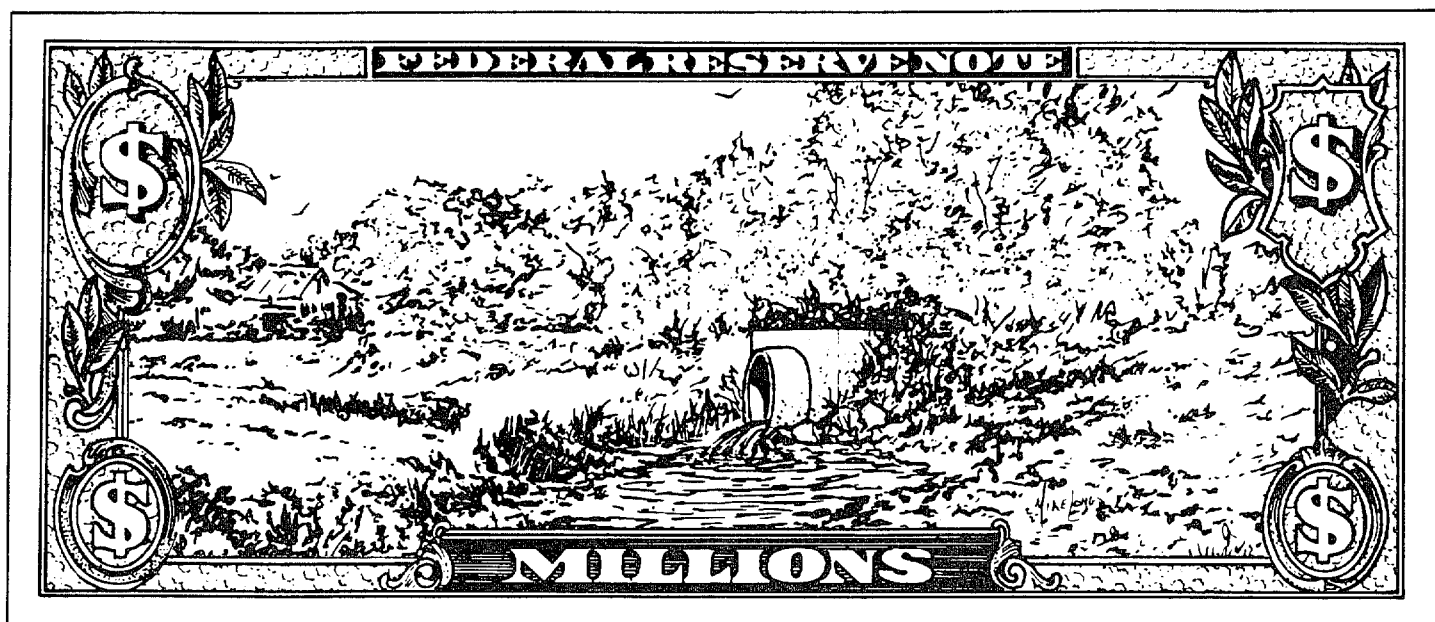


# STORMWATER MANAGEMENT FINANCING STRATEGY FOR HAMPTON ROADS VIRGINIA



PREPARED BY  
HAMPTON ROADS PLANNING DISTRICT COMMISSION

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1991

FEBRUARY 1991

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**STORMWATER MANAGEMENT FINANCING STRATEGY**

**FOR**

**HAMPTON ROADS VIRGINIA**

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## TABLE OF CONTENTS

LIST OF TABLES .....	ii
LIST OF FIGURES .....	ii
EXECUTIVE SUMMARY .....	iii
INTRODUCTION .....	1
CURRENT STORMWATER MANAGEMENT ACTIVITIES IN HAMPTON ROADS .....	3
Drainage and Erosion and Sedimentation Control Programs .....	3
Nonpoint Source Pollution Control Programs .....	3
OVERVIEW AND FINANCIAL IMPLICATIONS OF RECENT STATE AND FEDERAL STORMWATER MANAGEMENT PROGRAMS .....	5
The Chesapeake Bay Preservation Act .....	5
State Stormwater Management Regulations .....	10
EPA NPDES Stormwater Permitting Regulations .....	11
SURVEY OF LOCAL STORMWATER MANAGEMENT FINANCING NEEDS .....	16
Local Stormwater Management Organization and Functions .....	16
Local Stormwater Management Financing Needs .....	17
OPTIONS FOR MEETING STORMWATER MANAGEMENT FINANCING NEEDS .....	23
Non-proportionate Funding Alternatives .....	23
Proportionate Funding Alternatives .....	32
RECOMMENDED STORMWATER MANAGEMENT FINANCING STRATEGY .....	40
IMPLEMENTATION OF A STORMWATER UTILITY .....	42
General Procedure for Development and Implementation .....	42
Establishing a Rate Structure .....	43
Billing .....	45
Administration .....	46
Implementation Costs .....	47
Public Acceptance .....	47
Regional Implementation .....	48
REVENUE POTENTIAL OF STORMWATER UTILITIES .....	49
STORMWATER UTILITY ORDINANCE .....	51
Model Ordinance .....	51
CONCLUSION .....	61
END NOTES .....	63
BIBLIOGRAPHY .....	65
APPENDICES	
A HRPDC STORMWATER MANAGEMENT FINANCING SURVEY .....	69
B U.S. COMMUNITIES WITH STORMWATER UTILITIES .....	81

**LIST OF TABLES**

1	Comparison of State and Federal Stormwater Management Regulations .....	6
2	Estimated FY 1991 CBPA Implementation Costs for Hampton Roads Planning District Localities .....	9
3	Summary of Local Stormwater Management Activities .....	19
4	Current and Projected Stormwater Management Financing Needs Compared to Budget Allocations .....	21
5	Funding Alternatives for Stormwater Management .....	24
6	Utility Charges and Revenues .....	50

**LIST OF FIGURES**

1	Stormwater Management Needs and Actual Budget Allocations for Selected Localities .....	22
2	Stormwater Utility Rate Structure .....	44

## EXECUTIVE SUMMARY

In recent years, there has been increasing concern for the water quality impacts associated with urban runoff. As a result, a variety of state and federal programs promoting the incorporation of nonpoint source pollution (NPS) control into local stormwater management activities have been developed. Programs having the greatest potential for impact on local governments include the Chesapeake Bay Preservation Act, the State Stormwater Management regulations and the EPA stormwater discharge permitting regulations. Although these programs represent considerable progress in achieving water quality management objectives, securing the funds necessary for local compliance poses a major challenge for local governments.

State and federal NPS pollution control mandates are proving to be costly and have come at a time when Hampton Roads localities are facing difficult economic times. Local budget deficits, cuts in federal and state funding, and declining tax revenues make it unlikely that localities can fund these mandates while continuing to address ongoing stormwater management needs.

In light of increasing costs and decreasing availability of funds for stormwater management, this study documents current and projected stormwater management funding needs and recommends financing strategies which could assist local governments in meeting those needs.

### CURRENT STORMWATER MANAGEMENT ACTIVITIES IN HAMPTON ROADS

All communities in the Hampton Roads Planning District have long been involved in the management of stormwater to prevent flooding, and to control erosion and sedimentation resulting from development activities. In recent years, local governments have implemented programs which address the water quality impacts of urban runoff.

Hampton Roads communities within the Chesapeake Bay watershed have recently adopted programs implementing the 1988 Chesapeake Bay Preservation Act (CBPA). State regulations developed to implement the CBPA require local governments to designate Preservation Areas and to incorporate site-specific stormwater management performance criteria into their land use controls to meet specific NPS control objectives.

Several localities have implemented or are developing stormwater management ordinances which establish site-specific performance standards for the control of both the quantity and quality of runoff from new development. These ordinances serve to supplement local CBPA programs by requiring additional stormwater quantity controls in Preservation Areas, and ensuring that both quantity and quality controls are implemented outside of Preservation Areas. The State has



recently finalized regulations which establish minimum acceptable criteria for such ordinances.

Some localities have adopted ordinances to control NPS pollution in watersheds surrounding public water supply reservoirs. These ordinances typically require the implementation of stormwater Best Management Practices (BMPs), shoreline buffers and stormwater diversion projects to prevent NPS pollutants from reaching reservoirs.

## OVERVIEW AND FINANCIAL IMPLICATIONS OF RECENT STATE AND FEDERAL STORMWATER MANAGEMENT REGULATIONS

### The Chesapeake Bay Preservation Act

The goal of the Chesapeake Bay Preservation Act is to maintain or restore water quality in the Bay and its tributaries through the identification and protection of Preservation Areas. To meet this goal, local governments are required to implement stormwater management performance criteria within Preservation Areas.

Direct costs to localities to implement the stormwater management provisions vary significantly depending on the size of a locality, the proportion of a locality designated as a Preservation Area, the nature and volume of development activity, and the amount of State funding assistance provided. In October, 1990, the HRPDC conducted a survey of its member jurisdictions to determine local costs associated with implementing various State mandates, including the CBPA. It was found that the cost of implementing all aspects of a local CBPA program will average slightly more than \$84,000 per locality during Fiscal Year 1991.

### State Stormwater Management Regulations

Under the 1989 Stormwater Management Act, localities may establish, by ordinance, stormwater management programs which require submission and approval of stormwater management plans prior to undertaking any non-exempt development activities. State regulations establishing minimum acceptable technical criteria and administrative procedures for these programs became effective on December 5, 1990.

To date, there has been no attempt to estimate the costs associated with the development and administration of local stormwater management programs that meet the State regulations. It is expected that program administration costs will greatly exceed ordinance development costs. Administration costs include such activities as plan review, site inspection, maintenance, enforcement, staff training and public education. The ongoing implementation costs of Virginia Beach's existing stormwater management ordinance are estimated to be \$117,000 per year over the next decade.

## EPA NPDES Stormwater Permitting Regulations

To implement Section 405 of the 1987 Water Quality Act (WQA), the Environmental Protection Agency has developed regulations requiring National Pollutant Discharge Elimination System (NPDES) permits for industrial and municipal stormwater discharges. Final regulations were issued on November 16, 1990.

As required by the WQA, the EPA regulations address five categories of stormwater discharges:

- discharges already permitted prior to the 1987 WQA;
- discharges associated with industrial activities;
- discharges from municipal storm sewers serving populations greater than 100,000; and,
- other discharge as designated by the EPA Administrator or the state.

By October 1, 1992, the EPA is required to issue regulations for stormwater discharges, other than those listed above. These regulations are currently being developed.

The EPA regulations for municipal storm sewer systems are intended to promote the development of community-specific stormwater management programs consisting of locally appropriate measures which control, to the maximum extent practical, NPS pollution from both new and existing development. These local programs must address four types of pollutant sources which typically discharge to municipal storm sewer systems. They include commercial and residential areas, industrial areas, construction sites, and illicit, non-stormwater discharges.

The regulations require a two-part application process. Part one requires existing information on a municipality's stormwater management facilities and activities. Part two requires additional information, including proposals for stormwater management programs needed for implementing permit conditions for a five year term.

The EPA regulations also require permits for stormwater discharges associated with a wide range of industrial facilities including municipal wastewater treatment plants, wastewater sludge disposal facilities, landfills, waste-to-energy facilities, airports, and vehicle maintenance facilities. These facilities are regulated under an industrial permitting process which is separate from and has different application requirements than the municipal permitting process. Applications for such facilities are due no later than November 16, 1991.

Another provision of the industrial stormwater discharge regulations that will apply to many development projects undertaken by local governments is the requirement that all construction sites greater than five acres and not part of a larger common plan of development must apply for NPDES permits.

According to estimates developed by the EPA in 1989, the average costs for preparing permit applications range from \$1,007 for an average industrial facility to \$76,681 for large municipal storm sewer systems. These estimates do not reflect costs required to comply with permit conditions.

Several studies indicate that EPA may have greatly under-estimated the costs of applying for municipal permits. The firm of Camp Dresser & McKee (CDM) has projected the cost of submitting a municipal permit application to be \$1,000,000 for a municipality with a population of approximately 250,000, and \$600,000 for a municipality with a population of 100,000. In a separate analysis, the City of Virginia Beach estimated that the permitting process will cost the City \$1.7 million over a two year period.

CDM estimates of the costs involved in developing the stormwater management programs required by the permitting regulations are \$2,000,000 for a system serving 100,000 people, and \$5,000,000 for a system serving 250,000 people.

#### SURVEY OF LOCAL STORMWATER MANAGEMENT FINANCING NEEDS

To gain a better understanding of local stormwater management efforts and to determine the magnitude of local stormwater management financing needs, local public works departments were surveyed.

The survey found that many localities do not have formal, comprehensive stormwater management programs. In the more rural communities, development has not occurred to the extent that stormwater management programs are required. In other localities, the approach to stormwater management is typically fragmented with responsibility residing in several departments. The lack of comprehensive local stormwater management planning is illustrated by the fact that, of the thirteen localities responding to the survey, only Franklin and Virginia Beach have stormwater master plans and ordinances (i.e. other than CBPA ordinances). Moreover, only Virginia Beach's plan and ordinance specifically addresses NPS pollution control. Awareness of the benefits of comprehensive stormwater management may be increasing, however. Many localities have indicated that master plans and/or ordinances are either planned or in progress.

Most localities were unable to provide complete financing needs data. However, the data that were provided indicate that stormwater management costs are anticipated to increase while budget allocations are not likely to keep pace. The increasing costs of stormwater management are also evidenced by past local expenditures. Data from the responding localities indicate that increases in annual

stormwater management expenditures ranged from 16% to 38% between 1984 and 1989.

The survey also found that, as expected, all localities depend heavily on general fund revenues and the capital improvement budget. Other lesser used sources include general obligation bonds, Community Development Block Grants, and cost-share agreements with developers.

## OPTIONS FOR MEETING STORMWATER MANAGEMENT FINANCING NEEDS

In formulating a stormwater management financing strategy that addresses existing and future needs, consideration should be given to a variety of funding alternatives. The most effective financing solution will most likely consist of a mix of alternatives that reflects a locality's specific needs. This report describes and evaluates a number of non-proportionate and proportionate stormwater management financing alternatives. Non-proportionate funding methods are those that do not require the costs to be allocated according to the amount of services received while a proportionate method requires that fees or taxes be assessed in proportion to services received. The alternatives evaluated in this report are as follows:

### Non-Proportionate Funding Alternatives

- General Fund Allocations
- General Obligation Bonds
- Grants and Loans

### Proportionate Funding Alternatives

- Revenue Bonds
- Double Barrel Bonds
- Land Development Fees for Construction
- Land Development Fees for Maintenance
- Participation and Reimbursement Agreements
- Assessments for Local Improvements
- Special Service Districts
- Watershed Improvement Districts
- Potable Water Volume Use Tax and Potable Water Surcharge
- Recreation Fees
- Stormwater Utilities
- Nonpoint Source Pollution Control Fee

## RECOMMENDED STORMWATER MANAGEMENT FINANCING STRATEGY

Based on the analysis presented in this report, a strategy combining several financing techniques which have the potential for efficiently and equitably meeting existing and anticipated local stormwater financing needs is recommended. The core of this approach would be a stormwater management utility. A utility could, depending on the content of state enabling legislation and the structure of local utility programs, equitably meet the costs associated with both federal and state mandates and ongoing stormwater management needs. A utility could ultimately be used to support the issue of revenue bonds which would provide funds for certain large-scale capital improvements that exceed the capacity of the utility fund. Perhaps the greatest advantage of a stormwater utility is that it can provide stability and self-sufficiency to a stormwater management program. This allows for more long-term, comprehensive planning to occur.

Developing localities are also encouraged to establish a pro-rata share payment program through which developers in developing areas would pay their proportionate share of regional stormwater management facilities. Such a program is currently allowed under State law and would provide up-front construction money which could eventually be supplemented by stormwater utility revenues.

Central to any stormwater management financing strategy is a stormwater management master plan which (1) guides both the immediate and long-term construction, operation and maintenance of stormwater management facilities; (2) establishes structural and non-structural programs that control both the quantity and quality of runoff; and (3) addresses state and federal stormwater management and NPS pollution control mandates.

## IMPLEMENTATION OF A STORMWATER UTILITY

The report presents a recommended planning procedure and a brief overview of the factors to be considered in implementing a stormwater utility. The recommended planning procedure is a nine-step process which includes the analyses needed to ensure the feasibility, proper design, public acceptance and effective implementation of a utility. Factors that deserve careful consideration when designing a utility include establishment of a rate structure and billing system, administrative responsibilities, implementation costs, public education, and the possibility of regional implementation.

## REVENUE POTENTIAL OF STORMWATER UTILITIES

By implementing a utility, it is not uncommon for local stormwater management programs to experience a three to five fold increase in revenues over previous general fund appropriations. A study conducted by the Maryland Department of the Environment estimated that a stormwater utility, depending on its structure, could generate from \$4.9 to \$23.0 million per year in Prince Georges

County, Maryland. A 1989 CDM study estimated that a utility serving a locality with a population of between 100,000 and 250,000 could, with a moderate fee based on \$2.00 per month for each single family residential unit, meet the cost of submitting an NPDES permit application and increase the area served by new regional BMPs by one to two square miles per year.

## STORMWATER UTILITY ORDINANCE

A local ordinance developed to establish a stormwater utility would specify the scope, administration, rate structure, billing system and other aspects of a utility. To provide general guidance to localities, this report includes a model stormwater utility ordinance. This model ordinance will have to be revised and supplemented to suit local stormwater control needs, financing needs, administrative functions and political philosophies. Also, the content of local ordinances will be governed by state enabling legislation, assuming such legislation is passed by the 1991 Virginia General Assembly.

In some cases, a stand alone ordinance may not be necessary. Stormwater utility regulations may be incorporated in existing stormwater management ordinances or in other ordinances that address the collection of user charges.

## CONCLUSION

The study recommends a financing approach that centers on use of a stormwater utility. A stormwater utility offers a solution that, if properly implemented, is fair and equitable and provides a continual and secure source of revenue that can be used for the full range of stormwater management activities. Furthermore, once established, a utility can be used to leverage funds for other financing mechanisms such as revenue bonds or matching grants.

Crucial to the successful implementation of a stormwater utility is a stormwater master plan. Such a plan will justify the need for additional revenues, guide the establishment of a utility rate structure, and provide a means of ensuring efficient expenditure of utility revenues. Also important to the establishment of a utility is a thorough and ongoing public information program that is initiated well in advance of the start up of a utility. Only with such a program is public acceptance of this potentially controversial funding mechanism possible.

Stormwater utilities offer the most effective means of financing both ongoing drainage needs and state and federal NPS control mandates. It is, therefore, imperative that local governments have this financing tool at their disposal. In Virginia, however, localities do not have the statutory authority to implement stormwater utilities. A number of Hampton Roads localities, as well as many other localities throughout the state, have formally requested that the 1991 Virginia General Assembly pass legislation granting local governments this authority. Such legislation has also been formally endorsed by the Virginia Municipal League, the

Virginia Association of Counties and the Virginia Association of Planning District Commissions.

Without stormwater utility legislation, many local governments will be confronted with the impossible task of attempting to meet existing backlogs of drainage needs with a declining revenue base, while at the same time attempting to address new and costly NPS pollution control requirements.

## INTRODUCTION

Historically, the focus of municipal stormwater management efforts has been twofold: the provision of drainage infrastructure to prevent flooding, and the control of erosion and sedimentation (E&S) resulting from construction activities. In recent years, however, there has been increasing concern for water quality impacts associated with urban runoff. This has resulted in the development of a variety of regulatory and non-regulatory state and federal programs which promote the incorporation of nonpoint source pollution (NPS) control into local stormwater management activities. Although these programs represent considerable progress in achieving water quality management objectives, securing the funds necessary for local compliance while still keeping pace with ongoing drainage and E&S control needs poses a major challenge for local governments.

As will be documented later in this report, state and federal NPS pollution control mandates are proving to be extremely costly. They have also come at a time when local governments can least afford them. Current federal and state fiscal crises make it highly unlikely that adequate amounts of funding will be made available to local governments to implement these programs. Also, localities are still trying to cope with a severe backlog of stormwater management needs generated by the rapid growth of the 1980s. Most importantly, continued reliance on general fund revenues, the traditional means of financing stormwater management, may no longer be practical for several reasons:

- Local governments are currently experiencing severe declines in tax revenues due to a general economic slowdown which is exacerbated in Hampton Roads by the deployment of large numbers of military personnel to the Middle East.
- Significant property tax hikes to fund such low profile programs as stormwater management may be unpopular in light of growing public resistance to tax increases.
- Declining tax revenues and cuts in federal and state funding assistance may persuade local governments to shift general fund revenues away from stormwater management to activities that are viewed as having higher priorities such as education, police protection and transportation.

In light of increasing costs and decreasing availability of funds for stormwater management, it is clear that an investigation of alternative financing approaches is needed. The purpose of this study is to document current and projected stormwater management funding needs and to recommend financing strategies which would assist local governments in meeting those needs.



This study builds upon the findings of two reports prepared by the Southeastern Virginia Planning District Commission (SVPDC) in 1989.\* The Regional Stormwater Management Strategy for Southeastern Virginia and the Elizabeth River Basin Environmental Management Program recommended various local and regional nonpoint source pollution controls that would satisfy the requirements of recent state and federal regulatory programs.

\* The SVPDC merged with the Peninsula Planning District Commission in 1990 to form the Hampton Roads Planning District Commission.

## CURRENT STORMWATER MANAGEMENT ACTIVITIES IN HAMPTON ROADS

### DRAINAGE AND EROSION AND SEDIMENTATION CONTROL PROGRAMS

All communities in the Hampton Roads Planning District have long been involved in the management of stormwater to prevent flooding. There is wide variability, however, in the scope of local flood control activities. In rural, less developed communities, drainage facilities are generally developed on an ad-hoc basis, often to control nuisance flooding or as incidental components of roadway improvement projects. The greater amount of impervious area found in urban communities usually means there is a greater potential for flooding. Therefore, these communities are required to take a more comprehensive approach to flood control. Many urban localities have developed and implemented stormwater management master plans. These plans provide a basis for determining drainage priorities in the local capital improvement programs by identifying the most cost effective means for mitigating current drainage problems and preventing flooding from future development. Stormwater management master plans typically address drainage on a watershed-specific basis and are often guided by computer models which simulate impacts of future development on existing and proposed drainage facilities.

All communities in Hampton Roads have also complied with the 1973 Erosion and Virginia Sediment Control Law (ESCL) by adopting ordinances which establish local erosion and sediment control programs. These programs require that any party engaging in any non-exempt land disturbing activity submit a project-specific erosion and sediment (E&S) control plan to the local government. Until recently, local E&S programs were only required to adhere to State guidelines contained in the Virginia Erosion and Sediment Control Handbook. In 1988, in response to inadequate and poorly enforced local E&S programs, the Virginia General Assembly passed a bill amending the ESCL to require the promulgation of official regulations which require localities to meet minimum E&S standards. These regulations became effective in September, 1990.

### NONPOINT SOURCE POLLUTION CONTROL PROGRAMS

In addition to traditional flood prevention and E&S control activities, Hampton Roads communities within the Chesapeake Bay watershed have recently adopted programs to implement the 1988 Chesapeake Bay Preservation Act (CBPA). The goal of this Act is to prevent significant water quality degradation of the Chesapeake Bay and its tributaries through the protection of certain environmentally sensitive lands known as Chesapeake Bay Preservation Areas. State regulations developed to implement the Act require local governments to designate Preservation Areas and to incorporate site-specific performance criteria into their land use controls which ensure that certain NPS control objectives are met within Preservation Areas. These objectives, the stormwater management performance criteria established to meet

them, and the potential fiscal impacts of the CBPA on local governments will be discussed in the next chapter of this report.

Several localities have implemented or are developing stormwater management ordinances which establish site-specific performance standards for the control of both the quantity and quality of runoff from new development. These ordinances serve to supplement local CBPA programs by requiring additional stormwater quantity controls in Preservation Areas, and ensuring that both quantity and quality controls are implemented in development activities occurring outside of Preservation Areas. The State has recently finalized regulations to implement the 1988 Stormwater Management Act. These regulations, which establish minimum acceptable criteria for local stormwater management ordinances, became effective on December 5, 1990 and are discussed in more detail in the next chapter. To date, only Franklin and Virginia Beach have adopted a stormwater management ordinance. The two cities intend to revise their ordinances to comply with the State regulations. A number of Hampton Roads localities are considering or have begun development of stormwater management ordinances.

Several localities have adopted ordinances specifically aimed at controlling NPS pollution in watersheds surrounding public water supply reservoirs. These ordinances typically require the implementation of stormwater Best Management Practices (BMPs), shoreline buffers and stormwater diversion projects to prevent NPS pollutants from reaching water supplies. These programs are generally funded by water sales revenues and contributions from developers. Localities with reservoir protection programs include Newport News, Norfolk, Portsmouth, James City County and York County.

## OVERVIEW AND FINANCIAL IMPLICATIONS OF RECENT STATE AND FEDERAL STORMWATER MANAGEMENT REGULATIONS

The following section briefly summarizes and discusses potential fiscal impacts of the Chesapeake Bay Preservation Act, the State Stormwater Management regulations and the EPA stormwater permitting regulations. Table 1 compares these three programs. Little information exists on the fiscal impacts of these programs on local governments. The information that does exist addresses each program separately and does not account for combined costs, or the possible economies of scale that may be realized through coordinated implementation of the three programs at the local or regional level.

### THE CHESAPEAKE BAY PRESERVATION ACT

As previously mentioned, the goal of the Chesapeake Bay Preservation Act is to maintain or restore water quality in the Bay and its tributaries through the identification and protection of Preservation Areas. To meet this goal, local governments are required to implement stormwater management programs which would achieve the following NPS pollution control performance criteria within Preservation Areas:

- prevent a net increase in NPS pollution from new development;
- achieve a ten percent reduction in NPS pollution from redevelopment; and,
- achieve a forty percent reduction in NPS pollution from agricultural and silvicultural uses.

In general, these performance criteria are designed to minimize erosion and sedimentation potential, reduce land application of nutrients and toxics, maximize rainwater infiltration, and ensure the long-term performance of the measures employed to meet the criteria. The CBPA regulations require localities to employ one of the following options in meeting the performance criteria:

- The use of on-site best management practices;
- adoption of a regional stormwater management program which incorporates pro-rata share payments by developers pursuant to Section 15.1-466(j) of the Virginia Code, and results in achievement of equivalent water quality protection;
- compliance with EPA NPDES stormwater permitting regulations pursuant to Section 402 (p) of the federal 1987 Water Quality Act;
- for redevelopment sites that are completely impervious, restoring a minimum 20% of the site to vegetated open space.

**TABLE 1**  
**COMPARISON OF STATE AND FEDERAL STORMWATER**  
**MANAGEMENT REGULATIONS**

PROVISION	NPDES	CHESAPEAKE BAY MANAGEMENT	STORMWATER MANAGEMENT
1. LEGAL/ADMINISTRATIVE			
A. Administrative Agency	EPA*	CBLAB	Conservation and Recreation
B. Deadlines	11/92: $\geq 250k$ 5/93: 100K - 250K	11/91	State Agencies: 1/91 Municipal: 7/90
C. Mandatory	Yes	Yes	State Agencies: Yes Municipal: No
D. Localities	Localities $\geq 100K$	Tidewater Va	State Agencies; Municipalities
E. Annual Compliance Report	Yes	No	Yes
2. AREA OF COVERAGE			
A. Geographical	Entire Jurisdiction	Local Discretion (RPA & RMA)	Entire Jurisdiction
B. Development Type	Existing /New	New	New
C. Land Use Classes	1. Commercial + Residential 2. Industrial 3. Construction 4. Illicit Connection	1. RPA 2. RMA	All Urban Land Uses

\* The Virginia State Water Control Board is currently evaluating the feasibility of assuming administrative responsibility for the NPDES stormwater permitting program.

**TABLE 1 (Continued)**  
**COMPARISON OF STATE AND FEDERAL STORMWATER**  
**MANAGEMENT REGULATIONS**

PROVISION	NPDES	CHESAPEAKE BAY MANAGEMENT	STORMWATER MANAGEMENT
<b>3. PERFORMANCE STANDARDS</b>			
A. Water Quality Goal	Maximum Extent Practicable (MEP)	1. Prevent Loading Increase (New Dev.) 2. Reduce Existing Loadings (Redev.)	Inhibit Water Quality Deterioration (MEP)
B. Loading Standard	MEP	1. Post = Pre 2. Redev = 90% Pre	BMP - Based Standard (MEP)
C. Pollutants	Approx. 140	Keystone: Total P - Nutrients - Sediment - Toxics	N/A
D. Water Quality Monitoring	Yes	No	No
E. Runoff Quantity Control	No	No	Yes (Erosion/Flooding)
<b>4. BMPs</b>			
A. Structural	Yes	Yes	Yes
B. Nonstructural	Yes	Yes	Yes
C. Onsite/Regional	Either (Based on Outfall)	Regional Mentioned	Regional Encouraged

Source: Camp Dresser & McKee. 1990 Clean Water Act Seminar, 1990.

All localities in Hampton Roads subject to the CBPA have elected to pursue the use of on-site best management practices to satisfy the required stormwater management performance criteria. Localities have not found the implementation of regional stormwater management programs to be a viable option due to the lack of a reliable funding mechanism. The pro-rata share option allowed under state law, though potentially helpful, would not provide sufficient funding for such programs. Also, highly urbanized localities typically lack the land area necessary for regional stormwater management facilities. The third option, compliance with the EPA NPDES stormwater permitting regulations, was also not considered to be a viable option because (1) the regulations only apply to the six cities in Hampton Roads with populations greater than 100,000, and (2) the final regulations were not issued until after most local CBPA programs had been adopted.

Direct costs to localities to implement and administer on-site stormwater management programs required by the CBPA regulations will vary significantly depending on the size of a locality, the proportion of a locality designated as a Preservation Area, the nature and volume of development activity, and the amount of State funding assistance provided. In October, 1990, the HRPDC conducted a survey of its member jurisdictions to determine local costs associated with implementing various State mandates, including the CBPA. It was found that the cost of implementing all aspects of a local CBPA program will average slightly more than \$84,000 per locality during Fiscal Year 1991. A breakdown of the costs specific to the stormwater management requirements of the CBPA requirements was not included in these estimates. The anticipated FY 1991 CBPA implementation costs for each HRPDC locality are shown in Table 2. Because localities used a variety of approaches in developing these estimates, caution should be exercised in drawing comparisons among the localities.

Similar results were obtained by a 1988 SDN Market Research survey of Tidewater localities.<sup>1</sup> This survey, to which more than fifty percent of cities and counties and one-seventh of incorporated towns in Tidewater responded, attempted to determine the average estimated cost to local governments to start-up and annually implement CBPA programs. Although the survey yielded a wide range of estimates, the average annual cost to implement local CBPA program was projected to be \$89,000.

**TABLE 2**  
**ESTIMATED FY 1991 CBPA IMPLEMENTATION COSTS FOR**  
**HAMPTON ROADS PLANNING DISTRICT LOCALITIES**

Southside	\$672,313
Chesapeake	\$95,350
Franklin	NA
Isle of Wight County	\$68,660
Norfolk	\$100,273
Portsmouth	\$120,000
Southampton County	NA
Suffolk	\$143,485
Virginia Beach	\$144,545
Peninsula	\$341,735
Hampton	\$100,000
James City County	\$30,000
Newport News	\$53,200
Poquoson	\$25,535
Williamsburg	\$3,000
York County	\$130,000
Hampton Roads	\$1,014,048

Note: In some cases, State grants partially offset local costs.

Source: Hampton Roads Planning District Commission, 1990.



## STATE STORMWATER MANAGEMENT REGULATIONS

The 1989 Virginia General Assembly passed the Stormwater Management Act enabling local governments to establish, by ordinance, stormwater management programs. Under this legislation, localities may implement stormwater management programs which would require submission and approval of a stormwater management plan prior to any non-exempt development activity. State regulations establishing minimum acceptable technical criteria and administrative procedures for these programs were recently finalized and became effective on December 5, 1990. These regulations require that local stormwater management ordinances do the following:

- require regulated development activities to maintain post-development peak runoff rates at or below pre-development runoff rates;
- establish minimum technical criteria to control nonpoint source pollution and localized flooding;
- require the provision of long-term responsibility for and maintenance of stormwater management facilities; and,
- require local programs to include certain minimum administrative procedures.

These regulations provide localities with considerable flexibility. Pursuant to the Stormwater Management Act, the implementation of local stormwater management programs is voluntary. Consequently, the purpose of the State regulations is to establish minimum requirements which must be met, but may be exceeded, only when a locality opts to develop a program. Furthermore, the regulations do not mandate specific management practices to achieve the required technical criteria. Instead, the criteria are performance standards which give localities the latitude to require stormwater management practices which are found to be suitable for local conditions.

To date, there has been no attempt to estimate the costs associated with the development and administration of local stormwater management programs that meet the State regulations. It is expected that administration costs will greatly exceed ordinance development costs. Administration costs would include such activities as plan review, site inspection, maintenance, enforcement, staff training and public education.

As mentioned, the City of Virginia Beach developed and implemented a stormwater management ordinance prior to passage of the Stormwater Management Act. Development of this ordinance was accomplished entirely in-house within the existing budget, although initial implementation required the hiring of one additional planner.<sup>2</sup> Though similar in structure to the program

outlined by the Stormwater Management Act regulations, some components of the City's program exceed the State's requirements while other components need revision to achieve full compliance. Costs associated with implementing the City's program provide a general indication of what it may cost other localities to implement similar programs that meet the State requirements. According to the City Office of Budget and Evaluation, ongoing implementation costs are estimated to be nearly \$117,000 per year over the next decade.<sup>3</sup> This estimate includes administrative as well as operations and maintenance costs. The extent to which this estimate is applicable to other localities will depend on levels of development activity, the scopes of the local ordinances, and existing staffing and funding levels.

## EPA NPDES STORMWATER PERMITTING REGULATIONS

### Stormwater Permitting Provisions of the 1987 Water Quality Act

The 1987 Water Quality Act (WQA) significantly increased federal involvement in NPS pollution control. The Act's most far-reaching stormwater provision is Section 405. This section directs the U. S. Environmental Protection Agency (EPA) to develop regulations which extend the National Pollutant Discharge Elimination System (NPDES) permitting program to cover industrial and municipal stormwater discharges. Draft regulations for this program were published in 1988 and underwent an extensive two-year public review. Final regulations were issued on November 16, 1990.

The 1987 WQA required that the EPA NPDES permitting regulations address the following five categories of stormwater discharges:

- stormwater discharges already permitted prior to the 1987 WQA;
- stormwater discharges associated with industrial activities;
- discharges from municipal storm sewers serving populations greater than 250,000;
- discharges from municipal storm sewers serving populations of 100,000 to 250,000; and
- any discharge which, based on the determination of the EPA Administrator or the state, contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States.<sup>4</sup>

In addition, the WQA requires that, by October 1, 1992, the EPA issue regulations which will (1) designate stormwater discharges, other than those listed above, which need to be regulated to protect water quality, and (2) establish a comprehensive program to regulate such discharges.

The WQA also established the following general provisions for the permitting of municipal stormwater discharges:

- Permits may be issued on a system or jurisdiction-wide basis, rather than for individual outfalls.
- Permits shall include a requirement to effectively prohibit non-stormwater discharges into storm sewers.
- Permits shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques, system design and engineering methods, and such other provisions as the EPA Administrator or the State determines appropriate for the control of such pollutants.<sup>5</sup>

#### EPA Regulations to Implement the Municipal Storm Sewer Permitting Provisions of the 1987 WQA

The intent of the recently issued EPA permitting regulations for municipal storm sewer systems is to promote the development of community-specific stormwater management programs consisting of locally appropriate pollution control measures. These regulations are particularly significant from a water quality management perspective in that, unlike the CBPA and the State stormwater management regulations, the EPA stormwater permitting process will require NPS pollution controls in areas of both new and existing development.

The EPA stormwater permitting regulations require a two-part application process. In general, part one of the application requires existing information on a municipality's stormwater management facilities and activities. Part two requests additional information, including proposed stormwater management programs, needed for implementing permit conditions for a five year term. The entire permit application is structured to address four key issues. These include (1) the viability of local institutional mechanisms for controlling pollutants in stormwater discharges, (2) an identification of the sources of pollutants in stormwater discharges, (3) a characterization of stormwater discharges, and (4) the development of a comprehensive stormwater management program. The regulations require that, for systems serving populations greater than 250,000, the first part of the permit application be submitted by November 16, 1991 and the second part be submitted by November 16, 1992. For systems serving between 100,000 and 250,000 people, the first part of the application must be submitted by May 16, 1992 and the second part must be submitted by May 16, 1993.

The stormwater management program required in the second part of the application must address four types of pollutant sources which typically discharge to municipal storm sewer systems. These sources include commercial and residential areas, industrial areas, construction sites, and illicit, non-stormwater discharges. The

application is designed to encourage the applicant to propose measures that would control NPS pollution from these sources to the maximum extent practical.

In developing stormwater management programs to control non-stormwater discharges, municipalities are not expected to adopt a literal interpretation of the WQA provision requiring permits to "effectively prohibit" non-stormwater discharges into municipal storm sewers. Instead, the regulations permit non-stormwater discharges to municipal systems as long as they are covered by separate NPDES permits. Municipalities will be required to implement a screening analysis and monitoring plan to identify non-stormwater discharges and ensure either their removal or their coverage by a NPDES permit.

In accordance with the WQA, the EPA regulations encourage municipalities to apply for system-wide permits. A system-wide permitting process would promote comprehensive stormwater management programs which target controls based on an evaluation of priorities. The regulations also encourage multiple entities with stormwater management responsibilities within the same system to be co-applicants for a single system-wide permit. Possible combinations of co-permittees include two localities sharing a storm sewer system, a locality and a large private development in that locality with its own storm sewer system, or a locality and the State Department of Transportation. This approach will provide a basis for coordinated stormwater management planning and will spread, among the co-applicants, the burden of monitoring discharges, assessing water quality impacts, and developing and implementing controls. Stormwater discharges associated with industrial activities will require separate permits which would have to be obtained by the industrial facility responsible for the discharge.

At present, the EPA has administrative responsibility for implementing the stormwater permitting regulations in Virginia. However, the Virginia State Water Control Board is currently studying the feasibility of assuming this responsibility. Although the VWCB does not yet have permitting authority, permit applications must still be submitted to the VWCB where they will be forwarded to EPA.<sup>6</sup>

#### EPA Regulations to Implement the Industrial Storm Sewer Permitting Provisions of the 1987 WQA

The EPA regulations also call for the permitting of stormwater discharges associated with a wide range of industrial activities. Included in the definition of industrial activities are such municipal facilities as wastewater treatment plants, wastewater sludge disposal facilities, landfills, waste-to-energy facilities, airports, and vehicle maintenance facilities. These facilities are regulated under an industrial permitting process which is separate from and has different application requirements than the municipal permitting process. Furthermore, all localities which own and operate industrial facilities, including those with populations less than 100,000, will be required to apply for industrial stormwater discharge permits.

Another provision of the industrial stormwater discharge regulations that may apply to any local government is the requirement that all construction sites greater than five acres and not part of a larger plan of development must apply for NPDES permits. This requirement may add additional time and expense to the planning and development of large capital improvement projects.

For more details on the industrial stormwater permitting regulations, the reader is referred to 55 Federal Register 47990, November 16, 1990.

#### Fiscal Impacts of the EPA NPDES Stormwater Permitting Program

The actual costs incurred by a locality, in money and time, in complying the EPA NPDES stormwater permitting regulations could vary significantly depending on a variety of factors including:

- The size of a system;
- The physical characteristics of a locality (i.e. topography, hydrology, land use, etc.);
- The availability of information required by the permitting regulations;
- The necessity of applying for permits with co-applicants;
- The degree to which a municipal system receives illicit non-stormwater discharges, or stormwater associated with industrial activity;
- The number of municipal facilities that could be defined as industrial activities under the permitting regulations;
- The availability of resources needed to fulfil the proposed permit application requirements (i.e., money, manpower, expertise, sampling and testing equipment, and so forth); and
- The adequacy of local legal authority and administrative capabilities needed to implement a stormwater management program that meets EPA permitting criteria.

According to estimates developed by the EPA in 1989, the average permit application for discharges from a municipal storm sewer system serving a population greater than 250,000 will require \$76,681 and 4,534 hours to prepare. A permit application for discharges from a municipal system serving between 100,000 and 250,000 people would take an estimated \$49,249 and 2,912 hours to prepare.<sup>7</sup> These estimates only reflect the costs to prepare an application and do not include costs that would be incurred in the implementation of the required stormwater management programs.

An average industrial permit application was estimated by the EPA to require \$1,007 and 28.6 hours to prepare. This estimate does not include the costs required to comply with permit conditions.

Several studies have been conducted which indicate that EPA may have greatly under-estimated the costs of applying for municipal permits. Independent cost estimates for the preparation of industrial permits are not available. The firm of Camp Dresser & McKee (CDM) has projected that the cost of preparing a municipal permit application could be \$1,000,000 dollars for a municipality with a population of approximately 250,000, and \$600,000 for a municipality with a population of 100,000.<sup>8</sup> In a separate analysis conducted by the City of Virginia Beach, it was estimated that the permitting process will cost the City \$1.7 million over a two year period.<sup>9</sup> The cost estimates developed by EPA, CDM and others are based on population to conform to the stormwater permitting requirements which apply to communities of different sizes. It is important to remember that actual costs incurred by municipalities will differ significantly as a result of the variables noted on the previous page.

CDM has also prepared estimates of the costs involved in preparing the stormwater management programs required by the permitting regulations. They estimate that preparation of a citywide or countywide plan for a system serving 250,000 people could cost as much as \$5,000,000, and a plan for a system serving a population of 100,000 could cost more than \$2,000,000.<sup>10</sup>

It should be noted that the CDM and Virginia Beach cost estimates contained in the preceding discussion were based on EPA's draft regulations. Similar estimates based on the final regulations do not exist. EPA's cost estimates for the final regulations are considerably less than those prepared for the draft regulations.

## SURVEY OF LOCAL STORMWATER MANAGEMENT FINANCING NEEDS

To gain a better understanding of local stormwater management efforts and to determine the magnitude of local stormwater management financing needs, the HRPDC staff surveyed local public works departments. Thirteen of the Planning District's fourteen member localities responded in some fashion. Two of the rural counties responded with unanswered questionnaires because they do not administer stormwater management activities. Other localities responded with partially answered questionnaires due to the unavailability of data. One locality did not return a completed questionnaire, but responded by providing data that answer many of the survey questions.

The survey was designed to gather information on a number of items including the organization and responsibilities of local stormwater management programs; the extent and nature of past stormwater management expenditures; current and projected stormwater management budget allocations as compared to actual needs; existing and planned regulatory programs; and existing funding sources. A copy of the survey instrument used can be found in Appendix A.

### LOCAL STORMWATER MANAGEMENT ORGANIZATION AND FUNCTIONS

The survey found that many localities do not have formal, comprehensive stormwater management programs. In the more rural communities, this can be attributed to the fact that development has not occurred to the extent that stormwater management programs are required. Rural stormwater management activities are usually conducted by the State during road projects, conducted by towns to correct nuisance flooding problems, or implemented in conjunction with the Chesapeake Bay Preservation Act. In other localities stormwater management is typically fragmented. Stormwater management activities are integrated into several departments with no one department or individual having total responsibility. Due to these situations, many localities have not established systems to account for stormwater management needs and expenditures and, therefore, were unable to fully complete the survey questionnaire.

The lack of comprehensive stormwater management planning at the local level is illustrated in the summary of local stormwater management activities found in Table 3. Of the thirteen responding localities, only Franklin and Virginia Beach have stormwater master plans and ordinances (i.e. other than CBPA ordinances). Moreover, only Virginia Beach's plan and ordinance specifically addresses NPS pollution control. A realization of the benefits of a more comprehensive approach to stormwater management may be on the increase, however. Two localities have indicated that stormwater master plans are in progress and six localities have indicated that the preparation of stormwater management ordinances is either planned or in progress. To be in conformance with the recent State stormwater management regulations, these ordinances will be required to address stormwater quality.

As shown in Table 3, each locality approaches the delegation of stormwater management responsibility differently. Public works and engineering departments generally have the broadest scope of responsibilities. In most localities these departments are involved, to varying degrees, in all aspects of stormwater management. Planning departments may also be involved, but their responsibilities are usually limited to administration, master planning, regulation and enforcement, and water quality management.

#### LOCAL STORMWATER MANAGEMENT FINANCING NEEDS

Table 4 shows a five-year projection of local stormwater financing needs as compared to expected budget allocations. It is evident from this table that, due to the fragmentation or lack of local programs, most localities were unable to provide complete financing needs data. It is also important to note that localities used differing accounting procedures in estimating needs and budget allocations. Consequently, this table should not be relied on to make comparisons among localities.

Despite the incompleteness of the data, it is clear from Table 4 that, overall, stormwater management costs are anticipated to increase while budget allocations are not likely to keep pace. The increasing costs of stormwater management are also evidenced by past local expenditures. The survey questionnaire asked localities for annual expenditures between 1984 and 1989. Because only a few respondents were able to provide this information, it was decided not to present the data in tabular form. However, data from the responding localities indicate that increases in annual stormwater management expenditures ranged from 16% to 38% during this period.

Figure 1 illustrates the magnitude of the anticipated disparity between stormwater management needs and budget allocations for the communities of Virginia Beach, Poquoson and York County. These localities were selected for this illustration because (1) they were able to provide complete needs/budget data, and (2) they represent three distinctly different communities. Virginia Beach is a large suburban city with moderate development potential, Poquoson is a small suburban city with low to moderate development potential, and York County is a primarily rural locality which is experiencing significant development pressures. It can be seen that regardless of the size or the anticipated development trends of a community, localities will find it difficult to meet their stormwater financing needs.

Hampton Roads communities are not alone in their inability to adequately fund stormwater management. In 1990, the firm of Evans, Mechwart, Hambleton and Tilton conducted a nationwide stormwater management survey to which fifty-two localities responded. When asked to rank eight stormwater management issues in terms of relative importance, "obtaining more money to perform needed actions" was given the highest overall ranking.



A summary of funding sources that are currently used by Hampton Roads localities to finance stormwater management can be found in Table 3. As would be expected, all localities depend heavily on general fund revenues and the capital improvement budget. Three localities, Newport News, Norfolk and Virginia Beach, indicated that they have issued general obligation bonds to fund stormwater management. Only Hampton cited the use of Community Development Block Grant funds, and only Williamsburg indicated the use of cost-share agreements with developers.

TABLE 3

SUMMARY OF LOCAL STORMWATER MANAGEMENT ACTIVITIES

Locality	Agencies with SWM Responsibilities	SWM Master Plan	SWM Ordinance	EPA NPDES Permit Required	CBPA Program	Existing Funding Sources
<b>SOUTHSIDE</b>						
Chesapeake	NR	NR	No	Yes	Not yet adopted	NR
Franklin	City Manager's Office 1,2,5,6 Public Works 1,2,3,4,5,6,7	Yes	Yes, quantity only	No	Not required	General Fund 1,2,3,4,5, Capital Improvements Budget 5,6 Stormwater Permit Fees 5
Norfolk	NR	No	Planned	Yes	Yes	General Fund 2,3,4,5,7 General Obligation Bonds 2,3,6,7 Sewer Utility 4
Portsmouth	Public Works 1,2,3,4,5,6 Planning 2,5	No	No	Yes	Yes	NR
Suffolk	Planning 1,7 Public Works - Downtown Only 4,5,6 City Engineer 1,7	No	No	No	Yes	General Fund 1,4,5,6 General Improvement Budget 3,4,6
Virginia Beach	NR	Yes	Yes, quantity and quality	Yes	Yes	General Fund 3,4,5,6,7 General Obligation Bonds 3,6
Isle of Wight County	NA	No	No	No	Yes	NA
Southampton County	NA	No	No	No	Not required	NA

**TABLE 3 (Continued)**  
**SUMMARY OF LOCAL STORMWATER MANAGEMENT ACTIVITIES**

Locality	Agencies with SWM Responsibilities	SWM Master Plan	SWM Ordinance	EPA NPDES Permit Required	CBPA Program	Existing Funding Sources
<b>PENINSULA</b>						
Hampton	Public Works 1,2,3,4,5,6,7	In progress	Planned	Yes	Yes	General Fund 1,2,3,4,5,6 CDBG Funds 6 General Obligation Bonds 6
Newport News	Engineering 1,2,3,5,6,7 Public Works <sup>4</sup> Planning <sup>7</sup>	No	Planned	Yes	Not yet adopted	General Fund 1,2,4,5, General Obligation Bonds 2,3,6
Poquoson	Engineering and Public Utilities 1,2,3,4,5,6,7 Public Works <sup>4</sup>	No	No	No	Not yet adopted	General Fund 1,2,3,4,5,6,7
Williamsburg	Planning 1,2,5,7 Public Works 1,2,3,4,5,6,7	No	Under consideration	No	Yes	General Fund 1,2,4,5 Cost Sharing w/ Developers 3,6,7
James City County	Code Compliance 1,2,3,4,5,7 Development Management 2,3,6,7	For developing watersheds only	In progress	No	Yes	General Fund 1,2,3,4,5,6,7
York County	Community Development 1,2,3,5,6,7 Environmental Services 1,3,4,6	In progress	Planned	No	Yes	General Fund 1,3,4,5 Capital Improvement Budget 2,4,6

<sup>1</sup>Administration

<sup>2</sup>Master Planning

<sup>3</sup>Design and Engineering

<sup>4</sup>Operations and Maintenance

<sup>5</sup>Regulation and Enforcement

<sup>6</sup>Capital Improvement

<sup>7</sup>Water Quality Management

NR - Not Reported

NA - Not Applicable

Source: Hampton Roads Planning District Commission, 1990.

TABLE 4

## CURRENT AND PROJECTED STORMWATER MANAGEMENT FINANCING NEEDS COMPARED TO BUDGET ALLOCATIONS

Locality	FY 1989-90		FY 1990-91		FY 1991-92		FY 1992-93		FY 1993-94	
	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted
<b>SOUTHSIDE</b>										
Chesapeake <sup>1</sup>	\$1,915,000	NR	\$2,228,000	NR	\$2,776,000	NR	\$128,000	NR	\$165,000	NR
Franklin	NR	\$105,338	\$144,100	\$41,500	\$167,600	\$41,500	\$61,340	\$41,500	\$65,330	\$41,500
Norfolk <sup>1</sup>	\$2,400,000	NR	\$3,000,000	NR	\$3,000,000	NR	\$5,000,000	NR	\$5,000,000	NR
Portsmouth <sup>2</sup>	NA	\$2,359,500	NA	\$3,964,150	NA	\$4,593,000	NA	\$3,543,100	NA	\$1,450,000
Suffolk	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Virginia Beach <sup>3</sup>	\$7,380,400	\$7,300,488	\$7,616,910	\$7,616,910	\$8,334,942	\$3,675,456	\$10,183,697	\$5,391,051	\$10,243,157	\$5,423,876
Isle of Wight County	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Southampton County	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>PENINSULA</b>										
Hampton	\$4,287,000	\$1,287,000	\$3,120,000	NA	\$3,130,000	NA	\$3,155,000	NA	\$3,155,000	NA
Newport News	\$1,112,000	\$1,112,000	\$2,632,000	\$2,077,000	\$5,367,000	NA	\$4,746,000	NA	\$3,957,000	NA
Poquoson	\$606,400	\$322,400	\$846,155	\$294,100	\$681,000	\$300,173	\$731,670	\$342,850	\$784,300	\$345,580
Williamsburg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
James City County	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
York County	\$376,750	\$343,750	\$564,000	\$472,500	\$408,650	\$369,000	\$491,200	\$367,100	\$456,700	\$299,200

## NOTES:

<sup>1</sup>Data were obtained from the State Commission Studying Local Infrastructure Needs and Revenue Resources. Cost figures represent capital improvements only.

<sup>2</sup>Portsmouth data only include the total costs of drainage projects listed in the Capital Improvement Budget. Cost figures may include some costs not attributable to drainage (street improvements, utilities, etc.)

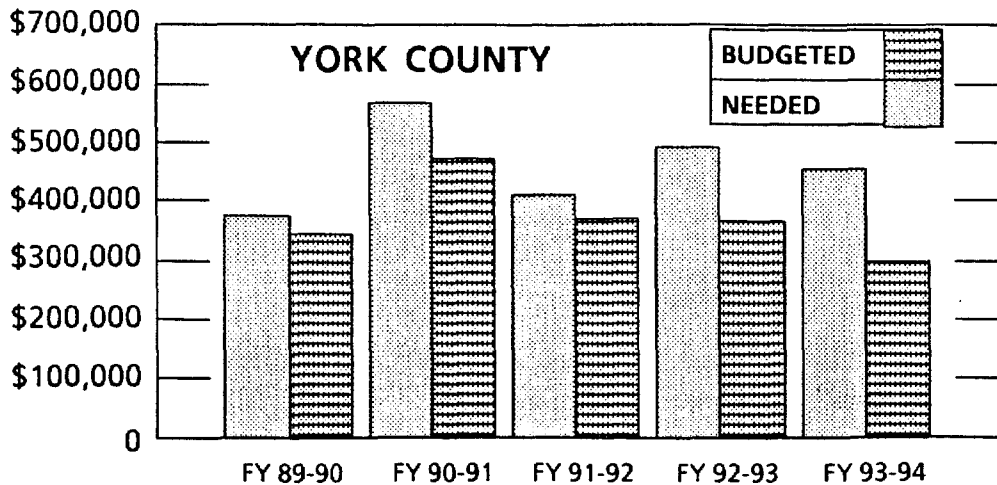
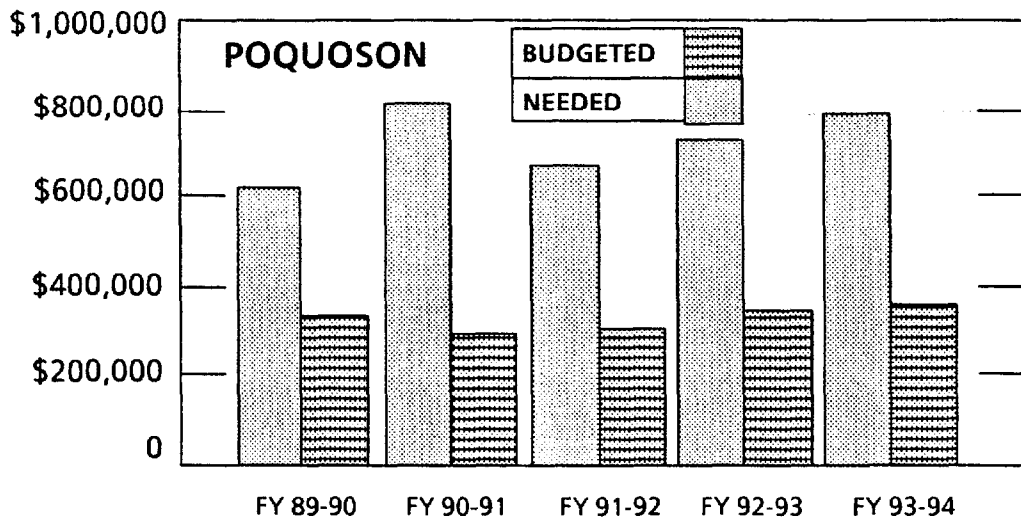
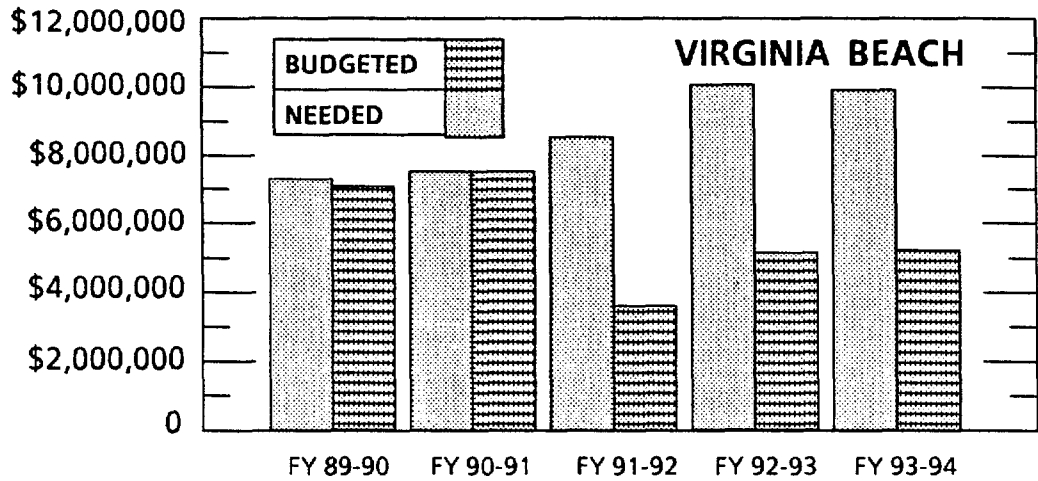
<sup>3</sup>Virginia Beach Office of Budget and Evaluation, 1990.

NR - Not Reported

NA - Not Available

Source: Hampton Roads Planning District Commission, 1990.

**FIGURE 1**  
**STORMWATER MANAGEMENT NEEDS AND ACTUAL BUDGET**  
**ALLOCATIONS FOR SELECTED LOCALITIES**



## OPTIONS FOR MEETING STORMWATER MANAGEMENT FINANCING NEEDS

As discussed in the previous chapter, local governments report a wide disparity between stormwater management financing needs and the funds actually allocated to address these needs. It is evident that stormwater management financing programs which provide an adequate and dependable source of funding are needed. In formulating a stormwater management financing program that would remedy existing and future needs, consideration should be given to a variety of funding alternatives. The most effective financing solution will most likely consist of a mix of alternatives that reflects a locality's specific situation.

This chapter describes and evaluates a number of non-proportionate and proportionate stormwater management financing alternatives. A non-proportionate funding method does not require that costs be allocated according to the amount of services received. Most localities in Hampton Roads currently depend on non-proportionate stormwater management financing strategies. The proportionate financing alternatives operate by assessing fees or taxes in proportion to the amount of service received. With respect to stormwater management, assessment of these fees and taxes would be based on the potential for increased runoff contribution which is usually a function of the amount of impervious surface. It is important to note that not all stormwater management financing options discussed below are currently allowed under Virginia law. Many would require the approval of the Virginia General Assembly before they can be implemented by local governments.

Most of the information presented in this chapter was obtained from a report prepared in 1990 by the Northern Virginia Planning District Commission (NVPDC) entitled Evaluation of Regional BMPs in the Occoquan Watershed. Table 5, which was adapted from the NVPDC report, provides a summary of the advantages and disadvantages associated with each of the alternatives.

### NON-PROPORTIONATE FUNDING ALTERNATIVES

#### General Fund Allocations

The general fund is a locality's primary operating fund. It finances the day-to-day operations of a local government and accounts for all revenues and expenditures which are not included in specific purpose funds. The general fund is comprised of revenues from a variety of sources including property taxes, other local taxes (sales, utilities, meals, hotels, etc.), permitting and licensing fees, charges for services, and state and federal aid. Most local stormwater management programs are either partially or entirely funded through the general fund. Additional funding might be raised for stormwater management by reallocation of existing general fund expenditures or by increasing general fund revenues through property or sales tax hikes.

**TABLE 5  
FUNDING ALTERNATIVES FOR STORMWATER MANAGEMENT**

Funding Alternatives	Potential for Revenue	Administrative Burden	Advantages	Disadvantages	Related State Enabling Legislation (VA Code)
General Fund Allocations	High	Low	<ul style="list-style-type: none"> <li>• Can finance all aspects of SWM program since general fund is unrestrictive for municipal purposes.</li> <li>• Easy to administer.</li> <li>• Avoids inconvenience of borrowing.</li> </ul>	<ul style="list-style-type: none"> <li>• Allocations are subject to shifting budget priorities and fluctuations in the economy.</li> <li>• Little flexibility for unexpected capital expenses.</li> <li>• Not all contributors are benefited directly.</li> <li>• Politically unfavorable.</li> </ul>	Sect. 58.1-3000 to 3016
General Obligation Bonds	High	High	<ul style="list-style-type: none"> <li>• Substantial funding can be secured in a short time.</li> <li>• Bonds may be reimbursed through the general fund or other local monies.</li> <li>• Low interest rate.</li> <li>• Can finance all aspects of a SWM program.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires vote approval by public.</li> <li>• Payouts exceed bond value.</li> <li>• Obligates general funds for an extended time and therefore local spending power may be limited or existing services may be cut.</li> <li>• May be limited by local bonding capacity.</li> </ul>	Sect. 15.1-170 Sect. 15.1-185 Sect. 58.1-3245
Grants and Loans	Low to Moderate	Low	<ul style="list-style-type: none"> <li>• New monies in addition to base revenue.</li> <li>• Interest paid on loans is usually below market rate.</li> </ul>	<ul style="list-style-type: none"> <li>• Grants and loans are in high demand and awarded on a competitive basis.</li> <li>• Application costs cannot be recovered.</li> <li>• Funding unstable.</li> <li>• Conditions accompanying grants and loans may be burdensome.</li> </ul>	NA

**TABLE 5 (Continued)**  
**FUNDING ALTERNATIVES FOR STORMWATER MANAGEMENT**

<b>Funding Alternatives</b>	<b>Potential for Revenue</b>	<b>Administrative Burden</b>	<b>Advantages</b>	<b>Disadvantages</b>	<b>Related State Enabling Legislation (VA Code)</b>
Revenue Bonds	High	High	<ul style="list-style-type: none"> <li>• Substantial funding can be secured in a short time.</li> <li>• Can finance all aspects of a SWM program.</li> <li>• Local bonding capacity is unaffected.</li> </ul>	<ul style="list-style-type: none"> <li>• Payout exceeds bond value.</li> <li>• Interest rate paid out is higher than with general obligation bonds.</li> <li>• SWM facilities do not generate revenue (unless combined with utility program).</li> </ul>	Sect. 15.1-170 Sect. 15.1-185 Sect. 15.1-1239 to 1270 Sect. 58.1-3245
Double Barrel Bonds	High	High	<ul style="list-style-type: none"> <li>• Substantial funding can be secured in a short time.</li> <li>• Can finance all aspects of a SWM program.</li> <li>• Interest rate paid out is lower than with revenue bonds.</li> </ul>	<ul style="list-style-type: none"> <li>• Payout exceeds bond value.</li> <li>• Interest rate paid out is higher than general obligation bonds.</li> <li>• SWM facilities do not generate revenue (unless combined with a utility program).</li> <li>• Are subject to voter approval.</li> </ul>	Sect. 15.1-170 Sect. 15.1-185 Sect. 15.1-1239 to 1270 Sect. 58.1-3245
Land Development Fee for Construction	Low to Moderate	Moderate	<ul style="list-style-type: none"> <li>• Fees may be assessed to new developments within the drainage area of the off site facility.</li> <li>• Developers contribute funds in proportion to proposed runoff volume.</li> <li>• Encourages developers to use regional facilities.</li> <li>• May be used in lieu of an on-site program in complying with CBPA.</li> </ul>	<ul style="list-style-type: none"> <li>• Cannot assess fee until a general water, sewer, and drainage improvement plan is adopted.</li> <li>• Can only be assessed to and used for new development.</li> <li>• Funds can only be used for construction/upgrade of regional SWM facilities.</li> <li>• Locality responsible for O&amp;M.</li> <li>• Most regional SWM facilities need to be constructed in advance of development.</li> </ul>	Sect. 15.1-466(d) Sect. 15.1-466(j) Sect. 10.1-603.1
Land Development Fees for Maintenance	Low to Moderate	Moderate	<ul style="list-style-type: none"> <li>• Maintenance funding available in advance.</li> <li>• Promotes preventative maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Politically unpopular.</li> <li>• Difficult to determine future maintenance costs.</li> <li>• Funds will eventually run out.</li> </ul>	Enabling legislation required



**TABLE 5 (Continued)  
FUNDING ALTERNATIVES FOR STORMWATER MANAGEMENT**

Funding Alternatives	Potential for Revenue	Administrative Burden	Advantages	Disadvantages	Related State Enabling Legislation (VA Code)
Participation/Reimbursement Agreements	Moderate to High	High	<ul style="list-style-type: none"> <li>• Construction financed up-front by developer.</li> </ul>	<ul style="list-style-type: none"> <li>• See land development fees.</li> <li>• Rely on developer willing to participate.</li> <li>• Local governments need additional staff to administer fee collection and reimbursement.</li> <li>• Reimbursement may be delayed if development activity slows.</li> </ul>	Sect. 10.1-614 Sect. 21.112-1 Sect. 15.1-466
Assessments for Local Improvements	Low	Moderate	<ul style="list-style-type: none"> <li>• Equitable</li> <li>• Provide up-front construction funds.</li> </ul>	<ul style="list-style-type: none"> <li>• Only applicable in very limited circumstances.</li> <li>• Residents must request assessments.</li> </ul>	Sect. 15.1-239
Special Service District	High	Low (After established)	<ul style="list-style-type: none"> <li>• Locality can assess taxes to property owners within the district to construct and maintain facilities needed to provide the desired governmental service.</li> <li>• Ability to structure tax schedule to relate addition of imperviousness to increases in runoff and NPS pollution.</li> </ul>	<ul style="list-style-type: none"> <li>• Citizens within the district must make a petition to the circuit court in order to create a district.</li> <li>• May be unfeasible to set up in undeveloped watersheds.</li> <li>• Separate districts would need to be set up for each watershed and therefore this option is not easy to implement community-wide.</li> </ul>	Sect. 15.1-18.2 Sect. 15.1-18.3

**TABLE 5 (Continued)**  
**FUNDING ALTERNATIVES FOR STORMWATER MANAGEMENT**

Funding Alternatives	Potential for Revenue	Administrative Burden	Advantages	Disadvantages	Related State Enabling Legislation (VA Code)
Watershed Improvement District	High	Low	<ul style="list-style-type: none"> <li>• Bonds, grants and loans may be used to cover all costs.</li> <li>• The Board elected by the soil and water conservation district may assess land owners fees to finance stormwater program.</li> <li>• Can be used in multi-jurisdictional watersheds.</li> </ul>	<ul style="list-style-type: none"> <li>• No local govt. oversight.</li> <li>• Requires special petition, referendum vote passed by 2/3 vote in proposed district.</li> <li>• Set up and running of program could be costly unless landowners with skills are willing to volunteer their time.</li> </ul>	Sect. 21-112.1 Sect. 10.1-614-647
Public Water Volume use Tax and Surcharge	Moderate to High	Moderate To High	<ul style="list-style-type: none"> <li>• Promotes protection of drinking water supply and reduction of water treatment costs through SWM programs.</li> <li>• Easy for locality to administer.</li> <li>• Relates tax to volume used.</li> </ul>	<ul style="list-style-type: none"> <li>• May be cumbersome for a private water purveyor to transfer its income to a locality.</li> <li>• Since water use is variable, funding from taxes will be variable.</li> <li>• Disregard runoff from property owners with private wells.</li> </ul>	Will require enabling legislation to allow localities to levy a tax.  Surcharges are allowed under Sect. 15.1-1260.
Recreation Fees	Variable	High	<ul style="list-style-type: none"> <li>• Places cost of improving water quality with beneficiaries.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not assess generators of runoff.</li> <li>• Discourages use of recreation facilities resources and licenses.</li> <li>• Would not generate significant revenue.</li> </ul>	Sect 15.1-1281  Will require enabling legislation to permit use of fees for BMP/SWM facilities which do not protect designated recreation facilities.

**TABLE 5 (Continued)**  
**FUNDING ALTERNATIVES FOR STORMWATER MANAGEMENT**

Funding Alternatives	Potential for Revenue	Administrative Burden	Advantages	Disadvantages	Related State Enabling Legislation (VA Code)
Stormwater Utilities	High	Low (after established)	<ul style="list-style-type: none"> <li>• A guaranteed continuing revenue base is created to finance regional BMP/SWM programs.</li> <li>• Can finance all aspects of a SWM program.</li> <li>• Equitable since it relates addition of impervious surface to increase in runoff volume.</li> <li>• May be assessed to owners of new and existing sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Initial start-up costs high.</li> </ul>	Enabling legislation is needed to clarify and/or confirm local authority to implement stormwater utilities.
Nonpoint Source Pollution Control Fee	High	High	<ul style="list-style-type: none"> <li>• Places costs of stormwater quality management with generators of NPS pollution.</li> <li>• Provides financial incentive to control NPS pollution.</li> </ul>	<ul style="list-style-type: none"> <li>• Assessments are inequitable because all property owners pay some fee.</li> <li>• The cost of the certification required for avoiding surcharge might be excessive.</li> <li>• Politically unfavorable.</li> </ul>	Will require enabling legislation.

SOURCES: Northern Virginia Planning District Commission, Evaluation of Regional BMPs In the Occoquan Watershed, (Annandale, Virginia: NVPDC, 1990), pp.3.6 - 3.7.

Hampton Roads Planning District Commission, 1990.

Continued reliance on general fund allocations has a relative minor administrative burden since revenue generating programs are already in place. Also, relying on general fund allocations to finance stormwater management activities allows a locality to avoid the costs and the inconveniences associated with borrowing. There are, however, a number of significant disadvantages to using the general fund to finance stormwater management. These disadvantages are as follows:

- Stormwater management is rarely a high priority for general fund appropriations. Moreover, since general fund revenues cannot be obligated in the long term to any particular purpose, allocations for stormwater management could be subject to shifting priorities during the annual budget process.
- The stormwater management budgeting process would be subject to fluctuations in general fund revenues.
- Little flexibility is provided for dealing with unexpected capital expenses.
- A financial burden is placed on current residents while future residents, who will also enjoy the benefits of the expenditures, are subsidized.
- Advantages of inflation, i.e. buying at today's prices and paying back over a period of years as the value of the dollar decreases, cannot be realized.
- The use of the general fund for stormwater management is inequitable. Since payments made to the general fund are not based on the potential for increased runoff, there would be a disparity between the taxes paid for and the benefits received.
- Most general funds currently do not have the resources to implement a comprehensive stormwater management program. Raising local taxes for any purpose, including stormwater management, would most likely be politically unpopular. Furthermore, convincing state legislators to earmark portions of sales and fuel tax revenues for specific local purposes would undoubtedly meet with resistance.

#### General Obligation Bonds

General obligation bonds are long-term borrowing mechanisms which are commonly sold by local governments to finance major non-revenue producing capital improvements such as roads, schools, recreational facilities and so forth. These bonds have traditionally been one of the most popular means of financing stormwater management projects. Through this method, the taxing power of a locality is pledged, through the general fund or other local money, to pay interest upon and retire debt on bond issues.

Property tax increases are often required to assure bond repayment. The advantages of general obligation bonds are that they carry low interest rates, they can be used to finance both the short and long-term costs of a stormwater management program, and they can secure substantial funding in a relatively short time.

The prime disadvantage of general obligation bonds is that localities are subject to specific debt restrictions under the Code of Virginia. A locality's outstanding debt obligation is limited to no more than ten percent of the assessed value of taxable real estate. In addition, the State Code requires counties to hold referenda on local general obligation bond issues unless a county chooses to be a city for the purpose of issuing general obligation bonds. Cities and towns may issue general obligation bonds without voter approval unless the local charter provides otherwise. In Virginia Beach and Chesapeake, bonds may be issued without referenda as long as specific annual debt limitations are not exceeded. Annual debt limitations in Virginia Beach and Chesapeake are \$10 million and \$8.5 million respectively plus any principal amount retired during the year. In both cities, bond referenda have been passed which have significantly increased general obligation debt. Although there have not been any referendum bonds issued specifically for stormwater management, bonds have been issued for street and highway improvements which have stormwater management components.

Another disadvantage of general obligation bonds is that bond installments paid from the general fund over a long period of time could reduce a locality's ability to fund other activities that are not supported by obligated funds. Timing may also be a constraint in the issue of general obligation bonds. Localities may be unable to handle the long-term debt associated with bonds issued when interest rates are high.

### Grants and Loans

There are a number of federal and state grants-in-aid and low-cost loan programs which may be used to help finance local stormwater management programs. Most of the grant programs are implemented on a competitive or matching fund basis. Most of the loan programs offer below market interest rates. Many of these programs are targeted at problems other than stormwater management, but local stormwater management projects may benefit if they are consistent with the grant/loan regulations and contribute to overall program goals. Some possible federal grant programs are listed below.

- **Community Development Block Grants.** This program has funds available for the planning and construction of water, sewer and/or housing projects. These projects must meet an urgent or immediate need to assist a community in providing a suitable living environment. This program has

funded drainage improvements, usually as part of the comprehensive renovation of a blighted neighborhood. The Virginia Department of Housing and Community Development administers this program for non-entitlement communities only. Other communities must apply directly to the U.S Department of Housing and Community Development.

- **EPA Section 319 Funds.** Under Section 319 of the 1987 Water Quality Act, the EPA is authorized to grant funds to states for controlling NPS pollution problems. The Commonwealth of Virginia has used a portion of its annual appropriation to provide competitive grants for projects which demonstrate innovative BMP technologies. Local governments are eligible to compete for these funds. This program is administered by the Division of Soil and Water Conservation, Department of Conservation and Recreation.
- **EPA Clean Lakes Program.** This EPA-administered program makes competitive grants available on a 70 percent cost share basis for the purpose of making urban lakes more usable and healthful. Initial grants can only be used for the planning of water quality projects. Once planning has been completed, projects are eligible for fifty percent cost-sharing grants to finance actual clean-up work.

State grant and loan programs that might be used to finance stormwater management are listed below.

- **The Virginia Water Facilities Revolving Loan Fund.** Under Section 601 of the 1987 Water Quality Act, the federal wastewater treatment construction grant program is to be gradually phased out and matching funds are appropriated to states to capitalize state revolving loan funds. The Virginia Water Facilities Revolving Loan Fund was established under this provision and is administered by the Virginia Resources Authority. In Virginia and throughout the country, revolving loan funds are principally used for the construction of publicly-owned wastewater treatment systems to ensure that federal water quality standards are met. To date, very few stormwater management projects have been funded by this program. Localities which have financed stormwater management projects through state revolving loan funds include Fresno, California and Jefferson County, Washington.<sup>11,12</sup>
- **Chesapeake Bay Preservation Act Program Grants.** The Chesapeake Bay Local Assistance Department administers this competitive grant program to assist Tidewater localities and planning district commissions (PDCs) in implementing the Chesapeake Bay Preservation Act.
- **Virginia Coastal Resources Management Program.** Through this program, the Virginia Council on the Environment allocates federal Coastal Resource

Management funds to state agencies, PDCs and local governments for the purpose of providing coastal resource planning and technical assistance. Both localities and PDCs are eligible for competitive grants. These grants might be used for local planning projects which address the water quality aspects of stormwater runoff. In addition to the competitive grant program, PDCs are eligible for formula grants to be used in providing technical assistance to localities.

Federal and state grants and loans offer distinct advantages to local governments. Grants are often used to offset federal or state mandates and, except for the local match, can be obtained at little or no cost to localities. Interest paid on loans is usually much less than the debt service paid on general obligation or revenue bonds. A disadvantage of federal and state grants and loans is that they usually have to be reapplied for on an annual basis and are usually extremely competitive. Therefore, funds from these sources cannot always be counted on in the stormwater management budgeting process. Also, costs associated with preliminary planning and engineering and application preparation are not recoverable if a grant or loan applicant is unsuccessful. Finally, grants and loans may come with conditions that may threaten local autonomy over local projects.

## PROPORTIONATE FUNDING

### Revenue Bonds

Revenue bonds are generally sold for revenue projects like water or sewer systems. Revenues from such projects are used to pay annual dividends to bond holders. These bonds are a type of proportionate funding because debt is retired from the revenues produced by a particular enterprise, a stormwater utility for example, rather than from the general fund. A prime advantage of revenue bonds is that, because they are not backed by the full faith and credit of the local jurisdiction, local bonding capacity is not reduced. Also, voter approval is seldom required. A disadvantage is that interest rates for revenue bonds are higher than general obligation bonds and are, therefore, more expensive to issue. Also, stormwater management facilities do not generate revenue, unless combined with a utility program.

### Double Barrel Bonds

One long-term borrowing mechanism that combines the benefits of both general obligation and revenue bonds is the "double barrel" bond. Double barrel bonds function as revenue bonds as long as revenues are sufficient to meet debt obligations. If, however, a drop in revenue results in the debt obligation not being met, allocations would be made from the general fund to cover debt payments. Double barrel bonds are generally used to finance water and sewer projects. The City of Virginia Beach is using these bonds to finance the Lake Gaston water supply project.

Because they are ultimately backed by the full faith and credit of the local government, double barrel bonds generally have lower interest rates than revenue bonds. Further more, they are not subject to the annual debt limitations established by city charters. They do, however, require voter approval and they are subject to the state-imposed debt ceiling of ten percent of assessed real estate value.

### Land Development Fees for Construction

In accordance with Section 15.1-466(d) of the Virginia Code, local governments are required to provide adequate provisions for drainage and flood control. This requirement is supported by Section 15.1-466(j) which enables localities to assess fees to developers based on the pro-rata share of runoff contributed by new development. These fees can only be assessed if a locality has a comprehensive drainage master plan in place. Also, fees can only be used for offsite facilities which would serve the developer's project. These fees, which are usually assessed on a per acre basis, could be based on imperviousness, land use or contribution to peak flow. A locality may elect to give credits where on-site control is provided.

Localities unable or unwilling to implement pro-rata share payment programs under Section 15.1-466(j) may decide to work with individual developers to elicit voluntary payments for offsite stormwater management improvements.

The main advantage of this funding alternative is that it encourages the development of regional stormwater management facilities because most developers would prefer to pay a one-time fee for publicly constructed off-site facilities than to contend with the design and construction of multiple on-site facilities. In addition, under the Chesapeake Bay Preservation Act regulations, a locality may implement this alternative in lieu of a program which requires on-site controls. On-site control programs are generally less effective and more difficult to administer than regional stormwater management programs. Finally, this alternative is relatively equitable in that developers will recoup these fees from the ultimate beneficiaries of new stormwater management facilities through higher home costs.

There are a number of disadvantages to the pro-rata share payment program as provided for under state law.

- Fees can only be assessed on new development. Costs cannot be recovered from existing landowners in the watershed.
- Fees can only be used for the construction of facilities that serve new development.



- Facilities must be constructed in advance of development and before receipt of pro-rata share contributions. Typically, bond issues or general fund allocations are used for these front-end construction costs.
- Funds cannot be used for operation and maintenance,
- A locality must have a master drainage plan in place. Such plans do not exist for most Hampton Roads localities.
- Fees can only be used to construct regional stormwater management facilities. In some localities, such facilities are impractical due to the lack of large tracts of undeveloped land.

### Land Development Fees for Maintenance

Under this option, developers would be required to make a lump sum payment, usually prior to construction, to pay for ten to fifteen years of maintenance to publicly maintained facilities serving residential areas. It may also be possible to use a variation of this alternative to require owners of privately maintained basins to make a front-end payment to cover maintenance inspection costs.

An advantage to this approach is that localities would have maintenance funding in advance which would facilitate effective planning and budgeting. In addition, this option promotes preventative maintenance, and is equitable in that fees would undoubtedly be passed on to the benefitting property owners through higher home prices.

The assessment of these fees is likely to be unpopular with developers. Another disadvantage is that a fee might underestimate the cost of future maintenance and funds might run out sooner than expected. Also, this option only buys time for a locality. Once the up-front funds run out, maintenance costs will become the sole responsibility of the locality. Finally, enabling legislation is required to allow the assessment of up-front fees for the maintenance of public stormwater management facilities.

### Participation and Reimbursement Agreements

Another proportionate funding alternative is the use of voluntary participation and reimbursement agreements with developers. Through this technique, a developer agrees to finance and construct a regional stormwater management facility to the specifications of a locality and to be reimbursed over time as new development occurs in the same watershed. The benefit of this approach is that a locality does not have to have the up-front capital to construct a facility.

Disadvantages to this option are similar to those associated with land development fees. Additionally, it may be difficult to encourage a developer to participate in such agreements because the rate of reimbursement is dependent upon the level of development. Full reimbursement could be significantly delayed if there is a significant slowdown in development activity in the watershed.

#### Assessments for Local Improvements

Section 15.1-239 of the Code of Virginia permits localities to assess abutting property owners who benefit from public stormwater management improvements. This special tax assessment must be in proportion to the benefits received from the improvement. Up to 50% of the cost of the project can be charged to an abutting property owner who would have up to ten years repay the debt through his assessments. Special assessments can be implemented either by a request from 75% of the abutting landowners, or by a request from a majority of landowners and a two-thirds vote by the city council or board of supervisors.

This option has applicability in very limited circumstances. It is not likely to provide revenues for most stormwater management projects.

#### Special Service Districts

Special service stormwater management districts can be established in designated areas, usually watersheds. Property owners in such districts would be taxed by the locality to provide funds for the construction and maintenance of local stormwater management facilities. To ensure equitable taxation, a locality may decide to develop a tax rate based on the imperviousness of each property.

The establishment of a special stormwater management district may be very difficult because its formation is contingent upon the approval of fifty percent of the proposed district's voters. Consequently, this alternative is probably only practical in developed areas where chronic flooding problems are so severe that residents are willing to tax themselves to obtain relief. It is highly unlikely that residents of a sparsely developed watershed without existing stormwater problems would create a district in anticipation of future development. It is also unlikely that a locality could garner enough community support to establish service districts to cover its entire jurisdiction.

#### Watershed Improvement Districts

Section 21-112.1 of the Virginia Code allows property owners within a specific watershed to establish a special Watershed Improvement District (WID) which is administered not by the local government, but by the local Soil and Water Conservation District (SWCD). Establishment of a WID requires a special petition, public hearings and a referendum approved by two-thirds of the property owners representing at least two-thirds of the land area within the proposed WID. Once the

referendum is passed, the SWCD appoints a board of directors. This board could issue bonds, apply for federal and state grants and loans, and assess fees in order to finance the construction, operation and maintenance of stormwater management projects. An advantage of WIDs is that they can be used in watersheds that include more than one jurisdiction.

A potential disadvantage of WIDs is that the development and administration of a WID stormwater management program would be outside the control of the locality. This could seriously undermine a locality's comprehensive stormwater management efforts. Another disadvantage is that it is highly unlikely that WIDs could obtain approval in every watershed within a locality. Also, it is doubtful that a WID could raise the funds necessary to hire the staff required to develop and implement a successful stormwater management program. One possible solution to these problems would be to enact enabling legislation which would allow localities some control in WIDs in return for administrative services.

#### Potable Water Volume Use Tax and Potable Water Surcharge

Water consumers have a direct interest in protecting their water supply from NPS pollution. If stormwater management techniques can be used to reduce the amount of NPS pollution entering a water supply, then the cost of water treatment can be reduced. By linking NPS pollution control to water supply protection, it is reasonable to assess water supply users a potable water tax or surcharge to finance the implementation of stormwater management programs within water supply drainage basins. A water volume tax is based on the amount of water used by each customer, while a water surcharge is a flat fee assessed to each customer regardless of the volume used. Both types of assessments could be added to water bills.

One disadvantage of this technique is that it can only be used to finance stormwater management activities in water supply drainage basins. Also, it disregards runoff from property with private wells. In Hampton Roads, many water supply reservoirs are located outside of the jurisdictions that own them. In these cases, there may be political and administrative obstacles to developing a process through which a locality owning a water supply transfers a portion of its income to the locality in which the water supply is located for the purpose of stormwater management.

A disadvantage specific to the water volume use tax is that, due to fluctuations in annual rainfall, the amount of water used, and therefore tax revenues, is unpredictable. This would result in considerable uncertainty in the stormwater management budgeting process. Another disadvantage to use taxes is that enabling legislation does not currently exist to allow water utilities to assess such taxes for water quality improvements.

## Recreation Fees

Since the control of NPS pollution enhances water-based recreation, a recreational users fee for stormwater management might be considered. This fee could be collected at public water access facilities. A problem with this approach is that it would probably not generate sufficient revenue to adequately address stormwater management problems. Furthermore, the equity of this approach is questionable since generators of runoff would not be assessed a fee. Another disadvantage is that such a fee may discourage the use of recreational facilities and licenses. Finally, state enabling legislation would be required to allow the use of recreation fees for water quality improvement.

## Stormwater Utilities

A stormwater utility is perhaps the most promising option for the financing of stormwater management programs in Hampton Roads. Many localities throughout the United States are using stormwater utilities in combination with bonds and other programs to finance all aspects of local stormwater management. A listing of U.S. communities known to have stormwater utilities can be found in Appendix B. The 1990 Evans, Mechwart, Hambleton and Tilton survey found that there is considerable interest throughout the country in establishing stormwater utilities. Of the fifty-two responding localities, six (12%) have a stormwater utility in place, fourteen (27%) are currently developing utilities and 23 (44%) expressed interest in the stormwater utility concept. In Hampton Roads, both Hampton and Virginia Beach are studying the feasibility of stormwater utilities.

A stormwater utility is similar to a water or sewer utility in that it is a local government enterprise, financially separate from other municipal functions, and it is financed by user fees placed into restricted accounts that can be used only for one purpose. A significant advantage of a stormwater utility is that revenues can be generated without impacting the general fund. These revenues can be used to support the issue of revenue bonds, or to provide the up-front costs for facilities that will ultimately be paid for through development fees.

Stormwater utilities should be nonexclusive with fees assessed to all generators of runoff located in areas where runoff is managed through publicly owned systems. Stormwater utility fees should be assessed to individual parcel owners and should be related to the amount of runoff generated in excess of that contributed by land in a natural, undeveloped state. In some cases, credits for onsite control are given. The following briefly describes three techniques for assessing stormwater utility fees.

- The "rational method" bases the fee on the rational runoff coefficients corresponding to different land use designations.
- A fee can be based on the amount of impervious surface which is either measured, estimated or assumed for each parcel of land. One common

approach is to base a fee on the number of "equivalent residential units", or ERUs, associated with a site. An ERU is commonly defined as the area of impervious surface corresponding to a typical single family detached residential unit.

- An administratively simple but potentially inequitable approach is to assess a flat charge to each property owner.

Stormwater utilities have a number of advantages. Most importantly, they represent a stable and secure funding source for both short and long term stormwater management activities. Moreover, utilities would be relatively easy to administer because the charges can be attached to other municipal billings or be included as a line item on the annual property tax bill.

The prime disadvantage of stormwater utilities is that there is no clear authorization under Virginia law to establish stormwater utilities. CDM has suggested that the following sections of the Code of Virginia might be pieced together to provide sufficient local authority to implement stormwater utilities:

- Section 15.1-283: Provision of Adequate Drainage
- Section 15.1-170: Public Finance Act
- Section 15.1-446(j): Pro-rata Share Provisions of Subdivision Ordinance

Although adequate authority might be derived from these sections, CDM has concluded that the ability to issue bonds may be compromised without enabling legislation that specifically allows localities to establish stormwater utilities.<sup>13</sup> Other sources have reached a similar conclusion. A bill that would authorize stormwater utilities was considered and rejected by the 1990 Virginia General Assembly. Given stormwater financing needs throughout the state, the 1991 General Assembly is considering similar legislation.

Once established, stormwater utilities are relatively simple to administer. Setting up a utility may prove to be difficult, however. The process of defining a service boundary, identifying exemptions, and developing an equitable rate structure and billing system will be expensive, and may be subject to citizen resistance.

In general, it appears that stormwater utilities throughout the country have been successful. In 1988, the Maryland Department of the Environment surveyed nineteen stormwater utilities nationwide.<sup>14</sup> Representatives of these utilities were asked to rank their operations as to whether they are very successful, successful, somewhat successful or not successful. Of the sixteen utilities that answered this question, seven utilities were ranked as very successful, seven were ranked successful

and only two were ranked somewhat successful. None of the responding utilities were ranked as not successful.

### Nonpoint Source Pollution Control Fee

The nonpoint source pollution control fee is a financing technique that has been proposed by the Washington State Department of Ecology (DOE). This approach is similar to a stormwater utility in that a base fee is assessed to most property owners. It differs from a utility in that it is administered by the state and revenues are used solely for NPS pollution control, and not for drainage control. Another difference is that this technique imposes a financial disincentive on landowners that are causing significant NPS pollution.

Under the Washington DOE scheme, most property owners would pay a \$12 per year fee that would be collected via special assessments on property tax statements. These revenues would be used to finance local and state NPS control programs. A \$75 per year avoidable surcharge would be assessed to landowners with onsite septic systems or livestock operations. This surcharge could be avoided if landowners can certify that septic systems are in good working order and that BMPs are used to control animal waste. In addition, an annual \$6 per parcel surcharge would be assessed to urban landowners which could be avoided if stormwater management controls are in place. Once a locality adopts a comprehensive stormwater management program, this surcharge would be removed. Although this program is proposed to be implemented on the state level in Washington, it may be feasible to implement such a program at the local level.

Because this strategy is still in the development stage in Washington state, its feasibility remains to be seen. A foreseeable problem with this approach is that it is inequitable. All property owners with similar land uses would pay the same base fee regardless of parcel size or intensity of land use. For this reason, this approach is likely to be politically unacceptable. It is likely that the cost of conducting the certification required for avoiding the \$75 per year surcharge will exceed the surcharge itself. This would offer little incentive for compliance. Another problem with this approach is that, in Virginia, it would require state enabling legislation.

## RECOMMENDED STORMWATER MANAGEMENT FINANCING STRATEGY

There is no single stormwater management financing strategy that could comprehensively address the specific needs of all local governments. Localities have differing stormwater management approaches and financial needs. They also have differing drainage infrastructures, mixes and intensities of land uses, and political considerations. They may also be subject to different state and federal stormwater management regulations. All of these variables will dictate the most appropriate type of financing strategy. However, based on the analysis presented in this report, HRPDC staff recommends a strategy which combines several financing techniques which appear to have the greatest potential for efficiently and equitably meeting local stormwater financing needs. Although wholesale adoption of this strategy may not be appropriate for most localities, it should be considered as a starting point for the development of community-specific approaches. This recommendation is consistent with stormwater financing strategies developed by CDM for the City of Virginia Beach and by the Northern Virginia Planning District for the Occoquan watershed. 15, 16

Central to any stormwater management financing strategy is a stormwater management master plan which accomplishes the following:

- guides both the immediate and long-term construction, operations and maintenance of stormwater management facilities;
- establishes structural and non-structural programs that control both the quantity and quality of runoff; and,
- addresses state and federal stormwater management and NPS pollution control mandates.

Such a plan is crucial to the development of a financing strategy as well as a budget which accurately reflect current and long-term stormwater management costs. In addition, contested stormwater management financing strategies are more likely to be upheld if they are based on a master plan.

The HRPDC staff recommends the use of a combination of financing mechanisms to meet both existing and anticipated stormwater management needs. The core of this approach would be a stormwater management utility. A utility could, depending on the content of state enabling legislation and the structure of local utility programs, meet the costs associated with federal and state NPS pollution control mandates as well as ongoing stormwater management needs. It can also be a relatively equitable approach as long as the selected rate structure provides a defensible means of proportionately allocating costs to the contributors of runoff. A utility would ultimately be used to support the issuance of revenue bonds which would provide funds for certain large-scale capital improvements that exceed the capacity of the utility fund. Perhaps the greatest advantage of a stormwater utility is

that it can provide stability and self-sufficiency to a stormwater management program. This allows for more long-term, comprehensive planning to occur.

During the time required for a utility to be developed and, once a utility is implemented, to entirely phase out general fund contributions, a locality will continue to depend on the general fund and general obligation bonds to fund stormwater management activities. Stormwater utilities designed for several municipalities in Florida were set up to phase out general fund contributions in two to five years.<sup>17</sup>

Developing localities are also encouraged to establish a pro-rata share payment program through which developers in developing areas would pay their proportionate share of regional stormwater management facilities. Such a program is currently allowed under State law and would provide up-front construction money which could eventually be supplemented by stormwater utility revenues.



## IMPLEMENTATION OF A STORMWATER UTILITY

This section provides a brief overview of the procedure to be followed and the factors to be considered in implementing a stormwater utility. It is important to note that, in Virginia, the structure and functions of local stormwater utilities will be dependent on the content of enabling legislation. The bibliography cites a number of additional publications that provide further information on stormwater utility implementation.

### GENERAL PROCEDURE FOR DEVELOPMENT AND IMPLEMENTATION

The following recommended planning procedure should be followed in conjunction with an overall master planning process to develop and implement a stormwater utility:

1. Document the need for additional revenues to finance stormwater management.
2. Determine present and estimate future financing needs and determine which needs can be realistically met by a stormwater utility.
3. Identify and resolve legal constraints which may impede development of a utility.
4. Evaluate alternative rate structures and select a simple but equitable rate structure that is appropriate for the locality.
5. Develop a strategic plan which will guide the expenditure of funds collected through the utility.
6. Develop an effective public relations program to facilitate public acceptance of a utility.
7. Develop a billing system.
8. Determine organization and staffing needs.
9. Prepare an ordinance(s) which will establish the utility.

Although the time required to implement the above planning process will vary depending on the community, the experience of existing utilities indicates that a stormwater utility can be implemented in twelve to eighteen months. Many communities retain consultants to assist in the development of a utility. Consultant services are most often required for master planning and the development of billing systems.

Once implemented, a utility program should be evaluated after a year or two, and adjustments should be made to ensure that the rate structure is fair and that it generates the revenues necessary to meet stormwater management needs.

## ESTABLISHING A RATE STRUCTURE

Stormwater utilities have been implemented in numerous communities throughout the United States. These utilities finance a range of activities and use a variety of rate structures. Selection of an appropriate rate structure for a utility will depend on local conditions and policies, and a careful evaluation of options that are being employed elsewhere. Ideally, a rate structure will be designed so that the sum of the charges for all parcels plus other sources of revenues to a utility will equal calculated revenue requirements.

The following is a discussion of typical approaches to developing rate structures. For more information on establishing utility rate structures, the reader is referred to the documents cited in the bibliography, especially those published by CDM and the Maryland Department of the Environment.

Stormwater utility charges are typically based on a rate factor that expresses a parcel's runoff potential and its consequent burden on a municipal drainage system. In reality, runoff potential is a function of a combination of many factors including total site area, imperviousness, soil, slope, etc. However, in developing stormwater utility rate structures, imperviousness is the only factor that can be used with any practicality. Rate factors are usually derived in two basic ways: (1) the application of Rational Method runoff coefficients developed for discrete land use categories, or (2) the measurement or estimation of impervious area for each parcel. The second approach is the most commonly used and is discussed below. However, a number of existing utilities use a combination of both approaches. An alternative would be to link rates to the amount of a particular pollutant, such as sediment, generated on a parcel. This approach would seem to be impractical due to the lack of reliable data and the difficulty and expense associated with obtaining such data.

In estimating runoff potential as a function of measured or estimated impervious area, estimates may be based on either total parcel imperviousness or solely on the directly connected impervious area (DCIA). The DCIA includes those areas, such as driveways, which drain directly to the municipal drainage system. Rooftops and patios are not generally included in DCIAs because they drain to pervious surface (i.e., the lawn)

The amount of impervious area on a parcel is usually expressed in terms of "equivalent residential units" (ERUs).<sup>18</sup> One ERU represents the average total imperviousness, or the average DCIA, for residential parcels within a service area. These averages are generally obtained by digitizing a random sample of residential parcels from property maps or aerial photos. Average residential parcel imperviousness or DCIA can be calculated for single family unit parcels only, or for all

**FIGURE 2**  
**STORMWATER UTILITY RATE STRUCTURE**

◆ **BASE UNIT:** FLAT RATE ( \$/MONTH) FOR EACH  
"EQUIVALENT RESIDENTIAL UNIT" (ERU)

● ERU - AVERAGE IMPERVIOUS AREA (SQ. FT.)  
OF SINGLE FAMILY RESIDENTIAL PARCELS

◆ **OTHER LAND USES:**

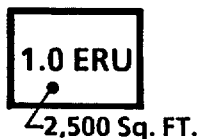
● NO. OF ERUS = (IMPERVIOUS AREA) / ERU

◆ **EXAMPLE:**

● ERU = 2,500 SQ. FT.

● FLAT RATE = \$2.00 / MONTH / ERU

**SINGLE  
FAMILY  
UNIT**



**INDUSTRIAL SITE  
IMPERVIOUS AREA**

1.0 ERU	0.8 ERU
---------	---------

Total = 1.8 ERU  
Rate = (1.8 ERU) x (\$2.00) = \$3.00 /Month

**COMMERCIAL SITE  
IMPERVIOUS AREA**

1.0 ERU	1.0 ERU	0.5 ERU
1.0 ERU	1.0 ERU	0.5 ERU

Total = 5.0 ERU  
Rate = (5.0 ERU) x (\$2.00) = \$10.00 /MONTH

Source: Hartigan, John P. Use of Stormwater Utility to Meet New Water Quality Requirements, (Virginia Beach, Virginia: Camp Dresser & McKee, 1989), p. 3.

residential parcels (i.e., single family, multi-family, condominiums and mobile homes).<sup>18</sup> Based on this approach, every single family unit parcel, or every residential parcel, is considered to have one ERU and is charged a flat rate. Most utilities choose to standardize charges for residential properties because, in most communities, the majority of parcels are classified as residential, the intensity of development of these parcels is generally similar, and it would be excessively expensive to determine precisely the percentage of impervious area on each parcel. Surveys of existing utilities have found that ERU values generally range from \$1.00 to \$4.50.<sup>20, 21, 22</sup>

A utility fee for non-residential parcels is based on the number of ERUs on that parcel. This is obtained by dividing the measured total impervious area or DCIA of that parcel by the assumed average total imperviousness or DCIA for all residential parcels. This procedure is illustrated in Figure 2 which outlines an ERU-based rate structure and provides examples of how fees might be assessed for industrial and commercial sites. Initially, the imperviousness for each non-residential property will have to be measured using property maps and/or aerial photos. Eventually, however, a data base can be built that would facilitate this process by requiring impervious area measurements on building permit applications. The calculation of impervious area is already required for development occurring within Chesapeake Bay Preservation Areas.

Some localities have incorporated a fee for undeveloped land in their stormwater utility. This fee is generally based on soil characteristics, water table depth and, if applicable, type of agricultural use. Fees for undeveloped land are generally used in communities with large tracts of undeveloped property or a large number of vacant parcels. This practice is controversial, however. Owners of undeveloped land have argued successfully in court that they should not be charged because they have not altered natural conditions.

## BILLING

Developing a fair and equitable billing system is likely to be the most expensive and time consuming process in developing a stormwater utility. The development of a billing system includes identifying the customers of a utility, establishing an appropriate per unit charge, and generating the standard data necessary to calculate, print, mail and collect payment on bills. This process can be particularly expensive if parcels have to be mapped or digitized to determine impervious area. Since it is not within the scope of this report to fully investigate the many issues associated with the development a utility billing system, only a brief overview of some of the major issues is provided. For a more detailed discussion, the reader is referred to a 1987 URS report entitled Surface Water Management: The Utility Approach.

To reduce administrative costs and facilitate implementation, a stormwater utility bill is typically "piggybacked" on an existing utility billing system (e.g., water,

sewer, electric and so forth). Other options, which are usually less efficient, include adding stormwater charges to property tax bills or creating a new, separate billing system. The type of billing device used will depend on the service areas and the billing systems of other utilities, the costs associated with the various options, public perceptions, and the regulations of the State Corporation Commission.

Existing utilities use a wide variety of billing frequencies. The 1988 Maryland Department of the Environment (MDE) survey and a 1990 survey of utilities conducted by the City of Virginia Beach report that monthly, bimonthly, quarterly, semiannual and annual billing cycles are commonly used.<sup>23</sup> In general, less frequent billings will result in lower billing costs.

In order for a stormwater utility to be fair and equitable, all land uses contributing runoff to a public drainage system should be included in the program. Utilities often charge properties that are normally exempt from user charges such as government, church and school properties. It is not uncommon, however, for a utility to exempt these uses for political reasons. Street rights-of-way are usually exempt, although some utilities in Washington state have begun charging limited access highways.<sup>24</sup> In some cases, utilities exempt parcels which drain directly to receiving waters and do not make use of public drainage systems.

A feature that is common to most utility billing systems is the issuance of credits or the addition of surcharges to utility fees depending on the characteristics of a parcel. Credits may be issued to properties that provide on-site stormwater management. A surcharge may be imposed on parcels located in a floodplain because they receive additional benefits. Surcharges may also be levied in specific watersheds which have a greater need for the maintenance of existing facilities or for the construction of new facilities.

## ADMINISTRATION

The MDE survey found that stormwater utilities are most often administered by utility departments.<sup>25</sup> In most cases, however, it was found that utility department administrators report to the directors of public works which implies some management responsibility by public works departments. Other agencies with direct utility management responsibilities include public works, environmental services, engineering, public services, the city manager's office, and new departments that were specifically formed to administer stormwater utilities.

A locality may elect to establish a Stormwater Management Board to oversee the utility program. Specific responsibilities of this Board would include identifying stormwater management problems, developing long range master plans, determining utility charges, and hearing any petitions or appeals. Such boards are typically comprised of five to seven members who are appointed by the governing body.

## IMPLEMENTATION COSTS

The 1988 MDE survey found that total costs to implement a utility ranged from \$15,000 to \$785,000, while per capita implementation costs ranged from \$0.44 to \$6.67.<sup>26</sup> The reported estimated costs were developed in different ways and, in some cases, are over ten years old. Therefore, the MDE cautions that they should be used only as rough approximations of the costs to implement a utility.

## PUBLIC ACCEPTANCE

There are several obstacles to public acceptance of local stormwater utilities. Securing public acceptance will depend on a locality's ability to adequately educate citizens about the problem and convince them of the merits of the proposed solution. A well designed stormwater utility program is also essential for public acceptance. A utility rate structure and billing system must be fair and reasonable and bear a clear relationship to the costs of services and facilities. Excessive user charges will, more than any other factor, kill a utility proposal.

The general public is always wary of local government proposals to increase revenues. Raising money specifically for drainage and NPS pollution control may be particularly difficult due to common public perceptions regarding stormwater management. Some of the perceptions are summarized as follows:

- Most people view stormwater management as a government service to solve a public problem, not a service that they use to manage runoff that they themselves generate.
- In semi-rural developing areas, the natural system has been traditionally used to convey, store and discharge stormwater runoff. Citizens may question the funding of stormwater quality control facilities when it seems that the natural system is adequately handling runoff.
- Upstream landowners may question the funding of downstream improvements when they do not benefit. Conversely, downstream landowners may object to paying for improvements when it is upstream properties that are causing the problems.
- Existing property owners may object to paying for stormwater management facilities that are required as a result of new development.

These perceptions can be countered by emphasizing the importance of a comprehensive stormwater management program in assuring a high quality of life for all residents, regardless of how long they have lived in a community or where they live in a watershed. Community-wide stormwater management benefits include the following:

- Maintaining adequate water quality in receiving streams to protect the viability of aquatic resources and to protect the aesthetic and recreational qualities of waterways.
- Keeping streets open to emergency vehicle traffic, and for the conduct of business.
- Maintaining stormwater management facilities so they do not become health or safety hazards.
- Promoting the use of stormwater management facilities for recreational purposes.

A number of techniques can be employed to promote and educate citizens about stormwater utilities. These include public meetings, the creation of citizen advisory boards, the mailing of information brochures to property owners, and the purchase of advertisements in newspapers or on radio and television.

#### REGIONAL IMPLEMENTATION

One long-term option deserving consideration is the implementation of a regional stormwater utility. Utilities serving multiple jurisdictions have been implemented successfully in several areas of the country.<sup>27</sup> Existing regional utilities typically serve a city and the urbanized portion of an adjacent counties. In Hampton Roads, regional service agencies that might have the capability to develop and implement a stormwater utility for all or part of the region include the Hampton Roads Sanitation District, the Southeastern Public Service Authority, of the Virginia Peninsula Public Service Authority.

The formation of a regional stormwater utility might be of value in several situations. Two or more localities sharing a common watershed might form a utility to address mutual flooding problems or to manage the water quality of the receiving stream. A regional utility may also be of benefit in meeting certain requirements that are common to all localities required to comply with state and federal mandates. For example, significant economies of scale might be achieved by conducting the sampling, analysis and illicit connection screening requirements of the EPA NPDES stormwater permitting regulations on a regional basis. Master planning, the development of region-wide stormwater management standards and guidelines, technical assistance in complying with state and federal mandates, and public education are other activities that might be undertaken by a regional utility.

A disadvantage to a regional approach is that there are currently no utilities that serve the entire region so that it is likely that a new billing system would have to be created.

## REVENUE POTENTIAL OF STORMWATER UTILITIES

The revenues generated by a stormwater utility can be significant. By implementing a utility, it is not uncommon for local stormwater management programs to experience a three to five fold increase in revenues over previous general fund appropriations.<sup>28</sup> A study conducted by the MDE estimated that a stormwater utility, depending on its structure, could generate from \$4.9 to \$23.0 million per year in Prince Georges County, Maryland. This revenue would greatly benefit the County's stormwater management program which currently costs approximately \$11 million annually.<sup>29</sup>

A 1989 CDM study estimated that a \$2.00 per ERU per month utility charge assessed by a locality with a population of between 100,000 and 250,000 can fund all local programs required by new water quality management regulations. Specifically, it was estimated that this rate structure could not only meet the cost of submitting an NPDES permit application, but could also increase the area served by new regional BMPs by one to two square miles per year.<sup>30</sup>

Table 6, which is adapted from the MDE survey, shows utility charges and revenues for twenty-one existing utilities. It includes number of accounts, the typical monthly utility charge for a single family residence, and the revenues solely from user charges as well as the total utility revenues derived from all sources. Most utilities depend on revenues from sources other than user charges. These sources may include regulatory and development fees, special benefit assessments, interfund transfers, interest from investments, and state and federal grants. As can be seen from Table 6, user charges can account for anywhere from 82% to 100% of total utility revenues.



**TABLE 6**  
**UTILITY CHARGES AND REVENUES<sup>1</sup>**

Utility	Number of Accounts	Typical Monthly SFR <sup>2</sup> Charge	Utility Revenue From Charges	SFR Charges as Percent of Charges	Total Utility Revenues	Charges As Percent of Total Utility Revenues
Ann Arbor, MI	21,175	\$1.52	\$932,244	NA	\$932,244	100%
Auburn, WA	7,000	\$2.00	\$820,000	15%	\$820,000	100%
Austin, TX	203,000	\$1.30	\$4,300,000	63%	\$4,300,000	100%
Bellevue, WA	24,000	\$7.45	\$4,100,000	46%	\$4,100,000	100%
Billings, MT	26,000	\$1.74	\$1,302,815	NA	\$1,302,815	100%
Boulder, CO	25,00	\$4.03	\$1,536,000	NA	\$1,536,000	100%
Cincinnati, OH	100,000	\$1.28	\$4,300,000	NA	\$4,480,000	95%
Corvallis, OR	11,000	\$2.15	\$560,000	50%	\$560,000	100%
Everett, WA	60,000	\$1.83	\$1,925,000	NA	\$1,925,000	100%
Ft. Collins, CO	25,000	\$1.80	\$4,600,000	NA	\$4,750,000	96%
Kent, WA	6,000	\$2.50	\$2,500,000	NA	\$2,500,000	100%
Louisville, KY	184,571	\$1.75	\$8,200,000	NA	\$8,337,000	98%
Medford, OR	15,600	\$2.95	\$1,200,000	NA	\$1,460,000	82%
Montpelier, VT	1,700	\$3.00	\$75,000	78%	\$75,000	100%
Portland, OR	157,370	\$3.45	\$10,471,000	37%	\$10,471,000	100%
Renton, WA	10,282	\$2.50	\$1,200,000	21%	\$1,200,000	100%
Roseville, MN	10,000	\$1.07	\$532,342	NA	\$594,257	89%
Seattle, WA	178,000	\$2.64	\$8,500,000	50%	\$8,700,000	97%
Tacoma, WA	62,450	\$2.30	\$2,231,400	NA	\$2,400,000	92%
Vancouver, WA	21,000	\$1.40	\$482,500	NA	\$482,500	100%
Wooster, OH	NA	\$2.90	NA	NA	NA	NA

<sup>1</sup>Results of telephone survey conducted by the Maryland Department of the Environment in June 1990.

<sup>2</sup>SFR = Single Family Residential, also know as Equivalent Residential Unit (ERU).

NA - Not Available

Source: Maryland Department of Environment, Stormwater Management Administration, 1990.

## STORMWATER UTILITY ORDINANCE

The previous chapter outlines a planning procedure for developing a stormwater utility. This procedure concludes with the development of an ordinance to implement a utility. Such an ordinance would specify the scope, administration, rate structure, billing system and other aspects of a utility.

The following model ordinance has been developed to guide local governments in establishing stormwater utilities. Because of the wide diversity among communities with respect to stormwater control needs, financing needs, administrative functions and political philosophies, this ordinance does not recommend a specific rate structure or billing system. The model ordinance will have to be revised and supplemented to suit local needs. Also, the content of the ordinance will be governed by state enabling legislation, assuming such legislation is passed by the 1991 Virginia General Assembly. Under no circumstances should the model ordinance be adopted verbatim.

In some cases, a stand alone ordinance may not be necessary. Stormwater utility regulations may be incorporated in existing stormwater management ordinances or in other ordinances that address the collection of user charges.

The following was adapted from a model ordinance prepared by the Maryland Department of the Environment in 1988. The MDE ordinance was based on twenty stormwater utility ordinances used in communities throughout the country.

### MODEL ORDINANCE

#### Sec. 1. FINDINGS, INTENT AND AUTHORITY

##### Sec. 1.1. Findings. The (local government council/board) finds that:

- (a) The (local government) maintains a system of stormwater management facilities which includes inlets, conduits, manholes, channels, ditches, drainage easements, retention and detention basins, infiltration facilities, and other components as well as all natural waterways.
- (b) The stormwater system has received inadequate maintenance and is in a state of disrepair.
- (c) Water quality is degrading due to erosion and the discharge of pollutants into and through the stormwater system.
- (d) The (local government) is faced with a variety of state and federal mandates to control nonpoint source pollution.
- (e) The public health, safety and welfare is adversely affected by poor water quality and flooding that results from inadequate management of both the quantity and quality of stormwater.
- (f) The (local government) is exposed to the possibility of costly litigation due to the state of disrepair of the existing system and the potential for

floods that can cause property damage, personal injury, and impede the movement of emergency vehicles.

- (g) Every parcel of real property, both public and private, either uses or benefits from the maintenance of the stormwater system.
- (h) Current and anticipated growth in the (local government) will contribute to and increase the need for improvement and maintenance of the stormwater system.
- (i) The extent of use of the stormwater system by each property is dependent on factors that influence runoff including land use and intensity of development, amount of impervious surface, and location of property within a watershed.
- (j) Property owners should finance stormwater management to the extent that they contribute to the need for it.
- (k) The (local government) needs to better define responsibilities for stormwater management, to improve planning for stormwater management, and to ensure that the true costs of stormwater management are reflected in the capital improvements program and the operating budget.
- (l) Management of the stormwater system to protect the public health, safety and welfare will require increased revenues.
- (m) It is in the interest of the public to consolidate responsibility for management of the stormwater system within a single agency, to initiate long range master planning, to undertake water quality management and stormwater facility maintenance activities, and to finance stormwater management adequately with a user charge system that is reasonable and equitable so that each user of the system pays to the extent to which he contributes to the need for it.

Sec. 1.2. Intent. With the passage of this ordinance, it is the intent of the (local government board/council) to promote the health, safety and welfare by:

- (a) Creating a stormwater management utility to manage the stormwater system.
- (b) Consolidating responsibility for all stormwater management activities in the (local government agency).
- (c) Preparing long range plans for stormwater management for each water basin in the (local government).
- (d) Undertaking regular maintenance for all public stormwater management facilities and requiring annual inspections of all private facilities.
- (e) Financing stormwater management through imposition of user charges for each piece of real property that uses the stormwater system.
- (f) Setting charges such that the fees paid by each user reflect the extent to which the user creates a need for the system and such that the fees bear a substantial relationship to the cost of service.
- (g) Creating a rate structure based on the intensity of land use and the amount of impervious area on each property that is fair and equitable, is

simple to understand and can be administered easily, will generate sufficient revenues.

Sec. 1.3. **Authority.** Authority for creation of this stormwater utility and the imposition of charges to finance stormwater management is conferred in (State Code provision) which states:

(Insert State Code Citation)

The provisions of this Ordinance are adopted under the authority of the (local government) Code and shall apply to all real properties within the area of the (local government). The application of this Ordinance and the provisions expressed herein shall not be deemed a limitation or a repeal of any other powers granted by State statute.

Sec. 2. DEFINITIONS

For the Purposes of this Ordinance, the following definitions are adopted:

(Insert Definitions of Key Words and Phrases Found in Ordinance)

Sec. 3. CREATION AND ADMINISTRATION OF UTILITY

Sec. 3.1. **Establishment of Stormwater Management Utility.** In accordance with all applicable laws of the Commonwealth of Virginia, the (local government council/board) hereby establishes a Stormwater Management Utility with the authority to determine and levy charges for stormwater management. The Utility will be in the (local government agency) under the control of the (local government agency administrator).

Sec. 3.2. **Boundaries and Jurisdiction.** The boundaries of the Utility will be (boundaries of local jurisdiction(s)) or (such watersheds within the boundaries of the local jurisdiction as identified by the local agency administrator and approved by the local government council/board).

Sec. 3.3. **Creation of Stormwater Management Board (optional).** To assist with management of the Utility, the (local government council/board) hereby establishes a Stormwater Management Board to provide advice to the (local government council/board) concerning all aspects of the program. The board shall consist of from five to seven members as determined by the (local government council/board). The (local government council/board) shall appoint all members. Terms of members shall be four years, except that initial appointments shall be made in such a way that terms overlap.

Sec. 3.4. **Duties of the Board (optional).** The Board shall provide advice and recommendations on all aspects of the management and operation of the Utility including:

- (a) Identification of stormwater management problems.
- (b) Development of a long range master plan for stormwater management, including priorities for implementation of capital improvements.
- (c) Determination of Utility charges.
- (d) Any petitions or appeals by users of the system who contest levels of charges or request waivers or exemptions from charges.

Sec. 3.5. **Utility Administration.** The (local government agency administrator) shall have responsibility for implementing all aspects of the Utility including long range planning, plan implementation, capital improvements, maintenance of stormwater facilities, determination of Utility charges, billing, enforcement of applicable stormwater management ordinances, and hearing of appeals and petitions. The (local government agency administrator) will also have responsibility for providing staff support to the (local government council/board) and the Stormwater Management Board. Such responsibility will be delegated to those agencies and staff within the (local government) administration best equipped to perform a particular task. In the event that an agency or department other than the one in which the Utility is located is best equipped to undertake a particular task, the (local government agency administrator) shall ensure that appropriate interagency charges are determined such that all costs of stormwater management are reflected in the Utility budget and that Utility charges finance all aspects of stormwater management.

Sec. 3.6. **Scope of Utility Responsibility.** The (local government council/board) hereby transfers all components of the stormwater system presently maintained by other agencies within the (local government) administration to the Utility. The Utility shall have responsibility for planning, development, and maintenance of the stormwater system. The Utility shall be responsible for all additions to the stormwater system constructed with public funds.

With respect to new stormwater management facilities constructed by private entities, the (local government agency administrator) shall develop criteria for use in determining whether facilities will be maintained by the Utility, by the private entity that constructed them or by property owners. In general, preferences shall be given to public maintenance of new facilities, particularly for those facilities designed to provide water quality benefits. In situations where it is determined that public maintenance is not preferable, standards shall be developed to ensure that the inspection and maintenance of facilities occurs as needed.

Sec. 4. MASTER STORMWATER PLAN (optional)

The (local government council/board) hereby requires the (local government agency administrator) to prepare a Master Stormwater Management Plan for each water basin in the (local government). The Plan shall establish goals for stormwater management and shall be the basis for determining all future activities, including capital improvements and maintenance activities, which are undertaken by the Utility. The Utility shall not undertake any activities that are not recommended in the Plan.

In general, the Plan shall include an inventory of all existing stormwater management facilities an identification of alternative actions that the Utility can undertake to achieve stormwater quality and quantity goals, and the costs of such alternatives. The Plan shall include such maps as necessary to show the locations of facilities and alternatives by basin. Projects or facilities that are proposed should clearly be linked to projected improvements in water quality and flooding and shall reflect State and federal regulations and guidelines. The Plan shall include benefit cost analyses and cost-effectiveness criteria which can be used to compare alternatives. Where they exist, existing planning documents for individual basins may be consolidated as part of the Master Plan.

The Plan shall be submitted to the (local government council/board) for approval not more than one year following establishment of the Utility. The (local government agency administrator) shall periodically update the Plan at intervals established by the (local government council/board).

Sec. 5 . STORMWATER USER CHARGES

Sec. 5.1 **Creation and Purpose of Stormwater Charges.** The (local government council/board) hereby establishes stormwater user charges to finance all Utility activities. Necessary activities generally are those identified in the Master Plan and at minimum shall be identified as administrative, operations and maintenance, and capital improvements. Such charges shall be paid by each user of the stormwater system and will reflect the extent to which the user creates a need for the system. The charges will bear a substantial relationship to the cost of service for the property. The rate structure shall be fair and equitable, simple and easy to administer, and generate sufficient revenues to fund necessary Utility activities.

Use of charges is limited to those purposes for which the Utility has been established, including but not limited to: planning; acquisition of interests in land and real property, including easements; design and construction of facilities including debt service and related financing expenses; maintenance of the stormwater system; billing and

administration; and water quality management, including monitoring, surveillance, private maintenance inspection, construction inspection, and any other activities. If the (local government agency administrator) determines that capital charges shall differ among basins, it shall be required that capital expenditures from the Utility fund relate to the particular basin from which the fees were collected. It shall not be required, however, that expenditures for administration, and operations and maintenance relate to the particular basin from which the fees were collected.

Such charges may be increased periodically, if, in the judgement of the (local government council/board), increases are needed to achieve stormwater management goals. Updates of the Master Plan shall include estimates of the magnitude of increases in charges that would result from implementation of the Plan.

- Sec. 5.2. **Calculation of Fees in General.** The (local government agency administrator) shall establish a method of calculating charges and a rate structure based on land use and impervious surface on each property. Prior to implementation of the Utility, the (local government agency administrator) shall submit the proposed rate structure to the (local government council/board) for approval.

(Insert Description of Locally Derived Fee Calculation Formula)

- Sec. 5.3. **Standardized Residential Charges.** The (local government council/board) finds that most parcels of real property are classified as single family residential, that the intensity of development of these parcels is similar, and that it would be excessively and unnecessarily expensive to determine precisely the percentage of impervious area on each parcel. Therefore, the (local government council/board) directs the (local government agency administrator) to standardize charges for all single family residential parcels. The standard single family residential charge will be a flat fee based on average imperviousness derived from a representative sample of single family residential parcels. The (local government agency administrator) may establish classes of single family residential users based on total parcel area if doing so would better reflect contribution to runoff and would result in more equitable charges.

- Sec. 5.4. **Charges in the Event of Multiple Owners.** In the case of multiple owners or occupants of properties where each owner/occupant receives utility services from his own meter, such as condominiums and supermarkets, the mathematical average of the number of owners/occupants and the size of the parcel of land will be used to calculate each stormwater utility charge. If there are significant differences in the total area owned or

occupied by any owner or occupant, the (local government agency administrator) shall consider the relative contributions to runoff in determining the allocation of the total charge to the owners/occupants.

Sec. 5.5. **Charges for Public Properties.** The (local government council/board) finds that all real property owned and maintained by various local, state and federal governmental units contributes to runoff and the stormwater management problem. Public properties, including streets and rights-of-way and properties owned by other local units such as school districts, are to be charged as if they were private properties. In the case of properties owned by the (local government), such charges will be paid from the general fund and deposited in the Stormwater Utility Fund. In the case of properties owned by other local governments, or state and federal governments, intergovernmental charges will be levied.

Sec. 5.6. **Watershed Management Areas.** If in the Plan, significant differences in capital requirements are found to exist in different water basins, and the (local government agency administrator) determines that different capital fees should be established for each basin, he shall designate such basins as Watershed Management Areas and conduct public hearings to inform basin residents of the designation and of the intent to impose differential charges.

Sec. 6. **STORMWATER FUND**

Sec. 6.1. **New Stormwater Fund.** The (local government council/board) hereby directs the (local government agency administrator) to establish a separate enterprise fund called the Stormwater Utility Fund to be used exclusively for the purpose of the Utility. All revenues received by the Utility shall be deposited into the Fund. All disbursements from the Fund will be for expenditures for stormwater management authorized by (local government agency administrator) in accordance with all applicable laws, regulations and policies.

Sec. 6.2. **Interagency Charges.** As is necessary, the (local government agency administrator) shall develop a procedure for implementing and accounting for interagency charges such that all expenditures for the purpose of stormwater management are paid for by revenues from Utility charges. Examples of the types of expenditures that should be accounted for by interagency charges, and paid for by Utility revenues, include legal fees, billing expenses, and general administrative and accounting expenses. In addition, the procedure shall include provisions to insure that charges to the general fund for runoff from public properties are credited to the Utility Fund.



Sec. 7 . CREDITS, EXEMPTIONS AND SURCHARGES

Sec. 7.1 **Credits for On-site Management.** The (local government agency administrator) shall develop and administer procedures whereby users of the stormwater system can receive credit for on-site control of stormwater runoff. Such credit will consist of partial exemption from user charges. Precise determination of the magnitude of the credit will depend in part on calculations made by the (local government agency administrator) on the extent of the control provided by the user. The (local government agency administrator) shall consider the degree of control of both quantity and quality of stormwater when determining credits. In addition, the (local government agency administrator) shall consider future responsibility for maintenance when determining credits (see Section 3.6). In no case, shall the user charges be reduced to the amount less than the standard single family residential charge.

Such credits shall remain in effect so long as the owner of such systems has obtained the proper permits and constructed the facilities in accordance with plans approved by the (local government agency), the owner remains responsible for all costs of operation and maintenance of the system, and the (local government agency administrator) has access for inspection of the system to determine if it is in compliance with the system's design and maintenance standards and functioning properly

Sec. 7.2. **Exemptions from Charges (optional).** Notwithstanding any local ordinances which exempt certain parcels from having to implement stormwater controls, all properties except those listed below will be liable for payment of stormwater charges.

- (a) Wetlands, ponds, and other natural water courses that serve as components of the stormwater management system.
- (b) Public parks that have been developed to include no impervious area and are predominantly in their natural state.
- (c) Agricultural land.
- (d) Undeveloped land.

Sec. 7.3. **Surcharges for Parcels in Floodplains (optional).** Properties lying within the historical 100 year floodplain may be flooded despite activities undertaken by the Utility. Costs to serve and protect such properties generally will exceed costs to serve and protect other properties. Because costs to protect these parcels will be greater, a surcharge shall be levied on them. The (local government agency administrator) shall undertake studies to determine the increase in costs necessary to serve and protect these properties and shall recommend to the (local government council/board) a surcharge stated in terms of the percentage of the general Utility charge for a similar parcel not in the 100 year floodplain.

Sec. 8. BILLING

(Insert Description of Locally Developed Billing System)

Sec. 9 . ENFORCEMENT AND PENALTIES

Sec. 9.1. **Enforcement.** The (local government agency administrator) is authorized to use the full powers of the (local government) to enforce provisions of this ordinance. In the event that any user fails to pay the charges specified herein, the (local government agency administrator) shall take whatever legal steps necessary to collect such charges. Unpaid charges shall constitute a lien against the property affected. Charges which have not been paid for a period of six months prior to (date of issuance of property taxes) of any year may, after notice to the property owner and by resolution of the (local government council/board), be certified to the (local government assessor), who shall place the charges on the next tax bill. Alternatively, the (local government council/board) may direct the (local government attorney) to file suit and to collect unpaid charges.

Sec. 9.2. **Penalties (optional).** Any persons convicted of violating the provisions of this Ordinance shall be guilty of a misdemeanor, and upon conviction thereof, shall be subject to a fine of (specify amount) or imprisonment not exceeding (specify period), or both. In addition, the (local government council/board) may institute injunctive relief, mandamus or other appropriate action or proceedings at law or equity for the enforcement of this Ordinance or to correct violations of this Ordinance, and any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent, injunctions, or mandamus or other appropriate forms of remedy or relief.

Sec. 10. APPEALS

Any person aggrieved by an action of the (local government agency administrator), who believes that stormwater charges have been imposed without basis or have been determined incorrectly, shall have the right of appeal and may petition the (local hearing examiner) for a hearing to contest such charges. The appeal shall be filed in writing within (time frame) of the date of official notification or transmittal of the contested determination by the (local government agency administrator). The petitioner shall state clearly the grounds on which the appeal is based. The appeal shall be processed in the manner prescribed for hearing administrative appeals under (local or state code provision).

Sec. 11. SEVERABILITY

If any section, subsection, sentence, clause, phrase, or portion of this Ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portion of this Ordinance.

Sec. 12. FLOODS AND LIABILITY

Floods from stormwater runoff may occasionally occur which exceed the capacity of the stormwater system maintained and financed with Utility charges. This Ordinance does not imply that properties subject to charges shall always be free from flooding or flood damage, or that all flood control projects to control runoff can be constructed cost-effectively. Nothing whatsoever in this Ordinance shall deem the (local government, local government council/board, local government agency administrator, or local government agency staff) liable for any damage incurred in a flood or from adverse water quality. Nothing in this Ordinance purports to reduce the need or necessity for flood insurance.

## CONCLUSION

In the 1990s, local governments will be faced with new stormwater management responsibilities and challenges. Not only must they continue to develop and maintain facilities to ensure adequate storm drainage, but they must also comply with state and federal mandates to manage nonpoint source pollution. There is little argument that local NPS control programs are needed. The water quality impacts of urban runoff are well documented. Unfortunately, these mandates have been passed on to local governments at a time when all levels of government are experiencing severe fiscal problems. Consequently, little or no funding assistance has been made available to implement the state and federal requirements. Not only must local governments make up for the lack of state and federal funding assistance, but, due to their own fiscal crises, localities are under pressured to shift general fund revenues away from stormwater management to other public services that are viewed as having a higher priority.

It is evident that local governments must develop new strategies for financing stormwater management. The HRPDC staff has recommended an approach that centers on the implementation of a stormwater utility. A stormwater utility offers a solution that, if properly implemented, is fair and equitable and provides a continual and secure source of revenue that can be used for the full range of stormwater management activities. Once established a utility can be used to leverage funds for other financing mechanisms such as revenue bonds or matching grants.

Crucial to the successful implementation of a stormwater utility is a stormwater master plan. Such a plan will justify the need for additional revenues, help establish a utility rate structure, and provide a means of ensuring efficient expenditure of funds generated by a utility. Also important to the establishment of a utility is a thorough and ongoing public information program that is initiated well in advance of the start up of a utility. Only with such a program is public acceptance of this potentially controversial funding mechanism possible.

Stormwater utilities offer the most effective means of financing both ongoing drainage needs and state and federal NPS pollution control mandates. It is, therefore, imperative that local governments have this financing tool at their disposal. In Virginia, however, localities do not have clear statutory authority to implement stormwater utilities. A number of Hampton Roads localities, as well as many other localities throughout the state, have formally requested that the 1991 Virginia General Assembly pass legislation granting local governments this authority. Such legislation has also been formally endorsed by the Virginia Municipal League, the Virginia Association of Counties and the Virginia Association of Planning District Commissions.

Without stormwater utility legislation, many local governments will be confronted with the impossible task of attempting to meet existing backlogs of drainage needs with a declining revenue base, while at the same time attempting to address new and costly NPS pollution control requirements.

## ENDNOTES

1. SDN Market Research, Economic and Fiscal Impact Analysis of the Chesapeake Bay Preservation Act on Tidewater Virginia Localities, Prepared for the Chesapeake Bay Local Assistance Department, (Hampton, Virginia: SDN, 1989).
2. Telephone conversation with Clay Bernick, Director, Virginia Beach Office of Environmental Management.
3. Virginia Beach Office of Budget and Evaluation, 1990.
4. Sec. 405 (p) (2), Clean Water Act of 1987.
5. Id. Sec. 405 (p) (3) (B).
6. Telephone Conversation with Fred Holtz, Virginia State Water Control Board, January 31, 1991.
7. U.S. Environmental Protection Agency, 40 CFR, parts 122, 123, 124, and 504, "National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges; Final Rules", Federal Register 49990, November 16, 1990, p. 48061.
8. Hartigan, John P., The Use of a Stormwater Utility to Meet New Water Quality Requirements, (Virginia Beach, Virginia: Camp Dresser & McKee, 1989), p.7.
9. Meyer, BettyJean, Presentation to the Local and State Government Infrastructure and Revenue Resources Commission, October 25, 1990.
10. Hartigan, P.7.
11. Environmental Protection Agency, Office of Water, Assessment and Watershed Protection Division, "California Approves \$20 Million SRF Loan for Fresno Area Stormwater Management" in EPA Nonpoint Source News-Notes, January-February, 1991, No. 10, p. 14.
12. Environmental Protection Agency, Office of Water, Assessment and Watershed Protection Division, "Jefferson County, WA: First in the Nation to Use State Revolving Loan Fund for NPS Management" in EPA Nonpoint Source News-Notes, October 1990, No. 8, p. 10-11.
13. Camp Dresser & McKee, Stormwater Management Plan; Institutional/Financial/Regulatory Analyses, Prepared for the City of Virginia Beach: CDM, 1989), pp. 1-36.

14. Lindsey, Greg, A Survey of Stormwater Utilities, (Dundalk, Maryland: Stormwater Management Administration, Maryland Department of the Environment, 1988), p. 37.
15. Camp Dresser & McKee, pp. 1-40 - 1-42
16. Northern Virginia Planning District Commission, Evaluation of Regional BMPs in the Occoquan Watershed, Prepared for the Occoquan Technical Advisory Committee, State Water Control Board, (Annandale, Virginia: NVPDC, 1990), pp. 318-3.19.
17. Hartigan, p. 2.
18. The names of the units used to assess stormwater utility vary widely in the literature. A Maryland Department of the Environment survey found the term "single family equivalents" to be commonly used by utilities throughout the country. Another commonly used term is "equivalent residential units".
19. A Camp Dresser & McKee study of 35 stormwater utilities nationwide found that the average single family unit contains approximately 2,460 square feet of impervious area, and only 30% to 40% is directly connected.
20. Hartigan, p. 2.
21. Lindsey, p. 22.
22. Priede, Nilo, Financing Stormwater Management in the 1990s and Beyond, Jacksonville, Florida: Camp Dresser & McKee, undated, p. 12.
23. Lindsey, p.14, and the Virginia Beach Office of Budget and Evaluation, 1990.
24. URS Corporation, Surface Water Management: The Utility Approach, URS White Paper, 1987, p. 4.
25. Lindsey, p. 5.
26. Lindsey, p. 10.
27. Three in Washington state (Everett, Seattle/King County and Vancouver/Clark County) and one in Kentucky (Louisville/Jefferson County).
28. Priede, p. 11.
29. Lindsey, Greg, Financing Stormwater Management: The Utility Approach, (Dundalk, Maryland: Stormwater Management Administration, Maryland Department of the Environment, 1988), p. 5.
30. Hartigan, p. 7.

## BIBLIOGRAPHY

- Camp, Dresser & McKee, Inc. Stormwater Management Plan: Executive Summary. Prepared for the Department of Public Works, City of Virginia Beach. Virginia Beach, Virginia: CDM, 1988.
- \_\_\_\_\_. Stormwater Management Plan: Institutional/Financial/Regulatory Analyses. Prepared for the Department of Public Works, City of Virginia Beach. Virginia Beach, Virginia: CDM, 1988.
- \_\_\_\_\_. Using User Fees to Finance Stormwater Utilities. CDM report. Cambridge, Massachusetts: CDM, 1989.
- Chesapeake Bay Local Assistance Department. Local Assistance Manual: A Guide for the Development of Local Programs in Order to Comply with the Chesapeake Bay Preservation Act. Richmond, Virginia: CBLAD, 1989.
- Chesapeake Bay Local Government Advisory Committee. Local Programs Survey. Washington, D.C.: LGAC, 1990.
- Commonwealth of Virginia. Chesapeake Bay Preservation Area Designation and Management Regulations. Richmond, Virginia: The Commonwealth, 1989.
- Dean, Lillian F., Peggy B. Johnson and Phyllis W. Ross. Understanding Stormwater Management: A Primer for Citizens and Local Government Officials. Prepared for the Clint River Watershed Council. Utica, Michigan: CRWC, 1984.
- Debo, Thomas N. "Rapid Urbanization? Don't Forget Storm Drainage" in Public Works. March, 1984, pp. 58-60.
- Environmental Protection Agency, Office of Water, Assessment and Watershed Protection Division. "Jefferson County, WA: First in the Nation to Use State Revolving Loan Fund for NPS Management" in EPA Nonpoint Source News-Notes. October, 1990, No. 8, pp. 10-11.
- Evans, Mechwart, Hambleton and Tilton, Inc. "Stormwater Questionnaire Summary - Transmittal," 1990.
- Fletcher, Jeff. "Localities Need Billions for Clean-Up" in Environmental Decisions. October, 1990, pp. 17-18.
- George, Thomas S., III, John P. Hartigan and Kelly A. Cave. "Water Supply Management Plans: Framework for New Federal Stormwater Permitting Regulations" in Proceedings of the 63rd Annual Water Pollution Control Federation Conference. Washington, D.C., 1990.



Hartigan, John P. "Regional BMP Master Plans" in Urban Runoff Quality, undated.

\_\_\_\_\_. The Use of a Stormwater Utility to Meet New Water Quality Requirements. Virginia Beach, Virginia: Camp Dresser & McKee, 1989.

Johnson, Peggy B. and Lillian F. Dean. Stormwater Management Guidebook for Michigan Communities. Prepared for the Clint River Watershed Council. Utica, Michigan: CRWC, 1987

Lindsey, Greg. A Survey of Stormwater Utilities. Dundalk, Maryland: Maryland Department of the Environment, Water Resources Administration, Sediment and Stormwater Administration, 1988.

\_\_\_\_\_. Financing Stormwater Management: The Utility Approach. Dundalk, Maryland: Maryland Department of the Environment, Water Resources Administration, Sediment and Stormwater Administration, 1988.

Maryland Department of Natural Resources, Water Resources Administration, Sediment and Stormwater Division. Maintenance of Stormwater Management Structures, A Departmental Survey. Dundalk, Maryland: MDE, 1986.

Maryland Department of the Environment, Sediment and Stormwater Administration. Sample Stormwater Utility Ordinance. Baltimore, Maryland: MDE, 1988.

Morandi, Larry and Tony Huchison. "Financing Water Quality: Nonpoint Source Legislative Options" in State Legislative Report. Vol. 14, No. 12. September, 1989.

Northern Virginia Planning District Commission. Evaluation of Regional BMPs in the Occoquan Watershed. Prepared for the Occoquan Technical Advisory Committee, State Water Control Board. Annandale, Virginia: NVPDC, 1990.

Priede, Nilo. Financing Stormwater Management in the 1990s and Beyond. Jacksonville, Florida: Camp, Dresser & McKee, updated.

Public Law 100-4. "Water Quality Act of 1987".

Roesner, Larry and Robert Mathews. "Stormwater Management for the 1990s" in American City & County. February 1990, 44-54.

URS Corporation. Surface Water Management: The Utility Approach. URS White Paper. URS, 1987.

SDN Market Research. Economic and Fiscal Impact Analysis of the Chesapeake Bay Preservation Act on Tidewater Virginia Localities. Prepared for the Chesapeake Bay Local Assistance Department. Hampton, Virginia: SDN, 1989.

\_\_\_\_\_. Economic and Fiscal Impacts of the Chesapeake Bay Preservation Act on the Virginia Peninsula. Prepared for the Virginia Peninsula Chamber of Commerce. Hampton, Virginia: SDN, 1990.

Smith, Merrill G. "Storm Drainage Utility: What is It?" in Ohio Cities and Villages. 1985, pp. 21-22.

Southwestern Illinois Metropolitan and Regional Planning Commission. Stormwater Management. Prepared for the Illinois Department of Transportation, Division of Water Resources.

Southeastern Virginia Planning District Commission. Regional Stormwater Management Strategy for Southeastern Virginia. Chesapeake, Virginia: SVPDC, 1989.

URS Consultants, Inc. Summary of the NPDES Permit Application Regulations for Stormwater Discharges. Virginia Beach, Virginia: URS, 1989.

U.S. Environmental Protection Agency. 40 CFR Parts, 122, 123 and 124. "National Pollutant Discharge Elimination System Permit Application Regulation for Stormwater Discharges; Final Rule." Federal Register 47990, November 16, 1990.

U.S. Environmental protection Agency, Office of Enforcement and Permits. Notice of Proposed Rulemaking (NPRM) for National Pollutant Discharge Elimination System (NPDES) permit Application Requirements for Storm Water Discharges. Washington, D.C.: EPA, 1988.

Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation. Statement on Proposed Stormwater Management Regulations. Richmond, Virginia: DSWC, undated.

\_\_\_\_\_. Virginia Nonpoint Source Pollution Management Program. Richmond, Virginia: DSWC, 1989.

\_\_\_\_\_. VR 215-02-00. "Stormwater Management Regulations." Virginia Register, Volume 7, Issue 3, November 5, 1990, p. 363.

Virginia Department of Housing and Community Development, Office of Local Development Programs. Capital Improvement Programming: A Practical Guide for Local Governments. Richmond, Virginia: VDHCD, 1986.

Washington State Department of Ecology, Shorelands and Coastal Zone Management Program, Shellfish Unit. A Nonpoint Source Pollution Control Fee Proposal. Olympia, WA: WDE, 1990.

Woodward-Clyde Consultants. Urban Targeting and BMP Selection. Prepared for the Environmental Protection Agency (Region V Water Division, Watershed Management Unit and the Office of Water Regulations and Standards and Permits, Office of Water Enforcement and Permits). Oakland, California: Woodward- Clyde Consultants, 1990.

**APPENDIX A**

**HRPDC STORMWATER MANAGEMENT FINANCING SURVEY**

1. Using the chart below, please list those agencies within your government that are involved in stormwater management and indicate their responsibilities by checking the appropriate box(es).

Administrative Agency	Administration	Master Planning	Design and Engineering	Operations & Maintenance	Regulation & Enforcement	Capital Improvements	Water Quality Management	Other (Briefly Describe)
1.								
2.								
3.								
4.								
5.								
6.								

2. Using the chart below, please provide a five year history of actual spending for stormwater management activities.

	FY 1984-85	FY 1985-86	FY 1986-87	FY 1987-88	FY 1988-89
ADMINISTRATION					
PLANNING					
DESIGN AND ENGINEERING					
OPERATIONS AND MAINTENANCE					
REGULATION AND ENFORCEMENT					
CAPITAL IMPROVEMENT					
WATER QUALITY MANAGEMENT					
OTHER _____					
TOTAL					

3a. Using the chart below, please provide a five year projection of stormwater management needs and actual budget allocations for each stormwater management activity.

	FY 1989-90		FY 1990-91		FY 1991-92		FY 1992-93		FY 1993-94	
	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted
ADMINISTRATION										
PLANNING										
DESIGN AND ENGINEERING										
OPERATIONS AND MAINTENANCE										
REGULATION AND ENFORCEMENT										
CAPITAL IMPROVEMENT										
WATER QUALITY MANAGEMENT										
OTHER _____										
TOTAL										

NOTE: The 1989-90 fiscal year is included in this table to maintain consistency with a recent State survey on local infrastructure needs and revenue resources.

3b. Please note the source(s) for the dollar estimates provided in the above chart (e.g. stormwater management plans, CIP, etc.).

4. Please indicate the approximate historic and projected expenditures for stormwater management consultants and contractors.

HISTORIC				
FY 1984-85	FY 1985-86	FY 1986-87	FY 1987-88	FY 1988-89

PROJECTED				
FY 1989-90	FY 1990-91	FY 1991-92	FY 1992-93	FY 1993-94

*Note: The 1989-90 fiscal year is included in the Projected table to maintain consistency with a recent State survey on local infrastructure needs and revenue resources.*



5. Using the chart below, please provide a five year history of staffing levels for stormwater management activities. Please indicate the number of staff positions (or portions of positions) assigned to each activity.

	FY 1984-85	FY 1985-86	FY 1986-87	FY 1987-88	FY 1988-89
ADMINISTRATION					
PLANNING					
DESIGN AND ENGINEERING					
OPERATIONS AND MAINTENANCE					
REGULATION AND ENFORCEMENT					
CAPITAL IMPROVEMENT					
WATER QUALITY MANAGEMENT					
OTHER _____					
TOTAL					

6a. Using the chart below, please provide a five year projection of the number of needed and budgeted staff positions for each stormwater management activity.

	FY 1989-90		FY 1990-91		FY 1991-92		FY 1992-93		FY 1993-94	
	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted	Needed	Budgeted
ADMINISTRATION										
PLANNING										
DESIGN AND ENGINEERING										
OPERATIONS AND MAINTENANCE										
REGULATION AND ENFORCEMENT										
CAPITAL IMPROVEMENT										
WATER QUALITY MANAGEMENT										
OTHER _____										
TOTAL										

NOTE: The 1989-90 fiscal year is included in this table to maintain consistency with a recent State survey on local infrastructure needs and revenue resources.

6b. Please note the source(s) of the staffing level estimates provided in the above chart (e.g. stormwater management plans, CIP, etc.).

7. Please indicate the number of historic and future budgeted stormwater management staff positions by type.

	FY 1984-85	FY 1985-86	FY 1986-87	FY 1987-88	FY 1988-89	FY 1989-90	FY 1990-91	FY 1991-92	FY 1992-93	FY 1993-94
Administrators										
Engineers										
Planners										
Surveyors										
Construction and Maintenance Staff										
Clerical										
Other _____										
Other _____										
Total										

8. Please describe the funding sources and/or financing mechanisms which currently support the stormwater management activities listed below. If more than one source/mechanism is used for a specific activity, please indicate the percentage of the total expenditure for that activity attributable to each source/mechanism.

Administration

Master Planning

Design and Engineering

Operations and Maintenance

Regulation and Enforcement

Capital Improvements

Water Quality Management

9. Does your community have a stormwater management master plan? If so, indicate status (e.g. current, outdated, update in progress). Please send copy with completed questionnaire.

10. Does your community have programs in place which require developers to provide either on- or off-site stormwater management facilities? If so, please provide a brief description.

11. Briefly describe your current stormwater operations and maintenance program.

12. Has your community addressed the upcoming EPA NPDES Stormwater Permitting Regulations in your stormwater management planning process? If yes, please provide program details, if known, or your preliminary approach to addressing these regulations. (This question only applies to localities with populations greater than 100,000).

13. Does your community intend to develop and implement a stormwater management program as authorized by the State's upcoming Stormwater Management Regulations? If yes, please provide program details, if known, or your preliminary approach to addressing these regulations.

**APPENDIX B**

**U.S. COMMUNITIES WITH STORMWATER UTILITIES**



## U.S. COMMUNITIES WITH STORMWATER UTILITIES

<b>COLORADO:</b>	Aurora Boulder Denver Fort Collins	Littleton Loveland
<b>FLORIDA:</b>	Cape Coral Daytona Beach Deland Gainesville Hillsboro County Manatee County Miami Oakland Park Ocala	Port St. Lucie Sarasota County Tallahassee/Leon County Tampa Tavares Winter Park
<b>KENTUCKY:</b>	Jefferson County/Louisville	
<b>MICHIGAN:</b>	Ann Arbor	
<b>MINNESOTA:</b>	Roseville	
<b>MONTANA:</b>	Billings	
<b>OHIO:</b>	Cincinnati Wooster	
<b>OKLAHOMA:</b>	Tulsa	
<b>OREGON:</b>	Corvallis Medford Portland	
<b>TEXAS:</b>	Austin Bedford	
<b>WASHINGTON:</b>	Auburn Bellevue Everett Kent Renton	Seattle Steilacoom Tacoma Vancouver

Source: Hampton Roads Planning District Commission, 1991.