
City of Portsmouth

Department of Public Works



Portsmouth and Pease International Tradeport Drinking Water Status Report 2024 Year in Review

The following report provides a summary of the operations for the Portsmouth and Pease International Tradeport Drinking Water Systems. Highlights from 2024 for both water systems include:

- The Portsmouth and Pease Drinking Water Systems had no drinking water quality violations in 2024.
- Water Production:
 - 4.0 Million Gallons – Average Day
 - 6.2 Million Gallons – Maximum Day
 - 2.7 Million Gallons – Minimum Day

Water supplied to Portsmouth Water System customers comes from a combination of surface water and seven groundwater well sources. The surface water supply is the Bellamy Reservoir, which is located in Madbury and Dover. Water flows from the reservoir to the Madbury Water Treatment Facility, where it is treated before distribution to our regional water customers.

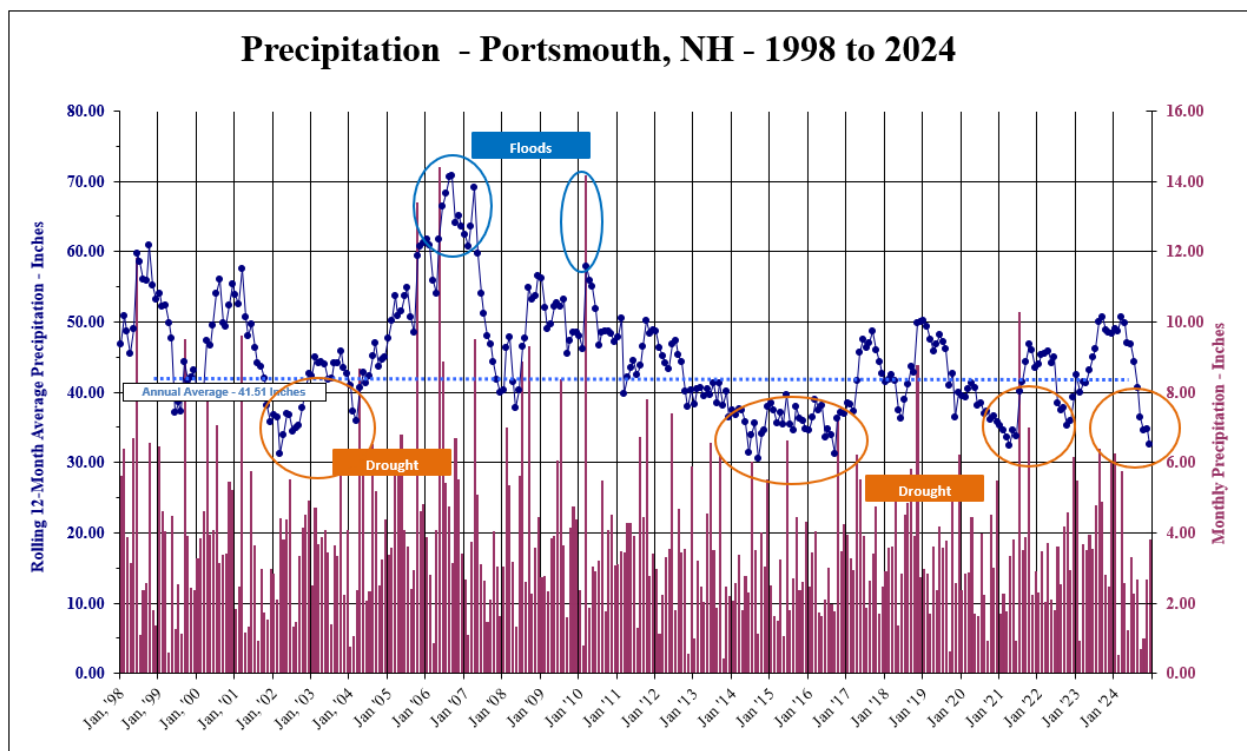
Water supplied to Pease Tradeport Water System customers comes primarily from the groundwater wells located within the Tradeport area (Harrison, Smith and Haven wells). The Portsmouth Water System can supply additional water to the Pease Tradeport Water System as needed. Throughout 2024, only 1.2% of the water supplied to the Pease Tradeport Water System came from the Portsmouth Water System.

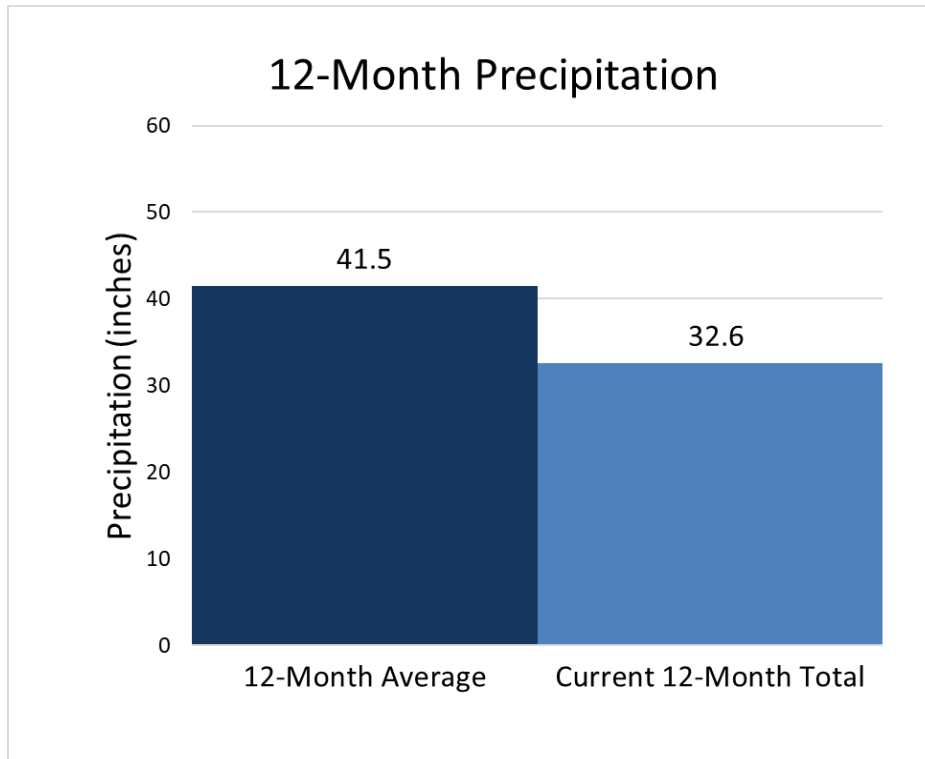
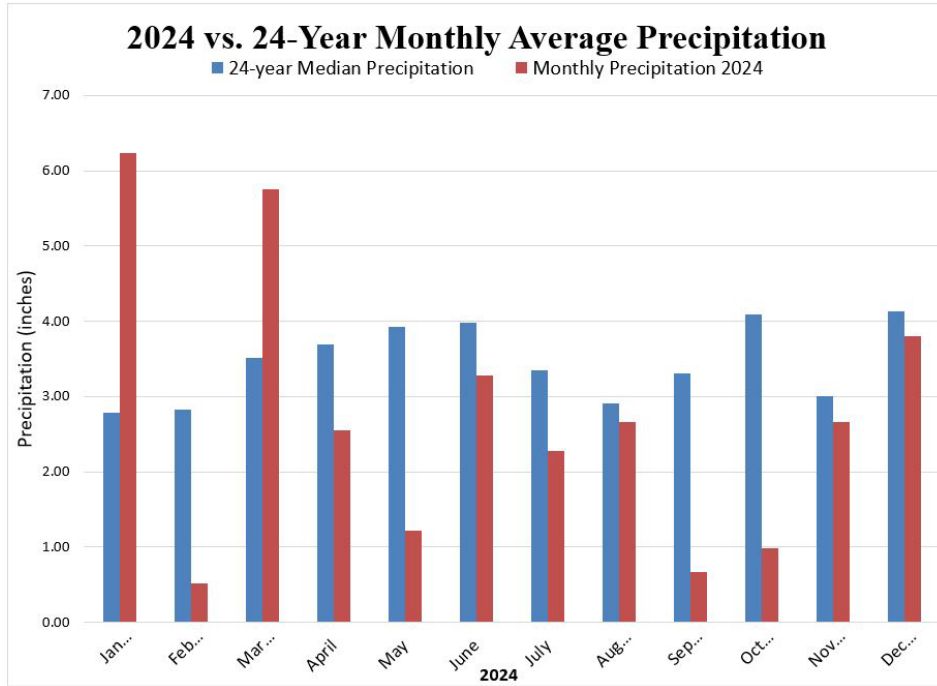
Precipitation, Weather and Water Demands

The City of Portsmouth NH water supply sources have been resilient to the drought conditions that have persisted since late summer 2024. The Bellamy Reservoir surface-water source has recovered from the low levels observed in October due to winter storms, and groundwater levels were within expected levels at year-end. The City will continue to monitor the water supply, and if drought conditions persist through the winter and spring, water use restrictions may need to be implemented in 2025. The City asks that water customers be vigilant and efficient with their water usage.

The following graphics show the monthly precipitation as recorded at the Pease NOAA weather station and the cumulative precipitation throughout the year.

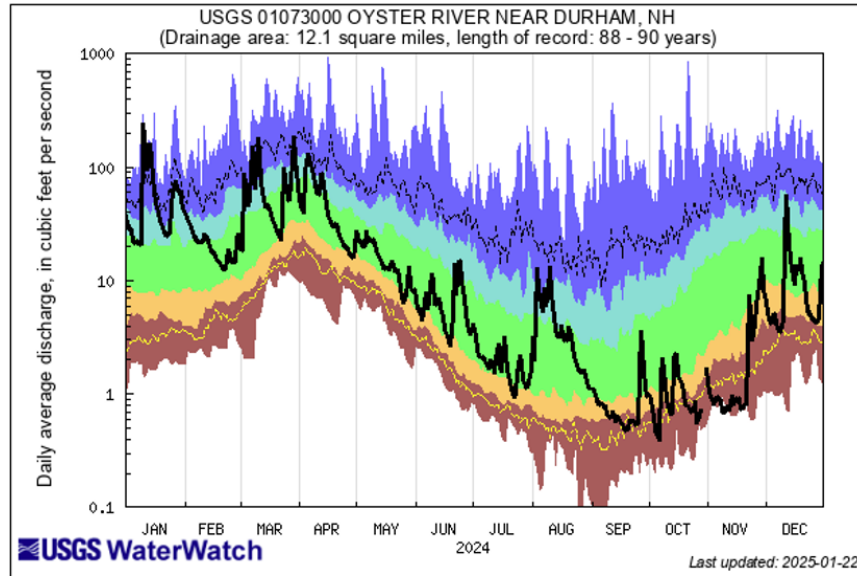
After a couple of months with much higher-than-normal precipitation at the start of 2024, the remainder of the year was much drier than normal, with September precipitation 80% below average and October, 76% below average. The third graphic shows the rolling 12-month average precipitation, which as of this report was below average.



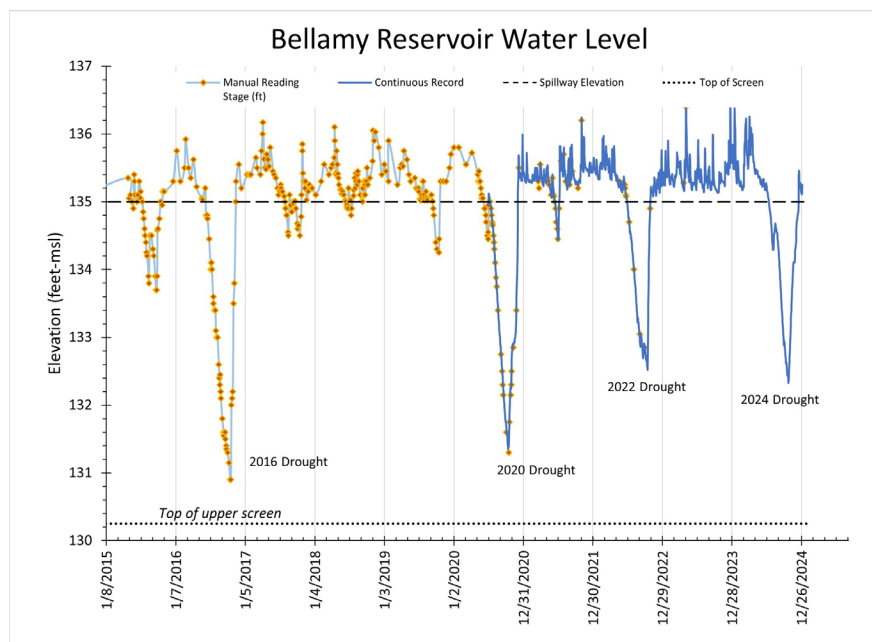


River Flows and Reservoir Levels

The following graphic shows the Oyster River flow trend throughout 2024, according to the USGS gauging station, which the City uses to assess the flow into the Bellamy Reservoir. Normal or above-normal conditions persisted until late August/early September, when dry conditions quickly led to below-average flows. Precipitation toward the end of the year trended upward, and the flow continued to increase at the start of 2025. This is also reflected in the Bellamy Reservoir water levels shown in the second graphic, which indicates the same timing of drought conditions experienced in the late summer. The water level trend also shows the extreme drought experienced in 2016 as well as the 2020 and 2022 droughts.



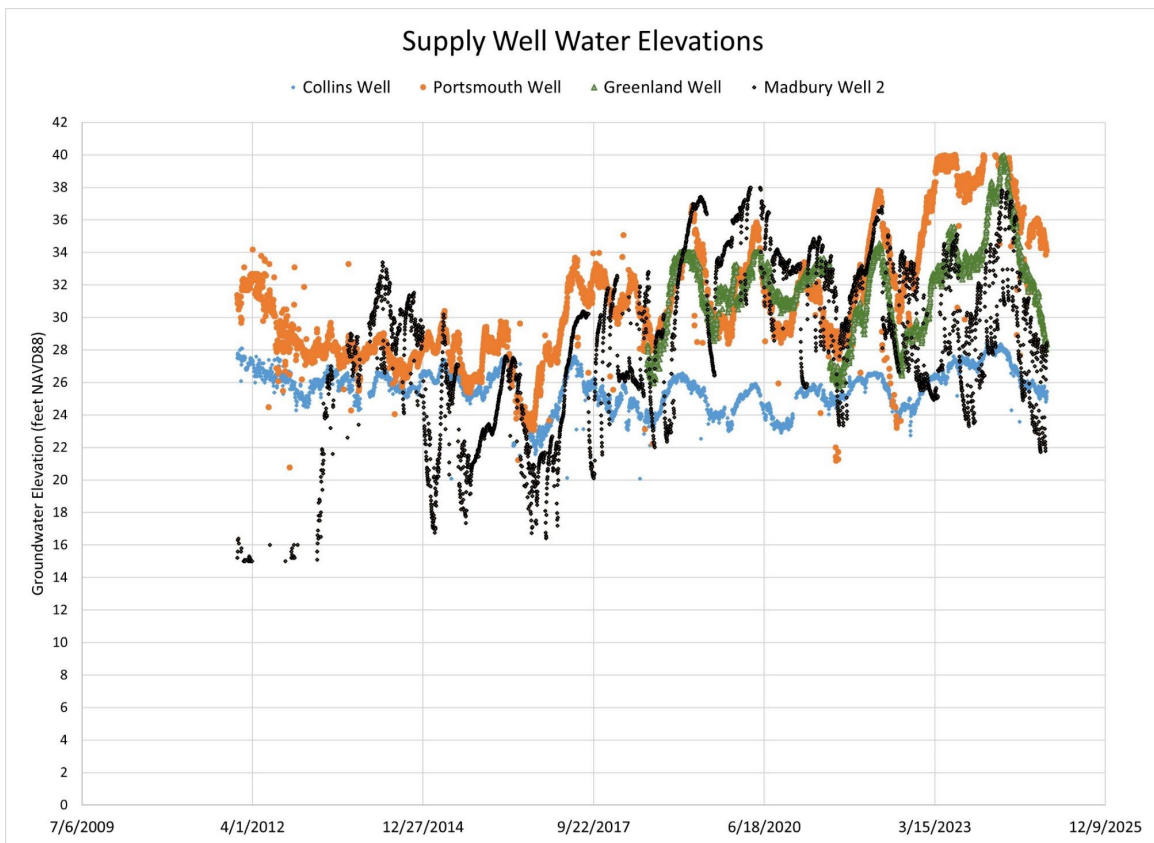
Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile-highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow



Groundwater Levels and Status

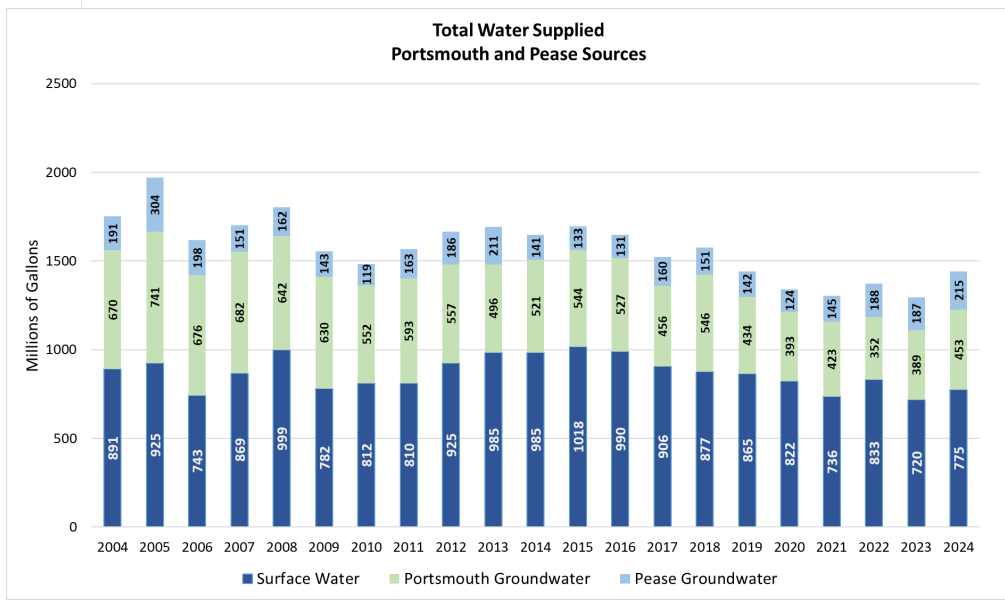
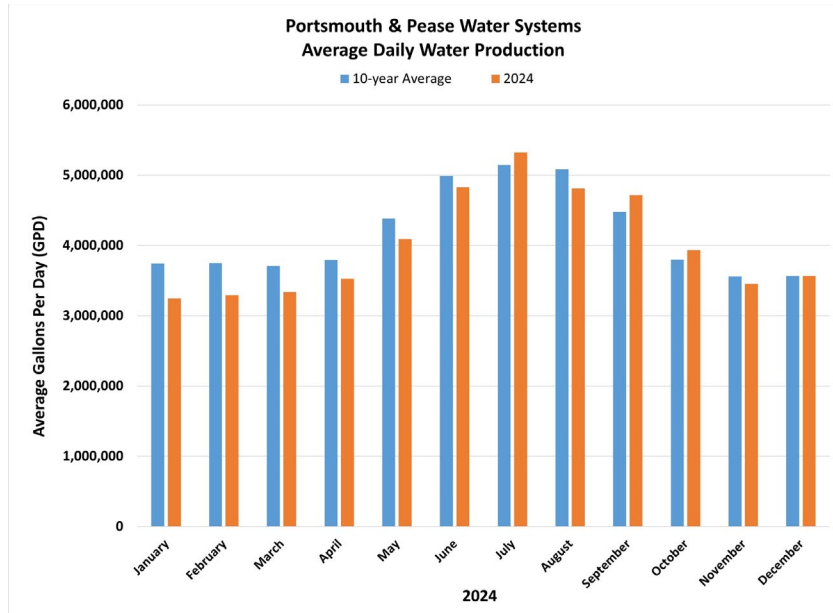
Levels in the City’s groundwater water supply wells declined over the summer and fall as expected. Spring water levels in most of the supply wells were higher than normal, so the summer and fall decline kept water levels within typical ranges. The wells in Madbury were utilized more over the late summer to balance the withdrawal from the reservoir, thus Madbury groundwater levels were slightly lower than experienced in the past six years. The typical reduction in water demands over the winter have prompted operators to minimize well withdrawals and allow time for aquifers to recharge before the return of high demand in the summer of 2025.

The following graphic shows the overall water level trends associated with four of the seven wells in the City’s groundwater supply.

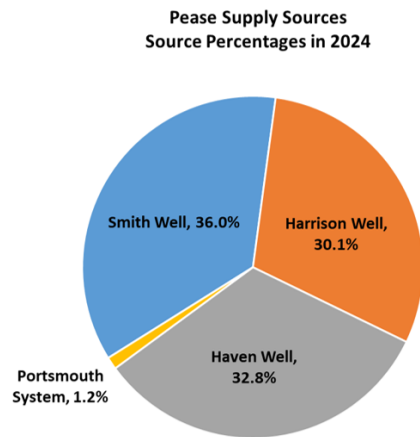
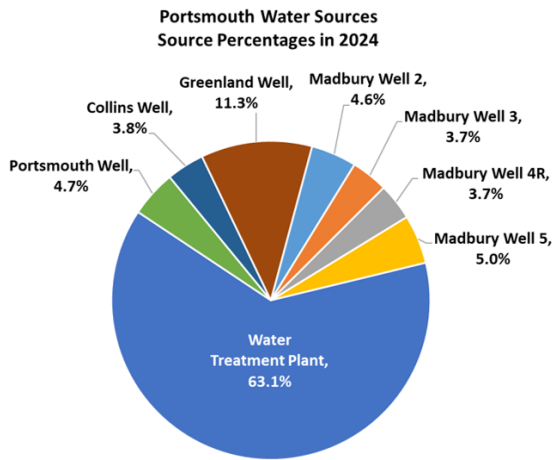
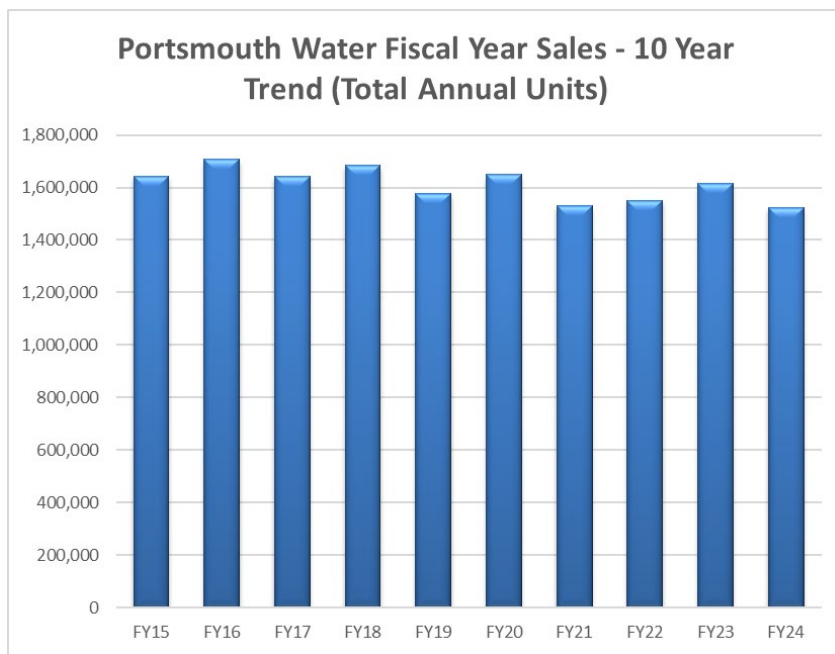
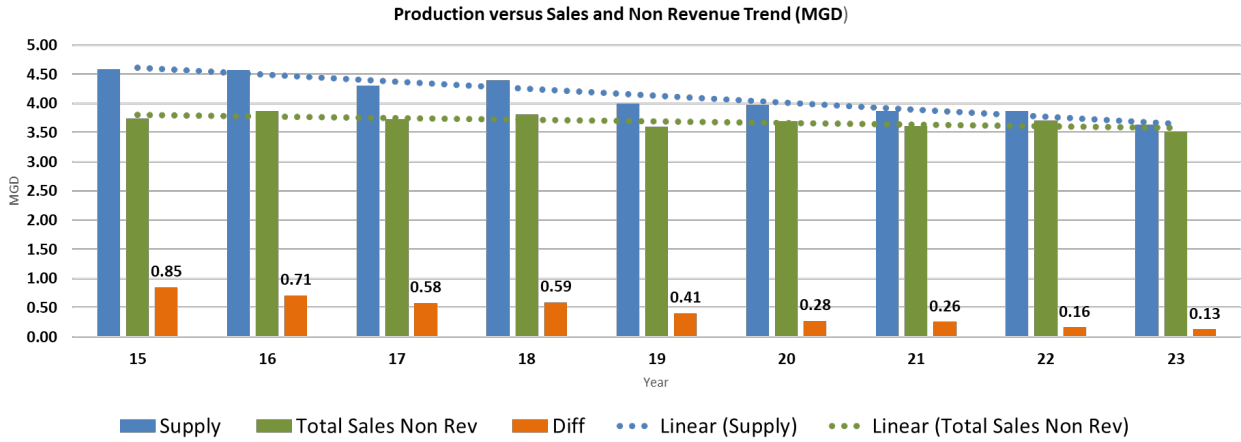


Water Production and Sales Trends

The Portsmouth and Pease Water Systems in 2024 produced an average of 4 million gallons per day, and the total annual water demand has remained constant at approximately 1.5 billion gallons per year over the past five years. Both systems experienced below-average demands toward the first half of 2024 and slightly above-average demands in July, September, and October.



The running Water Balance shown in the first graph below highlights the difference between the water produced by both the Portsmouth and Pease drinking water systems, versus the sales and other known demands in these systems. System improvements in metering upgrades, water main replacements, and leak detection have improved the water balance considerably from where it was just a few years ago. It is now standard practice for City staff to continually inspect the water systems for leaks. With 200-plus miles of water pipelines, this is quite an extensive effort. The third graphic provides a breakdown of the supply sources for the City’s surface and groundwater systems showing the percentage of supply sources serving Portsmouth and Pease customers. For the Portsmouth Water System, surface water treatment at the Madbury WTF made up 63% of the total production throughout 2024.



Water Efficiency

The City continues to offer water efficiency rebates of \$100 per low flow toilet and \$150 per high-efficiency washing machine. These are available to all residential customers, including multi-family customers. According to the NH Department of Environmental Services (NHDES), Portsmouth is still the only public water system in New Hampshire offering these rebates.

Additional information on this program can be obtained from the City's water billing department or from the City's website: <https://portsnh.co/water-efficiency-rebate>

Water Efficiency Rebate Program

Introduced in 2015

The First (and still only) Water Efficiency Rebate Program in New Hampshire



\$100 **\$150**

Residential Toilet and Washing Machine Rebate Program
Additional Information

Q. Why is Portsmouth offering toilet and washing machine rebates?
A. We are offering this program to our customers as an incentive to replace older, inefficient toilets and washing machines with high efficiency models. This is another step toward making our water and sewer systems as efficient as possible. When customers use less water then we have to produce and treat less water and wastewater, which saves water and money for everyone in the long run.

The City intends to continue with the rebate program and expand outreach efforts to focus on ways that customers can be more efficient with summertime water use for irrigation and cooling needs.

Water Quality Information

The Portsmouth Water Division routinely monitors water quality parameters and performs water quality sampling and analyses as directed by the Federal Safe Drinking Water Act and the New Hampshire Department of Environmental Services. Water sources are monitored for radioactive, biological, inorganic, volatile organic, and synthetic organic contaminants. Critical water treatment parameters for turbidity, pH, chlorine, orthophosphate and fluoride are continually monitored and tracked by staff Water Treatment Operators. The regulations require the City to monitor certain parameters less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are reported, along with the year in which the sample was taken. Annual Water Quality Reports for both water systems detail these efforts and are mailed to every water system customer annually. They are also available on the City’s website at: <https://portsnh.co/DrinkingWaterQualityReports>.

Updated reports highlighting the water quality data collected throughout 2024 will be available to the public before July 1, 2025.



PFAS Water Quality Sampling and Tracking

The City’s work to track and treat PFAS contamination at the Pease International Tradeport and Portsmouth Water System continues. The term “PFAS” covers a broad group of perfluoroalkyl and polyfluoroalkyl substances found in many commercial products including firefighting foam. On September 30, 2019, the NHDES established limits on the concentrations of four per- and polyfluoroalkyl substances (PFAS) in drinking water. The NHDES maximum contaminant level (MCL) for drinking water and groundwater remains at 15 parts per trillion (ppt) for perfluorooctane-sulfonic acid (PFOS), 12 ppt for perfluorooctanoic acid (PFOA), 11 ppt for

Perfluorononanoic Acid (PFNA), and 18 ppt for Perfluorohexane sulfonic acid (PFHxS). These limits were based on an annual rolling average of sample results collected throughout the state.

On April 10, 2024, the US EPA finalized regulations that limit acceptable concentrations of six PFAS compounds in drinking water; establishing legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water. Those compounds include: PFOA, PFOS, PFHxS, PFNA, and HFPO-DA as contaminants with individual MCLs, and PFAS mixtures containing at least two or more of PFHxS, PFNA, HFPO-DA, and PFBS. The new regulation uses a Hazard Index MCL to account for the combined and co-occurring levels of these PFAS in drinking water. The EPA also finalized health-based, non-enforceable Maximum Contaminant Level Goals (MCLGs) for these PFAS.

The City of Portsmouth continues to comply with all standards regulating levels of PFAS in both the Portsmouth and Pease Drinking Water Systems. Until the EPA rule requirements go into effect in 2027, Portsmouth, along with all community water suppliers in New Hampshire, must continue to comply with the PFAS maximum contaminant levels (MCLs) established by the DES in 2019 for four regulated PFAS compounds.

According to information provided by the NHDES on April 10, 2024:

“No immediate action by water systems is required at this time. A general summary of how and when the new regulations will impact NHDES and water systems from a regulatory standpoint based on our initial understanding is provided below:

1) **NHDES Rulemaking:** NHDES will need to adopt rules that are no less stringent than the new federal PFAS drinking water regulations within two years. The rules will not only include MCLs and MCLGs, but also parameters around the frequency and type of testing that must occur as well as specific requirements pertaining to public notification of violations.

2) **Water System Sampling: Applicable water systems will need to complete initial monitoring to comply with the new federal PFAS drinking water regulations within three years.** Water systems in New Hampshire have completed initial monitoring for PFAS dating back to 2019/2020 to comply with New Hampshire’s drinking water standards. Water systems that completed testing for all analytes covered by USEPA Methods 533 or 537.1 as recommended by NHDES in 2019 may have the data needed to satisfy the initial monitoring requirements of the new federal PFAS regulations. Water systems that only analyzed for the four PFAS (PFOA, PFOS, PFNA and PFHxS) that New Hampshire regulates will have to complete initial monitoring for HFPO-DA and PFBS even though these compounds very likely will not occur at a concentration that will exceed the new federal drinking water standards.

3) **Water System Public Notification:** Applicable public water systems will need to notify the public if finished drinking water exceeds the new federal PFAS drinking water regulations within three years. The notification to the public will not specifically be required and enforced by NHDES until its rulemaking (described in item 1, above) is complete. However, public water systems already have PFAS results for PFOA, PFOS,

PFNA and PFHxS and can notify the public in the near future. NHDES will follow up this email soon with recommended notification language for water systems that elect to notify the public sooner than required by the new federal PFAS regulation.

4) **Water System Drinking Water Quality Compliance and Violations: Applicable public water systems will need to comply with the new federal PFAS standards for the six PFAS within five years.** Public water systems that produce drinking water that will exceed the federal drinking water standards may implement corrective action sooner than five years to protect public health and avoid violations of the federal standard and the associated public notification requirements.”

The City has tracked, sampled and responded to PFAS regulation since these compounds were first discovered in the Pease drinking water sources in May 2014. The City of Portsmouth maintains a multi-pronged approach to addressing PFAS in water supplies. Actions include:

- Sampling all Portsmouth drinking water sources quarterly for PFAS compounds to assess the 12-month rolling averages for the four New Hampshire regulated compounds. Working with regulators and other waterworks professionals to track and respond to the evolving water quality information, regulations and treatment technologies related to PFAS compounds.
- Evaluating the need for and piloting effective treatments that may be necessary at any other drinking water sources of supply serving the City’s drinking water system.
- Designing and constructing a dual resin and granular activated carbon treatment system for the Pease water system wells that removes the PFAS compounds. The City has also been working with the Air Force monitoring and responding to PFAS compounds in the water sources in the Pease southern wellfield aquifer.
- Recommending and securing approval from City Council to budget \$7 million to design and install treatment on the Greenland Well, which is currently just over the 4 parts per trillion level of PFOA. An engineer is currently engaged in this design work, with bidding and construction anticipated in 2026.
- Undertaking preliminary design of treatment for the Portsmouth and Collins wells.

The City samples for PFAS in its water supply sources quarterly and periodically posts this data on the City’s website at: <https://portsnh.co/PFASTesting>

PFAS Average – 12 Month Rolling New Hampshire Regulated Compounds - All Sources In Compliance (Jan. 2024-Dec. 2024)

		EPA MCL (2024)	NH MCL	RAW*	MADBURY WTP FINISHED	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	MADBURY WELL 5	PORTSMOUTH WELL	COLLINS WELL	GREENLAND WELL
Perfluorohexanesulfonic acid(PFHxS)	ng/L	10	18	0.0	0.0	0.2	0.2	0.0	0.3	5.8	2.0	0.6
Perfluorooctanesulfonic acid (PFOS)	ng/L	4	15	0.4	0.3	0.4	0.4	0.0	0.2	5.1	4.3	3.0
Perfluorooctanoic acid (PFOA)	ng/L	4	12	2.6	2.7	2.7	3.0	0.9	3.2	7.7	3.6	4.7
Perfluorononanoic acid (PFNA)	ng/L	10	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	10		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perfluorobutanesulfonic acid (PFBS)	ng/L			0.3	0.3	0.4	0.3	0.3	3.1	4.7	10.4	2.3
Hazard Index*		1		0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.1

* Hazard Index MCL = (HFPO-DA/10)+(PFBS/2000)+(PFNA/10)+(PFHxS/10)



According to the City’s ongoing monitoring, the following water sources have detection averages above the EPA’s finalized MCLs:

- Portsmouth well: 5.1 ppt of PFOS, 7.7 ppt of PFOA
- Collins well: 4.3 ppt of PFOS
- Greenland well: 4.7 ppt of PFOA
- No sources are currently over the Hazard Index
- The Pease Water Treatment Facility continues to remove these compounds from the system’s supply wells

The Pease Tradeport’s dual treatment system of ion exchange and granular activated carbon continues to perform very well. After almost four years of operation and nearly 834 million gallons of water treated, the levels of the regulated compounds remain “Non Detect.”

Pease Water PFAS Treatment System Performance

- Treatment system online since April 2021
- 834 million gallons treated
- 6 of 12 Ion-Exchange Resin Vessels - Media Replaced 2024
- 1 of 3 Granular Activated Carbon (GAC) Vessels – Media Replaced 2024
- No Regulated PFAS Detected in Treated Water

Total Trihalomethanes (TTHMs)

Total Trihalomethanes (TTHMs) are disinfection byproducts (DBPs) which are created when added chlorine disinfectant (sodium hypochlorite) reacts with natural organic matter in the water. On average, the Water Treatment Facility in Madbury removes about 64% of the total organic carbon (TOC) through the treatment process. The EPA Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2) require TOC removal of 50% for the type of water that is typical from the Bellamy Reservoir. The TOC that remains in the water after treatment reacts with chlorine and creates DBPs. Historically the TTHM concentration in the Portsmouth Water System averaged 56 parts per billion (ppb).

A storage tank mixer and aeration system were installed at the Newington Booster Pumping Station as part of the upgrade to that facility in September 2019. These improvements were designed to reduce the concentrations of trihalomethanes in the water distribution system. The highest average TTHM in the distribution system in 2024 is 30 ppb. The Pease system has near “Non-Detect” for TTHM due to the source water quality and the Pease Water Treatment system which includes granular activated carbon.

TTHM Running Average – 2024 – Portsmouth Water System

DATE	SITE	MCL's =>	TTHM	HAA5
Quarter IV 2024		Reference	80	60
ID #			ppb	ppb
Q4	Locational Running Average		Locational Running Average	Locational Running Average
321	30 SPINNAKER WAY		30	38
325	1550 WOODBURY PLAZA		26	34
323	120 SPAULDING TURNPIKE		27	36
324	WATER STREET		30	36

TTHM Running Average – 2024 – Pease Water System

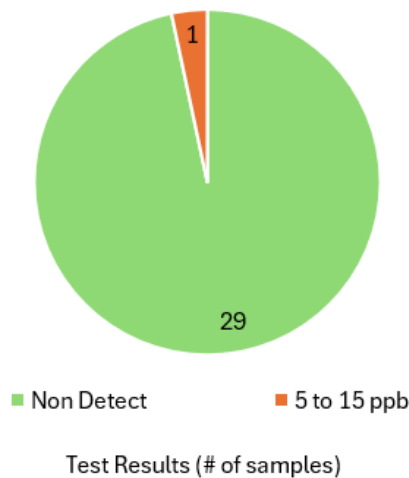
DATE	SITE	MCL's =>	TTHM	HAA5
Quarter IV 2024		Reference	80	60
ID #			ppb	ppb
Q4	Locational Running Average		Locational Running Average	Locational Running Average
321	135 CORPORATE DRIVE		19	2
322	14 MANCHESTER SQUARE		1	ND

Lead Sampling

The City of Portsmouth implemented a Lead & Copper Corrosion Control Program in 2003 and remains in compliance with its requirements. The general purpose of the Corrosion Control Program is to minimize the potential for water supplied by the City to leach potentially harmful metals such as lead and copper from pipes, fixtures and solder containing lead into drinking water. Because the City of Portsmouth water supply sources that are regularly monitored do not contain measurable quantities of lead, the primary source of any lead and copper in drinking water is therefore internal household plumbing systems, plumbing components within other privately owned buildings and the service lines feeding these properties.

Sampling conducted in 2024 throughout the Portsmouth water system found one location with measurable concentrations of lead out of 30 residential locations. This one detection of lead was reported at a concentration of 6.6 ppb, which is less than half of the “action level exceedance” concentration of 15 parts per billion (ppb). A total of 29 water samples had no traces of lead.

2024 Portsmouth Lead Monitoring Results



Lead is not present in the water when it leaves the City’s well and treatment facilities, or in the water mains that run below the streets. However, lead can be present in old service line connections that tie homes to the water system or plumbing inside homes and businesses. Due to the age of many homes in Portsmouth and surrounding towns (built before leaded solder was banned in 1986, and the associated potential for leaded plumbing components), the City encourages customers to have their water tested by a certified laboratory, especially if there are children under six or pregnant women in the household. The City actively adjusts the water chemistry at the treatment facility and well facilities according to the established Corrosion Control Program, to reduce the potential for lead in households to dissolve into the water and end up at the tap. But if lead is present in private plumbing system, and is in contact with water, some risk remains. Information about the Corrosion Control Program can be accessed on the City website: <https://portsnh.co/LeadCopperProgram>.

Service Line Inventory Efforts

The U.S. Environmental Protection Agency (EPA) Lead and Copper Rule Revision required all public water suppliers including the City of Portsmouth to submit a baseline inventory of every service line and their material type by October 16, 2024. The City of Portsmouth Water Division has submitted this inventory for the Portsmouth and Pease Tradeport Water Systems and has notified customers whose water service line material was identified as galvanized steel or whose service line material has not been identified. No lead services lines have been identified in the Portsmouth or Pease Water Systems. These notifications are intended to raise awareness of service line materials and help customers avoid possible exposure to lead from their household plumbing in their drinking water.

Customers who receive a notification letter are being asked to assist the City by following the directions outlined in the notice.

The information letters include:

- A statement that the service line material is either galvanized steel and requires replacement, or is unknown;
- Information on replacing galvanized steel service lines requiring replacement;
- Actions to take if the material of the water service line is unknown;
- An explanation of the health effects of lead; and
- Steps to reduce any exposure to lead.

In accordance with the federal regulation, letters must be sent to property owners on an annual basis until service lines that might contain lead are removed, or the public water system is able to verify that a service line does not contain lead. Anyone not receiving a letter by the end of the year should be assured that the Water Division has determined that their service line material does not contain lead.

More detailed information about this inventory effort can be found on the City website: <https://portsnh.co/serviceinventory>.

Safe Water Advisory Group (SWAG)

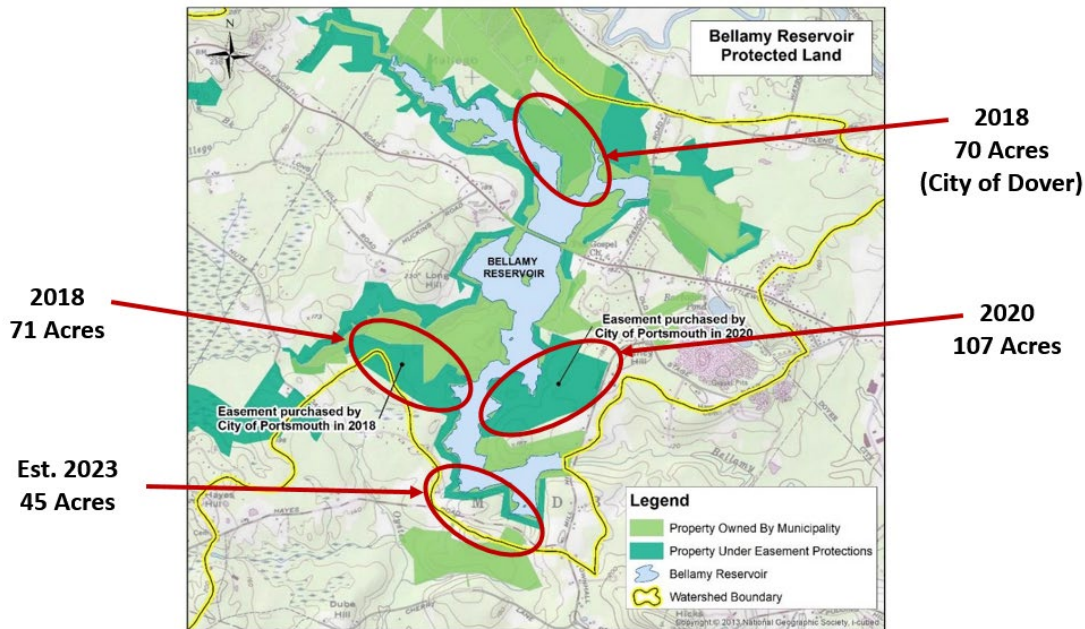
The Safe Water Advisory Group was created by the Mayor and City Council on October 5, 2020. Its mission is to review and communicate the latest science on the health and environmental effects of drinking water contaminants (with a heavy focus on PFAS), to monitor federal and state level legislative changes and to anticipate policy changes that could impact the City of Portsmouth.

The SWAG met four times in 2024. The public is invited to attend future meetings and encouraged to be involved with the community and informed of all aspects of the City's water supply. Video recordings, information, meeting agendas and minutes, and annual reports of the SWAG are posted on the City's website: <https://portsnh.co/safe-water-advisory-group>

Source Water Protection - Bellamy Reservoir

The City continues to work with the communities of Madbury and Dover to monitor and track land use within the Bellamy Reservoir watershed. The City of Portsmouth's Water Division has purchased easements around the perimeter of the reservoir to provide a protective buffer for the surface water supply and its overall quality. In addition to these buffers, the Portsmouth Water Division, in cooperation with the Town of Madbury and the New Hampshire Department of Environmental Services, has historically restricted activities in and around the reservoir. The following activities are not permitted in or around the water body: swimming, motorboats and campfires. Kayaks, canoes and other non-motorized boats are permitted on the reservoir.

Portsmouth – Bellamy Reservoir Source Water Protection Efforts

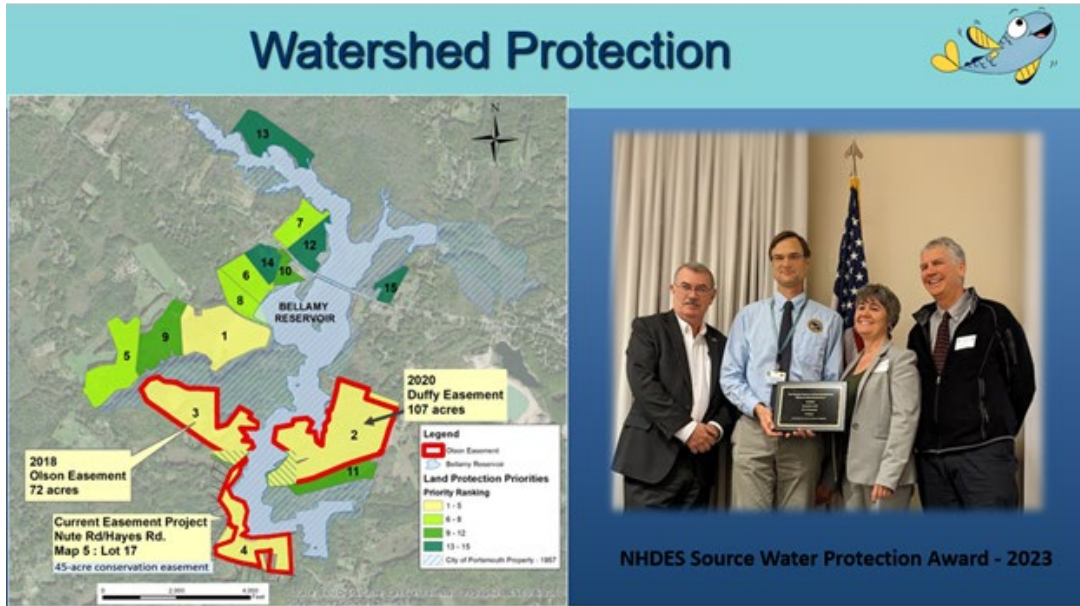


The City acquired conservation easements in 2018 and 2020 of properties that abut the Bellamy Reservoir. Easements on these parcels, totaling 178 acres, were obtained through the combined efforts of the City, Southeast Land Trust and the Town of Madbury to coordinate due diligence activities and prepare the easement documents. The City received approximately \$487,000 in grant funds for these easements from the New Hampshire Groundwater and Drinking Water Trust Fund and approximately \$14,500 from the Great Bay Resource Protection Partnership. The City is currently working on acquiring a 45-acre parcel near the surface water intake.

The protection of the Bellamy Reservoir is a high priority for the City of Portsmouth because the Reservoir is the primary water supply for the City. The Bellamy surface water is treated at the City's Water Treatment Facility in Madbury and delivered to regional communities around the seacoast. Conserving land within the watershed and areas that abut the reservoir and surrounding

wetlands, rivers, and streams, protect the water quality from the pressures of development and helps the municipal water system provide quality drinking water.

The City was recognized for these efforts by the NHDES in 2023 with their Source Water Protection Award.



The City of Dover continues to update Portsmouth water system staff about their efforts to track and remediate their closed landfill, which lies within the Bellamy Reservoir watershed. Dover must comply with EPA and DES requirements regarding the level of remediation they need to perform to protect all water sources around their site. City staff continue to be in communication with Dover staff and their consultants regarding these results and Dover’s response.

Water System Operations and Infrastructure Projects

System Maintenance and Improvements

The City continues to invest in water system capital improvement programs. Every year projects are identified to replace aging infrastructure. Water mains were replaced as part of the Islington and Union Street projects, as well as sections of mains on Bartlett Street, Peverly Hill Road, and Pinehurst Road. A pressure zone study was initiated to identify and evaluate options for the improvement of the Lafayette Road area distribution system pressure, as well as the operation and water quality management of the Lafayette Storage Tank. In 2024, a submersible water mixing system was installed in the 7.5-million-gallon storage tank to prevent thermal stratification and loss of chlorine residual to improve and maintain quality of water within the tank.

In anticipation of the Environmental Protection Agency’s finalized PFAS regulations, treatment upgrade preliminary designs are near completion for three of the Portsmouth groundwater supply

wells. The treatment systems for the Greenland, Portsmouth, and Collins Wells will be designed to remove PFAS with granular activated carbon media filtration.

New Water Transmission Main Under Little Bay

The Little Bay Water Transmission Main conveys drinking water from Madbury, under Little Bay, to the Portsmouth Water System. The City’s project to improve the resiliency of this transmission main has begun with the installation in 2024 of valves on each side of Little Bay. The valves will allow the City to close one of the two water mains as they cross under Little Bay if one were to begin to leak. This project will also provide connections to the transmission main that can be used to connect a third new water main across the bay. Aging water mains at various locations throughout the City are also being targeted for replacement. More information about these and other Capital Improvement Plan (CIP) initiatives is available online: <https://portsnh.co/cip>.



Seacoast Interconnection Study

Underwood Engineers was selected by the Seacoast Drinking Water Commission’s Advisory Committee to perform an interconnection assessment of all the Seacoast drinking water systems. Analysis of each water system’s customer demographics, supply capabilities, water quality and water demands is being performed. Projections for future needs along with the infrastructure improvements that would be required to further interconnect water systems will also be performed. A preliminary report from this study is scheduled for early 2025.

Further Updates and Information

This information is updated on the City of Portsmouth’s website in the Department of Public Works > Operations > Water section. More detailed updates on capital improvement projects can be located here: <https://www.portsmouthnh.gov/publicworks/projects>
For additional information or questions contact Al Pratt, Water Resources Manager at 603-520-0622 or Mason Caceres, Assistant Water Resource Manager at 603-312-3804.