Stormwater Financing/Utility Starter Kit

Funding provided by the U.S. Environmental Protection Agency and the U.S. Department of Housing and Urban Development Partnership for Sustainable Communities.

Prepared for:

The 101 Cities and Towns of Greater Boston

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March 23, 2014

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Table of Contents

Stormwater Financing Kit Module 2: Financing/Fee Structure

Methods to finance stormwater management can be wide-ranging. Traditionally in Massachusetts municipalities have had to rely on appropriations from the General Fund and/or securing grants and bonds to pay for their stormwater management program and projects. Lesser known mechanisms that some municipalities have utilized are in-lieu of construction fees and latecomer fees, all of which will be described in this Section, as municipalities may require more than one way to finance stormwater management and may want to find a combination of financing options to best suit their needs. However, with regard to developing a secure, long-term funding source for stormwater management, the drainage service fee approach is recommended as the fundamental financing mechanism. This section provides an overview of the different financing options municipalities have used to pay for their stormwater systems, with a primary focus on describing the drainage service fee and the utilization of an Enterprise Fund to account for revenues generated from the fee.

Difference between Tax and a Fee: A Critical Policy Distinction

In general the purpose of a tax is simply to raise revenue, and there need not be any single, pre-determined use of the revenue. A tax is defined by the federal government as a financial charge or other levy imposed on an individual or legal entity by a state or a functional equivalent of a state, such as a tribe. On the other hand, a fee is the price one pays as remuneration for services, such as fees paid for by new or expanded users for use of a municipal utility.

The shift of stormwater financing from tax-based to fee-based structures over the last thirty years has been challenged in a number of states, and the courts have consequently identified three substantial criteria that differentiate a utility fee from a municipal tax. Under these criteria the following three conditions must exist to distinguish a fee from a tax-- 1) the fee must be adopted by ordinance, 2) there must be a direct and transparent relationship between the fee paid and the services provided and 3) there must be a voluntary provision to the fee, i.e. the fees can be reduced by reducing the use of the stormwater system or program. In Massachusetts, Each of these criterion indicates the critical need for a robust internal and public education process as a fee is explored.

As mentioned briefly in Module 1, a Stormwater Utility Analysis Worksheet was developed as a parametric tool designed to help municipalities analyze existing and anticipated budgets and design appropriate billing and revenue structures for stormwater utility programs. The Worksheet can be found on the MAPC Stormwater Kit website.

Drainage Fees

A Drainage Fee (also known as drainage service or drainage user fee) is simply a charge for the generation of stormwater and the management of that stormwater by a municipality. The drainage fee provides a stable, equitable, and sufficient revenue stream to pay for stormwater service

demands. For these reasons, it is often used as the "umbrella" funding source for stormwater utilities. The user service fee is based on the principal understanding that all property owners are responsible for the generation of stormwater: anyone that owns property on which the natural landscape has been altered with the addition of impervious surfaces contributes to water quality/quantity issues. Addressing those issues becomes a municipal responsibility under the MS4 permit, which imposes a cost on the community for which there is no dedicated revenue stream. A drainage fee is bound by the notion that stormwater services are like any other municipal service, for example wastewater or water supply systems.

Drainage user fees are the preferred financing option for stormwater management programming for several reasons. First, the fees are equitable – the amount each resident or business is charged is based on a clear, transparent calculation of stormwater costs, which vary by property type and size. Second, a stormwater user service fee is also stable. The user pays on a regular basis for ongoing stormwater services, and the utility receives a predictable, stable revenue stream. Third, the fees are adequate – property calibrated fees are high enough to cover local stormwater needs (as defined by the community) and meet water quality regulations without generating excess revenue.

It is important to note that a drainage service fee is a highly visible cost, thereby making public acceptance critical. Public education and outreach strategies are fully described in Module 3.

After gathering information about resources needed to support elements of a stormwater management program, as described in Module 1, the overall cost of the program can be estimated. The cost can then be evaluated according to how much funding is currently available and what future funding the program will require. Typically, it is the unfunded slice needed to support the stormwater management program that is the focus of the fee. There are three types of drainage fees that can be established, as follows:

- Flat Fee System: This fee is developed as a specific surcharge to each property in a municipality. The cost is spread across properties based on an existing standard, such as the Massachusetts Land Use Classifications[2] for properties, or just generally across all properties at the same rate. If using the land use classification method, the flat fee could be assigned based on whether a property is a residential use or a non-residential use, or could be further broken down into other categories, such as single family residential, multi-family residential, commercial and industrial, instead of just non-residential. The fee would reflect a charge on each property in the city or town and would only vary based on the category used to delineate properties.
- **Graduated Fee System:** In this system, the fact that certain properties among different land use classifications are likely to send greater quantities of stormwater to a municipal storm sewer system is recognized. This recognition does require more work under a stormwater management program. An example of this fact is the difference between the impervious surfaces from the amount of parking on parcels with single family homes, versus the impervious surface from the amount of parking on parcels with shopping centers. An example of where this type of fee system is used is the City of Newton, MA. The calculation of a fee that reflects the differences in the amount of impervious surfaces, which results in different quantities of stormwater runoff, is considered to be a more equitable method for assessing a drainage fee. ***Therefore, this is the approach MAPC recommends, as further explained in the following sections.***

[2] Available as a Massachusetts Geographic Information System (GIS) Datalayer; digital dataset of land cover/land use based on 0.5 meter resolution digital ortho imagery captured in April 2005; created by The Sanborn Map Company, Inc.

- Customized Fee System: Drainage fees can be even more individualized at a parcel basis by developing specific measures of impervious surface. A customized fee system would not use an average measure of impervious area across land use classifications but would create an estimate for individual properties. This individual estimate would serve as the basis for the fee. Additionally, with a customized fee system, the fee can be even more comprehensive and take into account the stormwater runoff generated by both the impervious and pervious areas on a property. MAPC recognizes that the majority of cities and towns may not have the resources to implement this approach. However, some municipalities may choose to pursue this methodical system. Therefore, information regarding the two approaches in designing a customized fee system: Intensity of Development, and the Equivalent Hydraulic Area approaches, is described below.

Intensity of Development Approach

This Customized Fee approach calculates a fee based on the proportion of impervious surface to the entire size of a specific parcel. This approach is applied to all parcels, including vacant and undeveloped properties, and uses a sliding scale to assess the fees. For developed parcels, fees are based on their intensity of development, which is defined as the percentage of impervious area of the parcel. Vacant or undeveloped parcels contribute to runoff and are assigned a lower fee. Rates are calculated for several ID categories, as shown in the example below.

Table 2.1. Sliding Scale Example

Category (Impervious Percentage Range)	Rate (Per mo. per 1,000 sq. ft. of Total Served Area)
Vacant/Undeveloped (0%)	$0.08
Light development (1% to 20%)	$0.12
Moderate development (21% to 40%)	$0.16
Heavy development (41% to 70%)	$0.24
Very heavy development (71% to 100%)	$0.32

Source: Funding Stormwater Programs Fact Sheet - U.S. EPA

The benefit of this approach is that it also accounts for stormwater from the pervious portion of parcels. However, this method can be more difficult to implement than the graduated fee because the development intensity categories are broad and parcel pervious and impervious areas need to be reviewed.

Equivalent Hydraulic Area Approach

This version of the Customized Fee approach calculates a drainage fee based on the estimated runoff from both impervious and pervious surfaces on a site. It is different from the Intensity of Development approach since it uses a calculation that treats impervious surface areas and pervious surface areas as separate elements rather than along a sliding scale of development intensity. An example of this the calculation used by the City of Moline (Illinois) where residential properties greater than 2 acres in size and all non-residential properties are charged a fee based on a equivalent hydraulic area (EHA) calculation.

The formula calculating the EHA = (Impervious Acreage x 0.95) + (Pervious Acreage x 0.15).

The EHA is then multiplied by a set rate to determine the charge for the individual properties.

The primary benefit of this approach over a graduated fee system is that in addition to impervious surfaces, it accounts for the potential effect of stormwater runoff from the pervious area of a parcel. However, it includes a more in-depth level of analysis.

Developing a Graduated Fee System

The most common method of setting the fee using a graduated system is the Equivalent Residential Unit (ERU). According to the U.S. EPA, the ERU method is used by more than 80 percent of all stormwater utilities in the nation. The ERU is developed using a process that investigates the amount of impervious surface on properties in different land use categories and charging fees based on the average amount of impervious surfaces on properties in those categories. The primary advantage to this fee system is that the relationship (or nexus) between impervious area and stormwater impact is relatively easy to explain to the public: i.e., "you pave, you pay." In addition, the number of billable ERUs can be determined by limiting the parcel area review to impervious area only, making the analysis easier than other customized fees.

In most instances, the average amount of impervious surface on lots with a typical single-family home (e.g., driveways, sidewalks, roofs, etc) is determined to serve as the basis of the ERU and then the ERU is used as a basis for a sliding scale to assess properties with other land uses. On this scale, single family homes are typically charged a fee equivalent to 1 ERU and other properties are charged based on the amount of impervious surface relative to the ERU (e.g., commercial properties = 2 ERU's, industrial properties = 3 ERU's, etc). Examples of municipalities within Massachusetts, and outside of the state, using this type of fee system are shown in Table 2.2.

Table 2.2. Example Municipalities Using ERU Rates

City/Town	State	Population	Pop. Density (persons/sq mi.)	ERU (sq ft)	Basis	Annual Fees	Notes
Newark	DE	28,547	3,200	1,000	Imp. Surface	$5.00	
Normal	IL	52,799	3,688	3,200	Imp. Surface	$55.20	
Bloomington	IL	74,184	3,297	12,000	Gross Lot Area	$87.00	"Large" Parcel
Bloomington	IL	74,184	3,297	7,000	Gross Lot Area	$34.80	"Small" Parcel
Reading	MA	23,708	3,709	2,552	Imp. Surface	$39.84	
Newton	MA	83,829	7,220	2,300	Imp. Surface	$25.00	
Lewiston	ME	36,460	1,072	2,900	Imp. Surface	$50.00	
New Brighton	MN	22,200	3,344	43,560	Gross Lot Area	$215.00	Townhouses

** Gross Lot Area = total lot size.*

A step by step process for developing a graduated drainage fee system based on the ERU method is provided below.

1. Gather Data
2. Perform Analysis of Impervious Surface for Land Use Types
3. Weigh Critical Variables

4. Develop Standard for ERU and Determine ERU Fee Scale
5. Establish Credits

1. Gather Data:

Data for the municipality and the stormwater management program form the foundation for establishing the drainage fee. In particular, mapping data is a key element in this information gathering process; it is recommended that this data is accessible via a Geographic Information System (GIS). The recommended mapping data to be collected are shown in Table 2.3.

Table 2.3. GIS Mapping Needs

Name	Source	Notes
Parcel data	Municipality, Regional Planning Agency or MassGIS	Need to determine if parcels do or do not include right-of-way.
Assessors Data	Municipality	Must be linked to parcel data - if not already
Impervious Cover Data	MassGIS EPA	Data is based on analysis of digital ortho imagery captured. Data is based on an additional analysis that used MassGIS 2005 Land Use data to calculate impervious area (IA) and directly connected impervious area (DCIA).
Orthophotos	Municipality, MassGIS	Based on U.S. Geological Survey or better if available (e.g., municipal data or online map viewer like Bing or Google)

2. Perform Analysis of Impervious Surfaces to Determine ERU

This analysis is likely to involve two processes, each with a set of associated actions, and requires using GIS. The analysis is described using a detached single family residential property in a municipality to determine the ERU. However, the single family home could be replaced by another predominant residential land use type in a municipality (e.g., two- or three-family housing units).

Parcel Analysis

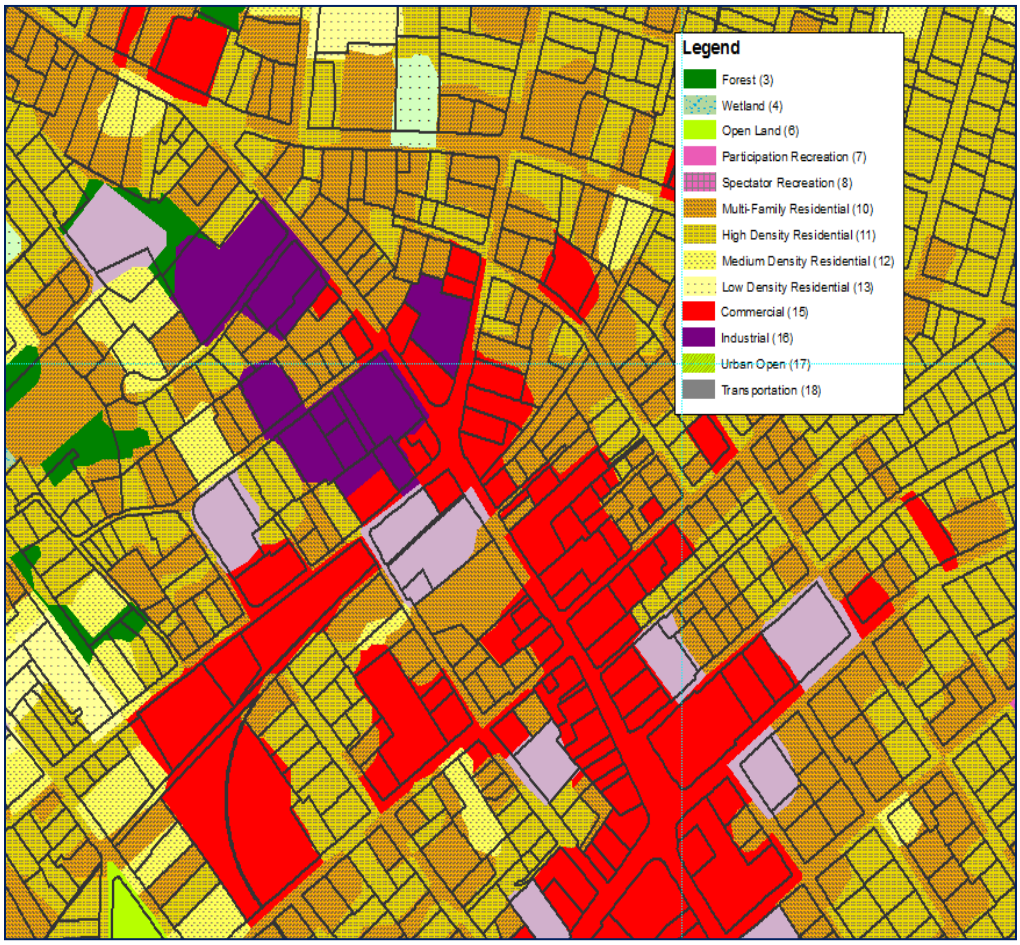
The first of the two processes assumes that parcel data does not include public rights of way (e.g., roadways – Figures 2.1 & 2) so that parcels only include structures and private improvements to the land. With this assumption in mind, the first process is aimed at linking the parcels with other necessary pieces of data as follows.

- ✓ Associate parcel data with property land use classifications that will be used for the fee categories (e.g., single family, multi-family parcel, industrial parcel),
- ✓ Associate parcel data with assessor's data (e.g., ownership, land area, address, etc.), and
- ✓ Link contiguous parcels that have the same property classification, share a structure or structures, and have joint ownership (e.g., shopping center that is under common ownership (but that is comprised of multiple contiguous parcels).

Figure 2.1. Parcel Mapping Example 1

Example of parcel data that does not include public rights of way.

Figure 2.2. Parcel Mapping Example 2



Land Use Map based on MA DEP GIS data.

By linking this information, the parcels contain the data that will be needed to determine impervious surface based on property classifications, property ownership and the drainage fee categories.

Analyzing for Impervious Cover

The second process is aimed at analyzing the parcels for impervious cover and then extrapolating that information in order to develop the ERU. This includes:

- ✓ Performing a Zonal Analysis: the creation of an output that is computed by including the cell values that intersect or fall within each zone of a specified input dataset. For example, the percent of impervious coverage (e.g., land covered by buildings, parking, and driveways) is calculated on each parcel within the municipality (see Figure 2.3).

Figure 2.3. Zonal Analysis Examples

Orthophoto (aerial photo) of a neighborhood

MassGIS impervious surface cover for the same neighborhood

- ✓ Use the resulting percent impervious for each parcel to calculate the land area (e.g., square footage, acreage, etc.) that is impervious.
- ✓ After calculating the area of impervious coverage for each parcel, develop a subset of parcels that includes the single family residential parcels based on the land use classifications.
- ✓ Determine the average impervious surface area for the subset of single family residential parcels. The result is the impervious coverage for the ERU.

3. Weigh Critical Variables

As a city or town moves forward in determining the fee, there are additional considerations that are part of this process. These considerations involve elements such as preferences in addressing pervious as well as impervious surfaces, the differences within specific land use classifications, and properties that may not currently be required to pay property taxes.

As has been discussed in this Kit, impervious surfaces are a major contributor relative to amount of stormwater runoff generated. These surfaces, especially surfaces that are part of the built environment, do not allow stormwater to percolate into the ground and naturally contribute to the watershed's water balance. Pervious surfaces allow stormwater to permeate the ground, but this is not always 100% of the rain that falls. Some of the stormwater is shed and runs off as it does on impervious surfaces. Given this fact, some municipalities and counties with stormwater utilities will add in some proportional cost for pervious surfaces on a property. This is the approach that would be used in a customized fee system. An example of where a model that uses both impervious and pervious considerations may apply is a town where natural waterways (e.g., creeks, streams, etc.) play a significant role in conveying stormwater. If annual work to clear debris and reduce flooding

from the waterways is supported by municipal staff, inclusion of pervious surface may be needed to account for runoff from yards, fields and other large open spaces on private properties.

There can be much variability among land use classifications in a city or a town. Older single family homes may sit on smaller lots as compared to lots for newer single family home developments, and this could be similar for older and newer commercial developments. If these variations occur in a municipality, it can be worth exploring the average impervious among the distinct sets of patterns within land use types. Examples are provided in the images below showing the variety in lots sizes for single family homes in one town.

Figure 2.4. Variations Example 1

Single Family Homes on 1/8 acre lots (approx.)

Figure 2.5. Variations Example 2

Single Family Homes on 1 acre lots (approx.)

Although they are not subject to local property taxes, lands that are publicly-owned or owned by non-profits are assessed as part of developing a drainage service fee. These properties are contributors of runoff to municipal systems and as a result, have a fee associated with them. Within city or town government discussions will need to take place about how these fees will be addressed and who will be responsible for paying them, which could mean specific divisions are responsible or possibly just under a municipal facilities director. For example, the local or region school district would also fall in this category and be responsible for paying a drainage fee for properties with schools, administration buildings and other facilities.

For properties owned by non-profit organizations, they would see a bill that is similar to other private property owners and that would be based on their land use and amount of impervious coverage. They would be billed for stormwater services just as they are already billed for water supply or sewer services if those are provided by the city or town.

4. Develop Standard for ERU and Determine ERU Fee Scale

An Equivalent Residential Unit (ERU) standard, appropriate to the municipality, is determined by undertaking the following steps:

1. Determining the ERU, which is the average impervious surface area per single family residential parcel.
2. Calculating "ERU equivalents" for the remaining parcels in the area of focus. Again, this is the multiplying factor to determine these parcel's impervious surface area relevant to the base ERU. This calculation will include:

a. Using the results of the zonal analysis to total the square footage of impervious surfaces on non-single family parcels. This includes residential and non-residential uses,
b. Calculating the average impervious surface area per parcel in each land use classification, and
c. Dividing the average impervious square footage by the value of the ERU to calculate the ERU equivalent.

3. Calculating the "stormwater unit" – the ERU / ERU equivalent multiplied by the number of parcels – for each land classification.
4. Adding the single family stormwater unit (i.e. the number of these parcels – since its multiplier is 1) to the other residential and commercial/industrial stormwater units to find the grand total.
5. Dividing the projected stormwater management annual budget need by the total number stormwater units to determine an ERU value per parcel, per year.

It should be noted that the budget could be the cost of the entire stormwater management program or the difference between what is currently covered and what funding will be need for required future program work.

A fictional town called "Littlemarsh" was used to illustrate this analysis, starting with the calculation of potential expenditures, as shown in Table. 2.4, and ending with the ERU calculation shown in Table 2.5.

Table 2.4 Example Expenditure Plan – Town of "Littlemarsh"

Stormwater Expenditures	Description	Estimated Costs
General Maintenance & Operations, (DPW)	Routine cleaning, general maintenance and day to day service operations	$600,000
Stormwater Cleaning & Treatment, (Contractual)	Costs of privately contracted facility to treat stormwater runoff.	$200,000
NPDES Compliance	Includes annual reporting and private consulting services.	$20,000
Service Requests	Reporting and Responding to notices, complaints and reported damage	$8,000
Master Planning for Stormwater	Develop a CIP based on Phosphorous Control Plan and Infrastructure Needs.	$55,000
MS4 Stormwater Permit Administration	Review of permits annually by consultants paid for by the developer(s)	$10,000
Illicit Discharge Detection and Elimination	Assume 10% of outfalls have illicit discharge. Estimate cost to identify source at appx. $1200 per hit. Removal costs should be the owner's responsibility.	$50,000
Erosion/Sediment Control Inspections	Estimate a 50% increase in workload due to additional maintenance and construction	$35,000
Catchbasin Inventory Plan	Field crews to inspect, record and clean catchbasins on a regular schedule. Two to Four times per year is recommended.	$12,400
Septic, Inflow and Infiltration Program	Cost of coordination between board of health and stormwater program.	$3,000
Pesticide, Herbicide and Fertilizer Program	Implement fertilizer optimization program. Assume coordination with multiple depts.	$5,300

Stormwater Expenditures	Description	Estimated Costs
Spill Cleanup Program	Develop a priority response program based on high accident areas, significant pollutant potential and proximity to receiving waters.	$16,000
Groundwater and Drinking Water Program	Technical review memo of drinking water quantity and quality in priority areas. Conclusions of reports to be considered in the improvement of the system.	$0
Drainage Monitoring & Mapping	Schematic mapping of water drainage system with field verification of performance	$125,000
Sewer Monitoring & Mapping	Sewer Infrastructure mapping. Assume coordination with multiple departments.	$100,000
Code Development and Zoning Support Services	Review and update ESC, SW, IDDE as needed, report on local regulations affecting impervious areas and report on feasibility of green practices.	$14,500
Hazard Mitigation and Flood Insurance Updates	Allowance for high hazard analysis by private consultant for specific areas of concern identified during the permitting process.	$34,000
Waterfowl & Pet Waste Management Programs	Install waterfowl education signs at congregation areas and implement waterfowl deterrents. Install pet waste stations in strategic locations.	$12,000
Street Cleaning	Increase effort, fuel, supplies, & disposal to Sweep streets.	$180,000
Stream Restoration/Stabilization	Complete at least one stream restoration project every set number of years.	$35,000
Ditch and Channel Maintenance	Assume cost of removal is borne by owner or sewer dept., cost of IDDE removal infrastructure improvements.	$35,000
Utility Fee Implementation Costs	Capital expenses associated with establishing HR to manage the new program.	$20,000
Billing Costs	Costs associated with preparing and distributing invoices.	$3,000
Administrative Fees	General office operations and overhead.	$3,000
Utility Fee Credits	Costs for administering expenses for properties that meet set compliance standards to reduce runoff.	$3,000
Collection Fees, Delinquencies	Costs for processing receivables with contingencies for late or non-payments.	$3,000
Legal Support Services	Legal Review of Regulatory changes - set number of years	$3,000
Inter-Municipal & Agency Coordination	Adjacent municipalities to meet every set number of years to review and coordinate programs	$12,000
Emergency Coordination	Meet twice a year to review and coordinate programs.	$3,000
NPDES Public Education Programs	Distribute at least two messages to residents, commercial, industrial, and construction constituencies and measure and report message effectiveness.	$15,000
NPDES Public Engagement Programs	Host public forums, regularly update websites and host regular workshops	$15,000
Certified Phosphorous Program	Recordkeeping, data tracking and correspondence with regulated entities for updating program progress under "Water Quality."	$10,400

Stormwater Expenditures	Description	Estimated Costs
Grants Program	(Staff efforts to apply for/administer grants received for stormwater programs; assume one grant every two years.)	$10,300
Subtotal:		$1,613,900
Existing Expenditure:		$900,000
Funding to be Covered Under Fee:		$713,900

Currently, most of the stormwater expenditures listed above are funded by sales and property taxes in most towns. If these activities are funded in the future by a stormwater fee, then sales and property taxes currently funding these activities would be available to fund other needs. This difference is indexed above in red.

The instructions listed above were employed, using our Stormwater Utility Workbook, to determine an appropriate ERU for "Littlemarsh". After determining the ERU equivalent for a single-family residential property, the ERU equivalent is then calculated for other residential and commercial / industrial properties. The "stormwater units" are the total number of parcels – per classification – multiplied by its ERU Equivalent (i.e. the multiplier based on the "base" equivalent of 1). This provides an accurate representation of other properties of varying size, relative to a single-family parcel. In other words, it is a way to measure their size in relation to a static figure.

Table 2.5 Calculating an ERU – Town of "Littlemarsh"

Land Use Classification	Number of Parcels	Total Impervious Surface (sf)	Aver. Impervious Surface (sf)	ERU Equivalent	Stormwater Units
Residential					
Detached Single Family	3,753	35,301,672	9,406.25	1	3,753.00
Other Res. & Non-Res.					
Detached Multi-Family, (e.g. Duplex, Triplex etc.)	314	2,893,579	9,215.22	0.98	307.62
Multi-Family	828	7,523,307	9,086.12	0.97	799.82
Commercial	159	1,736,147	10,919.16	1.16	184.57
Industrial	116	1,157,431	9,977.85	1.06	123.05
IMPERVIOUS TOTALS:					
Total Impervious Area:		48,612,136			
Total Stormwater Units:		5,168.07			
ERU Value p/parcel/p/yr:		$138.14			

The ERU value per parcel per year was calculated by dividing the additional budget needs (new expenditures that must be covered under a fee – see Table 2.4) by the total stormwater units. This provides a manager with the total annual revenue that will be drawn from every property. This is the value used to calculate fees for each property type. It should be noted that this calculation is conservative due to the fact that current expenditures that will continue are not included within this calculation. This example assumes that current expenditures will continue to be funded through the municipality's capital budget plan. However, this is not often the case.

The next determination to make is what ERU fee scale to employ. As stated previously, a municipality can develop a flat fee system, a graduated fee, or a customized fee (e.g., Intensity of Development,

or Equivalent Hydraulic Area approach). Again, we have chosen the graduated fee system as our primary example as it is proven to be the most popular and efficient method of assigning fees. Table 2.6 illustrates the calculation for the graduated fees.

Table 2.6 Calculating Graduated Fees – Town of "Littlemarsh"

Property Classification	Number of Parcels in Town	ERU Equivalent	Annual Drainage Fee per parcel	Annual Total Revenue
Residential				
Detached Single Family	3753	1.00	$134.00	$502,902.00
Detached Multi-Family, (e.g. Duplex, Triplex etc.)	314	0.98	$136.73	$515,216.33
Multi-Family	828	0.97	$138.14	$1,372,602.06
Non-Residential				
Commercial	159	1.16	$115.52	$220,406.90
Industrial	116	1.06	$126.42	$175,969.81
Total Revenue Raised:				$2,787,097.10

The base annual drainage fee of $134.00 is divided by each ERU Equivalent per property classification to calculate the annual drainage fee per classification. The annual revenues generated for each classification are also calculated by multiplying the number of parcels by the annual drainage fee. As shown in the table above, significant total revenues (close to $3 million annually) can be realized from the implementation of this basic fee structure.

5. Credits

An important incentive for proper stormwater management on properties is the inclusion of a credit system that rewards property owners for on-site and environmentally sustainable management of stormwater. Credits are linked to a reduction in the drainage fee which serves as an incentive to their installation. This includes techniques that minimize impacts to an area's natural hydrology and allows for groundwater recharge such as rainwater harvesting, Low Impact Development (LID) techniques, green roofs, permeable pavement, and other green infrastructure applications as shown in Figures 2.6 through 2.9.

Figure 2.6. Bioretention – Urban and Suburban Setting

Source: Horsley Witten Group

Figure 2.7. Rain Garden

Raingardens slightly differ from Bioretention facilities because they typically do not involve amended soils, complex sizing calculations, or sophisticated conveyance devices (flow splitters, underdrains, overflow inlets, etc.) Rather, they usually a shallow depression in native soils, or modestly amended soils.

Figure 2.8. Permeable and Grass "Paving"

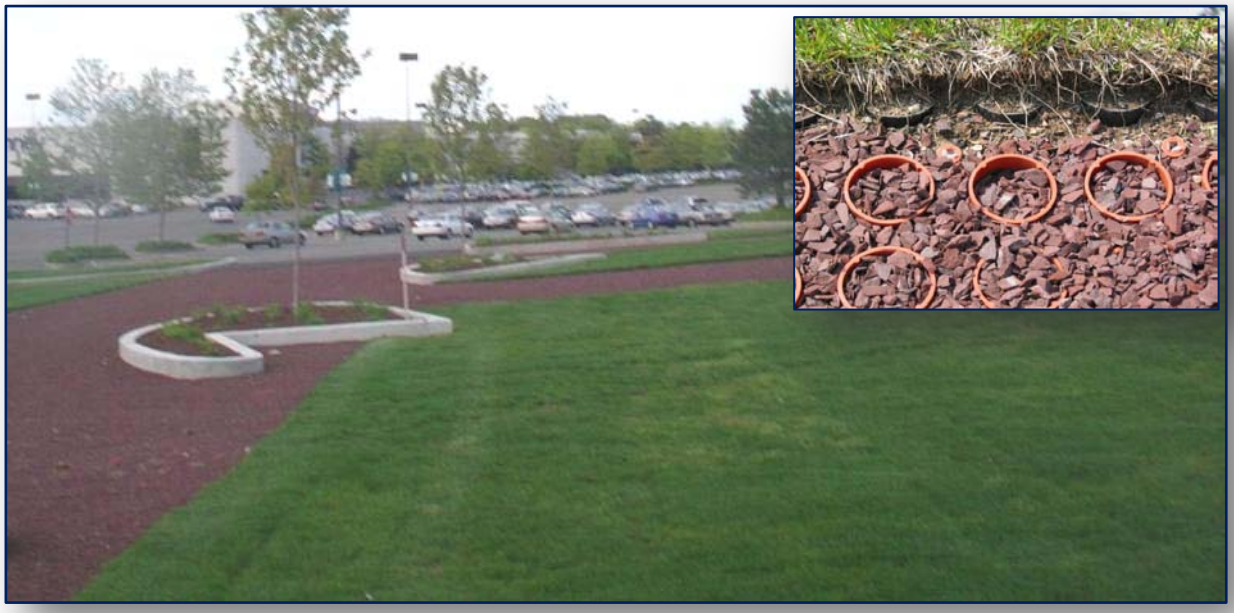


Figure 2.9 Rainwater Harvesting and Green Roofs

These on-site management features can address stormwater quantity and quality, and begin to reduce demands for municipal stormwater management. More information about these and other techniques, including the integration of recharge into an entire site's design, can be found in MAPC's Low Impact Development Toolkit.

In continuing our example analysis, the following provides a scenario for "Littlemarsh" in which a number of properties have either retrofitted or developed new, innovative stormwater management facilities that qualify for credits. Table 2.7 shows the credit calculations for hypothetical credits offered to property owners that implement these facilities.

Table 2.7 Credit Calculations – Town of "Littlemarsh"

Credit/Incentive Item	Residential			Non-Residential Properties			Totals
	Unit Cost	Quantity	Total	Unit Cost	Quantity	Total	
Rate Reduction (Swale/Constr. Wetland)	$500	10	$5,000	$1,000	15	$15,000	$20,000
Rainwater Harvesting (Rainbarrel/Cistern)	$50	100	$5,000	$200	50	$10,000	$15,000
Vol. Reduction (Green Roof, PermeablePave.)	$10,000	0	$0	$20,000	5	$100,000	$100,000
Water Quality (Raingarden/Bioretention)	$5,000	10	$50,000	$10,000	20	$200,000	$250,000
NPDES Costs/Private Maintenance	$1,000	120	$120,000	$3,000	90	$270,000	$390,000
			$180,000			$595,000	$775,000

Credits can also be provided for specific populations or organizations in a municipality. Some towns have considered offering credits, and even exemptions, for senior, low-income and disabled households. Additionally, similar credit systems have been considered for non-profits and municipal property. However, impervious areas on properties owned by these populations or organizations still contribute runoff that places a burden on the stormwater system. If the city or town does want to grant credits or exemptions, it should keep in mind that such a policy could impact the equitable nature of the drainage fee, the amount that others have to pay (in order to cover the deferred revenue) and efforts to reduce runoff through on-site management.

Lastly, if credits are to be offered, their expected effect on the funding for the overall program should be explored and take into account how best to offset reduced revenue to the program. This may mean adjusting how much credit can be claimed or the amount of the drainage fee in order to have sufficient income for management activities.

The final calculation to be made, in order to connect these separate analyses, is to determine the net operating income (NOI). The NOI is simply the credits provided (in dollars) subtracted from the total fee revenue generated from the graduated fee. This figure represents the amount of operating budget needed when you factor out properties that have reduced the need for engineered, municipal stormwater management on their properties, as shown in Table 2.8.

Table 2.8 Net Operating Income (NOI) – Town of "Littlemarsh"

Property Classification	Annual Revenue	Credits	NOI	New Prog. Budget	Excess
Residential	$2,390,720	$180,000	$2,210,720	$713,900	$1,298,197
Non-Residential	$396,377	$595,000	-$198,623		
	$2,787,097	$775,000	$2,012,097		

Enterprise Funds

An Enterprise Fund is essentially an accounting system for financial activities associated with a municipal service, in this case, stormwater management. The enterprise fund statute, M.G.L. Chapter 44, Section 53F½, was first enacted in 1986 as a way to allow Massachusetts municipalities to account for a range of financial activities associated with municipal services. Only Massachusetts cities and towns may adopt an enterprise fund pursuant to the law. Special purpose districts may not adopt an enterprise fund, unless permitted by special legislation.

Initially, the funds were most commonly used for water, gas and electric utility companies to account for annual operating costs, not the indirect costs, capital improvements or fixed assets of the service. Over the past decade, Massachusetts municipalities have looked to their sister/brother entities across the U.S. that have been utilizing Enterprise Funds to account for and manage stormwater drainage and other associated service fees.

Why Use an Enterprise Fund?

This accounting mechanism is quite beneficial because it allows the community to see the portion of the stormwater utility's cost that is paid for by user charges; and it helps to make clear what property owners are paying for and what they are getting in return. Under enterprise accounting, the revenues and expenditures for services are separated into separate funds with their own financial statements, rather than commingled with the revenues and expenses of all other government activities. The community decides which stormwater utility costs will be paid for through user fees (e.g. services versus capital costs). Additional advantages of using an enterprise fund include:

Useful Management Information - With the consolidation of revenues and the cost of services and information on the operating performance of the fund, municipalities will have useful information to make decisions on user charges and other budgetary items. They will be able to analyze how much the user fees and charges support the services and to what extent, if any, tax levy or other available revenues are needed to supplement the enterprise fund.

Investment Income and Surplus - Unlike services operating in the general fund, all investment earnings and any other operating surplus is retained in the enterprise fund rather than returned to the general fund at year-end. Once a surplus is certified as available it may be used to fund operating, capital or debt service costs.

Implement Capital Improvements - The enterprise fund will allow the entity (e.g. department or utility) providing the service to better plan for and implement capital improvements because these needs can be forecasted and integrated into the long-term financial management plans (expenditure, revenue and credit planning).

Adopting an Enterprise Fund

A city or town may adopt an enterprise fund by vote of its legislative body, subject to the local charter. Each enterprise fund must be adopted separately with its own vote. The *Enterprise Funds: G.L. c. 44, § 53F½* manual by the Massachusetts Department of Revenue provides the following sample language for a vote to adopt an enterprise fund:

"To see if the (city or town) will accept the provisions of Chapter 44, § 53F½ of the Massachusetts General Laws establishing (the service) as an enterprise fund effective fiscal year (year)."

Once adopted, the community begins the process of establishing the separate fund on its accounting records and identifying the assets, liabilities and equity in other funds if voted by the legislative body to be transferred to the enterprise fund. The community must operate the enterprise fund for a minimum of three years before the provisions may be rescinded like any local adoption law.

Budget

Under the enterprise fund statute, the entity responsible for operating the fund must submit a proposed line item budget to the local executive authority "no later than one hundred and twenty days prior to the beginning of each fiscal year" (March 1). The budget is then submitted to the community's executive authority like any other departmental request for review and appropriation. When preparing the budget, enterprise-related costs already included for appropriation in the General Fund operating budget must not be included for appropriation in the enterprise fund budget.

The budget is subject to the appropriation process. Any transfers among the enterprise fund's line-item appropriations require additional legislative action during the last two months of any fiscal year.

Expenses

All operating costs of the enterprise must be identified in the budget. Any surplus resulting from unspent appropriations as of June 30 is kept by the enterprise fund. At a minimum, common items to be broken out in enterprise fund budgets should include, salaries and wages, expenses, capital outlays, indirect costs, and a contingency for unforeseen events.

Revenues

Revenues may be appropriated by the town's legislative body until the tax rate is certified by the Bureau of Accounts. An estimated increase in revenues above the prior fiscal year's actual revenues must be supported in writing to the Bureau of Accounts using rate analysis, usage data, new rate implementation dates, etc., for tax rate certification purposes. Any surplus is kept by the enterprise fund at fiscal year-end.

As described in the Case Studies (see Appendices), the Towns of Newton and Reading have utilized an Enterprise Fund for their stormwater fees. For detailed descriptions of adoption and appropriations procedures of enterprise funds please review the *2008 Enterprise Funds Manual, G.L. c. 44, § 53F½* here, http://www.mass.gov/dor/docs/dls/publ/misc/enterprisefundmanual.pdf.

Other Financing Options

While the drainage service fee is the most effective way to implement a successful, long-term stormwater management program or utility, municipalities have a range of other financing options to consider when planning their stormwater system requirements and objectives. With the exception of general fund appropriations, however, most of these additional options are project specific; they are not dedicated or guaranteed, they vary from year to year, and are therefore far less predictable than

user fees. For these reasons, they limit a municipality's ability to pay for ongoing service delivery expenses, such as administration and operations.

Still, due to the range of stormwater system needs and expense types, many communities draw from a range of financing options, combining enterprise-based, user-fee revenues with other funding sources. This has been referred to as "blended funding." When setting up a management plan, municipalities could consider the following types of financing options.

General Fund Appropriation

General fund appropriations are a familiar, frequently used method to pay for stormwater management expenses. In most communities, they are used as the primary funding source for stormwater needs. The disadvantages of using general funds to pay for stormwater system expenses is that stormwater needs then compete against other municipal service needs and must be re-evaluated and re-appropriated each year, which does not provide for a stable funding source with which to make long-term plans. Additionally, there is no clear nexus between the source of the funds (which are primarily tax levies) and the uses. Finally, tax-exempt properties do not contribute to the general fund, though they impose costs on the stormwater/drainage system.

Bonds/Loans

A bond is a written promise to repay borrowed money on a definite schedule, and usually at a fixed rate of interest, for the life of the bond. Some types of bonds are tax exempt. Bonds represent a large source of capital, but can be a complex and more expensive way to borrow. The high expense results from the legal and administrative time required for issuing bonds. In some cases voter approval is required for issuing bonds.

A well-known municipal funding source, capital improvement bonds are especially appropriate for covering large capital expenses associated with stormwater management. Capital improvement typically is defined as a non-recurring expenditure or any expenditure for physical improvements, including costs for: acquisition of existing buildings, land, or interests in land; construction of streets and highways or utility lines; acquisition of fixed equipment; landscaping; and similar expenditures. There are two main types of capital improvement bonds for a municipality to consider: General Obligation Bonds and Revenue Bonds. General Obligation Bonds are backed by the "full faith and credit" of a municipality are not secured by a particular source of revenue. The municipality pledges to use legally available resources, including tax revenues, to repay bond holders. Revenue bonds are a municipal bond supported by the revenue from a specific project, such as a toll bridge, highway, or local stadium. A primary benefit for using revenue bonds versus GO Bonds is that they allow the municipality to avoid reaching legislated debt limits. It should be noted that if a municipality decided to use a revenue bond to pay for stormwater infrastructure capital expenses, it would need to keep user fees distinguishable as a revenue source.

Another bond option is a "Double-Barrel Bond": a municipal revenue bond secured by a pledge of two or more sources of payments, typically a user fee and the credit of the issuing government (generally taxes). State and local governments use double-barrel bonds to finance environmental improvements, including stormwater management and utility set-up, and/or the creation of stormwater management districts. The revenue stream pledge may be in the form of multiple taxes,

such as the real estate transfer tax or special assessment taxes. For further information on the use of this type of bond see *The Fundamentals of Municipal Bonds*; "General Obligation Bonds"[3] (http://www.amazon.com/Fundamentals-Municipal-Bonds-Wiley-Finance/dp/0471393657).

The State Revolving Fund (SRF) Water Pollution Control Program was implemented by the 1987 Clean Water Amendments to provide long-term, low-interest loans for capital improvement projects designed to abate point and nonpoint sources of water pollution. The SRF program is administered by states using federal grant money, matching state funds, and loan repayments to fund eligible projects. Massachusetts DEP and the Massachusetts Water Pollution Abatement Trust jointly administers the Massachusetts Clean Water State Revolving Fund (CWSRF), which provides a low-cost funding mechanism to assist municipalities in complying with federal and state water quality requirements. Financial assistance is available for planning and construction of projects, including CSO mitigation and nonpoint source pollution abatement projects (pollution prevention, and stormwater remediation). While the SRF is a viable funding source for many stormwater capital improvement projects, these loans are only available for projects that offer a solution for stormwater quality issues. Many municipalities also have important capital improvement projects that are intended to improve drainage and flooding issues. For further information on this loan program see the DEP State Revolving Fund Program webpage: http://www.mass.gov/dep/water/wastewater/srfinfo.htm.

Grants

Although an attractive source of funding by municipalities in years past, grants for water pollution from the federal government are far smaller than in earlier years with more stringent requirements. In addition, since grants are designed by the awarding agency or organization to meet certain, often specific, goals, they may carry additional mandates and those mandates may be costly to meet. A few notable grant programs still available to supplement a municipal stormwater management fee/utility include:

- *Clean Water Act Section 319 Nonpoint Source Competitive Grants Program*. This grant program is intended to provide supplemental funding for meeting the provisions of section 319 of the Clean Water Act: "implementation of projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution." Grants can be used to finance the development of a stormwater utility and are often used for CIP projects even if the rest of the stormwater management system is funded through another source. Projects must address activities that are identified in the Massachusetts NPS Management Plan and a 40% non-federal match is required from the grantee. Further information regarding this program can be found on the Massachusetts Department of Environmental Protection (DEP) webpage: http://www.mass.gov/dep/water/grants.htm#319. When the Request for Responses (RFR) is issued, it is posted on the Commonwealth of Massachusetts Procurement Access & Solicitation System, at www.comm-pass.com.
- *Coastal Pollutant Remediation (CPR) Grant Program*. The CPR grant program was established in 1996 by the Massachusetts Legislature to compliment the 319 program to help coastal communities abate water contamination problems from nonpoint source pollutants. The CPR program offers funding to Massachusetts municipalities within the designated Massachusetts Coastal Zone to assess and remediate stormwater pollution from paved

[3] Temel, Judy W.; The Bond Market Association; *The Fundamentals of Municipal Bonds*; "General Obligation Bonds;" 5th ed., John Wiley & Sons, Inc.; 2001.

surfaces and to build boat waste pump-out facilities. Projects may not exceed one year in duration and must be completed by June 30 of each year. Further information regarding this program can be found on the Massachusetts Office of Coastal Zone Management (CZM) webpage: http://www.mass.gov/czm/cprgp.htm. When the RFR is issued, it is posted on the Commonwealth of Massachusetts Procurement Access & Solicitation System, at www.comm-pass.com.

- *Transportation Equity Act for the 21st Century* (TEA-21). TEA 21 authorizes over $200 billion to improve the Nation's transportation infrastructure, enhance economic growth and protect the environment. Municipalities can access this source of funding via submitting project proposals to the Boston Region Metropolitan Planning Organization for inclusion in the Transportation Improvement Program (TIP). TEA-21 allows up to 20% of the cost of a transportation facility reconstruction, rehabilitation, resurfacing or restoration project to be used for environmental mitigation, pollution abatement or construction of stormwater treatment systems.

Betterments

Betterments are a well-known way of funding improved or expanded infrastructure through a discrete charge on properties that benefit from the improvements. Each property benefitting from improved infrastructure is charged an additional special property tax. The cost may be paid in full or apportioned over a period of 20 years. In Massachusetts, municipalities may assess a betterments tax through legislative action such as a city council or town meeting vote. The betterments charge does not have to be for the entire cost of the improved or expanded infrastructure, but if it is less than the full cost, a city or town must decide what other funding sources will be used to pay the expense.

Because betterment fees must be tied to the direct benefit of each assessed property within a set timeframe, such a fee is more suited to a smaller area with discrete improvements rather than a generalized area. Often, if betterment fees are used to finance development of larger areas, it can pose severe administrative burdens on the town, and will require both a clear billing system and an efficient management team.

Plan Review, Development Inspection, and Other Review Fees

Municipal development review processes frequently attach fees to various permits to pay for improvements to public infrastructure. The rationale is that new private development often requires new or upgraded infrastructure, including stormwater infrastructure, and that these costs should be borne, at least in part, by the developer. Such fees are integrated into Planning Board Rules and Regulations that specify the requirements and process for development review.

Using development review fees to help finance stormwater systems or stormwater utilities is attractive because the costs are borne by a special user group – the developer. For this reason, using such fees to pay for stormwater upgrades is politically attractive – the public does not need to be charged for the improvements. The disadvantages of this option are that as with many financing tools, developer fees produce a relatively small amount of revenue that is project-specific. Also, in weaker market cities and towns, additional development fees may act as a deterrent to development.

A primary example of communities applying development review fees (also known as impact fees) can be found on Cape Cod. Towns within Barnstable County have been authorized to assess impact

fees by the Cape Cod Commission Act (Chapter 716 of the Acts of 1989 and Chapter 2 of the Acts of 1990) upon certification of their local comprehensive plans by the Commission. This type of fee is a one-time payment made by an applicant to the municipality as a condition of approval on a proposed development. The premise is that the impact fees offset the municipal capital costs of infrastructure necessary to service the proposed development. These funds must be used for governmental services or infrastructure improvements that are affected by the proposed development. Therefore, management of stormwater created by impervious surfaces on a proposed development are an appropriate use of these funds.

There is a significant challenge in relying upon these fees to make real progress in compliant municipal stormwater management, primarily due to the sporadic nature of their receipt. There are only so many development proposals that come before the Planning board per year, thereby providing a fixed, and rather minute, amount of revenue that can be generated by these fees.

Capitalization Recovery Fees

This financing option seeks to recapture public investment for properties undeveloped at the time a major stormwater system improvement was made. Later developers pay a charge to the municipality to help repay the investment. Capitalization recovery fees are appropriate and complementary for municipalities with a stormwater user service fee that does *not* apply to undeveloped properties.

Massachusetts municipalities could structure a capitalization recovery fee as a betterment that is charged to incoming property owners. However, the administration of such an arrangement would be complex: a municipality would first need to bond for the capital improvements (requiring a vote of the legislature), and then assess the betterment on incoming property owners (again requiring a vote of the legislature). For these reasons, advancing this type of financing option is more suited to more centralized forms of local government (e.g., city councils) and less to decentralized forms (e.g., town meeting).

Summary

Although there are several alternative financing methods that may be used in certain circumstances, only a drainage fee structure provides a long-term, sustainable, dedicated revenue source for stormwater management. These funding sources could be considered to supplement a drainage fee, yet it is unadvisable to a municipality to rely upon these sources to solely fund town-wide stormwater management needs.

As with any new fee or revenue source, public understanding and acceptance is one of the most critical aspects for success. The following section provides guidance and recommendations on public outreach and education to support the implementation of a drainage service fee and/or stormwater utility.