STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION RESEARCH DIVISION
BUREAU OF PLANNING

DATE: FEBRUARY 2001

EXPERIMENTAL CONSTRUCTION 98-3

POTENTIAL BENEFITS OF ADDING EMULSION TO RECLAIMED BASE MATERIAL

Interim Report - Third Year

INTRODUCTION

Rehabilitation of deteriorated asphalt pavements has become one of the primary tools utilized by the Maine Department of Transportation (MDOT). One method used to achieve this task is the use of pavement reclaiming.

In an effort to improve the benefits of reclaiming, a study was undertaken to compare the properties of reclaimed material treated with emulsified asphalt, to material without this emulsion treatment.

PROJECT LOCATION/DESCRIPTION

Two projects were originally selected for construction in 1997 as part of this study, STP-6666(00)X in Winslow-Benton, and STP-7697(00)X in Passadumkeag-Lincoln. Problems encountered during the construction process necessitated the exclusion of the Winslow-Benton project. The Passadumkeag-Lincoln project is located on Route #2 and begins 0.42 km northerly of Beaver Brook Bridge #2059 in Passadumkeag and extends 20.4 km to the Access Road in Lincoln (see attached location map).

The original experimental feature for this project included three sections; the experimental section from station 1+900 to station 2+900 and two control sections from station 1+400 to 1+900 and station 2+900 to 3+400 respectively. The experimental sections consisted of full depth reclamation of the existing pavement and introducing an MS-2 emulsified asphalt at a rate of 6.0 liters per square meter. Treatment of the two control sections included full depth reclamation of the existing pavement with no emulsified asphalt added. Existing pavement

depths throughout the experimental and control sections varied from 150mm to 300 mm. As is common practice with MDOT's pavement reclamation projects, 25 mm of existing gravel base was also reclaimed. Each section was overlaid with 40 mm of Superpave 19.0 and 35 mm of Superpave 12.5.

CONSTRUCTION PROCEDURE

Reclaiming was performed using a CMI reclaimer. The MS-2 emulsified asphalt was incorporated into the reclaimed material by pumping the liquid directly from a tank truck to the reclaimer's spraybar.

A first pass was completed with the reclaimer to pulverize the existing pavement. A second pass was then made to add and mix the emulsion with the reclaimed base material. This material was then compacted using a Caterpillar vibratory roller. Density measurements were taken using a Troxler 3430 nuclear moisture-density gauge.

During the placement of the emulsified asphalt between stations 1+900 and 2+400, the contractor experienced problems with the emulsion metering system that caused an excess of emulsified asphalt to be added to the reclaimed base material. The amount added to the first 2.4-meter pass was sufficient to cover the entire 7.3 meter roadway width. To correct this, the contractor used a grader to blend the material containing excess emulsion into the remaining roadway width. MDOT personnel monitoring the operation were comfortable that this provided adequate distribution of the emulsion throughout the width of the pavement base.

Construction of the section from station 2+400 to 2+900 went as planned. The spraybar delivered the proper amount of emulsion during each of the three passes to provide a uniform application.

It was noted during construction, that there appeared to be several different existing roadway structure types within the experimental and control areas. Different pavement thickness, gravel depths, and subbase materials, including penetration macadam, were encountered. It is believed that this may be the result of a previous research effort by MDOT.

FIELD INSPECTION SUMMARY

As discussed in the First Year Interim Report, review of the original construction plans (dated late 1940's), identified two significantly different construction procedures in the experimental area. The first section, which began at approximately station 0+100 and ended at station 2+300 was treated with three inches of macadam, five inches of crushed stone base and 18 inches of gravel. The second section from station 2+300 to the end of the project was treated with two inches of asphalt treated gravel and 24 inches of gravel. Considering these differences and the variation that also occurred during the 1997 construction of the emulsion portion of this

project, two subsections were created within the emulsion treated area. Data presented in this report compare Control section #1 (1+400 - 1+900) with Experimental section #1 (1+900 - 2+400), and Experimental section #2 (2+400 - 2+900) with Control section #2 (2+900 - 3+400).

Falling Weight Deflectometer (FWD) Data Collection/Analysis

On September 21, 2000, FWD data was collected on each of the four sections at 50-meter intervals in each lane. A series of five drops, each at 9000 pounds was completed at each test point. This data was then analyzed using the AASHTO pavement design software "DARWin 3.01". Subgrade Resilient Modulus, Pavement Modulus and Effective Structural Number values were developed for each drop location. The Subgrade Resilient Modulus value is a measure of subgrade layer strength and elasticity. The Pavement Modulus value represents the pavement and gravel layer and the Effective Structural Number is a value of the overall roadway strength. Single values for each of these three data types were also developed for each of the four sections using all of the drop locations within each of the four areas.

Data from the September 2000 evaluation were then compared to data collected in 1998, one year after construction. Increases in strength occurred for each data type. This strength increase occurred primarily in the first year after completion and has been identified in several other research projects. It is believed this increase can be attributed to the densification of roadway materials under heavy traffic loads. Pavement Modulus and Effective Structural Number, the best representation of potential value for the emulsion treatment, indicate a greater percentage of increase in strength within the treated sections when compared to corresponding untreated sections. This result is considered preliminary in nature and will be evaluated closely in future inspections. Results of this comparison along with the 1999 data are summarized in Table I below. Data in its entirety is attached.

TABLE I

Summary of 1998-2000 Comparisons

	Subgrade Modulus				Pavement Modulus				Structural Number			
				% Chg.				% Chg				% Chg.
Section	**1998**	**1999**	**2000**	**98/00**	**1998**	**1999**	**2000**	**98/00**	**1998**	**1999**	**2000**	**98/00**
Control #1	9713	10598	10167	**4.67**	97852	115362	119883	**22.51**	6.84	7.23	7.32	**7.02**
Exp. #1	10090	10913	10203	**1.12**	98676	116188	125824	**27.51**	6.86	7.25	7.44	**8.45**
Exp. #2	6792	7489	7095	**4.46**	70902	81619	85492	**20.58**	6.15	6.44	6.54	**6.34**
Control #2	5597	6631	6105	**9.08**	68457	78122	76282	**11.43**	6.07	6.35	6.3	**3.79**

An “F and T” statistical analysis was also completed on the 1998 and 2000 data that confirmed that the experimental sections are increasing in strength at a greater rate than their corresponding controls.

FWD data was also collected in April 2000 using the same 50-meter interval testing sequence. Results were developed in the identical manner as the September 2000 data and the same comparison and “F and T” analysis were completed. The results of this analysis indicated a greater increase in strength occurred only in the Pavement Modulus results of Experimental section #2, compared to Control section #2. Results are summarized in Table II and the overall results of this comparison are attached.

TABLE II

Summary of Spring/September 2000 Comparisons

	Subgrade Modulus			Pavement Modulus			Structural Number		
	Spring	Sept.		Spring	Sept.		Spring	Sept.	
Section	2000	2000	% Chg.	2000	2000	% Chg	2000	2000	% Chg.
Control #1	9219	10167	**-9.32**	94128	119883	**-21.48**	6.76	7.32	**-7.65**
Exp. #1	8801	10203	**-13.74**	99538	125824	**-20.89**	6.88	7.44	**-7.53**
Exp. #2	5726	7095	**-19.30**	63580	85492	**-25.63**	5.93	6.54	**-9.33**
Control #2	4945	6105	**-19.00**	52025	76282	**-31.80**	5.54	6.30	**-12.06**

Automatic Road Analyzer (ARAN) Data Collection/Analysis

For the September 2000 evaluation, ride quality and rutting data was collected using the Department’s ARAN. Roughness data is presented as International Roughness Index (IRI) in metric units. A verbal description for these values is attached. Data was evaluated by section and lane direction. Averages were developed and an “F and T” analysis was completed.

No significant statistical difference was found with respect to roughness in Control and Experimental section #1. Results of the analysis for Experimental #2 and Control #2 indicated that the experimental section is displaying a statistically significant improvement in terms of roughness.

The “F and T” analysis completed on the rutting data verified that the Experimental sections are rutting less than their Control counterparts.

Roughness and rutting data are summarized in Table III below.

TABLE III

Roughness and Rutting Summary

	IRI (Meters/Kilometer)			Rutting (Millimeters)		
Section			Overall			Overall
	NB Lane	SB Lane	Average	NB Lane	SB Lane	Average
Control #1	1.09	0.91	**1.00**	4.71	4.62	**4.66**
Exp. #1	1.05	0.97	**1.01**	4.62	3.70	**4.16**
Exp. #2	1.17	0.92	**1.05**	5.62	4.02	**4.82**
Control #2	1.26	1.24	**1.25**	7.00	5.30	**6.15**

Visual Inspection

On September 21, 2000, a visual inspection was also completed. This inspection evaluated three types of pavement cracking; center pavement joint, transverse and load associated. After the first year of this more detailed evaluation of cracking, it appears the control sections are cracking at a more severe rate than their experimental counterparts. The totals of this evaluation are presented in Table IV below.

TABLE IV

Pavement Cracking Summary

	Center Joint						**Load Associated**								
	Cracking/Raveling			**Transverse Cracks**			**(Linear Meters)**								
	(Linear Meters)			**(# Of Cracks)**			**1999**			**2000**			**Total**		
Section	**1999**	**2000**	**Total**	**1999**	**2000**	**Total**	**I**	**M**	**S**	**I**	**M**	**S**	**I**	**M**	**S**
Control #1	207	27	234	0	0	0	0	0	0	31	0	0	31	0	0
Exp. #1	126	0	126	0	0	0	0	0	0	5	0	0	5	0	0
Exp. #2	32	4	36	0.5	0.5	1.0	0	0	0	41	0	0	41	0	0
Control #2	192	52	244	0	0.5	0.5	11	0	0	105	20	0	116	20	0

I = Initial M = Moderate S = Severe

SUMMARY AND FUTURE INSPECTIONS

After three years of service, each of the four sections remain in good condition. Much of the data collected and analyzed, indicate that a trend may be developing with respect to a higher

level of performance in the experimental sections. Strength data indicate that the treated sections are increasing in strength at a greater rate than their control counterparts. The experimental sections are also rutting at a less severe rate than their corresponding controls. Only the experimental and control section #2 comparison revealed any significant statistical difference with respect to roughness. A cursory review of the cracking data indicates that the control sections are exhibiting a greater number of cracks than the corresponding experimental sections.

FWD and ARAN data will again be collected in late summer 2001. A visual evaluation will also be completed at this time. Results of these efforts will be presented in the form of the fourth year interim report.

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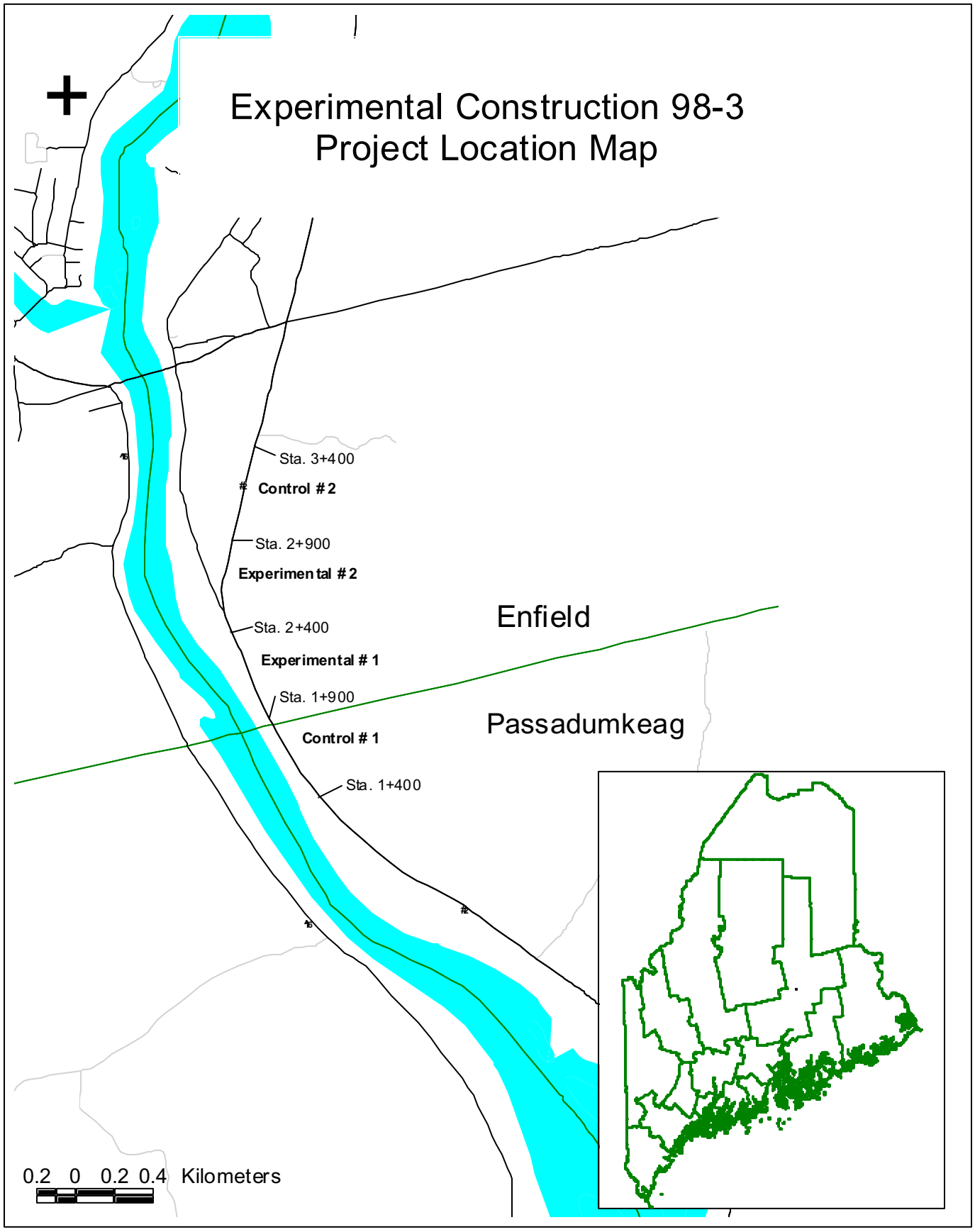
Other Available Documents:

- Construction Report - January 1998
- First Year Interim Report - March 1999
- Second Year Interim Report - September 1999


Experimental Construction 98-3
Project Location Map
Sta. 3+400
Control # 2
Sta. 2+900
Experimental # 2
Sta. 2+400
Experimental # 1
Sta. 1+900
Control # 1
Sta. 1+400
Enfield
Passadumkeag
0.2 0 0.2 0.4 Kilometers

Passadumkeag - Enfield
Route #2
Reclaim/Reclaim with Emulsion

Control #1 and Experimental #1

Control #1 Sta. 1+400 - 1+900

	1998			1999			2000			Percent Change 1998 to 2000		
Station	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number
1+425	11271	98571	6.86	12391	113165	7.18	11973	123746	7.40	6.23	25.54	7.87
1+450	7832	88995	6.63	7771	93597	6.74	7457	98811	6.87	-4.79	11.03	3.62
1+475	13298	111032	7.14	13712	121486	7.35	13266	142722	7.76	-0.24	28.54	8.68
1+500	6638	87578	6.59	7473	104141	6.99	7296	103941	6.98	9.91	18.68	5.92
1+525	10180	106327	7.04	10938	125697	7.44	10163	120439	7.33	-0.17	13.27	4.12
1+550	7052	78418	6.36	7997	109911	7.11	7190	111578	7.15	1.96	42.29	12.42
1+575	8489	99924	6.89	9258	114611	7.21	8816	131261	7.55	3.85	31.36	9.58
1+600	9341	92615	6.72	9934	105645	7.02	9254	115741	7.24	-0.93	24.97	7.74
1+625	8706	101890	6.94	9706	119981	7.32	8900	111278	7.14	2.23	9.21	2.88
1+650	6461	100096	6.89	7261	119435	7.31	6893	112273	7.16	6.69	12.17	3.92
1+675	12481	107747	7.07	13460	128288	7.49	13281	132114	7.56	6.41	22.62	6.93
1+700	12810	105193	7.01	14825	123883	7.4	8108	117585	7.28	-36.71	11.78	3.85
1+725	11449	97004	6.82	11954	112100	7.16	11994	116931	7.26	4.76	20.54	6.45
1+750	9614	84475	6.52	10919	107674	7.06	10062	106943	7.05	4.66	26.60	8.13
1+775	10053	113700	7.19	8979	121831	7.36	8959	146537	7.83	-10.88	28.88	8.90
1+800	10949	85340	6.54	12541	96997	6.82	11931	99770	6.89	8.97	16.91	5.35
1+825	10969	103946	6.98	12283	132691	7.57	12266	130041	7.52	11.82	25.10	7.74
1+850	9918	90943	6.68	10881	108724	7.09	10527	110051	7.12	6.14	21.01	6.59
1+875	13201	114808	7.22	15479	132255	7.57	14832	145056	7.80	12.36	26.35	8.03
Overall	9713	97852	6.84	10598	115362	7.23	10167	119883	7.32	4.67	22.51	7.02

Experimental #1 Sta. 1+900 - 2+400

	1998			1999			2000			Percent Change 1998 to 2000		
Station	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number
1+925	14353	118880	7.3	16498	148044	7.86	15335	167559	8.19	6.84	40.95	12.19
1+950	8994	100733	6.91	10251	116915	7.26	8972	118055	7.28	-0.24	17.20	5.35
1+975	12927	112199	7.16	14587	139016	7.69	13526	150865	7.91	4.63	34.46	10.47
2+000	9538	106364	7.04	10830	110041	7.12	10085	122092	7.37	5.73	14.79	4.69
2+025	10736	95202	6.78	12200	107431	7.06	11964	114109	7.20	11.44	19.86	6.19
2+050	11669	94177	6.76	12689	105686	7.02	11315	117917	7.28	-3.03	25.21	7.69
2+075	8724	103404	6.97	9258	130343	7.53	9399	140101	7.71	7.74	35.49	10.62
2+100	9373	88984	6.63	10430	102528	6.95	9819	112176	7.16	4.76	26.06	7.99
2+125	8758	102457	6.95	9340	125381	7.43	9036	136423	7.64	3.17	33.15	9.93
2+150	11911	104821	7	11434	126011	7.44	9827	137121	7.66	-17.50	30.81	9.43
2+175	8403	91998	6.7	9248	121539	7.36	8542	131696	7.56	1.65	43.15	12.84
2+200	8553	88721	6.62	9024	101650	6.93	8720	113972	7.20	1.95	28.46	8.76
2+225	9756	95605	6.79	10944	111274	7.14	9265	117778	7.28	-5.03	23.19	7.22
2+250	11825	108203	7.08	11580	128053	7.48	11301	133285	7.59	-4.43	23.18	7.20
2+275	10159	105926	7.03	11183	129613	7.52	10294	127387	7.47	1.33	20.26	6.26
2+300	9189	90513	6.67	9749	109846	7.11	8812	114517	7.21	-4.10	26.52	8.10
2+325	10762	98343	6.85	11353	121792	7.36	9317	128322	7.49	-13.43	30.48	9.34
2+350	7330	86765	6.57	6975	93967	6.75	7374	109940	7.11	0.60	26.71	8.22
2+375	9119	80869	6.42	10533	92742	6.72	10953	97337	6.83	20.11	20.36	6.39
Overall	10090	98676	6.86	10913	116188	7.25	10203	125824	7.44	1.12	27.51	8.45

Passadumkeag - Enfield
Route #2
Reclaim/Reclaim with Emulsion

Experimental #2 and Control #2

Experimental #2 Sta. 2+400 - 2+900

	1998			1999			2000			Percent Change 1998 to 2000		
Station	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number
2+425	7817	78643	6.36	8667	92005	6.70	8302	97798	6.84	6.20	24.36	7.55
2+450	6462	66183	6.01	8452	79642	6.39	8136	84051	6.50	25.91	27.00	8.15
2+475	11325	89679	6.65	12079	106795	7.05	11722	112328	7.17	3.51	25.26	7.82
2+500	4995	68613	6.08	6771	83341	6.49	6177	93180	6.73	23.66	35.81	10.69
2+525	9352	83768	6.50	7610	98631	6.86	6939	95583	6.79	-25.80	14.10	4.46
2+550	7512	70786	6.14	9896	86143	6.56	8932	91465	6.69	18.90	29.21	8.96
2+575	5892	76835	6.31	6486	94489	6.76	6325	108308	7.08	7.35	40.96	12.20
2+600	7347	68570	6.08	7602	78847	6.37	7181	88132	6.61	-2.26	28.53	8.72
2+625	8448	71678	6.17	10260	78969	6.37	10141	88224	6.61	20.04	23.08	7.13
2+650	4814	53572	5.60	6144	60858	5.84	5625	75725	6.28	16.85	41.35	12.14
2+675	6025	59448	5.80	6806	70835	6.14	6252	72975	6.21	3.77	22.75	7.07
2+700	6444	57530	5.73	7059	61943	5.88	6900	66644	6.02	7.08	15.84	5.06
2+725	7397	65916	6.00	7558	84322	6.51	7236	90015	6.66	-2.18	36.56	11.00
2+750	6179	73310	6.22	6838	72985	6.21	6621	66828	6.03	7.15	-8.84	-3.05
2+775	7099	77921	6.34	6674	90925	6.68	6324	85399	6.54	-10.92	9.60	3.15
2+800	4739	61648	5.87	5443	64857	5.97	5149	62463	5.89	8.65	1.32	0.34
2+825	5423	65236	5.98	5657	76067	6.29	5478	74471	6.25	1.01	14.16	4.52
2+850	5172	76135	6.29	5468	86238	6.56	5489	86468	6.57	6.13	13.57	4.45
2+875	5845	78578	6.36	6030	86513	6.57	5870	84292	6.51	0.43	7.27	2.36
Overall	6792	70902	6.15	7489	81619	6.44	7095	85492	6.54	4.46	20.58	6.34

Control #2 Sta. 2+900 - 3+400

	1998			1999			2000			Percent Change 1998 to 2000		
Station	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number	Subgrade Modulus	Pavement Modulus	Structural Number
2+925	5857	84405	6.51	6195	93093	6.73	5901	95993	6.80	0.75	13.73	4.45
2+950	5298	81475	6.44	6234	90834	6.68	5616	86065	6.56	6.00	5.63	1.86
2+975	7639	86711	6.57	7477	97711	6.84	7045	91598	6.69	-7.78	5.64	1.83
3+000	5701	75550	6.28	6191	80610	6.41	5680	79604	6.39	-0.37	5.37	1.75
3+025	6180	71441	6.16	6768	76316	6.30	6186	73808	6.23	0.10	3.31	1.14
3+050	5554	62421	5.89	6635	76849	6.31	6341	70555	6.14	14.17	13.03	4.24
3+075	5928	64585	5.96	6158	73230	6.21	5331	71002	6.15	-10.07	9.94	3.19
3+100	4382	58016	5.75	6301	67147	6.04	5835	64561	5.96	33.16	11.28	3.65
3+125	5344	58324	5.76	6186	67935	6.06	5459	64094	5.94	2.15	9.89	3.13
3+150	4611	54121	5.62	5499	63183	5.91	4987	61022	5.85	8.15	12.75	4.09
3+175	4875	62582	5.90	5748	73289	6.21	5390	71921	6.18	10.56	14.92	4.75
3+200	4887	55850	5.68	6960	63967	5.94	6848	59055	5.78	40.13	5.74	1.76
3+225	5573	64907	5.97	6193	77293	6.33	5630	77172	6.32	1.02	18.90	5.86
3+250	4870	65157	5.98	7133	62885	5.91	6423	63075	5.91	31.89	-3.20	-1.17
3+275	6270	67635	6.05	8232	87737	6.60	7681	90887	6.68	22.50	34.38	10.41
3+300	4832	65925	6.00	6495	80197	6.40	5883	82249	6.46	21.75	24.76	7.67
3+325	7956	75319	6.27	8415	86243	6.56	7968	88231	6.61	0.15	17.14	5.42
3+350	4778	69961	6.12	6111	78196	6.35	5405	72068	6.18	13.12	3.01	0.98
3+375	5813	76302	6.30	6593	91248	6.69	6392	86392	6.56	9.96	13.22	4.13
Overall	5597	68457	6.07	6631	78122	6.35	6105	76282	6.30	9.08	11.43	3.79

Passadumkeag - Enfield
Route #2
Reclaim/Reclaim with Emulsion
Spring-2000/September 2000 Comparison

Control #1 Sta. 1+400 - 1+900

	Subgrade Modulus				Pavement Modulus				Structural Number			
Station	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change
1+425	9999	11973	-1974	-16.49	91921	123746	-31825	-25.72	6.70	7.40	-0.70	-9.46
1+450	7688	7457	231	3.10	85396	98811	-13415	-13.58	6.54	6.87	-0.33	-4.80
1+475	11368	13266	-1898	-14.31	96959	142722	-45763	-32.06	6.82	7.76	-0.94	-12.11
1+500	6916	7296	-380	-5.21	85199	103941	-18742	-18.03	6.53	6.98	-0.45	-6.45
1+525	8926	10163	-1237	-12.17	92973	120439	-27466	-22.80	6.73	7.33	-0.60	-8.19
1+550	7191	7190	1	0.01	87598	111578	-23980	-21.49	6.60	7.15	-0.55	-7.69
1+575	8210	8816	-606	-6.87	99388	131261	-31873	-24.28	6.98	7.55	-0.67	-8.87
1+600	8203	9254	-1051	-11.36	96675	115741	-19066	-16.47	6.82	7.24	-0.42	-5.80
1+625	7891	8900	-1009	-11.34	89349	111278	-21929	-19.71	6.64	7.14	-0.50	-7.00
1+650	6574	6893	-319	-4.63	93628	112273	-18645	-16.61	6.74	7.16	-0.42	-5.87
1+675	10992	13281	-2289	-17.24	96371	132114	-35743	-27.05	6.81	7.56	-0.75	-9.92
1+700	7406	8108	-702	-8.66	92059	117585	-25526	-21.71	6.71	7.28	-0.57	-7.83
1+725	10328	11994	-1666	-13.89	82101	116931	-34830	-29.79	6.45	7.26	-0.81	-11.16
1+750	9413	10062	-649	-6.45	97368	106943	-9575	-8.95	6.83	7.05	-0.22	-3.12
1+775	7636	8959	-1323	-14.77	102571	146537	-43966	-30.00	6.95	7.83	-0.88	-11.24
1+800	11835	11931	-96	-0.80	89061	99770	-10709	-10.73	6.63	6.89	-0.26	-3.77
1+825	10707	12266	-1559	-12.71	110788	130041	-19253	-14.81	7.13	7.52	-0.39	-5.19
1+850	8436	10527	-2091	-19.86	91516	110051	-18535	-16.84	6.69	7.12	-0.43	-6.04
1+875	13398	14832	-1434	-9.67	111409	145056	-33647	-23.20	7.15	7.80	-0.65	-8.33
Overall	9219	10167	-948	-9.32	94128	119883	-25755	-21.48	6.76	7.32	-0.56	-7.65

Experimental #1 Sta. 1+900 - 2+400

	Subgrade Modulus				Pavement Modulus				Structural Number			
Station	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change
1+925	14095	15335	-1240	-8.09	126220	167559	-41339	-24.67	7.45	8.19	-0.74	-9.04
1+950	8092	8972	-880	-9.81	106748	118055	-11307	-9.58	7.04	7.28	-0.24	-3.30
1+975	11871	13526	-1655	-12.24	105456	150865	-45409	-30.10	7.02	7.91	-0.89	-11.25
2+000	8716	10085	-1369	-13.57	106967	122092	-15125	-12.39	7.05	7.37	-0.32	-4.34
2+025	10405	11964	-1559	-13.03	90455	114109	-23654	-20.73	6.67	7.20	-0.53	-7.36
2+050	9964	11315	-1351	-11.94	109657	117917	-8260	-7.00	7.11	7.28	-0.17	-2.34
2+075	7847	9399	-1552	-16.51	105543	140101	-34558	-24.67	7.02	7.71	-0.69	-8.95
2+100	7967	9819	-1852	-18.86	90593	112176	-21583	-19.24	6.67	7.16	-0.49	-6.84
2+125	7592	9036	-1444	-15.98	106019	136423	-30404	-22.29	7.03	7.64	-0.61	-7.98
2+150	9206	9827	-621	-6.32	111916	137121	-25205	-18.38	7.16	7.66	-0.50	-6.53
2+175	7179	8542	-1363	-15.96	94892	131696	-36804	-27.95	6.77	7.56	-0.79	-10.45
2+200	7106	8720	-1614	-18.51	89998	113972	-23974	-21.03	6.65	7.20	-0.55	-7.64
2+225	8897	9265	-368	-3.97	87547	117778	-30231	-25.67	6.59	7.28	-0.69	-9.48
2+250	9005	11301	-2296	-20.32	113125	133285	-20160	-15.13	7.18	7.59	-0.41	-5.40
2+275	8142	10294	-2152	-20.91	95620	127387	-31767	-24.94	6.79	7.47	-0.68	-9.10
2+300	7927	8812	-885	-10.04	94048	114517	-20469	-17.87	6.75	7.21	-0.46	-6.38
2+325	9302	9317	-15	-0.16	111077	128322	-17245	-13.44	7.14	7.49	-0.35	-4.67
2+350	6176	7374	-1198	-16.25	92127	109940	-17813	-16.20	6.71	7.11	-0.40	-5.63
2+375	8090	10953	-2863	-26.14	77681	97337	-19656	-20.19	6.34	6.83	-0.49	-7.17
Overall	8801	10203	-1402	-13.74	99538	125824	-26286	-20.89	6.88	7.44	-0.56	-7.53

Passadumkeag - Enfield
Experimental #2 and Control #2
Reclaim/Reclaim with Emulsion
Spring-2000/September 2000 Comparison

Experimental #2 Sta. 2+400 - 2+900

	Subgrade Modulus				Pavement Modulus				Structural Number			
Station	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change
2+425	6762	8302	-1540	-18.55	74703	97798	-23095	-23.62	6.25	6.84	-0.59	-8.63
2+450	6168	8136	-1968	-24.19	58100	84051	-25951	-30.88	5.75	6.50	-0.75	-11.54
2+475	9580	11722	-2142	-18.27	83309	112328	-29019	-25.83	6.49	7.17	-0.68	-9.48
2+500	5406	6177	-771	-12.48	70812	93180	-22368	-24.01	6.14	6.73	-0.59	-8.77
2+525	6630	6939	-309	-4.45	91827	95583	-3756	-3.93	6.70	6.79	-0.09	-1.33
2+550	5456	8932	-3476	-38.92	77427	91465	-14038	-15.35	6.33	6.69	-0.36	-5.38
2+575	5878	6325	-447	-7.07	83287	108308	-25021	-23.10	6.49	7.08	-0.59	-8.33
2+600	4823	7181	-2358	-32.84	57929	88132	-30203	-34.27	5.75	6.61	-0.86	-13.01
2+625	7973	10141	-2168	-21.38	77524	88224	-10700	-12.13	6.33	6.61	-0.28	-4.24
2+650	4045	5625	-1580	-28.09	47449	75725	-28276	-37.34	5.38	6.28	-0.90	-14.33
2+675	4428	6252	-1824	-29.17	42255	72975	-30720	-42.10	5.17	6.21	-1.04	-16.75
2+700	4698	6900	-2202	-31.91	39339	66644	-27305	-40.97	5.05	6.02	-0.97	-16.11
2+725	5669	7236	-1569	-21.67	58281	90015	-31734	-35.25	5.76	6.66	-0.90	-13.51
2+750	5462	6621	-1159	-17.50	43956	66828	-22872	-34.23	5.24	6.03	-0.79	-13.10
2+775	5587	6324	-737	-11.65	65017	85399	-20382	-23.87	5.97	6.54	-0.57	-8.72
2+800	4682	5149	-467	-9.07	48550	62463	-13913	-22.27	5.42	5.89	-0.47	-7.98
2+825	5012	5478	-466	-8.51	56384	74471	-18087	-24.29	5.69	6.25	-0.56	-8.96
2+850	5170	5489	-319	-5.81	73205	86468	-13263	-15.34	6.21	6.57	-0.36	-5.48
2+875	5514	5870	-356	-6.06	68886	84292	-15406	-18.28	6.09	6.51	-0.42	-6.45
Overall	5726	7095	-1369	-19.30	63580	85492	-21912	-25.63	5.93	6.54	-0.61	-9.33

Control #2 Sta. 2+900 - 3+400

	Subgrade Modulus				Pavement Modulus				Structural Number			
Station	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change	Spring 2000	Sept. 2000	Difference	% Change
2+925	5525	5901	-376	-6.37	75988	95993	-20005	-20.84	6.29	6.80	-0.51	-7.50
2+950	6264	5616	-352	-6.27	68919	86065	-17247	-20.04	6.09	6.56	-0.47	-7.16
2+975	6386	7045	-659	-9.35	71698	91598	-19900	-21.73	6.17	6.69	-0.52	-7.77
3+000	5306	5680	-374	-6.58	61264	79604	-18340	-23.04	5.85	6.39	-0.54	-8.45
3+025	5136	6186	-1050	-16.97	49579	73808	-24229	-32.83	5.46	6.23	-0.77	-12.36
3+050	5492	6341	-849	-13.39	51295	70555	-19260	-27.30	5.52	6.14	-0.62	-10.10
3+075	4682	5331	-649	-12.17	49632	71002	-21370	-30.10	5.46	6.15	-0.69	-11.22
3+100	5066	5835	-769	-13.18	41906	64561	-22655	-35.09	5.16	5.96	-0.80	-13.42
3+125	4039	5459	-1420	-26.01	44265	64094	-19829	-30.94	5.25	5.94	-0.69	-11.62
3+150	3853	4987	-1134	-22.74	37315	61022	-23707	-38.85	4.96	5.85	-0.89	-15.21
3+175	4169	5390	-1221	-22.65	43874	71921	-28047	-39.00	5.24	6.18	-0.94	-15.21
3+200	3979	6848	-2869	-41.90	34445	59055	-24610	-41.67	4.83	5.78	-0.95	-16.44
3+225	4677	5630	-953	-16.93	54984	77172	-22188	-28.75	5.65	6.32	-0.67	-10.60
3+250	4670	6423	-1753	-27.29	36985	63075	-26090	-41.36	4.95	5.91	-0.96	-16.24
3+275	5375	7681	-2306	-30.02	58406	90887	-32481	-35.74	5.76	6.68	-0.92	-13.77
3+300	4588	5883	-1295	-22.01	53804	82249	-28445	-34.58	5.61	6.46	-0.85	-13.16
3+325	6009	7968	-1959	-24.59	54466	88231	-33765	-38.27	5.63	6.61	-0.98	-14.83
3+350	4402	5405	-1003	-18.56	46247	72068	-25821	-35.83	5.33	6.18	-0.85	-13.75
3+375	4767	6392	-1625	-25.42	53343	86392	-33049	-38.25	5.59	6.56	-0.97	-14.79
Overall	4945	6105	-1160	-19.00	52025	76282	-24257	-31.80	5.54	6.30	-0.76	-12.06

International Roughness Index (IRI)
Verbal Descriptions

IRI (Meters/Kilometer)	IRI (Inches/Mile)	Verbal Description
Less than 1.02	Less than 65	Extremely comfortable ride at 65/105 mph/kph. No potholes, distortions or rutting. Extremely high quality pavement. (Typically new or near new pavement)
1.02 - 1.57	65 - 99	Comfortable ride at 65/105 mph/kph. No noticeable potholes, distortions, or rutting. High quality pavement.
1.58 - 3.15	100 - 199	Comfortable ride at 55/88 mph/kph. Moderately perceptible movements induced by occasional patches, distortions, or rutting.
3.16 - 4.73	200 - 299	Comfortable ride at 45/72 mph/kph. Noticeable movements and swaying induced by frequent patches and occasional potholes. Some distortion and rutting.
Greater than 4.73	Greater than 299	Frequent abrupt movements induced by many patches, distortions, potholes, and rutting. Ride quality greatly diminished.