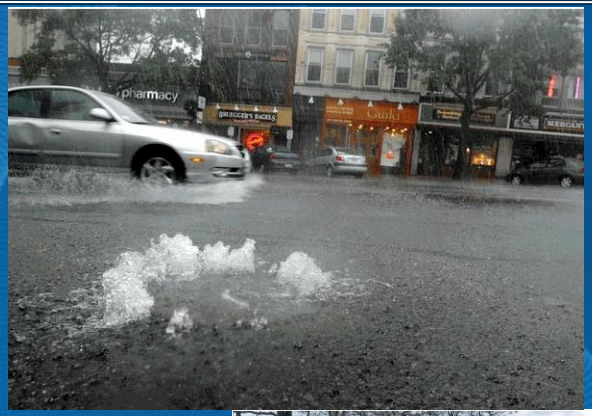
Northampton's New Stormwater and Flood Control Utility



James Laurila, Northampton City Engineer

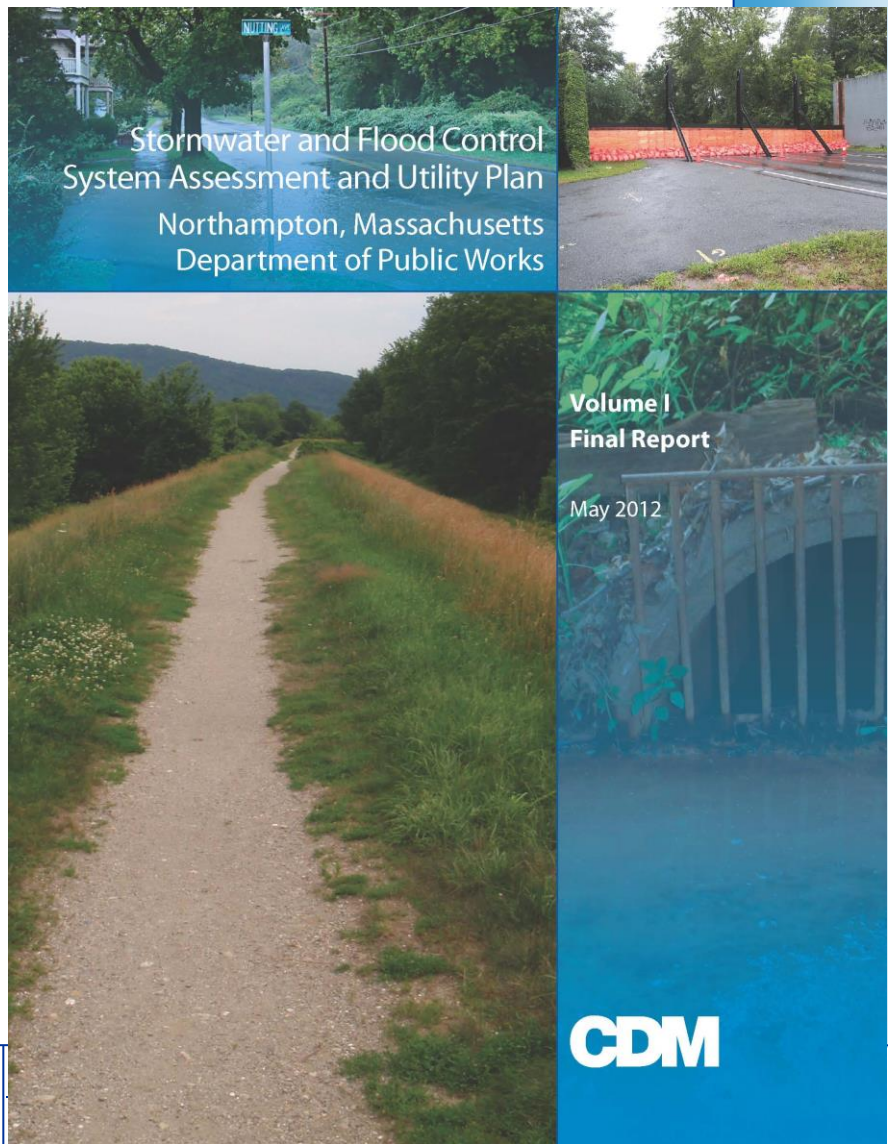
Virginia Roach, CDM Smith

Watershed Management & Stormwater Conference

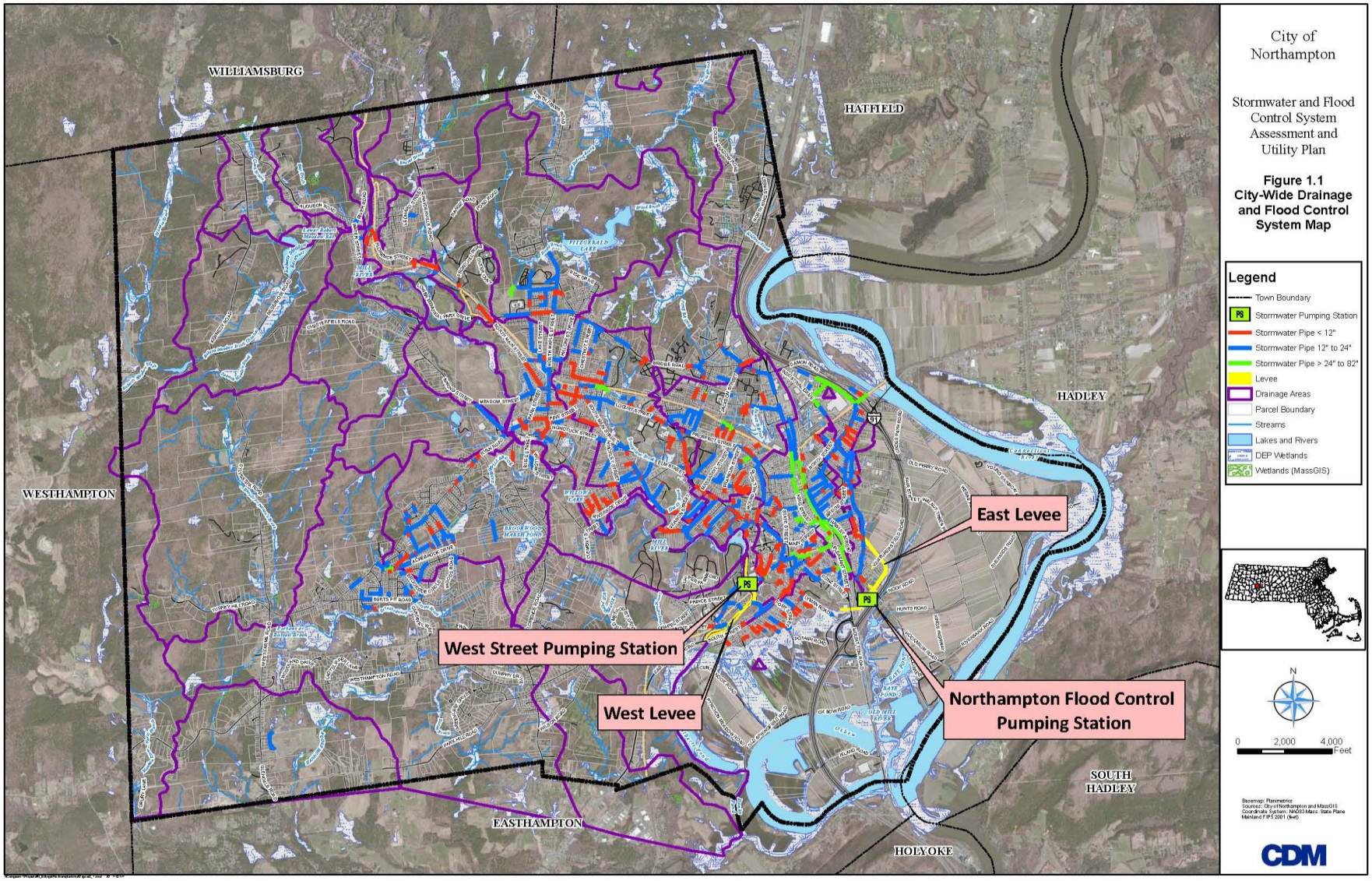
October 16, 2014

Overview

- Northampton stormwater and flood control systems
- Initial study (May 2012 report)
  - Problem areas
  - Development of stormwater utility
- Work done since the May 2012 report
- FY15 Implementation of new utility



114 Miles of 4- to 82-Inch Drainage Pipe, 5,000 Catch Basins and 326 Outfalls



Aging Stormwater Infrastructure

- Over 100 years old in many areas
- Under capacity in many areas
- Some areas do not have drainage systems and need improvements
- Limited funds for replacing, repairing and constructing

Table 2.1

Summary of Pipe Material in Four Study Areas

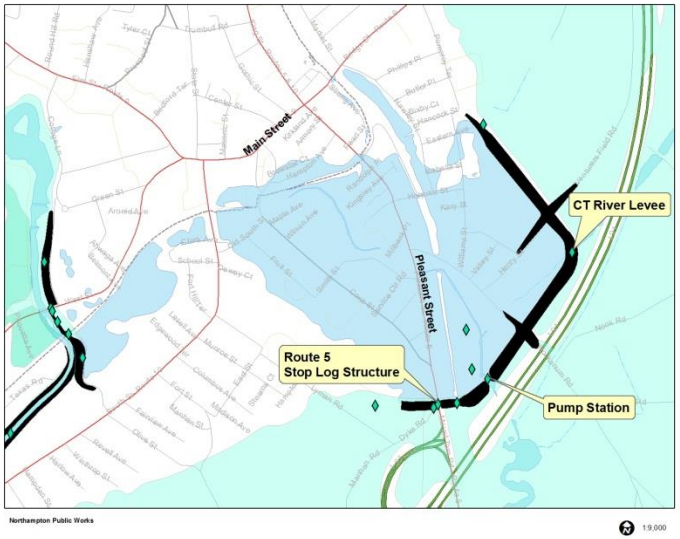
Pipe Type	*Total Feet*	*Total Miles*	*% Total*
Concrete	35,943	6.81	53%
Vitrified Clay (VC)	24,055	4.55	35%
Iron	1,017	0.19	1.5%
Stone	1,870	0.35	2.7%
Brick	1,890	0.36	2.8%
Asbestos Cement (AC)	3,238	0.61	4.8%
Polyvinyl Chloride (PVC)	78	0.01	0.1%
Total	**68,090**	**12.87**	**100%**

Flood Control - Overview

- Two Systems Constructed by Federal Government (Army Corps) – 1940
- Levees and Pumps built in response to Flooding in 1936 and 1938
  - Connecticut River Levee and Pumping Station
  - Mill River Levee, Pumping Station and River Diversion

Connecticut River Flood Control

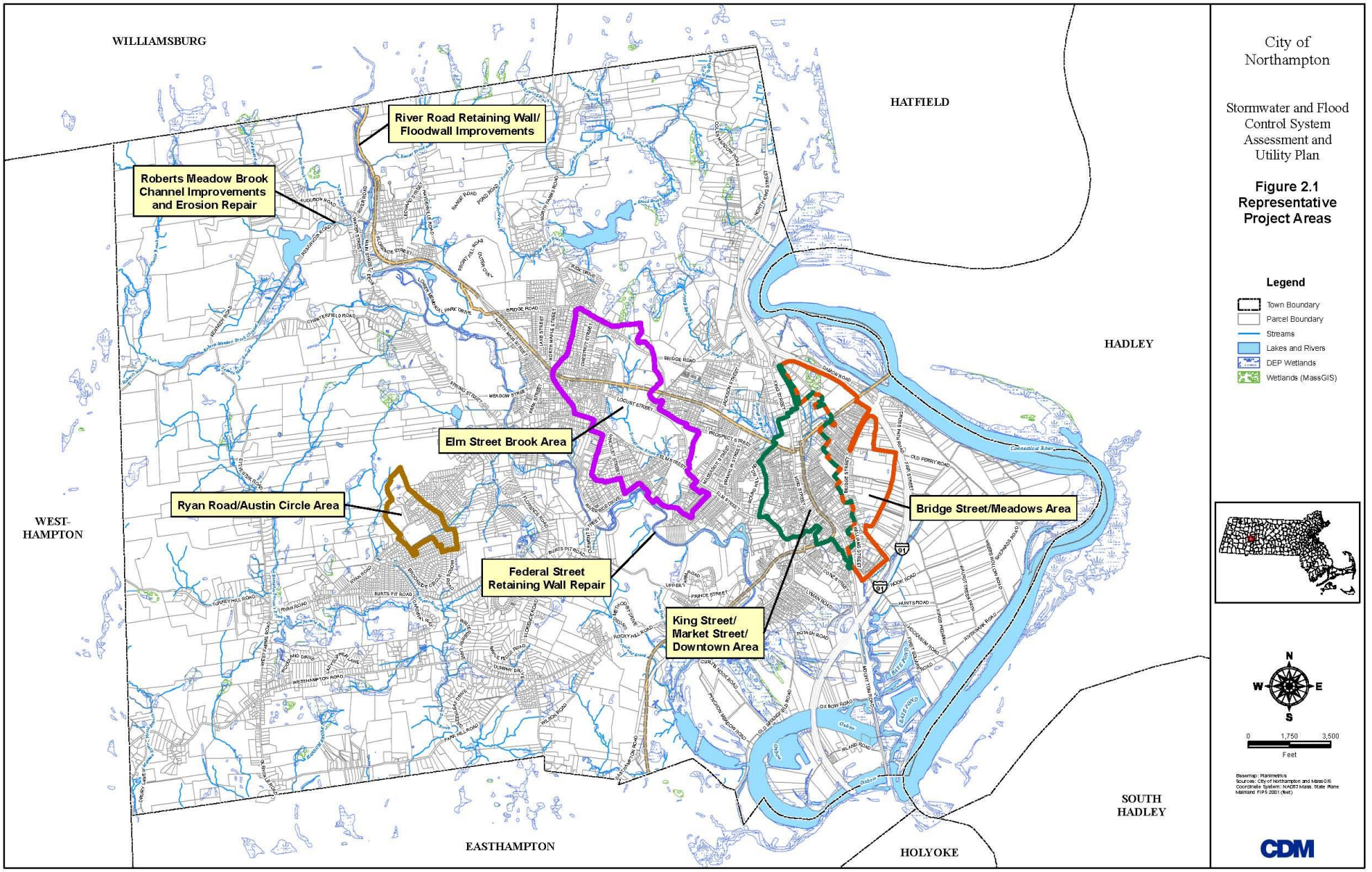
- 4,950 feet of levee/earthen embankment
- Two 8-foot tall stop log structures
- 150,000 gpm pumping station
  - Pumps down the Old Mill River bed drainage area
    - » Over 770 acres of land drainage



Mill River Flood Control

- 2,300 feet of levee
- 450 feet of concrete flood wall
- 14-foot high stop log structure
- West Street pumping station
- 3,200 feet of armored Mill River channel from West Street to South Street
- 15-foot drop structure under South Street Bridge
- 8,000-foot Mill River diversion from South Street to the Connecticut River Oxbow

Representative Problem Areas



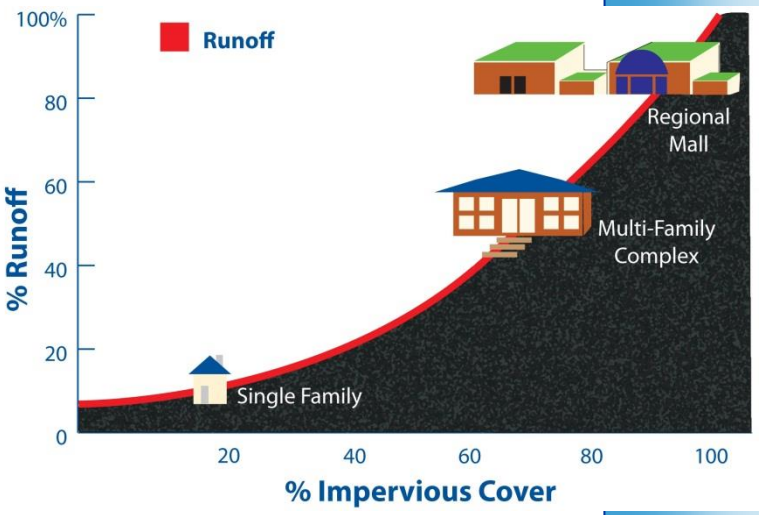
River and Brook Erosion Threats

- City is blessed with scenic brooks and rivers, BUT
  - Stream bank erosion may threaten property and infrastructure
  - No funding source for these threats
  - City aggressively chases limited grant money
    - Inadequate funding
    - Lacks responsiveness required for needs

Flooding Problems

Development of Northampton Stormwater and Flood Control Utility

- Developed a planning-level budget
  - Stormwater-related expenses currently funded through the sewer rate and General Fund
  - Anticipated capital improvements
- Analyzed GIS data
- Applied equivalent residential unit (ERU) methodology based on impervious area
- Developed a financial model
  - Combined budgetary data with GIS/ERU data
  - Developed a stormwater and flood control fee
  - Assessed impact on typical customers



Project Cost Schedule

Table 3.6
Summary Project Cost Schedule

Project Description	Year										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	202
Bridge Street/Meadows Phase 1 Improvements		$441,000	$5,072,000								
River Road Floodwall Improvements	$155,000	$1,453,000									
Roberts Meadow Brook Channel Improvements	$43,680	$502,320									
Federal Street Retaining Wall Improvements						$120,000	$1,380,000				
Elm Street Brook/Florence Area Phase 1 Improvements					$516,000	$5,939,000					
King Street/Market Street Area Phase 1 and 2 Improvements						$911,000	$5,160,000	$5,315,000			
Levee Certification	$275,000	$275,000									
Levee Capital Improvements	$280,000	$275,000	$56,000	$647,000							
Flood Control Pumping Station Upgrades				$1,391,000	$15,998,000						
West Street Portable Pumps				$46,000	$533,000						
Austin Circle/Ryan Road Area Phase 2 Improvements									$327,000	$3,757,000	
Bridge Street/Meadows Area Phase 3 Improvements											$448,
Elm Street Brook/Florence Area Phase 3 Improvements											
King Street/Market Street Area Phase 3 and 4 Improvements											
EPA MS4 Permit Requirements Allowance	$250,000	$250,000	$250,000	$250,000	$250,000						
Annual Allowance for Drainage Infrastructure	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,
Municipal Green Design/Construction Allowance	$258,000	$265,000	$273,000	$281,000	$290,000	$299,000	$307,000	$317,000	$326,000	$336,000	$346,
Total Costs per Year	$1,761,680	$3,961,320	$6,151,000	$3,115,000	$18,087,000	$7,769,000	$7,347,000	$6,132,000	$1,153,000	$4,593,000	$1,294
Grand Total	$95,586,000										

	Planning/Operations
	Design
	Construction

Incremental O&M Expenses

Table 5.3

Projected Incremental O&M

	2011	2012	2013	2014	2015	2016
Monitoring	$100,000	$103,000	$106,090	$109,273	$112,551	$115,927
MS4 Staff	$60,000	$61,800	$63,654	$65,564	$67,531	$69,556
O&M Staff	$100,000	$103,000	$106,090	$109,273	$112,551	$115,927
O&M Vehicle	$2,877	$2,963	$3,052	$3,144	$3,238	$3,335
Vactor Truck	$19,927	$20,525	$21,141	$21,775	$22,428	$23,101
Street Sweeper	$29,891	$30,788	$31,711	$32,663	$33,643	$34,652
Billing Clerk	$50,000	$51,500	$53,045	$54,636	$56,275	$57,964
Public Education	$20,000	$20,600	$21,218	$21,855	$22,510	$23,185
Energy Costs	$20,000	$20,600	$21,218	$21,855	$22,510	$23,185
Total	**$402,695**	**$414,776**	**$427,219**	**$440,036**	**$453,237**	**$466,834**

Parcel Analysis

Figure 5.2

Total Impervious Area and Parcel Count by Classification

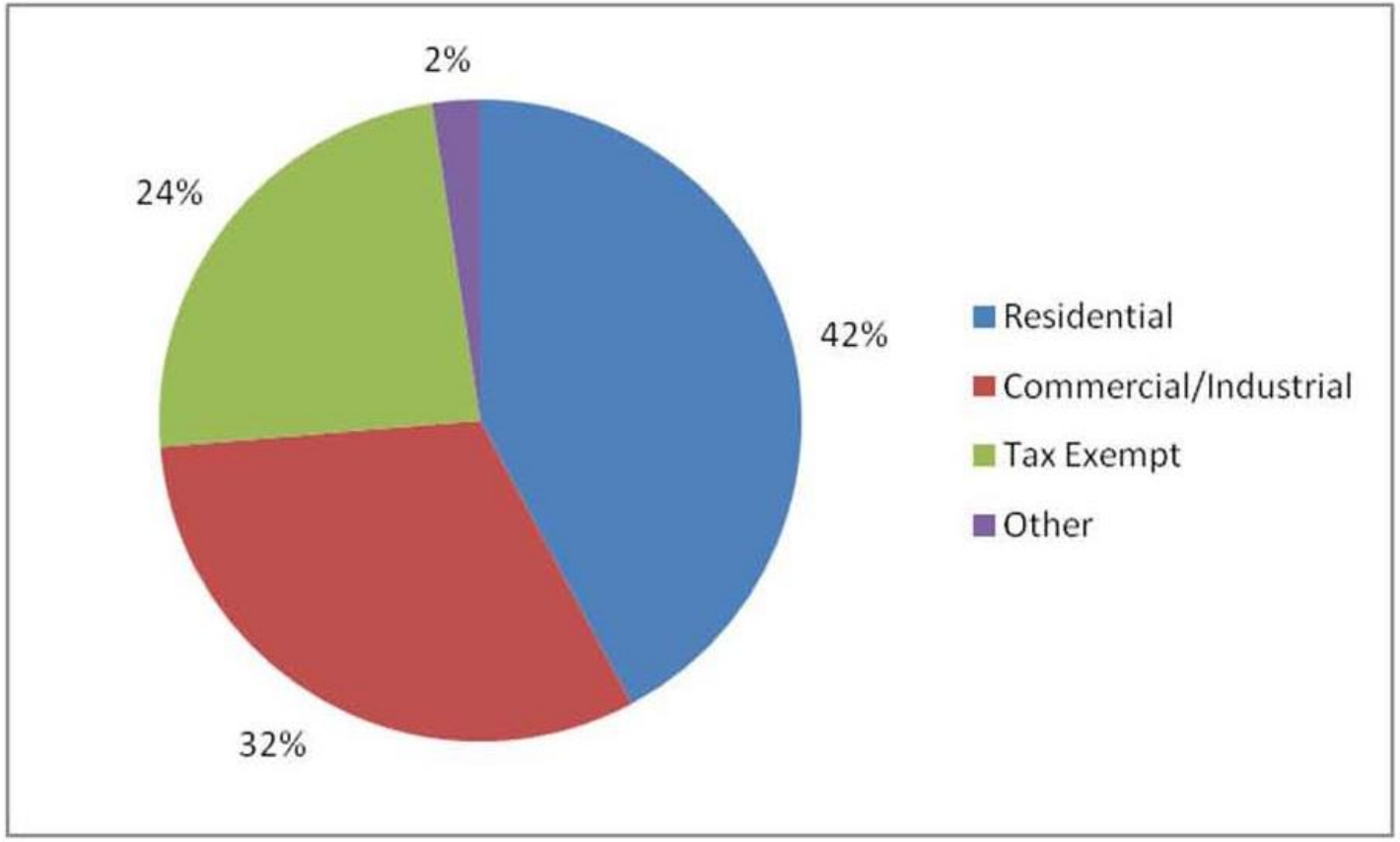


Table 5.8

Distribution of Dwelling Units, Impervious Area and ERU Calculation

ERU Calculation	
Impervious Area (sq. ft. thousands)	
Single-Family[1]	21,315
Two-Family	3,551
Three-Family	+ 829
Total	**25,696**
Number of Units (thousands)	
Single-Family[1]	7.3
Two-Family	1.8
Three-Family	+ 0.5
Total	**9.6**
Number of Units (thousands)	
Total Impervious Area	25,696
Total Units	÷ 9.6
Equivalent Residential Unit (sq. ft.)	**2,671**

[1] Includes condominiums and mobile homes

Revenue Requirement and Projected Annual ERU Charge

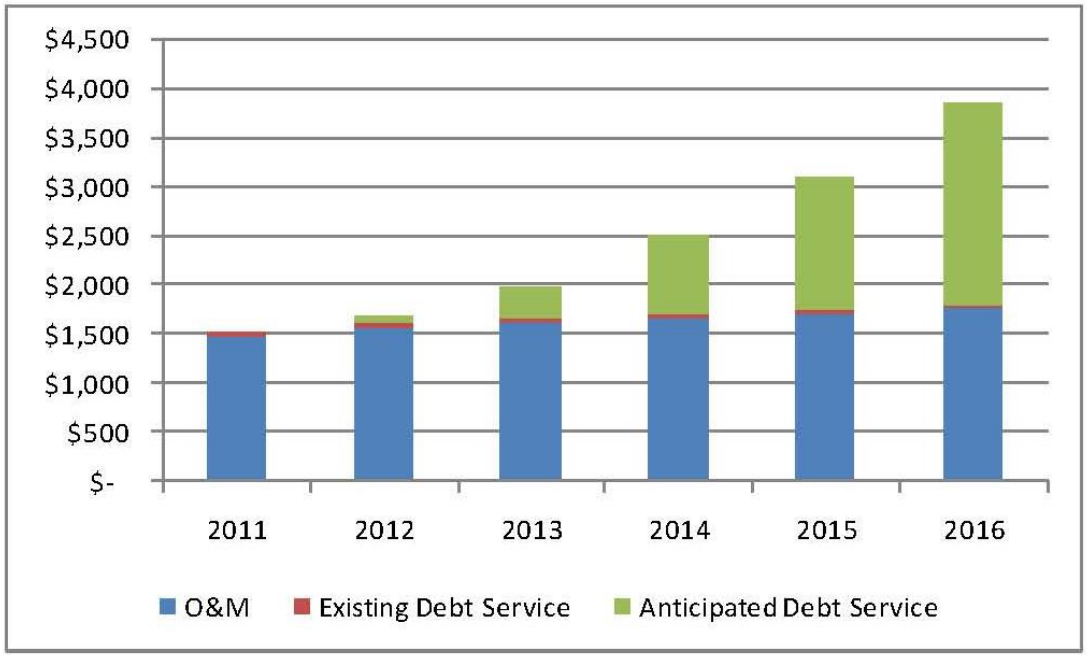
Table 5.11

Projected Annual ERU Charge

	2011	2012	2013	2014	2015	2016
Revenue Requirement	$1,518,572	$1,692,454	$1,973,771	$2,492,536	$3,089,388	$3,850,180
Residential Charge per ERU	$59.79	$66.63	$77.71	$98.13	$121.63	$151.58

Figure 5.1

Revenue Requirement (thousands)



ERU Approach

Table 5.2

Proposed FY 2012 Equivalent Residential Unit Stormwater Fee Schedule

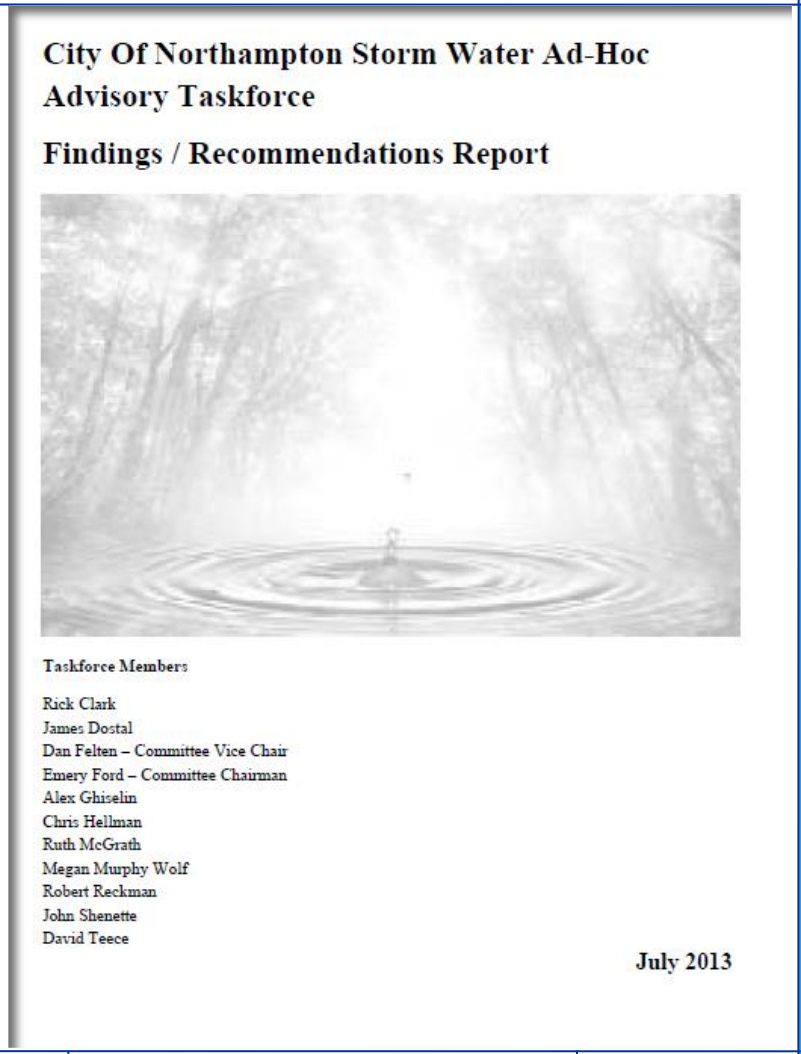
Classification	*Billing Units*	*ERU*	*Rate per ERU*
Single-family	1	1.00	$66.63
2-Family	2	2.00	$133.26
3-Family	3	3.00	$199.90
Classification	***Impervious Area***	***ERU***	***Rate per ERU***
Large Residential	10,821	4.05	$269.95
Commercial/Industrial with 1,000 sq. feet of IA	1,000	0.37	$24.95
Commercial/Industrial with 10,000 sq. feet of IA	10,000	3.74	$249.46
Commercial/Industrial with 100,000 sq. feet of IA	100,000	37.44	$2,494.58

Public Process - Summary

1. Board of Public Works Mtgs: Sept - Nov 2012
2. Stormwater Advisory Task Force: Mar – June 2013
3. City Council: August 2013 – Mar 2014
   - Presentation by Ward: Dec 2013 – Feb 2014
   - Presentations Chamber of Commerce: Dec 2013
   - Council Final Vote: Unanimous Mar 20, 2014
4. “This process has been, I think, a paragon for the community. The citizen involvment was in fact unparalleled.” City Council President Bill Dwight.

Task Force Recommendations

1. Create a Stormwater and Flood Control Fee
2. All property owners pay
3. Suggested two possible formulas
4. Recommended offering credits and incentives



City Of Northampton Storm Water Ad-Hoc Advisory Taskforce

Findings / Recommendations Report

Taskforce Members

Rick Clark
James Dostal
Dan Felten – Committee Vice Chair
Emery Ford – Committee Chairman
Alex Ghiselin
Chris Hellman
Ruth McGrath
Megan Murphy Wolf
Robert Reckman
John Shenette
David Teece

July 2013

Billing/Revenue Highlights

1. Billing formula based on runoff coefficients:
   - Impervious surface area = 0.95
   - Pervious surface area = 0.1
2. Bills for 1- to 3-family homes based on average impervious and pervious areas
3. 4 billing tiers for residential property
   - Grouped by impervious area
   - 25% residential properties in each tier
4. Bills for all other properties based on actual areas of impervious and pervious area on each property
5. Cap of 1 acre for pervious area
6. “Revenue Cap” of $2 million/year

Residential Bills

Impervious Areas and Pervious Areas Averaged for each Residential Tier to Determine Bill

Annual Residential Fees:

- Tier 1: **$61**
- Tier 2: **$85**
- Tier 3: **$113**
- Tier 4: **$230**

Example Bill – Lowest Residential Tier

Average Residential Property <2,020 SF IA:

- Impervious Surface = 1,551 sf
- Pervious Surface = 11,227 sf

1,551 sf x 0.95 = 1,473 sf
11,227 sf x 0.1 = 1,123 sf
1,473 + 1,123 = 2,596 sf (hydraulic acreage)

2,596 sf x 0.02366 (rate) = $61 Fee

Example Non-Residential Bill

Impervious Area at Cooley Dickinson Hospital

21

Example: Cooley Dickinson Hospital

Impervious Area: 685,305 sf x 0.95 = 651,040 sf

Pervious Area: 1,161,581 sf (cap 1 acre) =
43,560 sf x 0.1 = 4,356 sf

Total: 651,040 sf + 4,356 sf = 655,396 sf (hydraulic acreage)

655,396 sf x 0.02366 (rate) = $15,507

Sample Annual Stormwater Bills

DRAFT, Northampton DPW, 3/3/2014

City of Northampton
Sample Annual Stormwater Bill Comparison
Alternate Rate Method with Four Residential Tiers
DRAFT, Northampton DPW, 3/3/2014

Properties	Impervious Area (SF)[1]	Pervious Area (SF)[1]	Sample Bills[2]
1, 2 & 3 Family Houses (average areas by tiers)			
Less than 2,020 sf impervious area (1,649 properties)	1,551	11,227	$61
2,020 sf to less than 2,830 sf impervious area (1,644 properties)	2,402	12,955	$85
2,830 sf to less than 4,100 sf impervious area (1,651 properties)	3,394	15,345	$113
4,100 sf and greater impervious area (1,672 properties)	7,902	25,838	$239
Example Properties:			
Undeveloped Land (1 acres)	-	43,560	$103
Undeveloped Land (10 acres)	-	435,600	$103
Undeveloped Land (50 acres)	-	2,178,000	$103
Arcadia (1 of 10 parcels)	16,075	14,688,422	$464
1-Family Property (19.2 acre lot)	3,218	834,363	$113
Paradise Copies-21 Conz St	11,853	2,661	$273
Coopers, 35 Main St, Forence	16,550	4,669	$383
CVS, 366 King St	63,734	30,181	$1,504
Hotel Northampton, 36 King St & 43 Gothic St	77,835	1,495	$1,753
221 Pine Street	79,838	63,299	$1,898
Clarion Hotel & Conference Center, 23 Atwood Dr	190,319	143,509	$4,381
Lia Toyota, 246-280 King St	233,375	68,099	$5,349
River Run Condominiums, Damon Rd	242,688	479,131	$5,558
L-3 KEO, 50 Prince St	265,805	325,611	$6,078
Hathaway Farms, Barrett St (207 Apartments)	380,421	414,427	$8,654
Walmart, 180 North King St	423,020	87,505	$9,611
Coca-Cola, 45 Industrial Dr	756,582	152,341	$17,109
Cooley Dickinson Hospital	685,305	1,161,581	$15,507
Three County Fairgrounds	842,349	1,139,281	$19,037
VA Medical Center, 421 North Main St	1,099,758	3,448,442	$24,822
Smith College	2,764,872	5,157,630	$62,249

Total Revenue by Property Types[3,4]		Percent of Revenue	Revenue
Small Residential (1-3 Family)		41%	$825,944
Large Residential (4+ Unit Apartments, Condos, Rooming)		10%	$192,285
Commercial/Industrial Properties		24%	$471,498
City Properties		9%	$173,356
Tax Exempt Properties		10%	$208,446
Other Properties (Ag, Forestry, Recreation, Accessory Land)		7%	$130,320
Grand Total			**$2,001,850**

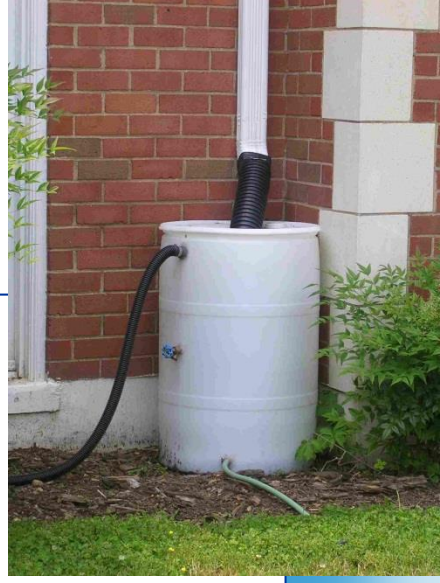
[1] Estimated areas based on 2005 MassGIS Impervious information, 2011 MassGIS Building Information, and 2012 MassGIS Level 3 parcel data

[2] Runoff Coefficients: Impervious = 0.95, Pervious = 0.1

[3] Implementation of a credit program may decrease the revenue at an order of magnitute of approximately $40,000

[4] All properties have been included except City Roadways, State Roadways, and Properties with Agricultural Preservation and Conservation Restrictions on

Proposed Credits and Incentives



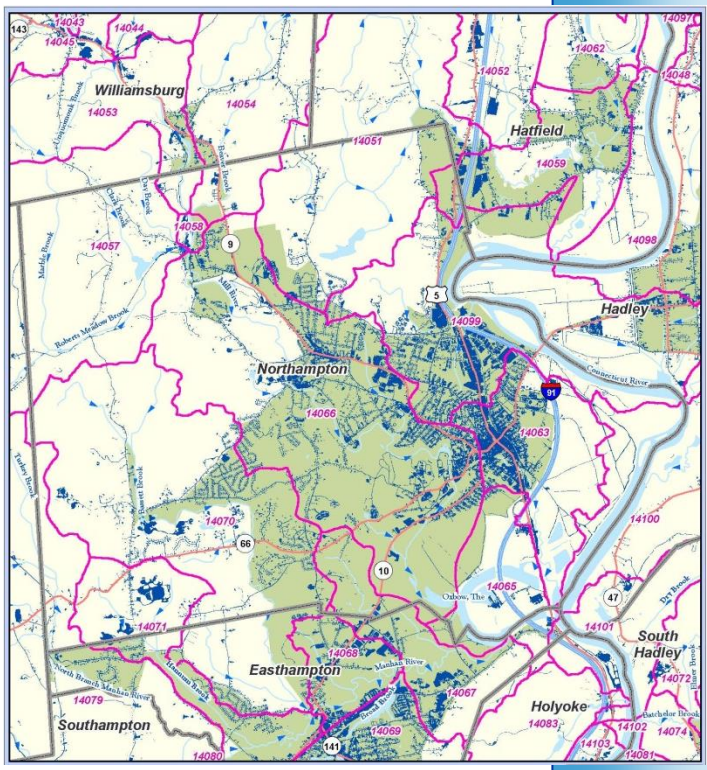
1. **Incentives**
   - Discount on purchase of rain barrels

2. **Credits – Max Value 50%**
   - Residential one-time credit for construction of rain gardens or porous driveways
   - Stormwater system maintenance and performance credits for commercial and other properties
   - Senior and Low Income Credits
   - Protected Land Credits for agriculture, forestry, and other open space with restrictions in place
   - Education Credit for private and public education institutions

CDM Smith

Data Management – Billing System

- Use 2005 MassGIS impervious surface and 2011 MassGIS building data
- GIS Assessors Map property boundaries
- Work with CDM Smith to determine bills for residential, commercial and other non-residential properties
- Incorporate billing database into accounting system
- Quarterly billing – First bills mailed



THANK YOU!

Questions?