Maine Department of Transportation
Highway Program

GEOTECHNICAL SERIES 100 REPORT

Route 166/166A/175
Castine, Penobscot, Orland, Maine

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Hancock County

WIN 18252.00
Fed Project #: STP-1825(200)X
December 13, 2012

Soils Report No. 2012-139
TEDOCS # 1248013

Map Scale 1:125000

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Highway Program

Brad Foley, Program Manager

Memorandum

DATE: December 13, 2012

TO: Shawn Davis **DEPT:** Region 4

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

SUBJECT: Final Soils Report # 2012-139, Castine - Orland, WIN 18252.00

Project Information

A subsurface investigation has been completed for the rehabilitation of a 14.9 mile portion of Routes 166, 166A and 175 in the towns of Castine, Penobscot, and Orland. The purpose of this investigation is to obtain 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). Stationing was determined by using a distance measuring instrument (DMI) and Route Log Mile information.

The project begins in Castine at the intersection of Route 166 and Main Street and extends 14.9 miles north to Orland. This project encompasses multiple highway route segments and rehabilitation measures. A detailed description of the individual route segments follows:

<u>Segment 1, Route 166/166A (10+00 – 375+38)</u>

Proposed rehabilitation: 1¼ - inch overlay and shim.

Segment Description:

> Segment 1A – Route 166 (1.27 miles, Sta. 10+00 – Sta. 77+06, RLM 0.0 – RLM 1.27)
> This segment begins at the intersection of Main Street and Route 166 in Castine and extends northwest 1.27 miles on Route 166 to the southern intersection of Route 166A.
>
> Segment 1B - Route 166A (3.79 miles, Sta. 77+06 – Sta. 277+17, RLM 0.0 – RLM 3.79)
> This segment begins at the southern intersection of Route 166 and Route 166A and extends northwest 3.79 miles on Route 166A to the northern intersection of Route 166.
>
> Segment 1C – Route 166 (1.86 miles, Sta. 277+17 – Sta. 375+38, RLM 5.41 – RLM 7.27)
> This segment begins at the north intersection of Route 166A and Route 166 and extends northwest 1.86 miles on Route 166 to the intersection of Route 175.

<u>Segment 2, Route 175 (375+38 – 798+31)</u>

Proposed rehabilitation: The proposed typical roadway design template for Segment 2 consists of two 11.5 -foot wide travel lanes with existing gravel and 4-foot wide paved shoulders. Reclamation is proposed to include 2 -inches of plant mix recycled asphalt pavement (PMRAP) placed over the existing pavement surface. 1½ -inch of hot mix asphalt is to be placed over the PMRAP.

Segment Description:

Segment 2A – Route 175 (8.01 miles, Sta. 375+38 – Sta. 798+31, RLM 37.88 – RLM 45.89). This segment begins at the intersection of Route 166 and Route 175 and extends northwest 8.01 miles on Route 175 to the intersection of Route 3/15.

As-Built Information – Segment 1

Segment 1, Route 166/166A (10+00 – 375+38)

This segment of highway was reconstructed in 2004 Federal Project STP-9720(00)X) as a Collector Highway Improvement Program (CHIP) project. Construction notes indicate that multiple rehabilitation/reconstruction applications were utilized. See Table 1A and Table 1B for specific treatment applications. Table 1A below provides a station comparison between the 2004 project and this project WIN 18252.00. Table 1B on the following page lists the specific 2004 treatment applications and estimated current pavement structure utilizing the current proposed project stationing (WIN 18252.00).

Table 1A: 2004 As-Built Information, Station Comparison

Pavement Treatment	9720.00 Stationing (2004)			18252.00 Stationing	
	Begin Station	End Station		Begin Station	End Station
Shim, 1¼“ Overlay		0+580		10+00	29+02
6" Foam + 2.75” HMA (8.75” total)	0+570	1+200		28+70	49+36
7" Foam + 3.94" HMA (10.9” total)	1+200	1+720		49+36	66+42
6" Foam + 2.75" HMA (8.75” total)	1+720	6+900		66+42	236+32
6" Foam + 3.94 HMA (9.94” total)	6+900	7+520		236+32	256+66
6" Foam + 2.75 HMA (8.75” total)	7+520	9+380		256+66	317+66
6" Foam + 3.12 HMA (9.12” total)	9+380	9+520		317+66	322+26
6" Foam + 2.75" HMA (8.75” total)	9+520	11+177		322+26	376+61
Full Construction	**Begin Station**	**End Station**		**Begin Station**	**End Station**
Above Pavement Treatment with 24" Gravel	2+044	2+128		77+04	79+80
	2+290	2+590		85+11	94+95
	3+230	3+290		115+94	117+91
	4+971	5+030		173+05	174+98
	8+080	8+144		275+02	277+12
Above Pavement Treatment with 12" Gravel Fill	1+720	1+880		66+42	71+66
	2+670	2+870		97+58	104+14
	3+740	3+840		132+67	135+95
	5+030	5+260		174+98	182+53
	6+060	6+400		208+77	219+92
	7+804	7+894		265+97	268+92

Table 1B: 2004 Treatment Information - Estimated Current Pavement Structure

Station	Treatment	HMA (in)	Foam	Total Pavement (in)	Estimated Gravel Thickness (in)	Total Structure (Pave+Base) (in)
10+00 - 29+00	Overlay	7.25	0.00	7.25	12	19
29+00 - 49+00	HMA+Foam	2.75	6.00	8.75	12	21
49+00 - 66+00	HMA+Foam	3.94	7.00	10.94	9	20
66+00 - 77+00	HMA+Foam	2.75	6.00	8.75	7	16
77+00 - 80+00	HMA+Foam+Gravel	2.75	6.00	8.75	24	33
80+00 - 85+00	HMA+Foam	2.75	6.00	8.75	22	31
85+00 - 94+00	HMA+Foam+Gravel	2.75	6.00	8.75	24	33
94+00 - 97+00	HMA+Foam	2.75	6.00	8.75	16	25
97+00 - 104+00	HMA+Foam+Gravel	2.75	6.00	8.75	12	21
104+00 - 115+00	HMA+Foam	2.75	6.00	8.75	20	28
115+00 - 117+00	HMA+Foam+Gravel	2.75	6.00	8.75	24	33
117+00 - 132+00	HMA+Foam	2.75	6.00	8.75	18	26
132+00 - 136+00	HMA+Foam+Gravel	2.75	6.00	8.75	12	21
136+00 - 173+00	HMA+Foam	2.75	6.00	8.75	10	19
173+00 - 182+00	HMA+Foam+Gravel	2.75	6.00	8.75	12	21
182+00 - 208+00	HMA+Foam	2.75	6.00	8.75	22	31
208+00 - 220+00	HMA+Foam+Gravel	2.75	6.00	8.75	12	21
220+00 - 240+00	HMA+Foam	2.75	6.00	8.75	16	25
240+00 - 266+00	HMA+Foam	3.94	6.00	9.94	14	24
266+00 - 269+00	HMA+Foam+Gravel	3.94	6.00	9.94	12	22
269+00 - 275+00	HMA+Foam	2.75	6.00	8.75	21	30
275+00 - 277+00	HMA+Foam+Gravel	2.75	6.00	8.75	24	33
277+00 - 317+00	HMA+Foam	2.75	6.00	8.75	22	30
317+00 - 322+00	HMA+Foam	3.12	6.00	9.12	20	29
322+00 - 376+00	HMA+Foam	2.75	6.00	8.75	19	27

As-Built Information – Segment 2

Segment 2, Route 175 (375+38 – 798+31)

An archival search for as-built plans for segment 2 located 1967 plans. This project (Project No. 255(503)) consisted of the reconstruction of a very short (0.3 miles) segment of Route 175 in Orland north of the intersection of Route 175 and Route 166. The project involved the filling of a low area utilizing a 17-inch to 24-inch aggregate base and 4-inches of pavement. No other information was located during the archival search.

Existing Pavement Data

ARAN Data Summary

Pavement distress is slight in Segment 1 (10+00 – 375+58) with small isolated areas of moderate distress. However, pavement distress is moderate to severe in Segment 2 (375+58 – 798+31) with cracking (fatigue, block, transverse, longitudinal, edge) and rutting. It is anticipated that moderate to severe distress is due to poor surficial and subsurface drainage, frost effects, traffic loading, and fatigue. A summary of the 2010 ARAN data is presented in Table 2 below. A complete listing of the 2010 ARAN data is presented on the Pavement Performance Assessment Summary (PPAS) found at the back of this report. The PPAS is a performance evaluation tool utilizing FWD and ARAN data.

Table 2: Summary of 2010 ARAN Pavement Data

	Pavement Condition Rating (PCR)		**International Roughness Index (IRI)**		**Rut Depth (left)**		**Rut Depth (right)**	
	Range	Ave.	Range	Ave.	Range	Ave.	Range	Ave.
	Marginal if < 3.5		Marginal if > 150		Marginal if > 0.5”		Marginal if > 0.5”	
Segment 1 (10+00 – 375+38) Route 166/166A	2.0 – 4.34	3.96	88 - 130	115	0.1” – 0.2”	0.1”	0.1” – 0.3”	0.2”
Segment 2 (375+38 – 798+31) Route 175	0.87 – 3.8	1.82	116 - 479	329	0.1” – 0.4”	0.3”	0.3” – 1.7”	0.8”

A description of the Pavement Condition Rating (PCR) and International Roughness Index (IRI) used in Table 2 and in the Pavement Performance Assessment Summary (PPAS) is provided below.

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.

Table 3: PCR Rating

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.

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:

Table 4: IRI Rating

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

Existing HMA Thickness

A summary of existing pavement thickness estimates are shown in Table 5 on the following page. This summary is based on power auger borings, pavement cores and ground penetrating radar (GPR) information.

Pavement Coring / Power Auger Data:

Pavement cores and power auger borings were used to physically measure the existing pavement thickness. A total of thirty-three pavement cores were drilled in Segment 1 and Segment 2. These cores were transported to the Bangor Lab and photographed. The core photographs are located within the ground penetrating radar data attachment found at the back of this report. Power auger borings were conducted in Segment 2 only. Two out of the 5 borings conducted through the travel lanes encountered a 1.0” – 1.5” thick unbound pavement layer underlying the solid pavement layer.

Please refer to the attached boring logs and pavement core summary sheet for individual test locations and pavement depths.

Ground Penetrating Radar (GPR):

GPR data was collected at 1 foot intervals in the left and right wheel path of both the North and South bound lanes. 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 in developing the estimated GPR pavement thicknesses. This data is presented on the attached GPR Estimated Pavement Thickness summary sheets as an average pavement thickness utilizing a 100' interval. These average thickness estimates represents the thickness of the "solid" pavement layer only.

The GPR Estimated Pavement summary sheets have been presented individually for Segment 1 and Segment 2. These GPR depth estimates have been included at the back of this report.

Table 5: Pavement Thickness Summary/Comparison

	Solid Pavement	**Unbound Pavement / Treated Gravel**
Segment 1, Route 166/166A (10+00 – 375+38)		
Pavement Core Data		
Range of Thickness (HMA+Foam)	5" – 12"	
Average Thickness (HMA+Foam)	9½"	
Ground Penetrating Radar Data		
Range of GPR Pavement Thickness (HMA+Foam)	7" – 12½"	
Average GPR Pavement Thickness (HMA+Foam)	10"	
Segment 2, Route 175 (375+38 – 798+31)		
Pavement Core/Auger Data		
Range of Thickness	3" – 12"	1" - 1½" when encountered
Average Thickness	6½"	1"
Ground Penetrating Radar Data		
Range of GPR Pavement Thickness	4" – 11"	
Average GPR Pavement Thickness	6½"	

FWD Results

FWD data was collected every 500 feet along the southbound travel lane at an approximate centerline offset of 9'.

<u>FWD Deflection Plots</u>

Segment 1, Route 166/166A, (10+00 – 375+38)

Payment Layer Deflections - FWD deflection data for the pavement layer in Segment 1 are relatively lower than Segment 2. Pavement layer deflections are generally less than 15 mils in Segment 1 and greater than 15 mils in Segment 2. The highest deflections (>15mils) in Segment 1 were encountered generally between 10+00 – 129+00 and 259+00 – 375+00.

Subbase/Subgrade Soil Layer Deflections - FWD deflections in the subbase/subgrade soil layers are roughly uniform throughout the project area suggesting somewhat uniform subgrade soil conditions. Deflections are relatively higher and/or erratic between stations 29+00 - 129+00 and 259+00 – 320+00. These deflection increases may indicate moist to wet subgrade soil conditions.

Segment 2, Route 175 (375+38 – 798+31)

Payment Layer Deflections - FWD deflection data for the pavement layer in Segment 2 are relatively higher than Segment 1. Pavement layer deflections are generally greater than 15 mils throughout Segment 2. The highest deflections were encountered generally between stations 555+00 - 615+00 and 595+00 – 724+00.

Subbase/Subgrade Soil Layer Deflections - FWD deflections in the subbase/subgrade soil layers are roughly uniform between stations 375+38 - 540+00 and 724+00 – 798+31. This may indicate that the subgrade soil conditions are relatively uniform. However, deflections become higher and/or erratic between stations 540+00 – 724+00. These deflection increases may indicate non-uniform subgrade soil conditions and/or moist to wet subgrade conditions. These increases may be due to the presence of moist to wet clay silt soil conditions as indicated by borings HB-PEOR 107, HB-PEOR 109, and HB-PEOR 111.

The FWD deflection plots have been included at the back of this report.

FWD Analysis

An FWD analysis was conducted using the following variables:

Design Life: 12	Future 18-kip P2.5 ESALs (Design Life): 127,020
Initial Serviceability: 4.5	Terminal Serviceability: 2.5
Reliability Level: 90%	Overall Standard Deviation: .45

Pavement depths used for DARWin analysis were taken from Ground Penetrating Radar Summary sheet. Gravel depths used for Segment 1 DARWin analysis are based upon 2004 geotechnical field work and 2004 construction notes. Gravel depths used for Segment 2 DARWin analysis are based upon 2012 power auger borings.

The subgrade resilient modulus values in Segment 2 are greater than 8000 psi at many locations, especially between stations 530+00 and 630+00. This may indicate the presence of a relative shallow bedrock surface. If these values are artificially high due to bedrock, these values will not be representative of the actual subgrade “soil” conditions.

As noted the existing structural number (SN) exceeds the future structural number throughout Segment 2 (Route 175). This is not the result of a large existing SN but rather more the result of a low 18-KIP Equivalent P2.5 value used in the calculations.

A summary of the FWD analysis is provided in Table 6 on the following page.

Table 6: Summary of FWD Analysis

Design Variables	Existing SN exceeds Future SN	Range	Average	75th Percentile
Segment 1, Route 166/166A, (10+00 – 375+38)				
Existing SN exceeds Future SN	100%			
Existing SN		3.3 – 7.4	5.4	
Pavement Modulus (psi)		39,404 – 213,494	109,904	80,190
Subgrade Resilient Modulus (psi)		3,210 – 33,065	6,848	4,850
Segment 2, Route 175 (375+38 – 798+31)				
Existing SN exceeds Future SN	100%			
Existing SN		3.0 – 6.4	4.7	
Pavement Modulus (psi)		27,822 – 141,772	69,261	55,680
Subgrade Resilient Modulus (psi)		2,827 – 17,225	6,349	4,530

Subsurface Explorations

Subsurface explorations were conducted by Maine DOT using a CME 45C truck mounted drill rig. Bore hole logging was performed by Maine DOT.

Power Auger Borings

A total of 14 power augers borings were conducted along the project (See Boring Logs). Power auger borings were conducted using 5" solid stem augers. Borings were limited to Segment 2, Route 175 (375+38 – 798+31) for the purpose of determining the existing roadway structure beneath the existing travel lanes and gravel shoulders.

Soil Sampling

A total of 16 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 attached Laboratory Testing Summary Sheet at the back of this report.

Existing Roadway Base (Segment 2 only)

Existing Base Material Type:	silty gravelly SAND,	A-1-b
	gravelly silty SAND,	A-1-b
Percent Passing #200 Sieve:	8% - 20%	
Range of Base Material Thickness:	10" – 23"	
Quality of Drainage (AASHTO):	poor	
Permeability:	2.5' – 6' per day	

The existing base generally consists of damp silty gravelly SAND (S1, S8, S14) and gravelly silty SAND (S3). Overall, the existing base thickness and quality is marginal throughout Segment 2, Route 175 (375+38 – 798+31).

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Existing Shoulder Base Material (Segment 2 only)

Existing Shoulder Material Type:	silty sandy GRAVEL,	A-1-a
	silty gravelly SAND,	A-1-b

Percent Passing #200 Sieve:	8% - 20%
Range of Base Material Thickness:	7" – 42"
Quality of Drainage (AASHTO):	poor
Permeability:	2.5' – 6' per day

Several power auger borings were conducted in the existing gravel shoulders (Segment 2 375+38 – 798+31) to determine the material type and thickness of the unpaved shoulders. Boring data indicates that the existing shoulder material generally consists of damp to wet silty gravelly SAND (S1, S6, S7, S8, S10, S13) and silty sandy GRAVEL (S11). The thickness and quality of this shoulder material varies considerably. In about half the areas where borings were conducted in the travel lane and adjacent shoulder, borings indicate that the granular base material in the shoulders may not extend as deep as the granular base material beneath the travel lanes creating a "bathtub" affect.

Subgrade Soils (Segment 1 only)

Based on power auger boring data subgrade soils are anticipated to consist primarily of moist to wet sandy SILTS (S2, S5, S15) and clay SILTS (S9, S12). These soils are very silty with 54% – 94% passing the # 200 sieve and are highly frost susceptible. These soils are sensitive to moisture and have high volume changes between wet and dry states. They have a high dry strength but lose much of this strength upon absorbing water. These soils are poorly drained.

A low subgrade resilient modulus value (M_r) was encountered between stations 599+00 and 608+00. It is anticipated that this low value is due the presence of clay SILT soils. If the clay SILT soils are not well drained in this area additional base material may be necessary to support traffic during construction if the existing pavement surface is removed.

Drainage

Surficial and subsurface drainage is marginal to non-existent between stations 375+38 and 798+31 (Segment 2). This lack of drainage can increase the damaging effects of frost action and reduce the long term performance of the pavement. Wet subgrade soil conditions were encountered in borings at stations 440+10, 599+14, and 599+50.

Ditching

Ditching to remove surficial flow and/or to drawdown the water table is critical if design expectations are to be met. Ditches should be constructed with a minimum depth of 3 feet below finished grade when possible.

Pavement Performance Assessment Summary

(PPAS)

Castine, Penobscot, Orland Rte 175

18252.00

			PERFORMANCE MEASURESUREMENTS							GEN. PAVEMENT INFORMATION					
				FWD Data		ARAN Data				ARAN Supplied Data					
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN < Future SN	Increased FWD Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"		Shoulder Type and Width				Yr. Built	Yr. Resurf.
								Left	Right	Left		Right			
								(in.)	(in.)		ft		ft		
10+00	Intersection Main Street and Rte 166														
10+00	0	2010	0			4.01	130	0.1	0.2	Paved	2	Paved	2	2004	2004
27+42	0.33	2010	0			4.01	130	0.1	0.2	Paved	2	Paved	2	2004	2004
28+48	0.35	2010	1		X	4.01	130	0.1	0.2	Paved	2	Paved	3	2004	2004
31+12	0.4	2010	1		X	4.01	130	0.1	0.2	Paved	2	Paved	3	2004	2004
33+23	0.44	2010	1		X	4.00	115	0.1	0.1	Paved	2	Paved	3	2004	2004
35+34	0.48	2010	1		X	4.00	115	0.1	0.1	Paved	2	Paved	4	2004	2004
38+51	0.54	2010	1		X	4.00	115	0.1	0.1	Paved	2	Paved	2	2004	2004
44+85	0.66	2010	1		X	4.00	115	0.1	0.1	Paved	4	Paved	4	2004	2004
45+38	0.67	2010	1		X	4.00	115	0.1	0.1	Paved	4	Paved	4	2004	2004
48+54	0.73	2010	1		X	4.00	115	0.1	0.1	Paved	3	Paved	3	2004	2004
49+07	0.74	2010	1		X	4.00	115	0.1	0.1	Paved	3	Paved	3	2004	2004
50+66	0.77	2010	1		X	4.00	115	0.1	0.1	Paved	3	Paved	3	2004	2004
51+71	0.79	2010	1		X	4.00	115	0.1	0.1	Paved	3	Paved	3	2004	2004
55+41	0.86	2010	1		X	4.00	115	0.1	0.1	Paved	3	Paved	3	2004	2004
55+94	0.87	2010	1		X	4.18	117	0.1	0.2	Paved	3	Paved	3	2004	2004
76+00	1.25	2010	1		X	4.18	117	0.1	0.2	Gravel	1	Gravel	1	2004	2004
77+06	1.27	2010	1		X	4.18	117	0.1	0.2	Gravel	1	Gravel	1	2004	2004
Section Average						**4.03**	**119**	**0.10**	**0.14**						
77+06	South Intersection of Rte 166 and Rte 166A														
77+06	0	2010	1		X	3.89	124	0.1	0.2	Paved	2	Paved	2	2004	2004
79+70	0.05	2010	1		X	3.89	124	0.1	0.2	Paved	2	Paved	2	2004	2004
92+37	0.29	2010	1		X	3.89	124	0.1	0.2	Paved	2	Paved	2	2004	2004
95+54	0.35	2010	1		X	3.89	124	0.1	0.2	Paved	4	Paved	2	2004	2004
96+07	0.36	2010	1		X	3.89	124	0.1	0.2	Paved	4	Paved	4	2004	2004
98+71	0.41	2010	1		X	3.89	124	0.1	0.2	Paved	4	Paved	4	2004	2004
99+24	0.42	2010	1		X	3.89	124	0.1	0.2	Paved	2	Paved	2	2004	2004
105+57	0.54	2010	1		X	3.89	124	0.1	0.2	Paved	2	Paved	2	2004	2004
108+21	0.59	2010	1		X	3.94	116	0.1	0.2	Paved	2	Paved	2	2004	2004
134+08	1.08	2010	1		X	3.94	116	0.1	0.2	Paved	2	Paved	2	2004	2004
136+72	1.13	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
146+23	1.31	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
147+28	1.33	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
147+81	1.34	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
154+68	1.47	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
161+54	1.6	2010	0			4.24	98	0.1	0.2	Paved	2	Paved	2	2004	2004
165+24	1.67	2010	0			4.24	96	0.1	0.2	Paved	2	Paved	2	2004	2004
172+63	1.81	2010	0			4.24	96	0.1	0.2	Paved	2	Paved	2	2004	2004
192+16	2.18	2010	0			4.24	96	0.1	0.2	Paved	2	Paved	2	2004	2004
193+75	2.21	2010	0			4.18	100	0.1	0.2	Paved	2	Paved	2	2004	2004
205+36	2.43	2010	0			4.18	100	0.1	0.2	Paved	2	Paved	2	2004	2004
221+20	2.73	2010	0			4.18	100	0.1	0.2	Paved	2	Paved	2	2004	2004
222+26	2.75	2010	0			4.34	88	0.1	0.2	Paved	2	Paved	2	2004	2004
249+72	3.27	2010	0			4.34	88	0.1	0.2	Paved	2	Paved	2	2004	2004

Castine, Penobscot, Orland Rte 175															
18252.00															
			PERFORMANCE MEASURESUREMENTS							GEN. PAVEMENT INFORMATION					
				FWD Data		ARAN Data				ARAN Supplied Data					
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN < Future SN	Increased FWD Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"		Shoulder Type and Width				Yr. Built	Yr. Resurf.
250+77	3.29	2010	0			4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
252+88	3.33	2010	0			4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
260+28	3.47	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
261+86	3.5	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
264+50	3.55	2010	1		X	4.04	129	0.1	0.2	Curb	3	Paved	2	2004	2004
267+14	3.6	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	4	2004	2004
268+72	3.63	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	4	2004	2004
270+31	3.66	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
277+17	3.79	2010	1		X	4.04	129	0.1	0.2	Paved	2	Paved	2	2004	2004
Section Average						**4.08**	**113**	**0.10**	**0.20**						
277+17	North Intersection of Rte 166 and Rte 166A														
277+17	5.41	2010	4		X	2.00	393	0.4	1	Paved	2	Paved	2	2004	2004
279+28	5.45	2010	1		X	3.89	123	0.2	0.3	Paved	2	Paved	2	2004	2004
312+55	6.08	2010	1		X	3.68	116	0.1	0.3	Paved	2	Paved	2	2004	2004
326+27	6.34	2010	1		X	3.68	116	0.1	0.3	Paved	4	Paved	6	2004	2004
327+33	6.36	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	6	2004	2004
327+86	6.37	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	6	2004	2004
328+39	6.38	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	3	2004	2004
329+44	6.4	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	3	2004	2004
329+97	6.41	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	3	2004	2004
335+78	6.52	2010	0			3.68	116	0.1	0.3	Paved	3	Paved	3	2004	2004
345+81	6.71	2010	0			3.80	116	0.1	0.3	Paved	3	Paved	3	2004	2004
374+32	7.25	2010	0			3.80	116	0.1	0.3	Gravel	4	Gravel	4	2004	2004
375+38	7.27	2010	0			3.80	116	0.1	0.3	Gravel	4	Gravel	4	2004	2004
Section Average						**3.59**	**138**	**0.13**	**0.35**						
375+38	Intersection of Rte 175 and Rte 166														
375+38	37.88	2010	0			3.80	116	0.1	0.3	Gravel		Gravel	4	0	2011
376+44	37.9	2010	0			3.80	116	0.1	0.3	Gravel	4	Gravel	4	0	2011
379+08	37.95	2010	2			1.47	315	0.3	1.1	Gravel	4	Gravel	4	0	2011
380+13	37.97	2010	2			1.47	315	0.3	1.1	Gravel	4	Gravel	4	0	2011
405+48	38.45	2010	2			1.47	315	0.3	1.1	Gravel	4	Gravel	4	0	2011
409+17	38.52	2010	2			1.63	329	0.3	1	Gravel	4	Gravel	4	0	2011
411+81	38.57	2010	2			1.63	329	0.3	1	Gravel	4	Gravel	4	0	2011
435+57	39.02	2010	2			1.63	329	0.3	1	Gravel	4	Gravel	4	0	2011
439+27	39.09	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
443+49	39.17	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
447+19	39.24	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
461+97	39.52	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
462+50	39.53	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
465+67	39.59	2010	2			1.72	322	0.3	1	Gravel	4	Gravel	4	0	2011
469+36	39.66	2010	**3**			1.45	411	0.4	0.8	Gravel	4	Gravel	4	0	2011
469+89	39.67	2010	**3**			1.45	411	0.4	0.8	Gravel	4	Gravel	4	0	2011
483+09	39.92	2010	**3**			1.45	411	0.4	0.8	Gravel	4	Gravel	4	0	2011
495+24	40.15	2010	**3**			1.45	411	0.4	0.8	Gravel	4	Gravel	4	0	2011
499+46	40.23	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011
511+08	40.45	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011
511+60	40.46	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011
514+77	40.52	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011

Castine, Penobscot, Orland Rte 175															
18252.00															
			PERFORMANCE MEASURESUREMENTS							GEN. PAVEMENT INFORMATION					
				FWD Data		ARAN Data				ARAN Supplied Data					
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN < Future SN	Increased FWD Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"		Shoulder Type and Width				Yr. Built	Yr. Resurf.
515+30	40.53	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011
525+33	40.72	2010	**3**			1.66	379	0.4	0.8	Gravel	4	Gravel	4	0	2011
529+56	40.8	2010	**3**			1.49	340	0.4	0.8	Gravel	4	Gravel	4	0	2011
540+00	40.9	2010	4		X	1.49	340	0.4	0.8	Gravel	4	Gravel	4	0	2011
555+43	41.29	2010	4		X	1.49	340	0.4	0.8	Gravel	4	Gravel	4	0	2011
559+65	41.37	2010	4		X	1.47	424	0.4	1.1	Gravel	4	Gravel	4	0	2011
585+52	41.86	2010	4		X	1.47	424	0.4	1.1	Gravel	4	Gravel	4	0	2011
589+75	41.94	2010	4		X	1.38	394	0.4	1.3	Gravel	4	Gravel	4	0	2011
615+62	42.43	2010	4		X	1.38	394	0.4	1.3	Gravel	4	Gravel	4	0	2011
619+84	42.51	2010	4		X	1.41	366	0.4	0.8	Gravel	4	Gravel	4	0	2011
645+72	43	2010	4		X	1.41	366	0.4	0.8	Gravel	4	Gravel	4	0	2011
649+94	43.08	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
661+03	43.29	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
664+72	43.36	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
665+78	43.38	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
675+28	43.56	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
675+81	43.57	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
678+98	43.63	2010	4		X	2.01	287	0.3	0.8	Gravel	4	Gravel	4	0	2011
680+04	43.65	2010	4		X	2.07	275	0.2	0.7	Gravel	4	Gravel	4	0	2011
695+35	43.94	2010	4		X	2.07	275	0.2	0.7	Gravel	4	Gravel	4	0	2011
695+88	43.95	2010	4		X	2.07	275	0.2	0.7	Gravel	4	Gravel	4	0	2011
701+16	44.05	2010	4		X	0.87	479	0.4	1.7	Gravel	4	Gravel	4	0	2011
719+64	44.4	2010	4		X	0.87	479	0.4	1.7	Gravel	4	Gravel	4	0	2011
725+44	44.51	2010	4		X	1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
740+23	44.79	2010	3			1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
740+76	44.8	2010	3			1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
743+92	44.86	2010	3			1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
748+15	44.94	2010	3			1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
748+68	44.95	2010	3			1.05	436	0.4	1.5	Gravel	4	Gravel	4	0	2011
749+73	44.97	2010	3			2.11	340	0.3	0.6	Gravel	4	Gravel	4	0	2011
750+79	44.99	2010	3			2.11	340	0.3	0.6	Gravel	4	Gravel	4	0	2011
752+37	45.02	2010	3			2.11	340	0.3	0.6	Gravel	4	Gravel	4	0	2011
755+01	45.07	2010	3			2.11	340	0.3	0.6	Gravel	4	Gravel	4	0	2011
755+54	45.08	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
756+07	45.09	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
757+65	45.12	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
760+29	45.17	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
761+88	45.2	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
766+63	45.29	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
768+21	45.32	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
769+80	45.35	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
770+32	45.36	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
772+44	45.4	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
772+96	45.41	2010	3			2.11	340	0.3	0.6	None	0	None	0	0	2011
774+02	45.43	2010	3			2.06	253	0.3	0.6	None	0	None	0	0	2011
774+55	45.44	2010	3			2.06	253	0.3	0.6	None	0	None	0	0	2011
775+60	45.46	2010	3			2.06	253	0.3	0.6	None	0	None	0	0	2011
778+24	45.51	2010	3			2.06	253	0.3	0.6	None	0	None	0	0	2011
779+83	45.54	2010	3			2.06	253	0.3	0.6	None	0	None	0	0	2011
780+36	45.55	2010	3			2.06	253	0.3	0.6	None	0	Gravel	4	0	2011
783+00	45.6	2010	3			2.06	253	0.3	0.6	None	0	Gravel	4	0	2011
783+52	45.61	2010	3			2.06	253	0.3	0.6	None	0	Gravel	4	0	2011

Castine, Penobscot, Orland Rte 175															
18252.00															
			PERFORMANCE MEASURESUREMENTS							**GEN. PAVEMENT INFORMATION**					
				FWD Data		**ARAN Data**				**ARAN Supplied Data**					
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN < Future SN	Increased FWD Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"		Shoulder Type and Width				Yr. Built	Yr. Resurf.
784+05	45.62	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4	0	2011
788+80	45.71	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4	0	2011
791+44	45.76	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4	0	2011
794+08	45.81	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4		
796+20	45.85	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4		
796+72	45.86	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4		
797+25	45.87	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4		
798+31	45.89	2010	3			2.06	253	0.3	0.6	Gravel	4	Gravel	4		
Section Average						**1.82**	**329**	**0.32**	**0.83**						
Intersection of Rte 175 and Rte 15															
PROJECT AVERAGE						**2.78**	**235.6**	**0.227**	**0.559**						
Note: Year Built and Year Resurfaced dates are provided by the ARAN data and may not be accurate															
PROJECT AVERAGE						**2.77**	**236**	**0.23**	**0.56**						
Note: Year Built and Year Resurfaced dates are provided by the ARAN data and may not be accurate															

December12, 2012

Falling Weight Deflectometer (FWD)
Summary Sheet

Project #: 18252.00
Town(s): Castine-Orland
Route(s): 166/175
Date Tested: 07/30/2012
Requested By: S Hayden
Direction of Testing: Data was collected in the southbound travel lane.

Of FWD tests: 158 # Of Power Augers/Spoons - 5
Design Life: 12 Future 18-kip P2.5 ESALs (Design Life): 127,020
Initial Serviceability: 4.5 Terminal Serviceability: 2.5
Reliability Level: 90% Overall Standard Deviation: .45

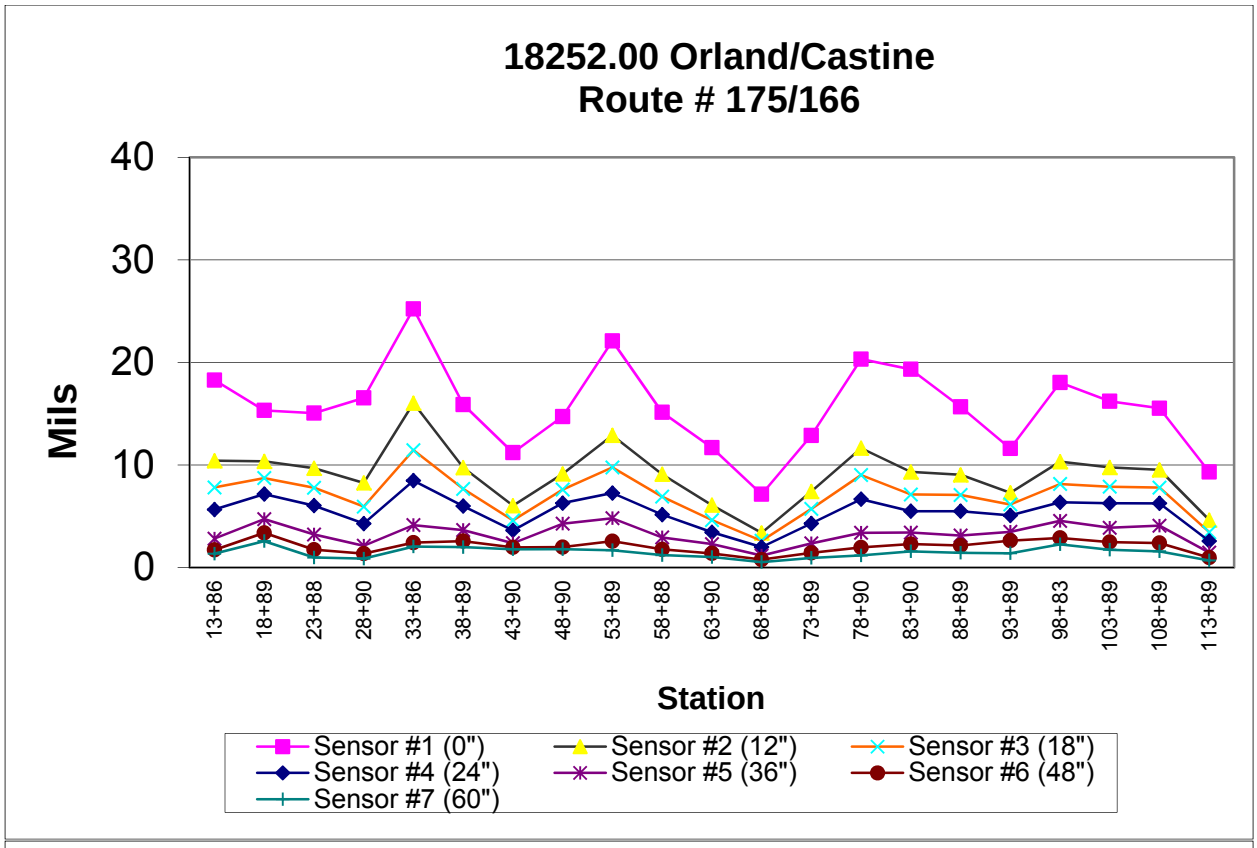
Locations

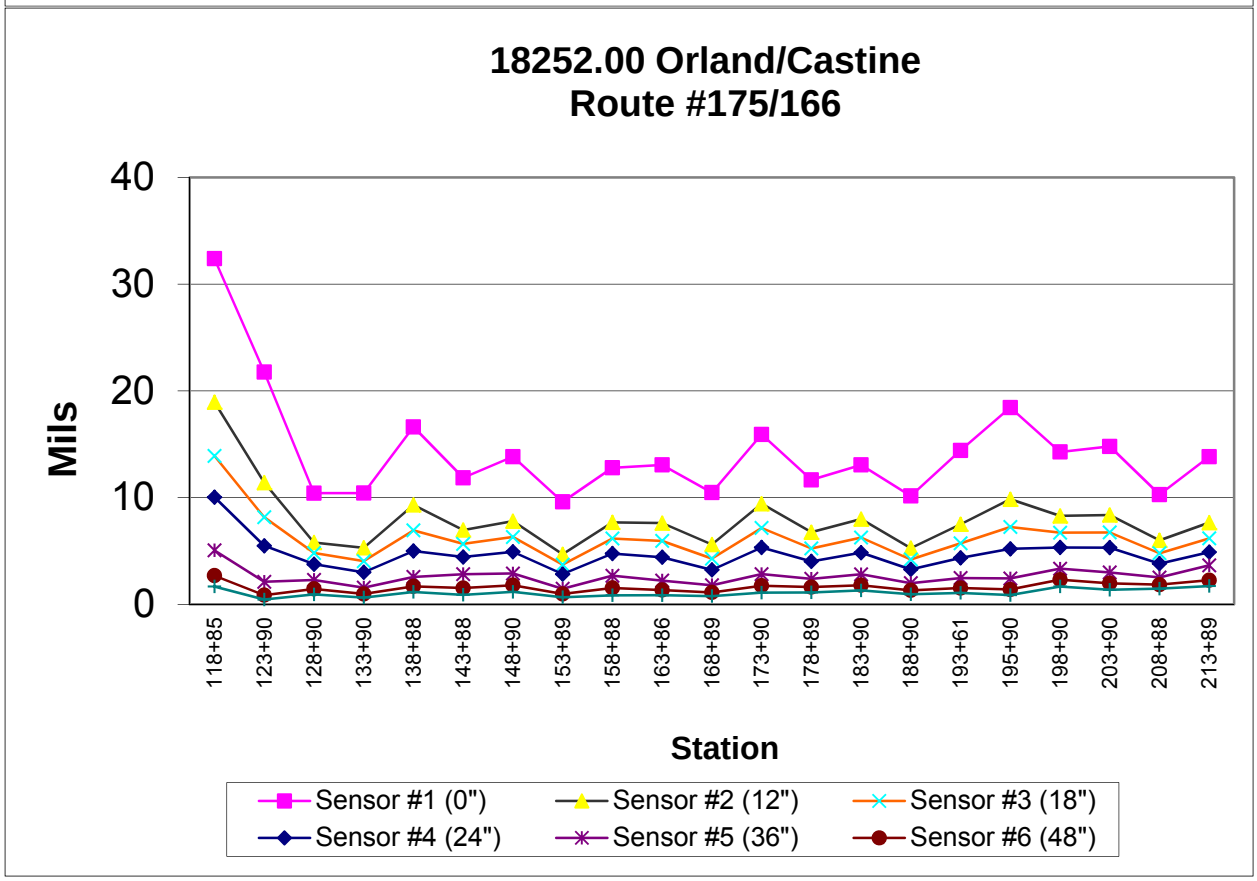
Station (Feet)	Description

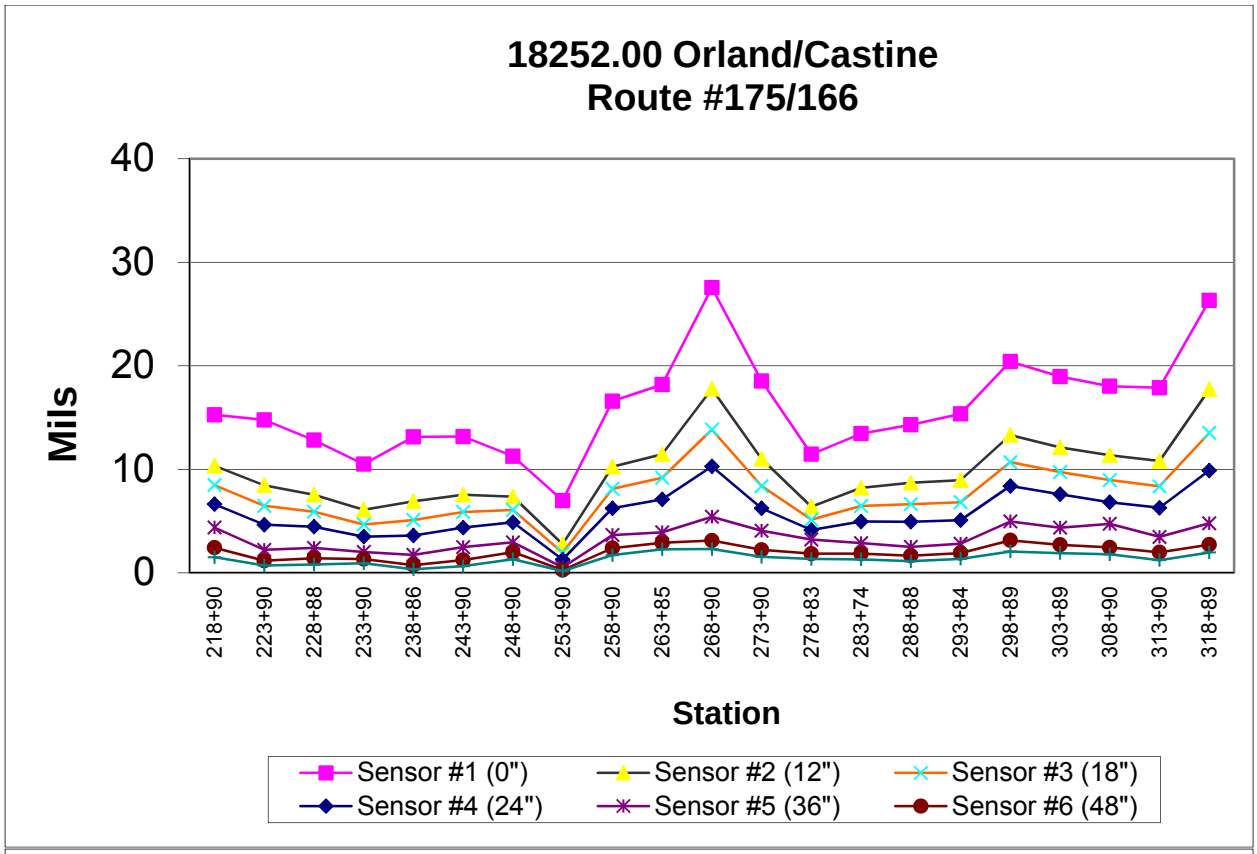
Comments:

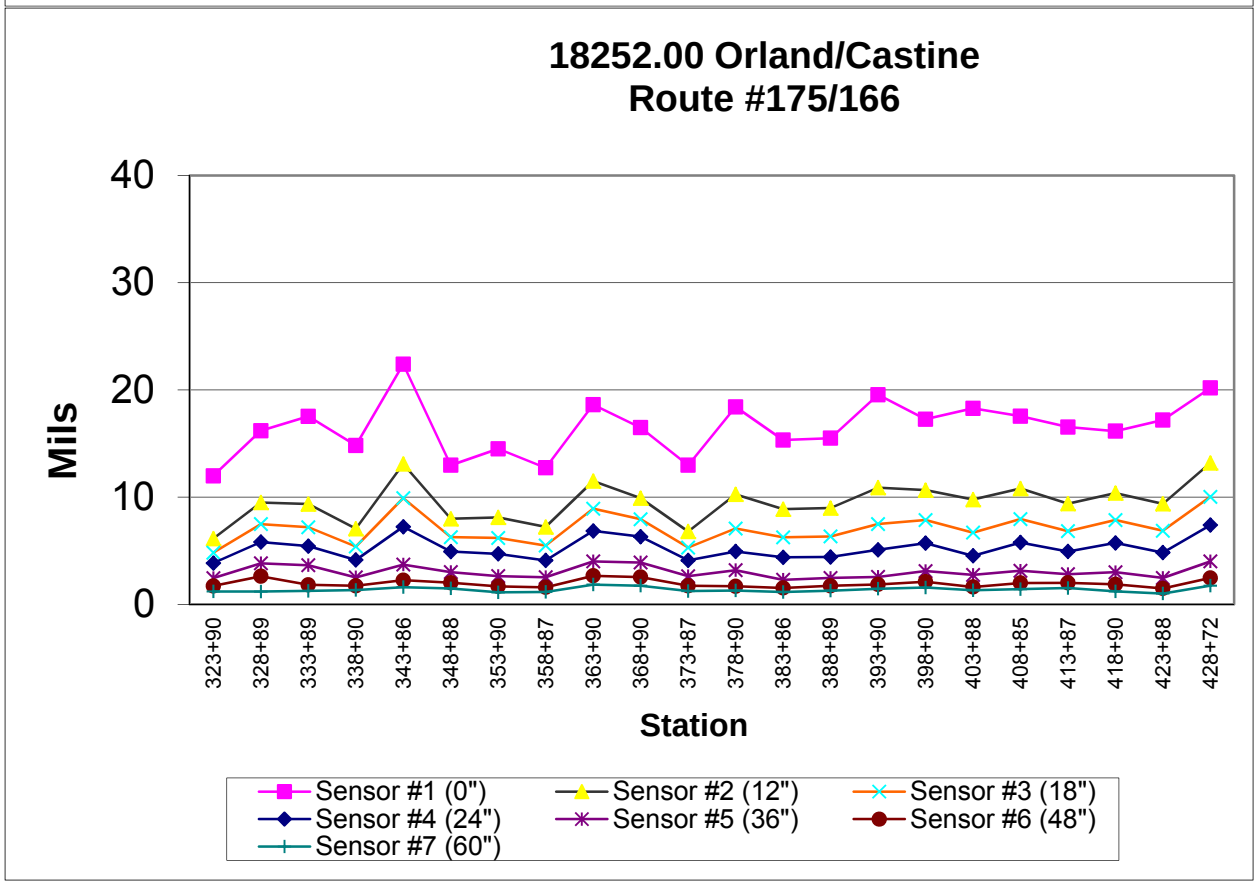
Pavement depths used for DARWin analysis were taken from Ground Penetrating Radar Summary sheets.

Gravel depths from station 10+00 to 375+38 were taken from available “as-built” information.


18252.00 Orland/Castine
Route # 175/166
Mils
40
30
20
10
0
13+86
18+89
23+88
28+90
33+86
38+89
43+90
48+90
53+89
58+88
63+90
68+88
73+89
78+90
83+90
88+89
93+89
98+83
103+89
108+89
113+89
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")
Sensor #7 (60")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
118+85
123+90
128+90
133+90
138+88
143+88
148+90
153+89
158+88
163+86
168+89
173+90
178+89
183+90
188+90
193+61
195+90
198+90
203+90
208+88
213+89
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
218+90
223+90
228+88
233+90
238+86
243+90
248+90
253+90
258+90
263+85
268+90
273+90
278+83
283+74
288+88
293+84
298+89
303+89
308+90
313+90
318+89
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
323+90
328+89
333+89
338+90
343+86
348+88
353+90
358+87
363+90
368+90
373+87
378+90
383+86
388+89
393+90
398+90
403+88
408+85
413+87
418+90
423+88
428+72
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
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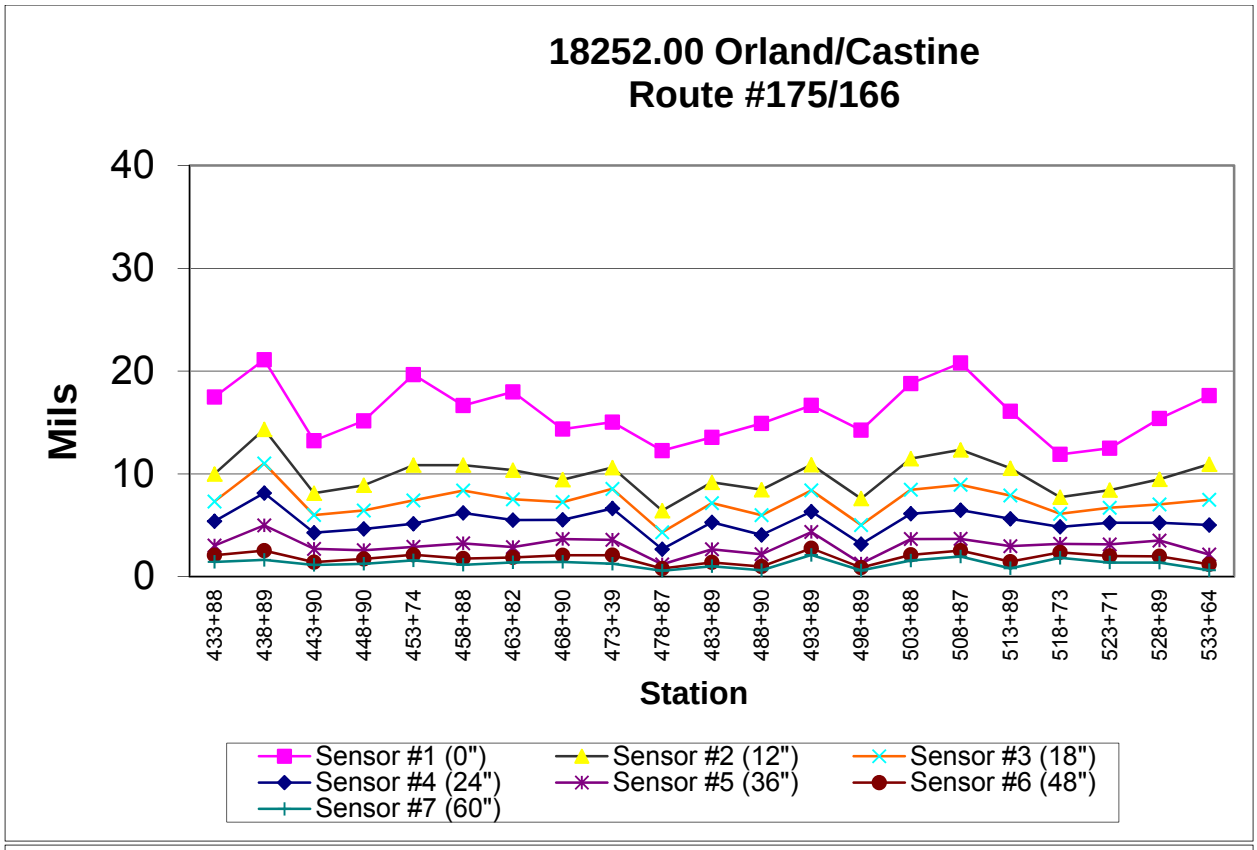
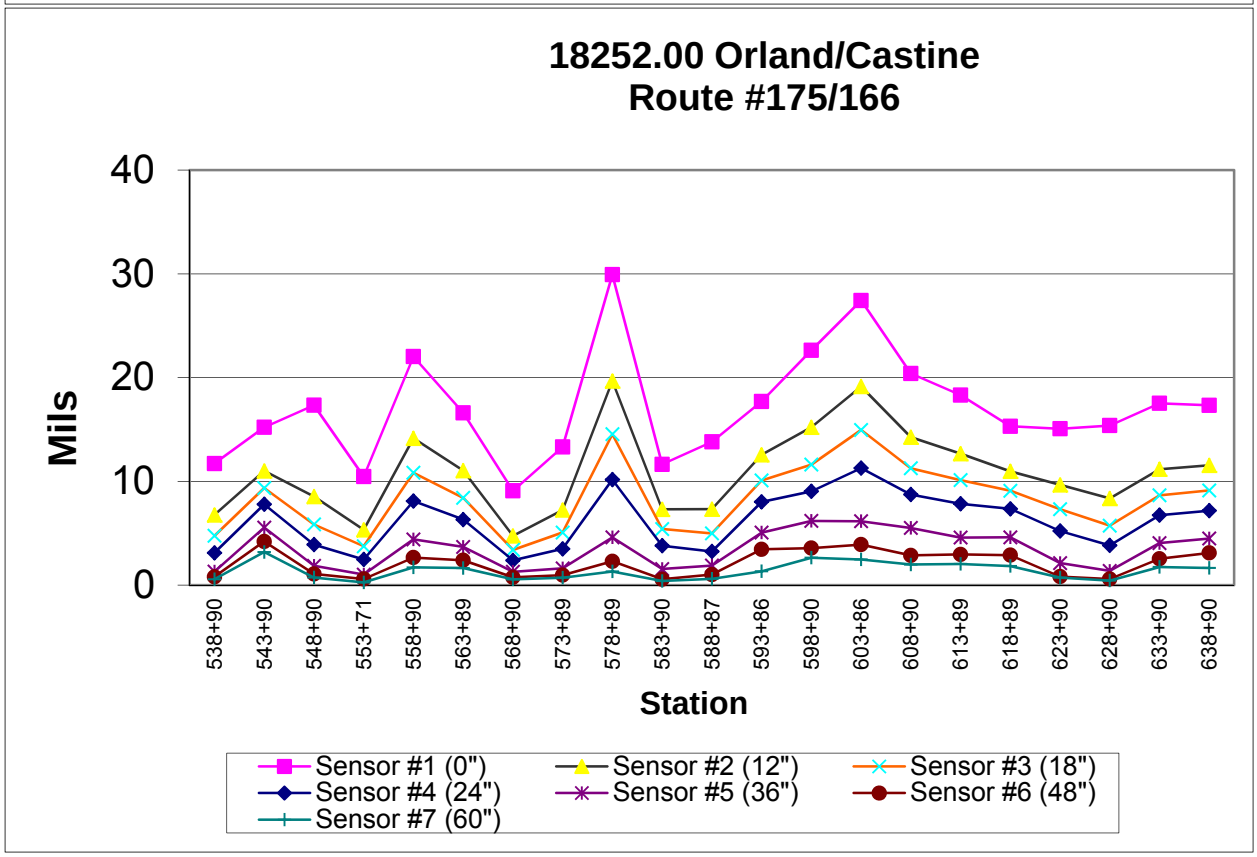
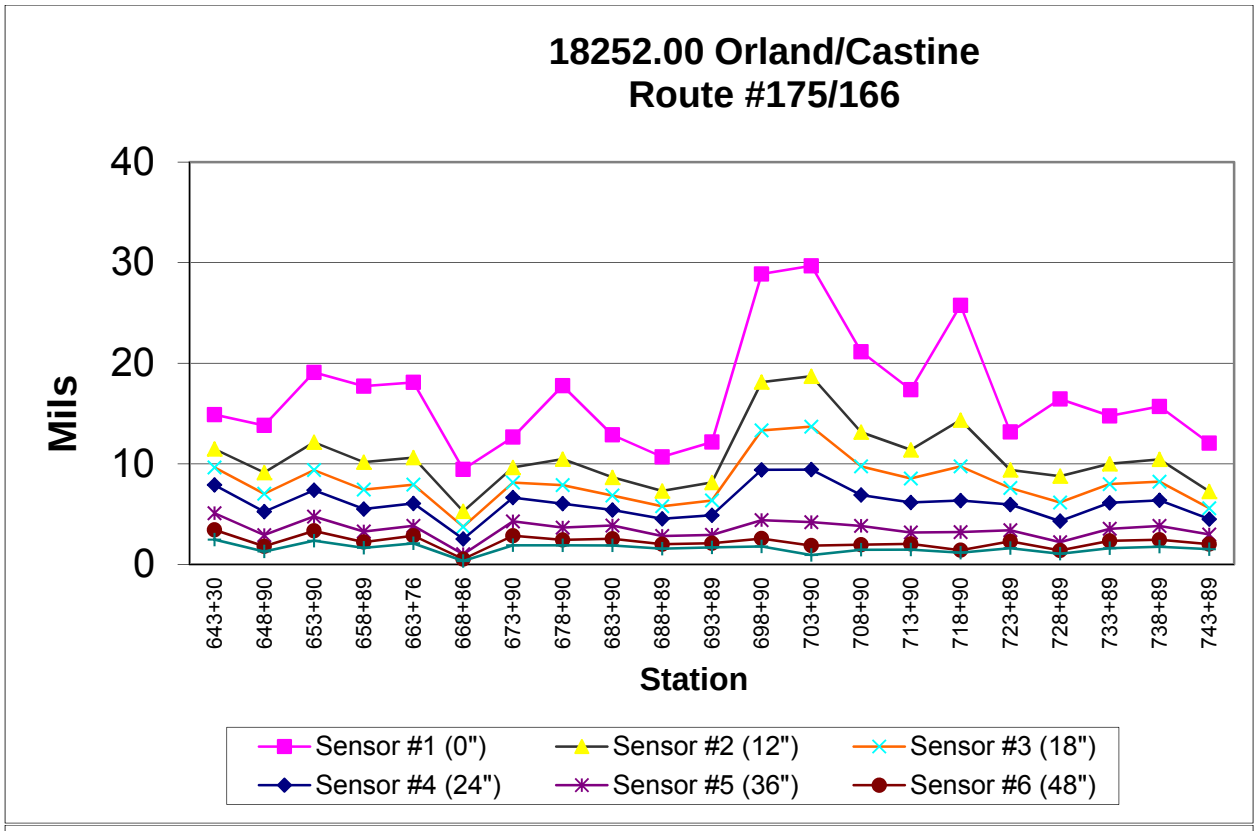
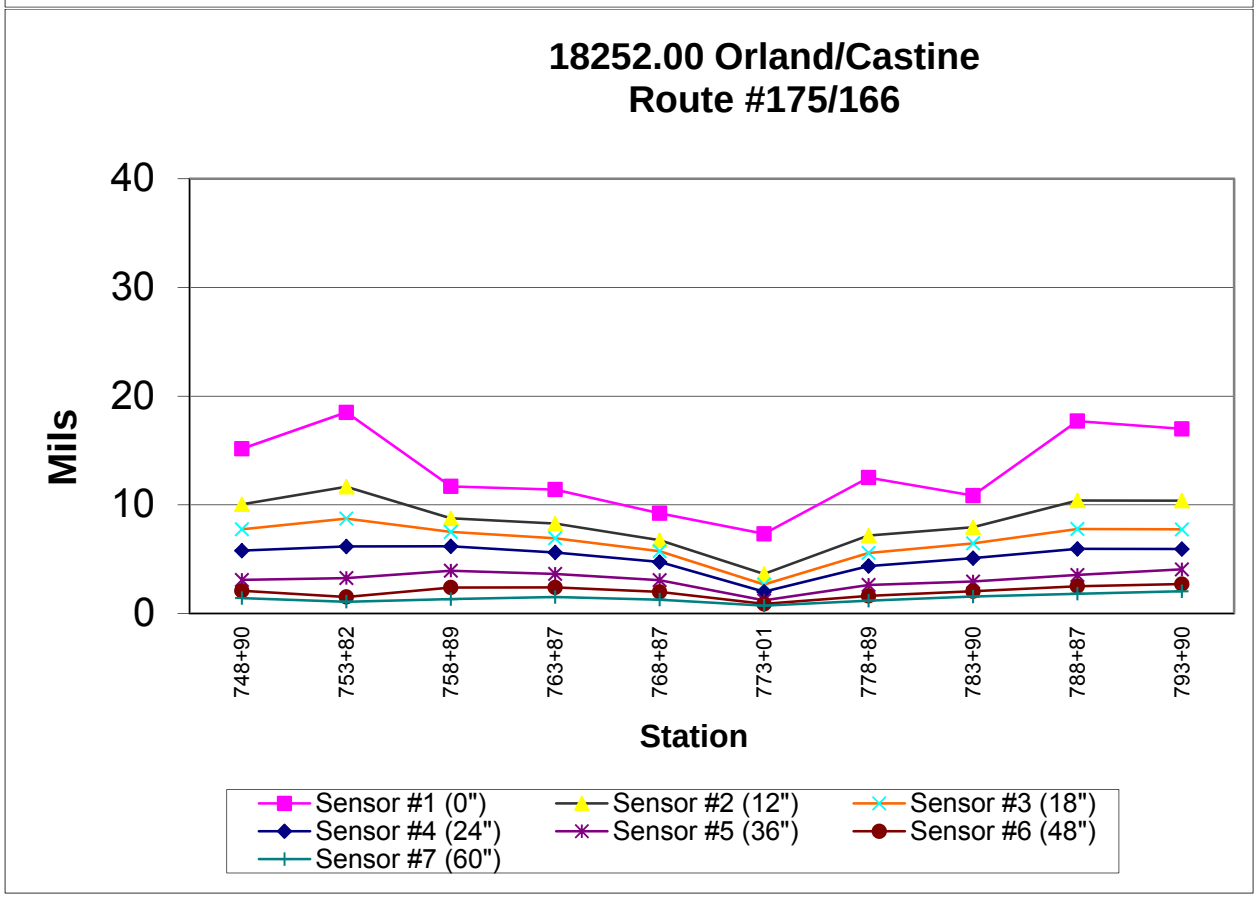
Sensor #6 (48")
Sensor #7 (60")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
433+88
438+89
443+90
448+90
453+74
458+88
463+82
468+90
473+39
478+87
483+89
488+90
493+89
498+89
503+88
508+87
513+89
518+73
523+71
528+89
533+64
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")
Sensor #7 (60")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
538+90
543+90
548+90
553+71
558+90
563+89
568+90
573+89
578+89
583+90
588+87
593+86
598+90
603+86
608+90
613+89
618+89
623+90
628+90
633+90
638+90
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")
Sensor #7 (60")


18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
643+30
648+90
653+90
658+89
663+76
668+86
673+90
678+90
683+90
688+89
693+89
698+90
703+90
708+90
713+90
718+90
723+89
728+89
733+89
738+89
743+89
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")

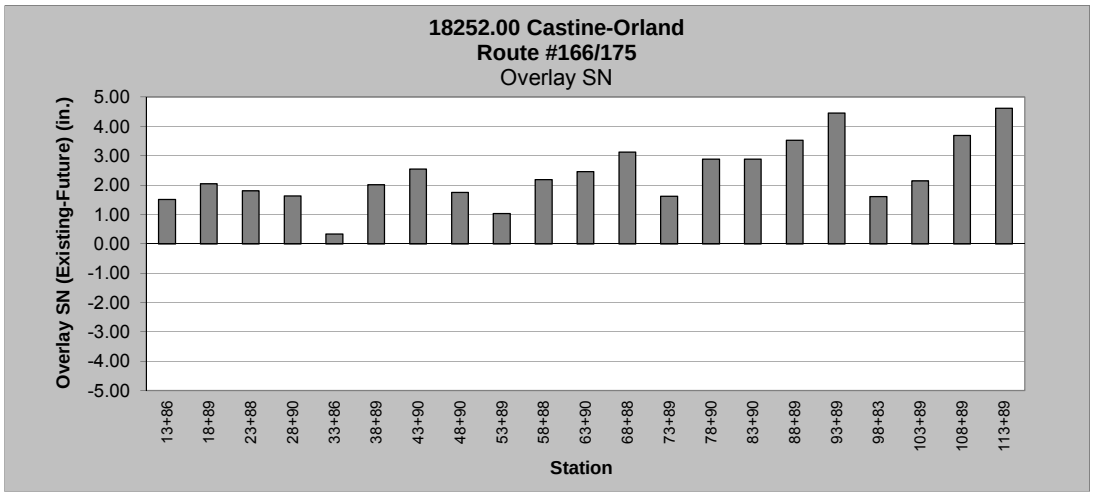

18252.00 Orland/Castine
Route #175/166
Mils
40
30
20
10
0
748+90
753+82
758+89
763+87
768+87
773+01
778+89
783+90
788+87
793+90
Station
Sensor #1 (0")
Sensor #2 (12")
Sensor #3 (18")
Sensor #4 (24")
Sensor #5 (36")
Sensor #6 (48")
Sensor #7 (60")

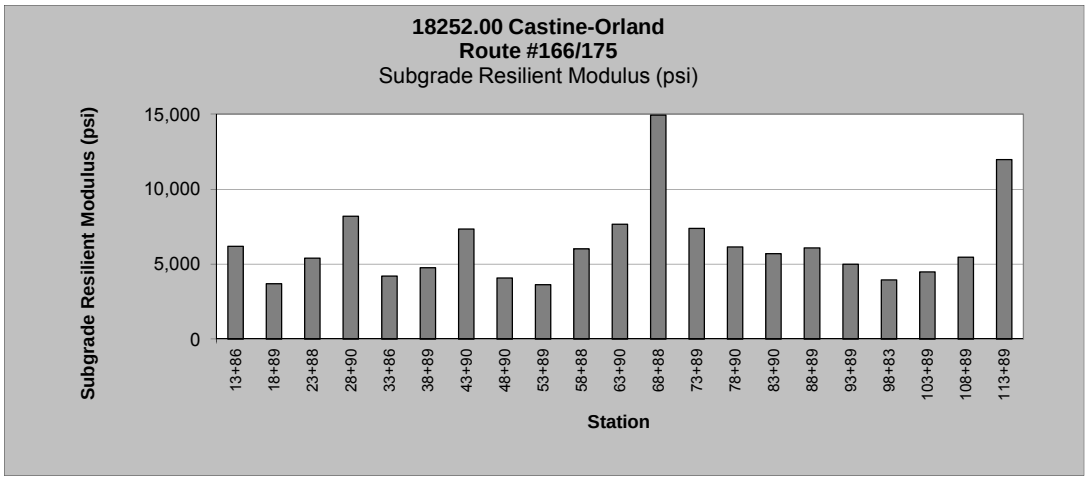
18252.00 Castine-Orland
Route # 166/175

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)
				Segment 1				
13+86	4.13	2.62	1.51	-	91,370	6,182	8.2	20.4
18+89	5.20	3.16	2.04	-	168,648	3,686	8.7	20.9
23+88	4.56	2.75	1.81	-	124,304	5,399	8.1	20.3
28+90	3.99	2.36	1.63	-	69,131	8,194	9.4	21.6
33+86	3.35	3.02	0.33	-	40,224	4,206	9.5	21.7
38+89	4.89	2.88	2.01	-	114,435	4,764	10.2	22.4
43+90	5.01	2.46	2.55	-	183,073	7,343	10.6	19.6
48+90	4.80	3.05	1.75	-	182,735	4,071	9.8	18.8
53+89	4.21	3.18	1.03	-	92,646	3,622	11.7	20.7
58+88	4.84	2.65	2.19	-	134,041	6,019	12.0	21.0
63+90	4.88	2.42	2.46	-	169,836	7,666	10.6	19.6
68+88	5.00	1.88	3.12	-	213,494	14,931	11.6	18.6
73+89	4.07	2.45	1.62	-	122,678	7,386	11.2	18.2
78+90	5.50	2.62	2.88	-	67,665	6,151	9.9	30.0
83+90	5.58	2.70	2.88	-	70,545	5,704	8.6	30.0
88+89	6.16	2.63	3.53	-	95,219	6,087	10.1	30.0
93+89	7.29	2.84	4.45	-	157,658	4,984	9.9	30.0
98+83	4.70	3.09	1.61	-	113,219	3,947	9.6	21.6
103+89	5.09	2.95	2.14	-	130,140	4,489	10.3	22.3
108+89	6.43	2.74	3.69	-	108,264	5,464	10.0	30.0
113+89	6.66	2.04	4.62	-	126,335	11,973	9.5	29.5

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





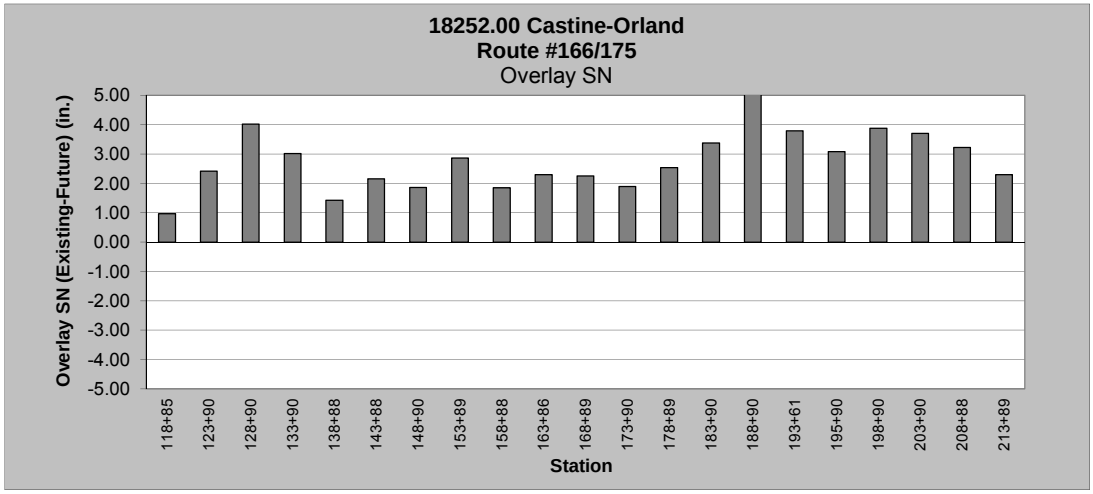
18252.00 Castine-Orland
Route # 166/175

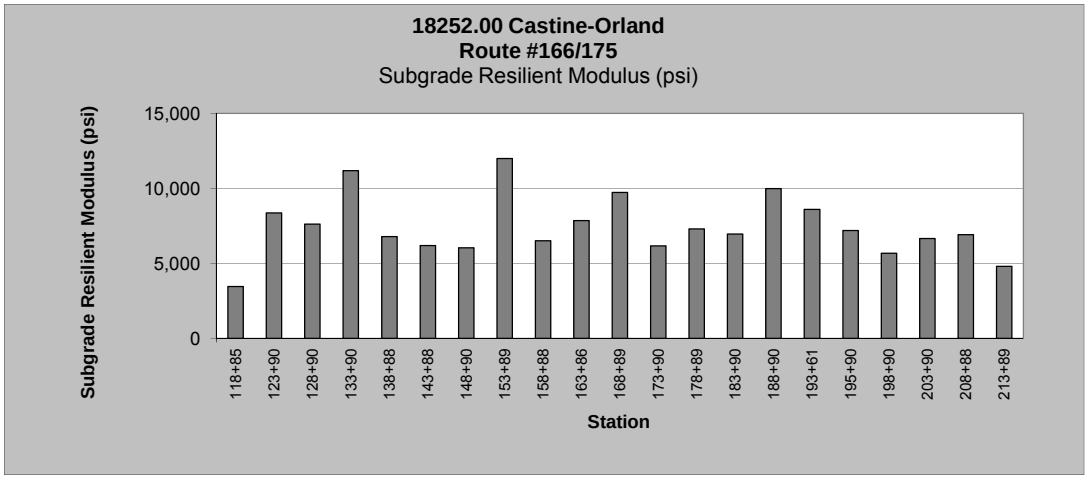
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
118+85	4.21	3.24	0.97	-	39,404	3,445	9.5	27.5
123+90	4.76	2.34	2.42	-	57,696	8,365	9.4	27.4
128+90	6.44	2.42	4.02	-	141,049	7,622	9.5	27.5
133+90	5.12	2.10	3.02	-	141,889	11,171	9.8	21.8
138+88	3.95	2.53	1.42	-	95,383	6,791	9.2	19.2
143+88	4.77	2.62	2.15	-	163,121	6,179	9.4	19.4
148+90	4.50	2.64	1.86	-	140,999	6,027	9.2	19.2
153+89	4.90	2.04	2.86	-	174,238	11,984	9.5	19.5
158+88	4.42	2.57	1.85	-	124,105	6,504	9.7	19.7
163+86	4.70	2.40	2.30	-	142,508	7,848	10.0	20.0
168+89	4.46	2.21	2.25	-	123,598	9,731	9.9	19.9
173+90	4.51	2.62	1.89	-	83,608	6,159	10.9	22.9
178+89	5.00	2.46	2.54	-	118,720	7,301	10.6	22.6
183+90	5.88	2.51	3.37	-	82,499	6,960	11.2	30.0
188+90	7.37	2.19	5.18	-	162,682	9,975	11.2	30.0
193+61	6.11	2.32	3.79	-	92,698	8,589	10.5	30.0
195+90	5.56	2.48	3.08	-	69,999	7,195	9.2	30.0
198+90	6.58	2.70	3.88	-	115,704	5,665	9.9	30.0
203+90	6.25	2.55	3.70	-	99,143	6,650	9.7	30.0
208+88	5.73	2.51	3.22	-	191,725	6,921	10.1	22.1
213+89	5.18	2.88	2.30	-	153,636	4,791	9.5	21.5

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.



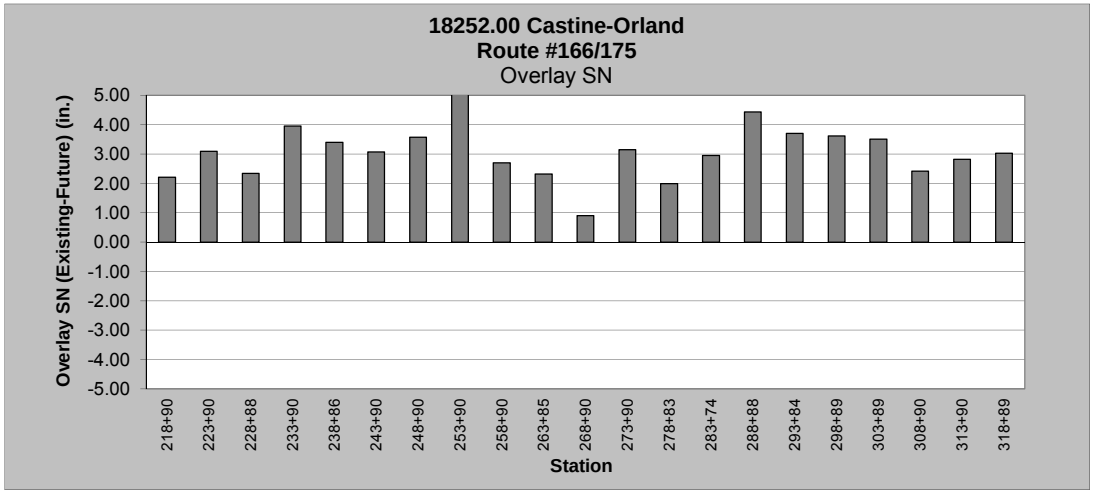


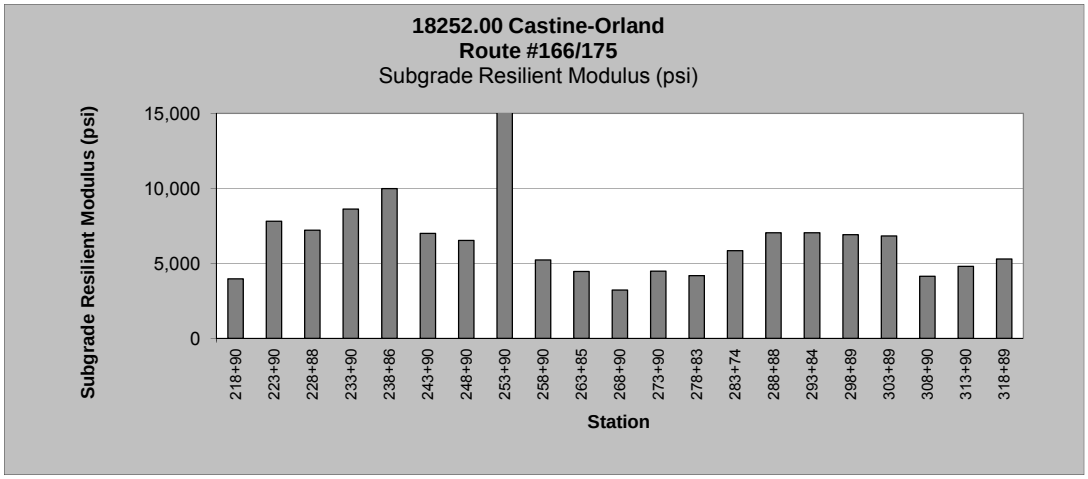
18252.00 Castine-Orland
Route # 166/175

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)
218+90	5.29	3.08	2.21	-	144,170	3,971	10.4	22.4
223+90	5.49	2.40	3.09	-	96,710	7,798	10.6	26.6
228+88	4.81	2.47	2.34	-	67,068	7,212	10.3	26.3
233+90	6.27	2.32	3.95	-	155,382	8,616	9.9	25.9
238+86	5.59	2.19	3.40	-	104,258	9,979	10.4	26.4
243+90	5.57	2.50	3.07	-	119,802	7,002	11.1	25.1
248+90	6.14	2.57	3.57	-	149,469	6,535	11.7	25.7
253+90	6.41	1.35	5.06	-	172,518	33,065	11.2	25.2
258+90	5.49	2.79	2.70	-	108,372	5,231	11.6	25.6
263+85	5.28	2.96	2.32	-	102,398	4,449	11.1	25.1
268+90	4.23	3.33	0.90	-	65,637	3,210	11.3	23.3
273+90	6.10	2.95	3.15	-	92,422	4,482	10.9	30.0
278+83	5.01	3.02	1.99	-	51,043	4,182	10.3	30.0
283+74	5.62	2.67	2.95	-	72,251	5,847	9.1	30.0
288+88	6.93	2.50	4.43	-	135,089	7,029	9.8	30.0
293+84	6.20	2.50	3.70	-	96,960	7,036	9.5	30.0
298+89	6.12	2.51	3.61	-	93,090	6,922	10.3	30.0
303+89	6.03	2.52	3.51	-	89,048	6,832	10.0	30.0
308+90	5.45	3.03	2.42	-	65,680	4,147	9.8	30.0
313+90	5.69	2.87	2.82	-	74,819	4,800	9.7	30.0
318+89	5.80	2.77	3.03	-	79,422	5,299	10.6	30.0

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





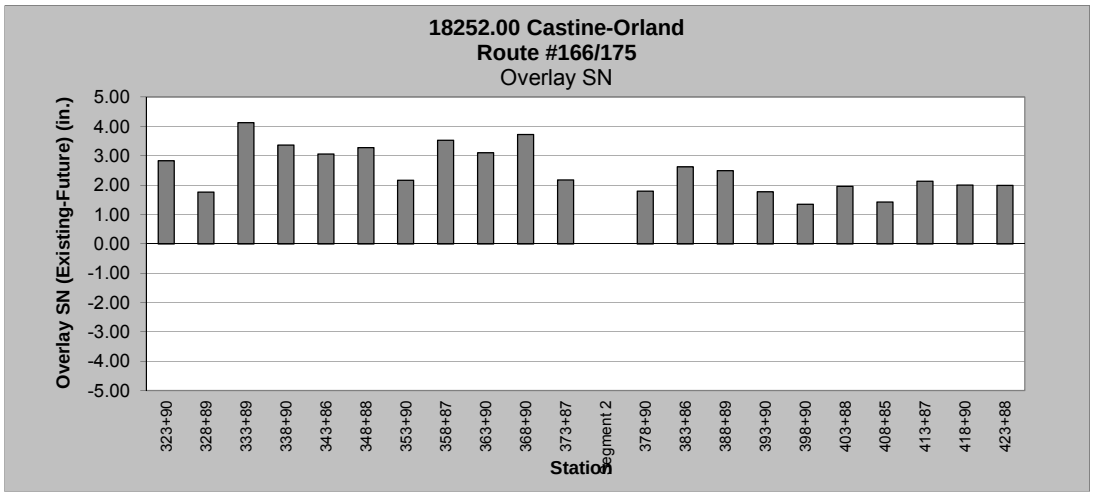
18252.00 Castine-Orland
Route # 166/175

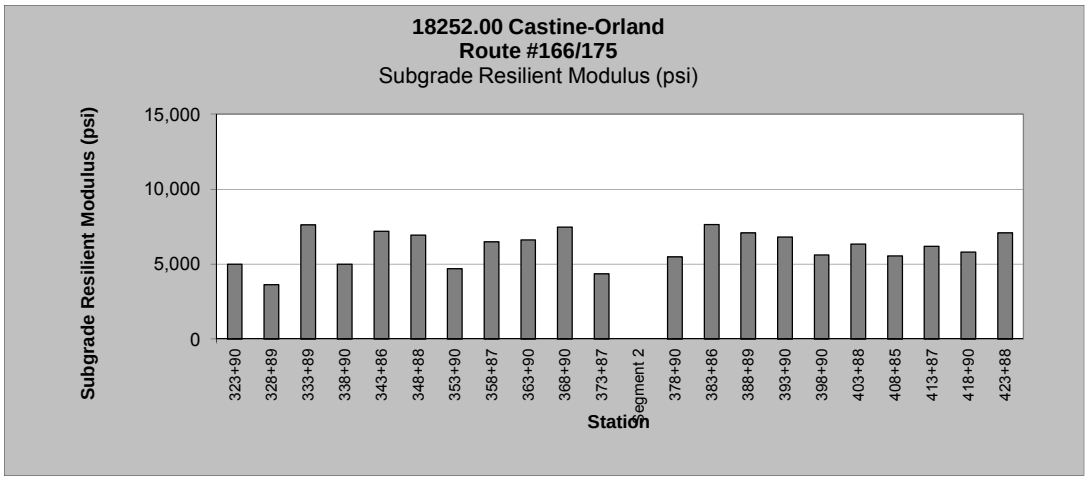
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
323+90	5.66	2.83	2.83	-	78,173	5,001	10.4	29.4
328+89	4.94	3.18	1.76	-	52,008	3,632	10.4	29.4
333+89	6.55	2.42	4.13	-	114,023	7,619	11.3	30.0
338+90	6.19	2.83	3.36	-	97,594	4,994	10.9	29.9
343+86	5.54	2.48	3.06	-	71,805	7,197	10.6	29.6
348+88	5.79	2.51	3.28	-	87,249	6,938	10.0	29.0
353+90	5.06	2.90	2.16	-	56,644	4,694	10.3	29.3
358+87	6.10	2.57	3.53	-	100,895	6,482	10.1	29.1
363+90	5.66	2.56	3.10	-	84,389	6,608	9.7	28.7
368+90	6.16	2.44	3.72	-	104,332	7,471	10.1	29.1
373+87	5.16	2.98	2.18	-	60,094	4,351	10.3	29.3
				Segment 2				
378+90	4.53	2.74	1.79	-	68,480	5,471	5.6	24.6
383+86	5.04	2.42	2.62	-	81,598	7,647	6.8	25.8
388+89	4.98	2.49	2.49	-	82,722	7,077	6.4	25.4
393+90	4.30	2.53	1.77	-	55,088	6,807	6.1	25.1
398+90	4.06	2.71	1.35	-	46,890	5,619	6.0	25.0
403+88	4.55	2.59	1.96	-	66,065	6,341	6.0	25.0
408+85	4.14	2.72	1.42	-	46,348	5,554	6.6	25.6
413+87	4.75	2.62	2.13	-	75,074	6,191	6.0	25.0
418+90	4.68	2.68	2.00	-	67,919	5,804	6.5	25.5
423+88	4.48	2.49	1.99	-	57,340	7,086	6.8	25.8

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





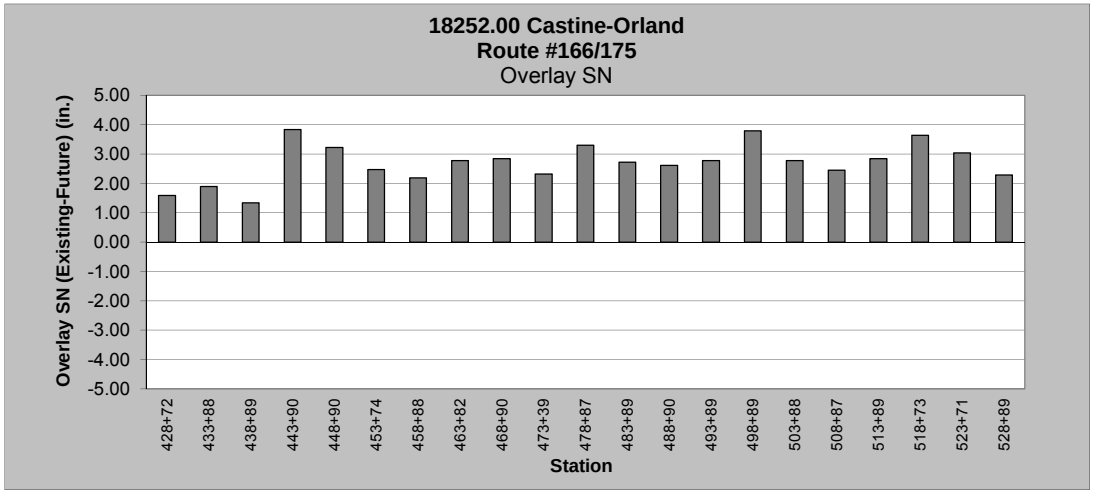
18252.00 Castine-Orland
Route # 166/175

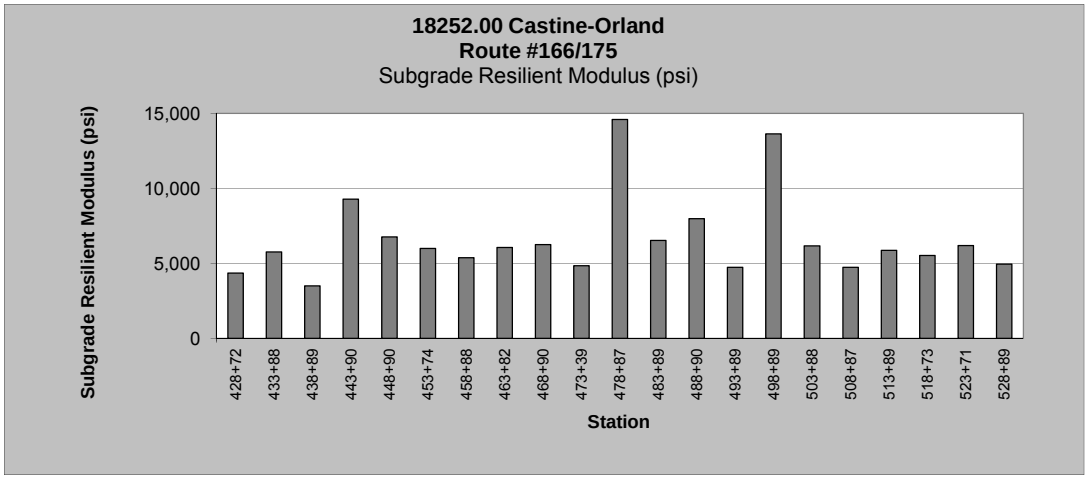
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
428+72	4.57	2.98	1.59	-	64,835	4,346	6.3	25.3
433+88	4.58	2.69	1.89	-	65,905	5,757	6.2	25.2
438+89	4.57	3.23	1.34	-	63,339	3,495	6.5	25.5
443+90	6.08	2.25	3.83	-	91,233	9,273	6.8	30.0
448+90	5.75	2.53	3.22	-	77,255	6,755	6.4	30.0
453+74	5.12	2.65	2.47	-	54,422	5,993	5.9	30.0
458+88	4.95	2.76	2.19	-	49,159	5,366	5.7	30.0
463+82	5.42	2.64	2.78	-	64,662	6,056	5.9	30.0
468+90	5.45	2.61	2.84	-	65,777	6,254	6.0	30.0
473+39	5.18	2.86	2.32	-	56,377	4,851	6.1	30.0
478+87	5.19	1.89	3.30	-	56,709	14,596	5.9	30.0
483+89	5.29	2.57	2.72	-	60,000	6,525	5.8	30.0
488+90	4.99	2.38	2.61	-	50,485	7,977	6.1	30.0
493+89	5.66	2.89	2.77	-	73,604	4,733	5.3	30.0
498+89	5.73	1.94	3.79	-	76,588	13,627	8.1	30.0
503+88	5.40	2.62	2.78	-	63,858	6,155	9.5	30.0
508+87	5.34	2.89	2.45	-	61,806	4,733	8.9	30.0
513+89	5.51	2.67	2.84	-	67,978	5,861	10.0	30.0
518+73	6.37	2.73	3.64	-	105,070	5,526	8.3	30.0
523+71	5.66	2.62	3.04	-	73,778	6,184	8.2	30.0
528+89	5.12	2.84	2.28	-	54,449	4,953	9.7	30.0

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





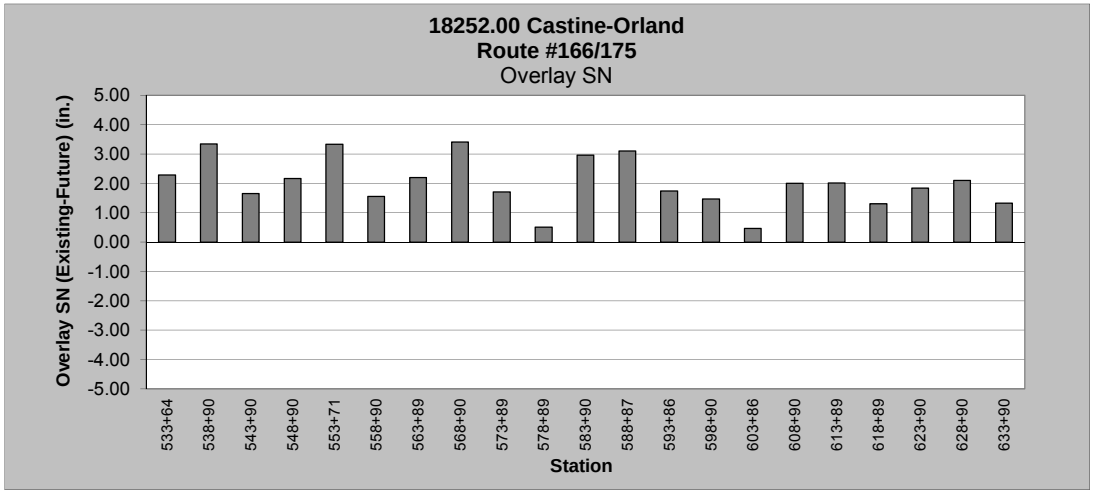
18252.00 Castine-Orland
Route # 166/175

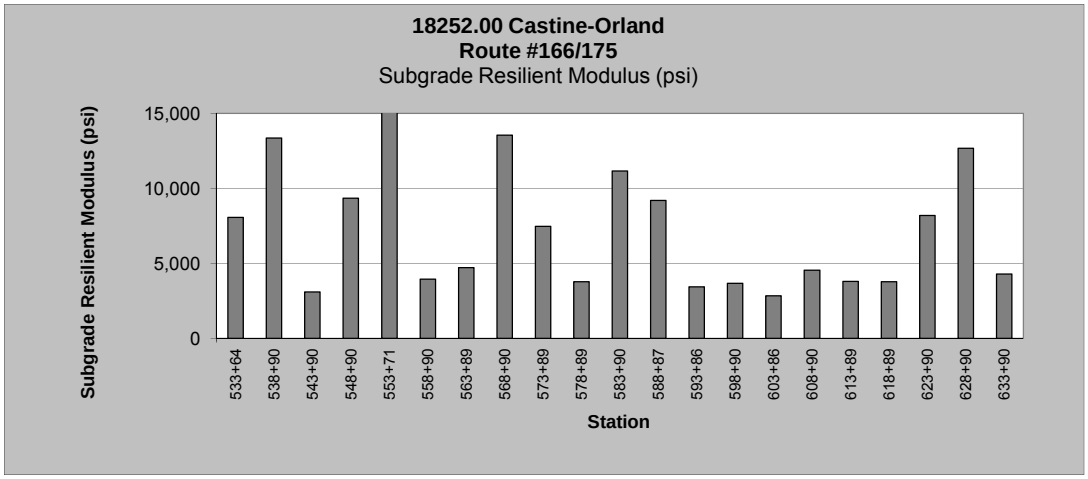
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
533+64	4.66	2.37	2.29	-	41,261	8,069	9.2	30.0
538+90	5.30	1.96	3.34	-	60,341	13,359	4.6	30.0
543+90	5.02	3.37	1.65	-	70,469	3,098	4.0	27.0
548+90	4.41	2.25	2.16	-	41,559	9,350	5.3	28.3
553+71	5.11	1.78	3.33	-	69,073	17,067	4.7	27.7
558+90	4.64	3.09	1.55	-	52,781	3,945	4.5	27.5
563+89	5.09	2.89	2.20	-	71,797	4,718	4.2	27.2
568+90	5.36	1.95	3.41	-	83,813	13,541	4.2	27.2
573+89	4.15	2.44	1.71	-	62,986	7,456	4.2	23.2
578+89	3.64	3.13	0.51	-	27,822	3,782	7.7	26.7
583+90	5.06	2.10	2.96	-	63,914	11,166	9.1	28.1
588+87	5.36	2.26	3.10	-	76,780	9,203	9.0	28.0
593+86	4.99	3.25	1.74	-	72,622	3,434	7.6	26.6
598+90	4.64	3.17	1.47	-	54,018	3,661	8.3	27.3
603+86	3.94	3.48	0.46	-	33,284	**2,827**	8.2	27.2
608+90	4.93	2.93	2.00	-	60,430	4,548	8.9	27.9
613+89	5.14	3.13	2.01	-	74,726	3,795	8.1	27.1
618+89	4.44	3.14	1.30	-	66,205	3,775	5.4	24.4
623+90	4.20	2.36	1.84	-	50,089	8,191	6.3	25.3
628+90	4.10	2.00	2.10	-	44,548	12,666	6.7	25.7
633+90	4.31	2.99	1.32	-	51,744	4,291	6.7	25.7

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





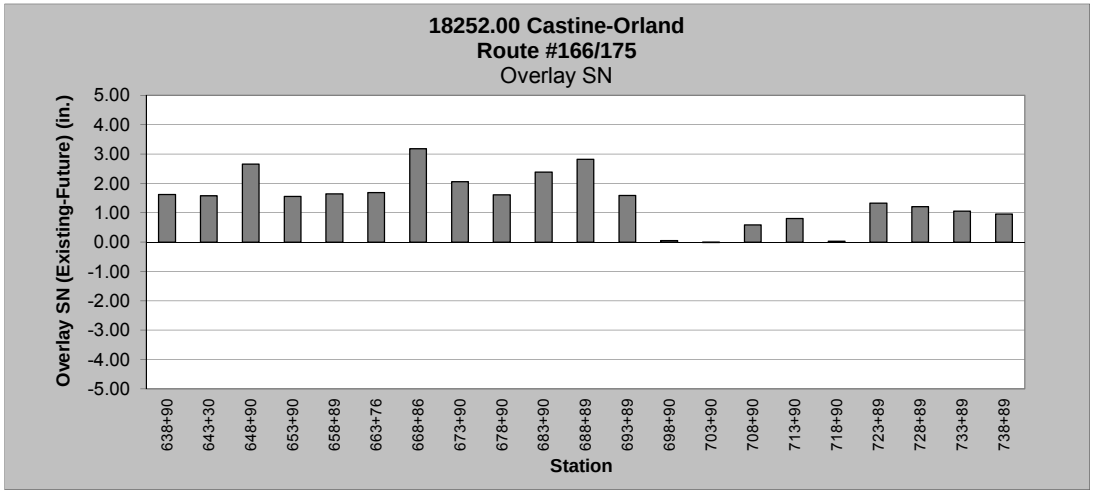
18252.00 Castine-Orland
Route # 166/175

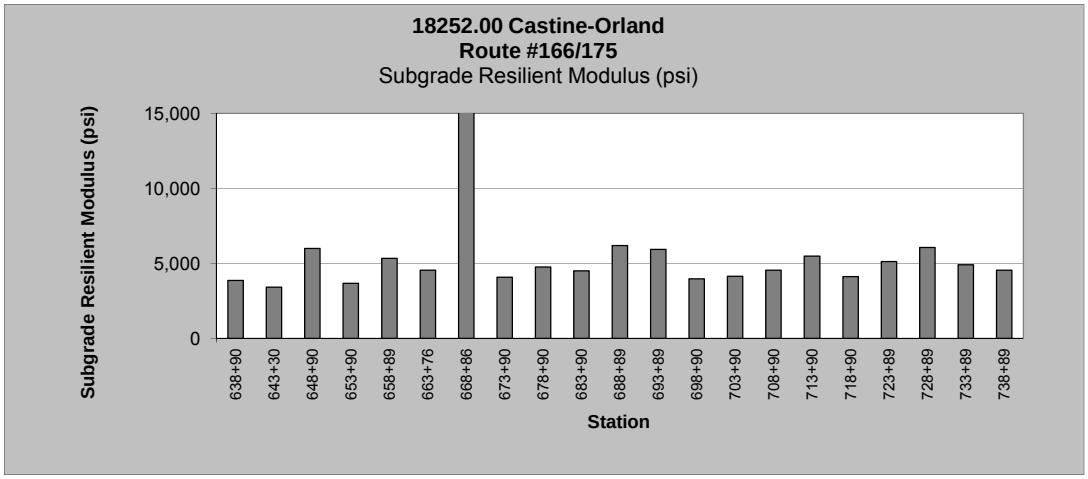
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
638+90	4.73	3.11	1.62	-	66,941	3,870	6.9	25.9
643+30	4.83	3.25	1.58	-	76,145	3,418	6.3	25.3
648+90	5.31	2.65	2.66	-	89,231	5,985	7.4	26.4
653+90	4.72	3.17	1.55	-	69,491	3,662	6.5	25.5
658+89	4.41	2.77	1.64	-	48,901	5,325	7.8	26.8
663+76	4.61	2.93	1.68	-	65,432	4,540	6.4	25.4
668+86	4.95	1.77	3.18	-	75,832	17,225	7.0	26.0
673+90	5.11	3.05	2.06	-	89,130	4,064	6.4	25.4
678+90	4.49	2.88	1.61	-	65,899	4,754	5.7	24.7
683+90	5.32	2.94	2.38	-	111,213	4,509	5.6	24.6
688+89	5.44	2.62	2.82	-	124,766	6,185	5.2	24.2
693+89	4.25	2.66	1.59	-	111,686	5,939	5.6	19.6
698+90	3.13	3.08	0.05	-	38,399	3,958	6.6	20.6
703+90	3.02	3.03	-0.01	0.02	36,701	4,142	6.2	20.2
708+90	3.51	2.93	0.58	-	55,882	4,548	6.4	20.4
713+90	3.54	2.74	0.80	-	55,884	5,481	6.6	20.6
718+90	3.07	3.04	0.03	-	33,298	4,115	7.2	21.2
723+89	4.14	2.81	1.33	-	77,006	5,122	7.6	21.6
728+89	3.84	2.64	1.20	-	67,264	6,064	7.0	21.0
733+89	3.90	2.85	1.05	-	71,415	4,916	6.9	20.9
738+89	3.88	2.93	0.95	-	70,309	4,548	6.9	20.9

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





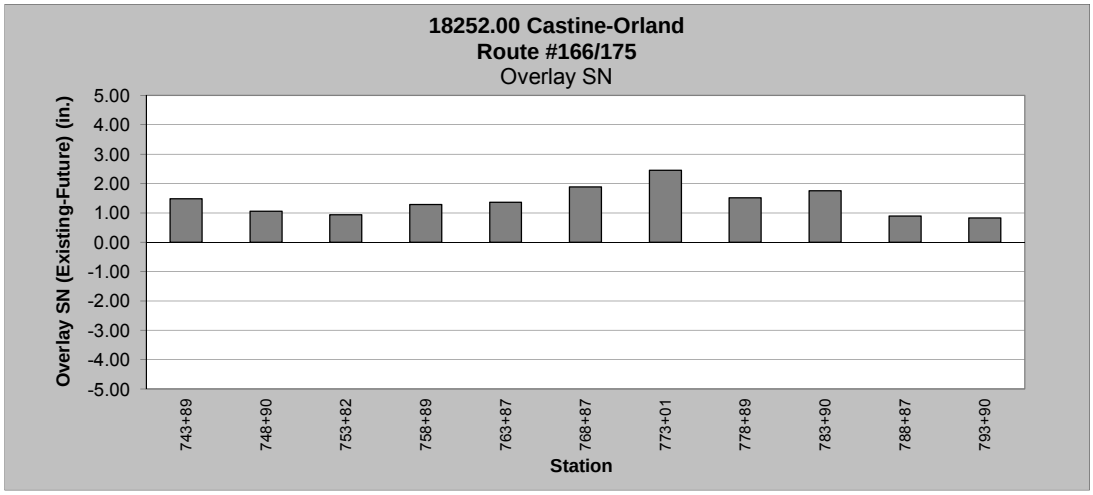
18252.00 Castine-Orland
Route # 166/175

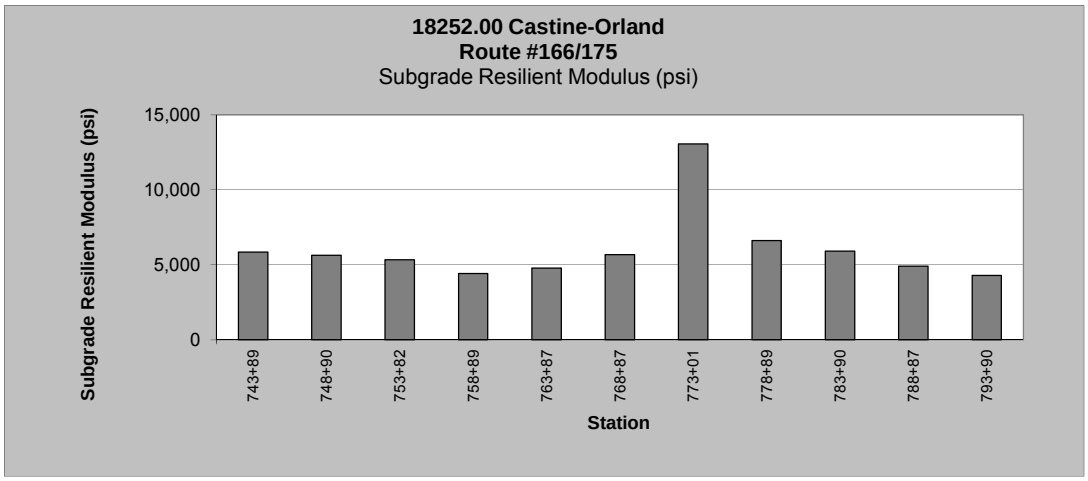
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
743+89	4.15	2.67	1.48	-	84,623	5,848	7.0	21.0
748+90	3.76	2.71	1.05	-	61,960	5,627	7.1	21.1
753+82	3.70	2.76	0.94	-	54,279	5,342	7.7	21.7
758+89	4.24	2.96	1.28	-	106,115	4,421	5.9	19.9
763+87	4.24	2.88	1.36	-	106,425	4,775	5.9	19.9
768+87	4.58	2.70	1.88	-	136,094	5,673	5.8	19.8
773+01	4.43	1.98	2.45	-	141,772	13,052	4.9	18.9
778+89	4.06	2.55	1.51	-	91,693	6,620	6.0	20.0
783+90	4.41	2.66	1.75	-	124,761	5,918	5.6	19.6
788+87	3.74	2.85	0.89	-	63,889	4,906	6.8	20.8
793+90	3.83	3.00	0.83	-	70,467	4,282	6.6	20.6

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Pavement depths were taken from Ground Penetrating Radar Summary Sheet.





State of Maine - Department of Transportation

Pavement Core Summary Sheet

Towns: Orland Work Number: 18252.00

Station (Feet)	Offset (Feet)	Pavement Depth (Inches)	Unbound Pavement	PC-Number	Saved Core	Comments / Date 8/21/2012
58+90	9.0 Lt.	10.5		33		
156+07	9.0 Lt.	12.0		32		
253+00	9.0 Lt.	11.0		31		
360+42	9.0 Lt.	9.5		28		
360+42	1.0 Lt.	5.0		29		
360+42	9.0 Rt.	9.0		30		
400+50	9.0 Lt.	3.5		25		
400+50	1.0 Lt.	7.5		26		
400+50	9.0 Rt.	10.5		27		
440+10	9.0 Lt.	6.0		22		
440+10	1.0 Lt.	7.5		23		
440+10	9.0 Rt.	5.0		24		
479+91	9.0 Lt.	5.0		19		
479+91	1.0 Lt.	6.5		20		
479+91	9.0 Rt.	3.0		21		
519+57	9.0 Lt.	6.5		16		
519+57	1.0 Lt.	12.0		17		
519+57	9.0 Rt.	7.5		18		
559+42	9.0 Lt.	4.5		13		
559+42	1.0 Lt.	5.5		14		
559+42	9.0 Rt.	5.0		15		
599+14	9.0 Lt.	4.5		10		
599+14	1.0 Lt.	8.5		11		
599+14	9.0 Rt.	5.0		12		
638+90	9.0 Lt.	7.5		7		
638+90	1.0 Lt.	7.0		8		
638+90	9.0 Rt.	5.5		9		
678+79	9.0 Lt.	5.0		4		
678+79	1.0 Lt.	6.5		5		
678+79	9.0 Rt.	5.0		6		
718+91	9.0 Lt.	7.0		1		
718+91	1.0 Lt.	10.5		2		
718+91	9.0 Rt.	6.5		3		
	I					

Logged By: C. Giles

2" Thinwall Core

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

Ground Penetrating Radar (GPR)

Estimated Pavement Thickness

018252.00 - Penobscot,Orland,Castine

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

GPR data was collected in the left and right wheel path of both lanes. Data was collected at 1 foot intervals along the entire section. Pavement thickness estimates were developed using Geophysical Survey Systems Inc. (GSSI) RADAN GPR Data Processing Software. Where available, pavement thickness from Geotechnical borings and/or pavement cores collected by MaineDOT personnel were used in developing the estimated GPR pavement thicknesses.

GPR pavement thickness averages are to be considered for estimating purposes only. Actual pavement thickness may vary.
Pavement Thickness Estimates in Segment 1 are thought to represent the combined depth of HMA and Foamed Asphalt layers

Additional Comments
Segment 1, Route 166/166A (10+00 - 375+38)

Lane Tested	Analysis Distance, ft.	Overall Average Thickness, in.	Overall Minimum Thickness, in.	Overall Maximum Thickness, in.
MAINLINE	**100**	**10.1**	**7.3**	**12.5**

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
10+00	11+00	7.3	11+00	12+00	7.3	12+00	13+00	7.5	13+00	14+00	8.2
14+00	15+00	8.2	15+00	16+00	7.8	16+00	17+00	8.0	17+00	18+00	8.5
18+00	19+00	8.7	19+00	20+00	9.1	20+00	21+00	8.1	21+00	22+00	7.6
22+00	23+00	7.7	23+00	24+00	8.1	24+00	25+00	8.5	25+00	26+00	9.0
26+00	27+00	8.3	27+00	28+00	8.7	28+00	29+00	9.4	29+00	30+00	10.2
30+00	31+00	10.6	31+00	32+00	10.6	32+00	33+00	9.7	33+00	34+00	9.5
34+00	35+00	9.6	35+00	36+00	10.6	36+00	37+00	10.9	37+00	38+00	10.8
38+00	39+00	10.2	39+00	40+00	10.2	40+00	41+00	10.0	41+00	42+00	10.0
42+00	43+00	10.1	43+00	44+00	10.6	44+00	45+00	9.5	45+00	46+00	9.5
46+00	47+00	9.6	47+00	48+00	9.6	48+00	49+00	9.8	49+00	50+00	11.2
50+00	51+00	11.8	51+00	52+00	11.1	52+00	53+00	11.2	53+00	54+00	11.7
54+00	55+00	11.8	55+00	56+00	12.1	56+00	57+00	12.3	57+00	58+00	12.4
58+00	59+00	12.5	59+00	60+00	12.1	60+00	61+00	12.5	61+00	62+00	12.3
62+00	63+00	11.0	63+00	64+00	10.6	64+00	65+00	11.3	65+00	66+00	11.4
66+00	67+00	11.0	67+00	68+00	11.4	68+00	69+00	11.6	69+00	70+00	11.5

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
70+00	71+00	11.2	71+00	72+00	11.4	72+00	73+00	11.0	73+00	74+00	11.2
74+00	75+00	11.1	75+00	76+00	11.4	76+00	77+00	11.1	77+00	78+00	10.2
78+00	79+00	9.9	79+00	80+00	9.9	80+00	81+00	9.8	81+00	82+00	10.0
82+00	83+00	9.1	83+00	84+00	8.6	84+00	85+00	9.7	85+00	86+00	9.9
86+00	87+00	9.7	87+00	88+00	10.0	88+00	89+00	10.1	89+00	90+00	9.8
90+00	91+00	9.8	91+00	92+00	9.7	92+00	93+00	9.8	93+00	94+00	9.9
94+00	95+00	10.4	95+00	96+00	9.9	96+00	97+00	9.5	97+00	98+00	9.9
98+00	99+00	9.6	99+00	100+00	9.3	100+00	101+00	9.6	101+00	102+00	10.1
102+00	103+00	10.0	103+00	104+00	10.3	104+00	105+00	10.1	105+00	106+00	9.6
106+00	107+00	9.4	107+00	108+00	9.6	108+00	109+00	10.0	109+00	110+00	9.8
110+00	111+00	10.1	111+00	112+00	10.6	112+00	113+00	9.9	113+00	114+00	9.5
114+00	115+00	9.1	115+00	116+00	9.2	116+00	117+00	10.1	117+00	118+00	9.9
118+00	119+00	9.5	119+00	120+00	10.1	120+00	121+00	10.2	121+00	122+00	9.6
122+00	123+00	9.4	123+00	124+00	9.4	124+00	125+00	9.6	125+00	126+00	9.9
126+00	127+00	9.8	127+00	128+00	9.5	128+00	129+00	9.5	129+00	130+00	9.1
130+00	131+00	9.3	131+00	132+00	9.3	132+00	133+00	9.4	133+00	134+00	9.8
134+00	135+00	9.5	135+00	136+00	9.7	136+00	137+00	10.2	137+00	138+00	9.2
138+00	139+00	9.2	139+00	140+00	9.3	140+00	141+00	9.0	141+00	142+00	9.1
142+00	143+00	9.3	143+00	144+00	9.4	144+00	145+00	9.5	145+00	146+00	9.6
146+00	147+00	9.6	147+00	148+00	9.3	148+00	149+00	9.2	149+00	150+00	9.1
150+00	151+00	9.0	151+00	152+00	9.2	152+00	153+00	9.1	153+00	154+00	9.5
154+00	155+00	10.0	155+00	156+00	10.0	156+00	157+00	9.6	157+00	158+00	9.5
158+00	159+00	9.7	159+00	160+00	9.7	160+00	161+00	9.8	161+00	162+00	9.9
162+00	163+00	10.0	163+00	164+00	10.0	164+00	165+00	9.6	165+00	166+00	9.4
166+00	167+00	10.0	167+00	168+00	10.0	168+00	169+00	9.9	169+00	170+00	10.0
170+00	171+00	10.1	171+00	172+00	10.7	172+00	173+00	10.2	173+00	174+00	10.9
174+00	175+00	10.8	175+00	176+00	10.2	176+00	177+00	10.5	177+00	178+00	10.8
178+00	179+00	10.6	179+00	180+00	10.7	180+00	181+00	10.5	181+00	182+00	10.4
182+00	183+00	10.5	183+00	184+00	11.2	184+00	185+00	10.9	185+00	186+00	11.1
186+00	187+00	10.6	187+00	188+00	11.0	188+00	189+00	11.2	189+00	190+00	10.6
190+00	191+00	10.3	191+00	192+00	10.7	192+00	193+00	10.6	193+00	194+00	10.5
194+00	195+00	9.6	195+00	196+00	9.2	196+00	197+00	9.4	197+00	198+00	9.1
198+00	199+00	9.9	199+00	200+00	9.8	200+00	201+00	9.6	201+00	202+00	9.4
202+00	203+00	9.8	203+00	204+00	9.7	204+00	205+00	9.2	205+00	206+00	9.7
206+00	207+00	9.6	207+00	208+00	10.1	208+00	209+00	10.1	209+00	210+00	9.9
210+00	211+00	10.0	211+00	212+00	9.7	212+00	213+00	9.7	213+00	214+00	9.5
214+00	215+00	9.7	215+00	216+00	9.6	216+00	217+00	9.6	217+00	218+00	10.1
218+00	219+00	10.4	219+00	220+00	10.5	220+00	221+00	10.0	221+00	222+00	9.9
222+00	223+00	10.2	223+00	224+00	10.6	224+00	225+00	11.1	225+00	226+00	11.3
226+00	227+00	9.8	227+00	228+00	9.6	228+00	229+00	10.3	229+00	230+00	9.7
230+00	231+00	9.5	231+00	232+00	9.9	232+00	233+00	9.8	233+00	234+00	9.9
234+00	235+00	9.9	235+00	236+00	10.2	236+00	237+00	9.9	237+00	238+00	10.5
238+00	239+00	10.4	239+00	240+00	10.8	240+00	241+00	10.8	241+00	242+00	10.6
242+00	243+00	11.4	243+00	244+00	11.1	244+00	245+00	11.1	245+00	246+00	11.0

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
246+00	247+00	11.4	247+00	248+00	11.7	248+00	249+00	11.7	249+00	250+00	11.3
250+00	251+00	11.2	251+00	252+00	12.1	252+00	253+00	11.4	253+00	254+00	11.2
254+00	255+00	11.3	255+00	256+00	11.6	256+00	257+00	11.6	257+00	258+00	11.9
258+00	259+00	11.6	259+00	260+00	11.4	260+00	261+00	11.3	261+00	262+00	11.6
262+00	263+00	11.5	263+00	264+00	11.1	264+00	265+00	10.6	265+00	266+00	10.3
266+00	267+00	10.7	267+00	268+00	11.0	268+00	269+00	11.3	269+00	270+00	10.9
270+00	271+00	10.3	271+00	272+00	11.3	272+00	273+00	10.8	273+00	274+00	10.9
274+00	275+00	10.6	275+00	276+00	10.4	276+00	277+00	11.4	277+00	278+00	11.2
278+00	279+00	10.3	279+00	280+00	10.3	280+00	281+00	10.4	281+00	282+00	9.9
282+00	283+00	9.6	283+00	284+00	9.1	284+00	285+00	9.8	285+00	286+00	9.9
286+00	287+00	9.4	287+00	288+00	9.4	288+00	289+00	9.8	289+00	290+00	10.8
290+00	291+00	10.8	291+00	292+00	10.1	292+00	293+00	9.4	293+00	294+00	9.5
294+00	295+00	9.5	295+00	296+00	9.2	296+00	297+00	9.7	297+00	298+00	9.7
298+00	299+00	10.3	299+00	300+00	10.5	300+00	301+00	10.4	301+00	302+00	10.5
302+00	303+00	10.3	303+00	304+00	10.0	304+00	305+00	10.0	305+00	306+00	9.8
306+00	307+00	10.0	307+00	308+00	10.5	308+00	309+00	9.8	309+00	310+00	9.6
310+00	311+00	9.7	311+00	312+00	9.7	312+00	313+00	10.5	313+00	314+00	9.7
314+00	315+00	9.1	315+00	316+00	9.9	316+00	317+00	10.2	317+00	318+00	10.5
318+00	319+00	10.6	319+00	320+00	10.5	320+00	321+00	10.0	321+00	322+00	10.3
322+00	323+00	10.6	323+00	324+00	10.4	324+00	325+00	10.3	325+00	326+00	10.6
326+00	327+00	10.7	327+00	328+00	10.8	328+00	329+00	10.4	329+00	330+00	10.0
330+00	331+00	10.3	331+00	332+00	10.8	332+00	333+00	11.2	333+00	334+00	11.3
334+00	335+00	11.1	335+00	336+00	10.4	336+00	337+00	10.7	337+00	338+00	10.9
338+00	339+00	10.9	339+00	340+00	11.0	340+00	341+00	10.4	341+00	342+00	10.3
342+00	343+00	10.1	343+00	344+00	10.6	344+00	345+00	10.3	345+00	346+00	10.4
346+00	347+00	10.0	347+00	348+00	10.2	348+00	349+00	10.0	349+00	350+00	10.3
350+00	351+00	9.6	351+00	352+00	9.5	352+00	353+00	9.7	353+00	354+00	10.3
354+00	355+00	9.9	355+00	356+00	10.4	356+00	357+00	9.8	357+00	358+00	10.1
358+00	359+00	10.1	359+00	360+00	10.2	360+00	361+00	10.2	361+00	362+00	10.2
362+00	363+00	10.0	363+00	364+00	9.7	364+00	365+00	10.4	365+00	366+00	10.4
366+00	367+00	10.0	367+00	368+00	10.0	368+00	369+00	10.1	369+00	370+00	9.9
370+00	371+00	9.4	371+00	372+00	9.7	372+00	373+00	10.0	373+00	374+00	10.3
374+00	375+00	11.2	375+00	375+60	11.1						

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

Ground Penetrating Radar (GPR)

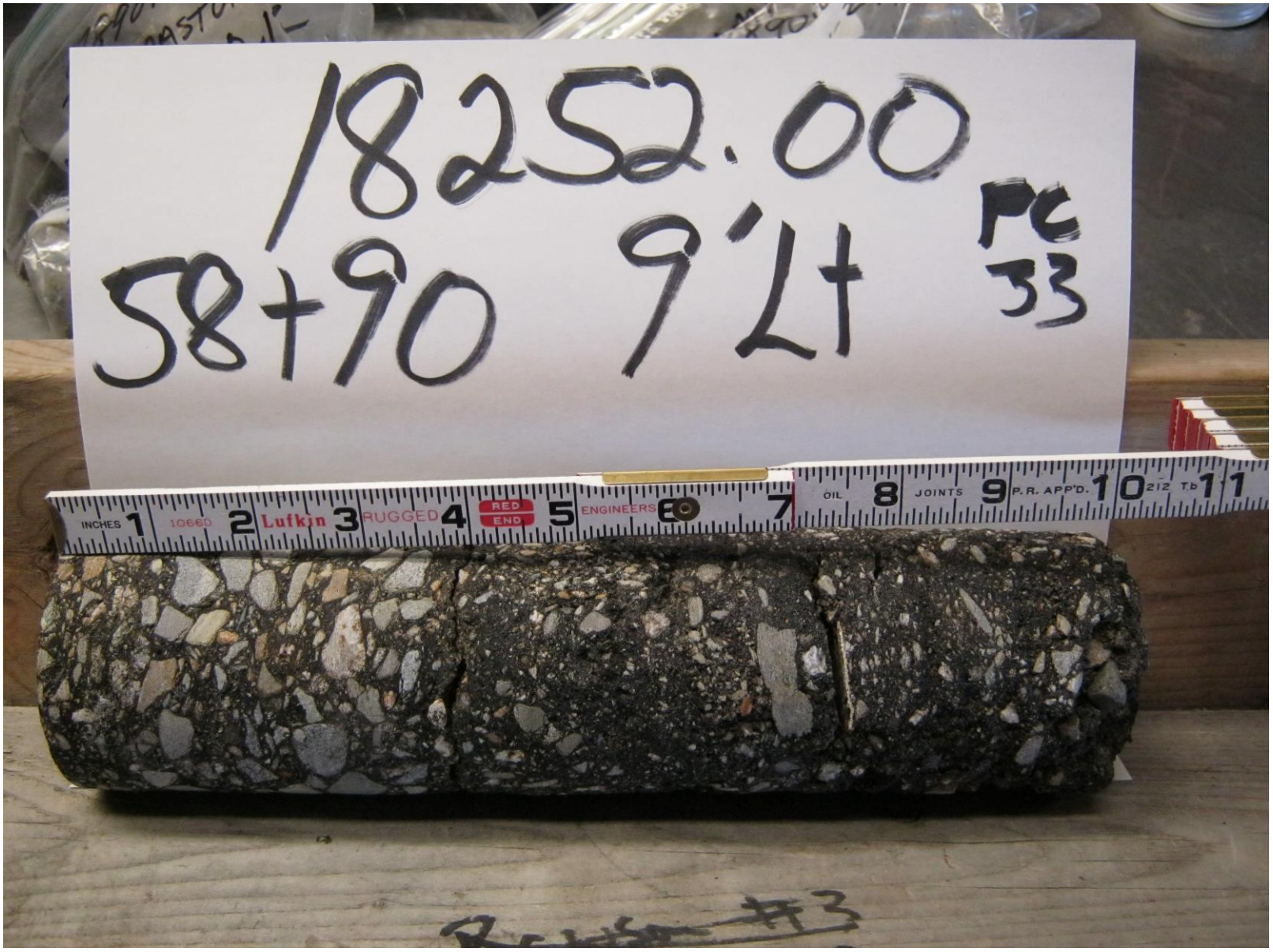
Estimated Pavement Depths at Transverse Locations

018252.00 - Penobscot,Orland,Castine

Station	Left Offset, ft					CL	Right Offset, ft					Comments
			9	3	1		3	9				
58+90			10.5	10.25			11.5	12.5				
156+07			12	12			11.25	12.25				
253+00			11	10.25			13					
360+42			9.5	5.5	5		6.5	9				

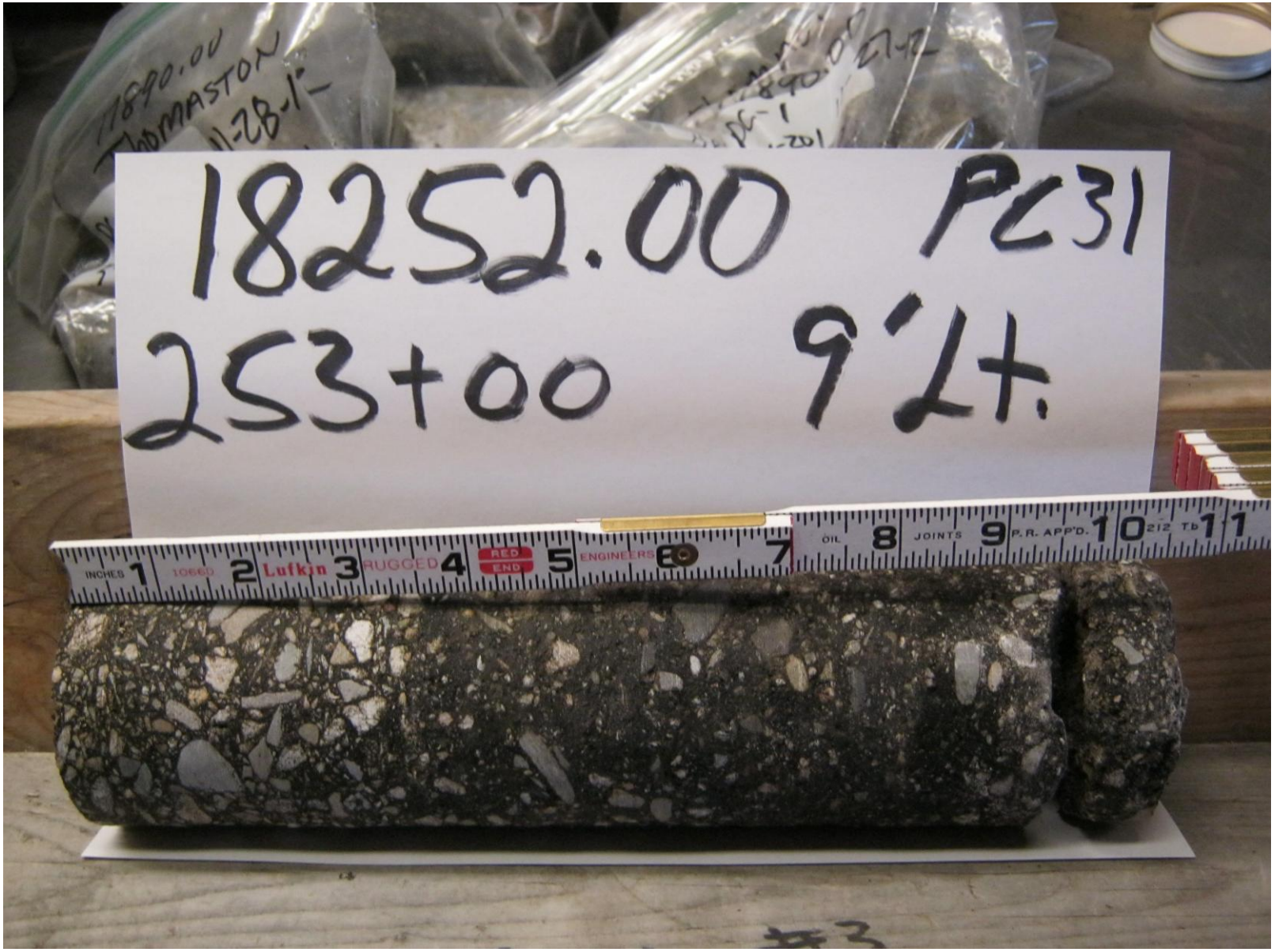
Highlighted areas indicate pavement cores were taken at this location.

GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine

GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine

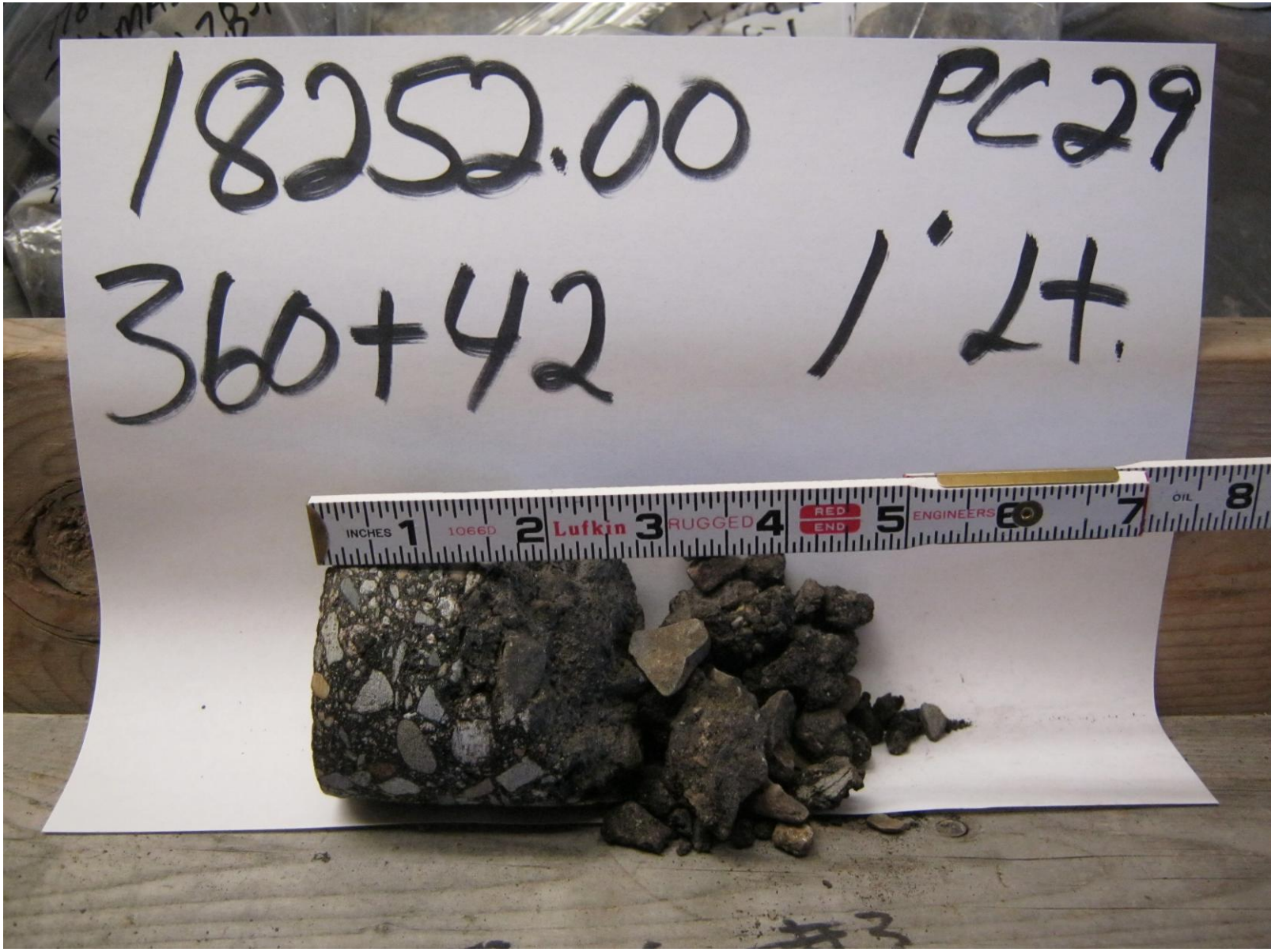


GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine

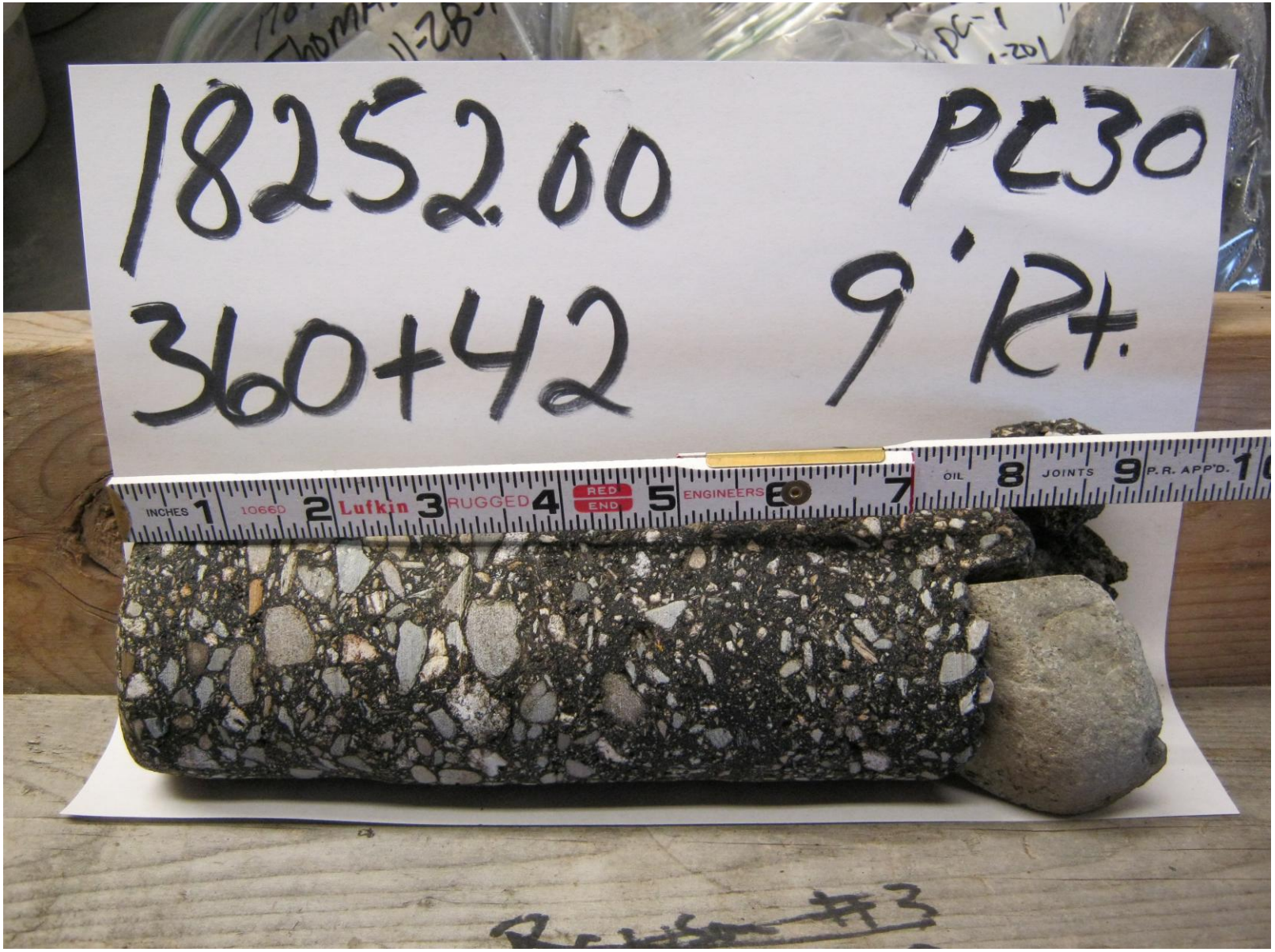
GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine



Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

Ground Penetrating Radar (GPR)

Estimated Pavement Thickness

018252.00 - Penobscot,Orland,Castine

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

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

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

Additional Comments
Segment 2, Route 175 (375+38 - 798+31)

Lane Tested	Analysis Distance, ft.	Overall Average Thickness, in.	Overall Minimum Thickness, in.	Overall Maximum Thickness, in.
MAINLINE	**100**	**6.6**	**3.8**	**11**

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
375+60	376+60	5.1	376+60	377+60	5.3	377+60	378+60	5.1	378+60	379+60	5.6
379+60	380+60	6.2	380+60	381+60	6.5	381+60	382+60	6.1	382+60	383+60	6.5
383+60	384+60	6.8	384+60	385+60	6.3	385+60	386+60	6.8	386+60	387+60	7.0
387+60	388+60	6.5	388+60	389+60	6.4	389+60	390+60	6.6	390+60	391+60	6.8
391+60	392+60	6.4	392+60	393+60	6.1	393+60	394+60	6.1	394+60	395+60	6.2
395+60	396+60	6.0	396+60	397+60	6.2	397+60	398+60	5.9	398+60	399+60	6.0
399+60	400+60	5.8	400+60	401+60	5.7	401+60	402+60	5.8	402+60	403+60	6.1
403+60	404+60	6.0	404+60	405+60	5.9	405+60	406+60	6.0	406+60	407+60	6.2
407+60	408+60	6.4	408+60	409+60	6.6	409+60	410+60	6.9	410+60	411+60	6.9
411+60	412+60	7.0	412+60	413+60	6.4	413+60	414+60	6.0	414+60	415+60	5.9
415+60	416+60	6.5	416+60	417+60	6.8	417+60	418+60	6.3	418+60	419+60	6.5
419+60	420+60	6.4	420+60	421+60	6.8	421+60	422+60	6.6	422+60	423+60	6.5
423+60	424+60	6.8	424+60	425+60	6.5	425+60	426+60	6.5	426+60	427+60	6.5
427+60	428+60	6.8	428+60	429+60	6.3	429+60	430+60	5.6	430+60	431+60	6.2
431+60	432+60	6.3	432+60	433+60	6.1	433+60	434+60	6.2	434+60	435+60	6.6

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
435+60	436+60	7.0	436+60	437+60	6.7	437+60	438+60	6.4	438+60	439+60	6.5
439+60	440+60	6.7	440+60	441+60	6.4	441+60	442+60	6.6	442+60	443+60	6.6
443+60	444+60	6.8	444+60	445+60	6.9	445+60	446+60	6.6	446+60	447+60	6.3
447+60	448+60	6.7	448+60	449+60	6.4	449+60	450+60	6.7	450+60	451+60	6.7
451+60	452+60	6.1	452+60	453+60	6.3	453+60	454+60	5.9	454+60	455+60	5.8
455+60	456+60	6.2	456+60	457+60	6.1	457+60	458+60	5.9	458+60	459+60	5.7
459+60	460+60	6.5	460+60	461+60	6.1	461+60	462+60	5.9	462+60	463+60	6.2
463+60	464+60	5.9	464+60	465+60	6.2	465+60	466+60	5.9	466+60	467+60	6.1
467+60	468+60	6.0	468+60	469+60	6.0	469+60	470+60	6.7	470+60	471+60	6.5
471+60	472+60	6.3	472+60	473+60	6.0	473+60	474+60	6.1	474+60	475+60	6.8
475+60	476+60	6.7	476+60	477+60	6.2	477+60	478+60	6.0	478+60	479+60	5.9
479+60	480+60	5.9	480+60	481+60	5.6	481+60	482+60	5.4	482+60	483+60	5.5
483+60	484+60	5.8	484+60	485+60	6.3	485+60	486+60	6.2	486+60	487+60	5.9
487+60	488+60	6.0	488+60	489+60	6.1	489+60	490+60	5.8	490+60	491+60	5.3
491+60	492+60	4.9	492+60	493+60	4.9	493+60	494+60	5.3	494+60	495+60	5.1
495+60	496+60	5.3	496+60	497+60	7.9	497+60	498+60	7.8	498+60	499+60	8.1
499+60	500+60	7.6	500+60	501+60	8.3	501+60	502+60	8.9	502+60	503+60	8.3
503+60	504+60	9.5	504+60	505+60	8.7	505+60	506+60	8.7	506+60	507+60	9.6
507+60	508+60	9.0	508+60	509+60	8.9	509+60	510+60	9.5	510+60	511+60	10.9
511+60	512+60	11.0	512+60	513+60	10.8	513+60	514+60	10.0	514+60	515+60	8.7
515+60	516+60	8.6	516+60	517+60	9.2	517+60	518+60	8.6	518+60	519+60	8.3
519+60	520+60	8.9	520+60	521+60	8.6	521+60	522+60	8.4	522+60	523+60	7.6
523+60	524+60	8.2	524+60	525+60	8.8	525+60	526+60	9.4	526+60	527+60	9.6
527+60	528+60	9.1	528+60	529+60	9.7	529+60	530+60	9.8	530+60	531+60	9.5
531+60	532+60	9.2	532+60	533+60	8.9	533+60	534+60	9.2	534+60	535+60	8.7
535+60	536+60	7.3	536+60	537+60	4.8	537+60	538+60	4.6	538+60	539+60	4.6
539+60	540+60	4.7	540+60	541+60	4.7	541+60	542+60	5.0	542+60	543+60	4.5
543+60	544+60	4.0	544+60	545+60	4.2	545+60	546+60	4.5	546+60	547+60	4.8
547+60	548+60	5.0	548+60	549+60	5.3	549+60	550+60	4.9	550+60	551+60	4.1
551+60	552+60	4.3	552+60	553+60	4.7	553+60	554+60	4.7	554+60	555+60	4.2
555+60	556+60	4.2	556+60	557+60	4.7	557+60	558+60	4.6	558+60	559+60	4.5
559+60	560+60	4.6	560+60	561+60	4.4	561+60	562+60	4.3	562+60	563+60	4.2
563+60	564+60	4.2	564+60	565+60	4.3	565+60	566+60	3.9	566+60	567+60	3.8
567+60	568+60	4.0	568+60	569+60	4.2	569+60	570+60	4.2	570+60	571+60	4.1
571+60	572+60	4.6	572+60	573+60	4.6	573+60	574+60	4.2	574+60	575+60	3.8
575+60	576+60	4.3	576+60	577+60	7.2	577+60	578+60	7.4	578+60	579+60	7.7
579+60	580+60	8.2	580+60	581+60	9.4	581+60	582+60	8.6	582+60	583+60	9.0
583+60	584+60	9.1	584+60	585+60	9.4	585+60	586+60	8.6	586+60	587+60	9.2
587+60	588+60	9.2	588+60	589+60	9.0	589+60	590+60	8.8	590+60	591+60	9.6
591+60	592+60	8.9	592+60	593+60	8.3	593+60	594+60	7.6	594+60	595+60	6.5
595+60	596+60	7.0	596+60	597+60	8.8	597+60	598+60	9.1	598+60	599+60	8.3
599+60	600+60	8.5	600+60	601+60	9.3	601+60	602+60	9.8	602+60	603+60	8.4
603+60	604+60	8.2	604+60	605+60	8.5	605+60	606+60	8.7	606+60	607+60	8.5
607+60	608+60	8.4	608+60	609+60	8.9	609+60	610+60	8.5	610+60	611+60	9.6

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
611+60	612+60	8.3	612+60	613+60	8.7	613+60	614+60	8.1	614+60	615+60	7.9
615+60	616+60	7.6	616+60	617+60	5.5	617+60	618+60	5.3	618+60	619+60	5.4
619+60	620+60	5.1	620+60	621+60	5.0	621+60	622+60	4.6	622+60	623+60	5.5
623+60	624+60	6.3	624+60	625+60	6.7	625+60	626+60	7.0	626+60	627+60	6.9
627+60	628+60	6.7	628+60	629+60	6.7	629+60	630+60	6.5	630+60	631+60	6.1
631+60	632+60	6.4	632+60	633+60	6.3	633+60	634+60	6.7	634+60	635+60	6.3
635+60	636+60	6.9	636+60	637+60	7.0	637+60	638+60	7.4	638+60	639+60	6.9
639+60	640+60	6.7	640+60	641+60	7.0	641+60	642+60	6.8	642+60	643+60	6.3
643+60	644+60	6.7	644+60	645+60	6.6	645+60	646+60	7.4	646+60	647+60	7.0
647+60	648+60	7.0	648+60	649+60	7.4	649+60	650+60	6.8	650+60	651+60	6.6
651+60	652+60	6.6	652+60	653+60	6.3	653+60	654+60	6.5	654+60	655+60	6.1
655+60	656+60	6.4	656+60	657+60	6.5	657+60	658+60	7.5	658+60	659+60	7.8
659+60	660+60	8.1	660+60	661+60	7.1	661+60	662+60	7.5	662+60	663+60	6.5
663+60	664+60	6.4	664+60	665+60	6.6	665+60	666+60	6.8	666+60	667+60	6.7
667+60	668+60	7.0	668+60	669+60	7.0	669+60	670+60	6.3	670+60	671+60	6.2
671+60	672+60	6.2	672+60	673+60	6.2	673+60	674+60	6.4	674+60	675+60	6.6
675+60	676+60	5.4	676+60	677+60	5.7	677+60	678+60	5.9	678+60	679+60	5.7
679+60	680+60	5.9	680+60	681+60	5.7	681+60	682+60	5.6	682+60	683+60	5.0
683+60	684+60	5.6	684+60	685+60	5.7	685+60	686+60	5.6	686+60	687+60	5.6
687+60	688+60	5.0	688+60	689+60	5.2	689+60	690+60	5.3	690+60	691+60	5.3
691+60	692+60	5.3	692+60	693+60	5.3	693+60	694+60	5.6	694+60	695+60	4.8
695+60	696+60	4.9	696+60	697+60	6.5	697+60	698+60	6.8	698+60	699+60	6.6
699+60	700+60	6.3	700+60	701+60	5.7	701+60	702+60	6.0	702+60	703+60	6.3
703+60	704+60	6.2	704+60	705+60	7.1	705+60	706+60	7.4	706+60	707+60	7.1
707+60	708+60	6.6	708+60	709+60	6.4	709+60	710+60	6.5	710+60	711+60	6.9
711+60	712+60	7.2	712+60	713+60	7.2	713+60	714+60	6.6	714+60	715+60	6.6
715+60	716+60	8.0	716+60	717+60	8.0	717+60	718+60	8.1	718+60	719+60	7.2
719+60	720+60	7.3	720+60	721+60	7.3	721+60	722+60	7.5	722+60	723+60	7.5
723+60	724+60	7.6	724+60	725+60	6.8	725+60	726+60	7.0	726+60	727+60	6.5
727+60	728+60	6.6	728+60	729+60	7.0	729+60	730+60	7.1	730+60	731+60	7.4
731+60	732+60	7.6	732+60	733+60	6.7	733+60	734+60	6.9	734+60	735+60	6.6
735+60	736+60	7.0	736+60	737+60	7.1	737+60	738+60	6.9	738+60	739+60	6.9
739+60	740+60	7.1	740+60	741+60	7.3	741+60	742+60	7.3	742+60	743+60	7.4
743+60	744+60	7.0	744+60	745+60	7.0	745+60	746+60	7.3	746+60	747+60	6.8
747+60	748+60	7.2	748+60	749+60	7.1	749+60	750+60	8.2	750+60	751+60	7.6
751+60	752+60	7.2	752+60	753+60	7.6	753+60	754+60	7.7	754+60	755+60	7.4
755+60	756+60	6.4	756+60	757+60	6.3	757+60	758+60	5.6	758+60	759+60	5.9
759+60	760+60	5.8	760+60	761+60	6.0	761+60	762+60	5.9	762+60	763+60	6.3
763+60	764+60	5.9	764+60	765+60	6.0	765+60	766+60	5.8	766+60	767+60	5.8
767+60	768+60	6.0	768+60	769+60	5.8	769+60	770+60	5.2	770+60	771+60	5.6
771+60	772+60	5.6	772+60	773+60	4.9	773+60	774+60	5.4	774+60	775+60	5.1
775+60	776+60	5.2	776+60	777+60	5.8	777+60	778+60	5.7	778+60	779+60	6.0
779+60	780+60	5.9	780+60	781+60	6.1	781+60	782+60	6.1	782+60	783+60	5.8
783+60	784+60	5.6	784+60	785+60	5.9	785+60	786+60	6.2	786+60	787+60	6.5

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

Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits, feet		Average Depth, in.	Station Limits		Average Depth, in.
787+60	788+60	6.8	788+60	789+60	6.8	789+60	790+60	6.5	790+60	791+60	6.8
791+60	792+60	7.2	792+60	793+60	7.0	793+60	794+60	6.6	794+60	795+60	6.3
795+60	796+59	7.1									

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

Ground Penetrating Radar (GPR)

Estimated Pavement Depths at Transverse Locations

018252.00 - Penobscot,Orland,Castine

Station	Left Offset, ft					CL	Right Offset, ft					Comments
			9	3	1		3	9				
400+50			3.5	7.25	7.5		6	10.5				
440+10			6	7	7.5		7.25	5				
479+91			5	5	6.5		7.25	3				
519+57			6.5	12.5	12		9.25	7.5				
559+42			4.5	4	5.5		3	5				
599+14			4.5	8.25	8.5		9.5	5				
638+90			7.5	6.75	7		6.25	5.5				
678+79			5	5	6.5		5	5				
718+91			7	8.25	10.5		6	6.5				

Highlighted areas indicate pavement cores were taken at this location.

GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine

GPR Pavement Cores

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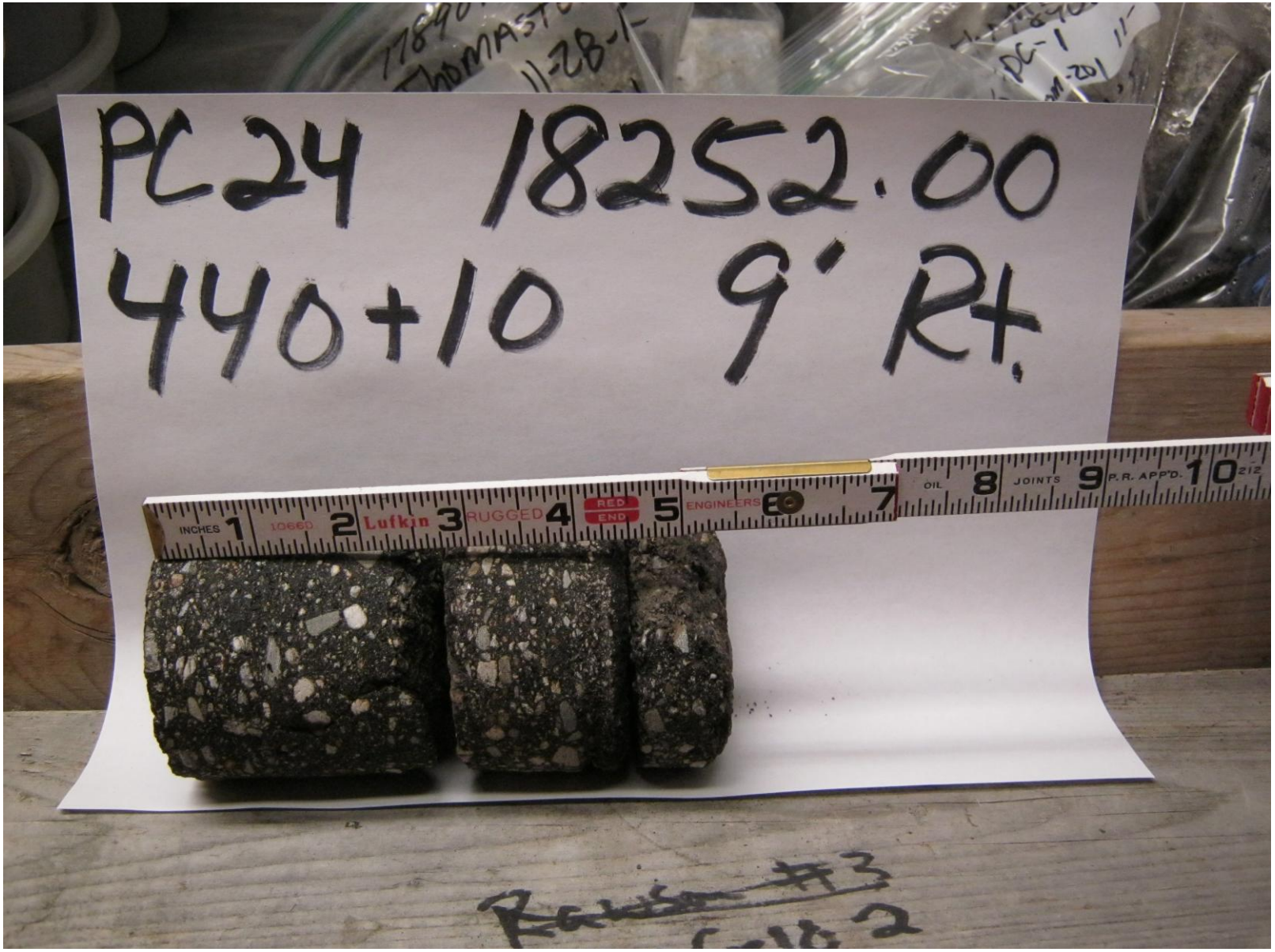
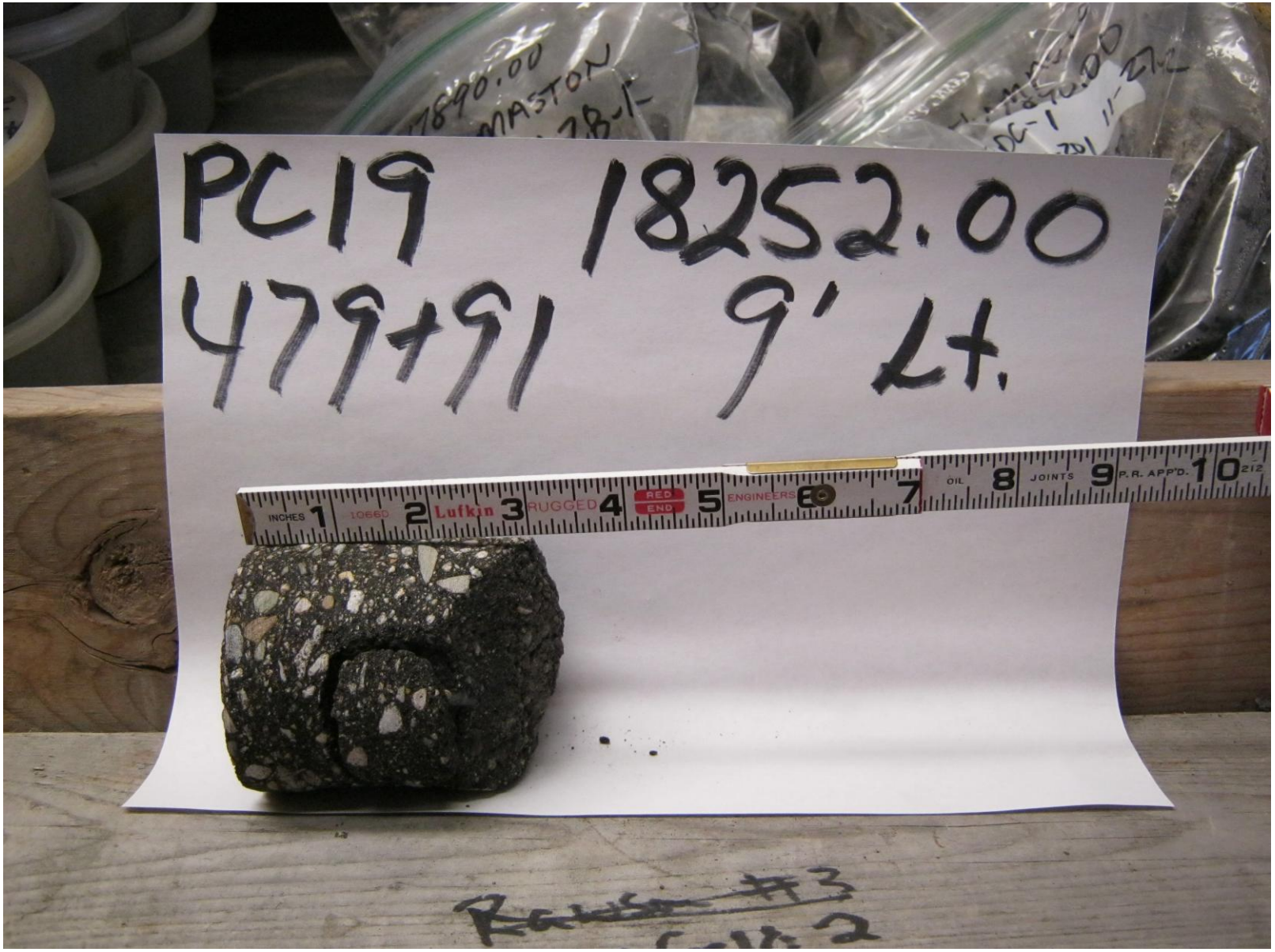
GPR Pavement Cores

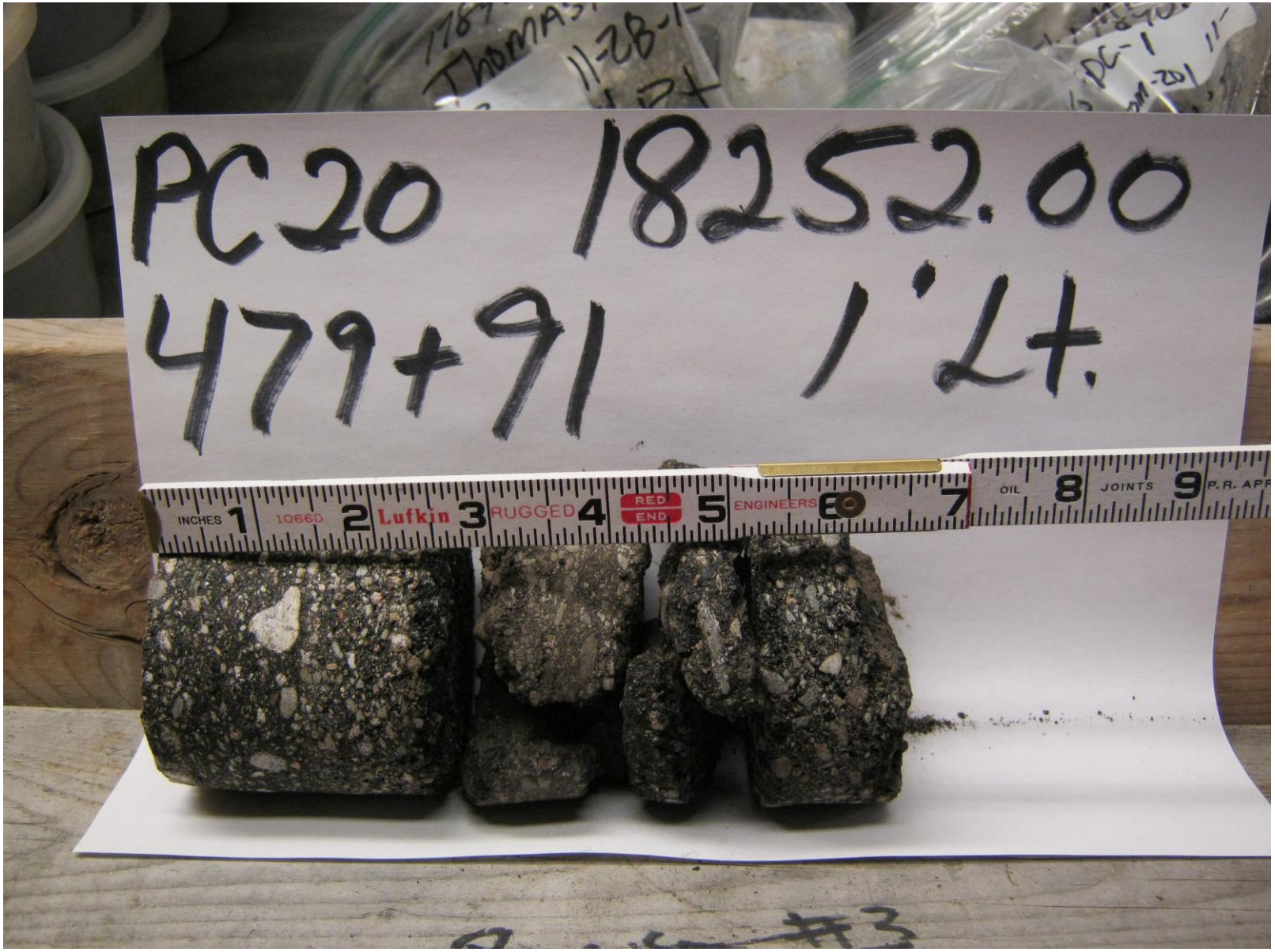
018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine

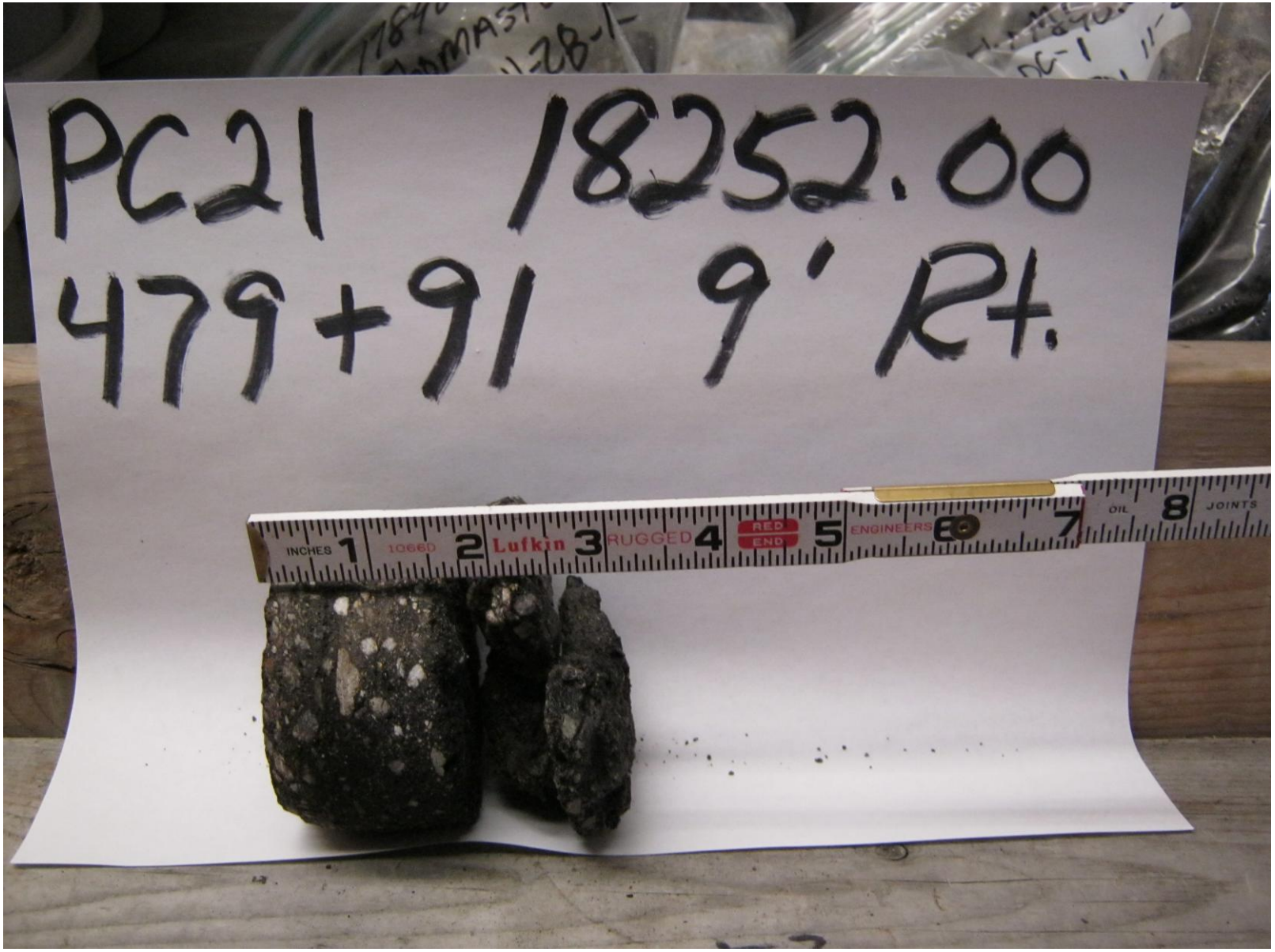


GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine



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018252.00 - Penobscot,Orland,Castine

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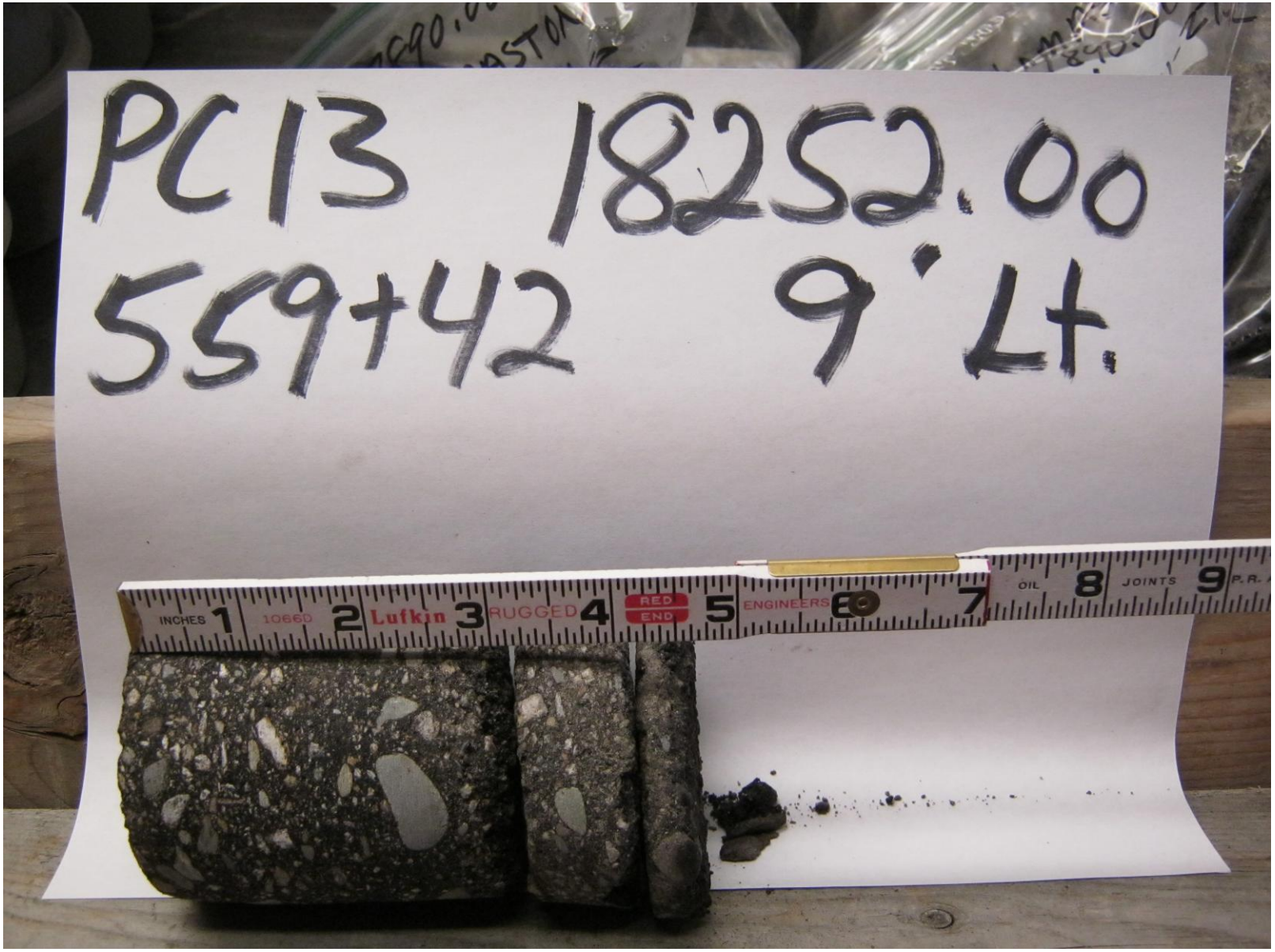
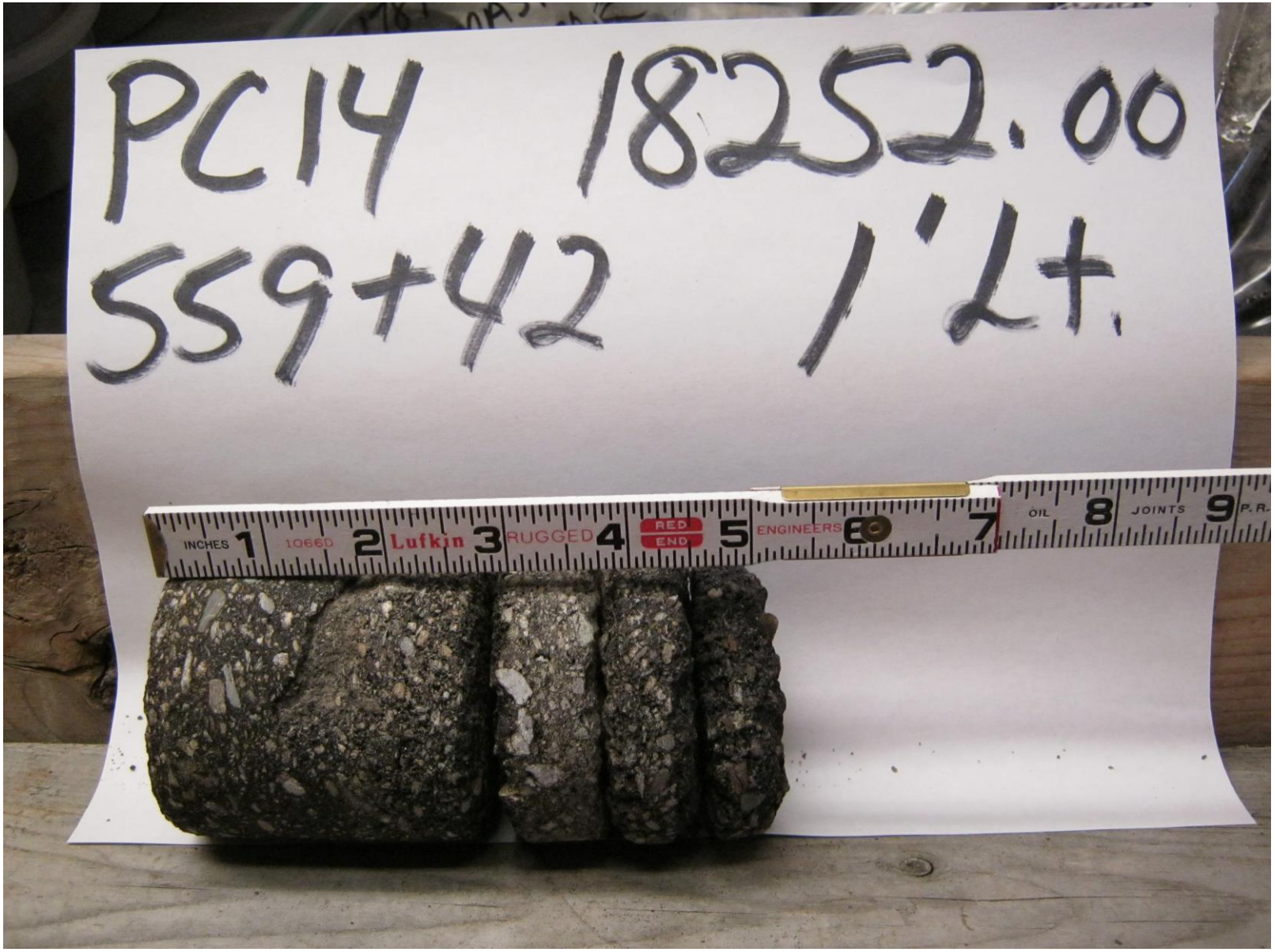
018252.00 - Penobscot,Orland,Castine

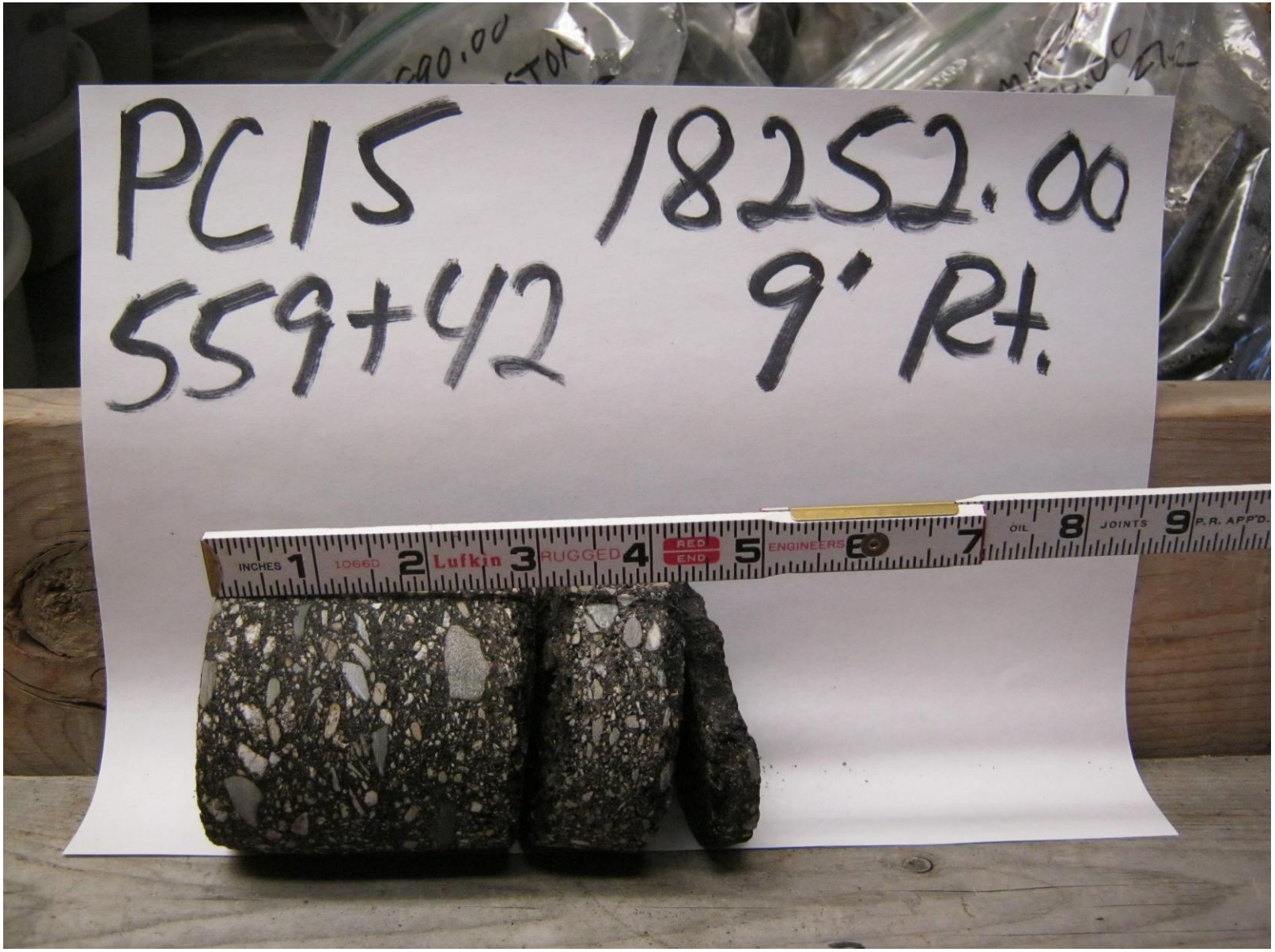


GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine



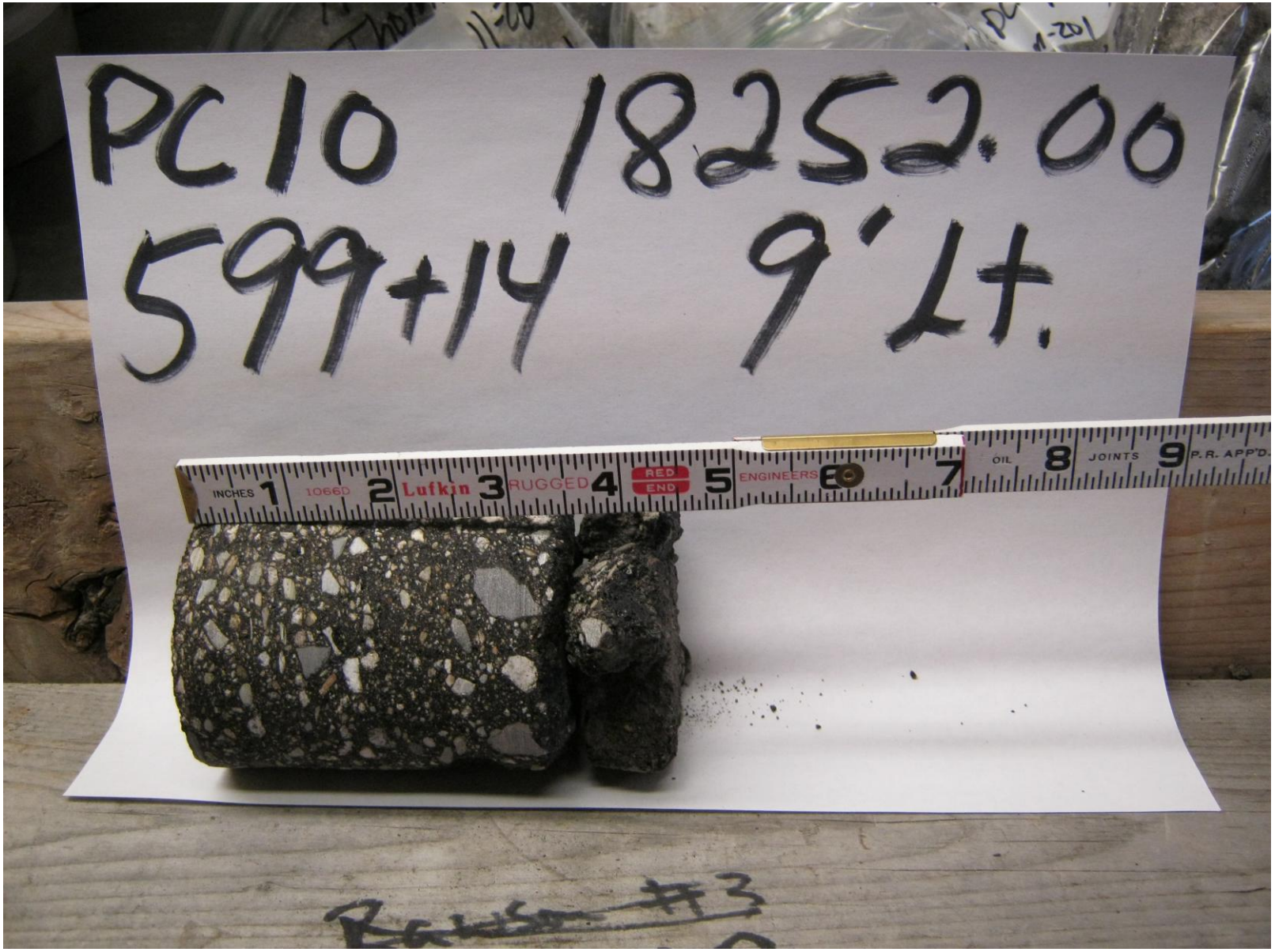
GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine

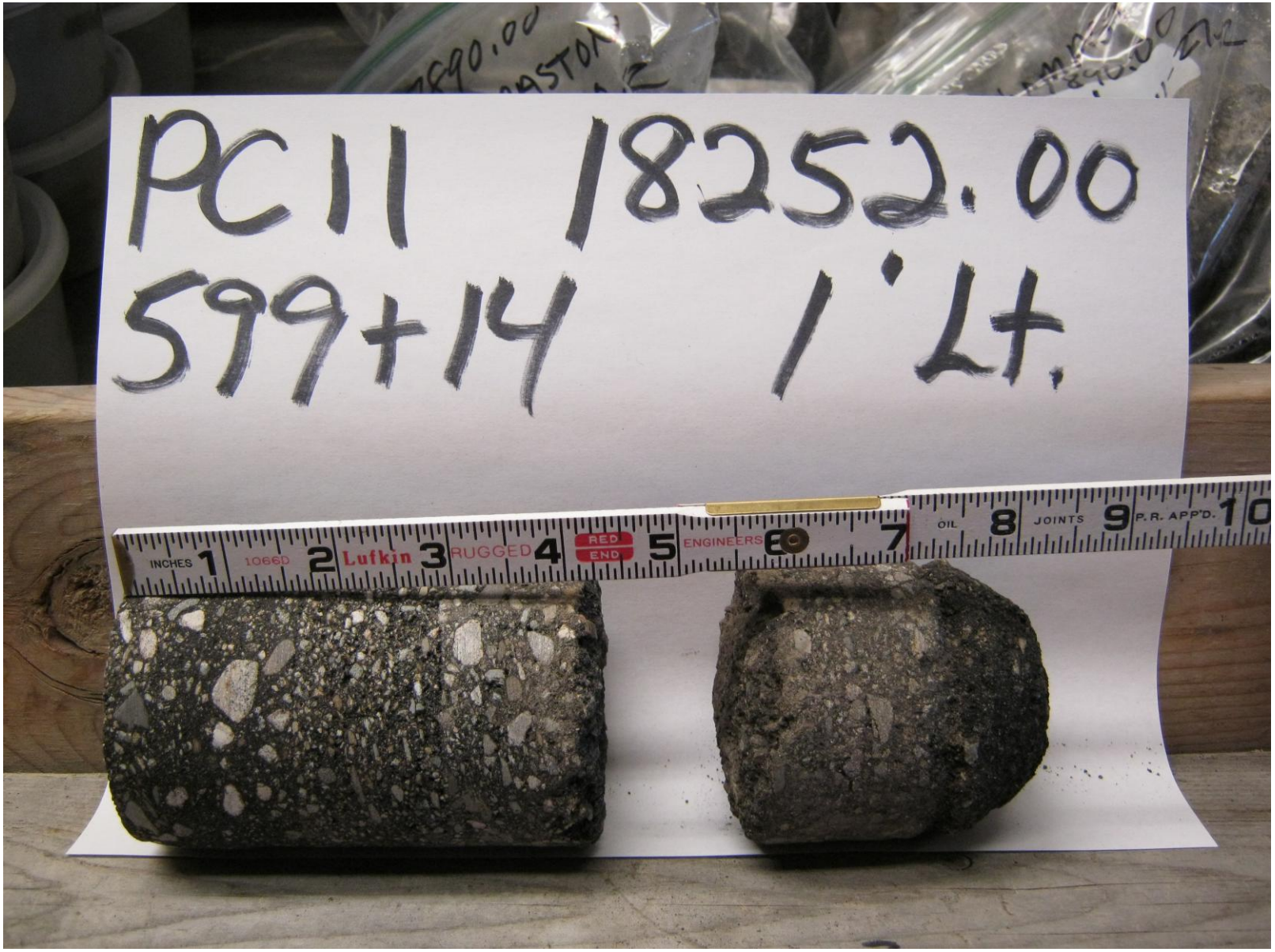


GPR Pavement Cores

018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine



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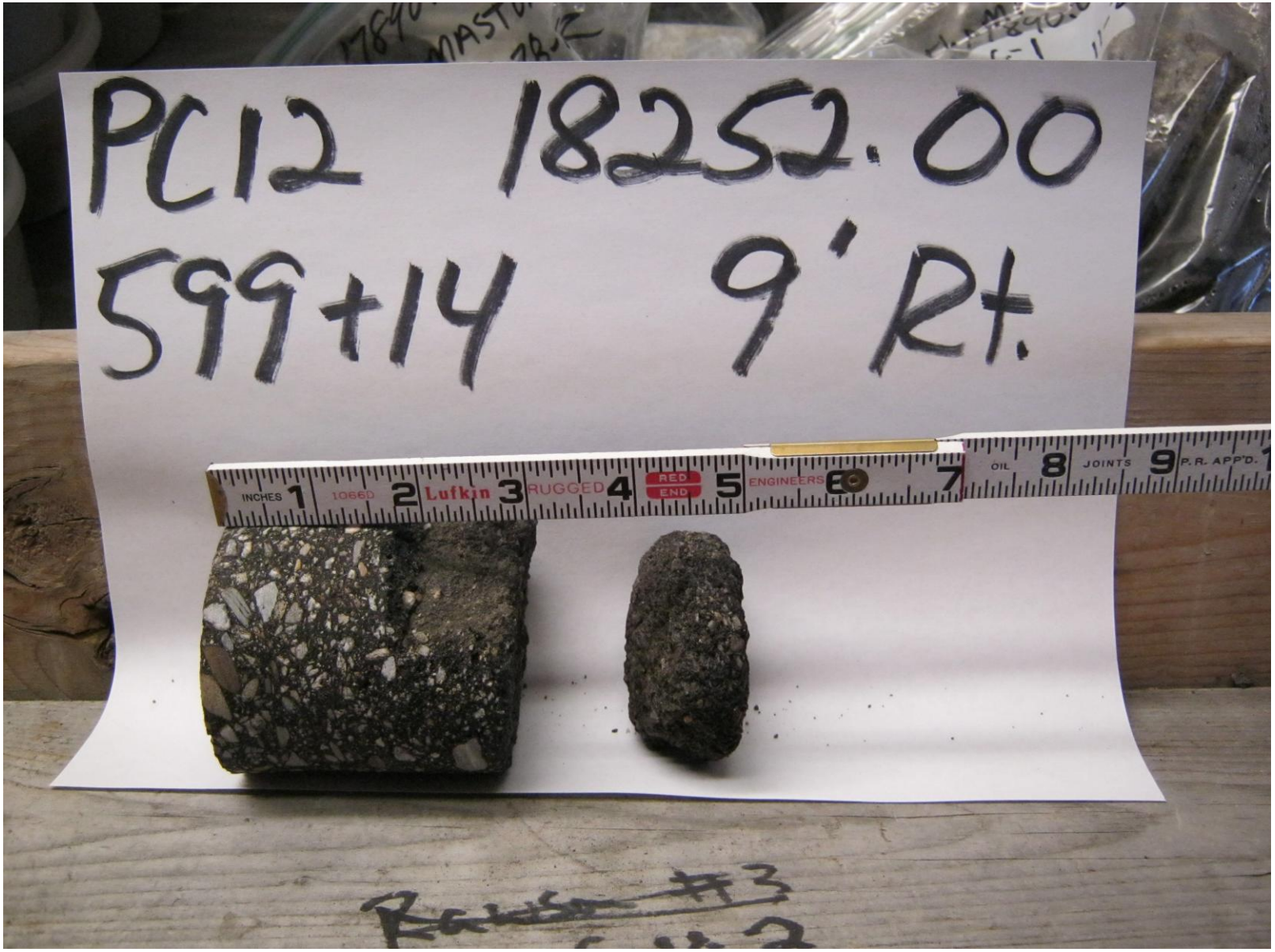

GPR Pavement Cores
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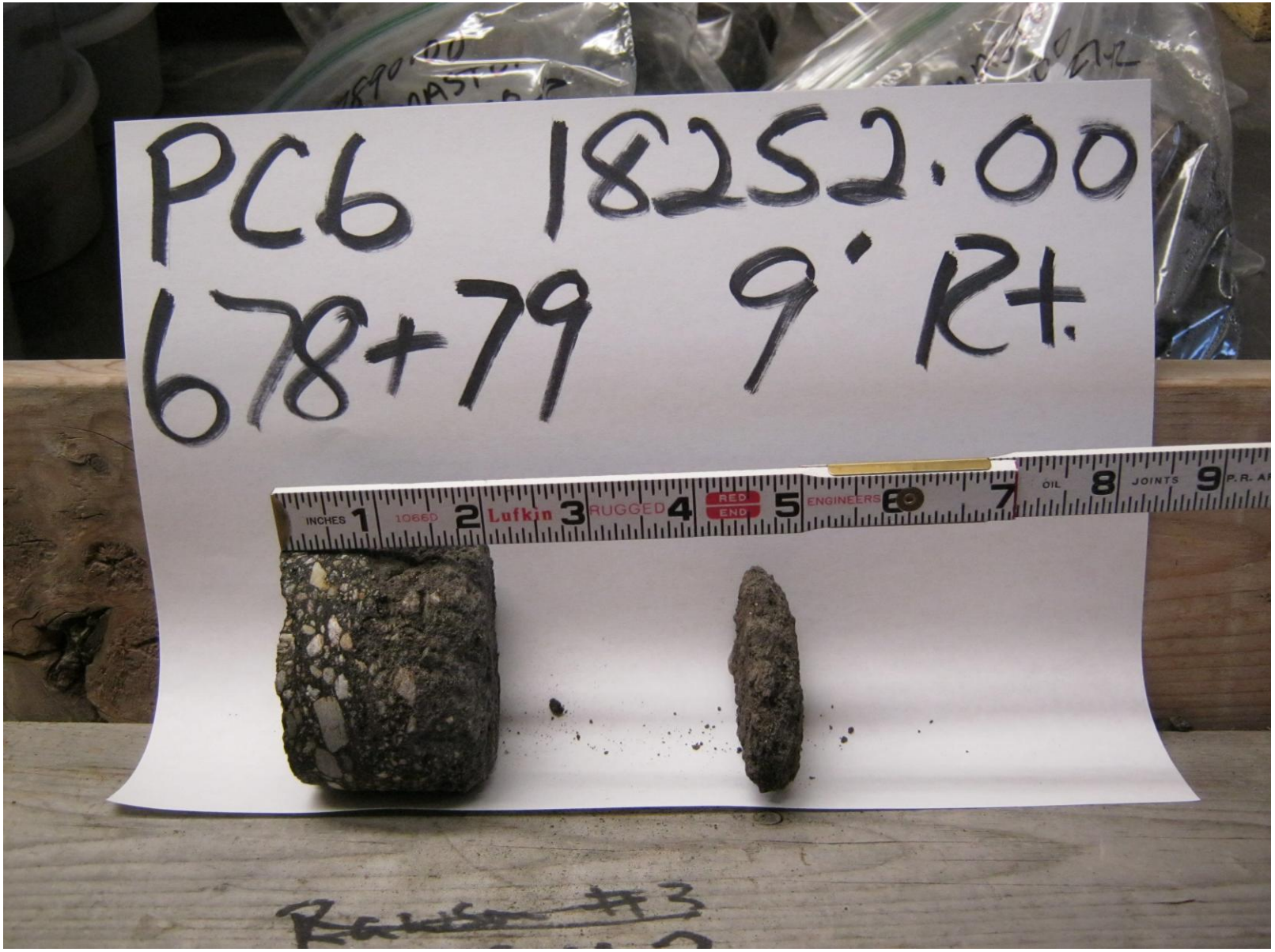
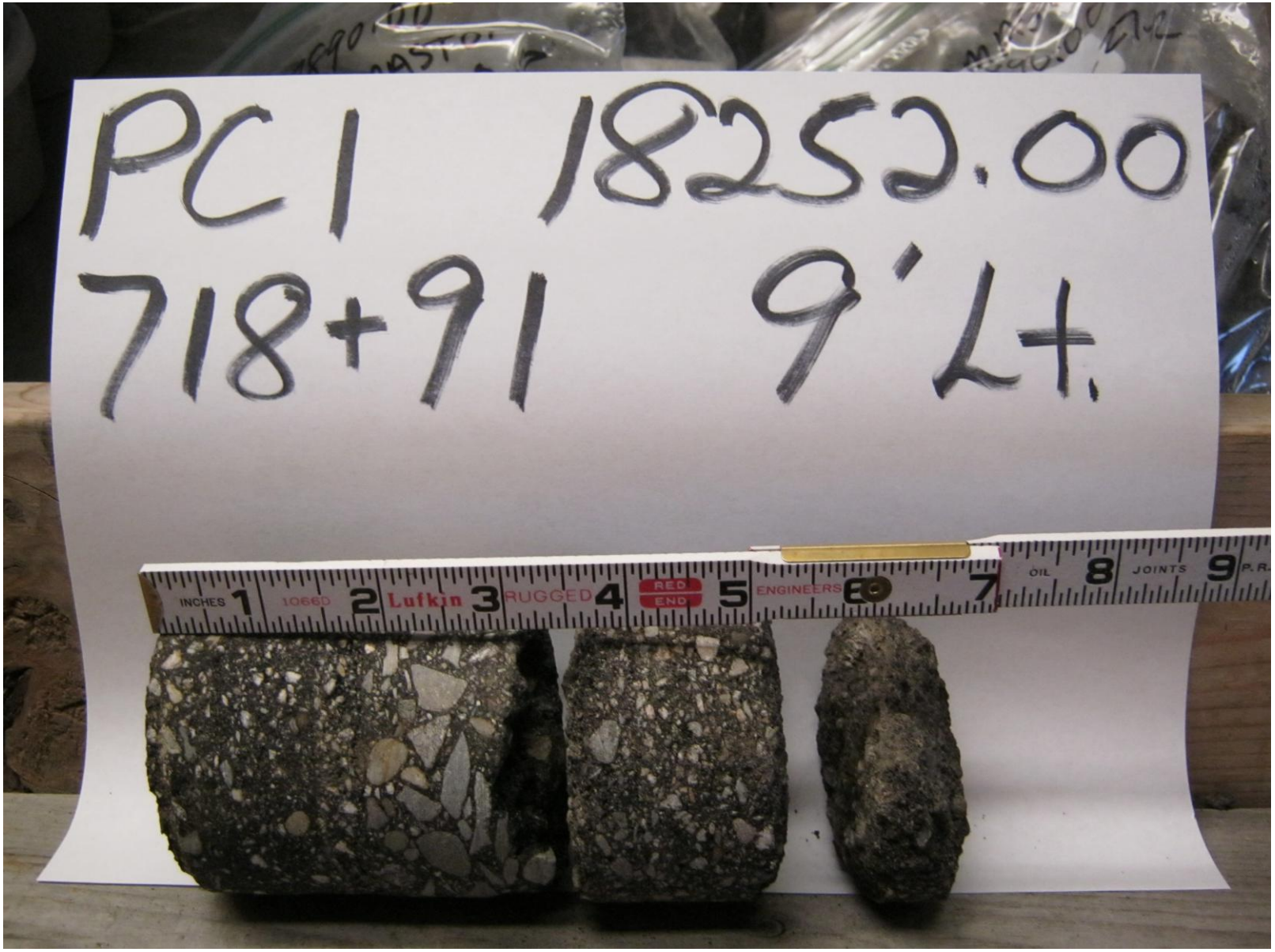


GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine



GPR Pavement Cores
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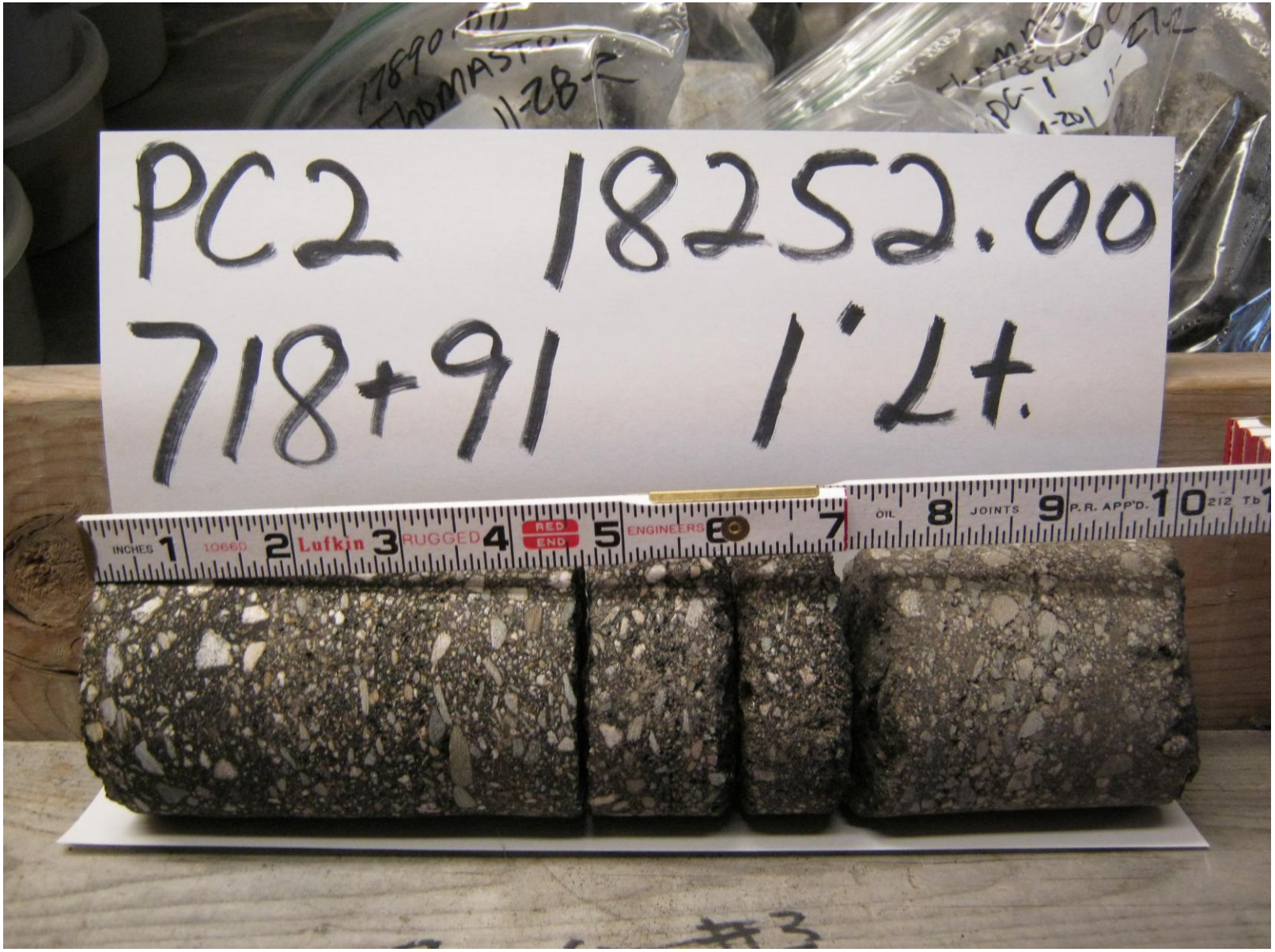


GPR Pavement Cores
018252.00 - Penobscot,Orland,Castine

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Penobscot-Orland Work Number: 18252.00

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-PEOR-101, S1	400+50	9.0 Lt.	0.5-2.1	266739	1	5.0	14.1		SM	A-1-b	II
HB-PEOR-101, S2	400+50	9.0 Lt.	2.1-5.0	266740	1	14.9	54.0		ML	A-4	IV
HB-PEOR-103, S3	440+10	8.0 Rt.	0.5-1.3	266741	1	6.3	19.7		SM	A-1-b	II
HB-PEOR-103, S4	440+10	8.0 Rt.	1.3-2.9	266742	1	12.9	38.5		SM	A-4	III
HB-PEOR-103, S5	440+10	8.0 Rt.	2.9-5.0	266743	1	13.8	53.9		ML	A-4	IV
HB-PEOR-104, S6	440+10	15.0 Rt.	0.0-1.0	266744	1	11.0	8.0		SW-SM	A-1-b	0
HB-PEOR-105, S7	479+91	14.0 Rt.	0.0-5.0	266745	2	4.8	19.5		SM	A-1-b	II
HB-PEOR-106, S8	519+57	16.0 Rt.	0.0-3.5	266746	2	6.7	8.4		SW-SM	A-1-b	0
HB-PEOR-107, S9	559+42	7.0 Rt.	2.3-5.0	266747	2	27.7	89.1		ML	A-4	IV
HB-PEOR-108, S10	559+42	14.0 Rt.	0.0-0.6	266748	2	5.6	13.3		SM	A-1-b	II
HB-PEOR-109, S11	599+14	7.5 Rt.	0.42-2.0	266749	2	3.4	15.3		GW-GM	A-1-a	0
HB-PEOR-109, S12	599+14	7.5 Rt.	2.0-5.0	266750	2	33.3	94.1		CL	A-6	IV
HB-PEOR-112, S13	678+79	15.0 Rt.	0.0-3.2	267026	3	5.6	16.8		SM	A-1-b	II
HB-PEOR-113, S14	718+90	7.0 Lt.	0.5-1.7	267027	3	6.8	16.6		SM	A-1-b	II
HB-PEOR-113, S15	718+90	7.0 Lt.	1.7-5.0	267028	3	15.9	58.6		ML	A-4	IV
HB-PEOR-114, S16	718+90	13.0 Lt.	0.0-1.7	267029	3	6.1	11.8		SW-SM	A-1-b	0
							L.L.	P.I.			
HB-PEOR-107, S9	559+42	7.0 Rt.	2.3-5.0	266747	2	27.7	32	8	ML	A-4	IV
HB-PEOR-109, S12	599+14	7.5 Rt.	2.0-5.0	266750	2	33.3	33	11	CL	A-6	IV

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

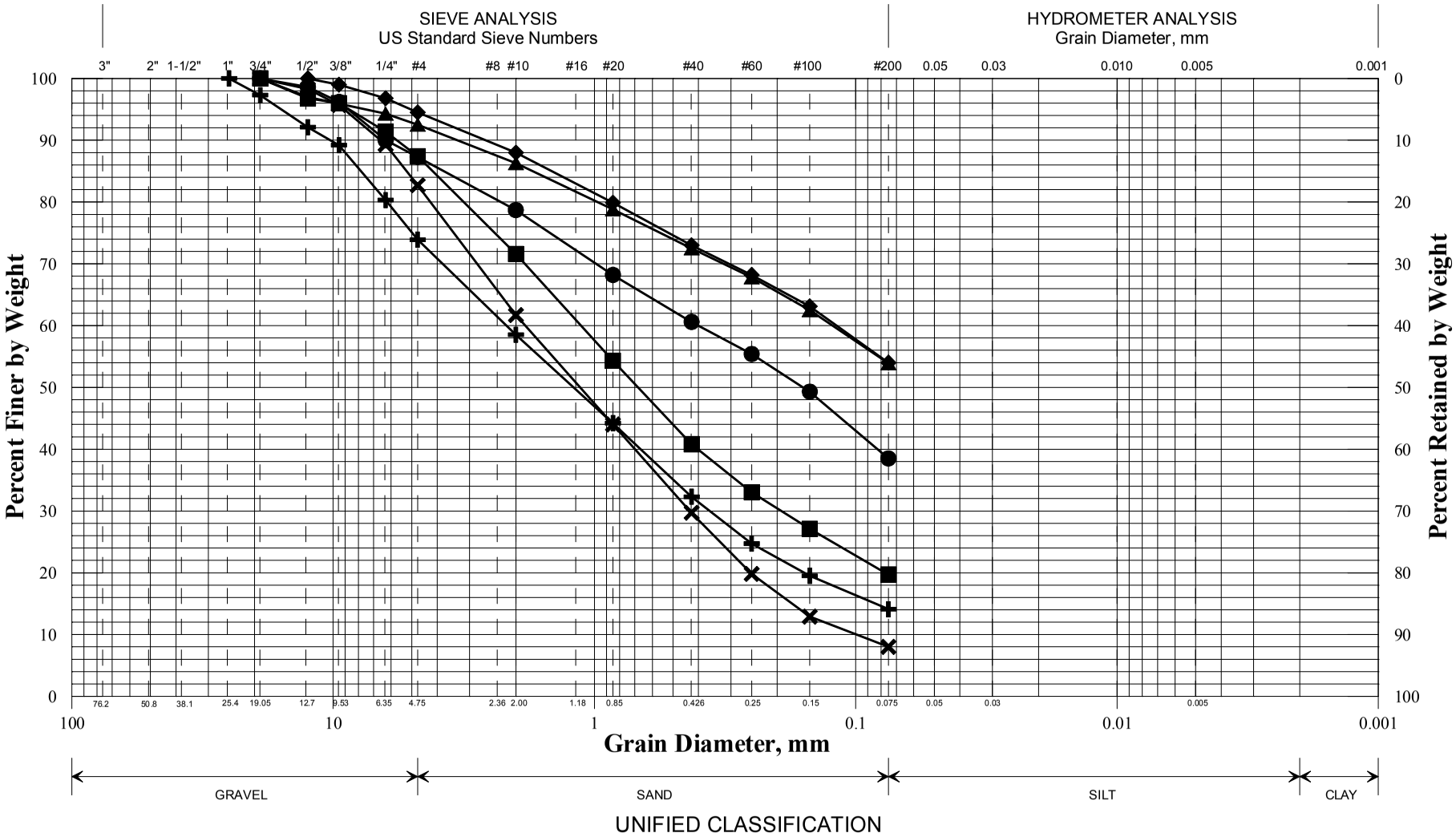
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

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

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

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-PEOR-101/S1	400+50	9.0 LT	0.5-2.1	SAND, some gravel, little silt.	5.0			
◆	HB-PEOR-101/S2	400+50	9.0 LT	2.1-5.0	Sandy SILT, trace gravel.	14.9			
■	HB-PEOR-103/S3	440+10	8.0 RT	0.5-1.3	SAND, little silt, little gravel.	6.3			
●	HB-PEOR-103/S4	440+10	8.0 RT	1.3-2.9	Silty SAND, little gravel.	12.9			
▲	HB-PEOR-103/S5	440+10	8.0 RT	2.9-5.0	Sandy SILT, trace gravel.	13.8			
✕	HB-PEOR-104/S6	440+10	15.0 RT	0.0-1.0	SAND, some gravel, trace silt.	11.0			

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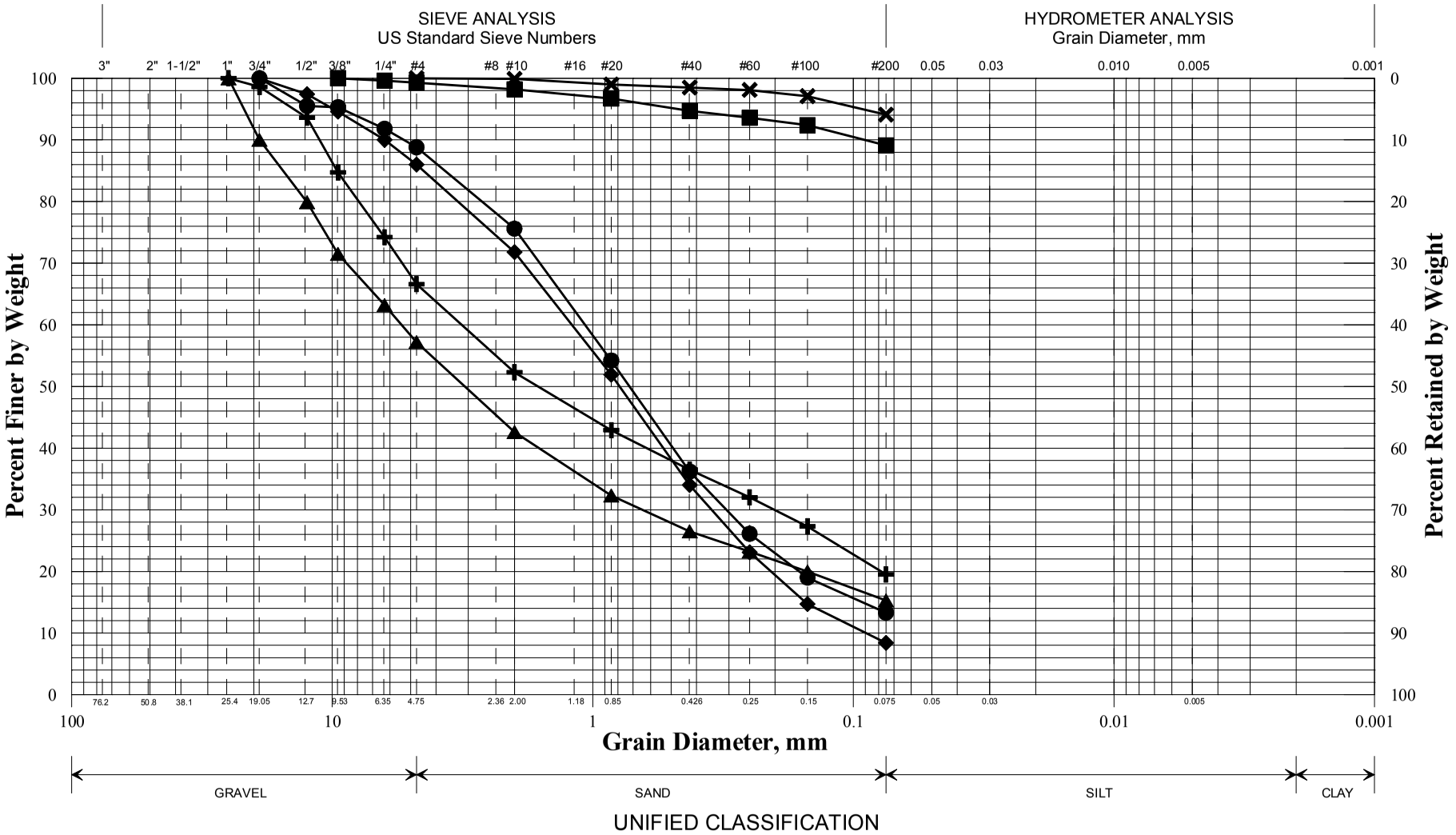
Reported by/Date
WHITE, TERRY A 12/6/2012

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-PEOR-105/S7	479+91	14.0 RT	0.0-5.0	SAND, some gravel, little silt.	4.8			
◆	HB-PEOR-106/S8	519+57	16.0 RT	0.0-3.5	SAND, little gravel, trace silt.	6.7			
■	HB-PEOR-107/S9	559+42	7.0 RT	2.3-5.0	SILT, little sand, trace gravel.	27.7	32	24	8
●	HB-PEOR-108/S10	559+42	14.0 RT	0.0-0.6	SAND, little silt, little gravel.	5.6			
▲	HB-PEOR-109/S11	599+14	7.5 RT	0.42-2.0	Sandy GRAVEL, little silt.	3.4			
✕	HB-PEOR-109/S12	599+14	7.5 RT	2.0-5.0	SILT, trace sand.	33.3	33	22	11

WIN
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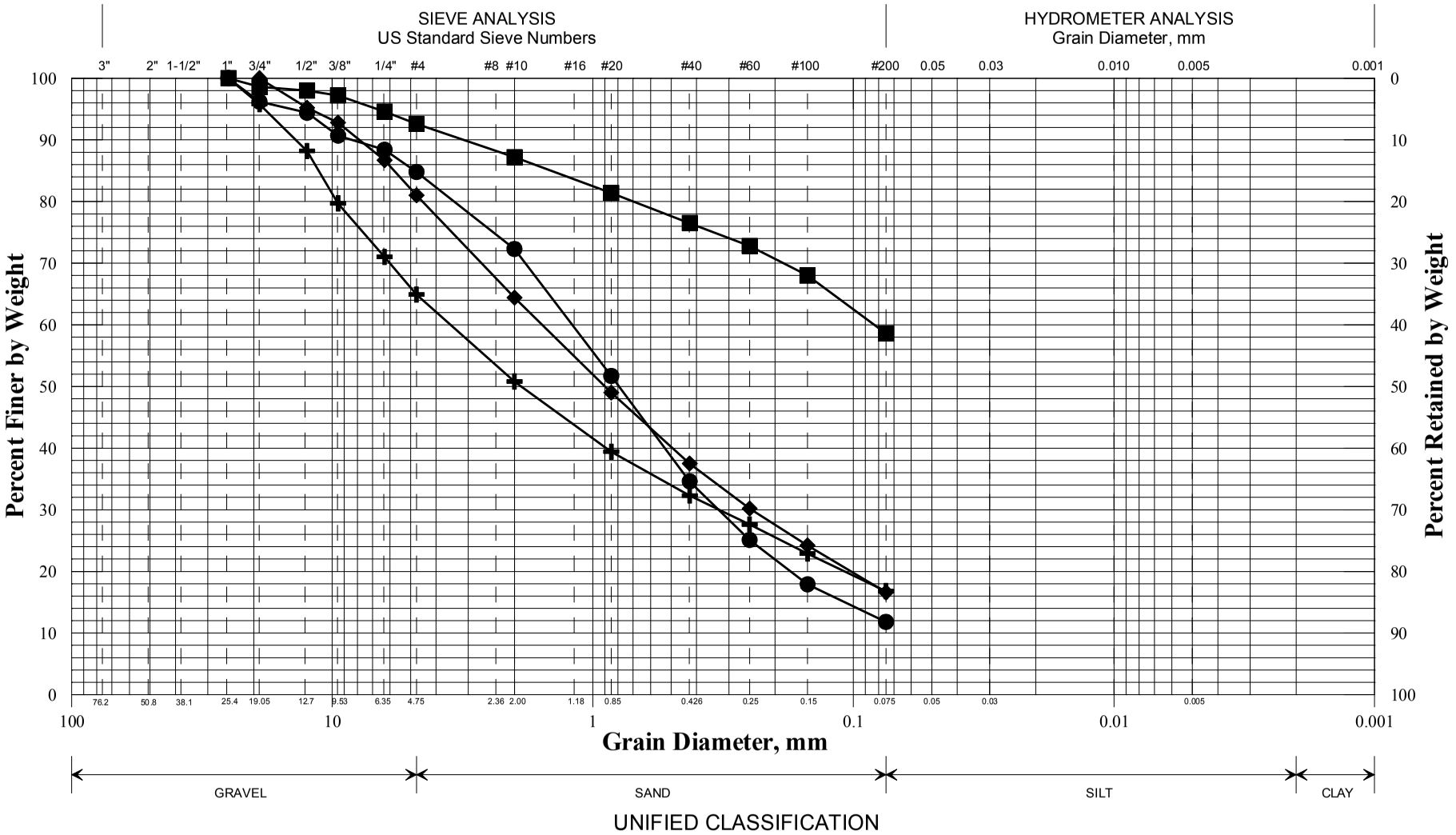
Town
Penobscot,Orland,Castine
Reported by/Date
WHITE, TERRY A 12/6/2012

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-PEOR-112/S13	678+79	15.0 RT	0.0-3.2	SAND, some gravel, little silt.	5.6			
◆	HB-PEOR-113/S14	718+90	7.0 LT	0.5-1.7	SAND, little gravel, little silt.	6.8			
■	HB-PEOR-113/S15	718+90	7.0 LT	1.7-5.0	SILT, some sand, trace gravel.	15.9			
●	HB-PEOR-114/S16	718+90	13.0 LT	0.0-1.7	SAND, little gravel, little silt.	6.1			
▲									
✕									

WIN
018252.00
Town
Penobscot,Orland,Castine
Reported by/Date
WHITE, TERRY A 12/6/2012

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-101
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	400+50, 9.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S1		0.50 - 2.10			SSA	-0.42		5" PAVEMENT. 0.42	G#266739 A-1-b, SM WC=5.0%
							-0.50		1" Unbound Pavement. 0.50	
	S2		2.10 - 5.00				-2.10		Brown, moist, fine to coarse SAND, some gravel, trace silt, occasional cobbles. 2.10	G#266740 A-4, ML WC=14.9%
									Light brown, moist, silty, fine to medium SAND, trace gravel.	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-102
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	400+50, 15.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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, moist, fine to coarse SAND, some gravel, trace silt, occasional cobbles. ≅S1	
							-1.90		1.90 — Light brown, moist, silty, fine to medium SAND, trace gravel. ≅S2	
5							-5.00		5.00 — **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Boring No.: HB-PEOR-102

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-103
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	440+10, 8.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	3.9 ft bgs.

Definitions:
D = Split Spoon Sample
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
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	S3		0.50 - 1.30			SSA	-0.38		4½" PAVEMENT. (0.38)	
							-0.50		1½" Unbound Pavement. (0.50)	G#266741 A-1-b, SM WC=6.3%
	S4		1.30 - 2.90				-1.30		Brown, damp, fine to coarse SAND, some gravel, little silt. From 1.0-1.2 ft bgs, dark brown layer. (1.30)	G#266742 A-4, SM WC=12.9%
	S5		2.90 - 5.00				-2.90		Grey, moist, silty, fine to coarse SAND, trace gravel. (2.90)	G#266743 A-4, ML WC=13.8%
									Light brown, moist, silty, fine to medium SAND.	
5							-5.00		(5.00)	
10										
15										
20										
25										

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

Remarks:

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

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

Boring No.: HB-PEOR-103

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-104
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	440+10, 15.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S6		0.00 - 1.00			SSA	-1.00		Brown, wet, fine to coarse SAND, some gravel, trace silt.	G#266744 A-1-b, SW-SM WC=11.0%
									1.00 Light brown, moist, silty, fine to medium SAND. ≅S5	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-105
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	479+91, 14.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S7		0.00 - 5.00			SSA			Brown, damp, gravelly, fine to coarse SAND.	G#266745 A-1-b, SM WC=4.8%
							-2.50		2.50 Cobble from 2.5-3.1 ft bgs, occasional cobbles there after.	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

Surface boulder in area.

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-PEOR-105

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-106
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	519+57, 16.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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		0.00 - 3.50			SSA			Brown, damp, gravelly, fine to coarse SAND, trace silt, occasional cobbles.	G#266746 A-1-b, SW-SM WC=6.7%
							-3.50		3.50 Light brown, moist, silty, fine to medium SAND. ≅S5	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-107
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	559+42, 7.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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						SSA	-0.42	5" PAVEMENT.	
								0.42 — Brown, damp, gravelly, fine to coarse SAND, trace silt, occasional cobbles. ≅S8	
	S9		2.30 - 5.00				-2.30	2.30 — Olive brown, moist, fine sandy SILT, little clay.	G#266747 A-4, ML WC=27.7% LL=32 PL=24 PI=8
5							-5.00	5.00 — **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10									
15									
20									
25									

Remarks:

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

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

Boring No.: HB-PEOR-107

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-108
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	559+42, 14.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S10		0.00 - 0.60			SSA	-0.60		Brown, moist, fine to coarse SAND, some gravel, trace silt. 0.60	G#266748 A-1-b, SM WC=5.6%
									Olive brown, moist, fine sandy SILT, little clay. ≅S9	
5							-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-109
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	599+14, 7.5 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S11		0.42 - 2.00			SSA	-0.42		5" PAVEMENT.	
									0.42 Brown, moist, gravelly, fine to coarse SAND.	G#266749 A-1-a, GW-GM WC=3.4%
	S12		2.00 - 5.00				-2.00		2.00 Olive wet, clayey-SILT.	G#266750 A-6, CL WC=33.3% LL=33 PL=22 PI=11
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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Boring No.: HB-PEOR-109

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-110
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	599+50, 14.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	-0.58		Brown, moist, gravelly, fine to coarse SAND. ≅S11 — 0.58	
									Olive wet, clayey-SILT. ≅S12	
5							-5.00		**Bottom of Exploration at 5.00 feet below ground surface.** — 5.00	
									NO REFUSAL	
10										
15										
20										
25										

Remarks:

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 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-111
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	638+00, 15.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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		Brown, moist, gravelly, fine to coarse SAND. ≅S11	
									0.50 Olive brown, moist, fine sandy SILT, little clay. ≅S9	
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 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-112
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	678+79, 15.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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		0.00 - 3.20			SSA			Brown, moist, gravelly, fine to coarse SAND, trace silt.	G#267026 A-1-b, SM WC=5.6%
							-3.20		3.20 — Olive brown, moist, fine sandy SILT, little clay. ≅S9	
5							-5.00		5.00 — **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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Boring No.: HB-PEOR-112

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-113
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	718+90, 7.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S14		0.50 - 1.70			SSA	-0.50		6" PAVEMENT. 0.50	
	S15		1.70 - 5.00				-1.70		Dark brown, damp, fine to coarse SAND, some gravel, little silt. 1.70	G#267027 A-1-b, SM WC=6.8%
									Brown, moist, silty, fine to coarse SAND, trace gravel.	G#267028 A-4, ML WC=15.9%
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

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Boring No.: HB-PEOR-113

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 175
Location: Penobscot-Orland, Maine

Boring No.: HB-PEOR-114
WIN: 18252.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/26/12-11/26/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	718+90, 13.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
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
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	S16		0.00 - 1.70			SSA			Dark brown, fine to coarse SAND, some gravel, trace silt.	G#267029 A-1-b, SW-SM WC=6.1%
							-1.60		1.60 Brown, moist, silty, fine to coarse SAND, trace gravel. ≅S15	
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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