Striking the Right Balance
VWEA Stormwater Committee
Spring Conference

Fairfax County Stormwater-Program Management Case Study

Department of Public Works and Environmental Services
Working for You!
Fairfax County

Size: 395 sq. miles
Population: 1.2 million
MS4 - Phase 1 Community
**Program History**

- The Fairfax County Board of Supervisors adopted a 20 year vision in 2004, which committed to protecting and enhancing our watersheds and natural streams.
- Goals of the Division included:
  - Plan for and implement projects to restore the county’s waters
  - Meet regulatory requirements
  - Maintain existing infrastructure
  - Provide safety for the residents
  - Effectively manage the fund to achieve these goals
- FY2006 a stormwater service district was created and a $.01/$ (100 assessed value) from the real estate tax "the penny” was dedicated to stormwater programs, including:
  - watershed planning,
  - project implementation,
  - dam safety,
  - regulatory compliance and
  - infrastructure reinvestment components.
History of “the Penny”

2006 – The Board dedicated the “the penny” to SWM programs
2007 – The Board dedicated “the penny” to SWM programs again
2009 – Stormwater operations were officially funded from “the penny” as part of budget process.
2010 – Stormwater Service Tax District created: Tax Rate $.01/$100 assessed value
2011 – Stormwater Tax rate raised to $0.015/$100 assessed value
2013 – Stormwater Tax rate raised to $0.02/$100 assessed value
2015 – Stormwater Tax rate raised to $0.025/$100 assessed value*

*The Board agreed to a 5yr plan to increase the tax at an additional $.0025/yr (approximately $5,000,000)
Fairfax County’s stormwater management program includes 6 principal areas to help insure that water quality, water quantity and infrastructure reinvestment are all properly addressed.
Regulatory Requirements Driving Water Quality

MS4 Permit
TMDL’s

- Chesapeake Bay
  - Phosphorous
  - Nitrogen
  - Sediment

- Local streams
  - Bacteria
  - Sediment
  - PCB’s
  - Others

Support of Programs administered by Land Development Services

- Virginia Storm water Management Program (VSMP)
  - Plan review
  - Stormwater management ordinance

- Virginia Erosion and Sediment Control Program (VESCP)

- Chesapeake Bay Preservation Ordinance (CBPO)

Floodplain Regulations
Regulatory Programs

Watershed Planning
Stream monitoring and assessment
USGS monitoring partnership
Outreach and Education

Industrial and High Risk Runoff (IHRR)
Illicit Discharge and Improper Disposal (IDID)
State Regulated Dams
FEMA Program
Regulatory Programs

Watershed Planning

GIS
Land use
Watershed/Subwatershed Modeling
  • Support of Bay Model
  • Local watershed models

Floodplain
RPA

Potential short term and long term projects were identified. These watershed plans are one tool used to identify capital improvement projects.
Regulatory Programs

Stream Monitoring and Assessment

- Wet and dry weather screenings
- Lake monitoring
- Water quality
  - Bio-assessment (bugs and fish)
  - Bacteria
  - Habitat
  - Trends evaluation
    - stream health
    - Flows
    - Nutrient levels
  - USGS monitoring partnership
  - Completed stream restoration projects
Outreach and Education

Fairfax County maintains a very strong partnership with the public schools at every level.

• Elementary school workbooks and programs
• Middle school- visit classrooms- career days
• High school- Steam Crime investigation, sewer science

Program information on-line
Stream Clean up
Rain Barrels
Reforestation- planting days
Regulatory Programs

**Industrial and High Risk Runoff (IHRR)**
- Address Industrial and Commercial Runoff
- Pro-active inspection program
- Assist property owners in preparing SWPP and providing BMP solutions to address their runoff

**Illicit Discharge and Improper Disposal (IDID)**
- Unauthorized – non stormwater discharges
- Responds to reported violation concerns
- Enforcement through education/awareness and technical support.
State Regulated Dams

Dam certification and regulatory Compliance
- Emergency Action Plans
- Hydraulic and Hydrologic analysis

Dam inspection

Dam maintenance
- major repairs (to ensure continued compliance
- Routine maintenance

Dredging

Dredging at Hunstman Lake
Regulatory Programs

FEMA program

National Flood Insurance Program
FEMA map amendments and Revisions
Community Rating System (CRS)
  - Includes mitigation projects
  - Reduces flood insurance premiums
Cooperating Technical Partners (CTP) Certifications
Streams and Water Quality

Capital Improvement Projects

- Natural channel stream restoration
- Pond retrofits
- Partnerships with outside agencies through their capital program
- Outfall improvements (regenerative step pool conveyance)

- LID enhancements on county owned properties
- Pond Dredging
- Reforestation
Completed Water Quality Projects
FY09-15

<table>
<thead>
<tr>
<th>Completed Water Quality Projects FY09-15</th>
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<tbody>
<tr>
<td>Number of Projects</td>
</tr>
<tr>
<td>Acres Treated</td>
</tr>
<tr>
<td>Linear Feet Treated</td>
</tr>
<tr>
<td>Phosphorous Removed</td>
</tr>
<tr>
<td>Nitrogen Removed</td>
</tr>
<tr>
<td>Sediment Removed</td>
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</table>

Map of Fairfax County with water quality projects.
<table>
<thead>
<tr>
<th>Practices</th>
<th>Number Installed</th>
<th>Capital Cost ($/lb/yr)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>TN</td>
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<tr>
<td>Stream Restoration</td>
<td>27</td>
<td>$2,300</td>
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<tr>
<td>Pond Retrofits</td>
<td>46</td>
<td>$4,000</td>
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<tr>
<td>Infiltration Swales &amp; Trenches</td>
<td>7</td>
<td>$7,600</td>
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<tr>
<td>Dry Swales</td>
<td>8</td>
<td>$10,400</td>
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<tr>
<td>Bioretention (Rain Gardens)</td>
<td>37</td>
<td>$21,500</td>
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<tr>
<td>Pervious Pavement</td>
<td>12</td>
<td>$54,300</td>
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</table>
County Assets

- 1600 publically maintained stormwater management facilities
- 4,400 privately maintained stormwater management facilities
- 1,300 miles of storm drain pipe
- 60,000 storm drain structures
- 20 state regulated dams
- 90 miles of man-made channels
- Miles of streams
Infrastructure-reinvestment

Condition Assessment

Older portions of infrastructure built in the 1940’s and reaching the end of their life cycle.

Cured in place pipe lining

More inexpensive approach to increasing life of older infrastructure, before failure. Significant cost savings.

Outfall improvements- regenerative step pool conveyance

Structure maintenance- repair

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<tr>
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<th>Annual Expenditures ($)</th>
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<tr>
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<td>Condition Assessment</td>
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<tr>
<td>FY 12</td>
<td>158,458</td>
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<tr>
<td>FY 13</td>
<td>445,484</td>
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<tr>
<td>FY 14</td>
<td>875,364</td>
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<td>FY 15</td>
<td>931,497</td>
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</table>
Stormwater Treatment Systems

- Ponds - Public and Private
- LID practices

Before

After
Ponds

- Tracking and reporting both public and private facilities
- Private Facilities
  - Inspection - over 700 annually
  - Enforcement
- Public Facilities - including state regulated dams (PL566)
  - Inspection
  - Major maintenance - can be done as part of Capital Improvement Program
    - Dredging
    - Trench replacement
    - Removal of low flow ditches
- Routine maintenance
  - mowing
  - Minor sediment removal
  - Structure and embankment repair
### STORMWATER MANAGEMENT PONDS

#### CURRENT INVENTORY

<table>
<thead>
<tr>
<th>Function</th>
<th>Privately Maintained</th>
<th>Publicly Maintained</th>
<th>Total</th>
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<tr>
<td></td>
<td>Dry Pond</td>
<td>Wet Pond</td>
<td>Dry Pond</td>
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<tr>
<td>Detention Only</td>
<td>294</td>
<td>123</td>
<td>651</td>
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<td>Water Quality BMP</td>
<td>238</td>
<td>184</td>
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<tr>
<td>Lakes (PL566)</td>
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<td><strong>Grand Total</strong></td>
<td>532</td>
<td>307</td>
<td>1,353</td>
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*As of March 31, 2016*
Dam Safety and Facility Rehabilitation

Storm water Treatment Systems

Green Infrastructure/LID
- Tracking and reporting
- Inspections
- Maintenance
  - New technology
  - Inexperienced contractors
  - Increased complexity, time and cost
## Dam Safety and Facility Rehabilitation

### STORMWATER MANAGEMENT FACILITIES

#### CURRENT INVENTORY

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Privately Maintained</th>
<th>Publicly Maintained</th>
<th>Total</th>
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<td>1,885</td>
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<td>Wet Pond</td>
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<td>PL566 Dam - Lakes</td>
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<tr>
<td>Infiltration Trench</td>
<td>1,122</td>
<td>44</td>
<td>1,166</td>
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<tr>
<td>Underground Detention</td>
<td>549</td>
<td>82</td>
<td>631</td>
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<tr>
<td>Bioretention</td>
<td>510</td>
<td>95</td>
<td>605</td>
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<tr>
<td>Rooftop Detention</td>
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<td>450</td>
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<tr>
<td>Treebox Filter / Filterra</td>
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<td>150</td>
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<td>Sand Filter</td>
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<td>229</td>
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<tr>
<td>Manufactured BMP</td>
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<td>Permeable Pavement</td>
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<td>49</td>
<td>58</td>
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<tr>
<td>Reforestation</td>
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<td>25</td>
<td>26</td>
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<tr>
<td>Vegetated Swale</td>
<td>22</td>
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<tr>
<td>Vegetated Roof</td>
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<td>7</td>
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<td>Vegetated Filter</td>
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<tr>
<td>Constructed Wetland</td>
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<td>Amended Soil</td>
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<tr>
<td>Forebay</td>
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<td><strong>Grand Total</strong></td>
<td><strong>4,147</strong></td>
<td><strong>1,862</strong></td>
<td><strong>6,009</strong></td>
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*As of March 31, 2016*
Emergency and Flood Response

Emergency Response and Public Safety
Infrastructure Improvements to reduce flooding risks and hazards
Emergency and Flood Response

Emergency Response and Public Safety

Flood response program

- Flood prone areas of the county - both tidal and non tidal
- State regulated dams - monitoring

Preparation

- Flood response staff training annually
- Site specific staff training annually
- Annual exercises and drills
- Establish response teams for the field and the operations center
- Prepare and maintain inundation maps
- Create and maintain monitoring guidelines
  - Weather - national weather service forecasting
  - Tides
  - Rain gauge and pump equipment
- Post storm follow up
Emergency and Flood Response

Infrastructure Improvements

Purchase and Improve flood prone properties
Tear down flood prone properties - maintain meadow or forest
Operations

Public Facilities maintenance and repair
Conveyance systems maintenance and repair
Miscellaneous tasks
Non storm water Functions (these are funded from general fund)
  • Snow removal
  • Sign shop
  • Sidewalk, trail, curb and gutter, asphalt maintenance
  • Bridges
  • Handrails
Operations

Public Facilities Maintenance and repair

Sediment Removal
Tree removal
Mowing
Vegetative control
Regrading
Control structure maintenance including concrete work
Rip rap maintenance
Conveyance Systems maintenance and repair

Pipe repairs
Structure repair
Cave Ins

Clean and repair ditches
Tree removal in stream valleys
Rip rap
Blockage removal

Flusher trucks
Operations

Miscellaneous Tasks

- Drainage Complaint response
- Flood Response
- Support Fire Department in property demolition
- Yard grading
What’s Next?

Program uncertainties moving forward

Chesapeake Bay TMDL-2017 model update

Local TMDL’s

Nutrient removal efficiencies
Rapidly evolving technology

Long Term operation and maintenance costs of “greener” solutions

Nutrient trading opportunities
For additional information, please contact

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