NCAT+MnROAD:
National Long-Term Pavement Preservation Benefit Experiment

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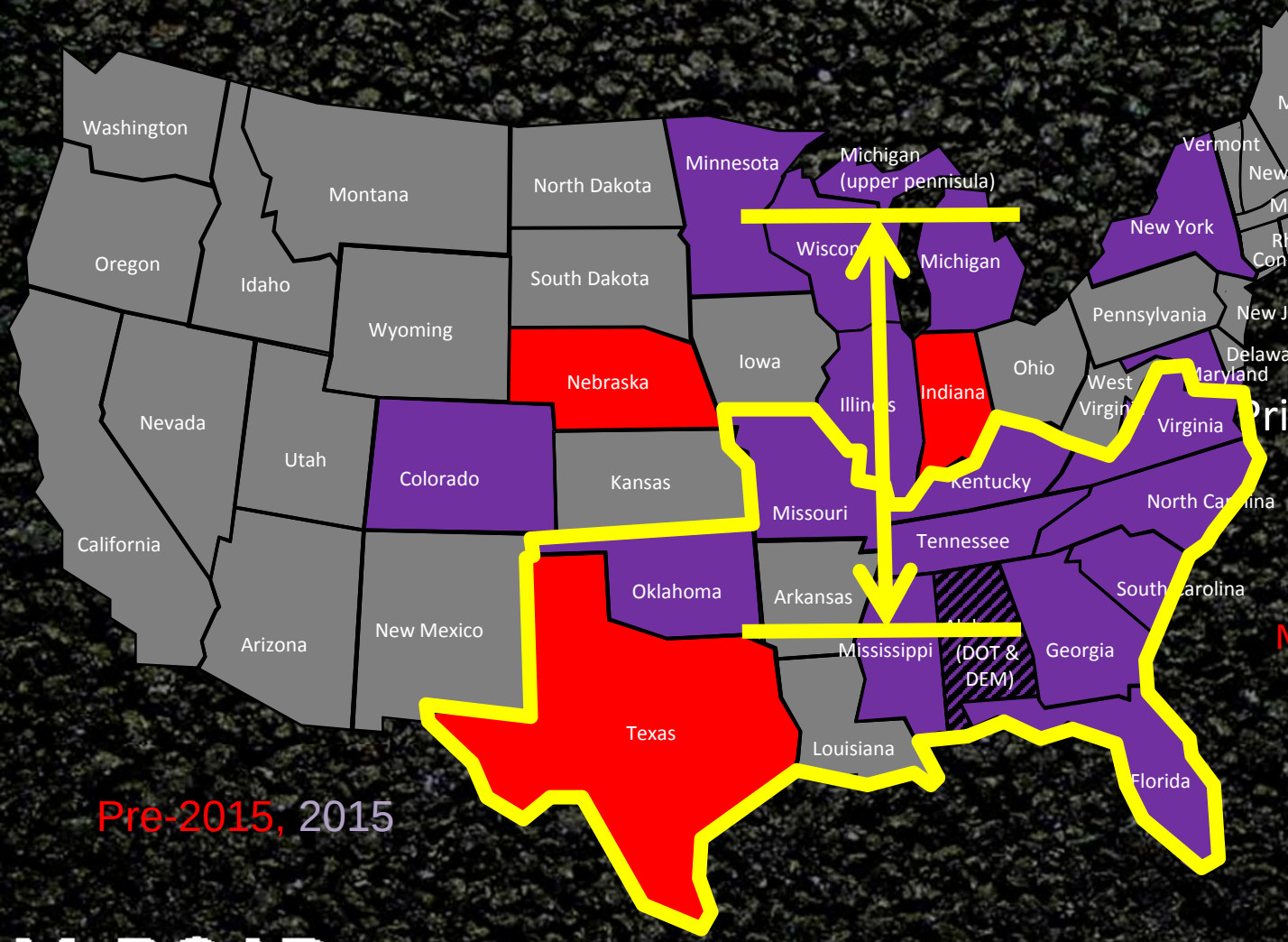
NCAT Pavement Test Track



Pre-2015, 2015

FHWA

Private Sector Sponsors

Cargill Deicing Technology
Collaborative Aggregates
FP^2
Kraton Polymers
Modified Asphalt Solutions
Oldcastle Materials
Polycon Manufacturing
Seneca Petroleum
Shell Sulfur Solutions
Trinidad Lake Asphalt

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ADEM
Alabama Department of Environmental Management

ALABAMA
Department Of Transportation

COLLABORATIVE
AGGREGATES LLC

CO CDOT

Department of Transportation
United States of America

FP2

State of Florida
Department of Transportation

GDOT
Georgia Department of Transportation

Illinois Department
of Transportation

KENTUCKY
TRANSPORTATION
CABINET

MDOT
Michigan Department of Transportation

MDOT
Mississippi Department of Transportation

Minnesota
Department of Transportation

MoDOT

NEW YORK
STATE OF
OPPORTUNITY.
Department of
Transportation

State of North Carolina
Department of Transportation

ODOT
Oklahoma Department
of Transportation

SCDOT
South Carolina Department of Transportation

TN TDOT
Department of
Transportation

VDOT
Virginia Department of Transportation

Wisconsin
Department of Transportation

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SHA
State Highway
Administration
Maryland Department of Transportation

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NCAT Pavement Test Track

- Help state DOTs implement positive change
- Promote real innovation for the industry
    - Mix and materials
    - Structural pavement design
    - Pavement preservation.

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Standalone Research

- Optimization of reclaimed/recycled materials
- Increasing RAP in polymer surfaces
- Benefit of rejuvenator in RAP+RAS mix
- Innovative porous surface mix design
- Asphalt based high friction alternatives
- Lower cost thinlay rutting and cracking
- Mix improvements on longitudinal joint.

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Thickness Design Optimization

- Stiff Track subgrade and aggregate base
  - Original 24” Track via ‘93 AASHTO Design Guide
  - 9” conventional HMA found to be perpetual
  - 5¾” high polymer HMA found to be perpetual
- Soft subgrade imported to Track for Oklahoma
  - 10” failed (salvaged with high polymer inlay)
  - 14” found to be perpetual (micro milled/inlaid).

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Thickness Design Optimization

- Mechanistic-Empirical (M-E) implementation
- Incorporation of "unconventional materials"
- Ongoing support for empirical (E) designs
- Layer coefficients for modern DGA, OGFC, CR…
  - ≈0.54 for dense (DGA) & gap (SMA) graded asphalt
  - ≈0.15 for open graded friction course (OGFC)
  - ≈0.36 for foamed cold central plant recycle (CCPR).

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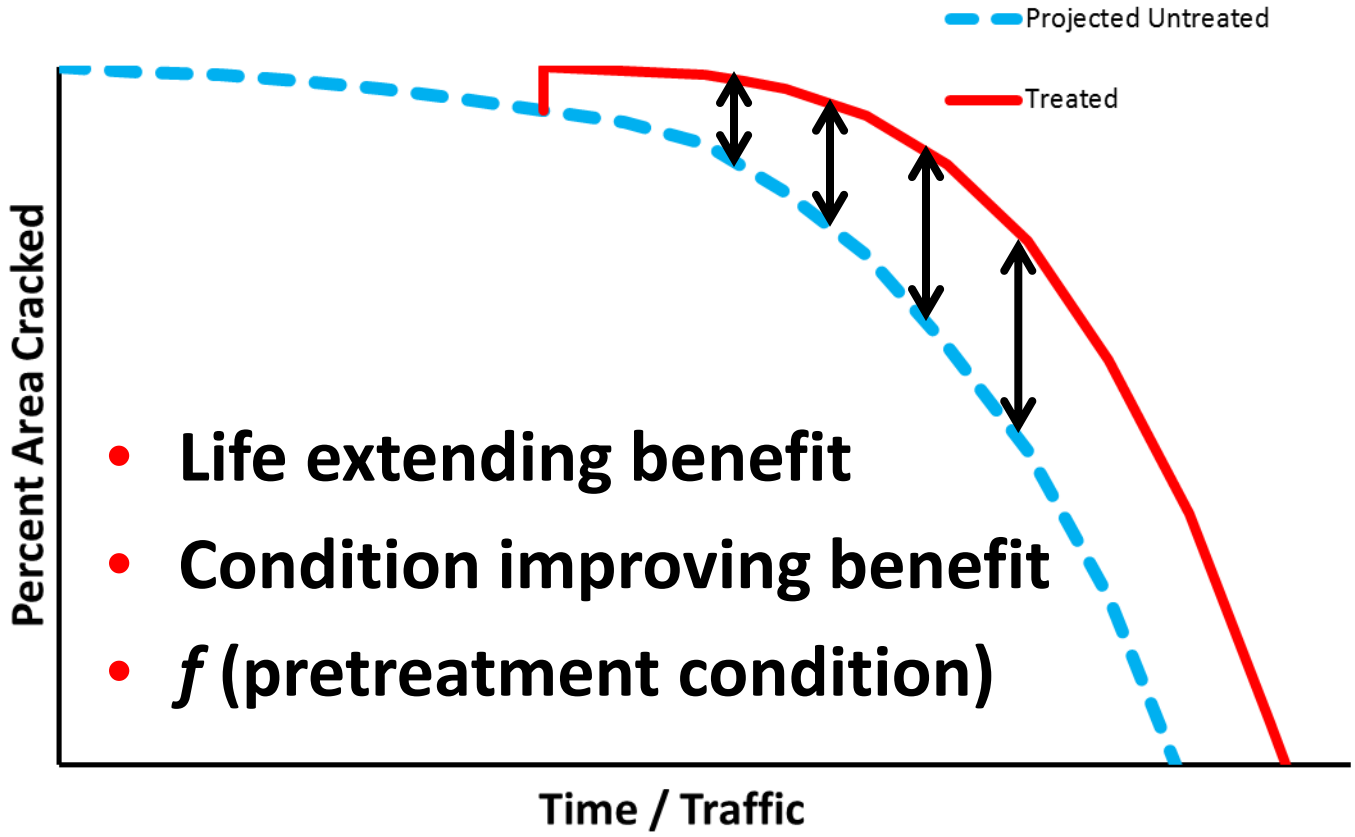
Benefits of Preservation



- **Life extending benefit**
- **Condition improving benefit**
- ***f* (pretreatment condition)**

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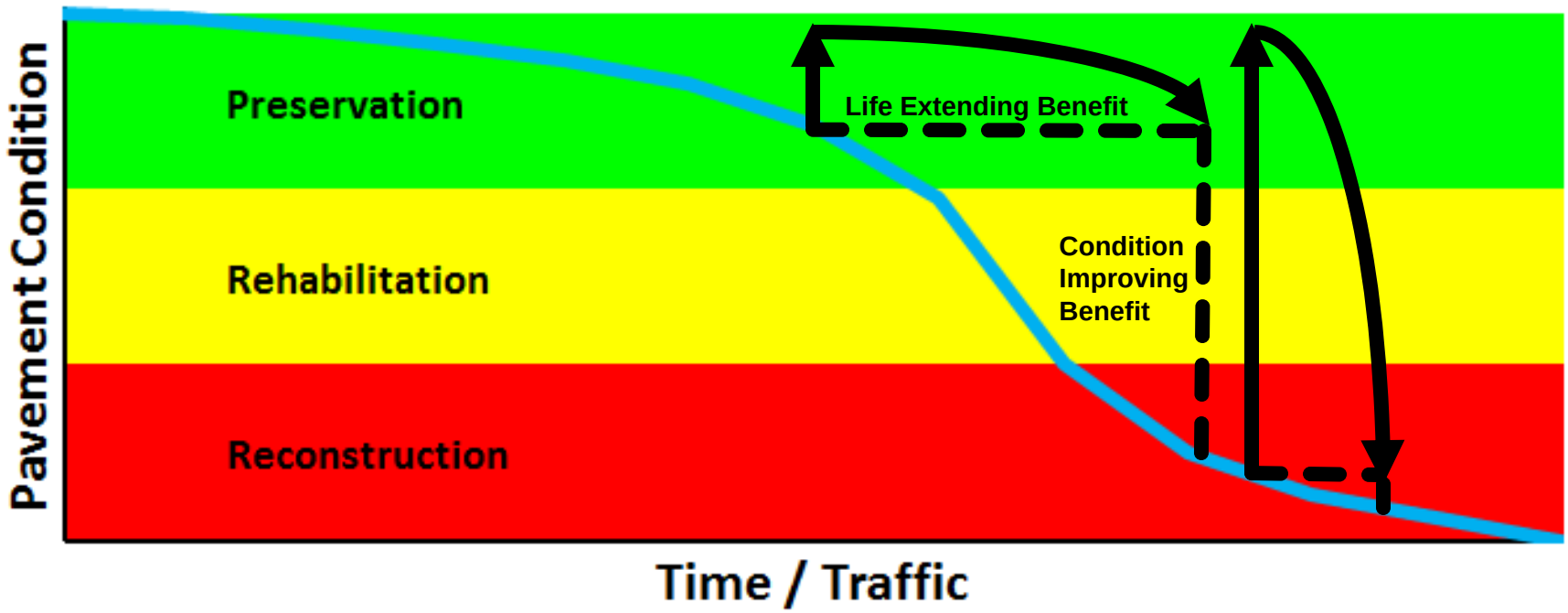

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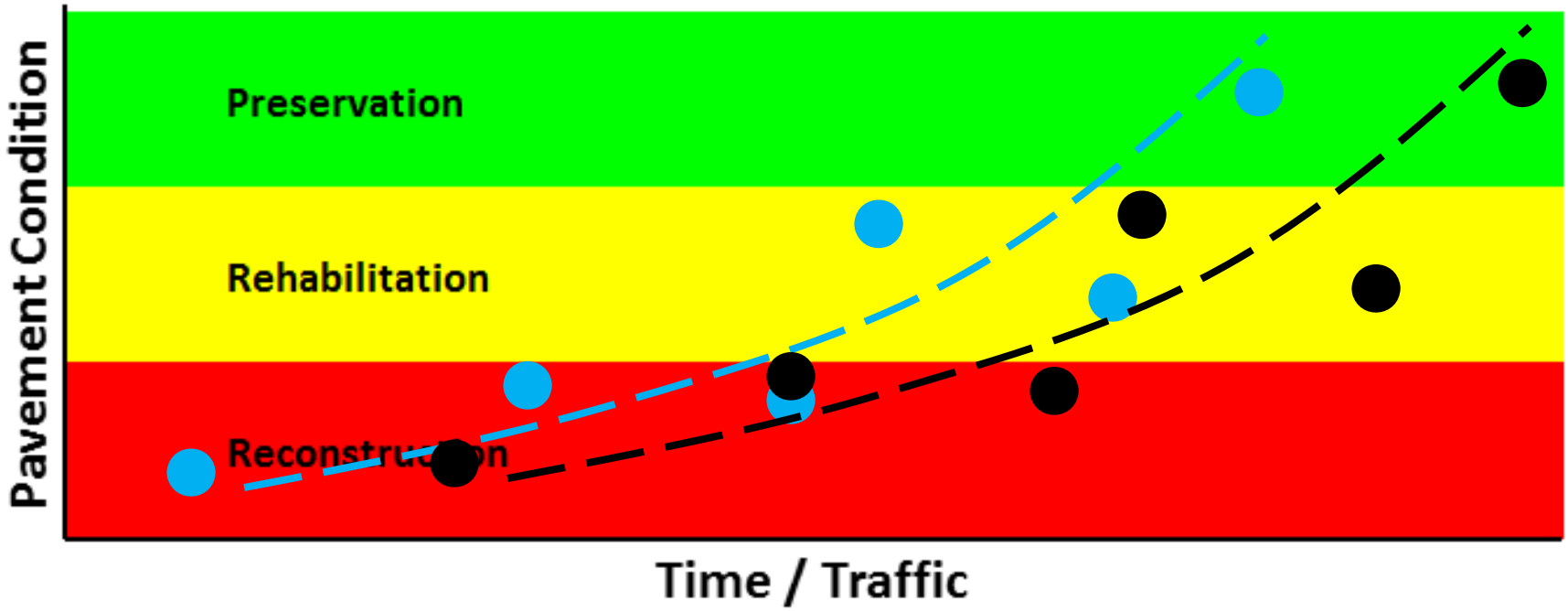
Benefits of Preservation



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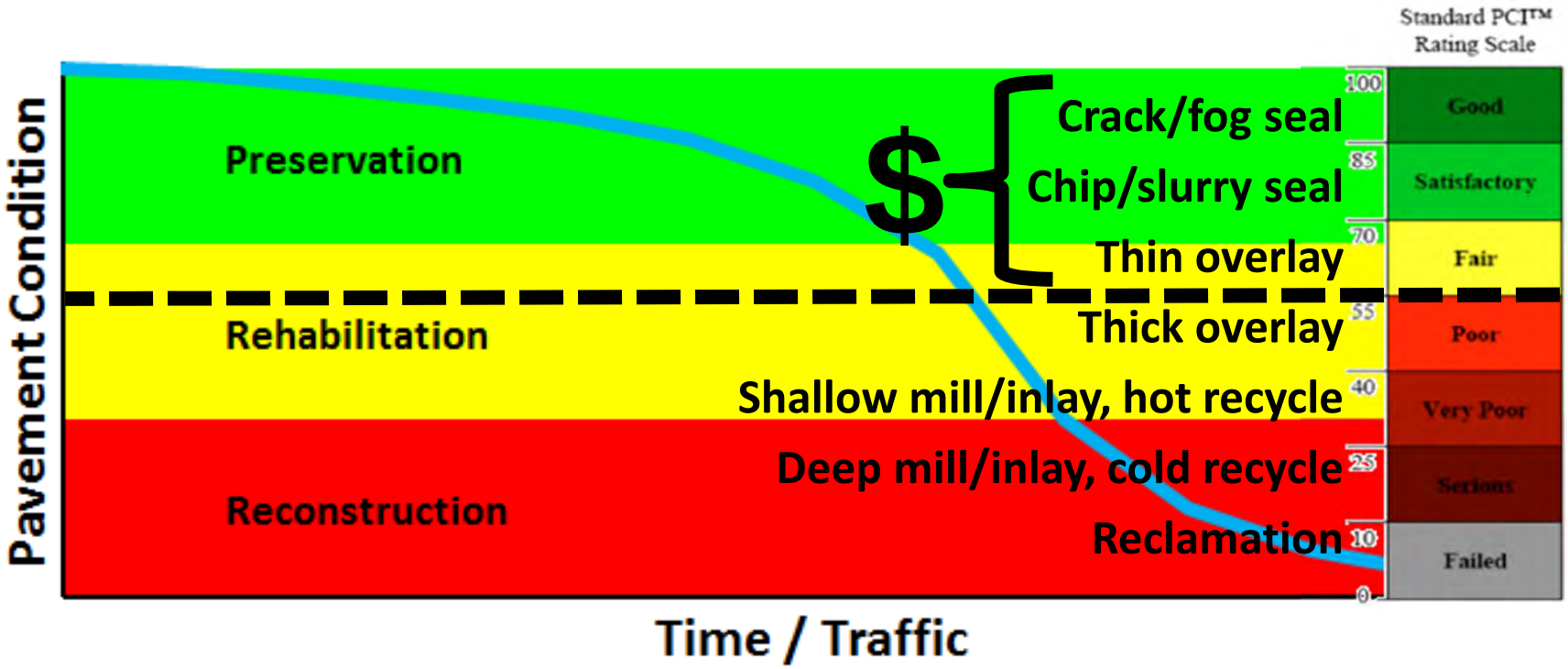
Pavement Preservation



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Track Thinlay

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Lee Road 159 Low Traffic Preservation

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Benefits of Preservation

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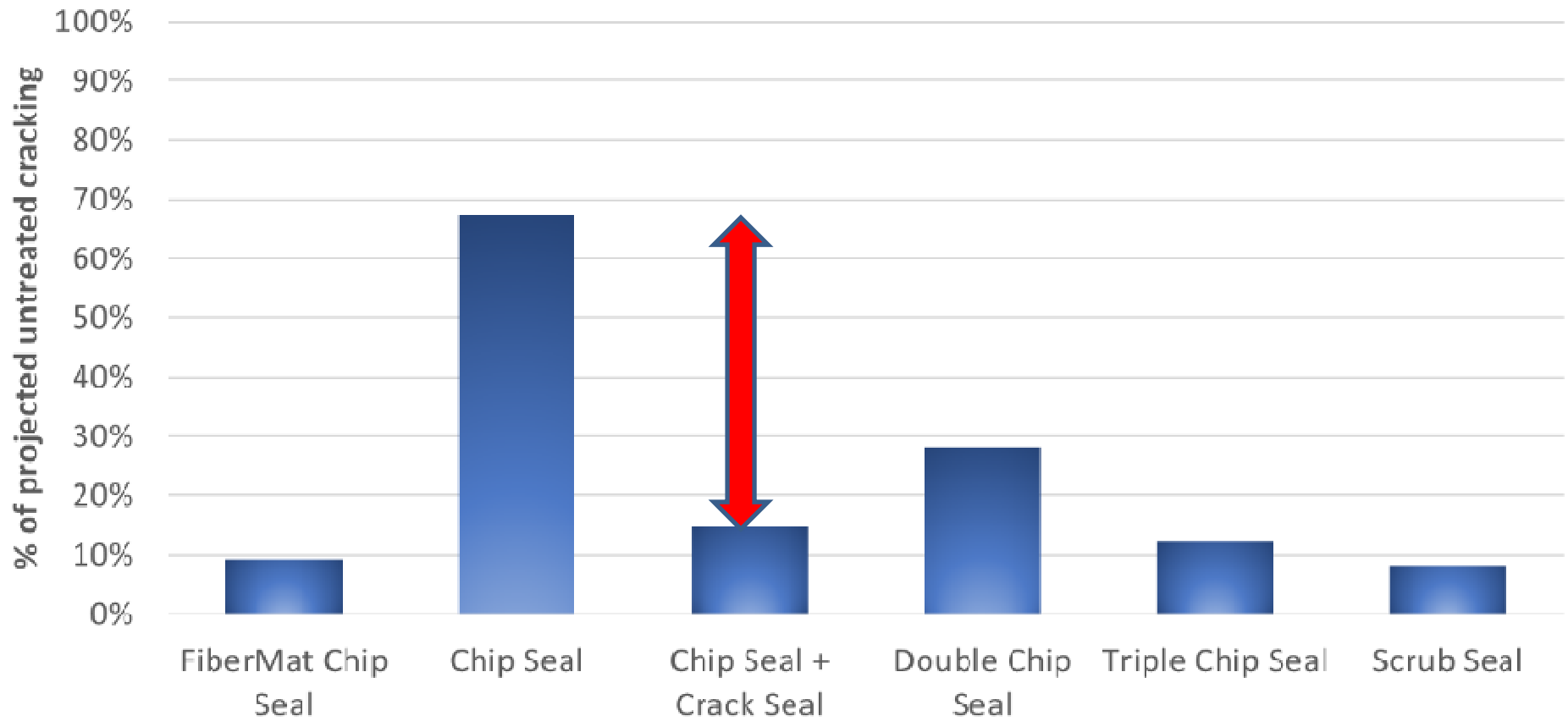

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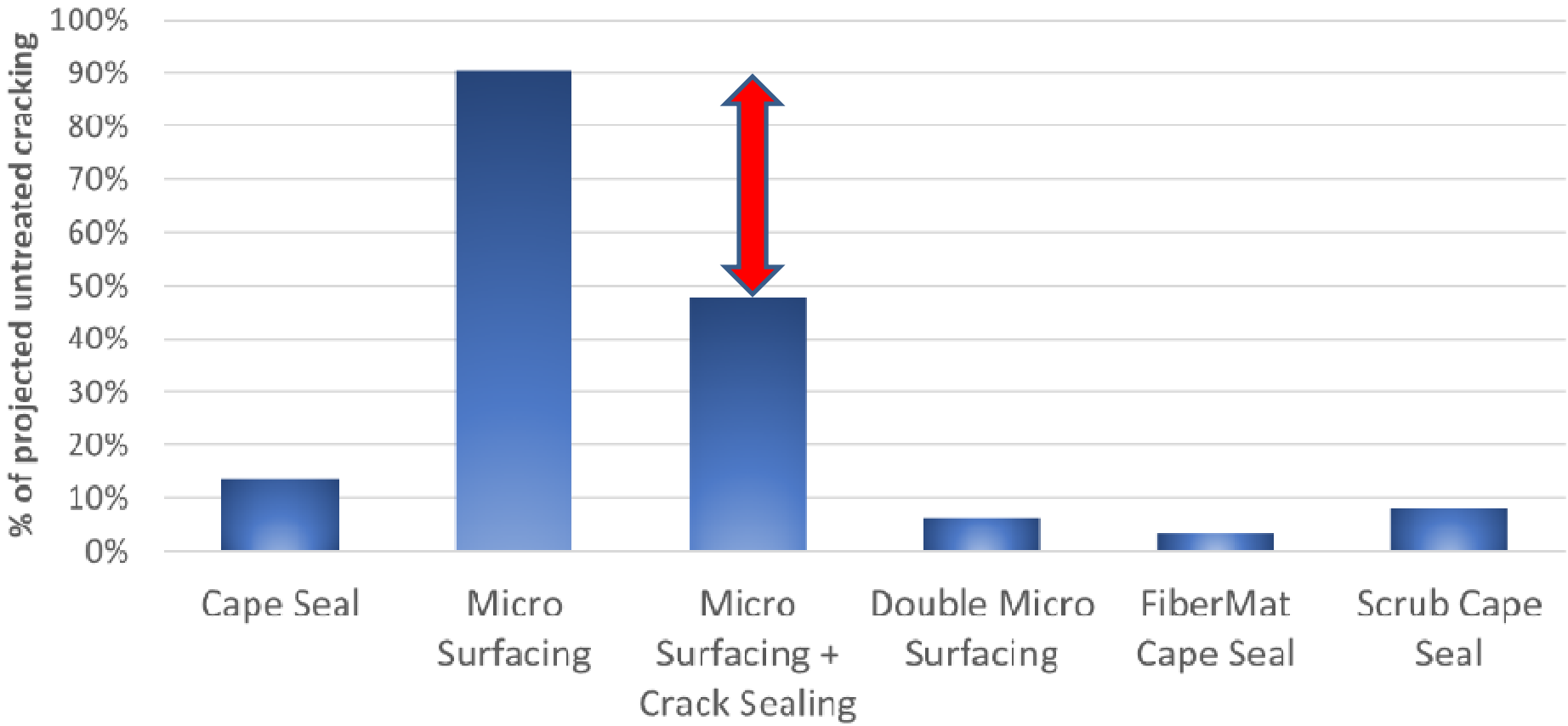

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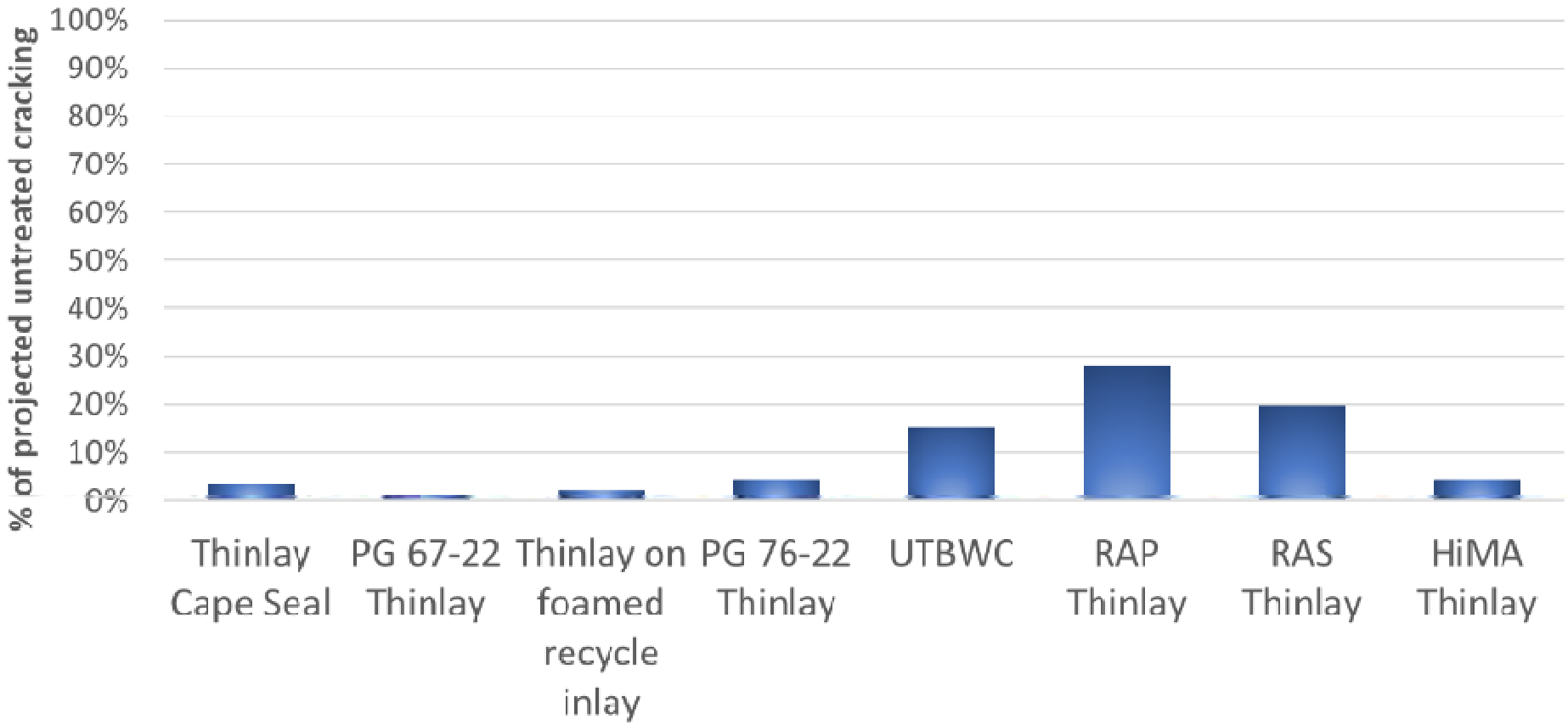

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Ultra Thin Bonded Wearing Course

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DGA Polymer Thinlay

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Balanced HMA Mix Designs

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US-280 High Traffic Preservation

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High Traffic Thinlays on US-280

- 4.75 mm NMAS dense graded asphalt
  - Standalone test sections at ¾” thickness (virgin vs ABR)
  - Thinlay Cape seals (¾” in combination with chip seals)
  - 1” overlays on cold recycle mixes (CCPR & CIR, F & E)
- Open graded friction course (OGFC) 1” thinlays
  - Spray paver, UltraTack, PG67-22, UltraFuse, eTac
- ¾” ultra thin bonded wearing course (UTBWC).

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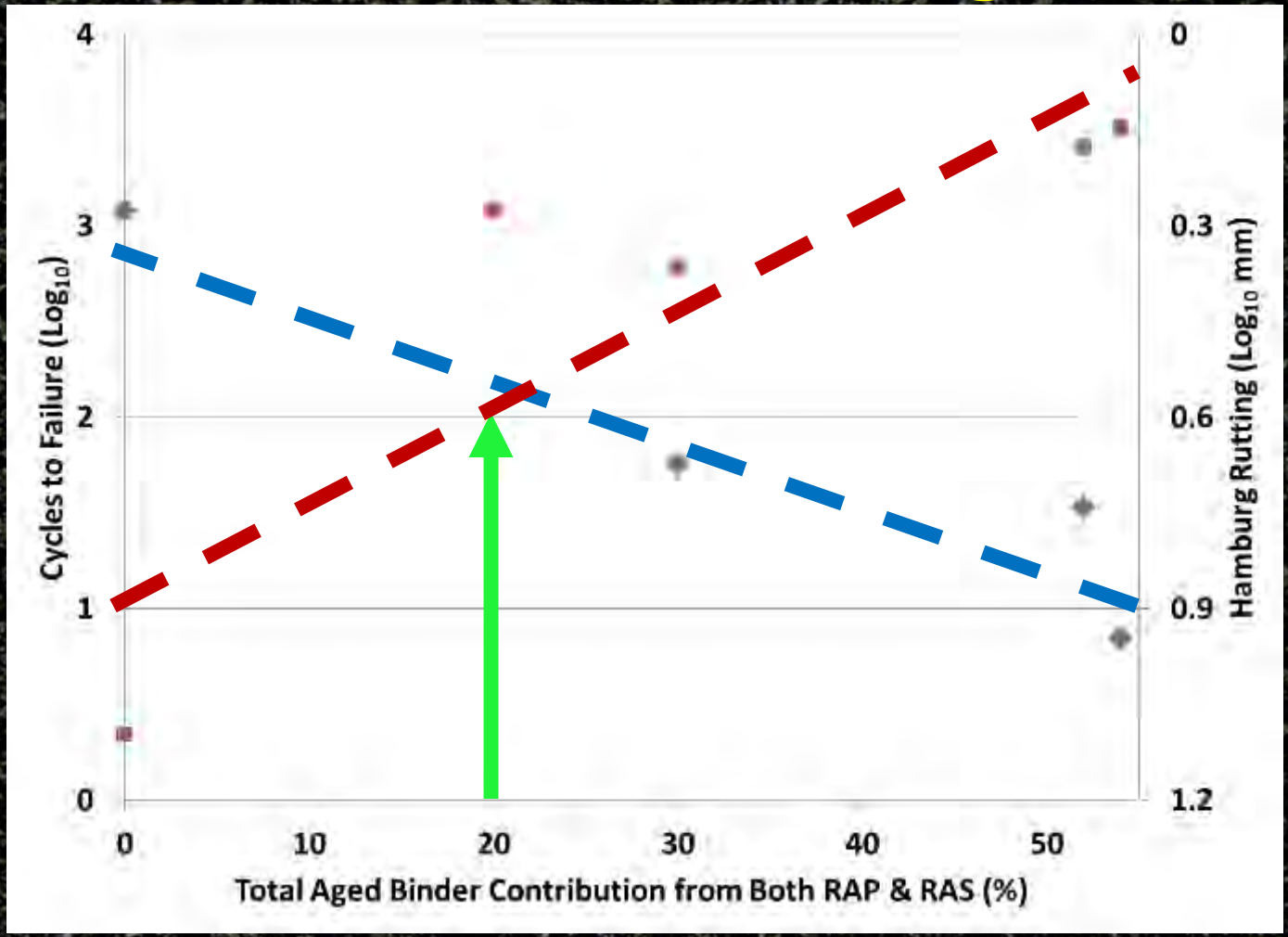
Balanced Mix Designs



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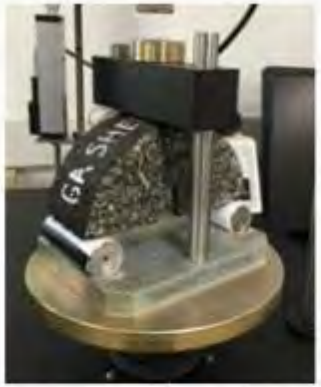
Balanced Mix Designs

BBF



SCB-LA

I-FIT

OT-TX

OT-NCAT

SVECD

DCT

Energy Ratio

Nflex Factor

Cantabro

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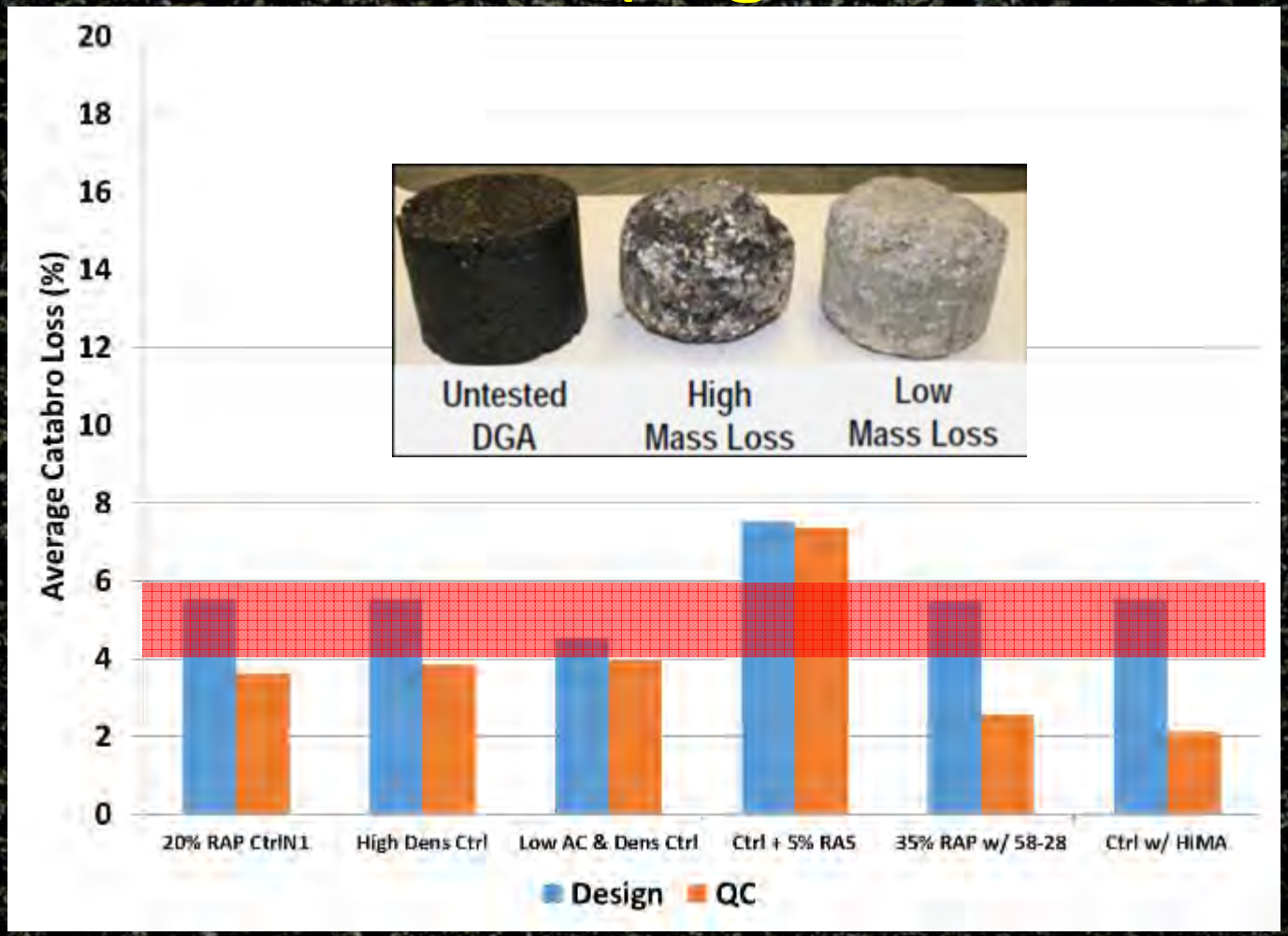
Cantabro Loss (e.g., TEX-245-F)



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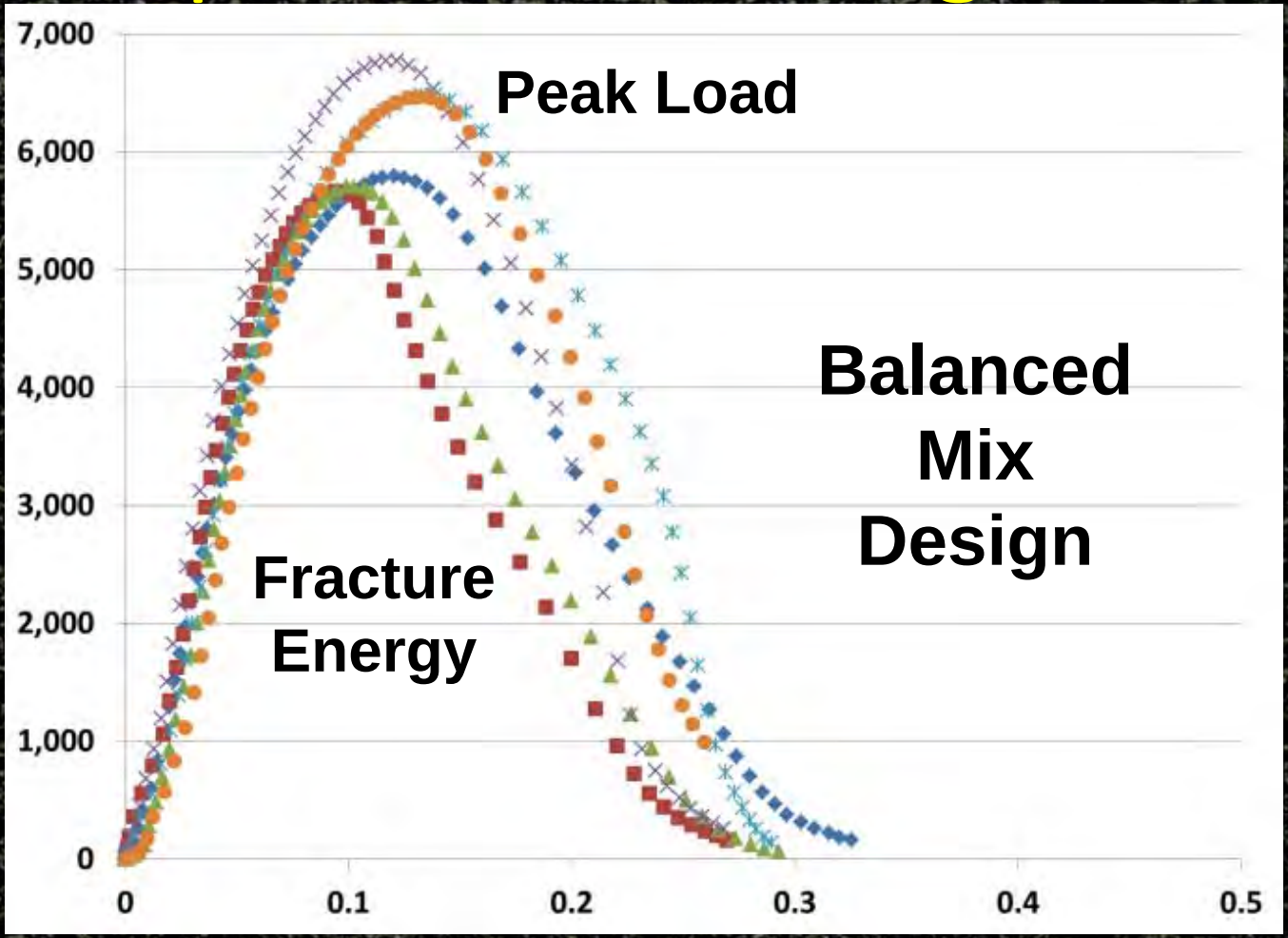
Split Tensile Strengths



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RAP+RAS Thinlays on Cold Recycle$_{F,E}$

Central Plant

In-Place

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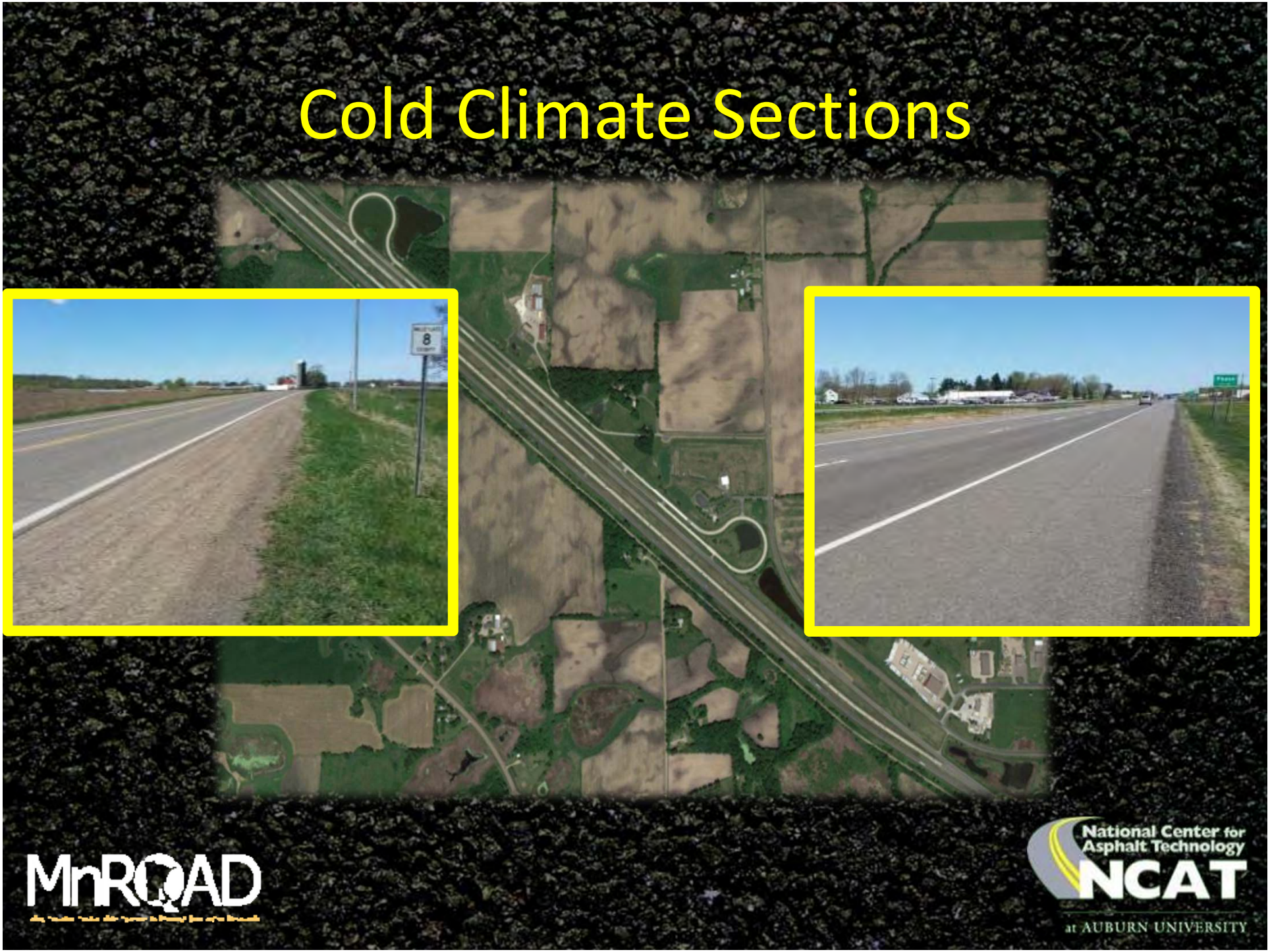
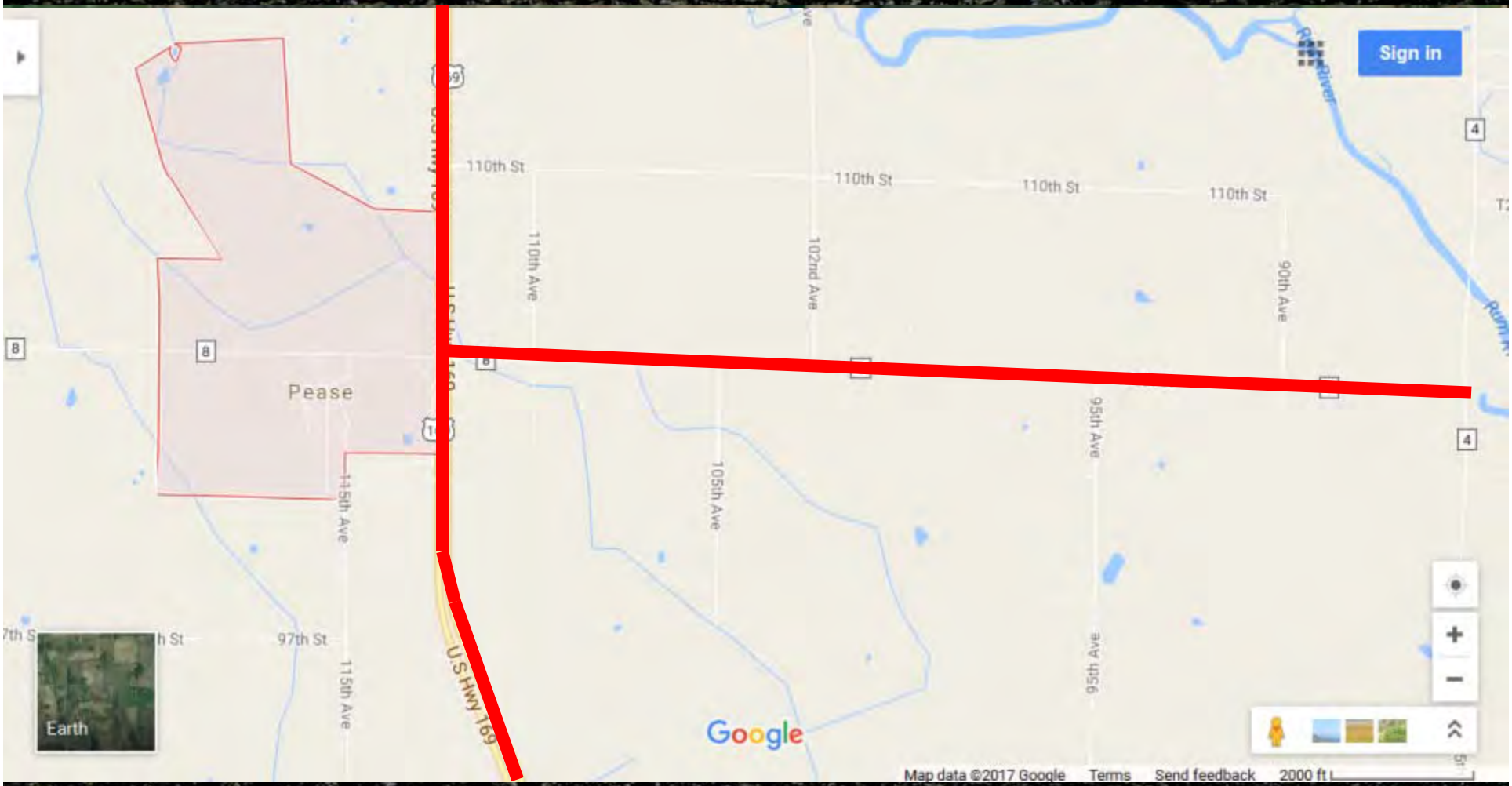
Cold Climate Sections



Minnesota Preservation Sections



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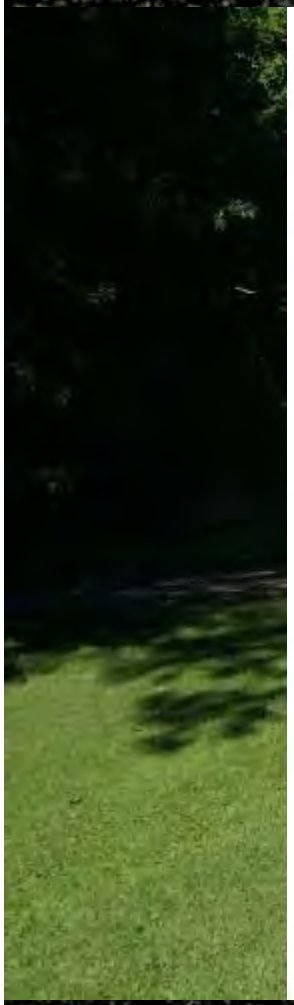
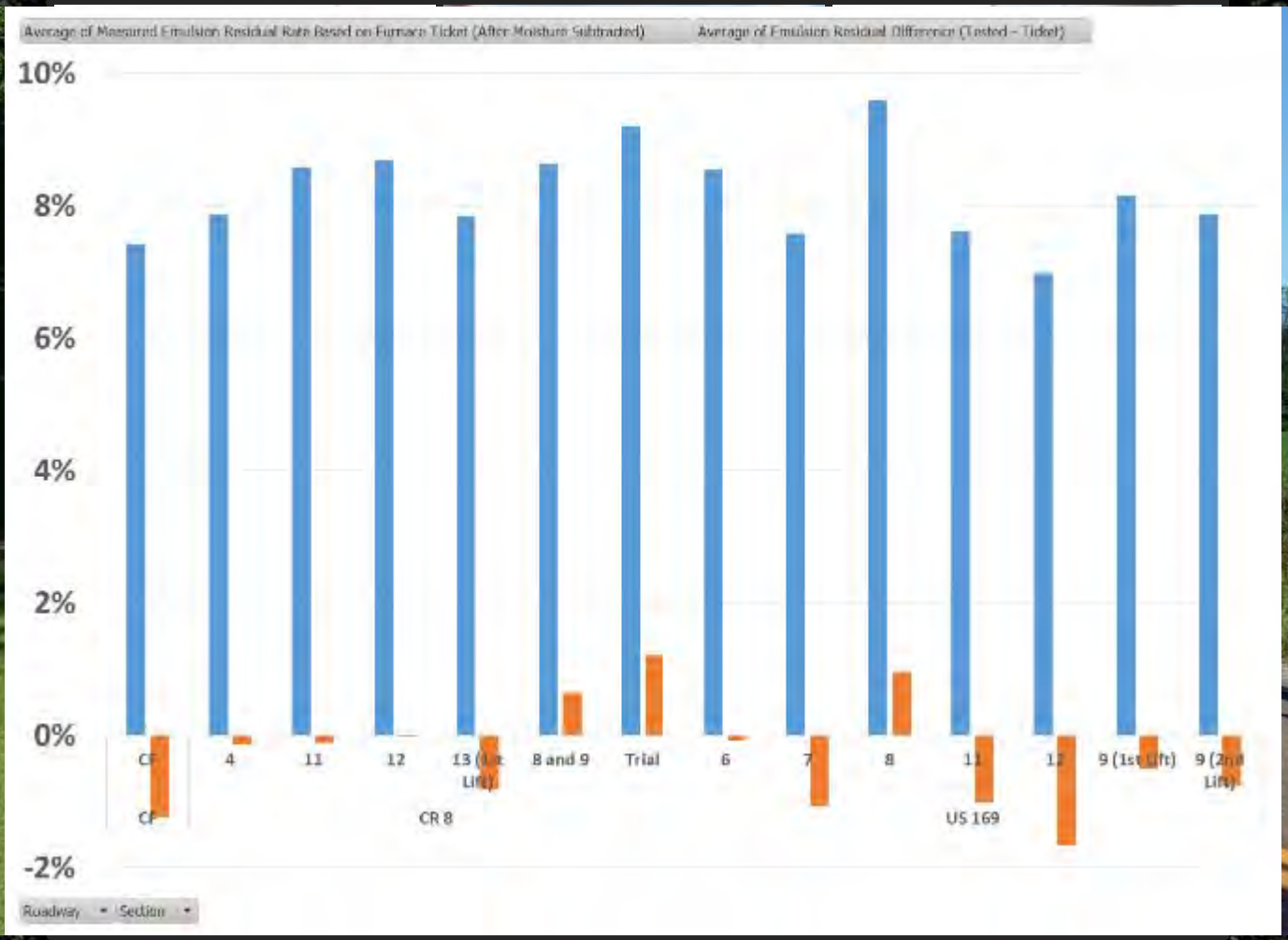
MnROAD Low Traffic Sections





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MnROAD High Traffic Sections

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Chip Seal

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Micro Surface

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Micro Surface with Crack Sealing

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Thinlays

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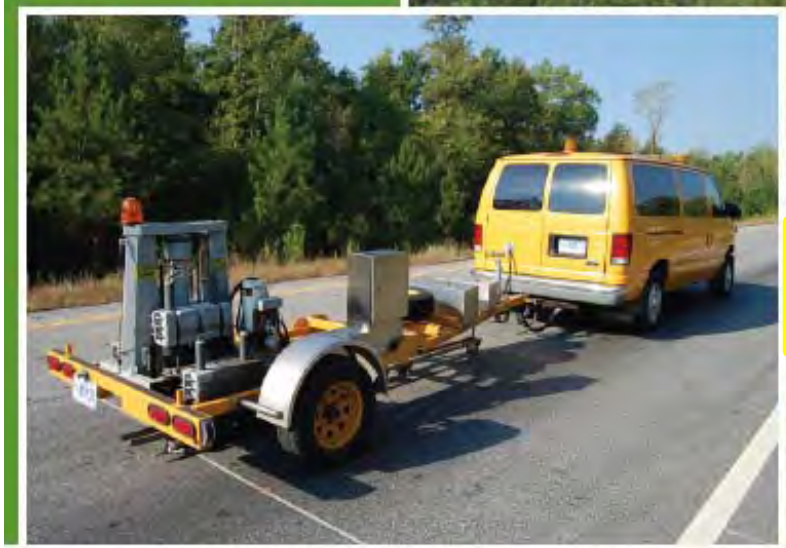
End-of-Cycle Track Conference



- High RAP/RAS balanced mix designs
- Nationwide pavement preservation
- Preventing reflective distresses
- Optimized structural design
- Implementation

Pavement Test Track Conference

March 27-29, 2018

The Hotel at Auburn University
and Dixon Conference Center

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