Implementing Pavement Preservation

Pennsylvania Department of Transportation

Bureau of Maintenance and Operations

Charles C. Goodhart, Director

August 28, 2012

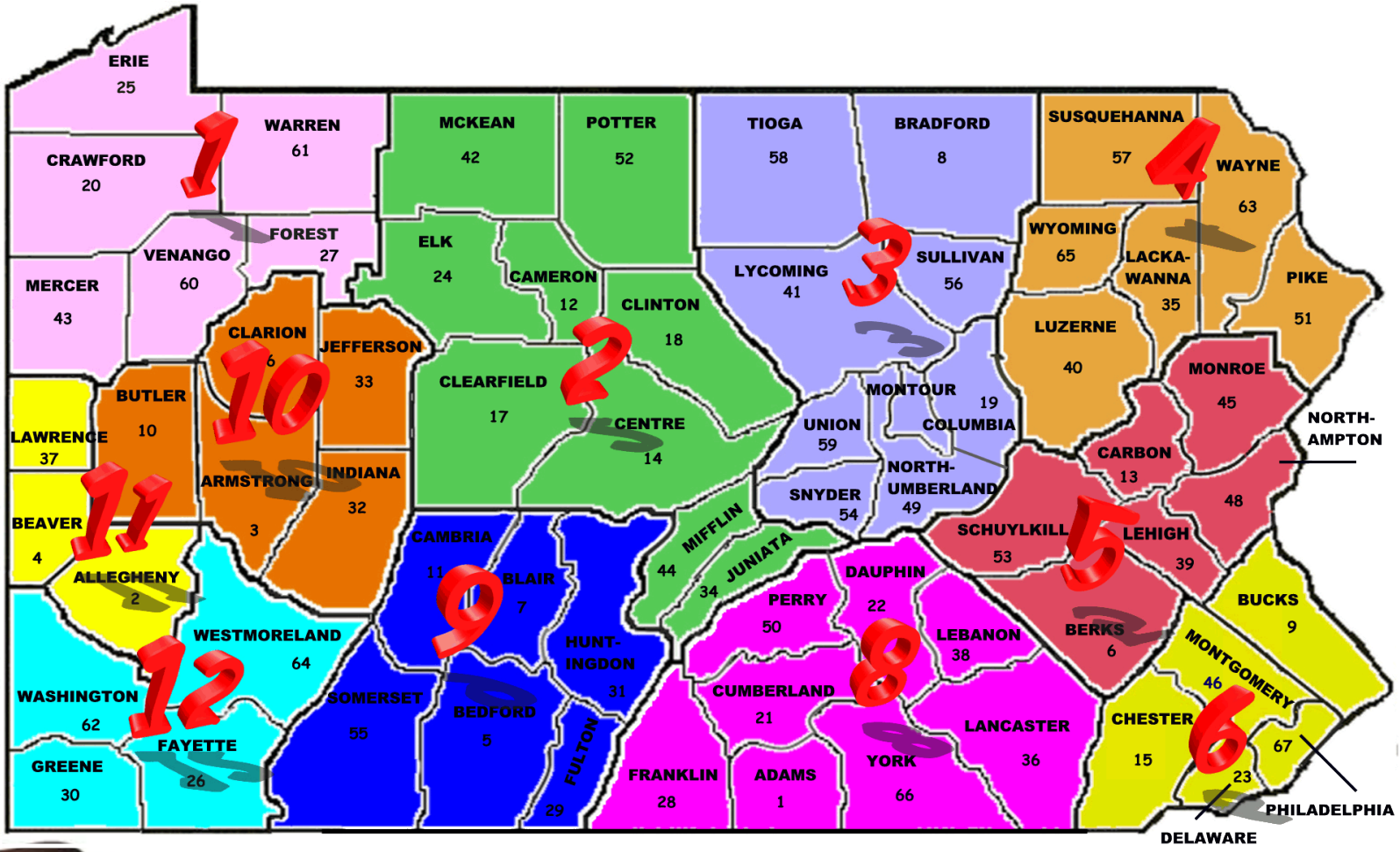
Implementing Pavement Preservation

- PennDOT's Organization
- Relationship with Asset Management
- Pennsylvania's Roadway Network
- What is Pavement Preservation?
- Pavement Preservation at PennDOT
  - Treatments and Schedules
  - Measures of Effectiveness

Pennsylvania Department of Transportation

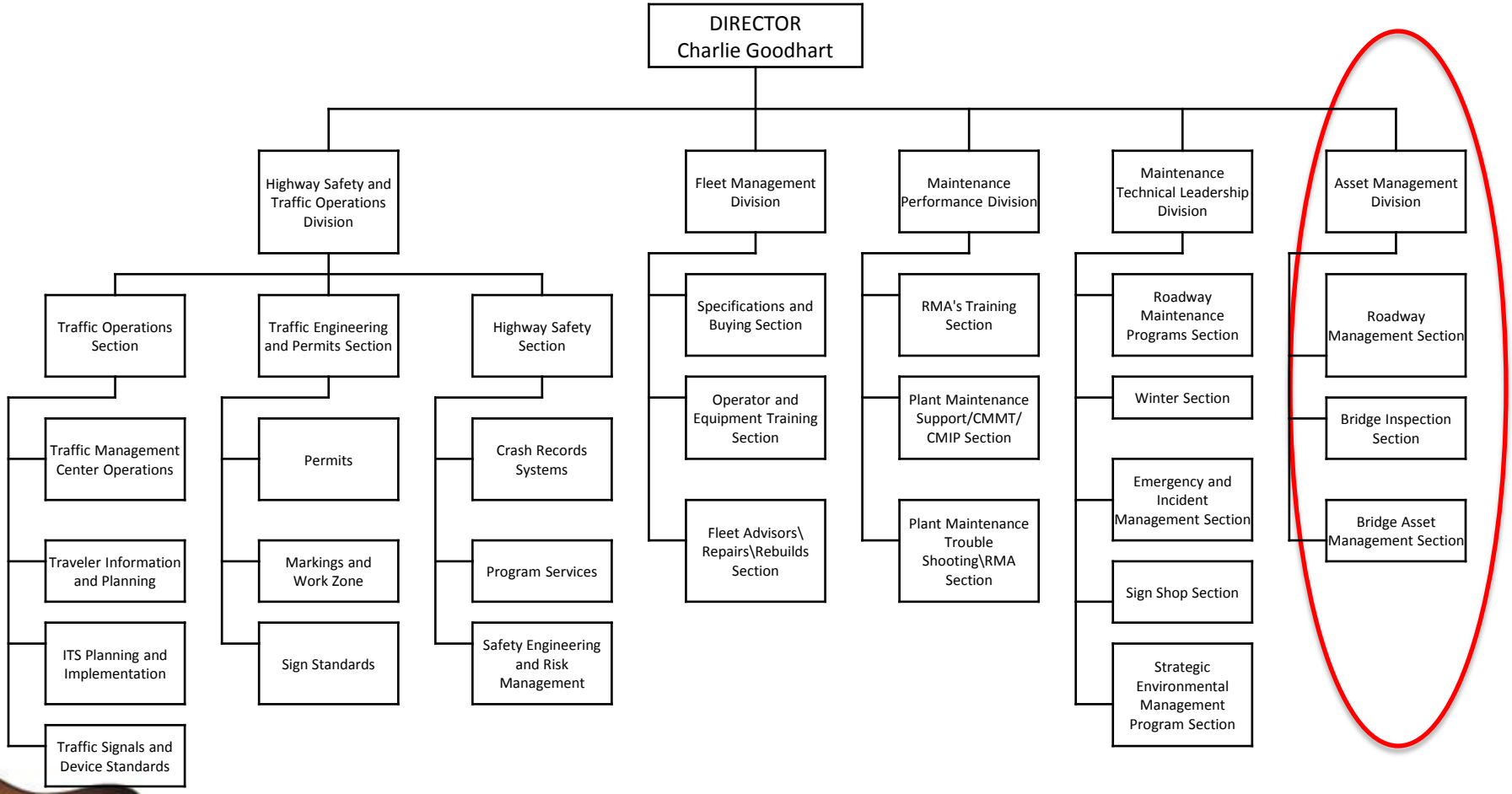
- PennDOT Organization
- Central / District Offices
- Bureau of Maintenance and Operations

Pennsylvania Department of Transportation District Map



Pennsylvania Engineering Districts

Bureau of Maintenance and Operations



Asset Management

- What is Asset Management?
  - Strategic framework for managing transportation infrastructure, aligning resource allocation to maintain and/or improve the system to **a specific level**
  - Predictive, not reactive (making informed decisions)
  - Principals:
    - ❑Policy Driven (Strategic)
    - ❑Performance Based
    - ❑Option Oriented
    - ❑Data Driven
    - ❑Transparent – Getting public's trust

Asset Management

- Why is Asset Management Important?
  - Large Customer Base – Transportation User
  - Protecting Investment
  - Current needs far outweigh available resources; program must focus on **preservation** of existing system
  - Requirement of Federal ReAuthorization (MAP 21)
    - "Risk Based Asset Management Plan"
    - Funding requirements tied to Performance
  - Demonstrate best use of every dollar

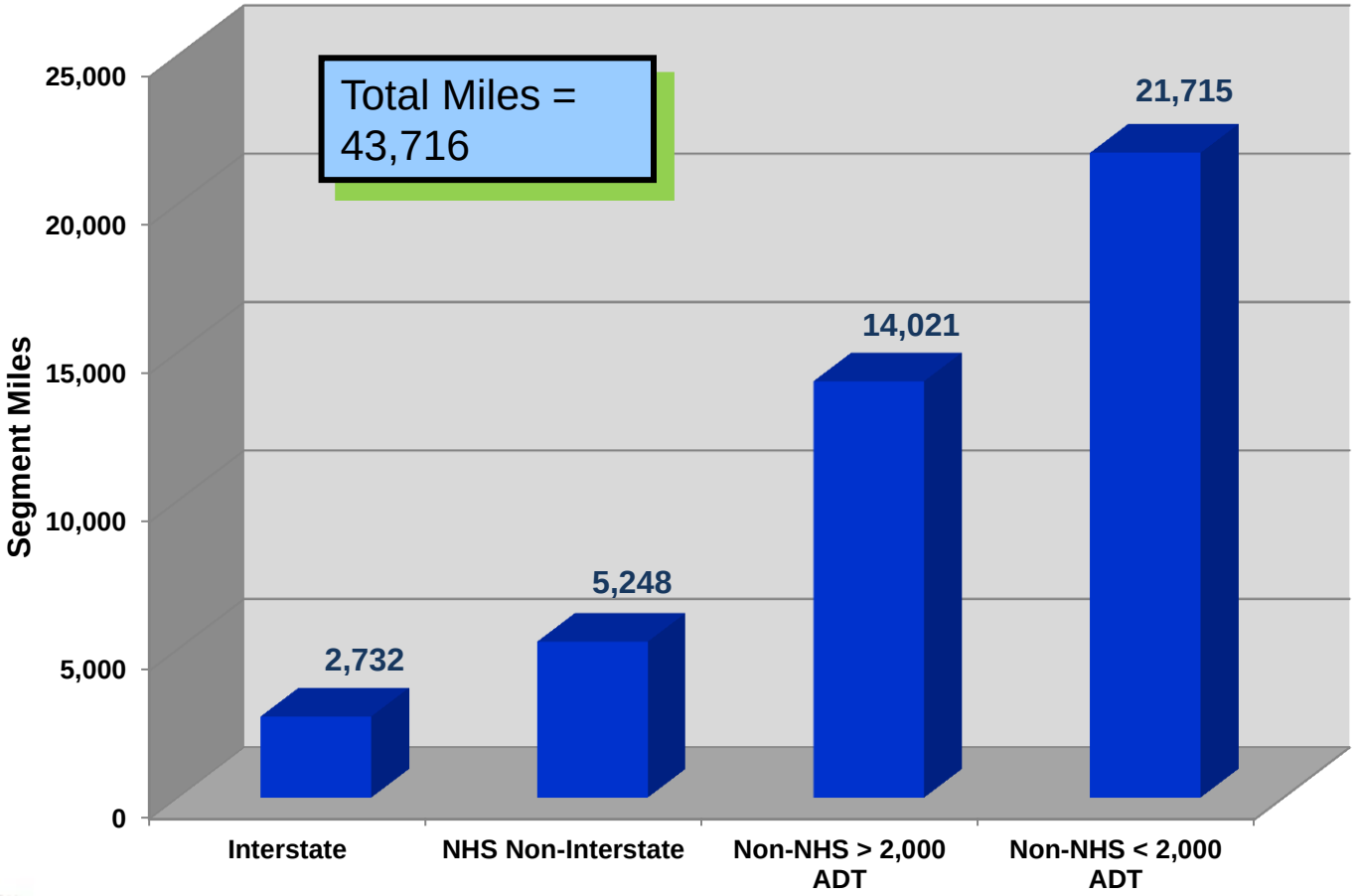
Pennsylvania's Roadway Network

- PennDOT is responsible for:
  - ❑ > 40,000 miles of roads (5th for state-maintained miles)
  - ❑ > 25,000 bridges
- Annual budget of more than $6 billion in State and Federal Funds.
- Roughly 10,500 of PennDOT's 12,000 employees are engaged in maintenance, restoration and expansion of the highway system.

Pennsylvania's Roadway Network

- Four Business Plan Networks (BPNs):
  - Interstates
  - National Highway System (NHS) Non-Interstate
  - Non-NHS (> 2,000 ADT)
  - Non-NHS (< 2,000 ADT)
- > 226 million DVMT on State System

Pennsylvania's Roadway Network



Pennsylvania's Roadway Network

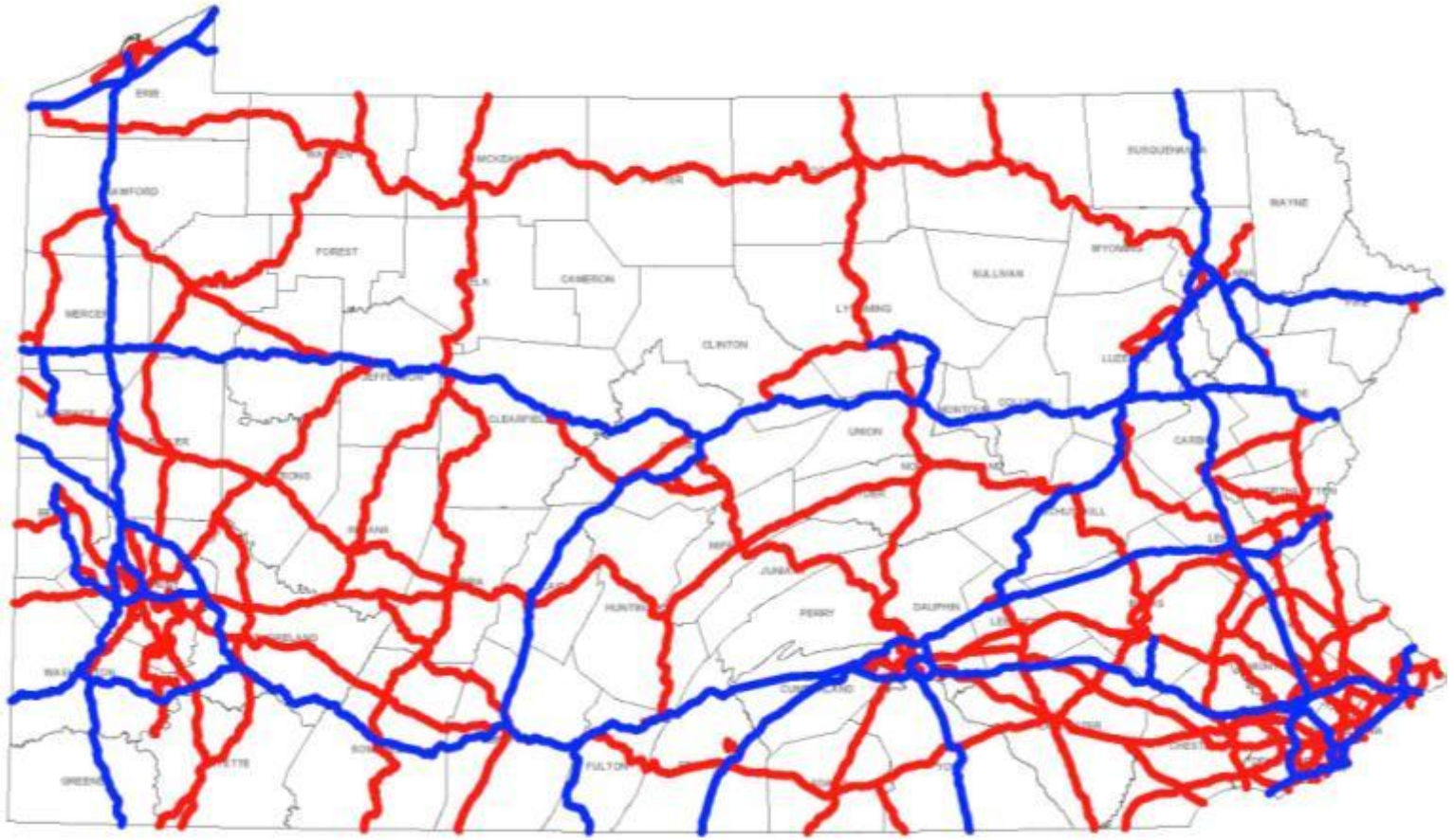
Interstate

Interstate ——

Note: Local Roads Not Shown

Pennsylvania's Roadway Network

Interstate & NHS

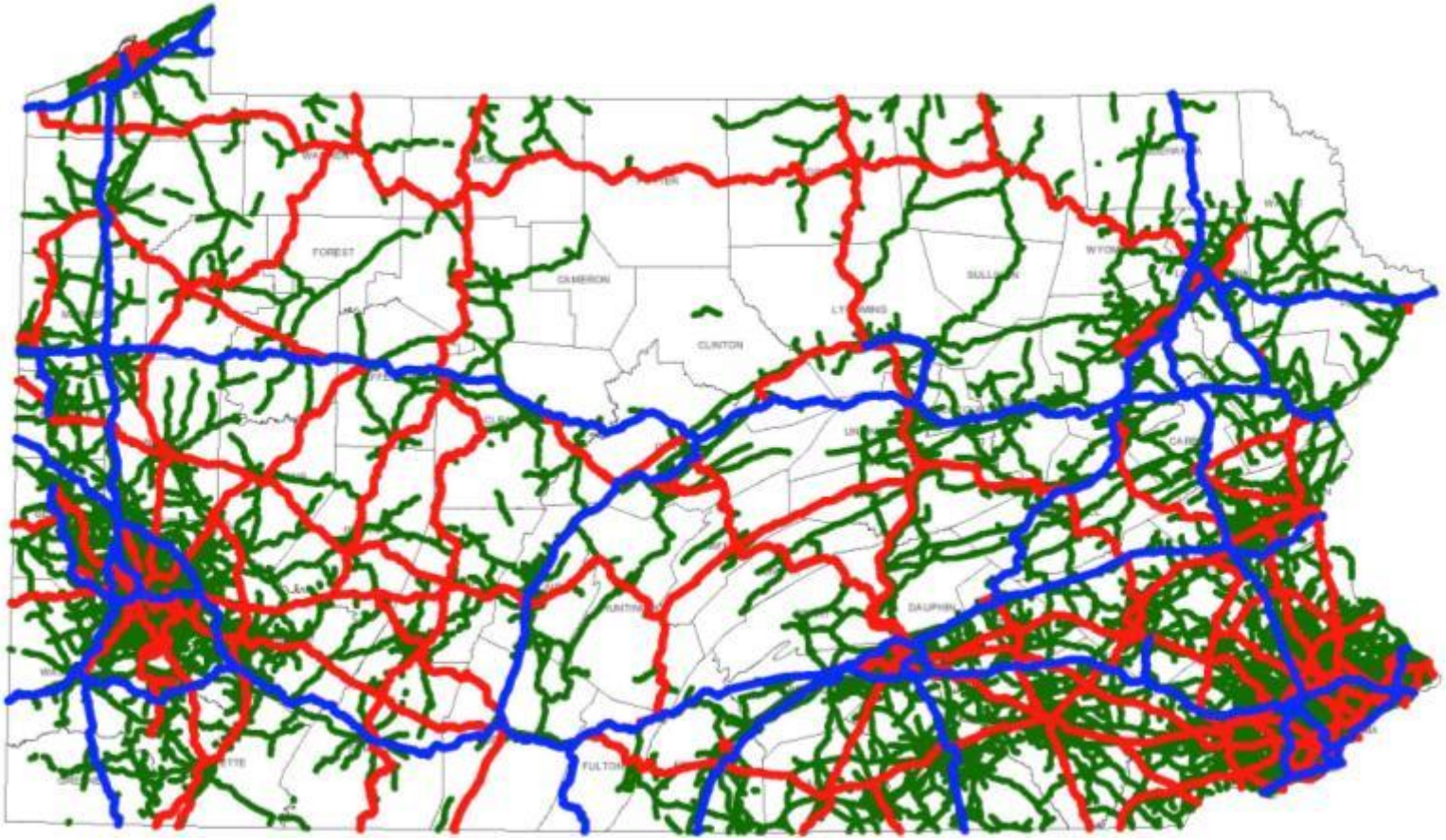


Interstate	
NHS	

Note: Local Roads Not Shown

Pennsylvania's Roadway Network

Interstate, NHS, and Non-NHS (>2000ADT)



Interstate

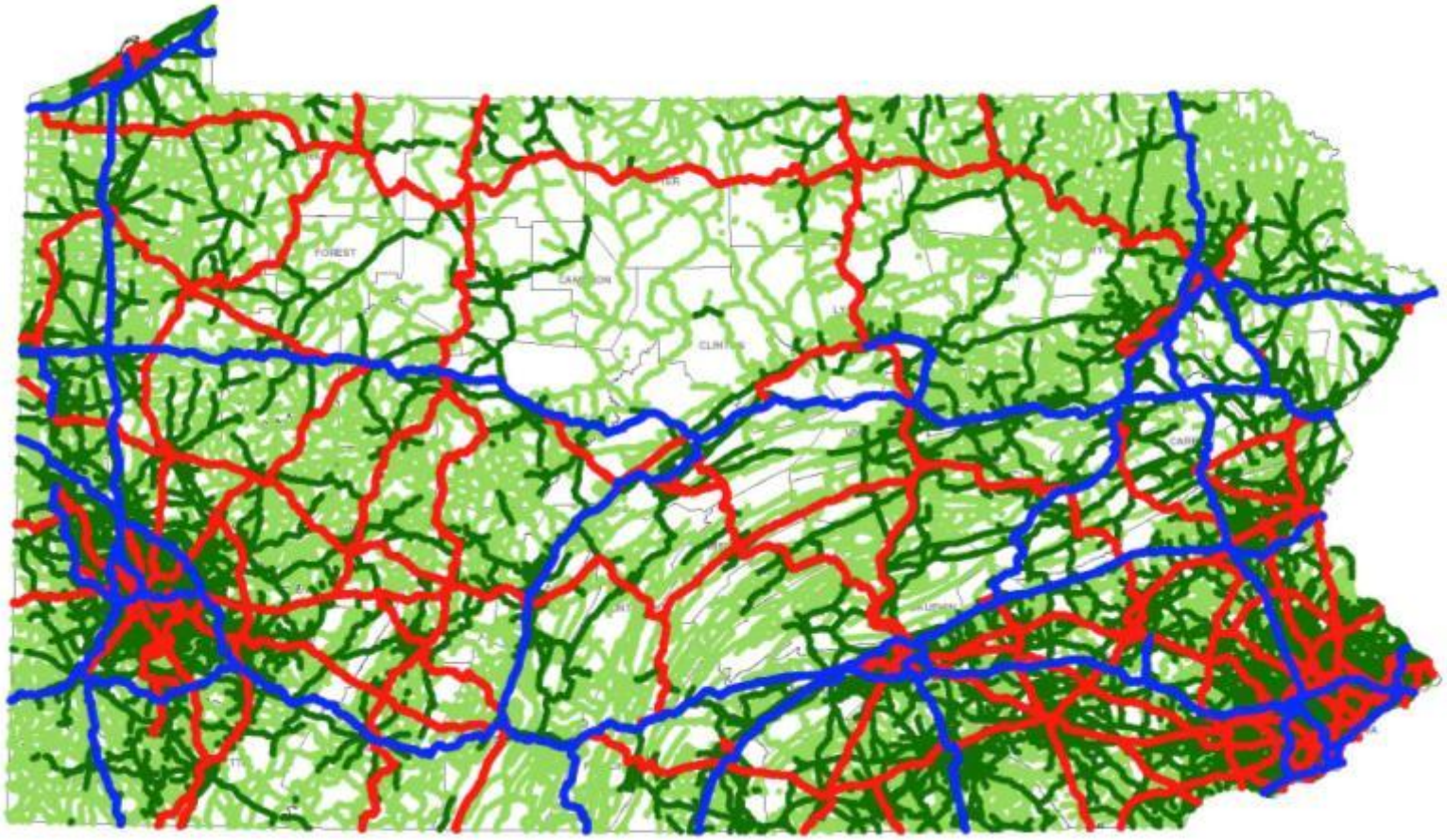
NHS

Non-NHS (> 2000 ADT)

Note: Local Roads Not Shown

Pennsylvania's Roadway Network

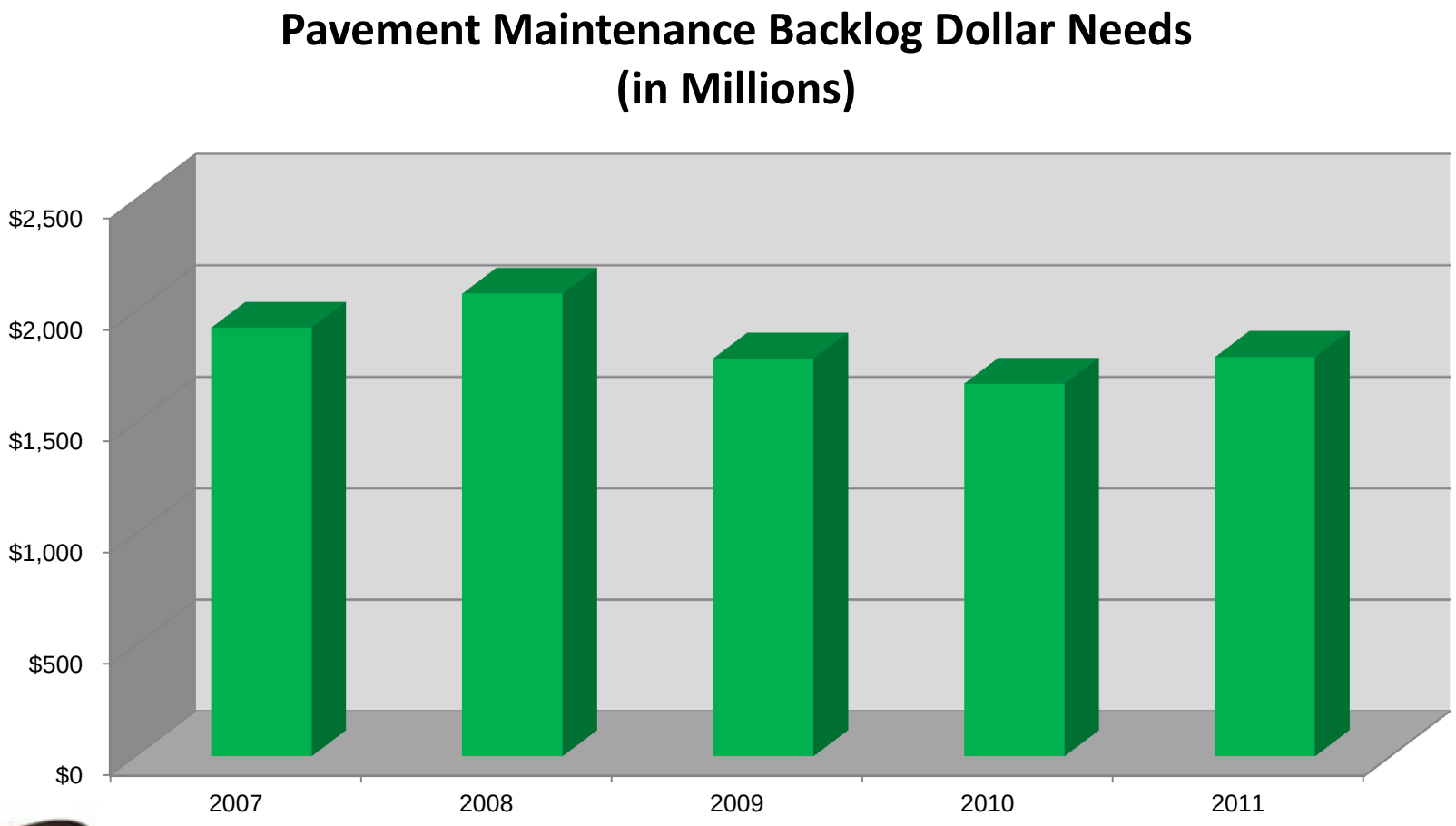
Interstate, NHS, and Non-NHS



Interstate		Non-NHS (> 2000 ADT)	
NHS		Non-NHS (< 2000 ADT)	

Note: Local Roads Not Shown

Pennsylvania's Maintenance Backlog



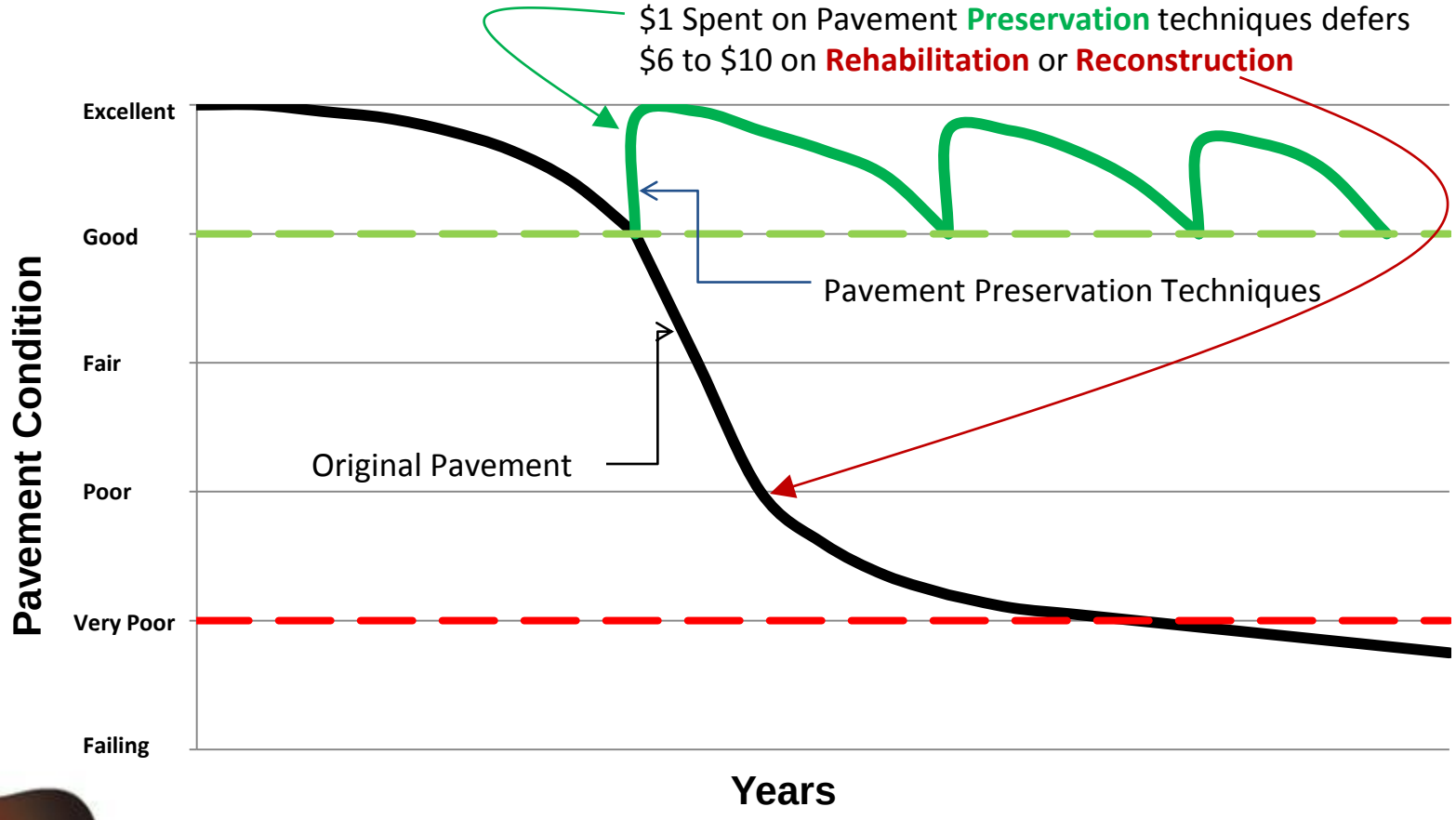
Pavement Preservation

Applying the right treatment…

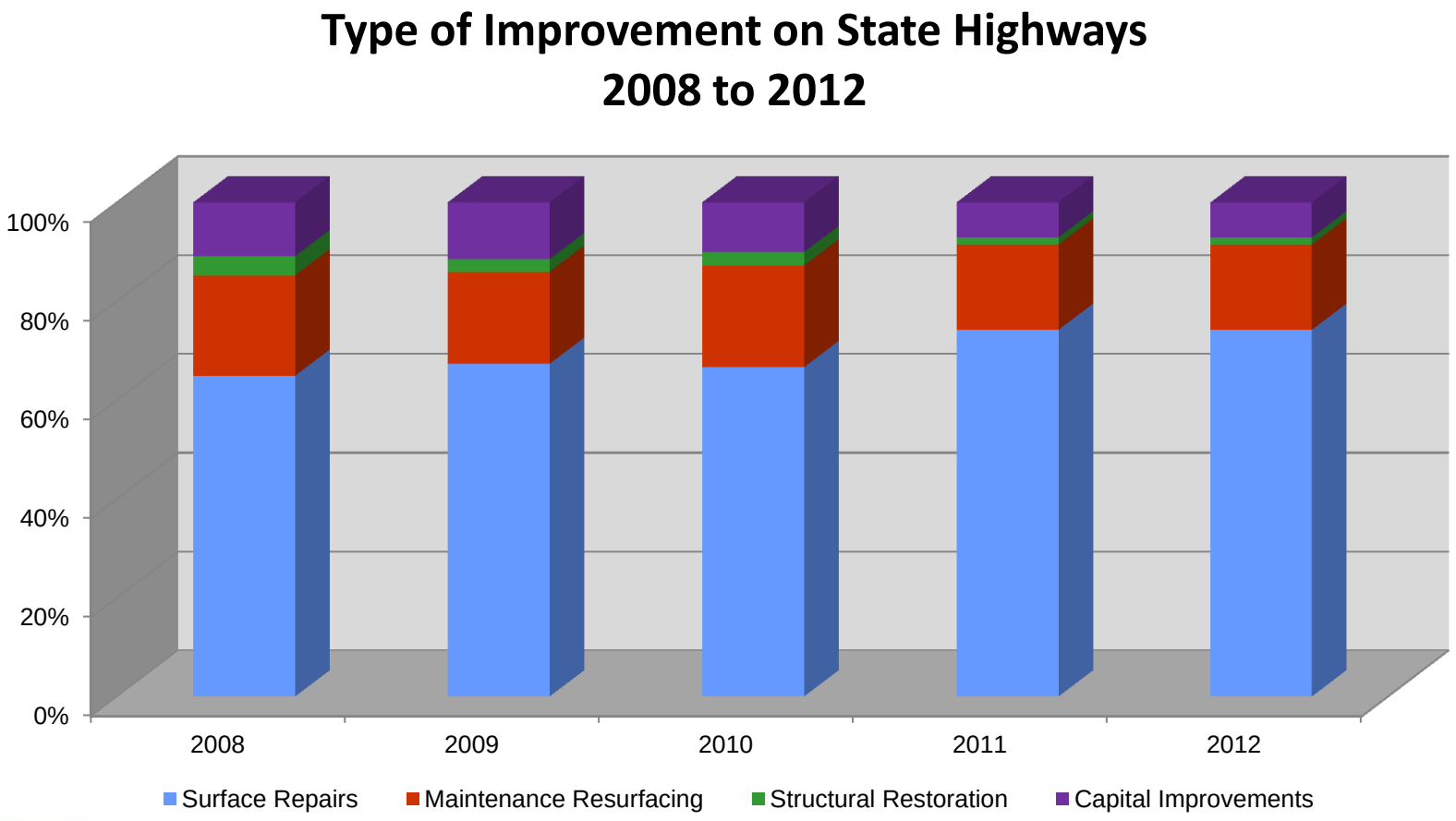
…To the right pavement…

…At the right time

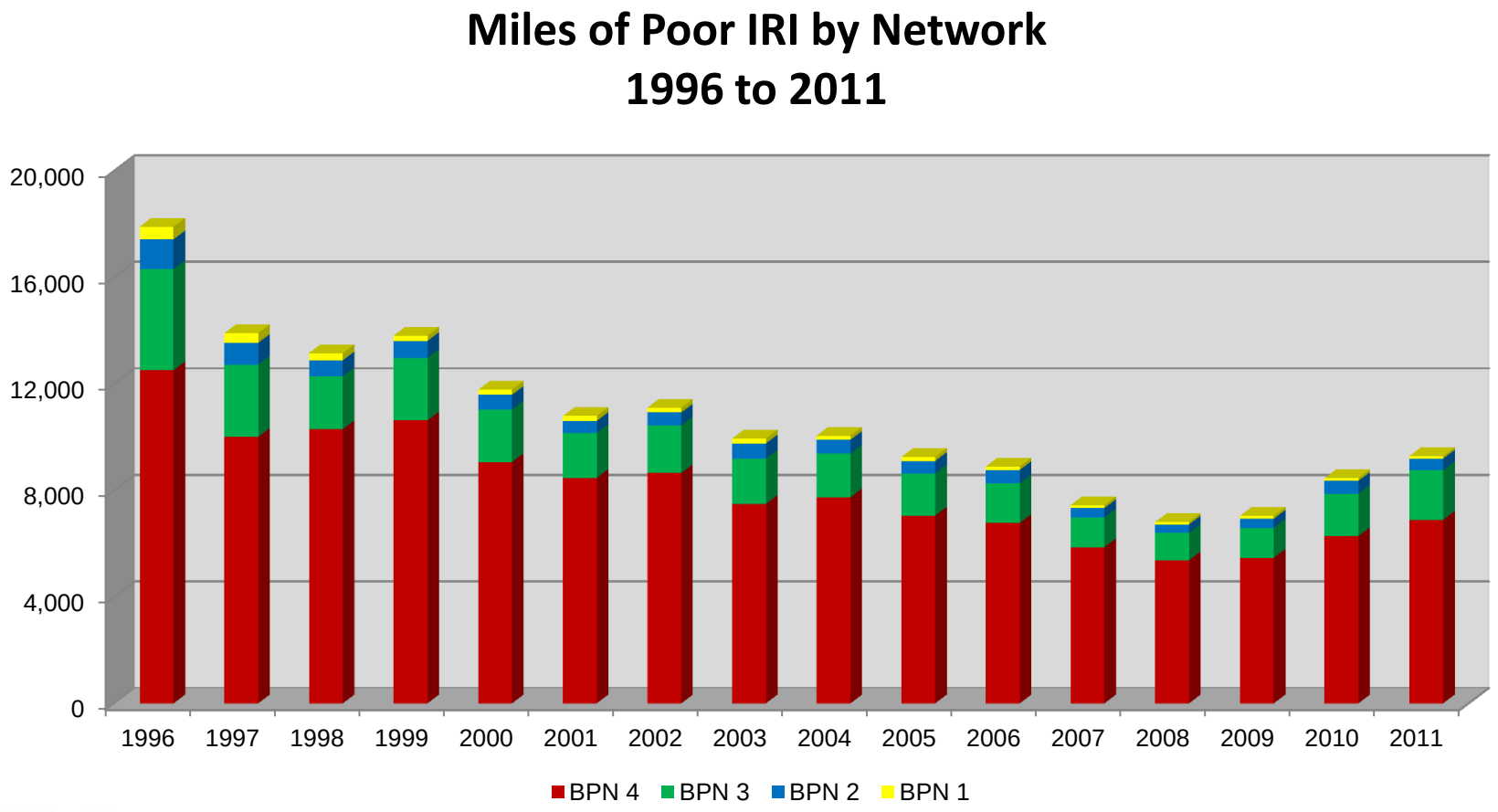
Pavement Deterioration Curve



Pavement Preservation at PennDOT



Pavement Preservation at PennDOT



Pavement Treatment Cycles

- Pavement Treatment Cycles by Pavement Types:
  - Concrete Pavements
  - High-Level Bituminous Pavements
  - Low-Level Bituminous Pavements

Pavement Treatment Cycles

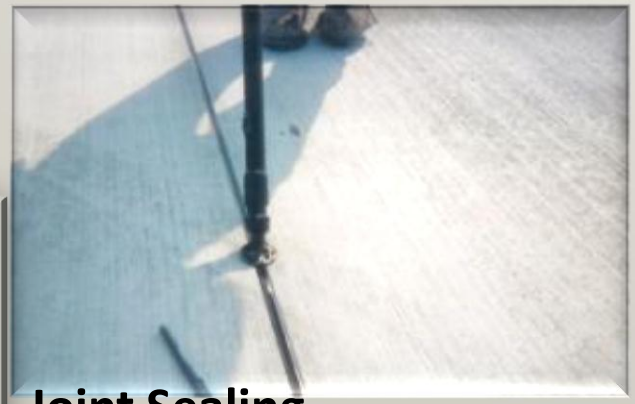
Concrete Pavement Cycles

Activity	Frequency
Joint sealing	5 years
Concrete patching	Year 15, 20 and 25
Diamond Grinding	Between Year 15 to 20
Overlay	Between Year 20 to 30
Seal coat shoulders (if bituminous)	5 to 7 years

Pavement Preservation Treatments

Concrete Pavements

Diamond Grinding



Joint Sealing

Ultrathin Friction Course

Dowel Bar Retrofit

Spall Repair

Pavement Preservation Treatments

High-Level Bituminous Pavement Cycles

Activity	Frequency
Crack sealing	3 to 5 years
Micro-Surfacing	One application between year 5 to 10
Resurfacing	8 to 12 years (w/ no interim micro surfacing) 13 to 17 years (w/ interim micro surfacing)
Seal coat shoulders	5 to 7 years

Pavement Preservation Treatments

High-Level Bituminous Pavements

Crack Sealing

Micro-Surfacing

Thin Overlays

Chip Sealing

Pavement Preservation Treatments

Low-Level Bituminous Pavement Cycles

Activity	Frequency
Crack sealing	3 to 5 years
Seal coat (rural) or Macro-surface	4 to 7 years
Micro-Surface or level (urban)	5 to 6 years
Resurface or level	15 to 20 years

Note: First seal coat after a level should be placed within 2 years.

Pavement Preservation Treatments

Low-Level Bituminous Pavements

Crack Sealing

Recycled Asphalt Paving

Thin Overlays

Chip Sealing

Pavement Preservation Treatments

Activity	Amount (FY 2011)
Crack Sealing	6,535 miles
Chip Sealing	3,288 miles
Micro-Surface	406 miles
RAP	1,340,426 sq.yds
Concrete Patching	4,017 sq.yds.

Measures of Effectiveness

- County Maintenance Measurement Tool
- Performance Metrics Dashboard

CMMT Measures

- CMMT: County Maintenance Measurement Tool

- Purpose: CMMT will provide for uniformity and consistency in reporting and performance measurement and help identify “Best Performers”

CMMT Measure 21 (Pavement Management)

- Objective:

  To assure pavements are maintained in accordance with the BOMO guidelines in order to extend the pavement service life, and to reduce the backlog of pavement maintenance needs identified by STAMPP to effectively assist in Pavement Preservation.

CMMT Measure 21 (Pavement Management)

- Compliance is based on the following 4 criteria:
  - Crack seal all high level bituminous roadways every 5 years. The miles of roadway that have not been cracked sealed in the last 5 years are **out of cycle**.
  - Seal coat all low level bituminous roadways every 7 years. The miles of roadway that have not been seal coated in the last 7 years are **out of cycle**.

CMMT Measure 21 (Pavement Management)

- Shoulder cut all high level roadways every 7 years to promote drainage off the pavement. The miles of roadway that have not been shoulder cut in the last 7 years are **out of cycle**.
- Shoulder cut all low level roadways every 10 years. The miles of roadway that have not been shoulder cut in the last 10 years are **out of cycle**.

Performance Metric Dashboards

- Measurement Tool based on 4 categories
  - Resurfacing
  - Leveling and Sealing
  - Total Surface Improvement
  - Crack Sealing
- Dashboards used in District Executives Performance Evaluations.

Performance Metric Dashboards

- Resurfacing
  - This metric tracks the number miles of resurfacing completed throughout the fiscal year, and measures completed mileage versus planned mileage.

Performance Metric Dashboards

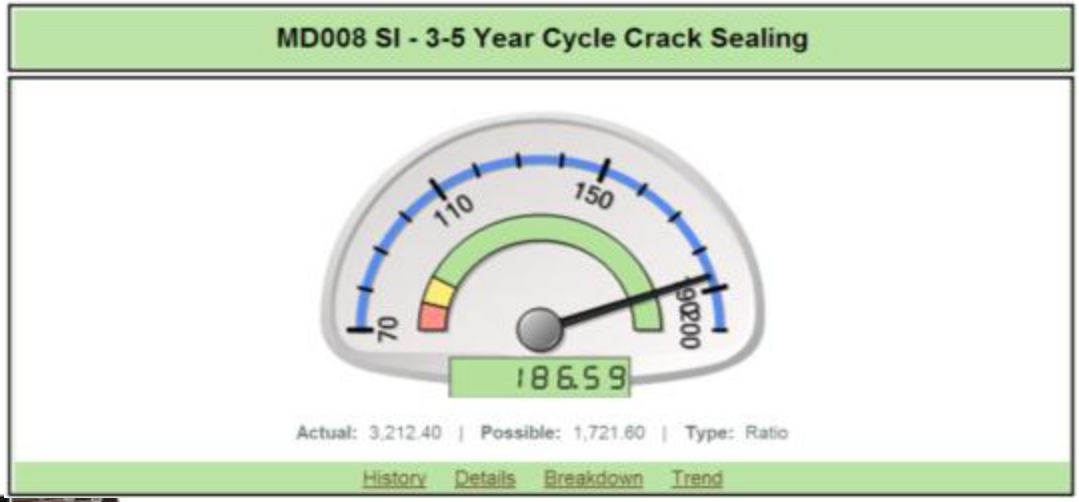
- Leveling and Sealing
  - The metric tracks the number miles of leveling and sealing completed throughout the fiscal year, and measures completed mileage versus planned mileage.

Performance Metric Dashboards

- Total Surface Improvements
  - The metric tracks the number miles of surface improvement completed throughout the fiscal year, and measures completed mileage versus total system mileage. The goal is to improve 15% of the system each fiscal year.

Performance Metric Dashboards

- Crack Sealing
  - This metric track the miles with crack sealing completed throughout the fiscal year, and measures completed mileage versus total mileage on the resurfacing network (high level bituminous) with a surface no more than five years old.

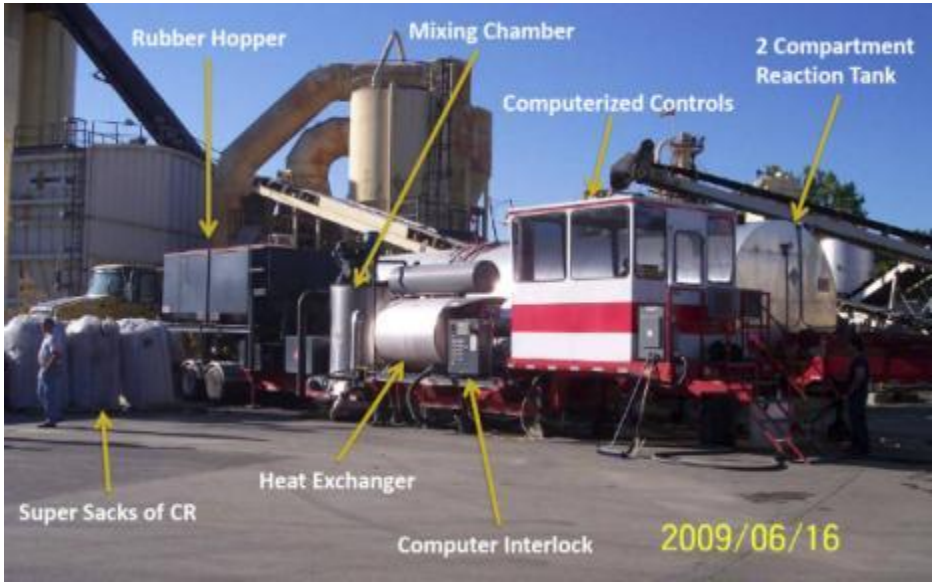


Ongoing Research Projects

- Asphalt Rubber Gap Graded (AR-GG)
- HMA and WMA Fiber
- Thin HMA Overlay
- Flexible Micro Surfacing

Asphalt Rubber Gap Graded (AR-GG)

- District 5-0 will pilot an AR-GG asphalt mix design on I-78, Mile post 11 to 16 EB & WB
- Uses the ASTM D 6114, Type II, wet process
- Control section will use a polymer modified PG 76-22.



HMA and WMA Fiber

- 1 pound fibers per 1 ton mix
- No mix design changes
- Performs better in rut testing and crack resistance


HMA Blend


WMA Blend

Thin HMA Overlay

- 6.3mm PG 76-22, ¾” to 1 ¼” depth overlay
- Utilizes 75 gyration volumetric design
- Conducting 3 Pilot Projects

Flexible Micro Surfacing

- New research project to investigate Flexible Micro Surfacing

  - Reduce fatigue cracking
  - Consists of an emulsion formulation enhanced with a performance additive. The additive is typically a fiber or a polymer
  - A good surface treatment to be placed over recycled asphalt paving projects

Questions?

Pennsylvania Department of Transportation

Charles C. Goodhart, Director
Bureau of Maintenance and Operations
400 North Street – 6th Floor
Harrisburg, PA 17120
Phone: (717) 787-6899
Fax: (717) 705-5520
cgoodhart@pa.gov
http://www.dot.state.pa.us/