PlusRide® Asphalt Pavement

SR 405, Contract 2768
S Curve/Cedar River
Bridge and RR Bridge

Post Construction Report
WA-RD 130.1

August 1987
This study was conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

This is the post construction and one year evaluation Report of PlusRide® being used as the wearing course on a bridge deck overlay under very high traffic volumes.

A rubberized Class D Asphalt Concrete Pavement friction course was used on an adjacent bridge to compare against the PlusRide®. The properties evaluated were friction resistance, noise, fatigue properties and deicing characteristics. The friction and noise properties are the same. The PlusRide® has deeper ruts and large areas in the traveled lane have delaminated. The deicing characteristics have not been confirmed. The rubberized class D ACP is performing better than the PlusRide®,

<table>
<thead>
<tr>
<th>Key Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>PlusRide®</td>
</tr>
<tr>
<td>Asphalt Concrete Pavement</td>
</tr>
<tr>
<td>Overlays</td>
</tr>
<tr>
<td>Bridges</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclassified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security Classification of Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclassified</td>
</tr>
</tbody>
</table>

Form DOT F 1700.7 (8-88)
PlusRide® Asphalt Pavement
SR-405, Contract 2768
S Curve/Cedar river Bridge and RR Bridge

by

R.L. Schultz
Special Projects Engineer
Washington State Department of Transportation
Materials Laboratory

Post-Construction Report
and
One Year Evaluation

Experimental Project WA 84-01

Prepared For
Washington State Department of Transportation
and in cooperation with
U.S. Department of Transportation
Federal Highway Administration

August: 1987
Disclaimer

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicinity Map</td>
<td>1</td>
</tr>
<tr>
<td>Synopsis</td>
<td>1</td>
</tr>
<tr>
<td>Study Site</td>
<td>1</td>
</tr>
<tr>
<td>Construction Summary</td>
<td>1</td>
</tr>
<tr>
<td>Cost</td>
<td>3</td>
</tr>
<tr>
<td>Performance Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>Conclusions</td>
<td>4</td>
</tr>
<tr>
<td>Appendix A (Photos)</td>
<td>5</td>
</tr>
<tr>
<td>Appendix B (Materials Specification)</td>
<td>13</td>
</tr>
<tr>
<td>Appendix C (Roadway Sections)</td>
<td>17</td>
</tr>
<tr>
<td>Appendix D (Test Reports)</td>
<td>18</td>
</tr>
</tbody>
</table>
SYNOPSIS

PlusRide® was used as an 0.08 ft maintenance overlay on SR-405 from M.P. 3.51 to M.P. 3.81 on the northbound structure. The project was titled S Curve/Cedar River Bridge and RR Bridge. A Rubberized Asphalt Concrete pavement Class D was used on the southbound structure within the same limits. The contract plans called for planing off the existing asphalt system down to the bare concrete surface and placing the above materials as a new roadway surface.

The PlusRide® asphalt is claimed to have the following list of benefits:

1. Safety - Ensures high friction resistance.
2. Noise Resistance - Reduced decibel noise levels
3. Increased Road Life - Increased fatigue properties compared to conventional pavements

All of the features will be evaluated on this installation.

STUDY SITE

The project is located within the city limits of the city of Renton, Washington on the I-405 corridor, as shown on the accompanying vicinity map. The S Curve/Cedar R. Br. No. 405/18 E & W are located between M.P. 3.51 and M.P. 3.81 of I-405.

CONSTRUCTION SUMMARY

The paving of both the PlusRide® and the Rubberized Class D ACP was done by Hi-Line Paving Asphalt Co. Inc. of Seattle, Washington. Hi-Line Paving was both the prime and the paving contractor. Bob Linden of All Seasons Surfacing Corporation, Bellevue, Washington was the technical representative for PlusRide® and was present for both the plant and street operations.

The job mixes recommended by All Seasons (PlusRide®) and Arizona Refining (Rubberized Class D) are listed below along with the extraction results for the mixes that were produced for the overlay.

Aggregate Gradation

PLUSRIDE®

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Mix Design % Passing</th>
<th>Extraction Results % Passing</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1/4</td>
<td>73.6</td>
<td>73</td>
<td>60-80</td>
</tr>
<tr>
<td>#10</td>
<td>32.4</td>
<td>25</td>
<td>23-38</td>
</tr>
<tr>
<td>#30</td>
<td>18.6</td>
<td>16</td>
<td>15-27</td>
</tr>
<tr>
<td>#200</td>
<td>9.5</td>
<td>9.3</td>
<td>8-12</td>
</tr>
<tr>
<td>Asphalt</td>
<td>8.5</td>
<td>8.2</td>
<td></td>
</tr>
</tbody>
</table>
### RUBBERIZED CLASS D

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Mix Design % Passing</th>
<th>Extraction Results % Passing</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>100</td>
<td>100</td>
<td>97-100</td>
</tr>
<tr>
<td>#4</td>
<td>36</td>
<td>38</td>
<td>30-50</td>
</tr>
<tr>
<td>#8</td>
<td>12</td>
<td>14</td>
<td>5-15</td>
</tr>
<tr>
<td>#200</td>
<td>2.5</td>
<td>3.5</td>
<td>2-5</td>
</tr>
<tr>
<td>Asphalt</td>
<td>8.5</td>
<td>8.7</td>
<td></td>
</tr>
</tbody>
</table>

CSS-1 was used for both tack coat and a fog seal on the Class D. An average coverage of 0.87 Gal/sq yd was distributed by a 1979 Ford F-700 with a 1,500 gallon tank and 10 ft bar powered by a 7 1/2 HP Hercules engine. This coverage represented a heavy tack coat and light fog seal.

For the PlusRide®, the rubber granules were added to the aggregate at the 10,000 pound batch plant and dry-mixed for 15 seconds. The AR-4000W was then added and mixed for 25 seconds. The temperature of the mix was maintained between 290°-330°F.

For the Class D Asphalt, the rubber granules were added to the AR-4000W which had been heated to 400°-450°F. This mixture was then agitated and heated for one hour. This mixture was pumped into the aggregate after 7 seconds of dry-mixing. The rubberized asphalt and aggregate were then mixed for 32 seconds. The temperature of the mix was maintained between 280°-305°F.

A Barber Green SA-145 Track Paver placed both types of mix. Compaction was accomplished by a compaction train consisting of a 16 ton Dynapac CC-50 Vibratory Roller (used statically) for breakdown and an 8 ton, steel wheel, Hyster C-340 roller for finish rolling.

The following mat temperatures were observed at rolling:

<table>
<thead>
<tr>
<th>PLUSRIDE®</th>
<th>RUBBERIZED CLASS D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown 290°-330°F</td>
<td>275°-300°F</td>
</tr>
<tr>
<td>Intermediate 220°-290°F</td>
<td>225°-275°F</td>
</tr>
<tr>
<td>Finish 170°-220°F</td>
<td>175°-225°F</td>
</tr>
</tbody>
</table>

Compaction on the PlusRide® was monitored by Nuclear Densometer. And after the first two passes with the Dynapac roller the density was checked and after each additional pass until breakover which occurred between the 6th and 7th pass.

The rubberized Class D compaction was done to the satisfaction of the Engineer, as there was no required density level for this material.

On September 15, 1984 the outside northbound lane was paved with PlusRide® and the outside southbound lane paved with Rubberized Class D. On September 16 the inside northbound lane was paved with PlusRide® and the inside southbound lane paved with Rubberized Class D.

The paving was done at night as required by Contract Traffic Control Provisions. The weather both nights was clear and warm with temperatures between 60°F and 69°F.
The paving was originally scheduled to be done in one night but due to a plant breakdown an additional night was needed to complete the project.

COST

The unit contract bid cost was $50/ton (334 tons) for PlusRide® and $86.85/ton (354 tons) for the Rubberized Class D ACP.

Performance Evaluation

FRICTION

The initial friction tests were done November 1984 which was 2 months after the completion of the paving. The friction values on the PlusRide® ranged from 33 to 40 with an average of 38. The friction values for the Rubberized Class D ranged from 31 to 40 with an average of 37. The tests were run again May 1987 and the range for the PlusRide® was 35 to 43 with an average of 40. The values for the Rubberized Class D ranged from 35 to 42 with an average of 39. There is no difference between the two when looking at the friction number. We would usually expect to see numbers in the 50 range when tested after 2½ years of use.

NOISE

Noise measurements were made on the inside of an auto traveling at the posted speed limit and the PlusRide® was 1 db noisier than the Rubberized Class D. These measurements were done in 1984 and 1987. The concrete at the south end of the bridge was 6 to 7 db noisier than both the asphalt mixes. There is no discernable difference between the two asphalts but there is between the asphalt and the concrete.

FATIGUE

Rut measurements were not taken at the completion of the contract but measurements were taken on May 19, 1987. The rut measurement in the outside wheel path on the PlusRide® was 3/8" deep. The rut measurement in the Rubberized Class "D" was 3/16" deep in the outside wheel path. A small area on the north end of the Rubberized Class D is showing signs of raveling. This area is roughly representative of one truck load of mix. Large areas of the PlusRide® have delaminated in the left wheel path of the outside lane all the way through the job. These areas have been patched back with regular Class B Asphalt Concrete pavement. These areas are shown in the pictures in Appendix A.

DENSITY

The Rubberized Class D had a specification to be compacted to the satisfaction of the Engineer. The PlusRide® had a specification to be compacted to 95% to 98% of maximum density (rice density) determined by WSDOT Test Method 705. This density specification was recommended by the Technical Representative at the design stage. The PlusRide® densities were 88% of the required rice density. This could be one of the factors that contributed to why the large areas in the traveled lane had to be patched.
DE-ICING

We have not been able to confirm any de-icing characteristics of the PlusRide® materials as claimed by the manufacturers.

CONCLUSION

Because of the large areas of delamination and patching in the outside lane paved with PlusRide®, one would conclude the Rubberized Class D is performing better than the PlusRide®.

K49/006
Appendix A

Photographs
SR 405
S Curve/Cedar River
Br. & RR Br. northbound
between first & second
expansion joint on Plus
Ride
Fall 1984

SR 405
S Curve/Cedar river
Br. & RR Br. northbound
first expansion joint,
northbound on Plus Ride
Fall 1984

SR 405
S Curve/Cedar River
Br. & RR Br. northbound
start of Plus Ride
Fall 1984
SR 405

S Curve/Cedar River
Br. & RR Br. northbound
approaching end of Plus
Ride
Fall 1984

SR 405

S Curve/Cedar River
Br. & RR Br. northbound
end of the Br. in back-
ground Plus Ride in
foreground
Fall 1984

SR 405

S Curve/Cedar River
Br. & RR Br. northbound
second expansion joint
on Plus Ride northbound
Fall 1984
SR 405
S Curve/ Cedar River
Br. & RR Br. southbound
approaching the south end of the Rubberized
Class D
Fall 1984

SR 405
S Curve/ Cedar River
Br. & RR Br. southbound
middle of Br. on Rubberized
Class D
Fall 1984

SR 405
S Curve/ Cedar River
Br. & RR Br. southbound
second expansion joint on Rubberized
Class D
Fall 1984
Spring 1987
Shape
Rubberized Class D in the
expansion joint. Shows the
RR Bridge Southbound Little
S Curve/Cedar River DR A
SR 405

Spring 1987
outside lane
Rubberized Class D in the
shows some curling in
RR Bridge Southbound Just
RR Bridge Southbound Just
S Curve/Cedar River DR A
SR 405

Spring 1987
Class D
beginning of Rubberized
RR Bridge Southbound
S Curve/Cedar River DR A
SR 405
SR 405
S Curve/Cedar River Br. & RR Bridge southbound second expansion joint on Rubberized Class D. Surface looks good

SR 405
S Curve/Cedar River Br. & RR Bridge southbound third expansion joint on Rubberized Class D. Surface looks good

SR 405
S Curve/Cedar River Br. & RR Bridge southbound south end of bridge on Rubberized Class D shows rich strip in the outside wheel path
APPENDIX B

MATERIALS SPECIFICATIONS
When placing tack coat, procedures shall be utilized that will prevent the material from entering the Cedar River. Temporary plugging of bridge drains will be required to conform to the requirement.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading equipment impractical, the paving may be done with other equipment or by hand.

**Compaction**

The acceptable level of compaction shall average between 95 percent and 98 percent of the maximum density as determined by WSDOT Test Method 705. Control shall be per section 5-04.3.10B of the standard specifications.

**Measurement**

Section 5-04.4 of the standard specifications is supplemented with the following:

Measurement of the rubber modified asphalt concrete will be by the ton and will include the granulated rubber, the asphalt cement and any other component of the mix.

**Payment**

Section 5-04.5 of the standard specifications is supplemented with the following:

The unit contract price per ton for "Rubber Modified ACP Including Paving Asphalt" and the estimated cost for "Mineral Filler" shall be full compensation for furnishing all labor, equipment, materials, and royalties required in the construction of this material as specified.

---

**RUBBERIZED ASPHALT CONCRETE PAVEMENT CLASS D**

This special provision covers the modification of the standard specifications for Class D asphalt concrete to include granulated rubber in the binder phase of the mixture.

The standard specifications for asphalt concrete Class D shall be applicable except for the following changes:

Section 9-02 of the standard specifications is supplemented by the following:

**Asphalt**

Asphalt shall be AR-4000W conforming to section 9-02.1(4) of the standard specifications.

---

SR 405
S CURVE/CEDE R. BR. AND BR BR.
R4W096 26
Granulated Rubber
Granulated rubber shall be free from fabric, wire, or other contaminated materials except that up to four percent of calcium carbonate may be included to prevent particles from sticking together. The rubber shall meet one of the following gradations and shall be at the option of the Contractor:

1. 100% ground vulcanized rubber:

<table>
<thead>
<tr>
<th>Sieve</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 16</td>
<td>95-100</td>
</tr>
<tr>
<td>No. 25</td>
<td>0-10</td>
</tr>
</tbody>
</table>

All percentages are by weight.

2. 40% powdered reclaimed devulcanized rubber and 60% ground vulcanized rubber scrap:

<table>
<thead>
<tr>
<th>Sieve</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 8</td>
<td>100</td>
</tr>
<tr>
<td>No. 30</td>
<td>60-80</td>
</tr>
<tr>
<td>No. 50</td>
<td>15-40</td>
</tr>
<tr>
<td>No. 100</td>
<td>0-15</td>
</tr>
</tbody>
</table>

All percentages are by weight.

Section 5-04.3 of the standard specifications is supplemented by the following:

Mixing Asphalt and Rubber
The asphalt and rubber shall be combined as rapidly as possible in the proportions of a minimum of two pounds of rubber to one gallon of asphalt (standard at 400 degrees F), then held for such a time and temperature that the consistency of the mix approaches that of a semi-fluid material. The temperature of the asphalt shall be between 400 degrees F and 450 degrees F prior to mixing. The use of up to nine percent diluent to assist in the mixing of rubber will be permitted. If a diluent is used, it shall have a boiling point of at least 350 degrees F. After reaching the proper consistency, the use of the material shall proceed immediately, and in no case shall the material be held at temperatures in excess of 350 degrees F for more than one hour after reaching that point.

The method and equipment for combining the rubber and asphalt shall be so designed and accessible that the Engineer can
readily determine the percentages, by weight, of each of the two materials being incorporated into the mixture.

For the rubberized asphalt concrete Class D only, the first sentence in the third paragraph of section 5-04.3(8) of the standard specifications is deleted and replaced by the following:

When discharged, the temperature of the mix shall not exceed 325 degrees F.

Section 5-04.5 of the standard specifications is supplemented by the following:

Rubberized asphalt will be measured by the ton in accordance with section 1-09 of the standard specifications and shall include the rubber and diluent. Any conversions from volume to weight shall be calculated on the basis of 7.5 pounds per gallon at 60 degrees F of asphalt rubber material.

Rubberized asphalt concrete will be measured by the ton with no deduction being made for the weight of liquid asphalt, rubber, diluent, blend sand, mineral filler, or any other component of the mixture.

Section 5-04.5 of the standard specifications is supplemented by the following:


The unit contract price per ton for "Rubberized ACP Class D Including Paving Asphalt" shall be full compensation for furnishing all labor, tools, materials, and equipment necessary to complete the work as specified.

**AVERAGE REFINERY PRICES**

(JANUARY 31, 1983)

Within 10 days following award of contract, the Contractor shall provide the State with the name of a single asphalt cement supplier from whom he intends to obtain his asphalt cement for this project. At the end of each month, the State will obtain quoted prices for each day of that month for asphalt cement FOB at the refinery from major suppliers so that a statewide average can be determined.

It shall be the Contractor's responsibility to determine that his proposed supplier has regularly furnished information to the Department's Project Development Office regarding his previous month's daily refinery prices. These prices will be used in accordance with these specifications for determining a statewide average refinery price and information for the previous month must be received by the Department no later than the seventh of each month. Suppliers not...
APPENDIX C

ROADWAY SECTIONS
APPENDIX D

TEST REPORTS
**MATERIALS LABORATORY**

**No. 13804**

**Material:** RUBBERIZED CL. D

**Contract No.: 2768**

**Section:** S CURVE/KEELE R. RR.

**F.A. No.: 28-405-3(50B)**

**C.S. No.:**

**County:** KING

**Contractor:** HI-LINE ASPHALT

**Subcontractor:**

**Place:** SEATTLE

**Organization Code:** 412344

**Forwarded by:** STATE CAR

**SPS No.:**

**Date:** Sampled 9-15-84 Tested 9-15-84

**Mix Design Desired:** Based on Field Test No.: Other

**Field Test Results - Report all screens used:**

<table>
<thead>
<tr>
<th>Screen</th>
<th>Field</th>
<th>Class B</th>
<th>Dist. Lab.</th>
<th>Misc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-14</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
</tr>
</tbody>
</table>

**Asphalt in Mix: Design 8.5% Plan 8.5% Extract 0.7%**

**Remarks:**

**For:** D LABORATORY

**OF ASPHALT MIXTURE**

**EXTRACTION ANALYSIS**

<table>
<thead>
<tr>
<th>SIEVES</th>
<th>% PASS</th>
<th>CLASS B</th>
<th>CLASS D</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
</tr>
<tr>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
</tr>
<tr>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
</tr>
</tbody>
</table>

**LUBLABORATORY COMPACATION**

**RESULTS**

**RECOMMENDED RANGE**

**RUBBERIZED**

**MATERIALS ENGINEER**

**A. J. PETERS, P.E.**

**Date:** 9-26-84

**By:** K. E. WILSON

**PLAN MATERIALS ENG**

**REFERENCES:**

[X]

**7007-2**

**RECEIVED OCT 1 1984**

**PROJ. ENGR. MILLER**

**Lab No. 810154**

**MATERIALS LABORATORY**

**No. 13804**

**Material:** RUBBERIZED CL. D

**Contract No.: 2768**

**Section:** S CURVE/KEELE R. RR.

**F.A. No.: 28-405-3(50B)**

**C.S. No.:**

**County:** KING

**Contractor:** HI-LINE ASPHALT

**Subcontractor:**

**Place:** SEATTLE

**Organization Code:** 412344

**Forwarded by:** STATE CAR

**SPS No.:**

**Date:** Sampled 9-15-84 Tested 9-15-84

**Mix Design Desired:** Based on Field Test No.: Other

**Field Test Results - Report all screens used:**

<table>
<thead>
<tr>
<th>Screen</th>
<th>Field</th>
<th>Class B</th>
<th>Dist. Lab.</th>
<th>Misc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-14</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
</tr>
</tbody>
</table>

**Asphalt in Mix: Design 8.5% Plan 8.5% Extract 0.7%**

**Remarks:**

**For:** D LABORATORY

**OF ASPHALT MIXTURE**

**EXTRACTION ANALYSIS**

<table>
<thead>
<tr>
<th>SIEVES</th>
<th>% PASS</th>
<th>CLASS B</th>
<th>CLASS D</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
</tr>
<tr>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
<td>0.075</td>
</tr>
<tr>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
<td>8.60</td>
</tr>
</tbody>
</table>

**LUBLABORATORY COMPACATION**

**RESULTS**

**RECOMMENDED RANGE**

**RUBBERIZED**

**MATERIALS ENGINEER**

**A. J. PETERS, P.E.**

**Date:** 9-26-84

**By:** K. E. WILSON

**PLAN MATERIALS ENG**

**REFERENCES:**

[X]
No. 13806

Material: Pine

Brand: ID No.:

Control Sample No.: 1 Field Test No.:

Certificate No.: Truck/Car No.:

Quant. Represented: Produced to Date:

Aggregates: Washed Scaled

Stockpile No.: Plt No.: A-338

Used at: Sta. to Sta.:

Sampled/Tested by: RM

Sampled at: Batch Plant

Date: Sampled 9-16-84 Tested 9-16-84

Mix Design Desired:

Field: Acceptance Rejection Other

Based on Field Test No.:

Field Test Results - Report all screens used:

Screen: 3/8 1/4 1/2 3/4 2" Pass

Field % Pass 100 74 27 10 0

Dist. Lab. % Pass 100 93 33 11 0

Spec: 100 93 33 11 0

Grams/Lbs. Removed by District Lab:

Remarks:

Project Engineer: MILLER/CM

Phone: (SCAN)

DOT FORM 130-086
REVISED 3/86
White Copy with Sample
Yellow Copy for Proj. Files

LABORATORY OF ASPHALT MIXTURE
ELD LABORATORY

EXTRACTION ANALYSIS

<table>
<thead>
<tr>
<th>SIEVES</th>
<th>% PASS</th>
<th>CLASS I</th>
<th>CLASS II</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; Square</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot; Square</td>
<td>90-100</td>
<td>90-100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4&quot; Square</td>
<td>67-88</td>
<td>69-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot; Square</td>
<td>60-69</td>
<td>90-100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; Square</td>
<td>80-80</td>
<td>75-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot; Square</td>
<td>22-48</td>
<td>32-48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot; Square</td>
<td>10-20</td>
<td>15-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot; Square</td>
<td>4-10</td>
<td>15-27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot; Square</td>
<td>3-0</td>
<td>8-12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot; Square</td>
<td>2-0</td>
<td>8-12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Material meets specification requirements - except as noted.

A. J. PETERS, P.E.
Materials Engineer

Date: 9-26-84

L.M. Materials Engineer

T8C Y-1
Material: CL. D w/PREBER (20%)  

Contract No.: 2768  

Section: 5 (Cypress/Cedar & Be.)  

F. A. No.: 4-40S-2-5SR  

C. S. No.: 5  

County: KING  

Contractor: HI-LINE ASPHALT  

Subcontractor:  

Place: SEATTLE  

Date: 9-16-84  

Organization Code: 412244  

SPS No.:  

Asphalt in Mix: Design 8.5% Plan 8.5% Extract 9.1%  

<table>
<thead>
<tr>
<th>Screen</th>
<th>@8</th>
<th>#4</th>
<th>#2</th>
<th>2B</th>
<th>S/S</th>
<th>Miscellaneous</th>
<th>Field</th>
<th>Dist. Lab.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.18mm Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.36mm Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.75mm Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.5mm Round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19mm Round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25mm Round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 Nos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt Content</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Field Test Results - Report all screens used:  

<table>
<thead>
<tr>
<th>Screen</th>
<th>100%</th>
<th>90-100</th>
<th>85-90</th>
<th>75-85</th>
<th>65-75</th>
<th>50-60</th>
<th>30-50</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field % Pass</td>
<td>100</td>
<td>90-100</td>
<td>85-90</td>
<td>75-85</td>
<td>65-75</td>
<td>50-60</td>
<td>30-50</td>
<td>100</td>
</tr>
<tr>
<td>Dist. Lab. % Pass</td>
<td>42</td>
<td>42</td>
<td>14</td>
<td>3.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gravimetric Analysis:  

<table>
<thead>
<tr>
<th>Sieves</th>
<th>% Class E</th>
<th>% Class B</th>
<th>% Class C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.18mm Square</td>
<td>100</td>
<td>90-100</td>
<td>85-90</td>
</tr>
<tr>
<td>2.36mm Square</td>
<td>67-68</td>
<td>60-60</td>
<td>55-55</td>
</tr>
<tr>
<td>4.75mm Square</td>
<td>58-58</td>
<td>53-53</td>
<td>48-48</td>
</tr>
<tr>
<td>9.5mm Round</td>
<td>37-37</td>
<td>32-32</td>
<td>27-27</td>
</tr>
<tr>
<td>19mm Round</td>
<td>10-10</td>
<td>8-8</td>
<td>6-6</td>
</tr>
<tr>
<td>25mm Round</td>
<td>6-6</td>
<td>4-4</td>
<td>2-2</td>
</tr>
<tr>
<td>5Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt Content</td>
<td>9.1</td>
<td>8.7</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Test of Asphalt Mixture  

Material meets specification requirements — except where marked.

T807-2  

A. J. Peters, P.E.  

Materials Engineer}

Dist. Lab. No.: 81-1011-4  

Hqtrs. Lab. No.: 405  

Materials Engineer
Material: + RIDE

Contract No.: 2768
F.A. No.: 1-205-3

Section: S CURVE / CEMENT R. BL.
C.S. No.: 1-205-3 (508)

County: KING

Subcontractor: H & LINE ASSALT

Place: SEATTLE
Date: 9-16-84

Organization Code: 412344
Forw. By: STATE CAR

Mix Design Desired:

Field Test Results - Report all screens used:

<table>
<thead>
<tr>
<th>Screen</th>
<th>3/8'</th>
<th>1/4'</th>
<th>1/10'</th>
<th>3/20'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>100%</td>
<td>100%</td>
<td>90-100</td>
<td>70-80</td>
</tr>
<tr>
<td>Test 2</td>
<td>70%</td>
<td>70%</td>
<td>60-70</td>
<td>50-60</td>
</tr>
</tbody>
</table>

Asphalt in Mix: Design 8.2% Plan 8.2% Extract 8.4%

Field Test Results - Report all screens used:

<table>
<thead>
<tr>
<th>Screen</th>
<th>3/8'</th>
<th>1/4'</th>
<th>1/10'</th>
<th>3/20'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>100%</td>
<td>100%</td>
<td>90-100</td>
<td>70-80</td>
</tr>
<tr>
<td>Test 2</td>
<td>70%</td>
<td>70%</td>
<td>60-70</td>
<td>50-60</td>
</tr>
</tbody>
</table>

Asphalt Content: 8.3%

Material meets specification requirements - except where noted.

A. J. PETERS, P.E.
Materials Engineer

Date: 9-26-84

N. E. Wilhahn, Jr.
# Request for Approval of Material Sources

**Date:** 01/15/84

**Cont. No.:** 2768  
**F.A. No.:** IE-405-3508  
**City/County or S.R. No.:** 405

**Section:** MP 2.65 TO 3.81 S CURVE/CLINCH F. BE & RR. BE.

<table>
<thead>
<tr>
<th>#</th>
<th>Description of Material</th>
<th>Local Supplier</th>
<th>Manufacturer's Brand or P/N</th>
<th>Approval Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>AC FOR JACK CSS-1</td>
<td>Carbon Asphalt</td>
<td>Richmond Beach</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>RUBBER MODIFIED NCP</td>
<td>Stonewy 5&quot; L</td>
<td>CEBEC Shores A338</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Aggregate CL &quot;D&quot;</td>
<td>Stonewy 5&quot; &amp; 6&quot;</td>
<td>Dieringer Pit B231</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Aggregate CL &quot;G&quot;</td>
<td>City Trench &amp; Fend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>RUBBERIZED NCP CL &quot;D&quot;</td>
<td>CHEVRON ASPHALT EVAGRO GRANULES</td>
<td>CEBEC Shores ASS8</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>CLASS &quot;O&quot; AGGREGATES</td>
<td>J.A. Jack &amp; Sons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contractor: Higbee, ASPHALT Paving Co., Inc.  
Submitted by: Michael J. Loomis

1. [Signature]

I, [Signature], have reviewed all items above for conformance to contract specifications and requirements and do recommend approval as these items conform thereto (✓) do not concur (Attach comments).

ANY ITEMS FOR WHICH APPROVAL IS BEING SOUGHT AS EQUIVALENT TO A SPECIFIED MATERIAL OR PRODUCT HAVE BEEN CIRCLED. ITEMS FULFILLING A SPECIFICATION OTHER THAN THE APPLICABLE STANDARD SPECIFICATIONS AS AMENDED HAVE BEEN UNDERLINED.

DEPARTMENT OF TRANSPORTATION MATERIALS LABORATORY USE ONLY

Action as items indicated by number in the approval column is identified per the following code:

1. Source Approved. Approval for Change of Source must be secured from the Headquarters Materials Engineer per Chapter 7.1 of the Construction Manual.
2. Approved without; submit samples for preliminary evaluation.
3. Approved without; submit samples for preliminary evaluation.
4. Approved without; submit brand name, name of manufacturer, or treating plant.
5. Approved without; submit Transportation Department P1 number (if known) and legal description.
6. Approved without; please submit catalog cuts and/or shop drawings.
7. Source Approved: Acceptance of Materials for project use is to be conditional upon certification of either 100 percent American manufacture or identification of foreign manufacture and materials cost within the permissible limits for the project (See Special Provisions).

**Received:** Oct 1, 1984  
**Received:** Aug 31, 1984  
**Contact:** Proj Engr. Miller

**Reviewed by:**  
**Phone No.:** 8231 783

**Reviewed by:** Proj Engr. Miller  
**Date:** 9/19/84  
**Project Engineer will submit control samples of material's finish and designations as covered in Construction Manual, Chapter 8.

**Materials Engineer:**
### Request for Approval of Material Sources

**Department of Transportation**

**48783**

**Date:** 8/22/84

**Contractor:** Hi-Line Asphalt

**Submitted by:** Michael J. Lemon

**Material:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description of Material</th>
<th>Source of Supply</th>
<th>Approval Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Rubberized ACP Class O</td>
<td>U.S. Oil</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>incl. Pavement Asphalt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AR 4000 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extender Asphalt</td>
<td>TACOMA</td>
<td>V, 2, 5</td>
</tr>
<tr>
<td></td>
<td>Rubber</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubber Modified Asphalt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concrete Pavement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AR 4000 W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- Sources of supply for all items checked (\( \)) in approval column are approved for use on the above improvement provided the materials delivered comply with specifications.
- Items as indicated by number in the approval column are identified per the following code:
  1. Source Approved. Approval for Change of Source must be secured from the Headquarters Materials Engineer per Chapter 3-1.7 of the Construction Manual.
  2. Approval with remarks; submit samples for preliminary evaluation.
  3. Approval withheld; submit brand name, name of manufacturer, and testing plant.
  4. Approval with remarks; submit Transportation Department pit number if known and test description.
  5. Approval withheld; please submit catalog, cuts, and/or shop drawings.
  6. Approval withheld.
  7. Source Approved: Acceptance of materials for project use is to be conditional upon certification of either 100 percent American manufacturer or identical to foreign manufacturer and material cost within the permissible limits for the project (See Special Provisions).

**Received:** SEP 21/1984

**Proj. Engr. Miller**

**Special Provisions:**

- Source data for all items checked (\( \)) in approval column are approved for use on the above improvement provided the materials delivered comply with specifications.
- Items as indicated by number in the approval column are identified per the following code:
  1. Source Approved. Approval for Change of Source must be secured from the Headquarters Materials Engineer per Chapter 3-1.7 of the Construction Manual.
  2. Approval with remarks; submit samples for preliminary evaluation.
  3. Approval withheld; submit brand name, name of manufacturer, and testing plant.
  4. Approval with remarks; submit Transportation Department pit number if known and test description.
  5. Approval withheld; please submit catalog, cuts, and/or shop drawings.
  6. Approval withheld.
  7. Source Approved: Acceptance of materials for project use is to be conditional upon certification of either 100 percent American manufacturer or identical to foreign manufacturer and material cost within the permissible limits for the project (See Special Provisions).
**REQUEST FOR APPROVAL OF MATERIAL SOURCES**

**Date:** August 20, 1984

**Cont. No.:** 2768

**F.A. No.:** IR-405-3 (508)

**City/County or S.R. No.:** 405

**Source:** SR 405 S Curve/ Cedar River Bridge

<table>
<thead>
<tr>
<th>Bid Item No.</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SOURCES OF SUPPLY</th>
<th>Approval Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Paint stripe</td>
<td>Norris Paint Co., Salem, Or.</td>
<td>Wash. spec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Control Sign Co., Tacoma, Wa.</td>
<td>Wash. spec/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR Traffic Safety Supply, Portland, Or.</td>
<td>RAY-O-Lite Corp., Huntingbeach, Ca.</td>
</tr>
<tr>
<td>11</td>
<td>Type I lane markers</td>
<td>QMC Company, Kent, Wa.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Type II lane markers</td>
<td>Epoxy to install lane markers</td>
<td></td>
</tr>
</tbody>
</table>

**Contractor:** [Signature]

**Submitted by:** [Signature]

---

**DEPARTMENT OF TRANSPORTATION MATERIALS LABORATORY USE ONLY**

Sources of supply for all items checked (✓) in approval column are approved for use on the above improvement provided the materials delivered comply with all specifications.

1. Source Approved. Approval for Change of Source must be secured from the Headquarters Materials Engineer per Chapter 3-1.7 of the Construction Manual.
2. Approval withheld: Submit samples for preliminary evaluation.
3. Approval withheld: Submit brand name, name of manufacturer, or treating plant.
4. Approval withheld: Submit Transportation Department part number (if existent) and legal description.
5. Approval withheld: Please submit catalog cuts and or shop drawings.
6. Approval withheld:
7. Source Approved: Acceptance of Materials for project use is to be conditional upon certification of either 100 percent American manufacture or identification of foreign manufacturer and materials cost within the permissible limits for the project (See Special Provisions).

---

**Date:** AUG 22, 1984

**Project Engineer:** [Signature]

**Materials Engineer:** [Signature]
**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

**DAILY REPORT OF ASPHALT PLANT OPERATIONS**

**SR** 405  **Section** 5 CURVE/CEMEX R. BR.  **District** 1

**Date** 9-13-84  **Class Mix** 'D'  **Contract No.** 2768

**Batch** Continuous  **Drum**  **Manufacturer** STANDARD  **Report No.** 1  **Capacity** 10,000

**IVX COMPOSITION**

<table>
<thead>
<tr>
<th>Bin #</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Filler</th>
<th>Asphalt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Total Mix</td>
<td>360</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>Wt. Lbs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>360</td>
<td>400</td>
</tr>
<tr>
<td>Average % Blending Sand Included</td>
<td>100 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 %</td>
</tr>
</tbody>
</table>

**IVX ANALYSIS**

- Indicate Method — Extraction or Quick Wash With or Without Vacuum Extraction

**Hot or Cold Bin Analysis**

<table>
<thead>
<tr>
<th>Bin #1</th>
<th>Bin #2</th>
<th>Bin #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Time</td>
<td>9:30</td>
<td></td>
</tr>
<tr>
<td>Temp. Mix °F</td>
<td>290</td>
<td></td>
</tr>
<tr>
<td>Temp. Aphalt °F</td>
<td>385</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>Q.L.</td>
<td></td>
</tr>
</tbody>
</table>

| % Passing | | 1% | | 5/8 | | 3% | | 1% | | 4 | | 2% | | 3% | | 2% | | 6 | |
|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90%       | | 100 | | 59 | | 30 | | 25 | | 20 | | 15 | | 10 | | 5 | | 2 | |
| 80%       | | 90-100 | | 45-50 | | 25-30 | | 15-20 | | 10-15 | | 9-10 | | 5-6 | | 3-5 | | 2-3 | |
| 70%       | | | | | | | | | | | | | | | | | |
| 60%       | | | | | | | | | | | | | | | | | |
| 50%       | | | | | | | | | | | | | | | | | |
| 40%       | | | | | | | | | | | | | | | | | |
| 30%       | | | | | | | | | | | | | | | | | |
| 20%       | | | | | | | | | | | | | | | | | |
| 10%       | | | | | | | | | | | | | | | | | |
| 5%        | | | | | | | | | | | | | | | | | |
| 2%        | | | | | | | | | | | | | | | | | |
| 1%        | | | | | | | | | | | | | | | | | |

**ASPHALT PERCENTAGES**

- Original Design | 8.5 %
- Ordered | 8.5 %
- Calculated from Production | 8.7 %
- By Extraction Test | 8.7 %

**AGGREGATE WASTED**

- Bin No.
- Tons

**PRODUCTION**

- Plant Started | 7:30 AM
- Plant Stopped | 3:00 AM
- Air Temp. | 68 F
- P.M.

**NOTES:**

- PLANT BROKE BINN AT 5:30 AM
- Weather CLEAR
- Total Production: 180

**R. Mithill** 9-13-84
**DAILY REPORT OF ASPHALT PLANT OPERATIONS**

**SR** 405  **Section** 5 CURVE/CE DAR R. BR.  **Contract No.** 2768

**Date** 9-16-84  **Class Mix** D  **Report No.** 2

**Batch** Continuous  **Drum**  **Manufacturer** STANDARD  **Capacity** 10,000

**AGGREGATE COMPOSITION**

<table>
<thead>
<tr>
<th>Bin #</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Total Mix</td>
<td>8360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wt. Lbs.</td>
<td>3660</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average % Blending Sand Included</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ASPHALT ANALYSIS**

- Filter Asphalt Total 100%  
- Total Batch Wt. or Lbs./Rev. 340 400

**ANALYSIS**

- Indicate Method — Extraction or Quick Wash With or Without Vacuum Extraction

**TEST ANALYSIS**

<table>
<thead>
<tr>
<th>Test #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Size</td>
<td>% Passing</td>
<td>Screen Size</td>
<td>% Passing</td>
<td>Screen Size</td>
<td>% Passing</td>
</tr>
<tr>
<td>Time</td>
<td>9:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. Mix °F</td>
<td>320</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. Asph. °F</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>Q.F.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Passing</th>
<th>Job</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>#10</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>#20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#200</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>% Asph.</td>
<td>9.1</td>
<td></td>
</tr>
</tbody>
</table>

**SAND/SILT RATIO**

| % Moisture |  |  |  

**ASPHALT PERCENTAGES**

- Original Design 8.5%
- Ordered 8.5%
- Calculated from Production
- By Extration Test 9.1%

Mix sample sent to Lab today represents 16B Tons Total Production

Our complete analysis is shown by Test # 1

**PRODUCTION**

- Plant Started 8:30 AM
- Plant Stopped 11:00 PM
- Air Temp. 66° F

**BATCH WASTED**

<table>
<thead>
<tr>
<th>Bin No.</th>
<th>Tons</th>
</tr>
</thead>
</table>

**REMARKS:**

- Signed by R. Mitchell 9-16-84

- Weather: Clear
# Daily Report of Asphalt Plant Operations

## Plant
- **District:** 1
- **Contract No.:** 276.8

## Mix Composition
- **Bin #:** 4
  - **Rubber:** 120 lbs
  - **Mineral Filler:** 200 lbs
- **Total:** 3350 lbs

## Composition Analysis
- **Method:** Q.E.
- **Job Frac. Design:**
  - **Screen Size:**
    - **% Passing:**
      - 1/8": 100%
      - 3/16": 79%
      - 3/8": 79%
      - 5/32": 79%
      - 7/32": 79%
      - 9/32": 79%
      - 1/4": 79%
      - 5/32": 79%
      - 3/8": 79%

## Aggregate Wasted
- **Bin No.:**
- **Tons:**

## Production
- **Plant Started:** 11:50
- **Plant Stopped:** 3:00
- **Air Temp.:** 59°F A.M. 59°F P.M.
- **Weather:** clear to partly cloudy

## Notes
- **SAME #2 TAKEN 9-15-84 FOR INFORMATION**
- **PLANT BORKEN DOWN AT 3:00 A.M.**
- **R. Mitchell:** 9-15-84
## Daily Report of Asphalt Plant Operations

### General Information
- **Plant:** 405
- **Section:** S Curve / Cedar R. BL.
- **Contract No.:** 2768
- **Date:** 9-16-84
- **Class Mix:** A-338
- **Date of Report:** 9-16-84

### Mix Composition
- **Bin # 1:** 120
- **Bin # 2:** 200
- **Bin # 3:** 330
- **Total Batch Wt. or Lbs. / Rev.:** 622
- **Particle Coating (WSDOT Test 714):** 90%

### Mix Analysis
- **Test #** | Bin # 1 | Bin # 2 | Bin # 3
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>11:45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. Mix °F</td>
<td>320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. Asph. °F</td>
<td>375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>Q.E.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### File: Std. Specs.
- Cl. "A" 100
- Cl. "B" 90-100
- Cl. "C" 80-88
- Cl. "D" 75-85

#### Screen Size

<table>
<thead>
<tr>
<th>Screen Size</th>
<th>Bin # 1</th>
<th>Bin # 2</th>
<th>Bin # 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#8</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#200</td>
<td>10.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moisture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Aggregate Wasted
- **Original Design:** 8.2%
- **Plant Started:** 6:30 AM
- **Plant Stopped:** 1:15 P.M.
- **Air Temp.:** 60° F

### Production
- **Total Total Production:** 154 tons

### Notes:
- **Date:** 9-16-84
- **Weather:** Clear
- **Signed:** R. Mitchell

---

**Observations:**

- The asphalt mix percentages are calculated based on the original design and the actual production.
- The screening analysis shows that the mix meets the required standards for each size.
- The aggregate wasted is calculated for each bin, ensuring the production is within acceptable limits.

---

**Signatures:**

- R. Mitchell [Signature]
- Date: 9-16-84
October 18, 1984

Sam Teltzel

FILE

Contract 2768
S Curve Cedar River Bridge & RR Bridge
Pavement Noise Measurements

Noise measurements were made on the repaved Renton SR 405 S Curves, October 5, 1984. These measurements were made inside car 1A1-202, Ford Fairlane (front seat) travelling the speed limit both north and southbound. These measurements were made to see if there was an interior difference in noise level between the plus ride (northbound) and rubberized open graded (southbound) lanes.

The results showed the same dBA levels both northbound and southbound. Going 50 mph, the noise level inside the car was 68 dBA on the right lanes north and southbound and 67 dBA on the left lanes. Several runs were made in each direction in each lane. This noise level was 4 to 6 dBA less than that measured on the worn and grooved concrete pavement on either side of the S Curves, and the differences in noise level was readily noticeable.

These results are not meant to be conclusive. A study in cooperation with the University of Washington is planned to extensively evaluate the tire-pavement noise for a variety of different pavement surface and wear conditions.