

Bioretention Hydrologic Performance Study

Status Update, 11/18/15

Bill Reilly, City of Bellingham, Sponsor

Bill Taylor, Taylor Aquatic Science
Doug Beyerlein, Clear Creek Solutions, Inc.

Bryan Berkompas, Cardno
Jenny Saltonstall, AESI
Anne Cline, Raedeke Assoc. Inc.
Chris Wright, Raedeke Assoc. Inc.

Team Members and Disciplines

- Bill Reilly – City of Bellingham Sponsor
- Bill Taylor, Taylor Aquatic Science – Principal Investigator
- Doug Beyerlein, Clear Creek Solutions– Prime and Hydrologic Modeling
- Bryan Berkompas, Cardno – Monitoring Installation and Flow Data Analysis
- Jenny Saltonstall, AESI – Hydrogeology/Geotechnical
- Anne Cline and Chris Wright, Raedeke – Vegetation Community

How Are Bioretention Facilities Doing (Hydrologically)?

- Purpose of the RSMP supported research is to:
 - Feedback to jurisdictions to help implement the permit, and
 - Provide feedback to the SWWMM
- This project is aimed at assessing the hydrologic performance of bioretention facilities. - If they aren't performing hydrologically, nothing else really matters.

Project Overview

- Phase I – Bioretention Site Selection and QAPP
- Phase II – Conduct the Monitoring and Modeling of the Systems

Phase I Overview

- Phase I – Site Selection and QAPP
 - Contact jurisdictions to identify “Candidate” bioretention facilities for monitoring
 - Develop a “Criteria Checklist” to assess facilities for monitoring
 - Obtain TIR, geotechnical reports, and planting plans
 - Compile observations from site visits and reports
 - Sites selected for monitoring
 - QAPP completed for monitoring

Jurisdictions Responding and Bioretention Sites Assessed

- Broad – based and enthusiastic response from jurisdictions
- 20 Jurisdictions recommended facilities
- 28 Facilities recommended
- 23 Facilities visited, with TIRs, design model, geotechnical, vegetation information reviewed
- Approximately 70 individual bioretention units visited

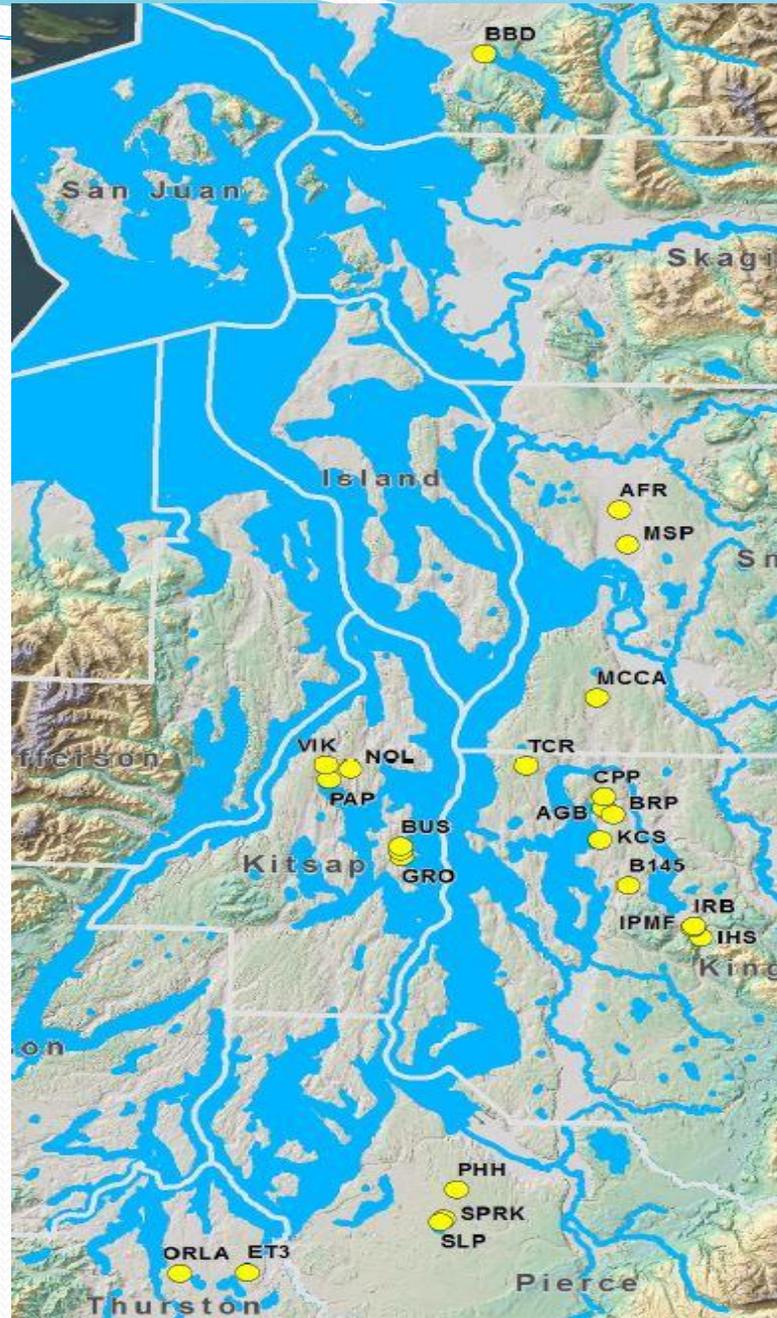
Jurisdictions Contacted Overall

- Bainbridge Island
- Bellingham
- Bellevue
- Bothell
- Bremerton
- Everett
- Issaquah
- King County
- Kirkland
- Kitsap County
- Marysville
- Mason County Cons. Dist.
- Mill Creek
- Olympia
- Pierce County
- Poulsbo
- Puyallup
- Redmond
- Seattle
- Shoreline
- Snohomish County
- Thurston County

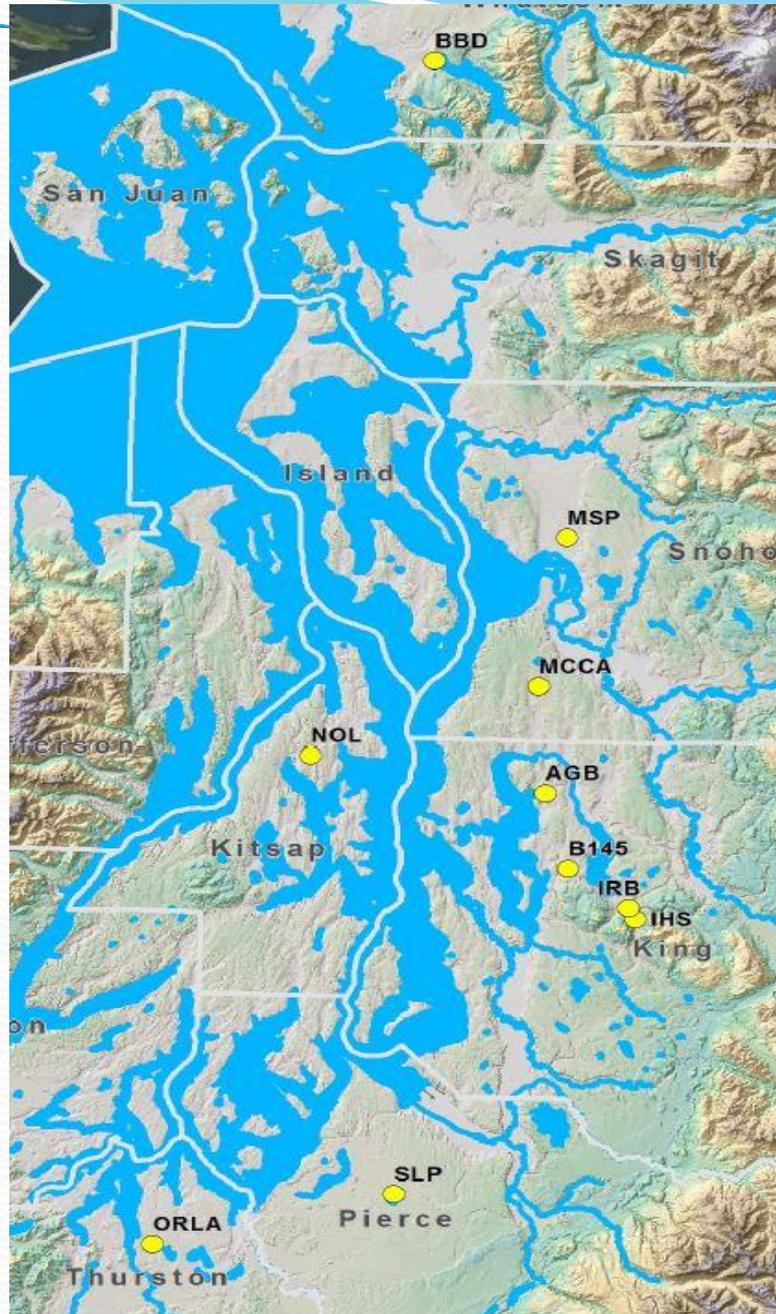
Site Selection Criteria

- Wide Ranging Criteria – used as a checklist to assess the sites
- Categories of Criteria – General, Monitoring, Soil/ Infiltration, Vegetation
- In the end, flow “monitor-ability” was exclusively the final criterion that had to be met.
- Other important criteria included contributing drainage area, hydrogeologic setting, soil media, and plant community

Candidate Bioretention Facilities Assessed in the Field



Bioretention Facilities Selected for Monitoring



Site Selection Technical Memo

- Summarizes the process and the background information for each discipline:
 - Monitoring
 - Geotechnical/hydrogeologic
 - Modeling
 - Vegetation

Jurisdictions and Contacts

Jurisdiction	Project Name	Location	Contact Name	Contact Phone
Bainbridge Island	Bainbridge Isl. High School	Bus Barn NE1/4 SE1/4 S22, T25N R2E	Melva Hill	206-780-3724
Bainbridge Island	Bainbridge Isl. High School	200 Building 9330 NE High School Rd.	Melva Hill	206-780-3724
Bainbridge Island	Grow Community	280 Madison Avenue N.	Melva Hill	206-780-3724
Bellevue	145th Place SE	145th Place SE & SE 22nd Street	Rick Watson	425-452-4896
Bellingham	Bloedell Donovan Park	2214 Electric Avenue	Bill Reilly	360-778-7955
Issaquah	Rainier Blvd. LID Phase II	Rainier Boulevard and NW Holly Street	Kerry Ritland	425-837-3410
Issaquah	Park Maintenance Facility	525 1st Avenue NW	Kerry Ritland	425-837-3410
Issaquah	Issaquah High School	700 2nd Avenue SE	Kerry Ritland	425-837-3410
Kirkland	AG Bell	11212 NE 112th St	Kelli Jones	425-587-3855
Kirkland	Benjamin Ryan Short Plat-Lot 1	10220 124th Avenue NE	Kelli Jones	425-587-3855
Kirkland	Cedar Park	112th Avenue NE	Kelli Jones	425-587-3855
Kirkland	Kirkland Children's School	5311 108th Avenue NE	Kelli Jones	425-587-3855
Marysville	Art Investments Res. Devel.	51st Ave NE & 83rd Street NE	Brooke Ensor	360-363-8288
Marysville	Armed Forces Reserve Center	13613 40th Avenue NE	Brooke Ensor	360-363-8288
Mill Creek	MC Community Association Bldg	15524 Country Club Dr.	Mary Ann Heine	425-316-3344
Olympia	ORLA School	12th Avenue SE & Boulevard Rd SE	Jake Lund	360-753-8152
Pierce County	Spanaway Lake Park	14905 Bresemann Blvd S.	Dawn Anderson	253-798-4671
Pierce County	Woods at Golden gibbon	104th and Golden Gibbon	Dawn Anderson	253-798-4671
Poulsbo	Anderson Parkway	Anderson Pkwy & NE Lincoln Rd	Anja Hart	360-394-9753
Poulsbo	Noll Roundabout	Lincoln Rd & Noll Rd	Anja Hart	360-394-9753
Poulsbo	Viking Ave	between SR 305 & New Finn Hill Rd	Anja Hart	360-394-9753
Shoreline	N Fork Thornton Creek	multiple sites	Uki Dele	206-801-2451
Thurston County	Evergreen Terrace III	9th Ave & Torrey	Steve Johnson	360-867-2332

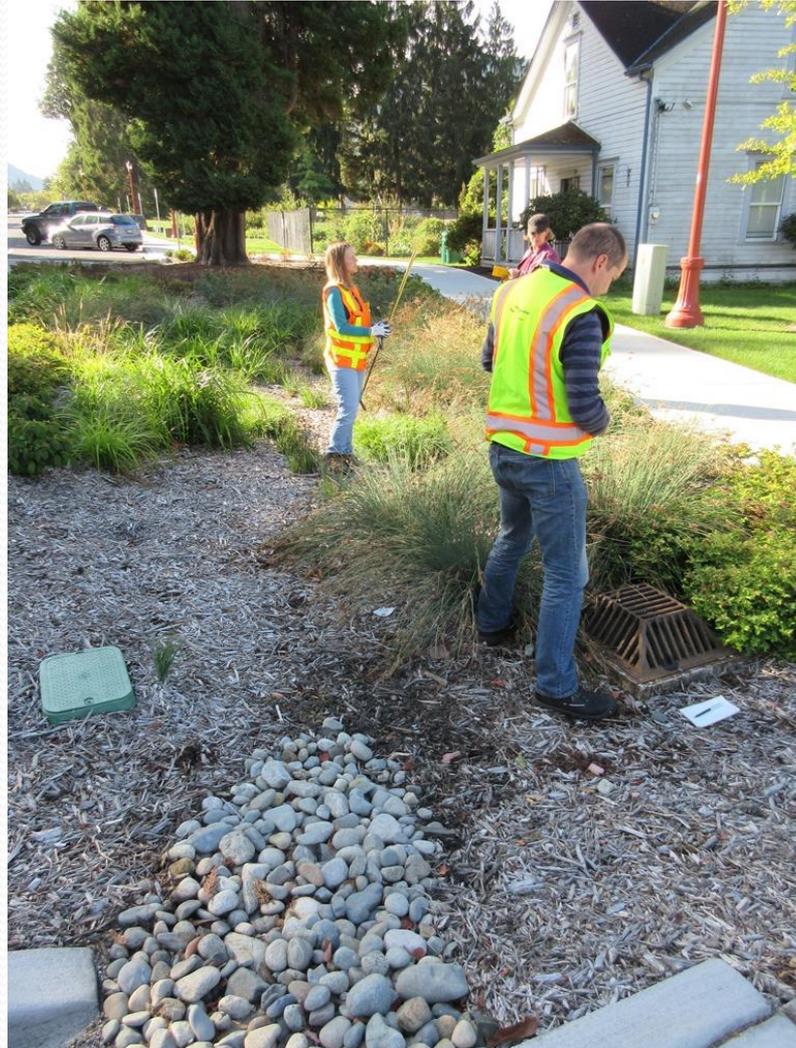
Bellevue 145th Place SE



Bellingham Bloedel Donovan Park



Issaquah Rainier Blvd. LID Ph. II



Issaquah High School



Kirkland Alexander G. Bell School



Marysville Residential Cul-de-sac



Mill Cr. MCCA Building



Olympia ORLA School



Pierce Co. Spanaway Lake Park



Poulsbo Noll Ave. Roundabout



Phase I – Draft QAPP Completed

- Input from All Team Members and Ecology
- Delivered to Ecology This Week
- Edit Final QAPP

Phase II Schedule

- Schedule
 - Contracting w/ Bellingham for Phase II Ready by Amendment
 - Authorize Phase II with SWG and Ecology
 - Order Equipment by January 2016
 - Start Monitoring by January 2016 for Sufficient Data Set
 - Complete Monitoring by June 2016

Phase II Budget

- Phase II Budget Update
 - Labor Savings by
 - Shared Team Trips
 - Shorter Monitoring Period
 - Three Jurisdictions Helping Monitoring (Bellingham, Pierce Co., Poulsbo)
 - Cost Increases in Equipment and Data Analysis
 - Original Total Budget \$467k (Phase I and II)
 - New Proposed Budget \$492k (\$25k increase proposed)

Moving Forward

- Selected sites represent real world facilities and conditions, and
- Results of the project will provide data to evaluate design and performance, for confidence in how bioretention will work in your community.

