CHAPTER II

STORMWATER PROGRAM ASSESSMENT

A. CHAPTER SUMMARY OF PROGRAM ASSESSMENT

Following this summary are sections which discuss the current types of stormwater services and levels of service provided in Fairfax County. In addition, this assessment compares the levels of service provided by Fairfax County against a benchmark of similar U.S communities as one method to evaluate the need for change in levels of service. Finally, this Chapter will identify the gaps, issues, and needs in stormwater operations and management, that must be undertaken in order for Fairfax County to begin to address the goals and objectives identified in the Strategic Plan, as well as to bring the stormwater system up to acceptable performance in protecting public health and safety.

The first step in assessment of the current program was the review of the role of watershed planning in the County Stormwater Program. In conjunction with the recently completed Stream Protection Strategy report and the Strategic Plan prepared for the stormwater management group, the Watershed Plans were found to provide the critical technical foundation for future capital improvement work. Public participation in these studies provides an opportunity for the County to educate the public about the major stormwater issues in their neighborhoods, while receiving feedback about the types of projects and initiatives they are willing to support. This combination of technical assessment and community involvement is the key to building a program that meets the central mission of the stormwater program "to develop and maintain a comprehensive watershed and infrastructure program that will protect public health and safety and will enhance the quality of life in Fairfax County."

The second step in the assessment was the identification of the current types and levels of services provided in Fairfax County. Section C below gives a detailed overview of the current services provided, organized by functional cost center. By assigning services to one of eight key functional areas, activities and costs were organized so that the overall levels of service could be determined and evaluated against other similar stormwater programs in the benchmarking process (see Appendix I for the full report on Benchmarking). The result of assigning specific tasks and associated costs to each service area (i.e. Operations and Maintenance, Watershed Planning, Engineering, etc) was the development of a stormwater program cost estimate by function. In Fiscal Year (FY) 2004, Fairfax County spent approximately $11.7 million on stormwater related activities, distributed as shown in the following table.

Current Estimated Cost of Operation - 2004

Administration	$	1,072,260
Special Programs	$	179,036
Billing and Finance	$	131,427
Watershed Management - Planning	$	2,164,736
Engineering Design	$	1,341,968
Operations and Maintenance	$	4,024,665
Plan Review and Erosion Control	$	1,045,044
Capital Improvements	$	1,792,962
TOTAL	**$**	**11,752,097**

The third step was to compare Fairfax County to other similar jurisdictions, through a benchmarking survey on other stormwater programs throughout the eastern United States. Eight (8) communities were surveyed through the use of a questionnaire to identify information on stormwater practices, characteristics, levels of service, and funding strategies. Results of this benchmarking exercise showed that the average per capita spending on stormwater for the surveyed communities was $31.99 and ranged from a low of $13.88 to a high of $50.00. For comparison, per capita spending in Fairfax County is $11.78, lower than all communities surveyed.

Finally, as part of the current program assessment, gaps and needs were identified. This work was done in consultation with various Fairfax stormwater staff and considered such issues as the need to continue to meet existing regulatory mandates (National Pollutant Discharge Elimination System (NPDES) permit); to prepare for new requirements (additional TMDL allocations); to minimize backlog of facility retrofits, conveyance system, and capital improvements; to improve execution of work orders in response to citizen complaints; and to increase public outreach and involvement on stormwater issues. The program gaps and needs are listed by function in Section E below.

Key issues identified in this process include:

- Limited capital improvements program.
- Reactive maintenance level of service, with only high risk/high priority needs addressed.
- Continuing degradation of the stormwater conveyance system as the system ages.
- Priority need to continue Watershed Plan initiative to ensure capital improvements focus on needs identified through community input.
- Regulatory compliance with mandatory water quality and dam safety requirements.
- Minimal level of investment in stormwater management on a per capita basis in a dense, urban environment.

B. ROLE OF WATERSHED PLANNING

Planning is a critical component in the overall management and operation of any infrastructure, project, program, or activity. Creating public support and instilling

confidence in the utilization of public resources requires a strategic vision of the desired outcome so that elected officials, staff, and citizens have expectations that are realistic and achievable within the constraints of time and funding. The County has initiated two important components of planning within the Stormwater Program. One is an organization-wide strategic planning initiative which, in 2003, resulted in an Environmental Scan and Strategic Plan for stormwater. The second is the study of all the watersheds in the County, which are scheduled for completion by 2010. These plans (there are 30 watersheds) become the foundational guide to creating an effective strategic vision for the long-term viability of the stream health and infrastructure performance throughout the County. This work is important as a guide to investment of limited funds in capital improvements, ensuring that those resources are wisely utilized to be effective in sustaining performance of the infrastructure. In the past it has been difficult to implement capital improvements due to lack of community support. To address that problem, the new watershed planning studies include increased public involvement to better understand the needs and priorities of the community and to develop capital programs that the community will support. Reinvestment in the system, without the guidance of Watershed Plans and public input, can result in wasteful spending and increased system failure.

Since the early 1990's, several other positive changes have taken place in the County's Stormwater Management Program. As a result of their first NPDES Phase I Permit in 1997, the County began focusing its program on water quality protection, as well as water quantity control. In 1998, the funding of the Stream Protection Strategy (SPS) resulted in the designation of 30 watersheds and establishment of 114 principal monitoring sites spread throughout the watersheds. At these sites, data was gathered on in-stream features, biological diversity, habitat, and flow. The SPS study provided valuable information on the condition of the County's streams and led to the next phase of stream protection, which was to revise the method to assign Resource Protection Area (RPA) status to local water bodies by using perennial flow. After receiving State approval of revised perennial stream protocols, the County surveyed (between 2002 and 2003) the headwater reaches of streams to designate perennial streams upstream of the original RPAs that were established in 1993. As a result, the length of the perennial streams in the County increased from over 600 miles to over 800 miles. These changes were adopted by the Board of Supervisors in 2003 as amendments to the County's Chesapeake Bay Preservation Ordinances.

Now that information has been gathered on the locations and types of problems in the County's stream network, the next step in the County's watershed protection strategy is the development of Watershed Management Plans for all 30 watersheds. The Stormwater Planning Division has been designated to lead the effort to develop watershed management plans for all watersheds, sub-watersheds, and/or groupings of watersheds by 2010. The schedule for the completion of these plans has been made part of the County's Virginia Pollution Discharge Elimination System (VPDES) permit. To date, watershed planning studies are underway in six watersheds including Little Hunting Creek, Popes Head Creek, Difficult Creek, Cub Run, Cameron Run and Bull Run.

A vital step in developing a County-wide comprehensive stormwater program will be the evaluation and prioritization of the water quality protection needs of the community. The Watershed Management Plans are intended to accomplish this by providing a consistent basis for the evaluation and implementation of solutions for protecting and restoring the

health of receiving waters and other natural resources of the County. A key component of reaching this goal is to include an active public involvement program in each watershed planning study. By reaching out to the public, educating them about the issues in their watersheds, and asking for feedback on proposed solutions, the County hopes to develop plans that can be implemented with the full support of the community.

C. SUMMARY OF CURRENT STORMWATER SERVICES

1. ORGANIZATION

a. COUNTY ORGANIZATION

Fairfax County is governed under the Urban County Executive form of government with executive powers vested in an elected Board of Supervisors. The Board consists of nine members elected by district, plus a Chairman, elected at large. The Board of Supervisors establishes County government policy, passes resolutions and ordinances, approves the budget, sets tax rates and fees, and approves land use plans. Board members are elected for four-year terms and there is no limit to the number of terms a member can serve. The next Board election is scheduled for November 2007, with Board members taking office in January 2008.

The Board appoints the County Executive, who is the administrative head of the County government. Among other activities, the Office of the County Executive plays in a key role in:

- Strategic planning for the County
- Fostering partnerships within the community
- Preparing the County's annual budget
- Executing all resolutions and orders of the Board of Supervisors.

The County Executive also oversees the functional departments of the County, including departments responsible for financial services, human resources, economic development, public safety, recreation, information technology, and public works.

b. DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES

The Department of Public Works and Environmental Services (DPWES) is a multi-faceted agency providing the County with a wide range of services including construction of roads and utilities, construction and maintenance of County facilities and infrastructure, and enforcement of state and local codes relating to building planning and construction, land development, transportation, waste management, and other environmental protections. Specifically, DPWES is organized into six primary business areas:

- Capital Facilities (CAP) - which supports the design and construction of libraries, courts, public safety buildings, governmental facilities, and infrastructure improvement projects. Included in this business area are the following subgroups: the Construction Management Division, the Land Acquisition Division, and the Planning and Design Division.

- Facilities Management (FAC) – which is responsible for providing building services for County-owned and leased facilities and for leasing, managing, and disposing of real property. This business line includes the Facilities Management Division.

- Land Development Services (LDS) – which is responsible for ensuring that all development in Fairfax County meets all applicable health, safety and building codes. The are 12 subgroups in this business line including the Office of Building Code Services, the Office of Site Development Services, the Environmental and Facilities Inspections Division, the Code Enforcement Division, and the Permits Division.

- Solid Waste Management (MSW) – which provides solid waste collection, disposal, and recycling services for the County. This business line includes the Division of Solid Waste Collection and Recycling and the Division of Solid Waste Disposal and Resource Recovery.

- Wastewater Management (WWM) – which provides wastewater treatment and collection services for the County. This business line includes the Wastewater Collection Division, the Wastewater Planning and Monitoring Division, and the Wastewater Treatment Division.

- Stormwater Management (STW) – which provides engineering design, project management, contracting, monitoring, and maintenance services for street name signs, storm drainage, flood control, water quality protection, commercial revitalization, roads, and other County infrastructure. This business line includes the Maintenance and Stormwater Management Division and the Stormwater Planning Division.

c. STORMWATER MANAGEMENT DIVISIONS

Management of the majority of the County's stormwater functions lies in two divisions within the Department of Public Works and Environmental Services – the Maintenance and Stormwater Management Division and the Stormwater Planning Division. Supported by other county, regional, and state agencies, these two business units are tasked with "developing, promoting, and implementing strategies that protect the County's stormwater infrastructure and preserve and improve the natural ecosystem". Their mission has three key components:

- To develop and maintain a comprehensive watershed and infrastructure program that will protect public health and safety and will enhance the quality of life in Fairfax County,
- To plan, design, construct, operate, and maintain the infrastructure in compliance with all government regulations, and
- To be responsive and sensitive to the needs of the County's residents, customers, and public partners.

The Maintenance and Stormwater Management Division (MSMD) provides maintenance and rehabilitation on the existing stormwater infrastructure. Maintenance services are provided in an effort to manage the capture and conveyance of stormwater runoff in order to mitigate flooding and improve the water quality of local water bodies. MSMD provides inspection and oversight of public and privately maintained stormwater

management facilities, as required by state and federal water quality permits and provides support during emergency response (mostly flooding) operations.

In fiscal year 2004, MSMD had 100 full-time equivalent (FTE) authorized positions. Of these, approximately 71 were assigned to stormwater-related services and 29 were assigned to other activities including maintenance of park-and-ride facilities, trails and walkways, public street signs, and commercial revitalization. In addition to in-house work forces, the division uses contracted services to meet some of their maintenance requirements, such as dam embankment mowing and some channel and riser cleaning.

The Stormwater Planning Division (SPD) provides stormwater planning, monitoring, capital project design, and floodplain management services. This division is responsible for compliance and reporting related to the National Pollutant Discharge Elimination System (NPDES) stormwater permit. SPD also coordinates state mandated dam safety operation and maintenance certificates, emergency action plans related to flooding, watershed management efforts, stream monitoring and assessments, and public education and outreach initiatives.

In fiscal year 2004, SPD had 27 FTE authorized positions. All positions perform stormwater-related planning and design services. Like MSMD, SPD uses contracted services to help meet their resource demands, specifically in the areas of monitoring and master planning.

2. CURRENT PROGRAM ELEMENTS

The County's stormwater management program consists of dozens of smaller operations that function together to meet the County's stormwater needs. These smaller operations have been divided by functional cost centers to help further identify the many activities within the stormwater program, as well as to help quantify the resources assigned to each function. Table II.1 shows how these functions can be combined into eight (8) functional centers.

Table II-1 – Major Stormwater Management Functional Cost Centers

1. **Administration & Management** General Administration Purchasing HR Functions General Program Planning & Development Budget and Cost Controls Contract Management Legal Services Facilities Management 2. **Special Programs** Public Education/Outreach GIS, Mapping and Database Management Inter-Agency Cooperative Activities 3. **Billing and Finance** Billing Operations	5. **Engineering & Design** Design Criteria, Standards and Guidance BMP Analysis & Design Design, Field and Operations Engineering Hazard Mitigation Dam Safety Program Retrofitting Program Flood Insurance Program Community Rating System 6. **Operations & Maintenance** General Maintenance Management SW Management Facilities Maintenance Conveyance System Maintenance General Remedial Maintenance Emergency Response Maintenance Infrastructure Management

3. **Billing and Finance (cont)** Customer Service Financial Management Capital Outlay 4. **Watershed Management Planning** Watershed Planning BMP Development Comprehensive Monitoring Program Stream Protection and Restoration BMP Programs and Activities Used Oil & Toxic Materials Spill Response and Clean Up Program for Public Education & Reporting Illicit or Cross Connections Illegal Dumping Multi-objective Planning Support Zoning Support Landfills and Other Waste Facilities	**6. Operations and Maintenance (cont)** GASB 34 Field Data Collection (inventory) Public Drainage System Inspection and Regulation Private Facilities Inspection & Regulation Public Assistance/Complaint Response 7. **Plan Review and Erosion Control** General Code Development & Review Stormwater System Inspections – new dev. Regulatory Enforcement General Permit Administration Erosion & Sediment Control Program 8. **Construction Services** Capital Improvements Construction Project Management Inspections Land, Easement, and R-O-W Acquisition

The following section provides an overview by function of the key stormwater program operations in Fairfax County:

a. ADMINISTRATION & MANAGEMENT

- General Administration – DPWES staff perform general administrative functions including purchasing, warehouse management, human resources activities, and budget management.
- General Program Planning & Development - Budget document preparation and staff from each DPWES division performs cost control functions.
- Contract Management – DWPES staff are responsible for administration of vendor contracts for such services as mowing and culvert maintenance and professional services contracts.
- Legal services – The County Attorney office provides advice and support to DPWES on legal issues.

b. SPECIAL PROGRAMS

- Public education and outreach – In the past, public dialogue on the County's stormwater activities was limited to public presentations and sporadic involvement at County events. The County is now taking a more proactive approach by engaging the public through the watershed planning program. The public involvement program for the watershed study work includes: citizen advisory groups, public meetings, assistance with the formation of community watershed groups, and an overall Public Education Campaign with an interactive website aimed at educating the public about their watersheds.
- GIS, mapping and database management – The inventory of stormwater management and storm sewer facilities is documented and tracked through use of the County's mapping system. The documented inventory of storm drainage infrastructure is currently being digitized in a GIS format with planned completion scheduled for 2005.

- Interagency Cooperative activities – DPWES works with numerous other local, regional, and state agencies to promote water quality protection through a wide range of activities. Some specific examples include: working cooperatively with the County Health Department which prepares the annual water quality report and monitors West Nile Virus issues; partnerships with the Northern Virginia Soil and Water Conservation District (NVSWCD) and the Virginia Department of Forestry (VDOF) to perform stream stabilization projects; partnership with the Northern Virginia Regional Commission (NVRC) to develop a regional pollution-prevention outreach strategy; partnerships with the United State Geological Survey (USGS), the Virginia Department of Conservation and Recreation (DCR), and the Virginia Department of Environmental Quality (DEQ) to pursue bacteria source tracking for Accotink Creek as part of a statewide TMDL study and other various on-going cooperative working relationships with the Engineers and Surveyors Institute (ESI), the Northern Virginia Building Industry Association (NVBIA), and the Council of Governments (COG).

c. BILLING & FINANCE

- Capital project financing – The Capital Facilities business area provides financial support to the stormwater program through several of its divisions. This includes processing of invoices and work orders and management of all revenue streams. The Planning and Design Division provides cost estimating services, the Construction Management Division advertises projects, open bids, and recommends contract awards, and the Administrative Support Branch provides purchasing, accounting, and budgeting services.

d. WATERSHED MANAGEMENT PLANNING

- Watershed Planning – The County is in the process of developing Watershed Master Plans for all 30 of its watersheds. Watershed plan development for entire watersheds, sub-watersheds and/or groupings of watersheds is being implemented over an anticipated six-year period. To date studies of the following areas are underway: Little Hunting Creek, Popes Head Creek, Difficult Creek, Cameron Run, Bull Run, and Cub Run. The goal of the watershed plans is to provide an assessment of management needs and prioritized solutions within each watershed so that the County can provide watershed protection in a consistent manner. Citizen input is an important component of the watershed planning effort with the County developing an extensive public involvement campaign to ensure the community has input to the plans.
- BMP Development – The County continues to work with developers and engineers in the area by providing guidance on such issues as low impact design techniques and innovative BMPs to promote land use practices that improve water quality in the County. The County provides design standards and application conditions to assist with appropriate BMP implementation.
- Monitoring – The County is involved in several types of monitoring activities including: continued extensive county-wide water quality monitoring as part of the NPDES program; biological monitoring of bacterial levels, macroinvertebrates, and fish, begun as part of the Stream Protection Strategy surveys; environmental monitoring at specific development projects to evaluate sediment removal efficiencies of planned erosion and sediment controls; and a floatables

monitoring program performed in coordination with the County's Adopt-A-Stream program.

- Stream protection and restoration – The County has partnered with other regional organizations to perform several stream stabilization projects recently with the main purpose to reduce stream erosion and sediment build-up and to protect infrastructure in the Chesapeake Bay watershed.
- BMP programs – The County's stormwater control program has the goal of ensuring the collection, detention, and control of the discharge of sediment and stormwater-related pollutants to local streams. A key requirement of their program is to limit post development runoff to that which does not exceed pre-development runoff rates. This is accomplished by requiring installation and proper maintenance of acceptable Best Management Practices (BMPs) such as: on site detention and regional ponds, ponds incorporating water quality treatment, underground chambers, percolation trenches, and other newer Low Impact Development (LID) techniques, such as rain gardens. The County has recently been sending letters to industry on the selection and use of BMPs. These letters are one of the initial steps in adopting and encouraging the use of better site design and LID techniques for improving water quality in the County.
- Spill prevention and response – The Fire & Rescue Department responds to all reported incidents of hazardous material, spills, and discharges. Their Hazardous Materials & Investigative Services Section (HMIS) investigates hundreds of spills each year. DPWES staff members receive regular training in pollution prevention measures and in proper response procedures for incidences where spills may be exposed to stormwater.
- Watershed public education program - Citizen input is an important component of the watershed planning effort. The County is developing an extensive public involvement campaign to ensure the community has direct input to the plans.
- Illicit connections – The County has a dry weather screening program as part of its NPDES permit. The goal of this program is to detect illicit connections and improper discharges to the local surface waters.
- Planning and zoning support – DPWES enforces the Zoning Ordinance and the Subdivision Ordinance criteria related to stormwater for new development and redevelopment through its plan review process.
- Used oil and toxic materials, illegal dumping – The Fire & Rescue Department's Hazardous Materials Services section acts as an agent of the Director of DPWES to permit and enforce activities related to control of toxic materials, including enforcement of illegal dumping regulations. This includes the investigation of improper disposal of petroleum and toxic materials. Fire & Rescue responded to 278 incidences in 2003 that had the potential to discharge prohibited materials into storm drains or local surface water bodies.
- Landfills and other waste facilities – The Division of Solid Water Disposal and Resource Recovery is responsible for the operations of the County landfills. This includes performance of compliance activities as required by their VPDES General Permits. Solid Waste staff perform quarterly visual inspections at stormwater outfalls and semi-annual sampling of discharge storm water. The Solid Waste Division maintains waste facility test results and inspection reports.

e. ENGINEERING & DESIGN

- Design criteria and standards – The County is working with the Northern Virginia Regional Commission on the revision of the Northern Virginia BMP Handbook.

The handbook revision will provide guidance to developers and engineers so that they can develop acceptable site plans regarding stormwater management. The handbook will include standard calculation methodologies for BMP sizing, as well as expected maintenance efforts of the built BMPs.

- BMP Analysis and Design – The design staff of SPD performs analysis on BMP submittals, contributes to the updating of the design standards handbook, and assists in the preparation of designs for public facilities.
- Design for field operations – The design staff of the SPD is responsible for scope development, design, and project management of storm drainage improvements. Typical projects include stream bank stabilization, flood proofing of dwellings, design for repairs of existing dam embankments, and retrofitting of existing retention and detention ponds.
- Hazard mitigation – As part of the statewide program to minimize hazards from flooding and other natural occurrences, the DPWES works with other County agencies to keep their hazard mitigation plans updated and their staff trained in recommended mitigation activities. SPD staff act as technical consultants to the Hazardous Management group.
- Dam safety program – County staff inspect all PL-566 dam facilities every fall in order to identify any safety or operational items in need of corrective action. In addition, either a contracted engineering firm or in-house professional engineer performs a biennial inspection to check the stability of the dam embankment and the functioning of the water control structures. State operating permits are valid for six-years and must be reissued at the end of each permitting period. The permit re-issuing is tied to the most recent County inspection.
- Retrofitting program – The County annually rehabilitates or retrofits as many stormwater management facilities as funding allows. In 2003, ten (10) County maintained stormwater management ponds were rehabilitated and/or retrofitted.
- Floodplain management – Fairfax County restricts development and disturbance within any floodplain served by a drainage area greater than 360 acres. Together with the zoning restrictions, which limit development within the 100-year floodplain, this program reduces flood risks and protects public safety. Also, as part of the County floodplain management function, Resource Protection Areas (RPAs), determined by field investigations, are evaluated for technical correctness.
- Community rating system – Under this program, the Federal Emergency Management Agency (FEMA) reviews and assesses the County's floodplain program and assigns scores, which are then used to determine the National Flood Insurance Rates throughout the County. The County then advises owners of property or structures located within floodplains of their Federal insurance obligations and ensures that all structures within FEMA flood zones are insured.

f. OPERATIONS AND MAINTENANCE

- Stormwater management facilities maintenance – The County is responsible for mowing of earthen dams approximately once per year. They also identify physical problems and remove blockages and debris. In 2003, maintenance work orders were required on more than 20% of the over 1,000 facilities
- Conveyance system maintenance – The County maintains approximately 1400 miles of storm sewer and 800 miles of streams. The storm drainage conveyance system is scheduled to be inspected once every 5 years. It is the responsibility

of the County to identify problems and to remove major blockages in the drainage system, to repair safety hazards, and to repair damaged structures.

- Emergency response – DPWES staff often respond to emergencies involving flooding and hazardous chemical spills. Staff assist with blockage removals, sand-bagging, and spill containment.
- Government Accounting Standards Board – Statement 34 (GASB 34) – This is a mandated program which requires the County to report the current value of all capital assets, including its storm sewer and stormwater management inventories. Currently, the County has inventoried all ponds and water control structures and is about half done with the remaining inventory of pipes and drainage systems.
- Field data collection (inventory) – The County annually field verifies and inspects at least one-fifth of its storm drainage system in compliance with its NPDES permit.
- There over 1,100 public stormwater management facilities maintained by the County. These public stormwater facilities are inspected once per year.
- Private stormwater management facilities inspection – The County conducts inspections of wet ponds and dry ponds located within commercial, and some residential, developments, along with inspections of certain underground chambers and percolation trenches. They also conduct inspections and enforcement of maintenance agreement terms for privately maintained facilities. In compliance with the County's NPDES permit, each facility is inspected at least once every five (5) years in order to ensure these facilities are maintained and operated consistent with industry standards. The current inventory includes over 2,200 privately maintained facilities.
- Public assistance and complaint response – The County received about 1,600 drainage complaints in 2003. When a call comes in, it is screened to determine whether it is an emergency or non-emergency. Assuming a non-emergency, it is logged, entered into the database, and assigned to a technician to research and respond. The goal is to schedule a meeting with the complainant within one (1) business day and to write a work order, if necessary, within five (5) business days. Due to limited resources, the average time to perform the work order on high priority activities is often 25-30 days. A low priority (category 3) may take up to six months. During emergency situations, complaints are handled by senior supervisors and prioritized and responded to as quickly as possible.

g. PLAN REVIEW AND EROSION CONTROL

- General code development and review – The DPWES works with other County and regional agencies to review and update codes and ordinances related to stormwater management. This includes Zoning and Subdivision Ordinances, the Chesapeake Bay Preservation Ordinance, building and dam safety codes, erosion and sediment control initiatives, and BMP design and development requirements.
- Inspections of stormwater systems for new development - DPWES enforces the Zoning Ordinance and the Subdivision Ordinance criteria related to stormwater for new development and redevelopment through its plan review and inspection process.
- Regulatory enforcement – The County enforces compliance with the Chesapeake Bay Preservation Ordinance through the development review and inspection process and enforces compliance with the NPDES program through ordinances, training, public information and plan review.

- There are 17 stream segments that drain portions of Fairfax County that are on Virginia's 2002 "impaired waters" list for violating State water quality standards. Under the federal Clean Water Act, TMDLs (Total Maximum Daily Loads) must be developed to determine the sources of the impairment and to allocate needed reductions. Fecal coliform bacteria TMDLs have already been developed for Accotink Creek and Four Mile Run, with the remaining TMDLs scheduled to be developed between 2006 and 2014. It is likely that additional stream segments will be added to the impaired waters list when DEQ performs its biannual update in 2004.
- General permit administration – The County tracks compliance with their regulatory permits, prepares new and revised applications, and prepares annual reports, as required for the NPDES stormwater permit.
- Erosion and sediment control – The Environmental and Facilities Inspections Division (EFID) of DPWES performs plan reviews and E&S inspections on construction sites in Fairfax County. In 2003, there were 328 Erosion and Sediment Control Plans submitted and approved by the County.

h. CONSTRUCTION SERVICES

- Capital improvements – The majority of stormwater capital improvement work on-going in the County is related to the regional pond program and to major stormwater drainage improvements and is funded partially through the Pro Rata Share Program. Over the past few years, between $1.5 and $3 million has been spent annually on stormwater capital improvements. Staff estimates the capital reinvestment need is between $340 million and $800 million to address system performance and long-term structural integrity of the drainage system.
- Construction project management – County staff manage the scoping, engineering design, and construction oversight of their capital improvement projects.
- Land, easement, and right-of-way acquisition – Land acquisition and easements for stormwater capital projects are handled on a case-by-case basis by the Land Acquisition Division of DPWES.

3. CURRENT ESTIMATED COST OF SERVICES – FY '04

The following table (Table II-2) summarizes the approximate dollars and full time equivalent (FTE) staff time currently being dedicated to each element of the stormwater Program in Fairfax County. A more detailed breakdown of these costs is included in Appendix II. Table II-3 presents the same current cost information by budgetary category.

Table II-2 Current Stormwater Management Costs by Function

Functional Cost Center	Estimated Costs	Personnel FTE
Administration	$ 1,072,260	12.00
Special Programs	$ 179,036	3.50
Billing and Finance	$ 131,427	2.50
Watershed Management - Planning	$ 2,164,736	11.00
Engineering Design	$ 1,341,968	12.80
Operations and Maintenance	$ 4,024,665	57.23
Plan Review and Erosion Control	$ 1,045,044	12.00
Capital Improvements	$ 1,792,962	4.10
TOTAL	**$ 11,752,097**	**115.13**

Table II-3 Current Stormwater Costs by Budget Category

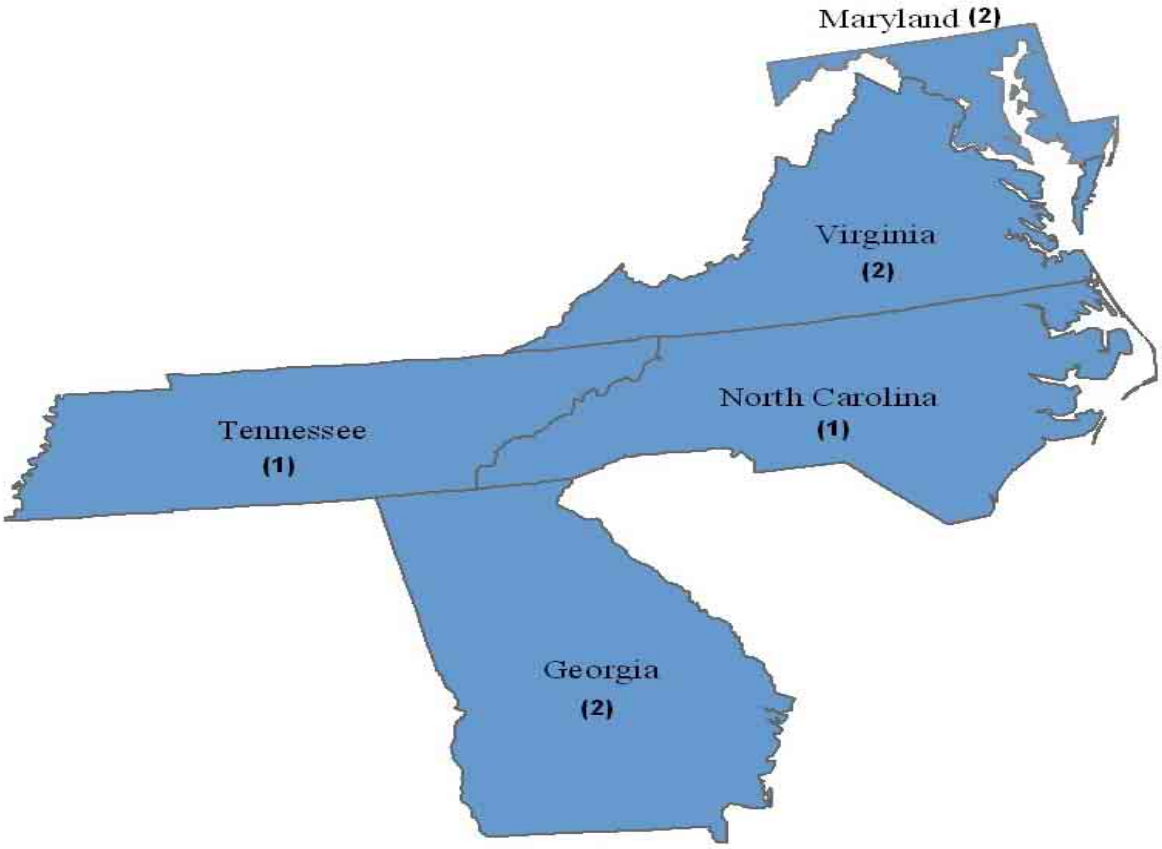
Major Expenditure Categories	Estimated Costs	% of total
Labor Costs with Benefits	$ 6,431,659	54.70
Operating Expenses	$ 895,245	7.60
Contracted Services	$ 225,000	1.90
Capital Equipment	$ 210,000	1.80
Capital Outlay	$ 3,990,193	34.00
TOTAL	**$ 11,752,097**	**100**

D. BENCHMARKING TO OTHER COMMUNITIES

1. INTRODUCTION

The purpose of the stormwater management program benchmarking analysis was to gain a better understanding of the current state of the Fairfax County Stormwater Management Program and how Fairfax's program may compare to other major urbanized communities from around the mid-Atlantic region and the eastern United States. The study examined a group of localities from the eastern United States, with a concentration on the mid-Atlantic and southeastern United States, that, in the estimation of the County staff, are reasonably representative of the conditions found in Fairfax County and will provide a defensible measuring stick against which to benchmark the County's stormwater services. The list of communities examined can be found in Appendix I. The geographic breakdown of the study area is shown graphically on the following page.

Figure II-1 Distribution of Benchmarked Communities



The participating communities each completed a benchmarking questionnaire that sought to measure a number of different stormwater management practices, characteristics, policies, procedures, and funding strategies. The benchmarking questionnaire used for this study can be reviewed in Appendix I. Each community was contacted directly and the survey forwarded to the respondent for review. Each respondent was then contacted again by phone to review answers and to clarify any questions or provide further comment on the respondent's answers.

2. SUMMARY OF DATA

In order to organize the results, the questions included in this survey have been cataloged into four broad categories:

- Basic Data: including demographic, topographic, hydrologic, and land use characteristics;
- Program Data: including a number of topics related to services provided by the communities examined, including regulatory programming, operational services, planning, and capital improvement programming;
- Physical System Data: including information on whether they provide services on private, as well as public facilities, as well as information on some of the physical characteristics of that system; and

- Budget and Funding Data: including community budget allocations for stormwater services as well as community funding approaches for those services.

Examination of these benchmarks will provide Fairfax County with a tool to measure its own programs' level of service and to highlight potential programming decision points that may lead to policy and programming adjustments. A summary of the results of the surveyed data from each of these categories follows below.

a. BASIC DATA

An examination of the basic data gathered for the survey notes that the populations serviced by their stormwater programs ranged from roughly 230,000 to 826,000 in population (based on 2002 population numbers), and the vast majority include urbanized counties with significant unincorporated areas for which the Counties surveyed provide some level of stormwater management services. In comparison, Fairfax County is a large urbanized County with a population of roughly 1 million that provides stormwater services to the majority of the County's area, including all unincorporated areas.

The service area coverage of the surveyed communities ranged anywhere from approximately 281 square miles to 497 square miles. The service area of Fairfax County falls within this range at approximately 378 square miles (this is minus Herndon and Vienna). However, in terms of density (population per square mile of service area) the range of surveyed communities is between 636 people per square mile to over 1940 per square mile. Fairfax is more densely populated than any of the surveyed communities with over 2,600 people per square mile. In addition, all of the communities surveyed noted land features or topographic characteristics similar to those of Fairfax County, including "piedmont," "coastal," and "riverine" topography and land features. Also, as the communities surveyed were all east of the Mississippi River, annual rainfall characteristics proved relatively similar. Annual precipitation for the studied communities ranged between 43.1 and 54 inches per year. Fairfax County averages approximately 44 inches per year.

Land use patterns were very diverse among the surveyed communities with residential properties accounting for anywhere from 20% to 58% of total land use. Approximately 51% of Fairfax County land area is dedicated to residential use.

b. PROGRAM DATA

Each of the jurisdictions surveyed provide some level of stormwater planning, maintenance, regulatory compliance and capital improvement services to their citizenry. The following table identifies the number of respondents that stated that they provide the specific type of service listed as part of their stormwater management program:

Table II-4 Types of Services Provided

Services	No. of Respondents Providing This Type of Service	Notes	Fairfax County Provides this Service
Watershed Planning	*5*	*6 of 8 responded*	*Yes*
Water Quality Monitoring	*7*	*7 of 8 responded*	*Yes*
Inspection of Public Facilities	*7*	*7 of 8 responded*	*Yes*
Inspection of Private Facilities	*2*	*7 of 8 responded*	*Yes*
Maintenance of Public Drainage System	*5*	*6 of 8 responded*	*Yes*
Maintenance of Public Facilities	*7*	*7 of 8 responded*	*Yes*
Maintenance of Private Facilities	*1*	*7 of 8 responded*	*No*
NPDES Compliance	*7*	*7 of 8 responded*	*Yes*
GIS-Based Physical Assets Inventory	*7*	*7 of 8 responded, 1 noted they are partially responsible for this service*	*Yes*
Erosion & Sediment Control	*8*	*8 of 8 responded*	*Yes*
Floodplain Management	*8*	*8 of 8 responded*	*Yes*
Public Education Program	*6*	*6 of 8 responded*	*Yes*
TMDL Program	*4*	*5 of 8 responded*	*Yes*
Development Plan Review	*7*	*7 of 8 responded*	*Yes*
GASB 34 Valuation	*5*	*6 of 8 responded, 1 noted they are partially responsible for this service; 1 ongoing*	*Yes*
Capital Project Management	*7*	*8 of 8 responded*	*Yes*
Capital Project Design	*7*	*8 of 8 responded*	*Yes*
Capital Project Inspection	*6*	*6 of 7 responded*	*Yes*
Dam Safety Program	*4*	*7 of 8 responded*	*Yes*

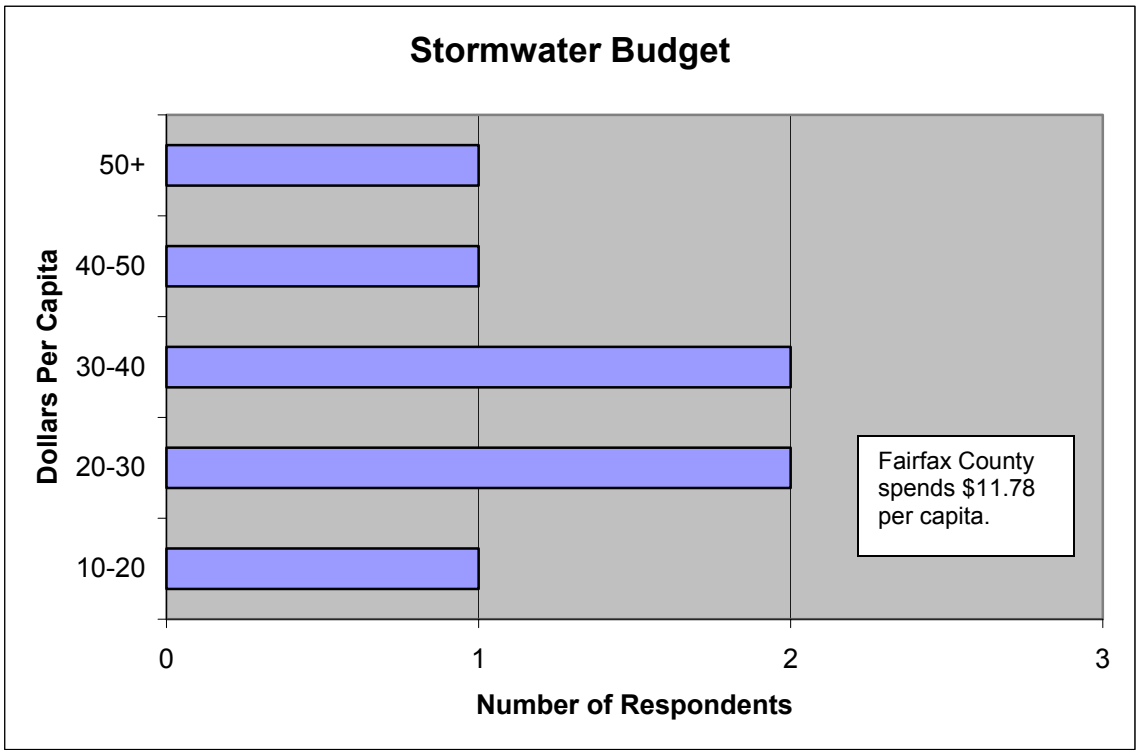
c. PHYSICAL SYSTEM DATA

Each of the jurisdictions polled for this survey manage a unique physical stormwater management system. Some deal with more closed pipe systems, others with more open channels and ditch systems, usually depending on topography and historical land development patterns. Summaries of information on the various physical components for each community are included in Appendix I.

d. FUNDING AND BUDGET DATA

The level of service provided for physical infrastructure maintenance, stormwater management planning, regulatory compliance, and capital construction and improvement programs in each of the surveyed jurisdictions can be traced directly to the amount each community budgets for stormwater-related service and the availability of funding to provide those budgeted dollars.

An examination of the stormwater data gathered for the survey shows that the total annual budgets for these various stormwater programs range from roughly $4 million to $35 million (based on 2004 budgets). In comparison, Fairfax County's 2004 costs for stormwater services totaled about $11.7 million. Using a per capita dollar measurement, the surveyed communities' stormwater budgets ranged from $13.88 per capita to $50.00 per capita. Fairfax County is currently spending about $11.78 per capita on stormwater services. The following graph shows the number of survey respondents and their per capita range.



In order to identify what the surveyed communities' level of service was for the key elements of their programs, budgets were broken down and assigned to five (5) program elements – Engineering & Planning, Regulatory Compliance, Operations & Maintenance, Capital Improvements and Other (includes such elements as emergency response, customer service, debt service, etc). The following table estimates the percentage that each of the surveyed communities budgeted to these program elements in 2004.

Table II-5 Percentage of Total Budget Allocated to Each Element by Community

Program Element	1	2	3	4	5	6	7	8	Fairfax
Engineering & Planning	7.4	30	No data	30.5	11.2	32.6	2	41.4	30
Regulatory Compliance	1.1	30	No data	8	5.6	31.4	3	8.6	8.5
Operation & Maintenance	37.7	29	No data	34.4	65.4	22	48	50	34.2
Capital Improvements	36	11	No data	26.7	14	0	24	0	15.4
Other	17.8	0	No data	7.6	3.8	14	23	0	11.9

Additional information on budgets and funding sources on benchmark communities can be found in Appendix I.

E. GAPS, ISSUES, AND NEEDS

1. ORGANIZING THE PROBLEMS, NEEDS, AND ISSUES

Using the same general functional organization for the Fairfax County stormwater program as shown on Table II-1, the program has been divided into eight (8) functional areas for organizing the identified gaps and issues in the current stormwater program.

In evaluating the current program, identifying opportunities for improvement, and documenting problems, needs and issues, some will naturally fall under one of the functional service categories. For example, a drainage system inspection falls under the functional category of "Operations and Maintenance". Many of the problems, needs and issues discussed can be placed under individual headings while others might be divided among two or more categories.

2. KEY STORMWATER PROGRAM ISSUES

a. ADMINSTRATION & MANAGEMENT

- Currently, professional contracts, for such services as watershed studies and pond design, are managed by engineering staff, creating inefficient use of these technical resources. To help consolidate and streamline the management process, an administrative contract manager, assigned tasks related to contract negotiation, invoice review, contract compliance, etc. will relieve other staff, providing increased attention to project management and will consolidate administrative function of contract oversight, providing consistent management of the process.
- More efficient tracking and reporting would help alleviate some of the effort required to prepare budgets and track costs. This effort can be tied to an

improved database management system identified under “Special Programs” below.

- The existing work order system requires repeated handling of information and inefficient tracking. A new, more robust work order system, integrated into the GIS/inventory system and emergency response systems, would increase efficiency and allow better tracking and evaluation of services and needs. This system will be most useful when fully integrated into GIS, allowing for access by planners, operational manager, program managers, and key leadership. It can be effective in dispatching crews during emergency conditions, in analysis of system conditions by providing assessment on potential system failures, and in allowing a more proactive approach to system management.

b. SPECIAL PROGRAMS

- The County is actively pursuing citizen input on their Watershed Planning work, but there needs to be a more comprehensive stormwater education program in Fairfax. (See Chapter VI - Communication Plan Summary for additional information). Helping the community understand the “cause and effect” of behaviors in their control, the need for preventative maintenance, and the methods to communicate with technical staff (i.e., through a focused website) are important goals of an enhanced communications program.
- The inventory of stormwater facilities is being well documented through inspections and integration into the GIS system, however the update to the SPS study on physical stream assessments (physically walking and inspecting the streams) is not being done due to competing priorities. The stream assessments need to be updated and documented in a similar fashion. Both datasets must be maintained to ensure that the initial investment is not lost and that the data remains useful and effective in management of the drainage and stormwater systems.
- Potential opportunities exist to expand cooperative agreements in support of encouraging proper operation and maintenance of BMPs. Setting up a grant or cost-share program to support retrofits of existing private stormwater facilities and to encourage installation of innovative BMPs will assist property owners with potentially costly repairs, while improving overall system performance.

c. BILLING & FINANCE

- An enhanced stormwater program will require professional financial management to ensure funds and expenditures are tracked and reported completely and accurately.

d. WATERSHED MANAGEMENT PLANNING

- The County continues to undertake its watershed plan development with six (6) watersheds underway and three (3) more scheduled to get underway in FY ’05. The goal is to have all the studies completed by 2010. The recommendations from these initial studies are now available and resources must be set aside to start addressing the priority projects in each area. The workload required to manage these studies, maintain useful models and databases and to begin capital improvements implementation, while meeting this schedule, requires additional resources. Planning is a critical foundation to long-term performance of the drainage and stormwater management system. The County is committed to investing resources to ensure that the correct strategies, valued by the community,

are put in place to provide a sustainable quality of life. These Plans must be managed, updated and implemented on a consistent basis. Resources to ensure that the current investment is not lost or eroded are important for the future management of the overall system.

- The County has several long-term planning activities underway including Watershed Plans, source tracking for TMDL identification, Chesapeake Bay 2000 commitments, NPDES five (5) year compliance schedule, BMP effectiveness, model updates, and system monitoring programs. These activities generate significant datasets that can be more valuable when integrated. This data needs to be coordinated through one entity to ensure integration and consistency with program goals and sufficient resources need to be ear-marked to meet schedules and regulatory commitments. A database system that is GIS-linked, menu-driven, allowing for easy search and analysis will enhance the functionality of the individual dataset and allow ease of tracking, reporting, monitoring, etc.
- Erosion and degraded streams have been identified as major problems in the County as addressed in the Stream Physical Assessment and Stream Protection Strategy Reports. The County goal is to continue monitoring selected streams, require enhanced stormwater controls, and identify and implement stream restoration projects. Enhancement in funding is needed to keep ahead of the issue of stream degradation. Monitoring of stream health and stream conditions is an important component of system planning and should be continued with increased resources.
- Additional flow and stream condition monitoring would help assess water quantity and stream flow issues. Increased placement of stream gauges to provide automated data at dams would help identify problem areas. This supports planning and general maintenance efforts, contributing to a more effective analysis on potential system failures.
- The workload demand to keep up with new BMP designs, Low Impact Development (LID) techniques, and other innovative approaches has resulted in a backlog of work related to providing updated design standards, guidance on appropriate implementation, and assessment of efficiencies of these various techniques. A short-term increase in resources in this area would allow backlog to be handled and would provide more timely guidance to the development community.
- Review of rezoning for compliance with Zoning and Subdivision ordinances requires a significant amount of DWPES staff time. In order to keep up with the demand and respond to the applicants in a timely manner, additional resources are needed.

e. ENGINEERING AND DESIGN

- Existing Stormwater System - Basically all maintenance resources go to immediate (public safety) problems, leaving little support for needed retrofits. Older ponds or those with potential dam embankment problems get first priority, as appropriate. There is also no infrastructure replacement program in place to proactively address an aging storm drainage conveyance and stormwater management facility system. Taking care of high risk sites is a reactive approach to managing the total storm drainage and stormwater management system. In a proactive program, minor problems can be addressed before they expand to high risk failures or potential failures. As the infrastructure continues to age, more major rehabilitation of the total system will be needed. Additional resources are

needed to keep up with the design, construction, and oversight of these rehabilitation projects.

- The County currently administers a dam safety program for a number of PL-566 dams in the Pohick Creek Watershed and another 10 regional detention facilities were recently added to the list. A program is being developed to ensure compliance with the State's Dam Safety Regulations, but Fairfax doesn't yet have a complete count of the number of facilities that will ultimately fall under this program. Resources are needed to compile a complete inventory and assessment and then to perform appropriate repairs or upgrades.
- In addition to the need for facility retrofits and conveyance system rehabilitation, the County has a large backlog of new capital projects and area retrofits with an estimated dollar value between $340 million (known backlog) and $800 million (estimated county-wide need). This estimate will be refined as additional Watershed Plans are completed over the next 6 years. For the past several fiscal years the County budgeted about $2 to $3M a year on capital improvements, which is not keeping up with demands to address known problems. In order to address major stormwater improvements that are known problems and to implement the capital needs identified in the Watershed Plans, the County will need to increase capital funds and add staff to manage this increase in capital work.

e. OPERATIONS & MAINTENANCE

- The County is doing the inspections of private stormwater management facilities, but has limited enforcement authority to force maintenance of these systems. Existing agreements have general maintenance standards but do not specific performance requirements. Also, a significant amount of these facilities have no maintenance agreements in place. Decisions need to be made on ways to increase enforcement capabilities to ensure that maintenance occurs.
- The current level of service is to inspect each segment of the public drainage system every 5 years. Much of the system is reaching the end of its design life, requiring an increase in frequency of inspection. Increasing inspections to at least once every three years will prevent some failures and will maintain functional facilities. As new regulations include innovative BMPs and LIDs, additional demand for inspections will occur, increasing the existing workload of inspectors, requiring additional resources to keep up with the workload.
- On the public stormwater management system, work orders were required on more than 20% of over 1,000 facilities in 2003. This only included work of a critical nature and did not necessarily bring facility functionality back up to design standards. The performance goal is to ensure that each facility functions properly as designed and causes zero erosion. This standard is not being fully met. In order to accomplish this goal, additional resources are needed.
- There is no maintenance program for stream "spot" improvements and erosion control. Work in streams is limited to removing blockages that cause house and roadway flooding. A stream maintenance program is needed to address the smaller severe erosion problems and "spot" stream improvements to minimize property damage caused by stream erosion and widening.
- Mowing and channel cleaning of the public facilities is now limited, due to resource restrictions, to once per year. This is not considered sufficient to properly maintain the areas and the frequency should be increased to at least twice per year as a consistent performance standard for the level of service for mowing and cleaning.

- As additional dams are added to the list of facilities requiring County inspection and maintenance, additional resources are needed for mowing, vegetative control, rehabilitation, and inspection. It is estimated that each facility requires an annual maintenance cost of $15,000. This service is contracted to the private sector. Additional staff time should be dedicated to managing this program to ensure that contractor performance is effective.
- MSMD now has over 1400 miles of storm sewer and 800 miles of stream to maintain. 20% of the storm system is inspected yearly. Much of the existing storm system is approaching 50 years old and is in need of rehabilitation and increased impervious area in the County is resulting in increased stream erosion. In order to keep up with these problems, increasing the frequency of inspections and significant investment in maintaining the existing system is required. Also, increased video monitoring of the system would improve assessing and tracking maintenance needs.
- Initial response to citizen's complaints is good, but work order completion is taking longer than desired. With over 1,600 documented complaints per year, those issues that are maintenance in nature (blockages) and/or are safety issues (cave-ins or broken manhole covers) are dealt with swiftly (usually within 25 days), but those that require development of storm drainage improvements take much longer to address. There is a substantial backlog of Priority 2 and 3 repairs that can take as long as six months to complete when the issue can be addressed. For many, work is never undertaken to address the problem. Additional resources are needed to deal with this backlog. This will be supported through an enhanced work-order and database management system described under the functional categories of Special Programs and Administration. These tools will enable the County to be more effective in supporting the reduction of this backlog. However, only an increase in funding for remedial and capital improvements will create a proactive management approach to system maintenance.
- The County uses data from the GIS system to provide GASB 34 information, but there does not appear to be a process to add and track new development information on structures and conveyance system. Adding this information to a new tracking system, as identified above, would improve information access and help with the valuation of assets.

f. PLAN REVIEW AND EROSION CONTROL

- Under the federal Clean Water Act, TMDLs (Total Maximum Daily Loads) must be developed to determine the sources of stream impairment and to allocate needed reductions. Fecal coliform bacteria TMDLs have already been developed for Accotink Creek and Four Mile Run, with the remaining TMDLs scheduled to be developed between 2006 and 2014. It is likely that additional stream segments will be added to the impaired waters list when DEQ performs its biannual update in 2004. While the actual TMDLs will be developed by DEQ in cooperation with the County, subsequent TMDL Implementation Plans will require specific actions by the County. While most County stream impairments are currently caused by violations of fecal coliform standards, at least three watersheds (Mills Branch, Popes Head Creek, and Accotink Creek) are on the impaired waters list because of impaired aquatic ecosystems – which can have multiple causes (sediment, temperature, turbidity, toxics, etc.). It is anticipated that significant additional demands will be placed on County staff as more TMDLs and TMDL Implementation Plans are developed and integrated into the County's VPDES permit.

- The draft Shenandoah and Potomac Basins Tributary Strategy, released in April 2004 to implement the nutrient and sediment reduction goals of the 2000 Chesapeake Bay Agreement, relies heavily on urban BMPs. In the Potomac basin alone, the draft Tributary Strategy includes 187,000 acres of urban nutrient management and 71,000 acres of urban retrofit with bioretention facilities, swales, and other innovative BMP practices. These urban BMPs are expected to cost $240 million through 2010. While the Tributary Strategy is technically voluntary, failure to meet target nutrient and sediment reductions has the potential to result in the imposition of a Chesapeake Bay-wide TMDL. This would effectively supplant the voluntary Chesapeake Bay Program and make implementation mandatory through the County's VPDES permit.
- To ensure local erosion control is meeting County standards, a more robust system is required. Additional resources are needed to meet the challenge of minimizing increased sediment and erosion concerns.
- The County has stormwater regulations but does not have a Stormwater Ordinance. Development of such an ordinance would allow standardized enforcement authorities and other stormwater related activities. The need for such an ordinance should be evaluated at the same time that the funding option is being considered, as a decision to go to a stormwater utility would result in the need for a rate ordinance. This is an opportunity to combine an ordinance for stormwater management with a funding/rate ordinance, which is often done when a utility is established.

g. CONSTRUCTION SERVICES

- Managing an enhanced approved capital program will require professional staff following a streamlined implementation process. Additional resources identified under Watershed Planning (above) are necessary to ensure that an effective capital reinvestment strategy can be accomplished in a timely manner. This is critically important to ensure that public confidence is sustained for the operation of the stormwater program.
- As the County starts to increase spending on capital improvements over the next few years, additional construction inspection staff will be required to ensure that projects are kept on schedule and built according to plans and specifications.