

2018

WATER QUALITY REPORT



A letter from the Director of Public Works...

Dear Community Members,

The Plainville public water system has faced many challenges over the last few years in its efforts to produce and deliver clean safe drinking water to the 2,400 residential and commercial customers it serves. For many it seemed that the water quality was poor, especially for those located in the south east portion of Town. Calls reporting discolored or dirty water were frequently received by the Water Operations Center. The Water Operation's crew worked diligently to respond to the reports of dirty/discolored water by flushing hydrants at or near the ends of pipelines; customers were also instructed to run their water until the water ran clear. These activities had limited or temporary success.

In the fall of 2017, the Water Operations staff conducted a water system flushing of the entire public water distribution pipeline. Although results showed significant removal of sediments from the pipeline, reports of discolored water soon redeveloped in the same south east area of Town. It was determined that elevated levels of iron and manganese coming from the Mirimichi wells was the root cause of these water quality issues. In an effort to improve water quality the Mirimichi Well field was taken offline later that fall. Reports of discolored/dirty water quickly subsided as water quality improved. Although the Mirimichi well field is offline, the wells pumps and systems are routinely operated to maintain their readiness to supply water at some point in the future.

During this same time period, routine testing samples showed elevated total trihalomethanes (TTHM). TTHMs are formed when naturally occurring organic and inorganic materials in water react with the disinfectants forming a disinfection byproduct. As a result of the elevated levels of TTHMs the Town was found to be in violation of a Massachusetts Department of Environmental Protection Agency (DEP) disinfection by-product rule and the public water system was required to notify all customers of this violation.

Routine testing samples taken in December of 2017 showed elevated total trihalomethanes (TTHM), and elevated Haloacetic Acids (HAA5). HAA5s occurs when natural organic and inorganic materials in water react with disinfectants forming a second disinfection byproduct. The elevated levels of TTHMs and HAA5s resulted in a second violation of the DEP disinfection by-product rule and the public water system was required to notify all customers of this violation.

Immediately following the second violation of the DEP disinfection by-product rule, the Public Works Department proactively enlisted the assistance of a professional engineering firm to investigate the source of Plainville's water quality issues and to make recommendations to reduce the formation of TTHMs and HAA5s.

In February of 2018, the DEP issued an Administrative Consent Order addressing the second violation of the disinfection by-product rule, outlining requirements of the public water system to come into line with Massachusetts Drinking Water Regulations.

In response to the ACO issued by the DEP, the Plainville Public Works Department in conjunction with professional engineers prepared and filed a report with the DEP outlining the findings of the investigation; and activities to remediate water quality issues and reduce the levels of TTHMs and HAA5s in Plainville's water. The report found that Plainville's elevated disinfection byproduct levels were likely caused by ineffective chlorine dosing and insufficient distribution system operation and maintenance. The following actions were recommended to bring the system into compliance:

- Implementation of a semi-annual unidirectional flushing program.
- Annual water tank inspection with cleaning and disinfection to take place every five years.
- Operational changes to reduce the age of the stored water in the tanks.
- Optimization of treatment techniques.

We are pleased to report that we have implemented all of the recommended actions. Over the spring and summer, the treatment techniques were adjusted to improve effectiveness of disinfectants; and the Sharlene Water Storage tank was drained, cleaned and refilled. Operational changes have increased water draw down of both the East Bacon and Sharlene water storage tanks resulting in reduced water age; and the Turnpike Lake Water Treatment Contact Tank was drained and cleaned in mid-December.

We are confident that these changes have resulted in improved water quality and we are committed to further improvements to the operation and maintenance of Plainville's Public Water System.

In closing the following report details the operation of the Plainville water distribution system, the measures taken to improve water quality and reduce the formation of trihalomethanes and haloacetic acid.

Sincerely,

Paul Scott

Paul Scott
Director of Public Works



Mission

The Plainville Public Work's Water Operation's primary mission is the delivery of clean, safe potable water to the community for consumption. Our goal is to provide the community with water that is not only safe but dependable. Our team works diligently to continually improve the water treatment process and protect our water resources.

Our Team Delivers

The water delivered to Plainville's consumers is regulated by state and federal laws, as such all of our water treatment plan operators and system operators must be licensed and are required to continuously update their training to meet all regulations and standards. Our licensed water professionals have a basic understanding of a wide rage of subjects, including chemistry, biology, math and physics. Our operators are tasked with:

- Operating and maintaining equipment to disinfect and distribute potable drinking water;
- Monitor and inspect machinery, meters, gauges, and operating conditions;
- Conduct tests and inspections on water and evaluating the results;
- Maintaining optimal water chemistry;
- Applying data to formulas that determine treatment requirements, flow levels, and concentration levels;
- Documenting and reporting test results and system operations to regulatory agencies; and
- Serving our community through customer support, education and outreach.

When you turn on your faucet, take a shower, or pour a glass of water please think of the skilled professionals who stand behind each drop.

Where Does My Water Come From?

The Town of Plainville supplies water to 2,400 water service connections within the community through groundwater wells and the intermunicipal agreement with the Town of North Attleborough.

The public water supply delivered to the community is absolutely safe. The Town of Plainville draws its water from three wells located in the Turnpike Lake area; and from Plainville's well #3 located off West Bacon Street.

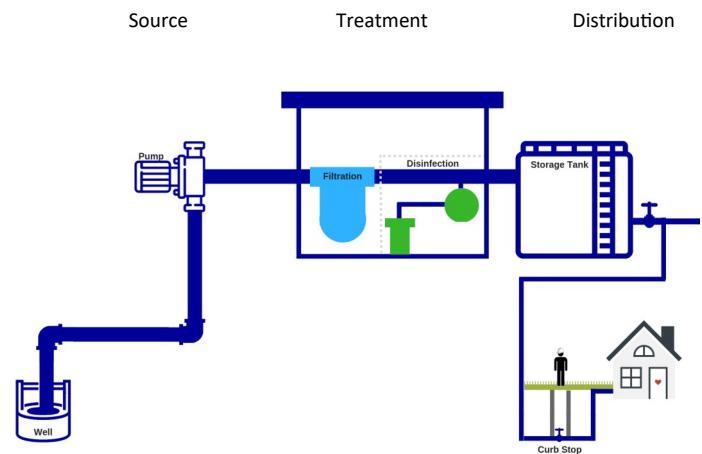
Plainville also has three groundwater wells near Lake Mirimichi. The Lake Mirimichi wells were taken off line in September of 2017 due to elevated levels of iron and manganese.

Plainville's Water Distribution Network

The Plainville Water Distribution System supplies water through 58 miles of water main to 2,400 service connections utilizing two water storage tanks and five booster pumping stations.

The Flow of Our Water

Water is pumped from the groundwater wells, treated at the Turnpike Lake Water Treatment Plant and at the North Attleboro Water Treatment plant, then pumped to water storage tanks which deliver water to consumers through water mains and service connections.



Turnpike Lake Treatment Facility

Water is drawn from the Turnpike Lake Wells, which is treated at the Turnpike Lake Treatment Plant. The water is treated for iron, manganese, volatile organic compounds, and is disinfected; it is then routed to both the water storage tanks; and the distribution system to the community through water mains that feed service lines to water consumers.

Water Supplied through the Intermunicipal Agreement with the Town of North Attleboro

Water is pumped from Plainville's well #3 to the North Attleboro Treatment Plant. The water is treated for iron, manganese, volatile organic compounds, and is disinfected; it is then routed to the Everett Street Booster Pump Station and water storage tanks. Water is then distributed to the community through water mains that feed service lines to water consumers and is stored in water storage tanks for fire protection.

Water storage is essential to meet all of Plainville's domestic, industrial and fire demands. Plainville has two storage tanks, the East Bacon Water Storage Tank and the Sharlene Water Storage Tank. Each of the tanks are flat bottom cylindrical tanks. The East Bacon Water Storage tank is a steel water storage tank and has the capacity to hold 1.5-million-gallons of water. The Sharlene Water Storage Tank is a concrete water storage tank with the capacity to hold 1.5-million-gallons of water.

Plainville's five booster pump stations are instrumental in pressurizing the water distribution system for elevated segments of Town to maintain constant reliable water supply and pressure.

Quality Control

As mandated by the Massachusetts Department of Environmental Protection and the Massachusetts Drinking Water Regulation, 310 CMR 22.00 Plainville's water is sampled and tested quarterly at the South Street Market and Heather Hill for trihalomethanes (TTHM) and Haloacetic Acids (HAA5).

To ensure water quality, the Plainville Department of Public Works exceeds the mandated monitoring, by testing monthly for total organic carbon and by perform-



ing weekly monitoring of:

- Chlorine
- Iron
- Manganese
- PH
- Water Temperature

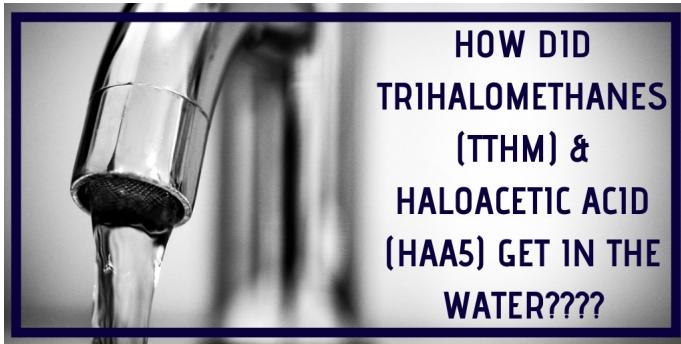
Potential Sources of Contamination

Sources of Drinking Water (both tap water and bottled water) include lakes, rivers, 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 can pick up substances resulting from the presence of animals or human activity. Contaminants that may be present in source water include;

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

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

In order to ensure that Tap Water is safe to drink, The Department of Environmental Protection (DEP) and US Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by Public Water System. The Food and Drug Administration (FDA) and Massachusetts Department of Public Health (DPH) regulations establish limits for contaminants in bottled water that must provide protection for public health.



Elevated Trihalomethanes (TTHM)/ Haloacetic Acid (HAA5)

In September of 2017, a routine water sampling test performed by Department of Public Works Water Operation indicated high trihalomethanes (TTHM). TTHMs are four volatile organic chemicals that form when disinfectants react with natural organic matter in the water. The community and the Department of Environmental Protection Agency (DEP) were immediately notified of the elevated TTHM; and the Department of Public Works immediately began a unidirectional flushing program to remove sediment and reduce the TTHM levels. The Department of Public Works continued to monitor the water quality performing monthly total organic carbon testing in October and November of 2017.

The Department of Public Works performed the DEP required quarterly water sampling tests on December 15, 2017; sampling results received in January of 2018 indicated that Plainville's water exceeded the standard or maximum contamination level for TTHM and Haloacetic Acids (HAA5). HAA5 are chemicals that can form as a result of water treatment, when water acidity and temperature are slightly high and treatment chemicals react with organic particles or bromide. They can occur during water treatment involving chlorination, chloramination or ozonation. The community and the DEP were immediately notified of the results. The Public Works Department

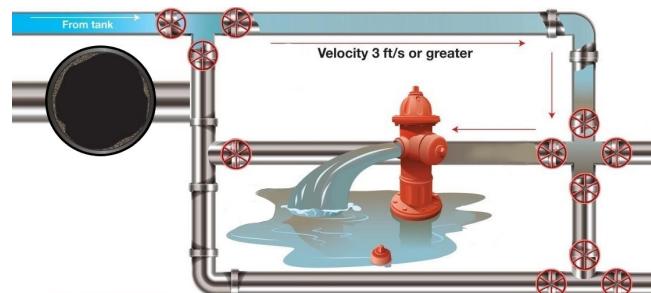
proactively engaged the services a specialized engineer to conduct a disinfection byproduct investigation and to develop a plan to mitigate the high TTHM and HAA5 levels; and to address the existing water quality issues.

The DEP issued an Administrative Consent Order to the Town of Plainville on February 28, 2018; the Town was in violation of the stage 2 byproducts requirement due to high levels of TTHM and HAA5 in the water.

What We Have Learned...

Working with our consultants we have learned that that there were contributing factors for the elevated levels of TTHM/HAA5 that lead to the byproduct exceedance.

- A unidirectional flushing program can release organic matter that interacts with chlorine to create disinfection byproducts.
 - Velocity of water is significantly higher in unidirectional flushing and provides a far better pipe cleaning. Sediment, corrosion and biofilm are forcefully flushed out.
 - Valves are opened and closed during unidirectional flushing enabling operators to locate broken or closed valves. Exercising hydrants and valves this way prolong their useful life.
 - Unidirectional flushing uses up to 40% less



water than conventional flushing

- The American Water Works Association recommends that water storage tanks should be cleaned every three to five years to remove sediment build up, biofilms and algae.
- Increasing water storage tank drawdowns reduces the age of the stored water decreasing the likelihood of the formation of TTHMs.
- Optimizing chlorine residual can reduced the risk of TTHM formation while maintaining compliance.



Implementation of Measures to Reduce TTHM/HAA5 & Increase Water Quality

In conjunction with the ongoing water testing and sampling, the Plainville Public Works Department has implemented the following measures to reduce TTHM/HAA5 levels and increase water quality:

- Mirimichi wells were taken offline in November of 2017 due to elevated levels of iron and manganese. Additional filtration treatment is required to bring the wells back online.
- The Public Works Department implemented a unidirectional flushing program to assist in the removal of tuberculation and bacteria from the water system; improving water quality. The unidirectional flushing program will be conducted semi-annually.
- The Sharlene Water Storage Tank was taken offline, cleaned and disinfected in June of 2018. The Turnpike Lake Water Treatment Plant was taken offline, cleaned

and disinfected in December of 2018. Regular tank cleaning and inspection to ensure proper tank maintenance and to remove any sediment build up. The interior of the storage tanks will be cleaned and inspected at least once every three years and the exterior will be inspected annually.

- Tank drawdowns have been increased to reduce the water age in the East Bacon and Sharlene tanks.
- Water treatment processes were adjusted to optimize chlorine residual in the system, while maintaining compliance to reduce the risk of TTHM formation.

Through the implementation of the measures to improve water quality, we have been successful in the decrease of the TTHM/HAA5 levels in the water distribution system.



Image of Hydrant Flushing at the implementation of the unidirectional flushing program



Image of Hydrant Flushing prior to the completion of the Fall unidirectional flushing program

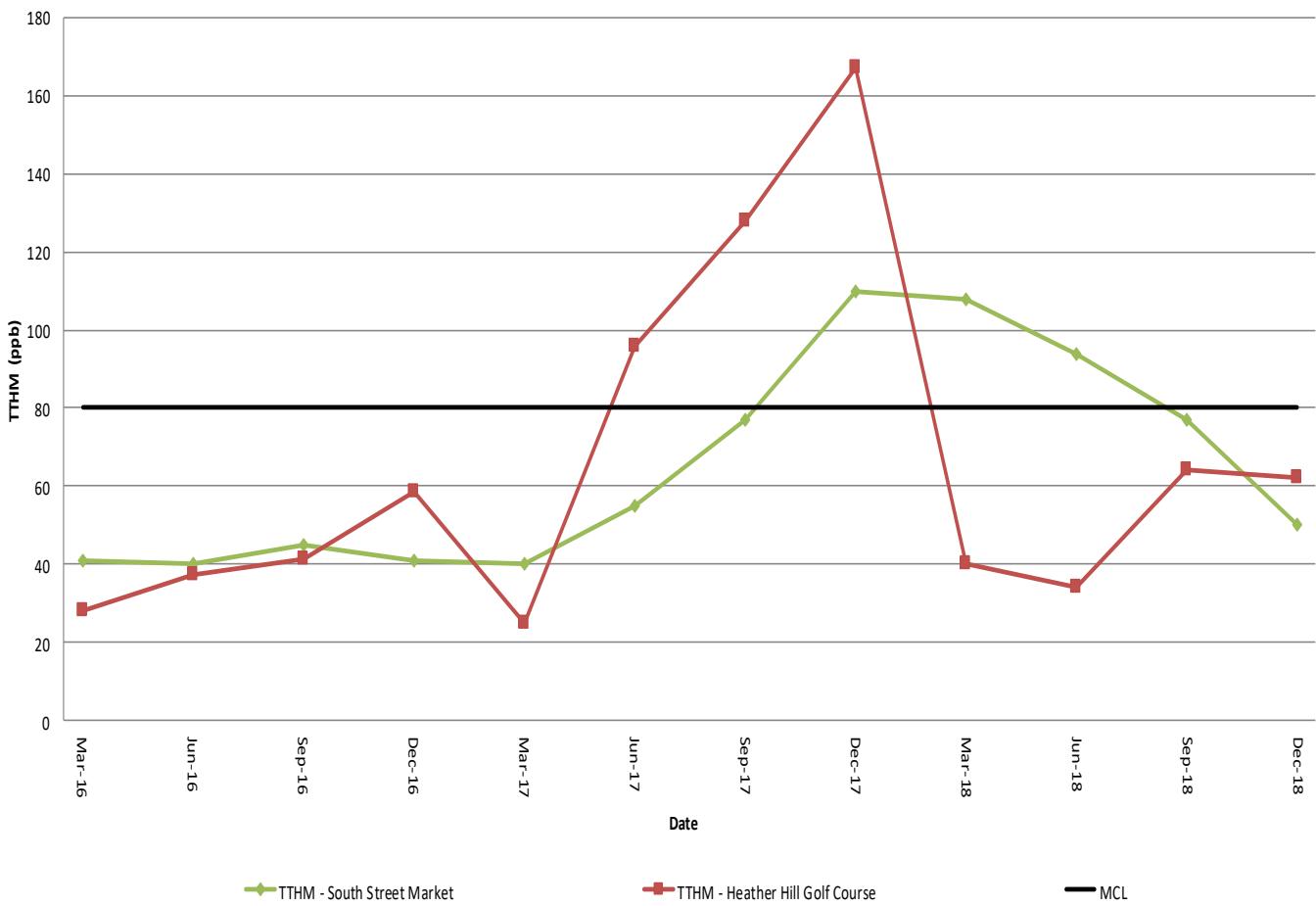
Timetable for Improving Plainville's Water Quality

Date	Water Sampling	Communication	Actions	Activity	Reporting
September 2017	 Water Sampling Quarterly TTHM/HAA5 High TTHM 87 ppb. Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment	 Communication <ul style="list-style-type: none"> Notification to DEP Notification to Plainville Water Customers 	<ul style="list-style-type: none"> Implementation of Unidirectional Flushing Program Mirimichi Wells taken Offline. C Value & Fire Flow Testing 		
October 2017	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment				
November 2017	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment				
December 2017	Quarterly TTHM/HAA5 High TTHM 115/167 ppb & HAA5 57 ppb/123 ppb. Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment				
January 2018			Implement Operations Processes to Improve Water Quality Including Lowering Chlorine Residual at the Turnpike Lake Treatment Plant	The Public Works Department Engaged BETA Group, Inc. to Conduct a Disinfection Byproducts Investigation & to Develop a Plan to Mitigate High TTHM & HAA5 levels and Water Quality Issues.	
February 2018				The Department of Public Works Responded to the DEP with a Plan of Action to Reduce TTHM/ HAA5 Levels .	DEP issues Administrative Consent Order for violation of the Disinfection By Products Requirements (DBPR).
March 2018	Quarterly TTHM/HAA5 High TTHM 100 ppb/100ppb & 67ppb/ for HAA5 Still Exceeded the Standard or Maximum Contamination Level Outlined by the DEP. Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		

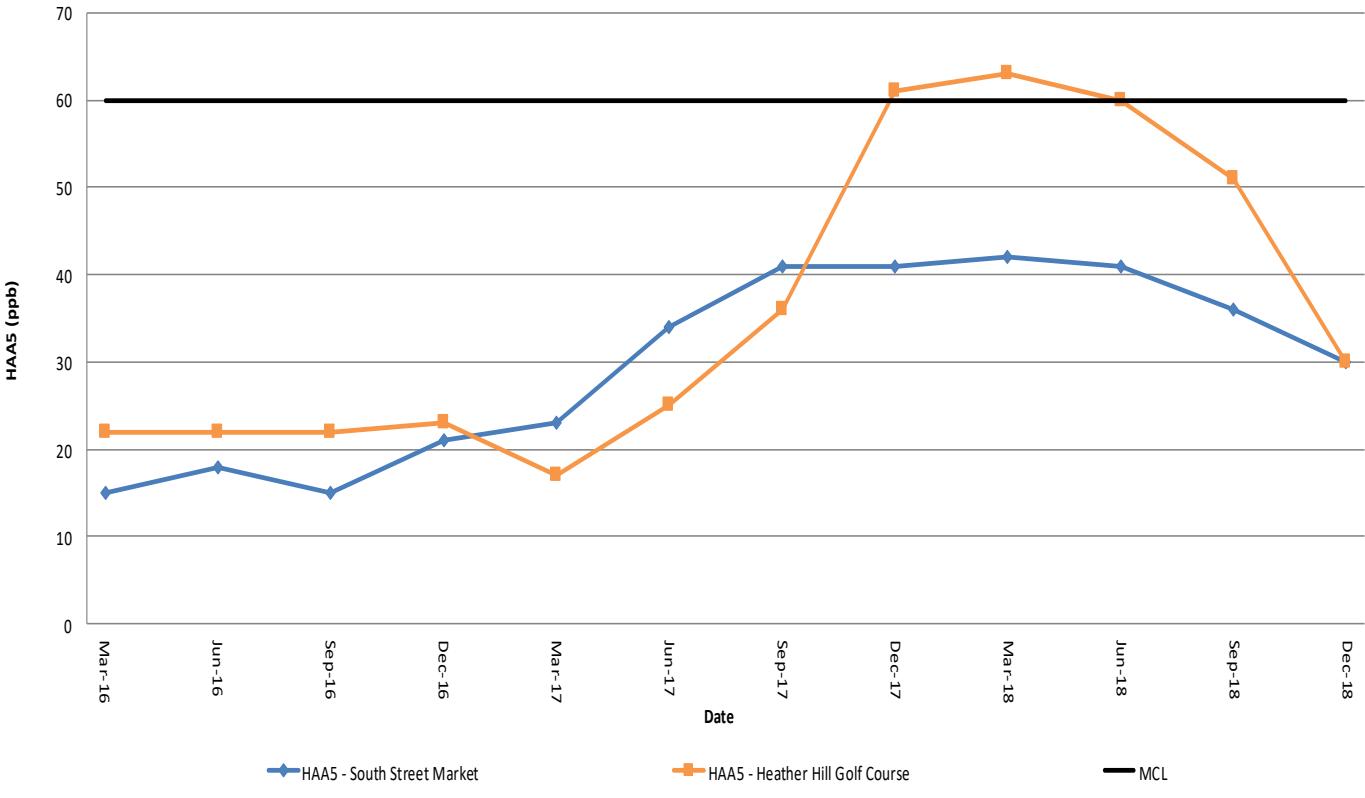
Timetable for Improving Plainville's Water Quality

 Date	 Water Sampling	 Communication	 Actions	 Activity	 Reporting
April 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment	<ul style="list-style-type: none"> Notification to DEP Notification to Plainville Water Customers 	The Town Continues to Work to Minimize the Formation of TTHM & HAA5 While Maintaining an Adequate Level of Disinfection. Weekly Monitoring Chlorine Temperature PH Iron Manganese		
May 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		
June 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		
July 2018	Quarterly TTHM/HAA5 TTHM Results of 86 ppb/94 ppb were lower than December 2017 & March of 2018 Results. Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Minimization of the formation of TTHM, Additional Steps to Charge Disinfection Levels, Removal of Natural Organics, Increased Flushing Water Lines; and Sharlene Lane Tank was Taken Off Line & Cleaned. Weekly Monitoring Chlorine Temperature PH Iron Manganese		
August 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese	BETA Group, Inc. completed the Disinfection Byproducts Investigation and Submitted it to the DEP for Review	
September 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		
October 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		
November 2018	Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Weekly Monitoring Chlorine Temperature PH Iron Manganese		
December 2018	Quarterly TTHM/HAA5 TTHM Results of 73 ppb/77 ppb & HAA5 36 ppb/51ppb Monthly Total Organic Carbon Testing Various Distribution Locations, Wells & Treatment		Turmpike Lake Contact Tank was Taken Off Line & Cleaned. Weekly Monitoring Chlorine Temperature PH Iron Manganese		

TTHM Locational Running Annual Averages 2016 - 2018



HAA5 Locational Running Annual Averages 2016 - 2018





Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or <http://water.epa.gov/drink/hotline>.