VILLAGE OF MILLBROOK WATER SYSTEM
GROUND WATER UNDER THE INFLUENCE OF SURFACE WATER
WHAT'S GOING ON?

The Village of Millbrook owns and maintains a water supply and distribution system which delivers potable water to approximately 1,400 customers, through 720 service connections. Originally put into service in 1932 it has undergone several expansions and improvements over the years. Our supply capacity is 374,400 gallons per day, the system is flushed annually in May, and an Annual Water Quality Report must be issued to all users by May 31st of each year.

Our well field lies within three aquifer protection zones, depicted on the Village of Millbrook Water Supply Protection Map, dated April 1992. Source water for the system is provided by a series of infiltration galleries, installed 12-15 ft. deep, within a gravel aquifer located in the Town of Washington. The site is adjacent to the Mill and Shaw Brooks. Raw water from the galleries is collected by 12-inch pipe and flows via gravity through a series of bunkers before reaching a 45,000 gallon clear well chlorine contact tank located beneath the existing treatment building.

As water enters the treatment plant it is injected with a sodium hypochlorite solution for disinfection, sodium hydroxide for pH control and zinc orthophosphate for corrosion control. Adequate chlorine contact time as well as storage for future use is achieved in the 45,000 gallon clear well. Alternating pumps then send water from the clear well to the distribution system and/or to the 500,000 gallon elevated storage tank located on Haight Ave. Booster pumps start and stop based on water levels within the "water tower".

Our water is tested daily for chlorine residual and monthly for coliform bacteria and e-coli.

We have never failed a water quality test.

Reports are submitted monthly to the Dutchess County Dept. of Health and those reports have shown that not only is the system capable of meeting the demands put upon it, but the sodium hypochlorite was able to meet disinfection requirements and all bacteriological surveillance monitoring was satisfactory.

Quality standards regarding our drinking water have never been compromised or in question.

We received a letter from the Dutchess County Board of Health in January of 2010 stating that our water plant had been selected for further evaluation for surface water influence. The proposed testing, Ground Water Under the Influence of Surface Water (GWUDI), would take place over a period of 12 months, and was ultimately performed twice. The Board of Health also noted that our infiltration galleries are in danger of contamination from flooding of the Mill and Shaw Brooks based on their proximity and extreme wet weather patterns.

The purpose of regulating ground water sources under the direct influence of surface water is to protect against contamination from large diameter pathogens such as cryptosporidium and giardia, both of which require filtration for removal.

Final analysis of the many years of testing was completed on May 21, 2013 and in July of 2013 we were informed that the results of microscopic particulate analysis (MPA testing) showed that the source water had been determined to be under the influence of surface water. Green Algae, Blue-Green Algae, Diatoms, and Flagellated Algae were detected both in the stream and the *raw* water collection system. These micro-organisms indicate ***the potential*** for surface contamination, not the presence of, and are themselves eradicated during the disinfection process. Again these algae were detected in the raw water sample, before disinfection, not in samples of water taken from the active system! Additionally the GWUDI determination is based primarily on risk assessment as extensive water chemistry testing shows no influence. Not a single protozoan was detected.

Large particle pathogens have <u>never</u> been detected in our water supply.

Although the determination was made that we were GWUDI in July 2013, we were given 18 months to install an adequate filtration system in accordance with the Long Term 2 Enhanced Surface Treatment Rule (ESWTR). That time period expired January 16, 2015.

New York State Sanitary Code Subpart 5-1.30 (b) states: Minimum treatment for surface water sources or ground water sources directly influenced by surface water shall be filtration and disinfection techniques capable of 99 percent removal of Cryptosporidium oocysts, 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses.

In order to comply with the Sanitary Code, the Village has contracted with Delaware Engineering to design a new water treatment facility capable of providing the level of required treatment. A preliminary design has been provided to the Dutchess County Dept. of Health and the NYSDOH for their review and comment. Once the regulators have provided comments we will begin the Final Design.

The Engineering Plan for the Water Plant proposes construction of a new treatment building to be located at the site of the existing facility. This building will be constructed at an elevation necessary to prevent flooding from the adjacent streams during extreme wet weather. This building will include filtration equipment, a chemical storage and feed room, a loading dock for delivery of chemicals and process equipment, and a new emergency generator to allow complete operation of the water supply and treatment system during loss of electrical service.

Raw water will be pumped from the infiltration galleries bunker system through the new filtration system via pumps. As raw water enters the treatment building, it will flow successively through a 25 micron bag filter, a 5 micron cartridge filter, and a 1 micron absolute cartridge filter. The proposed filtration sample will provide 4-log inactivation of Cryptosporidium (3.6-log removal by filtration and a 2- log credit for chlorination contact) in accordance with the ESWTR and Part 5 of the NYS Sanitary Code.

To provide redundancy, two filtration trains will be installed at the facility; each sized to handle 100% of the permitted capacity. Filtered water will be injected with sodium hypochlorite via a chemical feed system which will be based on maintaining a set residual as determined by a probe downstream of the booster pumps. Caustic soda and zinc orthophosphate will be added to finished water by means of a flow-paced chemical feed system.

A new 150,000 gallon baffled and/or mixed contact/storage tank will be constructed adjacent to the proposed filtration building, and new booster pumps controlled by water levels in the water tower will pump water into the distribution system as needed. The proposed storage/contact tank will provide the required contact time for the first users in the distribution system as well as additional storage capacity. Also included in this capital project is the completion of bunker construction and resealing the water tower on Haight Ave. inside and out.

Since the filtration construction project was not completed by January 16, 2015 the Dutchess County Department of Health has issued a violation against the Village pursuant to NYS Sanitary Code Subpart 5-1.30 (b). That violation requires that we notify our consumers quarterly that our system has been found to be under the influence of surface water until the project construction is complete. The BOH did not require a notice to residents back in 2013, nor were any concerns raised about our drinking water quality. The quality is the same as it was in 2010 before the testing, in 2013 after the results, and yesterday.

The quality of our water has NOT changed. Providing safe drinking water is our primary and highest priority.

The preliminary design budget is $1.9 million. This is a huge cost to be absorbed by only 720 users. Therefore, we are working with our engineers to reduce the capital expense while still complying with the filtration requirements. This includes searching for funding opportunities and fine tuning the design. We will be performing an income analysis of our water customers in hopes of qualifying for grants. Construction is expected to begin in April 2016. Upon completion of this project we will have a water supply system that will be capable of meeting our needs well into the future. The complete engineering report is available for review on our web site, www.villageofmillbrookny.com. Our water and sewer operators, VRI, are also available to answer any questions and to address concerns you may have regarding the quality of our drinking water.