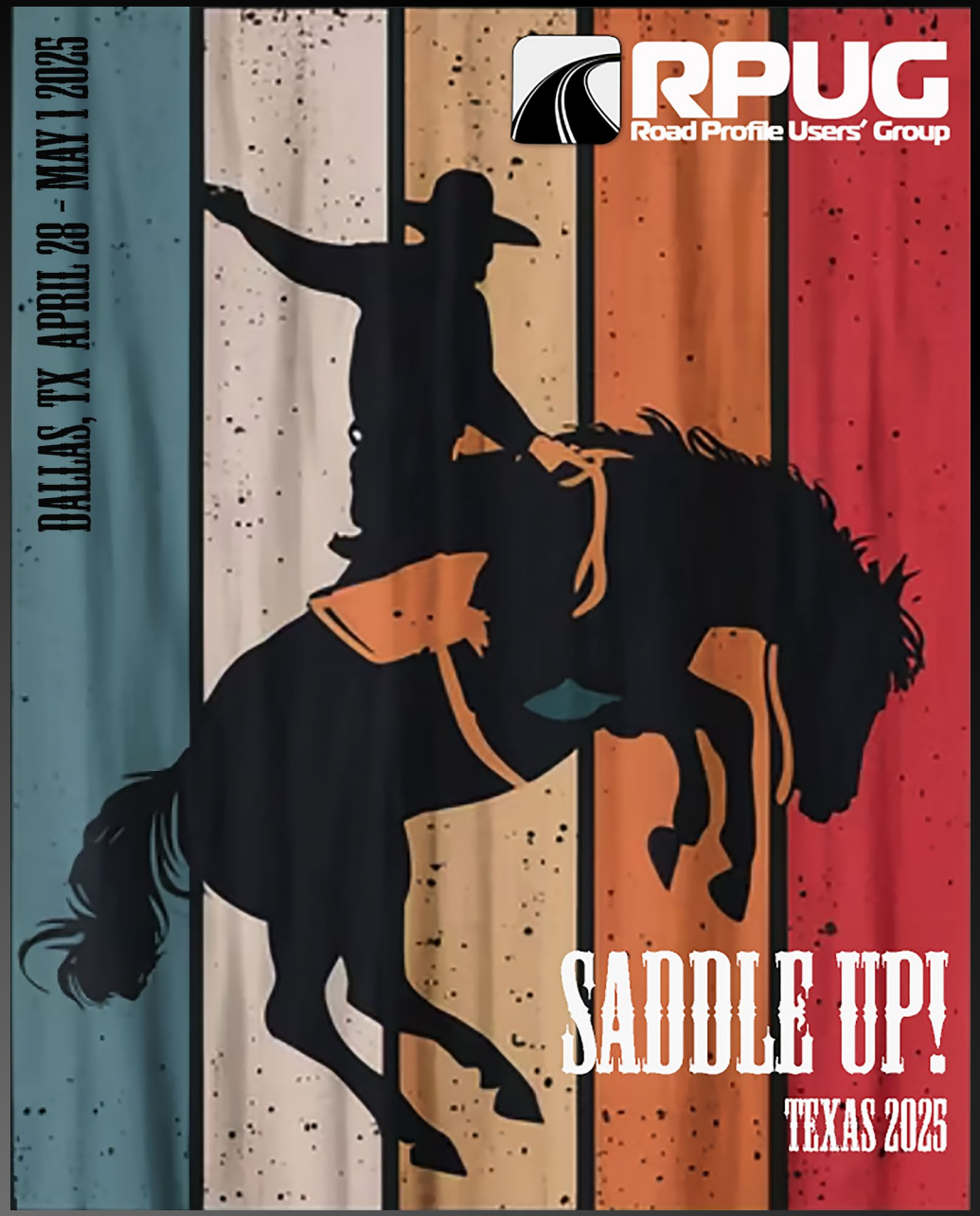

THE ROLE OF CONTINUOUS TIRE-PAVEMENT FRICTION MEASUREMENT IN THE MANAGEMENT OF HIGH FRICTION SURFACE TREATMENTS

ISAAC BRISKIN, WDM USA LIMITED

DIRECTOR OF ANALYTICS

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OBJECTIVES

- Highlight the importance of successful High Friction Surface Treatment in roadway safety
- Explore how continuous pavement friction measurement ensures HFST effectiveness and enables early issue detection
- Show how CPFM tracks pavement performance from installation through service life

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THE IMPORTANCE OF HFST

- "Up to 70% of wet pavement crashes could be prevented or minimized by improving pavement friction and texture."*
- HFST has been identified as "pavement treatments that dramatically and immediately reduce crashes, injuries, and fatalities associated with friction demand issues…."*
- HFST, when placed correctly, can reduce crashes…but…
- It's Expensive! Failure is not an option!

(*FHWA)

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WHY DOES HFST FAIL?

THE SUCCESS OF HFST IS NOT GUARANTEED AND IT CAN FAIL PREMATURELY IN ITS ENTIRETY OR IN PATCHES FOR MANY REASONS:

- PLACEMENT OVER PAVEMENT IN POOR CONDITION (CRACKING, RUTTING, RAVELING, ETC.),
- PLACEMENT OVER PAVEMENT LESS THAN 30 DAYS OLD,
- PLACEMENT UNDER POOR ENVIRONMENTAL CONDITIONS (TEMPERATURE OR MOISTURE)
- INADEQUATE MATERIAL MIXING OR QUALITY

CAN'T JUST "SET IT AND FORGET IT!" – HFST IS EXPENSIVE!

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HFST FAILURES

HFST FAILURES THAT REQUIRE REPAIRS; RETROACTIVE PATCHES AND SEALS MAY PERFORM SUB-OPTIMALLY AT THESE LOCATIONS

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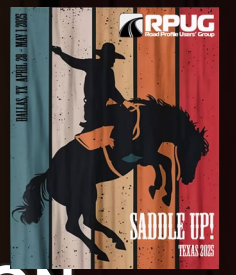
CPFM: SCRIM READING



FHWA has identified preliminary Investigatory Thresholds for Friction, represented by SCRIM Reading (SR) (measured by SCRIM®, Sideways Force Coefficient Routine Investigation Machine) that vary by facility type and geometric context:

FHWA Pavement Friction Investigatory Thresholds

Roadway Type	Roadway Feature	Suggested Investigatory SFN 40	Range from FHWA Graphical Analysis
Freeways	Tangent	40	36 – 38
	Curve	45	42 – 44
	Ramp		44 – 46
Rural, Multi-lane Roadways	Tangent	50	48 – 50
	Curve & Intersection	55	54 – 56
Rural, Two-lane, Two-way Roadways	Tangent	50	48 – 50
	Curve	55	54 – 56
	Intersection	60	54 – 56
Urban / Suburban Arterial Roadways	Tangent & Curve	50	48 – 50
	Intersection	55	54 – 56

- HFST Friction Range: 75 – 105

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CASE STUDY 1

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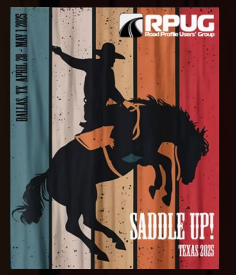
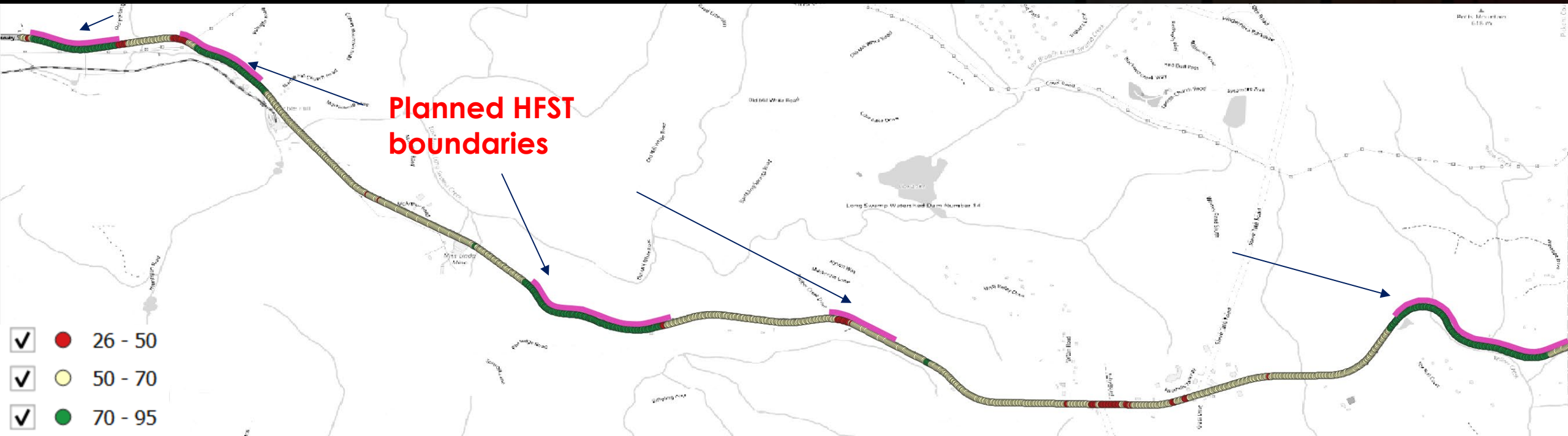
CASE STUDY 1

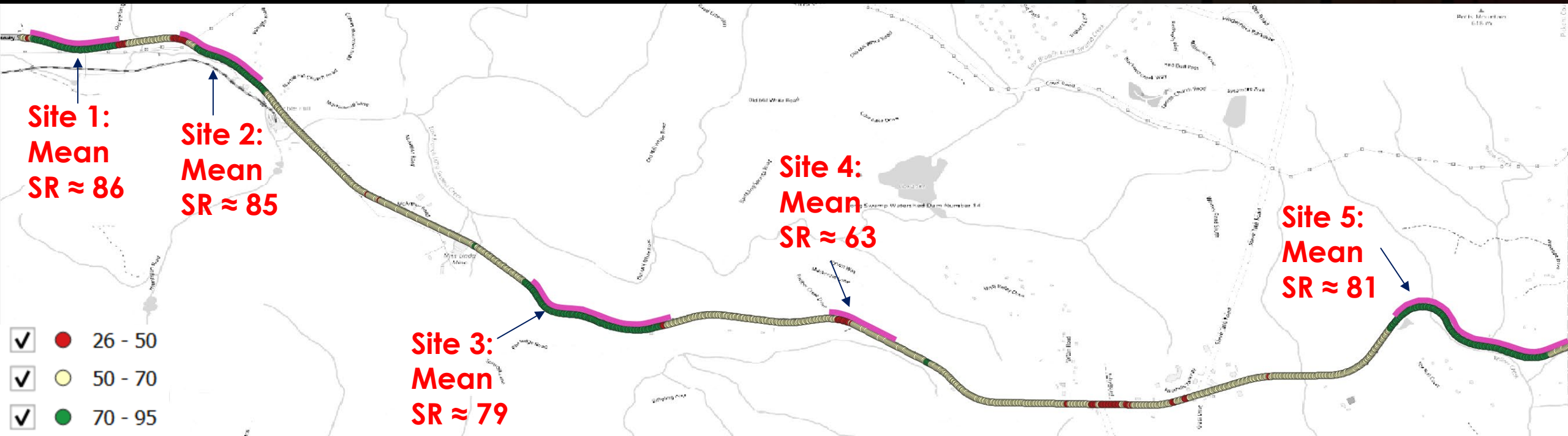


- SCRIM SURVEYED ~6.5 MILES WITH 5 RECORDED HFST PROJECTS COVERING ~2.2 MI.
- THE INCREASES IN FRICTION (GREEN) SHOW US THAT THE HFST BOUNDARIES ARE SLIGHTLY DIFFERENT THAN THE PLANNED BOUNDARIES.
- KNOWING THESE BOUNDARIES IMPROVES FUTURE SAFETY ANALYSES.

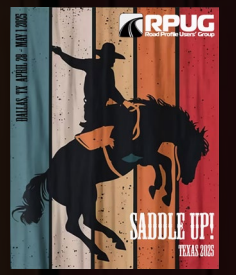


CASE STUDY 1

- 4/5 PLANNED HFST SITES ARE REFLECTED IN THE COLLECTED FRICTION DATA
- THE SCRIM READING (SR) MEANS RANGE FROM 79 TO 86 FOR THESE 4 SITES
- THE MEAN SR FOR THE NON-HFST ROADWAY IS 58
- THE MEAN SR FOR SITE 4 IS 63

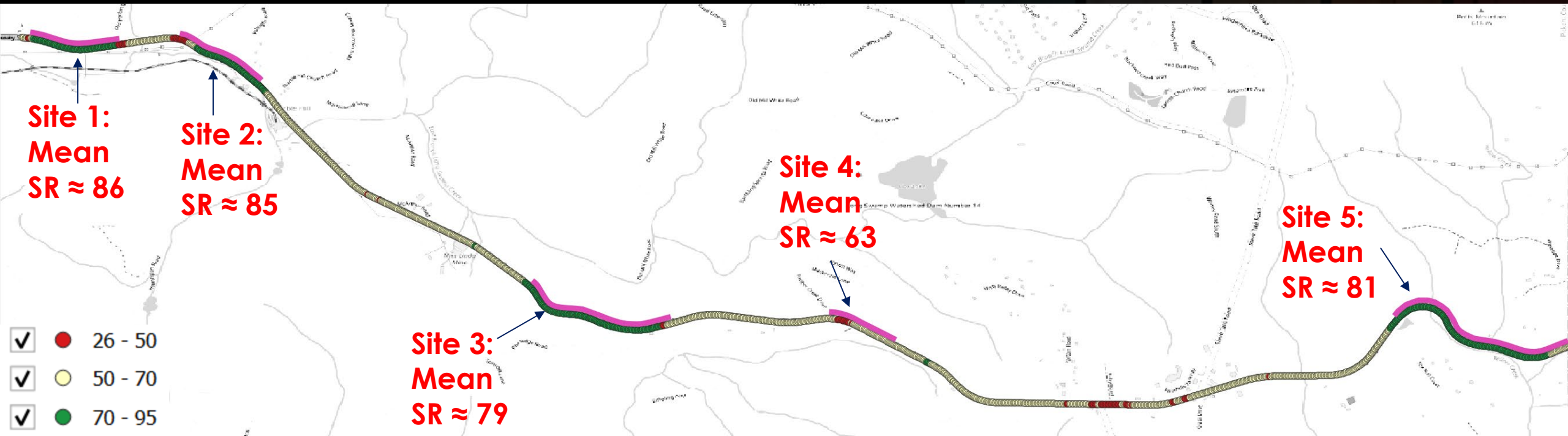


CASE STUDY 1



WHY IS THIS INFORMATION HELPFUL? SOME SITE 4 QUESTIONS…

- IS SITE 4 A PLANNED HFST PROJECT THAT WAS NEVER EXECUTED? OR
- IS SITE 4 AN HFST FAILURE – IF SO, WHEN AND WHY DID IT FAIL?
- CPFM GIVES YOU INSIGHT INTO *WHICH QUESTIONS TO ASK AND HOW TO ANSWER THEM*



CASE STUDY 1

- CPFM helps you know more about your HFST's project boundaries, improving record keeping and future safety evaluations and analyses involving crash histories.
- Knowing that the HFST failed prematurely should trigger an evaluation of the process – it's important to answer the question: why did it fail?

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CASE STUDY 2

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CASE STUDY 2

- RESEARCH-ORIENTED COMPARISON OF PAVEMENT PERFORMANCE USING SCRIM EQUIPMENT.
- 0.8-MILE PROJECT TEST SITE WITH 7 DIFFERENT SURFACES, INCLUDING MULTIPLE "HIGH FRICTION" MIXES.

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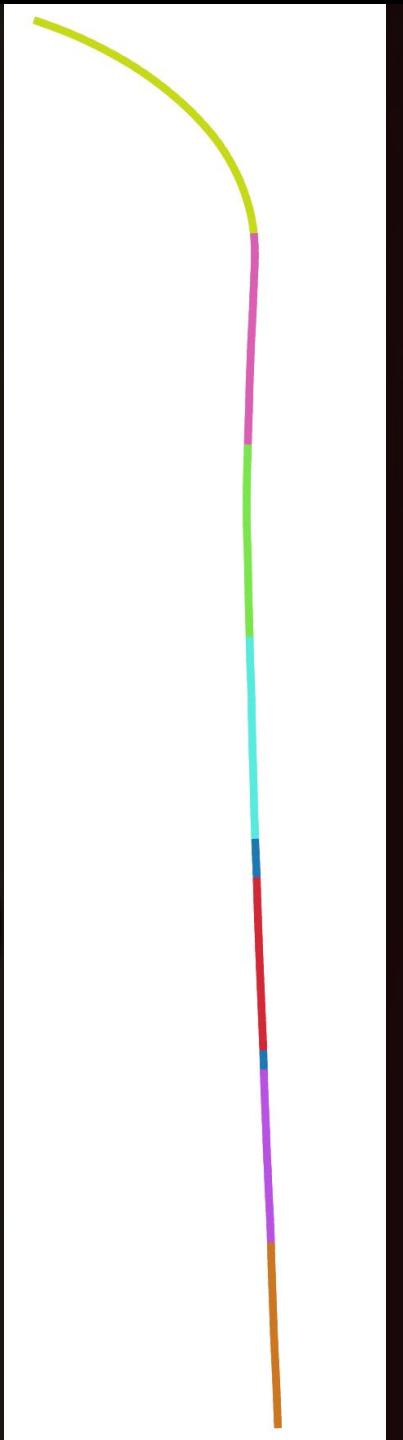
CASE STUDY 2

Section	Mean SR
-1. Calcined Bauxite 2020	80
0. Existing Pavement	43
1. GSB -8 Taconite	47
2. GSB -6 Taconite	44
2.5. Gap 100'	63
3. HFST Taconite	84
3.5. Gap 35'	70
4. HFST Bauxite	85
5. New GSB -8 Taconite	51

- Only 3 years after installation, the GSB Taconite pavements have the lowest friction of all the test sections
- Both HFST's have high friction, with SR values resembling HFST in other states



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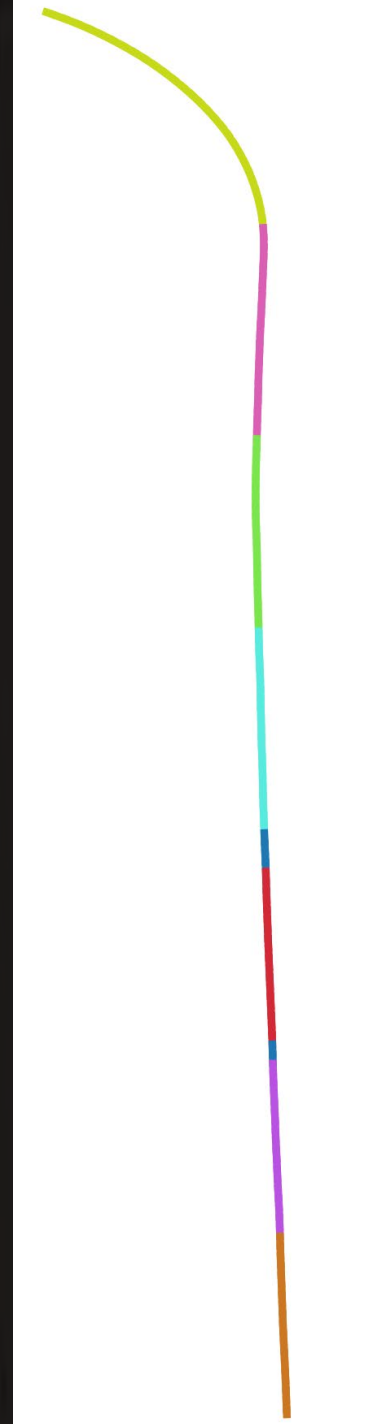
CASE STUDY 2

SOME QUESTIONS CPFM MIGHT HELP YOU *ASK AND ANSWER*:

- WILL THE HFST TACONITE AND HFST BAUXITE MAINTAIN SIMILAR LEVELS OF FRICTION OVER TIME? DO THEY REQUIRE DIFFERENT MAINTENANCE / RESURFACING SCHEDULES?



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TAKEAWAYS: THE BENEFITS OF SYSTEMIC MONITORING WITH CPFM

CPFM allows for high resolution friction data at a network level, but it also allows enables:

- Early detection of degradation and either partial or complete failure
- Identification of (actual) treatment boundaries
- Comparison of pavements with different aggregate mixes, for development of alternative high friction surfaces
- Monitoring & modeling friction performance from installation to failure

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QUESTIONS?

- Thank you!

Isaac Briskin, WDM USA Limited
Isaac.briskin@wdm-int.com

- https://www.nj.gov/transportation/eng/pavement/pdf/High_Friction_Surface_Treatment%28HFST%29Guidance.pdf
- https://cait.rutgers.edu/cait-researchers-test-high-friction-surface-treatments-across-nj-for-performance-and-service-life/

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