PennDOT’s 2018 Construction Program & Initiatives

George W. McAuley Jr., P.E.
Deputy Secretary for Highway Administration

January 15-17, 2018
Hotel Hershey
Partnering – Culture Change

- Future Leaders of Industry (FLI)
- PACA Young Leaders Development Group
- APC Regional Sessions
- PAPA Regional Technical Meetings
- Pennsylvania Association of Asphalt Material Applicators (PAAMA) – QIC
- Winter School Efforts (including Industry Day)
Diversity

- **Equal Employment Opportunity**
  - Hiring, Recruitment, Mentoring, Retention, Career Paths

- **DBE contracting requirements**
  - Three (3) Regional Outreach Sessions for the first time
  - New recruitment position and function including:
    - Career fairs
    - Partnering with diverse organizations
Asset Management

- Better predictive models, cyclical preventative maintenance, the right treatment at the right time

- Pavement Asset Management System (PAMS)
  - Developing the upgrade to implement by fall, 2018

- Bridge Asset Management System (BAMS)
  - Plans to be implemented within 24 months

- Performance Metrics
PennDOT Maintenance

- Core Maintenance Cycles
- Productivity
- Good practices statewide
- Cost effective practices
- Equipment Sharing
  - Tools
  - Practices
  - Cost Effective/Right Size Summer Fleet
County Transformation

- County Transformation and Accreditation
  - “Smart Practices”
  - Fleet Right Sizing
  - Winter Liquid Strategy
  - Sectional Cycle Maintenance
  - Updated Trainings
  - Succession Planning/Mentoring Programs
  - New Organization Structure “Unit”
Road MaP

- Road Maintenance and Preservation (Road MaP)
  - $2.1B Investment
    - $600M highway and bridge capital projects
    - $500M for Interstate preservation and reconstruction program
  - $1B for Maintenance
    - Short-term funding distribution
      - $16 million for 2018-19
      - Additional $16 million/year following
    - Winter
    - Core Cyclical Maintenance
    - Efficient & Effective with remaining capacity
Secondary Road Improvement Plan

- Lower-Volume Roads

- Evolving 5-Yr. District “Paving” Plan
  - Low-Cost Treatments
    - RAP, High RAP WMA, Flexible Base, etc.
Reclaimed Asphalt Pavement (RAP)

- Beneficial Uses
- Policies
- Plan / Track
- Retainage
  - Quantities
  - Bid Prices
Reclaimed Asphalt Pavement (RAP)

- 2017 RoadMaP Pilot Sites
  - Armstrong County
    - Roughly 5 miles of lower volume roads
    - $225,000 compared to approximately $371,000
  - Monroe County
    - Nearly 4 miles of lower volume roads
    - $245,000 compared to roughly $584,000
Green Initiatives - RAP

Reclaimed Asphalt Pavement (RAP) Usage Trend in HMA & WMA

With RAP

Without RAP

Virgin HMA/WMA

HMA/WMA w/ RAP
Green Initiatives - RAP

Amount of RAP Milled from Pavements

District

D1 D2 D3 D4 D5 D6 D8 D9 D10 D11 D12

Tons

0 100,000 200,000 300,000 400,000 500,000 600,000 700,000 800,000 900,000 1,000,000

2015 2016 2017
QC Data Analysis for Process Control

- Use Six Sigma principles to analyze data.
  - Short Term Process Capability ($C_{pk}$)
  - Long Term Process Capability ($P_{pk}$)

- Incentives
  - Less oversight or higher incentive pay for higher levels of process capability.

- Disincentives
  - More oversight or stopping production for process incapable processes.
Extended-Season Paving

• 2015 – Revised Pub. 408, Section 409

• 2017 PennDOT = new process
  (for paving beyond traditional end of season dates)

• Process ➔ contractor enhanced QC practices & documentation

• Wearing courses >10 million ESALs or PG 76-22 extended thru November 15

• All other courses extended thru December 15 & from March 1 thru March 31
Extended-Season Paving

- Specification highlights include:
  - Extended-Season QC Plan & pre-meeting
  - Density acceptance by cores
  - All temp and surface requirements still apply
  - WMA at HMA temperatures
  - No change to ambient & surface temps
  - Contractor required to submit QC data
  - Spring evaluation of pavement
    (performance thresholds prior to final acceptance)
Extended-Season Paving

• PennDOT gave contractors option to volunteer for fall 2017 pilot paving projects

• 26 pilot projects performed in 7 of 11 Districts

• Preliminary pilot information collected and being analyzed

• Anticipate a Clearance Transmittal be circulated in Spring 2018 (moving process forward)
  - Dropping requirement to record depth measurement
  - MTV requirement for placements of 1500 LF or more
  - Cores could be optional provided technician monitors
    o Dept still has option to take cores
Extended-Season Paving

- 7 Extended-Season Pilot Projects
  - Pilot density averaged 95.1%
  - Results for binder and wearing mixes (after Oct 31) averaged 94.7%
Collaboration

- Transportation Quality Initiative (TQI)
  - Partnering
  - Steering quality initiatives
- Asphalt Pavement Quality Improvement Committee (APQIC)
- Other Improvement Committees
  - Concrete Pavement Quality Improvement Committee (CPQIC)
  - Aggregate Quality Improvement Committee (AQIC)
  - Pennsylvania Association of Asphalt Material Applicators (PAAMA)
Project Letting Trends

*2018 Projected

- 2011: $1.93B, 846 Projects
- 2012: $1.92B, 764 Projects
- 2013: $1.63B, 566 Projects
- 2014: $2.56B, 832 Projects
- 2015: $2.52B, 608 Projects
- 2016: $2.43B, 825 Projects
- 2017: $2.56B, 703 Projects
- 2018: $2.4B*, 750 Projects

* Dollars: Billions
  # of Projects

Pennsylvania Department of Transportation
www.dot.state.pa.us
# Contract Distribution

## Cost Based Percentage

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>59%</td>
<td>69%</td>
<td>53%</td>
<td>65%</td>
<td>56%</td>
</tr>
<tr>
<td>Bridge</td>
<td>36%</td>
<td>24%</td>
<td>35%</td>
<td>21%</td>
<td>33%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>7%</td>
<td>12%</td>
<td>14%</td>
<td>11%</td>
</tr>
</tbody>
</table>

* 2018 Projected
# Material Quantities

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt (Tons)</td>
<td>5.33M</td>
<td>4.13M</td>
<td>6.12M</td>
<td>6.75M</td>
<td>6.40M</td>
<td>7.70M</td>
<td>7.35M</td>
</tr>
<tr>
<td>Structural Concrete (CY)</td>
<td>0.38M</td>
<td>0.37M</td>
<td>0.32M</td>
<td>0.38M</td>
<td>0.37M</td>
<td>0.39M</td>
<td>0.40M</td>
</tr>
<tr>
<td>Concrete Paving (SY)</td>
<td>0.48M</td>
<td>0.58M</td>
<td>0.67M</td>
<td>1.01M</td>
<td>1.04M</td>
<td>0.80M</td>
<td>0.71M</td>
</tr>
<tr>
<td>Aggregate (Tons)</td>
<td>7.79M</td>
<td>7.61M</td>
<td>9.55M</td>
<td>11.72M</td>
<td>9.88M</td>
<td>11.60M</td>
<td>12.00M</td>
</tr>
</tbody>
</table>

*Projected
### 2018 Program Distribution By District*

<table>
<thead>
<tr>
<th>1-0</th>
<th>2-0</th>
<th>3-0</th>
<th>4-0</th>
<th>5-0</th>
<th>6-0</th>
<th>8-0</th>
<th>9-0</th>
<th>10-0</th>
<th>11-0</th>
<th>12-0</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>57.0%</td>
<td>73.0%</td>
<td>86.0%</td>
<td>77.0%</td>
<td>77.0%</td>
<td>39.0%</td>
<td>71.0%</td>
<td>56.0%</td>
<td>54.0%</td>
<td>37.0%</td>
<td>57.0%</td>
<td>56.0%</td>
</tr>
<tr>
<td>28.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>3.0%</td>
<td>5.0%</td>
<td>19.0%</td>
<td>1.0%</td>
<td>3.0%</td>
<td>5.0%</td>
<td>6.0%</td>
<td>8.0%</td>
<td>11.0%</td>
</tr>
<tr>
<td>15.0%</td>
<td>22.0%</td>
<td>9.0%</td>
<td>20.0%</td>
<td>18.0%</td>
<td>42.0%</td>
<td>28.0%</td>
<td>41.0%</td>
<td>41.0%</td>
<td>57.0%</td>
<td>35.0%</td>
<td>33.0%</td>
</tr>
</tbody>
</table>

* Projections for 2018
For 2018 we anticipate up to 15 projects greater than $20 Million
Quality – Trends & Targets

Bituminous Lot Payment Percentage

- Full Payment (%)
- Reduced Payment (%)
- R & R (%)

No PWT Lots Included
Quality – Trends & Targets

Bituminous Lot Payment Percentage

- Bonus Payment (%)
- Full Payment (%)
- Reduced Payment (%)
- R & R (%)

PWT Lots Included
Quality – Trends & Targets

Bituminous Lot Payment Percentage – CY 2017

- 409 Std.: 2.4%
- 409 Total: 95.2%
- PWT Std.: 18.7%
- PWT RPS: 8.5%
- PWT Total: 72.1%
- SMA: 49.1%
- Totals: 38.3%

- Bonus Payment (%): 0.8%
- Full Payment (%): 8.5%
- Reduced Payment (%): 11.2%
- Remove & Replace (%): 1.5%

www.dot.state.pa.us
# CY 2017 R&R Lot Disposition

<table>
<thead>
<tr>
<th>Lot Disposition</th>
<th>409 Std. &amp; RPS and 419 (SMA)</th>
<th>PWT Std. &amp; RPS</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Lots Retested (R&amp;R)</td>
<td>8 (8=R&amp;R)</td>
<td>16 (11=R&amp;R)</td>
<td>40,388.09</td>
</tr>
<tr>
<td>Retested Lots = Pass (or Higher OLPF)</td>
<td>5 (5 of R&amp;R)</td>
<td>12 (9 of R&amp;R)</td>
<td>36,238.28</td>
</tr>
<tr>
<td>Total R&amp;R Lots After All Retests</td>
<td>22</td>
<td>9</td>
<td>33,015.16</td>
</tr>
<tr>
<td>R&amp;R Lots Left in Place @ 50%</td>
<td>10</td>
<td>0</td>
<td>10,363.64</td>
</tr>
<tr>
<td>R&amp;R Lots Left in Place @ 70%</td>
<td>0</td>
<td>4</td>
<td>7,324.03</td>
</tr>
<tr>
<td>R&amp;R Lots Left in Place per Agreement</td>
<td>1</td>
<td>0</td>
<td>1,333.45</td>
</tr>
<tr>
<td>R&amp;R Lots – Outlier Remvd = 100%</td>
<td>0</td>
<td>0</td>
<td>4,820.89</td>
</tr>
<tr>
<td>R&amp;R Lots - TBD (Open)</td>
<td>9</td>
<td>4</td>
<td>9,656.86</td>
</tr>
<tr>
<td>R&amp;R Lots Actually R&amp;R'd</td>
<td>2</td>
<td>1</td>
<td>4,337.18</td>
</tr>
</tbody>
</table>
Asphalt Content for 9.5 mm and 12.5 mm Wearing Courses – Individual Box Samples
Quality – Trends & Targets

Bars = AC Std. Dev.
Line = % Sublot Results within ±0.2 of JMF Target
Percent Within Tolerance (PWT)

- **All Appropriate Paving Projects** in 2018

- Target: Drive product consistency focused on job mix formula (50% lot pay factor)

- Tighter adherence to field density spec. requirements (50% lot pay factor)
Focus Areas: WMA Standard Const. Individual Core Density

Statewide % of WMA Cores with X% Density
[Std. Lots (409A)]

Normalized % of Total

% Density of Individual Cores - Wearing

Wearing Course Density Data from eCAMMS.
Focus Areas: WMA RPS Const. Individual Core Density

Statewide % of WMA Cores with X% Density [RPS Lots (409B)]

Wearing Course Density Data from eCAMMS.
Focus Areas: WMA PWT Standard Const. Individual Core Density

Statewide % of WMA Cores with X% Density [Std. Lots (409APWT)]

Normalized % of Total

% Density of Individual Cores - Wearing

Wearing Course Density Data from eCAMMS.
Focus Areas: WMA PWT RPS Const.
Individual Core Density

Statewide % of WMA Cores with X% Density [RPS Lots (409BPWT)]

Normalized % of Total

% Density of Individual Cores - Wearing

Wearing Course Density Data from eCAMMS.
Warm Mix Asphalt (WMA)

### WMA Percentage

- **2016**:
  - Construction: 70%
  - Dept Force: 48%
  - Overall: 63.4%

- **2017**:
  - Construction: 92%
  - Dept Force: 78%
  - Overall: 88%
Full-Depth Reclamation (FDR)

- Slag FDR Pilot Project
  - SR 46 in McKean County
  - Control Section used 2A aggregate
  - Experimental Section used Slag aggregate
  - Emulsified Asphalt Stabilization FDR
  - Project completed in 2016
Pennsylvania Asphalt Pavement Association
58th Annual Asphalt Paving Conference

We Look Forward to Working with PAPA in 2018!

Thank You