# COMPREHENSIVE REVIEW

## Routine Maintenance

Virginia Department of Transportation

October 13, 2026

# BLUF: 2026 Maintenance and Operations Comprehensive Review – Routine Maintenance

- Today's presentation
  - No action required today
  - Not a request for additional funds
  - Overview of the Routine Maintenance framework for targeted investments

**To Date:**

**April 2026:**
Overview of the 2019 Comprehensive Review

- Pavements
- Bridges
- Investments (Maintenance and Operations Program/State of Good Repair Program)

**May 2026:**
Continued the Overview of the 2019 Comprehensive Review

- Routine Maintenance
- Emergencies
- Explained the tensions experienced since 2019

**July 2026:**
Re-baselining

- Pavements and Bridges
- Scenarios modeled

**September 2026:**

- Overview of Special Structures Program

**Today:**

**October 2026:**
Routine Maintenance Baselining

- Proposed Metric Activities and other non-metric activities

# Maintenance and Operations Comprehensive Review

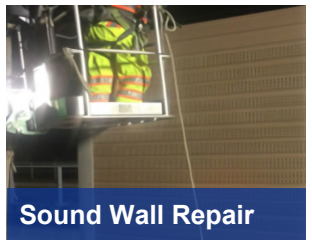
- **Challenges**
  - Workforce size
    - 2002 - 10,200 employees
    - 2026 - 7,900 employees
  - Statewide maintenance facilities reduced in 2007
    - 335 to 248 statewide

- **Back to basics**
  - Planned (proactive) versus reactionary when responding to citizen work requests
  - Creates efficiencies in work production and investment cost


Pavement Repair


Pipe Maintenance


Mowing


Sound Wall Repair


Slope Protection


Ditch Cleaning


Drainage


Storm Water Basin


Shoulder Grading


Park & Ride Lot


Equipment


Litter Pickup


Vegetation Control

# Maintenance and Operations Comprehensive Review

## Routine maintenance definition:

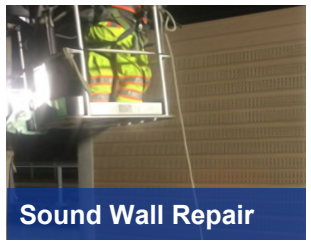
- **Purpose**
  - Preserves the condition, safety, and performance of roads, roadside facilities, and infrastructure
  - Prevents deterioration and extends asset service life (yields a cost savings over the useful life of the asset)

- **Delivery**
  - Diverse tasks performed by state forces and contractors
  - Includes metric and non-metric activities


Pavement Repair


Pipe Maintenance


Mowing


Sound Wall Repair


Slope Protection


Ditch Cleaning


Drainage


Storm Water Basin


Shoulder Grading

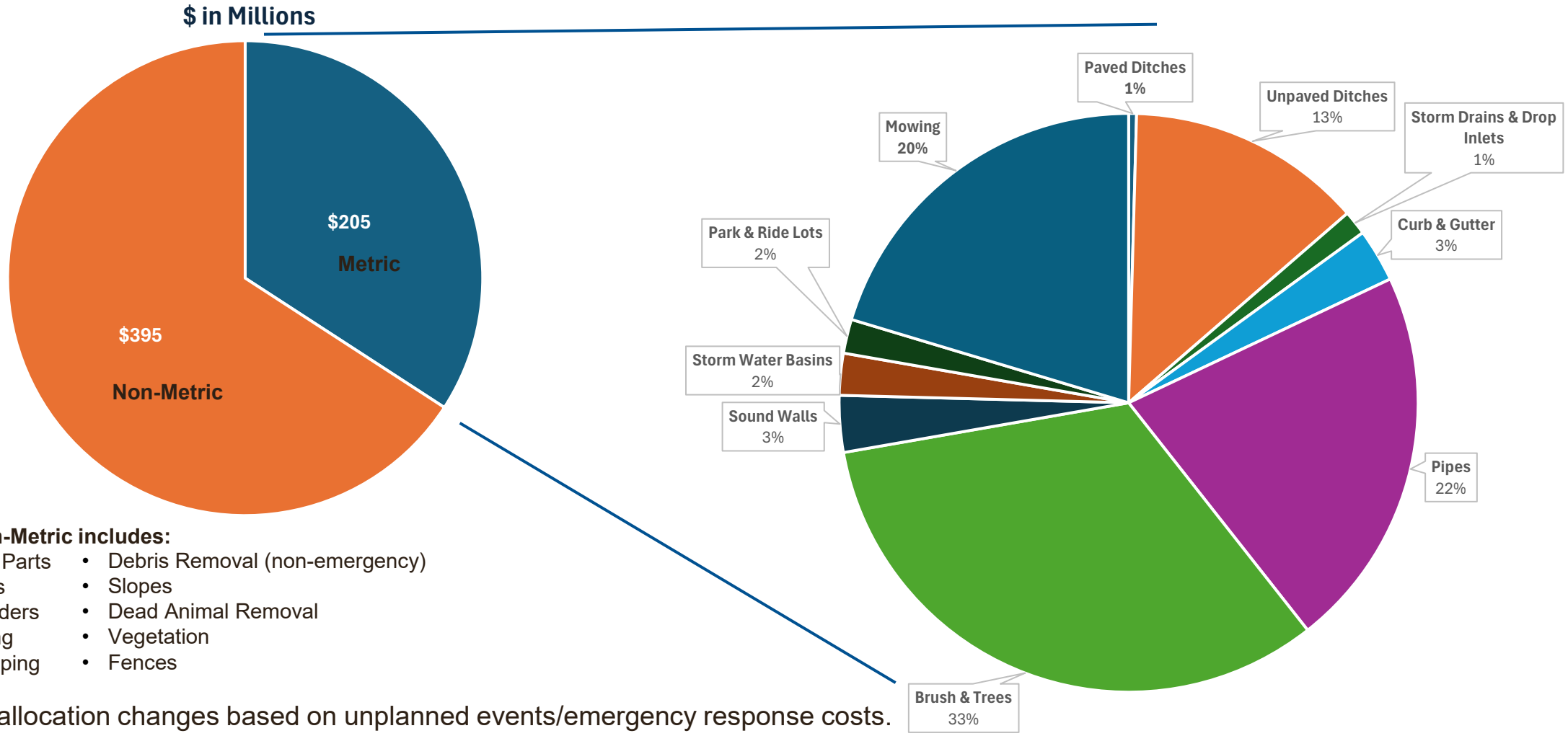

Park & Ride Lot


Equipment


Litter Pickup


Vegetation Control

# Routine Maintenance Activities
# Metric and Non-Metric Activities ~ $600M annually




**Non-Metric includes:**

- Equipment and Parts
- Unpaved Roads
- Unpaved Shoulders
- Pothole Patching
- Roadway Sweeping
- Debris Removal (non-emergency)
- Slopes
- Dead Animal Removal
- Vegetation
- Fences

NOTE: The allocation changes based on unplanned events/emergency response costs. This impacts routine maintenance accomplishments.

# Re-baseline Routine Maintenance Metric Activities (2019 vs. 2026)

*From cyclical activity to data-driven Level of Service*

## 2019 Comprehensive Review

ESTIMATED

- Limited asset inventory or condition data existed
- Inventory estimated from expert opinion, extrapolation, observation and judgment
- Maintenance needs estimated based on best practices & cyclical activities

## 2026 Comprehensive Review

DATA DRIVEN / LOS

- ✓ Asset inventory and condition assessment performed
- ✓ Data gathered using a combination of field inspection, mobile LiDAR, high-definition right-of-way photos, and high-resolution aerial imagery
- ✓ Level of Service (LOS) approach developed based on actual inventory and condition data
- ✓ Costs calculated to maintain and/or achieve target LOS

# Assets Considered For Metrics (All Systems)

## 2019 Comprehensive Review

### ASSETS CONSIDERED

- Paved Ditches
- Unpaved Ditches
- Pipes
- Brush & Trees
- Storm Water Basins
- Unpaved Roads
- Unpaved Shoulders
- Mowing

**Approach: Asset Inventory was estimated and maintenance targets were set based on cyclical activities**

## 2026 Comprehensive Review (Re-baseline)

### ASSETS CONSIDERED

- Paved Ditches
- Unpaved Ditches
- Storm Drains & Drop Inlets
- Curb & Gutter
- Brush & Trees

Image analysis using mobile LiDAR, right-of-way images, and high-resolution aerial imagery

- Pipes

Field Inspection performed by VDOT staff & contractors

- Sound Walls
- Park & Ride Lots

Consultant performed networkwide assessment

- Storm Water Basins

Inspection performed annually by VDOT

- Mowing

Cyclical

**Approach: Assets were Inventoried through various methods; actual conditions and deficiencies were calculated using objective criteria to determine the Level of Service for each asset**

# Statewide Inventory Summary (2026) - Metric Assets and Activities

| Asset | Unit of Measure (UOM) | Interstate | Primary | Secondary | Statewide Total |
|---|---|---|---|---|---|
| Paved Ditches | miles | 285 | 377 | 272 | 934 |
| Unpaved Ditches | miles | 1,706 | 13,164 | 25,426 | 40,296 |
| Storm Drains & Drop Inlets | each | 8,119 | 29,243 | 136,728 | 174,090 |
| Curb & Gutter | linear ft | 0.7M | 14.4M | 50.8M | 65.9M |
| Pipes | each | 7,266 | 46,567 | 144,404 | 198,237 |
| Brush & Trees | shoulder mi | 2,286 | 10,175 | 48,655 | 61,116 |
| Sound Walls | sq ft | — | — | — | 23.9M (807 walls) |
| Storm Water Basins | each (BMP) | — | — | — | 2,668 |
| Park & Ride Lots | sq ft | — | — | — | 10.5 M (114 lots) |
| Mowing | acre | — | — | — | Cyclical |

# Methodology (2026 Re-baseline)

## Data Collection

- Collect asset inventory and condition attributes
- Each attribute is scored as *very good, good, poor & very poor*
- Data is captured through a combination of methods
  - LiDAR
  - Right-of-way photos
  - Aerial imagery
  - Field inspection
  - Consultant review
  - Annual VDOT inspection program

## Deficiency Calculation

- *Poor* and *very poor* count as "deficient"
- % Deficiency = Deficient quantity ÷ Total inventory of the asset
- % Deficiency is rolled up by asset, district, and statewide

## Grading (Level of Service)

- Level of Service (LOS) grades are established based on VDOT expert opinion & other state DOT scorecards
- Each asset is assigned a letter grade from A to E, by system (Interstate, Primary, and Secondary)

## Reporting

- Statewide scorecard to show the grade for every asset and system
- Cost to improve = deficient quantity × unit cost

# Data Collection - Inventory & Condition

| Very Good | Good | Poor | Very Poor |
|---|---|---|---|
| New or Rehabilitated | Meets the VDOT maintenance standard | Below VDOT standard; can be corrected with routine maintenance | Requires replacement or major repair to restore to VDOT standard |

(Very Good + Good) ➡ Acceptable

(Poor + Very Poor) ➡ Deficient

## How the Acceptable and Deficient are used

Only Poor and Very Poor assets count toward % Deficient. % Deficient = deficient quantity ÷ total inventory quantity → Level of Service grade (A - E) → cost to address deficiencies.

## VDOT Maintenance Standard

Roadside assets remain structurally sound, unobstructed, and functionally operational to preserve roadway integrity, ensure proper drainage, and enhance safety (e.g., by maintaining clear sight distances).

# Level of Service Thresholds

| | | Level of Service Grade Ranges (% Deficient) | | | | |
|---|---|---|---|---|---|---|
| Asset | Unit of Measure (UOM) | A | B | C | D | E |
| Paved Ditches | miles | ≤2 | ≤5 | ≤10 | ≤25 | >25 |
| Unpaved Ditches | miles | ≤2 | ≤5 | ≤10 | ≤25 | >25 |
| Storm Drains & Drop Inlets | each | ≤2 | ≤5 | ≤10 | ≤25 | >25 |
| Curb & Gutter | linear ft | ≤2 | ≤5 | ≤10 | ≤25 | >25 |
| Pipes | each | ≤5 | ≤10 | ≤15 | ≤25 | >25 |
| Brush & Trees | shoulder miles | ≤3 | ≤6 | ≤12 | ≤25 | >25 |
| Sound Walls | sq ft | ≤5 | ≤10 | ≤15 | ≤25 | >25 |
| Storm Water Basins | each (BMP) | ≤1 | ≤3 | ≤5 | ≤10 | >10 |
| Park & Ride Lots | sq ft | ≤10 | ≤20 | ≤30 | ≤40 | >40 |
| Mowing | acre | N/A | N/A | N/A | N/A | N/A |

# Investment Definitions

| Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|
| *Investment to keep inventory at the current Level Of Service | *Investment to improve deficiencies to meet target Level Of Service | **Average annual expenditures by system (past three years) |

* Investments are calculated using estimated statewide unit costs

** Annual expenditures were impacted by weather events and emergencies

# Paved Ditch

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Paved Ditch | % Deficient (miles) | ≤2 | ≤5 | ≤10 | ≤25 | >25 |

| System | Inventory (miles) | % Deficient | Current LOS Grade | Target LOS Grade |
|---|---|---|---|---|
| Interstate | 285 | 8.1% (23 miles) | C | B |
| Primary | 377 | 7.3% (28 miles) | C | C |
| Secondary | 272 | 8.1% (22 miles) | C | D |

| System | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26)* |
|---|---|---|---|
| Interstate | $0.7M | $1.6M | $0.5M |
| Primary | $0.1M | $0.1M | $0.2M |
| Secondary | $0.3M | $0.3M | $0.2M |
| Statewide Total | $1.1M | $2.0M | $0.9M |



* Estimated based on inventory, costs will be tracked separately for paved and unpaved ditches in the future

# Paved Ditch

## Acceptable

Good condition: well-defined ditch profile, stable side slopes, clear flow path, limited sediment/vegetation obstruction.





## DEFICIENT





Obstruction of cross-section



Cracking



Undermining / Erosion

# Pipes

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Pipes | % Deficient (Each) | ≤5 | ≤10 | ≤15 | ≤25 | >25 |

| System | Inventory (each) | % Deficient | Current LOS Grade | Target LOS Grade |
|---|---|---|---|---|
| Interstate | 7,266 | 20.0% (1,453) | D | B |
| Primary | 46,567 | 13.6% (6,333) | C | C |
| Secondary | 144,404 | 13.0% (18,773) | C | C |

| System | Investment to Maintain Current LOS** | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26)* |
|---|---|---|---|
| Interstate | $3.8M | $22.0M | $2.5M |
| Primary | $12.5M | $12.5M | $12.8M |
| Secondary | $31.0M | $31.0M | $28.7M |
| Statewide Total | $47.3M | $65.5M | $44.0M |

**Ongoing construction on interstates will address some deficient pipes

*Pipe inspection costs are ~$1.6M yearly

# Pipes

## Acceptable

Good condition: clean opening, intact pipe/headwall, no significant cracking, deformation, blockage, or erosion.





## DEFICIENT



Obstruction of pipe opening



Joint separation/misalignment



Vegetation blocking flow



End wall in poor condition



Erosion at outfall

# Statewide Summary by Asset – Metric Activities (All Systems Combined)

| Asset | Investment to Maintain Current LOS | Investment to Meet Target LOS | *Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Paved Ditches | $1.1M | $2.0M | $0.9M |
| Unpaved Ditches | $31.0M | $31.0M | $27.1M |
| Storm Drains & Drop Inlets | $3.4M | $3.9M | $2.8M |
| Curb & Gutter | $8.9M | $10.0M | $6.1M |
| Pipes | $47.3M | $65.5M | $44.0M |
| Brush & Trees | $55.4M | $55.4M | $67.5M |
| Sound Walls | $7.8M | $7.8M | $6.5M |
| Storm Water Basins | $3.2M | $7.7M | $4.8M |
| Park & Ride Lots | $4.6M | $4.6M | $3.9M |
| Mowing | $49.9M | $49.9M | $41.8M |
| Statewide Total | $212.6M | $237.8M | $205.4M |

* Annual expenditures were impacted by weather events and emergencies

# Summary

- **Routine Maintenance management program will mature as VDOT continues to collect performance data, inventory, etc.**
  - Metrics for other routine maintenance activities may be presented for future consideration
- **Routine Maintenance activities get deferred when other critical needs emerge**
  - Emergency response costs exceed planned budget
  - Deferral of routine maintenance work increases backlog and subsequent cost
- **Routine maintenance performance will be reported annually to the Board**

# NEXT STEPS

# Upcoming CTB Meetings

| Description | CTB Meeting Date |
| --- | --- |
| **CTB approval**<br>• Performance Targets<br>i. Pavements<br>ii. Structures<br><br>• Special Structures 50-Year Long-Term Plan | December 9, 2026 |

# Appendix

# Unpaved Ditch

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Unpaved Ditch | % Deficient (miles) | ≤2 | ≤5 | ≤10 | ≤25 | >25 |

| System | Inventory (miles) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Interstate | 1,706 | 3.6% (61 miles) | B | B |
| Primary | 13,164 | 2.3% (303 miles) | B | B |
| Secondary | 25,426 | 2.7% (687 miles) | B | B |

| System | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26)* |
|---|---|---|---|
| Interstate | $4.1M | $4.1M | $3.1M |
| Primary | $2.9M | $2.9M | $5.8M |
| Secondary | $24.0M | $24.0M | $18.2M |
| Statewide Total | $31.0M | $31.0M | $27.1M |



*Estimated based on inventory, costs will be tracked separately for paved and unpaved ditches in the future

# Unpaved Ditch

## Acceptable

Good condition: well-defined ditch profile, stable side slopes, clear flow path, limited sediment/vegetation obstruction.





## DEFICIENT







Obstruction of cross-section



Erosion

# Storm Drains & Drop Inlets

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Storm Drains & Drop Inlets | % Deficient (Each) | ≤2 | ≤5 | ≤10 | ≤25 | >25 |

| System | Inventory (each) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Interstate | 8,119 | 4.1% (333) | B | B |
| Primary | 29,243 | 11.7% (3,421) | D | C |
| Secondary | 136,728 | 7.1% (9,708) | C | D |

| System | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Interstate | $1.6M | $1.6M | $1.2M |
| Primary | $1.4M | $1.9M | $0.8M |
| Secondary | $0.4M | $0.4M | $0.8M |
| Statewide Total | $3.4M | $3.9M | $2.8M |

# Storm Drains & Drop Inlets

## Acceptable

Good condition: grate/frame intact, inlet unobstructed, pavement/curb connection intact, no major sediment or vegetation blockage.



## DEFICIENT



Storm Drains Damage



Storm Drains Obstruction



Drop Inlet Damage

# Curb & Gutter

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Curb & Gutter | % Deficient (Feet) | ≤2 | ≤5 | ≤10 | ≤25 | >25 |

| System | Inventory (linear ft) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Interstate | 0.7M | 17.9% (0.13M) | D | C |
| Primary | 14.4M | 21.7% (3.1M) | D | D |
| Secondary | 50.8M | 8.9% (4.5M) | C | D |

| System | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Interstate | $5.6M | $6.7M | $2.8M |
| Primary | $1.7M | $1.7M | $1.8M |
| Secondary | $1.6M | $1.6M | $1.5M |
| Statewide Total | $8.9M | $10.0M | $6.1M |

# Curb & Gutter

## Acceptable

Good condition: continuous curb/gutter, intact joints, no significant cracking or settlement, and unobstructed flow line.






## DEFICIENT





Flowline obstruction





Damage/Breakage

# Brush & Trees

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Brush & Trees | % Deficient (shoulder mile) | ≤3 | ≤6 | ≤12 | ≤25 | >25 |

| System | Inventory (shoulder miles) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Interstate | 2,286 | 0.7% (16 miles) | A | A |
| Primary | 10,175 | 3.2% (326 miles) | B | B |
| Secondary | 48,655 | 9.8% (4,768 miles) | C | C |

| System | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26)* |
|---|---|---|---|
| Interstate | $8.3M | $8.3M | $10.1M |
| Primary | $11.5M | $11.5M | $20.7M |
| Secondary | $35.6M | $35.6M | $36.7M |
| Statewide Total | $55.4M | $55.4M | $67.5M |

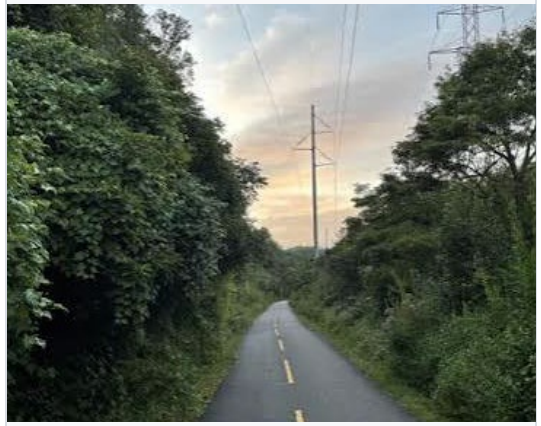
* Annual expenditures were impacted by weather events and emergencies

# Brush & Trees

## Acceptable

Good condition: vegetation controlled within the appropriate roadside limits; adequate sight distance; drainage structures visible and accessible.



## DEFICIENT



Vertical clearance over roadway



Vertical clearance over sidewalk



Hazardous trees



Horizontal and vertical clearance around structure

# Sound Walls

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Sound Walls | % Deficient | ≤5 | ≤10 | ≤15 | ≤25 | >25 |

| Scope | Inventory (sq ft) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Statewide (807 walls) | 23.9M | 5.6% by wall area (51 walls) | B | B |

| Scope | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Statewide | $7.8M* | $7.8M | $6.5M |

* Includes ordinary maintenance such as vegetation control and repair

* New sound walls added as part of the major projects (e.g., I-81 widening) should improve overall condition

# Sound Walls

## Acceptable

Good condition: continuous wall, intact panels/posts, no major cracking or displacement, stable foundation, no significant vegetation encroachment.






## DEFICIENT



Joint separation




Damaged panels



Surface deterioration



Vegetation

# Storm Water Basins (BMPs)

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Storm Water Basins (BMPs) | % Deficient (Each) | ≤1 | ≤3 | ≤5 | ≤10 | >10 |

| Scope | Inventory (each) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Statewide (2,668 BMPs) | 2,668 | 2.0% (61 BMPs) | B | A |

| Scope | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Statewide | $3.2M* | $7.7M | $4.8M |

*New storm water basins added annually should improve overall condition

# Storm Water Basins (BMPs)

## Acceptable

Good condition: stable embankment, maintained vegetation, functioning inlet/outlet, no major erosion, standing water within the intended basin area.





## DEFICIENT

Deficient: embankment erosion/breach, excessive sediment, clogged inlet/outlet, uncontrolled vegetation, exposed structures, or significant bank erosion.



# Park & Ride Lots

| Asset | | Level of Service Grade Ranges | | | | |
|---|---|---|---|---|---|---|
| Asset | Rating Unit | A | B | C | D | E |
| Park & Ride Lots | % Deficient (SF) | ≤10 | ≤20 | ≤30 | ≤40 | >40 |

| Scope | Inventory (sq ft) | % Deficient | Current LOS | Target LOS |
|---|---|---|---|---|
| Statewide (114 lots) | 10.5M | 12.8% (25 lots) | B | B |

| Scope | Investment to Maintain Current LOS | Investment to Meet Target LOS | Avg. Annual Expenditures (FY 24 – 26) |
|---|---|---|---|
| Statewide | $4.6M* | $4.6M | $3.9M |

*Includes mowing, snow removal, trash pickup, and other ordinary maintenance activities

# Park & Ride Lots

## Acceptable

**Good condition: sound pavement, clear parking markings, functional drainage, clean lot, intact curbs/islands, accessible spaces and pedestrian facilities.**



## DEFICIENT

**Deficient: potholes, cracking/failing pavement, faded markings, ponding, damaged curbs, debris, vegetation encroachment or deteriorated pedestrian areas.**



# Mowing (Turf)

## Turf mowed with selective plant-growth regulator applied: $50M

- Interstate: 3 times annually
- Primary: 3 times annually
- Secondary: 2 times annually

## Annual accomplishment (complete/incomplete) to be reported

| System | Est. Cost Mowing with PGR | Est. Cost 1 Full Cycle with litter pickup | Avg. Annual Expenditure (FY 24 - 26)* |
|---|---|---|---|
| Interstate | $3.5M | $1.3M | $6.1M |
| Primary | $21.6M | $6.0M | $15.2M |
| Secondary | $24.8M | $13.7M | $20.5M |
| Total | $49.9M | $21.1M | $41.8M |

*Includes extra mowing performed by localities