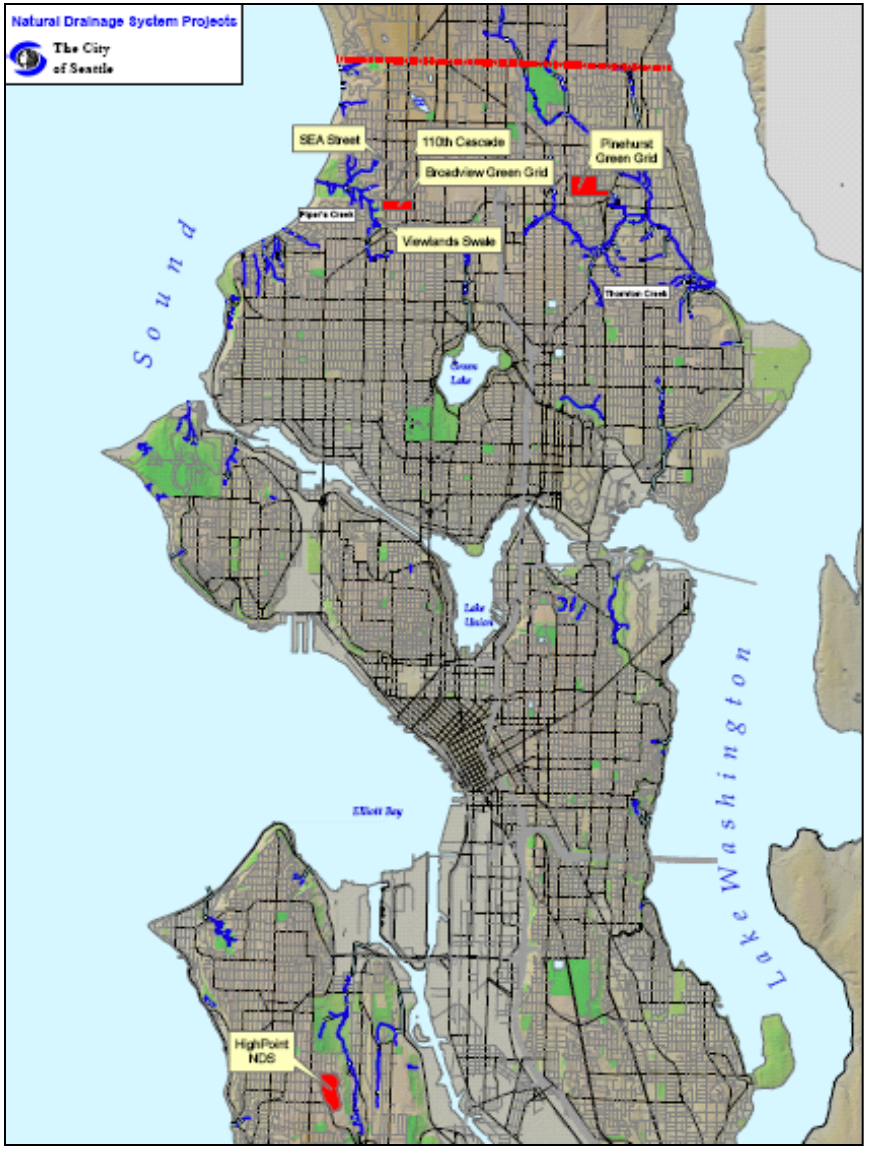
# Ballard Roadside Raingardens, Phase 1 – Lessons Learned

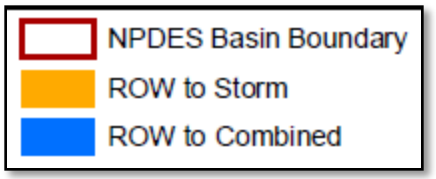
# Natural Drainage Systems

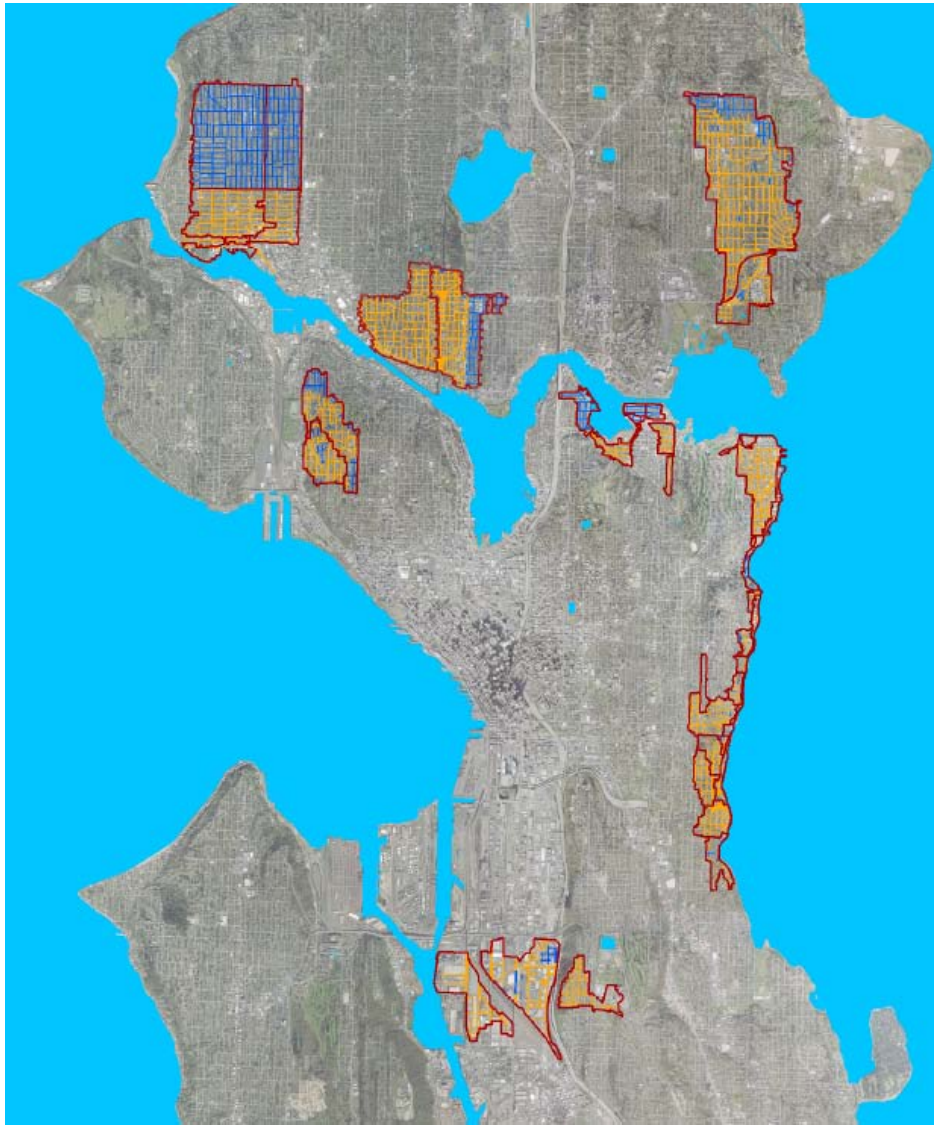
- Initiated 1999 for **creek restoration**
- Provides conveyance / localized flooding reduction
- Pilot blocks
- Pilot catchments
- Pilot partnering



# GSI Accomplishments

# CSO GSI Right-of-Way Work Feasibility



# Project Goals

- Develop design templates for future Roadside Raingardens
  - Planting strip design
  - Curb extension design
  - Full curb shift
- Refine construction costs
- Refine performance data

# What Could Go Wrong?

## The Ballard Raingardengue

HOME PICTURES ISSUES GOALS TAKE ACTION

### Issues

The residents on 77th and 29th/28th Avenues North
neighborhood of Seattle, Washington) are part of a pi
funded Raingardens that will soon be installed aroun
city.

Official Project Name: Ballard Roadside Raingarden

As one of the homeowners on this block, we as reside
project and continue to understand the necessity, but
dissatisfied with the results and current status.

We have consistently communicated major flaws in t
Utilities (SPU) and specifically the project planners:
Transportation (DOT); City Councilmember Mike O'
and the entire City Council; and Mayor Mike McGinn
O'Brien met with us on November 3, 2010, to listen t
approximately twenty-five neighbors turned out. Th
modifications.

I encourage you to check out these Raingardens and

KOMOnews.com

ballard KOMO

LATEST NEWS TRAFFIC CRIME PETS COMMUNITY SERVICE RESTAURANTS EVENTS

Home ›

### Ballard's new green infrastructure has some neighbors seeing red

Submitted by Michael Harthorne, KOMO Communities Reporter
Tuesday, January 25th, 02:15pm

Share:

When Seattle Public Utilities began installing 10 blocks of rain gardens in Ballard in June, the typically green neighborhood – residents boast of having "Undriver Licenses" and are working to build a solar power-generating park – had visions of less storm water runoff in the streets and a healthier Puget Sound.

kirotv.com

Seattle 63° Partly Cloudy | 11:00am 66° | 2:00pm 75° | 5 Day Forecast | WX Alerts | Tower Cams

Tuesday, September 6, 2011 | 10:06am | Site Web Keyword

Home News Weather Sports Traffic Seattlewinder Entertainment

KIROTV.com » News » Story

### Seattle Ratepayers Will Foot $500K Bill To Remove $1.8M Ballard Rain Gardens That Didn't Work

WATCH IT: Removal Of Ballard Rain Gardens Will Cost Ratepayers $500K

Graham Johnson
KIRO 7 Eyewitness News
Twitter | E-mail

Posted: 12:53 pm PDT August 26, 2011

SEATTLE -- Seattle Public Utilities ratepayers will be stuck footing a $500,000 bill to remove rain gardens that were installed in Ballard and didn't work.

KIRO 7 photographers first found standing pools of water, where the rain gardens should have been, in March.

"Lots of standing water," said Stefin Kohn, who remembers them well. "They did not drain."

The city installed 50 of the rain gardens in Ballard. They were supposed to capture rainwater and let it drain into the soil to keep it from overwhelming the sewer system.

But in some places, the ground just couldn't absorb the water, said Tracy Tackett with Seattle Public Utilities.

The gardens cost about $1.8 million -- mostly federal stimulus money -- to install, but now utility ratepayers will have to pick up the bill to remove them.

"It is a lot of money to retrofit and incorporate these lessons learned," Tackett said. "It will help us have great projects for the future, so I think in the long run the money will pay off."

The city acknowledges it had to meet a deadline for the stimulus money, which meant some of the work was done at times of the
groundbreak

Kohn was u

"I think with t

KUOW.ORG 94.9 FM

LISTEN PROGRAMS NEWS SUPPORT EVENTS CONTACT ABOUT

SEARCH Advanced search

SUPPORT KUO

KUOW NEWS

### Improving Ballard's Rain Garden Program

Staff Reporter
02/16/2011

ShareThis

Some residents in Seattle's Ballard neighborhood are complaining about rain gardens. Or as they derisively call them —

Sound: "They're water retention ponds. They are hazards. Just this muddy, you know, mess. [Laughter.] Swamps."

The city of Seattle piloted these rain gardens in an effort to prevent sewage lines from overflowing and spilling into Puget Sound and other waterways. But the city acknowledges that the gardens aren't working as well as they had hoped. KUOW's Dave Blanchard has more.

LISTEN TO KUOW NEWS
REALAUDIO
MP3 HI
DOWNLOAD
KUOW NEWS ON-DEMAND
POD RSS

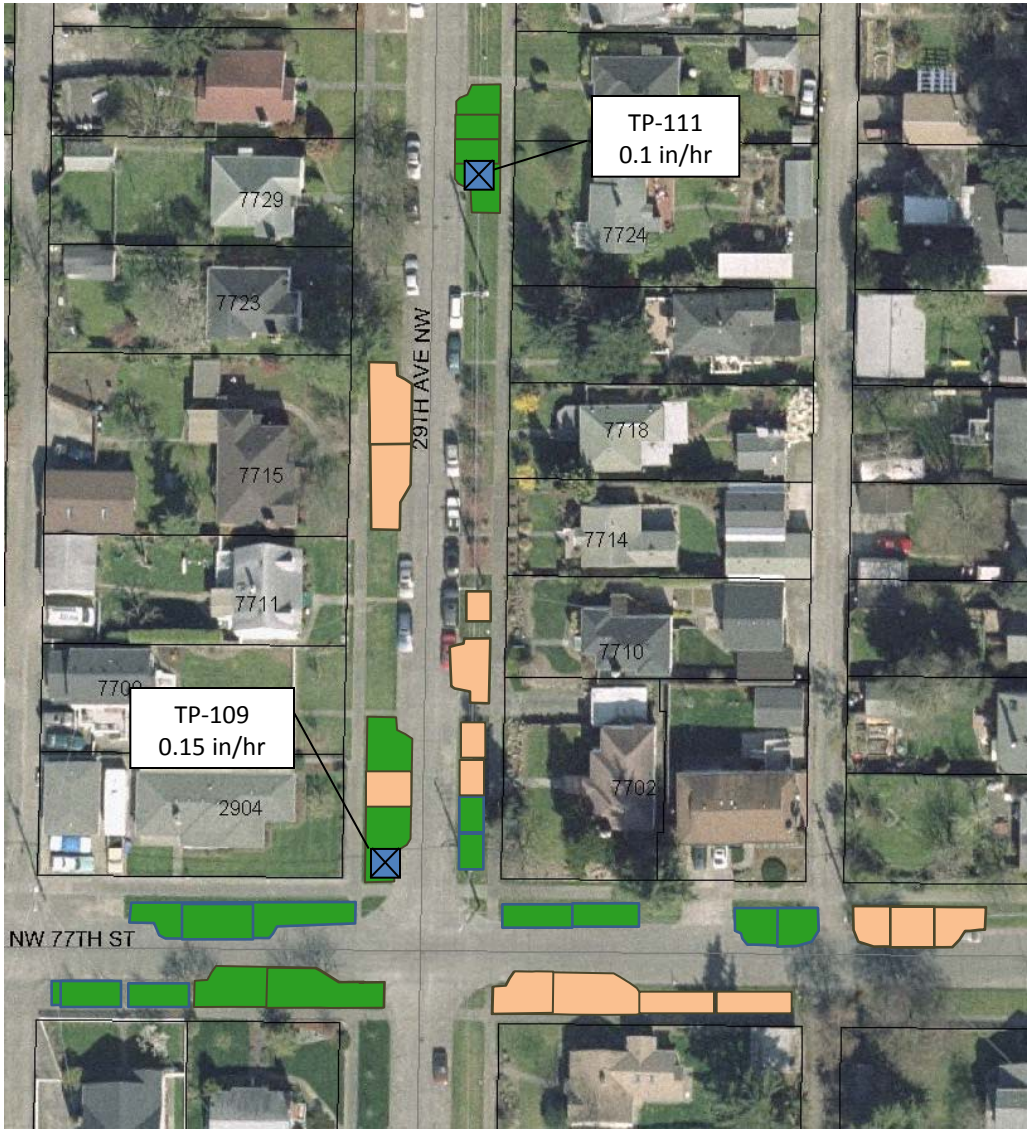
# Timeline

- Spring 2009 – began concept design
- Early July – likely to receive ARRA (Stimulus) funds
- Aug 17th – formally awarded ARRA loan
- Sept 17th – 90% Plans, Specs and Engineering Report required to be submitted
- November – Geotechnical Report finalized
- Feb. 16th 2010 – Required date for signed construction contract

# Timeline, con't

- Original completion date of November 2010.
- Sept 2010 – construction not complete, rains start
- Community very upset (signage, parking)
- Some cells not draining, but still in construction
- Dec. 2010 – construction substantially complete
- 33% of cells not draining, 33% draining too slowly, 33% working as designed

# 29th Ave NW & NW 77th St




Raingarden Post-Construction Performance

Infiltrating (drains in < 24 hours)

Not infiltrating or infiltrating very slowly

Raingardens not exactly to scale.

# 28th Ave NW between NW 65th & 67th St


Raingardens not exactly to scale.

Raingarden Post-Construction Performance

- Infiltrating (drains in < 24 hours)
- Not infiltrating or infiltrating very slowly

# Winter Pain!

- La Nina year
- Raingardens don’t drain!
- Community angry!
- Raingardengue blog appears
- February 2, 2011 – community meeting held – 80 people, brought their own powerpoint

# Community Demands

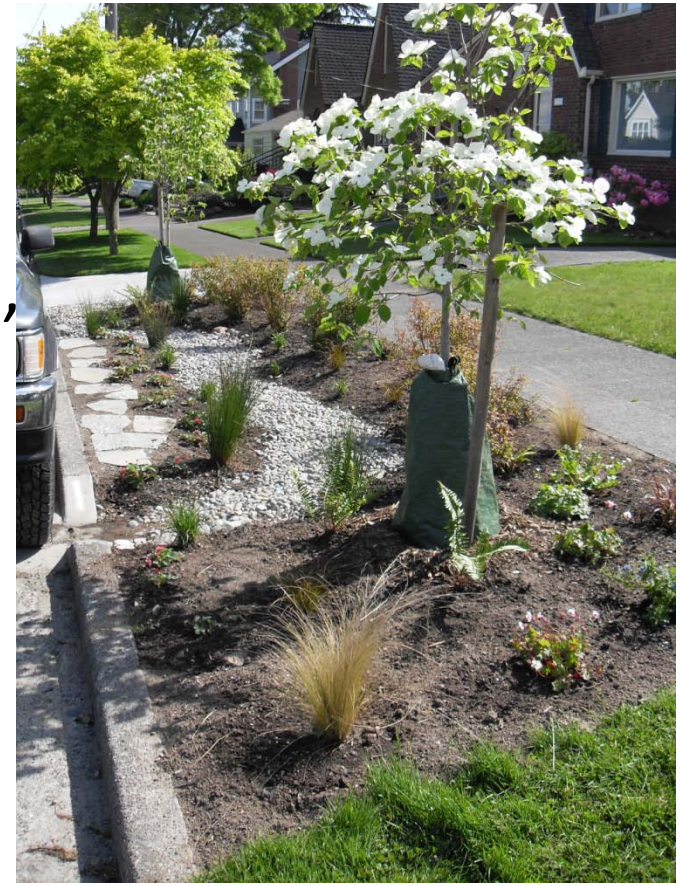
- Drain promptly – less than 24 hours
- Don’t fill up with water for most of the winter
- No ponding – less than 2” of water
- Restore parking
- Get rid of signs
- Shallower cells
- Engagement on the solution

# Spring Action!

- Vactor cells and drill holes in weirs
- Task Force formed to come up with solution for non-draining cells (3 months)
- Solutions include:
  - Removal
  - Retrofit for low performance (fill in with additional bioretention soil)
  - Retrofit for live storage with underdrain, achieve higher performance

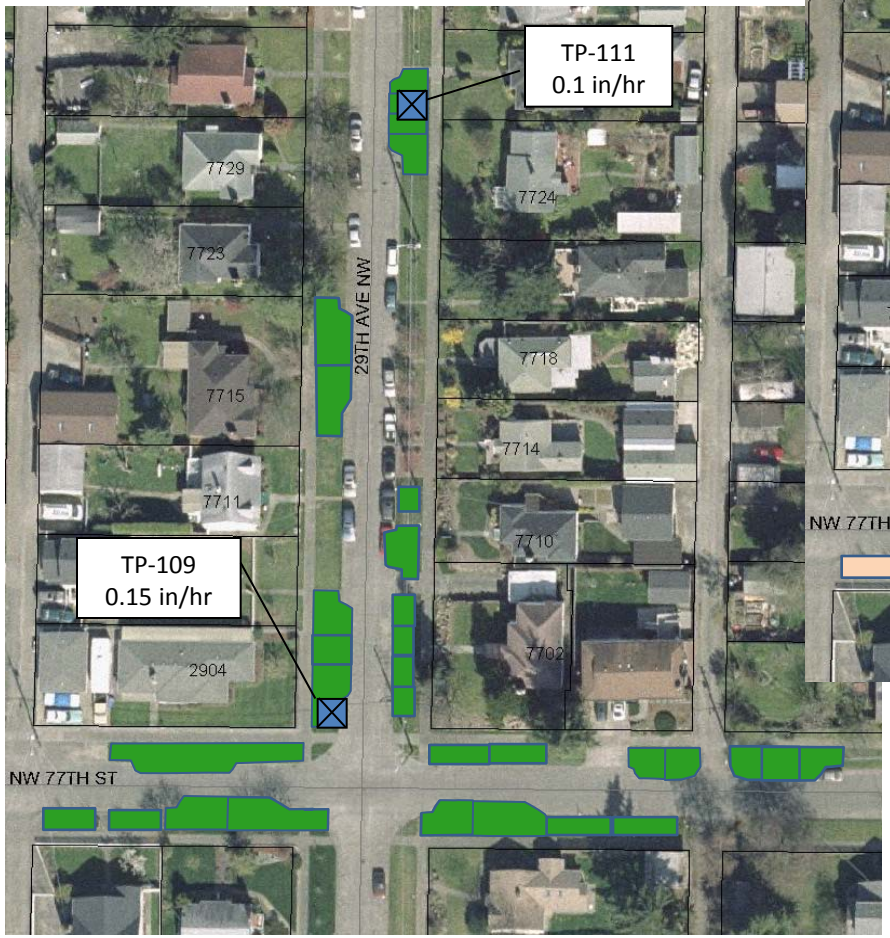
# Retrofits

- Fill, fill, fill
- Recontoured for shallower cells with less ponding, river rock added, relandscaped
- Returned some to planting strip
- Started evaluating underdrain design to increase confidence in cell function
- Fundamental design shift from ponding/ infiltration to no-ponding/detention (slow release)

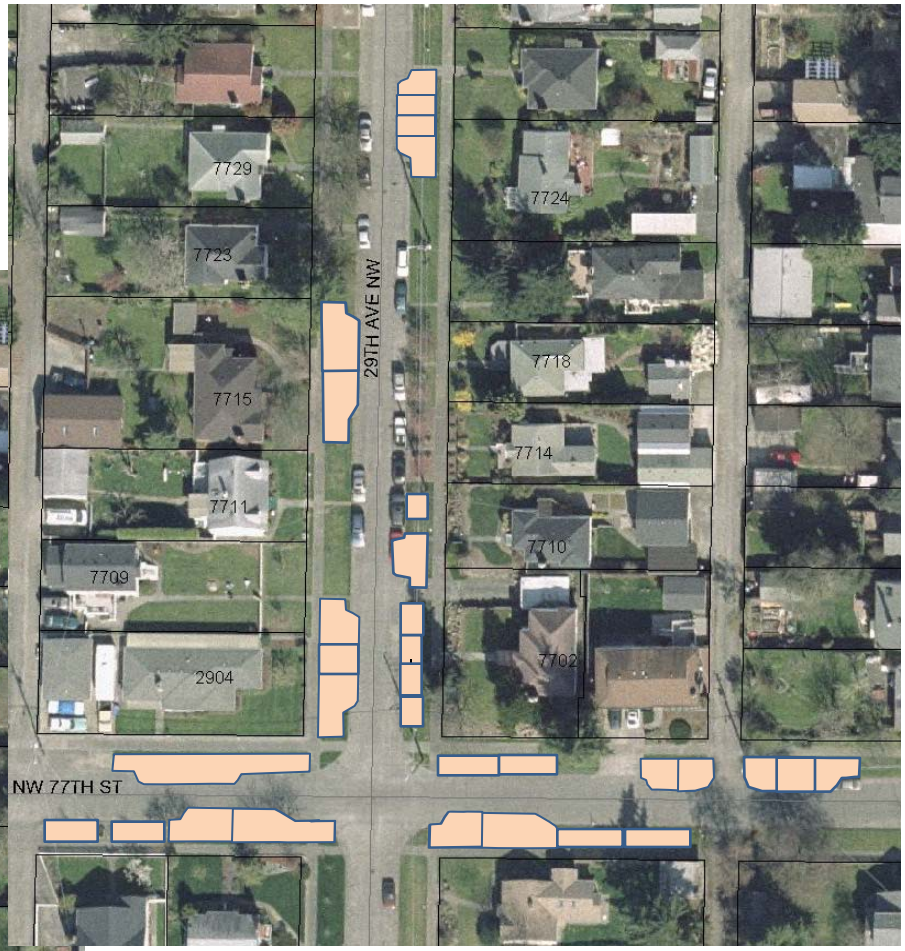


# 29th Ave NW & NW 77th St

## Original design




Raingardens not exactly to scale.




## Retrofit design

- Infiltrating raingarden
- Remove and convert back to planting strip

## Original design


Raingardens not exactly to scale.


Retrofit design

28th Ave NW between NW 65th & 67th St

Infiltrating raingarden

Low functioning raingarden

Raingarden converted to live storage with underdrain

# Lessons Learned

## – *Planning*

- Hasty planning & design means not enough time for thorough QA/QC
- Analyze risks of accelerating a schedule to meet a deadline and communicate them up
- Say no to unrealistic schedules even it means turning down money
- Community Engagement Plan and schedule
- Get management support of project policies
  - Acceptable impact to community (i.e., parking loss)
  - Community acceptance threshold related to site selection

# Lessons Learned
# – *Community Engagement*

- Get out into the community early and often
- Introduce the problem before presenting the solution
- Don't rely just on the community meetings to engage the community and get feedback
- Written questionnaire on wet basements & soggy yards
- Projects with flexible siting require lots of rounds of community interface, because each meeting results in design changes that impact new people who haven't been to the earlier meetings, and they too want to modify or eliminate the design
- Don't be fooled that just because you have a lot of fans at the planning stage, doesn't mean you won't have a lot of critics at final design/construction
- Consider demonstration infiltration tests on evenings/weekends so skeptical neighbors can be eye witnesses.

# Lessons Learned
# – *Community Engagement*

- Understand the neighborhood “look”
  - Curb and Gutter creates different community ownership of frontage than ditch & culvert areas
- Be clear about:
  - Short term standing water and why it’s important. Puddles are good. Puddles may be present consistently for four months of winter
  - Loss of parking – impact to neighbor in front and other neighbors along the street.
  - Change in Aesthetics – during construction, end of construction, 1-yr later, 5-yrs later
  - Signs!!!
  - Staging has got to go in front of someone’s house

# Technical Design

- Technical / Design Approach
  - Enthusiasm for trying to meet citizen traffic calming request took precedent over intended project scope (curb shift design and working on 28th without survey)
- Unidentified Subsurface Geology Conditions

# Lessons Learned – *Geotechnical*

- Consider ratio of sidewall to bottom area during test and try to limit horizontal flow.
- Consider potential for groundwater mounding on top of glacial till.
- If test pits find <0.5 in/hr, Monitor groundwater levels for a minimum of one winter.
- Ask community about evidence of groundwater springs, basement flooding, and other groundwater problems.

# Lessons Learned – *Design*


- Ensure adequate investigation of site low points
- Include formal geotech review during 30% circulation
- Design should consider backup system (underdrain) if design infiltration rate is less than 0.5 in/hr
- Contract documents should include a backup plan (underdrain) should native soil conditions vary from design assumption
- Include constructability review by CM at 60% circulation

# Lessons Learned – *Design*

- If “field directed” elements to be included work closely with construction management . Clearly articulate intent of “field directed” elements in the design.
- Review project design and function and critical project elements with CM

- Run off from roof & private driveway/ sidewalk is source of erosion
- Deliberately decide when the facility will be “turned on” to accept runoff
- Don’t be cheap with the plants – buy some larger stock

# Lessons Learned – *Construction*

- Bring geotechs out during construction to verify soils
- If shallow utilities cross cell, avoid, relocate, or place sidewalks in those locations.
- Don’t under estimate the amount of water that can flow down a sidewalk into a planting strip or off of paved surfaces on adjacent private properties.


# Questions?

# Maintaining Your Rain Garden & Cistern

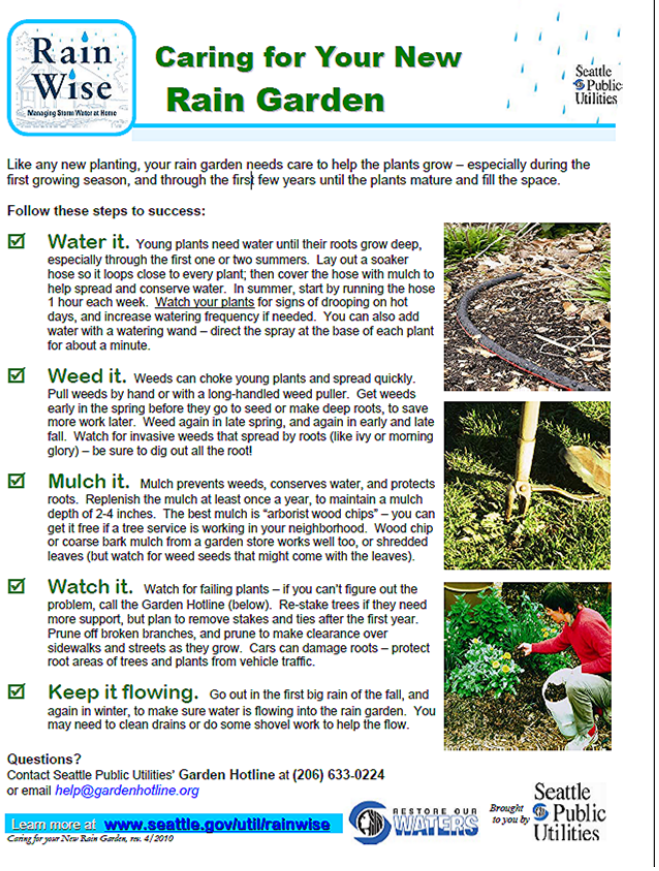
Craig Chatburn

Seattle Public Utilities

Installing Rain Gardens & Cisterns

*Trainings for contractors, April 26, 2011*

www.seattle.gov/util/rainwise



Rain Wise
Managing Storm Water at Home

**Caring for Your New Rain Garden**

Seattle Public Utilities

Like any new planting, your rain garden needs care to help the plants grow – especially during the first growing season, and through the first few years until the plants mature and fill the space.

**Follow these steps to success:**

☑ **Water it.** Young plants need water until their roots grow deep, especially through the first one or two summers. Lay out a soaker hose so it loops close to every plant; then cover the hose with mulch to help spread and conserve water. In summer, start by running the hose 1 hour each week. Watch your plants for signs of drooping on hot days, and increase watering frequency if needed. You can also add water with a watering wand – direct the spray at the base of each plant for about a minute.

☑ **Weed it.** Weeds can choke young plants and spread quickly. Pull weeds by hand or with a long-handled weed puller. Get weeds early in the spring before they go to seed or make deep roots, to save more work later. Weed again in late spring, and again in early and late fall. Watch for invasive weeds that spread by roots (like ivy or morning glory) – be sure to dig out all the root!

☑ **Mulch it.** Mulch prevents weeds, conserves water, and protects roots. Replenish the mulch at least once a year, to maintain a mulch depth of 2-4 inches. The best mulch is "arborist wood chips" – you can get it free if a tree service is working in your neighborhood. Wood chip or coarse bark mulch from a garden store works well too, or shredded leaves (but watch for weed seeds that might come with the leaves).

☑ **Watch it.** Watch for failing plants – if you can't figure out the problem, call the Garden Hotline (below). Re-stake trees if they need more support, but plan to remove stakes and ties after the first year. Prune off broken branches, and prune to make clearance over sidewalks and streets as they grow. Cars can damage roots – protect root areas of trees and plants from vehicle traffic.

☑ **Keep it flowing.** Go out in the first big rain of the fall, and again in winter, to make sure water is flowing into the rain garden. You may need to clean drains or do some shovel work to help the flow.

**Questions?**
Contact Seattle Public Utilities' **Garden Hotline** at **(206) 633-0224**
or email *help@gardenhotline.org*

Learn more at **www.seattle.gov/util/rainwise**

RESTORE OUR WATERS

Brought to you by Seattle Public Utilities

*Caring for your New Rain Garden, rev. 4/2010*

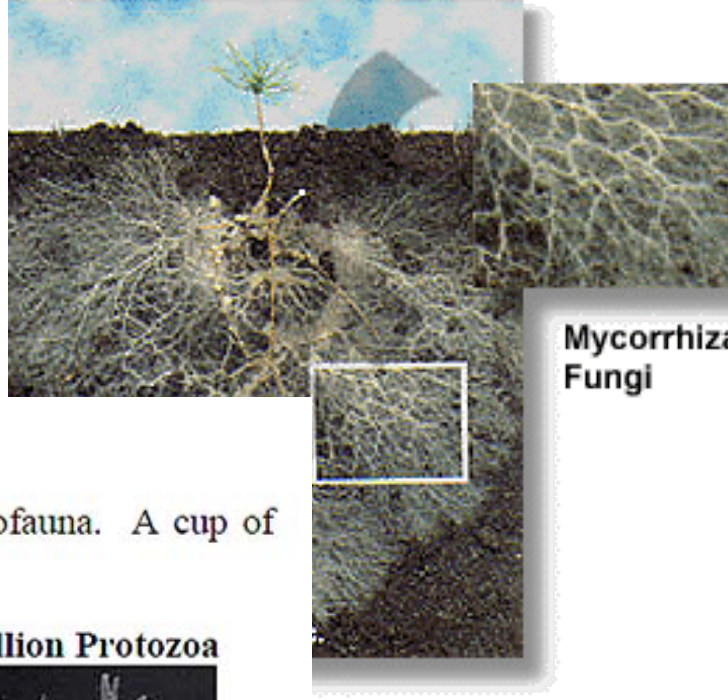
# How-to guide for rain garden care

- **Water** your new plants regularly for the first 2-3 years, until they are well established.
- **Weed** in spring, summer, and fall until the plants close in. **Don't use fertilizers or pesticides.**
- **Mulch with arborist woodchips annually** to feed the soil, conserve water, reduce weeds, until the plants close in to shade out weeds.
- Watch the inflow and overflow areas keep free of debris, and protected from erosion.

# Gardening tasks that can wreck rain gardens!


1. Use of non-organic fertilizer
2. Use Herbicides, Fungicides, Insecticides
3. Rotor-tilling
4. Use of Weed barriers (fabric or plastic)
5. Repeated removal leaves, and plant debris
6. Mulches lacking diversity – beauty bark, lava rock, washed playchips, sawdust

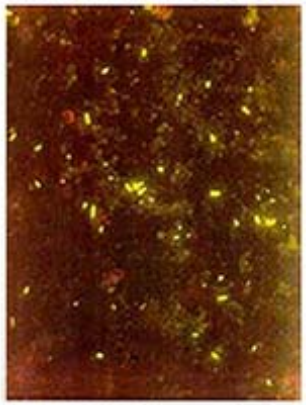
# Rototilling



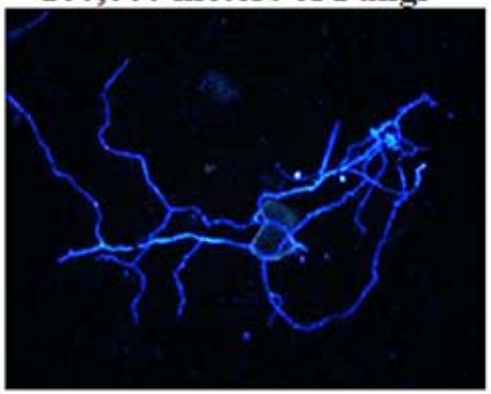

## Soil Biota Enhancement

Soil contains macroflora, microflora, macrofauna, mesofauna and microfauna. A cup of undisturbed native topsoil can contain:

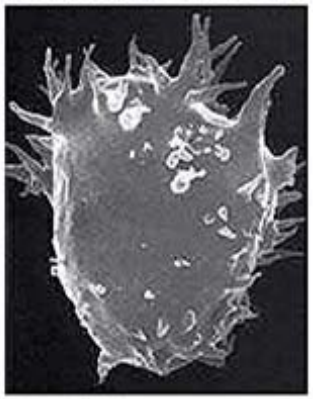
**200 billion Bacteria**



**100,000 meters of Fungi**



**20 million Protozoa**

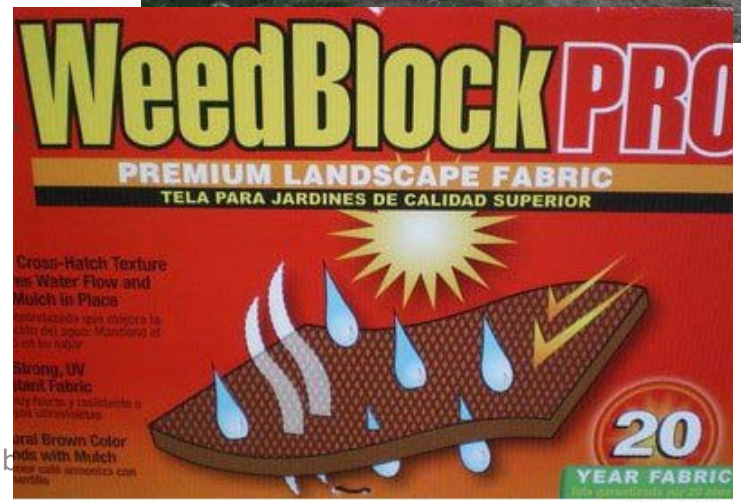


**100,000 Nematodes**

**Earthworms <1**

**50,000 Arthropods**

# Use of Weed blockers (fabric or plastic) prevents access to organic matter




Bill Volk

# Repeated removal of leaves, and plant debris

# Mulches lacking diversity– beauty bark, lava rock, washed play-chips, sawdust

- **Bioretention Maintenance**
- Workers must know WHAT BELONGS and WHAT DOESN’T.
- Weed discriminately by HAND
- EDUCATE your client as to why you do things differently

# Rain Gardens Success Depends on Your Client Understanding:

1. Healthy Soil = Healthy Plants
2. **Do not use fertilizers or pesticides.**
3. Feed the Soil, Not the Plant
4. **Replenish arborist woodchip mulch annually**