2020 Annual Virginia Concrete Conference

VDOT Chief Deputy Commissioner Rob Cary, P.E., L.S.
Mission & Priorities

Plan, deliver, operate and maintain a transportation system that is safe, enables easy movement of people and goods, enhances the economy and improves our quality of life.

Our mission remains the same.
Virginia: A Leading State + DOT

RANKED #1 BY CNBC AS THE 2019 TOP STATE FOR BUSINESS

7TH IN NATION FOR THE # OF FORTUNE 1000 COMPANIES

8.5 MILLION RESIDENTS

VIRGINIA IS THE 3RD LARGEST STATE-MAINTAINED SYSTEM

HOME TO MORE THAN 60 COLLEGES AND UNIVERSITIES
Work Zone Crashes Were on the Rise in 2019

49% Work Zone Crashes
37% Work Zone Injuries
4% Distracted Driving Crashes
VDOT is BIG Business
# VDOT of Tomorrow

<table>
<thead>
<tr>
<th>1</th>
<th>PREPARE OUR PEOPLE</th>
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<tbody>
<tr>
<td>• We will be willing to learn</td>
<td></td>
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<tr>
<td>• We will mentor each other</td>
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<tr>
<td>• We will support new ways of working</td>
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<table>
<thead>
<tr>
<th>2</th>
<th>EMPOWER INNOVATION</th>
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<tbody>
<tr>
<td>• We will generate new ideas</td>
<td></td>
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<tr>
<td>• We will listen and be open to change</td>
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<tr>
<td>• We will think outside of the box</td>
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<thead>
<tr>
<th>3</th>
<th>MODERNIZE OUR METHODS</th>
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<tbody>
<tr>
<td>• We will research tools to better do our jobs</td>
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<tr>
<td>• We will explore new ways to do things</td>
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<tr>
<td>• We will learn how to work more efficiently</td>
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</table>
VDOT’s commitment to continuous improvement

AASHTOWARE Project
Construction and Materials Software

Track the complete construction and materials management process

Robotic Process Automation (RPA)

Automating repetitive tasks to allow VDOT to focus on bigger-picture issues
Technology Improvements | eConstruction Initiatives

3D | 4D

Tablet-Based Inspection

Document Management Systems

Digital Strategy

3D engineered model linked to project schedule (4D)

Unmanned Aerial Systems (UAS)

Automated Machine Guidance (AMG)

PlanGrid

HeadLight Pilot

Integrations

Project dashboard

Radio Frequency Identification (RFID)

E-Ticketing

Submittal processes

Workflow mapping

Project Document Management

Evaluation of Current Systems

Post-implementation O&M

Other Research and Development

Virginia Department of Transportation
Technology Improvements  | eConstruction Initiatives

**PlanGrid Pilot Program**
Began in September 2018
VDOT inspectors using iPads to review plans & documents, take pictures, and complete daily diaries
Full implementation beginning on projects advertised after January 1, 2020

**HeadLight Pilot Program**
Phase 1 began in Fall 2018; Phase 2 began in Spring 2019
VDOT inspectors using iPads to complete daily diaries and material test reports
Phase 3 planned for 2020; full implementation in 2021 or beyond

**eTicketing**
Special Provision will be revised to allow contractors to submit e-tickets to VDOT electronically (as an option not a requirement)
New Transportation Legislation in Virginia

Safety Measures under consideration

- Prohibiting the use of handheld cell phones while driving
- Banning open containers of alcohol in vehicles
- Making failure to wear a seatbelt a primary offense
- Allowing localities to lower speed limits

... to save more than 120 lives each year
New Transportation Legislation in Virginia

Governor’s Omnibus Legislation (Amounts provided are based on Introduced Legislation)

- Dedicated state funding for Special Structures ($80 million in FY 2023 with continued growth annually)
- Funding for Pavement Maintenance for both VDOT and City Maintained Streets ($50 million by FY 2023)
- Additional state funding for SMART SCALE Distribution ($90 million in the next four years)
- Creates Virginia Highway Safety Improvement Program with additional funding beyond today’s federal HSIP program ($115 million by FY 2024 with current HSIP funding)

Central Virginia Transportation Authority – HB 1541 creates Authority to administer approximately $200 million annually for regional, transit and locality-specific needs
Major Initiatives
Hampton Roads Bridge-Tunnel Expansion Project

- Settlers Landing in Hampton to Interstate 564 Norfolk (10 miles)
- I-64 improvements include 6 lanes of highway and drivable shoulder, and construction of 4-lane bridge/tunnel
- New HRBT tunnels will serve eastbound traffic
- Two existing HRBT tunnels will serve westbound traffic
I-95 Projects
Fredericksburg Area

Nearly $1 billion in highway corridor investment

Major I-95 projects finished by 2023:
- I-95 Express Lanes Fredericksburg Extension
- I-95 Rappahannock River Crossing – NB and SB
- Exit 140 Diverging Diamond Interchange and Widening

Plus:
- New commuter parking
- I-95 overpass replacements
- Virginia Railway Express station improvements
I-81 Corridor Improvements

$2.2 billion in highway corridor investment

Major I-81 projects getting underway:

• 2 out of the 3 consultant design contracts were shortlisted and qualified team selected. The remaining contract had interviews 2/10/20
• 8 projects were advertised with 3 contracts awarded
  • 2 projects in Bristol (accel and decel lane extensions) awarded to W&L Construction
  • 1 corridor-wide CMS Boards contract advertised and awarded to Richardson & Wayland.
  • Remaining 5 projects (accel and decel lane extensions) where advertised January 7th as a bundle contract
Maintenance and Operations Comprehensive Review
Structures – Inventory

As of July 1, 2019

Statewide 21,173

Virginia Department of Transportation

3,396
3,491
3,071
2,069
2,607
1,728
1,709
2,277
825
## Rating – General Condition Rating (GCR)

<table>
<thead>
<tr>
<th>Condition Category</th>
<th>General Condition Rating (GCR)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
<td>9</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Fair</strong></td>
<td>6</td>
<td>Satisfactory</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Poor (Structurally Deficient)</strong></td>
<td>4</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Serious</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Imminent Failure</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Failed</td>
</tr>
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</table>

Components of a Bridge
Examples of Good, Fair, and Poor Bridges

- **Good**
- **Fair on the “CUSP” of Poor**
- **Poor (Structurally Deficient)**
Structurally Deficient (SD) Structures Improved Since 2010

2,130 SD Structures Replaced or Improved
Next Challenge - 4,440 Structures on CUSP

- One inspection rating from becoming Poor (SD)
- Most can be rehabilitated & preserved at ~15% replacement cost
- Preservation - decades of additional service life
- Average age = 62 years
Structures – Long Term Sustainability

Analysis undertaken to define a sustainable solution

- Reviewed historical performance
- Cost to achieve the current performance targets?
  - Current policy: 99% for Interstate, 96% for Primary, and 94% for Secondary
  - Current policy: 95.5% NBI and All Structures Not Structurally Deficient (SD)
- Cost to maintain the current performance?
  - Current performance: 99% for Interstate, 97% for Primary, and 96% for Secondary
- Reviewed overall condition of the inventory
- Is the best strategy for improved long term performance preservation?
  - Reviewed: 75% preservation and 25% replacement
  - No posting on Interstate
- Evaluated different analysis time periods
  - Minimum 20 years
Overall Inventory Condition - Historical

![Graph showing the percentage of structures not structurally deficient vs. average GCR from 2010 to 2020. The graph indicates an increasing trend with an average GCR weighted by importance factor and the percentage of structures not structurally deficient.]
Long Term Sustainability - Preservation Approach

- Focus on overall inventory condition
  - Not “Worst First”
- Current performance levels - an additional $122M/year to maintain
  - “Worst First” cost higher than proactive preservation
- Preservation approach maintains long term acceptable level of service
  - Uses existing funding level
  - Consistent with industry best practices - Focus on balanced approach
- Remaining SDs are safe
  - Will continue to be monitored and programmed appropriately
Overall Funding Scenario

Preservation Activities and Investment Levels Evaluated (75%)

• Deck repair and preservation (overlays & joints)
• Superstructure repair (beam ends) and preservation
• Substructure repair and preservation
• Culvert (liners)

Replacement Activities (25%)

• Components or whole structures
Interstate Network – 50 Year Outlook

2,404 Structures (12%)
26M SF Deck Area (28%)

% Not SD (Preservation)
% Not SD (Current Policy)

Average Weighted GCR (Preservation)
Average Weighted GCR (Current Policy)

Average GCR 5.6 Acceptable Level of Service

Average GCR 5.2

Avg. $109M
Avg. $113M

Fiscal Year
2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075

- All Future Expenditures are in 2019 Dollars
- Excludes Special Structures

Virginia Department of Transportation
Secondary Network – 50 Year Outlook

12,961 Structures (61%)
29M SF Deck Area (30%)

Average General Condition Rating

- % Not Structurally Deficient (SD)
- Average GCR 5.6 Acceptable Level of Service

- Average Weighted GCR (Current Policy)
- Average Weighted GCR (Preservation)

- % Not SD (Current Policy)
- % Not SD (Preservation)

- Fiscal Year
  - 2010
  - 2015
  - 2020
  - 2025
  - 2030
  - 2035
  - 2040
  - 2045
  - 2050
  - 2055
  - 2060
  - 2065
  - 2070

- Average General Condition Rating
  - 2010: 6.43
  - 2015: 6.45
  - 2020: 6.45
  - 2025: 6.1
  - 2030: 5.9
  - 2035: 5.9
  - 2040: 5.8
  - 2045: 5.8
  - 2050: 5.8
  - 2055: 6.0
  - 2060: 6.0
  - 2065: 6.0
  - 2070: 6.0

- % Not Structurally Deficient (SD)
  - Year 20: 95.7%
  - Year 50: 96%

- Average Weighted GCR (Current Policy)
  - Year 20: 5.6
  - Year 50: 5.2

- Average Weighted GCR (Preservation)
  - Year 20: 5.3
  - Year 50: 5.2

- Actual
- Current Policy
- Proposed Policy (Preservation)

- 12,961 Structures (61%)
- 29M SF Deck Area (30%)

- All Future Expenditures are in 2019 Dollars
- Excludes Special Structures
## Summary - Structures Investment Options

Current investment: $384M per year, FY 2020

<table>
<thead>
<tr>
<th>Targets, % Not-SD</th>
<th>IS</th>
<th>PR</th>
<th>SC</th>
<th>All Systems Average GCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Investment – Current Policy</td>
<td>99%</td>
<td>96%</td>
<td>94%</td>
<td>N/A</td>
</tr>
<tr>
<td>Current Investment – Proposed Target</td>
<td>97% No Postings</td>
<td>93%</td>
<td>90%</td>
<td>Average GCR ≥ 5.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avg. Total Cost per Year, $ Millions</th>
<th>IS</th>
<th>PR</th>
<th>SC</th>
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<tbody>
<tr>
<td>Years 1-50</td>
<td>161</td>
<td>222</td>
<td>123</td>
</tr>
<tr>
<td>Current Investment – Current Policy</td>
<td>$506</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Investment – Proposed Target</td>
<td>($122)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Policy</td>
<td>$384</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposed Target</td>
<td>$0</td>
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*All amounts in 2019 dollars*
Thank you for continuing to be a key part in delivering quality projects!