

Integrated Municipal Stormwater & Wastewater Planning for Burlington, Vermont



Objectives

- ▶ Provide background regarding Burlington's water quality challenges and interest in this approach
- ▶ Educate participants about integrated stormwater and wastewater planning
- ▶ Discuss how integrated planning could help Burlington address regulatory and water resource planning challenges
- ▶ Kick off the public input process!

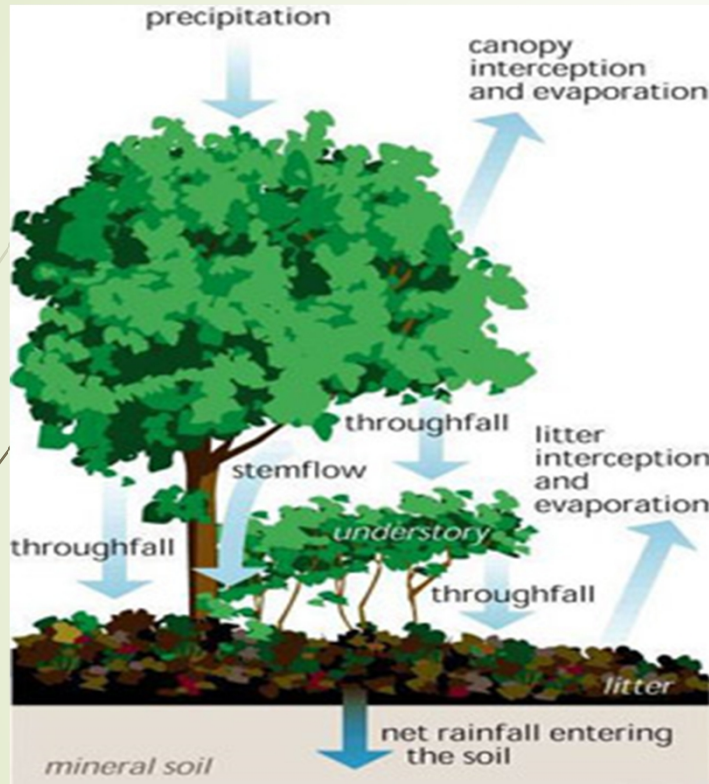




It's not a stormwater problem, it's an **impervious** problem...

Impervious surface = Rooftops, paved surfaces, gravel/dirt driveways, compacted lawns

Additional land-use problems



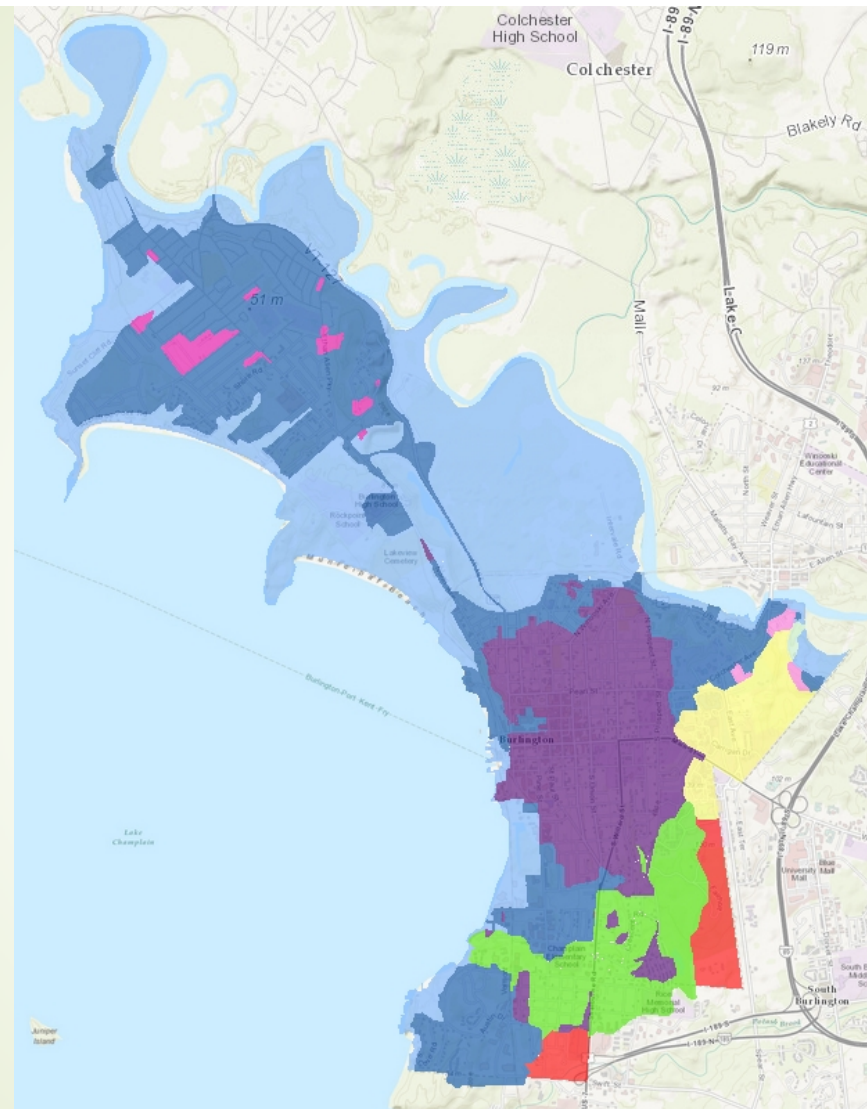
Removal of trees, vegetation



Connected impervious

Burlington's Water Resource Management Challenges





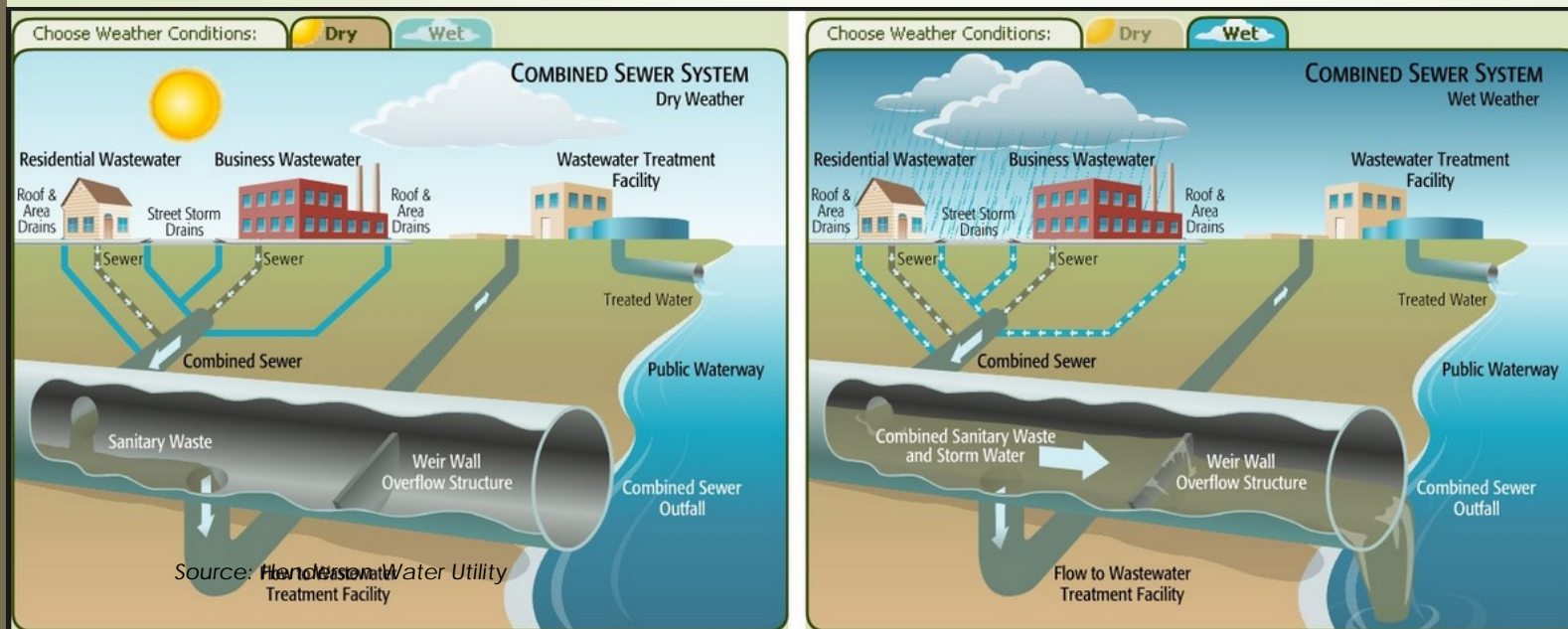
➤ Burlington Sewersheds/Watersheds

Drainage Area

| | | | |
|---|-----------------------------------|---|----------------|
| | 1.1 Main Plant | } | Combined Sewer |
| | 1.2 North Plant | | |
| | 1.3 East Plant | | |
| | 2.1 Englesby Brook | | |
| | 2.2 Centennial Brook | | |
| | 2.3 Potash Brook | | |
| | 3 MS4 (Non Impaired) | | |
| | 4 Direct Discharge (Non Impaired) | | |

<http://www.burlingtonvt.gov/DPW/Mapping-Links>

Combined Sewer Issues: Combined Sewer Overflows and WWTP impacts



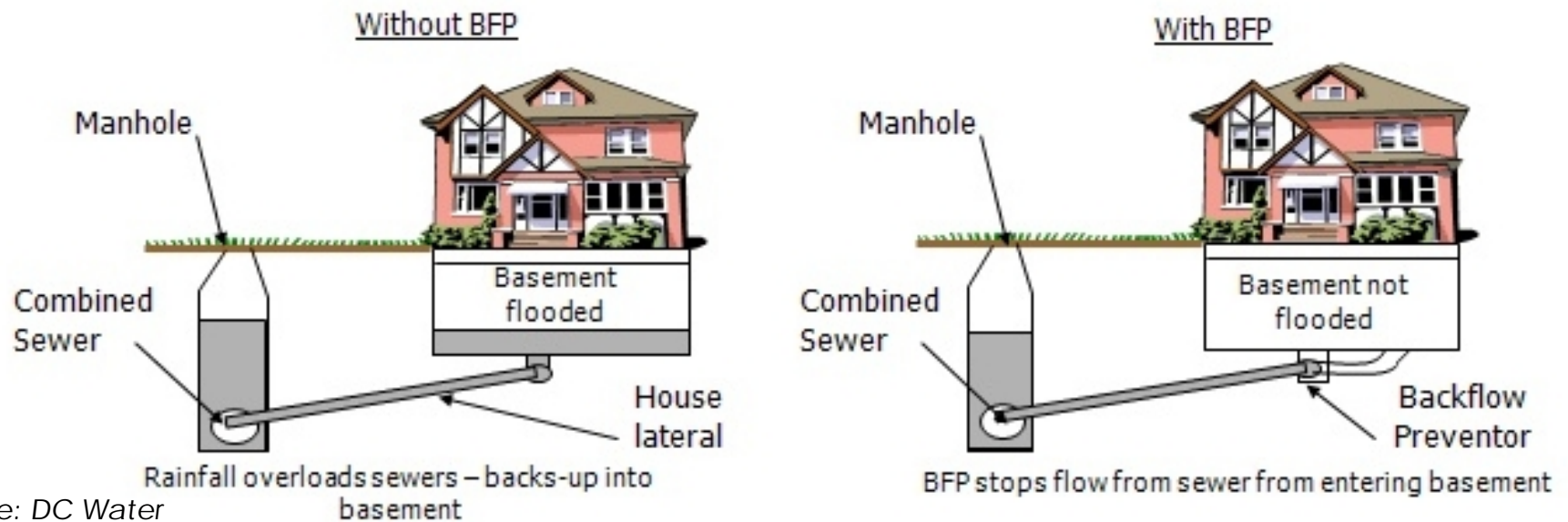
➤ 4 remaining untreated CSOs in Burlington

➤ WWTP nutrient treatment processes are partially bypassed during large storm events

- Substantial investment have been made to reduce the # of Combined Sewer Overflow points and to reduce the frequency of overflows at the remaining CSOs.
- Sewer Separation has pros and cons

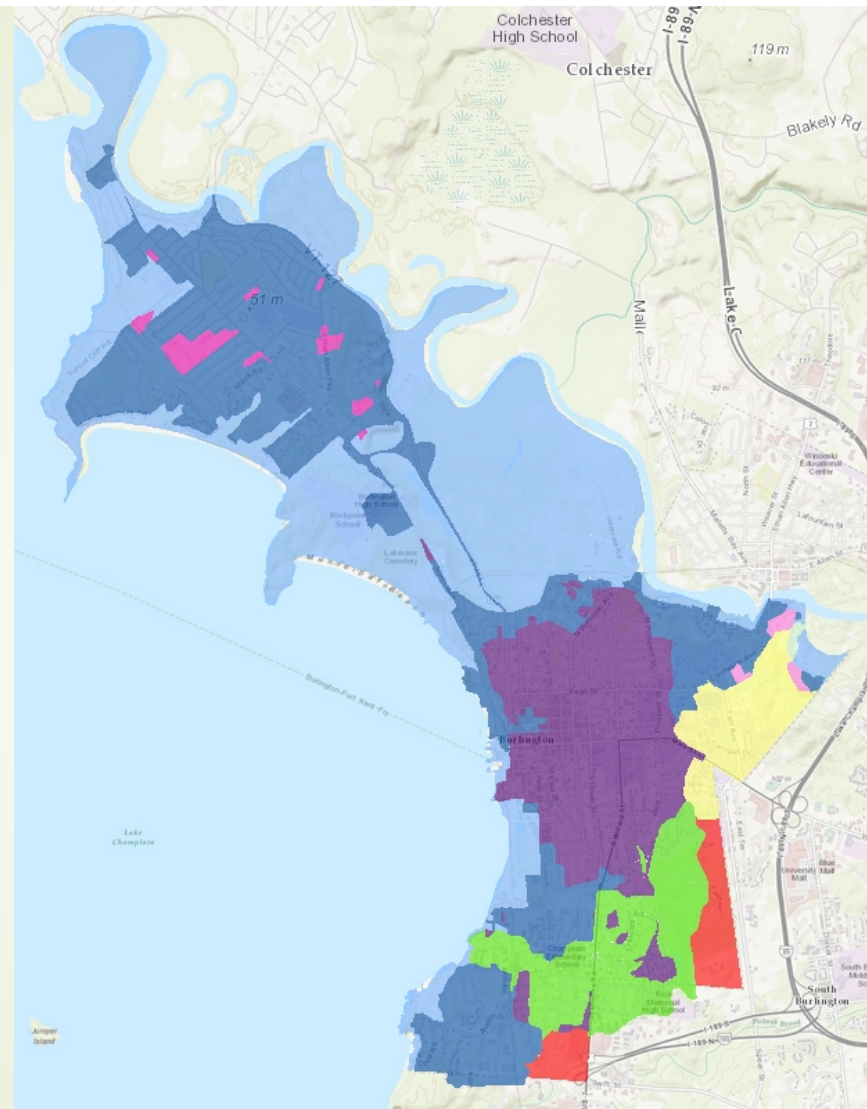
Untreated Overflow Reports at: <https://anrweb.vt.gov/DEC/WWInventory/SewageOverflows.aspx>

Combined Sewer Issues: Basement Backups



Source: DC Water

- ▶ Plumbing code requires that property owners install backwater prevention valves on fixtures that are lower than the elevation of the next upstream manhole cover in the street
- ▶ Low lying homes in the in the combined sewer system are particularly susceptible
- ▶ For more information: <http://www.burlingtonvt.gov/DPW/Information-Related-to-Sewage-Backups-During-Storm-Events>



Burlington Sewersheds/ Watersheds

Drainage Area

- | | | |
|---|-----------------------------------|-----------------------|
| | 1.1 Main Plant | |
| | 1.2 North Plant | |
| | 1.3 East Plant | |
| | 2.1 Englesby Brook | } Stormwater Impaired |
| | 2.2 Centennial Brook | |
| | 2.3 Potash Brook | |
| | 3 MS4 (Non Impaired) | |
| | 4 Direct Discharge (Non Impaired) | |

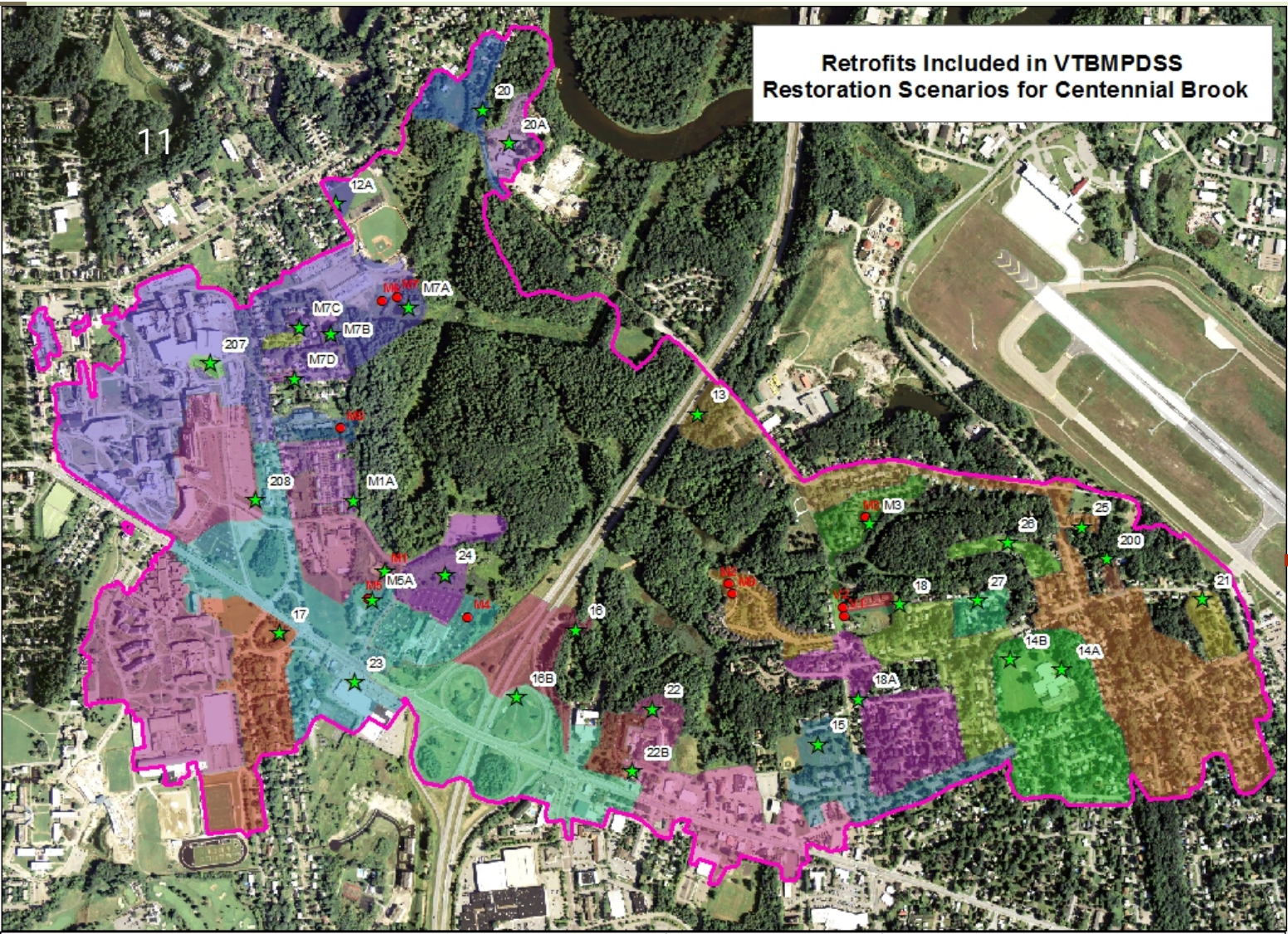
<http://www.burlingtonvt.gov/DPW/Mapping-Links>



Stormwater Impaired Streams:

- ▶ Peak /flows are so high that the stream bed is eroded and scoured
- ▶ Aquatic life (macro-invertebrate bugs and fish) cannot survive

**Retrofits Included in VTBMPSDSS
Restoration Scenarios for Centennial Brook**



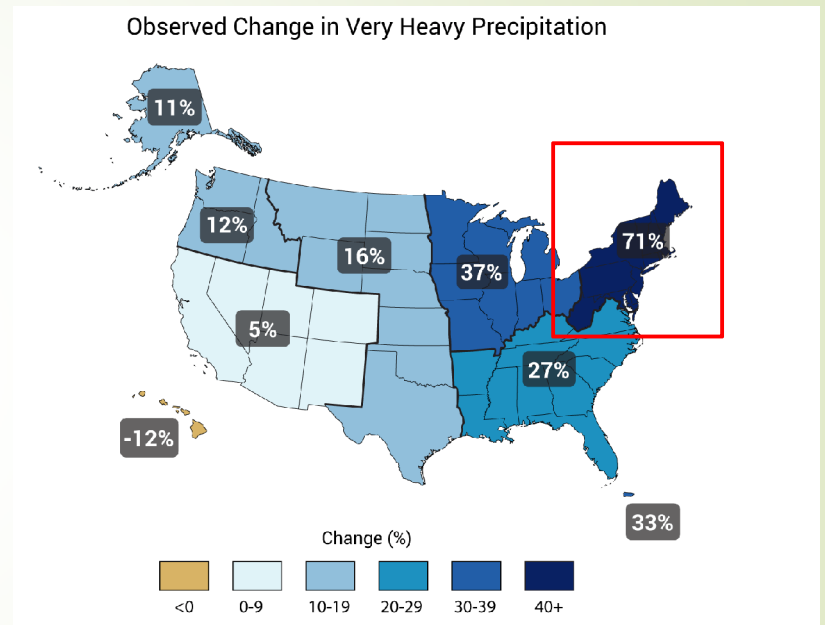
An Example:
Centennial Brook Flow
Restoration Plan

- 40 retrofits modeled
- >90% watershed impervious cover managed
- \$9.74 million total
 - Burlington = \$1.5 M
- Englesby and Potash FRPs are underway
 - Englesby estimated \$9 M
 - Watershed almost entirely in Burlington
 - Potash ~\$25 M total
 - Burlington has small % of this cost

| | | | | |
|---------------|------------|--------|---------------|-----------------|
| Legend | ★ Retrofit | stream | Wetlands_SoBu | Existing BMP DA |
| ★ Retrofit DA | Watershed | Parcel | | |

1,000 Feet

Infrastructure Issues: Localized flooding



Source: <http://nca2014.globalchange.gov/>

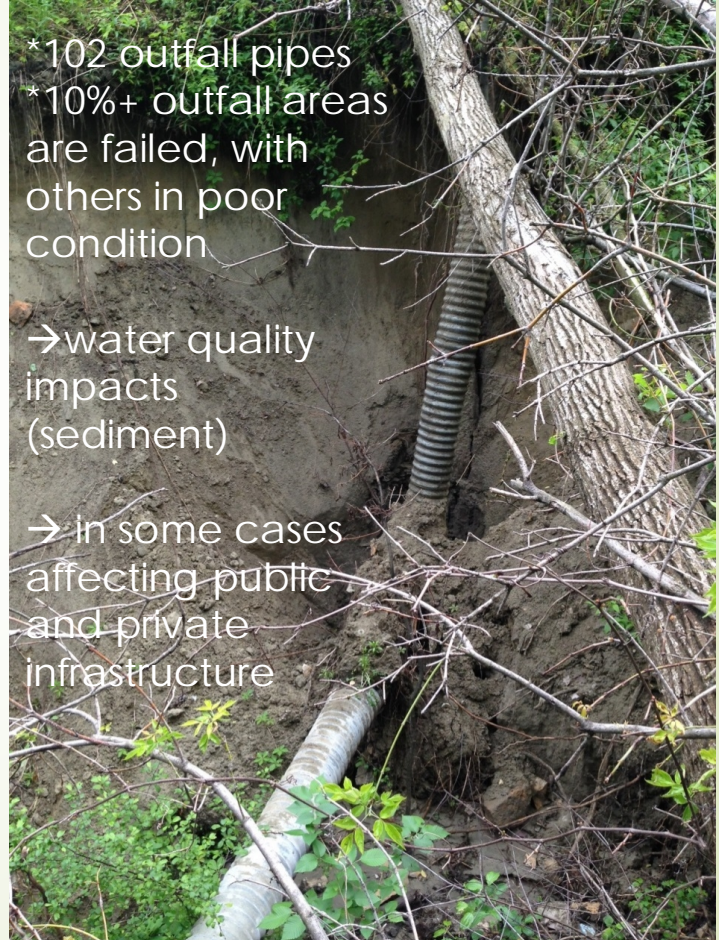
Infrastructure Issues: Aging Pipes & Outfalls



~53,000 linear feet of Corrugated Metal Pipe (CMP)



~50% have some sort of structural deficiency;
~10-20% need near term repair



*102 outfall pipes
*10%+ outfall areas
are failed, with
others in poor
condition

→ water quality
impacts
(sediment)

→ in some cases
affecting public
and private
infrastructure


Lake Champlain Phosphorus TMDL

- Wastewater Treatment Plant Upgrades
 - 0.8 mg/L Phosphorus → 0.2 mg/L
 - Estimated cost ~\$38 million for 3 plants
- Retrofits of existing impervious surface
 - Separate stormwater reductions and treatment
 - Combined sewer stormwater volume reductions/storage



Integrated Municipal Stormwater & Wastewater Planning

- ▶ Planning approach to address stormwater and wastewater with an integrated project review, evaluation, and decision-making process
- ▶ Consolidates the various goals, priorities, actions, and outcomes of separate Clean Water Act requirements into one planning exercise
- ▶ Encouraged by US EPA through the 2012 Memorandum and *Integrated Municipal Stormwater and Wastewater Planning Approach Framework*, but the approach is voluntary
 - ▶ http://water.epa.gov/polwaste/npdes/stormwater/upload/integrated_planning_framework.pdf





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN -5 2012

MEMORANDUM

SUBJECT: Integrated Municipal Stormwater and Wastewater Planning Approach Framework

FROM: Nancy Stoner 
Acting Assistant Administrator
Office of Water

Cynthia Giles 
Assistant Administrator
Office of Enforcement and Compliance Assurance

TO: EPA Regional Administrators
Regional Permit and Enforcement Division Directors

In recent years, EPA has increasingly embraced integrated planning approaches to municipal wastewater and stormwater management. EPA further committed to work with states and communities to implement and utilize these approaches in its October 27, 2011 memorandum "Achieving Water Quality Through Municipal Stormwater and Wastewater Plans." Integrated planning will assist municipalities on their critical paths to achieving the human health and water quality objectives of the Clean Water Act by identifying efficiencies in implementing requirements that arise from distinct wastewater and stormwater programs, including how to best prioritize capital investments. Integrated planning can also facilitate the use of sustainable and comprehensive solutions, including green infrastructure, that protect human health, improve water quality, manage stormwater as a resource, and support other economic benefits and quality of life attributes that enhance the vitality of communities.

To provide further guidance on developing and implementing effective integrated plans under this approach, we have developed, with extensive public input, the attached Integrated Municipal Stormwater and Wastewater Planning Approach Framework document. We are posting the framework document on our website and, as they become available, will provide practical examples of how municipalities are implementing this approach. We would like to thank Regions 2, 4, 5, 7 and 10 for their assistance in conducting public workshops to gain input on the draft framework. We encourage all Regions to work with their States to identify

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Integrated Planning in Burlington (with a little help from EPA!)

- ▶ Input will be used by project team to:
 - ▶ Understand **primary concerns and priorities** of various stakeholders
 - ▶ Formalize community-supported integrated and prioritized **water resource goals**
 - ▶ Identify, characterize, and rank a **suite of criteria** proposed for use in evaluating, prioritizing and selecting stormwater/ wastewater projects



Criteria will be based on community/stakeholder input and may consider:

- ▶ Performance
 - ▶ Pollutant and peak flow/volume reductions
- ▶ Cost
 - ▶ Capital costs for projects
 - ▶ Operation/maintenance
 - ▶ Funding availability
- ▶ Efficiency
 - ▶ Cost per pound for treatment
 - ▶ Operational resilience
- ▶ Other issues / community benefits
 - ▶ Addresses multiple issues and/or pollutants
 - ▶ Creates green-space
 - ▶ Improves aesthetics
 - ▶ Economic benefits
 - ▶ Traffic calming
 - ▶ Integrated with Bike/Pedestrian safety
 - ▶ Greenhouse gas reductions
 - ▶ Satisfies legal requirements
 - ▶ Builds community partnerships

Using the Community Criteria for Project Selection

UPGRADE WWTP TECHNOLOGY

OR

MORE COMBINED SEWER AND SEPARATE STORMWATER RETROFITS

OR

TRADE PHOSPHORUS CREDITS WITH THE AGRICULTURAL SECTOR

OR...



OR



Benefits: Planning vs. Just Do It?

- ▶ Combines consideration of separate regulatory requirements to
 - ▶ Optimize benefits
 - ▶ Address the community's highest concerns first
 - ▶ Maximize municipal resource use
 - ▶ Efficiently and effectively comply with regulations
- ▶ Enhances options for improving water quality
 - ▶ Green stormwater infrastructure
 - ▶ Possible nutrient trading with agricultural sector
- ▶ Accommodates flexible sequencing and scheduling
- ▶ Possibility of factoring in comprehensive affordability into compliance schedules



Input Opportunities!

- ▶ Burlington is in the process of engaging stakeholders through:
 - ▶ A webcast of this presentation– presented on 6/4, archive available
 - ▶ Neighborhood Planning Assemblies
 - ▶ **Public Input survey**
 - ▶ Integrated planning tours – WWTP, green infrastructure, etc.
 - ▶ Stakeholder meetings
 - ▶ Email updates
 - ▶ Social Media/Front Porch Forum



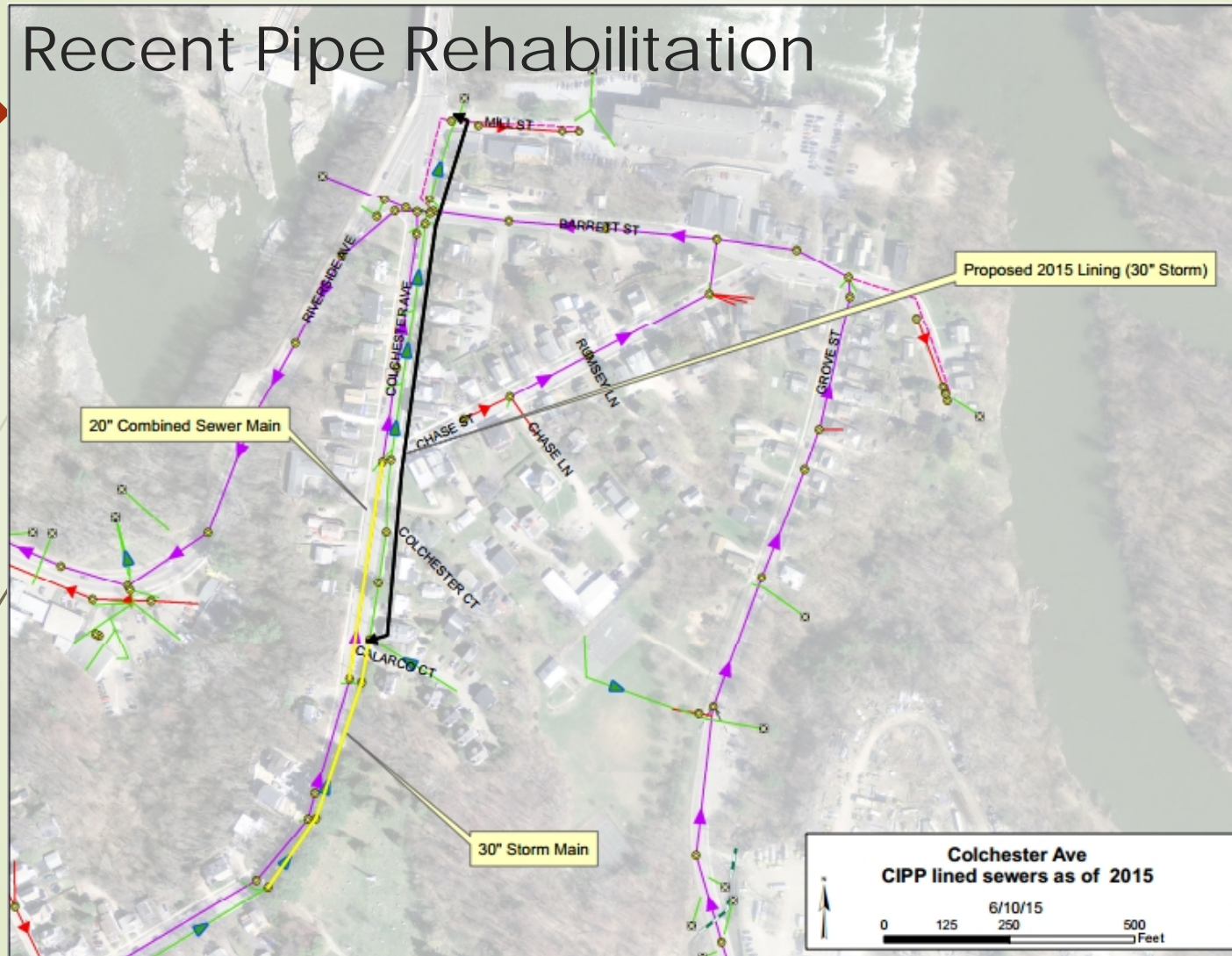
Please participate!

- ▶ For more information and to keep updated on progress please visit:
<http://www.burlingtonvt.gov/DPW/Stormwater/IMSWP>
- ▶ Contact: Megan Moir, City of Burlington,
mmoir@burlingtonvt.gov, 802-540-1748



Questions?

Recent Pipe Rehabilitation



- 435 linear feet of combined sewer lined (2010)
- ~350' corrugated metal pipe lined (2013)
- Additional storm pipe lining proposed summer 2015 pending budget approval