applied pavement TECHNOLOGY

Reclaimed Asphalt Pavement (RAP) Use in Pavement Preservation Surface Treatments

PENNSYLVANIA ASSOCIATION OF ASPHALT MATERIAL APPLICATORS
PAAMA ANNUAL MEETING • BOALSBURG, PA • OCTOBER 20,2022

Presenter
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Applied Pavement Technology, Inc.

Project Objectives

- Document case studies, best practices, testing costs, and specifications for the use of recycled asphalt pavement in surface pavement preservation treatments.
- Evaluate chip seals, microsurfacing, and slurry seals as treatments.
- Provide documentation and guidance for practitioners.

Source: FHWA

RAP Characteristics

- Valuable by-product.
- High-quality source.
- Material behavior.
  - “Black” Rock.
  - Interactive binder.
- Processing.
  - Crushing.
  - Fractionation.

Task 2 Current Practices Summary

Source: Applied Pavement Technology, Inc.

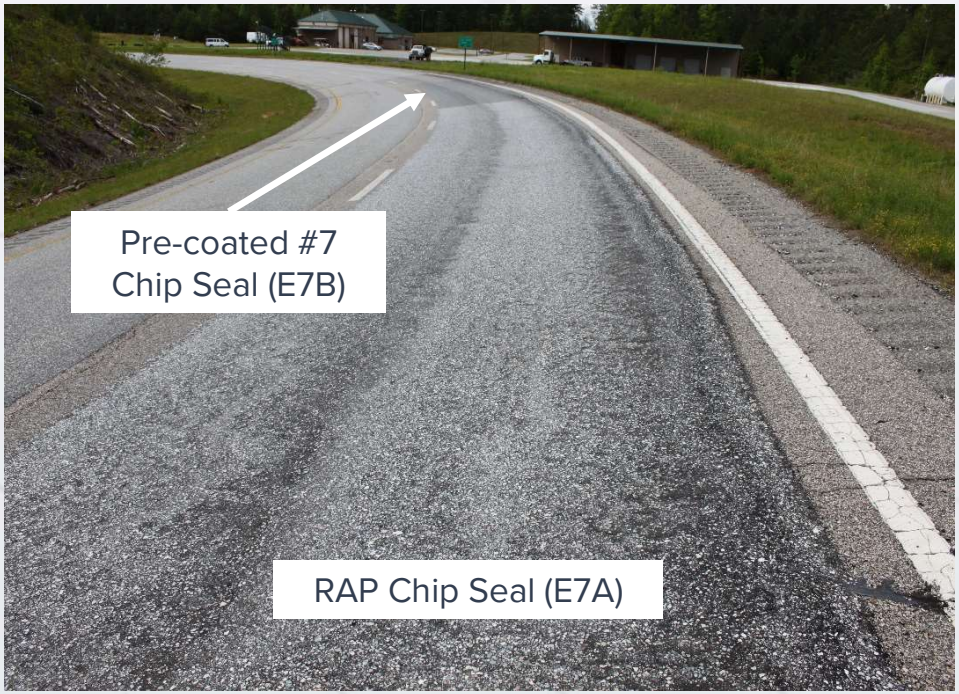
Task 2 Current Practices Summary

INTERVIEWS

- **Scott Metcalf** (Ergon Asphalt and Emulsions, Inc.)
- **Buzz Powell** (The National Center for Asphalt Technology [NCAT])
- **Doug Ford** (Pavement Coatings, Inc.)
- **Don Matthews** (Pavement Recycling Systems)
- **Van Truong** (Los Angeles County Public Works)
- **Angel Lemus** (San Bernardino County)
- **Mike Hemsley** (Paragon Technical Services)
- **Virgil Valdez** (NMDOT Research Bureau)

Early Findings

- **Why use RAP?**
  - Cost effective.
  - Environmentally sustainable.
  - Alternative to scarce aggregate resources.
- **Differences in using RAP.**
  - Chip seal characteristics.
    - Better aggregate bond.
    - Blacker texture for longer.
  - Microsurface and slurry seal characteristics.
    - One-to-two percent reduction in virgin asphalt emulsion.
    - Slower set.



Source: FHWA

Case Study–NCAT

- Case study findings
- Rubber-modified hot applied chip seal placement.
  - Precoated virgin aggregate.
  - RAP chips.
- Loaded and monitored for two years.
- Skid data showed lower friction than pre-coated virgin section.

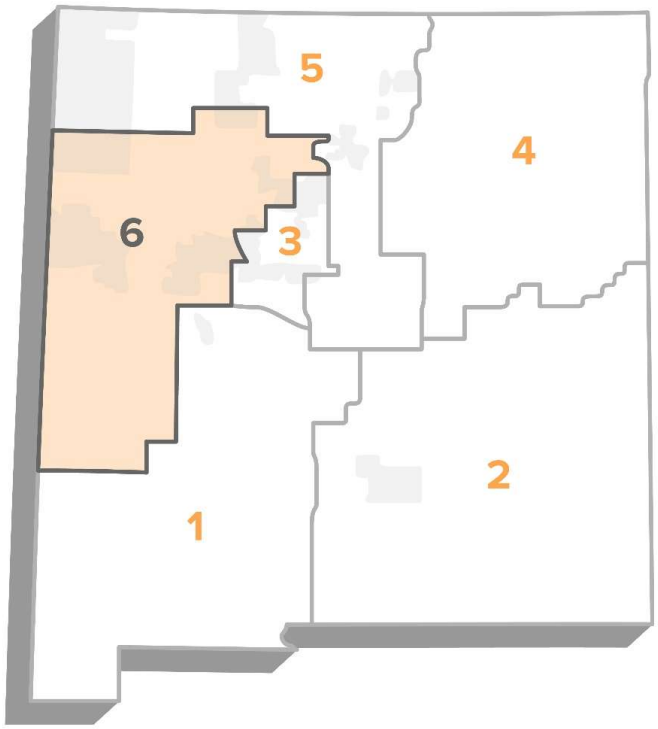
Source: FHWA

Case Study–Paragon Technical Services

- Case study findings
- Provide mixture designs for clients.
- Design test results showing similar performance for RAP slurry and microsurface:
  - Wet-track abrasion.
  - Loaded wheel tester.
- Develop lower design emulsion content, but overall higher binder content.

Case Study– NMDOT

Lisa Vega, District 6 District Engineer
Source: NMDOT



New Mexico DOT District 6
Source: APTech

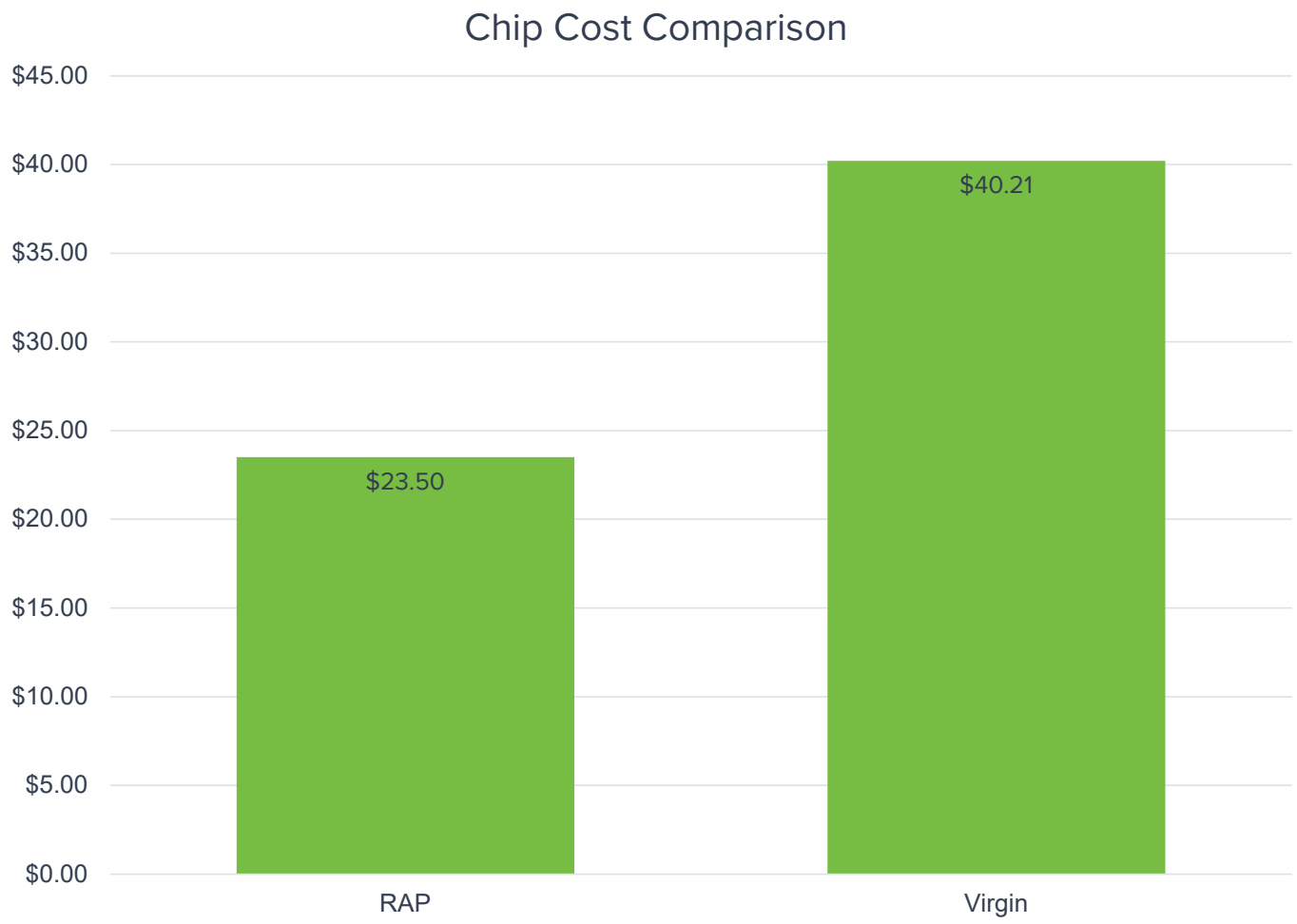
Source: FHWA

Case Study–NMDOT

Case study findings

- Scarce aggregate sources.
- State-retained RAP piles.
- In-house chip seal crews.
- Contract fractionation and hauling.
- Cost savings.

Case Study– NMDOT



Source: Source: Applied Pavement Technology, Inc.

Source: FHWA

Case Study–NMDOT

- Case study findings
- Similar application rates for emulsion and stone.
- Darker surface, better line contrast.
- Similar skid resistance.
- Fine fraction uses.

Source: FHWA

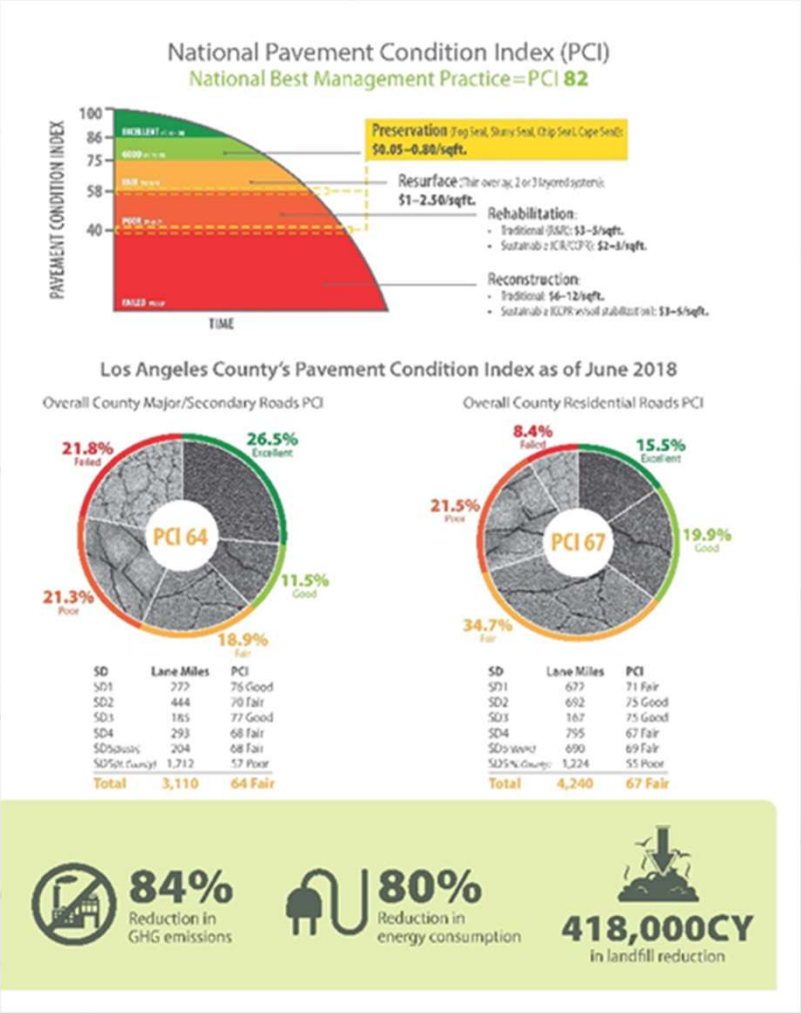
Case Study–San Bernardino Co.

- Case study findings
- Scarce aggregate sources.
- In-house chip seal crews.
- Contract aggregate delivery.
- Bid competition.
- Up to 30 percent cost savings.

Case Study– Los Angeles Co. (LAC)

Van Truong, Pavement Engineer Los Angeles County Public Works
Source: Truong

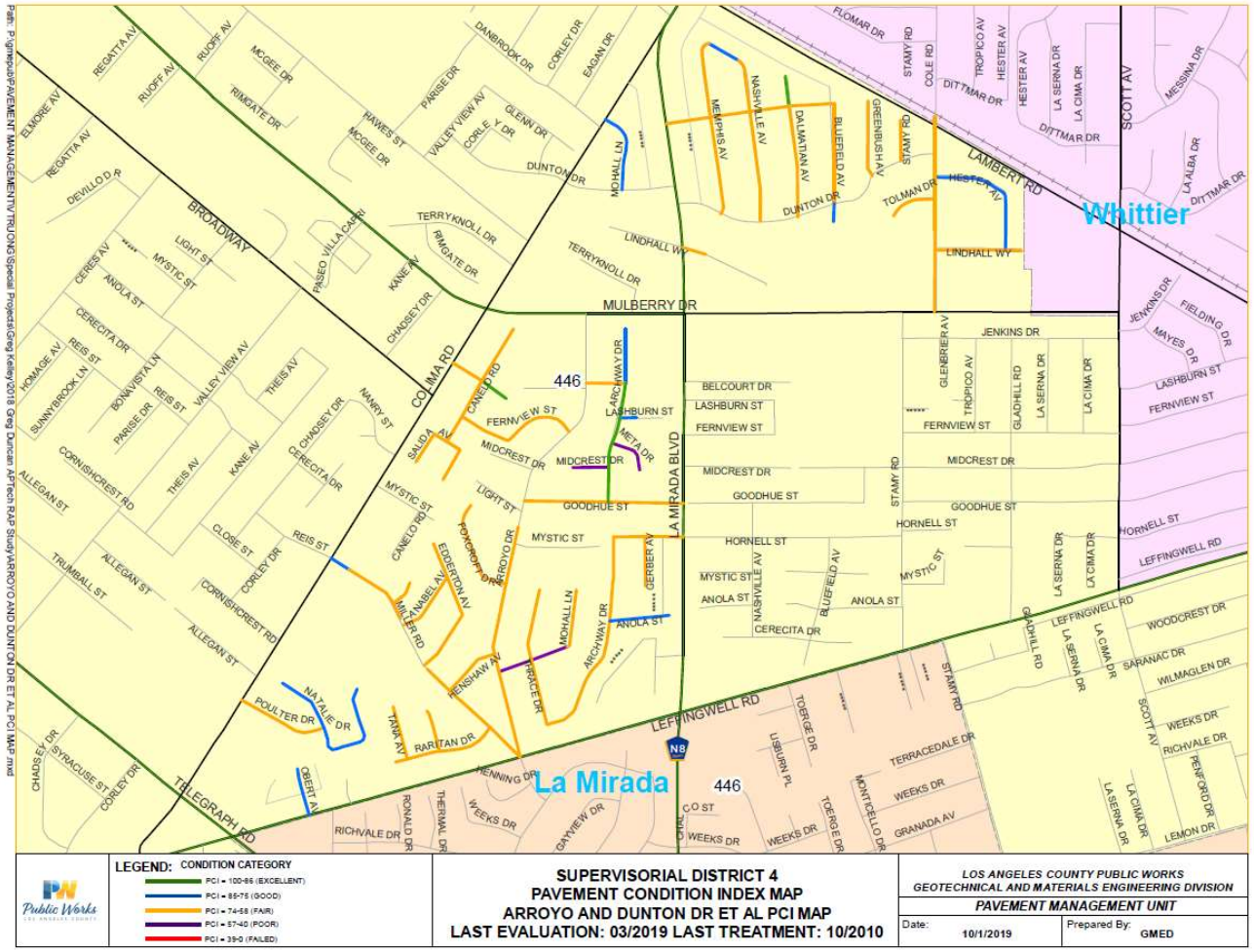
Los Angeles County, California
Source: APTech



Case Study–Los Angeles Co. (LAC)

- Case study findings
- Public relations campaign–Sustainability.
- Specify RAP treatments.
- Found similar performance after three years.
- Provide a job-order contracting mechanism.
- Use scrub, chip, and slurry seals and microsurface treatments.

LAC–Virgin Aggregate Treatments



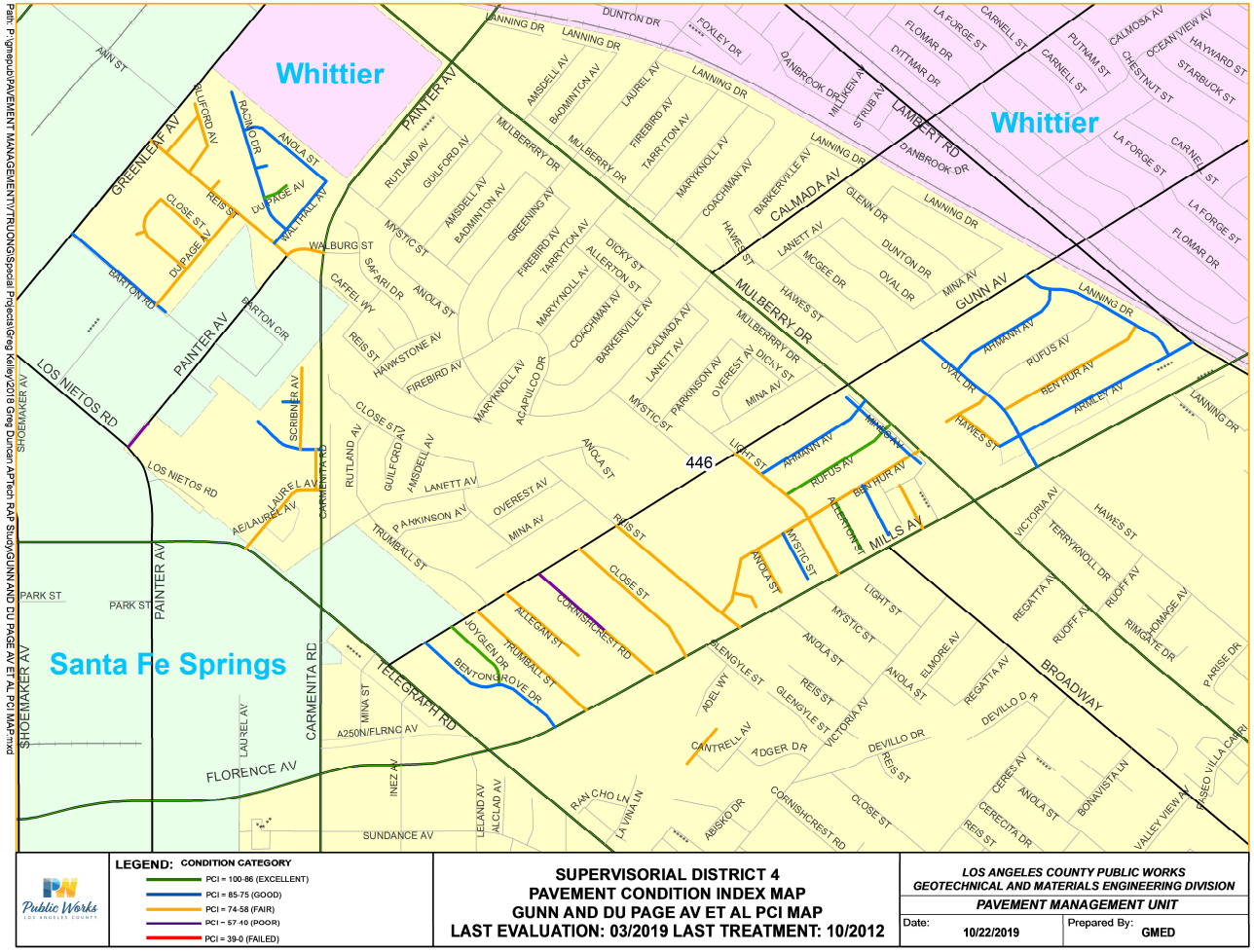
Arroyo & Dunton Dr

Virgin aggregate (slurry + asphalt rubberized chip seal)

Before condition (2010)

After condition (2016)

LAC–RAP Aggregate Treatments

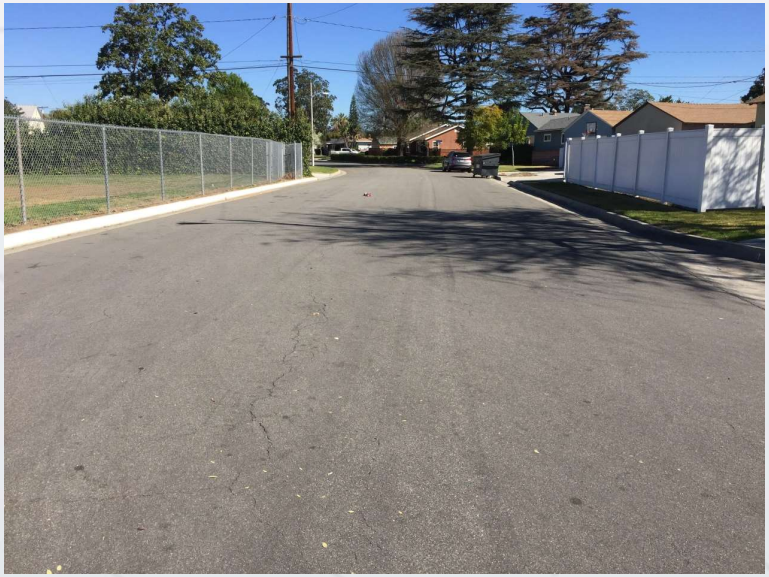


Gunn & Du Page Av

RAP treatment (PME-RAP slurry + asphalt rubberized chip seal)

Before condition (2012)

After condition (2016)



Case Study–Pavement Coatings

Source: FHWA

Case study findings

- Evaluate RAP's usefulness in pavement preservation treatments.
- Test the concept and merge companies.
- Balance production.
- Address construction nuances.
- Ensure similar performance.

Case Study– Pavement Coatings

Source: FHWA

Case Study– Pavement Coatings

Source: FHWA

Source: FHWA

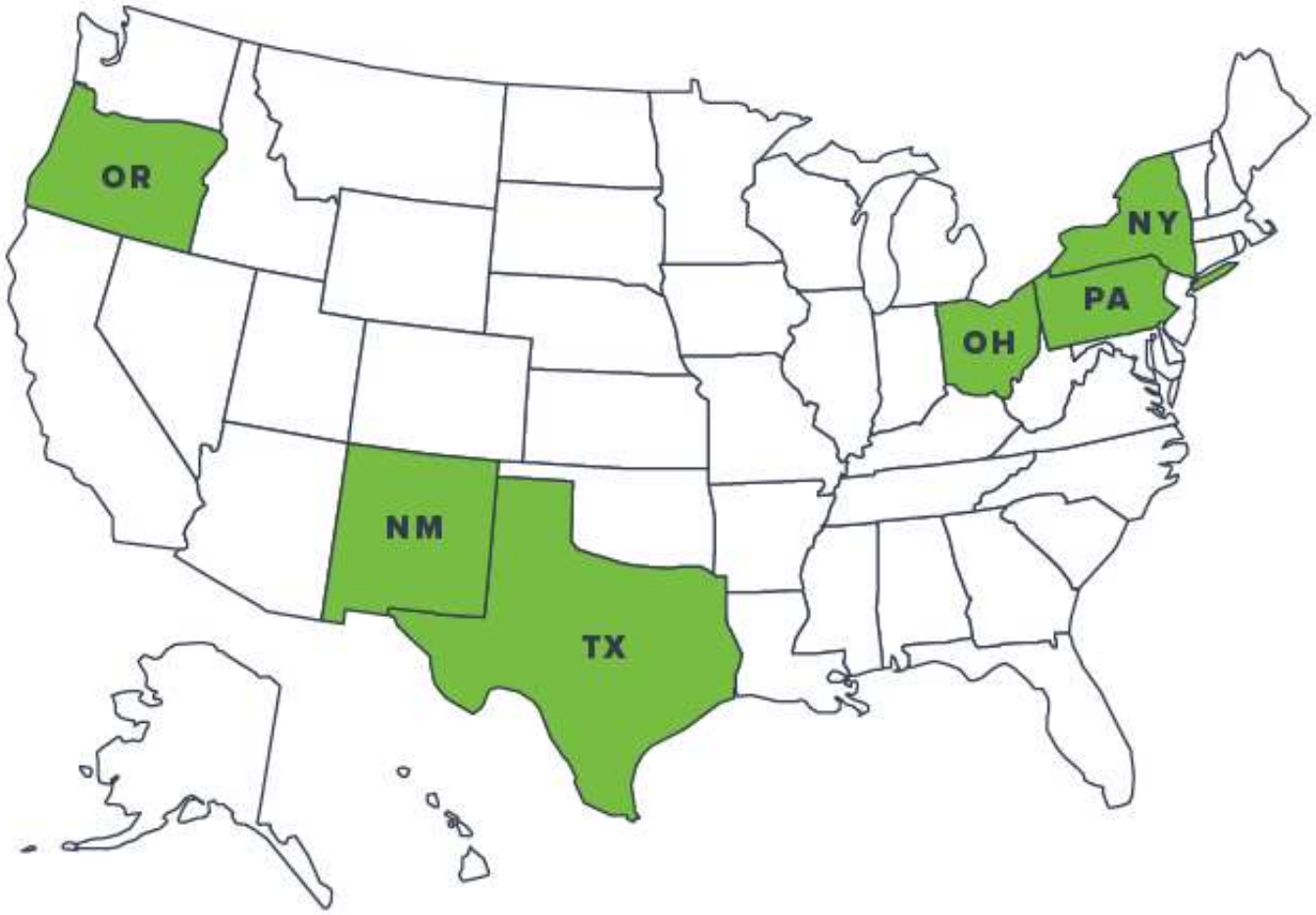
Findings

Significant conclusions

- RAP may be a cost-effective alternative depending on who owns it.
- Chip seals constructed with RAP require little alteration and perform comparatively.
- RAP in slurry and microsurfacing treatments require reduced emulsion content.
- RAP in PP is a rapidly progressing technology.

Others Using RAP in PP

- New York
- Pennsylvania
- Texas?
- Ohio–Study Completed
- Oregon–Study Ongoing
- New Mexico–Study Ongoing



Report available

- FHWA posted final report at https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/21007/index.cfm
- TechBrief, (in process)
- LinkedIn #TechThursday post

Phase 2 project

- Topic Areas
  - Determining RAP Availability
  - RAP Storage
  - Fractionation
  - Storage
  - Performance-based Specifications
  - Testing Requirements

Project 2 Outcomes

- Webinars
  - Topical information gathering
  - Research findings
- Final Report
  - Executive Summary
  - TechBrief
  - White Papers
- Engagement through 2024

What questions do you have?

Source: FHWA

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