- District Twelve’s asphalt producer’s utilize high RAP and RAP/RAS content mixtures.
- The RAP/RAS replacement binder ratio (RBR) on these mixtures is up to .52 on base courses and .40 on wearing courses.
- NCHRP Report 752, 2013 considers mixtures with RBR equal to or greater than .25 to be high RBR mixtures.
- Special stockpile handling and performance testing is recommended for high RBR mixes.
District Twelve requested performance testing for informational purposes on asphalt mixtures with RBR equal to or greater than .25 in 2014.

The asphalt institute recommended the bending beam fatigue test ASTM D7460 to predict the fatigue durability of the high RBR mixtures compared to the virgin mixture.

The performance testing that was conducted in 2014 showed a significant decrease in the fatigue durability of the high RBR mixtures.
District Twelve created a special provision in 2015 that requires the ASTM D7460 testing on asphalt mix designs with RBRs greater than .25 for design approval.

District Twelve used this special provision on one hundred percent state funded projects in 2015 and 2016.

District Twelve will continue to use this special provision on one hundred percent state funded projects in 2017.
Performance testing was conducted by two District Twelve producers in 2015 and 2016 to meet the requirements of the high RBR special provision.

The producers were able to meet the special provision requirements with the use of 58 – 28 asphalt in the high RBR mixtures.

The test results have shown a significant increase in fatigue durability of the high RBR mixtures by using 58 – 28 asphalt.
Performance Testing Results

Mixtures 19mm NMAS
ASTM 7460 4-point Flexural Fatigue
Cycles*Stiffness Analysis
20.0°C

<table>
<thead>
<tr>
<th>Mixtures</th>
<th>Cycles to Failure, (Nf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016 19mm 58-28 25% RAP/5% RAS</td>
<td>452,064</td>
</tr>
<tr>
<td>2015 19mm 64-22 25% RAP &amp; 5% RAS</td>
<td>133,668</td>
</tr>
<tr>
<td>2015 19mm 64-22 35% RAP &amp; 5% RAS</td>
<td>82,951</td>
</tr>
<tr>
<td>2014 19mm Virgin 64-22</td>
<td>212,060</td>
</tr>
<tr>
<td>2014 19mm 64-22 15% RAP/5% RAS</td>
<td>184,501</td>
</tr>
</tbody>
</table>

Microstrain

Pennsylvania
DEPARTMENT OF TRANSPORTATION
• For JMF’s placed in quantities of 500 tons or less, the tonnage may be considered a lot if density acceptance is by pavement cores, however mixture acceptance will be by certification. The lot will be divided into three equal sub lots.