

Town of Shrewsbury Water Department

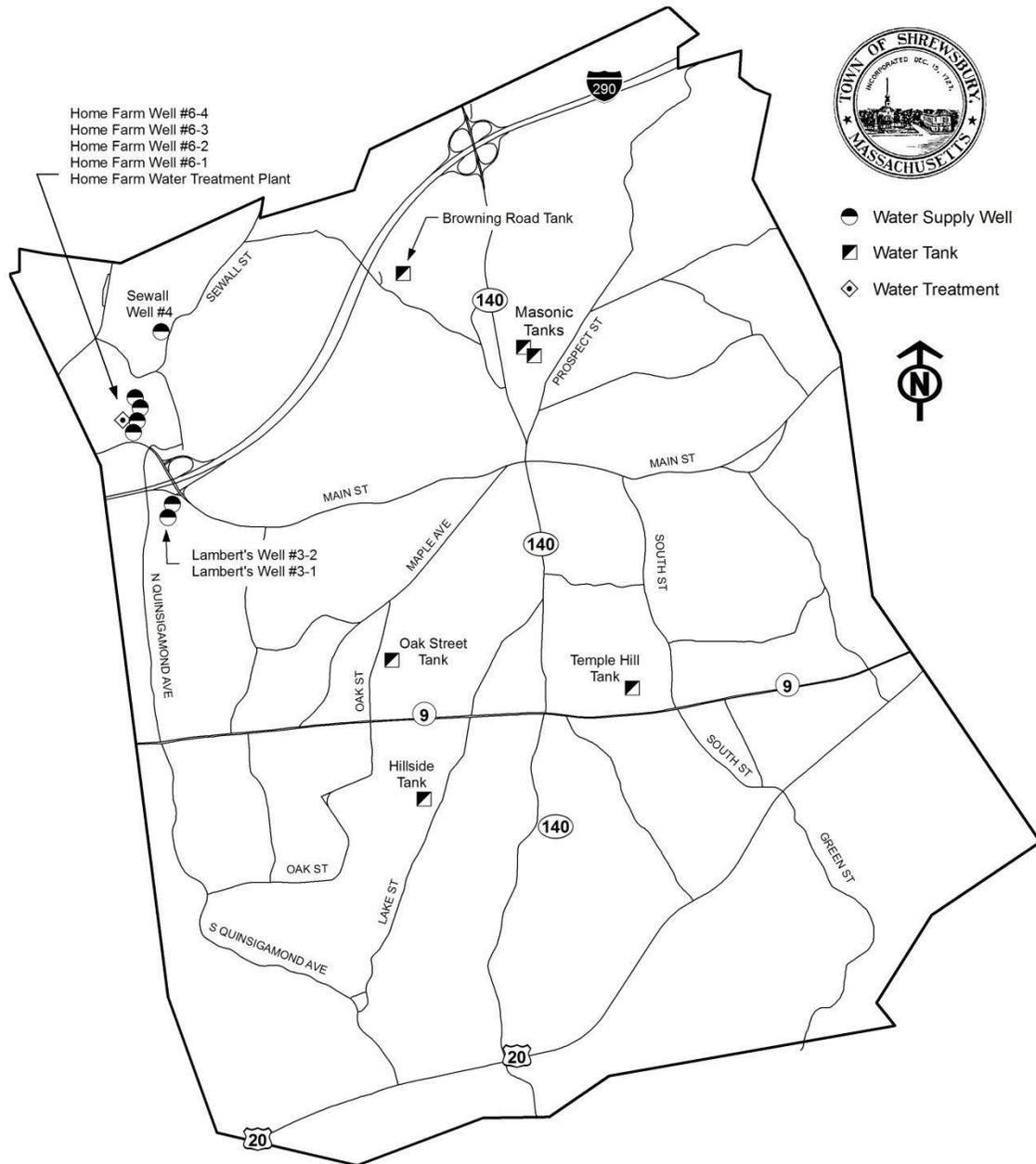
2017

Annual Drinking Water Quality Report

Public Water System Information

Shrewsbury Water Department PWS#2271000

The Shrewsbury Water Department is committed to providing our customers with high quality drinking water 24 hours a day, 365 days a year. To ensure we deliver this quality product, we continue to make significant investments in water treatment facilities, water quality monitoring, water sources, and the distribution system. Today's consumers are keenly aware of environmental and health issues, so they should have information regarding their water supply. Well-informed customers are our best allies in supporting improvements necessary to maintain the highest drinking water standards.



- Water Supply Well
- Water Tank
- ◆ Water Treatment



The Water Department is located on the second floor of the Richard D. Carney Municipal Building, at 100 Maple Ave. We hope this report answers any questions that you may have regarding the water supply. If you have any further concerns, please contact Robert Tozeski @ (508) 841-8506. Our fax number is (508) 841-8497.

Source Water Assessment and Protection Report

The Source Water Assessment and Protection (SWAP) program requires states to assess the susceptibility of the public water supplies to potential sources of contamination. The Department of Environmental Protection (Mass DEP) has completed its assessment on each of the Zone II's for Town of Shrewsbury's Wells. Each of our wells has a protected area known as Zone I which is the 400 foot radius proportional to the well's pumping rate. The Town owns or controls by easement this area for each of our individual wells. The Zone II area for each well is the primary recharge area for the aquifer. This area is defined by hydrogeologic studies and varies for each well source.

A susceptibility rating of high was assigned to each Zone II using the information compiled by Mass DEP. The main reason being that the wells are located in an aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barrier (i.e. clay) that can prevent contaminant migration. There is also a mixture of residential, commercial and light industrial land uses along with the Route 290 corridor in the Zone II areas.

The Shrewsbury Water Department has long recognized the susceptibility of its sources, and has worked closely with the state to maximize the protection of all of its Zone II's. An Aquifer Overlay District for allowed activities and building requirements in our different well zones has been in place since 1988 along with numerous other zoning by laws passed over the years at our annual Town Meeting. The complete SWAP report can be reviewed online at <http://www.mass.gov/eea/docs/dep/water/drinking/swap/cero/2271000.pdf> or at the Shrewsbury Water Department in the Richard D. Carney Municipal Building, 100 Maple Ave.

Drinking Water Sources

The Town's water supply comes entirely from a series of eight (8) active gravel packed groundwater supply wells, located in the northwest quadrant of Town. The six wells are pumped to the Home Farm Water Treatment Plant facility for treatment before entering the distribution system. State and federal drinking water regulations require certain chemical treatments before groundwater enters the distribution system:

- Air stripping is performed on the waters from the Home Farm, 6-1, Home Farm 6-3, 6-4 & 6-5 satellite wells and 6-2 wells to remove VOC'S (Volatile Organic Compounds). After treatment, levels have remained undetectable.
- Chlorine is added to disinfect the water to prevent waterborne diseases
- Potassium Hydroxide which adjusts the pH of the water and a phosphate based corrosion inhibitor is added to minimize lead and copper. Also, manganese is sequestered in the process to prevent problems in the distribution system
- Fluoride is added for tooth decay prevention

The three remaining wells South St., Sewall St. #5 and Oak St are presently not in use because their rated daily capacities have been transferred to the Home Farm Wells. This site has higher yield capacity and better pumping efficiency for the Town.

The Board of Selectmen often have water related issues on their agenda and we would encourage your attendance and participation in these meetings.

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. It can pick up substances resulting from the presence of animals or from human activity. 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 stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides -which may come from a variety of sources such as agricultural, urban stormwater 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 stormwater runoff, and septic systems.

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

Lead & Copper – 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. The Town of Shrewsbury Water Department 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>.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (EPA) prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) 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 at 800.426.4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-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 at 800.426.4791.

Important Definitions

Maximum Contaminant Level (MCL) – the highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

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.

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

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 that, if exceeded, triggers treatment or other requirements that a water system must follow.

Parts Per Million (ppm) – This unit is equivalent to one milligram per liter (mg/L). One part per million is equal to:

- One ounce in 82,500 pounds
- One minute in two years
- One penny in \$10,000

- One drop in ten gallons

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

Parts Per Billion (ppb) – Micrograms per liter (ug/L). Equivalent to one drop in 10,000 gallons

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

Lead and Copper 90th Percentile – Out of every 10 homes sampled, 9 were at or below this level.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant 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 below which there is no known expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

ND= not detected N/A= not applicable

WATER QUALITY TESTING RESULTS

The tables below list all the drinking water contaminants that were detected during the 2017 calendar year or during the most recent monitoring period for each contaminant group in the water supplied to the distribution system.

Bacteria	Highest # Positive Samples In a Month	MCL	MCLG	Violation Y/N	Possible Source of Contamination
Total Coliform**	0	1	0	N	Naturally present in the environment
E. Coli	0	**	0	N	Human and animal fecal waste

*Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful bacteria may be present.

** Compliance with the E. coli MCL is determined upon additional repeat testing.

Regulated Contaminants	Date Collected	Highest Result	RANGE	MCL	MCLG	Violation Y/N	Possible Source
Inorganic Contaminants							
Nitrate (ppm)	05/04/17	0.75	0.75	10	10	N	Runoff from fertilizer use; leaching from septic tanks, sewage, erosion
Hexavalent Chromium (ppb)	04/04-12/11/17	5.5	3.0-5.5	100	100	N	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories
Barium (ppm)	05/04/17	0.023	0.023	2	2	N	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Fluoride (ppm)	Daily	0.82	0.615-0.82	4*	4	N	Water Additives which promotes strong teeth
Perchlorate (ppb)	09/11/17	0.00	0.00	2	--	N	Rocket propellants, fireworks, munitions flares, blasting agents
Radioactive Contaminants							
Gross Alpha Particle (Latest scheduled results)	5/31/13	0.27	--	15	0	N	Erosion of Natural Deposits
Combined Radium (Latest scheduled results)	5/30/13	0.61	--	5	0	N	Erosion of Natural Deposits

*Fluoride also has a secondary contaminant level of 2ppm.

Regulated Contaminants	Date(s) Collected	*Highest Quarterly RRA	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation Y/N	Possible Source(s) of Contamination
Disinfection and Disinfection By-Products							
Chlorine (ppm)	Monthly (2017)	0.01	0.00-0.01	4	4	N	Water additive used to control microbes
Haloacetic Acids (ppb)	09/06/17	2.7	0.0-2.7	60	--	N	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs) (ppb)	09/06/17	9.2	8.2-9.2	80	--	N	Byproduct of drinking water chlorination

* Highest RRA = running annual average of four consecutive quarters. Compliance is based on the quarterly RRAs.
 Note: Chlorine is reported as the highest monthly average for 2013. Sampling is done daily and averaged for month.

Inorganic Contaminants	Date (s) Collected	90 th Percentile	Action Level (AL)	MCLG	#sites Sample	#sites above AL	Possible Source
Lead (ppb) (Various locations)	09/11-09/21/17	1.9	15	0	30	0	Corrosion of household plumbing systems
Copper (ppm) (Various locations)	09/11-09/21/17	0.32	1.3	1.3	30	0	Corrosion of household plumbing systems

Unregulated/Secondary Contaminants	Date Collected	Range Detected	Average	SMCL	ORSG	Possible Source
Manganese (ppb)* Distribution System	Monthly 2017	145-469	313	50	300	Erosion of natural deposits
Sulfate (ppm) (Latest Result)	05/06/14	2.2	2.2	250	N/A	Natural Sources
Sodium (ppm)***	05/04/17	108	108	N/A	20	Natural sources, runoff from road salt
Nickel (ppb)	05/04/17	2.3	2.3	N/A	100	Discharge from industrial processes
Bromoform (ppb)	09/06/17	ND-0.78	0.39	700	N/A	Trihalomethane; byproduct of drinking water chlorination
Bromodichloromethane (ppb)	09/06/17	ND-0.72	0.36	700	N/A	Trihalomethane; byproduct of drinking water chlorination
Tetrachloroethylene (ppb)	05/04/17	ND-2.5	1.25	5	N/A	Manufactured in chemicals used in coatings and lubricants
Radioactive Contaminants						
Radon (pCi/L) (Latest scheduled results)	6/20/13	250	250	N/A	10,000	Natural Source

*Manganese: US EPA and MassDEP have established public health advisory levels for manganese to protect against concerns of potential neurological effects. More information on this contaminant can be found on page eight (8) of this report

***Sodium sensitive individuals, such as those experiencing hypertension, kidney failure, or congestive heart failure should be aware of the levels of sodium in their drinking water where exposures are being carefully controlled.

Cross-Connection Control and Backflow Prevention

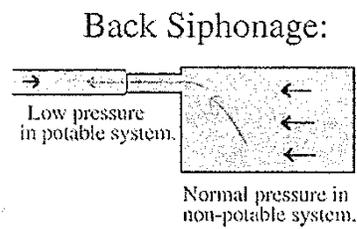
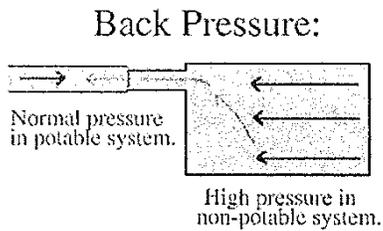
The Town of Shrewsbury makes every effort to ensure that the water delivered to your home and business is clean, safe and free of contamination. Our staff works very hard to protect the quality of the water delivered to our customers from the time the water is extracted via deep wells from underground aquifers or it is withdrawal from a surface water source, throughout the entire treatment and distribution system. But what happens when the water reaches your home or business? Is there still a need to protect the water quality from contamination caused by a cross-connection if so, how?

What is a cross-connection?

A cross-connection is any actual or potential connection between the drinking water lines and potential sources of pollution or contamination such as a piping arrangement or equipment that allows the drinking water to come in contact with non-potable liquids, solids or gases hazardous to humans in event of a backflow.

What is a backflow?

Backflow is the undesired reverse of the water flow in the drinking water distribution lines. This backward flow of the water can occur when the pressure created by an equipment or system such as a boiler or air-conditioning is higher than the water pressure inside the water distribution line (backpressure), or when the pressure in the distribution line drops due to routine occurrences such as water main breaks or heavy water demand causing the water to flow backward inside the water distribution system (backsiphonage). Backflow is a problem that many water consumers are unaware of, a problem that each and every water customer has a responsibility to help prevent.



What can I do to help prevent a cross-connection?

Without the proper protection something as simple as a garden hose has the potential to contaminate or pollute the drinking water lines in your house. In fact over half of the country's cross-connection incidents involve unprotected garden hoses. There are very simple steps that you as a drinking water user can take to prevent such hazards, they are:

- NEVER submerge a hose in soapy water buckets, pet watering containers, pool, tubs sinks, drains or chemicals.
- NEVER attach a hose to a garden sprayer without the proper backflow preventer.
- Buy and install a hose bibb vacuum breaker in any threaded water fixture. The installation can be as easy as attaching a garden hose to a spigot. This inexpensive device is available at most hardware stores and home-improvement centers.
- Identify and be aware of potential cross-connections to your water line.
- Buy appliances and equipment with a backflow preventer.
- Buy and install backflow prevention devices or assemblies for all high and moderate hazard connections.

If you are the owner or manager of a property that is being used as a commercial, industrial or institutional facility you must have your property's plumbing system surveyed for cross-connection by your water purveyor. If your property has NOT been surveyed for cross-connection contact the Shrewsbury Water Department to schedule a cross-connection survey.

Radon

Radon is a radioactive gas that you cannot see, taste, or smell. It is found throughout the United States. Radon can move up through the ground and into a home through cracks and holes in the foundation. Radon can build up to high levels in all types of homes. Radon can also get into indoor air when released from tap water from showering, washing dishes, and other household activities. Compared to radon entering the home through soil, radon entering the home through tap water will be (in most cases) a small source of radon in indoor air. Radon is a known human carcinogen. Breathing air containing radon can lead to lung cancer. Drinking water containing radon may also cause increased risk of stomach cancer. If you are concerned about radon in your home, test the air in your home. Testing is inexpensive and easy. Fix your home if the level of radon in your air is 4 picocuries of radon per liter of air (pCi/l) or higher. There are simple way to fix a radon problem that aren't too costly. For additional information, call your state radon program or call EPA'S Radon Hotline, 800 SOS.RADON.

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 µg/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 µg/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 µg/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

http://www.epa.gov/safewater/ccl/pdfs/reg_determine1/support_cc1_magnese_dwreport.pdf and MassDEP Office of Research and Standards Guideline (ORSG) for Manganese
<http://www.mass.gov/eea/agencies/massdep/water/drinking/manganese-in-drinking-water.html>

The Town of Shrewsbury did record distribution samples at or above the manganese health advisory level of 0.3 mg/L (300 ppb) during 2017.

Water System 2017 Overview

Water Department

2017 was an exciting year as groundbreaking took place in early July for a new Water Treatment Plant located behind the existing Home Farm Treatment Facility. The low bidder for the project was Waterline industries out of Seabrook, New Hampshire with a bid of \$11,499,077.00 substantially under the construction estimate of \$14,000,000. The new plant will use biological treatment to remove manganese, a groundwater mineral, from the drinking water supply. When completed this plant will be the second largest in the United States using this technology for manganese removal behind only Lake Havasu, Arizona. Funding for this project was provided by the State Revolving Fund at a two percent interest rate. Traditionally, green sand filtration is the treatment of choice for this type of process but during pilot testing biological technology far out performed all conventional methods. This will allow us higher rates of flow through the filters, longer time between backwashes, less chemical used especially potassium permanganate and less taste and odor issues. We feel the Town will benefit from using innovative technology both in the short and long term in improved quality of water and less system issues.

The Department worked with Mass DEP and Tetra Tech, the environmental consultant for Metso Controls throughout the year in the installation and testing of additional monitoring wells along Bowditch Drive and Plantation Street for detection of hexavalent chromium. This chemical compound had been detected in low levels in our finished water and we have proactively spent much time and effort working to identify the source and how it is influencing our groundwater wells. At year's end, the source had not been clearly identified but bedrock characteristics and hydrogeologic information were better understood in this area. The depth to bedrock along Plantation Street was observed to be between 30 to 44 feet below ground level. The depth to bedrock drops significantly easterly toward our well sites and is found to be greater than 100 feet below the ground surface. The ground surface also drops significantly toward the east along Bowditch Drive. Higher levels of hex chrome in the range of 1900 ppb (parts per billion) to 990 ppb were encountered near the southeast property corner of Bowditch Drive between the Metso rear addition toward Plantation Street. The main plume continues away from our wells with a small, thinner finger with much lower levels branching off that is picked up in varying degrees by three of our wells on our southeast property corner. By limiting the pumping of the well that is our lowest output producer of the three affected wells, it allows the hex chrome to stay low in the adjacent two wells. When combined with flow from our new replacement well Home Farm 6-5, our hex chrome levels remained low at 3.00 ppb for the month of December

which is well below the State Maximum Contaminant level of 100 ppb for total chromium and also below the California State level (the only state to enact a level for Hexavalent Chromium individually) of 10ppb.

Even though levels are low, we continue to evaluate treatment options to consider if levels of hex chrome rise or change. To this effect, we have been working with a company, AdEdge Water Technologies, to set up pilot testing a biological treatment method to remove hex chrome from our incoming water supply. We have received approval from Mass DEP to proceed with the pilot testing in the spring of 2018 to see its viability in this process.

During the year, we successfully installed a new replacement well Home Farm 6-5. This well shows no manganese to date and less than 0.1 ppb for hex chrome in the raw water which is an excellent supply well for the Town along with increased output. We have also started the process of installing test wells at our Sewell Street well site to install a new additional replacement well source to further protect our well supply. By adding these replacement wells and mixing their source water with our other supply wells in conjunction with evaluating other potential hex chrome treatment alternatives, we are working to try to keep levels of hex chrome as close to zero as possible.

During the year, the Department worked on water main replacement projects on Lake Street on various sections between Grafton Street and Boston Turnpike along with Jill Circle. This work completes the entire length of water main between Grafton Street and Boston Turnpike being replaced along with all of Janet Circle, Jill Circle, Elaine and Roger Streets.

The annual water quality report is available upon request at the Shrewsbury Water Department, 100 Maple Ave. Please contact us at (508) 841-8506 for more information regarding this matter.

OUTDOOR WATER USE RESTRICTIONS

Effective between May 1 and September 30, 2018, unless modified by the Commissioners, based upon the street address number as follows:

Even numbered addresses may use water outdoors: Wednesday & Saturday only

Odd numbered addresses may use water outdoors: Thursday and Sunday only

No nonessential outdoor water use on Monday, Tuesday and Friday

Outdoor Watering Hours

Nonessential outdoor watering hours are restricted to before 9:00 A.M. and after 5:00 P.M.

Nonessential outdoor water uses that are subject to the mandatory restrictions include:

- Irrigation of lawns via sprinklers or automatic irrigation systems
- Washing of vehicles, except in a commercial car wash or as necessary for operator safety; and
- Washing of exterior building surfaces, parking lots, driveways or sidewalks except as necessary to apply surface treatments such as paint, preservatives, stucco, pavement, or cement.

The following uses may be allowed when these mandatory restrictions are in place before 9:00 AM and after 5:00 PM.

- Irrigation to establish a new lawn and new plantings during the months of **May** and **September**
- Irrigation of public parks and recreational fields by means of automatic sprinklers outside the hours: and
- Irrigation of lawns, gardens, flowers and ornamental plants by means of a hand-held hose.

Town of Shrewsbury Water & Sewer Dept.
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