

Minutes of the Water Quality Management Committee, July 23, 2020

Members Present: Steve Leighton, Eric Turkington, John Waterbury, Matt Charette, Tom Duncan. Also present: Paul Dreyer, Planning Board; Peter Fang, Falmouth Water Stewards; Selectman Doug Brown

1. Falmouth's Pilot Permeable Reactive Barrier (PRB) project Presentation by: Matt Charette, WHOI

Matt Charette gave a status update on the Shorewood Drive PRB demonstration project. He reviewed the initial site characterization data as well as the recent data that has been collected by WHOI prior to injection. Charette indicated there has overall been good consistency between the data except for a young, shallow plume likely from the local neighborhood that was not seen in prior sampling. He indicated that all data were considered by the advisory board when evaluating where the most effective vertical interval placement would be for the injection to maximize the treatment of nitrate by the PRB.

Charette reported that the injection of the emulsified vegetable oil (EVO) began on July 13th and was completed that same week.

Chairman Turkington inquired about an initial oversight in determining the groundwater flow in Orleans and whether this PRB could be subject to a similar issue. Charette indicated that the location of the Shorewood Drive PRB is so close to the estuary and based on the topography and site characterization, there is really no way for the groundwater to reverse or shift directions. In Orleans, there was additional seasonal inputs that were not initially taken into consideration during design that caused a change in the direction of water flow.

Charette reminded the committee that the project was designed with the PRB having two discrete sides. One side of the PRB received a 10% dosage of EVO which is estimated to be a 12-month supply, while the other side received a 20% dose of EVO estimated to be a 24-month supply. The objective of the study is to have the 12-month dose be exhausted during the study to determine actual longevity of the EVO in situ which will aid in more accurate determinations of life-time costs for full scale PRBs.

Charette reported that the next step will be to regularly monitor the performance of the PRB over the course of the study. The first round of post-injection sampling is scheduled for August which will allow enough time to see an effect of the PRB in the downstream wells. After August, monitoring will occur quarterly.

John Waterbury asked whether there is a chance of a biomat buildup around the injection site. Charette indicated that there needs to be additional evaluations done on this and that it could be a potential concern about reinjecting in the same location.

2. A Waquoit Bay sewer scenario using GHD's proposed Waquoit Bay intermunicipal allocations

Presentation by: Kristen Rathjen, Science Wares

Kristen Rathjen reviewed Falmouth's proposed nitrogen removal plan for Waquoit Bay as presented in the South Coast Comprehensive Wastewater Management Plan update considering GHD's draft Waquoit Bay allocation for Falmouth's share of the nitrogen removal requirements. Rathjen presented the planning scenarios for three main areas of Waquoit Bay; Eel Pond, Childs River and the eastern sub-embayments which include the Quashnet River, Hamblin Pond and Red Brook. The main planned nitrogen removal activities in the Eel Pond and Childs River subwatersheds are sewerage and shellfish aquaculture. The proposed nitrogen removal activities in Eel Pond would exceed the GHD removal target for Falmouth, while there would be a deficit in the Childs River watershed. John Waterbury reiterated the complexities of the tidal movement in the Waquoit Bay system between these subwatersheds and that it is very likely that the excess removal in Eel Pond will be seen in Childs River to aid the deficit.

Selectman Doug Brown questioned whether there are plans for a satellite treatment facility on the eastern side of town and whether that would be more cost effective for sewerage more areas in the East. Chairman Turkington stated that anything is possible if it shows to be a cost-effective option.

Tom Duncan acknowledged the enormous challenge of the segmentation of the subwatersheds for planning purposes. He proposed an idea about averaging the results of the three sentinel stations for the whole Waquoit Bay system to present to the State with the idea that if the average of the three meets State standards then the Towns should get credit for their efforts. John Waterbury remarked that idea is a conversation to have after the efforts have been done.

3. MEP report on West Falmouth Harbor-discussion

Summary by Tom Duncan

Tom Duncan summarized a recent report circulated by the MassDEP indicating that there has been an increase in the presence of eel grass in West Falmouth Harbor. Duncan recounted several concerns with the way in which the recent study was conducted. He indicated that there was no quantification of eel grass or indication of the physical health of the eel grass itself as the images showed eel grass covered in epiphytes which is indicative of a system still nutrient enriched. He reported that the study characterizes the benthic community but only for sites where eel grass was not present as there are sampling restrictions for benthic sampling if eel grass is present. He presented data from prior work he himself conducted in West Falmouth Harbor characterizing the benthic community on a temporal and spatial scale. Duncan remarked that in the current study the limited period of sampling could severely skew the whole picture of the estuary if using benthic invertebrates as bioindicators.

Duncan pointed out inconsistencies in the current study in the overall health indicator rankings and use of averages in the rankings to eliminate potential noise in the sampling. He

also felt the study was highly restrained by not being able to sample to characterize the benthic invertebrate community in areas where eel grass was present.

He remarked that the big picture goal of the State's efforts is to develop a standardized way for other groups and agencies to use standard techniques and obtain comparable high quality data that can be evaluated temporally against earlier studies and across estuaries. He stated that the problem is that there is no single metric that can easily describe what is going on. John Waterbury stated that the Buzzards Bay Coalition (BBC) currently has a health index indicator that includes many of the metrics that this study was lacking and said that the BBC indices have been successful and widely accepted in the region.

Tom Duncan would like to follow up with written comments to the State with his concerns on the methodology used for this study.

4. WQMC/BBC final report to CCWPC- discussion Summary by John Waterbury

John Waterbury gave a summary of the final report on the West Falmouth innovative and alternative (I/A) septic system demonstration project submitted by the Buzzards Bay Coalition. Other project partners included the Water Quality Management Committee, Science Wares, and the Massachusetts Alternative Septic System Test Center. Waterbury reviewed that the first phase of the project was to install 20 I/A's around West Falmouth Harbor. For the second phase, an additional 10 systems were installed. The original criterion for the program was to install technologies that achieved 12 mg N/L or less.

Waterbury summarized data from the study that indicated denitrifying systems using cellulose as the carbon source (e.g., NitRoe) had the highest nitrogen removal performance by consistently achieving 5.0 – 5.5 mg N/L. Several of the systems in the study did not consistently meet the reduction target of 12 mg N/L. There have been some systems installed in the second phase that have not been sampled yet. Waterbury also summarized the range of installation, O & M, and sampling costs from the project.

Waterbury indicated that the take home lesson from both phases is that the cellulose-based systems are the direction the Town should be headed. He reported that the second part of the project was to develop a management plan for the wide-spread use of I/A systems in a watershed. He indicated that a plan was developed by Falmouth and has been adopted by several other communities on the Cape. He stated that there are still challenges to overcome with the State that need to be worked out for them to accept the management plan to make the wide-spread use of I/A's a cost-effective option in a watershed.

5. Reports of members and staff

Steve Leighton reported that after Ken Foreman's presentation on Little Pond at the last meeting, he asked Ken to do some additional analyses to include the timing of sewer connections made in relation to sampling intervals. Emphasis was placed on well LP-3

where the greatest potential signal of nitrogen reduction was seen. The revised figures showed that the decrease in nitrate concentration corresponds to timing of sewer connections. Leighton reported that Foreman has applied for funding to further expand this monitoring program, but remarked that using the location and timing of sewer connections and factoring in the groundwater travel time could be useful to predict when the effects of sewerage should be seen in the estuary.

6. Vote minutes of prior meeting (06.18.20)

Tom Duncan recommended one minor edit to the minutes. Duncan motioned to accept the minutes as edited. Steve Leighton seconded. Unanimous in favor.

Motion to Adjourn- 11:00am. Unanimous.

Minutes submitted by Kristen Rathjen.

List of Documents

- Draft minutes of the 06-18-2020 WQMC meeting
- Field Scale Validation of Permeable Reactive Barrier for Non-Point Source Groundwater Nitrogen Remediation - presentation
- GHD's Waquoit Bay Nitrogen Allocation and Falmouth's Scenario to Meet the TMDL - presentation
- Massachusetts Estuaries Project Benthic Monitoring Report for West Falmouth Harbor
- Sung Harbor Benthos Summary
- Final Report: Designing a Municipal Model for Mandating, Funding, and Managing Innovative/Alternative Septic Systems
- Revised Update on MBL Nutrient and Groundwater Monitoring of Little Pond - presentation