out the country has shown that, for several reasons, stormwater system OMM is often neglected or, at best, performed only sporadically. This maintenance deficiency poses a serious threat to the safe and effective operation of the stormwater systems we have come to rely upon and to the health and safety of the people and water bodies the facilities are intended to protect.

While there are several reasons for this maintenance neglect, including lack of inspectors or institutional mechanisms, the primary cause is a lack of adequate maintenance funding. The problem of inadequate funding manifests itself in several ways, including insufficient staffing, inadequate equipment, lack of or inattentive facility inspections, and ineffective operation, maintenance, and management efforts.

Similarly, the problem of inadequate stormwater maintenance (or program) funding also has several causes. These include legal and regulatory constraints, a shortage of overall operating funds, poor stormwater program planning, and a lack of commitment by elected officials and by citizens. ***Unfortunately, stormwater management has always been "the orphan infrastructure" - only receiving public attention and funding in times of crisis.*** At budget time, stormwater program funding seldom competes well against other community needs such as police protection, fire protection, ambulance service, etc. Accordingly, funding stormwater maintenance and management programs from traditional general fund sources has led to inadequate funding.

These causes signify an overall failure to recognize stormwater system OMM as a key component of any stormwater management program. ***The only way to solve this dilemma is through a comprehensive public information program which educates elected officials, citizens, and the private sector about the importance of stormwater management programs, proper stormwater system OMM, and the need for adequate funding.*** Because of limitations on traditional general funding sources, the solution requires both commitment and creativity.

4.1. Public Financing of Stormwater OMM

A major policy issue facing local governments is whether they should assume responsibility for stormwater system OMM. Assumption of stormwater OMM may take the form of direct involvement by local government staff or by contracting with private maintenance services.

Where local governments already have assumed such maintenance, the lack of adequate funding has led to a seriously high level of facility maintenance default. This not only creates severe health and safety hazards for their residents and threatens the health of their water bodies, but it may also threaten the continuation of the overall stormwater management program. ***It is extremely difficult to generate the vital public support that a successful stormwater program requires if the local residents are surrounded by stormwater systems that are unsightly, unsafe, and ineffective.***

In addition, a local government may wish to assume the maintenance of all or some of the privately constructed stormwater systems within its borders. Traditionally, this has been the exception rather than the status quo. ***Most local governments prefer to require systems serving private land uses to be owned, operated, and maintained by private landowners or property owner associations. Unfortunately, history has shown that most private owners do an inadequate job of stormwater system OMM.*** Consequently, as a last resort, more local governments are considering assumption of OMM

responsibilities to restore and maintain existing systems which have already suffered continued neglect from owners or to avert anticipated defaults by potentially negligent owners. In either case, a lack of adequate funds will prevent the local government from assuming this maintenance, which in turn will only add to the growing list of unsightly, unsafe, and ineffective stormwater management systems within the community.

The problem of inadequate stormwater system OMM funding described above indicates that the traditional methods of public financing may either be ill-suited for this purpose or are not being used to their fullest extent. In response to these factors, four stormwater funding sources have been identified and are being used widely around the country. These funding sources, individually or in combination, offer a greater opportunity to provide an adequate source of funds to meet local government stormwater system OMM obligations. ***These four recommended funding sources are:***

- ***General tax revenues***
- ***Stormwater utility fees***
- ***Inspection or permit fees***
- ***Dedicated contributions***

Details about these four funding sources will be subsequently presented, along with suggested criteria for evaluating the suitability of each. Prior to a discussion of each one, however, it is important to note some fundamental aspects of public stormwater system OMM financing.

The success or failure of any proposed financing program which must receive public support and approval is often determined by the degree of information the public receives. For many reasons, the public is generally protective of its dollars and initially suspicious of any new public program which proposes to spend them. Often, this suspicion is beneficial, for it helps promote sound fiscal planning and spending programs.

However, where this suspicion is unwarranted and cannot be overcome, it may also prevent a valuable and fiscally sound program form advancing beyond the proposal stage. Therefore, ***the value of a comprehensive public information program can not be overemphasized. Such a program must explain the basis, purpose, and details of the financing proposal and must convince the public and their elected officials that it is both necessary to implement and beneficial to their interests.*** Experience has shown that citizens and elected officials don't mind spending money if they know exactly what the money will be used for and what benefits the expenditures will provide to the community.

All successful stormwater management maintenance (or program) funding programs should possess certain fundamental elements or characteristics. These include:

- ***Be based upon a stable source of consistent funds.*** Proper stormwater system OMM must be continually and consistently performed on a regularly scheduled basis. This requires a long term commitment of personnel, equipment, and materials. As a result, the funds to support this commitment must be based upon a stable, secure, and reliable source.

- ***Be compatible with the local organizational structure.*** The overall effectiveness of a stormwater OMM program is based to a large extent upon the efficiency of its funding program. The most efficient funding program is that which is most compatible with the organizational structure of the managing department, agency, or authority. Wherever possible, the funding program should use the billing, collection, and bookkeeping operations of an existing public system.

- ***Include provisions for the four essential operations - Program Administration, Accounting and Budgeting, Revenue Management, and Information Management.*** Program Administration is needed to insure the effective and efficient operation of the overall program. Accounting and Budgeting procedures are needed to accurately track operations and determine required funding levels. This may include the use of detailed work orders and time sheets by maintenance and inspection personnel and their supervisors. Revenue Management must insure a secure and reliable source of program funds to meet expenses and oversee their expenditure. Information Management must provide all of the above with comprehensive and accurate data upon which operational decisions can be based. It must also foster program understanding and support by providing government leaders and the public with timely information, explanations, and answers.

- ***Be based upon an equitable, understandable, and defensible fee or rate structure.*** Stormwater OMM funding programs may require complex procedures and operations in order to provide adequate funding levels. However, to obtain public acceptance and support, the program's fees or rates must be based upon a formula or method that can be readily explained to and understood by the public. The fees or rates must be perceived as being both reasonable and equitable and based upon accurate data and sound decisions.

- ***Be continually reviewed and updated.*** Program costs, revenues, and responsibilities must be regularly evaluated and adjusted as needed to maintain maximum cost effectiveness. The do this, the program must possess a flexibility of approach which will allow it to quickly respond to such changes. This is especially true when a large storm occurs and OMM needs are increased significantly.

- ***Be consistent with applicable state laws and regulations.*** The final details of a specific public stormwater OMM financing program will depend to a great extent upon the general authorities and requirements established in state law or regulations. Prior to the adoption of any financing program, the local government's general counsel should review all details of the program to assure it is compatible with state law.

4.1.1. General Tax Revenues

Around the nation, t***he general tax fund is the most commonly used source of funding for stormwater programs and stormwater system OMM.*** General tax revenues are an obvious source of funding since the purpose of local government taxes is to fund activities necessary to provide for the community's health, safety, and welfare through the implementation of a number of social, economic, recreational, and environmental programs. Accordingly, since properly functioning stormwater systems provide public heath, safety, and environmental benefits, and since neglect of stormwater system OMM can create serious health, safety, and environmental hazards, the use of general tax revenues to provide for the maintenance of stormwater systems can be construed as being consistent with this purpose.

However obvious, ***general tax revenues may also be the least suitable source of stormwater program or maintenance funding.*** As the name implies, "general" tax revenues originate at a number of sources and are used to finance an equally diverse number of public programs, including police and fire protection, civil and criminal courts, social

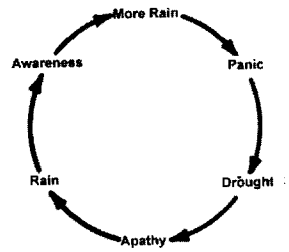
and economic support programs, roadways, utilities, and recreational activities and facilities. This combination of broad base and use creates two distinct problems which must be overcome if general tax funds are to be used to support public OMM of stormwater systems.

First, with such a broad base, it may be difficult to justify the expenditure of general funds to maintain a stormwater system that will only benefit a portion of the taxpaying community. Second, with an equally broad use, ***stormwater programs and maintenance must compete against a large number of other vital public programs for a very limited number of tax dollars***. This is one reason why so many stormwater programs are inadequately funded and why so many stormwater systems are improperly operated and maintained. This problem has been compounded in recent years by tax caps and the public's general opposition to new or higher taxes.

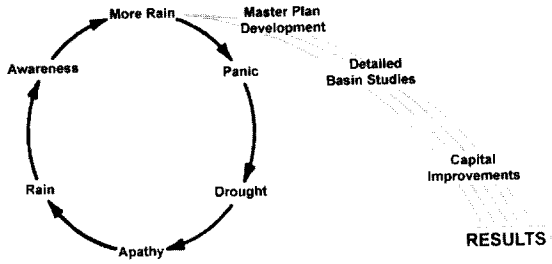
Elected officials have discretionary authority in allocating general tax revenues through the annual budget process. However, both a government' s responsibilities and its political realities tend to define how these funds are actually spent. Mandatory services such as police and fire protection must receive priority over more discretionary budget items such as stormwater system OMM. Therefore, to win use of general tax funds to finance stormwater system OMM, it must be demonstrated to the public and to elected officials that this activity has greater importance than other discretionary budget items.

The success of this effort will depend upon many factors, including the overall costs and community benefits of the maintenance program, the severity and extent of the maintenance neglect problems, and the effectiveness of the methods used to inform and educate the public and their elected officials. ***Experience has shown that this effort is often successful after a recent "crisis" such as a major flood or contamination of an important community water body. These calamities present an opportunity to gain public support and to prevent future disasters. They are an excellent time to break the "hydro-illogical cycle" and implement the "hydro-rational cycle".***

HYDRO-ILLOGICAL CYCLE



HYDRO-RATIONAL CYCLE



4.1.2. Stormwater Utility Fees

The unreliability of using general tax funds to finance stormwater programs or stormwater system OMM has led many communities around the country to implement either a stormwater utility fee or a stormwater special assessment. The use of utility charges to finance publicly owned water and sewer systems began in the early 1900s and, today, provides a stable source of funds for local utility authorities and agencies around the nation. In recent years, with the adoption of tax limitations, utility charges and

special assessments have become increasingly popular as local governments attempt to maintain an adequate level of public services in the face of limits on expenditure growth.

The concept of a utility charge to publicly finance stormwater system OMM is a sound one in several respects. Unlike general tax revenues, utility charges are not subject to state "tax cap" limitations. The public is used to utility charges because of the precedent set by water and sewer charges. Most importantly, a more direct relationship between costs and benefits of stormwater system OMM can be demonstrated than through the general assessment of local taxes. Finally, similar to general tax revenues, the stormwater utility charge can be used to publicly finance the maintenance of both new and established stormwater systems.

A variation of a city or county-wide stormwater utility fee is the establishment of a stormwater benefit area in which all property owners pay a special assessment charge. The charge generally is assessed on a per acre basis to fund construction and OMM of stormwater facilities within the benefited area. Additionally, if different land uses within the benefit area receive substantially different levels of stormwater benefits, the assessment of per acre fees from subarea to subarea should vary in proportion to the benefits received. The boundaries of the benefit area should be based on the contribution of runoff to the stormwater system. This may include the tributary drainage area for a single stormwater system, especially if it is a regional facility, or more commonly, for an entire network of facilities within a watershed or subwatershed.

Special assessment charges within a benefit area should meet the following criteria:

- Fees should not exceed the amount of the benefit received by any particular property.
- Fees should be properly allocated to the benefited properties.
- Property owners should have an opportunity to comment, or even vote, on how the assessments are allocated to their properties.

Whether for a stormwater utility fee or a special assessment fee, an important need is to establish a relationship between the fee and the benefits received. Unlike charges for water or sewer, a readily measured commodity is not delivered to the stormwater utility or benefit area customer. To a lesser extent, the service provided by stormwater system OMM is not as readily perceived or quantified as the service provide by a wastewater system which continually disposes of sanitary wastes from homes or businesses. As a result, the services provided to, and the benefits received by, the utility customer or special benefit property owner must be more broadly defined if an acceptable and equitable utility charge or special assessment is to be developed. ***The goal is to show that assessed fees are used to cover costs of stormwater system OMM or other stormwater services benefiting each property and that the benefits to each property are at least equal in value to the assessment fee***. Constitutional standards require that property owner benefits be special benefits which are generally not shared by the community as a whole.

The utility rate structure for a stormwater facility maintenance district should be based on several considerations. The most fundamental of these is the concept of payment based upon contribution to the need for the maintenance rather that the benefits provided by it. For example, a typical stormwater system OMM charge may be based upon the size of the property contributing runoff to the facility. This rate may be refined to reflect the percentage of impervious surfaces on the prop-

erty, the runoff potential of the remaining pervious areas, the type of land use, and other factors affecting the rate, volume, or pollutant loading of stormwater. For example, a one acre property containing a single family residence with 20 percent impervious area would pay proportionally less than a similarly sized industrial property with 80 percent impervious cover for the OMM of the stormwater system to which these lands contributes runoff .

While a certain degree of complexity may be required to equitably distribute OMM costs throughout the community or special district, the rate structure should remain as simple as possible. This simplicity will help make the rate structure more understandable to the rate payer and, as a result, more acceptable. The rate structure should also retain a degree of flexibility to accommodate changes in program revenues, expenses, and responsibilities.

The rate structure also must reflect the costs of providing the essential stormwater program elements listed in pages 8-21 and 8-22. These administrative and support costs are estimated to range from 10 to 25 percent of total program costs.

If a local government does not wish to own, maintain, and operate private stormwater systems, stormwater utility fees can provide an economic incentive to increase the likelihood that the private property owners will actually conduct OMM activities. Several local stormwater utilities provide "credits" if a property or subdivision has an on-site stormwater management system which is being maintained properly. An administrative problem with this system that must be addressed is how to assure that the private systems are being maintained properly. Some local governments have established Stormwater Operating Permits which require an annual inspection by staff or certification by a private inspector that the facility is being maintained and is operating as constructed. Since state and local government stormwater programs often have too few inspectors, the programs in Delaware and Florida have implemented training and certification programs for public and private sector personnel who wish to conduct inspections.

4.1.3. Inspection or Permit Fees

Similar to utility fees or special assessments, the use of inspection or permit fees to publicly finance stormwater system OMM represents a relatively new application of an established component of government revenues. In many states, local governments have the general authority to establish fees and other charges to pay for the operational expense of various programs and services. Often, these fees are associated with the issuance of a permit, such as a building permit, clearing or grading permit, stormwater permit, or sewer connection permit. Alternatively, these fees may be associated with building or stormwater program requirements for inspections.

Implementing a successful stormwater system OMM program funded entirely or partially by inspection or permit fees requires the establishment of two primary relationships. First, the permit program itself must be directly related in some manner to stormwater systems and, preferably, their operation and maintenance. For example, the use of fees from a sanitary sewer connection permit program to finance stormwater system OMM may not be feasible, permissible, or acceptable to the public. However, the use of fees from a storm sewer connection program may be. Other potentially feasible permit fees include those for a local construction permit, stormwater permit, or stormwater discharge permit. Inspection fees can be required when the local government's stormwater program requires a periodic inspection of private stormwater systems. The public inspections can determine whether the

owner is maintaining the facility properly. If not, they can help identify what OMM activities are needed and notify the owner. A permit program based upon fees for annual inspections, such as a stormwater discharge or stormwater operating permit, can provide a continuing source of funds. However, many permit or inspection fees are a one time charge, typically when the facility is first constructed. These are not a good funding source for continuing stormwater system OMM.

Second, a relationship should be established, if possible, between the payer of the inspection or permit fee and the use of the fee itself. For stormwater inspection fees, this relationship is relatively easy to establish. For permit fees, it is recommended that the fees be placed into dedicated accounts. To demonstrate that the fees are being used for the OMM of specific facilities, it is recommended that computer data bases be established to track facility maintenance activities and costs. This data base will also allow the stormwater program to more accurately estimate future resources and funding needed to adequately maintain stormwater systems. The more directly either of the above relationships can be established, the greater the chances of public acceptance.

Similar to utility charges, inspection and permit fees should reflect the concept of payment based upon contribution to the need for facility OMM rather than the benefits provided by it. For example, factors to consider in establishing a stormwater construction permit fee might include the size of the proposed facility, its contributing drainage area, the number of BMPs or structures, and whether it is for stormwater quantity control, stormwater quality control, or both. Therefore, a relatively small facility serving a residential area and intended only for quality control would be charged a proportionately lower permit fee than a larger facility providing both quantity and quality control to a commercial area. The same factors could be considered when establishing an inspection fee along with the number of inspections, time to conduct inspections, and time to travel to the site.

As with stormwater utility fees, permit or inspection fees need to be as simple as possible but still provide for an equitable distribution of costs. The fee schedule should also provide flexibility to accommodate changes in program revenues, expenses, and responsibilities. It also needs to reflect the costs of program administration, accounting and budgeting, and revenue and information management.

4.1.4. Dedicated Contributions

The use of dedicated contributions from land developers to finance public maintenance of stormwater systems represents an extension of an established procedure in a new direction. Under this program, the local government assumes the OMM of a stormwater system constructed as part of a private development. The actual OMM can be provided either by local government staff or through contract with a private maintenance service. ***All or a portion of the required funding for the OMM is obtained through a one-time contribution by the land developer to a dedicated account which is controlled by the local government. Often the developer is responsible for OMM during a "warranty period", frequently the first two years.***

The amount of contribution to the dedicated account could be based upon several factors including:

1. The type of stormwater BMP and the anticipated OMM activities.
2. The total number of years in which facility OMM would be provided.
3. The present annual maintenance, administrative, insurance, and support costs.

4. The anticipated annual increase in present costs due to inflation, equipment depreciation and replacement, increases in labor and insurance rates, rising disposal costs, and other factors.
5. The anticipated interest earned by the dedicated contribution.
6. The percentage, if any, of cost sharing between the developer and the local government.

The type of stormwater BMP will determine the frequency and types of needed OMM operations. Unfortunately, an extensive data base on this information is not available. However, the information presented earlier in this chapter can help to develop cost estimates of stormwater facility OMM. Administrative and support function costs are estimated to range from 10 to 25 percent of total program costs. An annual cost of 2 percent of the dedicated funds may be required to cover the administrative costs of the dedicated accounts themselves. This information can be used to help estimate the present annual OMM, administrative, insurance, and support costs.

The total number of years for which OMM will be provided will vary with the policies of each local stormwater program. Often the dedicated contribution is based on public OMM for 25 years, after which stormwater OMM costs are financed through either the local governments general tax revenues or stormwater utility fees.

The Township of West Windsor, New Jersey has established a Dedicated Contribution Program and will be used as an example for calculating the developer's contribution. The program is based upon the Township providing 25 years of OMM after which the stormwater OMM will be financed through the Township's general tax revenues. Participating developers are required to furnish 75 percent of the estimated annual stormwater system OMM costs in the form of a one-time payment. The amount of this payment is calculated for each facility through the use of a standardized Developer Contribution Worksheet (Table 8-10).

In the West Windsor program, annual OMM costs are based upon the performance of four major maintenance tasks by Township personnel. These tasks are grass mowing; landscape maintenance; general maintenance, which includes trash and debris removal and erosion repair; and periodic sediment removal and bottom restoration. Grass mowing is estimated at the rate of one acre per hour. Other required tasks are estimated based upon an hourly, yearly, or per task basis. Appropriate factors are used to reflect infrequent OMM tasks such as sediment removal and bottom restoration. Annual liability insurance costs are also estimated and combined with the estimated annual costs of the four major maintenance tasks to produce a total first-year OMM cost for the facility. This value is multiplied by an appropriate Present Worth Factor and then by 0.75 to determine the actual amount of the developer's dedicated contribution. This Present Worth Factor is based upon an average annual interest rate on the dedicated funds of 8 percent and an average annual cost increase of 6 percent over the 25 year OMM period.

The use of dedicated contributions to finance stormwater OMM has many advantages. First and foremost, they provide a secure, dedicated funding source for future stormwater OMM activities. Unlike general tax revenues, contributions to dedicated accounts are not subject to state tax cap limits. A disadvantage is that dedicated contributions are only applicable to new stormwater systems. The use of these funds and the activities they pay for need to be closely tracked. This is fairly easily done through account and expense records. This information can be used to demonstrate a direct relationship between the contributed funds and their use for facility OMM.

Equally important, this type of a data base can help the local government to better estimate the OMM costs of future new facilities and to estimate funding needs for OMM of older stormwater systems. To minimize overall administrative costs, it is recommended that a single dedicated account be established for all developer contributions.

TABLE 8 - 10.

Sample Worksheet for Calculating Dedicated Contribution To Stormwater Management System OMM.

NAME OF DEVELOPMENT: _____
LOCATION: _____
TYPE OF STORMWATER SYSTEM: _____
NUMBER OF ACRES OF STORMWATER SYSTEM: _____
NUMBER OF ACRES CONTRIBUTING TO THE SYSTEM: _____

1. MOWING

A. Rate per hour for labor and equipment =$_____
B. Base number of hours for labor and equipment for mobilization and mowing up to one acre: _____
C. Number of hours for mowing additional area (based on one hour per acre) _____
D. Hours needed for mowing = B + C =_____
E. Cost per mowing = A X D =$_____
F. Number of mowings per year: _____
G. Annual mowing cost = E X F =$_____
H. Materials cost =$_____
I. Total cost = G + H =$_____

2. LANDSCAPE MAINTENANCE

A. Rate per hour for labor and equipment =$_____
B. Number of hours of required landscape maintenance per year: _____
C. Annual landscape maint. cost = A X B =$_____
D. Materials cost =$_____
E. Total cost = C + D =$_____

3. GENERAL MAINTENANCE

A. Rate per hour for labor and equipment =$_____
B. Number of required hours of trash and debris removal per occurrence: _____
C. Number of required hours of erosion and sediment repair per occurrence: _____
D. Number of required hours of sediment removal per occurrence: _____
E. Number of required hours of other specific maintenance per occurrence: _____
F. Cost per occurrence = A X (B + C+ D+ E) =$_____
G. Number of occurrence per year: _____
H. Total cost = F X G =$_____

4. INSURANCE

A. Annual insurance cost =$_____

TOTAL FIRST YEAR COST

1. MOWING (1.I.) =$_____
2. LANDSCAPE MAINTENANCE (2.E.) =$_____
3. GENERAL MAINTENANCE (3.H.) =$_____
4. INSURANCE (4.A.) =$_____

TOTAL FIRST YEAR MAINTENANCE COST **=$**_____

CALCULATION OF DEVELOPER CONTRIBUTION

A. TOTAL FIRST YEAR COST =$_____
B. FOR 25 YEARS = x 19.79
C. TOTAL REQUIRED AMOUNT = A X B =$_____
D. DEVELOPER CONTRIBUTION PERCENTAGE = X 0.75
E. DEVELOPER CONTRIBUTION = C X D =$_____