Questions from chat box, May 26 webinar on engineered media

* Were any steps taken to mitigate preferential flow along column edges.
	+ We’ve done a number of column experiments and all the experimental recommendations say that a 50:1 ratio of column diameter to media particle size is large enough tom minimize edge effects. In addition, the sides of the mesocosms (garbage cans) were slightly rough from the manufacturer, so we’re confident we have minimal edge effects.
* Where did you get the reed sedge material?
	+ All our materials came from Plaisteds and their respective suppliers. We also document the details [in the full report](https://www.wrc.umn.edu/biofiltration-media-optimization) about all the materials.
* Ed, have you done continuous flow-weighted monitoring? The results look like they are grab samples.
	+ All of the samples are grab samples.
* The vast body of SW research only shows BMP performance of vegetated systems during storm events. The vegetation growth analysis in this study is important, but is anecdotal when it comes to water quality performance measurements. How do we overcome our lack of understanding of vegetation in such systems on water quality performance the lack of water quality datas due to no flows between storm events? This is a sector wide challenge that lacks a consistent analytical measurement accepted by all.
	+ This is a great question and comment! This is certainly a challenge and while we are not trying to measure the benefits of vegetation, we assume we will get the benefits if we have healthy vegetation.
* Are there any other upcoming projects with CCWD (Coon Creek Watershed District) for more IESF (iron enhanced sand filters) with biochar that you are working on?
	+ Yes. Starting design on another pumped system in Coon Rapids.
	+ On the west side of HWY 169 next to Champlain City Hall
* What is agricultural carbon
	+ Agricultural carbon is any carbon residue remaining after harvest, such as corn stalks or any plant stems.
* Keith, is the metal removal for dissolved or total metals?
* Keith, is it problem for water quality treatment if plants grow in the spent lime?
* Keith, what are the water treatment facilities doing with all their spent lime now?
* Keith, do you need to be considerate of spent lime chemistry and the potential for unintentionally introducing unwanted pollutants sourced from the spent lime?
* Curt, in the layered system is there anything that separates the layers? Fabric? How are you determining the layers used for treatment and removal of target pollutants?
	+ Layers are not separated by a fabric due to concerns of subsurface clogging within the cell.  Specific media types were chosen by how they would address target pollutant removal and by whether P was a water quality concern for receiving waters.
* Curt, in the vertical system, it seems the iron layer would be challenging to vegetate. Thoughts or observations on that?
	+ The iron/sand section typically does not vegetate well due to lack of organic and lack of water holding capacity.  However, the unvegetated areas are only visible at certain times of the year and are typically obscured by surrounding vegetation so unvegetated areas have not been a major aesthetic issue.   Incorporating organics into the upper portion of the iron layer could be a way to vegetate that area if vegetation is desired, but a potential concern with vegetating the iron/sand section is creating preferential flow in root zones which could limit the effectiveness of the iron/sand media.
* Curt, Like the concept, but curious if there are cost comparisons to standard bioretention/biofiltration systems. I can forsee construction consistency challenges with different medias used within one BMP. Still, neat concept worth additional exploration.
	+ A recent project was completed that included two standard bioretention basins using solely Mix B and two basins that had vertical layered systems using Mix B and iron enhanced sand.  The costs to furnish and install the engineered media was about 30% higher for the layered system compared to the standard basins. Other costs (excavation, inlets, underdrain, vegetation, etc.) were very similar for both sets of basins.
* What is the availability and sustainability of coir pith in MN? If we started using coir in many (all?) of our bioretention and biofiltration practices, could the supply keep up with demand?
	+ Availability is definitely an issue.  In the projects where we used coir pith, the coir needed to be ordered several weeks in advance of the project start and was challenging to procure.  The challenge of getting coir pith was considered when determining media types for future research- other media types were prioritized over coir due to the availability challenges.
* To all presenters, how long are the adsorption medias expected to last? For periodic disposal, what testing might be required and what disposal requirements are anticipated?
* Curt, what is the depth of the last set of cells in South St. Paul?
	+ Surface ponding depth was 12”, media was 18”.  Depths were limited by elevations of existing stormwater infrastructure.