VDOT STORMWATER MANAGEMENT PRACTICES
PRESENTATION TOPICS

• History of VDOT’s Municipal Separate Storm Sewer System (MS4) Program and Chesapeake Bay Total Maximum Daily Loads (TMDL)

• Current VDOT Reduction Requirements and Efforts

• Future VDOT Reductions Requirements and Efforts
VDOT’s Initial MS4 Permit – 2003 under the small MS4 General Permit

TMDL special conditions in permit have steadily increased in both 2008 and 2013 permits

- 2008 Planning Phase for local TMDL
- 2013 Planning Phase for Chesapeake Bay TMDL using EPA sanctioned model

TMDL implementation is ramping up

- Chesapeake Bay TMDL with Virginia’s Phase II Watershed Implementation Plan (WIP) commitments incorporated in 2013 permit
VDOT required to estimate baseline loading and required reduction for sediment (TSS), nitrogen (TN), phosphorus (TP)

Phase implementation from Phase II WIP over three permit cycles

- Achieve 5% reduction by 06/30/2018
- Achieve additional 35% reduction by 06/30/2023
- Achieve additional 60% reduction by 06/30/2028

Achieving the reductions is estimated to be a costly endeavor

- Estimating the VDOT load and reductions
- Selecting cost effective BMPs to achieve reductions
Collaboration with localities and state agencies is critical.

VDOT is 1 of 97 MS4’s with Chesapeake Bay responsibilities.
HISTORICAL TMDL SPENDING

Majority of current reductions achieved through:

- Credit for historical stormwater treatment
- Normal street sweeping efforts
- Redevelopment credit through roadway projects

Limited reductions have been through direct efforts

- Stream restoration at a maintenance facility, National Fish and Wildlife Foundation (NFWF) Grant
- Not eligible for Stormwater Local Assistance Fund (SLAF)
- Nutrient credit purchase (similar to compensatory mitigation)

It is difficult to estimate a true cost. However, using a unit cost range of $8,500 to $13,500/pound of TP with 670 pounds achieved to date:

- Approximately $5.7M – $9M
In 2011, Senate Finance Committee projected total TMDL costs:

- $13.6 to $15.7 billion including wastewater, agriculture, stormwater, on-site septic systems
- Total stormwater capital costs $9.4 to $11.5B
- Annual O&M costs additional $1.0B to $1.2B statewide
- Estimated VDOT costs $2.1B and $700 million, respectively
- Assumed runoff reduction practices
BMP COST AS REPORTED BY SENATE FINANCE COMMITTEE

Relative Per-Pound Costs of Reducing Nitrogen Pollution in the Chesapeake Bay Region

- Stormwater: $500+
- Wastewater TP: $92.40
- Enhanced NMP: $47.40
- Native oyster aquaculture: $21.90
- Algal turf scrubbing: $15.80
- Land retirement: $4.70
- Conservation tillage: $3.30
- Grassed buffers: $3.20
- Forest buffers: $3.10
- Restored/constructed wetlands: $1.50
- Forest buffers: $1.20

Source: World Resources Institute

January 2010
MS4s and other stakeholders have refined cost estimates since original report.

<table>
<thead>
<tr>
<th>Regulated Entity</th>
<th>Cost Estimate (millions)</th>
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</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>$2,100</td>
</tr>
<tr>
<td>Fairfax Co.</td>
<td>$651 - $845</td>
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<tr>
<td>Virginia Beach</td>
<td>$323 - $429</td>
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<tr>
<td>Richmond City</td>
<td>$159 - $305</td>
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<tr>
<td>Suffolk</td>
<td>$109 - $211</td>
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<tr>
<td>Lynchburg</td>
<td>$109 - $201</td>
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<tr>
<td>James City Co.</td>
<td>$87 - $149</td>
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<tr>
<td>Isle of Wight Co.</td>
<td>$40 - $79</td>
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<tr>
<td>Surry Co.</td>
<td>$7 - $13</td>
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<tr>
<td>Statewide</td>
<td>$9,400 - $11,500</td>
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</tbody>
</table>

*Estimates are capital cost only*
<table>
<thead>
<tr>
<th>BMP</th>
<th>$/pound of TP</th>
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<tbody>
<tr>
<td>Turnkey Delivery</td>
<td>$4,500 – $7,500</td>
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<tr>
<td>(stream restoration, land conversion)</td>
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<tr>
<td>Nutrient Credits</td>
<td>$9,600 – $16,000</td>
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<tr>
<td>(agricultural practices, land conversion)</td>
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<tr>
<td>Infrastructure Improvement</td>
<td>$5,000 – $15,500</td>
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<td>(outfall and channel stabilization)</td>
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<tr>
<td>Annual O&amp;M Credit</td>
<td>Refining cost estimates</td>
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<td>(street sweeping, catch basin clean-out)</td>
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<tr>
<td>Structural Retrofits</td>
<td>$35,000 – $45,000</td>
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<tr>
<td>(stormwater management facilities)</td>
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</tr>
<tr>
<td>BMP</td>
<td>BMP STATUS</td>
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<td>------------------------------</td>
<td>------------------------------------------------</td>
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<tr>
<td>Historical BMPs</td>
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<tr>
<td>Redevelopment</td>
<td>Already Implemented</td>
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<tr>
<td>Nutrient Credits</td>
<td></td>
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<tr>
<td>Stream Restoration</td>
<td>Estimated to be used during this permit cycle</td>
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<tr>
<td>Land Cover Conversion</td>
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<tr>
<td>Channel/Outfall Stabilization</td>
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<td>Street Sweeping</td>
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<tr>
<td>Catch Basin Clean-out</td>
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</tr>
<tr>
<td>Structural Retrofits</td>
<td>In the toolbox for future use</td>
</tr>
</tbody>
</table>

As identified in VDOT’s current Action Plan, developed consistent with DEQ Guidance
REQUIRED REDUCTIONS BY PERMIT CYCLE

06/30/18
5% Reduction

06/30/23
Add'l 35% Reduction

06/30/28
Add'l 60% Reduction

~13,500 Total Pounds (TP)

~5,400 Total Pounds (TP)

670 Total Pounds (TP)

Rappahannock
York
James
Potomac

Total Pounds of TP
EXPECTED FUNDING NEEDS

MS4/TMDL investment needed to address requirements

Using a range of $8,500 – $13,500/pound of TP

• Approximately $40M to $65M will be required to achieve 35% reductions
• Approximately $70M to $110M will be required to achieve 60% reductions

Other Considerations
• Future budgets need to address long-term O&M
QUESTIONS

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• TMDL implementation
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