

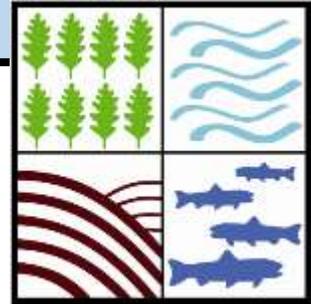
Green Infrastructure at the Local Community/Site Scale

Dan Mullins
Eastern Connecticut Conservation District

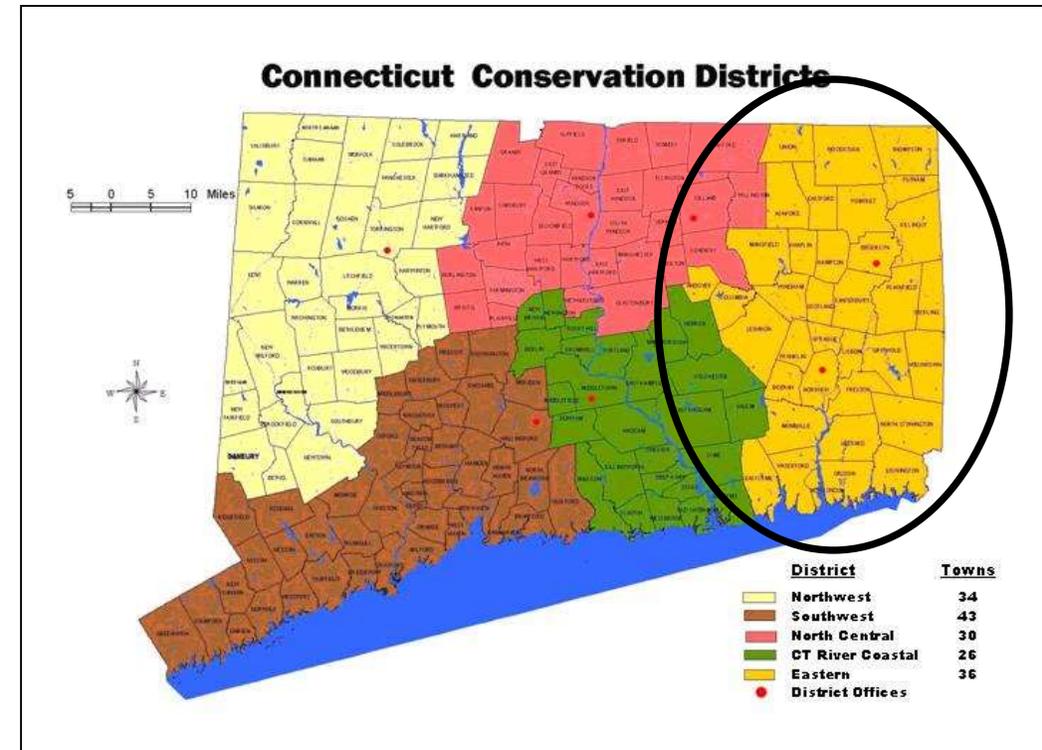
Introducing Green Infrastructure for
Coastal Resilience Conference
May 23, 2017

The Eastern Connecticut Conservation District, Inc.

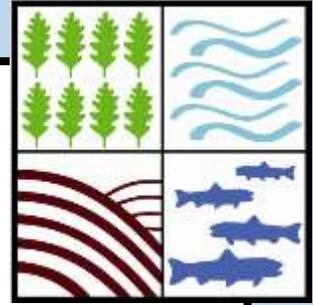
*A Not-For-Profit
Natural Resource Conservation Organization*



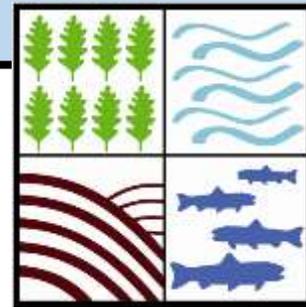
1. Conduct projects, watershed management investigations and test new conservation methods
2. Present workshops on natural resource topics
3. Assist Town "Land Use" Commissions with environmental reviews of development plans
4. Work with local citizens and towns to raise awareness of natural resource concerns



Presentation Overview



- Niantic River watershed
- GI practice – stormwater tree filters
- Three coastal GI projects
- Challenges we encountered (aka the fun we had)
- Upcoming projects



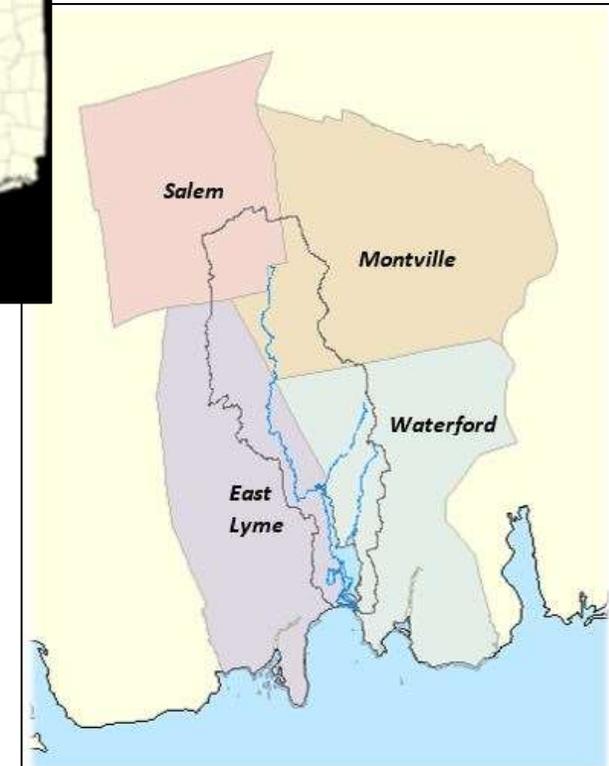
Niantic River Watershed

The Niantic River is listed as impaired for:

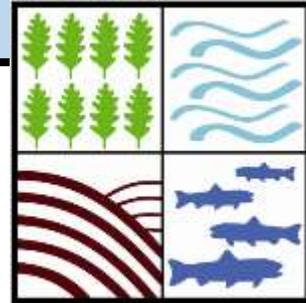
- aquatic life support
- primary recreational contact
- direct consumption of shellfish

due to pollutants associated with stormwater runoff, including fecal bacteria and nitrogen.

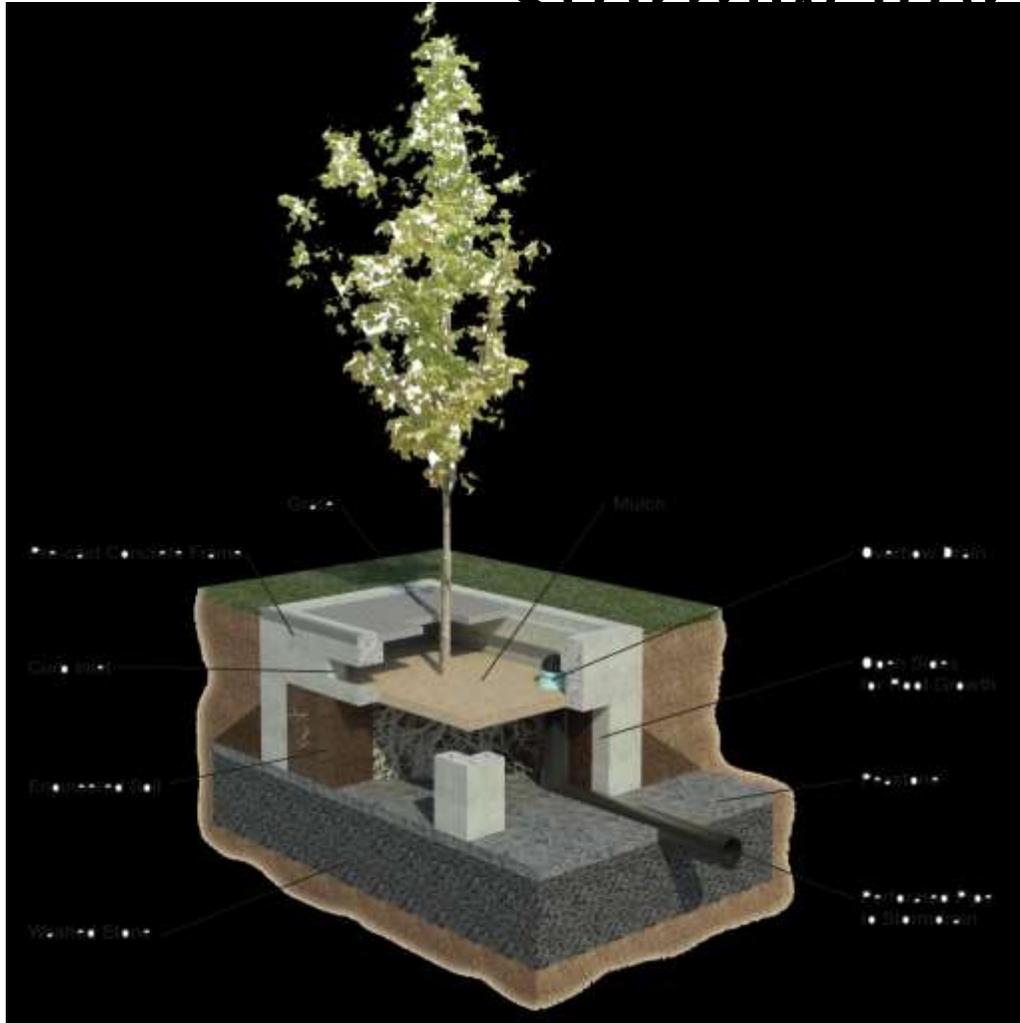
The Niantic River Watershed Protection Plan (2006) recommends the reduction of bacterial and nutrient loading from stormwater outfalls, runoff, and direct discharges.



The Niantic River watershed (outlined in grey) is located in the towns of East Lyme, Montville, Salem and Waterford.



Stormwater Tree Filters

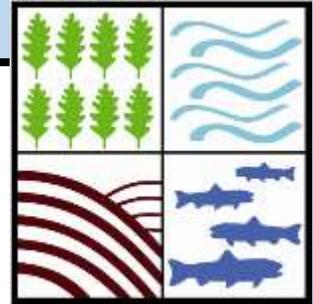


Expected Pollutant Removal Rates for Bioretention and Tree Filter Systems*

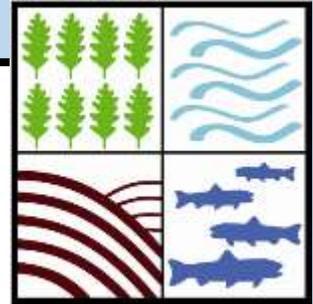
Total Suspended Solids	>83%
Total Nitrogen	>50%
Total Phosphorous	>60%
Total Select Metals	35% to 95%
Total Zinc	>85%
Oil and Grease	>80%
Bacteria	>85%

** Based upon published 3rd party testing by University of New Hampshire Stormwater Center; University of Massachusetts Stormwater Technologies Clearinghouse; University of Virginia Stormwater Center.*

So how does a tree filter work?



Colony Road Tree Filters (East Lyme)

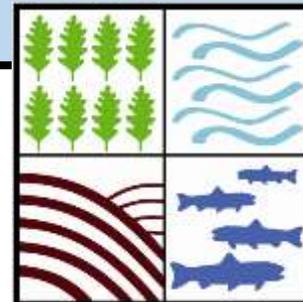


Latimer Brook was listed as impaired for recreation (2010) due to fecal coliform bacteria.

In 2012, ECCD installed 5 tree filters throughout the neighborhood.

This project was funded in part by CT DEEP via a CWA §319 NPS program grant.



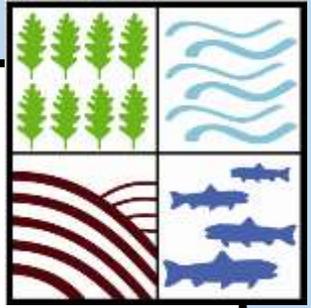


Site Considerations/Challenges

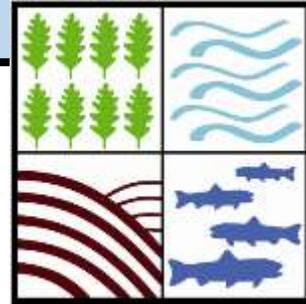
- Catch basin locations
- Overhead lines
- Existing underground utilities
- Wells/septic systems
- Driveways/sidewalks
- Soils
- Existing landscaping
- Homeowner buy-in



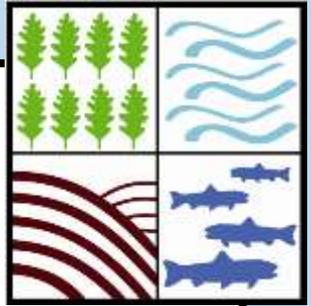
Overhead lines on the same side of the road as the stormdrain system...



Even when you know a utility is there....



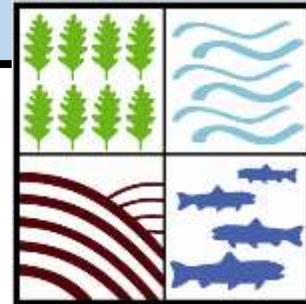
Well-intentioned Neighbors



March 2013



October 2015

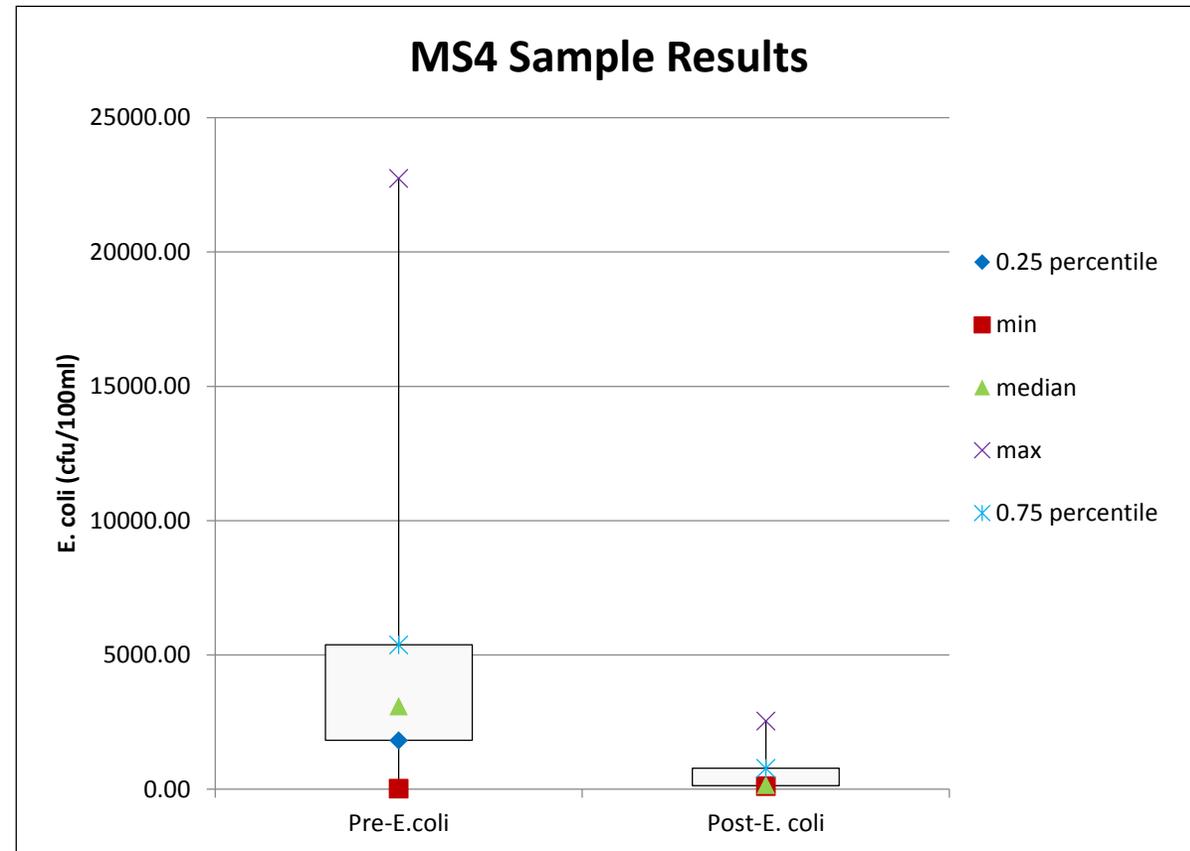


Tree Filter Pollutant Removal Rates

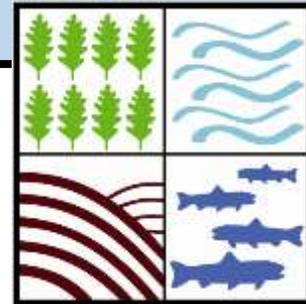
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** Based upon published 3rd party testing by University of New Hampshire Stormwater Center; University of Massachusetts Stormwater Technologies Clearinghouse; University of Virginia Stormwater Center.*



387% reduction



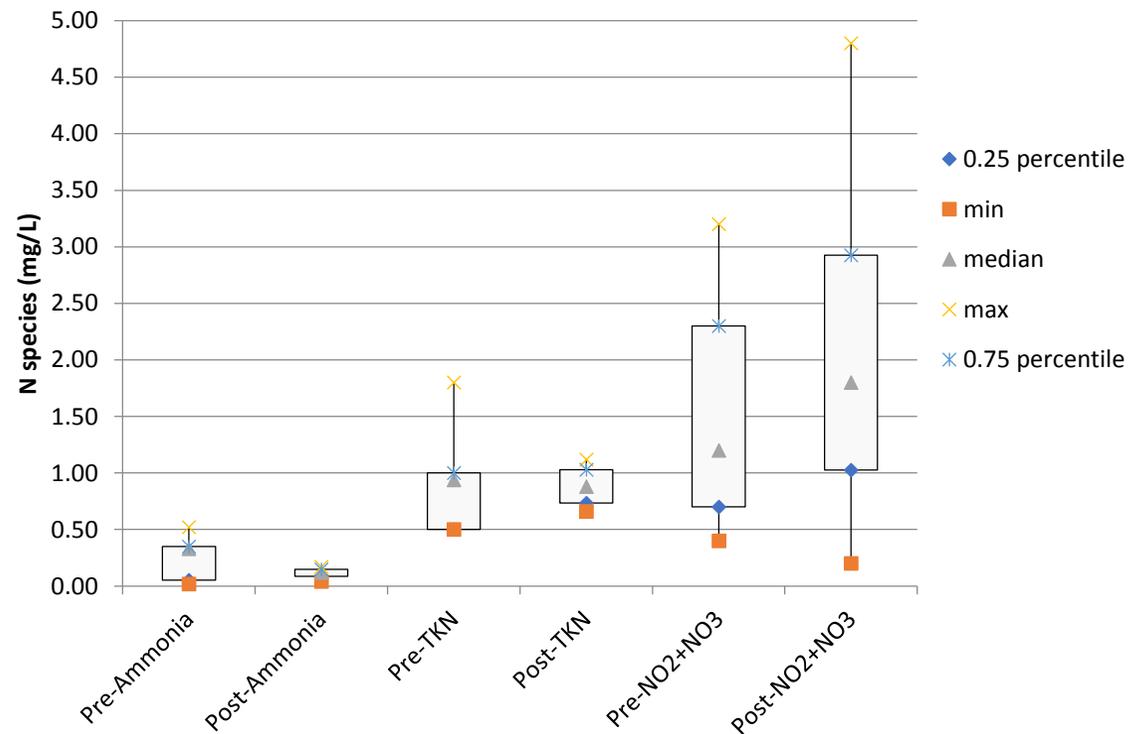
Tree Filter Pollutant Removal Rates

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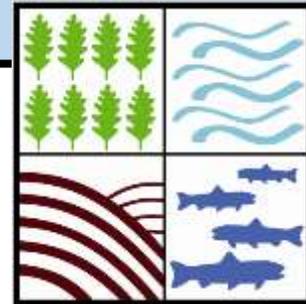
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MS4 Sample Results



170% reduction 32% reduction 31% increase

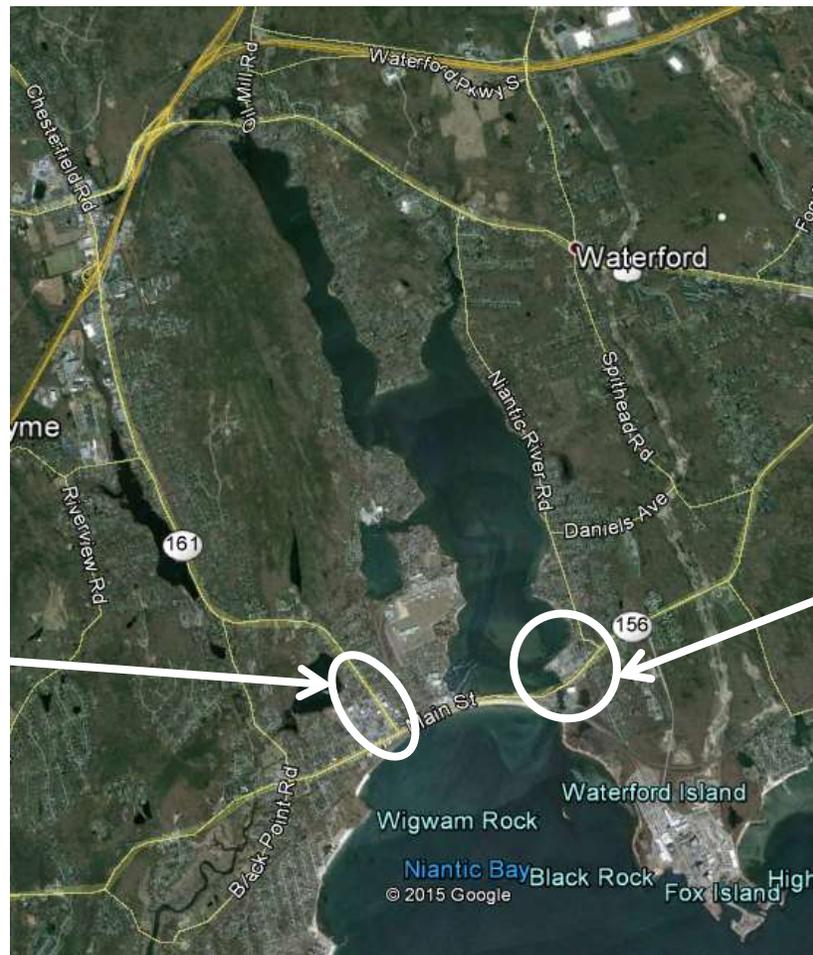


Niantic River Tree Filters

Downtown Niantic, East Lyme



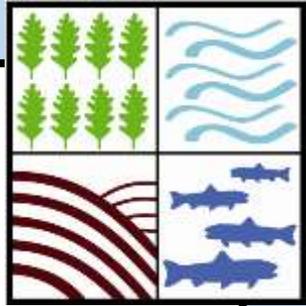
These projects were funded in part by CT DEEP via a CWA §319 NPS program grant and STEAP grants obtained by each municipality.



Mago Point, Waterford



Downtown Niantic – Spring 2015

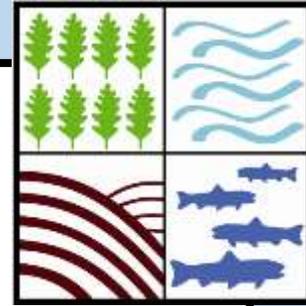


Google Earth Imagery Date 4/26/2016.



Looking north along RT 161,
by tree filter #3.

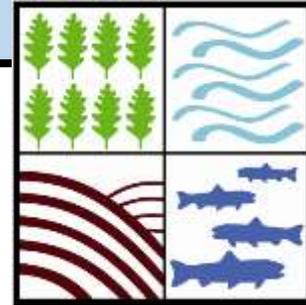
Challenges/Lessons Learned



- Conducted as part of a STEAP-funded municipal improvement project
- Installed in deep stratified drift deposits – great!

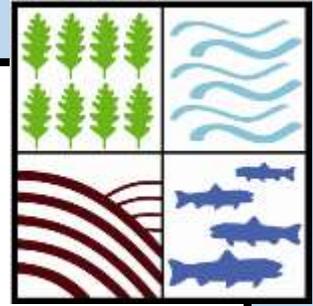


Mago Point, Waterford – Summer 2016



Google Earth Imagery Date 10/16/2016.

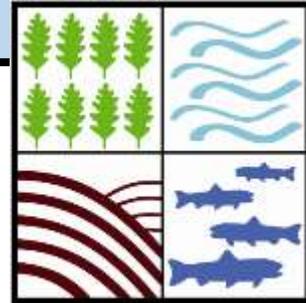
Challenges/Lessons Learned



- Complex deed restrictions/permitting process
- Re-developed site (former commercial site)
- Tree filters installed ahead of storm drain infrastructure (backwards)
- Very high, tidally-influenced groundwater
- Tides back into storm drain system daily
- Flood zone considerations
- Town seeking funding to complete parking lot



Construction debris/fill in pit for tree filter #4.



Buried treasure!

Underground storage tank



Abandoned sewer lateral



Inspection and Maintenance Checklist

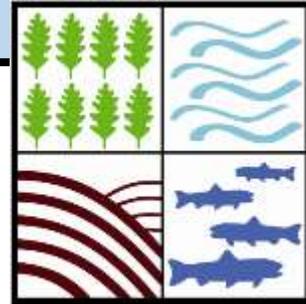
Tree Filter Inspection and Maintenance Checklist

Tree Filter ID/Address: _____

Date of Inspection: _____ Type of Inspection: Inspection Regular Maintenance Complaint Other

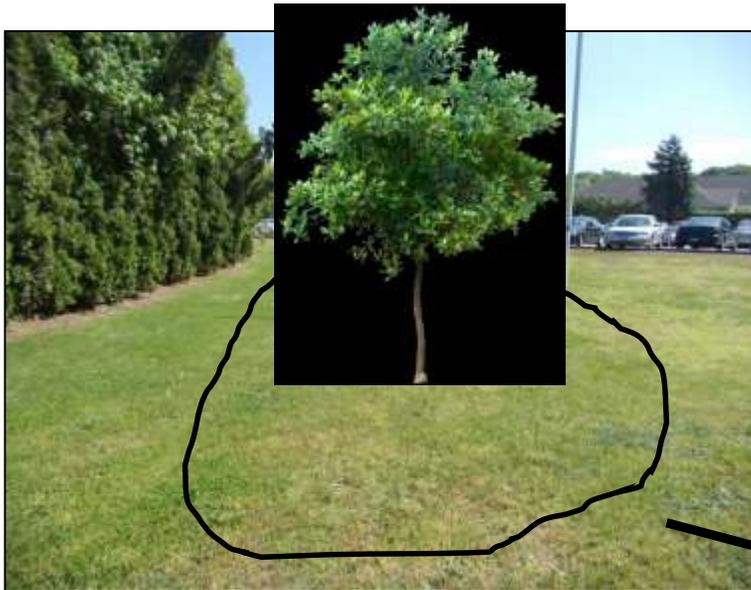
Inspector(s): _____

Tree Filter Element	Typical Condition	Maintenance Needed? (Y/N)	Comments (Problems, Conditions Observed, Maintenance Completed, Additional Maintenance Required)
Street Gutter	Street gutter should be free of sediment and other debris that may be deposited in tree filter.		
Tree	Tree should appear healthy, with no observed dead or diseased vegetation, or broken limbs.		
Mulch	Mulch should be free of trash/debris, sediment, and should be 3 inches deep.		
Soil Mix	Soil mix should be uncompacted and should be free of fine materials (sand/silt) to allow for proper infiltration.		
Trash/Debris	Unit should be free of trash and debris.		
Sediment	Unit should be free of sediment deposits.		
Infiltration	There should be no evidence of standing water more than 24 hours after a storm.		
Overflow Pipe	Overflow pipe should be free of sediment. Cap should be securely in place to prohibit entry of floatable debris.		



Upcoming Projects

East Lyme High School – Summer 2017

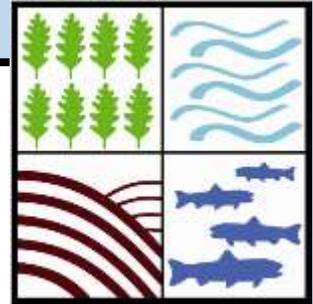


Bio-retention Basin

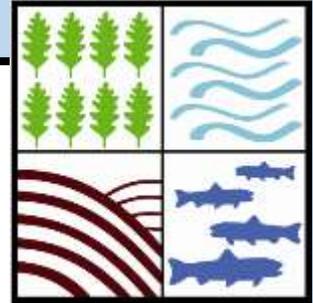


Sub-surface
Infiltration Galleries

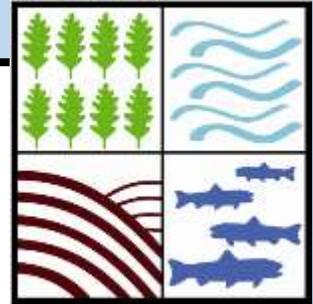
Grand Street, East Lyme Summer/Fall 2017



Proposed Green Street GI Practices

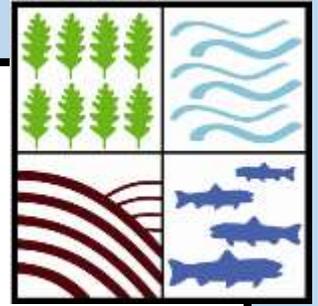


Images borrowed from *Promoting Green Streets*. July 2016. River Network and Hawkins Partners, Inc.



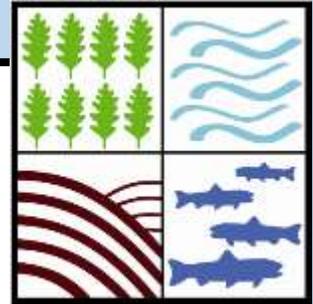
Potential Project:
Niantic River Watershed 4-Town Bio-infiltration, Filtration
& Rainwater Collection Project

- CWA §319 proposal submitted to CT DEEP (\$160,000)
- Received \$40,000 match from CIRCA
- Waterford, East Lyme, Montville and Salem
- Involves installing:
 - * 6 tree filters
 - * 20 Smart Sponges
 - * 20 rain gardens
 - * 30 rain barrels



Questions??

Contact Information



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