

# Stormwater Rates





# Background

- ▶▶ Since 1993, the City has required property owners to pay a user rate related to the operation and maintenance of the City's stormwater system.
- ▶▶ This study re-evaluates how stormwater rates are calculated in order to improve the methodology and equity of the rate structure.
- ▶▶ The new stormwater rate will be allocated to all properties in the City that specifically benefit from the availability of the City's stormwater system for disposal of stormwater.

# Stormwater Rate Design

Simplified Cost Allocation for Water (J. Beecher, MSU)



**GUIDING  
PRINCIPLE**



**INFORMING  
DISCIPLINE**



**FUNCTIONAL  
TASK**

**STEP  
1**

**REVENUE  
REQUIREMENTS**

Cost-based  
pricing

Finance and  
accounting

Determine total cost  
of service (budget) for  
the rate year(s) based  
on test-year data

**STEP  
2**

**COST  
ALLOCATION**

Nondiscriminatory  
pricing

Engineering  
and economics

Link costs to customer  
usage based on  
varying contributions  
to system load

**STEP  
3**

**RATE  
DESIGN**

Just and  
reasonable pricing

Economics,  
law, and policy

Construct revenue-  
neutral rates and  
charges to recover  
costs

# Stormwater Rate Design

## STEP 1

## Revenue Requirements

The stormwater rate is based on the cost of service of the stormwater system within the City including, but not limited to:

- ▶▶ Pipe Maintenance (cleaning and televising), Replacement and Extension
- ▶▶ Open Drainage Maintenance, Inspection, Repair, Replacement, Extension
- ▶▶ Catch Basin and Manhole Cleaning, Inspection, Repair and Replacement
- ▶▶ Storm Sewer Pump Station Inspection, Maintenance, Repair, and Replacement
- ▶▶ Consulting Services to plan, design, finance, construct, and maintain improvements to the system
- ▶▶ Debt Service
- ▶▶ Short Term Capital Improvement Plan (CIP) Funding

Total projected revenue requirement/cost of service = **\$1,985,000**

\*Specific items for inclusion and exclusion will be spelled out in the cost of service study and/or Ordinance.

\*\* The City will undertake an updated cost of service study to improve the accuracy of the cost of service/revenue requirement annually.

# Stormwater Rate Design

## STEP 2 Cost Allocation – Goals for Modification

- ▶▶ Devise revenue neutral method to allocate and collect the City's stormwater cost of service.
- ▶▶ Allocate charges according to actual stormwater runoff per parcel.
- ▶▶ Allocate charges associated with public roads to the City at large.
- ▶▶ Base property allocation the same regardless of use, zoning, or ownership.
- ▶▶ Keep administration of cost allocation transparent, including appeals and credits.

# Stormwater Rate Design

## STEP 2 Cost Allocation – Benefit Defined

- ▶▶ The stormwater system particularly benefits each parcel in the system:
  - Provides specific capacity to convey flows generated from each individual property;
  - Reduces individual parcel flooding;
  - Provides outlets for sump pumps to protect basements and foundations;
  - Transports pollutants contained in the runoff generated from the property; and/or
  - Expands use of the parcel (no on-site system is required).
- ▶▶ The amount of runoff from a parcel is its “load” on the system.
- ▶▶ Each individual property has a property runoff potential, or PRP, which can be assigned with precision based on impervious and pervious surfaces and runoff coefficients.
- ▶▶ Parcels that do not use (benefit from) the stormwater system do not contribute load to the system and therefore, will not be allocated costs.

# Stormwater Rate Design

## STEP 2 Cost Allocation

### Stormwater Systems

- ▶▶ Designed based on capacity needed to drain specific properties within an area calculated by various factors such as, but not limited to:
  - ▶▶ Tributary area
  - ▶▶ Impervious vs pervious area factors
  - ▶▶ Slopes
  - ▶▶ Soils
  - ▶▶ Means of conveyance
- ▶▶ Could include:
  - storm sewers and appurtenant features, lakes, ponds, channels, swales, storm drains, canals, creeks, catch basins, streams, gulches, gullies, flumes, culverts, siphons, retention or detention basins, dams, floodwalls, levees, pumping stations, and other like facilities, and natural watercourses and features located within the geographic limits of the City which are designed or used for collecting, storing, treating or conveying stormwater or through which stormwater is collected, stored, treated or conveyed, or any other physical means by which stormwater management is achieved.

# Stormwater Rate Design

## STEP 2 Cost Allocation

### Stormwater Systems

- ▶▶ **All properties can generate water quality impacting pollutants:**
  - ▶▶ Sediment
  - ▶▶ Petroleum products
  - ▶▶ Solvents
  - ▶▶ Fertilizers
  - ▶▶ Organic materials
- ▶▶ **Pollutants tend to stay on the property unless mobilized by stormwater runoff.**
  - ▶▶ Property Runoff Potential correlate to the amount of pollution that can be carried into the stormwater system.
  - ▶▶ Water quality regulations and requirements apply to stormwater systems.
  - ▶▶ Each property contributes pollutants into the system. However, those pollutants cannot be accurately measured on a per-parcel basis.
  - ▶▶ Based on the fact that the system also provides “public benefit” in reducing pollutant loading, we recommend the City’s General Fund be allocated a portion of the cost of service related to pollution prevention.



# Stormwater Rate Design

## STEP 2 Cost Allocation

### Property Runoff Potential (PRP)

The property runoff potential, or PRP, is based on hydrologic engineering principles for calculating runoff that use both the impervious surface area and pervious surface area. All surfaces will generate some amount of runoff during precipitation events and can be assigned a runoff coefficient to represent the fraction of the precipitation that results in runoff. The runoff coefficients used in this study are based on widely accepted practices for calculating runoff (refer to *“Handbook of Applied Hydrology: A Compendium of Water-resources”* by Chow, 1964).

Property Runoff Potential is measured in square feet, using the following formula:

$$\text{Property Runoff Potential (sft)} = 0.20 \times [\text{Total Area-Impervious Area}] + 0.9 \times [\text{Impervious Area}]$$

# Stormwater Rate Design

## STEP 2 Cost Allocation

### User Categories

- ▶▶ **Private Property Owners:** Allocated based on Property Runoff Potential (PRP)
- ▶▶ **City Roads:** Allocated based on PRP
- ▶▶ **Macomb County Roads:** Included as they have their own drainage system which outlets to a City system prior to discharge and allocated to the City based on PRP
- ▶▶ **MDOT Roads:** Not included as they do not appear to be connected to the City system (I-94)
- ▶▶ **Government – Government owned properties:** City-owned parcels are allocated based on PRP. Parcels owned by other government agencies (County, State, Federal) are allocated to the City based on PRP

# Stormwater Rate Design

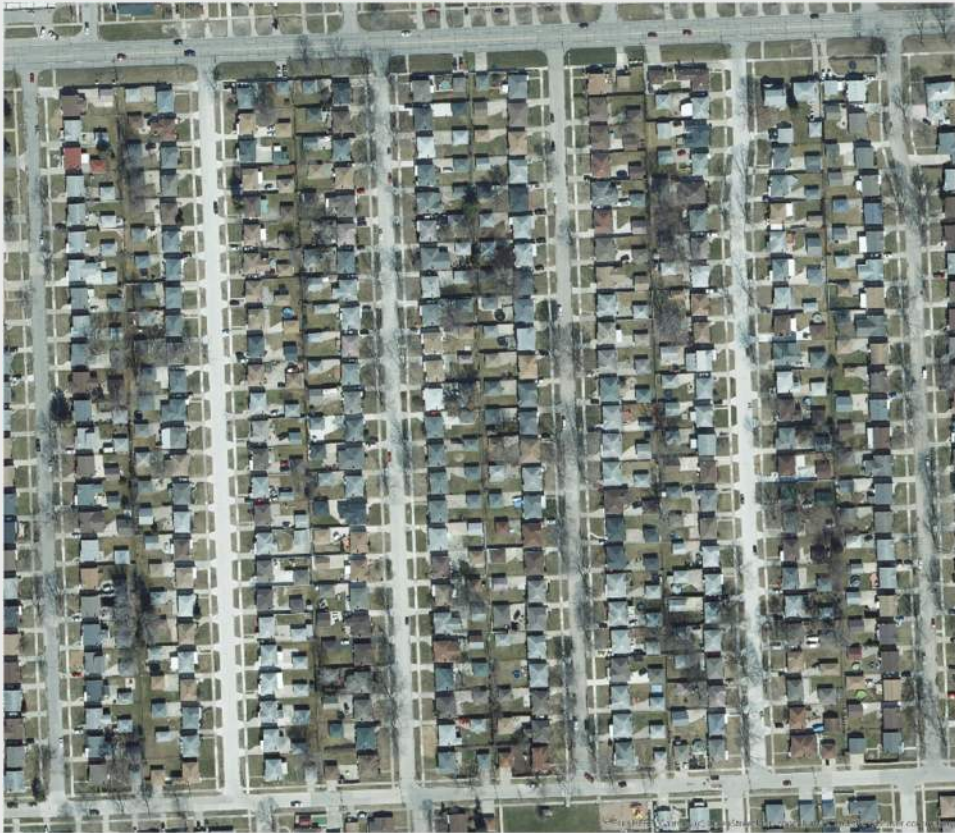
## **STEP** **2** Cost Allocation – Single Family Residential Properties

Single Family Residential (SFR) properties were grouped based on average development characteristics using blocks of homogenous parcels and calculating imperviousness for each residential block.

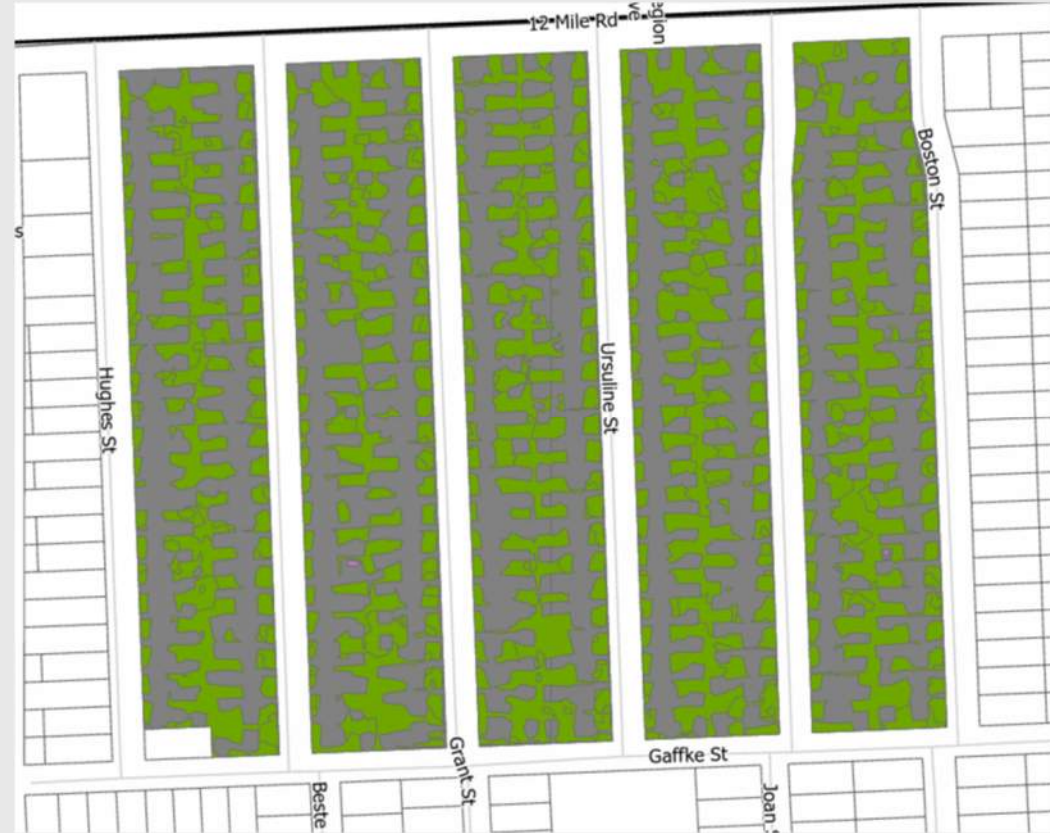
Five initial classifications based on lot area:

GROUP	LOT AREA	TOTAL PARCELS
Group 1	<.10 ac	613
Group 2	0.10 to 0.250 ac	19,240
Group 3	0.251 to 0.500 ac	2,293
Group 4	0.501 to 0.750 ac	185
Group 5	0.751 to 1.0 ac	14

**Aerial of Single Family Residential Area**



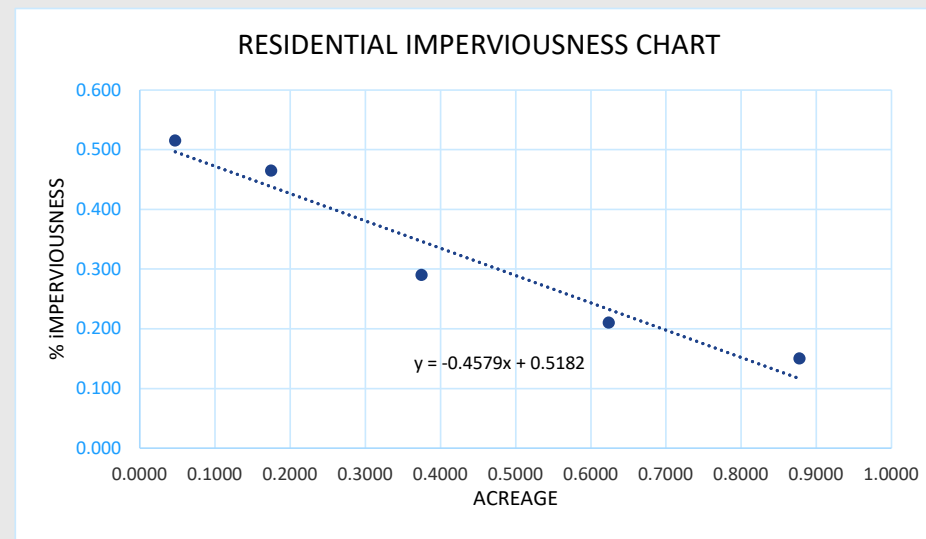
**SEMCOG Land Cover Data of Single Family Residential Area**



# Stormwater Rate Design

## STEP 2 Cost Allocation – Single Family Residential Properties

- ▶▶ Calculations performed multiple times for each SFR group, verified, and found to be with a 5% margin of error.
- ▶▶ The impervious factor per group was plotted and a linear equation developed for all SFR properties in the City.
- ▶▶ The PRP for each individual SFR parcel was then calculated based on area and this equation.



# Stormwater Rate Design

## **STEP** **2** Cost Allocation – Non-Single Family Residential Properties

- ▶▶ PRP was calculated utilizing SEMCOG Land Cover Data and NearMap high resolution aerial photos on a per parcel basis.
- ▶▶ Initially, 10% were field checked for consistency using ARC GIS Mobile Collector. An additional 700 parcels were then field verified and updated.

## Aerial of Non-Single Family Residential Area



## SEMCOG Land Cover Data of Non-Single Family Residential Area



# Stormwater Rate Design

## STEP 3 Rate Design

How is rate determined?

**A.**

Determine Revenue Requirement for system (i.e., cost of service)



**B.**

Sum all adjusted (for appeals and credit) benefiting Property Runoff Potential (PRP)



**C.**

Divide Revenue Requirement by benefiting parcel PRP to get cost (\$) per square foot of PRP



**D.**

Apply cost per square foot uniformly across all benefiting parcels



# Stormwater Rate Design

## STEP 3

### Single Family Residential Examples

PARCEL	ACREAGE	AVERAGE % IMPERVIOUS	PRP (sft)	APPROXIMATE ANNUAL RATE
Parcel 1	0.0470	49.7%	1121.9624	\$ 12.88
Parcel 2	0.1750	43.8%	3862.7982	\$ 44.35
Parcel 3	0.3750	34.6%	7229.0167	\$ 82.99
Parcel 4	0.6240	23.2%	9859.7358	\$ 113.19
Parcel 5	0.8780	11.6%	10759.0707	\$ 123.52

# Stormwater Rate Design

## STEP 3

### Non-Single Family Residential Examples

PARCEL	SIZE	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	RUNOFF POTENTIAL (SF)	APPROXIMATE ANNUAL RATE
Medical Office Building	2.07 AC	73173.00	18848.00	69625.30	\$799.33
Retail Store	0.07 AC	3300.000	699.000	3109.800	\$35.70
Medical Office Building	0.4 AC	17699.000	1615.000	16252.100	\$186.58
Drugstore	1.74 AC	93693.000	1853.000	84694.300	\$972.33

# Stormwater Rates

Existing vs. Proposed

## Existing Rate

### **Residential**

Flat rate for single family  
and multi-family properties

### **Commercial**

Charged \$121.71 per  
Effective Hydraulic Area  
(0.20 Pervious, 0.95  
Impervious)

## Proposed Rate

### **Residential and Commercial**

Rate calculated based on  
Property Runoff Potential on  
an individual basis to the  
square foot

# Stormwater Rates

## Existing vs. Proposed

### Existing Rate

#### General

- ▶▶ All real property is charged for stormwater
- ▶▶ Stormwater Review Board hears appeals in January every year
- ▶▶ Only hears appeals based on Effective Hydraulic Area
- ▶▶ Roads are exempt
- ▶▶ Credits based on Effective Hydraulic Area for non-residential

### Proposed Rate

#### General

- ▶▶ Only parcels with a particular benefit are charged
- ▶▶ Calculations based on PRP
- ▶▶ Appeals based on PRP and connection to system
- ▶▶ City/County roads are charged based on PRP
- ▶▶ Credits based on removal of impervious surface or BMPs for any property within the City

# Breakdown of Percentage by Cost

Revenue Requirement= \$1,985,000

(For Illustration Purposes)

- ▶▶ Single Family Residential: 48.53%
- ▶▶ City Streets, City Owned Properties: 27.52% (City General Fund)
- ▶▶ County Roads: 3.40% (City General Fund)
- ▶▶ Non-Single Family Residential Properties: 18.03%
- ▶▶ Schools: 2.52%

# Appeals

- ▶▶ Residents can appeal their stormwater rate any time throughout the year.
- ▶▶ PRP, and corresponding charge, will be adjusted on the next bill upon successful appeal.
- ▶▶ Owner must supply information for appeal which will be verified by the City.

**Example:** Detached garage was removed. Owner provides certificate of survey or photos of garage where previously located.

**Example:** Surplus parking area was removed. Owner provides City approved site plan, survey, or photos

**Example:** Owner redirects roof runoff to canal. Owner provides photos of work.

# Credits

- ▶▶ Any property has the ability to reduce their rate to \$0 through the utilization of BMPs.
- ▶▶ Similar to other utilities, if you do not use the system, there is no rate.
- ▶▶ Credits for other BMPS will be specified on a sft of impervious removal.

**Example:** New detention basin is added. Owner supplies as-built drawings and calculations showing the structure is completed and functional.

**Example:** Owner installs and directs roof runoff to a rain garden. Owner provides plans, calculations, and photos of the completed work.

# Credits

- ▶▶ If property owner converts Impervious area to Pervious Area, that area is recalculated as Pervious, thus reducing the rate
- ▶▶ If a property owner detains Impervious Area for a 10-year storm event, that area is recalculated as Pervious
- ▶▶ If a property owner detains any area for a 100-year storm event, that area is calculated as 0 on the calculation and that area is removed from the rate



# Questions

