

PAPA 60th Annual Asphalt Pavement Conference

PennDOT's 2020 Construction Program & Initiatives

Melissa J. Batula, P.E.

Deputy Secretary for Highway Administration
PA Department of Transportation



UPCOMING CHALLENGE: Generations

- **By 2021 – 46-50%** of workforce Millennials
- X-Gen “gap”
 - 72M Baby Boomers (1945-1964)
 - 40M X-Gens (1964-1980)
 - 73M Millennials (1980-1997)
 - 74M iGens (1997-2012)
- Millennials in Leadership
10 yrs. sooner than others
- **Are You Ready?**



PennDOT by the Numbers



PennDOT Strategic Themes

Our Strategic Themes



Sustainable Policy-Based Investments: Invest taxpayer money into smart, environmentally sustainable transportation infrastructure in which community benefits and impacts are sought before dollars are allocated.

Open, Proactive Communications: Maintain proactive, consistent, transparent, and open (two-way) communications with the public, employees, and transportation stakeholders.

Sustainable Infrastructure Investment: Proactively and innovatively manage resources.

Effective Partnerships: Be, at all levels, a consistent resource partner to intra-agency offices, outside partners, stakeholders, and our customers.

Innovative, Smart, and Diverse Organization: Nurture a diverse organization and workforce by encouraging innovative thinking, process improvement, job-specific training, minority opportunities, and sound technology investments.

Safety at All Levels: Sustain the resources to build a safety culture for employees, contractors, and our customers.

SAFETY

- Safety Culture Established – 2011
- Accomplishments
- Reinvigorate Safety Emphasis
- Executive Safety Council



PennDOT 20/20 Strategic Direction

Safety at All Levels

Sustain the resources to build a safety culture for employees, contractors, and our customers

- Focus efforts on **employee safety culture** and ensure safe work environments
- Provide travelers with the necessary tools and resources to make **travel throughout Pennsylvania safer**
- **Increase messaging** on the dangers of DUI, distracted driving behavior and failure to wear seatbelts



Work Zone Safety



Automated Work Zone Speed Enforcement (AWZSE) in Pennsylvania

OPEN, PROACTIVE COMMUNICATIONS

- Employees at All Levels
- Planning
- Design
- Construction
- Maintenance
- Operations & Performance



PennDOT 20/20 Strategic Direction



Open, Proactive Communications

Maintain proactive, consistent, transparent, and open (two-way) communications with the public, employees, and transportation stakeholders

- Implement a **modern website** that serves as a one-stop-shop for all PennDOT customers and partners.
- Develop and maintain an **interactive website** for Driver and Vehicle Services (DVS) products and services.
- Consistently explain **intermodal improvements** made possible through **Act 89** via website.
- Ensure that PennDOT's **Central and Field Press Offices** are adequately and appropriately staffed.
- Develop and implement a flexible and measurable **communications plan** addressing all areas of PennDOT 20/20 Vision.
- Expand and encourage **communications among employees** at all levels.



Enhanced Communications



511PAConnect is a new, trapped-traveler emergency communications tool that allows incident response teams to communicate via automated phone or text message directly with motorists who are trapped in a roadway backup.

511PAConnect is a new, trapped-traveler emergency communications tool that allows incident response teams to communicate via automated phone or text message directly with motorists who are trapped in a roadway backup. The tool also gives emergency crews a clearer picture of who is sitting in a trapped vehicle and where they are, so agencies can better plan for the use of resources.

511PAConnect is not a mobile app and requires no initial download or action from motorists.

511PAConnect will only be activated during prolonged, emergency roadway stoppages that are expected to last four or more hours. Upon activation, PENN will send a push message to all phones in the incident area. This message will provide motorists who are impacted instructions for how to participate and receive further information throughout the incident.

It also offers distinct benefits to travelers, including:

- Official updates and the latest relevant information delivered in the method most convenient for the traveler (automated phone call, text message, web page)
- No need to comb through social media postings to find status of the event
- Communications that reassure travelers throughout the event that the agency is aware of their presence.

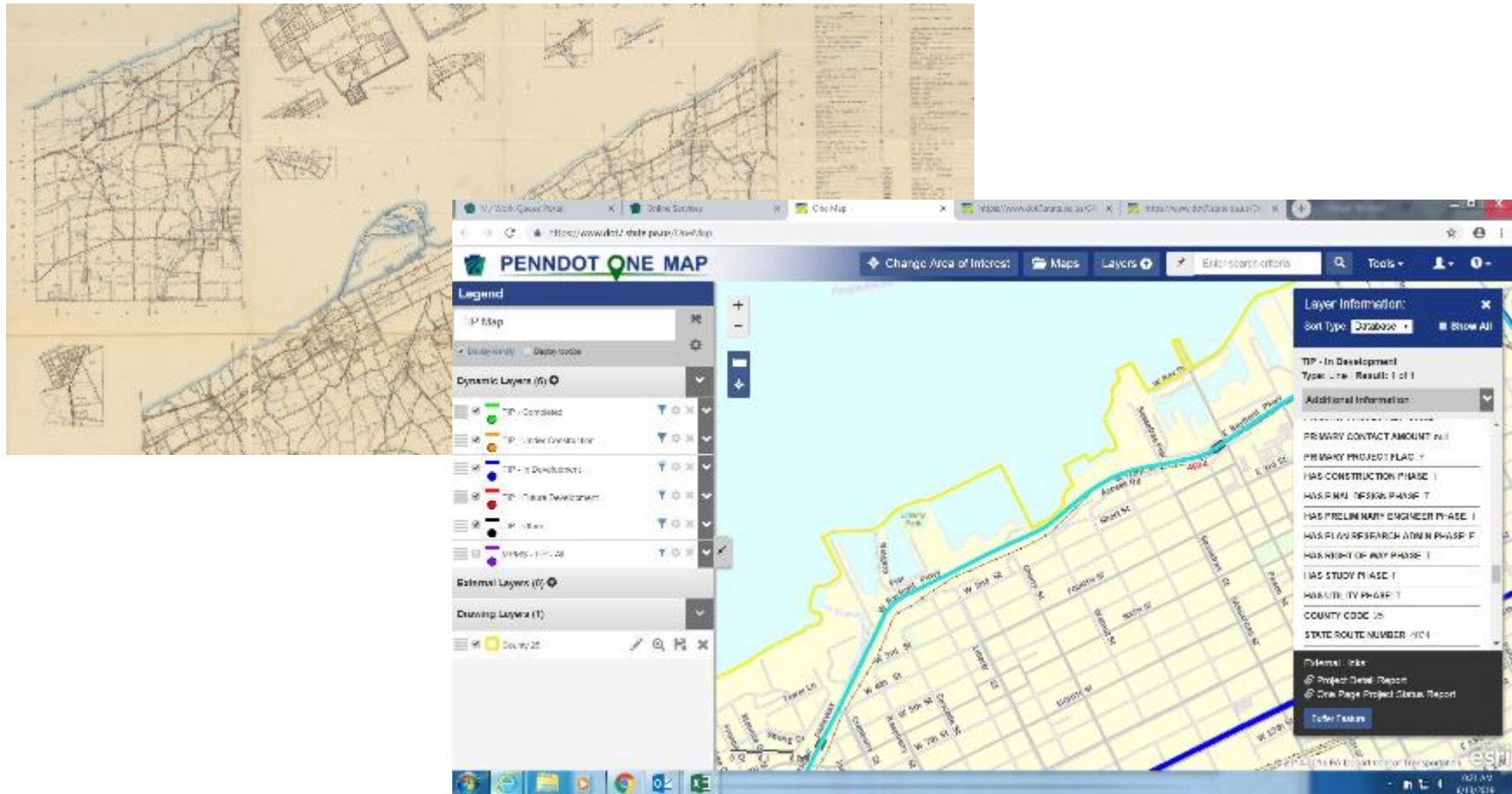


Implementation Report



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Evolution



“The significant problems we face cannot be solved at the same level of thinking we were at when we created them.” – Dr. Albert Einstein

SUSTAINABLE INFRASTRUCTURE INVESTMENT

- For 2020 we anticipate up to 25 projects will be greater than \$20 Million
- But Many Future Challenges

PennDOT 20/20 Strategic Direction



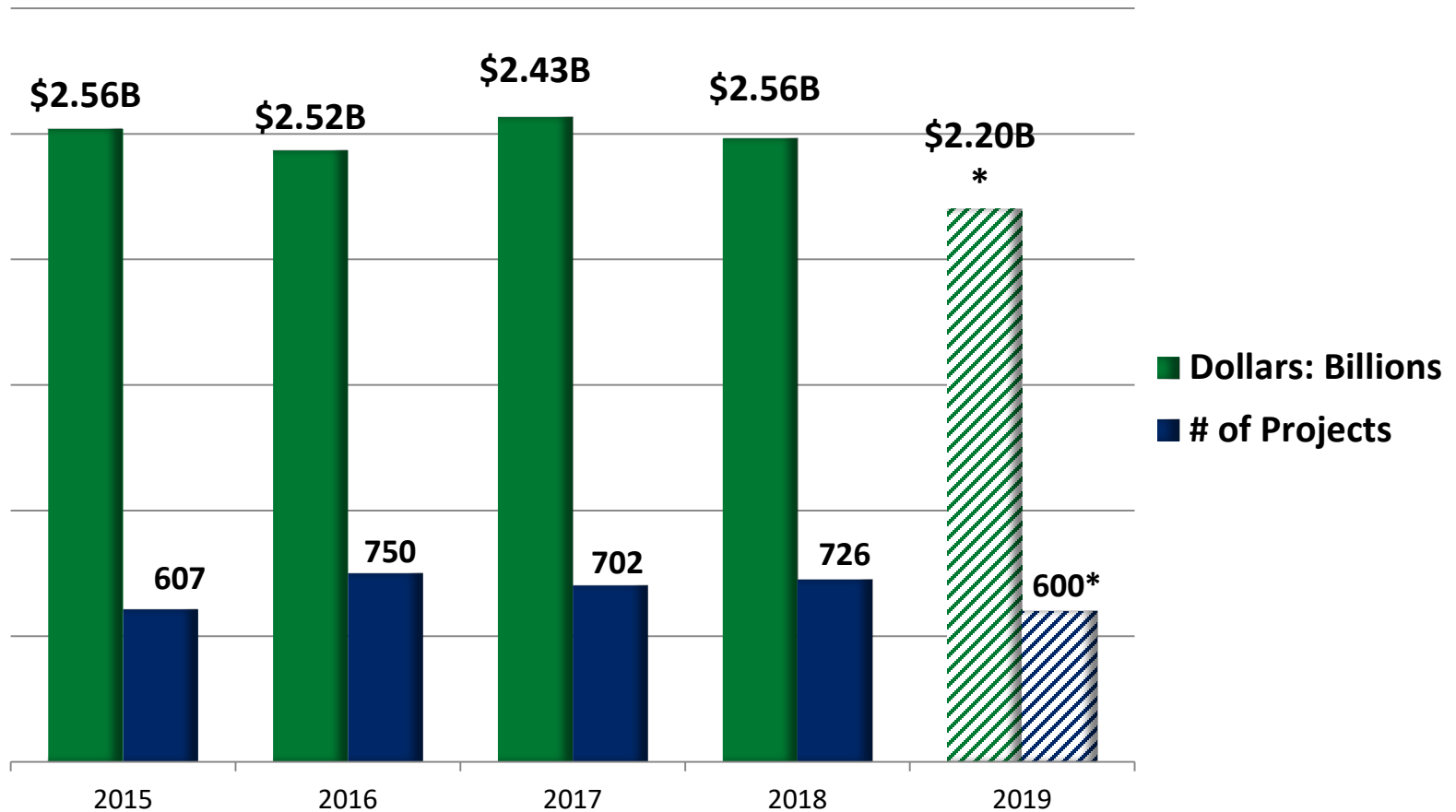
Sustainable Infrastructure Investment

Proactively and innovatively manage resources

- Implement a sound **continuous quality improvement** effort
- Work with **Pennsylvania ports** to ensure investments account for **future growth**
- **Manage resources wisely** to deliver efficient and effective winter operations, roadway maintenance, and bridge improvements
- Implement the **best use of technology**
- Identify and apply best practices in **rapid bridge design and construction**
- Invest in **state-of-the-art equipment and IT** ensuring we maintain and enhance the efficiency of the organization



PennDOT Project Letting Trends



2019 Projected *

2020 Program Distribution

	Cost Based Percentage					
	2015	2016	2017	2018	2019	2020*
Highway	69%	53%	64%	60%	70%	63%
Bridge	24%	35%	21%	28%	19%	25%
Other	7%	12%	15%	12%	11%	12%

PennDOT Construction Material Quantity & Cost

Material	2015 (000's)	2016 (000's)	2017 (000's)	2018 (000's)	2019 (000's)	2020* (000's)
Asphalt (Tons)	6,751	6,106	7,591	7,182	6,668	6,004
\$/Ton	\$77.07	\$65.54	\$65.77	\$71.95	\$71.88**	
Total	\$520,289	\$400,159	\$499,287	\$516,749	\$479,279	
Structural Concrete (CY)	386	371	359	405	267	248
\$/CY	\$972.04	\$1,079.49	\$950.10	\$877.44	\$1,136.79**	
Total \$	\$374,932	\$400,729	\$341,459	\$355,226	\$303,456	
Concrete Paving (SY)	1,007	1,043	802	674	440	671
\$/SY	\$117.06	\$121.28	\$122.59	\$124.08	\$145.08**	
Total \$	\$117,902	\$126,493	\$98,271	\$83,679	\$63,810	
Aggregate (Tons)	11,587	9,882	10,808	8,997	8,272	8,162
\$/Ton	\$30.77	\$31.20	\$27.96	\$32.64	\$32.51**	
Total \$	\$356,530	\$308,307	\$302,181	\$293,652	\$268,909	

* Estimated Projections

** Construction Unit Cost

Challenges – Additional Cost Pressures

- Local Roads and Bridges
- Safety and Guiderail Upgrades (\$820M)
- Intelligent Transportation Systems (\$35M)
- Real ID (\$150M through FY 2023-24)
- Driver & Vehicle Services (\$9M/yr through FY 2023-24 to reduce customer wait times)

- MS4 Stormwater Compliance (\$25.5M/yr)
- Emergency Repairs (\$110M over budget to date for FY 2018-19)
- Flooding
- Landslides
- ADA Station Upgrades
- Fleet Replacement (\$35M/yr)
- Facility Repairs (PennDOT Buildings) \$5M/yr
- Connected & Automated Vehicles

- County Maintenance
- Flat/Declining Budgets
- Aging Fleet/Equipment
- Aging & Deteriorating Buildings
- Difficulty Attracting Candidates; Winter Staffing (\$10M/yr)
- Reduced Purchasing Power (Inflation)

Source: Risks to Pennsylvania Transportation Funding Study –
Transportation Advisory Committee

Interstate Priority Needs (12 Years)



- **Currently, Interstate is funded at <50% of basic cyclic need**
 - Directing additional funding to Interstate negatively impacts remainder of system
- **Even more funding will be needed for:**
 - The current backlog of asset needs
 - Modernization (fiber network, ITS expansion, operational improvements, safety and guiderail upgrades)
 - Strategic Investments – selected capacity improvements, interchanges, truck climbing lanes

Pennsylvania's Interstate System

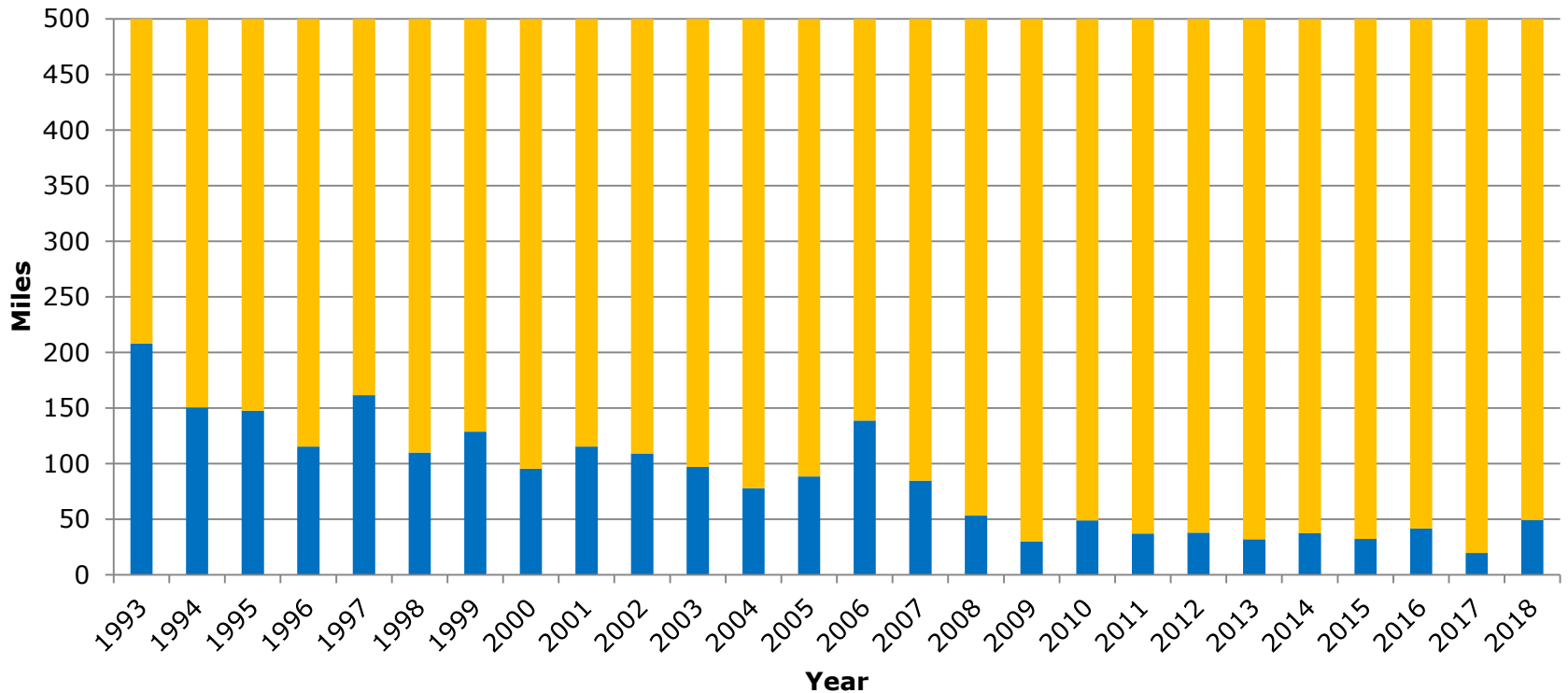


Statewide Concerns

- **Poor/Fair condition of bridges**
- **Critical Highway and Bridge Preservation**
- **Highway Preservation is not lasting as long**
 - **Reconstruction is what's needed**
 - **Modernization, Capacity**
- **Freight/Trucks**
- **Rest Areas / Truck Parking**

Pennsylvania's Pavement Reconstruction

Pavement Reconstruction Deficit Adding to the Backlog



Actual Reconstructed Need Not Met



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Pennsylvania's Interstate System



Pennsylvania's NHS (non-Interstate)

Annual Funding Need*

\$742M

- Current NHS Funding
- Safety Projects

\$2.2B

- Safety & Cyclic Asset Based Need
- Maintain existing highway and bridges

\$2.5B

- Strategic Investments

*Needs are based on current dollars, unadjusted for inflation

Pennsylvania Local Network and Bridges

- Local Governments own over 78,000 miles
- Locally owned bridges just over 6,400
 - 28% poor condition (Jan 2015 was 34%)
 - Or \$2.3 billion to improve poor condition



Greenfield Ave Bridge
City of Pittsburgh



Flood Impacts

- In 2019, \$59 Million total in Emergency Funding
 - 43 projects let (14 projects approximately \$10 million related to 2018 flooding)
- In 2018, \$125 Million total in Emergency Funding
- Secondary Road Improvement Program impacts



SUSTAINABLE POLICY BASED INVESTMENT

- Asset Management
- Quality Investment
- Core and Cyclical Maintenance
- Green Initiatives
- Recycled Asphalt Pavements
- MS-4

PennDOT 20/20 Strategic Direction



Sustainable Policy-Based Investments

Invest taxpayer money into smart, environmentally sustainable transportation infrastructure in which community benefits and impacts are sought before dollars are allocated

- Support **economic growth**, particularly in the **energy sector**
- Develop and implement a **Passenger Rail Sustainability Plan**
- Ensure that **bike/pedestrian activities** are planned and appropriately funded
- Seek opportunities to expand **Alternative Fuel Vehicles** within the PennDOT fleet and support the public development of alternative fuels
- Work with the Department of Environmental Protection (DEP) to modernize the **Vehicle Emissions Program** to support maximum benefit to Pennsylvania's air quality
- Strive for an **agile infrastructure** to be better prepared for environmental extremes
- Plan and design infrastructure using **sustainable materials and practices** with close attention to storm water management
- **Expand partnerships** with DEP and other permitting agencies



Asset Management



Pennsylvania Department of Transportation

Transportation Asset Management Plan 2019

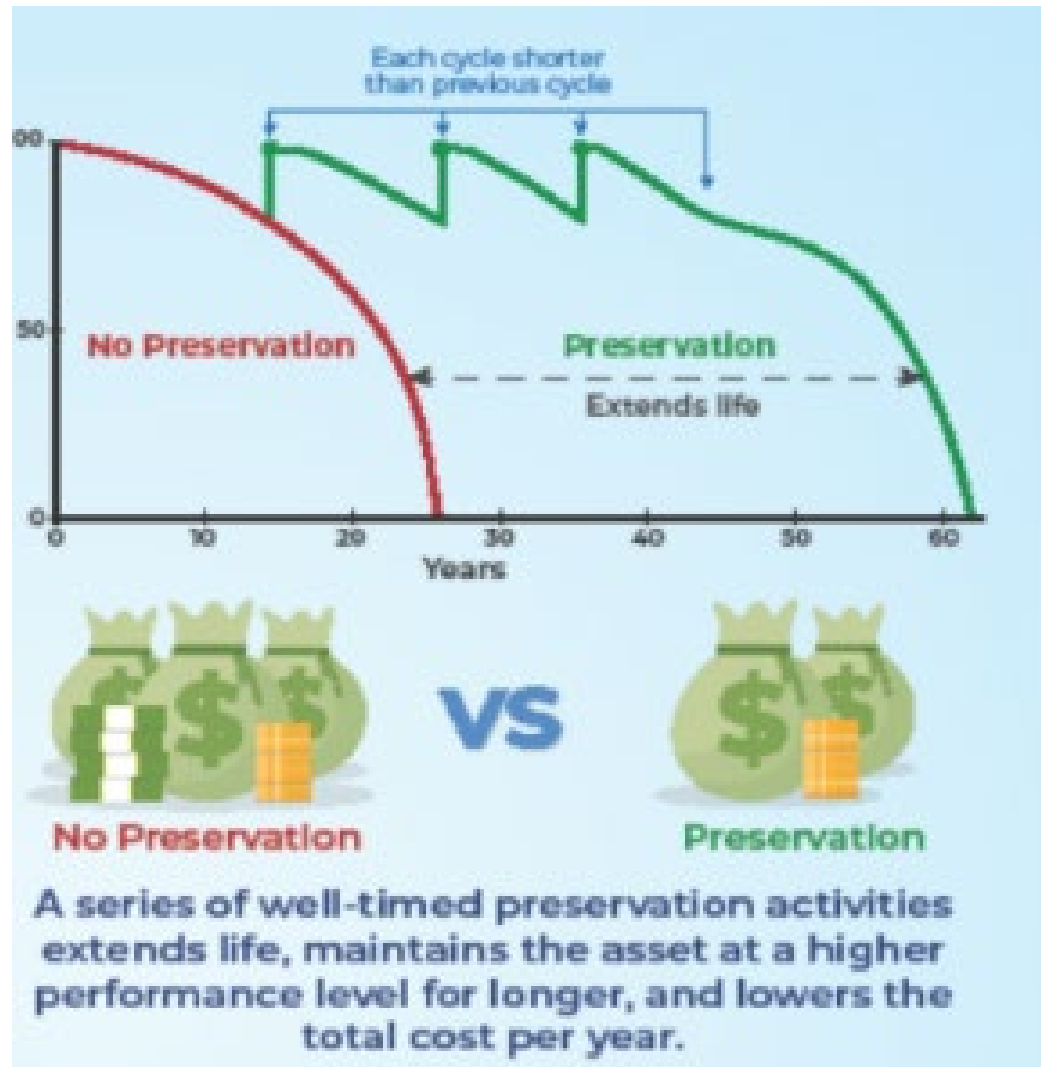
June 28, 2019

- Transportation Asset Management Plan (TAMP) certified by FHWA
 - PAMS, BAMS
 - Adding Guiderail, Drainage, others?
- Program Roads and Bridges Differently?
- Improved rehabilitation techniques?
- Better Preservation Tools and Processes?

Asset Management – (Cont'd.)

Lowest Life Cycle Cost (LLCC)

- Federally Mandated
- NHS Routes
- Risk-Based Prioritization
- Emphasis on Preservation
- Eliminates “Worst First” Approach



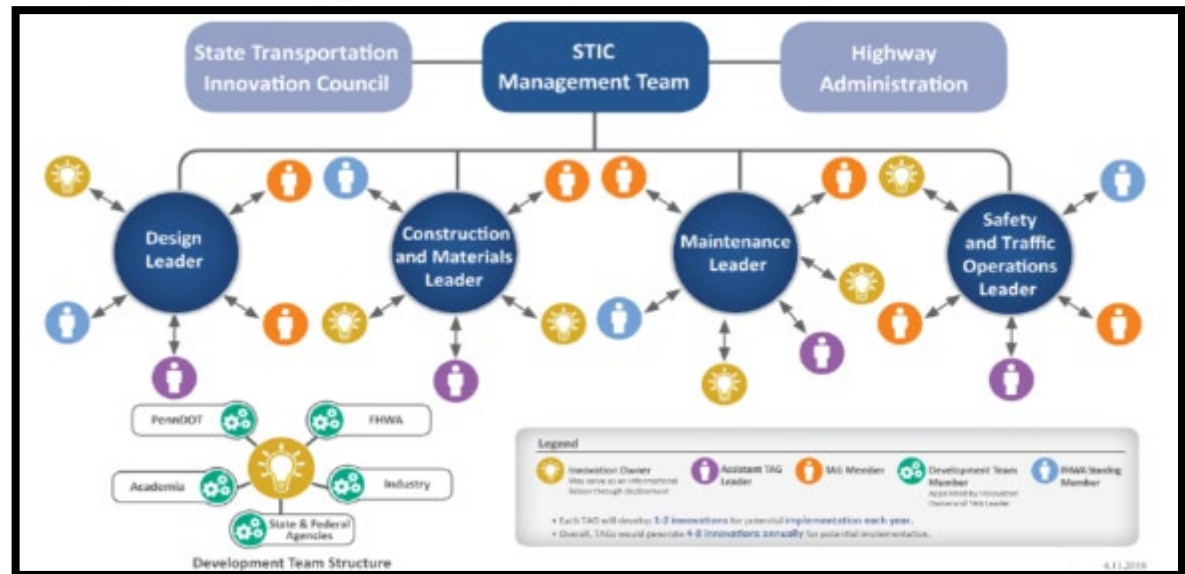
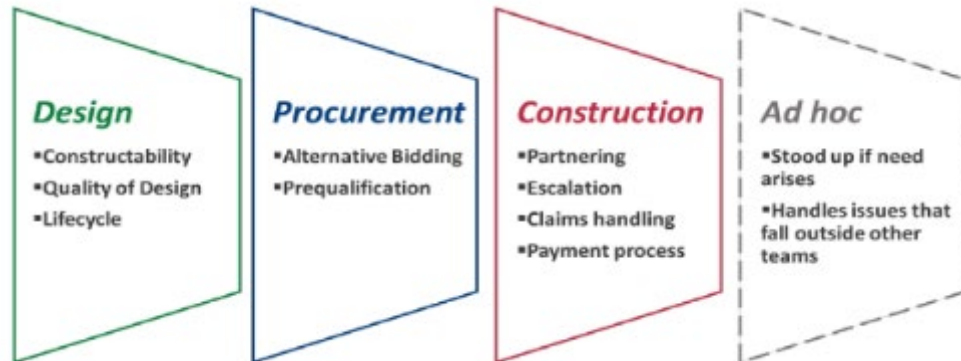
Quality

- TQI
 - Design
 - Construction
 - Procurement

- RAC
 - Reformatted Approach

- STIC
 - Restructured

- QICs



Asphalt Paving QIC (APQIC)

Activities and Accomplishments

- Stone Matrix Asphalt (SMA)
- Longitudinal Joint Density
- High Friction Surface Treatments (HFST)
- Minimum Effective Asphalt
 - 9.5 mm Project Data Collection
- Full Depth Reclamation (FDR)
- Percent Within Limits (PWL)




Asphalt Paving QIC (APQIC) – (Cont'd.)

Activities and Accomplishments (continued)

- Long Life Asphalt Pavement (LLAP)
- High RAP Mixes
 - 19 mm High RAP WMA Binder/Leveling Course
 - 9.5 mm High RAP WMA Wearing Course
 - 25 mm High RAP WMA Base Course
 - SMA with RAP
- NECEPT Subcommittee
 - Course Materials Update
 - Technician Performance Evaluation
- Mixture Performance Testing Subcommittee

09-588(12-15)


 **pennsylvania**
DEPARTMENT OF TRANSPORTATION

MEMO

DATE: March 25, 2019

SUBJECT: Amended Use Guidelines for 19.0 mm Warm Mix Asphalt High RAP Mixtures for Low Volume Roadways

TO: District Executives

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

This memo supersedes the May 7, 2018 memo titled "Use Guidelines for 19.0mm Warm Mix Asphalt High RAP Mixtures for Low Volume Roadways. Due to potential performance concerns, the development team reconsidered the daily trucks maximum. It was agreed that the level should be lowered from 750 daily trucks to 500 daily trucks. The intent of this change is to limit the type of roadway on which the material can be used. The change will not have an impact to the standard special provision referenced below.

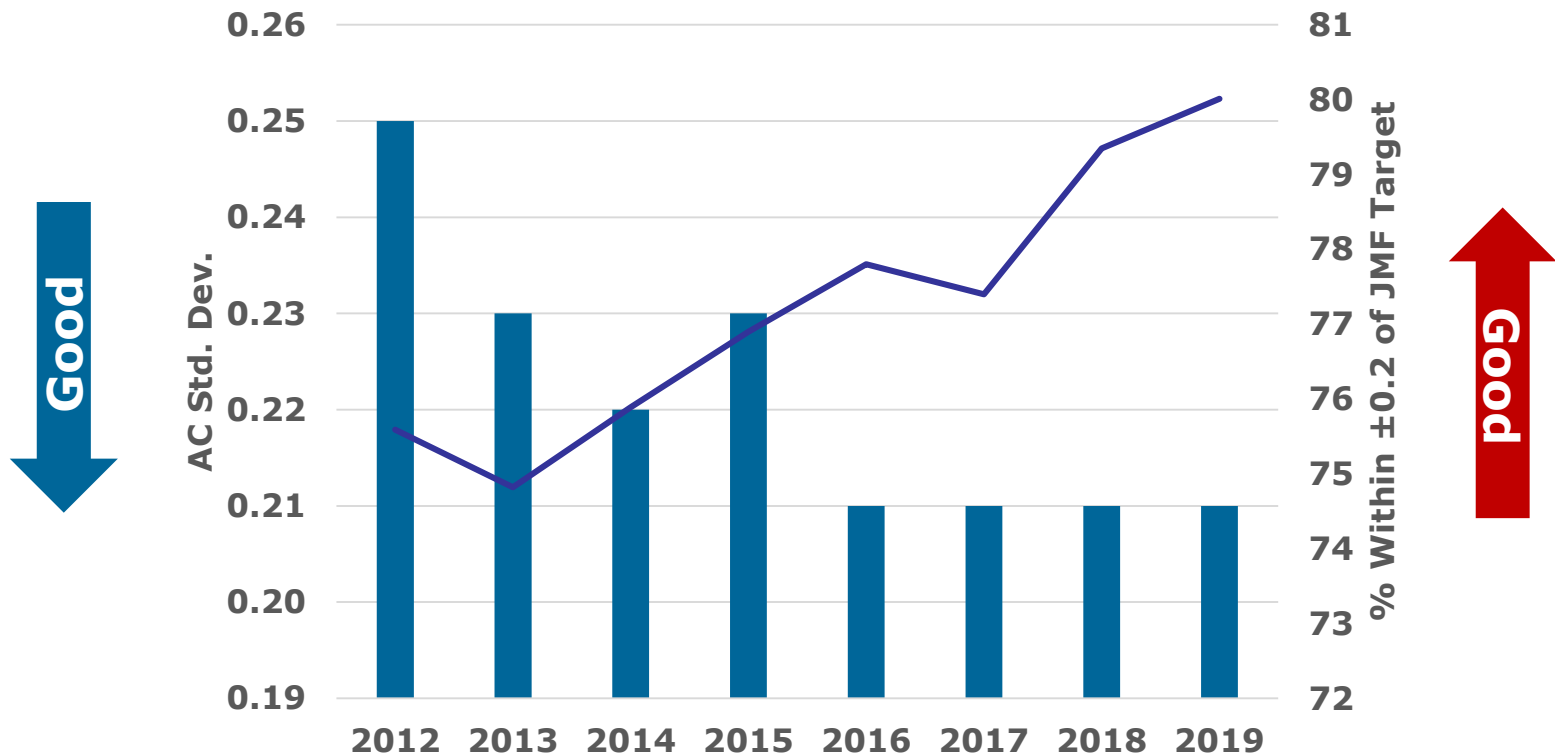
The Department, working with the Pennsylvania Asphalt Pavement Association, developed a standard special provision (SSP) facilitating the use of higher amounts of reclaimed asphalt pavement (RAP) into 19.0 mm asphalt mixtures for use on low volume roadways. This SSP was developed in support of the Department's RoadMap initiative to expand the cost-effective use of RAP on our roadways. The attached SSP allows up to a maximum of 50% RAP by weight in the mix, however, existing approved mixes with lesser quantities of RAP may also meet the requirements of the SSP.

This memo outlines the use guidelines for contracting the paving work via ECMS using the SSP. The Department is also working on separate mechanisms to use this specification for Department force paving operations, which will be addressed separately from this memo.

Index or Category: Provisional Specification Related
Sequence ID: 4111
Version: A
Provision Name: 0941 ITEM 4411-0010 SUPERPAVE ASPHALT MIXTURE DESIGN, WMA BINDER COURSE (LEVELING), - HIGH RAP
Status: Active
Description:

Quality – Trends & Targets

CY 2019 - All 9.5 mm Wearing Courses – Std. Dev. for Asphalt Content



Blue = AC Std. Dev.

Red = % Sublot Results within ± 0.2 of JMF Target

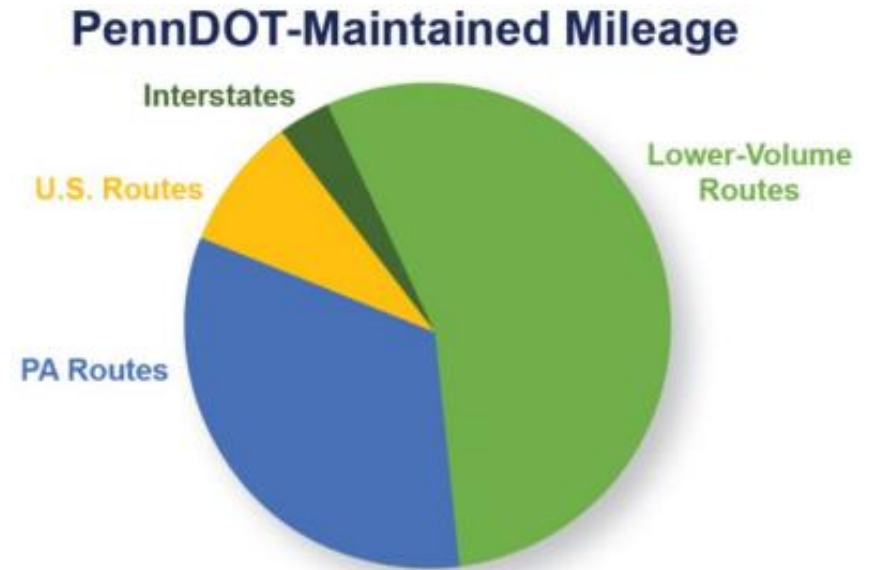
Cyclical Maintenance

- Cyclical Maintenance – defined work that requires to be carried out on an agreed cycle and can be performed annually or on a defined cycle.
- Cycles may vary based on;
 - Geography
 - Climate
 - Budget
 - Treatment Life Expectancies
- Long Term Cost Savings



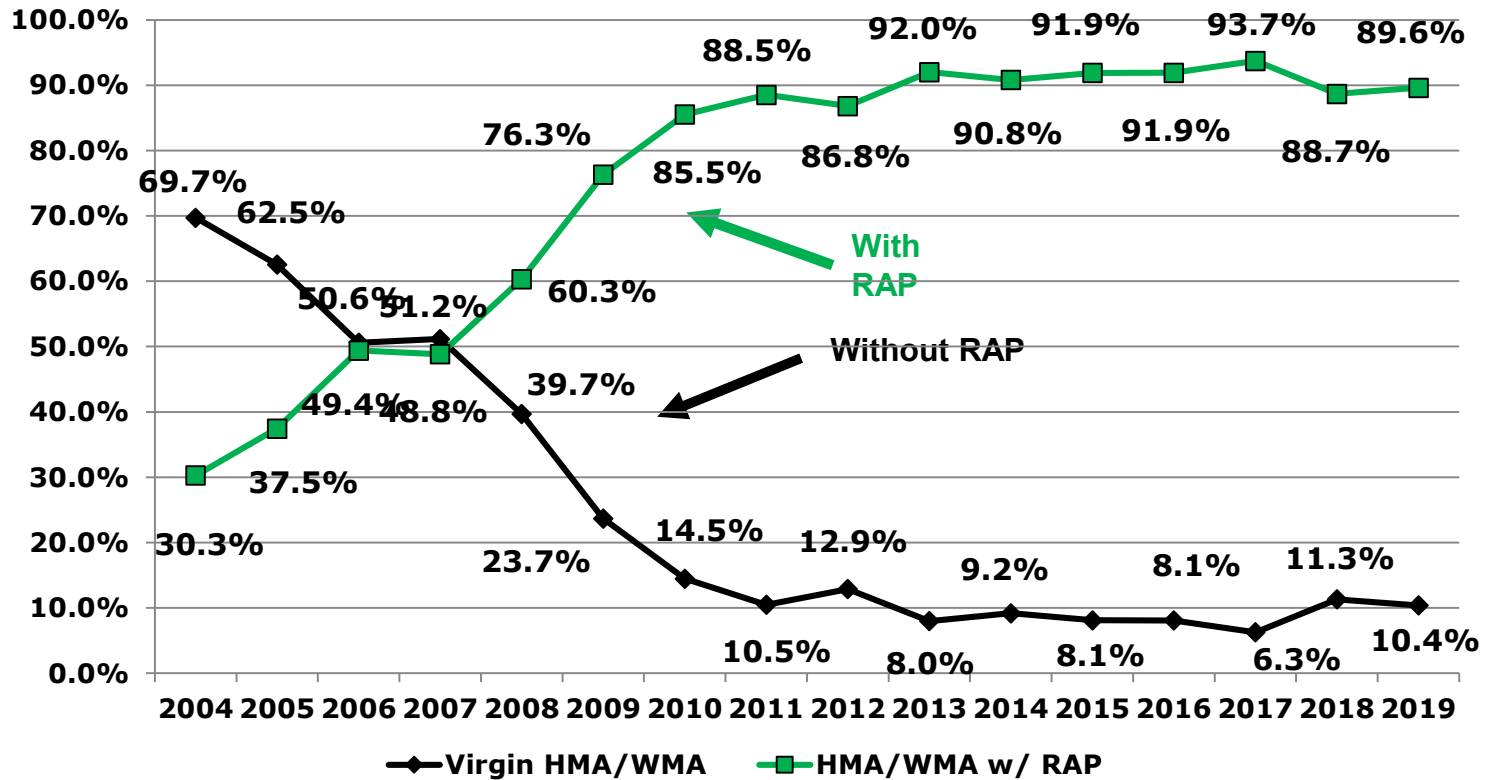
Secondary Road Improvement Program

- Low cost treatments
- Minimum of 2" structure
- Roadway Criteria
 - Up to 1,500 ADT and up to 75 trucks
 1. Recycled Asphalt Paving (RAP)
 2. Flexible Base Paving (FB)
 3. High RAP WMA Binder Overlay
 - 1,500 to 3,000 ADT and up to 300 trucks
 1. Recycled Asphalt Paving (RAP)
 2. High RAP WMA Binder Overlay
 - 3,000 to 5,000 ADT and up to 750 trucks
 1. High RAP WMA Binder Overlay
 2. Traditional Warm Mix Asphalt Binder Overlay
- 107 Miles RAP Paving, 294 miles High RAP



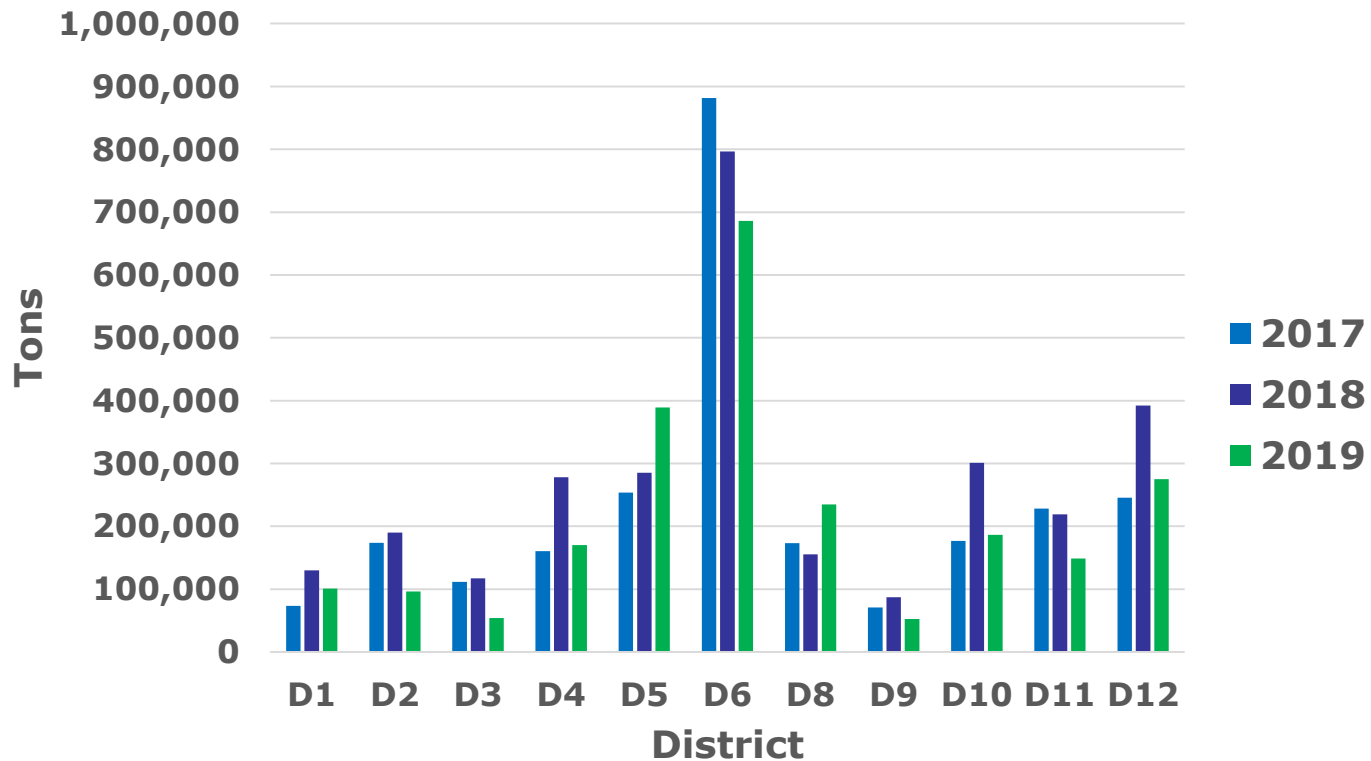
Green Initiatives - RAP

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



Green Initiatives - RAP

Amount of RAP Milled from Pavements



Reclaimed Asphalt Pavement

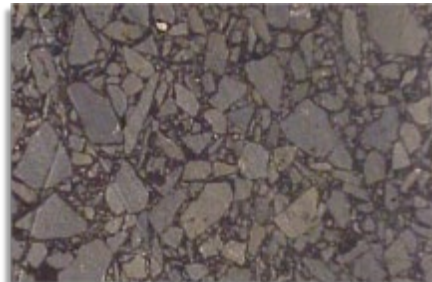
Why High RAP Mixes?

19.0mm High RAP WMA Binder/Leveling

9.5mm High RAP WMA Wearing

25mm High RAP WMA Base Course

SMA with RAP



19.0mm High RAP WMA Binder/Leveling

Instructions for Usage

- 100% state funded projects only, no federal funds
- No use on the National Highway System
- Traffic: Maximum 5000 ADT, maximum 300 daily trucks
- Binder/leveling course 2.5-inch minimum average depth
- No use as final surface, mix has no SRL designation
- No use in conjunction with PWL-LTS or PWL-HOLA SSPs
- Not Mandatory for Districts to include in ECMS contracts for projects meeting the use guidelines



Year	Quantity
2018	75,170
2019	288,417
2020	??

9.5mm High RAP WMA Wearing

Standard Special Provision

- Industry / PennDOT Team (SSP released 9/23/19)
- Supports RoadMaP
- SSP is currently provisional



Use Guidelines for Low Volume Roads

- Only use in 100% state funded projects (No federal funds).
- Only use for low volume roads that meet the following criteria:
 - Maximum Average Daily Traffic (ADT) \leq 2000 vehicles and,
 - Maximum Average Daily Truck Traffic (ADTT) \leq 300.
- Minimum design pavement thickness shall be \geq 1.5".
- The asphalt mixture's coarse aggregate Skid Resistance Level (SRL) shall comply with Bulletin 14.

25 mm High RAP WMA Base Course

Standard Special Provision

- Currently in Draft form
- Industry / PennDOT Team working on SSP
- SSP being developed in support of RoadMaP initiative
- eCAMMS Specification thresholds



Use Guidelines for Low Volume Roads

- Only use in 100% state funded projects (No federal funds).
- Only use for low volume roads that meet the following criteria:
 - Maximum Average Daily Traffic (ADT) \leq 5000 vehicles and,
 - Maximum Average Daily Truck Traffic (ADTT) \leq 300.
- Minimum design pavement thickness shall be according to PUB 242

SMA With RAP

“Second Tier” Premium Mix

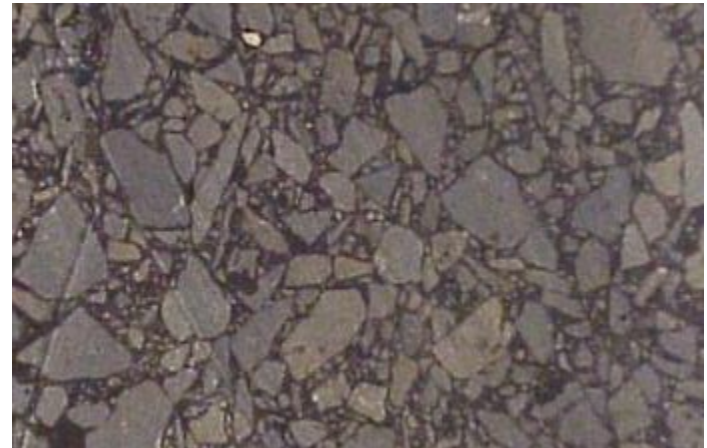
- Roads that can Accept Additional Risk

Environmental and Economical Benefits of RAP

- Pavement Performance more Cost Effectively

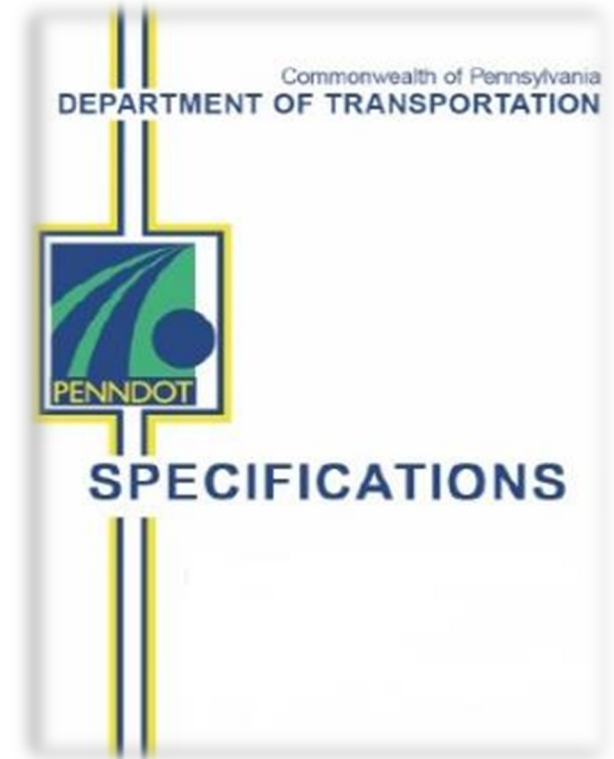
Current Status

- Pilot Project Districts 11 & 4
- Testing (Rutting & Cracking)



What We've Done

- PWL
- Publication 408 Rewrite
- Broader applications of RAP
- Late Season Paving
- Mix enhancements for super pave
- Longitudinal joint density
- Thinlay
- Long life
- Binder overlays
- High RAP Binder



Percent Within Limits (PWL)

- Closer Adherence to JMF / Increase in Average Density / Decrease in SD
- Incentives/Disincentives
- Publication 408/2020 –NEW Section 413
- Moving to Evaluation Phase Pavement Performance)
- Partnership with AASHTO re:source for assessing Labs
- Partnership with Penn State and NECEPT to provide PWT/PWL Training

What's Next

- Thinlay – broader deployment?
- Fibers in mixes
- RAS
- RAP in SMA
- Shoulder applications
- Quality Consistency
- Rejuvenators
- National Pooled Fund Study on Pavement Preservation

Long Life Asphalt Paving - LLAP

Many Best practices

- MTV required
- Tack Every Layer
- PWL spec
- Incentives
- Longitudinal Joint Spec.

Balanced Asphalt Mix Design Program

- Predict and balance rutting and cracking through performance testing
- Traffic loads
- Weather conditions
- Aging

Future Direction

- Robust research effort
 - Select best performance related perforation test(s)
 - Identify performance related spec. limits
 - To start early 2020



LLAP Full Depth Applications

District 2 Potters Mills Gap, SR 0322 B06

- GOH project
- Full depth pavement on new alignment
- Includes asphalt rich base layer
- Paving scheduled 2019 / 2020

District 11 SR 28 A55

- Lindy Paving Project
- Break and seat project
- Paving scheduled 2018

District 4 SR 0084 450

- James Morrissey project
- Full depth asphalt reconstruction
- Includes asphalt rich base layer
- Paving scheduled 2019 to 2022



INNOVATIVE, SMART & DIVERSE

- ✓ 2019 – Third Year of Outreach Sessions
- ✓ Small/Diverse Businesses
- ✓ Training
- ✓ Industry efforts?

PennDOT 20/20 Strategic Direction



Innovative, Smart and Diverse Organization

Nurture a diverse organization and workforce by encouraging innovative thinking, process improvement, job-specific training, minority opportunities, and sound technology investments

- Empower employees to suggest innovative ideas and practices
- Assess work products and organizational structure by benchmarking similar organizations
- Invest in the IT resources necessary to strengthen and enhance PennDOT's performance and customer service
- Encourage and support career advancement and succession plans for PennDOT employees
- Ensure proper training and career development at all levels of the agency to foster continuity of operations and employee pride
- Expand contract opportunities for Disadvantaged Business Enterprises and diverse businesses
- Actively recruit an ethnically and gender diverse workforce



PennDOT R&I Implementation

- Deployment is where we struggle
- Office of Operations and Performance
 - Research
 - STIC
 - New Products
 - QIC's
 - TQI



AASHTO Research and Innovation (R&I)

- Research to Deployment
 - 3 to 5 years
 - How to keep pace with Technology?
 - Tools to enhance Research Implementation
- Developing Innovative Culture
 - AASHTO Innovations Initiative
 - Innovation Community of Practice (iCoP)



Connected and Autonomous



Transportation Secretary Leslie Richards kicks off the AV Policy Task Force, Pittsburgh, June, 2016.



PennSTART Test Track

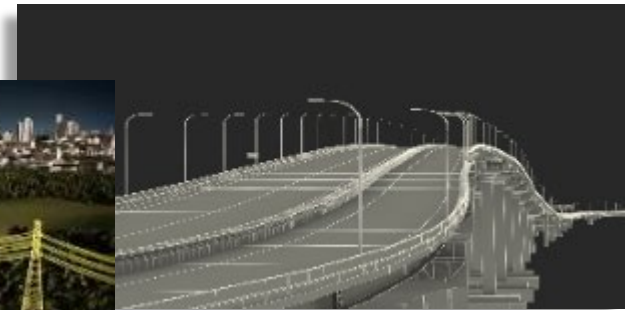
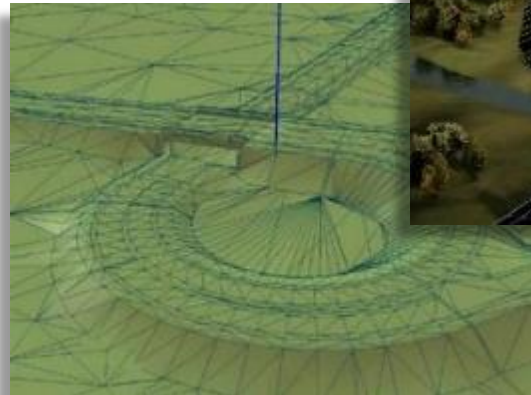


Unmanned Aircraft System (UAS or Drone)



“Planless 2025”

- **Time to embrace a new way of doing things**
- **Get away from - *“but that’s how we’ve always done it”***
- **We have the tools we need**
- **Rethink how we approach – the outcomes are limitless**



PennDOT Mobile Applications (Apps)

Currently Deployed



MC DOCs



PSA



Punchlist



Force Account



CMH Mobile



Visual Site
Inspection Report



MPT



RELATIONSHIPS

- PennDOT Connects
- Partnering, Future Leaders, Regional Sessions, Winter Schools
- QIC's, TQI
- Workforce Development forward?



PennDOT 20/20 Strategic Direction



Effective Partnerships

Be, at all levels, a consistent resource partner to intra-agency offices, outside partners, stakeholders and our customers

- PennDOT consistently **builds and strengthens internal relationships**
- PennDOT also consistently **builds and strengthens relationships** with:
 - Local governments and elected state and federal officials
 - Metropolitan Planning Organizations and Rural Planning Organizations
 - Other Commonwealth agencies
 - Transportation-related Associations
 - State and Federal lawmakers
 - Federal agencies
 - Public/Customers
 - Other DOTs and similar agencies



What We've Done

Existing QIC's

- Asphalt Paving Quality Improvement Committee (APQIC)
- Concrete Paving Quality Improvement Committee (CPQIC)
- Aggregate Quality Improvement Committee (AQIC)
- Concrete Quality Improvement Committee (CQIC)



New QIC's

- Pennsylvania Association of Asphalt Material Applicators Quality Improvement Committee (PAAMA-QIC)
- Cement Quality Improvement Committee (CEMQIC)
- Slag Quality Improvement Committee (SlagQIC)



Census 2020

- National Census Day is April 1, 2020.
- Pennsylvania's census count will affect the next decade of federal spending, policy, and decision-making.
 - Federal spending on programs like highway planning and construction.
- Everyone counts. Be a good neighbor and spread awareness in your community.



Moving Forward Into 2020

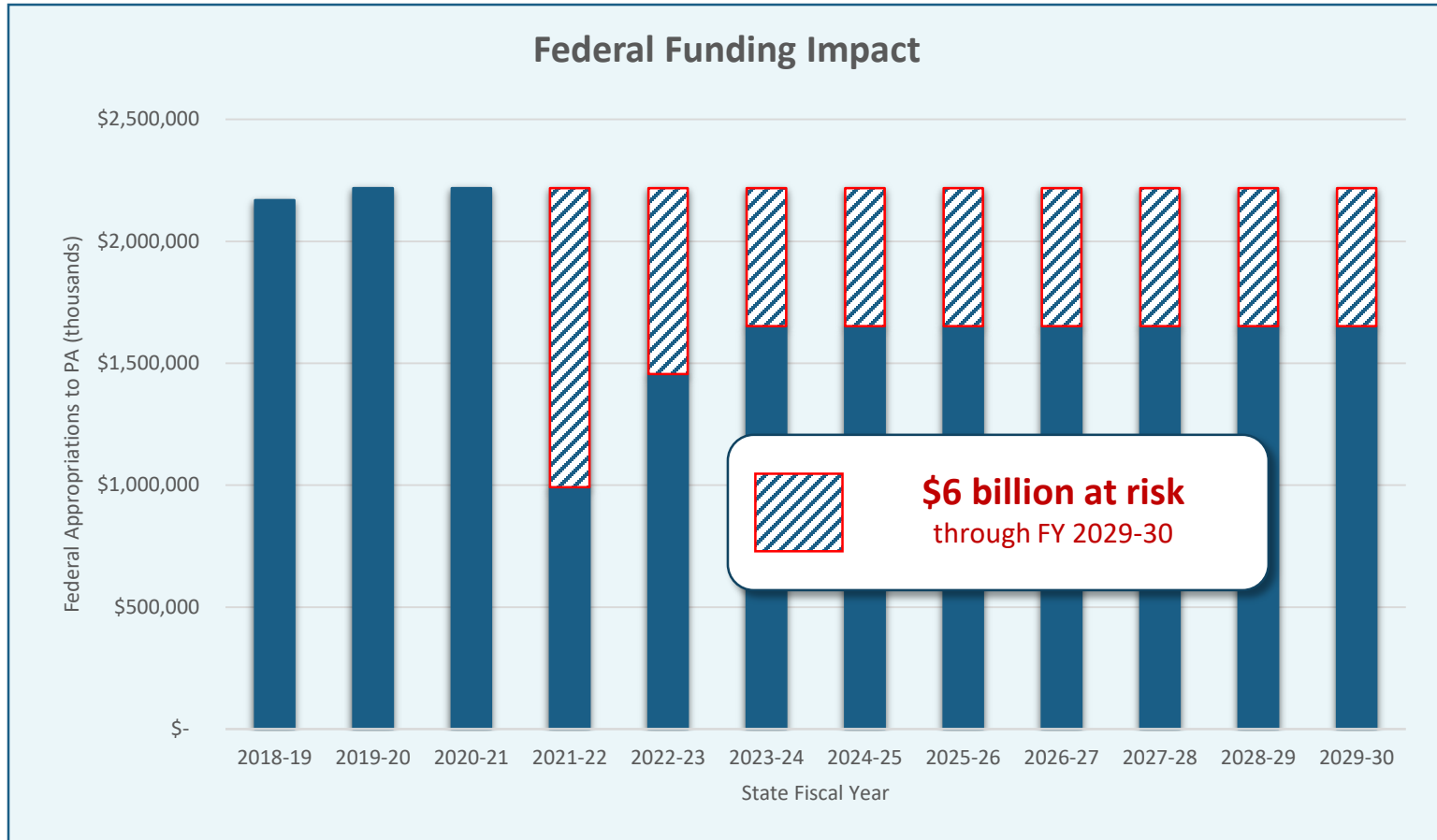
We look forward to working with PAPA and its members in 2020!



Any Questions?



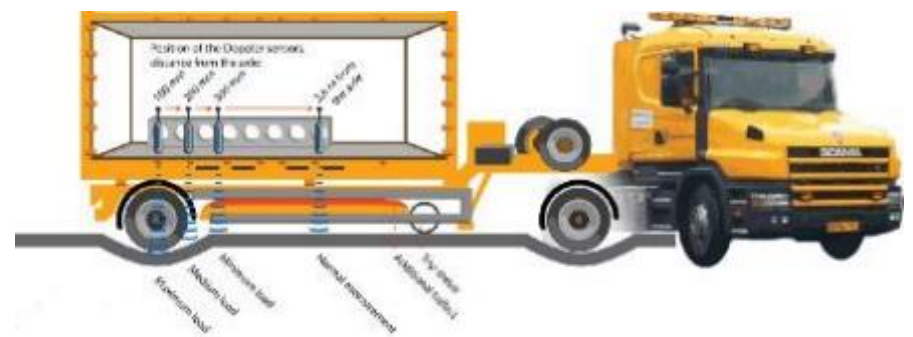
Challenges – Federal Funding Impact



Source: Risks to Pennsylvania Transportation Funding Study –
Transportation Advisory Committee

Traffic Speed Deflection Devices (TSDDs)

- Measurement: Deflection Velocity of Pavement
- Speeds up to 60 mph
- 100-200 miles per day
- Determine Existing Structural Condition
- Data Integrated w/PAMS
- Pooled Fund Study TPF-5(385)
- 3 Years @ 300 Miles/Year
- 2019 – 80 Miles of Asphalt Projects- Project Level Assessment
- Other Objectives:
 - Define Data Collection Protocols
 - Use on Composite or Concrete Pavement?
 - Compare to FWD
 - How to Incorporate Data into Pavement Management
 - Define Value Added



HOLA?

Lack of Trained Personnel

- Seasonal need

HOLA comes with extra costs

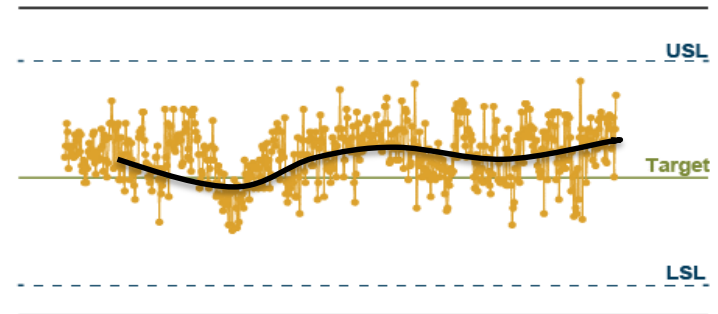
- Overtime
- Travel
- Sample security



Performance Based Acceptance Hybrid Approach

- Quantities typically not to F&T requirements
- Continue acceptance testing
- QC data consistency – Incentive/Disincentive
- What performance improvement can we achieve?

ISO for Asphalt → PASIN
Pennsylvania Asphalt Improvement Network

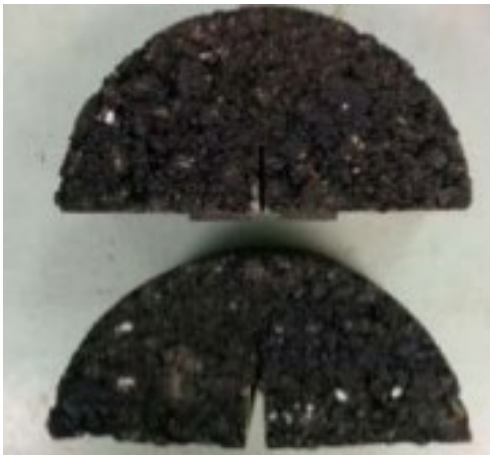


Performance Based Specifications

Performance related testing

\$500,000 balanced asphalt mix design research project.

- Evaluate cracking tests.
- Rutting test – Hamburg wheel tracking test.



Cracking Test(s)
(SCB and IDEAL CT)



Hamburg Wheel Tracking Test
(HWT)