

The Hanover Water Works Company, Inc.

Established 1892

Fall 2003



YESTERDAY



TODAY

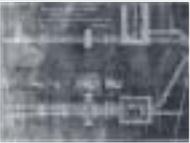


and
TOMORROW



1887

A series of disastrous fires, including the Hanover Inn fire, forced the Town and Dartmouth College into action.



1892

Plans were drawn for a gravity flow system and The Hanover Water Company was formed in 1892.



1893

The original dam was constructed by man and horsepower.



1893

When the dam was completed a cast iron distribution system was laid.

The Hanover Water Works Company was established in 1892 to create and operate Hanover's water system. The original well dug in 1770 and springs near the present Hanover Public Works Department could not meet the demand of the times. A series of disastrous fires, including the Hanover Inn fire, forced the Town and Dartmouth College into action.

In 1887, the New Hampshire Legislature authorized the Hanover Village Precinct, to raise no more than \$20,000 to implement the



plans drawn up by Professor Charles H. Pettee. In 1892, the Trustees of Dartmouth College authorized an additional \$25,000 for the project and The Hanover Water Works Company was born. When the Company was organized, the Village Precinct, now the Town of Hanover, owned 732 shares of stock, and Dartmouth College owned 818 shares. The same ratio of ownership remains today.



Laying the Foundation

YESTERDAY *The Original Water System*



Building the First Reservoir

The original plans for the gravity flow water system impounded water from Camp Brook into the present Fletcher Reservoir. A series of cast iron pipes formed the distribution system, and fire hydrants were placed in the downtown area. The first Directors of The Hanover Water Works Company inspected the system in the fall of 1893. On November 19, 1893, the first water was sent to town through the new system.

Inspecting the System





1954

The existing dam at Fletcher Reservoir was raised to increase the impounded water to 425 million gallons.



1962

A third reservoir was constructed on a tributary of Mink Brook in Hanover Center and increased impounded water to over 519 million gallons.



1993

Construction began on a new disinfection system utilizing a chlorine dioxide treatment process.



2001

A new 800,000 gallon storage tank provides uniform flow of treated water.

A typhoid fever scare in 1903 alarmed local officials. Was the water supply safe? In response, The Hanover Water Works Company followed the recommendation of the day to purchase the entire watershed and end all human activity, including fishing, within the watershed.



Improvements continued over the years. As demand for water grew, the Company constructed the second reservoir, the Parker Reservoir, on Camp Brook in 1924. This added 150,000,000 gallons of water to the system. Growth continued, and in 1954, the Fletcher Reservoir dam was raised increasing the impounded water in the system to 425,000,000 gallons. In 1962, a third reservoir was constructed increasing the watershed to 1,400 acres and the impounded water storage to 520,000,000 gallons.

Raising the Dam



YESTERDAY *Improvements to Meet Demand*



Replacing and Upgrading the Mains

But was the water safe? In 1955, the Company used continuous chlorination in the system. In 1958, fluoridation was added to the system. In 1993, the Company constructed a new disinfection system utilizing chlorine dioxide treatment. In 1998, The Hanover Water Works Company was awarded a \$4 million low interest loan to upgrade mains and for the construction of a new 800,000-gallon storage tank to provide a uniform flow of treated water and improve the overall operation of the water system.

Building the New Disinfection System



System Size:

- Miles of water main: 48
- Percentage of original 1893 water main: 20%
- Acres of watershed: 2,500
- Number of hydrants: 283
- Number of valves: 362
- Miles of fencing: 16

Capacity:

- Total reservoir capacity: 520,000,000 gallons
- Number of reservoirs: 3
- Number of pumping stations: 2
- Number of storage tanks: 3
- Storage tank capacity:
Baleh Hill: 400,000 gallons,
Greensboro Road: 300,000 gallons,
Sand Hill: 800,000 gallons

Usage:

- Number of customers: 1725 ±
- Average daily usage: 952,000 gallons
- Average annual residential bill: \$273
- Average annual statewide bill: \$305
- Boundaries of service area: North to Kendal at Hanover; out Greensboro Road including Great Hollow; south to Lebanon boundary

Ownership of Company:

- Dartmouth College: 52.8%
- Town of Hanover: 47.2%

Testing:

Twice monthly for bacteria

Today, The Hanover Water Works Company serves approximately 1725 metered customers including multi-family residences, industries, commercial and institutional users. The average daily



flow has been 1.1 million gallons per day with usage doubling to 2.1 million gallons per day in the summer months. Not surprisingly, Dartmouth College is the Company's largest customer, accounting for about 50% of the water used. The Company, with staff contracted from the Town of Hanover, monitors the watershed; operates and maintains two pumping stations and three storage tanks; services mains, valves, and hydrants; reads meters; oversees the treatment system; manages budgets; oversees engineering studies; and answers customer's concerns.

"We've dodged the bullet for a number of years. Now's the time to upgrade the system and bring the water company into the 21st century."

– Bill Boyle, MD,
 Health Officer for Town of Hanover, Board Member of
 The Hanover
 Water Works Company

TODAY

State of the System



The Hanover Water Works Company in 2003



Recent preventative maintenance has included annual flushing, valve replacement, painting the storage tanks, pump station upgrades, and service line replacement. Recognizing the age of the pipes and the accumulation of deposits, many larger cast iron pipes in the system have been cleaned and lined with concrete to both remove and prevent further accumulation of deposits. Each year stretches of cast iron pipe have been replaced with lined pipe. The plan is to replace all unlined pipe.



Current State of a Pipe Installed in 1893

If the water is clean, why does it sometimes look, smell, and taste so bad?

The source of the water, the current treatment method, and the age of the distribution system all contribute to aesthetic complaints about the water.



The source of the water consists of three reservoirs within the watershed area. These reservoirs are protected ponds complete with fish, animals,

microorganisms, and sediment.

The reservoir water is brought into the system for treatment. Fluoride is added to help promote strong teeth. Sodium carbonate (soda ash) raises the pH of the water and helps prevent leaching of lead and copper from household plumbing. Chlorine dioxide is used to disinfect the water prior to entering the distribution system. The chlorine dioxide kills bacteria and viruses (microorganisms) that may be present in the water, making it safe for people to drink.

The clean water is routed through the distribution system to homes and businesses. Pipes in the system have accumulated iron rich, organic rich deposits. Chlorine dioxide, used to treat the water, leaches these deposits from the

TODAY

Demand for Clean Water



Current Chlorine Dioxide Treatment Facility

pipes into the water. Flushing the pipes helps alleviate loose deposits, but older pipes are caked with years of deposits.

The water is considered clean by today's stringent requirements for avoiding filtration because chlorine dioxide kills the bacteria. However, the water can still be cloudy and murky with an unpleasant smell and taste. This is especially noticeable in the fall and spring. This can only be resolved with a filtration system.

“What people are drinking is basically disinfected pond water.”

– Jack Nelson, President,
The Hanover Water Works Company

While the water quality meets the stringent requirements set forth in the Surface

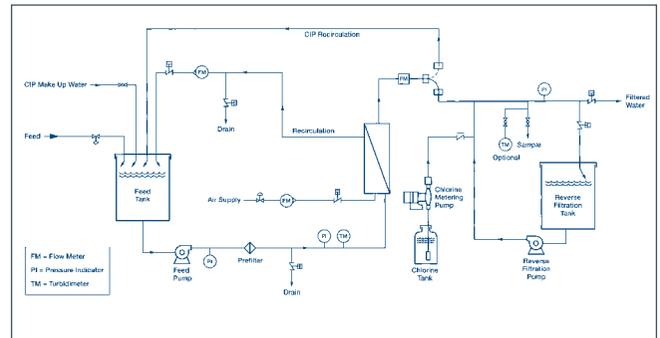
Water Treatment Rule (the conditions for not filtering a surface water source), The Hanover Water Works Company recognizes the need for filtration. In October of 2001, a contract was signed to perform a water treatment facilities study. During the summer of 2002, a pilot study was conducted using a membrane filtration technology that offers several advantages. The membrane filters the sediments, iron, and manganese that add color, taste, and odor to the water. This type of filtration also adds a positive protection barrier from giardia and cryptosporidium (two water-borne microorganisms that can cause intestinal illness). Filtration also reduces the need for chemicals in the treatment of the water.

“We want to improve the water quality to meet future regulations and to satisfy our customers.”

– Peter Kulbacki,
Director of Public Works,
Town of Hanover

Filtration is the first step in controlling the aesthetic quality of the water delivered. In addition, several years of flushing and line replacement will also be needed to remove accumulated sediments

TOMORROW *Plans for the Future*



An Example of a Membrane Filtration System

from the pipes. Over time and with continued attention, Hanover’s water quality will improve dramatically.

Preventative maintenance, plus replacement and upgrades of the current system are only part of the puzzle. The future system must also respond to changes in regulations and potential new hazards.

The Hanover Water Works Company is implementing a \$7-million-dollar capital improvement plan to bring the water system into the 21st century and address the demands of our customers now and in the future.