

**Minutes of the Water Quality Management Committee, June 5, 2023, 4:30pm
Falmouth Public Library, 300 Main Street, Falmouth, MA 02540**

Members present: Ken Foreman, Steve Rafferty, Eric Turkington, Matt Charette, Tom Duncan, Jordan Mora. Also present: Eduard Eichner, TMDL Solutions/SMASST; Anastasia Rudenko, GHD; Amy Lowell, Falmouth Wastewater Superintendent; Selectman Doug Brown; John Waterbury, Board of Health; Ed Jalowiec, Falmouth Heights-Maravista Improvement Association; Gilda Geist, Falmouth Enterprise; several members of the public

1. Presentation on the draft Linked Watershed Marsh Assessment and Modeling to Determine Critical Nitrogen Thresholds and Loading for the Herring Brook Estuarine System, Falmouth MA

Chairman Turkington gave a brief background on why there was a need to conduct a study on the Herring Brook system. He noted that much of the concern about Herring Brook is the location of the system within the path of discharge flow from beds 14 & 15. He said this study was conducted by all of the original people involved with the Massachusetts Estuaries Project (MEP) and done in the same manner as those reports.

Ed Eichner opened his presentation stating there is good news, that Herring Brook is a healthy salt marsh system and will remain a healthy system even with the potential additional nutrients inputs being discussed.

Eichner detailed the general characteristics and land use within the Herring Brook watershed. He explained the types of data collected and the applications of that data into the linked models to produce a TMDL for the system. He described the phases of the modelling, developing the hydrodynamic model, then the watershed nitrogen loading model, and finally developing the water quality model. Once the water quality model was developed it was validated by comparing the modeled results to the measured values. He reported there was very high agreement between the model and measured values.

Eichner stated the data show a robust gradient from the upper marsh to the inlet. He indicated there is higher nitrogen concentration coming in from Trout Stream than from Wing Pond. He noted this is due to the attenuation process that occurs in Wing Pond. He also noted the differences in freshwater inputs are likely correlated with cranberry operations upstream near Wing Pond.

Eichner explained the process for determining the critical nitrogen threshold for the system and how it compared to other similar salt marsh systems in the region. He stated that all signs presently show a healthy marsh system and that a conservative threshold for the sentinel station (at the upper and lower reach border) was set at 1.0 mg TN/L and 2.0 mg TN/L at the headwaters as has been for the over 20 MEP marsh systems in the region that have been evaluated. He also noted that over the course of the MEP evaluations, DEP also determined those are appropriate limits for a salt marsh system.

Eichner described the process of using the model to both hindcast and future-cast various scenarios within the watershed. He showed results for what the nitrogen loading was modeled to be prior to development and showed results for the proposed increased loading

scenario associated with discharge beds 14 & 15. He indicated that running the validated model for full buildout of the watershed would increase the TN at the sentinel station by 9% which would have a concentration of 0.546 mg TN/L, well below the projected threshold of 1.0 mg/L. A second model run was conducted with the proposed maximum projected tertiary treated effluent discharge scenario of 0.76 mgd to beds 14 & 15 which resulted in a net nitrogen increase of 3% over present conditions to Herring Brook after accounting for attenuation within Crocker Pond.

Jordan Mora asked if the model was run at full buildout plus the proposed discharge scenario as that would be the maximum potential load to the watershed. Eichner replied that it had not been but could be. The committee made a request to have SMAST calculate that additional scenario.

Ken Foreman asked whether there was any kind of health assessment of Crocker Pond being completed. Eichner noted that there is water quality data collected for Crocker Pond [as part of a requirement for the Town's discharge permit]. He remarked that because it is a freshwater system, it is likely phosphorus limited and the additional nitrogen inputs would not impact the water quality of the pond.

A member of the public asked why 0.5 mg TN/L was not an appropriate threshold like many of the estuaries. Eichner replied that it is a difference between the types of environments. He described that the estuaries are basins with limited flushing while a salt marsh is shallow, and the marsh systems nearly completely drain with the tidal cycle. He also noted that there is no eelgrass in the salt marsh system which would dictate a lower threshold concentration.

Discussion was raised about the frequency of the current discharge to beds 14 & 15 and whether the seemingly infrequent use of them was enough to see any trends in Crocker Pond. Additional concerns were raised about previous particle tracking models that show discharge into West Falmouth Harbor. Anastasia Rudenko clarified that the current model run of 0.76 mgd is specifically set at that volume to eliminate any additional contributions to West Falmouth Harbor from beds 14 & 15. Amy Lowell described the rotational schedule and variability of discharging to both beds 14 & 15 as well as beds 9 – 13.

2. Presentation on the draft ocean outfall discharge evaluation report

Chairman Turkington gave a brief background on the discharge site evaluations to date noting that the more the working group examined the land-based options, the more seemingly advantageous an outfall became for the long-term plan. He noted that GHD was one of the partners of the most recently installed outfall in Rehoboth, DE. He also noted that the level of information Falmouth has gathered presently far exceeds the data the Rehoboth outfall had at the time of installation.

Anastasia Rudenko indicated that the outfall modelling report was done in collaboration with Jim Churchill (WHOI) and done as part of a long-term strategy for disposal of effluent wastewater. She reviewed the land-based options noting that all options are upgradient of nutrient sensitive estuaries and would require an offset for additional nitrogen being introduced at the discharge site. She stated that the outfall modeling began in 2018 and was

primarily focused in Buzzards Bay. Over the course of evaluation, additional options in Vineyard Sound began to be explored.

Rudenko described the evaluation of all potential sites including comparing current distribution and velocity, geology, length of outfall required to meet zone of initial dilution requirements, presence of eelgrass among other factors. She indicated the model was run using an average annual discharge rate of 4 mgd at a concentration of 3.0 mg TN/L. Results of the evaluation revealed that the tidal currents in Vineyard Sound are more vigorous than the eastern portion of Buzzards Bay which promotes better mixing. She noted that if an outfall were installed in Buzzards Bay, it would require a much longer distance to eliminate the potential for any flow back onto the shore or into any nitrogen sensitive estuaries. Specifically, an outfall in Buzzards Bay would need to be a minimum of 4,380ft to meet all the criteria, while in Vineyard Sound they determined an outfall of at least 2,000 ft would meet all of the criteria. As a result of this and several other characteristics (geology, etc.), the outfall potential in Buzzards Bay was eliminated.

Evaluations of several sites in Vineyard Sound continued and were assessed for site access, land ownership, suitability for staging, and presence of eelgrass. She indicated that the primary drive for outfall length in Vineyard Sound was the presence of eelgrass. She said that WHOI was contracted to conduct eelgrass surveys in Vineyard Sound in October 2022. The results of the eelgrass survey indicate that the shortest distance to get beyond the eelgrass was off Kite Park at a distance of 2,300 ft. Rudenko also highlighted the other factors that make Kite Park a preferred location, and why other Vineyard Sound sites were less favorable.

Steve Rafferty commented that the initial screening was done using 4 mgd which is a flow that is not anticipated by the town within the next 100 years, if ever. He remarked that if the town is going to put an outfall in, they are only going to do it once, and do it right to handle all treated wastewater discharge for the foreseeable future. He said there is a marginal cost difference between 2 mgd (which is closer to the expectations in the next 40 years) versus 4 mgd. Chairman Turkington commented that the nearly 2 mgd assumes all treated wastewater would go to the outfall eliminating any discharge to West Falmouth Harbor, Herring Brook, or Buzzards Bay.

Several residents asked questions about the distance and route from the plant to the outfall and whether pumps would be required. Steve Rafferty noted that at 2 mgd it would be served by gravity. Anything more than that would require a pump which would be a simple addition. Other members of the community raised concerns about the actual quality of the discharge from the treatment plant as well as whether an outfall would deplete the aquifer. Rafferty commented that the USGS has been engaged in discussions and working on modelling the impacts of the proposed outfall on the aquifer. He noted that at this stage the USGS does not see a significant impact on the recharge of the aquifer. Other community members commented about deed restrictions on the Kite Park parcel and questioned other alternative sites in East Falmouth.

Chairman Turkington stated that the committee knows it has a lot of work to do with the community to garner support for the outfall and said the committee is willing to put the work in to have the outfall succeed.

3. Reports of members and staff

Kristen Rathjen reported that she will be completing the final sampling of the Shorewood Drive permeable reactive barrier within the next week and that Matt Charette would give an update on results at the next meeting.

Steve Rafferty reported that the Freshwater Pond group decided at their last meeting to move forward with forming a new committee devoted to water quality in the freshwater ponds.

Rafferty also reported that several people met with the Massachusetts Alternative Septic System Test Center (MASSTC) to discuss a urine diverting pilot project. He noted that there is a lot of ambiguity on the general nutrient content and expected quantity of urine from such a project. He reported the test center is currently developing a scope of work to examine cost, quality, and content of urine in Falmouth. He also stated that Science Wares continues to make progress on the urine diverting analysis.

Chairman Turkington reported that after the DEP received comments on their proposed title 5 and watershed permit regulations, the department decided to revise its advisory committee. He reported that there are now several representatives from Cape Cod on the committee including himself. He reported that there has been one meeting so far where the DEP rolled out its version of the proposed regulations and answered questions from the committee members but did not solicit any advice. He said he will keep the WQMC updated.

Jordan Mora reported on the boat ramp projects to treat stormwater runoff with APCC and the Town. She indicated that APCC is applying for funding to move the Waquoit Bay Landing site to 25% design, and the Ashumet Pond boat ramp through final designs, permitting and possibly construction by 2025.

4. Vote minutes of prior meeting (05.01.23)

Several minor edits were suggested by Tom Duncan and Steve Rafferty. Matt Charette moved to accept the minutes with the suggested edits incorporated. Jordan Mora seconded. Unanimous in favor.

5. Motion to Adjourn –6:34pm. Unanimous

Minutes submitted by Kristen Rathjen

List of Documents

- Draft Linked Watershed Marsh Assessment and Modeling to Determine Critical Nitrogen Thresholds and Loading for the Herring Brook Estuarine System, Falmouth MA
- Draft ocean outfall discharge evaluation report
- Herring Brook Estuarine System Linked Watershed Marsh Assessment and Modeling to Determine Critical Nitrogen Thresholds and Loading presentation
- Falmouth Ocean Outfall Evaluations Overview presentation
- Draft minutes of the 05-01-2023 WQMC meeting