

Q: What has changed? Why am I receiving this notice now?

Given that manganese is not a regulated contaminant, sampling for manganese has historically been done on a voluntary basis. Sample results collected prior to October 2013 were published in our annual Consumer Confidence Report along with the Health Advisory language that the EPA had established in 2004. In October 2013, the DEP announced a new outreach initiative designed to raise awareness regarding manganese in drinking water. Starting in 2014, all public water systems will be required to analyze their drinking water for the presence of manganese so that DEP can characterize the occurrence, possible sources, and possible health risks associated with manganese in those water systems. In an effort to keep our customers informed, we are choosing to be proactive in providing you with information about our sampling results to date as well as the important steps we are taking to identify and implement solutions.

Q: What is being done to ensure my tap water is safe to drink?

We are committed to producing drinking water that meets all state and federal drinking water standards. In 2012, in accordance with DEP regulations, we collected more than 700 samples and tested for over 100 regulated contaminants. We are pleased to report that all samples collected were below regulatory limits established by the DEP.

What's Next?

We will continue to work with our consultants and the DEP in order to minimize manganese levels in our finished water. In addition, we will continue to collect samples from residences and businesses on a regular basis in an effort to monitor water quality throughout our system. Our analysis will include not only manganese but iron, color, turbidity, calcium, pH, and chlorine. By monitoring for these contaminants we are better suited to respond to future complaints in a timelier manner. These results will be posted on our web site at: www.hanoverdpw.org.

Contact Information

How can I get more information about manganese?

For additional information on manganese please visit the DEP web site at: www.mass.gov/eea/agencies/massdep/water/drinking/manganese-in-drinking-water.html.

Neal Merritt, Deputy Superintendent Water Operations
merritt@hanoverdpw.org

Troy B.G. Clarkson, Town Manager
troy.clarkson@hanover-ma.gov

Town of Hanover's Web site address: www.hanover-ma.gov



Printed on recycled paper.



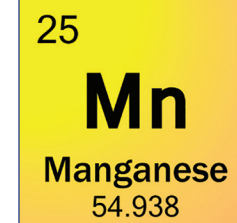
Town of Hanover



ENVIRONMENTAL UPDATE: Public Water Supply

As you may be aware, during this past summer we received numerous water quality complaints from residents in the northern part of town expressing concern about the water staining laundry and plumbing fixtures and also having an unpleasant taste and odor. This problem can be attributed to elevated levels of manganese in the water mains. We are pleased to report that since mid October, the manganese levels within the system have returned to normal.

This informational brochure is designed to explain what manganese is, what health effects are associated with manganese, and what is being done on our part to minimize the amount of manganese in our water supply.



Troy B.G. Clarkson, Town Manager

YOUR WATER SYSTEM

The Hanover water system consists primarily of nine wells, three treatment plants, three storage tanks, and approximately 110 miles of water main. Your water is treated at one of the following treatment plants prior to it entering the water distribution system:

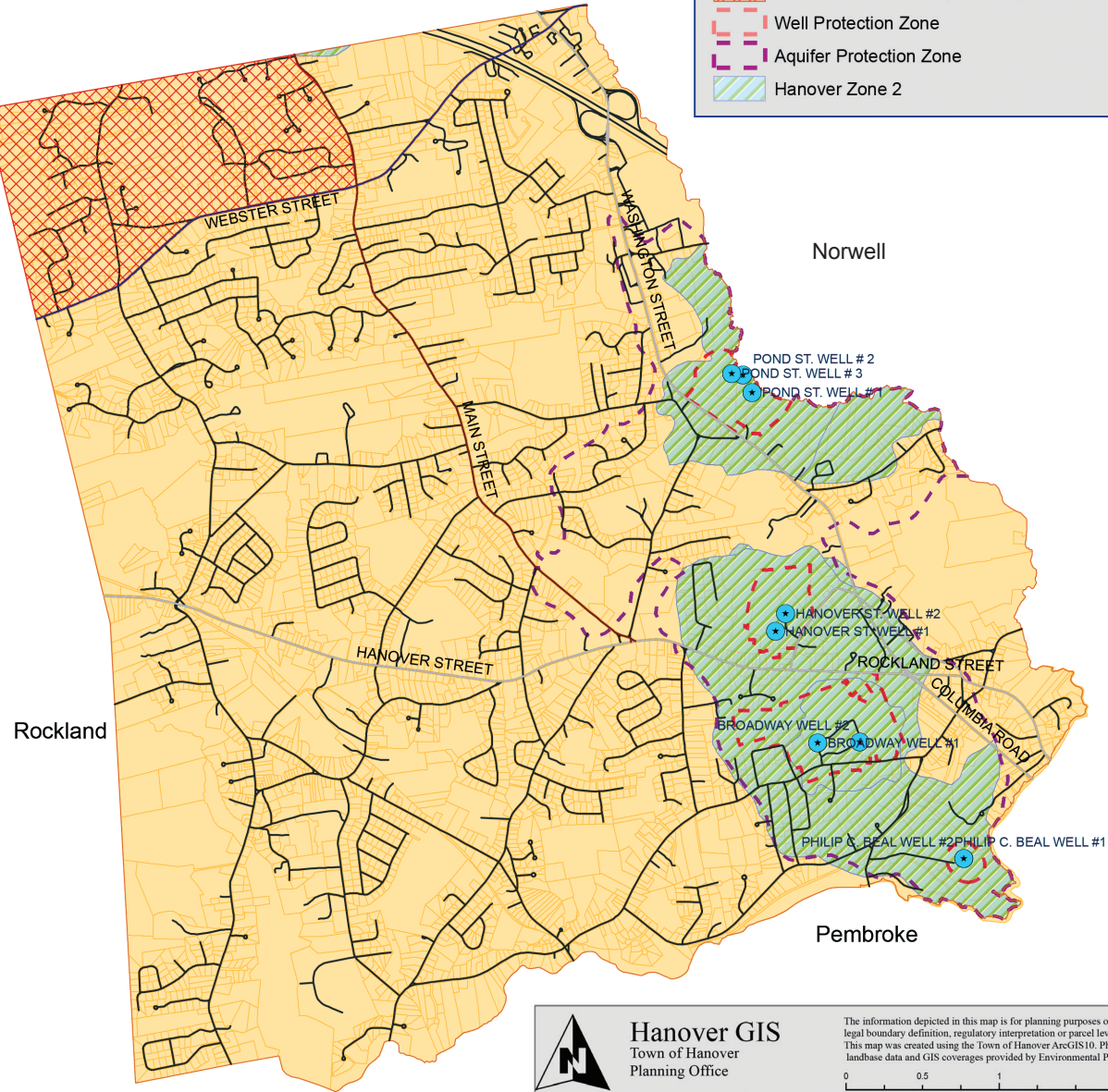
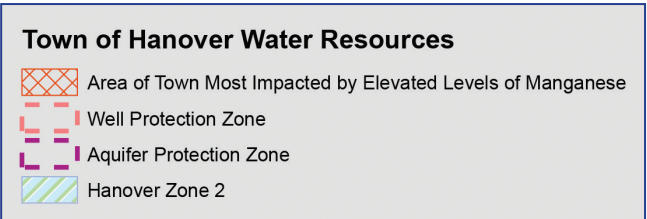
Pond Street Water Treatment Plant: This plant uses chemical addition, rapid mixing, flocculation, sedimentation, and filtration through mixed media filters to treat three groundwater wells for iron, manganese, organic color, and turbidity. The source wells for this plant are Pond Street Wells #1, #2, and #3 which are located to the rear of the treatment plant.

Beal Water Treatment Plant: This plant is designed to remove iron, manganese, and radon from two deep bedrock wells using a combination of chemical addition, air stripping, and manganese greensand pressure filtration. The source wells for the Beal Plant are Beal Wells #1 & #2 which are both located in close proximity to the plant.

Broadway Water Treatment Plant: Similar to the Beal Plant, this facility is designed to remove iron, manganese, and organic color using a combination of chemical addition and manganese greensand pressure filtration. Source wells for the Broadway plant consist of two wells located off of Hanover Street (Hanover Street Wells #1 & #2) and two wells located off Broadway (Broadway Wells #1 & #2).



Town of Hanover



FREQUENTLY ASKED QUESTIONS ABOUT MANGANESE

Q: What is manganese and where does it come from?

Manganese (Mn) is a common naturally-occurring mineral found in rocks, soil, groundwater, and surface water. Manganese is a natural component of most foods and it is an essential trace mineral in our diets.

Q: What are the levels of concern?

The United States Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (DEP) currently list manganese as a secondary contaminant because of aesthetic concerns including unacceptable taste, staining of fixtures and dark, cloudy water at levels greater than 50 micrograms per liter (µg/L) or parts per billion (ppb). Over a lifetime, the USEPA and DEP recommend that people drink water with manganese levels less than 300µg/L and over the short term, recommend that people limit their consumption of water with levels over 1000µg/L, primarily due to concerns about possible neurological effects. Children up to 1 year of age should not be given water with manganese over 300µg/L, nor should formula for infants be made with that water for longer than 10 days.

Q: Why is it present in my drinking water?

As stated earlier, Hanover gets its water from nine ground water sources, all of which contain varying amounts of manganese. The following table shows the average raw water manganese levels entering the three treatment plants, the average treated water manganese level exiting these plants, and the percent of manganese removal for 2012.

Table 1: Average Manganese Levels (2012)			
Treatment Plant	Raw Water Manganese (µg/L)	Treated Water Manganese (µg/L)	Mn Removal %
Pond Street WTP (Pond Street Well #1, #2, & #3)	280	41	85
Beal WTP (Beal Well #1 & #2)	1,200	15	99
Broadway WTP (Hanover Street Well #1 & #2) (Broadway Well #1 & #2)	380	15	96

As you can see, our treatment plants are effective at removing manganese. However, note that not all of the manganese is removed prior to entering the distribution system. As water exits the treatment plants and flows through the water distribution system, the remaining manganese settles out on the walls of the water mains. When there is a hydraulic disturbance in the system, such as a water main break, the use of a fire hydrant, flushing operations, or excessive summertime demand, these manganese sediments (and other sediments) may get dislodged from the water main wall and drawn into your home plumbing.

Q: What were typical manganese levels during the summer months in the northern part of town?

During the summer, this office collected and analyzed over 60 samples from residents. Test results showed an average manganese level of 284µg/L. Maximum and minimum levels detected were 900µg/L and 12µg/L, respectively.

Q: What are the current manganese concentrations in the northern part of town?

Test results for October and November (24 samples) show an average manganese level of 43µg/L, with maximum and minimum levels of 150µg/L and 16µg/L, respectively.

Q: What are the current manganese concentrations throughout the rest of town?

Starting on October 30th, we began to test the water for manganese in the remaining parts of town. Since that time 103 samples have been collected. Test results show an average manganese level of 29 ug/L with maximum and minimum levels of 71 ug/L and 4 ug/L, respectively.

Q: What is the DPW doing about the manganese problem?

We are working with our consultant in an effort to improve upon our existing water main flushing program which has been in place for over 40 years. Each Spring and Fall the entire distribution system, consisting of over 110 miles of water main, is flushed in order to remove sediment deposits (typically iron and manganese) from within the pipes. It is our intent to improve upon this plan and thereby increase the amount of solids removed from the mains.

We are also working with our consultant to improve manganese removal from our Pond Street Treatment Plant. In the summer months, the raw water entering the Pond Street plant becomes difficult to treat due to a significant increase in organic color. As a result, we can see manganese levels leaving the plant slightly above the secondary contaminant level of 50µg/L. Our goal is to modify the Pond Street plant treatment processes and/or equipment in order to improve upon our manganese removal.