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August 19, 2009

Mr. Kyle Sonnenberg, City Manager
Mr. Rich Lapointe, Public Works Director
City of Newark
220 Elkton Road
Newark, DE 19711

RE: Stormwater Utility Feasibility Report

Dear Mr. Sonnenberg and Mr. Lapointe:

Enclosed is our revised report summarizing the feasibility of a stormwater utility for the City of Newark. The purpose of the stormwater utility is to equitably fund the City's stormwater programs to reduce flooding and stormwater problems and improve water quality. ***In Newark, stormwater is drinking water.*** Many of these City programs are conducted in accordance with Federal/State laws like the Clean Water Act and Del. Stormwater and Sediment Control Regulations. Delaware municipalities are authorized to form stormwater utilities under Chapter 40, Title 7 of Delaware Code. Many college towns of similar character have successfully implemented stormwater utilities as dedicated and sustainable funding of stormwater, water quality, and floodplain management programs.

Based on a statistical GIS analysis of parcels and zoning districts and annual rates of $0.01 to $0.02 per square foot of impervious area, the stormwater utility would generate $716,000 to $1,432,000 per year for the City stormwater budget. The gross impervious cover of 7,500 parcels within 8.0 sq mi of the City is 34% (minus roads/railroads). At a penny per sf rate, the flat fee for single family residential parcels would be $3.33 per month and nonresidential fees would be $10.00 per 1000 sf per month. At two pennies per sf, the fee for single family residential would be $6.75 per month and nonresidential fees would be $20.00 per 1000 sf per month. The study includes a draft ordinance for consideration.

This report incorporates additional information presented at last night's City Council workshop.

Please do not hesitate to contact us at 302-831-4929 or jerryk@udel.edu.

Warmly;

Gerald J. Kauffman P. E.
Director

Andrew Homsey
GIS Manager

Cc: Roy Lopata, Newark Planning Department
Roy Simonson, Newark Water Department
Dennis McFarland, Newark Finance Department

Stormwater Utility Feasibility Report

City of Newark, Delaware

"*Stormwater is drinking water in Newark*".

August 19, 2009

prepared by:

University of Delaware
Institute for Public Administration
Water Resources Agency
Newark, Del.

prepared for:

City of Newark
Newark, Del.

Executive Summary

1. Newark maintains a stormwater system in the Christina/White Clay watersheds with 60 miles of sewers, 200 miles of curb/gutter, 3000 catch basins, 34 stormwater ponds, & 500 floodplain acres.

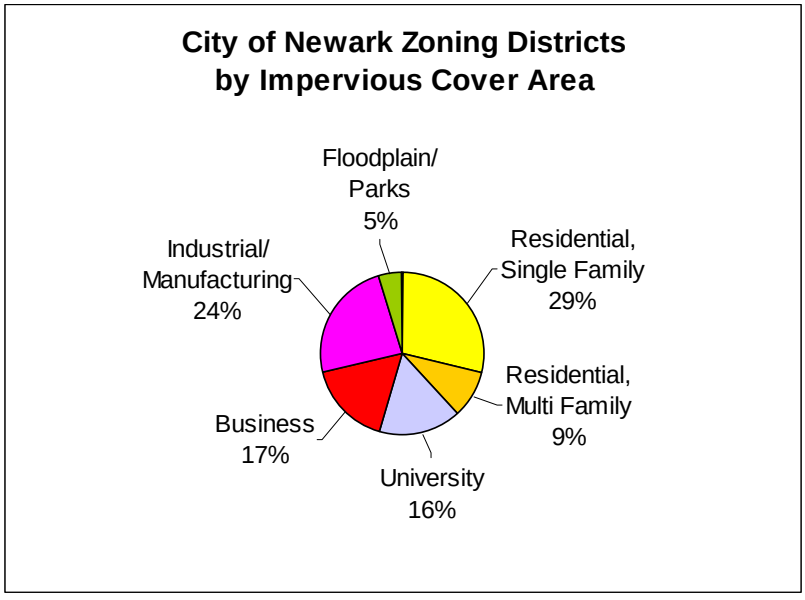
2. The City proposes to adopt a stormwater utility as a dedicated funding source to recover $1.6 million annually for operation of stormwater, water quality, and floodplain programs largely required by Federal and State laws and regulations.

3. The goals of the Newark stormwater program are to: (a) prevent/reduce flood and stormwater problems, (b) improve water quality, (c) decrease pollutant loads to City drinking water sources.

4. Stormwater utility advantages include: (a) treats stormwater as a utility resource (like drinking water) instead of waste stream, (b) equitable by stormwater contribution from impervious roof and pavement, (c) accrued to tax paying & tax exempt properties - both contribute stormwater runoff.

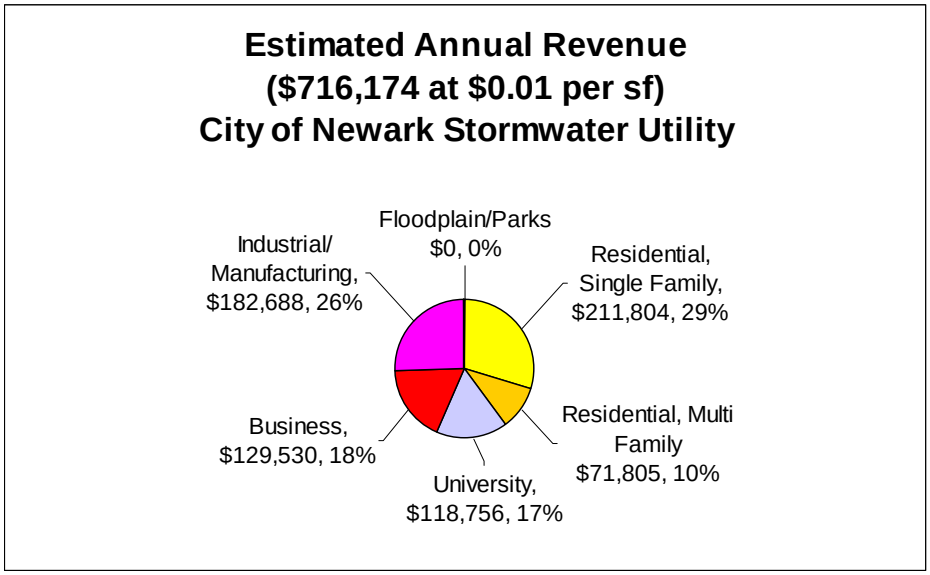
5. There are more than 500 stormwater utilities throughout the USA:
- The average stormwater fee for a single family home was $3.67 per month.
- College town monthly residential fees: $1.50 (Burlington, VT), $3.43 (Orono, ME), $14.26 (Ft. Collins, CO).
- USEPA survey in mid-Atlantic, residential stormwater fees range from $2 to $40 per quarter.
- Wilmington and Philadelphia monthly residential fees are $3.03 and $10.80, respectively.

6. About 34% of land on 7,500 parcels in Newark are covered by impervious area with breakdown:



7. The mean impervious cover of single family residential parcels in Newark is 4,000 sf which is defined as an equivalent residential unit (ERU).

8. Annual revenues from a stormwater utility in the City of Newark would range from:
- Option 1: $716,174 for $0.01 per sf impervious cover ($3.33 per month single family residential), to
- Option 2: $1,432,348 for $0.02 per sf impervious cover ($6.75 per month single family residential).



9. The following table lists possible options for a City of Newark stormwater utility fee:

Designation	Option 1 ($0.01/sf) Stormwater Fee	Option 2 ($0.02/sf) Stormwater Fee
Residential, One-family, detached, semidetached	$3.33 monthly	$6.75 monthly
Multifamily Residential, University, Business, Manufacturing, Industrial, Office	$10.00/1000 sf monthly	$20.00/1000 sf monthly
Open floodway district (undeveloped)	No building permitted	No building permitted
Parkland, Roads/streets, Railroads. City – owned land. City – leased parking facilities	Exempt	Exempt
Projected Annual Revenue	**$716,174**	**$1,432,348**

10. The City and WRA should initiate a public education program to inform property owners about the benefits of a stormwater utility to reduce flooding/stormwater problems and improve water quality:
- Meet with commercial properties that generate high stormwater runoff and (2) tax exempt properties.
- Establish a stormwater utility website.
- Create a stormwater utility brochure to be sent to all customers before initial billing.

11. Municipalities are authorized to form a stormwater utility in Chapter 40, Title 7, Delaware Code.

12. The City should consider the water/sewer/electric or property assessment billing systems to assess the stormwater fee with the latter being the preferred mechanism.

13. City Council should consider adopting a stormwater utility ordinance to recover annual costs of stormwater services provided to parcel owners with ordinance effective date January 1, 2010.

Stormwater Utility Feasibility Report
City of Newark, Delaware
August 19, 2009

Introduction

The City of Newark owns, operates, and maintains a complex stormwater drainage system in the Upper Christina River and White Clay Creek watersheds including over:

- 60 miles of storm sewers (Figure 1),
- 200 miles of roadway curb and gutter,
- 3000 stormwater inlets or catch basins,
- 34 stormwater detention ponds,
- 500 acres of floodplain along 10 stream miles within the City.

The City of Newark proposes to adopt a stormwater utility as a dedicated and sustainable funding source to finance administration, operation, and maintenance of stormwater, water quality, watershed, and floodplain programs largely required by State and Federal laws and regulations such as:

- Delaware Stormwater and Sediment Regulations,
- Delaware Source Water Protection Law of 2001,
- Federal Clean Water Act, NPDES MS4 Part 2 Permit and Total Maximum Daily Loads (TMDL),
- Federal Emergency Management Agency (FEMA) Flood Insurance Program,
- Federal Safe Drinking Water Act Amendments of 1996.

The goals of the Newark stormwater management program are to:

- Prevent and reduce flood damage from flood events (Table 1),
- Prevent and solve stormwater drainage problems,
- Improve water quality in the White Clay Creek and Upper Christina River watersheds (Figure 3),
- Decrease pollutant loads entering the City's drinking water streams and wellhead areas,
- Reduce soil erosion and sediment problems.

Table 1. Top 5 flood events along the White Clay Creek near Newark, 1932 – 2009 (USGS)

Flow (cfs)	Date	Storm	Frequency
19,500	9/16/99	Hurricane Floyd	100 yr
13,900	9/15/03	Tropical Storm Henri	50 yr
11,600	7/5/89	4th Of July Storm of '89	10 yr
9,150	1/19/06	Snowmelt Storm of '06	10 yr
9,080	6/22/72	Solstice Storm of '72	10 yr

A stormwater utility is based on the science of hydrology illustrated by the hydrologic cycle (Figure 2). Precipitation infiltrates into the ground, evaporates, transpires, or runs off to the stormwater system and the creeks. There is a direct correlation between the area of impervious cover on a parcel and the quantity and quality of stormwater runoff. A variation of the hydrologic cycle indicates:

Precipitation + Impervious Cover = Stormwater Runoff

Figure 1. Stormwater system near Newark High School

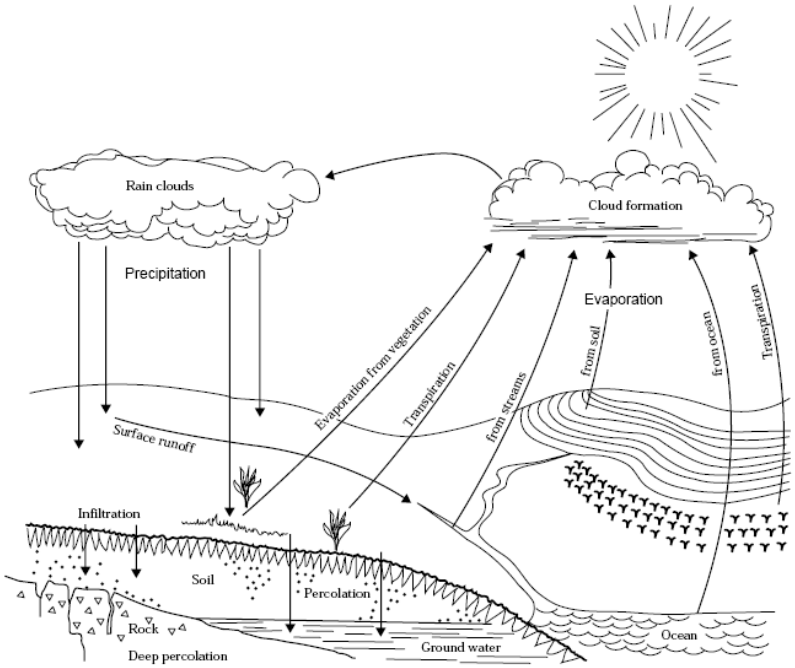


Figure 2. The hydrologic cycle (USDA, NRCS)

Benefits of Stormwater Utility

In the 21st century, stormwater management has evolved from a basic capital construction and maintenance function supported by property taxes to an integrated stormwater, floodplain, watershed, and water quality management program financed by an equitable user fee approach. In the USA, over 500 local governments have established stormwater utilities as efficient and feasible financing options

to provide dedicated revenue sources for stormwater management. A stormwater utility operates similarly to water and sewer utilities which are funded through service fees and administered separately from the general tax fund, ensuring stable and adequate funding for these public services.

Stormwater user fees have characteristics that differ from taxes. First, stormwater fees are charged for a government service (stormwater) which benefits the party (property owner) paying the fee. Second, the fee amount is designed to specifically recover the costs of services provided. Third, the stormwater fee is based on an equitable impervious cover measurement which directly relates to the amount of stormwater runoff. In contrast, property tax is based on the economic value of property with little relationship to stormwater runoff quality and quantity. And fourth, stormwater service fees are derived from a science - based, hydrologic connection between intensity of land use (impervious cover) and stormwater runoff from individual properties.

In January 2008, the U. S. Environmental Protection Agency, Region 3 in Philadelphia conducted a survey of stormwater funding alternatives in Delaware, Pennsylvania, Maryland, Virginia, West Virginia, and District Columbia. The survey found that the stormwater utility user fee approach to fund stormwater programs has many advantages compared to other techniques such as property tax/general funds, special assessment districts, grants/loans, and environmental tax shifting.

Stormwater Utility Advantages

- Treats stormwater as a valuable, utility resource (like drinking water) instead of a waste stream
- Equitable based on stormwater contribution from roof and pavement area (impervious cover)
- Hydrologic relationship between impervious area and the quantity/quality of stormwater runoff
- Impervious cover can be measured on a parcel by basis by GIS mapping
- Dedicated and sustainable funding source for total life cycle cost accounting
- Accrued to tax paying and tax exempt properties - both contribute stormwater runoff
- Improves the overall equity of the municipal financing mix
- Billing system already in place for water, sewer, electric, and property assessment.

Property Tax/General Fund Disadvantages

- Annual competition for municipal funds from other programs.
- Stormwater programs subsidized by tax dollars
- Parcels with large impervious ratios do not fund equitable share for managing stormwater
- Tax exempt properties do not fund stormwater programs
- Quantity/quality of stormwater runoff bears no hydrologic relation to assessed property value

Special Assessment District Disadvantages

- Pertains only to certain neighborhoods
- Just a variation of the property tax

Grants and Loans Disadvantages

- Highly competitive with a low success rate (5% to 10%) of obtaining grant/loan
- Loans must be paid back with interest
- High overhead and labor effort preparing applications and paperwork to fulfill grant requirements

Environmental Tax Shifting

- Requires tax on pesticide, fertilizer, concrete and asphalt sales.

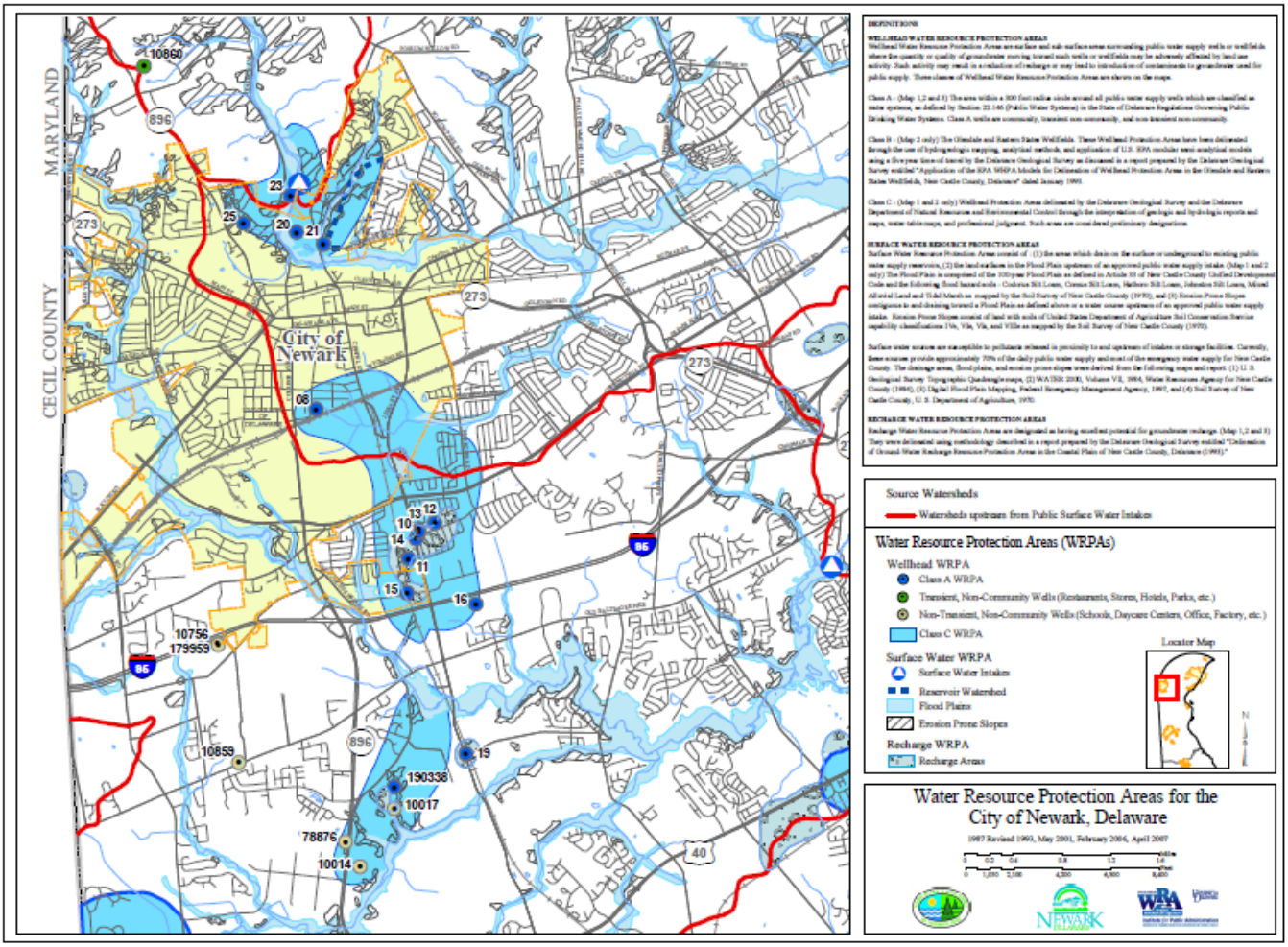


Figure 3. Water resource protection areas in the Upper Christina River and White Clay Creek watersheds in the City of Newark, Delaware

Scope of Work

The University of Delaware - Water Resources Agency (WRA) conducted the stormwater utility feasibility study according to the following tasks:

1. Benchmark stormwater utilities - Research other municipalities including college towns of like character to benchmark range of monthly stormwater utility fees.

2. Budget – Estimate annual budget of stormwater management program (City of Newark task) including labor, equipment, operation, and maintenance (O & M).

3. GIS mapping- Measure impervious cover (square feet and %) of parcels in Newark using GIS mapping. Map storm sewer system, stormwater ponds, floodplains, streams, and water resource protection areas (wellheads, reservoir watershed, and recharge areas).

4. Fees – Estimate monthly stormwater fees to meet annual budget based on range and mean impervious cover of parcels by City of Newark zoning districts (Table 2).

Table 2. City of Newark zoning districts

District	Designation	Minimum Lot Area
RH	Residential, One-family, detached	21,780 sf (1/2 ac)
RT	Residential, One-family, detached	15,000 sf (1/3 ac)
RS	Residential, One-family, detached	9,000 sf (1/4 ac)
RD	Residential, detached, semidetached	6,250 sf (1/8 ac)
RM	Residential, Garden Apartments	One acre, 2725 sf per family
RA	Residential, High rise apartments	2 acres, 1,200 sf per family
RR	Residential, Row house, townhouse	One acre, 2,725 sf per DU
AC	Residential, Adult community	One acre, 4,840 sf per DU
UN	University, college and university	
BL	Business, limited	3,000 sf
BLR	Business, limited business residential	3,000 sf
BN	Business, Neighborhood shopping	5,000 sf
BB	Central Business District	3,000 sf
BC	General Business	5,000 sf
ML	Limited Manufacturing	One acre
MI	General Industrial	5,000 sf
MOR	Manufacturing Office Research	Two acres
OFD	Open floodway district	No building permitted
PL	Public parkland	No building permitted

5. Legal – Research enabling authority to implement stormwater utility in Delaware.

6. Public Education and Outreach – Develop and initiate a public outreach program.

7. Stormwater Utility Ordinance – Review stormwater utility ordinances of similar communities and draft ordinance for consideration by City Council. Assist City with public hearings on the ordinance.

Benchmark Stormwater Utility Ordinance

In January 2008, the USEPA estimated there were more than 500 stormwater utilities throughout the United States and the average quarterly stormwater fee for a single family home was $11.00 or $3.67 per month or $44.00 per year. A 2008 Western Kentucky University survey identified close to 700 stormwater utilities in 38 states and the District of Columbia (Figures 4 and 5). Other college towns of similar character to the City of Newark have adopted stormwater utilities (Table 3). Monthly stormwater fees for residential parcels in land grant college towns vary from $1.50 for Burlington,

Vermont (University of Vermont) to $3.43 for Orono, Maine (University of Maine) to $14.26 for Fort Collins, Colorado (Colorado State University).

A nationwide survey of stormwater utilities by Black and Veach in 2007 and updated by WRA in 2009 indicates monthly residential fees range from $1.20 in Columbia, Missouri to $3.93 in Silver Spring, Maryland to $11.21 in Sacramento, California (Figure 6). A USEPA survey of Region 3 states in the mid-Atlantic indicates that residential stormwater fees range from $2 to $40 per quarter. Cities of Wilmington and Philadelphia monthly residential fees are $3.03 and $10.80, respectively.

Table 3. Stormwater utilities in college towns

College Town	College	Monthly Residential Stormwater Fee ($)
Burlington, VT	University of Vermont	1.50
Santa Cruz, CA	University of California, Santa Cruz	1.77
Fayetteville, NC	Fayetteville State University	3.00
Golden, CO	Colorado School of Mines	3.20
Chapel Hill, NC	University of North Carolina	3.25
Orono, ME	University of Maine	3.43
Golden, CO	Colorado School of Mines	3.52
Spokane, WA	Washington State University	3.60
Raleigh, NC	North Carolina State University	4.00
Lawrence, KS	University of Kansas	4.00
Provo, UT	Brigham Young University	4.10
Durham, NC	Duke University	4.50
Wilmington, NC	University of North Carolina, Wilmington	5.00
Louisville, KY	University of Louisville	5.02
Morgantown, WV	West Virginia University	5.30
Austin, TX	University of Texas	7.15
Tallahassee, FL	Florida State University	7.61
Gainesville, FL	University of Florida	7.65
Portland, OR	Portland State University	7.91
Palo Alto, CA	Stanford University	10.95
Ft. Collins, CO	Colorado State University	14.26

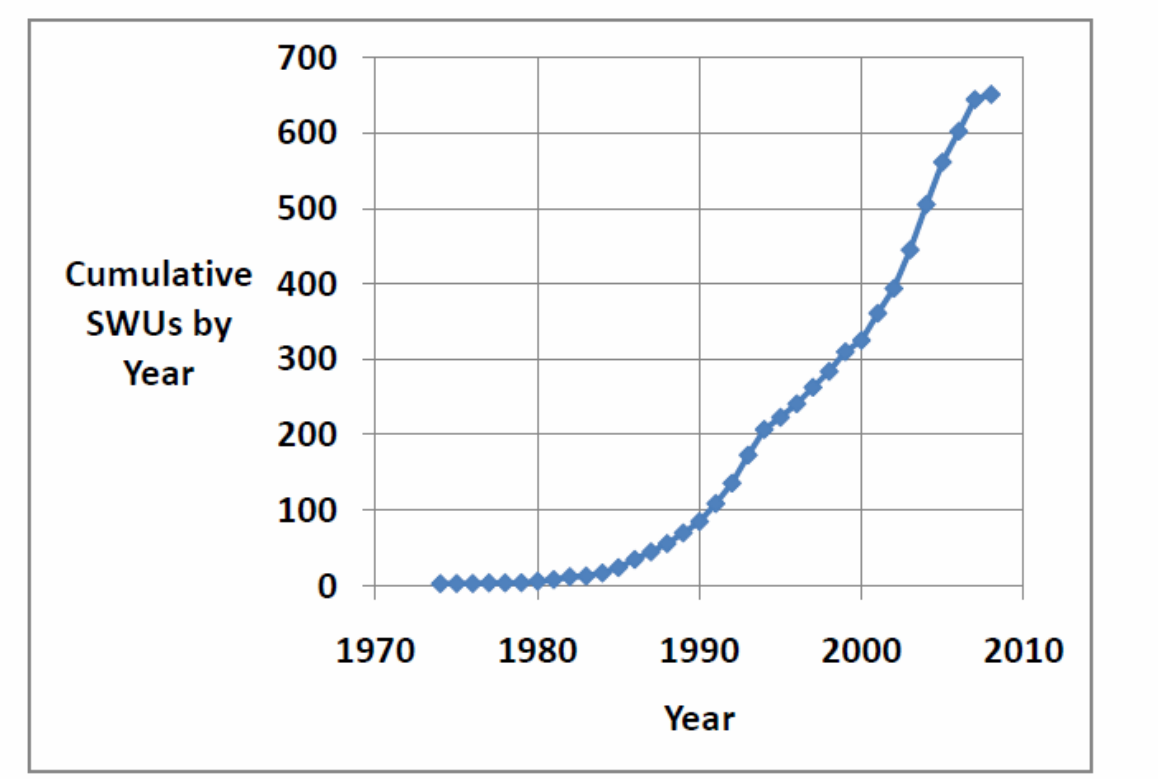
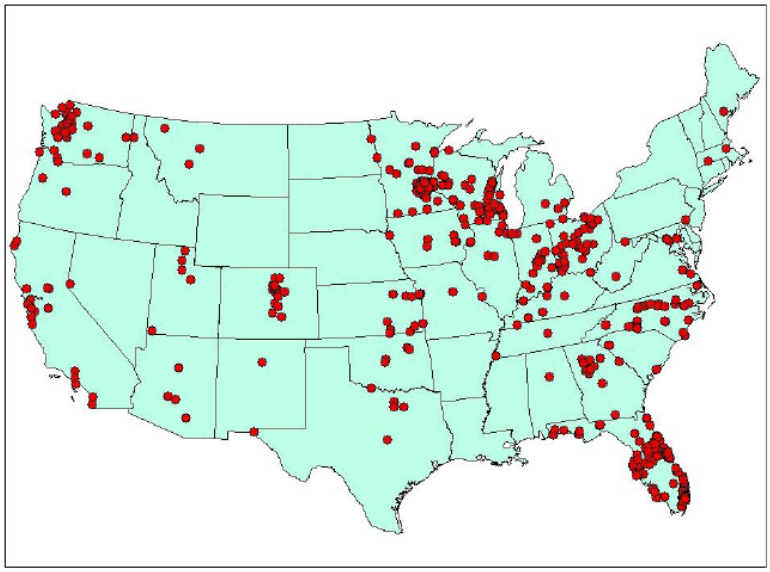
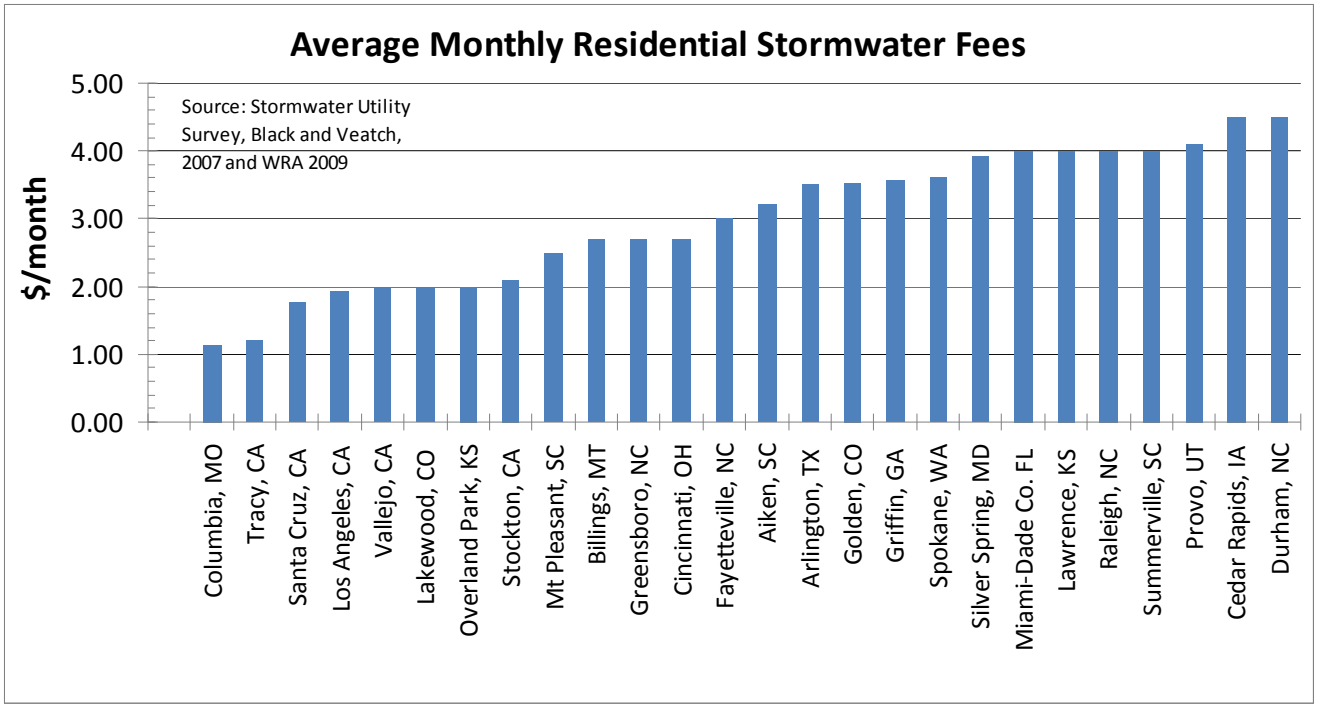


Figure 4. Growth in stormwater utilities in the United States (Western Kentucky Univ.)



Western Kentucky Univ.
2008

Figure 5. States with stormwater utilities in the United States (Western Kentucky Univ.)



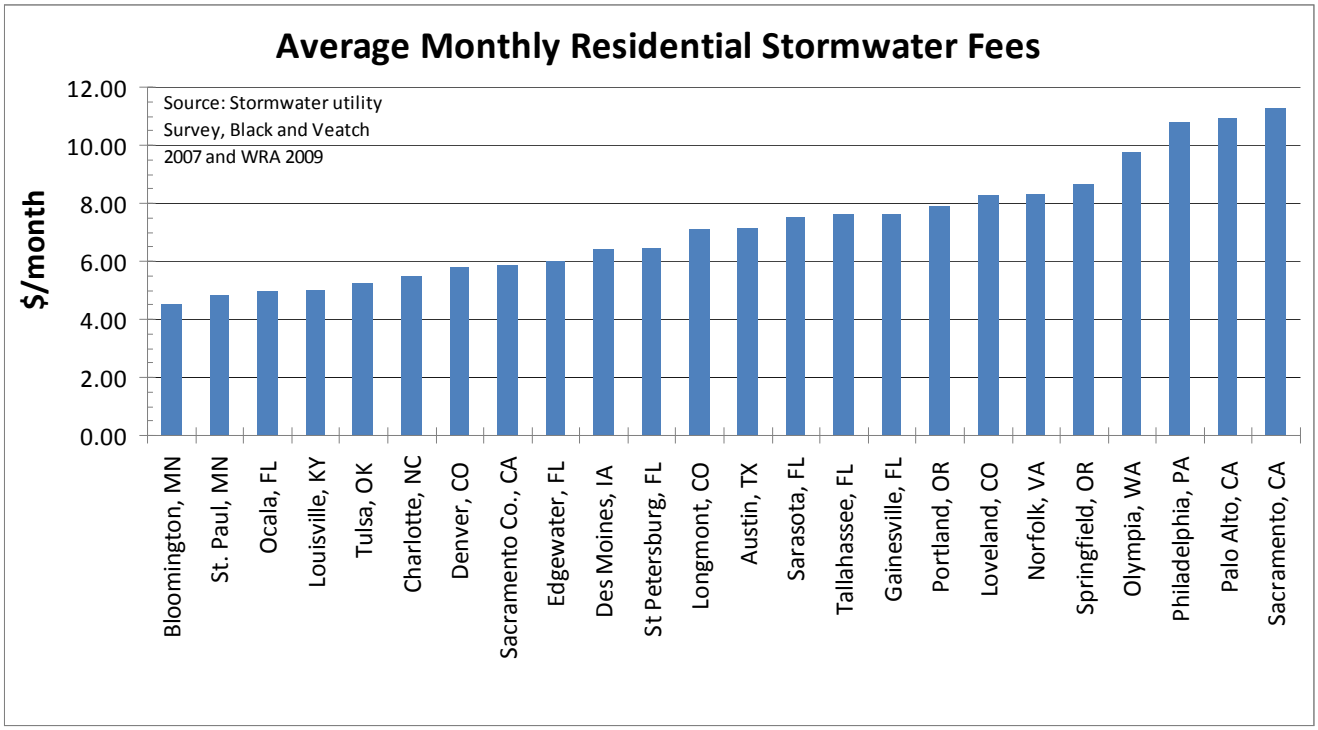


Figure 6. Nationwide survey of monthly residential stormwater utility fees (Black and Veatch 2007 and WRA 2009)

Stormwater Budget

As the basis for a stormwater utility fee, the City has prepared an annual budget of $1.6 million (Figure 7 provides a sample) that includes the following functions within the stormwater management program. Table 4 summarizes typical stormwater management functional centers based on a survey conducted for the Association of Flood and Stormwater Management Agencies in 2005.

1. Program Administration
- Secretarial/Clerical Support
- Financial Management
- Program Planning and Development
- Capital Outlay and Expense
- NPDES Stormwater Permit Compliance and Reporting
- Public Education and Outreach

2. Planning and Engineering
- Field Surveying and Inspection
- GIS Mapping and Inventory
- Stormwater Master Planning
- Water Quality Planning and Engineering
- Design and Field Engineering
- Flood Hazard Mitigation

3. Regulation and Code Adminstration
- Stormwater Code Administration
- Stormwater Plan Review
- Construction Inspection
- Private stormwater system complaints
- Floodplain/Flood Insurance Management
- Stormwater Quality Monitoring

4. Operation and Maintenance
- Routine and Remedial storm sewer maintenance
- Stormwater Pond maintenance
- Erosion and Sediment Control
- Flood Emergency Response
- Street Sweeping, Litter Control
- Spill Response/Containment
- Stream, bridge, and culvert cleaning

5. Capital Construction
- Strategic Watershed Studies
- Major Capital Improvements (stormwater ponds and stormsewers)
- Minor Capital Improvements (inlets, manholes, curb and gutter)
- Land Acquisition/Easement/Right of Way

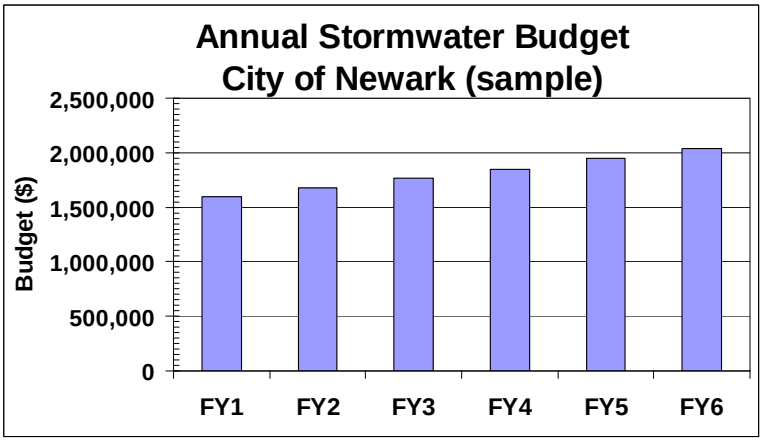


Figure 7. Sample annual stormwater budget for the City of Newark

Table 4. Major stormwater budget centers

Administration General Administration Prog Planning and Development Interagency Coordination	**Engineering & Planning** Des Criteria, Stds and Guidance Field Data Collection Master Planning Design, Field and Ops Engineering Hazard Mitigation Zoning support Multi-objective Planning Support GIS and Database Management Mapping Land Use Planning & Controls
Public Involvement & Education Public Awareness & Education Public Involvement Standing Citizen's Group	
Billing and Finance Billing Operations Database Management Customer Service Financial Management Capital Outlay Overhead Costs Cost Control Support Services	**Operations** General Maintenance Management General Routine Maintenance General Remedial Maintenance Emergency Response Maintenance Infrastructure Management Public Assistance
	Regulation and Enforcement Code Dev and Enforcement General Permit Administration Drainage Sys Insp & Reg Zoning and Land Use Reg Special Inspection Programs Flood Insurance Program Multi-Obj Floodplain Management Erosion Control Program
Stormwater Quality Mgmt Quality Master Planning Retrofitting Program Monitoring Program Struc and Non-Struc BMP Progs Pest, Herb and Fertilizer Used Oil & Toxic Materials Street Maint Prog Spill Response and Clean Up Prog for Pub Ed and Reporting Leakage and Cross Connections Industrial Program Gen Com and Residential Program Illicit Con and Illegal Dumping Landfills and Other Waste Facilities Combined Sewer Overflow Program Groundwater & Wellhead Protection Drinking Water Protection Watershed Assessment & TMDL Septic and I&I Program	**Capital Improvements** Major Capital Improvements Minor Capital Improvements Land, Easement, and Right-of-Way

[1] Table 1-1 provided by Hector Cyre, Water Resource Associates, Inc., Friday Harbor, Washington, 2005

GIS Mapping of Impervious Cover

WRA utilized GIS mapping with Newark zoning districts (Figure 8) and 2007 State of Delaware land use coverage to compute impervious cover area (Figure 9) of parcels in the City. Public streets and highways and railroads were excerpted from the analysis.

Table 5 summarizes the mean (%) and total impervious cover of zoning districts in the City of Newark. Of the 8.0 sq mi of land within the City of Newark (minus roads and railroads), 2.7 sq mi or 34% is developed as impervious cover. The impervious cover area of single family residential parcels ranges from 22% for RH, one family detached (21,780 sf min.) to 32% for RD, detached, semidetached (6,250 sf min.). The impervious cover of multifamily residential parcels ranges from 45% for townhouses to 67% for high rise apartments. The impervious cover for nonresidential zoning districts ranges from 46% for manufacturing office, research to 83% in the central business district. Approximately 31% of the University of Delaware campus is covered by impervious cover.

Figure 10 compares the parcel area and impervious (%) covered by zoning districts in the City of Newark. Single family residential parcels cover 39% of the City area yet contribute less than 30% of the impervious cover that contributes runoff to the stormwater system. Industrial, manufacturing, and business cover 20% of the City yet contribute more than 41% of the impervious cover. These differences illustrate the imbalance created using the property assessment to fund stormwater programs, an inequity that can be corrected using the stormwater fee approach.

Table 5. Parcel area and impervious cover of zoning districts in the City of Newark

Zone	Zoning District	Min. Lot Area	Area (sf)	% of City	Impervious (sf)	Impervious (%)
	Other		671,858	0.3%	159,182	24%
AC	Residential, Adult community	1 ac, 4,840 sf per DU	3,282,504	1.5%	552,650	17%
RH	Residential, One-family, detached	21,780 sf (1/2 ac)	5,793,244	2.6%	1,257,716	22%
RT	Residential, One-family, detached	15,000 sf (1/3 ac)	13,174,995	5.9%	3,177,391	24%
RS	Residential, One-family, detached	9,000 sf (1/4 ac)	48,780,230	21.8%	11,711,952	24%
RD	Residential, detached, semidetached	6,250 sf (1/8 ac)	15,460,702	6.9%	4,987,254	32%
RM	Residential, Garden Apartments	1 ac, 2725 sf per family	9,484,058	4.2%	4,819,943	51%
RR	Residential, Row house, townhouse	1 ac, 2,725 sf per DU	3,503,806	1.6%	1,586,182	45%
RA	Residential, High rise apartments	2 ac, 1,200 sf per family	1,148,070	0.5%	774,355	67%
UN	University and college		38,316,646	17.1%	11,875,630	31%
BL	Business, limited	3,000 sf	2,158,132	1.0%	1,127,286	52%
BLR	Business, limited business residential	3,000 sf	1,064,992	0.5%	569,497	53%
BN	Business, Neighborhood shopping	5,000 sf	751,130	0.3%	487,858	65%
BB	Central Business District	3,000 sf	4,533,007	2.0%	3,781,270	83%
BC	General Business	5,000 sf	8,892,740	4.0%	6,987,076	79%
MI	General Industrial	5,000 sf	24,050,210	10.7%	16,707,785	69%
MOR	Manufacturing Office Research	2 ac	3,393,576	1.5%	1,560,980	46%
PL	Public Parkland		21,181,474	9.5%	1,576,646	7%
OFD	Open Floodway District		18,136,975	8.1%	1,910,739	11%
	Public Roads and Streets/Railroads	Exempt from analysis				
			223,778,349	100%	75,611,392	34%
			8.0 sq mi		2.7 sq mi	

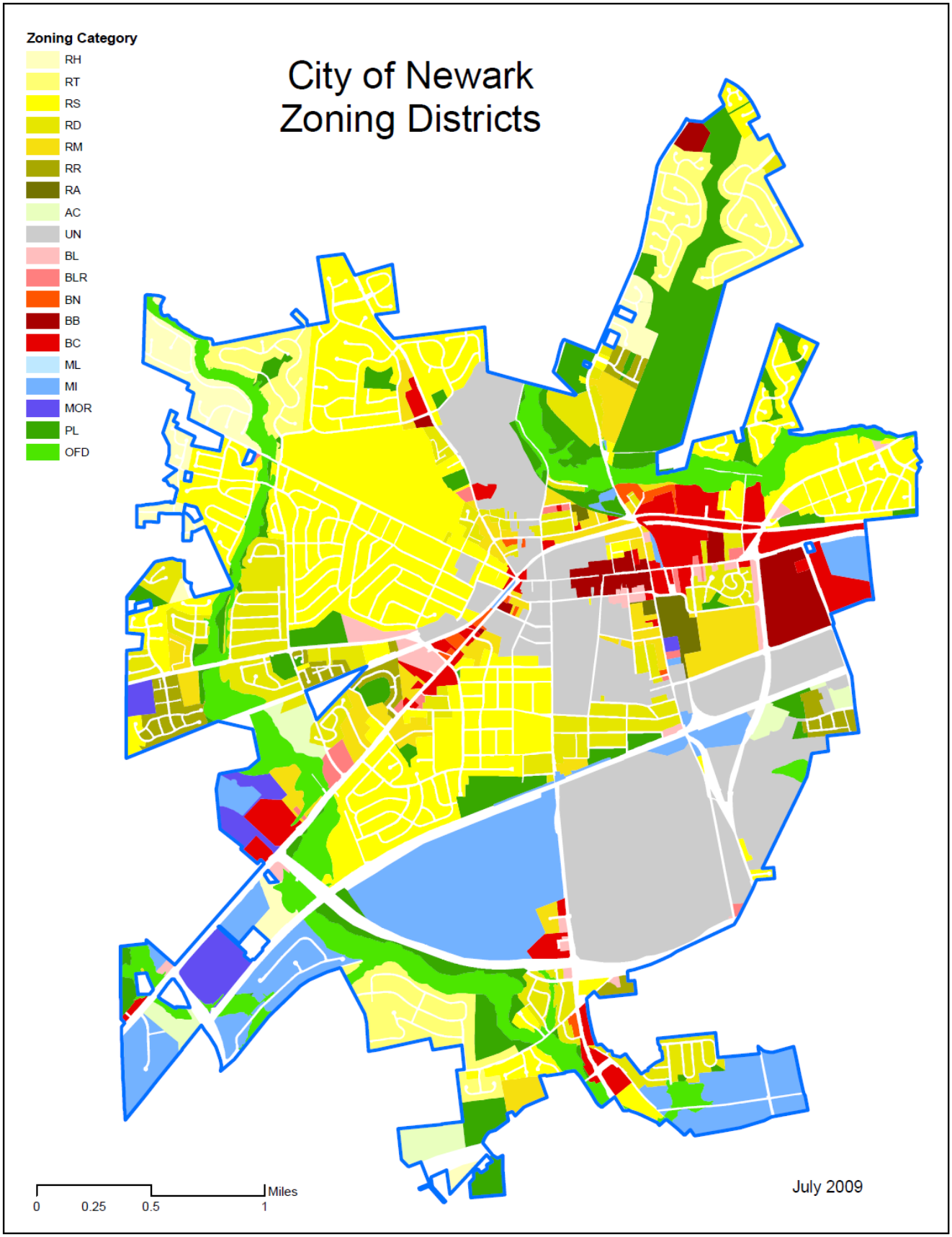


Figure 8. Zoning districts within the City of Newark

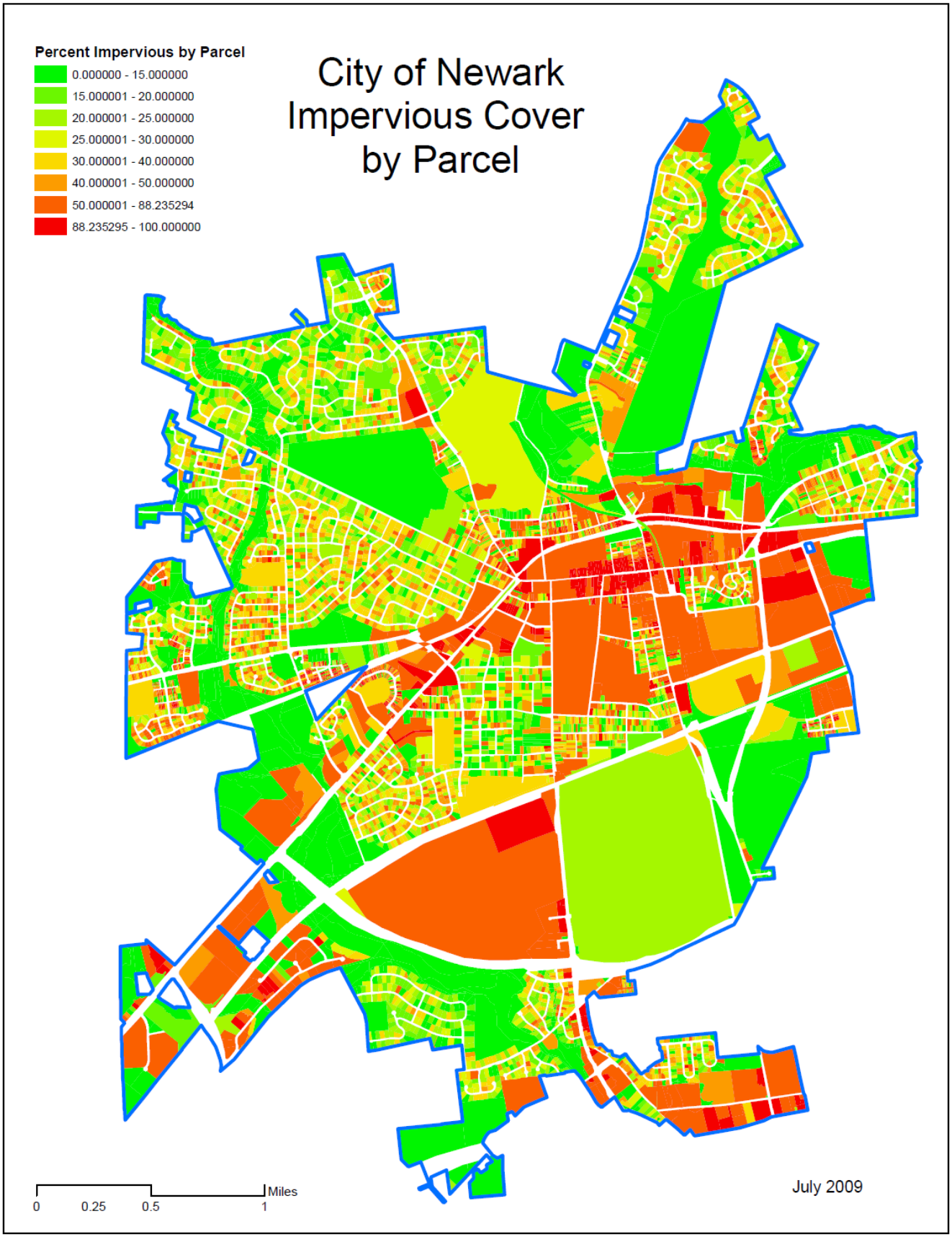
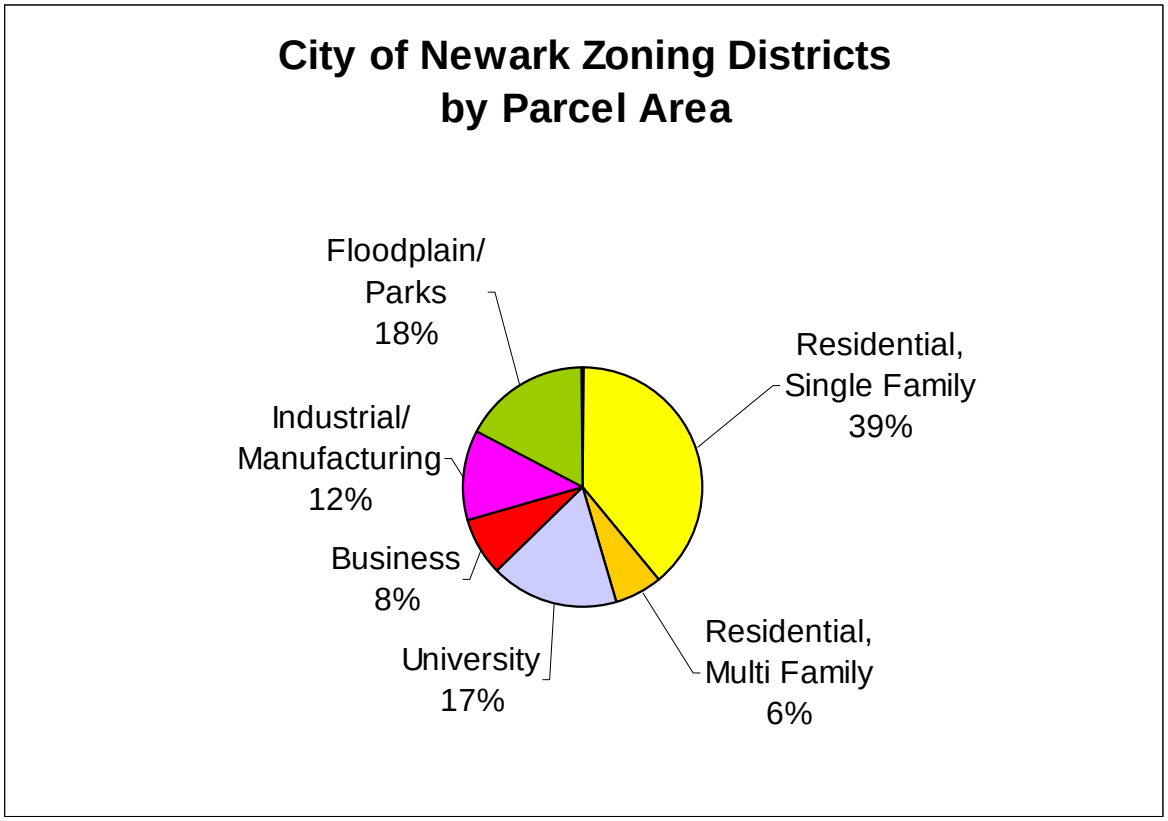


Figure 9. Impervious cover of parcels within the City of Newark



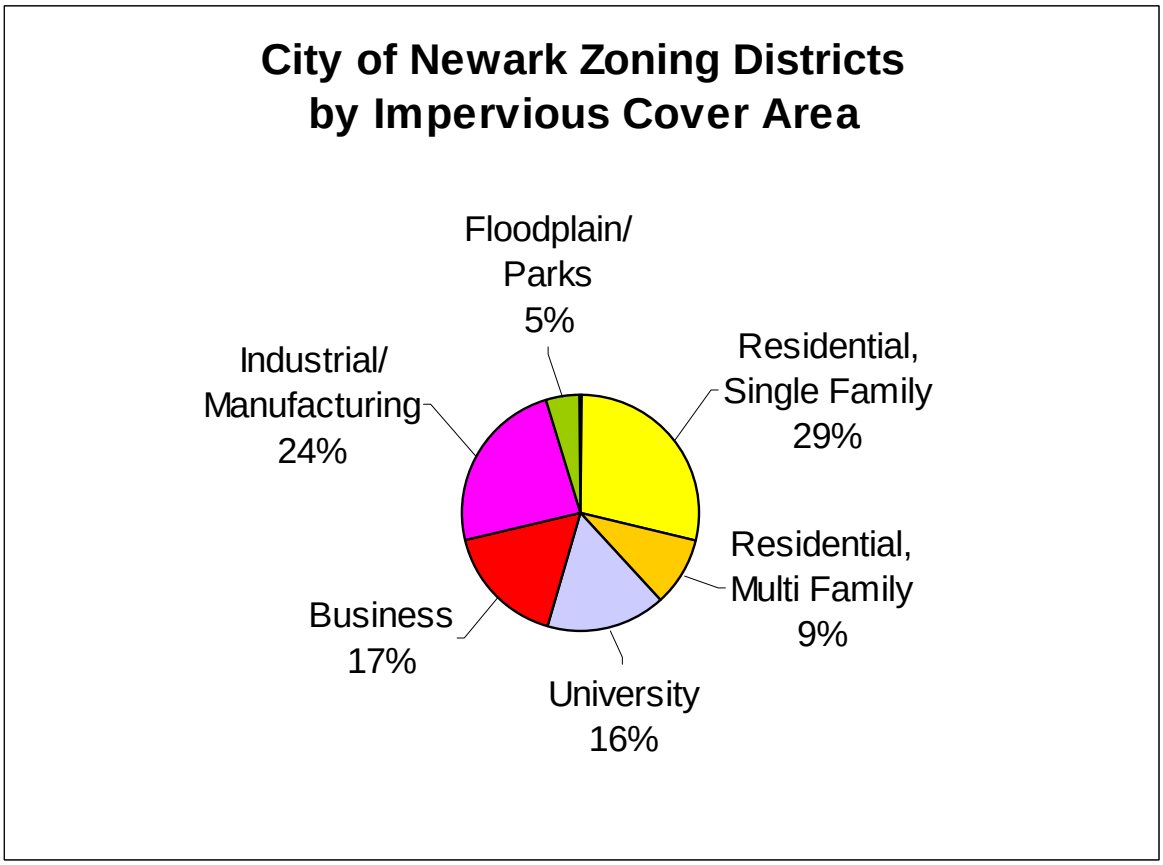


Figure 10. City of Newark zoning districts by parcel area and by impervious cover area

Calculation of Stormwater Fees

More than 80% of all stormwater utilities use the equivalent residential unit (ERU) method to calculate user fees. Parcels are billed depending on impervious cover. Stormwater user fees are charged like water/wastewater fees and calculated from physical/hydrological characteristics of a parcel including:

- Total parcel area
- Impervious cover (roof/pavement) area and %
- Zoning district

.

Table 6 summarizes the impervious cover analysis to derive stormwater user fees. Mean impervious areas of single family residential parcels (SFR) in the City of Newark ranges from 3,372 sf for Residential, detached, semidetached (6,250 sf lot), to 4,071 sf for Residential, detached (9,000 sf lot), to 4,735 sf for Residential, detached (15,000 sf lot), to 6,165 sf for Residential, detached (21,780 sf lot). The mean impervious area of lots (roof, driveway, sidewalk) in the four SFR districts is 4,000 sf. One ERU is equal to 4,000 sf as the average impervious cover on a residential parcel in Newark using statistical analysis from GIS mapping and aerial photographs. All SFRs are billed at a flat rate for one ERU thus improving the equitability of the bills to homeowners. The impervious area of multifamily and nonresidential parcels were individually measured by the GIS and divided by the impervious area of an ERU to determine the number of ERUS to be billed to the parcel. The ERU approach is more equitable to the property owner and more efficient from an administrative and billing standpoint.

Typical stormwater utilities in the USA charge a user fee of $0.01 to $0.02 per square foot per year (penny to 2 pennies per sf) of impervious cover. Based on the GIS analysis of impervious cover contribution to stormwater runoff at $0.01 per sf of impervious area, the flat fee for single family residential (detached) properties would be $40.00 per year ($3.33 per month) for stormwater service. Multifamily and nonresidential properties would be charged $3.33 per month per ERU or $0.01 per sf ($10.00 per 1000 sf) of impervious cover. Exemptions from the stormwater fee include City - owned land, public parks, public streets/highways, and railroads. At an annual rate of $0.01 per sf of impervious cover, the stormwater utility would generate $716,000 to meet the annual budget.

At $0.02 per sf of impervious area, the flat fee for single family residential (detached) properties would be $81.00 per year ($6.75 per month) for stormwater service. Multifamily and nonresidential properties would be charged $6.75 per month per ERU or $0.02 per sf ($20.00 per 1000 sf) of impervious cover. At an annual rate of $0.02 per sf of impervious cover, the stormwater utility would generate $1,432,000 to meet the annual budget.

Figure 11 and Table 7 summarize calculations of impervious cover and stormwater fees for several typical residential, business, and institution parcels in the City of Newark.

Figure 12 depicts a breakdown of estimated annual stormwater revenues by major zoning district at rates of a penny per sf (Option 1) and two pennies per sf (Option 2) of impervious cover. Table 8 recommends stormwater user fees by zoning district for the ordinance for the options considered.

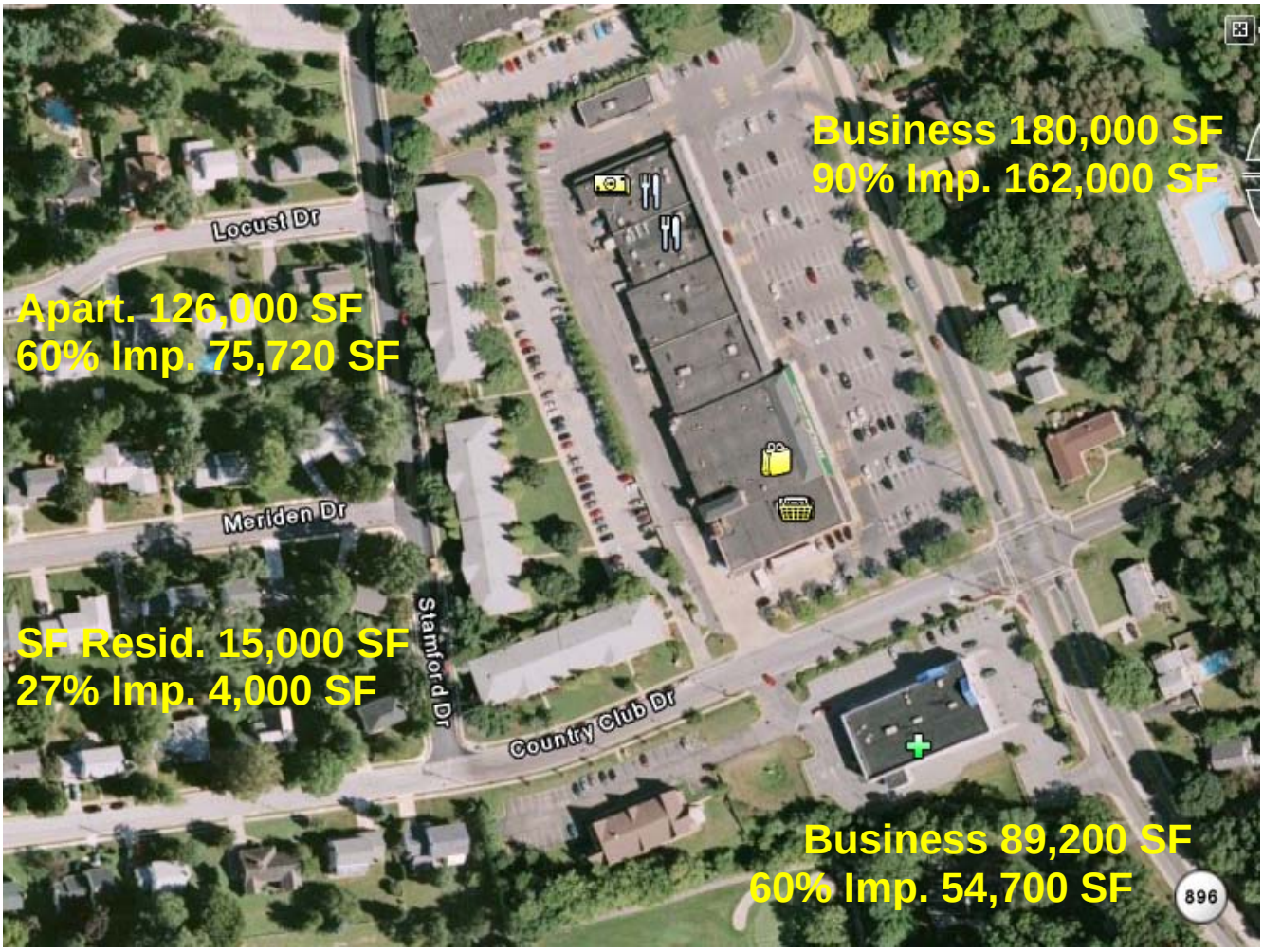
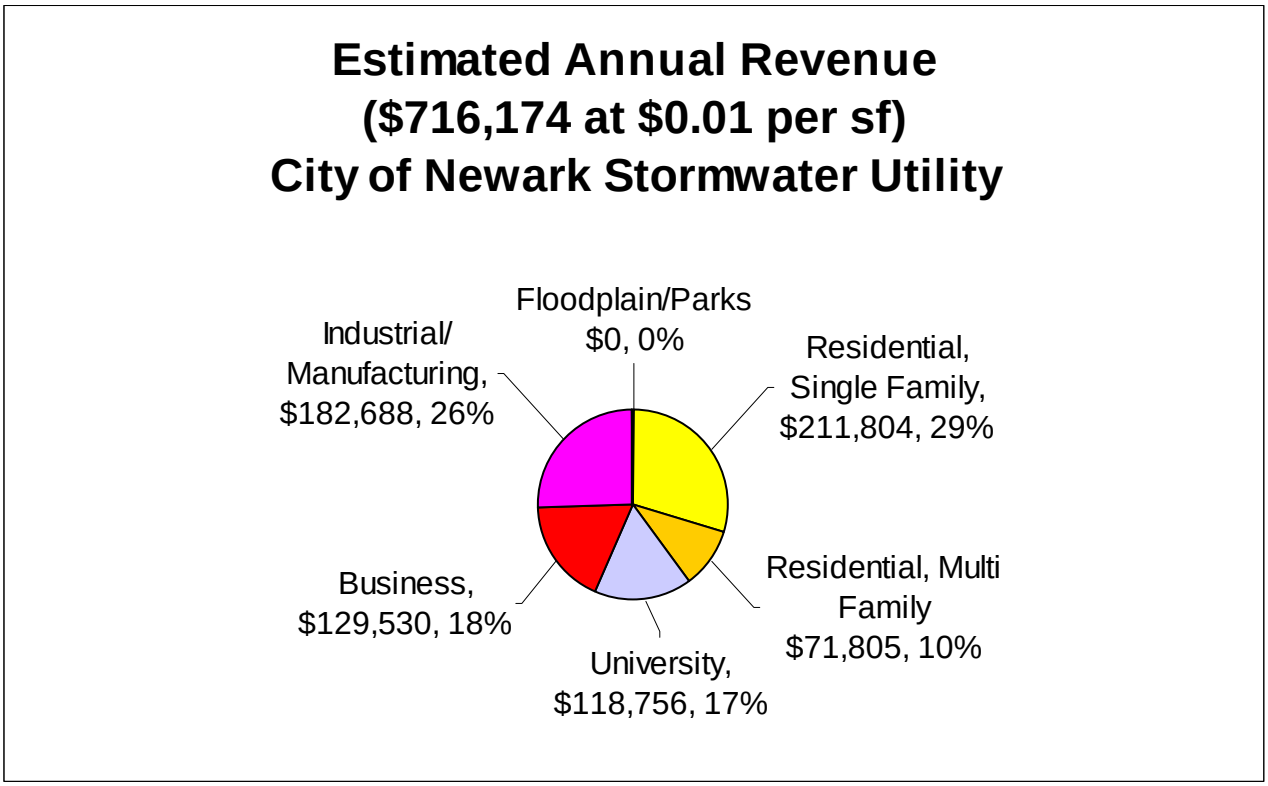


Figure 11. Calculations of impervious cover for typical residential and business parcels in Newark

Table 7. Calculations of stormwater fees for typical parcels in the City of Newark

Parcel	Area (sf)	Imperv. (sf)	Imperv. (%)	Annual Fee (@ $0.01/sf)	Annual Fee (@ $0.02/sf)
Drug Store	90,000	55,000	60%	$550	$1,100
Shopping Center	712,000	603,000	85%	$6,000	$12,000
Restaurant	17,000	17,000	100%	$170	$170
Church	54,000	24,000	44%	$240	$480
School	520,000	170,000	33%	$1,700	$3,400



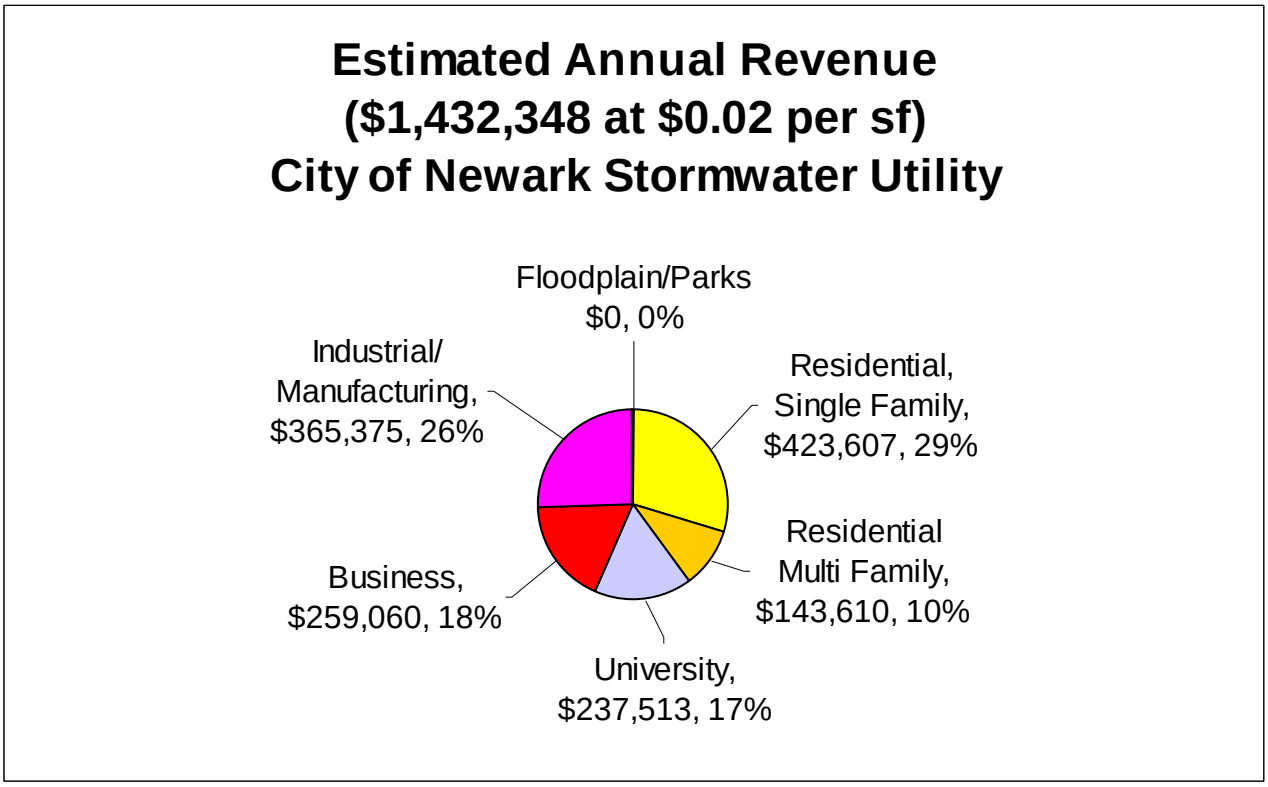


Figure 12. Estimated annual revenue of a City of Newark stormwater utility

Table 6.

Zone	Zoning District	Area (sf)	Imp. (%)	Imperv (sf)	No. of Parcels	Imperv sf/parcel	(1) Imp. ($/sf)	(1) Revenue ($)	(1) Fee/ parcel/yr	(2) Imp. ($/sf)	(2) Revenue ($)	(2) Fee/ parcel/yr
	Other	671,858	24%	159,182	25		0.010	$1,592	$64	0.020	$3,184	$127
AC	Residential, Adult 4,840 sf per DU	3,282,504	17%	552,650	6		0.010	$461	$77	0.020	$921	$154
RH	Residential, One-family, detached, 21,780 sf	5,793,244	22%	1,257,716	204	6,165	0.010	$8,242	$40	0.020	$16,484	$81
RT	Residential, One-family, detached 15,000 sf	13,174,995	24%	3,177,391	671	4,735	0.010	$27,110	$40	0.020	$54,220	$81
RS	Residential, One-family, detached 9,000 sf	48,780,230	24%	11,711,952	2877	4,071	0.010	$116,237	$40	0.020	$232,473	$81
RD	Residential, detached, semidetached 6,250 sf	15,460,702	32%	4,987,254	1479	3,372	0.010	$59,755	$40	0.020	$119,509	$81
RM	Residential, Apartments 1 ac, 2,725 sf	9,484,058	51%	4,819,943	377		0.010	$48,199	$128	0.020	$96,399	$256
RR	Residential, townhouse 1 ac, 2,725 sf/DU	3,503,806	45%	1,586,182	695		0.010	$15,862	$23	0.020	$31,724	$46
RA	Residential, High rise 2 ac,1,200 sf	1,148,070	67%	774,355	3		0.010	$7,744	$2,581	0.020	$15,487	$5,162
UN	University and college	38,316,646	31%	11,875,630	124		0.010	$118,756	$958	0.020	$237,513	$1,915
BL	Business limited 3,000 sf	2,158,132	52%	1,127,286	63		0.010	$11,273	$179	0.020	$22,546	$358
BLR	Business, business residential 3,000 sf	1,064,992	53%	569,497	42		0.010	$5,695	$136	0.020	$11,390	$271
BN	Business, shopping Neighborhood	751,130	65%	487,858	26		0.010	$4,879	$188	0.020	$9,757	$375
BB	Central Business District 3,000 sf	4,533,007	83%	3,781,270	115		0.010	$37,813	$329	0.020	$75,625	$658
BC	General Business 5,000 sf	8,892,740	79%	6,987,076	168		0.010	$69,871	$416	0.020	$139,742	$832
MI	General Industrial 5,000 sf	24,050,210	69%	16,707,785	113		0.010	$167,078	$1,479	0.020	$334,156	$2,957
MOR	Manufacturing Office Research	3,393,576	46%	1,560,980	11		0.010	$15,610	$1,419	0.020	$31,220	$2,838
PL	Public Parkland	21,181,474	7%	1,576,646	75		0.000	$0	$0	0.000	$0	
OFD	Open Floodway District	18,136,975	11%	1,910,739	394		0.000	$0	$0	0.000	$0	
	Roads/Streets//Railroads	Exempt										
		223,778,349	34%	75,611,392	7,468	4,040		$716,174			$1,432,348	

Table 8. Options for stormwater utility rates for the City of Newark (to append to ordinance)

Zoning District	Option 1 ($0.01 per sf) Stormwater Fee	Option 2 ($0.02 per sf) Stormwater Fee
Residential, One-family, detached, semidetached	$3.33 monthly	$6.75 monthly
Multifamily residential, University, Business, Manufacturing, Industrial, Office	$10.00/1000 sf	$20.00/1000 sf
Open floodway district (undeveloped)	No building permitted	No building permitted
Parkland, Public roads, Railroads, City - owned land, City leased parking facilities	Exempt	Exempt
Projected Annual Revenue	**$716,174**	**$1,432,348**
Or tiered residential		
Residential, One-family, RH, 21,780 sf	$5.08 monthly	$10.16 monthly
Residential, One-family, RT, 15,000 sf	$3.92 monthly	$7.84 monthly
Residential, One-family, RS, 9,000 sf	$3.42 monthly	$6.88 monthly
Residential, One-family, RD, 6,250 sf	$2.83 monthly	$5.66 monyhly
Multifamily residential, University, Business, Manufacturing, Industrial, Office	$10.00/1000 sf	$20.00/1000 sf
Open floodway district (undeveloped)	No building permitted	No building permitted
Parkland, Public roads, Railroads, City - owned land, City leased parking facilities	Exempt	Exempt
Projected Annual Revenue	**$716,174**	**$1,432,348**

Public Education and Information

The City of Newark and Water Resources Agency should initiate a public education and information program to inform residents and property owners about the benefits of a stormwater utility to reduced flooding and stormwater problems and improve water quality:

- Reach out and meet with key user groups including (1) commercial properties with large parking lots that generate significant amount of stormwater runoff and (2) tax exempt properties such as schools and churches that do not contribute taxes to the general fund to finance stormwater management.
- Establish a stormwater utility website.
- Create a stormwater utility brochure to be sent to all customers before initial billing.

Legal Authority

All States (including Delaware) and the District of Columbia in USEPA Region 3 have the legal authority to establish stormwater utilities. Municipalities in Delaware are authorized to form stormwater utilities under Chapter 40, Title 7 of the Delaware Code (following). Under Delaware law, "Stormwater utility means the establishment of an administrative organization that has been created for the purposes of funding sediment control, stormwater management or flood control planning, design, construction, maintenance, and overall resource needs by authorized and imposed charges."

TITLE 7 Conservation
Agricultural and Soil Conservation; Drainage and Reclamation of Lowlands
CHAPTER 40. EROSION AND SEDIMENTATION CONTROL

§ 4002. Definitions.
The following words, terms and phrases … shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:
(10) "Stormwater utility" means the establishment of an administrative organization that has been created for the purposes of funding sediment control, stormwater management or flood control planning, design, construction, maintenance, and overall … needs by authorized and imposed charges.

§ 4005. Program funding and financial assistance.

(a) The Department, conservation districts, counties or municipalities are authorized to receive from federal, state, or other public or private sources financial, technical or other assistance for use in accomplishing the purposes of this chapter. The Department may allocate, as necessary or desirable, any funds received to conservation districts, counties or municipalities for … effectuating this chapter.

(b) The conservation districts, counties and municipalities shall have authority to adopt a fee system to help fund program implementation. That fee system shall be implemented by the designated plan approval agency to fund overall program management, plan review, construction review, enforcement needs and maintenance responsibilities. In those situations where the Department becomes the designated plan approval agency, the Department may assess a plan review and inspection fee. That fee shall not exceed $80 per disturbed acre per project. There shall be no duplication of fees by the various implementing agencies for an individual land disturbing activity and the fee schedule shall be based upon the costs to the Department, conservation districts, counties or municipalities to implement and administer the program…

(c) *Authority is also granted to the Department, conservation districts, counties or municipalities to establish a stormwater utility as an alternative to total funding under the fee system. The stormwater utility shall be developed for the designated watersheds and may fund such activities as long range watershed master planning, watershed retrofitting, and facility maintenance. This fee system shall be reasonable and equitable so that each contributor of runoff to the system, including state agencies, shall pay to the extent to which runoff is contributed. Criteria for the implementation of the stormwater utility shall be established in regulations promulgated under this chapter. The implementation of a stormwater utility will necessitate the development of a local utility ordinance prior to its implementation.*

61 Del. Laws, c. 522, § 1; 67 Del. Laws, c. 234, § 1; 70 Del. Laws, c. 177, § 1.;

Stormwater Utility Ordinance

The City of Newark water/sewer/electric or property assessment billing systems are available to assess the stormwater fee with the latter being the preferred mechanism. The WRA will deliver to the City a table with parcel ID, impervious cover area, and stormwater fee to be tied to the billing system. The following stormwater utility ordinance is recommended for consideration by the City of Newark.

CHAPTER 26 STREETS1
Art. I. In General, §§ 26-1--26-10.1
Art. II. Street Construction, §§ 26-11--26-17
Art. III. Sidewalks, §§ 26-18--26-32
Art. IV. Street Vacation, §§ 26-33--26-36
Art. V. Easements, §§ 26-37--26-39
Art. VI. Drainage Swales and Ditches, § 26-40
Art. VII. Stormwater Utility

ARTICLE VII STORMWATER UTILITY
Sec. 26-41. Definitions
(a) "Stormwater utility" means the establishment of an administrative organization that has been created for the purposes of funding sediment control, stormwater management or flood control planning, design, construction, maintenance, and overall needs by authorized and imposed charges.

(b) “Impervious cover” means the area covered by roof and pavement or other constructed surfaces that prevent infiltration to groundwater.

(c) “Equivalent residential unit” is the mean impervious cover of single family residential parcels.

Sec. 26-42. Authority.
Pursuant to Chapter 40, Title 7 of the Delaware Code. the City of Newark is authorized to create a stormwater utility and establish a schedule of stormwater fees for property in the corporate limits. (Ord. No. ????)

Sec. 26-43. Stormwater utility.
(a) A stormwater utility is hereby established to provide stormwater management services, as authorized by Delaware State law. Stormwater service charges will be determined and modified from time to time so that the total revenues generated by said charges will be used to pay the principal of and interest on the debt incurred for stormwater purposes and such expenses as are reasonably necessary or convenient in the planning, construction, operation, and maintenance of the stormwater system.
(b) Operation, maintenance and/or improvement of stormwater management areas/facilities, or drainage issues, which are located on private property shall be and remain the legal responsibility of the property owner, except as provided for in previous agreements or in emergency situations if authorized by the Public Works Director.
(c) It is the express intent of this article to protect the public health, safety and welfare of people and property in general, but not to create any special duty or relationship with any individual person, or to any specific property within or outside the boundaries of the City. The City expressly reserves the right to assert all available immunities and defenses in any action seeking to impose monetary damages or equitable remedies upon the City, its elected officials, officers, employees and agents arising out of any alleged failure or

breach of duty or relationship.
(d) If any permit, plan approval, inspection or similar act is required by the City as a condition precedent to any activity or change upon property not owned by the City pursuant to this or any other regulatory ordinance, regulation or rule of the City, or under Federal or State law, the issuance of such permit, plan approval or inspection shall not be deemed to constitute a warranty, express or implied, nor shall it afford the basis for any action, including any action based on failure to permit, negligent issuance of a permit, negligent plan approval, or negligent maintenance of any permitted stormwater management system or facility not expressly dedicated to and accepted by the City for further maintenance in an action seeking the imposition of money damages or equitable remedies against the City, its council members, mayor, officers, employees or agents.
(Ord. No. ????)

Sec. 26-44. Service charges, rates and fee schedule.
(a) Stormwater service charges shall accrue beginning on January 1, 2010. Stormwater service charges shall apply to all property within the city limits without regard to ownership, except as set forth in Section 26-44. Such charges shall be based on the amount of impervious surface on each parcel as determined by the equivalent residential unit standard. For purposes of this article, an "equivalent residential unit (ERU)" is four thousand (4,000) square feet of impervious surface.
(b) The city council shall set a base rate for single-family residential uses. This base rate shall be automatically adjusted each year so that the new rate recovers the full cost of the storm water program. Charges for multifamily residential uses and non single family residential uses shall be calculated utilizing the equivalent residential unit fee. A "non-single-family residential use" shall be any land use other than single-family residential, except for undeveloped land. (Ord. No. ????)

Sec. 26-45. Exemptions.
Except as provided in this section, no public or private property shall be exempt from stormwater service charges except:
(a) Undeveloped land,
(b) Public road and street rights-of-way,
(c) Railroad rights of way,
(d) Land owned by the City of Newark, City leased parking facilities, and public park land shall be exempt from stormwater service charges. (Ord. No. ????)

Sec. 26-46. Billing method, responsible parties.
(a) Bills for stormwater service fees shall be sent at regular, periodic intervals. Stormwater service fees will be billed on a property assessment bill. The first dollars paid on any bill shall go to pay the stormwater fee first.
(b) The property owner is ultimately responsible for payment of the stormwater service fee for property for which the party billed has not paid the service charge.
(c) Stormwater fees are billed and collected by the Department of Finance on behalf of the City. Stormwater fees are due and payable simultaneously with any other fees included on the bill. Fees not paid within 30 days of receipt of the bill will incur late charges.
(Ord. No. ????)

Sec. 26-47. Backbilling.
Failure to receive a bill is not justification for nonpayment. The owner of each parcel of developed land shall be ultimately obligated to pay such fee. If a customer is under-billed or if no bill is sent for developed land, the city may backbill up to two (2) years. (Ord. No. ????)

Sec. 26-48. Complaints regarding a bill.
(a) A customer having a grievance that a bill is excessive must file a written notice with the Finance Department. If it is determined that the bill is in error, an adjustment will be made accordingly.
(b) No adjustment will be made for more than a two-year period. (Ord. No. ????)

Sec. 26-49. Appeal.
Any customer who believes this article has been applied in error may appeal in the following manner:
(a) An appeal must be filed in writing with the City Finance Director.
(b) A technical review shall be performed by the Department of Public Works to determine the accuracy of the information in the city's impervious surface database. The City may adjust the fee or credit as long as the adjustment is in conformance with the intent of this article. At the conclusion of the review the City Finance Director shall issue a written determination stating whether an adjustment to the service rate is appropriate, and if so, the amount of such adjustment.
(c) Any appeal concerning the impervious area of a parcel shall be accompanied by a study prepared a Delaware registered professional engineer or licensed land surveyor (Ord. No. ????)

References

Campbell, C. W. and D. Back, 2008. Western Kentucky University stormwater utility survey.

National Association of Flood and Storm water Management Agencies, January 2006. Municipal stormwater funding. Prepared under grant by the United States Environmental Protection Agency.

U. S. Environmental Protection Agency, Region III, January 2008. Funding stormwater programs. Prepared by the USEPA Region III and States including Delaware, Pennsylvania, Maryland, Virginia, West Virginia, and District Columbia.