2022 Annual Consumer Confidence Report (CCR)
Annual Drinking Water Quality Report

For - Manchester Water
Manchester by-the-Sea, Massachusetts
MassDEP PWSID # 3166000

This report is a snapshot of drinking water quality that we provided last year. Included are details about where your water comes from, what it contains, and how it compares to state and federal standards. We are committed to providing you with information because informed customers are our best allies.

1. PUBLIC WATER SYSTEM INFORMATION

Contact Person: Charles Dam, Director of Public Works
Address: Department of Public Works, Town Hall, 3rd Floor - 10 Central Street, Manchester by-the-Sea, MA 01944
Telephone #: (978) 526-1242
Fax #: (978) 526-2007
Internet Address: www.manchester.ma.us

WATER SYSTEM IMPROVEMENTS

Our water system is routinely inspected by the Massachusetts Department of Environmental Protection (MassDEP). MassDEP inspects our system for its technical, financial, and managerial capacity to provide safe drinking water to you. To ensure that we provide the highest quality of water available, your water system is operated by Massachusetts certified operators who oversee the routine operation of our systems. The Gravelly Pond Water Treatment Facility has been contract operated since it went online in 1997. The operation of the Manchester Water Treatment Facilities is performed by Woodard & Curran Inc., the town's contract operator since the year 2000. The Department of Public Works operates the distribution system under the Director.

During 2022, the Town cleaned, and cement lined approximately 950' of 12" and approximately 2,250' of 8" water main on School St. The water main on School St is over 100 years old and had a severe buildup of tuberculation, however, was still structurally sound.

In Quarter 4 of 2021 the town began monitoring for PFAS (Per-and Polyfluoroalkyl Substances) as required by MassDEP at our two points of entry into the distribution system. The results from the 2022 annual monitoring period as well as educational and health language pertaining to PFAS can be found throughout this report. As of December 2022, we are monitoring PFAS at the Lincoln Street Well monthly, and the Gravelly Pond WTF annually – per the MassDEP issued sampling plan.

The most recent Sanitary Survey was conducted in July 2020 by MassDEP and there were no violations, however there were recommendations that were implemented in prior years as a result of the survey. The Moses Hill Standpipe was last inspected and cleaned by Underwater Solutions Inc. in January 2023 and was found to be in good condition.

OPPORTUNITIES FOR PUBLIC PARTICIPATION

The Board of Selectmen serves as the Water Commissioners. The Board currently meets on the first and third Monday of every month, with additional meetings held as needed. All residents are welcome to attend and participate in these meetings but call in advance if you desire to be on the agenda.

MANCHESTER PUBLIC WATER SYSTEM

The Manchester Public Water System Consists of the following:

- Gravelly Pond Water Treatment Facility: Gravelly Pond Reservoir with Round Pond Well used as an aid for Gravelly Pond recharge.
- Lincoln Street Well Water Treatment Facility; Lincoln Street Well
- Distribution System: 44 miles of public water mains, with a vast majority of the mains being over 100 years old; Water Storage Facility: Moses Hill Standpipe with a capacity of 1.7 MGD.

2. YOUR DRINKING WATER SOURCES

WHERE DOES MY DRINKING WATER COME FROM?

The first source, the Gravelly Pond WTF (MassDEP Source ID# 3166000– 01S), is a surface water treatment facility, which is located off Chebacco Road in Hamilton. In the year 2022 the Gravelly Pond WTF provided approximately **49.3 percent** of Manchester's drinking water – or **101.947 million gallons**. The Gravelly Pond reservoir has a surface area of 49 acres and a capacity of over 360 million gallons when full. The pond is fed by rainfall, runoff from the surrounding area, and groundwater springs. The pond's watershed, or area that drains into the pond, is relatively small and the ability of the pond to recharge or fill back up, is limited.

The second source is the Lincoln Street Well (MassDEP Source ID# 3166000-01G). This is a 58-foot-deep, 500 GPM, gravel packed well which is located next to the Manchester/Essex Regional Junior/ Senior High School on Lincoln Street in Manchester. Groundwater is pumped from a sand and gravel deposit that underlies the area. In the year 2022 the Lincoln Street Well provided approximately **50.7 percent** of Manchester's drinking water – or **105.028 million gallons**.

To supplement the Gravelly Pond supply and in aiding with watershed recharge, the Town pumps water from the Round Pond Well (MassDEP Source ID# 3166000-02G) which is located along Chebacco Road in Hamilton - into Gravelly Pond. A total of **51.014 million gallons** were transferred in 2022.

IS MY WATER TREATED?

The Gravelly Pond Water Treatment Facility treats water from both Gravelly Pond and Round Pond. Treatment processes include oxidation, coagulation, pH adjustment, clarification, filtration, fluoridation, disinfection, and corrosion control. Filtration is a mechanical and chemical process used to remove particulates from water. Federal and State drinking water regulations require all surface sources to be filtered and disinfected to remove harmful micro-organisms. Filtration is used to remove microorganisms and oxidized iron and manganese, (compounds which can cause discolored water at higher concentrations). Disinfection, fluoridation, pH adjustment and corrosion control are accomplished with chemical additives at the Lincoln St. Well pump station and treatment facility with no filtration.

HOW ARE THESE SOURCES PROTECTED?

WATERSHED PROTECTION

One of the best ways to protect your drinking water is to take measures so pollutants don't get into it in the first place. To protect Manchester's water supplies, the town has acquired the land surrounding Gravelly Pond and restricts activities in this area to passive recreation such as hiking and cross-country skiing. Unfortunately, over many years the Town did not protect its Lincoln St. well and there are numerous activities that would not normally be in a protective Zone I area that are currently. The Town has or will have agreements with the Regional School District and Essex County Club to assure maximum protection of our drinking water resource is followed.

The Department of Environmental Protection published its Source Water Assessment Program (SWAP) Report for Manchester' Public Water Supply on June 27, 2003. The SWAP report notes that both our Lincoln Street Well and Gravelly Pond sources have land uses adjacent to the source that would be prohibited under today's regulations. The SWAP report has seven recommendations. The two critical recommendations are as follows:

1. Continue to inspect Zone A and Zone 1 areas regularly, and when feasible, remove prohibited non-water supply activities.
2. Develop and implement a groundwater and surface water supply protection plan.

The complete SWAP report is available in the Department of Public Works office where it can be reviewed during normal business hours or call 978-526-1242 for additional information.

CROSS CONNECTION CONTROL

Cross connection control helps to protect drinking water once it is in the distribution system. A cross connection occurs when non-potable water or piping is connected to the water supply system. Examples of areas where cross connections can be found in commercial establishments include dishwashers, air conditioning systems, fire protection systems, boilers, boat piers and private wells.

WATER CONSERVATION

Water conservation is an important issue for Manchester. In addition to its importance as a natural resource, wasting it causes additional costs in pumping and costs you additional fees on your water bill. Water conservation can also have an impact on the quality of the Town's drinking water. Excessive use causes higher flows, which in turn can cause turbulence in the water mains by churning up sediment, resulting in colored water and reduced pressures.

- Install water-saving devices: You can save water by installing low-flow showerheads, high-efficiency toilets, and kitchen/bathroom faucet aerators.
- Take shorter showers: Reduce your shower by 1 – 2 minutes and save 5 gallons!
- Turn water off while brushing your teeth: Save 3 gallons!
- Fix leaky faucets: Save up to 20 gallons a day!
- Wash a full load of laundry: Save 15 – 50 gallons per load!
- Broom instead of Hose: You can save as much as 100 gallons of water by cleaning your driveway by sweeping instead of using the hose.
- Water before 8 a.m.: You can save about 25 gallons each time you water, by watering before 8 a.m. Watering early reduces evaporation and puts that water to work, helping your plants grow.

There are many steps you can take to reduce your water use.

Additional information on reducing water use is available from the DPW Office at (978) 526-1242.

3. SUBSTANCES FOUND IN TAP WATER

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally- occurring minerals, and in some cases, radioactive material. Substances resulting from the presence of animals or from human activity can also be picked up. Contaminants that may be present in source water include:

Microbial contaminants -such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants -such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, and farming.

Pesticides and herbicides -which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

Organic chemical contaminants -including synthetic and volatile organic chemicals, which are by- products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

Radioactive contaminants -which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Department of Environmental Protection (DEP) and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) and Massachusetts Department of Public Health (DPH) regulations establish limits for contaminants in bottled water that must provide the same protection for public health. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and some infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control and Prevention (CDC) guidelines on lowering the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800- 426-4791).

4. IMPORTANT DEFINITIONS

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. MCL's are set at very stringent levels. To understand the health effect described for many regulated contaminants a person would have to drink two liters of water every day at the MCL levels for a lifetime to have a one-in-a-million chance of having the described health effect.

Maximum Contaminant Level Goal (MCLG) –The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) -- The highest level of a disinfectant (chlorine, chloramines, chlorine dioxide) allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) -- The level of a drinking water disinfectant (chlorine, chloramines, chlorine dioxide) below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL) – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

90th Percentile – Out of every 10 homes Sample, 9 were at or below this level.

Secondary Maximum Contaminant Level (SMCL) – These standards are developed to protect the aesthetic qualities of drinking water and are not health based.

Massachusetts Office of Research and Standards Guideline (ORSG) – This is the concentration of a chemical in drinking water, at or below which, adverse, non-cancer health effects are unlikely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.

ppm = parts per million, or milligrams per liter (**mg/L**)

ppb = parts per billion, or micrograms per liter (**ug/L**)

ppt = parts per trillion, or nanograms per liter (**ng/L**)

pCi/L = picocuries per liter (a measure of radioactivity)

NTU = Nephelometric Turbidity Units

mrem/year = millimrems per year (a measure of radiation absorbed by the body)

5. WATER QUALITY TESTING RESULTS

WHAT DOES THIS DATA REPRESENT?

The water quality information presented in the table(s) is from the most recent round of testing done in accordance with our DEP Sampling schedule. All data shown was collected during the last calendar year unless otherwise noted in the table(s). We are not required to list the 200-300 biological, chemical, or other potential contaminants we test for that do not appear in our drinking water. We are committed to providing you with the best water quality available. We are proud to report that last year your drinking water met all applicable health standards regulated by the state and federal government. Results with a prior year(s) date are from the last monitoring period that those contaminants were required to be sampled per our MassDEP sampling plans.

LEAD AND COPPER

Tap water samples were collected for lead and copper analyses from sample sites throughout the community.									
SUBSTANCE (UNIT OF MEASURE)	**DATE COLLECTED**	**90TH PERCENTILE**	**# OF SITES EXCEEDED**	**# OF SITES SAMPLED**	**% OF SITES ABOVE ACTION LEVEL**	**ACTION LEVEL**	**MCLG**	**VIOLATION**	**POSSIBLE SOURCE OF CONTAMINATION**
Lead (ppm)	Q3 2022	0.0034	0	21	0	0.015	0.00	NO	Household Plumbing
Copper (ppm)	Q3 2022	0.239	0	21	0	1.3	0.00	NO	Household Plumbing

When water leaves the treatment facilities, the levels of lead and copper are insignificant and sometimes not detectable. The source for lead and copper is believed to be the piping in the homes' internal plumbing and old service lines. As water sits in stagnant pipes, during periods of low use, copper and lead in the pipes can leach into the drinking water. Lead was used in brass manufacturing and pipe solder. The Manchester Water Department performed its required sampling for Lead and Copper in August and September of 2022. This process consisted of collecting samples from 20 different residential homes, and two different schools located in Manchester. The sampling plan was approved by MassDEP based on when the home was constructed, and the type of materials used in the service line to the home. The sampling plan is intended to capture locations with the highest potential for lead exposure in drinking water.

TURBIDITY

TURBIDITY (UNIT OF MEASURE)	**TREATMENT TECHNIQUE**	**LOWEST MONTHLY % OF SAMPLES**	**HIGHEST DETECTED DAILY VALUE**	**VIOLATION**	**POSSIBLE SOURCE OF CONTAMINATION**
Daily Compliance (NTU)	1.0 *	-----	0.066	NO	Soil runoff; natural organic matter
Monthly Compliance*	At least 95%	100%	-----	NO	Soil runoff; natural organic matter

*1.0 NTU = TT MCL for conventional or direct filtration.

*5.0 NTU = TT MCL for slow sand filtration, diatomaceous earth filtration, or other filtration.

Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality.

*Monthly turbidity compliance is related to a specific treatment technique (TT). Our system filters the water so at least 95% of our samples each month must be below the turbidity limits specified in the regulations.

REGULATED CONTAMINANTS

REGULATED CONTAMINANTS							
CONTAMINANT (UNIT OF MEASURE)	**DATE(S) SAMPLED**	**AVERAGE DETECTED**	**RANGE LOW-HIGH**	**MCL [MRDL]**	**MCLG [MRDLG]**	**VIOLATION**	**POSSIBLE SOURCE(S) OF CONTAMINATION**
INORGANIC CONTAMINANTS							
Barium (ppm)	09.02.2022	0.0084	0.0084	2	2	NO	Erosion of natural deposits
Fluoride ■ (ppm)	2022	0.663	0.409 – 0.782	4	4	NO	Water additive that promotes strong teeth
Nitrate (ppm)	09.08.2022	0.795	0 – 1.59	10	10	NO	Runoff from fertilizer use; Erosion of natural deposits
Perchlorate (ppm)	09.08.2022	0	0	2	N/A	NO	Inorganic chemicals used as oxidizers in fireworks, munitions
DISINFECTANTS & DISINFECTANT BY PRODUCTS							
Chlorine (ppm) [free]	2022	1.10	0.81 – 1.39	[4]	[4]	NO	Water additive used for disinfection
THM'S [Total Trihalomethanes] (ppb)	2022	37.375	25 – 54	80	80	NO	Byproduct of drinking water disinfection
HAA's [Halo acetic Acids] (ppb)	2022	13.875	8 – 20	60	60	NO	Byproduct of drinking water disinfection
RADIOACTIVE CONTAMINANTS							
Gross Alpha (pick/l)	8.20.14	1.47	1.31 – 1.63	15	0	NO	Erosion of natural deposits
Radium 226 (pCi/l)	8.20.14	0.125	0.02 – 0.23	5 Combined	0	NO	Erosion of natural deposits
Radium 228 (pCi/l)	8.20.14	-0.45	(-.038) – (-0.52)	5 Combined	0	NO	Erosion of natural deposits
■ Fluoride also has a secondary contaminant level (SMCL) of 2 ppm.							

PER- AND POLYFLUOROALKYL SUBSTANCES - PFAS								
REGULATED CONTAMINANTS								
CONTAMINANT (UNIT OF MEASURE)	**DATE(S) SAMPLED**	**SITE**	**RANGE LOW-HIGH**	**HIGHEST QUARTERLY AVERAGE**	**MCL**	**VIOLATION**	**POSSIBLE SOURCES**	**HEALTH EFFECTS**
PFAS (6) (ppt)	2022	01S	5.44 - 7.89	Q1 2022 6.80	20	NO	Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of common household materials such as: moisture and oil resistant coatings on fabrics, fleeces, and other textiles, as well as items containing Teflon, like coated cooking pans. Additional sources include the use and disposal of products containing these PFAS, such as fire-fighting foams.	Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers
		01G	10.22 – 20.07	Q1 2022 16.17	20	NO		

UNREGULATED CONTAMINANTS								
CONTAMINANT (UNIT OF MEASURE)	**DATE(S) SAMPLED**	**SITE**	**RANGE LOW-HIGH**	**HIGHEST QUARTERLY AVERAGE**	**ORSG**	**VIOLATION**	**POSSIBLE SOURCES**	**HEALTH EFFECTS**
Perfluorohexanoic acid (PFHxA) (307-24-4) (ppt)	2022	01S	0.932 – 1.65	Q4 2022 1.46	†	NO	Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of common household materials such as: moisture and oil resistant coatings on fabrics, fleeces, and other textiles, as well as items containing Teflon, like coated cooking pans. Additional sources include the use and disposal of products containing these PFAS, such as fire-fighting foams.	Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers
		01G	3.93 - 72	Q1 2022 5.77		NO		
Perfluorobutancesulfonic Acid (PFBS) (375-73-5) (ppt)	2022	01G	2.04 – 3.25	Q3 2022 2.80	†	NO	" "	" "

† There is no ORS Guideline

SECONDARY, UNREGULATED, OR OTHER CONTAMINANTS

Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining their occurrence in drinking water and whether future regulation is warranted.

SECONDARY, UNREGULATED, AND OTHER SUBSTANCES							
CONTAMINANT (UNIT OF MEASURE)	**DATE SAMPLED**	**AVERAGE DETECTED**	**RANGE LOW-HIGH**	**SMCL**	**ORSG OR HEALTH ADVISORY**	**VIOLATION**	**POSSIBLE SOURCE**
SECONDARY INORGANIC CONTAMINANTS							
Sodium (ppm)	2022	93.4	35 - 107	N/A	20	NO	Natural sources; runoff from use as salt on roadways; by-product of treatment process
Sulfate (ppm)	04.19.2022	17.3	13.7 – 20.9	250	N/A	NO	Natural Sources
OTHER ORGANIC CONTAMINANTS - When detected at treatment plant as VOC residuals, not TTHM compliance							
Chloroform (ppb)	09.08.2022	5.8	0 – 11.6	--	--	NO	Byproduct of drinking water chlorination
Bromoform (ppb)	09.08.2022	0.45	0 - 0.9	N/A	N/A	NO	Byproduct of drinking water chlorination
Bromodichloromethane (ppb)	09.08.2022	5.55	0 – 11.1	N/A	N/A	NO	Byproduct of drinking water chlorination

Chlorodibromomethane (ppb)	09.08.2022	2.94	0 – 5.88	N/A	N/A	NO	Byproduct of drinking water chlorination
OTHER SECONDARY CONTAMINANTS							
Aluminum (ppm)	04.19.2022	0.016	0.014 – 0.018	2	N/A	NO	Aluminum salts are commonly added as coagulants during water treatment to remove turbidity, organic matter and microorganisms. Aluminum is also an impurity found in other water treatment chemicals and can leach into drinking water from cement mortar pipes or linings.
Chloride (ppm)	04.19.2022	97.875	46.5 - 151	250	N/A	NO	A chemical constituent of salt found in runoff and leaching of natural deposits.
Iron (ppm)	04.19.2022	0.019	0.0 – 0.038	0.3	N/A	NO	Naturally occurring element, corrosion of cast iron pipes
Manganese* (ppb)	2022	38	6 – 96	50	300*	NO	Erosion of natural deposits
pH (SU)	2022	7.43	7.24 – 7.63	6.5-8.5	--	NO	-----
Total Dissolved Solids (ppm)	04.19.2022	255	120 – 390	500	N/A	NO	Erosion of natural deposits
Zinc (ppm)	04.19.2022	0.095	0.015 – 0.176	5	N/A	NO	Erosion of natural deposits, leaching from plumbing materials
UNREGULATED AND OTHER CONTAMINANTS							
Conductivity (ohms/cm)	09.08.2022	460	240 – 680	N/A	N/A	NO	From dissolved salts and inorganic materials such as alkalis, chlorides, sulfides and carbonate compounds
Hardness [CaCO3] (ppm)	04.19.2022	69.05	39.2 – 98.9	N/A	N/A	NO	Naturally present in the environment
Alkalinity [CaCO3] (ppm)	04.19.2022	53	25 – 81	N/A	N/A	NO	-----
Potassium (ppm)	04.19.2022	3.3	1.6 – 5.0	N/A	N/A	NO	Naturally occurring element
Magnesium (ppm)	04.19.2022	6.4	2.9 – 9.9	N/A	N/A	NO	Naturally present in the environment
Calcium (ppm)	04.19.2022	17.1	10.9 – 23.3	N/A	N/A	NO	Naturally present in the environment
Phosphate (ppm)	2022	1.26	0.55 – 1.61	N/A	N/A	NO	Water additive for corrosion control

***US EPA and MassDEP have established public health advisory levels for manganese to protect against concerns of potential neurological effects.**

6. EDUCATIONAL INFORMATION

Manganese: Manganese is a naturally occurring mineral found in rocks, soil and groundwater, and surface water. Manganese is necessary for proper nutrition and is part of a healthy diet but can have undesirable effects on certain sensitive populations at elevated concentrations. The United States Environmental Protection Agency (EPA) and MassDEP have set an aesthetics-based Secondary Maximum Contaminant Level (SMCL) for manganese of 50 ug/L (micrograms per liter), or 50 parts per billion. In addition, MassDEP's Office of Research and Standards (ORS) has set a drinking water guideline for manganese (ORSG), which closely follows the EPA public health advisory for manganese. ***Drinking water may naturally have manganese and, when concentrations are greater than 50 µg/L, the water may be discolored and taste bad. Over a lifetime, the EPA recommends that people drink water with manganese levels less than 300 µg/L and over the short term, EPA recommends that people limit their consumption of water with levels over 1000 ug/L, primarily due to concerns about possible neurological effects. Children up to 1 year of age should not be given water with manganese concentrations over 300 ug/L, nor should formula for infants be made with that water for longer than 10 days.*** *The ORSG differs from the EPA's health advisory because it expands the age group to which a lower manganese concentration applies from children less than 6 months of age to children up to 1 year of age to address concerns about children's susceptibility to manganese toxicity.* See: EPA Drinking Water Health Advisory for Manganese https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_magnese_dwreport_0.pdf and MassDEP Office of Research and Standards Guideline (ORSG) for Manganese http://www.mass.gov/eea/docs/dep/water/drinking/alpha/i-thru-z/mangorsg.pdf.

Lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Manchester Water is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Disinfection is considered to be one of the most important measures in making drinking water safe and the process of neutralizing harmful micro-organisms that may be found in the water. Disinfection is required by Federal Law for all surface water supplies. Chlorine is the most commonly used chemical for drinking water disinfection. In Manchester, water from Gravelly Pond and the Lincoln Street Well is disinfected with sodium hypochlorite, a liquid form of chlorine. Chlorine is often of concern because of its distinct taste and odor and because of reports of the potential health effects of by-products associated with its use. To minimize the taste and odor concerns, the amount of chlorine added to the drinking water is minimized to levels that meet State and Federal regulations.

Fluoridation is the addition of fluoride to drinking water. Fluoridation is added to help prevent tooth decay and promote dental hygiene. The American Dental Association and the American Medical Association both endorse fluoridation as a public health measure. Fluoride is added to Manchester's drinking water at levels recommended by the State Department of Public Health. Fluoride is a naturally occurring element in many water supplies in trace amounts. In our system the fluoride level is adjusted to an optimal level averaging 0.7 part per million to improve oral health in children. The Massachusetts DPH acceptable level is 0.7 ppm. At this level it is safe, odorless, colorless, and tasteless. There are over 3.9 million people in 140 Massachusetts water systems and 184 million people in the United States who receive the health and economic benefits of fluoridation. Some home water treatment units are available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP. For more information, please call the Manchester Water Department at 978-526-1242 or for additional information on fluoride in drinking water; please contact the Massachusetts Department of Public Health, Office of Oral Health, 617-624-5943.

Corrosion Control: Distribution system corrosion is a major concern for the Town. The majority of the pipes in the distribution system are over 50 years old, with some over 100. Many of these pipes are made of iron, which in time begun to rust and corrode. During periods of high flow, the rust can get stirred up causing your drinking water to appear yellow or dirty. The Town treats the water by increasing the pH or reducing the acidity of the water to make it less corrosive and adding a corrosion inhibitor which provides a protective lining on pipes.

Total Trihalomethanes: Some people who drink water containing trihalomethanes in excess of the MCL over many years' experience problems with their liver, kidneys or central nervous systems and may have increased risk of getting cancer.

Sodium is a naturally occurring common element found in soil and water. It is necessary for the normal functioning of regulating fluids in human systems. Some people, however, have difficulty regulating fluid volume as a result of several diseases, including congestive heart failure, kidney failure and hypertension. The guideline of 20 mg/L for sodium represents a level in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled. For additional information contact your health provider, your local board of health or the Massachusetts Department of Public Health, Bureau of Environmental Health Assessment at 617-624-5757.

PFAS: Per- and Polyfluoroalkyl Substances are a group of chemical compounds called PFAS. Two PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), were extensively produced and are the most studied and regulated of these chemicals. Several other PFAS that are similar to PFOS and PFOA exist. These PFAS are contained in some firefighting foams used to extinguish oil and gas fires. They have also been used in a number of industrial processes and to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease and stains. Because these chemicals have been used in many consumer products, most people have been exposed to them. While consumer products and food are the largest source of exposure to these chemicals for most people, drinking water can be an additional source of exposure in communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, for example, an airfield at which they were used for firefighting or a facility where these chemicals were produced or used. The MassDEP drinking water standard is based on studies of the six PFAS substances in laboratory animals and studies of exposed people. Overall, these studies indicate that exposure to sufficiently elevated levels of the six PFAS compounds may cause developmental effects in fetuses during pregnancy and in breastfed infants. Effects on the thyroid, the liver, kidneys, hormone levels and the immune system have also been reported. Some studies suggest a cancer risk may exist following long-term exposures to elevated levels of some of these compounds. MassDEP - Drinking Water Program - One Winter Street - Boston, MA 02108 03-31-22 https://www.mass.gov/drinking-water-program 2 It is important to note that consuming water with PFAS6 above the drinking water standard does not mean that adverse effects will occur. The degree of risk depends on the level of the chemicals and the duration of exposure. The drinking water standard assumes that individuals drink only contaminated water, which typically overestimates exposure, and that they are also exposed to PFAS6 from sources beyond drinking water, such as food. To enhance safety, several uncertainty factors are additionally applied to account for differences between test animals and humans, and to account for differences between people. Scientists are still working to study and better understand the health risks posed by exposures to PFAS. If your water has been found to have PFAS6 and you have specific health concerns, you may wish to consult with your doctor.