



## **Joint Meeting of the Board of Health and the Comprehensive Wastewater Management Plan Ad Hoc Committee**

**Monday, March 16, 2026, 3:00 PM**  
**James H. Crocker Jr. Hearing Room, Town Hall**  
*367 Main Street, 2<sup>nd</sup> Floor, Hyannis, MA*

### **MEETING MINUTES**

1. Call to Order meeting of the Board of Health and meeting of the Comprehensive Wastewater Management Plan (CWMP) Ad Hoc Committee

**A duly posted meeting of the Barnstable Board of Health was held on Tuesday, March 16, 2026. The meeting was called to order at 3:00 P.M. by F.P. (Thomas) Lee, Chair. Also in attendance were Board Members Paul Canniff, D.M.D., Christine Beer, PhD., Steven Waller, M.D., and Daniel Luczkow, M.D. Donald Guadagnoli, M.D. was not present. Health Division staff members Thomas McKean R.S., C.H.O., David Stanton R.S., and Vanessa Tripp, Office Manager, were present.**

#### **CWMP Ad Hoc Committee Members Present:**

Scott Horsley, Chair; Brian Hughes, Vice Chair; Tom Cambareri; Zee Crocker; Louise O'Neil; Butch Roberts; Kris Clark, Town Council; Gordon Starr, Town Council

#### **CWMP Ad Hoc Committee Members Absent:**

Rob O'Leary; Glenn Snell; Paul Neary

#### **Others in Attendance (in Person):**

Dan Santos, Director, Department of Public Works; Rob Steen, Director, Department of Public Works; Christopher Gadd, Communications Assistant, Department of Public Works

2. CWMP Ad Hoc Committee – Presentation on Best Available Innovative Alternative (I/A) Sewage Disposal Technology and the Committee's Recommendations Regarding I/As

Scott Horsley, Chairman of the CWMP Adhoc Committee, began his presentation showing a CWMP map. Mr. Horsely presented four general recommendations being made by the CWMP Adhoc Committee:

1. Evaluate a potential Health Regulation to implement septic system upgrades to nitrogen-reducing (NR) systems in coastal areas.

2. Support the restoration of wetlands at the cranberry bogs at the headwaters of the Marstons Mills River.

Mr. Horsely stated CWMP Ad Hoc Committee are also looking at non-traditional nitrogen mitigation techniques. Mr. Horsley stated there is a wetland restoration project led by Zee Crocker, that could have some major benefits and potential cost savings.

3. Assist with a pilot project to evaluate alternative phosphorus mitigation approaches and technologies at a freshwater pond.

Mr. Horsely stated Butch Roberts, member of the CWMP Ad Hoc Committee, manages the Barnstable Ponds Coalition. Ponds are not directly the objective of the nitrogen management for the estuaries, but a very important issue for the Town. Mr. Horsely stated the CWMP Ad Hoc Committee are recommending a follow up pilot project at the ponds.

4. Re-formulate the CWMP Ad Hoc Committee into a standing advisory committee to continue to identify and help develop alternative approaches to achieving the CWMP goals and other water quality initiatives.

Mr. Horsely stated the primary focus of this meeting is recommendation #1. Mr. Horsely stated this is a technology that has evolved and can provide benefits to the Town. Mr. Horsely presented the Massachusetts Estuaries Project (MEP) report and then was translated into a total maximum daily load report adopted by the Town. That study suggests or indicates that 85% of the nitrogen issue comes from septic systems. Mr. Horsley stated fertilizers are also an issue. Mr. Horsley asked, "Does it make sense to keep putting standard septic systems in the ground?" The CWMP Ad Hoc Committee believes it does not. Septic systems include Title 5 systems, current regulatory systems, but it also includes cesspools, etc. Mr. Horsley stated their perspective is that the same amount of nitrogen is contributed. A Title 5 septic system includes a septic tank and a leaching field. The concept of a nitrogen reducing system is to put a treatment system between those two features, the septic tank and the leaching field. Mr. Horsley further stated there are a number of technologies that are private companies developing these technologies and that the real focus of the nitrogen removal are wood chips. Wood chips are a carbon source or food for naturally occurring bacteria that do a tremendous job breaking down the nitrogen and transforming it into atmospheric nitrogen. This is a process that occurs naturally, particularly in wetlands. Mr. Horsely stated more recently the DEP suggested we should start referring Innovative and Alternative systems as Nitrogen Reducing systems (NR).

Mr. Horsely stated there is a study in Barnstable, at Schubael's Pond, that was participated not only by the Town, Barnstable Clean Water Coalition, but also the US Geological Survey, US EPA Office of Research and Development, the Nature Conservancy, and others. Research article, "*Reducing wastewater nitrogen loading by >90% with carbon-amended septic systems: A field demonstration in Barnstable (Cape Cod), Massachusetts,*" appeared in the Journal of Environmental Management and was peer reviewed by experts all across the Country. These systems were put in on the west shore of Shubael's Pond, and the average influent nitrogen concentration is about 98 mg/liter; which is a much higher number than what the CWMP Ad Hoc Committee have seen in some of the earlier models. Mr.

Horsely stated there are some assumptions that wastewater of a septic system is around 35 mg/liter, not according to recent data. The average effluent from this study is 7.6mg/liter, for a Nitrogen Reduction of 92%. Mr. Horsely stated these are initially weekly samples and then monthly after some time.

Mr. Horsely presented an image of a NitROE® system being installed near Shubael's Pond, and the same location five days later showing the restoration. The average cost of the upgrades was \$22,000.

Mr. Horsely further presented a map of Barnstable which shows the proposed sewerage area in grey, and in the green color are the areas that are 1,000 feet from the shoreline. He noted there were discussions on where to start the installation of these Nitrogen Reducing systems, with one answer: Watershed. Discussions by the CWMP Ad Hoc Committee include prioritizing areas with the quickest time of travel. Some locations have 50 plus years of groundwater travel time before they get to the bay; 1,000 feet is a 3-year flow time. By starting at 1,000 feet, the Town should see short-term results. There are around 2,000 systems within 1,000 feet that are part of the sewerage plan. A suggestion to the Board of Health would be to not have something like this apply throughout the whole Town. Mr. Horsely noted that it doesn't make sense to put these in areas that we know are going to be on sewer. Parcels in Phase 1 and 2 of the CWMP were specifically excluded from the regulation to avoid conflicts with future sewer installation.

Mr. Horsley continues his presentation with a discussion on a possible regulatory approach. Potential NR septic system installation triggers new construction, additions to existing homes (or ADU), replacement required by system failure, and real estate transfers. These are open for discussion.

Mr. Horsley noted the CWMP Adhoc Committee's work on the Watershed Management Plan for the Town of Wellfleet. The plan is to include some downtown sewerage in Wellfleet, but to use I/A septic systems or NR in the less dense parts of the community. Mr. Horsely asked what is the long term maintenance and operation? This is called the life cycle analysis. When you add up the installation costs and then operation maintenance over 80 years and then do a present value analysis, you end up around \$87,000 per home compared to the sewer cost in Wellfleet of around \$200,000. There is a desire to look at options, and the data shows these technologies are cost-effective at removing nitrogen.

Mr. Horsley noted the cost considerations in his presentation. He estimates the cost of a new Title 5 septic system is \$25,000 - \$30,000. This will occur with new homes, additions, failure, etc. The marginal cost adding NR technology is another \$25,000. There is an \$18,000 tax credit through the state. The net cost may be as low as \$7,000.

Mr. Horsley displayed a map of the Three Bays Watershed. There are parts of the watershed that are 100 years of flow time or more. He reiterates that the 1,000-foot setback makes sense to put these in areas where we might be able to see water quality improvement in a short period of time.

Mr. Horsley summarized the advantages of Nitrogen Reducing (NR) Septic Systems:

1. Time of travel would result in water quality benefits sooner.

2. Provides supplementary nitrogen removal as hedge against uncertainties would provide adaptive management.
3. Could reduce Phase 3 sewerage needs and costs.
4. Marginal cost of adding treatment when upgrading a septic system is approximately \$25,000 (minus tax credit of \$18,000 = \$7,000).

Zee Crocker, Water Quality Advisory Committee Member, was present. Mr. Crocker stated he has been working towards clean water for 10 years, while others on the committee and in the DPW have been working towards it for decades. Mr. Crocker displayed a map of Cape Cod with time to travel areas. He compares Cape Cod to a sick patient, with troubled water. He reiterates that time to travel tends to be shorter the closer to the shore, but different areas may have different timings.

Mr. Crocker displayed an image of the groundwater's role in Cape Cod's freshwater resources. Mr. Crocker stated there was a presentation by the County on groundwater. Mr. Crocker displayed images that help illustrate how the water works in the next slides. Mr. Crocker displayed an image of a cross-section of Cape Cod and stated water moves in a lot of different ways. It is difficult to get one target and say we are going to solve one problem, whether thinking of the sewer system expansion, individual alternative septic systems, or treatments like wetlands. Mr. Crocker described this as a complicated circulatory system.

Mr. Crocker presented images of an outhouse, cesspool, and Title 5 system. He noted that these are the culprits. He noted that nutrient overload is causing the conditions that are being looked at in the estuaries, lakes, ponds, and in our groundwater.

Mr. Crocker noted the NitROE® system is favored by Barnstable Clean Water Coalition, as it appears to be the best performing system out there. Mr. Crocker stated there are about 260 of these systems on Cape Cod and Islands. Mr. Crocker stated we need over 100,000 of these systems to really start to address the problem.

Mr. Crocker discussed possible solutions, including a holistic approach to the problem and the estuaries. Just a few years ago, almost the entire southern part of Cape Cod was designated as being a nitrogen-sensitive area. This has been known for decades and Mr. Crocker stated a generational change is needed.

Mr. Crocker stated he views sewer as critical, but expensive, and a prolonged timeline. He compared this to a transfusion. The CWMP Ad Hoc Committee are concerned about the money. Sewer is very expensive and an important part of the solution.

Mr. Crocker stated non-traditional solutions are critical to look at whether it is the nitrogen reducing systems or whether it's wetlands. Limitations of cost, performance, and system management are all topics that need to be discussed. Mr. Crocker stated sewer can't go everywhere and targeted solutions are needed.

Mr. Crocker presented a simplified view of how groundwater works. The size and thickness of the red arrows shows the relative nitrogen load going in or going out of a particular area.

Mr. Crocker presented a map of Cotuit Bay and a snapshot of the data. Mr. Crocker stated they do not claim that the numbers are exactly on target. He stated that he received question from the public, who are only there seasonally, on why do they care. Mr. Crocker stated to look at the water usage and that the bar chart shows that 70% plus of the water usage on Cape Cod occurs between May and September. In his view, targeting areas close to the water should be done as quickly as possible. Mr. Crocker stated quality of life is important and when it comes to quality of life of the estuaries or the lakes and ponds, it makes sense to do targeted approaches while bringing in the potential calvary of sewer expansion.

Mr. Crocker presented a US Geological Survey map which shows the area of the Marstons Mills River. He stated this is where the cranberry bogs are and that the US Geological Survey says this is the best target for alternative treatment on Cape Cod. Mr. Crocker stated we need better modeling to be able to understand how to deal with this very complicated problem.

Mr. Crocker summarized his presentation by noting that time is of the essence: a numbers game. He stated there needs to be regulations to effectively solve the problem. Mr. Crocker stated we need funding to “subsidize to equalize.” He stated that Scott Horsley mentioned the Aquifund has financing. Mr. Crocker stated the Town can do more in the future to figure out how to help, whether it’s grants, debt, and/or SRF funding. Incentives, ADU’s, and/or adding a bedroom were further discussed in this slide in regard to reducing nitrogen effluent. Mr. Crocker concluded his presentation and welcomed questions from the Board of Health.

### **3. Board of Health – Questions and Discussion**

Tom Lee stated the reason for this workshop is due to the complex issues and that it is affecting the citizens in so many ways, in terms of cost and planning. Tom Lee stated the Board of Health and CWMP Ad Hoc Committee want to communicate with citizens on what is the best way to move forward and to understand the impact this will have on citizens financially.

Tom Lee stated that a Title 5 system does not remove total nitrogen. At the outlet of a septic tank, wastewater discharges approximately 35 to 40mg/liter of total nitrogen. Tom Lee stated an I/A system, under the DEP, is around 19mg/liter. If you are reducing from 35mg/liter to 19mg/liter, the nitrogen removing system is down to 11mg/liter or less than 10mg/liter. Tom Lee noted hopefully it will be less than 10mg/liter. It is closer to the groundwater discharge permit for a wastewater treatment system. Tom Lee shared his opinion, as an Engineer, that I/A systems and Nitrogen Removal systems are two different levels in terms of terminology wise. Tom Lee stated he is open minded in terms on how to improve the environment.

Dr. Waller asked, “What should be done about cesspools?”

Mr. Crocker stated cesspools does not do much and are not tremendously different from a nitrogen reduction standpoint. Mr. Crocker stated a Title 5 system is an improvement. Mr. Crocker stated Title 5 systems are a much better design for pathogens which is what Title 5 systems are meant to target.

Scott Horsley stated he does not know how many cesspools the Town currently have, but presumably will need to be upgraded to a Title 5 system. Mr. Horsley stated there is an opportunity to get into this technology when those upgrades are made because Engineering does not cost more when putting one of these in. The marginal cost is something worth thinking about. Mr. Horsely stated if there is a goal to upgrade cesspools to Title 5, he suggested to take the extra step.

Tom Lee stated we do not have single cesspool units and usually would have two, as an overflow, to offset the problems, but that is not the solution. Tom Lee stated currently have seen parcels that have to be connected to Town sewer, and then return and request to do an emergency repair for a couple of years. Tom Lee stated this is not a long term solution for cesspools and will need to have other solutions in terms of Title 5 and location of the parcel versus inside the watershed. Tom Lee noted this is a case by case basis to make the final determinations.

Thomas McKean stated single cesspools have not been allowed and are not legal in the Town of Barnstable during the past 40 to 50 years. Mr. McKean stated single cesspools automatically fail and must be upgraded.

Dr. Beer stated the CWMP Ad Hoc Committee mentioned there are 260 nitrogen reduction systems on the Cape and that we need to get to 100,000. Dr. Beer asked, "What is the projected impact of 100,000? What does that 100,000 represent in terms of impact?" Dr. Beer further asked, "Part of this is the supply. If we could get there in five years with 20,000 per year, is there a sufficient supply of these systems?"

Mr. Crocker stated he was using a number to look at the entire peninsula, not the Town of Barnstable. Mr. Crocker stated there are about 170,000 parcels that are connected to sewer or something in the peninsula. There are 10-15,000 parcels that are actually connected to sewer. Mr. Crocker stated what do we we have to address to solve this problem on a holistic basis and that there are conflicting areas the Water Quality Advisory Committee are dealing with. One of the conflicted areas of the committee is solving the mandate from MassDEP but also addressing water quality needs, such as ponds and lakes.

Mr. Crocker displayed a slide of the sewer plan and stated the north side area does not have estuary problems. There is a substantial number of people on the south side and part of this side is tidal. Tides on the north side are 10 to 12 feet. On the south side they are 2 to 3 feet, so we don't have flushing. Mr. Crocker stated looking at the north side, there is a big problem which is a lot of people are not on Town sewer at all or not connected to Town water at all. Mr. Crocker stated if you have to put your cesspool or Title 5 system close to where your taking your drinking water from, that is a problem. Mr. Crocker stated we need a new tool because Title 5 is not doing the job here. He noted their hope, collectively, is to gain experience in the estuaries, where they know they have a close target that is getting "sick" at a rapid pace.

Dr. Beer stated she knew Barnstable regulations were discussed and how we can create triggers with real estate transfers, instead of other ways, which she believes there's work to do. Dr. Beer asked, "Where do we start to see some of the impact?" Dr. Beer stated it is helpful to know that focus is really the estuaries and that is where we are going to see some of the trends and probably learn from them.

Mr. Horsely stated the nearshore time of travel is the best way to start seeing results because, as Mr. Crocker mentioned, some of the more distant areas to the shore are 10-20 years away in terms of time of travel in the groundwater. Mr. Horsely stated the DPW is monitoring water quality in the base to see if changing at all and there has been no change seen yet in part because we are just starting to do the sewer system.

Mr. Crocker stated in Long Island, NY, while there is only a few hundred of this particular kind of system, they now put in several thousand systems (2-3,000 a year).

Dr. Canniff asked what the figure was between a Title 5 system and an I/A system, if \$25,000?

Mr. Horsely stated these are approximate costs and vary by site because some sites are more difficult than others, but the numbers seen are \$25-\$30,000 for a reasonable Title5 system, without getting into issues; roughly another \$25,000 to add the nitrogen treatment.

Dr. Canniff asked, “500 foot setback or 1,000 foot setback?”

Mr. Horsely stated DPW and GIS looked at a number of different setbacks just to look at how many systems would be part of the program. The numbers we have here is 1,000 feet. Mr. Horsely stated this was selected for discussion because of the three year travel time, a 500 foot setback might be more like a one and a half year travel time. Mr. Horsely stated that distance is up for debate and discussion. Mr. Horsely noted, “closer is better.”

Dr. Canniff asked, “What about the difference between the cost of sewerage and doing I/A systems?”

Dr. Canniff further asked, “If you go 1,000 feet past these tributaries to do the I/A systems, what would be the difference in sewerage some of these areas?”

Mr. Horsley stated it is tricky to get to those numbers, and would defer to Rob Stein or Dan Santos, in DPW Division. Mr. Horsley stated the further you go out, the longer the trip and the expense. Mr. Horsley stated that calculations are difficult and that he wouldn't want to give a number because that range is probably quite wide.

Dr. Canniff asked if the CWMP Ad Hoc Committee ever discussed the fact that these people that are going to have to do I/A systems are also paying for the rest of the Town to go on sewer, and is there a way this could be handled.

Mr. Horsely stated Mark Milne, Director of Finance, discussed with the committee different financing of cost sharing and that is if the Town was going to proceed along this direction. Mr. Horsley stated to make the cost share analogous to sewer, with some of the project paid for by the Town and some paid for by the property owner. In Mr. Horsley's view it should be as equal as possible and that everybody benefits from clean water.

Dr. Canniff asked if the DEP approved the plan for sewerage.

Mr. Horsely answered, “Yes.”

Dr. Canniff asked, “So. the DEP is okay with these other places having septic systems?”

Mr. Horsley stated the Town has an approved plan. What the CWMP Ad Hoc Committee is doing right now is looking at the five year update. Mr. Horsley stated all these plans, the watershed plan permit, has an adaptive management, meaning the Town can come back, generally on a five year basis, and look if any alternatives. The short answer is, “Yes.” In other communities this is part of the program, called a hybrid approach. Mr. Horsley stated these systems are approved at various levels by the State already. Mr. Horsley stated the DEP will approve this as part of a watershed plan.

Dr. Canniff stated you will have the problem of the people that need to do the I/A systems who are going to have to pay the extra money.

Mr. Horsley clarified the CWMP Ad Hoc Committee’s suggestion and discussion is to think about the cost share first. Mr. Horsley stated this should not all go on the homeowner; maybe it does initially, but overtime it certainly can be something that is cautious.

Dr. Canniff stated, “I agree with you 100%”

Dr. Luczkow asked “Where have we seen these systems implemented?” Dr. Luczkow further asked if we have seen definitive proof of a significant change in the water quality.

Mr. Crocker stated it is early to say there is a significant change.

Dr. Luczkow clarified he was looking for data from anywhere in the United States.

Mr. Crocker stated these are new systems that haven’t been anywhere in the United States. He stated he receives calls frequently from people all over the United States who want to see this. Mr. Crocker presented a graphic on the slideshow. He stated that you are going to see what the results are from the homes which have now been monitored weekly, by the US EPA, for about four to five years.

Mr. Crocker stated that even with sewer, they have not seen results in the estuaries, to his knowledge. The best results that Mr. Crocker shared is the Massachusetts Water Resources Authority (MWRA) in Boston Harbor and the Charles River, where it’s taken a generation.

Dr. Luczkow asked if this was in reference to sewer.

Mr. Crocker confirmed, “That was sewer, 100%, and also wildly costly.”

Dr. Luczkow asked, “What about dredging? Is that not an option to improve the flow of water in the estuaries?”

Mr. Horsley stated dredging was evaluated as part of the Three Bays Massachusetts Estuaries Project (MEP), and there have been dredging that occurred in the Three Bays. Mr. Horsley noted there is a very

minimal effect because of the location. Mr. Horsely stated the other dredging project is Mill Pond. This has been discussed and the Town continues to pursue this.

Mr. Horsley returned to previous question from Dr. Luczkow about seeing results in the receiving watershed. As mentioned, these technologies haven't been around long enough, and there haven't been enough of them put in the ground to see a result in the receiving waters. Mr. Horsley stated the issue at Shubael's Pond is that the groundwater is flowing a different way than it was originally mapped. The original map showed the water going from that area into the pond and then once the study with the USGC was done, the water was found going in a different direction. The purpose of that project was to demonstrate the effectiveness of the treatment, and that is the data presented on the slide.

Dr. Luczkow asked, "Have they done any controlled scientific experiments? Dr. Luczkow described an environmental laboratory experiment.

Mr. Crocker stated that this is what the Massachusetts Alternative Septic System Test Center (MASSTC) is doing. He stated Shubael's Pond is meant to duplicate this in a real world environment. Mr. Crocker stated how difficult it was to measure groundwater. He noted that groundwater doesn't move like a river. Mr. Crocker stated putting in these I/A systems is not worse than a Title 5 system and is not worse than a cesspool.

Dr. Luczkow stated in medicine, it is not easy to make a connection between making a change upstream and getting a clinical result downstream. In Dr. Luczkow's example, you get a cholesterol drug approved because it is going to lead to a decrease in heart attacks, but what they are measuring is that you use the cholesterol drug, it leads to a decrease in cholesterol levels, but that doesn't necessarily lead to a decrease to heart attacks in patients. Dr. Luczkow stated that all treatments are measured by risk and benefit. The risk here is the known cost to all homeowners. Dr. Luczkow stated we don't know the benefit yet. The risk is immediate known cost. That is a bit of a difficulty. Dr. Luczkow further discussed this is an environmental issue. The major cause of illness in patients is financial stress. It is a bit challenging. We want to have the clean water, there is a huge cost associated with it, and we don't know for sure how great of an impact we are going to get. There is a lot of unknowns.

Mr. Crocker stated he doesn't disagree. Mr. Crocker noted he felt the same way about Town sewer.

Tom Lee stated for the coastal waters, nitrogen is the critical nutrient we want to remove. When it comes to the freshwater ponds, it is phosphorus. There are two different parameters that we have to deal with it. There is no single I/A system or enhanced nitrogen systems that can't remove both nutrients. Tom Lee noted that Dr. Waller has an I/A (Fuji) system that can remove some of the phosphorus in the system, but we don't know what is the true performance of the removal of phosphorus.

#### 4. Public Comment

Larry Morin, resident of Cotuit, was present. Mr. Morin stated this was a very loaded panel with a lot of great questions. Mr. Morin stated based upon Tom Lee's questions, he began listening and asking himself, "Who are the people that really want to know about this?" First were Scientists. Mr. Morin stated Scientists have to come up with information and give the data. Second, were Engineers, and third

was the public. Mr. Morin stated public focus is on the shoreline and that the shoreline has a time urgency. Mr. Morin was present today for a gentleman that lives on Wianno Avenue in Osterville, MA. He expressed again the urgency of the public. Mr. Morin stated two or three of the Doctors on the Board of Health had already brought up that information and believes that's a matter that needs to be evaluated, needs to be based upon numbers, and needs to be ways of persuading and comforting the public. Mr. Morin stated we are dealing with a battle between Title 5 and I/A's, however, there is no data that he is aware of that has been announced. Mr. Morin asked, "How many different I/A installations have been installed in the last 15 years and are they working?" Mr. Morin further asked, "Is there any battle between different companies that put them in what are their strengths and weaknesses?" Mr. Morin stated this should be documented right away with statistics and to get this information out to the public right away. Mr. Morin stated the mappresented by Scott Horsely was interesting because we are dealing with "green and pink." Mr. Morin stated what is in "pink" was somehow never developed, and unsure whether that is going to happen or not, but Mr. Moore further noted the concept of the "green" properties need to be identified. Mr. Morin anticipated new maps that were going to have the streets on it and understands this was something that DPW Division is going to put together. Mr. Morin stated it is important to identify who are the people that actually determine these different criteria. Mr. Morin stated it has been done by the CWMP Ad Hoc Committee. Mr. Morin asked what are the options that can be done. An example provided was if a septic system is working, what if the owner just needs a minor fix and would that be acceptable. Will it buy the owner another five years? Mr. Morin stated these are options that will need to be documented and built into plan. Mr. Morin stated Dr. Luczkow nailed it regarding cost of systems. Mr. Morin asked, "Are there any recent regulations that are going to be done?" Mr. Morin recommended draft regulations to not be internal and to find people outside the area that are knowledgeable. He noted properties closest to the water is logical and further discussed that the problem is where the selections are being made to put these projects in.

Mr. Horsley responded to the question of tracking data on I/A systems and invited Brian Baumgaertel, Director of the Barnstable County Wastewater Division and Manager of the Massachusetts Alternative Septic System Test Center (MASSTC), to explain what tracking data exists.

Mr. Baumgaertel noted there is existing statistical data on the performance of existing onsite septic systems. Barnstable County has collected this data for about 20 years and is the largest database of this type of data anywhere in the Country. Anyone can access this data by visiting [septic.barnstablecountyhealth.org](http://septic.barnstablecountyhealth.org).

Town Councilor, Gordon Starr, asked Mr. Baumgaertel how the Massachusetts Department of Environmental Protection (MassDEP) certifies certain technologies and how long it takes.

Brian Baumgaertel responded that there are systems that perform in 19mg/L, and these are the historic technologies that were never made for nitrogen removal. Mr. Baumgaertel further stated with some tweaks, you can get decent nitrogen removal, however, is not good enough for our bays and estuaries, and that is where these newer technologies come in, NitROE® and NitRex® systems. Other companies are coming along in the industry. Mr. Baumgaertel stated it is a long process of getting approval in the state of Massachusetts, possibly the most restrictive from a regulatory standpoint. From start to finish it can take at least five years. Due to the fact that these can't all be installed on day one, that process may take more like seven to ten years, depending on how successful the vendor is. The NitRex® technology

has been around for 20 years and has not had much success in moving through the approval process. The new NitROE® technology has been able to move through quickly. Mr. Baumgaertel further discussed the investments involved with these companies.

Councilor Starr noted that these I/A systems are proprietary and needed to be brought from particular companies.

Mr. Baumgaertel stated any Engineer can do this and need the training on how to design the system. This is where the technology vendors come in.

Tom Lee adds that under the provisional use, you need 50 units installed for at least three years, which adds to the timeline.

Councilor Starr asked if a system was installed out of state, if the data could be used for Massachusetts approval.

Mr. Baumgaertel stated the State says that they will accept out of state data and it has to be climatically similar as they are biological processes.

Brian Hughes, Vice Chair of the CWMP Adhoc Committee, addressed the question on cost. Mr. Hughes stated there is an engineering or operations research technique known as Mini-Max, which in this case is to minimize your maximum loss. If we do not do the nitrogen removal, this leads to the degradation of the marine environment and the ecosystem, which leads to decreased marine usage and tourism. These are both major industries on Cape Cod and are substantial costs. With nitrogen removal, if it fails, you get \$7,000 per property, given the Massachusetts tax credit. You need the figures for the expected tourism and marine industry loss, which he estimates is going to be substantial.

Tom Lee asked if Mr. Hughes can share these figures with the Board of Health.

Brian Hughes responded that he does not have the tourism and marine figures, but it was discussed at a previous CWMP Ad Hoc Committee meeting.

Jane Ward, a resident of Centerville, was present. Ms. Ward discussed several items and considerations to be added to agendas going forward, including the public health impact of our water system and plumbing system, the water use impact of the plumbing system, and the energy/water nexus of the plumbing systems. Ms. Ward stated she is a Physician as well and makes an analogy of a patient bleeding in the Emergency Room, highlighting health, economic impacts of rentals, and harmful algal blooms, including pets that have died. Ms. Ward described MASSTC's vaccum toilets and Phoenix composting units as low-flow, plume-reducing systems that vaccum waste into vented composting containers started with wood chips. These systems reduce exposure and water use and Ms. Ward stated she believes it is cheaper than the best I/A septic system and cheaper than sewer. Ms. Ward stated to consider a hybrid system. Ms. Ward has had an I/A system at her property for three years now, and most of the phosphorus measurements, which came in at 35mg/liter, are less than one or undetectable over three years. Ms. Ward stated this requires maintenance, for example, replacing iron plates. The company that made the I/A system at her property is a Japanense manufacturer and have been in business for over

60 years. Ms. Ward noted their particular phosphorus removing system has been used in Japan and in Australia for over 20 years. Ms. Ward emphasized that we need to be thinking about water conservation, public health, and urgency.

Cliff Carol, resident of Barnstable, was present. Mr. Carol expressed his understanding of the effects with nitrogen loading. Mr. Carol stated his concern was water, which included drinking water, well water, and capacity of water. Mr. Carol stated on one hand we are in a stage two drought and on the other hand thousands of units at apartment buildings are being approved. The Barnstable Water Company recently sent a letter about hitting their federally allowed pumping capacity. Mr. Carol thanked Board of Health Chairman, Tom Lee, for noting that these denitrification systems do not pick up phosphate. To Mr. Carol's understanding, these systems don't take care of PFAS either, which Mr. Carol stated is another major issue. Mr. Carol stated the recommendation as written is very broad and also very expensive. Mr. Carol stated the Town of Wellfleet created I/A guidelines that were later rescinded and the reason was to minimize unnecessary burdens on property owners of the community, including potential impacts on year round housing. Mr. Carol further discussed that the Select Board asked the Board of Health to pause those rules, citing the unsustainable burden placed on residents by the upgrade requirements, one of which was a best available nitrogen clause. Mr. Carol stated there is a significant difference in pricing and a question he has for the Board of Health and CWMP Ad Hoc Committee are the economic effects of the recommendation. Mr. Carol reads a portion of the recommendation related to Phase 1 and Phase 2 of the Comprehensive Wastewater. Mr. Carol used an example of 1,000 homes at \$50,000 cost per system, which is \$50 million total. He noted a Barnstable County luxury tax on higher value sales and that this would affect the real estate market and economy. Mr. Carol asked how many houses would be included and if there is a list of all the people that will be affected. Mr. Carol asked if this includes every single property that is not within Phase I or Phase 2 of the CWMP. Mr. Carol further discussed his concerns about PFAS in wells and that sewer is beginning to pump PFAS back into the watershed. Mr. Carol remarks that Zee Crocker stated we are putting in systems that are guaranteed to pollute. Mr. Carol suggested a mandate on pumping septic systems every 2-3 years and penalties for noncompliance. Mr. Carol asked what effect would that have on the denitrification. He asked about people that need to install treatment systems to protect them against other chemicals that these systems do not remove. He further discussed an example within the Town of Falmouth. Mr. Carol noted the Town of Falmouth is 95% through permitting a 2,000-foot outfall pipe in Nantucket Sound, upgradient of the bays. Mr. Carol further discussed several transformer substations for the wind farms being installed near well fields, which are near sources of drinking water. Mr. Carol noted the marginal cost for the retired public and noted the Aquifund having an interest rate of 14% on their brochure.

Members of Committee noted the presented 14% interest rate was incorrect.

Mr. Carol completed his statement and noted that water, in addition to nitrate, needed to be addressed.

John Julius, a resident, was present. Mr. Julius noted he is a frequent speaker at Town Council because he cares about the Town. Mr. Julius stated he had a career in real estate and was previously a builder for 24 ½ years. In his real estate career and building profession, he sold over 6,000 homes in the last 41 years. Mr. Julius noted that he cared about the environment. Mr. Julius noted a lawsuit that the Conservation Law Foundation has had in place since 2021 and noted that we have the issue of septic

and also an issue of the sewer treatment plant, which Mr. Julius stated was built in Year 1935. Mr. Julius stated one of the provisions in the lawsuit that the Conservation Law Foundation, in which the Town of Barnstable, the sewer treatment plant pours 1.46 million gallons of effluent into the sand beds everyday and goes out to Lewis Bay. Mr. Julius stated no one talks about the town sewer, which is not the answer. Mr. Julius asked the Board of Health and the CWMP Ad Hoc Committee if anyone seen the Town's own comprehensive water plan. Mr. Julius stated the Town faces a 1.98 million gallon water shortage per day. Mr. Julius noted the Town is continuing to build housing units that are not needed and noted there is no housing crisis on Cape Cod. Mr. Julius further discussed there are two problems, which is the Town sewer, and the Town of Barnstable mandating a lot of residents to tie into the Town sewer. Mr. Julius noted the Hyannis Golf Course, owned by the Town of Barnstable, and to his knowledge, not tied into Town sewer. Mr. Julius also noted that the Cape Cod Community College, for the last 50 years, had cesspools. Mr. Julius noted that all that water ran into Brickyard Creek, and further stated the Town wonders why there is no shellfish and why there is contamination all over. Mr. Julius noted Burger King as another example of a location that is not tied to Town sewer. Mr. Julius noted a double standard, requiring residents to connect to sewer, but not the Town's own units. Mr. Julius noted the homes that are for sale on Cape Cod and the costs of homes. Mr. Julius further discussed his familiarity with NitRex® systems and the owner of this technology. The speaker urges the Board of Health to have mandated Title 5 septic inspections, and compared it to having motor vehicle inspections that are done once a year. Mr. Julius noted that now there is a mandate on very expensive systems and that this is not only unfair, but will "cream" people economically. Mr. Julius stated he was present to try to figure out a better and more inexpensive way for homeowners.

Scott Horsely stated that pumping and inspecting systems does not help with the nitrogen issue. Mr. Horsely stated we are all for trying to find the least expensive way to do this and will keep looking at that.

Ken Barron, resident, was present. Mr. Barron expressed confusion on the costs. Mr. Barron discussed what was presented on the screen, that there is a \$25,000 approximate cost with the credit of \$18,000, which brings it down to a \$7,000 cost. Mr. Barron stated he heard figures that were much higher and requested clarification. Mr. Barron added that conversations have been about the nitrogen removal system, but Title 5 is added back in to these conversations. Mr. Barron stated this should have been thought about decades ago, and in no way referring to anyone on the Board or in the Engineering Committee. Mr. Barron stated the over building is going to create a huge problem. Mr. Barron asked if someone puts in a nitrogen removal system, would there be a point further down the road where the system is not good enough and would need to have it replaced. Mr. Barron stated we need to find a final solution.

Sam Wilson, resident of Hyannis, was present. Mr. Wilson had a question regarding current Title 5 exemptions, including a family transfer or inheritance of property, and if that would still be in effect or exempt from having to do a transfer of property. Mr. Wilson stated it is unclear in the rules as currently written. Mr. Wilson noted if someone is visiting Cape Cod seasonally, how long do these systems take to kick into effect and work again and is there a period of time when water flows through that system without the full treatment.

Scott Horsely stated the answer regarding property transfer is completely up to the Town. Mr. Horsely stated the Town can decide whether they want to provide that same exemption on the rule. There is no state law that would mandate it. Mr. Horsley stated Brian Baumgaertel's group has done a study on the seasonal use. Also, some of the vendors have been looking at the NitROE® system; there are ways to get the system going in the spring, if it is a known seasonal use. If unknown, the annual loading is not significantly different.

Tom Lee stated with the title transfer, you would still need to do the Title 5 septic inspection.

Thomas McKean stated that Title 5 does allow for some exemptions from title transfer septic system inspections, for example for transfers among family members.

Mark Nelson, resident of West Barnstable, was present. He stated making the suggestion for nitrogen treatment in areas very close to the estuaries is an opportunity for good success and it's proposing this in areas that aren't part of the current sewer plan. Mr. Nelson noted that there are properties that have nitrogen going into the ground that have the most immediate effect on our coastal estuaries. Mr. Nelson noted the graph shown on the slideshow has been helpful to look at numbers and averages, and that the median numbers are below 10mg/liter for one technology. Mr. Nelson stated if there is an opportunity for companies to see that this is happening in a community, it is only going to grow. Mr. Nelson noted he is in support of this I/A technology, and believes it is a direct benefit in removing the nitrogen because it's a mass balance effect. He further stated that the health of an estuary is based on how much the tide circulates through it, but also what is the load of nitrogen that is coming in. Mr. Nelson stated as we learn more about it, it can reduce the scale of the sewerage and overall make the costs for the Town a little more cost effective overall. Mr. Nelson noted that the \$18,000 tax credit has to be granted over a three year period, so you have to make enough money to be paying the State of Massachusetts \$6,000 in taxes every year. Mr. Nelson further noted to make it more community-funded for those who cannot get the tax credit.

Heather Hunt, resident of Osterville, was present. Ms. Hunt noted she would be willing to spend money on the alternative system to help the community and the future of the Cape. Ms. Hunt noted her appreciation of the comments on affordability and means to help people who might not be in her situation to afford it, or to mitigate those costs over time. Ms. Hunt shared her immediate thought when it comes to the proposal. Ms. Hunt noted, in her experience, that the Town of Barnstable consistently ignored the occupancy code. Ms. Hunt noted she has had the experience of living near Air BnB's and presently have two proximate to her. Ms. Hunt has seen large parties stay at these locations for a week and is concerned about the environmental impact of that. Ms. Hunt stated the Town should enforce the occupancy code that is directly tied to the septic limits. Ms. Hunt noted that a child of a friend inquired about occupancy limits in reference to a fraternity visiting and was told by the Board of Health that they don't do occupancy. Ms. Hunt suggested to require septic system testing for short-term rental registrants and advertising occupancy limits. Ms. Hunt further suggested to require a commercial operator, that violates our occupancy code, to install one of these systems immediately. Ms. Hunt noted that speakers referenced overdevelopment here on Cape Cod, particularly in Barnstable. Ms. Hunt noted concerns that the public's place to express displeasure with these overdevelopments are going to be in the 2 ½ override, which isn't in the long term interest of anyone, but could manifest in that vote. Ms. Hunt

encouraged the Town to provide assurance to people across the Town that will have to vote on this. Ms. Hunt provided copies of her comments to Board of Health and CWMP Adhoc Committee.

Mark Robinson, resident of Cotuit, was present. Mr. Robinson apologized to the Town. Mr. Robinson served for seven years on the Conservation Commission, including as chair in the 1980's, which was the height of the development boom. Mr. Robinson noted various departments failed the Town by not recognizing the cumulative impact of the overdevelopment of the Town of Barnstable during that particular era. Mr. Robinson stated if he had known, as the Chair of the Conservation Commission, that the approval of a septic system in proximity to these salt water bodies were going to degrade the waters, he would have persuaded the Conservation Commission to deny every house permit that came before us. Mr. Robinson stated he did not know. Mr. Robinson stated to not compound the failure of our earlier lifetime by doing the same thing over again. Mr. Robinson stated that nitrogen is the issue in the salt water. Mr. Robinson stated the I/A systems within 1,000 feet of salt water is one specific small step we can take. Mr. Robinson stated he serves as a Water Commissioner in Cotuit and understands the groundwater issues, but the salt water pollution issue is what we are here tonight to deal with. There are a lot of legacy nitrogen in the ground in this Town. Mr. Robinson further discussed a 11.5 million dollar property sale in Cotuit. Real estate transfer times are the times to get at these issues. The waterfront home owner is directly benefitting by an increase in the quality of the water that their grandkids are using on their beach.

Nancy Trafton, resident, was present. Ms. Trafton printed a copy of the Mass DEP nitrogen sensitive areas map and noted that we are looking at the south side of the Town. Ms. Trafton says the map identifies the north side, Barnstable and West Barnstable villages, as areas that could potentially be designated as nitrogen sensitive areas in the future. Ms. Trafton stated she assumed that it would be the Mass DEP that would make that determination. In the event that they did, and in the event that this regulation passes, Ms. Trafton noted that it would pull West Barnstable into the mix. Ms. Trafton noted she was not clear on how to define "waterbodies." Ms. Trafton stated she is the owner of two septic systems and two dwellings and that this could mean a significant amount of money in the event that this was passed. Ms. Trafton understood that there are caps on sewer connection costs to owners and that the other percentage is covered by tax payers overall in the Town of Barnstable. Ms. Trafton noted if a mechanism is going to be developed to put something in place to help pay for the installation of these upgraded septic systems within places like West Barnstable because it seems equitable. Ms. Trafton stated she was worried about fertilizer. Ms. Trafton stated she does not know if these fertilizer regulations are being enforced. Ms. Trafton noted if there has been any consideration to banning the use of fertilizer for anything other than farming.

Tom Lee clarified that West Barnstable is not part of the nitrogen sensitive area, as determined by the DEP, therefore at this time there are no plans for Town sewer, upgrading to Title 5 or any I/A septic system.

Ms. Trafton asked if the status of nitrogen sensitive areas were to change, if that would pull West Barnstable into the fold.

Tom Lee stated this is a draft language and that there are more steps to define the details.

Ms. Trafton stated she wanted to bring this to the Board of Health and the CWMP Ad Hoc Committee's attention.

Tom Lee stated, "I agree. Thank you."

Brian Baumgaertel provided comments on the interest rates through the Cape Cod Aquifund program. He stated the interest rate that was quoted earlier in the meeting was incorrect. He stated projects that are within the watershed areas, where the Town deems that there's a nitrogen problem, the program offers a 0 to 4% interest rate for those loans. 14% is the default rate, and that's set by Massachusetts statute because it is a betterment loan. Mr. Baumgaertel asks, "How do you get a 0% loan?" If you fall between below 120% of the area median income, and you are within one of these watershed areas, you get a 0% loan. If you are between 120 and 180% of AMI, you get a 2% loan. If above 180% AMI, you get a 4% loan.

Thomas McKean stated for the record, a map was just handed to Nancy Trafton of the proposed areas to be regulated in this regard. Mr. McKean stated however, that it is very important that we get this map updated to show the road names. The DPW and GIS are currently working on this.

Ken Barron, resident, noted if the figures discussed earlier for the new nitrogen removal system seems to be a lot cheaper per homeowner than a proposed \$20,000 sewer hook up, which over a 30 year period is going to cost tens of billions of dollars. Mr. Barron asked why the Town wouldn't skip the sewer project and go directly home by home and say it is going to cost the owner \$10,000 to upgrade to new I/A system.

Scott Horsely stated we need the sewer as planned in part because of density and that the I/A systems alone will not solve the problem. Mr. Horsley stated if the Town started investing in this technology, that it may become apparent that parts of Phase 3, as Mr. Barron suggested, might be more cost effective.

Councillor Starr noted that the 30 year sewer plan is based on the fact that these different watersheds are the sewers taking 100% of the nitrogen out of each watershed. Mr. Starr noted if we start moving to nitrogen removal systems within the plan, the CWMP will have to be adjusted. The sewer system will take all of that nitrogen to Hyannis and treat it down to 3mg/L.

*There was a response from the public in the hearing room, however, comment could not be heard.*

Brian Hughes noted that a single sewage treatment plant is a good place to concentrate both nitrogen removal and phosphorous removal, and then PFAS removal. These are systems that we would not want to pay for individually.

In regard to the cost of an I/A system, Tom Lee stated there is also the cost of the standard Title 5 septic system at each site in the amount of approximately \$25,000 to \$30,000. Mr. Lee stated that when adding an I/A component, there is an additional estimated cost of \$25,000. Tom Lee noted that Mr. Horsley mentioned an \$18,000 tax credit during his presentation, which each citizen will be required to pay up-front. The tax credit is received in portions over the course of four years as part of the income tax

filing process. There is a difference of \$7,000 (\$25,000 minus \$18,000) which the citizen will not receive back in this regard. Also, for consideration, there may not be insufficient space available at parcels to install I/A systems. Therefore, there would have to be site-by-site determinations at each parcel when determining estimated costs.

Ken Barron asked if owner could bypass a Title 5 system and go directly to the brand new nitrogen removal system.

Scott responds that it's not a bypass, but a connection. Mr. Horsley noted that this has happened in Shubael's Pond. Each property had an existing septic system that the nitrogen reducing system was added to it.

Ken Barron as if needed to add to it or can add the nitrogen reducing system separately.

Tom Lee and Scott Horsley confirmed, "Add to it."

Ken Barron asked if a Title 5 system failed at some point in time, if have to replace that as well to go into the nitrogen removal system.

Scott Horsley stated another advantage of these systems other than nitrogen is the solids removal are much lower. The reason why most leaching fields fail over time are due to solids clogging. This should significantly increase the lifespan of a leaching field because there's almost no solids going to it. Mr. Horsley stated that one of the costs of Title 5 systems is eventually replacing the leaching field.

Zee Crocker noted in the case of the Shubael's Pond example, 60% of the homes were able to reuse the septic tank. In some cases, the leaching field was able to be re-used. It's difficult to have a one-price-fits-all number as each home is different.

Tom Lee added that each system is different also.

Thomas McKean noted a slide was presented which analyzed the costs of providing public sewer versus I/A systems over an eighty-year period. Mr. McKean asked if the costs included replacement of any ageing or failed I/A component parts and woodchips. Scott Horsley then invited Russ Gleacamp to provide information on this as he has done more detailed analysis on this. Russ Gleacamp, resident of Centerville, was present. When the 80-year lifecycle cost for NitROE® and NitRex® were reviewed, the replacement of woodchips, limestone, aeration tubing, periodic septic tank pump out, and air pump replacement were looked at. The costs were slightly different between NitROE® and NitRex®, but did include wood chip and limestone replacement.

Tom Lee asked Mr. Gleacamp if data could be shared. Mr. Gleacamp stated for the first 23 years of his career he worked on municipal sewer design. One of the main questions in Wellfleet was whether the

nitrogen reducing systems are a cost-effective approach for dealing with wastewater. Much of the Town's concern came from costs and residents that were already in the established sewer area. There were discussions about allowing an I/A system to be installed and, so long as it reaches an acceptable output, it can continue to be used until it fails, at which point you need to connect to sewer system. In Wellfleet, a comparison was done between an alternative that included a small sewer system and a large component of nitrogen reducing systems, to a full sewer layout. Planning numbers provided by MassDEP were used, indicating a 26.25 mg/L nitrogen concentration coming out of the septic tank. This was then treated down to 10 mg/L, which is the provisional approval status. The actual data showed an influent of an average of 103 mg/L of nitrogen. Wellfleet is different from Barnstable. In Wellfleet, per capita construction costs based on a full-sewer alternative with 1,972 parcels was approximately \$111,000. Wellfleet looked at NitROE® and NitRex® systems. NitROE® was estimated at \$53,000 per capita and NitRex® was estimated at \$73,000. This was an average estimated planning number meaning every site is different. They then factored in operations & maintenance (O&M) costs. Septic tanks last longer if you maintain them, similar to car maintenance. Over the span of 80 years, both systems averaged around \$80,000. The O&M costs for full sewer option were approximately \$179,000 for an 80 year net present value. It starts to make the case for a cost-effective solution for nitrogen. There are still questions that arise about PFAS, phosphorus, contaminants of emerging concern, and pharmaceuticals. The conversation tonight focused on waterfront parcels, which are the main nitrogen concerns. The closer to water, the more spread-out homes become. The more spread out, the less cost-effective it is to sewer. With regards to PFAS, pharmaceuticals, contaminants of emerging concern, what is the cost of doing nothing. In a primarily tourism-based economy, there is a concern about what happens if tourists choose to go elsewhere. The cost of infrastructure can be overwhelming. The question needs to be asked if it is cost-comparative and how do we make it fair and equitable. After some discussion, Mr. Gleacamp noted nitrogen removal systems showed very good numbers supporting the nitrogen removal as a cost effective solution.

There was no further public comment.

Councilor Starr inquired if the staff from the Department of Public Works (DPW) would like to add anything to clarify or catch anything that was missed. Dan Santos, Director, Department of Public Works, responds that there is nothing the DPW would like to add.

Scott Horsley noted that the CWMP will be meeting with Town Council to discuss how this fits into the overall plan. After this point, if the Council sees fit, the CWMP will discuss further detail with the Board of Health.

5. Adjourn the Board of Health meeting and CWMP Ad Hoc Committee meeting

Upon a motion made by Paul Canniff, D.M.D., duly seconded by Christine Beer, PhD., the Board of Health voted to adjourn. (Unanimously in favor).

Councilor Clark moved to adjourn the joint meeting of the Board of Health and the Comprehensive Wastewater Management Plan Ad Hoc Committee, on behalf of the CWMP Ad Hoc Committee. Councilor Starr seconds. Chris Gadd, Communications Assistant, Department of Public Works, conducts a roll call vote on the motion. The motion passes unanimously.

The joint meeting of the Board of Health and the Comprehensive Wastewater Management Plan Ad Hoc Committee was adjourned at 5:27 P.M.