

City of Dowagiac Water Treatment Plant 203 Chestnut Street

A Brief History

The City's water system was originally put into service near the turn of the century. The source of the City's water supply is a well field containing four wells located within the Department of Public Services grounds on South Front Street. These wells are approximately 160 feet deep and are drilled into a gravel/sand aquifer. The wells are classified as artesian wells. An artesian well will flow without any pumping from the aquifer in which it is drilled to the surface. Prior to the construction of the Water Treatment Plant in 1974 these wells were used to pump water directly into the City's water distribution system. They are now used as the source of untreated water to supply the Water Treatment Plant. The water from these wells is perfectly safe to drink without any treatment, but does contain high levels of iron and other minerals.

In 1974 the City's Water Treatment Plant was completed. It was built primarily to remove iron from the water supply. Iron and many other minerals are dissolved into the groundwater as it moves through the earth. Although iron is not normally a health hazard it can cause objectionable taste and odor problems in water, as well as staining of plumbing fixtures. After treatment, iron levels in the water are reduced by about 90 %. The Water Treatment Plant

was also built with provisions for the addition of chlorine to prevent the growth of bacteria, and fluoride for the prevention of tooth decay.

Major water system improvements were undertaken in 1980 with the construction of the Riverside Drive Pumping Station and Riverside Drive Storage Tank, and again in 1995 with the construction of the Rudolphi Woods storage tank and related pumping control system.

Water Treatment Plant Flows 1997

Maximum Design Flow	2.0 Million Gallons per Day
Average Daily Flow	721,000 Gallons per Day
Maximum Daily Flow	1,507,000 Gallons per Day
Minimum Daily Flow	492,000 Gallons per Day

Water Treatment Plant Systems

Ground water is pumped from a selected well through an aeration process, which blows air through the water and converts the dissolved iron to an insoluble form that can be removed by the filters. The filters are composed of activated carbon and graded gravel. As the water passes through the filters the iron is physically trapped in the filter media. After filtration the water passes into a storage tank where it is stored until pumped into the distribution system by the High Service Pumps. It is at this time that chlorine and fluoride are added to the treated water by chemical feed devices. Once each week the flow of water through the filters is reversed, (back washing), and the accumulated iron is flushed from the filters through the sewer system to the Wastewater Treatment Plant for disposal. All of these procedures with the exception of back washing are run automatically by the control system at the Water Treatment Plant. Some data on the Water Treatment Plant wells and pumps is listed below.

Source Water (Ground water from wells)

Well Number	Diameter (inches)	Depth (feet)	Gallons per Minute	Location	Treatment Type
19B	12	161	900	D.P.S. Grounds	Filtration
20	12	164	1175	D.P.S. Grounds	Filtration
21A	12	166	1450	D.P.S. Grounds	Filtration
22	12	165	1475	D.P.S. Grounds	Filtration

Pumping Capacity to Distribution System

UNIT	GALLONS PER MINUTE	GALLONS PER DAY
Filters	1,400	2,016,000
High Service Pump A	500	720,000
High Service Pump B	1,000	1,440,000
High Service Pump C	2,000	2,880,000

Distribution System and Pumping Stations

The City of Dowagiac has three water storage tanks located throughout the City with a total storage capacity of 1,570,000 gallons. These storage tanks have enough capacity to provide water for the City for about 24 to 36 hours if no additional water is pumped from the Water Treatment Plant

The City's one remote pumping station is used to supply the Rudolphi Woods pressure district elevated storage tank. Separation of this area from the main distribution system was necessary due to the fact that it is located on a hill and the other two storage tanks are not high enough above the ground to provide adequate pressure for this area. The pumping station is located next to the Riverside Drive Storage Tank on Riverside Drive. The station has two pumps rated at 1300 G.P.M. which are controlled from the pumping station via a level transmitter located in the Rudolphi Woods Elevated Tank.

Storage Tanks

Name	Capacity	Location
Clyborn Street Elevated Tank	500,000	Clyborn & McCleary Streets
Riverside Drive Standpipe	920,000	Riverside & Hill Streets
Rudolphi Woods Elevated Tank	150,000	Rudolphi Woods Subdivision

Operations / Staffing

The Water Treatment Plant, Pumping Station, and Storage Tanks are maintained and operated by personnel from the Water / Wastewater Treatment Plant division of the Department of Public Services. This division consists of four people who operate and maintain the treatment plants 365 days per year. Normal minimum daily operations at the Water Treatment Plant consist of taking meter readings to determine water use, checking equipment to determine proper operation, and performing all required water monitoring. These operations require approximately 20 hours per week with additional time being budgeted for repairs, maintenance of facilities and equipment, and special programs as needed.

Regulatory Authority

All regulations pertaining to operation and maintenance of public water supplies in the United States are controlled by the United States Environmental Protection Agency (USEPA). The authority for this oversight is provided by the Safe Drinking Water Act of 1976. This act was amended and re-authorized in 1996. In many states, including Michigan, the USEPA has delegated these responsibilities to the state, provided that required programs are administered in compliance with USEPA regulations.

The controlling authority in Michigan is the Michigan Department of Environmental Quality (MDEQ). MDEQ is responsible for overseeing all operations of public water supplies in

Michigan and assuring that the water supplies are in compliance with all applicable regulations. Each public water supply in Michigan is required to submit detailed monthly reports to MDEQ covering all phases of water supply and treatment. In addition, each public water supply must provide MDEQ with the results of all required water monitoring within the time limits set forth by the applicable regulations.

The State of Michigan requires that any person in responsible charge of a water supply facility be licensed to operate that system. The size of the water supply and the complexity of treatment required determine system-licensing requirements. Dowagiac currently has two employees licensed to operate the Water Treatment Plant and three employees licensed to operate the distribution system.

Water Monitoring

The Michigan Department of Environmental Quality determines all monitoring requirements for municipalities in Michigan. Monitoring requirements are based on USEPA regulations, the source of the water supply and its susceptibility to contamination, and the results of previous monitoring. The tests required fall into three main classifications, which are chemical monitoring, radiological monitoring, and bacteriological monitoring.

Water testing is required both at the Water Treatment Plant and throughout the City's distribution system. Each water test has a Maximum Contaminant Limit (MCL) associated with it. If the results of a test exceeds the MCL there are reporting requirements which mandate that the City inform water customers that this limit has been exceeded. To date, the City has never exceeded an MCL. In 1990 the City's laboratory was certified by the State of Michigan to perform bacteriological analysis. Special certification is required for this testing due to the

complexity of the analysis and the importance of accurate results. Below is a table shows what tests are currently being done by City personnel.

**City of Dowagiac Water Treatment Plant
Water Monitoring Schedule**

TYPE	PARAMETER	LOCATION(S)	FREQUENCY
Chlorination	Chlorine Residual Free and Total	Treatment Plant Distribution System Coliform Sites	Daily Weekly At time coliform samples are collected
Fluoridation	Fluoride Residuals	Well Water Treatment Plant Distribution System	Daily Daily Weekly
Iron Removal	Total Iron	Well Water Treatment Plant Distribution System	Daily Daily Weekly
pH	pH	Well Water Distribution System	With coliform samples With coliform samples
Bacteriological	Total Coliform Bacteria	Distribution System	Minimum of 11 samples per month

In addition to the monitoring listed above there are many other tests performed periodically on the City’s water supply. The Michigan Department of Environmental Quality laboratory in Lansing, Michigan performs this monitoring. A summary of these testing requirements is presented below.

Beginning in October 1999, the City will make available to the public a comprehensive annual report on water quality known as a “Consumer Confidence Report.” This is a new requirement under the Safe Drinking Water Act and is designed to provide water customers with

information on the quality of their drinking water. This information has always been available upon request but will now be published as a matter of routine.

The City of Dowagiac is fortunate in that it has a clean, reliable source of water that is free from any contaminants that pose a health hazard. The water from Dowagiac's wells could be used without any treatment at all if necessary. The State of Michigan has some of the most stringent monitoring and operational regulations in the United States. Many of their regulations and programs exceed the standards set forth by the United States Environmental Protection Agency. All of these factors work together to help insure that water customers in Dowagiac can expect safe, good quality drinking water for the foreseeable future.