silty fine SAND. ≅S4 — 1.90	G#207500 A-1-b, SM WC=4.0%
									GRAVEL, some brown, damp, fine to coarse sand, trace silt.	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.
Overhead wires at 225+00.

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

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Boring No.: HB-ROBY-128

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-129
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	675+50, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	2.3' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT. 0.40	
							-1.30		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 1.30	
							-2.30		Olive, wet, silty fine SAND. ≅S16 2.30	
									≅S16, but wet.	
							-3.50		Brown, wet, silty fine to coarse SAND, some gravel. ≅S17 3.50	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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

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Boring No.: HB-ROBY-129

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-130
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	693+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT. 0.40	
							-1.50		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 1.50	
							-2.50		Brown, moist, fine sandy SILT, (Fill?) ≅S14 2.50	
									GRAVEL, some brown, damp, fine to coarse sand, trace silt, cobbles, (Fill?) ≅S18	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-131
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	693+00, 11.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 — 0.60	
									Brown, moist, silty fine SAND, (Fill?) ≅S4	
							-2.70		2.70	
									GRAVEL, some brown, damp, fine to coarse sand, trace silt, cobbles, (Fill?) ≅S18	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-132
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	703+00, 8.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.45		PAVEMENT. 0.45	
							-0.55		Unbound Pavement. 0.55	
							-1.70		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 1.70	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-133
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	715+50, 7.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.40		PAVEMENT. 0.40	
	S19		1.00 - 2.50				-1.00		GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13 1.00	G#207994 A-1-b, SM WC=4.0%
							-2.50		Brown, damp, fine to coarse SAND, some gravel, little silt, (Fill). 2.50	
									Brown, moist, silty fine SAND. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-134
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	715+50, 12.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	4.7' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S20		0.00 - 2.10			SSA			Brown, damp, fine to coarse SAND, trace gravel, trace silt, (Fill).	G#207995 A-1-b, SW-SM WC=6.6%
							-2.10		2.10 Brown, moist, silty fine SAND. ≅S4	
							-4.00		4.00 Brown, moist, fine sandy SILT. ≅S14	
5							-4.70		4.70 ≅S14, but wet.	
							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-135
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	730+50, 7.3' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S21		0.40 - 1.70			SSA	-0.40		PAVEMENT. 0.40	G#207996 A-1-b, SW-SM WC=5.5%
	S22		1.70 - 5.00				-1.70		Brown, damp, silty fine to medium SAND, cobbles, some gravel, trace coarse sand, (Fill). 1.70	G#207997 A-1-b, SM WC=11.3%
									Brown, damp, silty, fine SAND, little gravel, trace medium to coarse sand.	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Offsets are from Existing CL.

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Boring No.: HB-ROBY-135

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-136
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	740+50, 8.0' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent ≅ = Similar or Equal too
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.70		PAVEMENT. (0.70)	
	S23		1.20 - 3.70				-1.20		Brown, damp, silty fine to medium SAND, cobbles, some gravel, trace coarse sand, (Fill). ≅S21 (1.20)	G#207998 A-4, SM WC=16.5%
									Brown, moist, silty, fine SAND, trace gravel, trace medium to coarse sand.	
							-3.70		GRAVEL, some brown, damp, fine to coarse sand, trace silt, ≅S18 (3.70)	
5							-5.00		(5.00)	
10										
15										
20										
25										

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-136

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 17
Location: Roxbury-Byron, Maine

Boring No.: HB-ROBY-137
WIN: 12775.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	G. Lidstone	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/12/07-7/12/07	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	750+50, 7.7' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	10.2' bgs.

Definitions:
D = Split Spoon Sample S = Sample off Auger Flight
MD = Unsuccessful Split Spoon Sample attempt
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SSA = Solid Stem Auger

Definitions:
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$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
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Definitions:
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PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.35	PAVEMENT.	
							0.35	GRAVEL, some brown, damp, silty fine to coarse sand, (Fill). ≅S13	
							-2.30	Brown, moist, fine sandy SILT, ≅S14	
							2.30		
							-3.80	GRAVEL, some brown, damp, fine to coarse sand, trace silt, cobbles. ≅S18	
							3.80		
5							-5.50	Brown, damp, silty, fine SAND, little gravel, trace medium to coarse sand. ≅S22	
							5.50		
							-7.30	≅S22, but with cobbles.	
							7.30		
							-9.10	Boulder.	
							9.10		
10							-10.20	≅S22, but wet with cobbles.	
							10.20		
							-11.00		
							11.00	**Bottom of Exploration at 11.00 feet below ground surface.** NO REFUSAL	
15									
20									
25									

Remarks:

Offsets are from Existing CL.

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

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

Boring No.: HB-ROBY-137