

# Balancing the Green: Vision for Meeting Portland's Infrastructure Needs

---



**Nancy Gallinaro,  
Water Resources Manager**

City of Portland





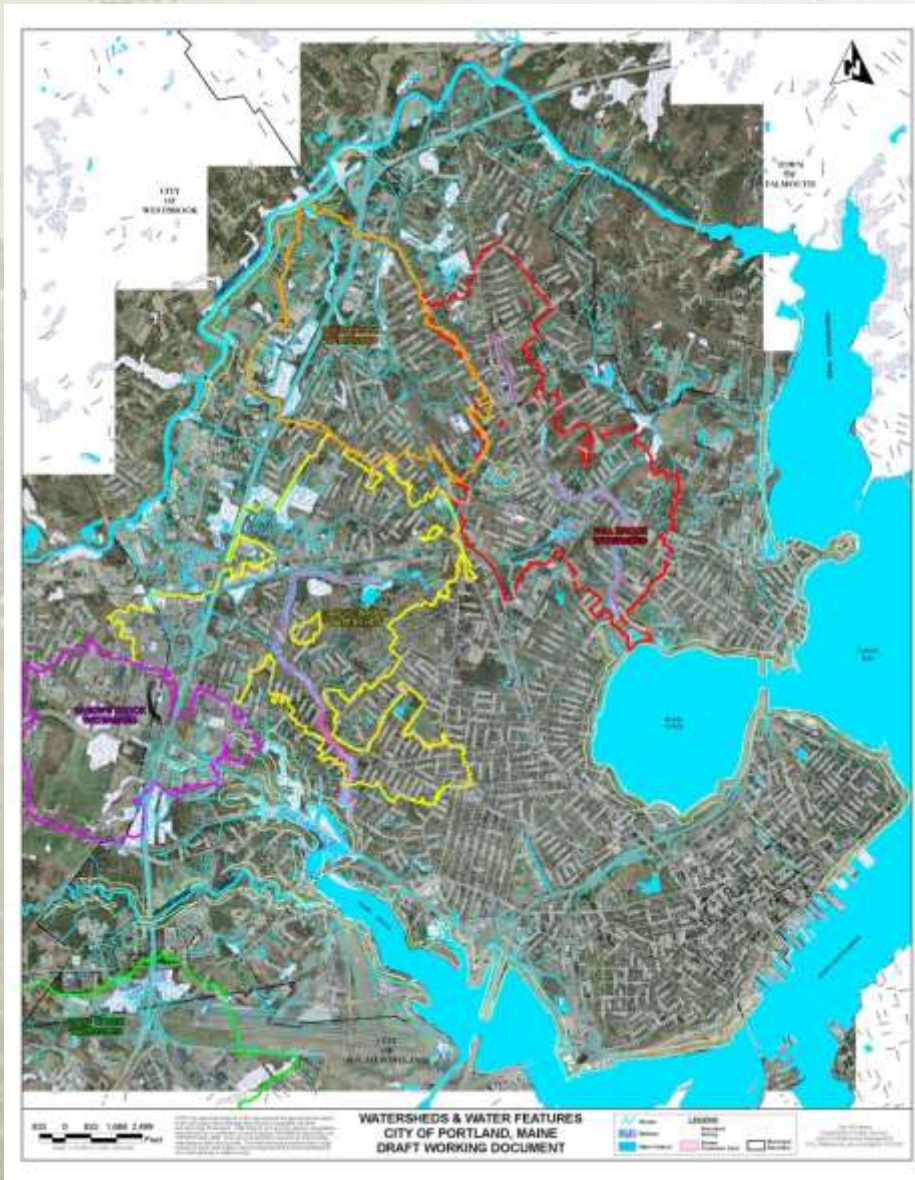
# Presentation Outline

---

- Brief summary of Portland's water quality challenges
- How Portland is incorporating green & grey infrastructure into sewer separation & stormwater management projects
- Development/Re-development: Promoting and incentivizing LID and stormwater management
- Watershed Investments: Protecting & restoring wetlands and stream corridors



# Water, Water Everywhere!



- Fore River
- Presumpscot River
- Stroudwater River
  
- Capisic Brook
- Dole Brook
- Fall Brook
- Long Creek
- Nason's Brook
- Portland Harbor
- Casco Bay
- Smith's Creek
  
- Capisic Pond
- Deering Oaks Pond
  
- Back Cove



# Background Information

## City of Portland Sewer & Storm Drain System

- Original sewers primarily combined
- Aging sewer system dates back to 1870's
- East End Treatment Plant online in 1979
  - Not designed for nutrient removal
  - Overwhelmed during large wet weather events
- Originally 43 CSO's to fresh & tidal waters
  - Reduced to 30 by 2016 and the frequency & volume of remaining CSO discharges significantly reduced
- Increasing number of separated storm drains



*Portland West Side Interceptor, 1940*



*East End Treatment Plant*



# Stormwater Management: A Daunting Challenge

- CSO Consent Agreement with Maine DEP (1991)
  - Phase I & II cost - \$99 Million
  - Phase III started in 2014 - \$170 million of projects (15 years)
- A.O. with Sanitary Sewer CMOM and Asset Management
  - September 2012 EPA Issued “Findings of Violation and Order of Compliance and Request for Information”
  - 2015 Compliance Schedule Approved
- MEPDES MS4 Permit (Stormwater)
- CWA - Impaired Waters: *5 Impaired Streams*



**Portland Dartmouth Street  
Combined Sewer, 1918**



**Rockland Avenue Storm Drain  
Outfall Rehabilitation, 2014**



# The Evolution of Stormwater Management in Portland

## ■ Traditional Approach to Reducing CSOs:

### 1. Sewer separation

- Reduces stormwater inputs to combined sewer system reducing sewer backups & CSO events
- New storm drains help reduce flooding but more untreated stormwater discharged to surface waters
- Treatment & volume management mainly limited to end of pipe options

### 2. Store & Treat

- Temporarily capture a portion of the combined flows to reduce flooding and CSO events, sending stored wastewater mix to the POTW after the storm ends



# Integrating Stormwater Treatment

## ■ **Mixing Grey and Green Infrastructure**

- Deep-sump catch basins with outlet hoods are a good first line of defense
- When space & other site constraints limit stormwater volume management, grey infrastructure can be a useful end-of-pipe treatment option
- Where space allows, green infrastructure can provide a degree of stormwater volume management and potentially a higher level of stormwater treatment than grey infrastructure
- Green infrastructure can be used with both separated storm drain systems and combined sewer systems to reduce or delay stormwater inputs and to reduce pollutant loading to these systems



# Tier I & II Projects

- **Hydrodynamic Separators:**  
Control of sediment, floatable trash, and petroleum products

*Vortechs by Contech*



*Wellwood St, Torrey St, Read St  
Mellen St, Auburn St, Clifton St...*



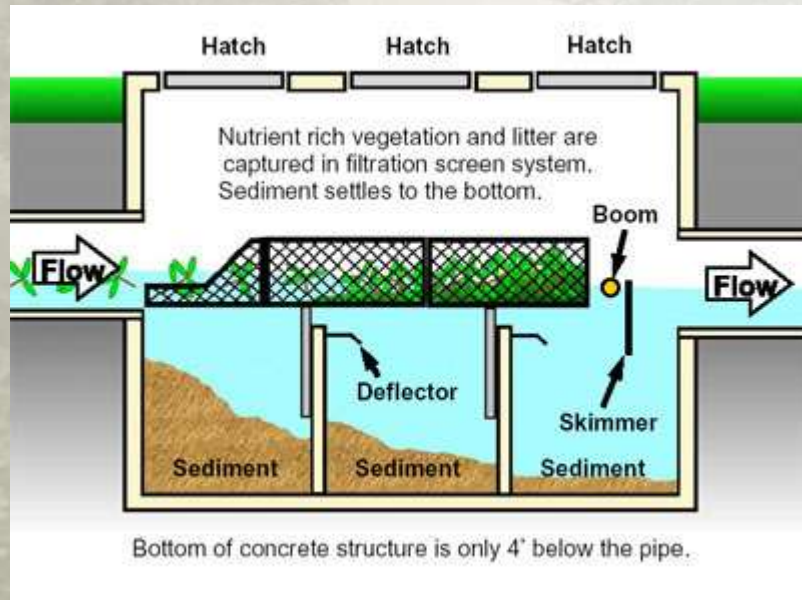
*Downstream Defender  
by Hydro International*





# Tier I & II Projects

- **Other Sediment Chambers:**  
Control of sediment, leaves, floatable trash, *pet waste bags* and petroleum products



*Broadway Street – Outlet Control Structure Inside NSBB*



*Suntree Technologies – Nutrient Separating Baffle Box (NSBB)*



# Tier I & II Projects

- **Proprietary Box Filter Systems:** Filtration of Sediment, Reduction of Petroleum, Metals, Trash, Nutrients, Bacteria

*Filterra Box Filter System*



***Mackworth & Austin Streets Clifton Street Sewer Separation 2009-2010***

*Filterra Box Filter System*



***Holm Ave Sewer Separation 2009-2010***



# Tier I & II Projects

- **Underdrain Soil Filters:** Filtration of Sediment, Reduction of Petroleum, Metals, Trash, Nutrients, Bacteria

*Vegetated Underdrained Soil Filter*



*Clifton Street Sewer Separation 2009-2010*

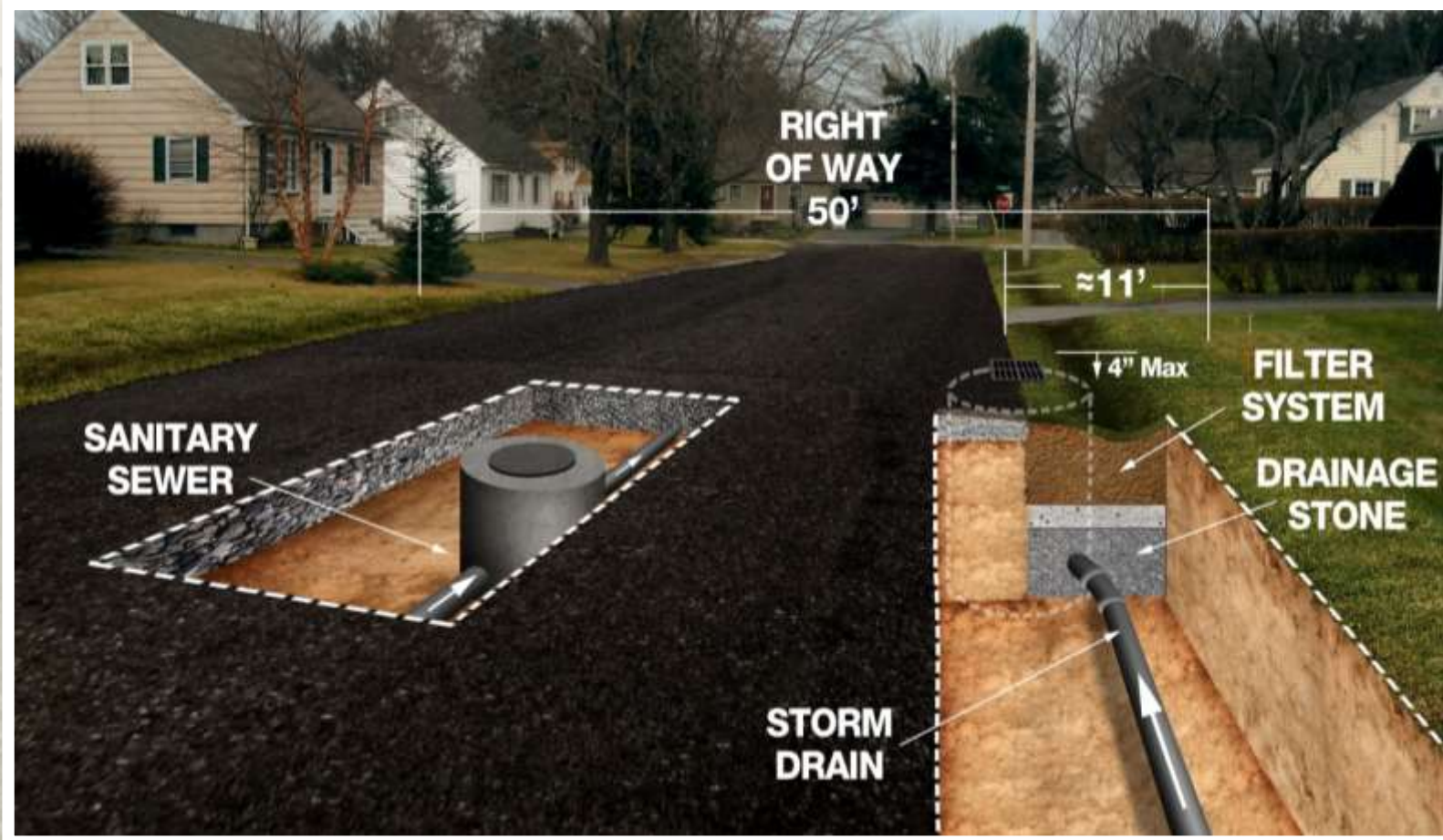
*Grassed Underdrained Soil Filter*



*Read Street Sewer Separation 2008-2009*



# Residential Street Retrofit Dorothy & Dibiase Sewer Separation Portland, ME





# Residential Street Retrofit Dorothy & Dibiase Sewer Separation Portland, ME

---



*Photos: Fall 2012*



# Residential Street Retrofit Winding Way Portland, ME

---



*Photos: May 2012*



*Photos: December 2012*



# Gravel Wetland Retrofit Lyman Moore Middle School Portland, ME

---



*Bartley Ave to Rustic Ln Sewer Separation Project, December 2012*



*Bartley Ave to Rustic Ln Sewer Separation Project, September 2013*



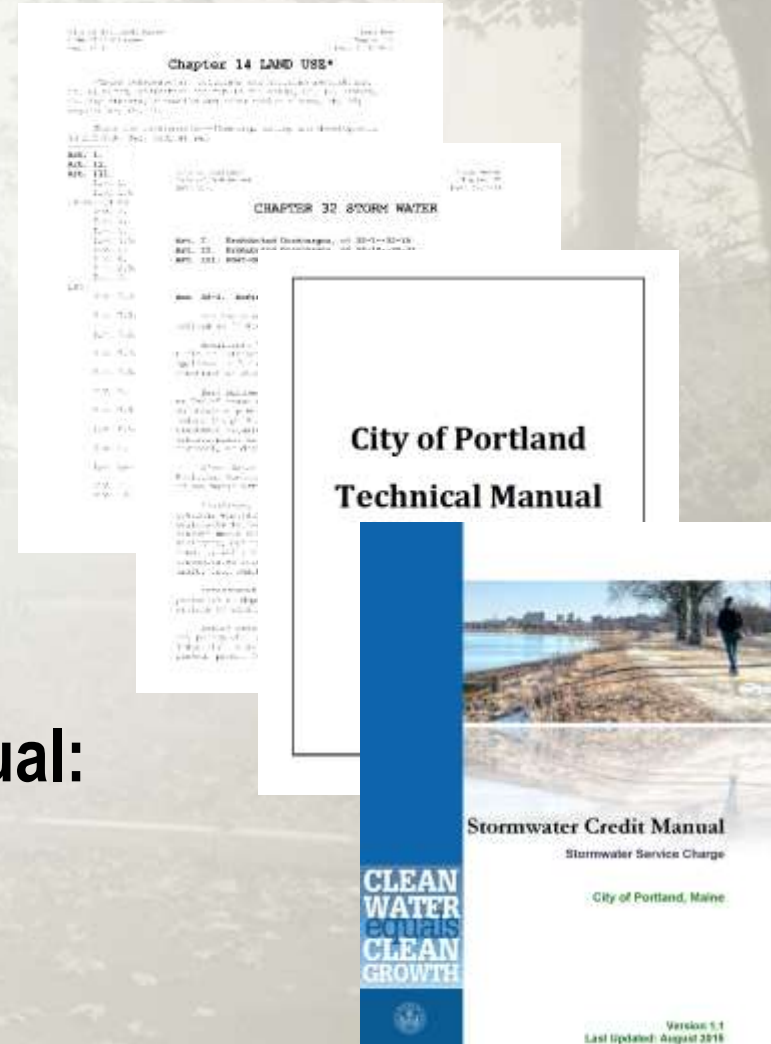
# Development Review & Design Standards

**Land Use Ordinance:** Site Plans, Subdivisions, and Zoning

**Sewer & Stormwater Ordinances:** Pollution Prevention and O&M for Stormwater Management Systems

**Technical Manual Standards:** Stormwater Management, Transportation Systems & Streets, Sewers & Storm Drains, Landscaping, Erosion & Sediment Control, etc.

**Stormwater Service Charge & Credit Manual:** Revenue for Stormwater Management Based on Impervious Area and Incentives for Installation of Stormwater Management Systems

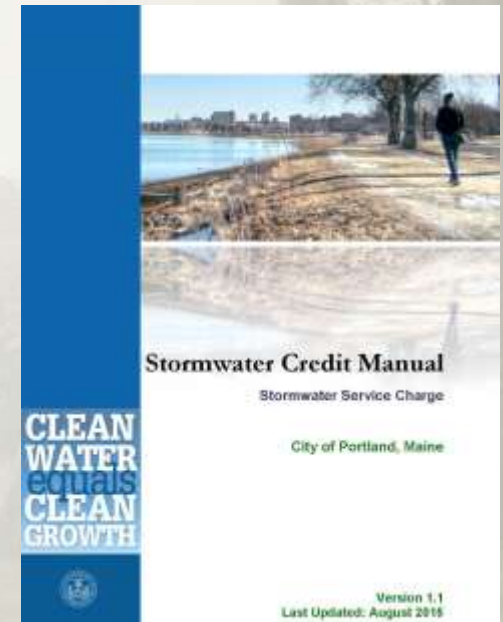






# Stormwater Service Charge & Credit Manual: Incentivizing Stormwater Management

- Portland's Stormwater Service Charge began January 2016
  - Rate of \$6.00 per 1,200 sf of impervious area
- Stormwater Credit Manual
  - Credits awarded for water quality & quantity systems
  - Systems must meet Portland's Stormwater Regulations
  - Possible to achieve 100% credit
  - Projects that meet modern stormwater standards typically receive up to 60% credit
  - Average monthly reduction is 30%
  - Annual inspection & maintenance reports required





# Wetlands Preservation & Stream Corridor Protection

## Capisic Brook Watershed

*Acquisition of 42.5 AC at Headwaters of Capisic Brook, 2015*



**Capisic Brook “Disconnect & Restore”**



# Wetlands Preservation & Stream Corridor Protection

## Dole Brook Watershed



***Headwaters of Dole Brook behind PATHS***



***Stream Corridor Protection by the tailwaters***



# Wetlands Preservation & Stream Corridor Protection

## EPA Supplemental Environmental Project: Dole Brook Buffer Restoration, Riverside Golf Course



*Zone 4 Before & After – Early Spring*



*View from 17<sup>th</sup> Fairway – Early Spring*



# Balancing the Green: Vision for Meeting Portland's Infrastructure Needs

Nancy Gallinaro, Water Resources Manager  
City of Portland, Maine  
207-874-8801  
[neg@portlandmaine.gov](mailto:neg@portlandmaine.gov)

