PAVEMENT THIN SURFACE TREATMENTS

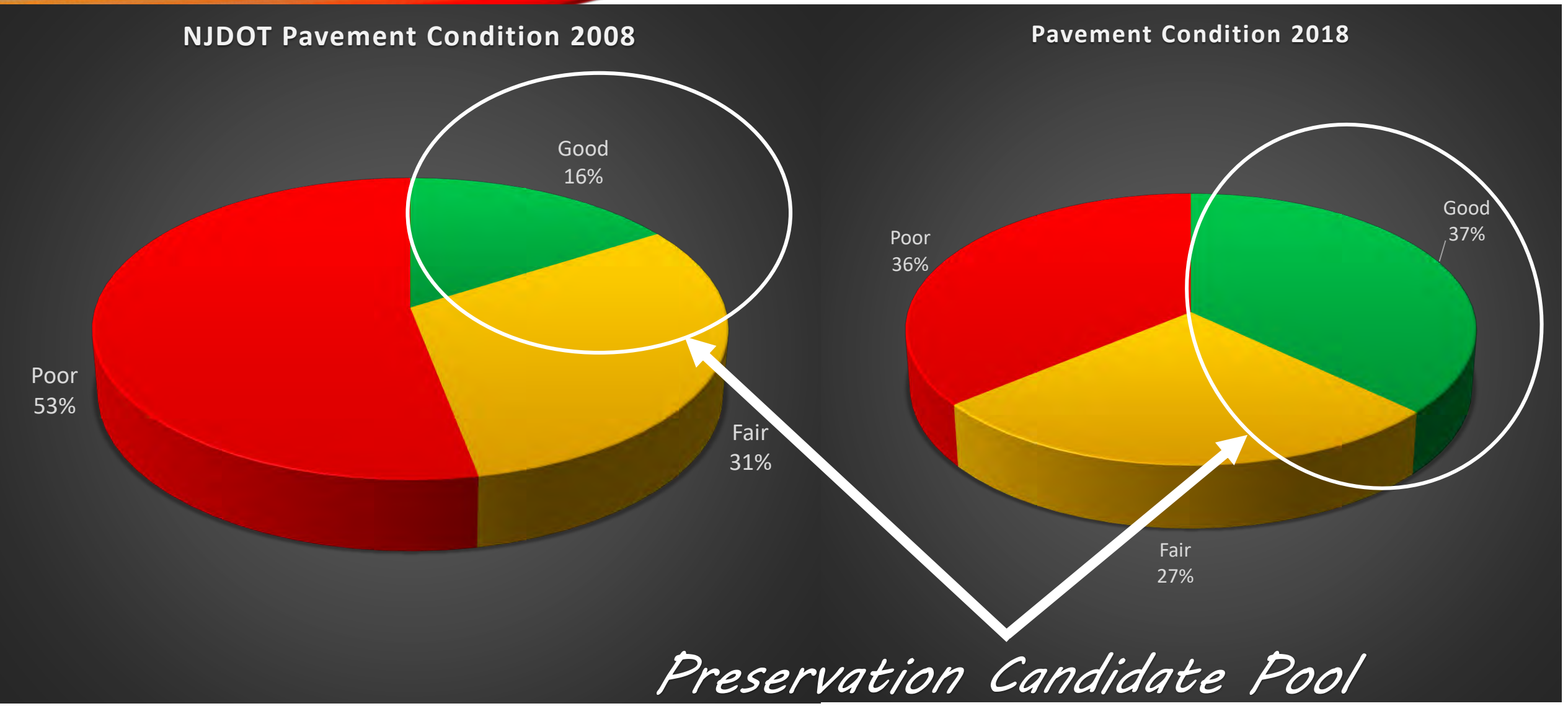
MICROSURFACING & HIGH FRICTION SURFACE TREATMENT

Local Aid Quarterly County Engineers Meeting

November 1, 2019

PAVEMENT THIN SURFACE TREATMENTS

- Why NJDOT is using thin surface treatments?
  - Pavement preservation
    - Microsurfacing and slurry seal
    - Other treatments
  - Safety
    - High Friction Surface Treatment (HFST)
      - NJDOT HFST is a "**Pilot**" program



Good = IRI < 95 and SDI ≥ 3.5

Poor = IRI > 170 or SDI ≤ 2.4

Fair = Everything in between

WHAT'S "GOOD" PAVEMENT?

- Pavement Evaluation
  - Visual Assessment
  - FWD
  - GPR
  - Coring
- Get a recommendation from a qualified pavement engineer

MICRO-SURFACING AND SLURRY SEAL

Cold applied mixture of:

- Polymer modified asphalt emulsion (CQS-1hP)
  - SB, SBS, SBR or natural latex
- High quality aggregate
- Mineral filler
- Water
- Additives

MICRO-SURFACING AND SLURRY SEAL

- Capable of being spread in variable cross-sections:
  - Wedges
  - Ruts
  - Longitudinal joints – micropaving joints
  - Scratch or intermediate layer
  - Surface treatment
- Typically applied at 20 lbs/SY aggregate + 0.35 gallons/SY asphalt emulsion

MICRO-SURFACING AND SLURRY SEAL

- A System – high quality aggregate and emulsion compatibility and consistency is vital
- Should maintain a skid-resistant surface (high wet friction coefficient)
- Type 2 (ISSA)
  - ¼" nominal maximum aggregate size

MICRO-SURFACING/SLURRY EQUIPMENT

- Types:
  - Truck mounted
  - Continuous paver
- Mixing Equipment
- Proportioning Devices
- Spreading Equipment
- Support equipment

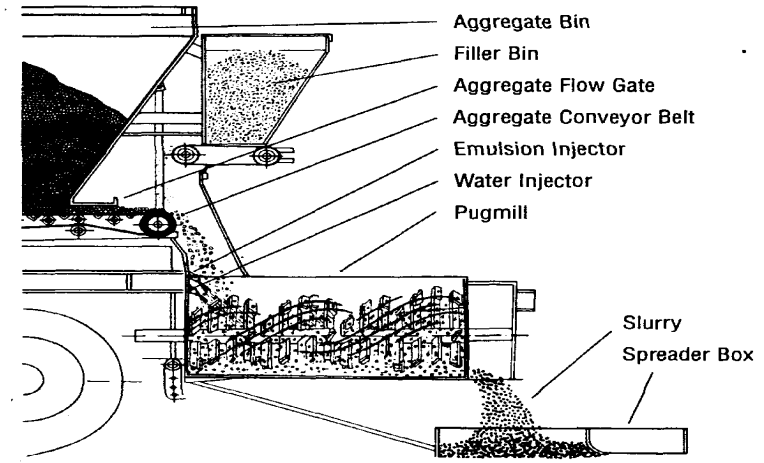


Figure 6.3 Flow Diagram of a Typical Slurry Seal Mixer

MICROPAVING LONGITUDINAL JOINTS

MICRO-SURFACING / SLURRY SEAL VIDEO

MICRO-SURFACING AND SLURRY SEAL

- Benefits:
  - Maintains existing ride quality
  - Improves skid resistance
  - Seals out water
  - Renew road surface
  - Quick open to traffic
  - Minimal to zero rap
  - 25-40% of the cost to mill and pave

MICRO-SURFACING AND SLURRY SEAL

- Limitations:
  - Requires tights traffic control during application
  - Weather sensitive
  - Does not improve ride quality
  - Tire noise is initially higher
  - May not be appropriate for some high volume + high truck traffic
  - Microsurfacing requires ADA

MICRO-SURFACING AND SLURRY SEAL

- Challenges:
  - Mitigating or managing quality; failures
  - Band-Aid or preservation?
    - Real Expectations
  - How much preservation?
    - Balanced program
  - Only one contractor bidding NJDOT projects
  - Experience

MICRO-SURFACING AND SLURRY SEAL

- International Slurry Surfacing Association
  - https://www.slurry.org/default.aspx
- National Center for Pavement Preservation
  - https://www.pavementpreservation.org/
- Pavement Preservation & Recycling Alliance
  - https://roadresource.org/
- Federal Highway Administration
  - https://www.fhwa.dot.gov/pavement/preservation/

WHY PAVEMENT PRESERVATION?

WHAT IS HIGH FRICTION SURFACE TREATMENT (HFST)?

- HFST is a safety countermeasure
  - polish-resistant calcined bauxite aggregate (grit)
  - bonded to the pavement surface using a polymer resin binder (glue)

WHY DO WE NEED HFST?

- Targeted Solution to Roadway Departure Crash Reduction– curve location only
- Friction ↑ Crashes ↓
- Distracted Driving?- HFST does not need to communicate with the driver to work
- Speeding?- HFST does not enhance driver comfort or promote higher speeds
- It's a Proven, Effective Solution.

Center for Sustainable Transportation Infrastructure

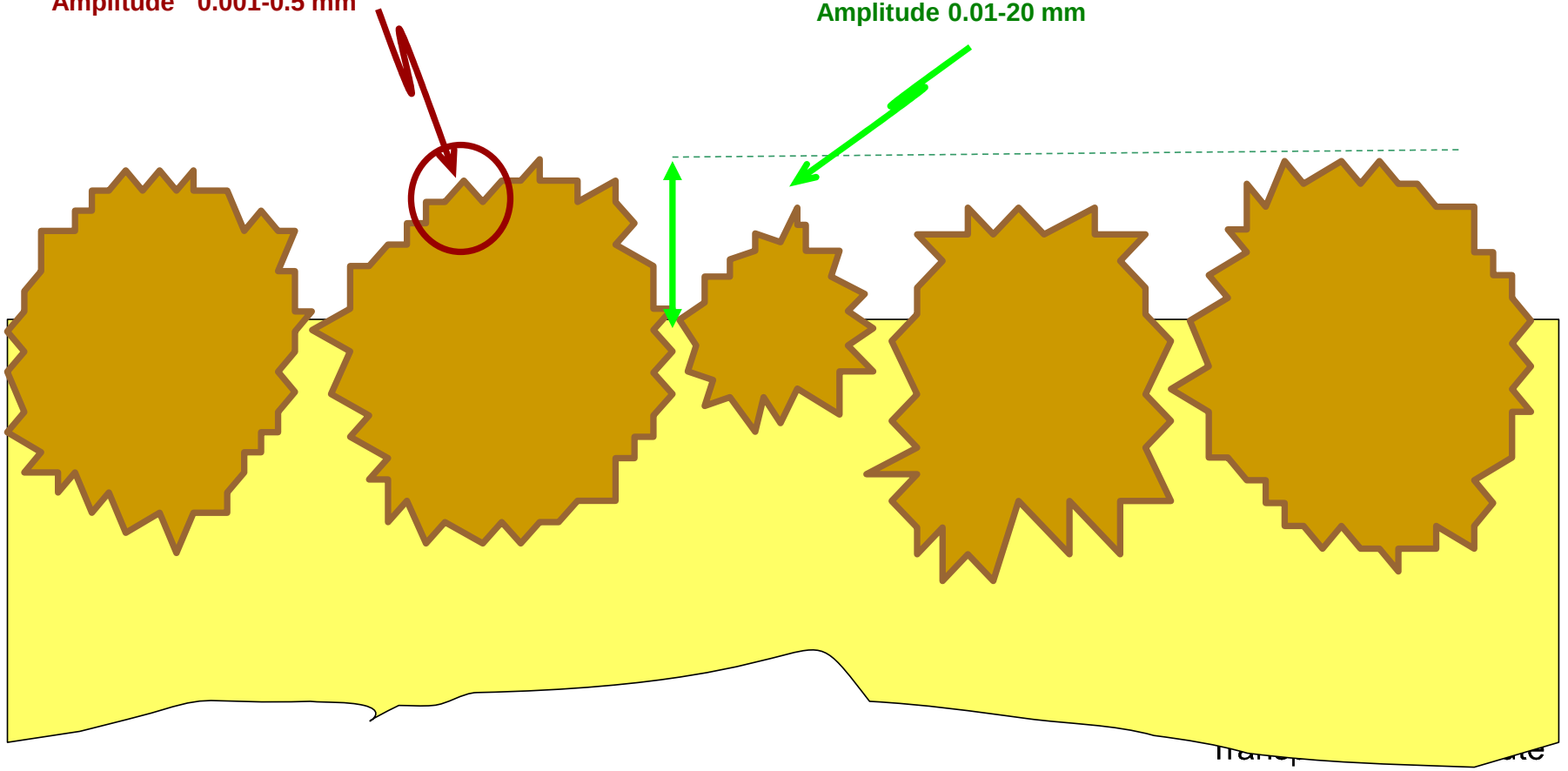
Textures that affects friction

Microtexture

Amplitude 0.001-0.5 mm

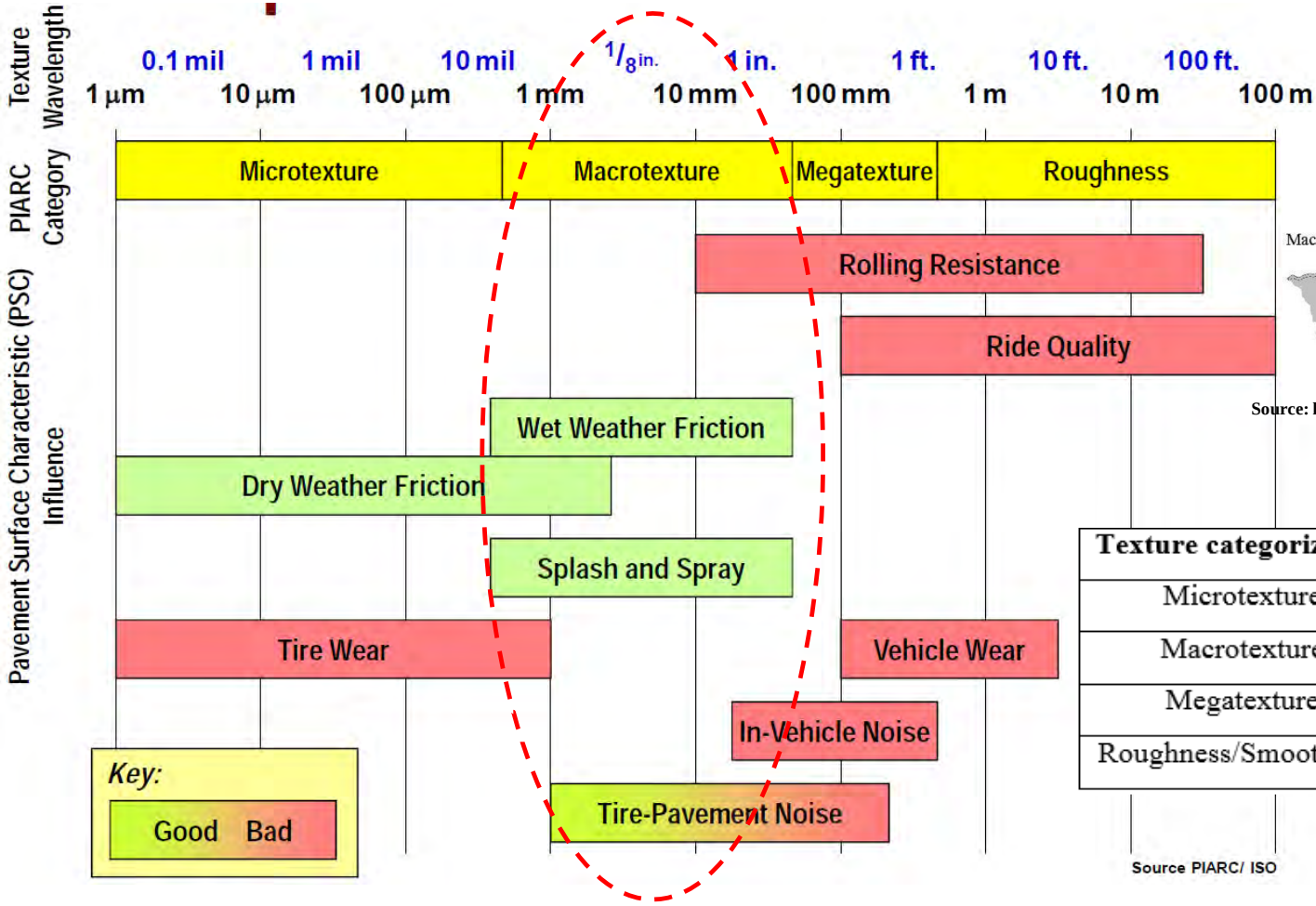
Macrotexture

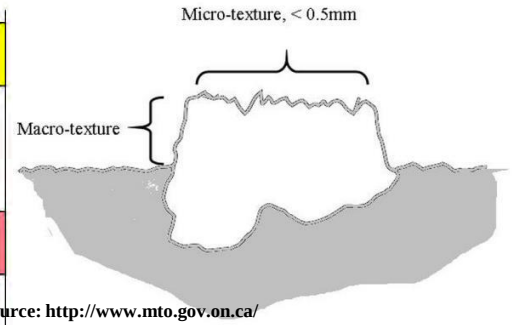
Wavelength 0.5-50 mm
Amplitude 0.01-20 mm



Center for Sustainable Transportation Infrastructure

Texture Wavelength Influence on Pavement Surface Characteristics





Source: http://www.mto.gov.on.ca/

Texture categorization	Texture Wavelength (λ)
Microtexture	λ < 0.5 mm
Macrotexture	0.5 mm < λ < 50 mm
Megatexture	50 mm < λ < 500 mm
Roughness/Smoothness	0.5 m < λ < 50 m

Source PIARC/ ISO

VirginiaTech Transportation Institute

WHERE TO INSTALL HFST?

- Horizontal Curves
- Intersections
- On and Off Ramps– especially with elevation change (loop ramps)
- Steep Grades
- Line of Sight problem locations
- High Speed connectors/Merge locations
- Where there are high crash clusters, roadway departures or poor roadway friction conditions

FOLLOW NJDOT HFST GUIDELINES

- <u>Good Pavement</u>
  - Newer pavement with adequate Remaining Service Life
  - Distress free or repair/resurface
  - Smooth
  - Structurally adequate
  - Quality material

APPLY HFST ONLY ON GOOD PAVEMENT

WHAT'S "GOOD" PAVEMENT?

- Pavement Evaluation
  - Visual Condition Assessment
  - FWD
  - GPR
  - Coring
- Get a recommendation from a qualified pavement engineer

LESSONS LEARNED

- Make sure pavement condition is GOOD!
  - Visual condition assessment IS NOT ADEQUATE!
  - Follow NJDOT draft guidance
  - Perform a full pavement evaluation
- Do not construct over risky pavement
  - Microsurfacing, slurry seal, chip seal, open graded surface course
- Follow NJDOT “pilot” specification and draft guidance

LESSONS LEARNED

- Experience and Quality workmanship matters
- Correct equipment, properly functioning and calibrated matters
- NJDOT Maintenance Bond works!
- NJDOT still in the PILOT phase with HFST

HIGH FRICTION SURFACE TREATMENT

- Federal Highway Administration – Safety
  - https://safety.fhwa.dot.gov/roadway_dept/pavement_friction/high_friction/