HOW TO CREATE A STORMWATER UTILITY

(or Stormwater Management Program)

Thank you for your interest

in creating a stormwater utility (stormwater management program). The materials included in this "How To" kit should help you get started. Please feel free to reproduce the materials as you see fit. We intentionally printed them in black and white (or blue and white) so they are easily reproducible. We did produce a few items in color so you can see what that looks like.

Contents

Step by Step Guide

1 **Problem Definition**—Define the scope of your community's stormwater management problem: flooding, erosion, water quality, etc.

2 **Research**—Research existing utilities to identify key issues–we have done that, so you don't have to! (see summary of research in briefing papers and graphical summaries).

3 **Community Outreach & Public Involvement I**—Begin the ongoing process of community outreach and involvement–press releases, educational brochures, public meetings, etc.

4 **Program Development I**—Develop a stormwater management program, elaborate a budget, and determine where the program will be housed and how it will function, including consideration of billing processes.

5 **Collaboration I**—Form an Advisory Committee–assure a broad range of participants, and be sure to have representatives from all city/town departments: public works, water, sewer, planning, community development, engineering, legal, etc.; area businesses; Chamber of Commerce; Advocacy/Environmental groups; regional planning agency; state environmental protection agency; legal assistance; elected officials, etc.

6 **Community Outreach & Public Involvement II**—Continue ongoing community outreach and public involvement.

7 **Collaboration II**—Work with key elected officials, department heads, community leaders, environmental groups and other concerned residents to start the process of passing a comprehensive stormwater management ordinance.

8 **Program Development II (Refinement)**—based on a cost/benefit analysis of different methods available and emphasizing your community's priorities and values, select an assessment method, set rates, etc.

9 **Legal/Political Foundation**—Pass stormwater management ordinance.

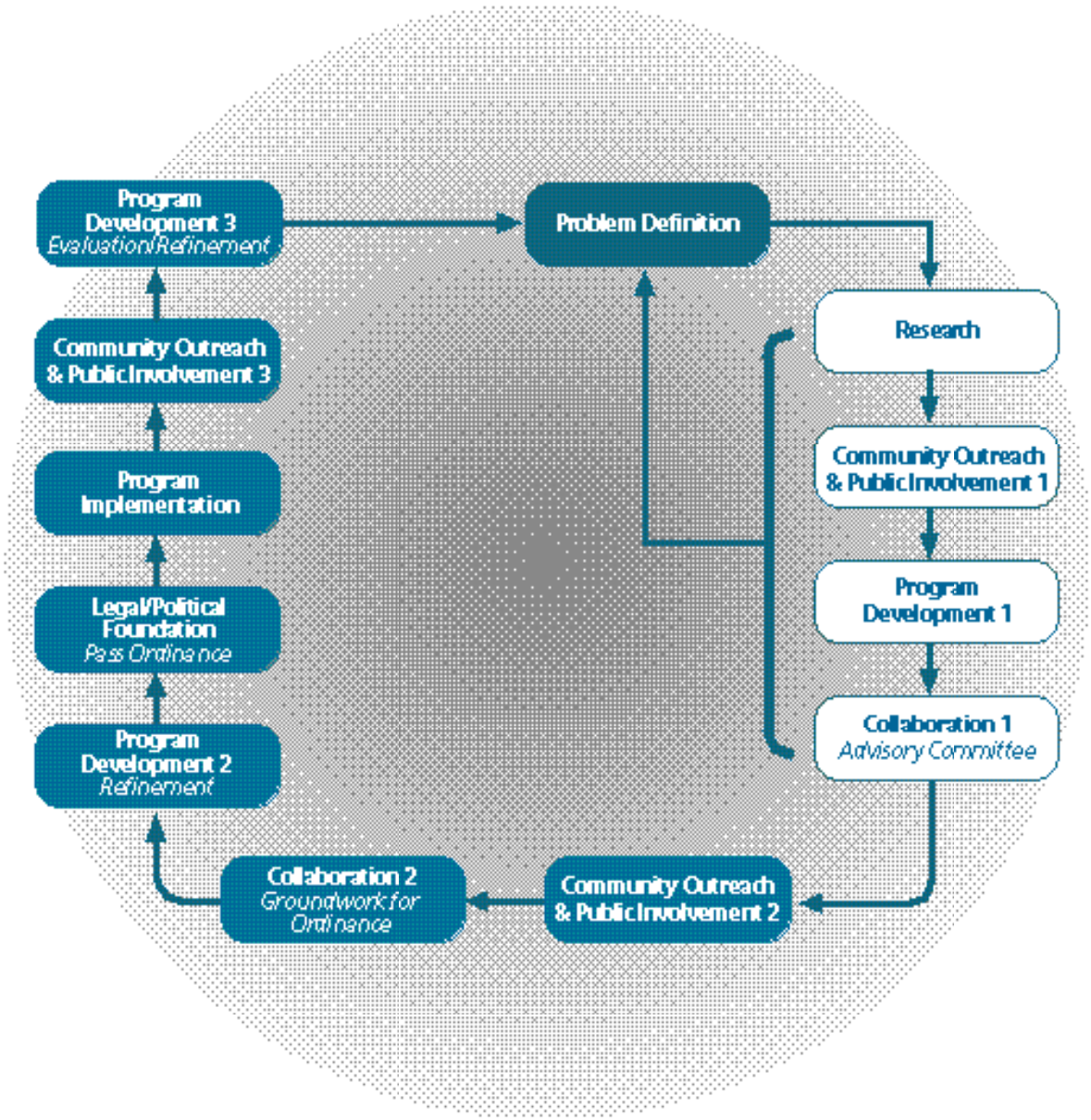
10 **Program Implementation**—start billing property owners, collecting funds and more effectively managing stormwater.

11 **Community Outreach & Public Involvement III**—Ongoing community education–tell people what you are doing with the funds collected and how they can help.

12 **Program Development III**— Program evaluation and ongoing refinement. Many utilities modify their fee structure over time.

For more information on this project, please feel free to contact Catherine Ratté at PVPC: 413/781-6045.

Stormwater Utility Development Process



Materials included in the How To Kit are available on disk. Please contact PVPC if you would like a copy.

This project was a cooperative effort of the Pioneer Valley Planning Commission, the City of Chicopee, the Town of South Hadley, the Massachusetts Department of Environmental Protection and the Environmental Protection Agency. A limited number of these kits are available from PVPC, call 413/781-6045.

If you have questions about this project, please feel free to contact any of the following agencies:

City of Chicopee DPW: 413/594-3557
Town of South Hadley DPW: 413/538-5083
Pioneer Valley Planning Commission: 413/781-6045
Massachusetts Department of Environmental Protection-Western Region: 413/755-2153

PRESS RELEASE

CONTACT: Stan Kulig, Superintendent of Public Works, (413) 594-3557 or
Tom Hamel, Water Polution Control, (413) 594-3585

FOR IMMEDIATE RELEASE
November 13, 1998

New Utility Will Mean Cleaner Water, Less Flooding

Chicopee residents will soon receive their first bills for the city's new stormwater utility. Like other public utilities, it is designed to charge community members for services provided by local government—in this case, managing problems caused when rainstorms cause sewers to overflow, polluting water supplies and flooding basements.

Residents will recive fact sheets (copy enclosed) about the new stormwater utility with their first bills, which will be mailed November ____. Bills will be a minimum of $10 and a maximum of $100 per quarter.

The first of its kind in Massachusetts, Chicopee's stormwater utility was created by order of the Environmental Protection Agency. Sewer repair and enhancement projects are already planned for the East Main Street area and Front Street.

# # #

PRESS RELEASE

CONTACT: Stan Kulig, Superintendent of Public Works, (413) 594-3557 or
Tom Hamel, Water Polution Control, (413) 594-3585

FOR IMMEDIATE RELEASE

Federal Money Flowing to Chicopee

Thanks to the efforts of Massachusetts Legislators, government officials and the Pioneer Valley Planning Commission, communities along the Connecticut River are receiving over $1 million in federal funds to help clean up the river.

The city of Chicopee has successfully competed for $241,860 of the one million dollars available.

Chicopee plans to use the funds to support their comprehensive stormwater management efforts. Last year the city launched Massachusetts's first Stormwater Utility. The utility, which charges residential property owners $10/quarter and industrial/commercial property owners $0.30/square foot/quarter, is raising funds to address the city's multi-million dollar stormwater problem.

- more -

Chicopee is pursuing all sources of funds to assure implementation of its stormwater management program, while placing as small a burden as possible on city residents.

Stan Kulig, Director of Chicopee's Department of Public Works, is proud of Chicopee's leadership role in stormwater management. "It's not always easy being the first community in the state to implement a potentially controversial new program, but we had a pressing problem, and we feel lucky to have had the funding support from the Department of Environmental Protection and the administrative support of the Pioneer Valley Planning Commission to create Massachusetts' first stormwater utility." Kulig added that his Department will continue to work to identify and secure outside funding to supplement Chicopee's Stormwater management budget.

# # #

PRESS RELEASE

CONTACT: Stan Kulig, Superintendent of Public Works, (413) 594-3557 or
Tom Hamel, Water Polution Control, (413) 594-3585

FOR IMMEDIATE RELEASE

High School Students Get Involved

Now playing on a television near you. Chicopee high school students have created an educational video describing the City of Chicopee's ground-breaking efforts to create Massachusetts' first Stormwater Utility. The project is a cooperative effort between the Telecommunications Department at the Chicopee High School and the City Department of Public Works.

"We love it when we can teach students about film-making while at the same time addressing a real-life community concern." said Bob Smith, Telecommunications Director at the Chicopee High School. "I learned a lot while making this video, so I know the students did too. When you live in a place, it's easy to take the government services for granted. It's neat to know that Chicopee is doing something really innovative to protect the environment and our community's quality of life."

All property owners in Chicopee suffer the negative effects of stormwater, flooding and water

- more -

pollution when combined sewers overflow, and all will have the opportunity to contribute to solving the problem. Chicopee's Stormwater Utility is an effort to secure a stable funding source for stormwater management. Stormwater utilities, much used in other parts of the country, are like other public utilities. They create a means of charging community members for services provided by local government.

The City of Chicopee is committed to solving stormwater problems. The Department of Public Works will separate and repair 15,000 feet of sewer pipe and install 8,000 feet of new sewer. The City is raising a portion of the $2,880,000 needed to solve stormwater problems through the new stormwater utility.

All single family residences are paying $10.00 per quarter. All other properties, commercial, industrial, multiple dwelling, etc. are paying $0.30 per 1,000 square feet of property per quarter.

Chicopee was encouraged to create a stormwater utility by the Environmental Protection Agency, which planned to penalize the City if they did not take steps to solve their water pollution problems. The City received a grant from the Massachusetts Department of Environmental Protection (DEP) and worked cooperatively with the Pioneer Valley Planning Commission (PVPC) to develop Massachusetts first stormwater utility.

- more -

Video p. 3

PVPC is documenting Chicopee's efforts so that other Commonwealth communities can learn from Chicopee's experience and create their own stormwater utility.

Some simple steps residents can take to help solve the problem of stormwater are:

- Remove leaves and debris from the top of catch basins
- Don't litter!
- Sweep your driveways and sidewalks—never use a hose to wash debris into the street.
- Wash your car on grass or gravel surfaces.
- Report clogged catch basins to the Department of Public Works.

For more information about Chicopee's stormwater utility, contact Stan Kulig, Superintendent of Public Works (413)594-3557 or Tom Hamel, Water Pollution Control (413)594-3585.

# # #

PRESS RELEASE

CONTACT: Greg Kereakaglow, Superintendent of Public Works, (413) 538-5033

FOR IMMEDIATE RELEASE

Funds to Help You Protect the Environment

You might not realize it, but your roof drain is probably connected to the town's sewer system. This means that rainwater flows off the roof into the sewer and is unnecessarily treated at the waste water treatment plant. It also means that sewers are receiving a lot more water than they were originally built to handle, which means they occasionally back up into people's basements when there is a lot of rain.

You can help to stop basement flooding and the unnecessary treatment of relatively clean rainwater. With funding support from the Massachusetts Environmental Trust and administrative support from the Pioneer Valley Planning Commission, the South Hadley Department of Public Works is offering re-bates of up to $100 to residential property owners who voluntarily disconnect their roof drains from the town's sewer system.

- more -

Assistance is available from the DPW. Call 538-5033 for an easy to follow manual on how to disconnect your roof drain and how to get reimbursed up to $100 from the town DPW.

Funds for the program are limited and must be expended by June 30, 1999, so call now if you want to participate.

The Roof leader disconnect effort is only one of many things the South Hadley DPW is doing to manage stormwater in the town. The DPW has also successfully competed for $610,730 of newly available federal funds to separate combined sewers in the Falls area.

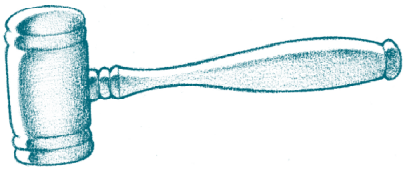
In addition, Superintendent Kereakaglow has been sitting on the city of Chicopee's Stormwater Utility Advisory Committee. Chicopee has recently created Massachusetts first Stormwater Utility. South Hadley considered creating a stormwater utility last year, but chose not to do so.

Kereakaglow is serving on Chicopee's Stormwater Advisory Committee because he knows that in a few years all communities will be required to better manage stormwater. "We were not ready to start charging residents last year, but we know we will have to find funds for stormwater management in the next few years. Stormwater utilities are the wave of the future."

# # #

THERE ARE FIVE ESSENTIAL AREAS TO CONSIDER IN THE DEVELOPMENT OF A MUNICIPAL STORMWATER UTILITY:

1) **Legal Issues,**
2) Community Outreach and Public Involvement
3) Management,
4) Assessment, and
5) Rate Setting.



As a rule, municipal stormwater utilities are established by ordinance. The vast majority of these ordinances are enacted by local government — Board of Aldermen, Select Board, City Council, and so on. Public referendum is also an option.

Of the 97 stormwater utilities responding to a national survey conducted by Black & Veatch Management Consulting in 1995-1996, 84% had **not** experienced a legal challenge.

Tools for protecting a stormwater utility ordinance against potential challenge include:

- citing the existing legal authority under which the utility is established,
- providing evidence of the need for the utility and the public process leading up to its creation, and
- ensuring the consistency of the stormwater utility ordinance with other local, state and federal regulations.

I. THE BASIC COMPONENTS OF A STORMWATER UTILITY ORDINANCE

The Name—relate the utility function and value to the user.

The Article or Chapter Designation in the Municipal Code —This information pertains to the organization and numbering system of the local ordinance, and where the stormwater utility regulations shall be located.

Establishment of the Utility and its Power to Collect Fees —the purpose of the utility, its responsibilities, administration, power to collect a fee, etc.

The System Of Fees—Descriptions of the stormwater charges (see assessment and rate setting). There is typically a description of each of the elements used in making the billing calculations, such as Intensity of Development Factor, Runoff Factor, Development Classification, Customer Classification, Equivalent Runoff Unit (ERU), etc., Also if applicable, credits for on-site and surface water detention systems, age or income level are described.

Identification of Who is, and is not, Charged—Where fees will be imposed on each and every lot and parcel of land within the municipality, this is explicitly stated, usually in connection with a description of the charges. Where this is not the case, as in exemptions for wetlands, undeveloped property, government property, etc., the heading Exclusion Of Certain Properties is typically used.

The Process For Adjustment And Appeals—This section lays out the procedure to be followed by customers who believe their charge has been calculated based upon incorrect information about their property or customer classification, or is otherwise unjust.

Protection Of The Municipality From Liability—Because many of the stormwater utilities currently in existence were established to address situations relating to flooding from stormwater runoff, ordinances typically include a section with the heading, "Flooding Liability" disclaiming responsibility and liability for damage relating to flooding that occurs subsequent to the creation of the stormwater utility.

Severability—Severability refers to the assertion that should any part of this ordinance be deemed invalid by a court of competent jurisdiction, the remaining portions hereof shall not be affected and shall remain in full force and effect. Along the same line, some ordinances address the issue of potential conflicts with other sections of the municipal code.

II. SUPPLEMENTARY COMPONENTS OF A STORMWATER UTILITY ORDINANCE

Findings of Fact—this component provides information about the development of the utility. Typically, it takes the form of a series of sentences or paragraphs beginning with Whereas.....

Definitions—Some stormwater utility ordinances contain no definitions. Others primarily define new terminology specifically related to the utility such as runoff factor, intensity of development factor, and so on. Yet others define commonplace terms within the context of the utility.

Authority—Many ordinances include a statement of the authority under which the utility is established, and cite relevant state regulations authorizing localities to establish stormwater utilities, public utilities, collect user fees, etc. , as appropriate. This section is usually in lieu of similar language in a "Findings... " section (see above). Massachusetts does not have state enabling legislation that specifically authorizes municipalities to establish stormwater utilities (although draft legislation was developed as part of this project). Communities are permitted to collect user fees under home rule regulations.

Physical Boundaries and Jurisdiction—This section is comprised of a statement of the geographic area to be served by the stormwater utility — e.g. the corporate limits of the city, specific designated drainage service areas. Sometimes a map of the service area is attached.

Billing Regulations, Collection and Penalties—Often billing regulations for the stormwater utility are covered under, or combined with, the billing regulations for sanitary sewerage. Where this is the case, the location of these regulations is referenced. When the stormwater utility has specific regulations of its own, these are presented in full.

CONCLUSION: ORDINANCES FOR COMMUNITIES

How an ordinance is structured and worded is part legal requirement and part community style. A stormwater utility ordinance is not an independent, stand alone document, but something to be appended to a community's existing code. The ordinance should:

- fit and be consistent with the community's existing code;
- be easy to read and understand by community residents as well as municipal officials and lawyers;
- reflect the decisions and concerns of the municipality in the process leading up to the establishment of the utility;
- justify the need and authority for the utility;
- be as explicit and detailed as possible, while also being as succinct as possible.

For detail on Legal Issues issues see Briefing Sheet #1 and Draft Local Stormwater Utility Ordinance and Draft State Enabling Legislation

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CREATING A STORMWATER UTILITY

COMMUNITY OUTREACH & PUBLIC INVOLVEMENT

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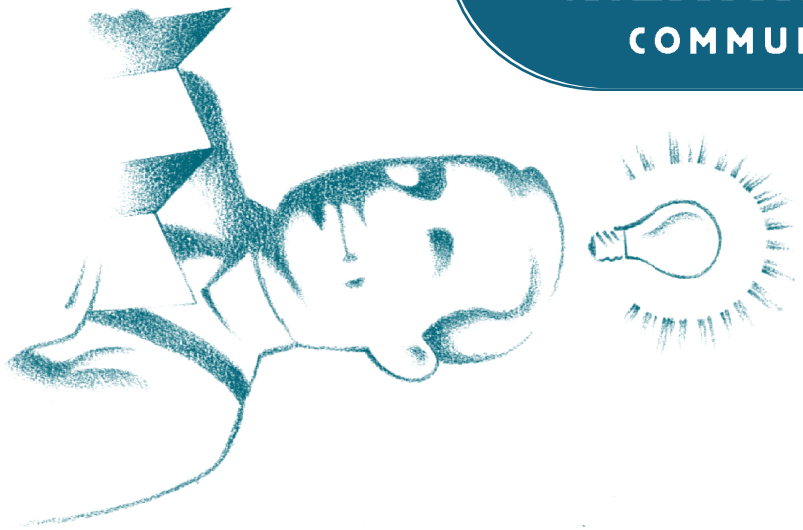

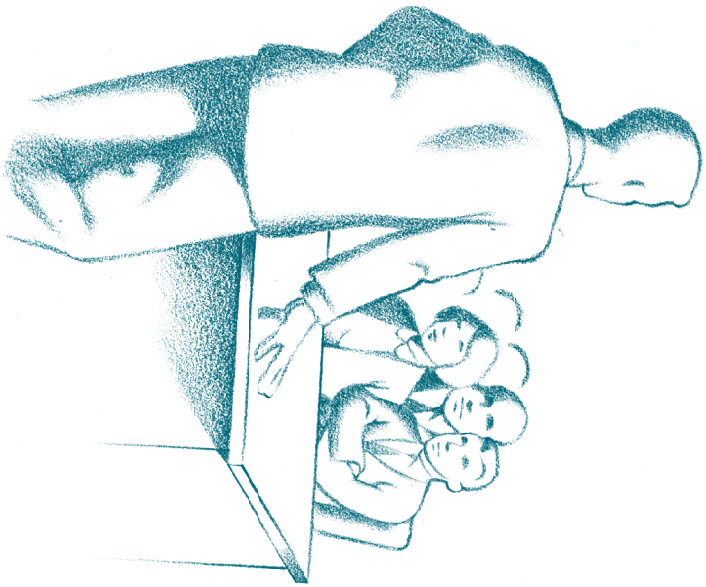

WHY PUT EFFORT INTO GETTING COMMUNITY SUPPORT?

- Educational efforts can foster acceptance of the fee structure and rates, minimizing unwarranted appeals for adjustments or exemptions.
- Education and outreach can promote stormwater management practices to property owners.
- And they can help a utility deliver on one of the advantages it offers the public: municipal accountability–an informed public is an involved public.

CONSIDERATIONS IN DEVELOPING PUBLIC SUPPORT FOR STORMWATER UTILITIES INCLUDE:

- Message — what information should be communicated and how should it be framed? Consider: timing, community circumstances, your target audience, and style.

- Media — what kinds of education and outreach activities will reach the intended audiences most effectively? Consider: direct communication—flyers, brochures, mailings; using the media—press releases, events, Public Service Announcements (PSAs), special events and programs—videos, slide shows, etc.; school curricula.

- Budgeting — how much emphasis — and resources — should be placed on education?

- Staffing — how will the outreach activities be conducted?

For detail on community outreach and public involvement, see Briefing Sheet #2 and sample flyers and results of public surveys and meetings in "How To Kit"

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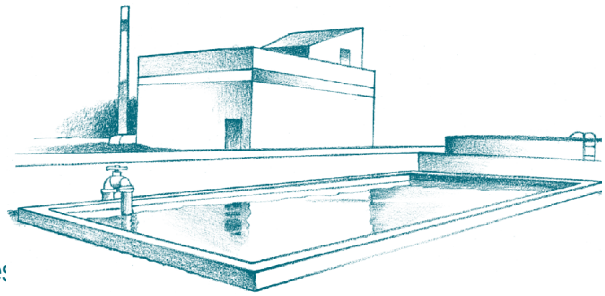


Stormwater utilities across the country are organized, staffed and managed in many different ways. While some utilities are designated as independent organizations, many others share budgets, offices and equipment with the department of public works (DPW) or another utility.

Managing a Stormwater Utility requires consideration of the following issues:

1) Organization
2) Staffing
3) Activities that will be funded
4) Alternative sources of revenue

1. ORGANIZATION OF STORMWATER UTILITIES

Black and Veatch's survey of stormwater utilities nationwide reports that 32% are combined with the department of public works, 16% are part of the wastewater utility, and 49% are organized as a separate utility.

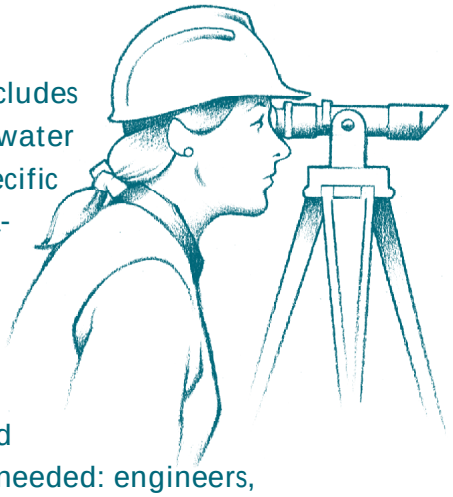
Separate vs. Consolidated Utilities

1) In some cases the stormwater utility is incorporated into the existing DPW or another utility department because both equipment and workers are already available for operations and maintenance.
2) Some stormwater utilities split the organization between 2 or more existing departments within the DPW.
3) In order to gain financial advantage and better compete for limited public funds, stormwater management can be placed in its own department, giving it separate attention and its own appropriated flow of revenues.

Positive and Negative Aspects of Creating a Separate Stormwater Utility

Positive	Negative
• Funding is channeled directly to the stormwater utility and funding for stormwater projects is directly controlled by the utility. • Conflict between the different DPW departments is avoided. • The utility can apply for and receive outside funding targeted to stormwater projects.	• It is expensive to create a separate utility. • Duplicating the purchase of equipment may seem unnecessary in the public's eyes.

2. STAFF NEEDS AND ORGANIZATIONAL DIVISIONS



There are three basic staff requirements:

1) **operations and maintenance (O&M)**— includes tasks such as daily maintenance of the stormwater infrastructure. Many utilities designate a specific staff for O&M because this ensures that infrastructure receives the attention it needs,
2) **capital improvement project (CIP)** — the focus of the stormwater utility, dictating future work loads and employment needs. Depending on the project or projects selected for construction, a variety of people may be needed: engineers, permit advisors, planners, inspectors, CAD technicians, and water quality experts. The number and scale of projects will dictate the number and type of staff required, and
3) **administration** — administrative staff for a stormwater utility is responsible for the coordination of all activities related to the utility. Coordination includes budget, O&M staff, plans, design, permits, and many other activities that are dependent on the organization of the utility itself.

Staffing Needs Summary

Required	Optional
• Operations and Maintenance (O&M) • Administration • Capital Improvement Project (CIP) Engineers • CAD and GIS Technicians	• Master Planners • Water Quality Specialists • Customer Service Representatives

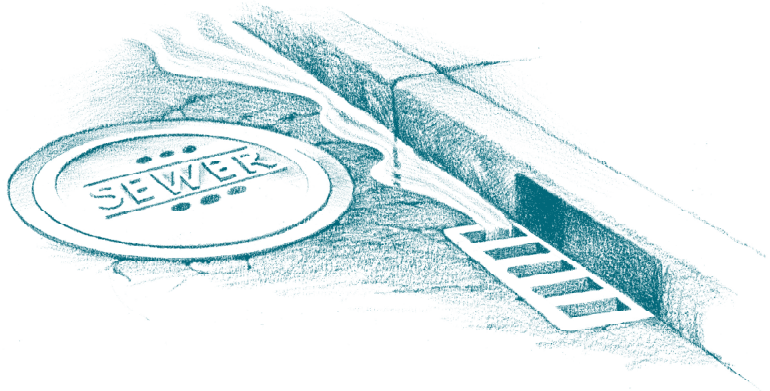
3. FUNDED ACTIVITIES

The motivation for creating a stormwater utility is to generate revenues that can pay for capital improvements that bring the stormwater infrastructure up to the required level of improvement. However, the revenues generated from the user fees ultimately contribute funds for several other uses.

In Chicopee, the following projects were identified for operation and maintenance funding:

- Catch Basin cleaning and repair
- Manhole repair
- Pipeline inspection, root treatment, grout/relining, replacement, and cleaning
- Culvert maintenance
- Street Sweeping

Chicopee also identified a number of construction projects to be funded in part by the Stormwater Utility. All of these projects address the existing water quality problems associated with combined sever overflows (CSOs).



Budget Considerations

Required	Optional
• Capital Improvement Projects (CIP) and related staff • Operations and Maintenance (O&M) and related staff • Other personnel • Taxes	• Debt Service • Water Quality Programs • Permits

4. ALTERNATIVE SOURCES OF REVENUE

Startup of a stormwater utility can be quite expensive and initial funding may not come from user fees. In addition to bonds, utilities utilize grants such as EPA grants and ISTEA funds, permit fees, development fees, ad valorem taxes and in-kind contributions. Depending on the priority of the stormwater utility within the larger scope of municipal services, the utility may receive more or less of its revenue from these sources.

For detail on Management issues see Briefing Sheet #3

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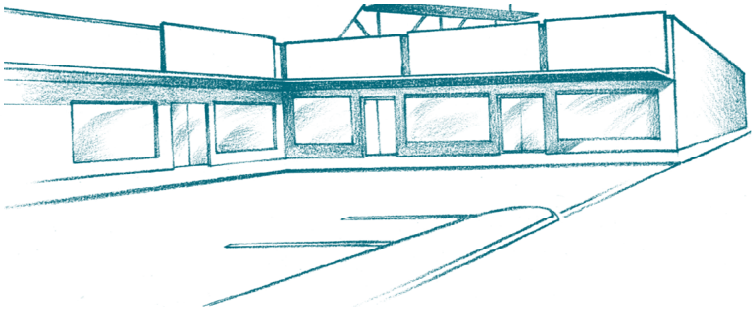
1) Legal Issues
2) Community Outreach and Public Involvement
3) Management
4) **Assessment,** and
5) Rate Setting

Assessment deals with determining how you will assess individual property owner's contribution to the stormwater management problem. The stormwater utility approach is based on the principle that polluters should contribute to covering the costs of correcting the environmental problems they cause. Property owners pay a fee to the utility for controlling the environmental impacts of stormwater runoff caused by development on their land. Utility charges are considered "user fees" — fees for using the municipal stormwater management system.

YOU PAVE, YOU PAY!



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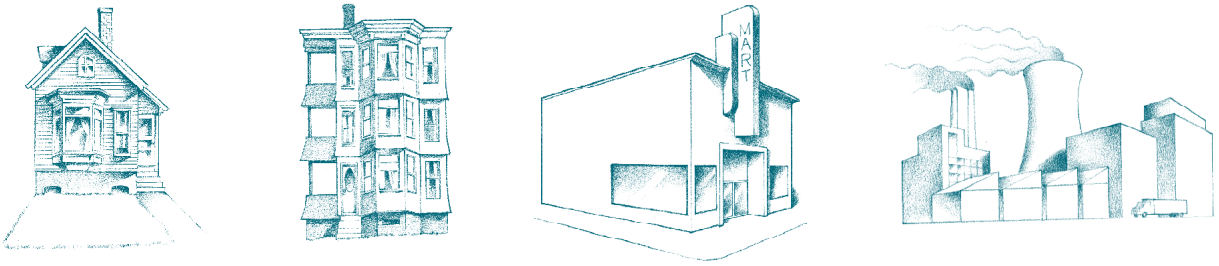
KEY ISSUES TO CONSIDER IN ASSESSING USER FEES INCLUDE:

1) fairness v. ease of implementation;
2) customer classification;
3) use of a flat rate v. attempting to calculate contribution to the problem

FAIRNESS – EASE OF IMPLEMENTATION SPECTRUM

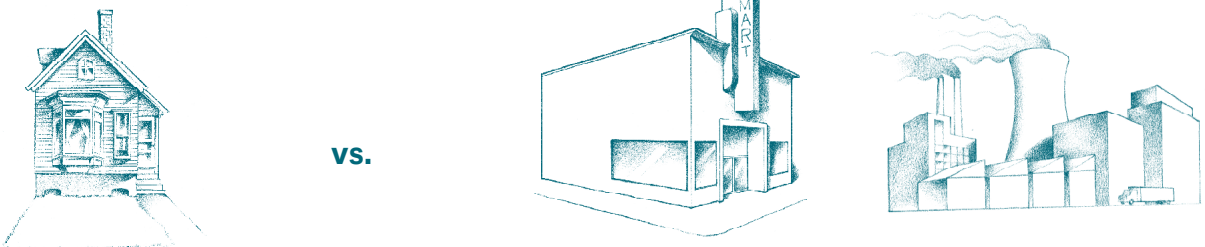
An equitable program may be very complicated to implement. Your community will have to decide where you fall on the "fairness - ease of implementation" spectrum.

CUSTOMER CLASSIFICATION



Different land uses contribute more or less to stormwater management problems.Your community will have to develop a way to classify properties before you assess Stormwater Utility user fees.

FLAT RATE V. CALCULATED RATE



vs.

$40

.30/1,000 sq. ft.

Flat rates are easy to explain and seem appropriate for residential properties. Research shows, however, that a calculated rate, based on the amount of impervious surface on a property, is more appropriate for non-residential properties.

For detail on assessment, see Briefing Sheet #4 and Cost/Benefit Report.

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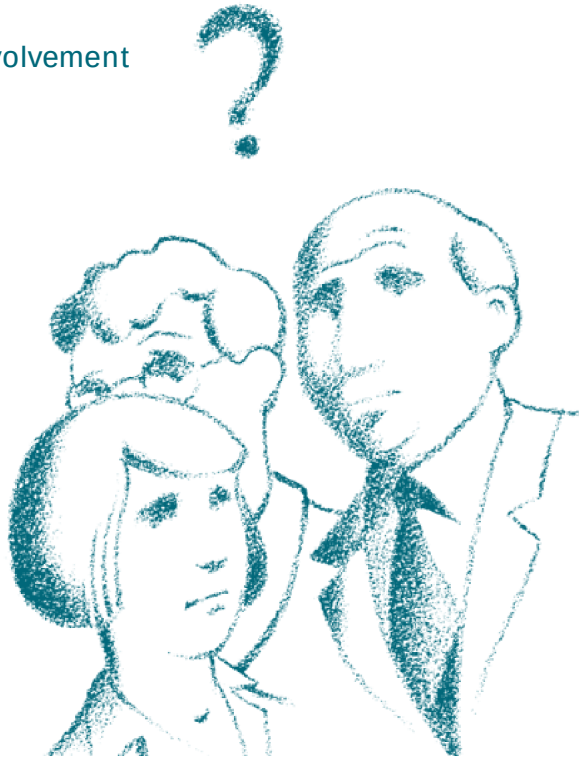

The Rate that a Stormwater Utility charges is the key to raising adequate funds in a manner that is perceived as fair and equitable to ratepayers.

WHEN SETTING STORMWATER UTILITY RATES, YOU NEED TO CONSIDER:

1. Total funds needed to effectively manage stormwater
2. Political feasibility of creating and implementing a user fee
3. Public relations

WHAT IS THE RATE?

It is the amount of money charged customers for each billing unit over a set time period. Calculating stormwater charges can be seen as a sequenced process. Rates enter in step 2.

1. Identify the number of billing units for each parcel or identify gross area of impervious surface for each parcel;
2. Multiply the number of billing units by the rate;
3. Add fixed charges or subtract credits (as appropriate—your community may not include these options).

Rate setting is particularly important because if people are going to complain about your Stormwater Utility, they will probably claim that it unfairly charges them. All the legal challenges to Stormwater Utilities have focused on attacks on the rate structure.

As a recent court case concluded: *"Charges must be fair and reasonable and bear a substantial relationship to the cost of services and facilities".*

This standard defines two important issues in rate setting:

1. reasonable accurate estimates of runoff will suffice—runoff does not need to be measured precisely;
2. the standard does not mention benefits or beneficiaries so the utility rate systems may be based on costs and not benefits.

Depending on your community's assessment method (see Briefing sheet #4/ Summary on Assessment) the rate is either a constant number applied to all customers or the rate varies depending on each parcel's contribution to stormwater and/or its type, i.e. residential, industrial, commercial, etc.

PROS/CONS:

A constant rate appears simple, but may be vulnerable to legal challenges.

Variable rates consider how different land uses contribute to more or less stormwater runoff, but may require a significant amount of preparatory work.

Before you set the rate, you need to know how much money you will need to fund your Stormwater management program (see Briefing Sheet #3/Summary on Management issues).

It is OK if your rate will not generate the total amount of funds needed to manage stormwater. Many New England communities with Combined Sewer Overflow (CSO) problems need millions of dollars to solve their stormwater management issues. A Stormwater Utility acceptable to your public will probably not generate this sort of money. Funds generated may be applied to a portion of your community's overall Stormwater Management Program.

For detail on Rate Setting issues see Briefing Sheet #5 and Cost/Benefit Report.

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Executive Summary

PROJECT PURPOSE

Stormwater utilities are proven effective mechanisms for generating revenue to manage stormwater. Just like electric or water utilities, stormwater utilities collect fees from residents to pay for a 'product'. Stormwater utilities are different from the other more established utilities as the 'product' being paid for is not something concrete and measurable like water or electricity. The product paid for by stormwater utilities is stormwater management. Stormwater management is an increasingly important government function, designed to control or eliminate water pollution, erosion and flooding. The purpose of this project was to examine the feasibility of creating a stormwater utility in Massachusetts.

The project consisted of four steps:

1. secondary research of successful stormwater utilities across the country
2. research into the legality of stormwater utilities in Massachusetts
3. design and implementation of a stormwater utility (Stormwater Management Program) in Chicopee, Massachusetts
4. technology transfer

This project has proved the viability of stormwater utilities in Massachusetts and has collected all the information and materials necessary for a Massachusetts community to create a stormwater utility.

PROJECT PROCESS

This project was supported through a contract between the Massachusetts Department of Environmental Protection (DEP) and the City of Chicopee. The City of Chicopee hired the Pioneer Valley Planning Commission (PVPC) to facilitate project implementation, including organizing and staffing the Advisory Committee, overseeing and producing all public information and education materials, assuring completion of legal research and work products, researching how and why stormwater utilities are created and managed in other communities across the United States, and facilitating technology transfer through presentations on the project, development of the "How To" kit and production of this Final Report.

KEY FINDINGS

1) Secondary Research

Stormwater utilities have been in existence in cities and towns across the United States for nineteen years. Existing utilities successfully generate funds to manage stormwater thereby helping government officials control flooding and its effects and assure community water quality. Research for this project was collected on the following ten communities: Fort Collins, CO; Bellevue, WA; Austin, TX; Charleston, SC; Hillsboro, CA; Los Angeles, CA; Aurora, CO; Boca Raton, FL; Tacoma, WA; Cincinnati, OH, and is summarized in the 5 briefing papers included in the "How To" kit.

- In establishing a stormwater utility, the approach one takes to assess

fees to property owners is a very important component of the utility.

- Community outreach and involvement are essential components of successful stormwater utility programs. Ongoing education of community residents is essential.
- It is not necessary to develop the perfect stormwater utility at the start of one's community efforts to manage stormwater. Most stormwater utilities have changed over time, including modifications to the assessment method.
- It is important to build in a plan to change residents' behavior. Most stormwater utilities are perceived not only as a means of generating revenue for stormwater management, but also as a means of educating people about the problem of stormwater management and providing residents with information on what they can do to mitigate the problem, with the hope of changing their behavior.

2) Legal Issues

- Stormwater utilities are not prohibited under existing Massachusetts law.
- A municipal or regional stormwater utility ordinance would facilitate implementation and administration of a stormwater management program.
- State enabling legislation would help to support municipal stormwater utility programs.

3) Demonstration Project

- The City of Chicopee adopted a stormwater fee which is anticipated to generate $500,000 annually for stormwater management efforts.
- Stormwater utilities can work in Massachusetts as evidenced by the success of Chicopee's stormwater management program.
- Community involvement is vital to the success of a stormwater management program. Chicopee received few complaints about the fee and the Department of Public Works staff attribute their success to the groundwork laid in educating and involving people in the process of program planning, especially DPW staff efforts with business leaders, but also with the general public.
- A comprehensive stormwater management ordinance is useful to organize and educate all segments of the community in support of stormwater management.
- The fee structure must be rational and there must be a correlation between the residential fee and the non-residential fee. Ideally, the assessment should relate to users contribution to the problem as measured by property owner's impervious surface and considering on-site stormwater best management practices.
- Billing is very complicated and can be surprisingly expensive. The appropriate billing process should be well thought out before the program is implemented.
- A multi-disciplinary Advisory Committee is essential to the success of a municipal stormwater management program.
- Education and community outreach and involvement must be ongoing.
- Pending state and national water quality initiatives, such as the National Pollution Discharge Elimination System (NPDES) Phase II regulations, will make stormwater utilities even more attractive in Massachusetts as

The user charge and the utility concept are the mos dependable and equitable approaches available to lo governments for financing stormwater management.

APWA from Urban Stormwater Management, 1991

municipalities with populations less than 100,000 will be required to obtain permits for their stormwater discharges.

4) Technology Transfer

Because this project is the first of its kind in the Commonwealth, an essential product was a series of presentations on the project and the production of a "How to Create a Stormwater Utility" kit. The "How To" kit includes: 1) A summary of Project Research, 2) A Step by Step Stormwater Utility Development Process, 3) The Legal Foundation, and 4) Sample education materials. A limited number of these kits are available from the Pioneer Valley Planning Commission and/or the Department of Environmental Protection.

RECOMMENDATIONS

- Massachusetts communities can create stormwater utilities to provide a stable source of funding for stormwater management, however passage of municipal stormwater management ordinances is essential to the success of local stormwater utility efforts—to lay the legal foundation, but also to assure broad-based community support.
- State enabling legislation to support municipal stormwater utilities should be pursued by a state-wide advocacy group, as such legislation will facilitate municipal efforts to develop stormwater utilities.

STORMWATER UTILITY DEVELOPMENT PROCESS

While it must be clearly understood that the City of Chicopee did not establish a stormwater utility as a result of this project, the City did pass an ordinance to collect fees from residents specifically for the purpose of managing stormwater. Combining the research conducted as part of this project, summarized in the "How To" kit, with the practical experience of the City of Chicopee suggests the following steps to develop a stormwater utility program.

Step by Step Guide:

1. Problem Definition — Define the scope of your community's stormwater management problem: flooding, erosion, water quality, etc.

2. Research — Research existing utilities to identify key issues—we have done that, so you don't have to! (see summary of research in briefing papers and graphical summaries—in "How To" kit").

3. Community Outreach & Public Involvement I — Begin the ongoing process of community outreach and involvement— e.g. press releases, educational brochures, public meetings. (See samples in "How To" kit).

4. Program Development I — Develop a stormwater management program, elaborate a budget, and determine where the program will be housed and how it will function, including consideration of billing processes. (See sample program from Chicopee in "How To" kit).

5. Collaboration I — Form an Advisory Committee—assure a broad range of participants, and be sure to have representatives from all city/town departments: public works, water, sewer, planning, community development, engineering, legal, etc.;

area businesses; Chamber of Commerce; advocacy/environmental groups; regional planning agency; state environmental protection agency; legal assistance; elected officials, etc.

6. **Community Outreach & Public Involvement II** — Continue ongoing community outreach and public involvement.
7. **Collaboration II** — Work with key elected officials, department heads, community leaders, environmental groups and other concerned residents to initiate the process of passing a comprehensive stormwater management ordinance.
8. **Program Development II (Refinement)** — based on a cost/benefit analysis of different methods available and emphasizing your community's priorities and values, select an assessment method, set rates, etc. (See Cost/Benefit Report in "How To" kit).
9. **Legal/Political Foundation** — Adopt stormwater management ordinance. (See Model Ordinance in "How To" kit).
10. **Program Implementation** — start billing property owners, collecting funds and more effectively managing stormwater.
11. **Community Outreach & Public Involvement III** — Ongoing community education—tell people what you are doing with the funds collected and how they can help.
12. **Program Development III** — Program evaluation and ongoing refinement. Many utilities modify their fee structure over time.

Proper stormwater management practices are necessary for the maintenance of a high standard of living as well as for the protection of people, property, and the natural environment.

David S. Pyzoha
Implementing a Stormwater Management Program, 1994

Research of existing stormwater utilities across the country suggests the following essential components of a stormwater utility:

- Legal Foundation—Stormwater Management Ordinance
- Community Outreach & Public Involvement
- Management Program
- Assessment Process
- Rate Setting Process

As evidenced by the difference between the over one-hundred and fifty existing stormwater utilities across the country[1], there is significant room for variation in the way that a municipality structures its stormwater utility. The key to a successful program is involving the appropriate people in program development, including passage of a comprehensive stormwater management ordinance. Depending on the community's values, municipal staff will need to make choices about the specific stormwater utility structure, i.e. the assessment method used and how the rates are set. Following the twelve-step process described previously, taking advantage of the research summarized as part of this project (using information in the "How To" kit), and assuring inclusion of the above five components, will assure a sound stormwater management program.

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[1] Black & Veatch Stormwater Utility Survey-1998-1999

1 BRIEFING PAPER #1

The Legal Foundation

As a rule, municipal stormwater utilities are established by ordinance. The vast majority of these ordinances are enacted by local government — Board of Aldermen, Selectboard, City Council, and so on. Public referendum is also an option. This paper will focus on the elements that go into drafting stormwater utility ordinances.

INTRODUCTION: ANATOMY OF AN ORDINANCE

While there is considerable variety in the way stormwater utilities are managed and how they charge their customers, their origins are very much the same: municipal regulations establish the utility and its power to collect fees, state who shall oversee its operations, lay out the fee structure and rate, provide a process for appeals, and specify where fees shall be deposited. These issues, along with various "boilerplate" sections concerning municipal liability, date of effectiveness and so on, are covered in every stormwater utility ordinance.

Most ordinances also include "findings of fact" to justify the establishment of the utility, definitions to clarify terms, details on the utility's physical boundaries and jurisdiction, billing collection procedures and regulations, and references to other stormwater management regulations at either the state or local level. The increased detail and precision can help municipal officials, staff and citizens understand the purpose of the utility and how it works, and can play a role in getting the ordinance passed.

Increased detail and clarity can also help an ordinance withstand legal challenge. This has not been an issue for most stormwater utilities. Of the 97 stormwater utilities responding to a national survey conducted by Black & Veatch Management Consulting in 1995-1996, 84% had not experienced such a challenge. But 15 did.[1] Tools for deterring, and protecting a stormwater utility ordinance against, potential challenge include citing the existing legal authority under which the utility is established, providing evidence of the need for the utility and the public process leading up to it, and ensuring the consistency of the stormwater utility ordinance with other local, state and federal regulations.

[1] Of the 15 stormwater utilities who reproted a legal challenge in the Black & Veatch survey, 9 had their fees sustained and the rest either reached a settlement or had not yet resolved the situation at the time of inquiry.

In addition to the basic elements describing the utility and how it functions, and the complementary elements providing for clarity, some stormwater utility ordinances include items that are specific to the locality. For example, Tacoma, Washington's ordinance includes special provisions for waterfront properties, and Cincinnati's features a mandate to the City Council that, prior to commencement of stormwater utility operations, it will enact a comprehensive drainage code. These three categories of ordinance provisions — what appears in nearly every stormwater utility ordinance, what appears in most, and features that are unique to just a few — will be explored in greater detail below. The information is the based on a close analysis of 10 ordinances, covering utilities in different parts of the country.

I. THE BASIC COMPONENTS OF A STORMWATER UTILITY ORDINANCE

As a general rule, municipal stormwater utility ordinances contain sections covering:

The Name

Though not a specific section of the ordinance, how the utility and the utility fee is referred to is an important component of it — and one that appears again and again. The name of the utility, the ordinance or fee can reflect community concerns and, by extension, function as a piece of public relations. While many stormwater management utilities, charges or fees are called, simply, stormwater management utilities, charges or fees others have been called "drainage utilities or funds," "stormwater pollution abatement charges," "storm and surface water utilities," "storm drainage service charges." These names attempt to relate the utility function and value to the user.

The Article or Chapter Designation in the Municipal Code

This information pertains to the organization and numbering system of the local ordinance, and where the stormwater utility regulations shall be located. Typical language might read: *An ordinance relating to stormwater runoff, establishing a municipal utility for stormwater management, amending (the appropriate sections of the municipal code).*

Establishment of the Utility and its Power to Collect Fees

This is the crux of the ordinance. Language varies, but generally includes the statement *There is hereby established a stormwater management utility...* What follows typically refers to the purpose of the utility, its responsibilities, administration, power to collect a fee, etc. This information may be given succinctly in a single paragraph, as this example from Cincinnati:

> *There shall be a division of stormwater management utility, within the department of public works, which shall be responsible for developing and implementing stormwater management plans and solely managing facilities, stormwater systems and storm sewers. This division shall charge a storm drainage service charge based on individual contribution of runoff to the system, benefits enjoyed and service received. The division of stormwater management utility shall be administered by the city stormwater management engineer under the direction and supervision of the director of public works.*

Alternatively, each sentence in the paragraph above might be elaborated upon and given its separate, numbered section in the ordinance.

The System Of Fees

Descriptions of the stormwater charges are generally the most detailed and varied portions of the ordinance, as they will be used as the basis for billing. There is typically a description of each of the elements used in making the billing calculations, such as Intensity of Development Factor, Runoff Factor, Development Classification, Customer Classification, Equivalent Runoff Unit (ERU), etc., as appropriate. Also when applicable, credits for on-site and surface water detention systems, age or income level are described. Some ordinances specify a dollar amount or rate, as in *The monthly charge per ERU is $1.00.* Others do

not, instead presenting a formula to which a rate can later be applied — e.g. all residential customers are to be charged the rate for one (1) ERU. For example, the Hillsboro County, Florida stormwater utility ordinance states:

> *The Board of County Commissioners, upon recommendation of the Director, shall, from time to time, by resolution, establish a rate for each ERU consistent with the benefits to be provided...*

The section on fees may also acknowledge that the system is subject to change. It may provide for periodic review of either the assessment formula or the rate (e.g. annually, every 2 years, etc.). Charleston, South Carolina included language in their stormwater utility ordinance stating that:

> *Pending the adoption of a permanent fee schedule, City Council may adopt an interim schedule or fees to assist in funding the establishment of the Utility, pending the completion and adoption of the Stormwater Utility Rate Study.*

Sometimes the issue of rate review is addressed in its own section of the ordinance. In addition to the question of periodicity — that is, when or how often the rate shall be reviewed — ordinances can specify who will determine the rate and the procedure for change.

Establishment or Designation of a Special Fund or Account in which the Fees will be Deposited
One of the most prominent reasons for creating a stormwater utility is to have funding for stormwater management in a separate and distinct municipal account. The money is earmarked solely for stormwater management activities, ensuring both a steady funding source and accountability to utility customers. Typically, the stormwater utility ordinance will contain a numbered section stating this fact — i.e. *A separate fund shall be created, known as the ...., for the purpose of identifying and controlling all revenues and expenses attributable to the utility.* This section may also detail activities for which the funds may, or may not, be used, including investment and borrowing. It may also provide for the production of an annual accounting to be provided to the municipal government.

Identification of Who is — and is not — Charged
Where fees will be imposed on each and every lot and parcel of land within the municipality, this is explicitly stated, usually in connection with a description of the charges. Where this is not the case, as in exemptions for wetlands, undeveloped property, government property, etc., the heading *Exclusion Of Certain Properties* is typically used.

The Process For Adjustment And Appeals
This section lays out the procedure to be followed by customers who believe their charge has been calculated based upon incorrect information about their property or customer classification, or is otherwise unjust.

Protection Of The Municipality From Liability
Because many of the stormwater utilities currently in existence were established to address situations relating to flooding from stormwater runoff, ordinances typically include a section with the heading *Flooding, Liability* disclaiming responsibility and liability for damage relating to flooding that occurs subsequent to the creation of the stormwater utility.

> *This chapter does not imply that property subject to the fees and charges established herein will always be free from stormwater flooding...*

Severability
Severability refers to the assertion that...

Should any part of this ordinance be deemed invalid by a court of competent jurisdiction, the remaining portions hereof shall not be affected and shall remain in full force and effect.

Along the same line, some ordinances address the issue of potential conflicts with other sections of the municipal code with a statement that *All ordinances or parts of ordinances insofar as they are inconsistent or in conflict with the provisions of this ordinance are superseded to the extent of any conflict.*

Effective Date
In addition to stating the date the ordinance takes effect, this section may also specify a separate date when billing can begin.

FOR CONSIDERATION:
Much of the information to be set down in a stormwater utility ordinance reflects decisions made about the utility management and assessment method, addressed in other papers in this series. Considerations specific to drafting the ordinance include:

- Where in the municipal code does the stormwater utility ordinance belong? Are there existing regulations that are affected and/or amended?
- How shall the utility, fee and ordinance be called?
- How shall the stormwater utility rate be set? Should there be provisions for periodic review?
- Is there the potential for the establishment of the utility to give ride to unreasonable expectations for which a disclaimer should be made — e.g. control of property flooding, stream and river bank erosion, combined sewer overflows?

II. SUPPLEMENTARY COMPONENTS OF A STORMWATER UTILITY ORDINANCE

As discussed above, many stormwater utility ordinances also contain language or sections covering the following:

Findings of Fact
Sometimes coming under such section heading names as *Findings of Fact, Findings and Determinations* or *Declaration of Purpose ,* and often appearing at the opening of an ordinance without heading or section number, this component provides information about the development of the utility. Typically, it takes the form of a series of sentences or paragraphs beginning with *Whereas...* Statements may include references to:

- the environmental situation giving rise to the need for the utility — *e.g. the lands and water of this municipality are great natural resources; the management of stormwater runoff is necessary to reduce pollution, siltation, sedimentation, local flooding and stream channel erosion, all of which have an adverse impact on land and water resources, and public health, safety and welfare; the repair, replacement, improvement, management and regulation of the existing stormwater management system is necessary to prevent ....., etc.*
- the governmental conditions giving rise to the need for, and/or allowing the establishment of the utility — e.g. state enabling legislation; state legislation authorizing municipalities to operate a public utility; legislative mandates for stormwater management or other related water pollution control; relevant state or local stormwater management plans, policies or studies, etc.
- community conditions leading to the establishment of the stormwater utility — *e.g. the municipality maintains a system of stormwater management facilities, including, but not limited to, inlets, conduits, manholes, channels,...etc.; it is necessary and in the best interests of the municipality, its citizens and the users of the stormwater system to establish a special charge for the maintenance and improvement of the municipality's stormwater management facilities, systems*

and services; the municipality needs to upgrade its capability to maintain existing and future stormwater management facilities and measures; owners of improved real property should finance the stormwater management system to the extent the contribute to the need for the system, etc.

Conditions relevant to the situation in Chicopee and South Hadley which may be appropriate to cite in a stormwater utility ordinance include, but are by no means limited to:

- the relationship between stormwater runoff, combined sewer overflows (CSOs) and pollution in the Connecticut and Chicopee Rivers;
- the negative impact of CSO-caused pollution on full utilization of the communities' water resources for fishing, swimming, boating, diving and other recreational and economic development uses;
- EPA mandates to conduct CSO abatement according to a legally binding schedule (the Administrative Orders);
- the exorbitant cost of CSO abatement by traditional methods of sewer separation;
- the inability of the community to finance mandated and otherwise needed pollution reduction activities;
- the potential for significant reductions in CSO abatement through a stormwater management-based approach;
- concern about, and the desire to prevent, the need for costly treatment of stormwater drain releases into the rivers;
- the ability of Massachusetts communities to collect user fees under home rule;
- municipal meetings, hearings, studies, votes, etc. leading up to the establishment of the utility.

Definitions

Some stormwater utility ordinances contain no definitions. Others primarily define new terminology specifically related to the utility such as *runoff factor, intensity of development factor, land use categories, equivalent runoff unit, basic assessment unit, parcel billing unit, base rate, benefited property, on-site detention, impervious surface area, semi-pervious surface area, stormwater facilities, stormwater runoff, non-stormwater runoff,* and so on. Yet others define commonplace terms within the context of the utility. These include: *annual budget, year, revenue, fee, owner, parcel, parcel size, square footage of surface area of lot or parcel of real property, utility customer, subdivider or developer, single family residential parcel, multi-family residential parcel, dwelling unit, developed property, director, cost of service.*

Factors affecting terms to be defined in a stormwate utility ordinance include the specific details of the billing system, definitions already included in the municipal code, and the general style of the existing code to which the ordinance will be added.

Authority

Many ordinances include a statement of the authority under which the utility is established, and cite relevant state regulations authorizing localities to establish stormwater utilities, public utilities, collect user fees, etc. , as appropriate. This section is usually in lieu of similar language in a *Findings...* section (see above).

Massachusetts does not have state enabling legislation that specifically authorizes municipalities to establish stormwater utilities but communities are permitted to collect user fees under home rule regulations. Utilities established under home rule may be more vulnerable to legal challenge than if enabling legislation were present. However, there is precedent around the country for proceeding without the authority conferred by enabling legislation. In Florida, for example, several stormwater utilities were created prior to the passage of state legislation. The state now has over 25 stormwater utilities. For a complete discussion of legal issues pertaining to creation of a stormwater utility in Massachusetts, see "How To Kit" Legal Foundation—"An Inventory and Review of Existing Massachusetts Laws and Regulations Pertaining to the Creation of a Stormwater Utility."

Physical Boundaries and Jurisdiction
This section is comprised of a statement of the geographic area to be served by the stormwater utility — e.g. the corporate limits of the city, specific designated drainage service areas. Often, this language is not placed in its own separate section of the ordinance, but is part of the declaration establishing the utility, as in this example from Austin, Texas:

> *The City Council hereby establishes the drainage utility service area as the city limits of the City of Austin, as presently configured and as the same may be amended from time to time.*

Sometimes a map of the service area is attached, or a map of stormwater flows in the municipality, along with appropriate language assigning responsibility to the utility for the management of stormwater runoff within the designated area.

Billing Regulations, Collection and Penalties
Often billing regulations for the stormwater utility are covered under, or combined with the billing regulations for sanitary sewerage. Where this is the case, the location of these regulations is referenced. When the stormwater utility has specific regulations of its own, these are presented in full.

FOR CONSIDERATION:

- What is the style and level of detail in the existing municipal code? Is this level of detail considered adequate, or does the community have a history of litigation resulting from ambiguities in its ordinances?
- What are the important findings or fact or determinations to be cited?
- What terms, aside from new terms related to the calculation of fees, should be defined?
- Will he billing regulations, collection method and penalties for the stormwater utility be different from those of the existing water and sewer utility?

III. SPECIAL FEATURES OF STORMWATER UTILITY ORDINANCES

As noted above, stormwater ordinances sometimes include regulations or references specific to the circumstances surrounding the individual stormwater utility. Examples include:

- The City of Tacoma, Washington has special provisions for waterfront properties, since they make up a significant portion of the utility's customer base and do not typically make use of, or affect, the municipal stormwater system. Another special feature of the ordinance is its inclusion in a small, spiral-bound booklet, titled *Sewage Disposal and Drainage Regulations and Rates*, produced for distribution to the general public.
- Cincinnati's ordinance, which asserts that prior to commencement of operations, the City Council will enact a comprehensive drainage code and other necessary rules and regulations also details the relationship between the stormwater utility and other municipal departments, specifying that *The Division of Stormwater Management Utility may avail itself of the services and facilities of other city departments necessary for the discharge of its responsibility — public works, personnel, finance, legal counsel, etc. Services shall be paid for by the Division at cost plus established overhead.*
- The stormwater utility ordinance for Fort Collins includes several provisions pertaining to stormwater management and pollution abatement, such as a requirement that stormwater facilities are required in new subdivisions, a statement making it is unlawful to discharge pollutants or contaminated water in public streets, watercourse, stormwater facility, any public or private property where there is the potential for migration, and an assessment for off-site stormwater

improvements for new construction. Typically, such regulations are enacted separate from the establishment of a stormwater utility, as in the case with Cincinnati, above.

- Bellevue, Washington's ordinance states that there is no estimated cost for the facilities, rights and original system or plan of the storm and surface water public utility. In contrast, Fort Collin's code provides basin by basin details of its drainage improvement plans, noting that *The stormwater basin fee base rate is founded upon the estimated or actual cost of necessary improvements and facilities identified in various basin master plans...*

FOR CONSIDERATION:

- Would the establishment or functioning of the stormwater utility be facilitated by new municipal stormwater management regulations?
- Does the community have specific stormwater management improvement plans, cost estimates, etc. that would strengthen the ordinance?

CONCLUSION: ORDINANCES FOR COMMUNITIES

How an ordinance is structured and worded is part legal requirement and part community style. A stormwater utility ordinance is not an independent, stand alone document, but something to be appended to a community's existing code. It will be used by members of the community, and read and debated by them prior to its adoption. The ordinance should:

- fit and be consistent with the community's existing code;
- be easy to read and understand by community residents as well as municipal officials and lawyers;
- reflect the decisions and concerns of the municipality in the process leading up to the establishment of the utility;
- justify the need and authority for the utility;
- be as explicit and detailed as possible, while also being as succinct as possible.

BRIEFING PAPER #2

Community Outreach & Public Involvement

An overwhelming majority of stormwater utility managers around the country say they believe an organized public information and education effort to be "essential" to the success of a stormwater utility.[1] This paper will present an array of communications methods and messages used by established stormwater utilities, and will also address the question of "How much community outreach and public information is enough?"

INTRODUCTION: A STORMWATER WHAT?

When people pay for something, they want to know what they're getting for their money. But while the benefits of a stormwater utility are indeed tangible and measurable — e.g. cleaner water, safe recreational use of rivers, reduced street and basement flooding, etc. — they are not direct. Education is needed to help utility customers make the connection between the fees they pay, the programs and projects undertaken by the municipality, and the environmental and personal benefits that come from stormwater management.

Making these connections early on in the development process is important for generating the public support needed to pass a utility ordinance. Even after a utility is up and running, education and outreach activities remain valuable and nearly every established utility conducts them. They can foster acceptance of the fee structure and rates and minimize unwarranted appeals for adjustments or exemptions. They can promote stormwater management practices to property owners, and they can help a utility deliver on one of the advantages it offers the public: municipal accountability. The specially earmarked funds of a

[1] 1995 Black & Veatch Stormwater Utility Survey; Florida Association of Stormwater Utilities

stormwater utility assure ratepayers of steady, reliable financing for necessary stormwater management activities; education programs can be used to inform ratepayers about how their fees are used.
In the northeast, where stormwater utilities are rare, education can also play an important role in familiarizing ratepayers with the concepts behind the new fee. Few people in a community beyond the public works department will have heard the terms stormwater or stormwater utility management, let alone understand what it is or why stormwater fees might be needed.

Considerations in developing public support for stormwater utilities include:

- Message — what information should be communicated and how should it be framed?
- Media — what kinds of education and outreach activities will reach the intended audiences most effectively?
- Budgeting — how much emphasis — and resources — should be placed on education? and
- Staffing — how will the outreach activities be conducted?

I. MESSAGE

What to focus on in a public education effort, and how to frame the message, depends in large part on whether the stormwater utility has been established or is in the development stage. Other factors include the specific circumstances in the community leading to the need for a stormwater utility, the receptivity of the community to the new fee, and the audience being addressed.

Timing

Education activities conducted prior to establishing a stormwater utility often — though not always, as in the case of Austin, Texas, described below — focus on justifying and explaining the new fee to the community. For example, Bellevue, Washington, highlighted the expensive capital improvements in their drainage system required by federal regulators as a means of convincing residents of the need for its new fee. Boca Raton, Florida, prepared their customers by sending out sample bills six months before its stormwater utility ordinance went into effect. The bill was accompanied by information explaining the advantages to this method of financing stormwater management needs.

In contrast with Bellevue and Boca, Austin, Texas chose not to focus on the impending new fee in its pre-utility public education efforts. Instead, the city launched a massive campaign promoting clean water resources and keeping garbage and pollutants out of the stormdrains. The reasoning behind Austin's strategy was that the controversial subject of the new fee should be avoided, and public discussion should focus on issues where there was concensus, such as the need for clean water.

After stormwater utilities have been established, education efforts typically change to promoting environmentally responsible practices relevant to stormwater. Just what those practices are depends on stormwater problems of the specific community.

Circumstances

In Florida and South Carolina, where flooding is the driving issue behind stormwater management programs, educational materials concentrate on the need for, and benefits to be derived from, flood control. In Los Angeles, where toxic chemicals and garbage entering stormdrains and polluting the ocean and bays is of primary concern, the focus is on getting citizens to make the connection between personal actions such as spilling motor oil down a catchbasin and the health of local water resources. The campaign uses "Make the Connection" as its slogan, with the tag line "Storm drains lead straight to the ocean."

These examples show how the content of stormwater utility education programs varies with local issues. In the study demonstration communities of Chicopee and South Hadley, the stormwater utility approach is being considered because of government mandates to remove stormwater from combined sewers. Relevant topics for public information include the CSO problem, the costs of complying with federal clean water regulations, and ways property owners can control their stormwater on-site.

Audiences

Successful education campaigns tailor their messages to the audience being addressed. How much do they

know about stormwater issues? need to know? want to know? What are the personal benefits to be gained from better stormwater management in their community? Many stormwater utilities emphasize reduced flooding in their educational efforts because that is a benefit to which property owners can relate and will readily support.

Educational campaigns can be addressed to the community at large, or specific sectors of it. Because the Los Angeles program targets oil spills and other toxics entering storm drains, its materials include posters promoting "Good Gas Station Operating Practices" and "Good Operating Practices for the Auto Repair Industry." A comparable target group relevant to the study communities is owners and developers of large commercial and industrial sites where stormwater best management practices may be implemented.

Style

Style in stormwater utility educational materials ranges from the corporate to the cute. Cincinnati's *Stormwater Management Utility* brochure is sober and corporate in both appearance and tone, explaining why the utility is needed, what it does, how customers are billed and what customer services are provided. Los Angeles takes the approach of an advertising campaign, with its slogan and tag line used repeatedly on a coordinated set of media that includes posters, video, brochures and stickers. Materials in Austin, Texas feature Storm Derrane, private crud investigator and Emm Maculate, clean water heroine, in the drama of polluted Town Lake. Citizens are urged to "Get Your Mind in the Sewer" and "Cut the Crud."

II. PROGRAMMING

Brochures and pamphlets are the most common methods used by stormwater utilities to communicate their messages to customers. But many go beyond that using such creative media as video, posters, t-shirts, and even doorknob hangers that let residents know a storm drain cleaning crew visited their neighborhood. Typically, programs include a combination of different types of activities in order to respond to different situations and reach different audiences.

Direct Communication

Direct communication refers to materials and messages sent directly from the utility to the utility customer, without an intermediary such as television or newspapers. Examples include brochures or newsletters inserted into water and sewer bills, specially prepared direct mail letters, and the doorknob hangers cited above — anything thing that is distributed directly from the utility to the intended recipient. Direct communication techniques give users the advantage of control — over both the message being communicated and who receives it.

Examples: Mount Pleasant, South Carolina sent a direct mail letter to property owners describing the city's new stormwater program and why funding was needed for its implementation. The letter closes with an appreciation of the community's support and a number to call with questions.

Boca Raton, Florida used bill insert distribution to send customers a sample of the new water bill showing the itemized stormwater fee. The sample bill was accompanied by an informational brochure describing the new fee, how it is calculated and what it is to be used for.

The News Media

Newspapers, television and radio can be used as communications tools by stormwater utilities on either a paid or free basis.

Paid coverage is, essentially, advertising. Aside from required tombstone-style newspaper ads for public hearings, advertising is not usually done, possibly because of its associations with commercial products and political contests.

Unpaid news coverage offers the advantage of reaching a large audience at relatively little cost. When the coverage is positive, the utility gains credibility. But there are no guarantees that coverage will be positive. Unlike the situation with direct communications, unpaid news coverage offers the utility little message control. A municipality can not be certain that reporting will happen when needed or wanted, or that the information delivered will be clear and accurate. Basic public relations techniques can help:

- Written materials such as news releases and fact sheets provide reporters with facts for reference, along with the municipality's perspective.
- News releases written in the style of the target reporter can help convince editors and news managers that the story fits in with their paper or program.
- Increasing the frequency of news releases and media contacts can increase the frequency of coverage.
- Providing photographs or other visual materials such as charts and maps may increase the amount of space or prominence given to an article; providing an interesting scenario for video can increase the chances of television coverage.
- Involving well-known figures, such as state or federal level politicians, may increase chances for coverage.
- Designating one or two spokespeople for the utility can ensure messages are delivered with consistency, and facilitate relationships with reporters. Spokespeople may also appear on local talk programs to discuss the utility and stormwater issues.
- Prompt reaction to negative or incorrect coverage can minimize damage.

While news coverage is unpaid, it is not free. Effective public relations activities requires substantial staff time for writing news releases and making media contacts.

Public Service announcements (PSAs) are somewhat of a hybrid between advertising and public relations. Television and radio spots produced like commercials, they have a public service content and are aired by stations for free. Timing is the issue. Stations broadcast PSAs when they can't sell high-priced commercial time, generally very early in the morning, very late at night or on weekends. So while the air time is free and the message is controlled, audience levels may be low. PSAs for television need to be professionally produced on video while radio stations may be supplied with either a professionally produced audiotape or script to be read by announcers or disc jockeys.

Examples: The stormwater utility in Charleston, South Carolina was able to get favorable newspaper coverage by providing a map showing the distribution of stormwater utilities around the country. The article implied that Charleston is on the cutting edge, joining a progressive, pro-active movement.

The education efforts of Los Angeles' stormwater utility are part of a larger "L.A. Resource" program on the city's pollution control efforts. The program included a PSA in two versions — one 15 second and one 30 second spot — urging viewers to "Make the Connection" between what goes into their storm drains and what comes out into the ocean. Titled "The Fantastic Voyage," it features computer animation of pollutants flowing through the storm drains to the sea.

Special Events and Programs

Special events and programs include such activities as public hearings, meetings and presentations, and information booths at local fairs and festivals. They offer an opportunity for interactive engagement with the public — that is, a chance for municipal officials to speak with the public, answer their questions on the spot and hear what they have to say. In contrast with the types of activitivies discussed above using mass media and mass mailings, the number of people reached is relatively low.

Public hearings are required by law as part of the ordinance development process. Their success as platforms for public education depends on the preparation going into them: how well the events are publicized, promoted and attended; the level of information provided, and the style in which it is delivered. This also holds true for public meetings held above and beyond the legal requirements. Hearings and meetings can be enlivened and made more effective with the use of presentation media such as story boards, overheads, slides and video.

Local events such as fairs or community celebrations provide ready made opportunities for distributing information. The settings are lively and fun, quite different from the formal atmosphere of a City Hall hearing, and likely to attract a different audience. Information booths can be places to trot out the presentation boards or video used at public meetings and, of course, flyers and pamphlets. They also lend themselves to lighter kinds of handouts such as slogan imprinted buttons, refrigerator magnets, funnels for recycling used oil, stickers, posters, etc.

Example: Austin, Texas prepared a slide show on the stormwater utility which was used in public meetings and later shown on public access television station.

School Environmental Education Curricula

School environmental education programs are commonly used after the implementation of stormwater utilities as part of campaigns to keep garbage and pollutants out of the stormdrains. Themed materials such as coloring books and stickers are used to bring the message home to parents.

Examples: Fort Collins, Colorado incorporated stormwater related issues into an existing environmental education curriculum. Children learn about such issues as hazardous waste disposal dangers and the connection between clean water resources and stormdrains.

The L.A. Resource program includes several child-based approaches: "Safe House. Safe Me!" is a coloring book for very young children wih a centerfold picture of a storm drain discharging to the watery home of a frog and fish. The making of the "Fantasic Voyage" PSA (noted above) was turned into the subject of a ten minute classroom video. "The Magical City Forest" is a teacher's guide covering a variety of urban environmental issues including stormwater. It was repared by a non-profit environmental group under a contract with the stormwater utility.

III. BUDGETING

How much emphasis should be placed on getting community support? A 1995 national stormwater utility survey by Black and Veatch shows 62% of those responding believe an organized public information and education effort is essential. Further, 38% found it helpful and only 1% found it unnecessary. Yet the same survey reported that 99% set aside between zero and five percent of their budget for education and public outreach activities.

At first, it appears the two sets of statistics are contradictory. Why so little for a highly valued activity? A number of explanations are possible. Public education activities are considerably less costly than stormwater management programs, particularly if capital expenses are involved. For example, 5 percent of a million dollar program is $50,000, sufficient to fund a full-time staff person to devote to the outreach process.

In addition, educational activities pertaining to the stormwater utility may be undertaken by other municipal departments and not show up in the utility's budget. This is certainly the case prior to utility establishment, when the most time consuming aspects of public education — meetings and hearings — need to be held. Stormwater utilities surveyed by the Pioneer Valley Planning Commission as part of this study indicated that education activities prior to implementation were completed by existing municipal staff who took on additional responsibilities.

Out of the ten utilities surveyed by PVPC, only two did not conduct some form of public outreach campaign. All of the utilities were required by law to inform the public that there would be an additional fee on their utility bill. This requirement was met by sending out a public meeting announcement. Eight of the utilities voluntarily went beyond this requirement and initiated an outreach campaign. The campaign was carried out through public hearings, bill inserts, newspaper articles, and traveling slide shows. Each of the utilities surveyed managed to implement the stormwater utility fee, regardless of their education campaign. The reason for this is that each town had a good idea of how much community support there was prior to the launch of the education campaign.

Reading your community

It is important to have a sense of what your community's reaction will be to an increase in their utility fees. Through the use of a focus group, which is a sample of the community, it is possible to gauge the response of the community by listening to the concerns presented by the focus group. Some municipalities have found that there is support within the community for a fee that will protect their water quality or protect their streets from flooding. Other municipalities are aware that implementing an additional fee will be a considerable challenge in their community requiring extensive education. The amount of money and energy directed towards education prior to the implementation of the fee will be based on this initial reading of the community's willingness to give support.

Hillsboro, Florida- The simple approach

The DPW managers of Hillsboro County, Florida did not engage in an extensive public outreach campaign. Believing that there would be little resistance from the community, they sent their customers a letter inviting them to a public meeting that would be a forum to discuss the new stormwater utility fee. This public meeting met the most basic legal requirements for public outreach according to the state of Florida. The utility fee was adopted after the public hearing. The philosophy expressed by the DPW representative in Hillsboro was, "the simpler the better." Hillsboro decided at the outset that the community did not need to receive extensive education to support the new fee, so a low cost and low technology approach was taken.

Austin, a city opposed to new fees

Austin, Texas did not conduct any form of public outreach outside the legal requirements either, but for a very different reason than Hillsboro, Florida. The DPW representatives in Austin believed that the public would not support the new fee if the outreach was focused on the fee increase itself. The philosophy used by the managers of the DPW in Austin instead emphasized the need to change people's behavior, not call attention to the fee change.

The managers of the Austin DPW, at the time the fee was initiated, believed that in order to gain community support for these clean water activities, attention should not focus on an additional fee which could stir up negative feelings among the residents. Ultimately, it was believed the fee had to be paid, so why create a controversy. Austin has engaged in an enormous education campaign focused on clean water resources and keeping garbage and pollutants out of the stormdrains. The residents of Austin now pay a fee that is listed on their utility bill each month and actively participate in clean water activities.

Boca Raton—The more, the better

The utility in Boca Raton, Florida placed educational inserts in the utility bills six months prior to the actual billing of a stormwater utility fee, predicting some difficulty in convincing the public that Boca Raton needed the fee. Boca Raton used a sample stormwater utility bill as its insert, accompanied by educational information. This time period of six months prior to the actual billing gave the stormwater utility managers a chance to answer questions from the public before the fee went into effect.

Conclusion

Each of the ten utilities interviewed has successfully implemented a stormwater utility fee. However, the methods for meeting the goal were all different. It was found through the interviews that while many examples exist for education programs, the extent of the education will depend on the perceived support for the fee prior to implementation. Once a municipality establishes to what extent it will educate, it must decide who will be responsible for this outreach campaign.

IV. STAFFING

Who conducts the outreach activities?

As the previous statistics showed, the majority of utilities (62%) surveyed nationally believe that an education campaign is essential to the success of the new stormwater utility. This is contrasted however by the following statistics:

- 94% of the municipalities employ 0-1 employees for education and public outreach,
- 99% of the municipalities set aside 0-5% of the program budget for education and public outreach activities.

At first, it appears that the two sets of statistics are contradictory. On the one hand, the municipalities feel education is essential. So why don't they invest people and money in a program? These numbers are explained very simply; the bulk of the outreach that is completed prior to the actual billing of the

stormwater utility fee is completed by the staff that already exist within the municipality. Bill inserts, letters, public meetings, and slide shows are low budget projects that require a minimal amount of staff time and money to put together. The municipalities interviewed all expressed that their education activities prior to implementation were completed in-house by existing staff who took on additional responsibilities.

Why use existing staff instead of new staff?

The implementation of a new stormwater utility fee is a short-term activity that requires a temporary dedication of time by an employee. There is little need to hire a person for this position. However, if there is no time among the staff for the completion of such an activity, it is possible to hire a consultant or an intern to complete the work.

Who continues the education program after the fee is implemented?

If the stormwater utility managers choose to continue the education program after the fee is implemented, the need to hire a person for a long-term position becomes greater, but it still is not necessary. The majority of the ten utilities interviewed have added stormwater awareness and education to already existing environmental education programs, eliminating the need for an additional person.

Both Austin, Texas and Los Angeles, California added stormwater to existing education programs that included clean surface water campaigns and household toxic substance disposal programs. In contrast, Tacoma, Washington hired 1.5 customer service representatives to handle stormwater utility customer questions and printed stormwater material distribution.

Before the decision to add a person is made, the municipality must determine what departments could take on additional education or public relations tasks or who they have in place to implement additional activities.

FOR CONSIDERATION:

1. What level of community support must be gained in your community?
2. Are there existing staff members who can carry out the initial start-up program for public education?

3 BRIEFING PAPER #3

Management

This paper will present information concerning stormwater utility management which was gathered from phone interviews with managers of ten stormwater utilities located throughout the country. Both positive and negative aspects of each utility's organizational structure are presented for further discussion.

INTRODUCTION: MANAGING A STORMWATER UTILITY

Stormwater utilities across the country are organized, staffed and managed in many different ways. While some utilities are designated as their own organization, many others share budgets, offices and equipment with the department of public works (DPW) or another utility. There is also a great deal of variety in staffing needs and budget revenues and expenses. Through interviews with managers of ten stormwater utilities throughout the country, information was collected on the practices of these utilities in the following areas:

- How are stormwater utilities organized?
- What are the staffing needs and organizational divisions for a stormwater utility?
- What activities does a stormwater utility fund?

1. ORGANIZATION OF STORMWATER UTILITIES

The 1998-1999 survey by Black and Veatch of stormwater utilities nationwide reports that 52% of the utilities are combined with the department of public works, 8% are part of the wastewater utility, and 37% are organized as a separate utility. An additional phone survey conducted by PVPC found that the organization of the stormwater utility within the municipality is tied directly to levels of funding, utility service prioritization, and existing utility department structure.

Separate vs. Consolidated Utilities

In some cases, the stormwater utility is incorporated into the existing DPW or another utility depart-

ment because both equipment and workers are already available for operations and maintenance. Tacoma, Washington has placed its stormwater utility in the DPW and shares the cost of operation and maintenance (O&M) with the sanitary and refuse departments. Fort Collins, Colorado has recently placed all water related utilities into one consolidated utility for cost cutting purposes, terminating the 18 year old stormwater utility.

Some stormwater utilities split the organization between 2 or more existing departments within the DPW. The stormdrain system in Los Angeles, California is owned and operated by the DPW. Within the DPW, the Bureau of Engineering is in charge of design and construction of capital Improvement projects (CIP) while the Bureau of Sanitation is in charge of O&M of the existing infrastructure.

The Cincinnati, Ohio stormwater utility was part of the DPW's Metro Sewer District at its outset. However, "finger pointing" between stormwater and sewer became such a problem that in 1996 stormwater was placed in its own utility. Austin, Texas, facing the same organizational battles over equipment and cost sharing between stormwater and sewer, created a watershed management department for stormwater related projects which employs over 180 people. This office handles stormwater related areas such as flooding and erosion, flood plain management, permit acquisition, and water quality.

In order to gain a financial advantage and a higher priority, stormwater can be placed in its own department, giving it separate attention and its own appropriated flow of revenues. Kevin McBride, a stormwater utility manager in Fort Collins, Colorado, states that for eighteen years, stormwater was set up as its own utility and received a high priority for funding. This was changed in 1997 and stormwater was consolidated with other water utilities. The Fort Collins stormwater utility now receives a low priority for funds within a larger utility department.

POSITIVE AND NEGATIVE ASPECTS OF CREATING A SEPARATE STORMWATER UTILITY

Positive

- Funding is channeled directly to the stormwater utility and priority is heightened for stormwater projects.
- Conflict between the different DPW departments is avoided.
- The utility can apply for and receive outside funding targeted to stormwater projects only that joint stormwater / sewer utilities may not be eligible for.

Negative

- It is expensive to create a utility that is exclusive from the others that are already in place.
- Duplicating the purchase of equipment may seem unnecessary in the public's eyes.

FOR CONSIDERATION:

1. What is the current capacity of the DPW or other utility departments? Is there room for additional staff responsibility and equipment use?
2. What priority level does stormwater have in comparison to other utilities. If it is low, will this impact the attention it receives in funding and management?

2. WHAT ARE YOUR STAFF NEEDS AND ORGANIZATIONAL DIVISIONS?

There are three basic staff requirements: operations and maintenance (O&M), capital improvement project (CIP) engineers, and administration. Whether the utility is operated within DPW or operated as its own organization, these basic employment needs should be considered.

Operations and Maintenance (O&M)

According to the 1998-1999 survey by Black and Veatch, 85% of the stormwater utilities rely on their own staff for O&M services. O&M includes tasks such as daily maintenance of the stormwater infrastructure. Many utilities designate a specific staff for O&M because it ensures that the infrastructure will receive the attention it needs. Utilities that share O&M employees with other utility services may have difficulty with staff allocation, however, this problem can be remedied by an administrative supervisor who has insight into the needs of the stormwater infrastructure.

The number of O&M employees varies greatly among stormwater utilities. Charleston, South Carolina has a population of 100,000 and a customer base of 27,000 and an O&M staff of 40 people that it shares with the other public services in DPW. Bellevue, Washington, also with a population of 100,000, has 14 O&M employees who are specifically assigned to stormwater.

Capital Improvement Project (CIP) Staff

Capital Improvement Projects are the focus of the stormwater utility, dictating future work loads and employment needs. Depending on the project or projects selected for construction, a variety of people may be needed on staff such as engineers, permit advisors, planners, inspectors, CAD technicians, and water quality experts. The necessity for these people depends on the scale of the project and the number of projects that occur at one time.

Each of the stormwater utility managers interviewed indicated that there is at least one supervisor who oversees CIP's on the city's payroll. This person can be employed specifically by the utility or the person can be an existing employee from a different city office who takes on an additional responsibility. In many cases, this person or group of people is located in the engineering department. Five out of the ten utilities interviewed have CIP project managers and engineers located within engineering departments.

Administration

The administration staff for the stormwater utility is responsible for the coordination of all activities related to the utility. The coordination includes budget, O&M staff, plans, design, permits, and many other activities that are dependent on the organization of the utility itself. All of the utilities in the PVPC survey indicated that they have an administrative staff or a manager who oversees the entire utility. The director of public services manages the Charleston, South Carolina utility however, in Bellevue, Washington, there is a staff of five who comprise the administration division. Once again, this is related to the size of the utility and the current work load of administrators in the DPW.

Miscellaneous Staff

Most of the utilities surveyed indicated that they employ additional staff that meet the changing needs of the utility. For example, the utility in Tacoma, Washington hired two customer service representatives to field questions from the public. Boca Raton, Florida decided to increase the GIS capabilities of the stormwater utility and hire a CAD technician. These positions, while not crucial to the daily operations of the utility, were found to be useful for a specific projects.

STAFFING NEEDS SUMMARY

Required

- Operations & Maintenance (O&M)
- Administration
- Capital Improvement Project (CIP) Engineers

Optional

- Master Planners
- Water Quality Specialists
- Customer Service Representative
- CAD and GIS Technician

FOR CONSIDERATION:

1. Is it more productive (for example) to have 40 shared employees who work on stormwater part time or 14 full time stormwater employees?
2. Should all staff be hired at the outset or should employees be added as the utility develops.

3. WHAT ACTIVITIES DO STORMWATER UTILITIES FUND?

The motivation for creating a stormwater utility is to generate revenues that can pay for capital improvements that bring the stormwater infrastructure up to the required level of improvement. However, the revenues generated from the user fees ultimately contribute funds for several other uses. All but one of the utilities interviewed stated that O&M receives funding from the utility. Bellevue, Washington spends 17% of their budget on O&M each year.

However, Bellevue allocates 20% of their revenues to debt service to repay bonds that were issued during the first five years of the utility. Similarly, Aurora, Colorado allocates 35% of the budget to debt service. In addition to debt service, utility funds are allocated for taxes, land acquisition, permitting, pollution abatement, and street sweepers among other things. Tacoma, Washington utilizes 30% of its revenues for superfund site cleanup.

Of the utilities surveyed, most first allocate funds to CIP's and the staff that is required to design and construct them, and to the equipment and staff for O&M. Beyond this, expenditures are made based on the organization of the utility. If there is staff sharing, funds are channeled through several different departments such as engineering, sanitation, data collection, and lab research.

BUDGET CONSIDERATIONS

Required

- Capital Improvement Projects (CIP) and related staff
- Debt Service
- Operations and Maintenance (O&M) and related staff
- Water Quality Programs

Optional

- Other personnel
- Permits
- Taxes

FOR CONSIDERATION:

1. What are all of the expenses, both short term (five years) and long term of the stormwater utility?
2. Beyond the funding of O&M and CIP's, what activities will the utility need to fund?

4. ARE THERE ADDITIONAL SOURCES OF REVENUE?

Startup of a stormwater utility can be quite expensive and initial funding may not come from user fees. Cincinnati, Austin, and Tacoma each used bonds for the initial funding of the utility. Los Angeles continues the use of $15 million in bonds each year for CIP's that are paid for by property taxes. Charleston, South Carolina uses bonds as a last resort, relying on user fees as the primary source of revenues.

In addition to bonds, utilities utilize grants such as Environmental Protection Agency (EPA) grants and Transportation Equity Act For The 21st Century (TEA-21) funds, permit fees, development fees, ad valorem taxes and in-kind contributions. Depending on the priority that stormwater utility has within the larger scope of municipal services, the utility may receive more or less of the revenues from these sources.

POSITIVE AND NEGATIVE ASPECTS OF USING BONDS FOR CIP FINANCE

Positive

- Large sums of money are available for utility start-up.
- Large scale CIP's can be undertaken and constructed without straining budget needs in other areas of the utility.

Negative

- Debt service requires a large percentage of user fees or additional sources of revenues such as ad-valorem taxes.
- Public may not vote for a bond while they are faced with a new utility fee.

FOR CONSIDERATION:

1. What revenues are required for the initial start-up and required CIP's?
2. Can the user fees cover these expenses?

A SAMPLING OF STORMWATER UTILITY ORGANIZATIONAL STRUCTURES

LOCATION	UTILITY ORGANIZATION	POPULATION AND CUSTOMER NUMBERS	STAFFING NEEDS	ACTIVITIES FUNDED BY THE UTILITY	OTHER SOURCES OF REVENUES
Fort Collins, CO	separate utility for18 yrs. Now part of WaterUtility through a consolidation meant to reduce costs.	Population: 100,000 Customers: 100,000	Finance Maintenance Master Planning Water Quality Development Review CIP Management	CIP's Debt Service Operations and Maintenance	Bonds
Cincinnati, OH	Changed from DPW to Metro Sewer District	Population: 365,000 Customers: 86,000	Finance (5) Engineering (9) O&M (6) Admin. (3)	Overhead from the city O&M Permits New sewers	Bonds and in-kind contributions from Army Corps of Engineers
Bellevue, WA	Part of the city utility department that also includes water, sewer, solid waste, and cable	Population: 100,000	O&M (14) Admin. (5) Development (2) Engineering (4)	Personnel (26%) Debt service (20%) CIP's (5%) Interfund payments (11%) taxes (6%) O&M (17%) Equipment (3%)	Interest earnings, development review fees, interfund charges, resources forward, grants
Austin, TX	"Watershed management department" is a separate organization	Population: 464,000	180 employees in 4 divisions: Infrastructure Management watershed engineering water quality monitoring water quality development	Flood Plain office NPDES permits Personnel Other permits Flooding and erosion Complaints	Bonds for CIP's, EPA grants, ICTE funds, and permit fees
Charleston, SC	A division within the city's engineering department	Population: 100,000 Customers: 27,000	Director of Public services supervises the utility O&M (40) Admin. (2)	CIP's Administration O&M	Ad Valorem tax (funds new drains only) FIMA Bonds (last resort)

A SAMPLING OF STORMWATER UTILITY ORGANIZATIONAL STRUCTURES

LOCATION ORGANIZATION	UTILITY AND CUSTOMER	POPULATION NEEDS NUMBERS	STAFFING FUNDED BY	ACTIVITIES OF REVENUES THE UTILITY	OTHER SOURCES
Hillsboro Co., FL	Considered an additional project for the engineering division within DPW. Nothing additional created.	Population: 541,945 Customers: 173,000	No additional staff hired. Existing staff took on needed responsibilities.	CIP's Land Acquisition Design Permits Construction Master Planning	Ad Valorem taxes are used to cover CIP's. State funds from the water management district and the dept. of environmental protection are used as well.
Los Angeles, CA	Stormdrain system is owned and operated by DPW and is managed by the Bureau of Engineering and Bureau of Sanitation.	Population: 3.5 million	Bureau of Engineering (design and construction) (25) Bureau of Sanitation (O&M)	Pollution abatement CIP's	Gas tax funds from the state fund street drains. $15 million/yr. in bonds paid for by property taxes.
Aurora, CO	part of the water, sewer, and drainage utility	Population: 250,000	Storm drainage operations (4) Wastewater operations (4)	household chemical roundup donations to the community 35% debt service 20% CIP's 17 field employees 4 office people	Development fees
Boca Raton, FL	O&M is part of municipal services. Admin. and CIP's are part of Utility Services	Population: 66,000 Customers: 24,000 res. 2,500 comm.	Manager-1 CAD Technician-1 Inspector-1 No staff were added. Existing staff took on more responsibility.	Personnel GIS Street Sweeper CIP's NPDES Permits O&M Joint project agreements with the city	None
Tacoma, WA	Part of DPW	Population: 250,000 Customers: 64,258 parcels	customer service-1.5 engineering-6 water quality-2 lab personnel-20 shared O&M staff	30% superfund remediation CIP's O&M debt service taxes	The utility was started with bonds. Paid off after 5 years.

BRIEFING PAPER #4

Assessment

There are over 150 stormwater utilities in existence today, and almost as many ways of charging customers. This paper presents a sampling of assessment methods, examines the different elements that go into them and discusses why there is such variation.

INTRODUCTION: WHAT IS MEANT BY "FEE ASSESSMENT?"

The stormwater utility approach is based on the principle that polluters should contribute to covering the costs of correcting the environmental problems they cause. In this case, property owners pay a fee to the utility for controlling the environmental impacts of stormwater runoff caused by development on their land. Utility charges are considered "user fees" — fees for using the municipal stormwater management system.

How much property owners are charged corresponds to how much they use the system, indicated by how much runoff they contribute to it. Typically, the more runoff one generates, the more one pays to the utility. The terms fee assessment and assessment method are used here to refer to how these payments are calculated. Assessment involves three things:

- a fee structure;
- a rate, and
- data collection.

Each of these will be explored below.

I. THE FEE STRUCTURE

In the more common utilities, such as water and electricity, meters track consumption of those commodities and customers are charged precisely according to what they use. With respect to stormwater, use of the municipal runoff management system is measured by each property owner's contribution to the

system — the amount of runoff generated on their land. But unlike the case with water and electricity, it is not possible to meter runoff, and even making educated estimates can involve complicated calculations. The labor and cost involved in making such calculations can place an undue burden on the utility and severely cut into its capacity for generating funds for stormwater management. So utilities have come up with other ways of computing customer charges and ensuring that those charges relate to stormwater contributions. These methods are what is meant here by the term fee structure.

"You Pave, You Pay": Impervious Surface as the Basis for Most Fee Structures

All property with the exception of wetlands, even undeveloped land, yields stormwater runoff. But runoff is dramatically increased by the impervious surfaces created by development — specifically buildings and pavement. This tight correlation has led to the widespread use of impervious surface as the basis of stormwater fee structures. Rather than measure actual runoff, the vast majority of stormwater utilities charge their customers according to the amount of impervious surface on their property. How they go about calculating impervious surface accounts for some of the differences in fee structures.

The Fairness – Ease of Implementation [Equity-Efficiency] Spectrum

Measuring impervious surface is less complicated than calculating runoff estimates. But when done on thousands of parcels, it can still be costly and utilities have developed ways of simplifying the process. For example, some stormwater utilities figure that most residential properties are similar, so they charge all residential customers a single flat fee based on a community average. This does away with the need to measure the impervious surface on the majority of a community's parcels. At the same time, it also does away with some of the fairness inherent in a user fee system: the owner of a 5,000 square foot house with a long three car driveway and paved tennis court would be charged the same amount as the owner of an 1,800 square foot row house with just enough space for a single vehicle, although the more developed property would contribute significantly more runoff.

Fairness is built into stormwater utility fees by increasing the complexity of a utility's fee structure. For example, the flat fee scenario given above could be enhanced by separating residential customers into two or more categories based on their property size and other characteristics. This would involve additional data collection and processing — the more equitable a fee structure is, the more difficult and costly it is likely to be to implement. Determining a fee structure can be seen as picking a point in a spectrum where fairness and ease of implementation, or equity and efficiency, are at opposite ends.

Incentives as a Byproduct of a Fair System

In the fairest or most equitable stormwater fee structures, owners of those properties contributing the most runoff would be charged the highest fees. By extension, reducing runoff would lead to reduced fees. Utility customers would therefore have an incentive to reduce the amount of runoff produced on their property by either reducing impervious surface or implementing stormwater best management practices (BMPs) to contain and process stormwater on site — before it "runs off" and contributes to pollution problems. Equitable systems offer property owners a degree of control over how much they pay in stormwater management fees to the extent that they can control stormwater flow on their land.

Components of a Stormwater Fee Structure

Fee structures are built up of different components, some of which can be used in combination while others are mutually exclusive. Just which elements go into building a fee structure is based on community needs and preferences. The process can be somewhat confusing and carries a great degree of variability: one study showed that charges could vary by as much as 60 percent for a given parcel depending on the fee structure used.

Here is a "menu" of commonly used components. Examples of how they are used to make up different fee structures appears in table 4 at the end of the section.

1. Customer Classifications: All assessment methods acknowledge that different types of land uses yield different amounts of runoff, and therefore apply different rates or assessment formulas to them. Some divide customers into just two classes: residential and non-residential property. Others recognize three — single family, multi-family residential and non-residential — or four, adding an undeveloped category. Still other utilities break out customers into as many as eight categories, with a different rate or assessment formula for each.

Customer classifications may correspond either to land use categories (i.e. single family residential, commercial, industrial, etc.) or intensity of development (i.e. undeveloped, light, moderate, heavy).

FOR CONSIDERATION:

Stormwater utility fee structures use customer classifications in order to allow a simplified billing system to recognize basic differences in runoff contributions by land use.

- What is the composition of land use types to be covered by the utility under consideration?
- What types of customer classes should be considered?
- How many customer classes would be reasonable and appropriate?

2. Intensity Development Factors (IDFs): The term Intensity Development Factor refers to the fact that the more intensely developed a parcel is, the greater the amount of impervious surface, and the more runoff, it will have per acre. IDF is represented as the percentage of a parcel typically developed in a particular land use category. For example, a factor of .85 for commercial property means that on average, 85 percent of a parcel in that classification is developed — covered by building footprints, parking, driveways and other impervious surfaces. Residential property with a factor of .20 will have 20% of the lot covered by impervious surface.

Assigning IDFs to land use categories involves measuring the percentage of impervious surface on a statistically valid sample of properties, then averaging the results.

When a parcel's gross area is multiplied by its IDF, the result is a reasonable estimate of the amount of impervious surface on the property. IDF's are not necessary in assessment formulas which use actual measurements of impervious surface on individual parcels. They are sometimes used as a factor in creating customer classifications. (See Tables 1, 2, and 3, below.)

FOR CONSIDERATION:

- What is the composition of land use types to be covered by the utility under consideration?
- Should IDFs be used indirectly, as a factor in creating billing or rate classes (e.g. Bellevue) or directly, as a component of billing equations?
- How should customers be classified?

3. Runoff Factor or Runoff Coefficient: This is a number representing how much stormwater runs off a parcel for a particular land use during a storm event. A table of runoff factors for each land use type may be available from the municipality.

Like IDFs, runoff factors are used to strengthen the relationship between what a landowner is billed and the amount of runoff produced on the parcel. Also like IDFs, they are used as a rationale for separating properties into customer classes and are incorporated into billing equations.

Most assessment methods use either one or the other, not both. IDFs are more easily understood by utility customers, while runoff factors provide a more accurate indication of runoff quantity.

FOR CONSIDERATION:

- Would the use of IDFs or rate factors better serve the utility under consideration? Consider the tradeoff between ease of use and comprehension versus accuracy.

Tables 1, 2 and 3 show examples of how customers may be classified by land use or intensity of development.

Examples: Use of Customer Classifications and IDFs

In Cincinnati's fee structure, Class A and B properties are both charged a flat fee, although the fee for Class B parcels is 1.4 times that of Class A parcels. Class C properties are charged individually according to a formula that uses both the property's size and IDF — parcel area is divided by 2,000 then multiplied by the IDF to get a figure that is multiplied by the flat fee rate.

TABLE 1. (CINCINNATI, OHIO)

LAND USE	CLASS	INTENSITY DEVELOPMENT FACTOR
Commercial	C	.85
Industrial	C	.75
Multi-family	C	.60
Transportation	C	.50
Institutional	C	.40
Residential (up to 10,000 sq. ft.)	A	.25
Residential (> 10,000 sq. ft.)	B	.20
Agricultural	C	.08
Park	C	.05

In Bellevue's fee structure, each parcel is charged individually by property size. The utility employs a different rate for each Intensity of Development category — e.g. undeveloped properties are charged $.30 for every 2,000 square feet of land area while very heavily developed properties are charged $4.26 for the same land unit. This figure is then added to a base charge of $1.86.

TABLE 2 (BELLEVUE, WASHINGTON)

LAND USE	INTENSITY OF DEVELOPMENT (CUSTOMER CLASS)	PERCENTAGE OF IMPERVIOUS SURFACE
Undeveloped	Undeveloped	0
House on one acre or more	Light	0-35%
Typical Single Family Lot	Moderate	>35-50%
Multi-family	Heavy	>50-70%
Industrial/Commercial	Extra heavy	>70%

TABLE 3 (DENVER, COLORADO)

CATEGORY OF DEVELOPMENT (CUSTOMER CLASS)	RATE FACTOR (IDF)
Very Light	0.25
Light	0.40
Moderate	0.60
Heavy	0.80
Extra heavy	0.95

In this example, Denver assesses a flat fee for each single family residential parcel of 12,000 square feet or less. For larger parcels, individual charges are calculated by multiplying the total area by the rate factor (IDF) for the parcel development category by the base rate. The base rate for the utility's operations and maintenance fund is $0.0005850 per square foot per month.

4. Billing Unit or ERU: Phone companies charge by the minute. Water utilities charge by the gallon. Some stormwater utilities charge by the square foot of land area, as seen in the Denver example above. Others have a charge per every 500 square feet or every 2,000 square feet, while others charge by the acre or fraction thereof. Many stormwater utilities, however, develop their own billing unit specific to the stormwater utility. This is called an ERU — equivalent runoff unit — and becomes part of the rate, which is expressed as $X per ERU.

Like many other aspects of stormwater utility fee structures, the size of an ERU and how it is calculated varies from utility to utility. Typically, ERUs are employed in utilities which use a flat rate for residential properties. The ERU is computed as either the average residential lot size or the average amount of impervious surface on each residential lot; each single family residence is then assessed at the flat rate of 1 ERU.

For this reason, some utilities define the ERU as an "equivalent residential unit" or use another term such as EDU (equivalent dwelling unit), SFU (single family unit) or SFE (single family equivalent). It is generally believed that utility customers can more easily understand charges when expressed in terms of a single family residence. Using single family units also facilitates billing since they represent between 60% and 80% of all parcels.

Where ERUs are used, charges for multifamily, commercial, industrial and other properties are calculated by dividing the size of the property to be assessed by the size of the utility's ERU (i.e. the average residential lot size) to get an ERU multiple. For example, in a scenario where the ERU was 10,000 square feet, a 100,000 square foot commercial property might be defined as having 10 ERUs.

It is important to note that there is no uniform definition of an ERU — each utility sets its own definition and uses it to make billing calculations in its own way. Cincinnati's stormwater utility defines its class A residential properties (< 10,000 s.f.) as 1 ERU and its class B residential properties (>10,000 s.f.) as 1.4 ERUs, but does not use the residential ERU size in determining the number of ERUs for each class C property. Instead, this is calculated by dividing the class C parcel size by 2,000 and multiplying by the IDF for the parcel's land use category to get the resulting number of ERUs.

The one consistent element of ERU use is its function as a tool for applying a rate. This is convenient for implementing rate changes: a utility's fee structure and assessment formulas may remain the same while the dollar amount per ERU is adjusted.

FOR CONSIDERATION:

- Is use of an ERU calculated as a residential unit average preferable to other base units, such as a charge per square foot, per acre, or for every 2,000 square feet of property?
- Should the billing unit be based on total property size or amount of impervious surface?
- What would the size of an ERU be for the utility under consideration if calculated as average residential parcel size? What is the range of deviation from this average?

5. Flat Fees: A flat fee is a stormwater utility charge that is the same for all property owners within a particular land use classification. It is most commonly used for residential customers, although there are instances where a flat fee has been used as the sole billing mechanism covering all property classes. Flat fees are the simplest of all stormwater utility assessment methods to utilize, as they do not require individual property measurements or involve complicated assessment formulas. However, they offer the lowest degree of correlation between utility payments and runoff contribution from the property — and consequently rank low on the issue of fairness and ability to provide incentives for property owners to minimize runoff.

Some utilities have used flat fees during their start-up period, moving over to more individually-based billing systems as data for making parcel area and impervious surface calculations became available.

FOR CONSIDERATION:

- Is the efficiency provided by flat fees a high priority for the utility under consideration? Does it justify foregoing the equity and incentives provided by other fee structures?
- Are flat fees desired:
  - for one property class or all? which ones?
  - for the utility start-up period or as a permanent feature?

6. Calculated or Individual Fees: The opposite of a flat fee is a calculated fee, where each individual property is assessed an amount according to a specified formula. Often, utilities charge flat fees for residential customers and calculate the charge for larger, more intensely developed properties. Assessment formulas can be based on:

- gross parcel area. Some utilities charge customers based on gross parcel area — i.e. $X per Ys.f. or Yacres. IDFs or runoff coefficients are used only as a factor in creating create customer classes. This is a simple approach based on the rationale that the quantity of runoff or impervious surface is proportionate to property size. Its success depends on the careful construction of property classifications.
- measured impervious surface. In this scenario, customers are charged according to the precise quantity of impervious surface on their property as represented by building footprints and paved areas. This approach is the most labor intensive, but also the most equitable.
- estimated impervious surface. Fee structures often use a property's gross area multiplied by its land use category IDF to provide an estimate of the amount the amount of a parcel's impervious surface in the absence of detailed measurements.
- runoff quantity. Runoff coefficients or factors are applied to individual parcel size.
- water use, water meter size, and number of rooms: These alternative fee structures work with data from Departments of Public Works and property assessors offices that is easy and inexpensive to obtain and to process. However, they are not as strongly correlated with stormwater runoff as other billing systems and are therefore used infrequently.

Some calculated charges include a small fixed fee added on to each bill regardless of property size or other basis for billing. An example is the utility in Bellevue, Washington, one of the first stormwater utilities ever established, which charges each customer $1.86 every two months in addition to an amount based on gross parcel area. With a rate of $0.30 per 2,000 s.f., the fee for a 10,000 s.f. property would be calculated like this:

10,000 s.f. / 2,000 s.f. = 5 billing units
5 X $0.30 = $1.50
$1.50 + $1.86 = $3.36 = total user charge

A 50,000 s.f. parcel in the same land use category would be charged:
50,000 s.f. / 2,000 s.f. = 25 billing units
25 X $0.30 = $7.50
$7.50 + $1.86 = $9.36 = total user charge

The inclusion of a fixed charge in a calculated fee structure ensures the utility a minimum revenue base. It may also be viewed as covering the stormwater contribution of impervious surfaces held in common ownership, such as the public road system.

FOR CONSIDERATION:

- What data is readily available as a basis for stormwater charges?
- How do the different methods fit with the community's targeted point on the equity-efficiency spectrum?
- Would the inclusion of a fixed charge be appropriate?

7. Credits and Incentives: As noted above, fee systems where charges are tightly correlated with runoff quantity provide an incentive to property owners to manage stormwater on site. Some utilities increase this incentive by offering credits which lower the fees charged to property owners using stormwater runoff "best management practices" (BMPs). Credits can be given for structural BMPs, such as a runoff retention pond on a campus-style industrial park, or non-structural practices, such as disconnecting a residential roof gutter to keep the runoff out of the municipal sewer. They can also be rewarded either for reducing the quantity of stormwater runoff on a parcel or for improving its quality.

In addition to rewarding utility customers, credit programs can save municipalities money in the long run on stormwater management costs. They increase the equity of the fee structure and are also good for community relations since customers are given options for lowering their utility bills.

Despite these advantages, incentive programs and credits are not yet widely used. A 1996 survey conducted by Black and Veatch Management Consultants found only 26% of utilities studied nationwide using credits to promote runoff quantity reductions — and only 11% had fee structures that addressed runoff quality. This may be due to the administrative work involved in the implementation of incentive programs. Most utilities surveyed expressed interest in exploring these features.

FOR CONSIDERATION:

- Is a credit program desirable for the utility under consideration?
- Should it focus on runoff quantity, quality or both?
- Should the program be limited to large-scale, structural BMPs, or extend to homeowners for non-stuctural methods?

8. Low Income Credits: Some stormwater utilities offer fee reductions or exemptions to property owners who can show financial hardship. In practice, this only applies to residential properties, not businesses.

TABLE 4. A SAMPLING OF STORMWATER UTILITY FEE STRUCTURES

UTILITY LOCATION	CUSTOMER CLASSES	IDFS	RUNOFF FACTORS	BILLING UNIT	FLAT FEES	CALCULATED FEES	CREDITS	COMMENTS
Bellevue, WA	6 undeveloped, light, moderate, heavy, extra heavy; wetlands (not charged)	IDF's used as basis for customer classification	———	per 2,000 s.f. of gross land area	———	each customer class charged a different rate for each 2,000 s.f. of gross land area	75% credit to customers meeting low income criteria	a small, uniform base charge is added to every bill, independent of calculated charges
Cincinnati, OH	9 A-res. <10,000 s.f. B-res. 10,000 s.f.+ C-park, agricultural, institutional, transportation, multi-fam., industrial, commercial	used for class C billing categories	———	ERU	class A = 1 ERU; B = 1.4 ERU	class C = gross parcel area divided by 2,000 X IDF = # of ERUs		the 7 sub-categories of class C customers in effect puts the billing classes at 9 rather than 3
Denver, CO	5 very light; light; moderate, heavy, extra heavy; wetlands (not charged)	termed "rate factor" and used in billing equation	runoff coefficients used in assigning parcels to customer classes	per s.f.	———	gross parcel area is multiplied by rate factor, then by the s.f. rate; the portion of single family parcels in excess of 12,000 s.f. is discounted 75%		different s.f. rates are used for customers in different drainage basins to correspond with capital improvement costs
Tacoma, WA	5	———	———	every 500 s.f. of gross area		parcel square footage is divided by 500 and multiplied by rate		fixed charge is added to each bill
Hillsboro County, FL	3 single family; multi-family; non-residential	———	———	1.5 s.f. of impervious surface (non-res. property only)	multi-fam. units are charged half the rate for single fam. homes	used for non-residential — the s.f. rate is applied to total impervious surface		
Charleston, SC	4 undeveloped (no charge); single family; multi-family; non-residential			ERU = 2,200 s.f. (average residential impervious)	single fam. = 1 ERU; multi-fam. = .75 ERU per unit	used for non-res. — total impervious surface is divided by 2,200 (ERU size); then ERU rate is applied	up to 30% reduction for meeting stormwater management standards	non-res. semi-pervious surface areas are charged at 1/2 the base rate
Austin, TX	2 residential; commercial			charges are per acre	used for all res.; charge = .1853 the per acre rate	gross parcel area is multiplied by 2; then the per acre rate is applied	properties managing stormwater entirely on site are exempted	
Charlotte, NC							25% credit for structural BMPs	
Roseville, MN							up to 75% credit for structural BMPs	
Los Angeles, CA	1 one formula for all properties	———	used in billing equations	EDU	———	number of EDUs per parcel is calculated by multiplying parcel area by its runoff factor, then dividing by 0.0637		LA's divisor of 0.0637 is the proportionate runoff from the average single family parcel

II. THE RATE

One important component of a utility's fee structure not discussed above is the rate. A full exploration of stormwater utility rates and how they are set will be presented in a separate briefing paper. For now, it is necessary only to look at what a rate is, and how it works with the utility's fee structure.

The utility rate is the amount of money charged customers for each billing unit or ERU for a specific time period.

Calculating stormwater charges can be seen as a sequenced process, where rates enter into the second step:

1. Identify the number of billing units (ERUs) for the customer's parcel.
2. Multiply the number of billing units (ERUs) by the rate.
   CUSTOMER CHARGE = RATE x # OF BILLING UNITS/ERUs
3. Add fixed charges or subtract credits as appropriate.

Some utilities have one rate which is applied to all customers. For example, Cincinnati's stormwater utility charges $2.11 per ERU per month regardless of customer class. Non-residential properties in Hillsboro County are charged $0.01 for each 1.5 s.f. of impervious surface. In contrast, both Tacoma and Bellevue have different rates depending on the property's land use category or intensity of development factor. In Tacoma, property in the undeveloped category is charged $0.1219 per 500 s.f. per month, while the rate for moderate and very heavily developed property jumps to $0.5008 and $0.9749 respectively. Bellevue's rates range from $0.30 to $4.26 for each 2,000 s.f. of property, depending on its development category.

Whether a utility applies the same rate to each parcel or has different rates for each land use category appears to depend on where intensity development or runoff factors are used. If they are used in the equation for calculating a parcel's billing units, then a single rate is appropriate. If not, having a range of rates serves as an alternate way of taking intensity of development factors into account.

FOR CONSIDERATION:

- should the utility under consideration have one rate, or a range of rates covering different land use categories?

III. DATA COLLECTION

All stormwater utility fee systems require data to make billing calculations. Some systems work only with gross parcel area, while others use figures on impervious surface and site features that control runoff. Some systems require parcel specific data only for non-residential properties, while others use parcel specific data for all properties charged. The kind of data an assessment method uses depends on what is available, and on community preferences along the equity-efficiency spectrum.

Sources and Methods

Stormwater utility billing data is typically gathered from one or more of the following:

Assessor's Records: This data source is readily available to all communities and is essential for providing information on parcel ownership, land use and size. Impervious surface coverage may also be calculated from building footprints, and some assessors maps show driveways and parking areas as well. Assessor's records are insufficient, however, because they do not take into account tax exempt property that may be charged by the utility. Additionally, inaccuracies in the assessor's data can result in fee inequities and petitions for fee adjustments.

Water and Sewer Bills: These can be used to identify customers who may not show up in assessor's records. Also, as noted in the discussion on fee structure, they are sometimes used as the basis for calculating stormwater charges.

Aerial Photography: Recent aerial photographs of a community provide detailed and accurate information on development patterns, land use and impervious surface. They can also document features that warrant utility credits, such as detention/retention basins or vegetative swales. Several methods can be used to generate data from the photographs:

- Geographic Information System (GIS) mapping. Parcel by parcel figures on impervious surface can be obtained when the information from aerial flyovers is mapped in GIS and correlated with parcel lot lines.
- Random Dot Method. The percentage of impervious surface on a property can be calculated by overlaying an aerial photograph with a grid of random dots. This is done by dividing the number of dots lying on impervious surface to the total number of dots on the entire parcel to get a ratio that is, essentially, the property's intensity of development factor. For example, a 400 dot parcel with 100 dots covering impervious surfaces would have an IDF of .25 (100/400).

On Site Calculation: This is the most accurate means of obtaining measurements of impervious surface, and is facilitated by a wheel connected to a distance counter. Although labor intensive, it can have a customer relations benefit in that property owners see for themselves the process on which their charges are based.

FOR CONSIDERATION:

- What sources of data are readily available?
- Are there data sources, such as aerial photos or GIS maps, that might be usable with some additional work — e.g. overlaying parcel lot lines?
- What kinds of data are needed to implement the community's preferred fee structure?

APPLYING THE DATA

Stormwater utility data collection can be performed either on a parcel by parcel basis or through sampling.

- Both ERUs and flat fees (i.e. 1 ERU) are usually based on average residential parcel size or average residential impervious surface. The averages can be computed from a statistically valid sample.
- IDFs for land use categories may also be computed from a statistically valid sample of parcels in each classification.
- Individually computed charges require parcel specific data, either for gross area or impervious surface.

FOR CONSIDERATION:

- To implement the preferred fee structure, which data needs to be collected on a parcel by parcel basis? (e.g. all gross area, non-residential gross area, non-residential impervious) Where can sampling be used?
- Does the preferred fee structure require more data than is readily available? How might it be modified so that additional data collection is unnecessary?

CONCLUSION: CRITERIA FOR EVALUATING FEE ASSESSMENT METHODS

Building a stormwater utility fee structure can be a complicated task. It is made easier if a community has clear priorities to against which to measure its choices. Camp, Dresser, & McKee, Inc. developed a set of eight evaluation criteria for a study of alternative assessment methods in Tampa, FL. They are:

1. Charges should be based on a reasonably accurate, technically defensible measure of runoff.
2. The data base used to calculate charges should be accurate.
3. Utility users in different land use classes should pay in proportion to the runoff their classes generate relative to others. That is, rates should be the same for all classes.
4. Users within a class should pay in proportion to their contribution to the total runoff generated by the class.
5. The fee structure should be legal and politically acceptable.
6. The fee structure should be flexible. For example, an the rate for a given class of users be changed without having to reprogram the entire fee structure?
7. The system should generate adequate revenues. This criterion comes into play when setting the rate.
8. The initial costs of implementing the utility should not be exorbitant. For example, fee calculations should make use of existing data.

These are not the only criteria. Nor are they universally applicable. For example, as seen above in the discussion on rates, some communities apply different rates to different classes — in opposition to criterion number 3. Other criteria to consider include:

- The fee structure should be easily understood by utility customers.
- The fee structure should provide opportunities and incentives for users to reduce their charges by implementing stormwater best management practices.
- Utility charges should not place an undue burden on low income households.

FOR CONSIDERATION:

- Which criteria are most important to the community?
- Are there criteria not mentioned that should be considered?

Other Issues: Who Do We Charge?

Once it is established how people will be charged, it is necessary to determine who will be charged. The following information describes some of the issues that communities have dealt with while developing their utility.

- **Residential vs. Commercial / Industrial Property Owners:** While both residential and commercial/ industrial property owners are charged, they are charged differently. It is important to realize that the properties in the commercial / industrial land use category will be responsible for larger fees than the single family homeowner. While many home owners will notice a small increase of only a few dollars in their utility bills, the business community will see a significant increase of hundreds of dollars. This discrepancy is due to the fact that residential properties have a smaller gross area as well as less impervious surface. While many homes have yards surrounding them, most commercial properties do not have significant green spaces, thus giving them a higher percentage of impervious surface. As mentioned previously, the large fees charged to commercial / industrial properties can provide those properties owners with an incentive to install technologies that earn them credits and a reduction in the charge. The residential fee is too negligible for these incentives to have the same effect.
- **Property Owners vs. Tenants:** In most cases, the property owner, not the tenant, receives the utility or tax bill that includes the fee for stormwater utility. However, just as a tenant is charged for water and trash removal, the landlord can incorporate the stormwater utility fee into the monthly rent.
- **Tax Exempt Properties:** In 1969, the Colorado Appellate Court decided, “he who sends more water downhill than would naturally flow must provide for it,” (Shoemaker et al. p. 49). How-

ever, those communities that include the stormwater utility fee on the property tax bill do not bill properties that are tax exempt, despite the fact that those properties contribute to the stormwater flows. The problem that arises in this billing structure is that the failure to bill properties with tax exempt status requires that the shortfall be subsidized by the non-tax exempt customers. However, case law in this area generally establishes that since stormwater charges are a user fee rather than a tax, it is appropriate for the utility to charge tax exempt properties in the billing process. The City of Los Angeles maintains that unless there is a valid cost based reason that justifies exempting certain properties, as in the case of a wetland or a lake or a property that maintains its own on-site drainage system, there is no reason for exemption from the user fees.

EXAMPLES OF USER FEE ASSESSMENT METHODS

Land Based Rate Policy

The land based rate policy is an assessment method that charges a fee based on the size of the property, its land use classification and the amount of stormwater that runs off of it during a storm event. This policy applies the same runoff factor to all property owners within a specific land use classification. In turn, the land use runoff factor does not reflect the specific contributions of stormwater from specific customers because it ignores the degree of variance between parcels within one class, however, it does recognize the different sizes of different properties, increasing the equity of the rate structure.

Using gross area for each property is easier and less costly than using the area of impervious surface on each property because the assessor's office has gross area data on hand whereas impervious surface data has to be measured and recorded. Some utilities such as Los Angeles, use an average gross area measurement for residential properties because there are so many properties in the database. While this reduces time and effort, it also reduces the equity of the rate structure. The land based rate policy utilizes the following information:

- Gross Area
- Base Unit
- Customer Classification
- Runoff Factor

The fee is determined using the following equation:

Gross Area X Runoff Factor (based on the customer classification) X Base Unit = Fee

Gross area X Runoff Factor X[Gross araea X Runoff Factor]/average gross areaXrunnoff factor

Before this calculation can be completed, the base unit has to be determined. While this calculation seems to be a simple task, it is actually an adventure unto itself. Los Angeles calculates the base unit by multiplying the gross area by the runoff factor and dividing it by the Basic Assessment Unit or BAU.

The BAU represents the estimated amount of runoff derived from a single family residential unit. It is calculated by multiplying the average residential property square footage (for Los Angeles this is 6,650) by the runoff factor for single family properties (for Los Angeles this is .4176). The BAU remains constant for EVERY property within the utility's jurisdiction.

THEREFORE:

BAU= 6,650 X .4176 = .0637
AND:
Base Unit = (Gross Area X Runoff Factor)/ BAU

Impervious Area Base Rate Policy

On the other side of equitable assessment methods is the impervious area base rate policy. Instead of basing the rate on gross area, this method bases the rate on the percentage of impervious surface that covers a property or the Intensity Development Factor or IDF. Like the land area based policy, the impervious area base rate policy has options for various levels of equity. On the most equitable side, each property's impervious surface is measured and that area is used in the rate structure. The impervious area base rate policy utilizes the following information:

- Intensity Development Factor (IDF)
- Base Unit
- Customer Classification

Utility Rate = % of impervious surface or IDF X $/base unit

Base Unit = IDF X gross area

However, for the sake of conserving time and money, it is possible to measure a sample of properties within a particular land use classification and use the average impervious surface of the sample as the number that is plugged into all rates. This average of impervious surface is called the Intensity Development Factor or IDF. This method requires a longer startup time than the land based method because the impervious surface area measurement of each property has to be recorded. The end result is reasonably accurate, easy to defend technically, and is a very equitable method because it can account for variances in parcels within a single land use category.

Notice that this equation for the utility rate specifies dollars per base unit. This is a calculation that can be applied to either land based or impervious surface based assessment methods. This equation is calculated by dividing the revenue requirements for the utility stormwater programs by the total number of base units in each land use category. The equation is:

$ / Base Unit = R (revenue requirements)

IDF (for each land use) X Area (total area in one land use category)

Important Points to Consider

What level of equity is important to our community?

- Individual Property measurements vs. Customer Classification Averages
- Billing to tax exempt customers including government properties, roads, railbeds

What type of data is available?

- Land based assessment method vs. Impervious area based assessment method

BRIEFING PAPER #5

5 Rate Setting

Most of the urban communities in the Pioneer Valley face a large gap between available funds and the financial requirements of correcting combined sewer overflow (CSO) problems and implementing other stormwater management measures. In the near future, urban communities will also have to address increased requirements to manage the quality of storm water through the U.S. EPA's proposed NPDES Storm Water Phase II regulations. These new regulations will require municipalities in the Pioneer Valley to adopt additional measures including implementing best management practices, but most local governments have not yet developed comprehensive programs or funding sources to address these issues. The creation of a storm water utility gives cities and towns a mechanism to directly raise funds to support the growing needs of stormwater management.

Throughout the country stormwater management has mainly been financed with general revenues from property taxes. The revenue raised for stormwater management using this method has often been inadequate because stormwater management is usually regarded as a low priority relative to other local programs. In the last nineteen years, some communities have instituted a stormwater utility charge or "user" charge as a more consistent and reliable way to raise revenues specific to stormwater management. The stormwater utility approach is useful because it creates a stable, secure source of funding, and it is more equitable than using general tax revenues. The American Public Works Association (APWA) stated in *Urban Stormwater Management*: "The user charge and the utility concept are the most dependable and equitable approaches available to local governments for financing stormwater management."

The rate that a stormwater utility charges is the key to raising adequate funds in a manner that is perceived as fair and equitable to ratepayers. This paper will discuss how stormwater utilities can set rates that meet the revenue requirements of stormwater management within the confines of the political and

public relations realities in communities. Ultimately the amount of revenues that a stormwater utility can generate is governed by the willingness of people to pay for stormwater management.

The Stormwater Rate Structure

In a previous paper as part of this project, *Briefing Paper #4—Assessment*, the different assessment methods that can be used for a stormwater utility were discussed. The fee assessment is the overall process which is used to calculate individual payments. The rate is an important component of a utility's fee structure. The utility rate is the amount of money charged customers for each billing unit or ERU for a specific time period. Calculating stormwater charges can be seen as a sequenced process, where rates enter into the second step:

1 Identify the number of billing units (ERUs) for each parcel or identify gross area of impervious surface area of each parcel.
2. Multiply the number of billing units by the rate:
   CUSTOMER CHARGE = RATE x # OF BILLING UNITS/ERUs
3. Add fixed charges or subtract credits as appropriate.

Setting the rate is not as simple as picking a number out of the air. A method needs to be developed that clearly links the fee charged to the contribution of stormwater each parcel makes to the stormwater system. In a recent survey, four of the nineteen utilities surveyed reported legal challenges—all questioning the rate structure (Sediment and Stormwater Administration of the Maryland Department of the Environment). In these court cases the legal standard that emerged can been summarized as: "Charges must be fair and reasonable and bear a substantial relationship to the cost of services and facilities." (Cyre, 1986) This standard defines two important issues in setting the rate:

1. Reasonably accurate estimates of runoff will suffice—runoff does not need to be measured precisely.
2. The standard does not mention benefits or beneficiaries so the utility rate systems may be based on cost and not benefits.

The second point here is very relevant to setting the rate for a stormwater utility. Legally, the rate must be set at a level to meet estimates of the revenue requirements for stormwater management. However for communities with CSO problems, a rate that would fulfill the revenue requirements may not be feasible because of the political reality of citizens' negative feelings about government spending. If residents are feeling over-burdened by existing federal, state, and local taxes and because of limitations imposed on local government to increase taxes, the introduction of a high stormwater fee may not even be an option for city governments. The capital costs of CSO correction projects are usually significantly larger than the revenues of a storm water utility. In these cases, the estimates of revenue requirements for stormwater management may be used to combine funds from different sources and show that the stormwater fee rate has been set to meet only a portion of the needed revenue.

Setting the Rate

Depending on the assessment method used, the rate is either a constant number which is applied to all customers or the rate varies depending on the contribution of stormwater each parcel or type of parcel (i.e. residential, commercial, etc.) makes to the stormwater system. Whether a utility applies the same rate to each parcel or has different rates for each land use category depends on whether intensity of development factors (IDF) or runoff factors are used. Intensity of development is a rating of how much impervious surface a parcel has—for example retail malls would have higher IDFs because of large paved areas. If IDFs are used in the equation for calculating a parcel's billing units, then a single rate is appropriate. If not, having a range of rates serves as an alternate way of taking intensity of development factors into account.

A constant rate is used either for simplicity or when the assessment method already takes into account the degree to which a parcel contributes stormwater to the stormwater system by actually measuring the

impervious area or by applying an "intensity of development factor" according to the designated use of each parcel. For example, Cincinnati's stormwater utility charges $2.11 per ERU per month regardless of customer class. This constant rate keeps the billing system simple but not as accurate in terms of measuring an individual parcels contribution to the problem. Hillsboro County, in contrast, uses a constant rate of $0.01 for each 1.5 square feet of imperious surface. In this case the constant rate is used in combination with a more precise measurement of individual parcels contribution to the problem.

Variable rates are used to take into account how different land uses contribute more or less stormwater runoff to the stormwater system. In these cases the rate is used to make the stormwater fee more equitable. In both Tacoma and Bellevue, WA there are different rates depending on the property's land use category or intensity of development factor. There are five different rate categories in Tocoma:

- Undeveloped (virgin property)
- Light Developed (Cemetery)
- Moderate (Residential)
- Light Commercial (Light Commercial, gravel parking, church, schools)
- Heavy Commercial (Heavy Commercial including all buildings and paved)

In Tacoma, property in the undeveloped category is charged $0.1240 per 500 s.f. per month, while the rate for moderate and very heavily developed property jumps to $0.5070 and $0.9920 respectively. Bellevue's rates range from $0.30 to $4.26 for each 2,000 s.f. of property, depending on its development category. Variable rates can be powerful tools to add a degree of equity to the billing process, but they must be used carefully. Any changes in the variable rates can shift the burden between different land owners—residential, commercial, industrial, etc. These changes may cause strong reactions by the public with potential political and legal consequences.

Revenue Requirements

One of the first steps in setting the rate for stormwater utilities is making an accurate estimate of revenue requirements and identifying potential sources of revenues. The range of activities financed by stormwater utilities varies greatly. (Please see *Briefing Paper #3—Management* for a longer discussion of this subject.) Some utilities fund both Operation & Maintenance (O&M) and capital projects with utility revenues while others fund only planning and O&M with utility funds and use general obligation bonds that are repaid with property tax revenues for capital improvements. Others wrap the maintenance costs in a percentage of debt for capital improvements. Estimates of costs for King's County, Washington ranges from 0.43% of total debt for basic maintenance of all facilities to between 3% and 10% for a more comprehensive stormwater management program including implementation of best management practices. In another comparison, the cost was estimated based on land area and it was found that the cost in most cities was: $15 to $25 per gross acre for basic stormwater administration, engineering, and reactive maintenance and $100 or more for comprehensive stormwater management that includes drainage master plans, preventative maintenance, and major capital improvements. (Cyre, 1987)

Other potential sources of revenues should also be identified as part of the utilities financial plan. Financing methods for each of the utility's functions and the amount to be raised should be specified in order to set the rate.

UTILITY LOCATION	ASSESSMENT METHOD	CURRENT RATE	RATE CHANGE IN PAST 2 YEARS	PUBLIC REACTION	REASON FOR RATE CHANGE	PERCEPTION OF RATE FAIRNESS AND COMMENTS
Cincinnati, OH	ERU	Class A $26.52/yr Class B $37.13/yr Class C 2.20/ERU	Yes: 1999 +4.7%	Very little response —change not significant	Due to emergency projects that need immediate funding	n/a
Denver, CO	Charge based on density ratio and ratio of impervious area to total parcel area.	Ranges from $0.006 to $0.0188 per sq. ft. of impervious area based on impervious area ratio.	Yes: 1997 +7%	Minimal public and media response	n/a	Method and rate are generally perceived as fair. Most complaints from residential owners with downspouts discharging to pervious areas.
Tacoma, WA	ERU with different rates based on land uses	Range based on land uses: $0.1240 to 0.9920 per 500 sq. ft. of total area plus $3.21 per month	Yes: 1997 +7% 1998 +8% 1999 +2%	Not Happy, but Acceptable	Inflation	Generally perceive rates as fair. Has Citizens Advisory Panel made up of customers that review all rate changes and forwards recommendations to City Council
Austin, TX	ERU method for residential and impervious are method for commercial.	Residential = $4.45 per month; Commercial $48 per acre of impervious area (based on inspection)	Yes: 1998 +21%	Very little response even at public hearings	To fund projects for FY 1999 by the Watershed Protection Dept.	Depends who you ask—vocal minority see the fee as unfair and majority of pubic is silent.
Hillsboro County, FL	Impervious Surface Measurement	n/a	No	n/a	n/a	Rates are perceived as generally fair due to rates perceived to be low.

Conclusions and Recommendations

In setting a stormwater utility rate, cities and towns should start by setting a reasonable rate. The experience of other cities shows that rates can be changed with little public reaction as long as the changes are not extreme and appear reasonable. The rate should build upon an overall assessment method that is fair and equitable. Any rate changes will open up the utility fee to public scrutiny. An assessment method that is understood and perceived as fair and equitable by the public will go a long way in defending any future rate changes.

Recommendations:

1. The individual assessment fee should be based on a reasonably accurate, technically defensible measure of runoff and the rate should be based on a reasonable estimation of revenue need.
2. Utility users in different land use classes should pay in proportion to the runoff their classes generate relative to others. If the assessment method is not accounting for this variability then variable rates should be used.
3. The rate should be legal and politically acceptable.
4. The rate or rates should be flexible so that the rate for a given class of users can be changed without having to reprogram the entire fee structure.
5. The set rate should generate adequate revenues.
6. The public should have a means to comment on and influence rate changes. For example Tacoma, WA has a Citizens Advisory Panel made up of customers that reviews all rate changes and forwards recommendation to City Council.

Cost Benefit Analysis

A REPORT ON THE COSTS AND BENEFITS OF DIFFERENT ASSSESSMENT/RATE SETTING APPROACHES TO STORMWATER MANAGEMENT IN CHICOPEE, MASSACHUSETTS

I. Purpose of Cost / Benefit Analysis

There is a wide range of methods that a stormwater utility can use to assess a fee on property owners for use of the stormwater system. In order to better understand why one method might work well for a given community it is important to compare the relative costs and benefits of a number of methods. The type of assessment method employed will affect the following aspects of the stormwater utility:

- cost to implement
- amount of money that can be raised
- ease (or lack thereof) to establish and administer the utility
- public perception of the fees
- ability of the stormwater utility to create incentives for the public to change behavior to help reduce runoff
- ability of the stormwater utility to weather political roadblocks

For the purposes of this project, 197 parcels in the city of Chicopee were analyzed to determine the different costs and benefits associated with four different assessment methods. The various costs and benefits of each assessment method are described based on the following four criteria:

Administrative Time / Resources—How much staff time, expertise and resources (specifically computer software and hardware) does the method require—for both start-up and the ongoing administration of the stormwater utility?

Equity—Do the stormwater fees reflect the actual impact each parcel has on stormwater runoff based on the area of impervious surface? If the bills reflect the actual area of impervious surface then a financial incentive is built into the utility structure for property owners to reduce their contribution to the stormwater management problem by either: a) reducing impervious surface or, b) creating on-site stormwater management systems.

Sustainability/Effectiveness—How well does each method meet the goals of the Stormwater Utility (management program), and what is the likelihood that the fee will be sustained over time by the community? In Chicopee the goals of the program are to provide: 1) capital for projects to correct Combined Sewer Overflows (CSOs), 2) revenue for the maintenance of the stormwater system, and 3) incentives for individual property owners to reduce stormwater runoff.

Political Expediency—What are the chances that the assessment method will be accepted by elected officials and residents?

II. Cost / Benefit Analysis of FourAssessment Methods

INTRODUCTION AND DESCRIPTION OF ASSESSMENT METHODS

A stormwater utility is based on the idea that property owners pay a "user fee" for using the municipal stormwater system. There are various assessment methods that can be used to measure how much each property contributes to the system and thus how much each property should be charged. For the purposes of this project, four assessment methods were chosen to be tested using a sample of properties in Chicopee, Massachusetts. Here is a brief description of each assessment method:

1) Modified Flat Fee

A flat fee is a stormwater utility charge that is the same for all property owners within a particular land use classification regardless of size or any other factor. Chicopee adopted a flat fee method in August of 1998. A flat fee of $40 per year is charged for all single family residences. All other properties pay a fee no less than $40 and no more than $400 based on the overall size of the property. This fee was established based on the fourth criteria mentioned above, political expediency. The fee will only generate an estimated $500,000 annually. The proposed stormwater management program for the city has an annual operating budget of either one or three million dollars, depending on how ambitious a program one chooses to adopt.

2) ERU

The "Equivalent Residential Unit" or ERU method uses a billing unit based on the average impervious surface for a residential parcel. The ERU is estimated by taking a random sampling of properties and finding the average impervious surface area for each property classification. For the sample tested in Chicopee the properties were divided into 4 types:

- Small Residential (1,2 & 3 Family houses, mobile home)
- Large Residential (condominiums, apartments, multiple housing on single parcel, group quarters, multi-use, child care)
- Industrial, Commercial, and Public Service
- Vacant and Limited Development (agricultural, forestry, recreational, vacant, open space)

3) Impervious Surface (Based on Assessor's Records)

This method uses assessor's records to estimate the impervious surface area on parcels based on building size and pavement areas. Chicopee's Assessor's records contain the square footage of all buildings but do not contain the square footage of all paved areas as pavement is not taxed on residential properties. The impervious surface area for each parcel is multiplied directly by a given rate to calculate the fee.

4) Impervious Surface (Based on Aerial Photos and GIS)

This method uses GIS (Geographic Information System) to combine parcel information from the assessor's records with actual measurements of impervious surface areas as identified through the use of aerial photography. The impervious surface area for each parcel is then multiplied directly by a rate to calculate the fee.

DATA CONSTRAINTS

It is important to note that for any assessment method employed, the results will only be as good as the quality of data used. As a community completes a cost/benefit analysis, one must be aware that data constraints might skew the results of the analysis. In the course of Chicopee's project the following data constraints were identified:

- purpose for which original data was collected may be different from purpose of stormwater utility—for example, in the case of assessor's data, information on properties is collected for tax purposes. The assessor's office may not have any use for information on size of driveways on properties, because property owners are probably not taxed based on the size of their driveway. Therefore, if one uses assessor's data to generate an idea of impervious surface on a property, one will likely miss driveways and parking lots—areas which contribute to stormwater management concerns;
- data from one source may be out of date—one might compare assessor's records of impervious surface with aerial photography and conclude that one source of data is inaccurate, but it may be that the data simply has not been updated;
- using a sample v. using the whole community—while it may seem easier to analyze a representative sample of properties to determine costs and benefits of different assessment methods, the use of a sample can introduce new problems. Creating a representative sample of the non-residential properties may be difficult, especially if one has a large number of non-residential classifications;
- data identifying whom to bill may be complicated as some properties appear to be owned by one person or entity when in fact individuals are responsible for the use of the land, as in the case of mobile home parks. In contrast, condominium owners may be billed for the square footage of their unit, but the common space (parking lots and driveways), probably much larger and more likely to contribute to runoff problems, may not be counted.

COST / BENEFIT ANALYSIS OF ASSESSMENT METHODS BASED ON THE FOUR CRITERIA IDENTIFIED

Criteria #1. Administrative Time / Resources

This criteria is defined as the amount of time (and other resources) spent administering a stormwater utility including: creation of a database of property owners, addresses, and property information; implementation of a billing system; outreach to the public and response to customer comments and complaints, and future updates to the database.

Method 1—Modified Flat Fee

(total property size)

The flat fee method requires that a database be created of all the parcels with information on the types of parcels (i.e. residential or commercial), the name and mailing address of the owner, and overall parcel size for the non-residential properties. The costs for this data (assuming that the assessor's office can provide an ASCII file and that the stormwater utility (management program) has the necessary computer equipment and software) is relatively low. Updating the data will be a minimal expense for single-family households, however for all non-single family parcels, because the fee is based on parcel size, administrators will

have to decide how often to update parcel information depending on the community's knowledge of variability in parcel size.

Method 2—Equivalent Residential Unit (ERU)

(sample of Assessor's Data by parcel type)

The ERU method requires the same database that was created for Method 1. Assessor's data is used to divide the database into 4 parcel type groupings as noted above. A sample is also taken using assessor's data that is large enough to be representative of each parcel type to calculate an average ERU for each class. For Chicopee the sample required approximately 200 parcels. The impervious surface area is calculated for each parcel in the sample. Assessor's records can be used to calculate the impervious surface area for commercial properties, but the records do not contain the square footage of all pavement areas for residential properties because driveways are not counted. The ERU method requires the most complex billing calculations of all the methods. This method requires approximately twice as much time for start-up and implementation as Method 1. Initially there is more time and resources required for this method to create the calculations for billing, but once the calculations are set up the time spent running the billing is the same as for the other methods. In subsequent years the sample data will need to be updated to recalculate the ERU for each parcel type.

Method 3—Impervious Surface Measurement from Assessor's Data

(all properties—building footprint)

This method requires a database of all parcels based on Assessor's data with complete information on all parcels regarding the square footage of impervious surface. Impervious surface area is calculated by adding the areas of all the buildings and paved areas on each parcel. This requires a large expenditure of time to collect the correct information from the assessor's data and to obtain the square footage of pavement areas in the city that are presently not taxed. A rate per square foot of impervious surface area is relatively easy to calculate. Start-up and implementation time for this method is not much more demanding than for Method 2 and the benefits of this method are much greater. The assessor's data used to calculate impervious surface will need to be updated periodically to ensure its accuracy. Using a method that assigns an exact value of impervious surface for each parcel may cause property owners to appeal the value that has been assigned to their property. The stormwater utility may need to respond legally to these challenges, thus creating the potential for substantial future expenses.

Method 4—Impervious Surface Measurement from Aerial Photography—GIS

This method requires gathering and creating costly data in order to measure the actual impervious surface area of each parcel. The steps required as part of this method include: aerial photography, measuring the impervious surface areas using the aerial photographs, entering assessor's data into GIS to define parcel boundaries, digitally inputting the impervious surface areas into GIS, and finally downloading the GIS information into a database that also includes additional assessor's data on parcel types. The cost for this method, time and other expenses, is estimated to be higher than the other methods. This method also requires hiring employees with GIS expertise or contracting an outside firm for this task. Future costs would be higher because updating would require additional aerial photographs and GIS work.

Criteria #2 Equity

Depending on the assessment method used, the fees assessed for each property may or may not reflect the actual impact each parcel has on stormwater runoff. The goal in creating an equitable system is to charge a fee that represents the product a customer receives just as an electric bill reflects the actual amount of electricity used. Unless a method is used that measures all impervious surface on a parcel, an estimate must be made to represent each parcel's usage of the stormwater system.

In this analysis, equity for each assessment method is measured by how close the stormwater charge is to the relative impervious surface area for each parcel based on the data gathered from Method 4. Without having a meter to measure how much water runs off each parcel into the stormwater system, impervious surface area is the best available indicator of the runoff each parcel contributes to the stormwater management system. Using Method 4 as the baseline, a comparison was made for the sample parcels in Chicopee to test how close each method comes to the baseline.

In order to analyze the equity of each assessment method a few parcels were chosen to highlight the different fees that are assessed by the different methods:

The table above shows variability in fees generated by the different methods. If one agrees that Method 4 is the most accurate representation of a property's actual impervious surface, it is most telling to look at the variability in fees produced by Methods 1 and 2 compared with fees from Method 4. The assessor's data does not include all paved areas and therefore the impervious surface area factored into a fee using assessor's data is smaller than the impervious surface area measured in the GIS Method. This discrepancy is offset to some extent by the different rates that were determined for Methods 3 and 4.

There is a large variation in size of impervious surface for properties in Class 3 including: commercial, industrial, public service, vacant, and other open space. This variation makes it impossible to use Method 1 or 2 with any accuracy for these types of parcels. PVPC analyzed the variation of impervious surface of these parcels and found a 95% Confidence Interval for a range of property size from 8,000 to 28,000

TABLE 1 - SAMPLE OF PARCEL STORMWATER FEES USING DIFFERENT METHODS

		Fees Assessed for Each Method				Impervious Area (ft2)		
Class*	Parcel Description	Method 1	Method 2	Method 3	Method 4	Assessor Data	GIS Data	Parcel Size (Acres)
1	Single Family	$40	$36	$14	$11	672	933	.239
1	Single Family	$40	$36	$36	$36	1668	3090	.184
1	Single Family	$40	$36	$61	$37	2856	3206	.358
1	Single Family	$40	$36	$40	$42	1881	3690	.274
2	Two-Family	$40	$56	$39	$34	1797	2970	.184
2	Three-Family	$40	$56	$37	$49	1705	4287	.172
2	Apartments 4-8	$40	$74	$144	$33	6800	2877	.178
2	8+ Apartments	$400	$74	$2,392	$4,526	112651	397142	30
2	Mobile Homes	$40	$36	$2,159	$1,870	101636	164079	11.8
2	Condominiums	$40	$36	$10	$878	467	76394	n/a
3	Small Retail & Service	$40	$128	$19	$31	870	2688	.085
3	Fuel Service	$40	$128	$302	$151	14078	13160	.324
3	Manufacturing	$40	$128	$227	$165	10590	14315	.371
3	Manufacturing	$373	$128	$2,401	$2,860	113071	250981	7
3	Warehouse & Distribution	$91	$128	$157	$182	7300	15787	1.75

** Class 1-Single Family Residential; Class 2-Larger Residential; Class 3-Non-Residential*

square feet. The 95% Confidence Interval measures the variation of size in the sample. This range of variation is too large to allow identification of trends in the data.

EQUITY OF ASSESSMENT METHODS:

Method 1—Modified Flat Fee

(total property size)

This method appears to be relatively equitable with regard to smaller residential properties because the variation of the impervious surface area is small for these types of properties. The 95% Confidence Interval of impervious surface area for 1, 2, and 3 family residences has a range of 1,580 to 1,757 square feet. This is a relatively small variation. For all other types of parcels a flat fee method is not very equitable.

The current Chicopee assessment method uses the overall parcel size as an indicator of the fee for all parcels except single family residences. An analysis of the correlation between overall property size and impervious surface area found no consistent correlation. While the Chicopee method makes an attempt at varying the fee to better represent different parcels' different impact on the stormwater system, it would be significantly more equitable to calculate impervious surface area for all non-residential parcels.

Method 2—Equivalent Residential Unit (ERU)

(sample of assessor's data—by parcel type)

As discussed above, this method, when applied to residential properties, is relatively equitable, but for non-residential properties the equity level is low due to the dramatic variability in impervious surface area of these property types. If equity is a significant community concern, the time spent calculating the ERU for these property types would be better spent calculating the actual impervious surface area using assessor's, or some other reliable data.

Method 3—Impervious Surface Measurement from Assessor's Data

(all properties—building footprint)

This method has a high level of equity, as it relies on actual impervious surface of buildings located on each parcel. To obtain an accurate count of total impervious surface by property, the pavement area of most parcels in Chicopee would need to be added to the Assessor's data. While the equity level for this method is much higher than Methods 1 and 2, especially for commercial and industrial properties there are still limitations based on human error and the challenge of maintaining up-to-date records.

Method 4—Impervious Surface Measurement from Aerial Photography—GIS

This method is the most equitable of the four methods analyzed. The measurements of impervious surface area are the closest they can be without going out and actually measuring the properties.

Criteria #3. Sustainability/Effectiveness

This criteria was measured by answering the following questions about each method: How well does the method meet the goals of the Stormwater Utility? In Chicopee the goals of the utility generally are to provide: 1) capital for projects to correct Combined Sewer Overflows (CSOs), 2) revenue for the maintenance of the stormwater system, and 3) incentives for individual property owners to reduce stormwater runoff.

It can safely be stated that all four methods will meet the goals of raising capital for CSOs and for stormwater system maintenance. The question is, how do they distribute the burden among utility fee payers, and how easy is it to get the different methods implemented? The simplicity of Method 1 seems to have been a major factor in Chicopee's success at implementing a stormwater management fee as smoothly as they did. However, its simplicity may be a liability as the public understanding of how the fees are assessed grows.

The following is an analysis of how well each method reaches the third goal of creating incentives for individual property owners to reduce stormwater runoff.

Method 1—Modified Flat Fee

(total property size)

This method creates the least incentive to reduce size of impervious surface for individual parcels. The individual property owners will not be aware of any relationship between the size of their bills and the amount of impervious surface on their property. For residential properties, the issue of incentive may not be as important because residential property owners cannot do much to limit impervious surface on their property.

Method 2—Equivalent Residential Unit (ERU)

(sample of Assessor's data by parcel type)

This method creates no incentives to reduce the size of impervious surface on parcels because it is based on the average size of a group of properties. Incentives could be built into this method to give credit to parcels that reduce impervious surface by adjusting the ERU for parcels. Any attempt at doing this would create significant administrative costs for the Stormwater Utility staff to assess and approve these adjustments.

Method 3—Impervious Surface Measurement from Assessor's Data

(all properties—building footprint)

This method includes incentives for property owners to reduce the size of the impervious surface because the fees are based directly on size of impervious surface. Again, as with Method 2, the administrative costs for the Stormwater Utility or the Assessor's Office would increase due to the need to certify that changes have been made to a parcel. If the bill reflects the actual area of impervious surface then a financial incentive is included in the utility structure for property owners to reduce their use of the stormwater system.

Method 4—Impervious Surface Measurement from Aerial Photography—GIS

This method includes incentives just as Method 3 does, but these incentives come at a higher cost as updating aerial photographs to identify changes in impervious surface area is more expensive than updating Assessor's records.

Criteria #4. Political Expediency

How likely is it that your community will accept the various methods? This is a difficult question to answer because each community has its own unique political situation, but each assessment method does raise unique political concerns.

The stormwater management fee in Chicopee was implemented with a flat fee for single family residential properties and a sliding scale for non-single family residential and all other properties based on

total size of the parcel. This fee system was both easy to implement and relatively simple to explain to the public. In Chicopee the simplicity of the method allowed for relatively smooth implementation. Chicopee chose to prioritize establishment of the fee, recognizing that over time, the City would need to make changes to the structure and the fee calculation to improve both the equity of the fee and the ability of the fee to generate sufficient funds for the city's stormwater management program. Research on other communities around the country shows that many municipalities have taken this approach when launching a stormwater utility. However, as the popularity of stormwater utilities grows, and the public is better educated about the need to correlate rates with actual contribution to the stormwater management problem, future publics may demand a more equitable fee system from the start.

Method 1—Flat Fee

(total property size)

This method has a relatively low administrative cost and is easily explained to the public. It is politically expedient to use this method as a starting point in order to establish a stormwater utility. For residential properties in Chicopee the flat fee may remain the most politically expedient because of the relatively small variation in parcel size of this property type.

Method 2—Equivalent Residential Unit (ERU)

(sample of assessor's data by parcel type)

This method is cumbersome and moderately expensive to implement and administer. It is more equitable than the Flat Fee Method, but the complexity of the billing calculations makes it quite difficult for the public to understand. This method is probably the least politically expedient as simplicity is often favored over fairness.

Method 3—Impervious Surface Measurement from Assessor's Data

(all properties—building footprint)

This method is expensive to establish and administer but it is much more equitable than Methods 1 and 2. As the public becomes more aware and informed about why and how stormwater fees are charged then more questions may arise about the equity of the fees. This method provides the municipality with a clear justification that the City is charging an individual property based on actual stormwater runoff that impacts the stormwater management system. This method would be politically expedient in a community with an educated and litigious public where the local government wants to create clear incentives for the public to change practices that contribute to stormwater and water quality problems.

Method 4—Impervious Surface Measurement from Aerial Photography—GIS

This method is the most costly to implement and administer, but it also produces the most equitable and legally defensible results. The use of aerial photography and GIS results in the most accurate measurement of impervious surface area, but the costs involved may make this method politically impractical. However, as many communities are creating GIS maps of their municipalities, it may cost considerably less to measure impervious surface as part of an already planned and paid for GIS program.

III. CONCLUSIONS OF COST/BENEFIT ANALYSIS

The Cost / Benefit analysis highlights a number of issues that are noteworthy for a community considering creating a stormwater utility. A city or town must decide its priorities and then determine which method best meets its needs. Below is a list of a few of the important findings from the cost / benefit analysis.

- There is a large amount of variability of impervious surface area for commercial and industrial properties. It would make sense for a stormwater utility to allocate extra funds and time to improve the accuracy and equity of the assessment method for the commercial and industrial parcels because this is where the most variation in impervious surface will occur.
- There is only slight variation in the impervious surface area of residential properties, making it practical and expedient to use a flat fee assessment method for single-family residences.
- Assessor's data is relatively easy to access, but many paved surface areas will need to be measured and added to the building data.
- Simplicity of assessment method is extremely important to facilitate both public understanding and acceptance and political support for the new utility.
- Use of a sample of properties to analyze rates can be extremely problematic. Sampling makes sense with groups of properties that do not vary dramatically, such as single family residential, but with property types that vary within their classification, it is very difficult to create a representative sample. It is only slightly more expensive and much more effective to use a technique to measure impervious surface area for all properties in these cases.
- While the use of GIS data seems cumbersome, it offers reliability and equity not offered by the other methods and, the popularity of GIS suggests that this assessment method will become increasingly affordable as municipalities create GIS maps and data layers for multiple uses.

Costs of the Different Methods/Minimum Requirements to Implement:

TABLEM 2—MAJOR FINDINGS AND ISSUES FOR THE DIFFERENT ASSESSMENT METHODS

	Admin. / Res.	Inter-class Equity	Effectiveness	Political Expediency	Ease of Implementation
1) Modified Flat Fee	Lowest Cost	Low except residential properties	Raises funds but creates no incentives for changing practices	High	High
2) Equivalent Runoff Unit (ERU)	Mid-Range Cost	Low except residential properties	Raises funds but creates no incentives for changing practices	Low	Medium
3) mpervious Surface (Based on Assessor's Data)	Higher Cost	OK but needs quality check	Achieves all goals	Medium	Low
4) Impervious Surface (Based on GIS Data)	Highest Cost—unless muni. has GIS	Best	Achieves all goals	Medium to High	Low

While it is tempting to look for a proscribed list of the items and resources a municipality must have in place in order to begin to undertake the development of a stormwater utility, the research conducted as part of this project shows that this is a wrong-headed approach toward developing a stormwater utility. An exciting characteristic of existing stormwater utilities in the United State is that they do not all look alike. While research for this project confirms the existence of basic components of a stormwater utility (legal foundation, community outreach and education, a management program, an assessment method and a rate setting procedure) the details of program development and implementation are very flexible.

For example, If a community has GIS capabilities already in place, then it certainly seems to make sense for them to use data derived from aerial photography to drive their assessment process. If they do not, then it may or may not be cost-effective for the community to develop GIS capabilities. Because each community is different, municipal staff will have to take the information presented in this report and evaluate the different approaches against their community's reality.

The City of Chicopee passed a stormwater management fee before the research for this project was complete. After discussing the proposed Stormwater Management program and fee with key business leaders and city council members, the Board of Sewer Commissioners recommended a $10/quarter fee for single-family residential properties and a $0.30/1000 square feet fee for non-single family residential, commercial, and industrial properties (with a cap of $400/year), as a stormwater management fee payment which the public could bear. This amount compares favorably with start-up fees in communities across the United States (see chart in Assessment Briefing Paper for detail). Such overt political planning can be an effective way to implement a stormwater management program. For a more systematic approach to rate setting, see Briefing Sheet #5 on Rates.

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AN INVENTORY & REVIEW OF EXISTING MASSACHUSETTS LAWS & REGULATIONS PERTAINING TO THE CREATION OF A STORMWATER UTILITY

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INTRODUCTION

A stormwater utility is not a new idea. Municipalities have had statutory authority since the mid-19th century to operate wastewater systems and to establish a set of fees and capital assessments to pay for the cost of operating and constructing such systems. In older systems such as the one in Chicopee, wastewater systems combine the transport and treatment of sewage and stormwater. Newer systems transport stormwater and sewage in separate systems.

In their role as provider of wastewater services, municipalities act as public utilities. They are the sole providers of such services, adhere to rate methods prescribed by legislation, are required to provide the service to any property owner requesting it, and are subject to state regulation over how the services are performed.

What is new in the stormwater field are programs that involve correction of stormwater quality problems at the source through non-structural measures, such as regulation to minimize impervious surfaces in new construction and improved material handling and parking lot sweeping in existing developments, and through structural measures, such as the treatment of stormwater through grassy swails and wet ponds that facilitate infiltration. What is also new are the imposition of fees and assessments related specifically to the amount of stormwater runoff and based upon each property owner's relative amount of impervious surface.

These new approaches for addressing stormwater concerns and charging for their implementation raise the following question: Can we fit the new stormwater program (including funding mechanisms) under the traditional separate wastewater and stormwater programs and the combined system programs, or a "home rule" adaptation of these programs, or must we expand the state and local authority by amending existing legislation and adopting a new ordinance?

In the following report, we demonstrate that not only is there a lack of express authority to require infiltration practices and to charge property owners on their respective amounts of impervious surfaces, there are a number of current statutory provisions that conflict with these new stormwater approaches. This leads to our recommendation that new legislation is required. Also, we conclude that municipalities must adopt new ordinances in order to establish a stormwater connection permit program, to add stormwater-based assessment formulas, and to establish a stormwater utility and enumerate its powers.

Our report is broken down as follows: Task 1: review of existing laws describing, first, wastewater programs, second, drinking water programs (included in Appendixes I and II), and, third, methods for raising revenue for these programs; Task 2: legal analysis, examining, first, "home rule" authority and, second, authority to adopt a new fee and assessment structure; Task 3: providing, first, a rationale for the

new legislation and ordinances and, second, preliminary drafts of same; and Task 4: providing an outline of presentation to the Legislative Committee. While the report has general application to all communities in Massachusetts, it has a special focus and relevance to the City of Chicopee.

TASK 1: INVENTORY AND REVIEW OF EXISTING LAWS AND REGULATIONS

I. DISPOSAL OF SANITARY WASTE AND STORMWATER

A. Historic Development

The State Legislature has authorized municipalities to lay out, construct, maintain and operate a system of common sewers and main drains in public or private ways as the municipalities "adjudge necessary for public convenience or the public health." G.L. c. 83 §1 ¶1. The system encompasses connections and other works, as well as sewage treatment and disposal. Id. §1 ¶1 and §6.

B. Sanitary Wastewater v. Stormwater

A "common sewer" is considered a sanitary sewer that carries sewage. Sewage includes wastewater from homes, public buildings and commercial or industrial establishments as well as surface and groundwater.[1] Id. §1. A "main drain" is one not used for sewage, but is used for combined street runoff and drainage from adjoining land. Bates v. Westborough, 151 Mass. 174 (1890). As reflected in these definitions, Chapter 83 encompasses separate sanitary outfalls (SSO), separate storm systems (SSS), and combined systems including combined system outfalls (CSO).[2]

C. Municipal Authority

(1) Sewage

The city council, selectmen, sewer commissioners or road commissioners may acquire property and easements across property by eminent domain or purchase that are necessary for the systems of common sewers (as well as main drains) and Publicly Owned Treatment Works (POTW). Id. §§1 and 6. The board or officers of a municipality having charge of the repair and maintenance of sewers, if requested by an owner who pays for the cost, or if ordered by the Board of Health, must construct connecting sewers within the limits of the street and building sewers to tie a house or business to the common sewer. Id. §§1, 3 and 11.

Section 7 of Chapter 83 authorizes DEP to eliminate any nuisance caused by a defective POTW. In this connection, DEP may order an enlargement or improvement to the POTW, or may prohibit industrial waste or other material that interferes with the operation of the POTW from entering the plant, or may require pretreatment before such industrial waste or other material is allowed to enter the plant. Sections 1 and 3 grant the courts jurisdiction to restrain the unlawful use of common sewers and to restrain discharges found unlawful under Section 10.

Section 43 of Chapter 21 states expressly that any state regulation over the discharge of sewerage does not supersede the powers of municipalities to enact and enforce sewer ordinances and to issue permits for sewer connections.

G.L. c. 40 §21, ¶10 authorizes municipalities to adopt ordinances to regulate the use of common

[1] G.L. c. 111 §17, which authorizes DEP to approve municipal systems, follows a different set of definitions: "drainage" means "rainfall, surface and subsoil water only; and "sewage" means "domestic and manufacturing filth and refuse."

[2] However, a drain constructed to handle runoff from a catchbasin to a stream is not a main drain within the meaning of G.L. c. 83, §1. Blaisdell v. Stoneham, 229 Mass. 563 (1918). Also see, Delamaine v. Revere, 229 Mass. 403 (1918).

sewers and to prohibit discharges that would interfere with proper operation of the sewerage system and the treatment and disposal works.

(2) Stormwater

Municipalities may construct and maintain connecting drains to property owners for stormwater drainage. G.L. c. 83 §1. Highway officials may construct ditches or drains to drain any street and carry water away from the street across other land to a pond or stream. Id. §4. The Board of Health may require abutters to repair any private drain located in a private or public way. Id. §12. Once a city or town builds separate systems for the transport of water and sewage, property owners must connect wastewater discharge to the sewer; and stormwater runoff, to the drain. Id. §5.

D. Recent Developments

In March 1997, the Department of Environmental Protection adopted Stormwater Management Standards (SMS) for new development and redevelopment projects. The SMSs are being implemented by local Conservation Commissions under the Wetlands Protection Act. To illustrate, Number 4 of the SMSs calls for removal of 80% Total Suspended Solids (TSS).

The SMSs rely upon Site Planning and Non-Structural Approaches (SPNSA) and Structural Best Management Practices (BMPs). Examples of SPNSA's are minimization of impervious surfaces, regular implementation of parking lot sweeping and catch basin cleaning, reduction of use of pesticides, and public education. Examples of BMPs that are constructed include stormwater wetlands, grassy swales, and sand and organic filters.

SMS's may be required in Discharge Permits under the State Clean Water Act as set forth in DEP's Stormwater Policy Handbook. While SPNSA's and BMPs have been incorporated in some subdivision regulations and zoning ordinances, to our knowledge they have not been included in wastewater ordinances and regulations.

E. Local Regulation-Chicopee

Chicopee has adopted a Subdivision Regulation under G.L. c. 41, 81Q. Sections 402.1, 402.2, and 403.2 of the Subdivision Regulation require developers to submit to the Planning Board their proposed surface drainage system, drainage calculations, and plans. Section 508.1 and the August 31, 1978 amendment provide for storm drainage criteria. These criteria apply to flooding concerns - the traditional subject of early subdivision regulations.

While Section 509.0 controls erosion and sedimentation from construction activities, this Subdivision Regulation does not require SMSs, as described in the state stormwater program. For example, developers are not required to maximize natural infiltration and use BMPs to remove sediment.

II. CHARGING FOR THE COST OF SANITARY AND STORMWATER PROGRAMS

A. Introduction

In the prior section, we discussed the existing authority of municipalities to implement wastewater programs. In this section, we will examine the authority of municipalities to set fees and assessments to pay for wastewater programs.

B. Assessment Methods

Sections 14-29 of Chapter 83 cover assessments for sewer and drain costs and imposition of liens for non-payment of such charges. Section 14 authorizes the appropriate local official to assess any person for both a connection to a main drain and a common sewer a proportional part of the charge of making or

repairing the drain or sewer as well as further extensions. This assessment applies not only to persons who tie into the new main drain but also to any person "who by remote means receives benefits thereby for draining his land or buildings." This include persons who own property that abuts the stormwater main drain but has chosen not to connect to it or who owns undeveloped property. See Stepan Chemical Co. v. Wilmington, 8 Mass. App. Ct. 880 (1979). In other words, the Legislature has authorized municipalities to assess the cost of a stormwater system on property owners who directly, or have the potential benefit, from such system.

C. Methods By Which Towns May Allocate the Construction Costs of Main Drains and Common Sewers

Municipalities have been authorized to follow three options for assessments under Sections 14, 15, 18 and 23. Specifically, costs may be recovered using: (1) a fixed uniform rate, Id., 15, (2) a uniform unit method, Id. §15, or (3) a permanent privilege charge, Id. § 17. While these options are available for "sewers," in light of the reference at the beginning of Section 15 to assessments made under Section 14, which encompasses pipes that carry stormwater and sewage, and the express authority in Section 18 to select a method of assessment for laying main drains or common sewers, we conclude that the assessment options apply to stormwater as well as to sanitary related work. Moreover, Section 18 authorizes the combined use of the several methods for assessment.

1. Assessment Based On Fixed Uniform Rate (FUR)

The FUR is the estimated average cost of all sewers and drains within the system according to the frontage of the land on any street or way in which the sewer is located, according to the area of land within a fixed depth from the street or way, or according to both frontage and area. However, no assessment can be made to a property if by reason of grade or level it cannot be drained into the sewer until the incapacity is removed. Id. §15.

2. Assessment Based on Uniform Unit Method (UUM)

The UUM is based upon sewer and drain construction costs divided among the total number of existing and potential "sewer units" to be served after apportioning the costs of general and special benefit facilities.[3] Id. A "sewer unit" equals a single family residence. Buildings with multifamily, commercial, industrial and semipublic uses are converted into sewer units by using residential equivalents. Id.

3. Assessment of Potential Development

Under Section 15, a portion of the costs of the general benefit facilities (i.e., force mains) may be apportioned by the uniform unit method on all areas to receive benefits within the pumping district or a combination of districts Id. ¶4. The uniform method of assessment applies to both existing and potential structures. Id. §15 ¶3. Existing and potential multifamily, commercial, industrial and semipublic uses will be converted into sewer units on the basis of residential equivalents. Id. The number of sewer units for a potential structure is to be calculated on the basis of zoning then in effect. Id. But, the cost of general benefit facilities attributable to undeveloped land not abutting a sewered street may not be assessed until properties are serviced by public sewerage. Id. ¶4.

The statute also allows municipalities, "from time to time," to redetermine the uniform rate fixed charge

[3] General benefit facilities include force mains, trunk mains, and pumping stations. Special benefit facilities include sewer mains serving adjacent facilities. G.L. c. 83 § 15. Through ordinance or by-law, municipalities may separate the costs of general benefit facilities from those of special benefit facilities.

for sewer construction costs. Id. § 15A. Municipalities may extend the time for the payment of the assessment on an undeveloped parcel "for a fixed time," but interest of 4% per annum must be paid annually upon the assessment from the time the assessment was made. Id. §19. Once the land is developed, the assessment must be paid within three months or at the expiration of the town's "fixed time." Id.

4. Charge for Permanent Sewer Privileges

Instead of charging assessments using either of the methods discussed above, municipalities may require sewer and drain users to pay for permanent privileges for their estates. Id. § 17. These privilege amounts must be reasonable, and are determined by the aldermen, sewer commissioners, selectmen or road commissioners. Id.

Property owners who paid assessments for the original construction of a sewer line, can be assessed again under Section 17 for a replacement sewer. Seiler v. Hingham, 353 Mass. 452 (1968).

D. Methods By Which Municipalities MayAllocate the Cost of Constructing Individual Sewer Lines

Municipalities may appropriate money for connecting certain estates to common sewers. The municipalities may issue bonds or notes to pay for such connections and assess property owners for amounts necessary to pay off the bonds or notes.

Moreover, municipalities may require landowners to pay in advance an amount equal to the estimated assessment of the connection, and any overpayment is returned to the landowners. Id. § 24.

Property owners benefited by a sewer line "from the common sewer to the boundary of the street" must pay the town for the permanent privilege of using the line. Id. The aldermen, sewer commissioners, selectmen or road commissioners determine the amount to be paid based on the estimated average cost of all such particular sewers within the territory for which a system of sewers has been built or adopted. Id.

E. Annual Charges

Municipalities are permitted to apply "just and equitable" annual charges or fees for the use of common sewers to every person who enters the sewer. This charge may cover maintenance and repair or "any debt contracted for sewer purposes." Id. § 16. Contrasted with the broader coverage in Section 14 that includes main drain and common sewers, the annual charge provision of Section 16 applies only to common sewers.

TASK 2: LEGAL ANALYSIS

I. HOME RULE AUTHORITY

The Home Rule Amendment to the State Constitution adopted in 1966 divides authority to adopt legislation between the State Legislature and municipal legislative bodies. Mass. Constitution, Amend. Art. 2. The State Legislature has the exclusive power to levy, assess and collect taxes. Id. § 7. The State Legislature has also retained the authority to pass laws pertaining to two or more municipalities and to pass special acts pertaining to a single municipality by two-thirds vote, or if filed by petition by such municipality. Id. § 8.

The Supreme Judicial Court (SJC) has confirmed that the Home Rule Amendment preserves the State Legislature's right to legislate with respect to state, regional and general matters, even though the action may have special effects on one or more individual municipalities. Clean Harbor of Braintree v. Board of Health of Braintree, 415 Mass. 876, 616 NE2d 78 (1993).

A municipality may, by adoption of a by-law or ordinance, exercise any power which the State Legislature has the power to confer upon it, which is not inconsistent with the constitution or laws enacted by the Legislature "in conformity with powers reserved to" the State Legislature by Section 8, and which is not denied by its Charter. Id. § 6.

The SJC will "review the delegation of lawmaking power to the city in light of the policy underlying the home rule amendment that "maximum elbow-room [be provided] for localities in solving local problems on their own initiative." Opinion of the Justices, 427 Mass. 1211, 1216 (1998) quoting, First Report of the Special Commission on Implementation of the Municipal Home Rule Amendment to the State Constitution, 1966 Senate Doc. No. 846, at 18. In fact, the State Legislature has conferred upon municipalities the power to adopt ordinances to carry out traditional "police power" functions of government. G.L. c. 40 §21(1).

An important case in the sanitary wastewater and stormwater field is Hadley v. Amherst, 372 Mass. 46 (1977). A 1912 statute authorized Amherst to "lay out, construct, maintain and operate a system or systems of main drains and common sewers" and gave the board of sewer commissioners the right to take or purchase land in Amherst and the Town of Hadley necessary for that purpose. Hadley requested that the statute be nullified under Section 9 of the Home Rule Amendment. In denying Hadley's request, the Court held that legislation concerning water quality is "within the ambit of retained legislative power" and that sewer systems "are a matter of State, regional, or general concern, and thus an area in which the legislature retained law-making authority." However, it does not follow from this case that municipalities are precluded from also adopting ordinances to regulate sanitary and stormwater systems as long as they are not in conflict with state law.

II. SETTING OF STORMWATER FEES AND BETTERMENTS

A. Fee vs. Tax

Governmentally imposed charges fall into one of two categories — taxes or fees. Both must be authorized by the State Legislature. The distinction is important because if a charge is a tax it must be authorized exclusively by the State Legislature. Mass. Constitution, Part I, Art 23; Amendment Article 2, § 7. Further, if taxes are imposed by the State Legislature, they must be "proportional and reasonable". Mass. Constitution, Part II, C.1, §1, Article 4. Property taxes must be levied "proportionately in the same class", Id., and are limited by Proposition 2_. Moreover, certain charitable entities are exempt from paying property taxes. G.L. c. 59 §5.

Under early case law, the SJC found a sewer charge was unconstitutional because the charge was not founded on special benefit. Sears v. Street Commissioners of Boston, 173 Mass. 350, 53 NE 876 (1899). Later, in Emerson College v. City of Boston, 391 Mass. 415 (1984), the SJC treated in more comprehensive fashion the tax vs. fee issue. Pursuant to a Special Act of the State Legislature, Boston charged certain large non-residential building owners for augmented fire services availability (AFSA). The Fire Department increased the AFSA for a property if additional personnel and equipment were deemed necessary to extinguish any fire and to ensure the safety of the occupants; and decreased the AFSA if fire suppression and detection equipment were present.

The SJC found that the City had correctly refrained from arguing that the charges were special assessments. Assessments are imposed for local improvements. The SJC stated that maintenance of additional fire companies "necessary to extinguish fires at various buildings throughout Boston is not a local improvement." Id. P. 416, Note 5.

The SJC applied the following four factors in deciding whether the charge was to be upheld as a fee:

(1) The AFSA charge must be set at a level to enable the City to recover the cost of providing AFSA protection;

(2) The charge must be sufficiently particularized as to justify distribution of the costs among a limited group (i.e., the users or beneficiaries of the services), rather than the general public. Id. P. 425;

(3) The AFSA charge must be voluntary, i.e., the owner can refuse the service for which the charge is made; and

(4) The AFSA charges collected must be used exclusively to pay for the extra services.

The SJC found that factor no. 1 was satisfied, but factor nos. 2, 3 and 4 were not. On factor no. 2, the SJC found that the extra service was designed not just to safeguard a building, but also to safeguard its occupants and to prevent the spread of fire. On factor no. 3, the SJC found that the owner must accept the extra service. On factor no. 4, the AFSA charges collected went to support not just the additional fire companies, but also for general police and fire services and for the general fund of the City.

With the City not having satisfied three out of four of the factors, the SJC held that the AFSA charge did not conform to any "constitutionally permissible form of monetary exaction."

In a subsequent case where the issue related to the legality of a fee charged for laying a water pipe, the Court of Appeals, distinguishing the Emerson decision, held that the fee was not a tax. Morton vs. Town of Hanover, 43 Mass. App. Ct. 197 (1997). In this case, the Board of Public Works (BPW) had authority by special act to fix just and equitable rates for the use of water. The rate assessed against a group of commercial businesses was based half on assessed property valuation and half on water usage in amounts necessary to pay off bonds issued by the Town. The Court declared that the "rates are valid if they are not 'taxes,' and were established according to lawful procedure, and also are 'just and equitable.'" Id. P. 199.

On the tax vs. fee issue, the Court applied the Emerson College criteria. First, the Court asks whether the installation of a new 16 inch pipe (for which the fee was charged to certain commercial property owners) benefited those property owners who were assessed the fees. While the property owners in question still relied on an older pipe, the Court found that the introduction of new pipes in the system allowed for an increased flow and pressure in the existing pipes that were relied upon by those property owners.

Regarding compliance with the other criteria from the Emerson case, the Court granted the Town its Motion for Summary Judgment. The Court held that (1) since water rates do provide a private benefit, they do not have to be voluntary; and (2) by definition water rates are not used for general revenue purposes.

On the fairness of the rate, the Court stated that the Town did not have to look alone to the quantity of water used. The Court applied a reasonableness test and even quoted another Massachusetts decision that some discrimination of rates is permissible within reasonable limits.

In Bertone v. DPU, 411 Mass. 536, 583 NE2d 828 (1992), the Hull Municipal Lighting Plant charged a hook-up fee to a customer seeking new or expanded service. The fee was necessary to expand its system to accommodate higher peak loads. A new condominium developer contended that the fee was an unlawful tax.

The Court held that the Emerson criteria were satisfied. First, the services are "sufficiently particularized." The service to old customers remains the same, and the new customers receive the benefit of the expanded service. Second, the Bertones are not "compelled" to pay the fee. They do not have to build the condominium project. Last, the fees will be applied to the cost of the new construction and not used for more general purposes.

In Berry v. Danvers, 34 Mass. App. Ct. 507, 613 NE2d 108 (1993), the Danvers Water and Sewer Commission set a sewer connection fee of $4 for each gallon of sewage. The Court of Appeals upheld a lower court ruling that the fee was an unlawful tax because it represented money to be used to upgrade the

entire system and not just to benefit new users.

The Berry decision can be contrasted to Winthrop v. Winthrop Housing Authority, 27 Mass. App. Ct. 645, 541, NE2d 582 (1989). In Winthrop, the Town charged an annual sewer use fee to all landowners to cover the operation and maintenance of the sewer system. Because the fee benefited those required to pay the fee, it was upheld as a fee, not a tax.

TASK 3: NEW LEGISLATION AND ORDINANCE

I. Gaps in the Stormwater Program[4]

A. Implementation

Based on the above review of Chapter 83, it is evident that the State Legislature has prescribed the municipal authority to implement and finance sanitary and stormwater systems. As stated in Hadley v. Amherst, such systems are properly a matter of concern by the State, and the Legislature has retained the power to regulate municipal activity in this field. Under the Home Rule Amendment, solely on the question of the scope of Chicopee's Stormwater Program, it can be argued that Chicopee may authorize and operate a program that simply amplifies or expands upon the municipal authority defined in Chapter 83, but such program cannot conflict with Chapter 83.

Chapter 83 imposes considerably greater control over sanitary and combined sanitary-stormwater flows than over control over stormwater flows.

(1) Sanitary and Combined Flows

As reviewed above, Boards of Health can require hook-ups; and local sewer departments, connection permits and pretreatment. POTWs are authorized. Municipalities can establish annual charges. G.L. c. 83 §16.

(2) Stormwater Flows

Municipalities lack authority to require environmental-type connection permits and pretreatment of stormwater discharges. Municipalities have only the limited power (i) to prohibit the obstruction of flow of a separate stormwater system (SSS), Id. §9; and (ii) to require repair of a private drain in a public or private way. Id. §12. They do not have explicit authority to regulate the use of stormwater drains and to establish annual charges.

In its present form, Chapter 83 does not expressly allow municipalities to regulate the quality of stormwater entering the SSS, nor the manner of collecting or infiltrating of stormwater on private property. Nor are municipalities authorized to build treatment facilities solely for stormwater (but only stormwater in combination with sewage).

However, as discussed below, municipalities in their planning and regulatory roles through site plan and subdivision plan review may have certain of these powers.

B. Financing

Sections 14-29 of Chapter 83 authorize an assessment setting system to pay for both sanitary and stormwater systems. In certain sections, Chapter 83 references only common sewers (i.e., those handling

[4] See "Controlling Stormwater in Wisconsin: Municipal Considerations and Strategies" by Laurie Kobza, 2 Wis. Envtl. L.J.1, Winter 1995.

sanitary flows). However, by referencing main drains (i.e., those handling stormwater flows) in the introductory as well as later sections, the Legislature states its intent to include funding measures for both sanitary and stormwater systems (and combined systems). This means that Chicopee has the authority to assess costs related to its stormwater system to property owners who are benefited by such system.

In many respects, stormwater rates are similar to water/sewer rates. In both cases, the rates are assessed on property owners who connect to the respective water/sewer and stormwater systems by pipes tied to their properties. If looked upon in this way, the stormwater system provides a private benefit to its customers, not a public benefit.

Typically, volume of use is one measure for setting the fee. For water/sewer fees, it is quantity of water used, and for stormwater fees, it is the amount of impervious surface. The latter translates into a measure of the amount of water discharging off the property.

Of course, some of the activities in stormwater programs, such as public education, are of general public benefit to citizens who are interested in having improved water quality in the streams and rivers of their communities. Yet, this type of service is similar to services typically performed by water-type utilities such as public education around water conservation. Further, if the stormwater program involves a charge assessed on all property owners, then such charge, following the decision in the Winthrop case, is assessed substantially to the class of people who benefit from the stormwater program.

The difficulty arises when we try to apply any of the three options for assessments set forth in G.L. c.83 §15 to the stormwater program. Under FUR, assessing fees on the basis of lot frontage or depth does not equitably relate to the apportionment of stormwater program expenses. Under UUM, we begin with a single family resident as a single unit. This achieves "rough justice" in the stormwater field assuming most single family properties in Chicopee are comparable in terms of impervious surface. But how many residential units are assigned to a commercial property? Also, Section 15 assumes a maximum build-out allowed under zoning.

There is a better alternative for the stormwater field. As discussed in the accompanying report by the Pioneer Valley Planning Commission (PVPC), one could assume that a residential unit on average had 2,000 sq. ft. of impervious surface. Then a commercial property with 10,000 sq. ft. of impervious surface would be assigned five residential units.

Can we mold a stormwater utility fee system under the existing statute or do we need explicit authority to allow an assessment based on amount of impervious surface? Possibly municipalities can rely upon an annual sewer user charge. G.L. c. 83, §16. But that may be limited to sanitary sewers and to a gallonage based charge. Certainly, the restrictive assessment options do not apply to an impervious surface based rate. Given the restrictive definition of the existing assessment and fee options, we conclude state legislation is required.

C. Other Opportunities

G.L. c. 83 §15 distinguishes general and special benefit facilities. This could be applied to stormwater related expenditures. For example, those property owners who benefit from a new storm drain in their street could be made responsible collectively for that expenditure by calling it a special benefit facility. Under the holding in Bertone, a stormwater utility can charge a property owner who proposes to expand its facilities a fee to pay for the expanded stormwater system.

D. Other Issues

Chicopee is undertaking work to separate sanitary and stormwater flows. Whether this work should be paid for by sanitary or stormwater related assessments or fees presents an important fiscal issue for the City.

II. OPTIONS FOR CHANGES TO LOCAL ORDINANCES

A. Subdivision and Zoning Approaches

The Proposed Stormwater Management Draft Ordinance resents a starting point. The question is how a comprehensive approach reflected in the draft could be applied to existing uses as well as to new development. For new development subject to subdivision plan approval, the criteria such as those in the Draft Ordinance can be added to Chicopee's Subdivision Regulation.

For projects requiring site plan approval, the performance standards and BMP requirements could be added to the Zoning Ordinance. See efforts to this effect in Site Plan Review Draft Ordinance, dated March 18, 1998. For smaller projects not requiring site plan approval, standards could be added to the zoning ordinance and be administered as part of the building permit application process.

B. Sewer Ordinance

Existing uses not requiring subdivision plan, site plan, or building permit approval could be made subject to a properly authorized ordinance administered by the DPW or Stormwater Utility. The DPW or Stormwater Utility could demonstrate that since activities on private property have an adverse effect on the maintenance and operation of the CSO and SSO systems, they should be regulated.

In the attached draft ordinance, we have included regulations to this effect. The attached draft ordinance will change the following sections of Chapter 230 Sewers of the Chicopee Ordinance:

§230-5 Connecting Private Drains with Sewers - Add a main drain connection permit with conditions for achieving infiltration of stormwater on-site, maintaining and cleaning catchbasins, and other BMPs, etc.

§230-6 Fees for sewer connections (meaning assessments) - Expand to include stormwater drain connections, but have special provision as follows: Substitute rate dependent on volume of stormwater entering the public system or natural waterbody measured by amount of impervious surface (to pay for upgrade necessary for system expansion) in place of fixed uniform rate based on amount of frontage.

§230-7 Method of Assessment - See §230.6. [Special vs. general assessments.]

§230-8 Rate of Assessment - Change from fifty cents ($.50) per foot of frontage to rate dependent upon amount of impervious surface.

§230-19 Permit required for any sewer work - Make consistent with §230-5.

§230-30 Discharge of Stormwater - Instead of allowing discharge of stormwater to natural outlet, require that stormwater be infiltrated to extent practical.

III. CONCLUSIONS

A. Legislation

Municipalities with CSOs have authority to regulate discharges to the CSOs, reduce CSO volume, separate or close CSOs, and treat the combined sanitary/stormwater effluent. Specific assessment methods are also authorized. They include the "equivalent residential unit" (ERU) method employed in many stormwater programs throughout the country. However, the ERU method authorized in Chapter 83 does

not envision use of the amount of impervious surface as the key factor when deciding what number of ERUs should be assigned to a property.

While Chapter 83 authorizes the operation and construction of common drains, it does not specifically authorize stormwater treatment and requirements to infiltrate stormwater, to prevent erosion in construction areas, and to prevent future pollution. Moreover, in the case of municipalities with separate stormwater systems, certain activities including regulation over discharges of stormwater to the system and treatment of stormwater are not expressly authorized.

While DEP may have authority to regulate certain activities that are causing pollution of state waters, and Boards of Health may have authority to eliminate public health nuisances, local public works and sewer departments do not appear to have express statutory authority to conduct their own stormwater regulatory programs.

In the same way that additional stormwater functions have to be authorized, the setting and collecting of fees for these services must also be authorized. While it is true that there are now accepted ways of separately financing certain service functions at the municipal level through enterprise and revolving funds,[5] a stormwater utility represents an expanded municipal endeavor and should be explicitly authorized.

The need to have a separate utility is evident when the control of the stormwater function is separate from the control of wastewater function. A separate system conducted by a stormwater utility is necessary, for example, when a municipality does not conduct its own wastewater program because it is already part of a district wastewater utility.

In light of the above, **we recommend that legislation be filed to expand municipal authority to include the operation of a more comprehensive stormwater system.** While it could be argued that municipalities could rely on "home rule" authority, since the State Legislature has spelled out in detail the operation and financing elements for sanitary and stormwater systems (as well as combined systems), it is advisable to pursue the State legislative route when it is necessary to change those details. The new legislation will:

1) authorize the establishment of stormwater utilities,
2) assign enforcement authority to the local DPW,
3) authorize stormwater connection permits,
4) clarify that an assessment and annual fee system based on the amount of impervious surface can be used, and
5) will change the existing formula so that property owners pay less, and not more, for leaving property undeveloped.

In this connection, we have provided a preliminary draft of the proposed legislation.

B. Ordinance

As Chicopee develops its stormwater management program, there are advantages in developing a comprehensive ordinance. The rationale for the program is explained. The responsibility for accomplishing the different parts of the stormwater program is defined. Those ordinances that were designed for the wastewater system will be distinguished from the new ordinance applicable to the stormwater program. For example, no longer will assessments be based on present and future development size, but instead be based on amount of impervious surface. The ordinance will explain how rates are calculated and collected and how revenues will be used. Having the ordinance will satisfy EPA's and DEP's requirements for demon-

[5] See Appendix III.

stration of specific legal authority to run programs and carry out enforcement measures and will demonstrate that the assessment formula is fair and reasonable. Last, there is the benefit of engaging the support of the community behind the stormwater program through adoption of the ordinance by the Board of Aldermen.

In this connection, we have provided a preliminary draft of the proposed ordinance.

TASK 4: PRESENTATION TO LEGISLATIVE COMMITTEE

I. Federal Requirements

Commencing September 1999 Phase II of the Federal stormwater program will apply to smaller communities with municipal separate storm sewer systems (MS4) in urban areas. It will subject municipalities to a stormwater general permit (GP) or to a watershed related general permit. Requirements of the GP will include: (a) application of best management practices (BMP); (b) adoption of a stormwater management plan; and (c) testing and reporting.

II. STATE REQUIREMENTS

The state requirements are to be accomplished on a watershed basis.

From these efforts, municipalities will be expected to:

- select applicable BMPs;
- educate the public;
- review new construction and development;
- evaluate need for stormwater treatment;
- require property owners to maintain and upgrade retention/detention areas and catch basins and to eliminate improper connections to stormwater drains; and
- devise fee and assessment rates that serve as incentives to reduce the amount of impervious surface.

III. EFFORTS NEEDED AT LOCAL LEVEL

Local stormwater programs must respond to problems relating to water quantity (i.e., flooding) and water quality.

Municipalities have experience in running wastewater programs and charging for administering such programs. Work by local Conservation Commissions in administering the state stormwater policies serves as precedent for local involvement in new stormwater initiatives. Building inspectors and local DPWs have traditionally dealt with stormwater issues.

Stormwater is a local issue. Solutions depend upon understanding local topographic, soil and hydrological conditions. The next important step is to provide better tools to municipalities and special districts.

IV. METHODS FOR RAISING MONEY

There are advantages to using a system of stormwater fees to be charged to all property owners.

Accepted accounting vehicles, such as enterprise funds, are already in use. The utility concept applies logically to the stormwater program. It provides a dedicated and dependable funding source for the development of a stormwater program in compliance with federal and state regulations and local watershed goals.

Separating the stormwater charge from the wastewater charge makes sense because the stormwater charge represents a payment for solving a special problem. By having a special charge for stormwater programs based on amount of impervious surface, property owners have the incentive to reduce the amount of impervious surface. Moreover, benefits achieved from the stormwater program can be highlighted.

V. NEED FOR NEW LEGISLATION

There is a need for express authority for municipalities to create stormwater utilities and to expand into a more comprehensive stormwater program. Current statutes were drafted without benefit of our current knowledge of effective stormwater programs. To pay for such stormwater initiatives from charges based on water usage or amount of development misses the mark. Property owner should pay based on their contribution to the problem. To do this, the relevant measure is amount of impervious surface within each property. In the same way, municipalities have authority to issue sewer connection permits, they should have authority to issue stormwater connection permits.

VI. BENEFITS

- Water quality of watersheds will improve.
- Municipalities will come into compliance with federal and state requirements.
- Local property taxes are not increased.
- Municipalities will qualify for the federally assisted State Revolving Fund.

All benefited parties are included. For example, owners of tax-exempt property and government property owners join in paying for stormwater related services that benefit the entire community.

Property owners who discharge off their properties greater amounts of untreated stormwater will pay proportionately a greater amount of the costs of the stormwater program. Those who take steps to infiltrate stormwater will correspondingly have lesser fees to pay. The argument can be made that in the long run money will be saved. For example, most non-structural practices and even structural BMPs are low cost; today, repair of flood destroyed property and recovery of diminished fisheries are high cost.

In light of the growing interest in upgrading the state's watershed, communities will welcome having the option to establish stormwater utilities.

. . .

MODEL STORMWATER UTILITY ORDINANCE DESIGNED FOR CHICOPEE, MASSACHUSETTS

ARTICLE 1
Import of Regulations and General Provisions

§ 1. Purposes

The purposes of the Stormwater Utility are:

(a) to develop and implement on a watershed basis a comprehensive stormwater management plan and regulatory program to minimize the adverse effects of stormwater on water resources.

(b) to control point and non-point sources of stormwater discharges in order to meet the water quality standards for the rivers, streams, lakes and wetlands in the City and its vicinity.

(c) to require the use of non-structural and best management practices (BMPs), including infiltration of stormwater where feasible and reduction of the discharge of stormwater to combined sewer outlets (CSOs), in order to prevent discharges of untreated wastewater and stormwater directly to rivers, streams, lakes and wetlands, and to control peak stormwater discharges.

(d) to provide for effective management and financing of the stormwater program within the City; and

(e) to establish reasonable stormwater service charges based on the property owner's contribution of stormwater runoff to the public system and various waterbodies.

§ 2. Stormwater Charge

(a) In order to accomplish these purposes, each property owner shall pay an annual stormwater service charge.

(b) The City's stormwater service charges and assessments shall be fair and reasonable, bear a substantial relationship to the cost of providing services and facilities, be proportional to the amount of stormwater contributed by each property owner. Such stormwater charges shall be established in amounts which will provide sufficient funds, proportionately calculated and assessed, to construct and maintain the facilities which need to be installed in the City. Rate studies shall be conducted periodically to ensure the equity of the service charges.

(c) The Board of Sewer Commissioners within the Department of Public Works (DPW) shall estab-

lish a Stormwater Utility Review Committee. The Review Committee shall review and make recommendations to the stormwater utility chief on any abatement application filed by an aggrieved property owner under G.L. c. 83 §16E. Subject to review and approval by the City Solicitor, the DPW Director is authorized to adopt and promulgate policy and procedures defining the Stormwater Utility Review Committee functions and the abatement process.

§ 3. This ordinance is enacted pursuant to the authority of G.L. c. 40, §8L and c. 83 §§1, 10, 11, 14, 15 and 16.

ARTICLE 2
Definitions

For the purpose of this Chapter, the words and phrases shall be defined as follows, unless the context clearly indicates or requires a different meaning:

(1) Abatement - any action taken to remedy, correct, or eliminate a condition within, associated with, or impacting a drainage system.

(2) Approved plans - plans approved under Section [ ] of the Chicopee City Code.

(3) BMPs - Best Management Practices

(4) Chief Administrative Officer - a person whose duties include general supervision and direction of the operation and administration of all departments, offices and bureaus of the City, with the exception of the Office of the Mayor.

(5) City - the City of Chicopee.

(6) CSO - Combined Sewer Overflow or Combined Sewer Outlet.

(7) Aldermen - Board of Alderman of the City of Chicopee.

(8) County - Hampden County, Massachusetts.

(9) DEP - The Massachusetts Department of Environmental Protection.

(10) Director - the City's Director of Public Works, or his designee.

(11) Engineer - a person registered under appropriate Massachusetts law.

(12) Equivalent Residential Unit (ERU) - a unit of measure which provides a basis for comparing the runoff generated by one parcel with that generated by another. An ERU is defined as the weighted average of impervious area for all single family and multifamily residential units in the City. The weighted average impervious area is determined to be 2000 square feet, and the weighted average shall be used for the purpose of all such computations. To compute the ERU's for any parcel, divide the parcel's impervious area by 2000. The ERU shall be used as the basis for computing monthly charges on residential and non-residential properties.

(13) Facilities - various drainage works, including but not limited to, inlets, conduits, manholes, energy dissipation structures, channels, outlets, retention/detention basins, and other structural components of this nature.

(14) Impervious area - surface areas on or in a parcel of real property, which prevents or severely restricts infiltration of stormwater into the earth.

(15) Natural Outlet - Any outlet into a river, stream, lake, wetland, ditch, or other body of surface or ground water.

(16) Order - the whole (or any part) of the final disposition (whether affirmative, negative, injunctive, or declaratory in form), of any matter issued by the City's Utility Bureau Chief or Director of Public Works, or person designated by them pursuant to any provision of this Chapter.

(17) Chicopee Urban Stormwater Management Manual (CUSMM) - that document referenced in and made a part of Chapter ___ of the City Ordinances which, in part, outlines the engineering design criteria and permitting procedures for stormwater management within the City.

(18) Person - any person, firm, individual, partnership, corporation, organization or association of any kind.

(19) Pollution - the contamination or other alteration of the physical, chemical, or biological properties of any natural waters of the City, including change in temperature, taste, color, turbidity, or odor of the waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

(20) Premises - the lot, buildings, and appurtenances situated thereon.

(21) Private - that property or facilities owned by individuals, corporations, and other organizations and not by a city, county, state, or federal government agency.

(22) Public - that property or facilities owned by a city, county, state or federal government or agency thereof.

(23) Stormwater - rainwater, surface runoff, snowmelt, and drainage.

(24) Stormwater system - all facilities, man-made structures, and natural watercourses used for collecting and conducting stormwater to, through, and from drainage areas to and including points of final outlet. A stormwater system may include any and all of the following: inlets, conduits and appurtenant features, canals, creeks, lakes, channels, catch basins, ditches, streams, drainage wells, gulches, gullies, flumes, culverts, ciphons, retention or detention basins, dams, floodwalls, levees, and pumping stations.

(25) Stormwater main drain or stormwater drain - a drain that carries stormwater, surface runoff, and drainage, but which excludes sanitary sewage and industrial wastes.

(26) Stormwater Policies - policies or regulations adopted by DEP from time-to-time requiring use of non-structural practices and BMPs for the control and treatment of stormwater discharges.

(27) Total Square Footage of Surface Area of Lot or Parcel of Real Property - the square footage of a parcel measured or estimated by using the outside boundary dimensions (in feet) to obtain the total enclosed square footage, without regard to topographic features of the enclosed

surface. The boundary dimensions in feet of the enclosed surface area may be established by any of the following methods:

(a) On-site or photogrammetric measurements of the apparent outside boundary dimensions of the parcel of real property made by the City or on its behalf or through the Massachusetts Geographic Information System (GIS), or

(b) Computation of the area using dimensions of the parcel of real property, or existing area measurements which are set forth in the Assessor's public records, or either of these things.

(28) Utility Bureau - the Stormwater Utility Bureau of the City of Chicopee.

(29) Utility Bureau Chief - the Director of Public Works, or the individual appointed to be the City Stormwater Utility Bureau Chief.

(30) Vacant land - a piece or parcel of land that is without any building, structure, appurtenance, or improvements. It does not mean recreation, green, or open space created around private or municipal facilities, or parcels connected thereto or contiguous with such facilities for such reason.

ARTICLE 3
Organization of Stormwater Utility Bureau

(1) There is hereby created a Stormwater Utility Bureau in the Department of Public Works of the City of Chicopee which, in coordination with the City Engineer and the City Finance Director, shall have the responsibility for planning, developing, and implementing stormwater management plans; financing, constructing, maintaining, rehabilitating, inspecting, and managing existing and new stormwater facilities; collecting fees and charges for the utility bureau; implementing and enforcing the provisions of legislation, ordinances, and regulations pertaining to the control of the adverse effects on the environment from stormwater discharges, and the carrying out of other related duties as directed by the Public Works Director. The Utility Bureau shall be administered by the Utility Bureau Chief.

(2) Responsibilities - The Stormwater Utility shall be responsible for administering the following Ordinances, _____.

ARTICLE 4
Stormwater Systems

(1) The Utility Bureau shall monitor the design, operation, maintenance, inspection, construction, and use of all stormwater systems in the City. The Utility Bureau Chief shall be responsible for the design and construction of public stormwater facilities owned by the City and shall inspect, operate, and maintain them as prescribed herein. The Chief shall be responsible for plan approval and construction inspection of both private and public, non-city stormwater facilities.

(2) The Utility Bureau may accept the responsibility for the operation and maintenance of private stormwater facilities only when such services have been agreed to, contracted for, and approved by the Board of Aldermen, and have been subject to the final review of the City Solicitor.

ARTICLE 5
Private Facilities

(1) The property owner shall be responsible for stormwater drainage facilities located on private property. The owner shall clean and maintain the facility or channel, as required, to ensure efficient and proper operation of the facility, and shall obtain the City Engineer's or the Utility Bureau Chief's prior written approval for any proposed changes or alterations to any private stormwater drainage facilities that may substantially or adversely affect stormwater drainage to rivers, streams, lakes and wetlands.

(2) The Utility Bureau Chief shall inspect stormwater facilities to ascertain that the facilities are functioning as designed and approved, and are properly maintained, based upon the severity of stormwater flooding and water quality problems.

(3) On-site retainage of stormwater and implementation of other stormwater management measures to control the rate, volume and characteristics of stormwater discharge shall be required whenever appropriate as determined by the Utility Bureau.

ARTICLE 6
Rules and Regulations

In order to accomplish the purposes of this Chapter, the Utility Bureau Chief may make and enforce rules and regulations that are approved by the Aldermen, and are necessary and reasonable to protect the drainage facilities, improvements, and properties controlled by the Bureau, and to prescribe the manner of their use by any person or government entity; and to lessen the volume and to improve the water quality of stormwater discharged off public and private property in the City.

ARTICLE 7
Capital Improvement Plan

The Utility Bureau Chief shall operate within the City's capital improvement plan for the stormwater system. The capital improvement plan shall be a comprehensive document prepared periodically, and delineating the stormwater capital needs of the City.

ARTICLE 8
Permits and Plan Review

To construct, enlarge, alter, repair, relocate, demolish or connect with a storm main drain, natural watercourse, or other drainage facility, the property owner or operator shall first file an application and obtain a proper permit from the City as provided for in the CUSMM.

ARTICLE 9
Rights of Entry for Survey, Examination, and Inspection

After presenting proper credentials, and at any reasonable times, the employees of the Utility Bureau or its agents (including contractors and consultants and their employees) may enter upon lands within the City to make surveys and examinations to accomplish the necessary preliminary findings to establish a City master stormwater plan, and for detailed analyses to prepare final plans and specifications for the pro-

posed site improvements. In addition, any and all such employees or agents may enter upon any lands to inspect private facilities to ascertain their compliance with this Chapter.

ARTICLE 10
Funding

Funding for the Utility Bureau activities may include, but are not limited to, the following:

(1) stormwater service charges.

(2) permit and inspection fees.

(3) special betterment assessments or connection fees.

(4) direct charges (the cost of designing and constructing stormwater facilities, administrative costs and related expenses where the Utility Bureau designs, constructs, or contracts for the construction of such facilities).

(5) Other income obtained from federal, state, local, and private grants or loans.

ARTICLE 11
Stormwater Fund

All revenues generated by or on behalf of the Utility Bureau, including stormwater service charges, permit and inspection fees, direct charges, and other income, and interest earnings on those revenues, shall be deposited in a stormwater revolving fund and used exclusively for Utility Bureau purposes.

ARTICLE 12
Stormwater Service Charge

(1) A stormwater service charge is hereby imposed on each owner of a separate parcel of land within the City; provided, however, that no additional or special charge shall be imposed on lakes or public streets, boulevards, highways, expressways, alleys (private alleys excepted), viaducts, sidewalks, curbing, street crossings, grade separations, and any highway structures.

(2) The Utility Bureau Chief, in accordance with the CUSMM, may reduce stormwater service charges on properties that have stormwater management facilities.

(3) There shall be no stormwater service charge on vacant land.

(4) All of the proceeds of this fee are deemed to be in payment for use of, and in receipt of benefits from, the City stormwater program by the real property on, and with respect to which, the charge is imposed on the owners.

(5) The Utility Chief may charge a connection fee (or assessment) for new or expanded connections to cover the cost of administering the stormwater and assessments connection permit program, pay for any related municipal work, and pay for an expansion upgrade of the system necessary in order to add the new connections. This latter expense shall be apportioned

among the new users by number of ERUs as set forth in Article 13.

(6) The Utility Chief may make assessments in accordance with G.L. c. 83 §15.

ARTICLE 13
Monthly Charge Per Equivalent Residential Unit (ERU)

(1) The monthly charge per ERU shall be $____ effective October 1, 1999, and $____ effective October 1, 2000.

(2) The Utility Bureau Chief shall prepare a list of all parcels (residential and non-residential) within the City, shall compute the number of ERUs per parcel, and charge a reasonable and equitable fee, according to the assigned ERU equivalence and site mitigation factors, if any; provided, however, that the Utilities Bureau Chief shall have the option to set a fixed minimum and maximum fee for residential parcels.

ARTICLE 14
Collection of Stormwater Service Charge

(1) The Utility Bureau Chief shall establish the frequency of billing for the service charge based on an assessment of the most efficient, effective and equitable method of billing and collections available to the Utility.

(2) The Utility Bureau Chief shall bill at least annually the stormwater service charge but no more than twelve (12) times in one calendar year. The Utility Bureau Chief is to assure that the most efficient and effective billing and collection techniques are being used. The Utility Bureau may add the stormwater service charge to the City's water and sewer fees.

ARTICLE 15
Delinquent Charges

All service charges and connection fees not paid within thirty (30) days after the bill is due, or that are not under active appeal, shall be considered delinquent.

All such charges and fees delinquent hereunder shall be subject to (1) an interest charge at the Massachusetts statutory rate, and (2) a rebilling charge covering administrative costs in accordance with this Chapter, and shall constitute a lien upon the real property affected, from the date charges and fees are incurred. Charges and fees which remain unpaid for a period of sixty (60) days may be reported to the Aldermen for assessment against the real property. In the alternative, the Aldermen may direct the City Solicitor to file suit thereon, and to collect all such unpaid charges and fees, including reasonable attorney's fees and charges.

ARTICLE 16
Emergencies and Abatement

In case of an emergency, the Utility Bureau Chief may direct that action be taken immediately to

correct the condition or abate the activity to protect the public health, safety, and welfare. The Utility Bureau may perform the required work and charge the owner for all such related costs.

ARTICLE 17
Flooding; Liability

Floods from stormwater runoff may occur which exceed the capacity of storm drainage facilities constructed, operated, or maintained by funds made available under this Chapter. This Chapter shall not be construed or interpreted to mean that property subject to the fees and charges established herein will always (or at any time) be free from stormwater flooding or flood damage, or that stormwater systems capable of handling all storm events can be cost-effectively constructed, operated, or maintained. Nor shall this Chapter create any liability on the part of, or cause of action against, the City, or any official or employee thereof, for any flood damage that may result from such storms or stormwater runoff. Nor does this Chapter purport to reduce the need or the necessity for obtaining flood insurance by individual property owners.

ARTICLE 18
Discharge of Polluting Matter in Natural Waters Prohibited

(1) It shall be unlawful for any person to drain, deposit, place or otherwise discharge into any natural outlet or stormwater system within the City, or to cause or permit to be drained, deposited, placed or otherwise discharged into such waters, any organic or inorganic matter which causes or tends to cause pollution.

The following materials when discharged to the stormwater system are found to contribute to a state of pollution:

(a) Petroleum products, including but not limited to oil, gasoline, and grease
(b) Solid Waste (as defined in City Code Chapter 28)
(c) Pet Waste
(d) Chemicals
(e) Paints
(f) Soaps
(g) Laundry Waste
(h) Steam Cleaning Waste
(i) Pesticides, Herbicides or Fertilizers
(j) Degreasers, Solvents
(k) Heated Water
(l) Sanitary Sewage
(m) Chemically Treated Cooling Water
(n) Antifreeze, and other Automotive Products
(o) Lawn Clippings, Leaves, Branches, etc.
(p) Animal Carcasses
(q) Silt
(r) Acids or Alkalis
(s) Recreational Vehicle Waste
(t) Dyes
(u) Construction Materials

(v) Any groundwater which contains phosphorous or nitrogen concentrations greater than the surface water into which the groundwater is discharged
(w) Any water which exceeds the state surface water standards
(x) Toxic or Poisonous Solids or Liquids
(y) Solids in such quantities or of such size capable of causing interference or obstruction to the flow in the City's stormwater system.

(2) It shall be unlawful to wash any public or private streets, buildings, sidewalks or parking areas, unless all visible debris and sediments have been removed prior to washing. If the removal of the debris and sediments is not feasible (as determined by the Utility Bureau Chief), then the street, building, etc. may only be washed with the Utility Bureau Chief's prior written approval, which may include requirements to clean the affected drainage pipelines or provide treatment of washwater runoff to prevent downstream pollution. Only water may be used for washing purposes.

ARTICLE 19
Stormwater Connection Permits

A permit shall be required from the Utility Bureau Chief for any connection from private or public property to the stormwater system. The Utility Bureau Chief may condition the permit to require the installation of BMPs as recommended under the DEP Stormwater Policies.

Where federal or state permits are required for the discharge of stormwater, the Utility Bureau Chief shall have the right to impose additional requirements as provided in this Chapter. Application for stormwater connection permits and accompanying plans shall be signed by an engineer.

ARTICLE 20
Public Education

The Utility Bureau Chief shall provide information to property owners pertaining to the use of nonstructural practices recommended in the Stormwater Policies.

ARTICLE 21
Correction and Discontinuance of Prohibited Discharge

(1) The Utility Bureau Chief may order the correction of any unsafe, nonconforming or unauthorized condition which is in violation of the Stormwater Policies, any provision of this code or regulation adopted hereunder. The Utility Bureau Chief may also order the discontinuance of any activity causing such condition.

(2) Whenever the Utility Bureau Chief orders the installation of BMPs or the correction or discontinuance of any condition or activity on any premises pursuant to Section 31.20(1), the Utility Bureau Chief shall notify the owner or other person responsible for such condition or activity in writing which notice shall state the nature of the violation, direct the person to correct or discontinue the condition or activity, and provide a reasonable time limit for the satisfactory correction thereof. The offender shall, within the time period stated in such notice, permanently cease or correct all violations. Failure to comply with such order shall constitute a violation of the provisions of this ordinance.

ARTICLE 22

Emergency Conditions Requiring Immediate Action

Notwithstanding any other provisions of this Chapter, whenever the Utility Bureau Chief determines that conditions or activities exist requiring immediate action to protect the public health, safety, or welfare, he or his designee is authorized to enter at all reasonable times in or upon any property for the purpose of testing, inspecting, investigating, measuring, sampling and correcting such emergency conditions. The Utility Bureau Chief may order the immediate discontinuance of any activity which causes or tends to cause the emergency condition. Failure to comply with such order shall constitute a separate violation of this ordinance.

ARTICLE 23

Liability for Pollution Abatement

Any person responsible for pollutant discharge into any natural waters or stormwater systems and who fails to correct any prohibited condition or discontinue any prohibited activity at the Utility Bureau Chief's request shall be responsible to pay the necessary expenses incurred by the City in carrying out the pollution abatement, including any expenses incurred in testing, measuring, sampling, collecting, removing, containing, treating, and disposing of the pollutant materials.

ARTICLE 24

Injunctive Relief Prohibiting Discharge

The City may, immediately upon discovering an ongoing or potential discharge of pollutants into the City's natural waters or stormwater system in violation of this Chapter, petition the District Court or the Hampden County Superior Court, or the Federal District Court, for a temporary or permanent restraining order or preliminary injunction to halt or prohibit such discharge. Prior to the filing of such petition, the Utility Bureau Chief shall send notice to the offender of the City's intention to file such action, but in cases of emergency such notification shall not be a condition precedent to the City's petitioning for and obtaining injunctive relief.

ARTICLE 25

Penalties

(1) Any person who violates any of the provisions of this Chapter shall be punished as provided in Section 1.08 of the City Code. Each and every day on which such person continues to violate the provisions of this Code after having been notified of such violation shall constitute a separate offense.

(2) Any person who violates any provision of this ordinance shall be subject to a civil penalty of up to $1,000 per day for each day that such person is in violation of this ordinance.

(3) Any person who causes or allows an unauthorized discharge, or who otherwise violates the provisions of this Chapter, may be required to appear before the Code enforcement Board for enforcement proceedings pursuant to Chapter 5 of the City ordinance.

(4) The remedies and penalties provided in this Ordinance are not exclusive, and the City may seek whatever other remedies are authorized by statute, at law or in equity, against any person who violates the provisions of this Ordinance.

ARTICLE 26
Appeal Procedure

(1) Any person aggrieved by a determination of the Utility Bureau Chief, or his designee that such person is in violation of this Ordinance shall have the right to a review by the Board of Aldermen in accordance with the procedures set forth in [ ] of the City Code.

[5] See Appendix III.

DRAFT—ENABLING LEGISLATION
An Act to improve the State's watersheds through establishment of local Stormwater Utilities.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. The general court hereby finds and declares that (a) the continued degradation of the state's rivers, streams, lakes, estuaries and wetlands is due in large measure to nonpoint source pollution; (b) the correction thereof requires focused attention at the local level through establishment of stormwater utilities (c) the cost of such effort should be borne by property owners in proportion to their contribution to such nonpoint source pollution; and (d) such effort will be of long-term benefit to the residential and business community throughout the Commonwealth.

SECTION 2. Chapter 40 of the Massachusetts General Laws, as it appears in the 1996 Official Edition, is hereby amended by adding the following section: Section 8L. Local Stormwater Utility - In a city, town or district which accepts the provision of this section, the city, town or district may by ordinance, by-law or regulation establish a stormwater utility. To improve the quality of the state's rivers, streams, lakes, estuaries and wetlands, the utility shall work in cooperation with the state watershed program administered by the department of environmental protection and make efforts to meet the standards established for specific watersheds for the proper control and cleanup of stormwater discharges; (ii) shall complement, to the extent applicable, the river basin water quality management plans pursuant to 33 USC §303(e), the nonpoint source management plans pursuant to 33 USC §319, and the estuary management plans pursuant to 33 USC §320; (iii) shall consult with the department of environmental protection before adopting or updating its local stormwater management plan; and (iv) shall formulate plans and establish priorities for stormwater management systems and watersheds to meet the needs of the community for flood protection and protection of water quality.

The stormwater utility may be operated by any department, board, commission or district that conducts the municipal wastewater collection and treatment program or by a separate utility established within the municipality whose function is to operate a stormwater program. Any such department, board or commission or separate entity authorized to carry out such stormwater program shall be referred to as the stormwater utility.

The stormwater utility shall treat watersheds as integrated systems and shall work to lower the concentrations of pesticides, nutrients, industrial chemicals, metals, suspended solids, and other pollutants within the streams, lakes, estuaries and wetlands of the one or more watersheds within the jurisdiction of such stormwater utility.

The stormwater utility with the approval of the city council, board of selectmen, or directors in any city, town or district may adopt regulations in order to protect the public health, safety and welfare and the

environment and to ensure proper and safe operation of the municipality's separate stormwater system or combined sanitary/stormwater system by regulating the direct and indirect discharge of wastewater and stormwater to such systems. Such local regulation shall be consistent with legislation and regulations under which the Department of Environmental Protection regulates the discharge of sanitary wastewater and stormwater. Notwithstanding any provisions of any general or special law to the contrary, cities, towns and districts are expressly authorized to adopt regulations that are stricter in their protection of the environment than such state legislation and regulation. To the extent that part or all of a city or town is serviced by the Massachusetts Water Resources Authority or other authority or special district, such municipality shall adopt regulations that are consistent with, but may be stricter than, the regulations of such authority or special district.

Such local regulation may require on-site detention or retention of stormwater and implementation of other stormwater management measures to control the rate, volume and quality of stormwater discharged to the public wastewater or storm drainage systems.

In addition to any other funding mechanism available to any city, town and district to construct, operate, or maintain stormwater programs, the stormwater utility may adopt a system of stormwater utility fees sufficient to support the operation, construction and maintenance of the stormwater program.

Any municipality may create alone, or in cooperation with other municipalities or special districts, one or more stormwater management benefit areas.

Cities, towns or districts are authorized to raise and collect in advance or otherwise from all property owners within a municipality or benefit area an annual, quarterly or monthly fee or an assessment based upon amount of impervious surface, or other reasonable method, as provided in sections 15 and 16 of said chapter 83, as amended, to fund the activities and programs described in this section 8L that service the city, town or district or benefit area.

For fees assessed pursuant to this section, cities, towns and districts may use the levy, assessment and enforcement methods as provided in section 14 through 29 inclusive of chapter 83.

SECTION 3. **Section 1 of chapter 83 of the General Laws**, as appearing in the 1996 Official Edition, is hereby amended by inserting after the word "sewage" in line 6, the following words: "and stormwater treatment."

SECTION 4. Said **section 1 of said chapter 83**, as so appearing, is hereby further amended by inserting at the end of the second sentence of section 1 at line 11 the following new sentence - Such works for drainage may include any stormwater treatment facility or measure for treating, or removing sediment or contaminants from, stormwater discharges.

SECTION 5. Said **section 1 of said chapter 83**, as so appearing, is hereby further amended by inserting at the end of the third sentence of Section 1 in line 15:-For purposes of this chapter, the word stormwater shall mean surface runoff from rain or melting snow.

SECTION 6. **Section 10 of said chapter 83**, as so appearing, is hereby further amended by inserting at the end of the first sentence of section 10 the following:-A city, town, authority or special district may from time-to-time prescribe rules and regulations for the use of main drains and the management of stormwater to prevent the discharge of sediment and pollutants therein which may tend to degrade wetlands, streams and other water bodies and to inspect the facilities for the collection and infiltration of stormwater in order to reduce flooding and improve the quality of stormwater runoff; for the connection of estates and buildings with main drains; for the construction, alteration and use of all connections entering into such main drains; and for the inspection of all materials used therein; and may prescribe civil penalties, not exceeding five thousand dollars for each day of violation of any such rule or regulation.

SECTION 7. **Section 11 of said chapter 83**, as so appearing, is hereby further amended by adding after "common sewer" in Section 11 in line 3 the following:-or main drain.

SECTION 8. **Section 15 of said chapter 83**, as so appearing, is hereby further amended by adding after the third paragraph of Section 15 in line 22 the following new paragraph:-In the case of construction of main drains and connections thereto, and facilities for the treatment of stormwater discharges, an average number of square feet of impervious surface shall be estimated for each residential unit. Existing multi-family, commercial, industrial and semi-public uses shall be converted into sewer units on the basis of amount of square footage of impervious surface. Credits may be granted against the amount of the fee to property owners who maintain on-site retention/detention basins or other filtration structures to accomplish stormwater infiltration. No assessment for stormwater related expense shall be made against undeveloped property.

SECTION 9. **Section 16 of said chapter 83**, as so appearing, is hereby amended by adding after the words "use of common sewers" in line 4 the following: and main drains; and adding at the end of section 16 the following:-In the case of annual charges for the use of main drains, the city, town or district may charge a fee equal to the number of equivalent residential units times the rate. The rate shall be calculated to generate sufficient funds to plan, construct, operate, and maintain stormwater management systems and to conduct stormwater programs. The fee-setting formula applied to each benefit area may vary depending upon the substantially different levels of stormwater benefits received by each such area. Credits may be granted against the amount of the fee to property owners who maintain on-site retention/detention basins or other filtration structures to accomplish stormwater infiltration.

SECTION 10. **Chapter 29 of the Massachusetts General Laws,** as so appearing in the 1996 Official Edition, is hereby further amended by adding at the end of section 2O the following section:-Section 2P. Watershed Conservation Fund - There shall be established and set upon the books of the commonwealth a separate fund to be known as the Watershed Conservation Fund consisting of amounts appropriated by the legislature and amounts credited to the fund in accordance with [ ].

The goal is to encourage regional decision-making and direct participation by cities, towns, and special districts in the improvement of the state's watersheds.

The Department of Environmental Protection shall administer all funds received by the Watershed Conservation Fund and may grant and/or loan to cities, towns, special districts, and planning districts funds for the improved infiltration of stormwater, the enhancement of water quality of stormwater runoff, and the control of erosion. Moneys from the fund shall not be expended for the planning, construction or expansion of treatment facilities for sanitary and industrial wastes.

To establish eligibility for such funding, the Department of Environmental P rotection shall require planning councils in cooperation with their member cities, towns and districts to submit stormwater management plans. Such plans for each designated watershed must contain the following information:

(1) Identification of stormwater quantity and quality problems;

(2) Overall condition and needs of the watershed;

(3) Alternative approaches to address existing and future problems;

(4) Analysis of the overall costs and benefits;

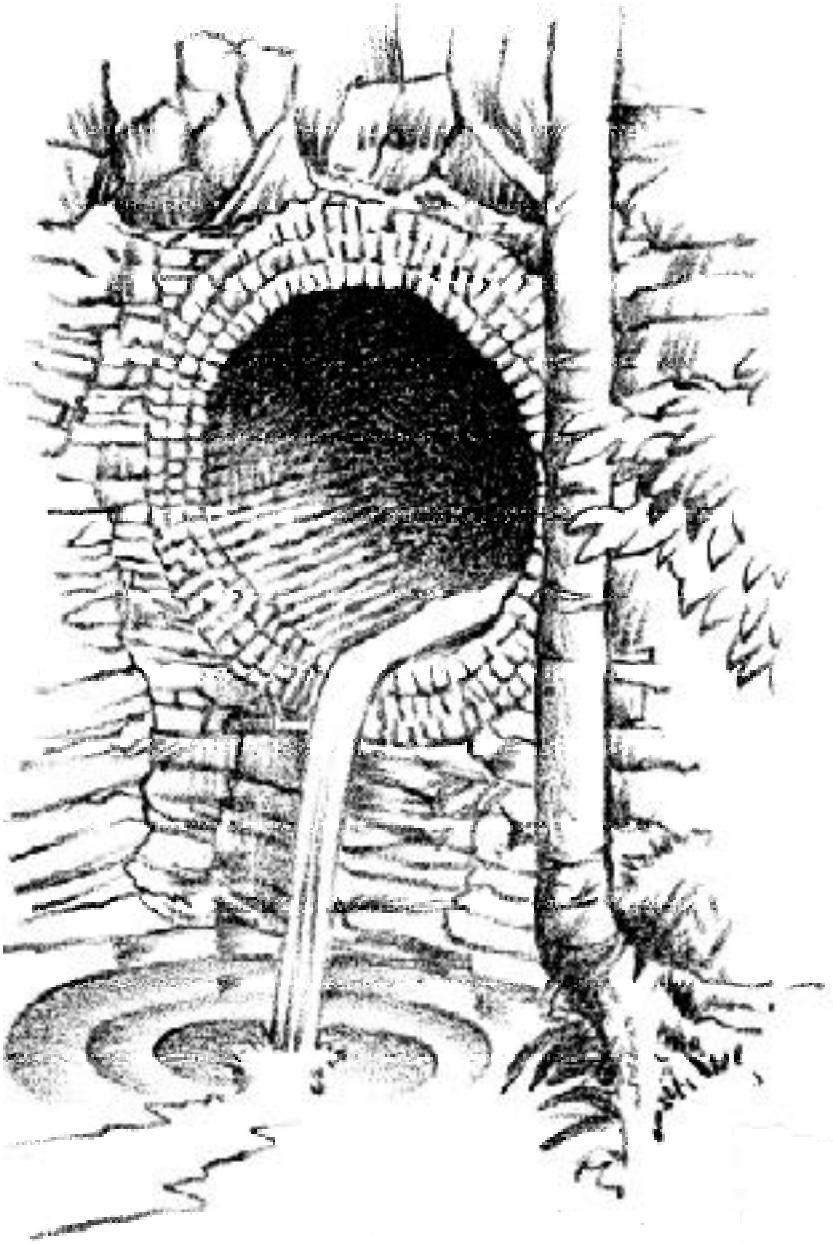
(5) A schedule for implementation;

(6) Funding sources and amounts; and

(7) A public involvement process which includes the establishment of a local watershed advisory committee and public hearing prior to approval by the city, town or district and the department.

Upon approval of the watershed master plan, all projects undertaken in the designated watershed must be consistent with the approved watershed master plan.

[Changes to General Laws, Chapter 29C]



Contents

This information was summarized from a variety of sources—for use in community outreach and public involvement efforts that are part of your stormwater management effort. You can use this information in educational brochures and flyers.

THINGS RESIDENTS CAN DO TO PROTECT WATER QUALITY

INTRODUCTION

The ultimate objective of a stormwater utility is to reduce pollution sources and improve the water quality of the streams and rivers of a community. It is, therefore, necessary to constantly provide education to community residents about nonpoint pollution sources and the actions that can be taken to reduce that pollution. The following sections can be used by Stormwater Utility (Management) staff as you develop your education program. The information can be used at various times depending on which theme the utility would like to emphasize. This is by no means a comprehensive list of all possible educational approaches. Municipalities should continue to contact other established utilities to obtain examples of public information flyers and educational approaches. A listing of Internet web sites is provided at the end as a sample of additional sources that may lead to other useful information that can be distributed to the community residents.

Automotive Care

Washing a car can degrade water quality if the dirty, soapy rinse water enters a storm drain or runs off into a stream. Wash and rinse water usually contain pollutants such as soap, oils and grease, suspended solids, heavy metals, and toxins. Used motor oil is also bad news for surface water and should be disposed of properly. One gallon of used motor oil can make one million gallons of water undrinkable. Even small amounts of motor oil can threaten fish, water birds, insects, and plant life.

- Instead of washing your car at home, take it to a commercial car wash. The drains in commercial car washes are connected to the sanitary sewer system, so rinse water does not wash down storm drains. Also, many commercial car washes conserve water by recycling rinse water several times.
- If you must wash your car at home, use mild dishwashing liquid and try to keep the soapy water from flowing to a storm drain. Park your car on grass or vegetation that will absorb the water and use a spray nozzle that shuts off.
- If you are holding a car washing event for fundraising, make sure the site has a drain that is hooked up to the sanitary sewer. Otherwise, the soapy, dirty water will flow down the nearest storm drain and eventually enter a stream. You might check with commercial car washes about fundraising. Some of them will let you sell tickets good for car washes at their site and will share the proceeds.
- Tell the lube shop where you get your car's oils changed to make sure the oil cap is screwed on tight to avoid dripping oil onto streets later.
- Buy re-refined oil if you change your own oil. Ask for it at lube shops when you have your oil changed. Re-refined oil is motor oil that has been remanufactured into new oil. The API logo ensures that it meets

the same rigorous national standards as virgin oil.

- Watch for leaky valve cover gaskets and engine seals. Replace them as soon as possible.
- Avoid overfilling your gas tank.
- Never pour used oil or antifreeze down or near storm drains or onto the ground. If you change your own oil, get a reusable used oil container. Drain the oil carefully into the container, avoiding splatter and spills. Seal the container securely and take it to your nearest used oil collection site.

Household Hazardous Waste

Many everyday products you use in and around your home such as cleaners, paint, solvents, bug killers, garden products, and automotive products contain hazardous materials. These products can threaten human health and also the environment. Since storm drains connect to streams and lakes, hazardous waste dumped into storm drains usually ends up washing into surface water. Poured on the ground, it can filter through the soil into groundwater, which also travels to lakes and streams. Chemicals washed down inside drains are treated by sewage treatment methods, but they still may be harmful to water quality once they are discharged into water bodies.

Key words to look for on hazardous product labels are DANGER, POISON, WARNING, CORROSIVE, or FLAMMABLE. Products marked DANGER are the most hazardous. Although labels must describe short- term health threats, they usually do not tell you about the product's long term health effects or potential environmental damage.

- Read labels and buy safe products.
- Keep hazardous products out of reach of children and pets.
- When storing hazardous waste products outdoors, make sure they are under cover (in shed or garage) and up off the ground where they will stay dry.
- To avoid spills and leakage, make sure hazardous products are in labeled containers with tight-fitting lids.
- Do not wash paintbrushes outside. Brush excess paint onto newspaper, let the paper dry, and put it into the garbage. Save and reuse paint on a roller by removing excess with the curved part of a coat hanger.
- Try to use up hazardous products or give them to someone who can use them. Put empty containers into the garbage. Although, some hazardous products are in #2 plastic containers, the empty containers cannot be recycled because of the residue. Next time you shop try to buy safer substitutes.
- If you cannot use up hazardous products or give them away, take them

to a local collection center. Leftover latex paint can be dried out in the can and placed into the garbage. Keep the lid off the paint can so the garbage collector will know the paint is dry.

- Tell the contractors you hire for home projects to avoid activities that will harm water quality, such as washing paint equipment outside or dumping dirty water from carpet cleaning products outside.

Lawn Care

We all want our yards and gardens to look good, but some landscaping practices can be dangerous to human health and also hurt the environment. When fertilizer, pesticides, and weed killers wash off lawns and down storm drains, they end up in lakes and streams. They can pollute the water and have toxic effects on fish and other aquatic life. Grass clippings and other yard waste dumped into a stream can cause excessive algal growth. When this algae dies and is consumed by bacteria, oxygen levels drop, and aquatic animal life become stressed and can die.

Giving up chemical fertilizers and pesticides does not mean that you'll have a bug-infested garden and a brown lawn full of weeds. A healthy lawn fertilized with organic fertilizers will resist weeds, disease, and insect pest. Your lawn and garden can look good without using toxic chemicals.

- Aerate and thatch your lawn in the spring and fall to let it breathe, keep weeds down, and encourage healthier roots.
- Use a grass seed that pests detest. Check with your garden center to find which pest-resistant grass seed will work best in your area. A good time to re-seed is in the spring, after aerating while the weather is still rainy. Fall is also a great time to seed lawns when competition from weeds is reduced.
- Fertilize with an organic fertilizer. More garden centers are carrying organic fertilizers that release over time, encouraging deep roots and a healthy lawn. (Chemical fertilizers give your lawn a quick boost, but encourage shallow roots) Check labels. A good time to fertilize is in the fall after aerating. Avoid applying fertilizer when rain is predicted or it will quickly wash away and travel to waterways.
- Choose a commercial lawn and garden service that is easy on the environment. Avoid services that spray pesticides routinely and over-fertilize.
- Invest in a soil sample kit. Soil conditions greatly affect water absorption and plant growth.
- Water only when plants and lawn need it and only as much as the soil can absorb. Over watering is the leading cause of disease and pest problems and the biggest waste of our limited summer water supply.
- Pull weeds by hand or use one of the new slicing tools. For weeds between bricks and concrete, use boiling salted water. A tool used for removing tile grout also works great. Thick weed blocking fabric from

garden catalogs will keep weeds down if you cover it with a layer of bark or stones. Be sure to get the heavy-duty type.

- Choose plants and trees that resist pests and disease. Certain flowering cherry trees are resistant to brown rot. Some rhododendrons are resistant to root weevils and are drought tolerant. Nurseries can help you in making choices.
- Create a safe slug trap instead of using slug bait. Nail two pieces of wood together to make a V. Turn it upside down to make a tent that provides shady, damp spot for slugs. Lift it up in the morning and scrape slugs into soapy water. Surround your prized plants with copper barriers sold through gardening catalogs. Slugs don't like to crawl over copper. It can be a shocking experience!
- Let good bugs do the dirty work. Ask your local nursery about using ladybugs or lacewing larvae to manage aphids, and beneficial nematodes to control root weevils.
- Use pesticides and weed killers as a last resort. Know the type of bug or weed you're trying to kill and make sure the product is intended for that use. Apply sparingly on a day when it isn't windy or rainy, and target the entire lawn. Read the label and follow directions. Keep children and pets away from pesticides, and make sure no one goes on treated lawn for the time on the label. Never use pesticides, fertilizers, or herbicides near streams, lakes, or wetlands.

Septic Systems

If your home is served by septic tank system rather than connected to the town's sewer system, you can do simple things to keep the system working properly. A failed septic system can result in high replacement cost, property damage, groundwater and surface water pollution, and disease.

- Have your tank inspected annually to make sure there are no developing problems that could get out of control.
- Get your tank pumped every three to five years. Regular pumping reduces the chance of solids flowing into and clogging the drain field. Once the drain field is destroyed, no amount of pumping can bring it back into service.
- Use Phosphate-free detergents and limit the use of bleach. Phosphates can cause excessive algae growth in nearby surface waters. Too much bleach will kill healthy microbial populations in your tank.
- Keep cars and trucks off the septic tank and drain field area to prevent pipes from breaking.
- Do not use garbage disposals. They increase the amount of solids and grease in the septic tank, which may result in drain field failure.
- Do not use septic additive or miracle septic cleaners. They have never

been found to work and can even harm the system by causing solids to flow into the clog system.

- Do not flush solid wastes such as diapers, cigarette butts, coffee grounds, or grease into the septic system.
- Do not push strong chemicals such as cleaning products down the drain. These household chemicals can destroy important bacteria in the system and pollute ground water.
- Reduce how much wastewater enters the system. Excessive water use is a main cause of septic system failure.
- Do not connect failing septic systems to a storm drain or drainage ditch.

COMPOSTING

What is composting?

Composting is simply recycling food scraps, grass clippings, yard trimmings, and other organic matter. Or more specifically the controlled decomposition of organic matter by microorganisms (mainly bacteria and fungi) into a humus-like product. What they leave behind can be used as potting soil, as mulch for the lawn and garden, to increase air and water absorption in soil, to decrease erosion, to suppress weed growth, and to improve soil texture.

Why compost?

First, composting makes sense. Instead of sending useful organic matter to a landfill (which in many states has been outlawed), it can be transformed into a useful additive that can even be sold. Second, composting is easy. Common materials like chicken wire, bricks, and buckets are all it takes to begin composting, which can be done either indoors or outdoors. Maintenance isn't difficult either: regular mixing and a little water can ensure success.

Some Other Ways Compost Can Be Used.

Compost can be used for a variety of gardening projects. It can enrich gardens, improve the soil around trees and shrubs, and be used as a soil additive for house plants and planter boxes. Compost can enhance soil texture, increase the ability of the soil to absorb air and water, suppress weed growth, decrease erosion, and reduce the need to apply chemical fertilizers.

Farmers use compost for enhancing crops and for sod farms. Landscapers use compost as a soil amendment and for decorative purposes on private properties, golf courses, and athletic fields. Landscapers also use compost to cover landfills and carry out reclamation projects. Nurseries use compost for enhancing plant and forest seedling crops in reforestation projects. Public agencies use compost for landscaping highway median strips, parks, recreational areas,and other public property.

WHAT TO COMPOST - THE IN LIST.

Cardboard rolls	Leaves and grass
Clean paper	Sawdust
Coffee grounds & filters	Shredded newspaper
Eggshells	Tea bags
Fireplace ashes	Vacuum cleaner lint
Fur	Vegetable trimmings
Gray cardboard boxes	Wool and cotton rags
Hair	

WHAT NOT TO COMPOST - THE OUT LIST.

Keep out	**Reason why ...**
Black walnut leaf and twigs	harmful to tomatoes
Oils and grease	produces odor and attracts vermin
Pesticides	can kill composting organisms and concentrate in compost
Pet poop	can carry disease and attracts flies
Egg yolk	attracts vermin
Meat	attracts flies and rodents

COMPOSTING YARD WASTE

What is yard waste?

Across the nation, composting is gaining increased attention as an environmentally sound way to manage yard wastes. Yard wastes are such material as leaves, grass clippings, brush, and tree prunings. Many communities and states have banned yard wastes from landfills. Composting diverts yard wastes from landfills and incinerators. The U.S. Environmental Protection Agency (EPA) recommends composting of yard wastes. Not only is composting sensible from an environmental perspective, it also effectively converts yard wastes into a useful soil additive or mulch.

If composting at home isn't possible, contact your local solid waste authority to learn about community composting of yard trimmings and garden debris. Many communities even have curbside collection - and if yours doesn't, maybe you can help to get one started!

Why Not Put Yard Wastes in Landfills?

Since these materials are relatively clean and biodegradable, disposal in landfills may not be necessary and wastes space. In addition, as yard wastes decompose in landfills, they generate methane gas and acidic leachate. Methane is a colorless, explosive gas that is released as bacteria decomposes organic materials in landfills. If methane is not controlled at a landfill, it can seep underground and into

nearby buildings, where it has the potential to explode. Yard waste also contribute acidity that can make other waste constituents more mobile and therefore more toxic.

Why Not Burn Leaves and Other Yard Wastes?

Burning leaves and other yard waste pollutes the air and can lead to uncontrolled fires. Leaf smoke can make breathing difficult for people who suffer from asthma, emphysema, chronic bronchitis, or allergies. A number of states currently ban leaf burning, and some communities either ban leaf burning or restrict when and where it can take place.

CONSERVATION BUFFERS

Conservation buffers are a common-sense way for you to protect your most valuable asset – your land – and demonstrate your personal commitment to conservation. They are best described as strips or small areas of land in permanent vegetation. Buffers help control potential pollutants and manage other environmental concerns. Filter strips, field borders, grassed waterways, field windbreaks, shelterbelts, contour grass strips, and riparian (streamside) buffers are all examples of conservation buffers.

- Conservation buffers can be especially helpful to you in maintaining a productive and responsible yard. Conservation buffers can help you protect soil, air, and water quality; improve fish and wildlife habitat; and demonstrate a commitment to land stewardship.
- Conservation buffers can be used along streams and around lakes or wetlands. They can also be installed at field edges or within fields. Buffers are most effective, of course, if they are planned as part of a comprehensive conservation system.
- To maximize their effectiveness and your overall conservation program, buffers should be combined with other proven conservation practices, such as conservation tillage, nutrient management, and integrated pest management. Working together, these practices will provide you with an effective yet profitable conservation program.

The Value of Buffers

Buffers slow water runoff, trap sediment, and enhance water infiltration in the buffer itself. They also trap fertilizers, pesticides, bacteria, pathogens, and heavy metals, minimizing the chances of these potential pollutants reaching surface water and ground water sources. Buffers also trap snow and reduce blowing soil in areas with strong winds. They offer a natural habitat for wildlife, and improve fish habitat. Wooded buffers can also provide a source of future income.

Properly installed and well-maintained buffers help diversify the "look" of your yard adding to its beauty, recreational opportunities, land value, and even

air quality. All of these benefits add up to make buffers a visible demonstration of your own personal commitment to common-sense conservation.

Types Of Buffers

There are many different types of buffers. While these practices may be called different names in different regions of the country, their functions are much the same - improve and protect ground water and surface water quality; reduce erosion on cropland and streambanks; and provide protection and cover for livestock, wildlife, and fish.

- **Shelterbelts or field windbreaks** are a row or rows of trees, shrubs, or other plants used to reduce wind erosion, protect young crops, and control blowing snow. Shelterbelts also provide excellent protection from the elements for wildlife, livestock, houses, and farm buildings. Field windbreaks are similar to shelterbelts but are located along crop field borders or within the field itself. They may also be called hedgerow plantings in some areas.
- **Living Snow Fences** are similar in design to field windbreaks/shelterbelts, living snow fences serve the additional function of being used to help manage snow deposits to protect buildings, roads, and other property. They can be designed and placed to help protect nearby areas for livestock, provide wildlife cover, and collect snow to enhance soil moisture and nearby water supplies.
- **Contour Grass Strips** are narrow bands of perennial vegetation established across the slope of a crop field and alternated down the slope with strips of crops. Properly designed and maintained contour grass strips can reduce soil erosion, minimize transport of sediment and other water-borne contaminants, and provide wildlife habitat.
- **Riparian Buffers** are streamside plantings of trees, shrubs, and grasses that can intercept contaminants from both surface water and ground water before they reach a stream and that help restore damaged streams.
- **Filter Strips** are strips of grass used to intercept or trap field sediment, organics, pesticides, and other potential pollutants before they reach a body of water.
- **Grassed Waterways** are strips of grass seeded in areas of cropland where water concentrates or flows off a field. While they are primarily used to prevent gully erosion, waterways can be combined with filter strips to trap contaminants or field sediment.
- **Salt-Tolerant Vegetation** strips are special areas planted to vegetation capable of growing in high-saline environments and capable of reducing saline seepage.
- **Cross-Wind Trap Strips** are rows of perennial vegetation planted in vary-

ing widths and oriented perpendicular to the prevailing wind direction. Cross-wind trap strips can effectively prevent wind erosion in cropping areas with high wind speeds.

- **Shallow Water Areas** for Wildlife are Areas of shallow water within or near cropland that are protected by permanent shrubs, trees, and grassed areas. These areas are vital to enhancing wildlife habitat.
- **A Wellhead Protection Area** is land within a maximum 2,000-foot radius from a public well, as designated by the Environmental Protection Agency (EPA) or a State-designated agency. Circular-shaped areas can be "squared off" to eliminate odd-shaped corners to a maximum of 367 acres.

Other Types of Buffers Include:

Field Borders - Grass-seeded areas along the edges or ends of cropland.

Alley Cropping - Crops planted between rows of larger mature trees.

Herbaceous Wind Barriers - Perennial vegetation established in rows across the prevailing wind direction.

Vegetative Barriers - Narrow, permanent strips of dense, tall, stiff, erect perennial vegetation established parallel and perpendicular to the dominant slope of the field.

Streambank Plantings - Plants, shrubs, and/or trees placed to protect streambanks.

MANAGING URBAN RUNOFF

The most recent National Water Quality Inventory reports that runoff from urban areas is the leading source of impairments to surveyed estuaries and the third largest source of water quality impairments to surveyed lakes. In addition, population and development trends indicate that by 2010 more than half of the Nation will live in coastal towns and cities. Runoff from these rapidly growing urban areas will continue to degrade coastal waters.

To protect surface water and ground water quality, urban development and household activities must be guided by plans that limit runoff and reduce pollutant loadings. To this end, communities can address urban water quality problems on both a local and watershed level and garner the institutional support to help address urban runoff problems.

HOW URBAN AREAS AFFECT RUNOFF

Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grasslands trap rainwater and snowmelt and allow it to slowly filter into the ground. Runoff tends to reach receiving waters gradually. In contrast, nonporous urban landscapes like roads, bridges, parking lots, and buildings don't let runoff

slowly percolate into the ground. Water remains above the surface, accumulates, and runs off in large amounts.

Cities install storm sewer systems that quickly channel this runoff from roads and other impervious surfaces. Runoff gathers speed once it enters the storm sewer system. When it leaves the system and empties into a stream, large volumes of quickly flowing runoff erode streambanks, damage streamside vegetation, and widen stream channels. In turn, this will result in lower water depths during non-storm periods, higher than normal water levels during wet weather periods, increased sediment loads, and higher water temperatures. Native fish and other aquatic life cannot survive in urban streams severely impacted by urban runoff.

Increased Pollutant Loads.
Urbanization also increases the variety and amount of pollutants transported to receiving waters. Sediment from development and new construction; oil, grease, and toxic chemicals from automobiles; nutrients and pesticides from turf management and gardening; viruses and bacteria from failing septic systems; road salts; and heavy metals are examples of pollutants generated in urban areas. Sediments and solids constitute the largest volume of pollutant loads to receiving waters in urban areas.

When runoff enters storm drains, it carries many of these pollutants with it. In older cities, this polluted runoff is often released directly into the water without any treatment. Increased pollutant loads can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe.

Point and Nonpoint Distinctions
There are two different types of laws that help control urban runoff: one focusing on urban point sources and the other focusing on urban nonpoint sources. The National Pollution Discharge Elimination System permit program of the Clean Water Act, which regulates stormwater discharges, addresses urban point source pollution. Nonpoint source management programs developed by states, territories, and tribes under the Clean Water Act cover urban nonpoint source pollution. In states and territories with coastal zones, programs to protect coastal waters from nonpoint source pollution also are required by section 6217 of the Coastal Zone Act Reauthorization Amendments.

Measures to Manage Urban Runoff

- **Plans for New Development.** New developments should attempt to maintain the volume of runoff at predevelopment levels by using structural controls and pollution prevention strategies. Plans for the management of runoff, sediment, toxins, and nutrients can establish guidelines to help achieve both goals. Management plans are designed to

protect sensitive ecological areas, minimize land disturbances, and retain natural drainage and vegetation.

- **Plans for Existing Development.** Controlling runoff from existing urban areas tends to be relatively expensive compared to managing runoff from new developments. However, existing urban areas can target their urban runoff control projects to make them more economical. Runoff management plans for existing areas can first identify priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Citizens can help prioritize the clean-up strategies, volunteer to become involved with restoration efforts, and help protect ecologically valuable areas.
- **Plans for Onsite Disposal Systems.** The control of nutrient and pathogen loading to surface waters can begin with the proper design, installation, and operation of onsite disposal systems (OSDSs). These septic systems should be situated away from open waters and sensitive resources such as wetlands and floodplains. They should also be inspected, pumped out, and repaired at regular time intervals. Household maintenance of septic systems can play a large role in preventing excessive system discharges.
- **Public Education.** Schools can conduct education projects that teach students how to prevent pollution and keep water clean. In addition, educational outreach can target specific enterprises, such as service stations, that have opportunities to control runoff onsite. Many communities have implemented storm drain stenciling programs that discourage people from dumping trash directly into storm sewer systems.
- **Limit Paved Surfaces.** Urban and suburban landscapes are covered by paved surfaces like sidewalks, parking lots, roads, and driveways. They prevent water from percolating down into the ground, cause runoff to accumulate, and funnel into storm drains at high speeds. When quickly flowing runoff empties into receiving waters, it can severely erode streambanks. Paved surfaces also transfer heat to runoff, thereby increasing the temperature of receiving waters. Native species of fish and other aquatic life cannot survive in these warmer waters.
- **Households can use alternatives** to areas traditionally covered by nonporous surfaces to limit pollution from paved surfaces. Grasses and natural ground cover, for example, can be attractive and practical substitutes for asphalt driveways, walkways, and patios. Some homes effectively incorporate a system of natural grasses, trees, and mulch to limit continuous impervious surface area. Wooden decks, gravel or brick paths, and rock gardens keep the natural ground cover intact and allow rainwater to slowly seep into the ground.

LANDSCAPING AND SITE MANAGEMENT TO CONTROL RUNOFF

Making changes to buildings, paved surfaces, the landscape, and soil surfaces can control some stormwater risks. This section reviews some easily addressed problems, as well as major landscape alterations you might want to consider.

Managing Erosion and Sedimentation.

Sedimentation occurs when wind or water runoff carries soil particles from an area, such as a farm field, and transports them to a stream or lake. Excessive sedimentation clouds the water, which reduces the amount of sunlight reaching aquatic plants; covers fish spawning areas and food supplies; and clogs the gills of fish. In addition, other pollutants like phosphorus, pathogens, and heavy metals are often attached to the soil particles and wind up in the water bodies with the sediment. Homeowners can reduce erosion and sedimentation by 20 to 90 percent by applying management measures to control the volume and flow rate of runoff water, keep the soil in place, and reduce soil transport.

Are there areas of bare soil around your home?

Areas of bare soil often exist in vegetable and flower gardens, on newly seeded lawns, and around construction projects. Even on gentle slopes, water from rain and snow can remove large amounts of soil and carry it to wetlands, rivers, and lakes. Planting grass or other ground covers is the best way to stop erosion. Putting a straw or chip mulch over gardens or newly seeded areas will slow erosion. Straw bales, diversion ditches, and commercially available silt fences around construction sites can help slow runoff and trap sediment on-site. If you are working with a contractor, insist that precautions be taken to control runoff and erosion during construction.

Can you eliminate paved surfaces or install alternatives?

Concrete and asphalt roads, driveways, and walkways prevent rainwater from soaking into the ground. When you have the choice, consider alternative materials such as gravel or wood chips for walkways. Avoid paving areas such as patios. Where you need a more solid surface, consider using a "porous pavement" made from interlocking cement blocks or rubber mats that allow spaces for rainwater to seep into the ground. If you must pour concrete, keep the paved area as short and narrow as possible.

Is your basement protected from stormwater seepage or flooding?

Stormwater in your basement can be a hazard in two ways: first, if water carries contaminants or disease organisms into your home, and second, if water picks up chemicals stored in your basement and carries them into the sewer or ground. Basement windows or doors are common stormwater entry points and should be sealed against leaks. It is best if window and doorsills are at least a foot above

ground level. If windows are at or below ground level, they can be protected with clear plastic covers available in building supply stores. Window wells that extend above ground level can help divert stormwater. Your yard should be sloped away from the foundation to prevent water from pooling near the house and leaking into the basement.

Does roof water flow onto pavement or grass?
Your house roof, like pavement, sheds water. If downspouts from roof gutters empty onto grassy areas, the water will have a chance to soak into the ground. Aim downspouts away from foundations and paved surfaces. For roofs without gutters, plant grass, spread mulch, or use gravel under the drip line to prevent soil erosion and increase the ground's capacity to absorb water. Consider using cisterns or rain barrels to catch rainwater for watering lawns and gardens in dry weather.

Can you change the layout of your landscape to reduce runoff?
An essential part of stormwater management is keeping water from leaving your property, or at least slowing its flow as much as possible. Many home lawns are sloped to encourage water to run off onto neighboring property or streets. Instead, you could provide low areas landscaped with shrubs and flowers to encourage water to soak into the ground. If your yard is hilly, you can terrace slopes to slow the flow of runoff and make mowing and gardening easier. If you have a large lot, consider "naturalizing" areas with prairie, woodland, or wetland plants. If your property adjoins a lake or stream, one of the best ways to slow and filter runoff is to leave a buffer strip of thick vegetation along the waterfront. Good sources for ideas are your local Extension Service, the USDA Natural Resources Conservation Service, or soil and water conservation district offices.

Landscape With Nature
Altering the natural contours of yards during landscaping and planting with non-native plants that need fertilizer and extra water can increase the potential for higher runoff volumes, increase erosion, and introduce chemicals into the path of runoff. In contrast, xeriscape landscaping provides households with a framework that can dramatically reduce the potential for NPS pollution. Xeriscape incorporates many environmental factors into landscape design—soil type, use of native plants, practical turf areas, proper irrigation, mulches, and appropriate maintenance schedules. By using native plants that are well suited to a region's climate and pests, xeriscaping drastically reduces the need for irrigation and chemical applications. Less irrigation results in less runoff, while less chemical application keeps runoff clean.

Trees and your backyard

Trees in your backyard can be home to many different types of wildlife. Trees can also reduce your heating and cooling costs, help clean the air, add beauty and color, provide shelter from the wind and the sun, and add value to your home. In recent years, studies of our urban forests have shown that city trees provide benefits worth many times the cost of their planting and upkeep, even as they just "sit there."

Benefits of tree planting

- Just three well-placed trees around a home can lower air conditioning bills by up to 50 percent, and windbreak trees can reduce winter heating bills by up to 30 percent.
- Tree root systems hold soil in place, preventing erosion. Trees also absorb stormwater that might otherwise result in flash flooding. A city's urban forest can reduce peak storm runoff by 10 to 20 percent, according to the USDA Forest Service.
- Trees help cleanse the environment. During photosynthesis, trees absorb, or sequester, carbon dioxide and convert it into oxygen for us to breathe. One acre of trees provides enough oxygen for 18 people, and absorbs as much carbon dioxide as a car produces in 26,000 miles. Trees also remove sulfur dioxide and nitrogen oxide, two major components of acid rain and ozone pollution, from the air.
- Trees are natural buffers to harsh weather conditions. Well-forested lands are consistently at least 2 to 4 degrees cooler during the summer and 1 to 2 degrees warmer during the winter than deforested land. This temperature reduction can significantly lower smog production, according to the U.S. Department of Energy. Trees can reduce wind speeds by up to 85 percent, compared to treeless areas. City trees also help to counter the urban heat island effect.
- Trees reduce noise pollution by acting as a buffer and absorbing urban noise. A U.S. Department of Energy study reports that a 100 foot wide and 45 foot tall patch of trees can reduce noise levels by 50 percent.
- Trees increase economic stability by attracting and keeping businesses and shoppers in a community. Mature trees also raise property values by up to 20 percent, according to the American Forestry Association.
- Trees provide homes for animals that would otherwise be unable to survive in an urban habitat.
- Trees help create relaxation and well being. They relieve psychological stresses, and a Texas A&M study indicates that patients in rooms with a view of green and woodland areas have shorter postoperative hospital stays.
- A study of public housing residents in Chicago has shown that trees

can play an important role in reducing urban violence.

- Trees add beauty and reflection to our everyday lives. Picture your home and city without trees. Would you still want to live there?

HOW ARE ANIMAL WASTES KEPT FROM BECOMING A POLLUTION PROBLEM?

Droppings from dogs and cats and from other commonly kept animals like exotic birds, rabbits, goats, and chickens can be troublesome in two ways. First, pet wastes contain nutrients that can promote the growth of algae if they enter streams and lakes. Second, animal droppings are a source of disease. The risk of stormwater contamination increases if pet wastes are allowed to accumulate in animal pen areas or left on sidewalks, streets, or driveways where runoff can carry them to storm sewers. Droppings that are not mixed with litter or other materials should be flushed down the toilet. Or, if local laws allow it, droppings may either be buried or wrapped and put in the garbage for disposal.

DON'T LITTER

Street litter, such as plastic bags, cups, and candy wrappers, often gets swept away with rainwater into storm drains and ends up floating in our lakes and ponds, in the ocean, or washing up on our beaches. A great deal of street litter is made up of plastic, which takes hundreds of years to break down and become harmless to the environment. Marine mammals can mistake plastics for food and can become tangled up in it.

Recycle as much of your trash as possible, and put all other litter in garbage cans. Never throw trash in the street or down the storm drain. If you see trash on the ground, pick it up and toss it in the nearest trash can.

INTERNET REFERENCE SITES FOR EDUCATIONAL MATERIAL

http://www.epa.gov/grtlakes/seahome/housewaste/src/references.htm
University of Missouri's Household Hazardous Waste Project

http://www.efp.state.pa.us/dep/deputate/airwaste/wm/HHW/facts/HHW_Links.htm
State of Pennsylvania Household Hazardous waste links

http://www.dep.state.pa.us/dep/deputate/enved/Can_Do/hhwtips.htm#TOP
Ideas for Non-point source reduction in your watershed

http://www.paint.org/6point.htm
Disposal and how to manage leftover paint

http://home.sprynet.com/sprynet/djowner/nontox.htm
Non-toxic cleaning in the home

http://www.lcswma.org/hhwalt.htm
Hazardous waste alternatives

http://www.ncg.nrcs.usda.gov/hazmat.html
Properly handle hazardous waste. Instead of.....

http://www.betterworld.com/BWZ/9606/product.htm
Natural cleansers and insecticides

http://www.chesapeakebay.net/bayprogram/pol/tsc/hhw/hhwbank.htm
Hazardous Waste Publication Resource Bank

http://www.epa.gov/epaoswer/non-hw/recycle/recy-oil.pdf
Car oil recycling

http://www.epa.gov/epaoswer/non-hw/recycle/grass.pdf
Recycle grass clippings

http://www.epa.gov/grtlakes/seahome/housewaste/src/compost2.htm
Composting

http://www.epa.gov/r02earth/water/npspage.htm
Non-point source pollution

http://www.epa.gov/owowwtr1/NPS/kids/ltrrite.htm
Litter

Tell Us What You Think

We would appreciate your comments about Chicopee's stormwater and CSO problems. Please take a few moments to fill out the brief survey below. Completed surveys can be either mailed to the Chicopee Stormwater Study Committee, 80 Medina Street, Chicopee, MA 01013, or dropped off at collection boxes located in City Hall (offices of the Alderman, Treasurer, City Collector or Mayor) and the Chicopee Electric Light Company.
You may also call 594-3585 with questions or comments. If you would like to be contacted, please provide your name, address and telephone number.

Please answer the following questions.

Were you aware of Chicopee's Stormwater/CSO problems before you read this flyer? ❑ Yes ❑ No

Did the information in this flyer help you understand the stormwater/CSO problem? ❑ Yes ❑ No

Would you like to know more about the issue discussed in this flyer? ❑ Yes ❑ No

Do you experience sewer backups in your basement? ❑ Yes ❑ No

Do you care about the water quality of the rivers? ❑ Yes ❑ No

Would you attend a public meeting about Chicopee's Stormwater/CSO problem? ❑ Yes ❑ No

Would you be willing to pay a fee to improve the city sewer and stormwater system? ❑ Yes ❑ No

How would you propose funding federally mandated water quality improvement projects? _____

_____

_____

Other Comments _____

_____

Name: _____

Address: _____

_____

Telephone: _____

In the next flyer - STORMWATER MANAGEMENT AND PAYING FOR THE FEDERAL MANDATE TO CLEAN -UP LOCAL RIVERS

Cut

A Message to Ratepayers

When It Rains, It Pours... and Pollutes!

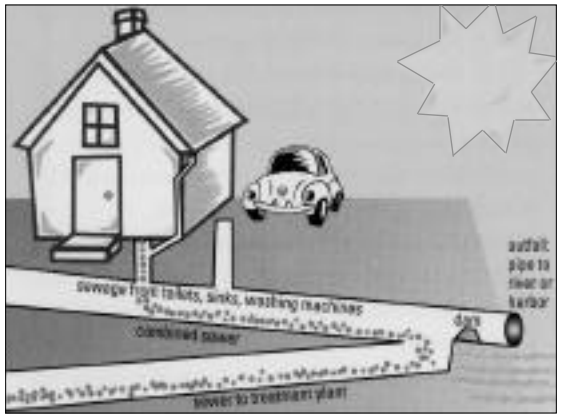
CHICOPEE ORDERED TO CLEAN-UP RIVERS BY ENVIRONMENTAL PROTECTION AGENCY

Chicopee Has A Problem When It Rains ....

- The Chicopee and Connecticut Rivers are being polluted with an average of 21 million gallons of sewage tainted stormwater when it rains.
- Rainwater from rooftops, driveways, parking lots and streets fill up the city sewer system, where it combines with wastes from homes and businesses.
- To prevent flooding of streets and property when the sewer is full, water must be allowed to discharge to the river. This discharge of stormwater and raw sewage into the Chicopee and Connecticut Rivers through outfall is called a combined sewer overflow (CSO).
- There are 32 CSO discharge points in Chicopee along the Connecticut and Chicopee Rivers.
- The U.S. Environmental Protection Agency (EPA) is ordering the city to stop pollution of the rivers by controlling stormwater and CSOs.
- Even with CSO outfalls, stormwater filled sewers still back up and flood basements and streets.
- Solving this problem will be expensive and the city must come up with a plan to address this problem very soon or face possible fines.

In December 1996 , the EPA issued an Administrative Order requiring the City of Chicopee and several other communities along the Connecticut River to take action to fix their CSOs. The EPA's authority to order the city to stop polluting comes from the Federal Clean Water Act of 1972 and 1987 amendments.

How a Combined Sewer Overflow Works



Sunny Day

Sewage from homes and businesses in Chicopee flows into the same pipes as storm drains and gutters. On days with little or no rain, a dam steers the entire volume to the Chicopee Waste Water Treatment Plant.

Rainy Day

Runoff from storms can overwhelm the system. When the pipes leading to the wastewater treatment plant fill up, rainwater and sewage flow over dams and into the rivers.

Polluted Rivers

Having polluted rivers hurts our quality of life by limiting our recreational and economic development opportunities. The City of Chicopee is considering planning a number of river access projects for the public including bicycle and walking trails along both rivers, fishing area approaches, and a Chicopee River Canoe Trail. The success and popularity of these recreational resources will depend on good water quality. Stopping the pollution will require an overhaul of the city's old sewer system to eliminate combined sewer overflows. Chicopee is not the only city with this problem. Controlling CSO's has been an expensive and difficult problem in many older U.S. cities. The city will continue to look for less expensive methods to solve this problem and to find sources of outside funding.