WSDOT Standard Practice for HMA Mix Designs QC 8

Standard Practice for Development, Submittal and Approval of Hot Mix Asphalt Mix Designs

1. Scope

1.1 This standard specifies requirements and procedures for evaluation and approval of Hot Mix Asphalt mix designs for the Qualified Products List.

1.2 This standard may involve hazardous materials, operations and equipment. It does not address all of the safety problems associated with their use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 WSDOT Standards

2.1.1 Standard Specifications for Road, Bridge, and Municipal Construction M 41-10

3. Terminology

3.1 AASHTO – American Association of State Highway and Transportation Officials

3.2 Contractor/Producer – The Contractor, Producer or production facility that has the capacity for producing HMA meeting WSDOT Standard Specifications.

3.3 ASA – Aggregate Source Approval

3.4 ASTM – American Society of Testing and Materials

3.5 HMA – Hot Mix Asphalt

3.6 PG – Performance Graded asphalt binder

3.7 QPL – Qualified Products List

3.8 State Materials Laboratory – 1655 S. 2nd Avenue SW, Tumwater, WA 98512-6951

3.9 WSDOT – Washington State Department of Transportation

3.10 Business Days – All weekdays, excluding state and federal holidays

3.11 Bituminous Materials Section – Testing Laboratory located at the WSDOT State Materials Laboratory
4. Significance and Use

4.1 This standard specifies procedures for designing, submitting, evaluating and approving HMA mix designs for inclusion to the QPL.

5. Mix Design Development

5.1 The Contractor/Producer or designee shall develop a HMA mix design in accordance with Section 5-04.2(1) of the Standard Specifications. The HMA mix design aggregate structure, asphalt binder content, anti-stripping additive, rutting susceptibility and indirect tensile strength shall be determined in accordance with WSDOT SOP 732, FOP for AASHTO T 324 and WSDOT FOP for ASTM D 6931 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6) of the Standard Specifications.

5.1.1 The Contractor/Producer's mix design %Gmm Ndesign must be 96.0 ± 0.2% at the optimum percent binder (Pb).

6. Submission to the WSDOT Qualified Products List

6.1 Once the HMA mix design has been developed, the Contractor/Producer shall contact the QPL Engineer (at qpl@wsdot.wa.gov) or 360-709-5442 to initiate the HMA mix design submittal process.

6.2 To initiate the mix design submittal process, the Contractor/Producer shall provide the following:

- Company contact and billing information
- A completed copy of WSDOT Form 350-042
- A completed WSDOT Product Submittal Application Form
- ASA Report for the aggregate source(s)
- QPL Contractor/Producer Product Information page(s) for the PG asphalt binder and the anti-stripping additive
- Certification on the source of the recycled materials and applicable documentation per Standard Specifications Sections 5-04.2 and 9-03.21(1) for mix designs containing Recycled Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS)

6.3 Once the information from Step 6.2 is received the QPL Engineer will forward the Contractor/Producer’s submittal to the Bituminous Materials Section and assign a QPL evaluation tracking number. This will initiate the timeline associated with each step of the mix design evaluation process in Section 6 of this plan, as shown in Table 1.

6.4 The Bituminous Materials Section will review the mix design submittal (WSDOT Form 350-042) and all documentation provided to ensure it is complete and meets specification requirements. The Bituminous Materials Section will notify the QPL Engineer once the review is complete. Mix design submittals that are incomplete or do not meet the specification requirements will be rejected and require resubmittal in accordance with Section 6.2 of this plan. All timelines in Table 1 will restart with resubmittal of mix designs.
6.5 If the mix design submittal is complete and meets specification, the QPL Engineer will provide the following to the Contractor/Producer:

- QPL evaluation tracking number
- Initial letter detailing mix design evaluation
- Cost sheet for mix design evaluation detailing submittal requirements and associated charges

6.6 After payment is received for the mix design evaluation, the Bituminous Materials Section will contact the Contractor/Producer and schedule the mix design materials delivery date.

6.6.1 The Contractor shall submit representative samples of aggregate, RAP and RAS (if required), totaling 700 pounds proportioned to match the Contractor’s proposal to the State Materials Laboratory for testing.

For example, if the Contractor’s proposal consists of five stockpiles with the following blending ratio:

<table>
<thead>
<tr>
<th>Material</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” – #4</td>
<td>20%</td>
</tr>
<tr>
<td>½” – #8</td>
<td>30%</td>
</tr>
<tr>
<td>#4 – 0</td>
<td>30%</td>
</tr>
<tr>
<td>RAP</td>
<td>15%</td>
</tr>
<tr>
<td>RAS</td>
<td>5%</td>
</tr>
</tbody>
</table>

Calculate the amount of aggregate needed from each stockpile in the following manner:

<table>
<thead>
<tr>
<th>Material</th>
<th>Pounds of Aggregate Needed Per Stockpile</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” – #4</td>
<td>700 lbs x 0.20</td>
</tr>
<tr>
<td>½” – #8</td>
<td>700 lbs x 0.30</td>
</tr>
<tr>
<td>#4 – 0</td>
<td>700 lbs x 0.30</td>
</tr>
<tr>
<td>RAP</td>
<td>700 lbs x 0.15</td>
</tr>
<tr>
<td>RAS</td>
<td>700 lbs x 0.05</td>
</tr>
</tbody>
</table>

6.6.2 Transport aggregate in bags or other containers so constructed as to preclude loss or contamination of any part of the sample, or damage to the contents from mishandling during shipment. The weight limit for each bag or container of aggregate is 30 pounds maximum.

6.6.3 Each aggregate bag or container shall be clearly marked or labeled with suitable identification including the contract number, aggregate source identification and size of stockpile material.
6.7 The Bituminous Materials Section will notify the Contractor/Producer when the mix design materials have been received, logged-in and a calendar day completion will be provided to the Contractor/Producer as specified in Section 6.9.

6.7.1 Mix design materials that are non-representative and/or out of specification will be rejected and require resubmittal of all mix design material. Mix design materials that are rejected and not picked up by the Contractor/Producer within 2 working days of the receipt of rejection will be disposed of. All timelines in Table 1 will restart with resubmittal of mix design materials.

6.8 A priority queue will be established by the Bituminous Materials Section for HMA mix design evaluations.

6.8.1 Preference will be given to mix designs submitted for WSDOT contracts.

6.8.2 HMA mix design evaluations for WSDOT contracts will be completed within 25 calendar days after the notification in Section 6.8.

6.8.3 HMA mix design evaluations that are not for WSDOT contracts will be completed approximately 40 calendar days after the notification in Section 6.7.

6.8.4 The Bituminous Materials Section reserves the right to limit the number of HMA mix design evaluations accepted for non WSDOT contracts at any time. Workload and staffing will dictate the number of HMA mix design evaluations accepted at one time.

6.9 After the mix design evaluation is complete the Bituminous Materials Section will provide the following:

- Final notification indicating QPL status after completion of the mix design evaluation.

### Table 1 Timelines Associated with Each Step of the Mix Design Evaluation Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>QPL Engineer Forwards Submittal &amp; Assigns QPL Tracking Number</td>
</tr>
<tr>
<td>6.4</td>
<td>Bituminous Materials Reviews Mix Design Submittal &amp; Notifies QPL Engineer</td>
</tr>
<tr>
<td>6.5</td>
<td>QPL Engineer Provides Contractor/Producer QPL Tracking Number, Letter and Cost Sheet</td>
</tr>
<tr>
<td>6.6</td>
<td>Bituminous Materials Contacts Contractor/Producer to Schedule Delivery of Materials</td>
</tr>
<tr>
<td>6.7</td>
<td>Bituminous Materials Notifies Contractor/Producer When Materials are Received, logged-in and provides the completion date</td>
</tr>
<tr>
<td>6.8</td>
<td>Mix Design Evaluation Stage See Sub-Sections for Calendar Day Criteria</td>
</tr>
<tr>
<td>6.9</td>
<td>Bituminous Materials Section Provides Contractor/Producer Final Notification Indicating QPL Status</td>
</tr>
</tbody>
</table>
7. Mix Design Evaluation

7.1 The HMA mix design submitted by the Contractor/Producer will be evaluated by the Bituminous Materials Section in accordance with Section 9-03.8(2) and 9-03.8(6) of the Standard Specifications. All communication from the Bituminous Materials Section will be to the Contractor's/Producer's contact as specified on WSDOT Form 350-042.

7.2 HMA mix designs will be placed on the QPL provided they meet the requirements of Section 9-03.8(2) and 9-03.8(6) of the Standard Specifications.

7.2.1 Voids in Mineral Aggregate (VMA) must be within 0.5% of the minimum specification in accordance with Section 9-03.8(2) of the Standard Specifications for the class of HMA evaluated.

7.2.2 % Gmm at N design must be within 1.5% of the specification in Section 9-03.8(2) of the Standard Specifications for the class of HMA evaluated.

7.2.3 Voids Filled with Asphalt (VFA) in Section 9-03.8(2) will not be part of the mix design evaluation.

7.3 A mix design that fails to meet the requirements listed in Section 7.2, 7.2.1 and 7.2.2 will not be accepted or placed on the QPL.

7.4 Adjustments to mix designs will not be allowed once they have been evaluated.

7.5 The Contractor/Producer will be issued a QPL mix design record providing the mix design is in compliance with Section 9 of this Standard Practice.

7.6 The QPL listing for HMA mix designs will show the following information:
   • Company name
   • HMA Class
   • Aggregate Source(s)
   • PG Grade
   • PG Supplier
   Anti-stripping additive brand and quantity (if applicable)

8. Referencing Mix Designs From The QPL

8.1 Requests for reference HMA mix designs for non WSDOT projects will be completed on WSDOT Form 350-041 and emailed to BituminousMaterials@wsdot.wa.gov.

8.2 Reference HMA mix design reports will be issued for new mix designs on active and awarded WSDOT contracts once accepted and placed on the QPL.

8.3 Reference HMA mix design reports will be issued for current mix designs on active and awarded WSDOT contracts provided the HMA production history is in compliance with Standard Specifications Section 5-04.3(11)F.
9. **Removal From The QPL**

   9.1 HMA mix designs will be automatically removed from the QPL in accordance with *Standard Specifications* Section 5-04.2(1).

   9.2 HMA mix designs may be removed from the QPL if found in nonconformance with the *Standard Specifications* or this Standard Practice. Causes for removal from the QPL may include, but are not limited to the following:

   - Failure to comply with requirements of Standard Practice QC 8.
   - HMA mix designs that are out of compliance in accordance with *Standard Specifications* Section 5-04.3(11)F.
   - Failure to notify WSDOT of changes in HMA production.
   - Removal at the request of the Contractor/Producer

10. **Ignition Furnace Calibration Factor (IFCF) Samples**

    10.1 Each HMA mix design submitted for evaluation will have 12 IFCF samples produced for WSDOT as part of the QPL evaluation process.

    10.2 The Contractor/Producer may elect to have 4 IFCF samples produced as part of the QPL evaluation process.