STORM WATER UTILITY DEVELOPMENT

SECTION 2

METHODOLOGY

2.0 METHODOLOGY

A storm water utility, operating much like an electric or water utility, may collect fees related to the control and treatment of storm water that can be used to fund a municipal storm water management program. Across the country, storm water utilities are becoming increasingly more common. According to a storm water utility survey conducted by Western Kentucky University in 2014, more than 1,500 storm water utilities now exist nationwide. In Pennsylvania, the trend was late coming but is now being seen with increasing frequency. The City of Philadelphia, the Borough of Dormont, the Borough of Ebensburg, the City of Lancaster, the City of Meadville, Mount Lebanon and Radnor Township have all implemented a storm water utility in recent years and many others are under consideration or in process of being formed.

The Borough of Greenville desired to research the feasibility of creating a storm water utility in order to separate this infrastructure from its current place as being part of the government operations funded under general tax revenue in order to provide it dedicated funding to better repair and maintain the infrastructure, provide comprehensive planning and be able to better respond to regulatory changes.

A storm water utility has three primary elements, a program that defines the operations and management of the storm water system, an organization that defines how the program is governed, and a funding mechanism that provides dedicated funding for the storm water system. The goal of this study is to review program models available to the Borough of Greenville on the creation of a storm water utility and recommend a model; collect data on existing land use, current operational costs, future needs from the Borough's storm water system; and provide recommendations on the governance structure and funding mechanism for the storm water utility.

2.1 STORM WATER UTILITY MODELS

Types of Storm Water Utility Models

There are three basic models of storm water utilities that can be used to calculate a storm water service fee. These are sometimes modified slightly to meet unique billing requirements. Impervious area is the most important factor influencing storm water runoff and is therefore a major element in each model.

Equivalent Residential Unit (ERU) Model

According to the EPA, the Equivalent Residential Unit or ERU model (also known as the Equivalent Service Unit (ESU) model) is used by more than 80 percent of all storm water

utilities. It bills an amount proportional to the impervious area (unable to pass water through) on a parcel, regardless of the parcels total area. It is therefore based on the effect of a typical single-family residential (SFR) home's impervious area footprint. A statistically representative sample of SFR parcels is reviewed to determine the impervious area of a typical SFR parcel. This amount is established as one ERU. In most cases, all SFRs up to a defined maximum total area are billed a flat rate for one ERU. In some cases, several tiers of SFR flat rate are established on the basis of an analysis of SFR parcels within defined total area groups. A tiered SFR flat rate approach improves the equitability of the bills sent to homeowners. The impervious areas on non-SFR parcels are usually individually measured. Each non-SFR impervious area is divided by the impervious area of a typical SFR parcel to determine the number of ERUs to be billed to the parcel.

Advantages

- The relationship between impervious area and storm water impact is relatively easy to explain to the public.
- The number of billable ERUs can be determined by limiting the parcel area review to impervious area only.
- Because pervious area analysis is not required, this approach requires the least amount of time to determine the total number of billing units.
- As vacant lots are not charged a fee, and single family residential lots are billed as a flat rate (sometimes several different rates under a tiered rate structure), this is the simplest model to administer.

Disadvantages

- Because the potential effect of storm water runoff from the previous area of a parcel is not reviewed, this method is sometimes considered to be less equitable than the Intensity of Development (ID) or Equivalent Hydraulic Area (EHA) models (discussed below) because runoff-related expenses are recovered from a smaller area base.
- This method could still be used to charge a fee to all parcels – pervious as well as impervious – to cover expenses, such as administration and regulatory compliance unrelated to impervious area.

Intensity of Development (ID) Model

This storm water cost allocation system is based on the percentage of impervious area relative to an entire parcel's size. All parcels, including vacant/undeveloped parcels, are charged a fee. 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 and are billed at a sliding scale, as shown in the table 2-1 below. For example, an SFR parcel, which is categorized as moderate development, would pay $0.16/month/1,000 square foot (ft^2) (or $1.60 for a 10,000 ft^2 lot).

Table 2-1 Example Rate Structure for an ID Model Storm Water Utility

Category (impervious percentage range)	Rate per month per 1,000 square feet of total served area (impervious plus pervious)
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

Advantages

- The ID model accounts for storm water from the pervious portion of parcels. Therefore, it can be more equitable than the ERU model.
- If a parcel's impervious area is increased slightly because of a minor construction modification, it probably would not be elevated up into the next higher ID tier. This reduces the time required for staff to maintain the billable unit master file.

Disadvantages

- The ID categories are broad, and parcels are not billed in direct proportion to their relative storm water discharges.
- This model can be more difficult to implement than the ERU model because parcel pervious and impervious areas need to be reviewed.

- It is also more complicated to explain to customers than the ERU model. This method might also discourage urban infill and inadvertently encourage sprawl.

Equivalent Hydraulic Area (EHA) Model

Under the Equivalent Hydraulic Area model, parcels are billed on the basis of the storm water runoff generated by their impervious areas. All parcels, including vacant/undeveloped parcels, are charged a fee, but the impervious area of each lot is charged a much higher rate than the previous area.

Advantages

- The EHA model accounts for flow from the pervious portion of parcels. Therefore, it might be more equitable than the ERU model.

- Like the ID method, it accounts for undeveloped/vacant parcels and allows them to be billed, but it is more equitable than the ID model because parcels are billed on the basis of individual measurements of pervious and impervious areas.

Disadvantages

- Because pervious area analysis is required in addition to impervious area, this approach requires more time to determine the total number of billing units.

- It is also more complicated to explain to customers than the ERU model.

These are three basic models that utilities can use to calculate fees, but are becoming clear that municipalities will need to be creative to find what will work for their specific community.

2.2 SELECTED MODEL AND METHODOLOGY

Based upon the a review of the advantages and disadvantages detailed above, Greenville Borough's Manager and stakeholders selected the Equivalent Residential Unit or ERU model as the best for Greenville to provide a workable storm water utility that balances cost to develop and govern with an equitable program.

ERU Model Methodology

The Development of the Greenville Borough Storm Water Utility (based on the ERU Model) required data on existing lots and current high resolution aerial mapping of the entire Borough. The ERU model requires the determination of a typical single-family residential (SFR) home's impervious area footprint, so several definitions had to be agreed upon in advance of proceeding:

> *Equivalent Residential Unit* (ERU) – It was decided a single tiered detached single-family residential fee structure would be utilized to simplify model development and provide the most cost effective billing unit. As Greenville Borough has three residential zoning districts that have different minimum lot sizes, it was agreed to that all lots containing detached single-family residences would be lumped into a residential category and the average impervious area determined. This value would become the basis for 1 ERU.
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> *Impervious Area* – From storm water generation perspective, the term impervious refers to a surface's inability to permit rainfall to pass through and infiltrate into the subsurface. The rainfall therefore flows off these a surfaces as storm water runoff. The standard examples of roofs, concrete sidewalks, paved driveways and parking lots were also augmented with gravel surfaces which, unless specifically designed for infiltration, compact to a dense (uniform) surface overtime and produce runoff at a rate comparable to asphalt or concrete paved surfaces.

The storm water utility development study was then divided into two separate phases outlined as follows:

Phase I

- Using recently obtained high resolution aerial photogrammetric mapping, existing impervious areas within the Borough for a representative sample of the detached single family resident parcels were identified in order to calculate the value of an equivalent residential unit (ERU) for the basis of the storm water utility fee assessment;

- Using the high resolution aerial mapping, existing impervious areas within the Borough for non - detached single family resident parcels were measured and divided by the determined ERU value.;

- Combining all the ERU's determined in the step above provided a total ERU value;

- The current costs incurred by Greenville Borough in the operation and maintenance of the existing storm sewer system were identified. An assessment of future needs for the system was then developed and added to the existing costs to create a draft multi-year capital plan for the storm water system;

- The Borough assembled an Advisory Committee that met periodically to review the data being generated and provide community based feedback on the program development; and

- Prepare this report summarizing the storm water utility funding mechanism and offering recommendations on the utility's program and organizational structure.

Phase II

Phase II of the program involves developing the required documentation for the Borough to implement the Storm Water Utility. Details of the tasks in Phase II include the following:

- Develop an implementation schedule;

- Assist the Borough Solicitor in the development of the required ordinance required to implement the storm water utility organization and fee;

- A series of public information and education meetings;

- Borough Council adoption; and

- Develop additional guidelines which could include incentives for the use of green storm water infrastructure within the Borough to assist in the control of storm water runoff, credit program for private investment in green storm water infrastructure, and a grant program for one time assistance with construction costs of green storm water infrastructure.