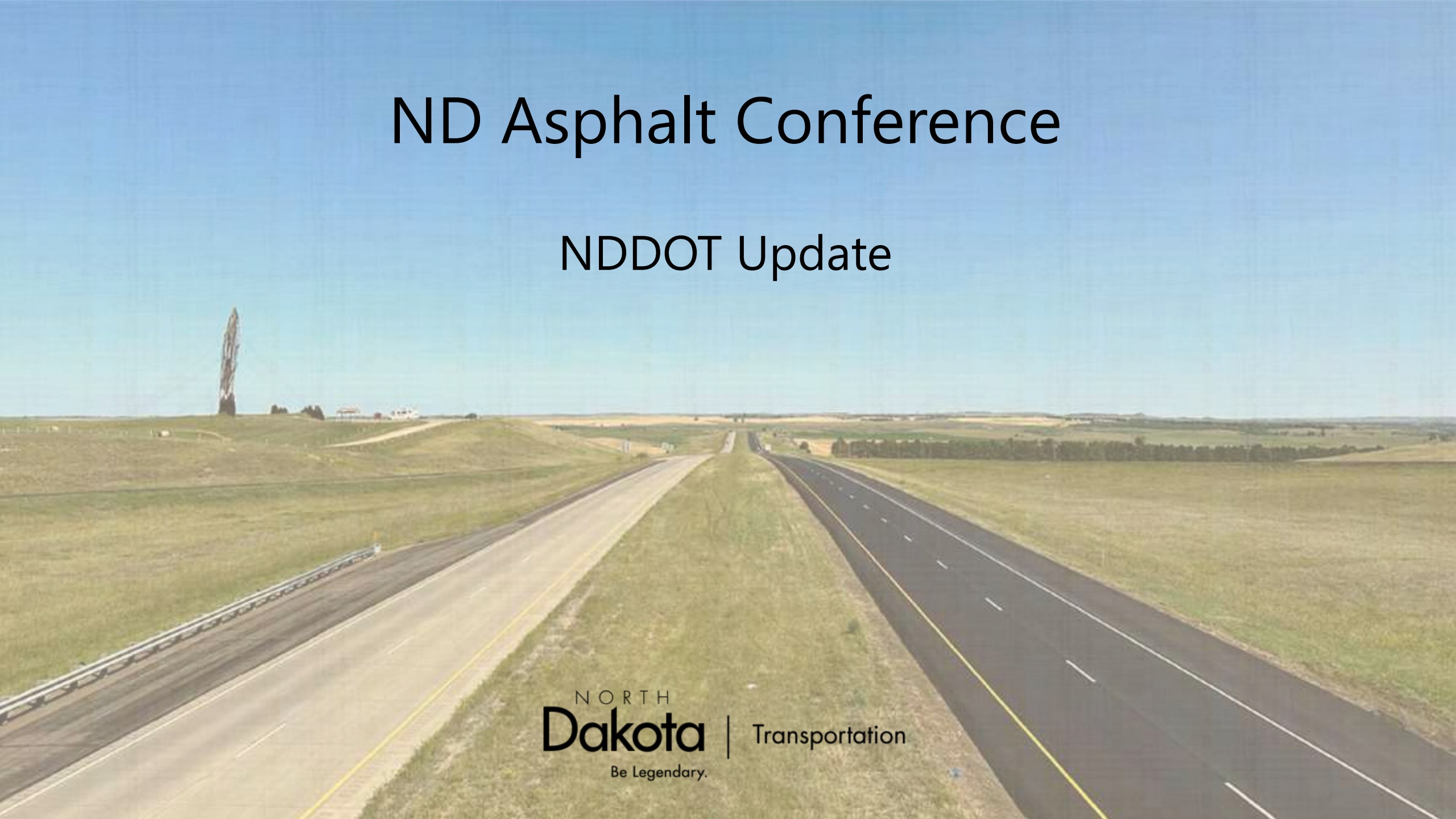
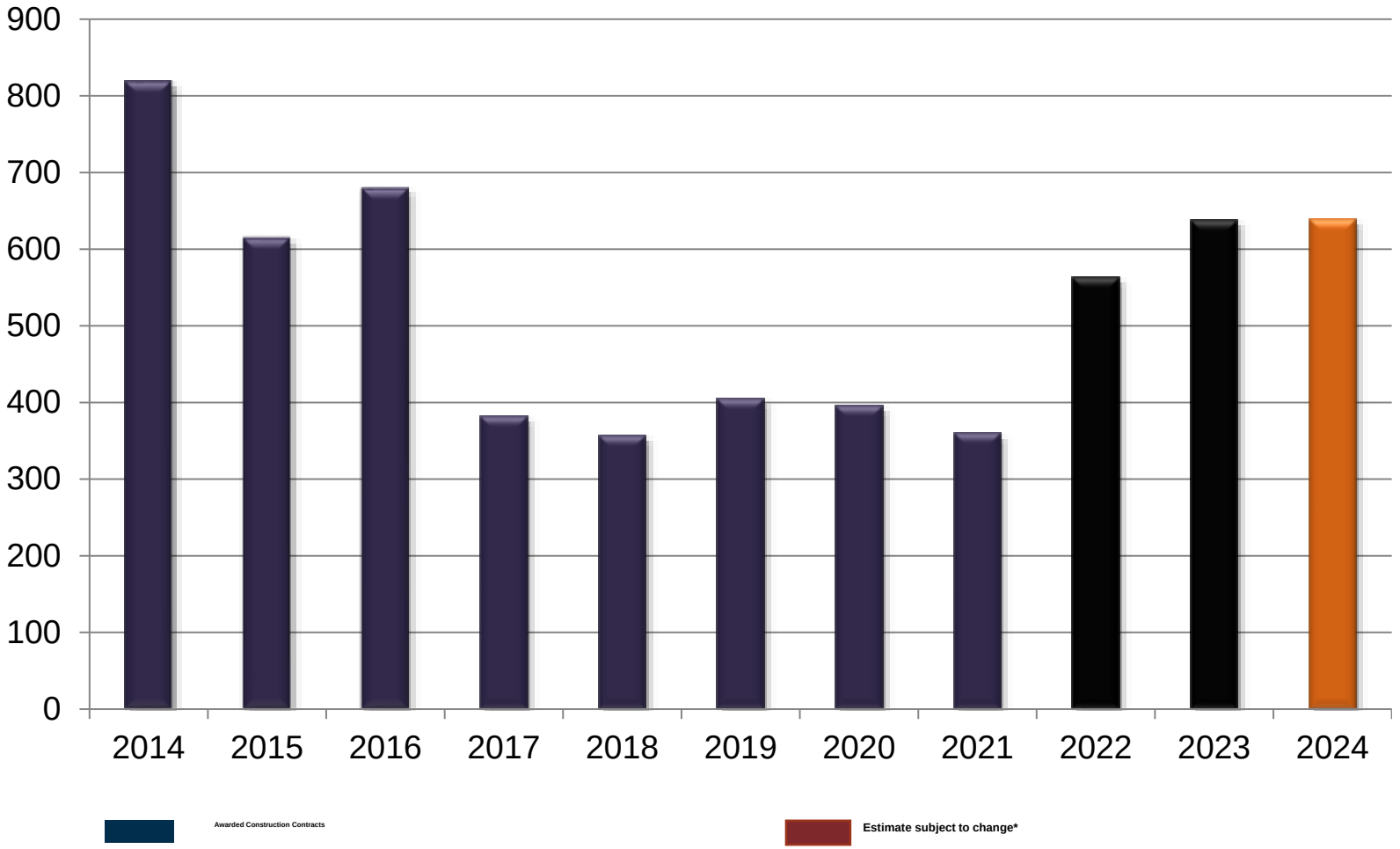
ND Asphalt Conference

NDDOT Update



NDDOT Construction Program

($$ Millions)



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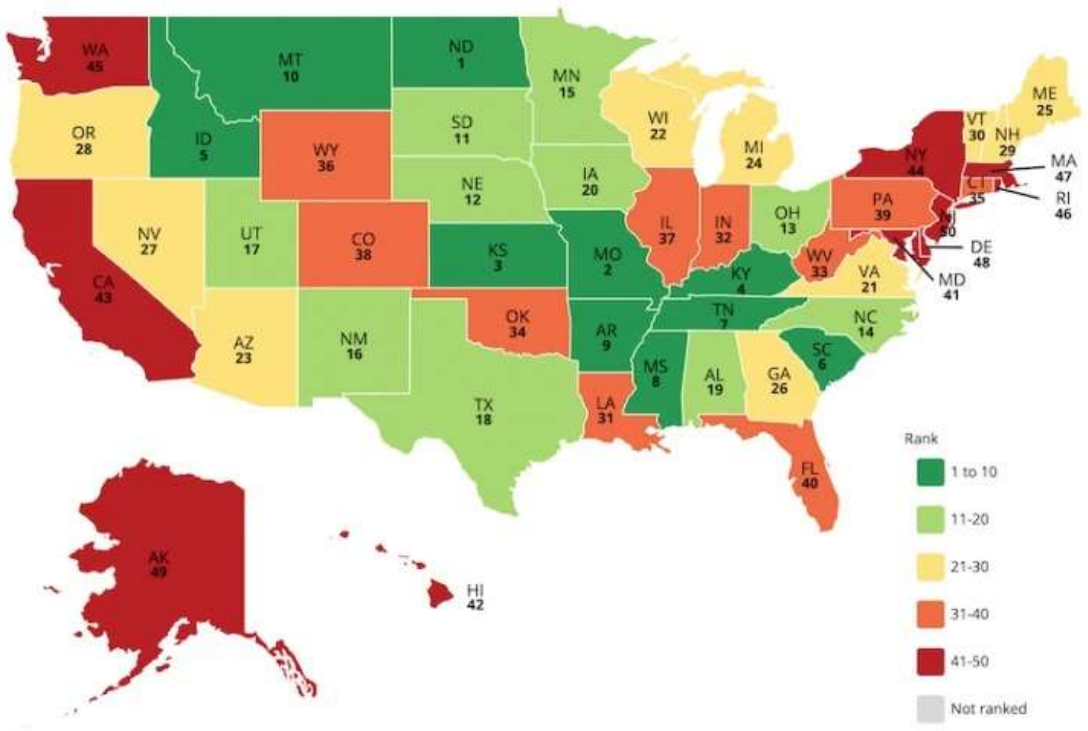
GRANT UPDATE

- $55 million for US 85 four lane
- $9.85 million RAISE Grant for Tribal Bike Paths
- Bidding the last US 52 Passing lane, an INFRA grant project
- Bidding Fort Yates Roundabout Tribal Safety project – RAISE Grant



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HMA UPDATE

- 1,361,467 Tons of Asphalt bid in 2023
- Tons including RAP = 58%
- Binder Used
  - 13% 58S-28
  - 21% 58S-34
  - 59% 58H-34
  - 7% 58H-28, 58V-28, 58V-34

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DENSITY RESULTS

- 2023 Avg Mainline Density: 93.4
  - 2022 Avg 93.8
  - 2021 Avg 93.6
  - 2020 Avg 93.4
  - 2019 Avg 93.4
  - 2018 Avg 92.9
- 2023 Avg Joint Density: 92.1
  - 2022 Avg 92.3

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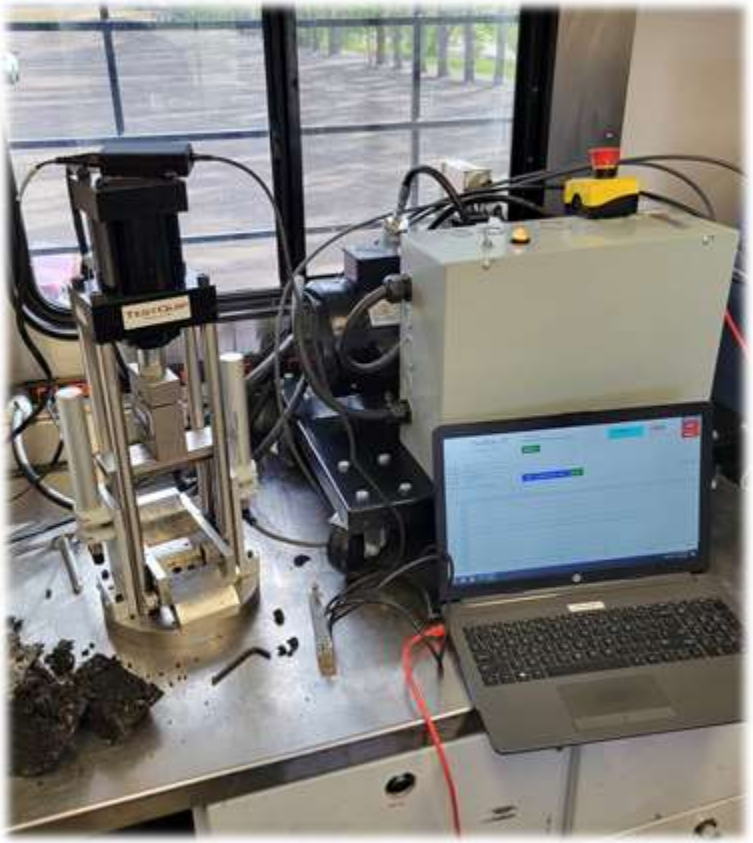
2023 HMA INCENTIVE $

- Ride Incentive $594,000
  - Avg MRI 39.3
- Mainline Density
  - Avg Pay Factor 101.3%



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HMA SELECTION GUIDE

- Superpave FAA Type
- Binder Grade

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Hot Mix Asphalt (HMA) Selection Guide

Superpave FAA Type

Daily One-way ESAL's	Superpave FAA Type
< 100 & Interstate shoulders	FAA 42
100 – 300	FAA 43
> 300 & Roundabouts	FAA 45

Performance Graded (PG) Asphalt Binder Selection Guide with MSCR

Daily One-way ESAL's	PG Binder Grade
< 100 & Interstate shoulders	PG 58S-28
100 – 200	PG 58S-28 with < 20% RAP PG 58S-34 with ≥ 20% RAP
200 – 1000	PG 58H-34
> 1000 & Roundabouts	PG 58V-34

- Daily One-way ESAL's are published each year by Planning/Asset Management Division and can be found in the District Highway Information book for each Hwy segment.

PILOT PROJECTS COMPLETED 2023

- Superpave 5 – Fargo Project
- High RAP – Valley City Project
- Intelligent Compaction – 10 projects
- Paver Mounted Thermal Profiler – 10 Projects
- Percent Within Limits – 5 Projects

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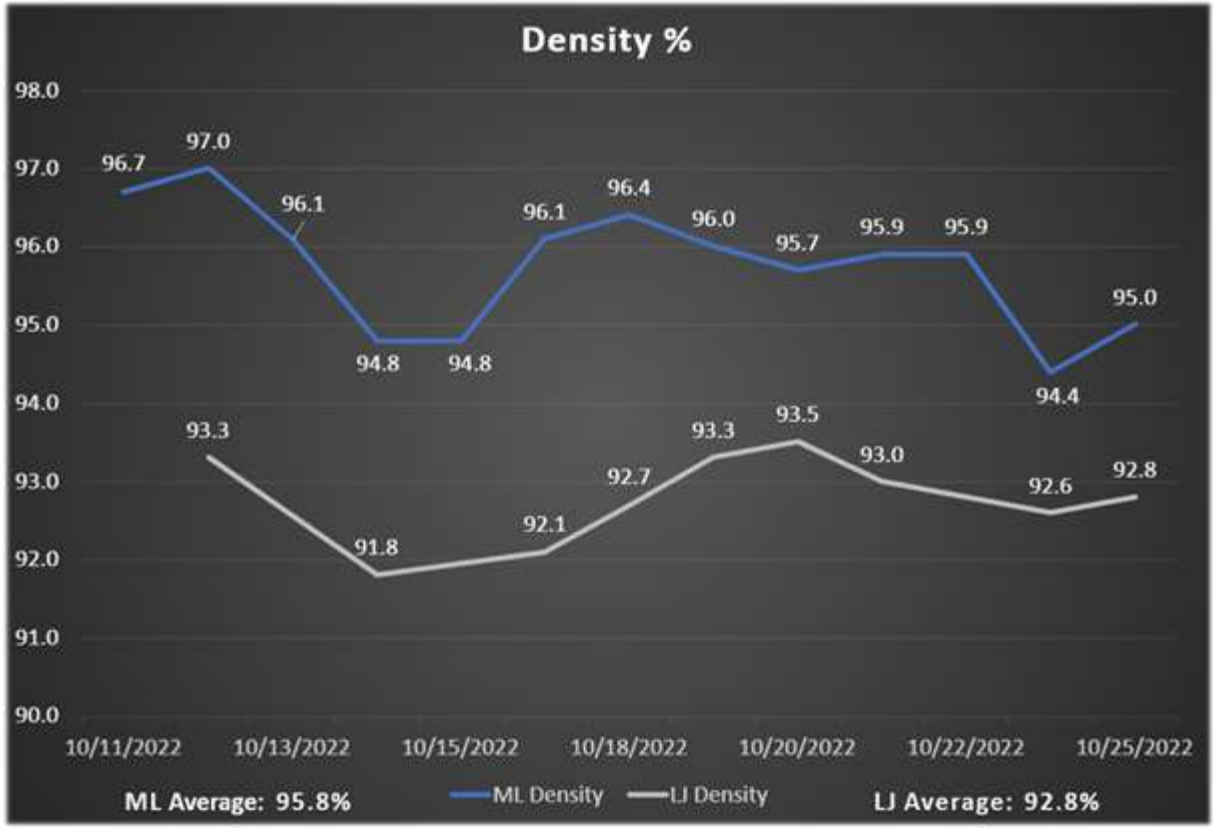
SUPERPAVE 5

- Target 5% air voids at mix design and compact to 95%
- Current Superpave method is 4% air voids and compact to 7% on the road.
- N_{design} of 30 gyrations instead of 75
  - Increased binder content



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SUPERPAVE 5

- SP Changes for 2024
  - Air Voids single test 3.5 to 6.5, previously 3.0 to 7.0
  - Air Voids range 4.0 to 6.0, previously 3.5 to 6.0
  - Min. Density for 100% pay moved from 92% to 94%

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DENSITY PROFILING (DPS)

- Grand Forks and Fargo projects profiled in 2023
- Presentation at CAPRI

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HIGH RAP

- 35% RAP content
- Ideal CT Avg: 46
- Hamburg: 6 mm @20,000

2023 HMA Performance Testing Results

Project #: SS-2-036(013)062 PCN: 23465

Highway/Interstate: ND 36 **Type:** 1" Mill, 2" Overlay **FAA:** 42 **PIT COA:** SN-1245

Pit Name: Odenbach **PG Oil:** 58S-34 **PG Brand:** Cenovus (Husky) **RAP:** 35%

Production Data			
Description	Test #1	Test #2	Test # 3
Sample Date	6/1/2023	6/8/2023	6/15/2023
Average Bitumen Content	3.71%	3.70%	3.68%
IA 1/2"	99.0	98.0	99.0
IA No. 4	56.0	61.0	55.0
IA No. 30	9.5	17.0	17.0
IA No. 200	3.6	5.1	5.8
IA Lightweight Pieces	2.4%	2.0%	1.2%
IA FAA	43	43	43
IA Flat & Elgonated	-	-	-
IA Fractured Faces	95%	92%	96%
IA Sand Equivalent	59	57	62
IA Air Voids	3.1%	3.8%	2.8%
IA Bulk SpG	2.378	2.369	2.399
IA Max SpG	2.454	2.463	2.467

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PILOT PROJECTS 2024

• Superpave 5	1 project
• Intelligent Compaction	13 projects
• Paver Mnt. Thermal Profiler	13 projects
• Percent Within Limits	4 projects
• Higher RAP %	1 project
• Machine Guidance Milling	1 project

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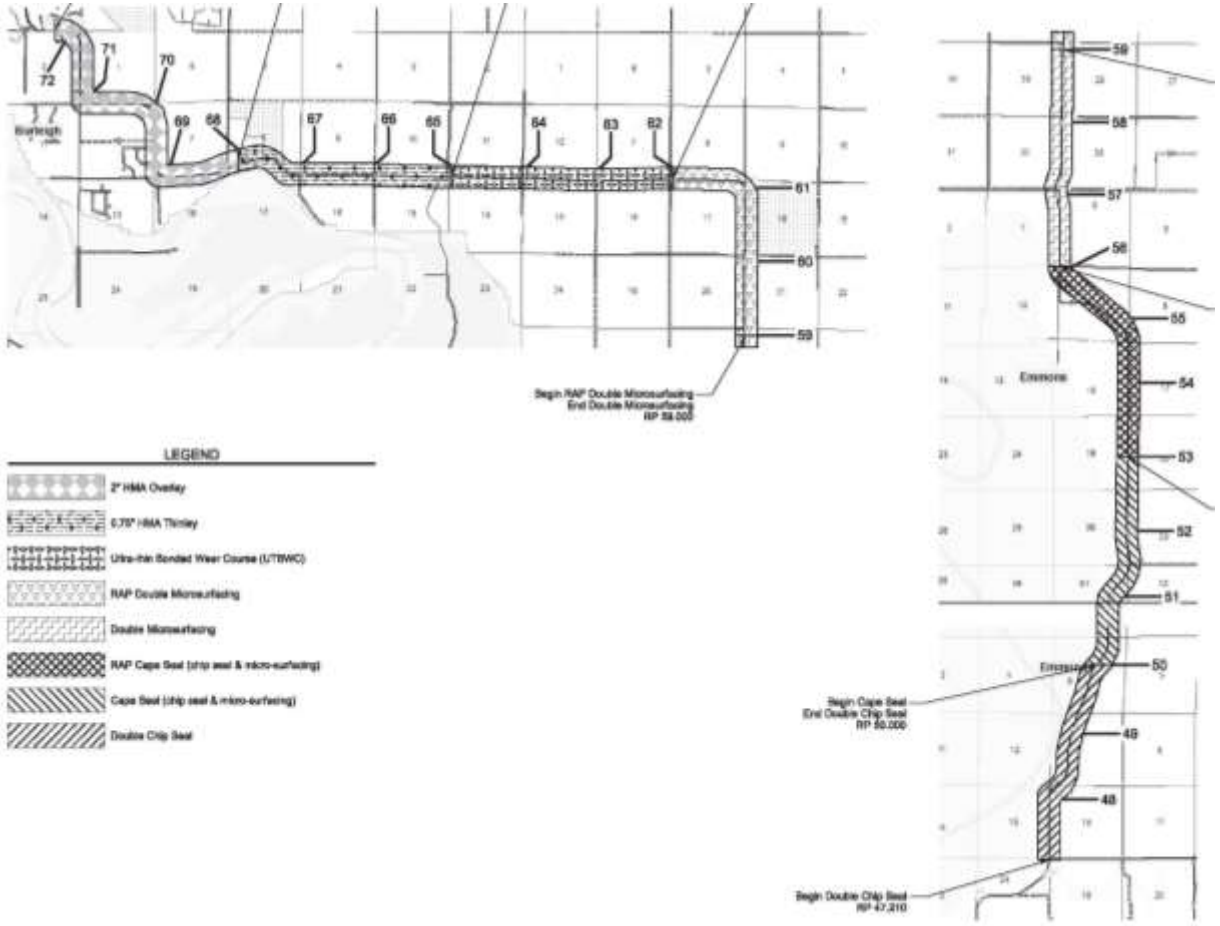
PAVEMENT PRESERVATION - TEST SECTION PROJECT



- Double Chip Seal
- Cape Seal
- RAP Cape Seal
- Double Micro-surfacing
- RAP Double Micro
- Ultra Thin Bonded
- 4.75 mm HMA Thinlay
- 2-inch overlay (control)

- 3 miles each

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TEST SECTIONS

- Section 1 Double Chip Seal (0.5”)
  - RP 47.21 to RP 50
  - Cost per Mile: $193,749
- Section 2 Cape Seal (0.5”)
  - RP 50 to RP 53
  - Cost per Mile: $166,644
- Section 3 RAP Cape Seal (0.5”)
  - RP 53 to RP 56
  - Cost per Mile: $169,938
- Section 4 Double Micro-surfacing (0.5”)
  - RP 56 to RP 59
  - Cost per Mile: $160,670

RAP Cape Seal

RAP Micro-surfacing

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TEST SECTIONS

- Section 5 RAP Double Micro-surfacing (0.5”)
  - RP 59 to RP 62
  - Cost per Mile: $163,785

- Section 6 Ultra-thin Bonded (0.75”)
  - RP 62 to RP 65
  - Cost per Mile: $403,968

- Section 7 HMA 4.75 mm (0.75”)
  - RP 65 to RP 68
  - Cost per Mile: $261,836

- Section 8 FAA 43 2” Overlay (2” Control)
  - RP 68 to RP 72.2
  - Cost per Mile: $389,486

Ultra-thin Bonded

4.75 mm Overlay

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9.5 MM SUPERPAVE

- University Drive 5 lane section in S Bismarck
- 1.25” thickness
- Finished MRI of 31
- Special Provision available to use

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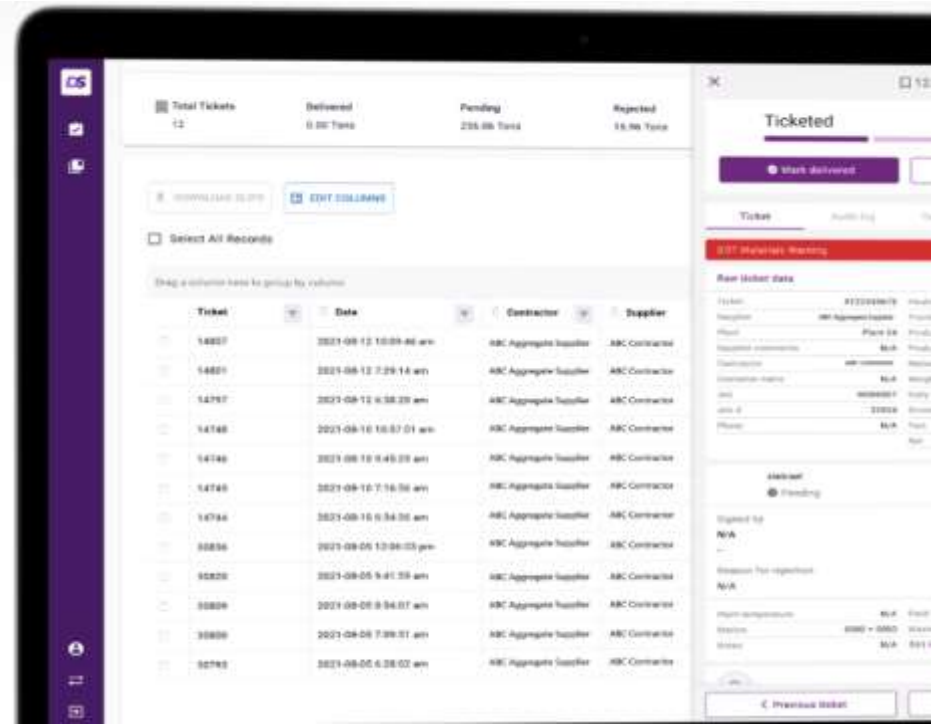
E-TICKETING

- Successfully used on 15 projects during 2023
- Special provision that allows for e-tickets on all projects
- Acquired DOT Portal by HaulHub to pilot this year
- Plan full implementation of e-ticketing by 2026



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HMA SPEC CHANGES 2024

- Requirements around Mix Controller and Mix Designer
- Superpave 5 tighter Air void and density requirements
- Stone Matrix Asphalt - Voids in Coarse Aggregate test

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FHWA CLIMATE CHALLENGE

- NDDOT applied for a Grant in 2022 and received $240,000
  - Training – Fall 2023
  - Proposal Development
  - Develop a Sustainable Pavements Evaluation Process

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TPF-5(478) DEMO TO ADVANCE NEW PAVEMENT TECH

- Project Timeframe: 2023 to 2026
- Benchmark ND mixes in 2022 and 2023
- Total Proposed Cost: $350,000
  - $250,000 from Pooled Fund
  - $100,000 research funds approved by RAC
- Build BMD test sections for field verification – 2024 construction
- Develop BMD specifications and implement through pilot projects

National Center for Asphalt Technology NCAT at AUBURN UNIVERSITY

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BMD Validation… What type of Project?

- Thermal Cracking a concern with an overlay
- Transverse Cracks reflect in year 1
- Picked a cement treated FDR with widening
- 4” HMA on 10” cement treated base

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BMD STAKEHOLDER TEAM

- Knife River Materials
- Mayo Construction
- Border States Paving
- Northern Improvement
- Sundre Sand & Gravel
- Terracon
- Aaron Swan Labs
- NDDOT
- DAPA
- NCAT
- FHWA

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STAKEHOLDER MEETING TOPICS

- Contractors asked for 1500 to 2000 tons of production before changing the mix
- Keep the variables to a minimum
- Portable plants typically only have 1 main liquid asphalt tank
- Crushing extra material to account for mix design variations would cost $$

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8 TEST SECTIONS

- Each section is 2 miles in length
- 2 binder types, 58S-28 & 58H-34
- Vary the AC Binder content by 0.5% from optimum, add RAP in 2 sections
- 5.5%, 6.0%, 6.5%, 4.5%+RAP
- Same Aggregate gradation thru-out

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1941 in Cogswell, ND

PROJECT DETAILS

- Project was bid in February 2024
- Construct in Summer 2024
- Project Cost: $20 million

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IMPLEMENTING BALANCED MIX DESIGN

- Step 1 Benchmarking Current Mixes - 2022 and 2023
- Step 2 Field Validation Project – 2024 Construction
- Step 3 Shadow Projects – 2025
- Step 4 Develop specifications/Pilot Projects – 2026
- Full Implementation - ??

National Center for Asphalt Technology NCAT at AUBURN UNIVERSITY

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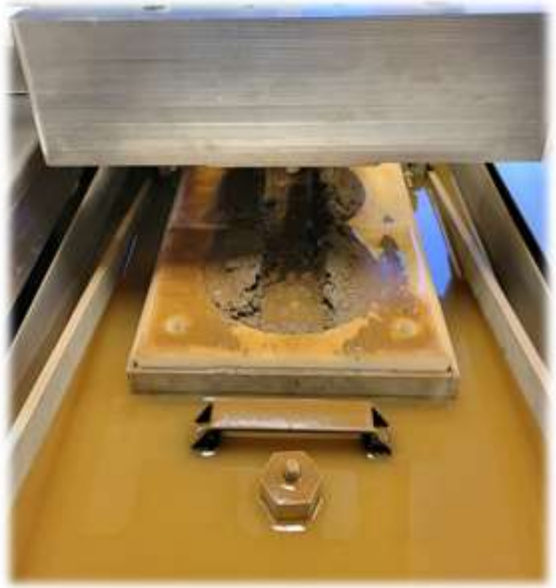
HMA PERFORMANCE TESTING

- Hamburg wheel tracker
  - Identified an area in SW ND with an aggregate stripping issue
  - Added a liquid anti-strip by change order after testing



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QUESTIONS?
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