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## Minutes of the Commission Meeting Held on March 29, 2018 In the Stone Building 33 New York Avenue, Oak Bluffs, MA

### IN ATTENDANCE

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Commissioners: (P= Present; A= Appointed; E= Elected)

P Gail Barmakian (A-Oak Bluffs)	- Michael Kim (A-Governor; non-voting)
P Trip Barnes (E-Tisbury)	P Joan Malkin (A-Chilmark)
P Leon Brathwaite (A-County)	P Katherine Newman (A-Aquinnah)
- Christina Brown (E-Edgartown)	P Ben Robinson (A-Tisbury)
- Peter Connell (A-Governor; non-voting)	P Doug Sederholm (E-West Tisbury)
P Robert Doyle (E-Chilmark)	- Linda Sibley (E-West Tisbury)
- Josh Goldstein (E-Tisbury)	- Ernie Thomas (A-West Tisbury)
P Fred Hancock (E-Oak Bluffs)	P Richard Toole (E-Oak Bluffs)
P James Joyce (A-Edgartown)	P James Vercruysse (E-Aquinnah)

Staff: Adam Turner (Executive Director), Sheri Caseau (Water Resources Planner), Christine Flynn (Economic Development and Affordable Housing Planner), Dan Doyle (Transportation Planner).

Chairman James Vercruysse called the meeting to order at 7:00 p.m. and noted that tonight is a planning meeting with several presentations.

### 1. MINUTES

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Commissioners Present: G. Barmakian, T. Barnes, L. Brathwaite, R. Doyle, F. Hancock, J. Joyce, J. Malkin, K. Newman, B. Robinson, D. Sederholm, R. Toole, J. Vercruysse.

*Fred Hancock moved and it was duly seconded to approve the minutes of September 14, 2017 as written. Voice vote. In favor: 8. Opposed: 0. Abstentions: 4. The motion passed.*

*Fred Hancock moved and it was duly seconded to approve the minutes of November 16, 2017 as presented. Voice vote. In favor: 9. Opposed: 0. Abstentions: 3. The motion passed.*

*Fred Hancock moved and it was duly seconded to approve the minutes of December 7, 2017 as corrected by Fred Hancock on line 60 and 61 the language should be "the applicant could not count the easement as open space." and as corrected by Doug Sederholm on line 125 the language should be "what evidence is there is that the use of Pea Pod would reduce trips." Voice vote. In favor: 11. Opposed: 0. Abstentions: 1. The motion passed.*

*Fred Hancock moved and it was duly seconded to approve the minutes of December 14, 2017 as written. Voice vote. In favor: 8. Opposed: 0. Abstentions: 4. The motion passed.*

*Fred Hancock moved and it was duly seconded to approve the minutes of December 21, 2017 as presented. Voice vote. In favor: 8. Opposed: 0. Abstentions: 4. The motion passed.*

### 2. ENHANCED NITROGEN REMOVAL PROJECT- PRESENTATION BY JOHN SMITH

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*Commissioners Present: G. Barmakian, T. Barnes, L. Brathwaite, R. Doyle, F. Hancock, J. Joyce, J. Malkin, K. Newman, B. Robinson, D. Sederholm, R. Toole, J. Vercruysse.*

**Adam Turner** introduced John Smith. He has a technique that has proven to be very efficient for sustainable water treatment.

## **2.1 Presentation**

**John Smith** presented the following:

- He became associated with the Island in 1977 when he lived here for two years. Eventually he bought a “rental” house in hopes that someday he would move here and relax. He did that and has been working every minute. He will be presenting one of two systems tonight. He has been in the wastewater game since he was 18 years old.
- CES Clean Water has two technologies which may have applications on the Island and the Cape; NitROE is for individual homes and the SanTOE system is for small developments and small communities. SanTOE is the same process, but handles a larger flow.
- CES Clean Water is a group of dedicated and innovative engineers and scientists with over 400 years of combined experience.
- A wastewater system was installed in Saudi Arabia that handles a flow of 1.5 million gallons per day. That system was installed in 2012. 100% of the water is reused for irrigation and industrial process use within the community. It saves \$700,000,000 per year by recycling wastewater. This is the technology that SanTOE is based on.
- CES Clean Water was set up to look at affordable and effective wastewater treatment, and has an established presence on the Island. His partner is Richard Donahue.
- NitROE is for individual homes and is a tank technology. 10 of these tanks will be installed in Tisbury by June 2018. There is a septic tank and a leaching field, with the NitROE tank in between. The NitROE tank has two chambers. The first is an aerated chamber that converts the ammonia to nitrate, and the second chamber is filled with wood chips, where the nitrate is converted to nitrogen gas through bacterial action. The water then goes to the leach field with significantly reduced total nitrogen. The wood chips last over 50 years and if they are completely saturated they do not decompose. There is a 95% reduction of nitrogen with the system.
  - **Doug Sederholm** asked if there was anything other than air flowing through the nitrogen chamber.
  - **John Smith** said there is limestone in the aeration chamber. It was sourced from western Pennsylvania, and it is costly to bring it to the Island. Hopefully, the team will find a more economical way to transport it, or find a way to reduce the amount that is needed. It is an essential component used for buffering capacity.
  - **Doug Sederholm** asked how long the limestone lasts.
  - **John Smith** said it lasts 40 years.
  - **Trip Barnes** asked what type of wood chips are used.
  - **John Smith** said ideally he would like to have an Island source, but for now they are forest fresh, which is 80% oak.
  - **Gail Barmakian** asked if this system is attached to an existing Title 5 system.
  - **John Smith** said yes, the system is required to be part of a conventional operating Title 5 System by the DEP. Since the program is under a pilot permit, there needs to be an isolation line.
- A grant from MassCEC for \$150,000 was received for Tisbury, and it has been matched with \$30,000 in kind cash and \$75,000 in kind labor. With these funds, the group will be doing five new systems and five Title 5 retrofits with this test program.



- **Gail Barmakian** asked do if the team would be going for general acceptance, or is it three or five years for DEP.
- **John Smith** said he has spoken with the DEP and have three already in place and looking for all ten by June. 18 months of monitoring is required for the pilot program, but if there are good results, the DEP would consider the system for provisional use. That classification would allow for 30 units to be installed the following year. After another year of monitoring, the system would be approved for general use.
- **Gail Barmakian** asked if there were any foreseeable conditions that would affect the numbers, i.e. weather, seasonal use.
- **John Smith** said the pilot program requires six months of influent out of the septic tank. With seasonal use, when there is no flow, the bacteria in the system will become dormant. Once the flow is restored, the bacteria will become active again after one or two weeks. The most valuable piece of information will be the nitrogen concentration coming out of the tank. Once that is determined, the system can be tweaked and optimized to have an output of around 5-10 parts per million.
- The Lagoon Pond watershed will have three installations and the Lake Tashmoo watershed will have seven installations.
- Photos were reviewed of the first nitrogen tank that was installed in Tisbury on December 1, 2017.
- For a six bedroom house a 2,000 gallon tank is used, but in the future there will be one or two 1,500 gallon tanks, since Goodale can make that size on Island. The shipping costs are extravagant for a 2,000 gallon tank. The only piece of mechanical equipment is a 40 watt air pump.
- The SanTOE system has the same steps: settling, treatment of sludge, aeration, limestone bed, and woodchips for the treatment of the nitrogen. It is a larger unit than the NitROE system.
- The first tank is the ABR (anaerobic baffled reactor) which flows to the SAB (submerged aerated bed), then to the denitrification bed (woodchips), and then to the leach field. The system is fed by gravity, and has a 100 watt air pump.
- The ABR is where the suspended solids settle with baffling to allow for greater treatment area. This is also where the organic carbon compounds are biodegraded anaerobically. If the organic compounds are not removed and move through to aerobic treatment, a prolific growth of bacteria could occur.
- This is a proven technology applied in an innovative way.
- The submerged aerated bed is where the ammonia is converted to nitrate, any residual organic compounds are degraded aerobically, and the suspended solids are significantly removed.
- The denitrification bed is where the nitrate is converted to nitrogen gas.
- Acetic acid (vinegar) can be used to supplement the woodchips based on the high flow. Vinegar is being used in the system in Saudi Arabia. The SanTOE system uses a 55 gallon drum of vinegar that needs to be changed every four to six months.
- A unit was installed in November in Barnstable for the Mass Alternative Septic System Test Center. It is treating 500-1,100 gallons per day. It has a 100 watt air pump to supply oxygen to the submerged aerated bed.
- In order to help with the aesthetics, the area above the tank can be planted. In Saudi Arabia, it created an oasis. From a Board of Health perspective, the area might need to be fenced. A cash crop could also be planted.
- Recent performance: 24 hour composite samples were taken at each step of the process, which were passed around and the clarity of the water was reviewed. These samples were shipped to Mass DEP certified lab, and those results will be back in two weeks.

- The following results are from a test kit. The pH of the untreated wastewater was 7.1 and the chemical oxygen demand (a measurement of the organic compounds) was 354 mg/L. After the water moved through the ABR, the pH was the same and the chemical oxygen demand was 340 mg/L. Since this system was installed in December, the population of bacteria had a hard time becoming established in the cold weather. This number will likely be much lower in warmer weather. The ammonia concentration was 45 mg/L. After the SAB, the pH was 7.2, the chemical oxygen demand was less than 10 mg/L, and the ammonia was non-detectable at less than 1 mg/L (a 98% reduction). After the denitrifying bed, the nitrate concentration was 2 mg/L. The total nitrogen reduction is about 95%.
  - **Doug Sederholm** asked for the nitrogen concentration of the water treated at the Edgartown wastewater treatment plant.
  - **John Smith** said he was not familiar with Edgartown, but Tisbury has 3-5 parts per million in the effluent.
- The operation and maintenance to run the SanTOE plant is not maintenance free, but it is low maintenance.
- The next steps for the SanTOE system: engage potential customers and install systems on the Cape and Islands. CES Clean Water will guarantee a performance based on influent flow. The goal is to demonstrate that this system is an affordable and sustainable option.
- The unit on the Cape that is treating 11,000 gallons per day cost about \$50,000-\$60,000 plus the leach field. Costs for these systems are site specific based on the capacity and the shipping.
- CES Clean Water focuses on using local labor and materials as much as possible.
  - **Gail Barmakian** asked if the SanTOE system could be used with a cluster development of six single family homes.
  - **John Smith** said yes.
- The cost to retrofit a NitROE system is in \$10,000-\$13,000 range for a 1,500 gallon tank. It is affordable and sustainable.
  - **Megan Ottens-Sargent** asked if the system was inoculated with bacteria.
  - **John Smith** said to speed up the NitROE system, five gallons of activated sludge is added. For a SanTOE system, between 5 and 10 gallons of sludge would be added to provide a good denitrifying population.
  - **Megan Ottens-Sargent** said that new regulations were mentioned in the presentation, and asked if those were local or state regulations.
  - **Michael Loberg** said Mr. Smith was referring to the new Board of Health regulations that were developed for the Town of Tisbury after hours of public hearings. The current cost to remove nitrogen at the Tisbury wastewater treatment plant is \$900/lb. These systems bring the cost down to about \$300/lb. If 1,000 of these units were installed in the Tisbury watersheds, 11,000 pounds of nitrogen would be removed annually.
  - **Adam Turner** said the testing is going on in different places in Tisbury. The systems are an adaptable tool to reduce nitrogen.

### 3. WATER QUALITY POLICY PRESENTATION

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*Commissioners Present:* G. Barmakian, T. Barnes, L. Brathwaite, R. Doyle, F. Hancock, J. Joyce, J. Malkin, K. Newman, B. Robinson, D. Sederholm, R. Toole, J. Verduyze.

**Adam Turner** said the current MVC Water Quality Policy was examined, and there was an effort to get to a better solution and to get the allowances down. The committee took one year to work on this project.

#### 3.1 Water Quality Policy Review



Doug Sederholm presented the following:

- The DRI Water Quality Policy Committee was charged to update and revise the existing MVC policy for DRIs. The current policy was adopted in 2006.
- The greatest issue with water quality is nitrogen concentration. Nitrogen is a great nutrient. When there is too much in the pond, it promotes the growth of things that harm the overall pond health, such as phytoplankton and algae, which cause a loss of water clarity. Over time there will be less light and oxygen in the water, which causes a loss of eelgrass, which will ruin the pond for shellfish, and eventually for finfish.
- The coastal ponds are a big part of our quality of life. Over half of the houses on the Island are second homes and people come here because it is a beautiful place, and that is especially due to the coastal ponds. The ponds are deteriorating and if nothing is done, they will eventually die from too much nitrogen. We can't control what comes from the atmosphere, but we can control the nitrogen from homes (septic systems), stormwater, and landscaping to some degree.
- None of the up-island towns have wastewater treatment plants and the down-island towns plants have a limited capacity. We need to find a way to address nitrogen coming from wastewater.
- If the quality of our ponds deteriorate it will affect our economy, property values and shell fishing. There are also regulatory and legal considerations.
- The current 2006 policy is based on the Buzzards Bay project model. The methodology used was in terms of nitrogen allocation per acre, which is the same in the updated policy.
- The changes since 2006: the availability of updated nitrogen analyses (MEP Reports), continued impairment of the ponds, and there are more effective nitrogen reducing technologies. In the next 2-5 years, there will likely be even more advances in that technology.
- The policy goals now are to reduce the rate of continuous pond impairment; embrace new technologies and create opportunities to use them; provide flexibility for DRI applicants; recognize technology and cost limitations; and ensure a measured approach. The policy attempts to balance a slower rate of impairment with the costs to remove nitrogen.
- The policy is only limited to DRIs; targets nitrogen loads in the Island ponds using pond specific nitrogen output limits per acre from the MEP reports; and establishes mitigation strategies.
- The Town of Tisbury has done a wonderful job and hopefully our policy will also follow suit.
- The 2017 Proposed Revisions are based on MEP data for the water quality policy. The allowable nitrogen load has been adjusted, and there are expanded options for mitigation.
- Mitigation options include: innovative alternatives and pilot programs; off-site mitigations by permanently restricting development on another property in the same watershed or IA installation; and a quantified mitigation fee (based on the cost to remove nitrogen, located in Appendix 2 of the policy).
- What is different with the new policy: it is based on better scientific data that quantifies the nitrogen going into the ponds vs. the amount of nitrogen to keep the pond healthy; expanded options for mitigation; increased flexibility for applicants; mitigation strategies; and a waiver if the development will be sewered within two years.
- Other efforts are being done to reduce nitrogen: fertilizer regulations, IA testing on Island, Permeable Reactive Barriers, shell fish and phragmites projects, Tisbury Board of Health regulations, sewer plant expansion plans, other Town initiatives.
- The 2006 policy allowed 35 ppm of nitrogen with a Title 5 System, but MEP found that 26.25 ppm was more realistic effluent from Title 5. A better calculation is available for denitrification systems as well, from 19 ppm and it can be reduced to 12 ppm, and there are systems that can go even lower. The opportunity to reduce nitrogen using denitrification is better than it was 12 years ago.

- Table A was reviewed for the nitrogen load limits for the revised policy. Nine of the 15 watersheds have less restrictive limits than the 2006 policy. However, some are more restrictive. The committee used numbers based on science from MEP. Column 7 (Adjusted Nitrogen Load Limit) is important for determining the nitrogen load limit would be for a DRI coming before the MVC. The allowed limit is to keep the pond at a healthy level.
  - **Joan Malkin** added that the nitrogen impairment multiplier is calculated having regard to the amount by which the current nitrogen load for a pond exceeds the load limit for that pond. It is slowing down the deterioration, not reducing it.
- This is an interim policy. It is expected to be reviewed again in two or three years, in the anticipation of more technologies being available to reduce nitrogen loads.
- The first step is to determine how much nitrogen the project will produce and contribute to the watershed. Section 4 explains the nitrogen load calculation.
  - Step 1: Calculate the Nitrogen Load Limit for the Project.
  - Step 2: Calculate the Adjusted Nitrogen Load Limit for the Project.
  - Step 3: Determine the total untreated nitrogen output of the Project.
  - Step 4: Modify the project, if necessary, to meet the Adjusted Nitrogen Load Limit.
  - Step 5: Offset any excess nitrogen load with one or more mitigation strategies.
- Appendix 4 of the revised policy contains the information for the total nitrogen calculation for residential and non-residential DRI projects.
- The Appendix include:
  - Appendix 2: Monetary Mitigation Calculation (the committee tried to figure out what it would cost to remove nitrogen)
  - Appendix 3: Nitrogen Output by Wastewater Treatment System Type
  - Appendix 4: Total Nitrogen Calculation for Residential and Non-Residential DRI Projects
  - Appendix 5: Observational Pond Data
  - Appendix 6: Standard Agronomic Fertilization Rates
  - Appendix 7 : Links to MEP Reports

**Joan Malkin** said the committee met frequently for one year and after a lot of deliberation some things were changed and some remained. Bill Wilcox was also on the committee as well as Commissioners and MVC Staff.

**Doug Sederholm** said that Joan Malkin worked tirelessly on this policy and Bill Wilcox provided expertise.

**Adam Turner** said with this policy, using MEP data, a project will receive an allocation, and that is reduced based on how impaired the watershed is. There can be an increase in capacity/allocation with mitigation, or perhaps by buying land. These are large numbers and something needs to be done. It is intended to be a two year policy. In order to clean up the ponds, nitrogen allocation needs to be smaller, and building smaller homes. The MVC does a lot of water testing to see if MEP is accurate. Last year, there were over 600 done, and staff can now start to look at the trends. Our testing is recognized by the State. This is a very important policy and it is complicated.

**Joan Malkin** said under the current policy there is a provision to pay a mitigation fee, a dollar figure was calculated for that, and the money would be used for the pond/watershed that the project is in. **Doug Sederholm** said the money would be used to reduce the nitrogen going into the ponds in the same town and the same watershed.

**Doug Sederholm** said regardless of all of the math, Column 4 of Table A (load reduction) shows where the nitrogen concentration needs to be for healthy ponds. The areas most impacted by development are



the down island ponds, such as Oak Bluffs Harbor at 25% and Lake Tashmoo 32%. More has to be done and we hope the Towns will find ways to do it. They have more regulatory power than the MVC.

### **3.2 Commissioners' Questions**

**Ben Robinson** asked if there has been any groundwater testing and tracking wells. **Doug Sederholm** said no. **James Vercruysse** said some towns have done well testing. **Joan Malkin** said part of the Tisbury regulations as a policy decision is to also begin doing well testing.

**Fred Hancock** congratulated the committee for working long and hard on this policy. He asked for clarification on section 3.2 Mitigation Strategies, would a project connected to sewer also need a reduction. **Doug Sederholm** said if any project is over its limit these are options for mitigation. **Joan Malkin** said she believes it is a drafting error and somewhere else in the policy it says if connected to a sewer, the project is exempt from this policy. We thought if the project was connected to a sewer it would be covered.

**Fred Hancock** asked about an agricultural DRI. It is not on the MVC DRI Checklist. **Joan Malkin** said it was in the last policy and we did not think about it. **Doug Sederholm** said fertilizer from agriculture is a significant contributor, but it is inevitable that some will be lost.

**Adam Turner** said we wanted to bring this policy to everyone and there will be a public hearing soon. He thanked Doug Sederholm, Joan Malkin and Bill Wilcox as well as the committee for their hard work. It needs to be complex and we needed to do it.

**Doug Sederholm** thanked the committee members for their hard work and the time they spent on the policy including the early morning meetings.

**Trip Barnes** asked if there will be another meeting on this as he has things to add. **James Vercruysse** said there will be a public hearing and he also thanked John Smith for his presentation.

**Doug Sederholm** said the public hearing date will be posted.

## **4. NEW BUSINESS**

*Commissioners Present: G. Barmakian, T. Barnes, L. Brathwaite, R. Doyle, F. Hancock, J. Joyce, J. Malkin, K. Newman, B. Robinson, D. Sederholm, R. Toole, J. Vercruysse.*

### **4.1 Executive Director Report**

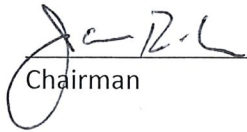
**Adam Turner** said there are two letters of support for the Housing Production Program. Tisbury wants to build 80 units and Oak Bluffs wants 40 to 60 units. They are great projects. Progress is being made in housing and the MVC has offered technical assistance. These projects came from the Towns.

The meeting was adjourned at 8:55 p.m.

### **DOCUMENTS REFERRED TO DURING THE MEETING**

- Minutes of the Commission Meeting – Draft, Held on September 14, 2017
- Minutes of the Commission Meeting – Draft, Held on November 16, 2017
- Minutes of the Commission Meeting – Draft, Held on December 7, 2017
- Minutes of the Commission Meeting – Draft, Held on December 14, 2017
- Minutes of the Commission Meeting – Draft, Held on December 21, 2017
- Water Quality Management Policy
- Town Of Tisbury's Housing Production Program Grant Application-Letter of Support, Dated March 27, 2018

- Town Of Oak Bluffs' Housing Production Program Grant Application-Letter of Support, Dated March 27, 2018

  
Chairman

6-21-18  
Date

  
Clerk-Treasurer

21 JUNE 2018  
Date