



# CITY OF NORTHAMPTON

## Flood Control and Stormwater Infrastructure Challenges

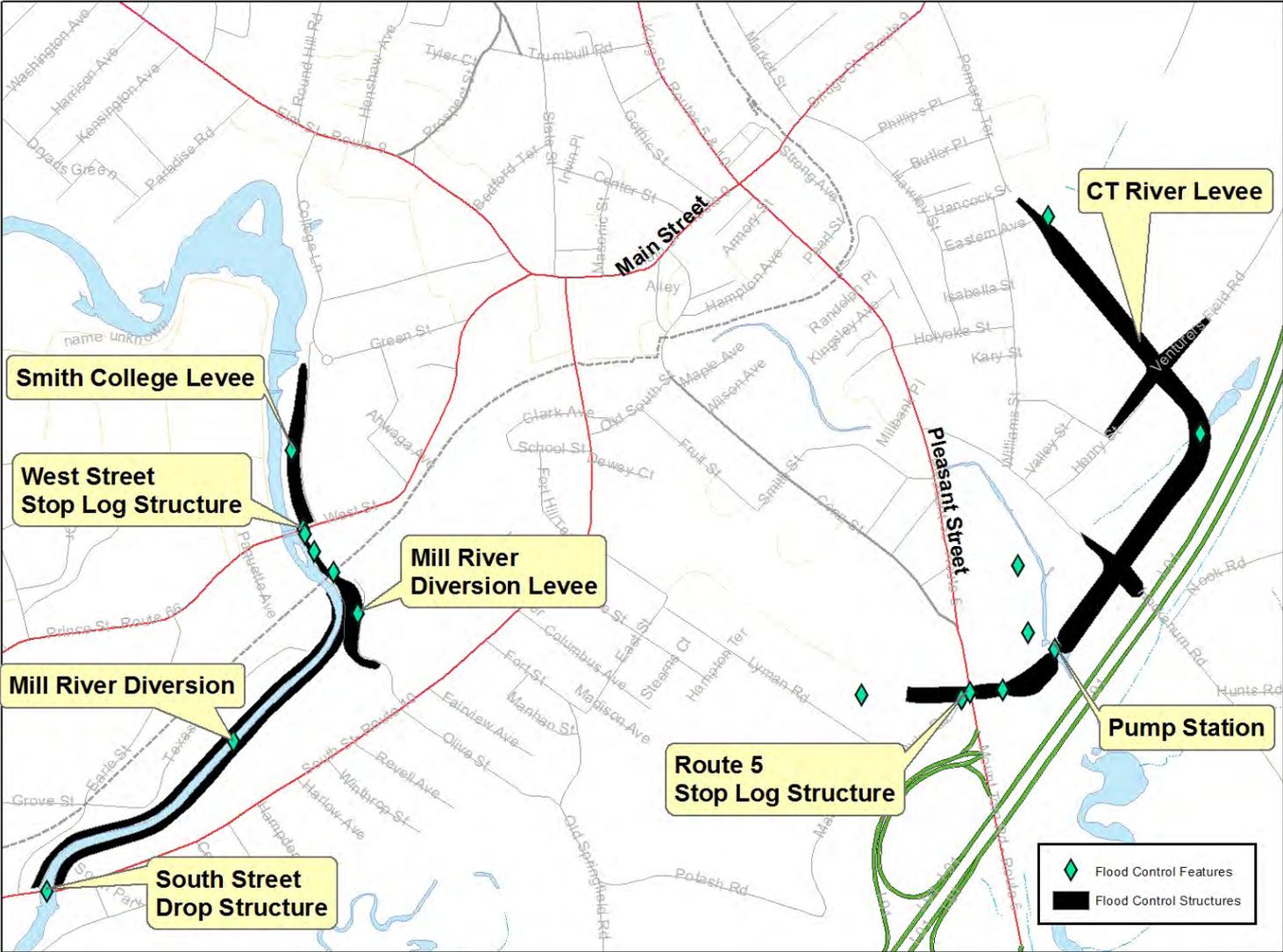


March 2013

# Flood Control - Overview

- Levees and Pumps built in response to Flooding in 1936 and 1938
- Two Systems Constructed by Federal Government (Army Corps of Engineers)
- Connecticut River Levee and Pump Station
- Mill River Levee and River Diversion

# Northampton Flood Control Structures



# Northampton Flooding at Elevation 127' with no Flood Control System



Northampton Public Works

1:10,000

# Pleasant Street Flood of 1936



# Downtown Underpass Flood of 1936



# Connecticut River 2011



# Property Values - Cost of Failure

- 2012 Assessor's values includes inside-the-dike value of land & buildings inundated:  
\$ 199,610,148

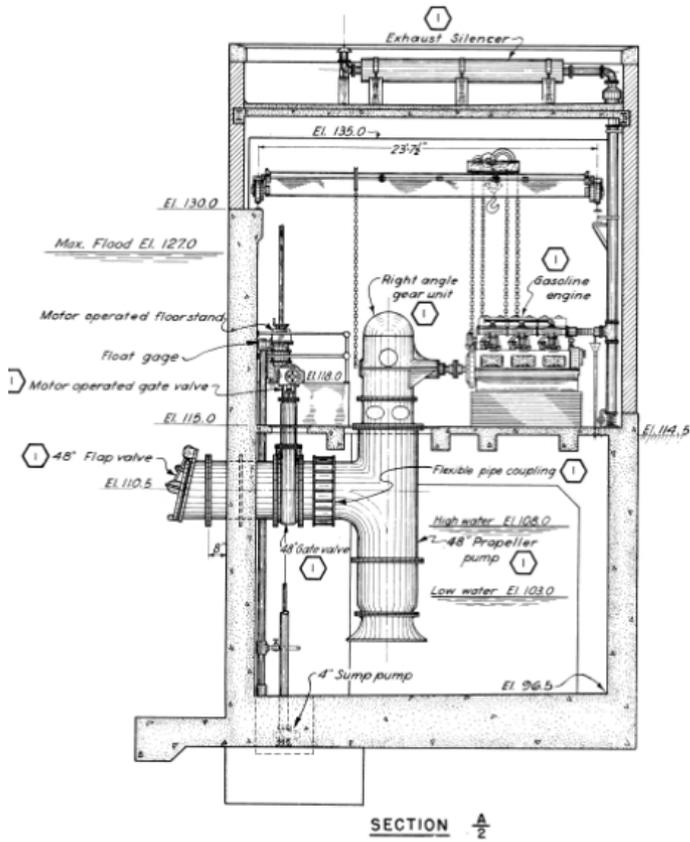
Total building value: \$ 54,203,450

Acres: 189 (under water inside the dike system in a 127' elevation flood)

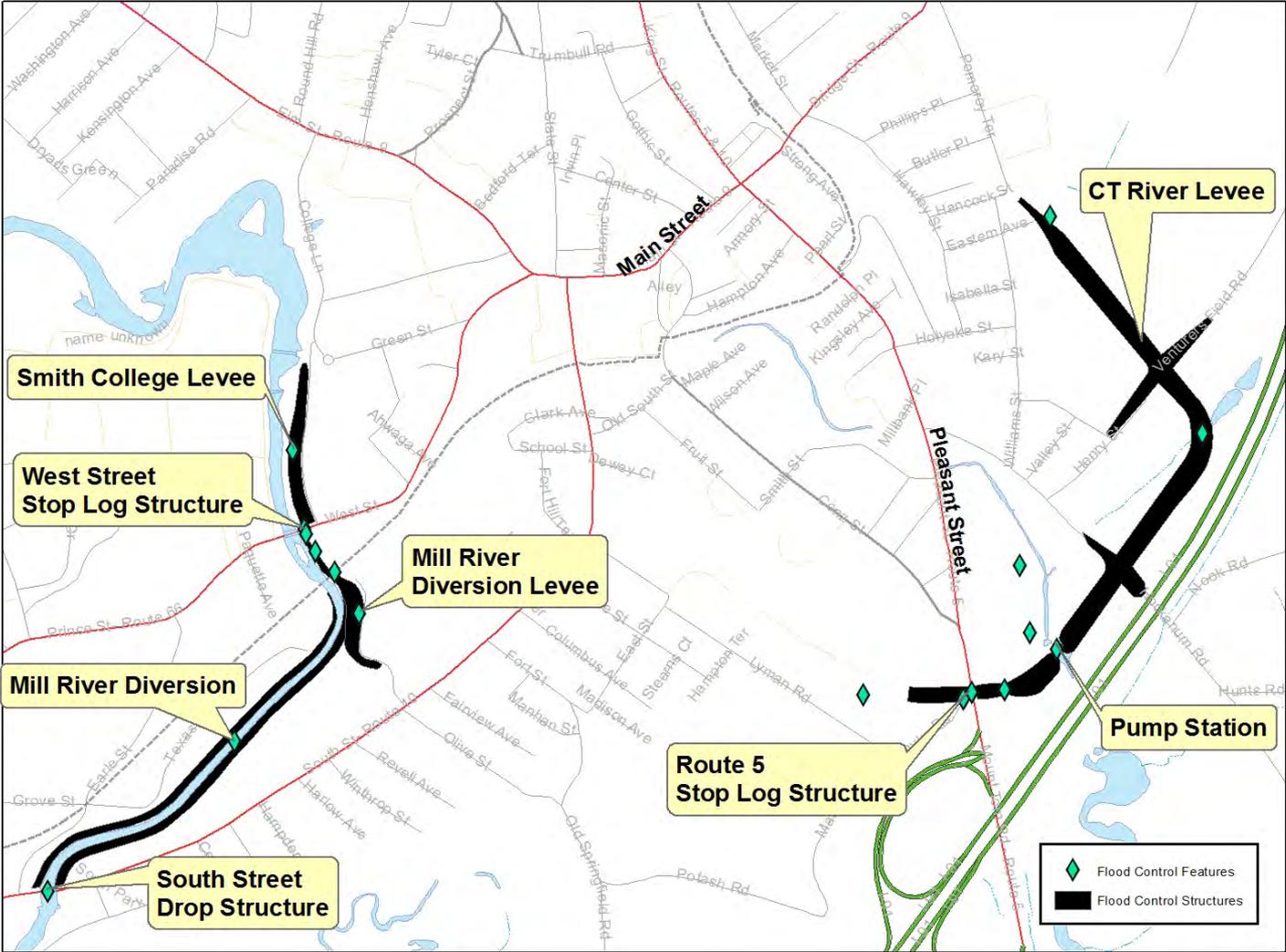
# Hockanum Road Pump Station



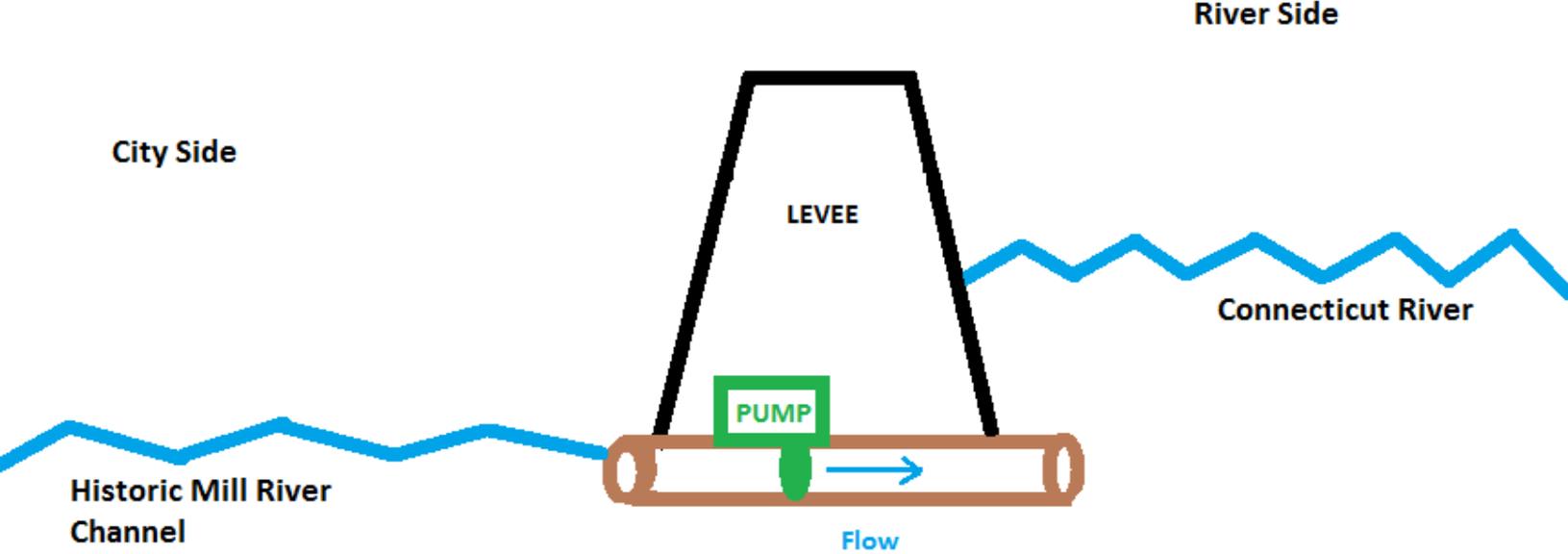
# Pump Engine



# Northampton Flood Control Structures



# Flood Control Pump Station at Flood Stage



# West Street (Mill River) August 2011



# Flood Control Mandates

- Army Corps mandated engineering studies and maintenance requirements
  - Analysis includes seismic, hydraulics, stability and settlement, topographic surveys and geotechnical borings.
- Mill River System - Maintenance and Analyses  
Deadline - January 2013
- Connecticut River System - Maintenance and Analyses  
Deadline - January 2014

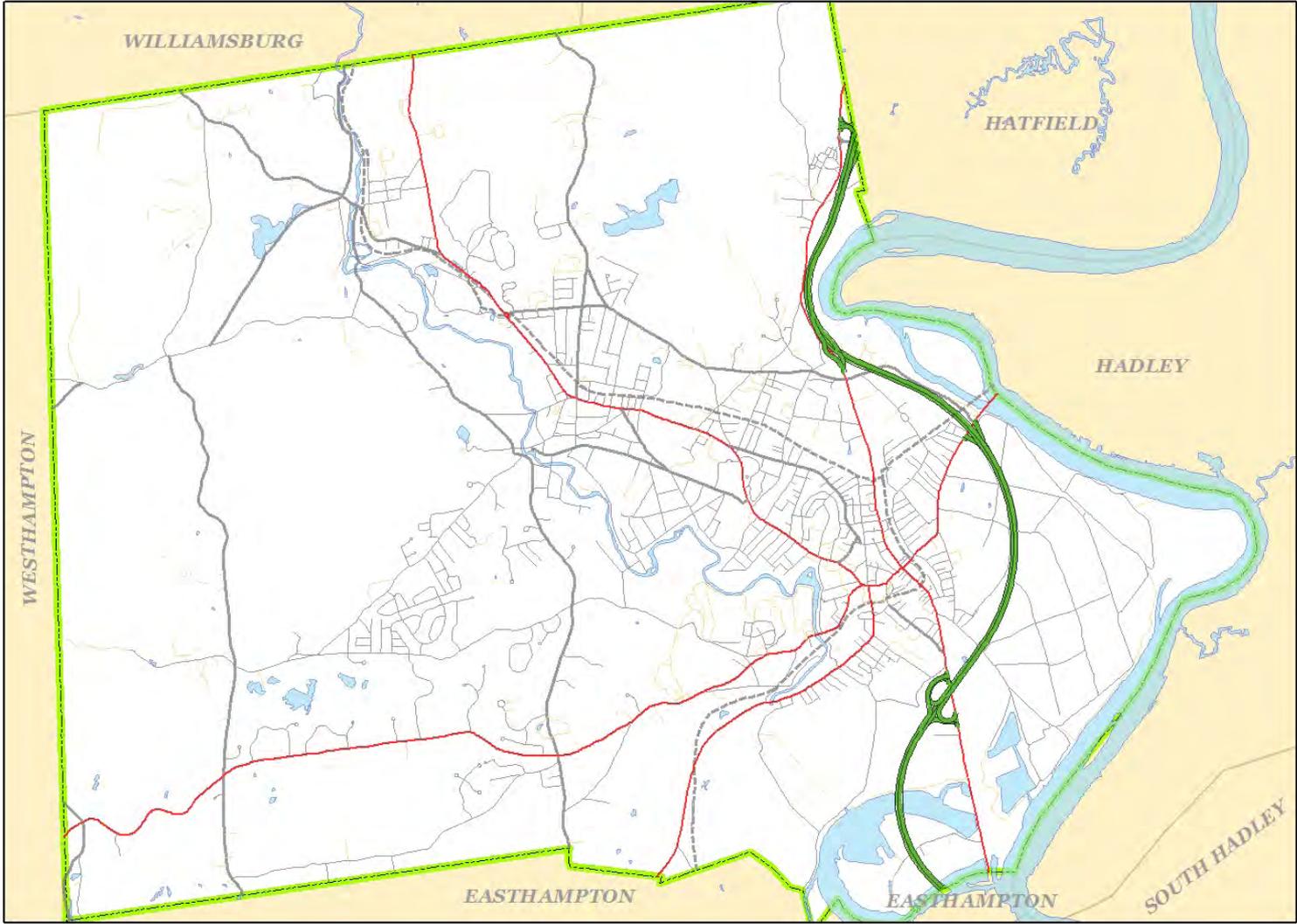
# Flood Control Mandate (cont.)

- Estimated minimal cost is \$1,200,000 for engineering and maintenance construction
- Unknown \$\$ to repair possible deficiencies
- Estimated mandates at the pump station begin in the \$1,000,000 range

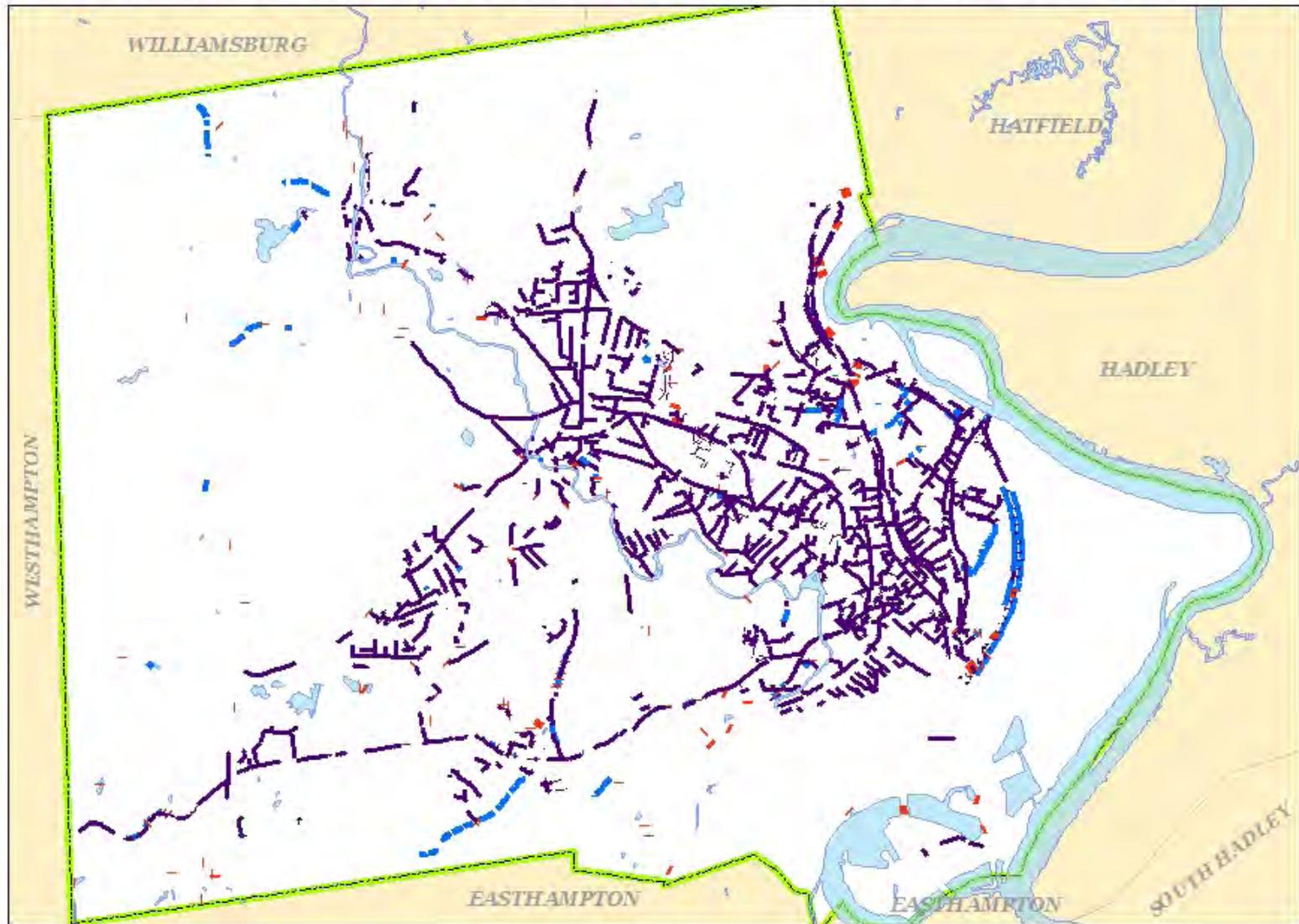
# Stormwater Drainage System

- Keeps roadways clear of water and ice
- Prevents localized flooding
- Minimizes damaging erosion and protects our infrastructure

# NORTHAMPTON



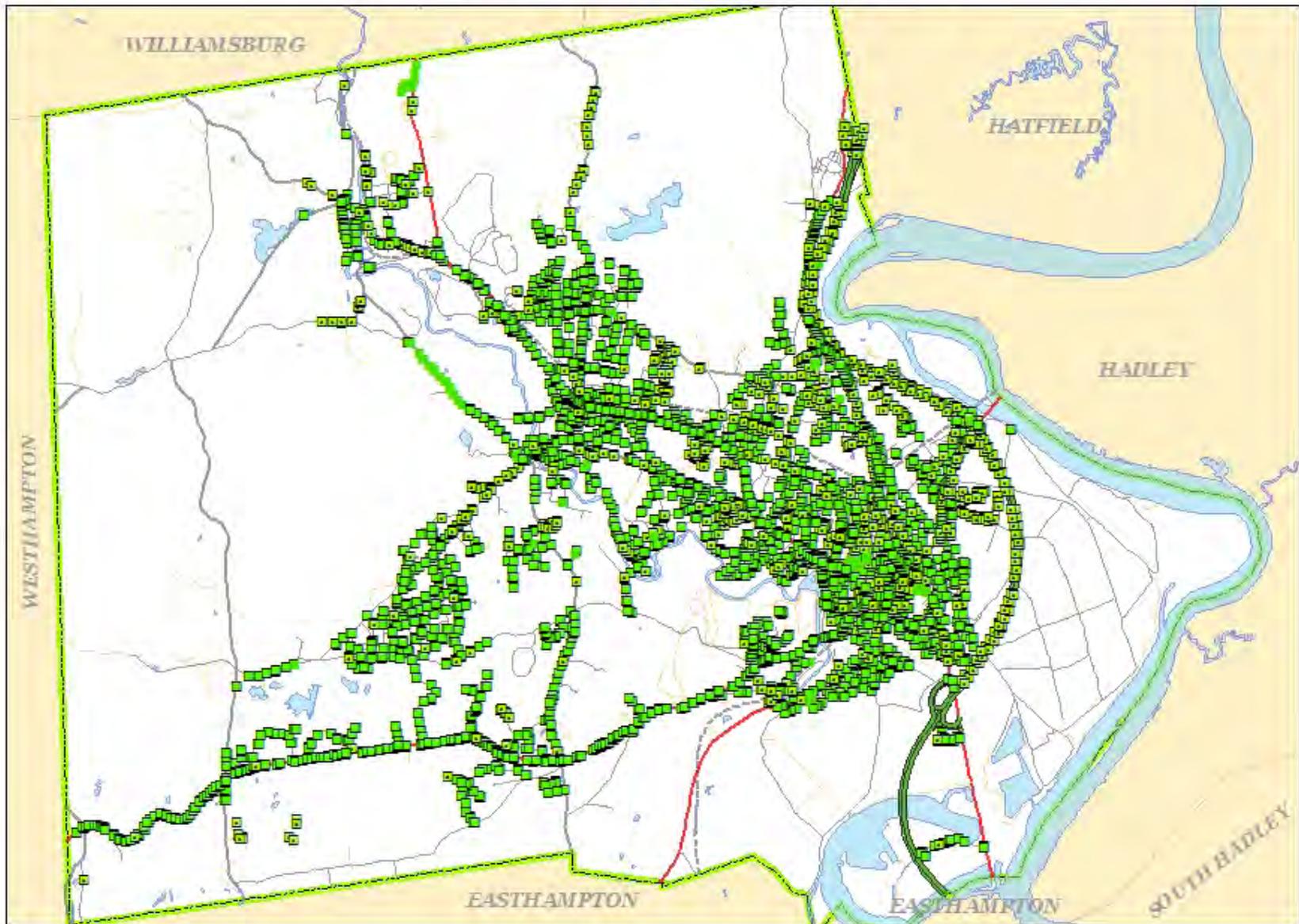
# 114 Miles of Pipe, 190 Culverts & Drainage Channel



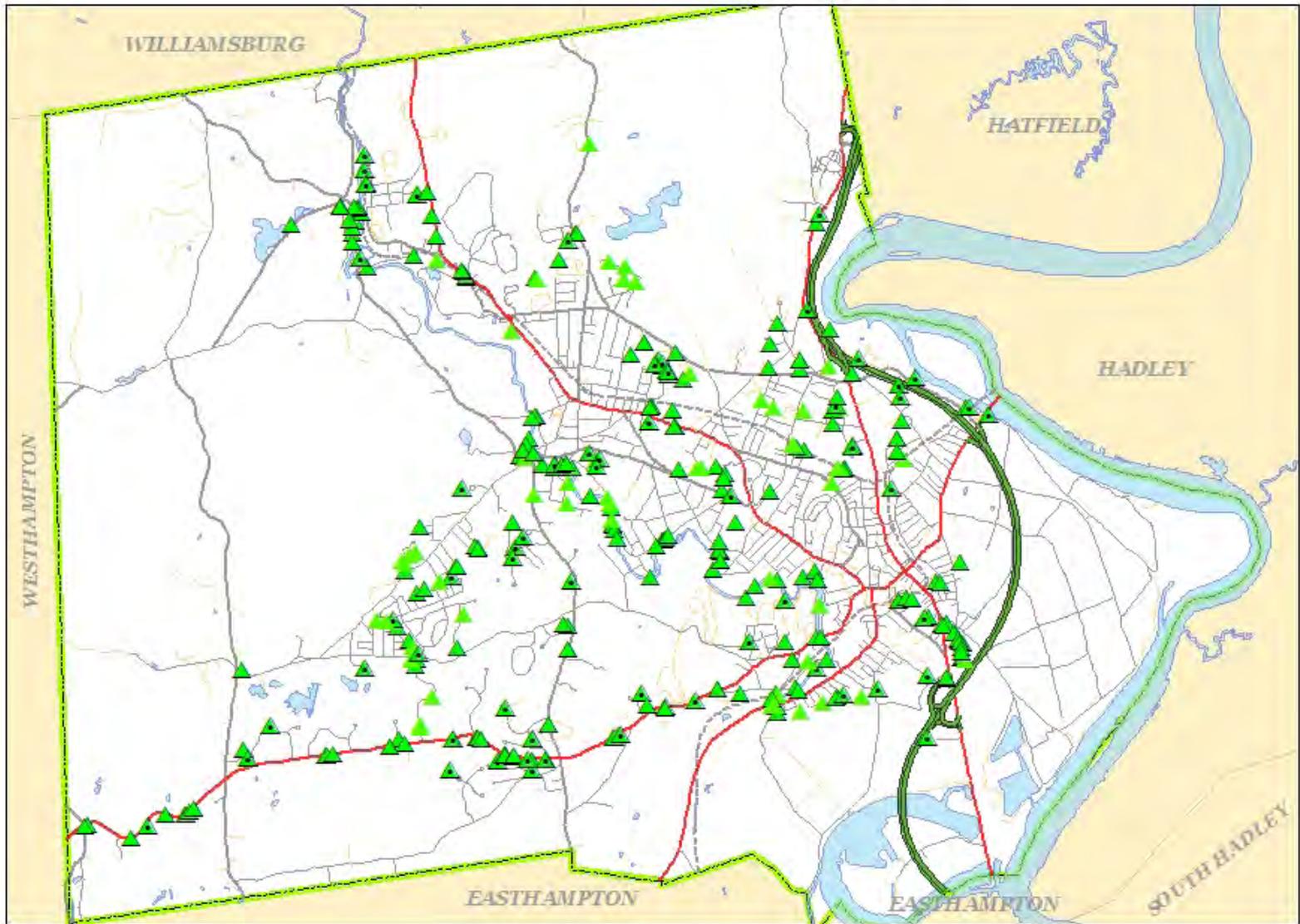
# Installation of a new drain



# 4,835 Catch Basins



# 326 Drain Outfalls



# Aging Stormwater Infrastructure

- System is over 100 years old in many areas
- System is under capacity in many areas
- Some City areas don't have drainage systems and others need improvements
- To date there have been limited funds for replacing/repairing/constructing



## Main Street Drainage

Under capacity stormwater drainage system causes surcharging of drain manhole during this rain event



## **North Street Flooding 2010**

Under capacity  
stormwater  
drainage system  
causes ponding in  
the underpass after  
thunderstorm



## **Hatfield Street Drainage**

Hatfield Street required emergency drainage repair in 2011. (Note yellow gas pipeline).



## Prospect Street Culvert Collapse

Emergency repairs cost \$29,000



## **Florence Street**

Erosion caused by broken stormwater drainage pipe



## **Elm/Riverside/Milton Streets Flooding**

Under capacity stormwater drainage system causes brook to overflow and flood the roadway and adjacent properties during rain storm



## **Vicinity of Austin Circle**

Example of location that may require new drainage infrastructure.

# New EPA Stormwater Permit - Mandates

- EPA permit regulates City stormwater discharges to Brooks and Streams
- New permit expected late 2013
- The new EPA permit drastically increases costs for stormwater systems



## **EPA MANDATE - Catch Basin Cleaning**

New EPA permit will require all catch basins to be maintained at less than 50% full with sediment. Currently, only certain catch basins are routinely cleaned of sediment.



**Catch Basin Cleaning with Vactor Truck**



## **EPA MANDATE - Street Sweeping**

New EPA permit will require sweeping more frequently



## **EPA MANDATE – OUTFALL SAMPLING**

### **Vernon St– Outfall to the Mill River**

New EPA permit will require outfall sampling of 33% of our 326 outfalls each year. This is about 100 outfalls that will require sampling and water testing in dry and wet weather.



**EPA MANDATE –  
Create more Green Infrastructure**

Drainage Green Retrofit on Conz Street – Water Quality Swale

# EPA MANDATE – PUBLIC EDUCATION



# Other EPA Permit Mandates:

- Illicit Discharge Detection and Elimination
- Nitrogen Reduction in discharges
- Municipal floor drain inspection/improvements

# 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 but this is inadequate funding and lacks responsiveness required for needs



## **River Road Retaining Wall – Mill River**

This retaining wall is failing and threatens River Road and sewer interceptor line.



## **Roberts Meadow Brook – Musante Beach Area**

Stream bank erosion on Roberts Meadow Brook threatens the house in the photo as well as a bridge a little further downstream.

# Total Flood Control & Stormwater Mandates

- Army Corps mandated engineering studies and maintenance and repair requirements for Mill River and Connecticut River Systems including Levees and Pump Stations (estimated cost of \$2,200,000 over the next three years).
- EPA Stormwater Permit Mandates that includes increased operation and maintenance costs estimated at \$425,000 per year.
- River and Brook erosion repair projects

# THANK YOU!

We would be happy to address any questions!



# Budget Projections

# FY 2013 Stormwater Expenses

	FY 2013	FY 2014	FY 2015	FY 2016
<b>Existing Operation Budget Allocations</b>				
Flood Control Personnel (Overtime Storms)	\$23,000			
Flood Control O&M	\$32,625			
Stormdrain Personnel	\$110,098			
Stormdrains O&M	\$54,050			
Indirect Costs	\$0			
<i>Total Allocated O&amp;M</i>	\$219,773			
<b>Increase in O&amp;M Budget (due to new EPA permit)</b>				
Monitoring (Outfalls/Drain Manholes)	-			
Engineering Staff	-			
Operations Staff	-			
Billing Clerk	-			
Catch basin cleaning vehicle	-			
Vactor truck	-			
Public education	-			
Energy costs	-			
<i>Total incremental O&amp;M</i>	\$0			
<b>Infrastructure Investments</b>				
Flood Control Pump St. Alts Anal/prelim dsn				
North St Drainage	\$219,240			
Drainage infrastructure -undefined				
Municipal green design/construction				
<i>Total Infrastructure Investments</i>				
<b>Total Operating Expenses</b>	<b>\$439,013</b>			
<b>Debt Service</b>				
General Bond (See Below)	\$99,746			
<i>Ridgewood Terrace/Crescent St</i>				
<i>Barrett St/Utility Study</i>				
<i>Mill River Levee - Partial Repair</i>				
Anticipated Future Debt (See Below)				
<i>Levee Capital Improvements</i>				
<i>River Road Retaining Wall</i>				
<i>Roberts Meadow Brook</i>				
<i>Levee Certification</i>				
<b>Total Debt Service</b>	<b>\$99,746</b>	-	-	
<b>Total Revenue Requirement</b>	<b>\$538,759</b>			

# FY 2014 Stormwater Expenses

	FY 2013	FY 2014	FY 2015	FY 2016
<b>Existing Operation Budget Allocations</b>				
Flood Control Personnel (Overtime Storms)	\$23,000	\$23,000		
Flood Control O&M	\$32,625	\$32,625		
Stormdrain Personnel	\$110,098	\$111,374		
Stormdrains O&M	\$54,050	\$54,050		
Indirect Costs	\$0	\$0		
<i>Total Allocated O&amp;M</i>	\$219,773	\$221,049		
<b>Increase in O&amp;M Budget (due to new EPA permit)</b>				
Monitoring (Outfalls/Drain Manholes)	-	-		
Engineering Staff	-	-		
Operations Staff	-	-		
Billing Clerk	-	-		
Catch basin cleaning vehicle	-	-		
Vactor truck	-	-		
Public education	-	-		
Energy costs	-	-		
<i>Total incremental O&amp;M</i>	\$0	\$0		
<b>Infrastructure Investments</b>				
Flood Control Pump St. Alts Anal/prelim dsn				
North St Drainage	\$219,240			
Drainage infrastructure -undefined		\$20,000		
Municipal green design/construction				
<i>Total Infrastructure Investments</i>		\$20,000		
<b>Total Operating Expenses</b>	<b>\$439,013</b>	<b>\$241,049</b>		
<b>Debt Service</b>				
General Bond (See Below)	\$99,746	\$94,301		
<i>Ridgewood Terrace/Crescent St</i>				
<i>Barrett St/Utility Study</i>				
<i>Mill River Levee - Partial Repair</i>				
Anticipated Future Debt (See Below)				
Levee Capital Improvements				
River Road Retaining Wall				
Roberts Meadow Brook				
Levee Certification				
<b>Total Debt Service</b>	<b>\$99,746</b>	<b>\$94,301</b>		
<b>Total Revenue Requirement</b>	<b>\$538,759</b>	<b>\$335,350</b>		

# FY 2015-16 Stormwater Expenses

	FY 2013	FY 2014	FY 2015	FY 2016
<b>Existing Operation Budget Allocations</b>				
Flood Control Personnel (Overtime Storms)	\$23,000	\$23,000	\$23,690	\$24,401
Flood Control O&M	\$32,625	\$32,625	\$33,884	\$35,194
Stormdrain Personnel	\$110,098	\$111,374	\$112,928	\$116,316
Stormdrains O&M	\$54,050	\$54,050	\$55,672	\$57,342
Indirect Costs	\$0	\$0	\$230,000	\$240,000
<i>Total Allocated O&amp;M</i>	\$219,773	\$221,049	\$456,174	\$473,253
<b>Increase in O&amp;M Budget (due to new EPA permit)</b>				
Monitoring (Outfalls/Drain Manholes)	-	-	\$100,000	\$103,000
Engineering Staff	-	-	\$60,000	\$61,800
Operations Staff	-	-	\$100,000	\$103,000
Billing Clerk	-	-	\$50,000	\$51,500
Catch basin cleaning vehicle	-	-	\$26,000	\$26,000
Vector truck	-	-	\$60,000	\$60,000
Public education	-	-	\$20,000	\$20,600
Energy costs	-	-	\$20,000	\$20,600
<i>Total incremental O&amp;M</i>	\$0	\$0	\$436,000	\$446,500
<b>Infrastructure Investments</b>				
Flood Control Pump St. Alts Anal/prelim dsn			\$200,000	
North St Drainage	\$219,240	\$0		
Drainage infrastructure -undefined	\$0	\$20,000	\$500,000	\$500,000
Municipal green design/construction	\$0	\$0	\$30,000	\$30,000
<i>Total Infrastructure Investments</i>		\$20,000	\$730,000	\$530,000
<b>Total Operating Expenses</b>	<b>\$439,013</b>	<b>\$241,049</b>	<b>\$1,622,174</b>	<b>\$1,449,753</b>
<b>Debt Service</b>				
General Bond (See Below)	\$99,746	\$94,301	\$91,801	\$90,373
<i>Ridgewood Terrace/Crescent St</i>				
<i>Barrett St/Utility Study</i>				
<i>Mill River Levee - Partial Repair</i>				
Anticipated Future Debt (See Below)				
Levee Capital Improvements			\$37,700	\$36,758
River Road Retaining Wall			\$160,800	\$156,780
Roberts Meadow Brook			\$54,600	\$53,235
Levee Certification			<u>\$55,000</u>	<u>\$53,625</u>
<b>Total Debt Service</b>	<b>\$99,746</b>	<b>\$94,301</b>	<b>\$399,901</b>	<b>\$390,771</b>
<b>Total Revenue Requirement</b>	<b>\$538,759</b>	<b>\$335,350</b>	<b>\$2,022,075</b>	<b>\$1,840,524</b>

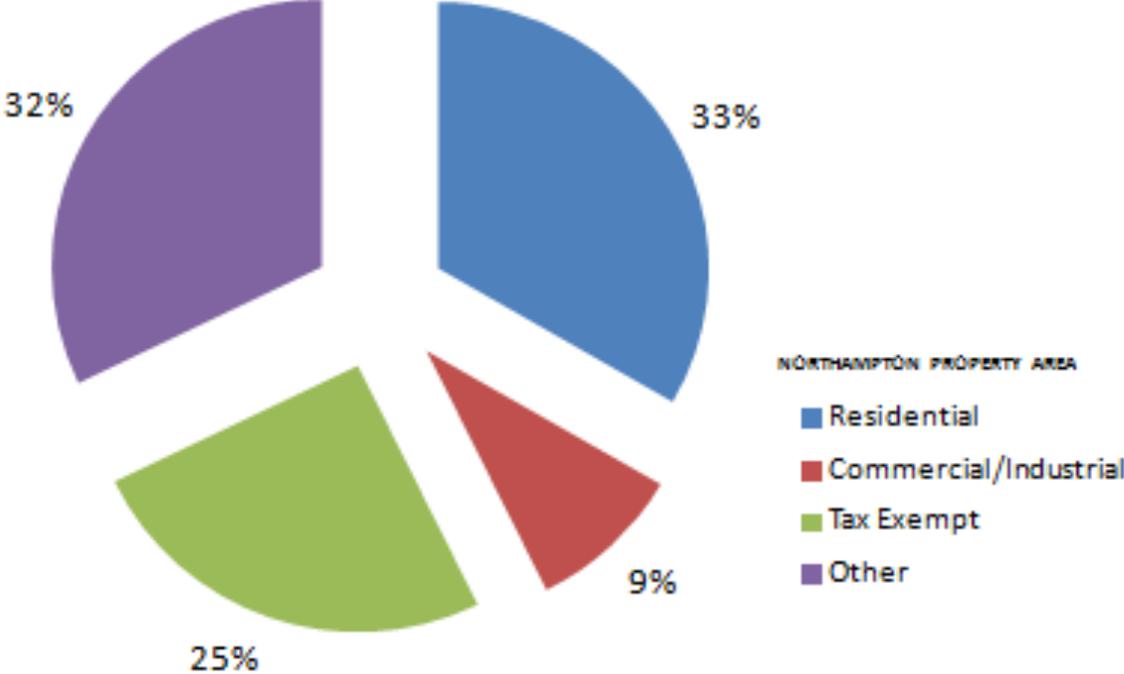
# Ways to Meet Funding Needs

- 1. General Fund – (Current Funding Method)**
- 2. Use Override(s)**
- 3. Create a new Stormwater and Flood Control Fee**
- 4. Combination of General Fund and Fee**

# 1) General Fund

- The existing source of funding for Stormwater and Flood Control
- Flood Control/Stormwater programs compete with other City departments and services for limited funds
- Funding may not be stable and adequate
- Funding is not equitable: The General Fund is based on property taxes which bear little relationship to stormwater runoff
- Non-profit institutions do not contribute to property taxes

# 25 % of the Area in Northampton is Tax Exempt





## **Elm/Riverside Street Flooding**

Under capacity stormwater system cannot drain the roadway and properties during rain storm

## 2) General Fund & Override

- To supplement the General Fund – Prop 2 ½ override(s) might fund stormwater & flood control programs
- Program funding needs fluctuate based on capital projects. Multiple override votes may be needed to sustain programs.
- Unpredictable funding source for stormwater and flood control programs

# 3) Stormwater & Flood Control Fee

- Create a new dedicated, stable revenue source to fund stormwater and flood control system programs
- Would require determining a fee structure
- Tax-exempt properties would be included
- Has been implemented in over 1,300 communities across the country since the 1970s
- Encouraged by DEP and EPA and allowed by law (MGL Chapter 83, Section 16 & MGL Chapter 40, Section 1A)
- Would require approval by the City Council

# 4) Hybrid of Fee & General Fund

- Pay program costs partly through fees and partly by General Fund
- For example use General Fund for operations costs and Utility for more variable capital projects
- General Fund may not provide a stable and adequate funding source

# Questions?

# How to Create A New Stormwater & Flood Control Fee

## Basic Steps:

1. Estimate program revenue requirements
2. Develop of a Rate Structure to provide funding
3. Develop of a Billing System

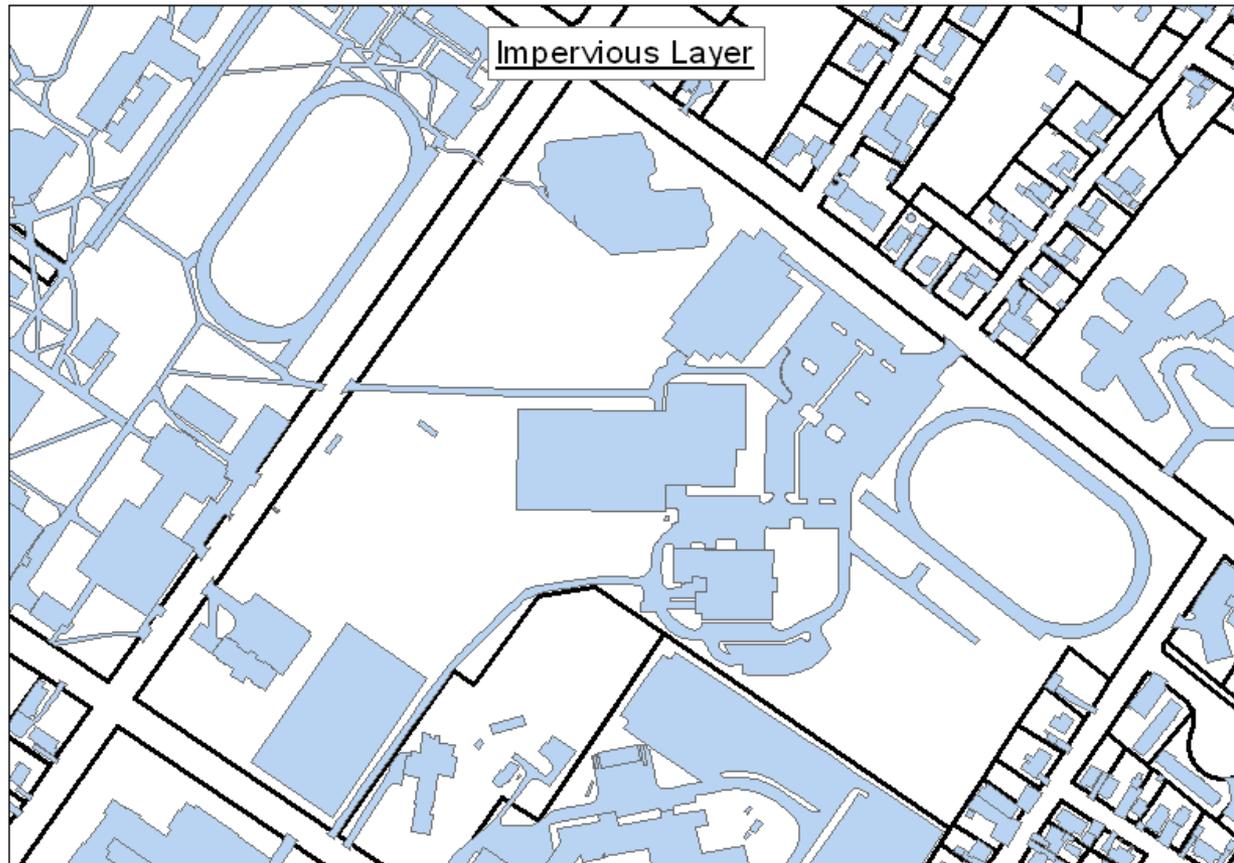
# Fee Structure Options

- Flat fee
- Based on property value
- Based on property gross area
- Based on impervious area; increased runoff means more flow and pollutants
- Residential vs. Commercial factors
- Credits for agricultural land or drainage mitigation projects

# 1. Rate Method – Impervious Area

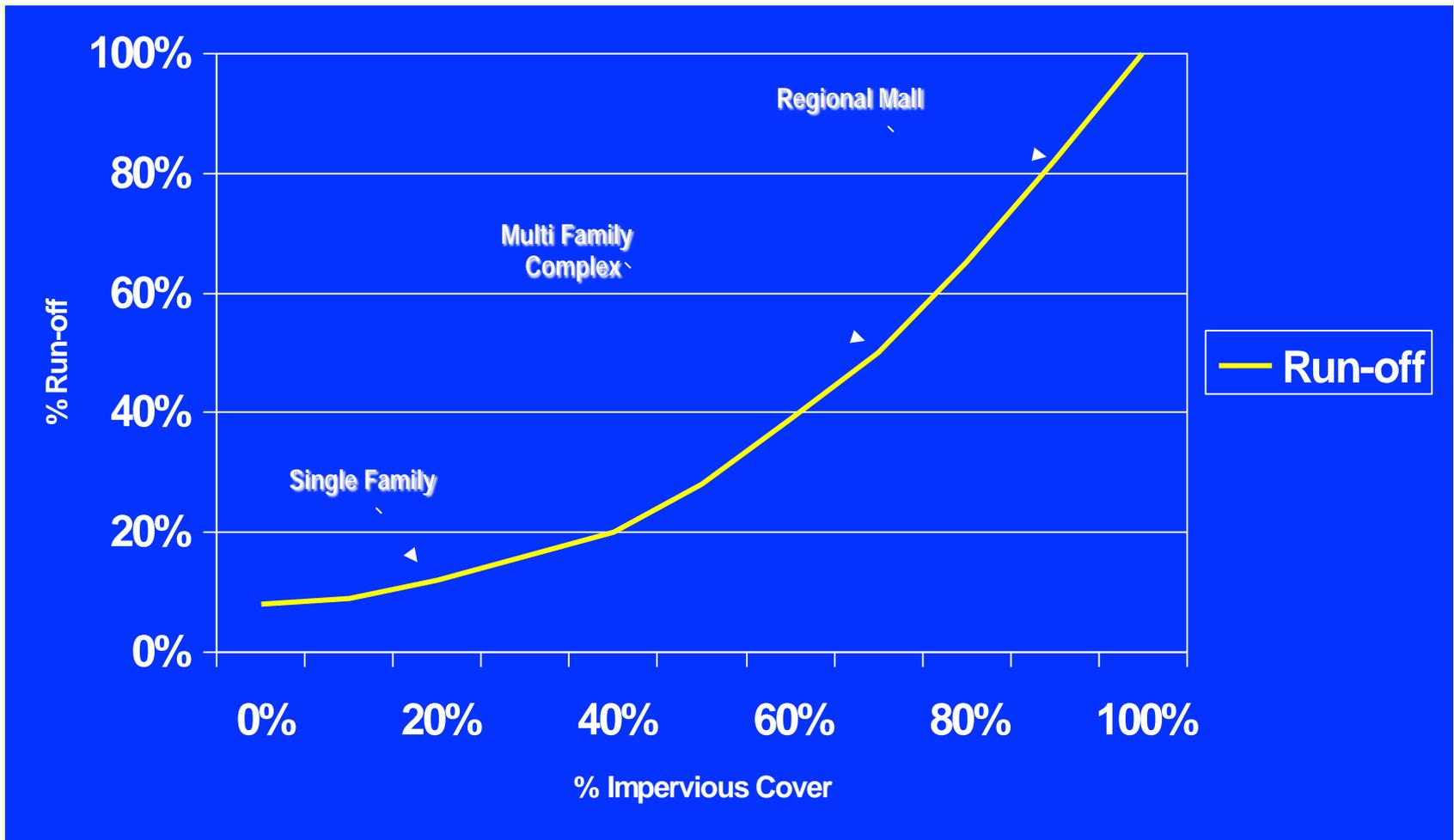
- Rate Based on Impervious area on a parcel
- Cost allocation based on property contribution to runoff
- Large roofs, parking lots, etc. pay more
- Question of how to treat undeveloped property
- Many towns use a flat fee for residential property, and calculate the actual impervious area for non-residential property

# Total Parcel Area and Impervious Area are Mapped for Each Parcel



- **Total Parcel Area = 36.3 acres**  
**Total Impervious Area = 12.4 acres**  
**(highlighted in blue)**

# Rates Based on Impervious Surface Area: The more pavement and runoff - the higher the fee



## 2. Combination of Impervious Area and Total Property Area

- Equitable – All property owners would contribute to flood control/stormwater programs
- The calculation will take in to account both impervious area and the overall size of the parcel
- Determination of calculations/factors may require customer education

# Stormwater Utility System Credits

- Possible Stormwater Impact Credits
  - On-site water management – beyond requirements
  - Rain gardens
  - Green roof-tops
  - Stream buffers/filters
  - Other systems that follow best management practices
  - Agricultural preservation
  - Conservation restrictions
  - CH61 Status lands, forestry, agriculture, recreation uses
  - Credit guidelines and credit values need to be determined

# Other Questions for the Task Force

- Use average flat fee for residential property?
- Calculate the fee for non-residential and commercial property?
- What about properties such as mixed-use, condominiums, mobile homes, and private roads?
- Should city property to be billed?
- Implement a utility credit system? Details?
- Many other details to be determined

# THANK YOU!

We would be happy to  
address any questions!

