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Getting the Most Out of an Asphalt Overlay
VDOT Experiences with Pavement Recycling

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Overview

- Background
- Examples
  - I-81
  - NCAT
  - I-64
- Summary

Background

- VDOT maintains nearly all roads in the state
  - About 128,000 lane miles
  - More than 97% has an asphalt surface

- CY 2018 planned paving
  - $515 million
  - 8500+ miles

Background

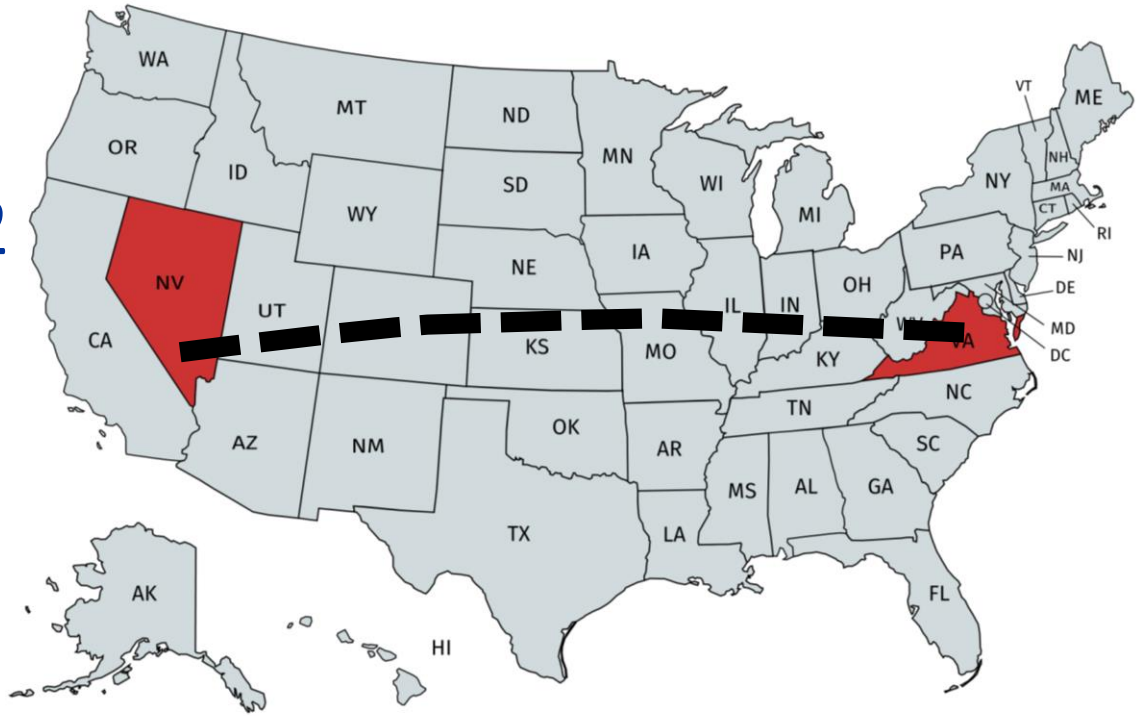
- Main causes of pavement deterioration
  - Environment and traffic loading
- Choice of pavement rehab methods
  - Costs
  - Traffic volumes
  - Allowable work hours
  - Type and causes of deterioration

Background

- Typical rehab methods = overlay or mill and overlay
  - Addresses most needs
  - Efficiently?
  - Suitable when distresses are in upper 3 to 4 inches
- Challenges
  - Increasing costs
  - Same treatments do not last as long as they used to
  - Greater reluctance to inconvenience public
  - Consumption of natural resources

More than 10 million tons of stockpiled RAP

Could pave a 12-foot wide lane, 12 inches deep for more than 2,300 miles



Background

- Pavement recycling can address some challenges
  - Reduced costs, environmental impact, and construction time
  - Expect similar service life to non-recycling
  - Can be easier to fix deeper issues

- Cold in-place recycling
- Cold central plant recycling
- Full depth reclamation

I-81 (2011)

- 3.7 miles
- FDR+CCPR right lane
- CIR left lane

- 29,000 AADT
- 29% trucks
- 14+ million ESALs (right lane)

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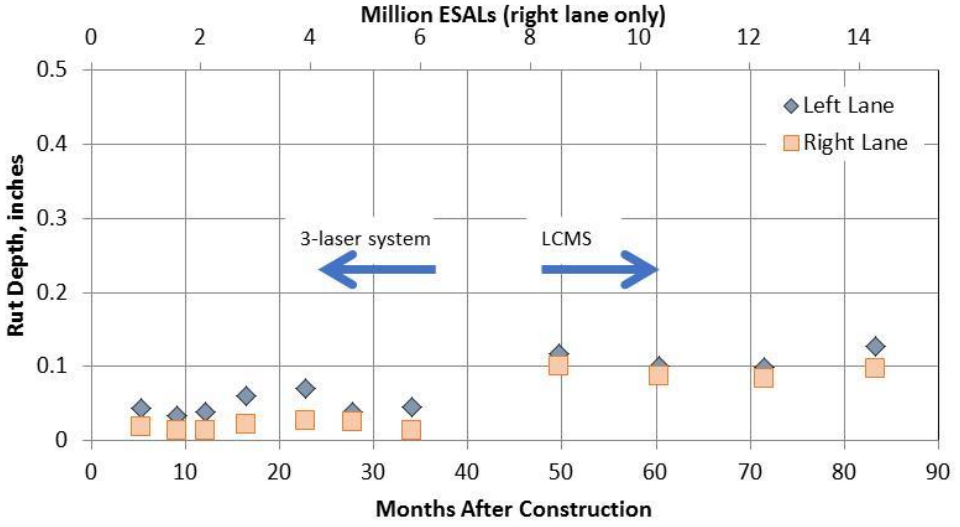
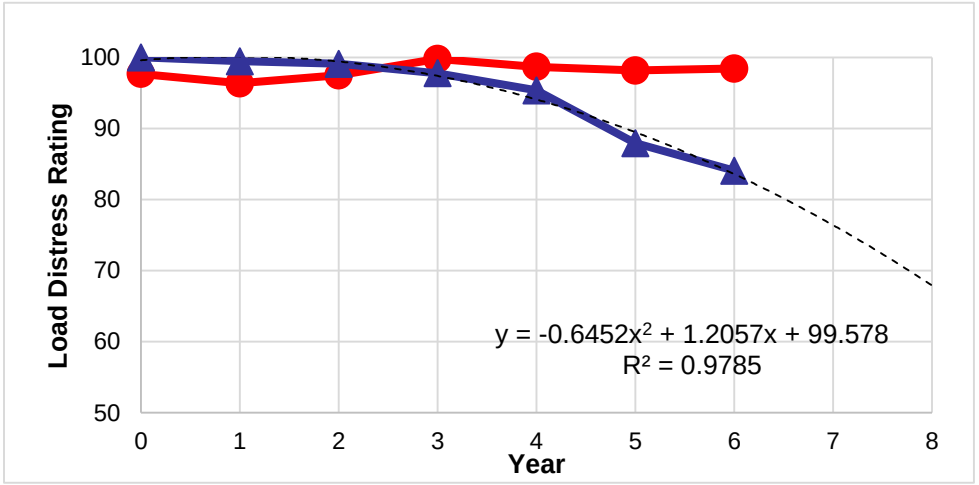
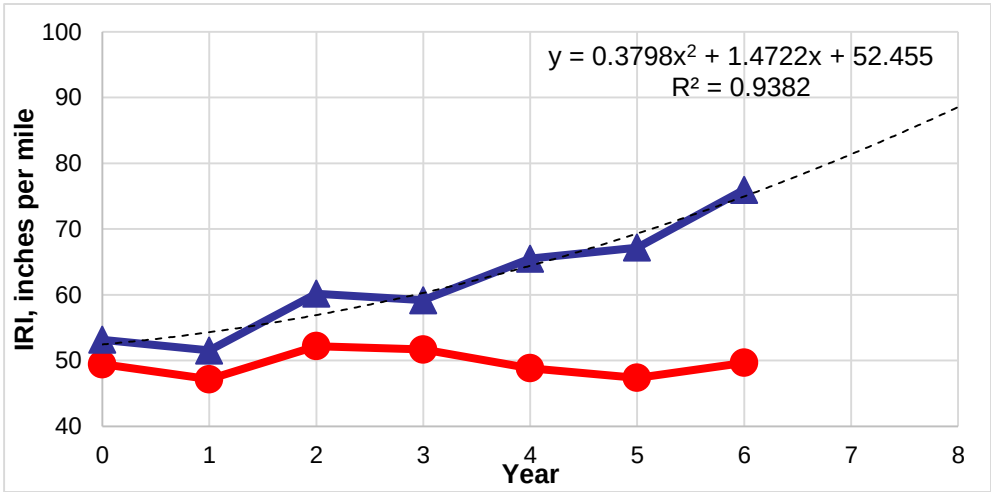
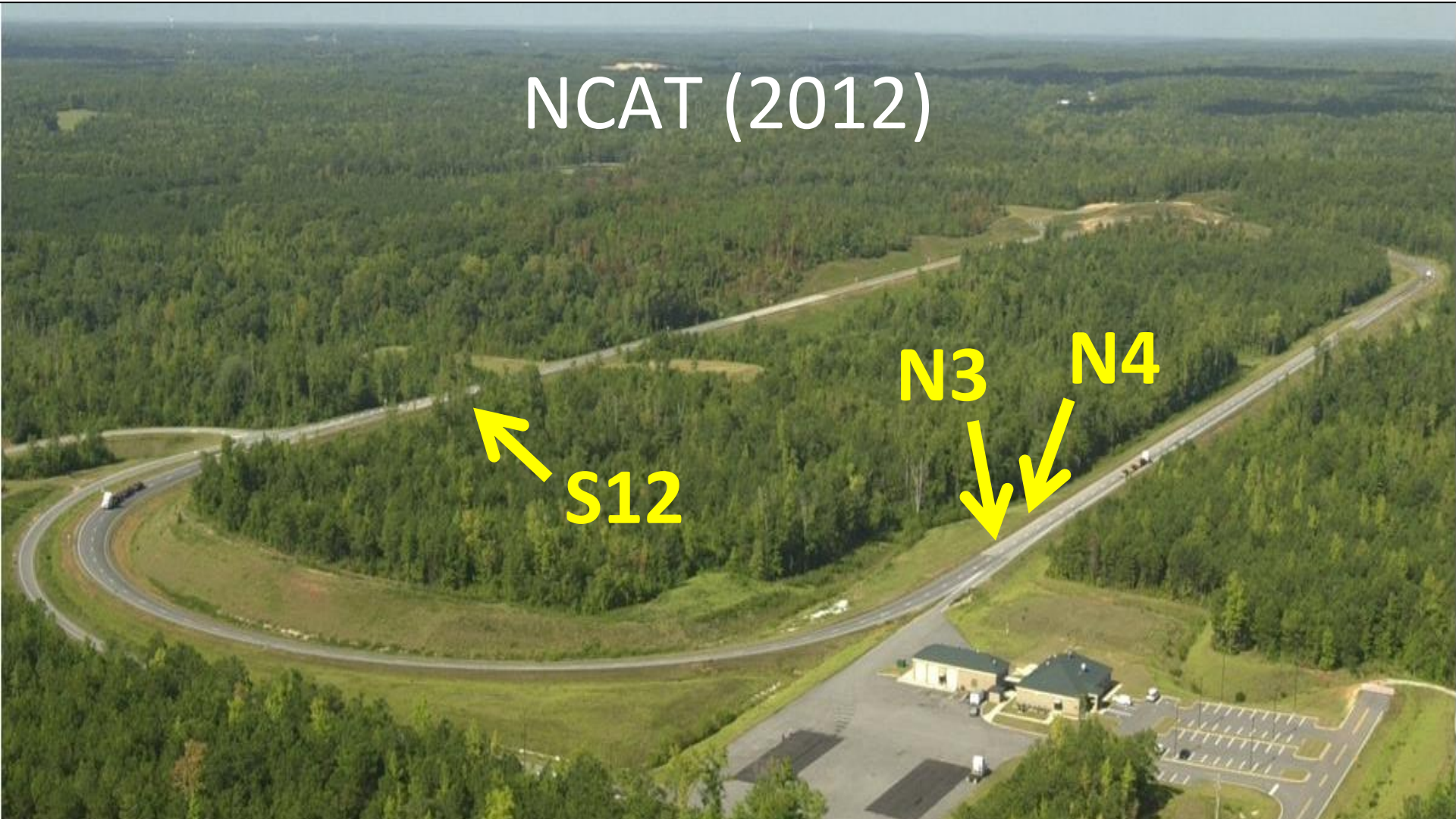


I-81 (2011)

- Performance comparison
  - Reconstruction with recycling (circles) versus single course overlay (triangles)






NCAT (2012)
N3
N4
S12

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- 3 test sections
- 2 with CCPR over aggregate base
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- 20 million ESALs to date

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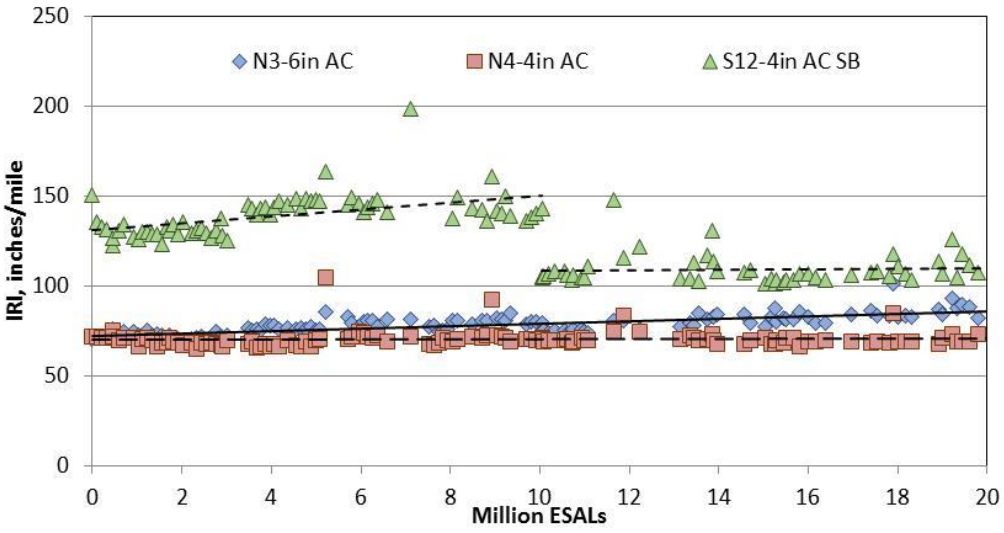

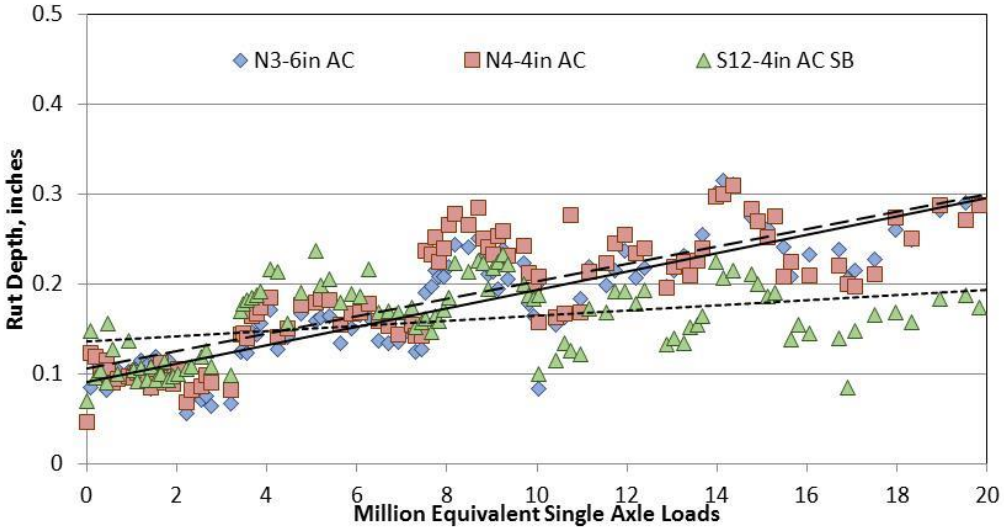

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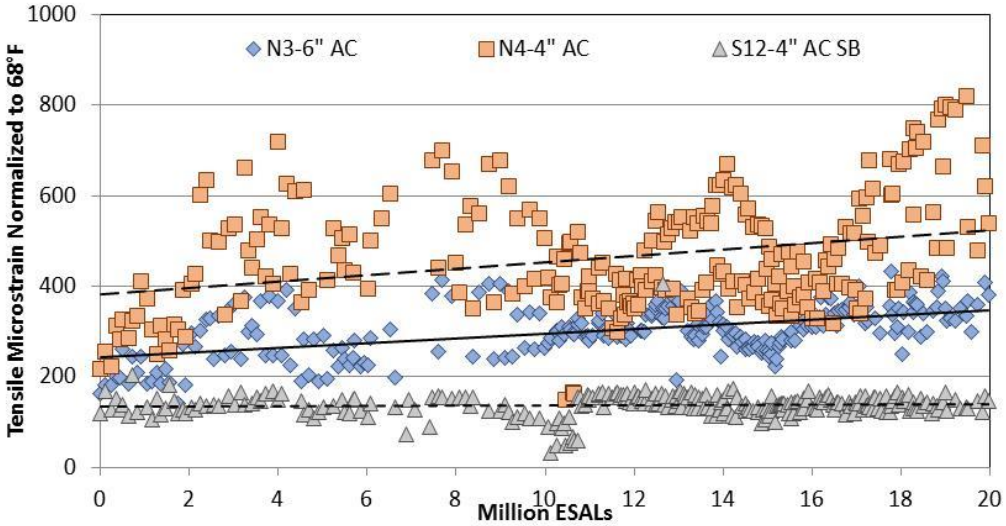


NCAT (2012)

- Section S12
- 85% recycled content
- Very low strain performance
  - Perpetual?


EAST
INTERSTATE
64
NIGHTLY
LANE
CLOSURE

I-64

- Segment 2
  - 7.1 miles (2017-2019)
- Segment 3
  - 8.3 miles (2018-2021)

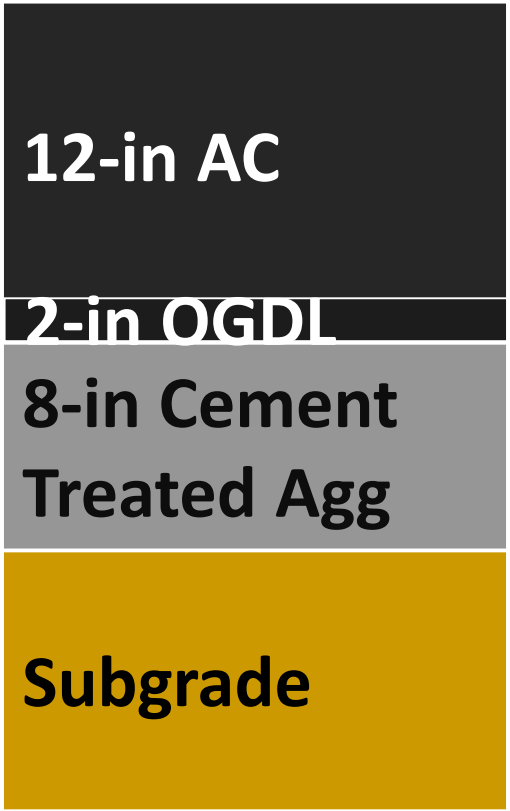
- 35,500 AADT
- 9% trucks

- New lanes
  - Imported material stabilized using an FDR process
- Existing lanes
  - Existing material under old concrete reclaimed using FDR
- All lanes include CCPR


MYERS


CCPR = 85% RAP, 15% #10s
100% passing 12.5mm

SN = 7.08, $83/SY



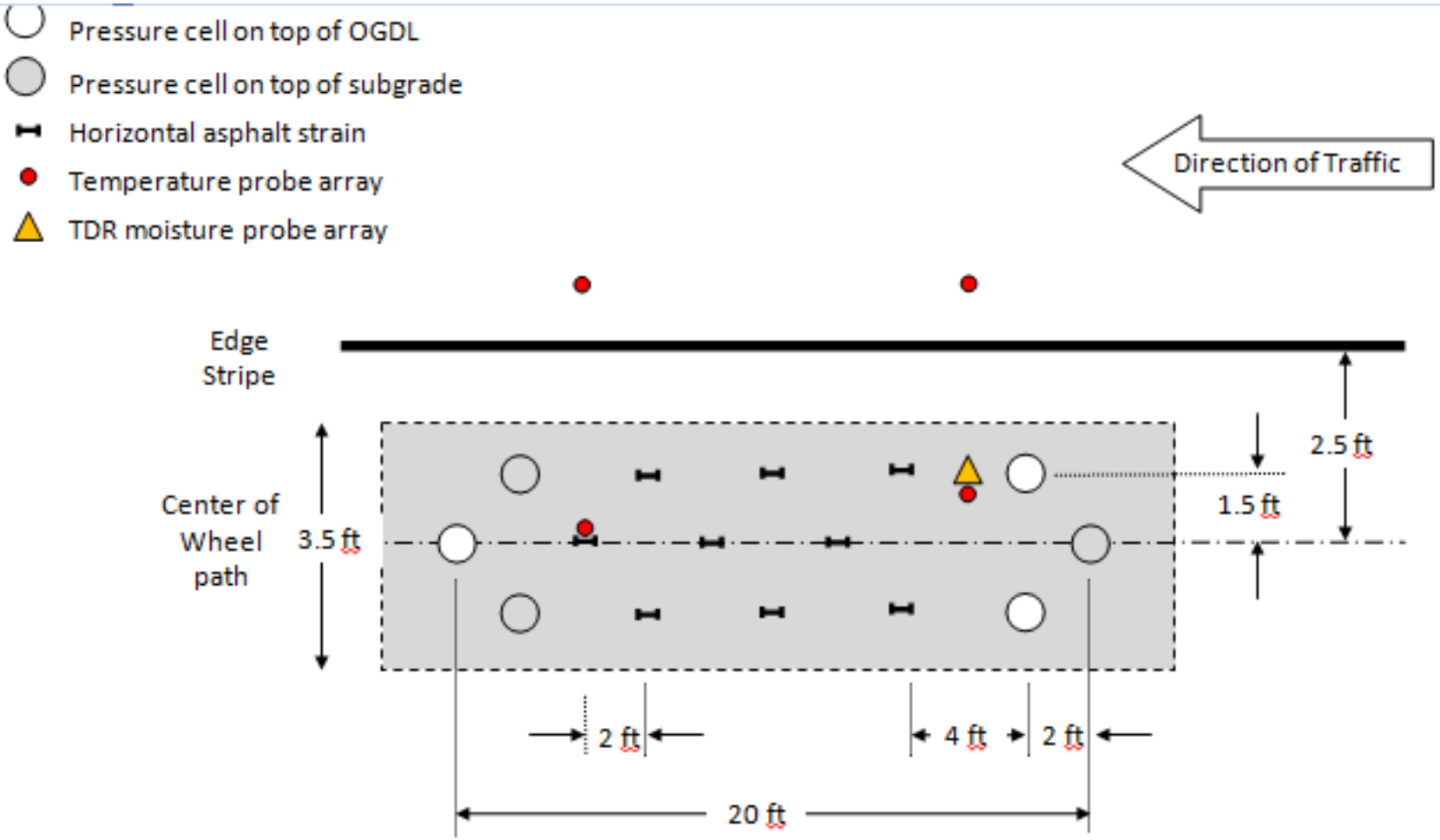
SN = 7.06, $40-61*/SY

I-64, Considering Segments 2 and 3

- About 154 lane miles of new pavement constructed primarily with recycled materials
  - Includes mainline and shoulders
- More than one million tons of material will be recycled
- Compared to a non-recycling design, cost savings exceed $15 million

I-64

- Annual performance monitoring
  - Ride quality, rut depth, and cracking measurements
- Instrumented test section


Pressure cell on top of OGDL
Pressure cell on top of subgrade
Horizontal asphalt strain
Temperature probe array
TDR moisture probe array
Direction of Traffic
Edge Stripe
Center of Wheel path
3.5 ft
1.5 ft
2.5 ft
2 ft
4 ft
2 ft
20 ft


25

Summary

- Recycling can address some pavement rehab challenges and increase the life of an asphalt overlay
  - Including on high volume pavements
- Further study needed to identify:
  - Expected service life
  - Failure mechanisms
  - Practical methods of QA

Thank you!

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