

TOWN OF FALMOUTH'S INNOVATIVE URINE DIVERSION FEASIBILITY PROJECT

OCTOBER 2024 PROJECT UPDATE

PROJECT OVERVIEW

Lakes, streams, bays, and estuaries across Cape Cod are becoming increasingly polluted by harmful nutrients from wastewater. Conventional sanitation systems effectively mix clean water with nutrient rich human feces and urine and transfer the resulting nutrient load into the environment. Once in the environment, these nutrients (nitrogen and phosphorus) cause the overgrowth of nuisance algae and toxic cyanobacteria which degrade our beloved water bodies and threaten public health.

Towns across Cape Cod are required by the federal Clean Water Act and enforced by the state Massachusetts Department of Environmental Protection (DEP) to reduce nutrient pollution and restore and maintain acceptable water quality. To do so most towns are creating comprehensive watershed management plans (CWMPs) that utilize a variety of methods to mitigate nutrient pollution. These plans include strategies such as sewer expansion, installation of innovative and alternative onsite septic systems (IA systems), reduced fertilizer usage, expanded oyster aquaculture, and more.

A strategy called urine diversion, or UD, offers another possible tool for reduction of nutrient pollution in CWMPs. UD is a strategy that separates urine from a household's wastewater by using specialized toilet and/or urinal systems that capture and store urine in a holding tank. The stored urine is then pumped out, processed and recycled as a soil amendment or fertilizer product. Given that urine contributes most of a household's nutrient output, and that effluent from septic systems is the primary contributor of those nutrients to our waters, diverting urine from septic systems would significantly reduce pollution.

While UD is seen by many as an important and potentially significant cost saving tool in our CWMPs, there are many hurdles to overcome before this strategy is viable and legally allowed. To address these hurdles, a formal feasibility project is needed to verify how well it can perform, how many people will be willing to do it, how much it will cost, how it will be managed, and if it can gain all necessary regulatory approvals. The Town of Falmouth is working with the Massachusetts Alternative Septic System Technology Center (MASSTC) and a team of expert ecological sanitation consultants to develop a feasibility project to answer these questions. To complete this project, a series of residential UD system test installations are needed. We are seeking participants who are willing to install UD systems in their homes and to allow the project team to visit and conduct sampling throughout the project period. Following are more details about the project plan and specific updates about the current project status.

PROJECT DETAILS

Project process - A group of more than 150 people have expressed interest in participating! Each of these potential sites will need to be assessed for compatibility with the project requirements and feasibility of UD system installation. Following an in-home UD system assessment, participants will be presented with options and will be able to choose preferred UD fixtures. Once fixtures are selected, the project team will oversee system design, permitting, purchasing and installation. Access ports to existing septic systems and water usage meters may also need to be installed to allow collection of samples and water usage data. Following installation the monitoring period will begin. The project team will visit each site every three months for a period of three years to conduct system inspections, collect samples, record water usage data and to pump out and measure urine volume as needed. Once the project period is completed the project team will produce a final report for submission to DEP. Collected urine will either be processed and recycled as a fertilizer or soil amendment, or as a last resort, disposed at a wastewater treatment plant.

Participant responsibilities - Project participants will need to install a UD toilet system that includes at least one toilet or urinal and allow the project team access to conduct sampling, maintenance and inspections throughout the project period. Participants will also need to maintain open communication with the project team regarding any maintenance needs or issues related to their UD systems during the project period. At the end of the project period any ongoing maintenance, repairs and/or system removal will become the responsibility of the homeowner.

Support from the project team - The project team will guide and support participating homeowners through every step of the project from site assessment to UD system selection, design, permitting, installation, maintenance, and monitoring. The project team is evaluating options to pay project expenses, although the exact level of financial support is yet to be determined. Financial support will be contingent on participant commitment throughout the project period. See more details about project funding in the Project Status section below.

UD system - A UD system consists of a urine collection fixture (UD toilet or waterless urinal), plumbing and venting pipes, and a storage tank located either in the basement or underground outside the foundation. Urine diverting composting toilets are eligible for this project. Incinerating toilets are not eligible since they do not provide the ability to measure the amount of nutrients removed. The project team is actively working with local and state regulators regarding compliance for UD system components.



*Urine-diverting
Toilets (UDTs)*

PROJECT STATUS

MassDEP approval - There is currently no streamlined approval pathway for UD installation in Massachusetts and no precedent for using UD to reduce nutrient pollution in CWMPs. The project team is actively working with DEP to establish compliance pathways to allow both the installation and operation of UD toilet systems as well as to facilitate a pathway for the Town to receive credit toward watershed nutrient reduction requirements. Recent communications with DEP have determined that the Town can receive credit toward nutrient reduction targets by implementing UD in impaired watersheds, though the amount of credit will depend on the results of this planned feasibility project. This is great news as it allows for flexibility in how UD is implemented and supports the use of UD technology. The next step is to submit a Provisional Use application to DEP which the project team is actively developing. After achieving Provisional Use approval, the systems will need to be inspected quarterly for 3-years to attain General Use approval.

Plumbing board approval - Plumbing products must have a current plumbing product acceptance number to be installed by a licensed plumber under a valid plumbing permit. If a plumbing product does not have a product acceptance number, a variance application or a special permission plumbing request application can be submitted to the State Plumbing Board for review. The availability of UD fixtures with full product acceptance by the Plumbing Board is currently limited to waterless urinals only. Plumbing variances to install UD toilets have been approved by the Plumbing Board previously but are only valid for those particular installations. The 2012 Falmouth Eco-toilet demonstration project successfully obtained variances for pilot approval for several fixtures, including UD toilets, however that pilot approval is no longer valid, and product acceptance was not sought for those fixtures as a part of that study. The project team is engaged with the Plumbing Board to review a list of available UD fixtures, including UD toilets and urinals, as well as storage system designs, in preparation of variance applications to pilot multiple fixtures as part of a Town study. The project team continues to gather technical documentation for fixtures that can be reviewed by the Plumbing Board in consideration for pilot approval. As part of this process the project team is also engaged with fixture manufacturers and distributors, who are invited to participate in the formal approval process with the Plumbing Board. The project team is happy to announce that a major American toilet manufacturer has developed a UD toilet fixture and may be able to provide a number of fixtures for piloting in Falmouth, depending on their initial manufacturing timeline.

Funding - The Town learned on September 11th that legal liability issues may bar the town from making certain expenditures towards the installation of UD (and IA septic) systems on private property. This news was surprising and disappointing. The Town would still be permitted to cover most of the feasibility project's non-installation related expenses, e.g., system monitoring, maintenance, sampling and analysis, and project management. If the Town cannot legally provide funding to install UD fixtures, alternate funding mechanisms for installation costs, such as grants, will need to be identified. Another option would be for the Town to pursue special legislation seeking permission to assess a betterment for the installation of UD and IA septic systems and

issue low or no interest loans repayable over 20 years to homeowners who are required to install these systems. This would mirror the existing betterment assessment process for connecting to municipal sewer systems. There are likely other towns facing a similar situation which could improve the chances for adoption. Participants from other towns are welcome and encouraged to volunteer and participate in this project, however no funding originated from the Town of Falmouth can be used for any portion of pilot sites in other towns and any participant who is not a Falmouth resident would have to fund their own installation and monitoring unless other funding can be identified. These potential participants are encouraged to engage with their own Town leadership to support UD initiatives. As part of the current feasibility planning effort, the project team is exploring additional funding opportunities, including state, federal and private foundation grants. Property owners would also have the option to pay for the purchase and installation costs themselves. Initial estimates indicate that the installation costs for a single toilet UD system would be around \$4,000. Of course, this number will vary significantly based on site specific considerations, but it can serve as a good starting point for estimating. System components including toilet fixture, piping, valves and storage tank would be in addition to that installation cost.

Site selection survey - To begin the process of assessing project sites and screening participants, we are preparing a survey that will be emailed to everyone who has signed up as a potential participant. For those interested in signing up and completing the survey please visit masstc.org/falmouth-urine-diversion-project. Your answers on this survey will help the project team conduct a preliminary assessment of the feasibility of your site for UD installation and compatibility with project goals. Stay tuned for that!

Timeline - The project team is currently working under an Intermunicipal Agreement between the Town and MASSTC which ends on November 27, 2024. The current goal is to complete as much preparatory work as possible by that date to prepare for the future feasibility project. Realizing that we may not be done by that date, the project team is actively working to develop strategies to continue progress beyond that date to assure regulatory approvals are completed in time for a spring 2025 town meeting vote for funding the future feasibility study. We will continue working and providing updates as progress continues.

Thank you for your interest in participating in this exciting and important project! We will continue our hard work to prepare it for action in the spring. In the meantime, we appreciate your enthusiasm, passion, and patience!

Sincerely,

The Falmouth UD Project Team

