

# BIORETENTION MEDIA STUDY PHASE 2 PARTNER MEETING

## AGENDA: JULY 1, 2019

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| 1:00-1:15 | Introductions <ul style="list-style-type: none"><li>• Partner introductions</li><li>• Review Meeting agenda and objectives</li></ul>   |
| 1:15-1:30 | Project update and schedule <ul style="list-style-type: none"><li>• Tasks completed</li><li>• Tasks remaining</li><li>• Toxicological questions</li><li>• Schedule ahead</li></ul> |
| 1:30-2:00 | Review flushing results <ul style="list-style-type: none"><li>• Adjustments from QAPP</li><li>• Results</li><li>• Media selection from flushing results</li></ul>                  |
| 2:00-2:45 | Review dosing results <ul style="list-style-type: none"><li>• Adjustments from QAPP</li><li>• Results</li><li>• Media selection from dosing results</li></ul>                      |
| 2:45-3:00 | Wrap-up <ul style="list-style-type: none"><li>• Next steps</li></ul>   |

## MEETING MINUTES

**Date:** 7-1-19 **Location:** Skype

**Project Number:** 16-06230-000

### Attendees:

Curtis Hinman	Shanti Colwell	Alice Lancaster
Chris May	Chris Webb	Doug Hutchinson
Doug Howie	John Lenth	Jennifer McIntyre
Brandi Lubliner	Jenee Colton	Jess Brown
Dylan Ahearn	Mark Maurer	

### Meeting Objective:

Second Advisory Committee meeting for BSM Phase 2 Study to discuss flushing and dosing findings and select best performing media for final analyses.

### Discussion:

1. Project update and schedule:
  - a. Reviewed tasks completed, tasks remaining and schedule moving forward.
  - b. Reviewed toxicological analyses and questions that have come up regarding the discrepancy for daphnia survivability in day 1 and day 2 influent water.
  - c. The most significant question for scheduling: will we run dosing event 5 this summer, fall 2019 or not at all. If we do run dosing event 5 in fall 2019 results would not be available until after final report is scheduled to be completed. Jenee, Curtis and Brandi will meet to discuss dosing event 5 and potential to extend final report due date.
  - d. Highway 520 discussion
    - o Curtis: dosing event 4 stormwater from Hwy 520 extraordinarily dirty and strongly recommends not using 520 water with long antecedent dry periods because these filters are not designed to handle extreme concentrations of contaminants without multistage system.
    - o Doug Howie: this limitation should perhaps be made explicit.
    - o Chris May: in this setting pre-treatment would be included.
    - o Mark Maurer: in this setting a treatment train would be appropriate.
    - o Brandi: dosing with high concentrations may be a good and appropriate test.
    - o Curtis: the extreme contaminants levels may immediately saturate and clog filters and we won't see a trend of filter effectiveness rather just functioning then dead.

- Discussion to be continued with King Co, Herrera and Ecology.
- e. Toxicological discussion
  - Jen McIntyre: significant discrepancy for daphnia survivability between day 1 and day 2 influent water for dosing experiment 1 (100% mortality for day 1 and minimal mortality for day 2). Daphnia in dosing experiment #4 exhibited significant mortality in influent water. No media appear to contribute toxicity in effluent water. Some media/effluent water may promote reproduction which could be hormesis (very low concentrations of some contaminants can be beneficial to an organism). All treatments appear to be protective for all dosing experiments except for Treatment 2.
  - Curtis: question...are the PAH concentrations in 520 stormwater typical?
  - Brandi: look at Phase 1 monitoring report.
- 2. Flushing results
  - a. Curtis reviews flushing results with group.
    - Typical findings with very high N, P, Cu and bacteria flushing from 60/40.
    - Very high aluminum flushing from treatments with lava sand (7 and 8).
  - b. In general Treatment 4 best performer for low flushing concentrations. Total phosphorus (TP) and ortho-phosphorus (ortho-P) flushing concentrations were much lower in treatment 4 than others.
- 3. Dosing results
  - a. Curtis reviewed dosing results with group.
    - Looking at TAPE objectives and bootstrapping results: Treatment 4 clearly best performer exceeding all TAPE objectives; treatments 2 and 6 meet basic and enhanced, but do not meet TP objectives.
    - Herrera notes to group that the bootstrapping results do not strictly meet TAPE screening guidelines; therefore, results are for general comparison.
    - Cost: from Curtis: primary media = ~\$200/CY, polishing layer = ~\$ 350/CY. From Shanti: 60/40~\$80-100/CY. From Dylan: Filtterra media \$500-\$880/CY.
- 4. Media selection
  - a. 70ss/20cp/10ash meets basic and enhanced, but not TP objectives.
  - b. Polishing layer necessary to meet TP objectives.
  - c. Shanti: are polishing layer components available?
  - d. Curtis: yes, in large quantities.
  - e. Question to Doug Howie: is polishing layer OK with Ecology. Doug: not ruling polishing layer approach in or out (decision up to other not just Doug at Ecology).
  - f. Doug Howie: 60/40 can be used everywhere except P limited lake basins and fish-bearing streams.
  - g. Brandi: Treatments 4 and 6 appears best and maybe 2.
  - h. Curtis: cautions about relying on Treatment 2 because compost delivers high concentrations of N, P and Cu that may saturate polishing layer early in life cycle of media.
  - i. Curtis: reminds group that plant growth is an important consideration and while all treatments grow plants Treatment 4 should grow plants as well as 60/40, but also meet treatment objectives.
  - j. Chris Webb: suggests using \$/# contaminants removed/year vs. \$/CY for a more accurate cost comparison among treatments.

- k. John Lenth, Curtis and others suggest stepwise approach using Treatment 4 outlined in a matrix by objectives to give users options.
    - o For basic treatment and metals use primary layer for Treatment 4 alone.
    - o For TP treatment and improved plant growth (also less plant maintenance likely) add polishing layer and compost mulch.
  - l. Selecting Treatment 4 also covers all media components for developing specification metrics and numeric ranges.
  - m. Group in general agreement to move ahead with Treatment 4.
5. Next steps
- a. Should we run dosing event 5?
    - o Curtis: strongly recommends against running last dosing with extremely dirty 520 water because these media alone not designed to filter extremely high concentrations of contaminants without pre-treatment.
    - o Brandi: WQ testing primary driver for grant. Toxicological study secondary.
    - o Doug Hutchinson: if we wait until fall 2019 to run 5<sup>th</sup> dosing would results change outcomes? If yes we should wait until dosing event complete or not run 5.

**Action Items:**

Action	Due Date	Assigned To
Determine if and when to run fifth dosing event		Curtis, Jenee, Brandi
Send out web poll for next in-person meeting to select metrics for media specification		Curtis



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