

# The History of Wastewater Treatment in Brewer

Written by Kenneth “Emmett” Locke (1956 – 2021)

## *The Early Years- Brewer Sewer System (Late 1800’s - 1975)*

Prior to 1970 the majority of Brewer’s sewer collection system was relatively old with construction of some lines having taken place in the late 1800’s.

Following the use of the private privy and the inception of a water supply system in Brewer, water became the universal means of conveying sewage through specifically constructed pipes from its place of origin to its point of disposal. Unfortunately, prior to the late 1800’s, all the raw wastewater from residents, businesses and industries in Brewer was discharged to ditches, brooks, and streams within the City, where it was conveyed to the Penobscot River for treatment.

As the City grew and certain areas became more populated, it became imperative that some means be provided for the collection of the discharged raw wastewater for public health, public recreation, esthetic and economic reasons.

By the late 1800’s, Tannery Brook, which originated in Outer Wilson Street and Chamberlain Street areas of the City, was essentially an open sewer due to the raw wastewater discharge, and became the City’s first project to protect public health and remove objectionable odors. The public health issues, present as a result of the brook being polluted by the discharge of raw wastewater, was the potential of waterborne diseases including typhoid fever, dysentery, cholera and many others. To protect public health, the City enclosed the entire brook in a brick pipe that now discharges to the Penobscot River at the old Public Works Building site on Hardy Street.

Other brick sewer projects were completed concurrent with the Tannery Brook project or shortly thereafter, and are as follows: Main Street from Burr Street to Center Street; Center Street from Main Street to Jordon Street; Washington Street from State Street to Chamberlain Street; Parker Street from Main Street to Maine Central Railroad; State Street from Main Street to Brook Street; Brimmer Street from Main Street to Fling Street and Union Street from Main Street to East Summer Street. The diameter of these brick sewer pipes range from 18 inches to 72 inches. As the City grew in the 1900’s most of the sewers constructed were mainly vitrified clay, reinforced concrete and eventually PVC in the 1970’s.

In the very early years of wastewater treatment, prior to building municipal and industrial wastewater treatment plant along the Penobscot River, “solution to pollution, is dilution” was highly regarded as the accepted method of wastewater treatment in the United States. During the 1800’s and early to mid- 1900’s, the Penobscot River was a body of water of a sufficient size and dilution ratio to prevent significant public health issues and offensive odors as a result of wastewater being discharged. The City and all the other municipalities and industries on the River essentially transferred the potential hazards associated with the wastes from the point of collection to the point of discharge.

When untreated or improperly treated sewage is discharged into a body of water, very unpleasant effects are likely to result. In the Penobscot River, rotting and decomposition of waste matter produced very objectionable odors and very unsightly conditions. Although odors themselves did not constitute a health hazard, they ruined recreation areas, rendered property undesirable as residential sections, and cause complaints from the public. The decomposition also caused an unsightly scum to form on the surface of the water and the solids in sewage were deposited on the shores of the River, thus building an ugly offensive sludge bank. Paper, rags, sticks, foam and other refuse from municipal and industrial sewers floated on the surface of the River and contributed to other nuisances caused by improper discharge of sewage.

### ***The Inception of Wastewater Treatment in Brewer (1966 - 1975)***

As the population and industry (specifically paper mills) increased along the Penobscot River, the volume of untreated wastewater being discharged exceeded the dilution factor of 40 parts receiving water to 1 part wastewater (40:1 ratio). A dilution factor of 40:1 is required for nature to effectively treat wastewater and once the ratio was exceeded the dissolved oxygen in the River decreased to dangerous levels for aquatic life, hence the disappearance of the Atlantic Salmon.

In 1966, as a result of significant pressure from Maine Department of Environmental Protection to do their part to help clean up the River, the City signed a contract with Camp, Dresser and McKee (CDM) to investigate the possibility of building a wastewater treatment plant in Brewer.

The consultant engineer's report recommended construction of interceptor sewer, pumping stations and a treatment facility for the City. They also suggested a joint treatment plant be constructed next to the paper mill in South Brewer, with separate treatment of sanitary and paper mill process wastewater.

In 1969, a final design was begun on a plant treating sanitary and mill wastewaters together, a significant savings to both the City and Eastern Fine Paper. Plans and specifications were completed by March 1971. Bid in 1973, the project comprised three construction contracts: the joint treatment plant, pumping stations and the interceptor sewers. City and mill wastewater was discharged to the plant in November 1975. The total cost of the project was \$7,200,000.

In the Senate in 1972, Senator Edmund Muskie of Maine emerged as the spokesperson for a clean water bill founded on ecological rather than economical principals which became the Clean Water Act of 1972. The bill dramatically increased federal support for construction of municipal wastewater treatment plants, and Brewer qualified for an 80% EPA grant/20% local funding package. As a result of Clean Water Act, its funding package and the MDEP pitching in 10%, the City share of the project costs was \$720,000.

### ***Brewer Collection System (1975 - Present)***

Brewer's public sewer system extends 46 miles and collects 800,000 gallons per day of sanitary sewage from 9,100 users. Many old, deteriorated sewers allowed excessive groundwater infiltration to leak into the system. Other combined sewers allowed stormwater inflow to enter from catchbasins, roof and cellar drains, brooks, swales and streams. During peak groundwater and wet weather events, total sewer system flows surpassed 40 million gallons per day. Because this exceeded the Brewer Water Pollution Control Facility design capacity of 5.2 MGD, excess flows (approximately 250 million gallons per year) was discharged to the Penobscot River through 10 combined sewer overflow structures (CSO). Untreated CSO discharges were an accepted practice when the treatment plant was constructed in 1975, but by the mid 1980's was restricted by federal and state regulations requiring their elimination.

CSO discharges can adversely impact the river's water quality. EPA and MDEP regulations, Brewer's wastewater treatment plant discharge permit, and a MDEP consent agreement signed by the City in 1992, required the City to develop a sewer master plan for long term abatement of CSO discharges.

The primary objective of the sewer system master planning process is to abate CSO discharges and the negative water quality impacts they create. The evaluation of Brewer's sewer system was accomplished from 1989 to 1993, and the Master Plan was written in 1994.

The CSO Master Plan contained several significant sewer separation and rehabilitation projects. The estimated capital cost to complete the projects in 1993 dollars, required of the CSO Master Plan was \$7,390,000. This cost estimate included \$1,965,000 for treatment plant flow maximization. Unfortunately, there was no federal or state grant money available to help fund the sewer separation projects, so Brewer proposed to implement the master plan over a 7 year period. In 1998, we re-negotiated the CSO Abatement schedule and extended the deadline to 2011.

The total cost of the CSO Master Plan projects to date is approximately \$17,000,000, and is 100% funded by the City sewer users. The final master plan sewer separation project is scheduled for completion during the spring of 2012. Once complete, the City will hire a consultant to perform a mandated CSO master plan update, as required by the City's MDEP wastewater discharge license. The update must review the original sewer model predictions, assess the impacts that each completed project has had on CSO discharges, and define the status of the City's CSO Abatement program.

### ***Brewer's Water Pollution Control Facility (1975 - Present)***

After going on-line in 1975, there were times when the new facility was unstable. High industrial loadings (Eastern Fine Paper), stormwater leaking into the City's sewer and malfunctioning equipment kept the facility from reaching its full potential. The facility averaged a wastewater discharge license violation every 11 days in 1990. In 1992, Brewer signed a consent agreement with MDEP agreeing to upgrade the Brewer Water Pollution Control Facility to eliminate

discharge violations. From 1992 through 1998, the facility capacity was expanded, deficient processes replaced, and new technology was added. The upgrade was completed in 1998 at a cost of \$7,000,000, and the results have been dramatic as no violations have been reported to MDEP in over 17 years.

The plant is a leader in pollution control technology. Brewer installed an innovative selector basin to control bacteria growth as the basin favors microbes that are effective in producing clean water. New stormwater treatment processes were added. The facility now treats peak loadings up to the capacity of the interceptor sewer system.

## *Summary*

In 1992, the City was advised that the Water Pollution Control Facility and sewer collection system was one of EPA's highest enforcement priorities.

Today, the plant is recognized as one of the best. The facility operators are proud of their accomplishments as operators at the Brewer Water Pollution Control Facility and are dedicated to the mission of creating the best quality effluent for discharge to the Penobscot River. As a result, the facility has been the recipient of many awards over the last 16 years, the most prestigious being the Richard B. Goodnow Award, received in 1995 from Maine Wastewater Control Association in Recognition of Excellence in Operation and Management of a Municipal Facility in Maine.

Other awards received by the facility are as follows:

- George W. Burke Facility Safety Award received in 1997 from New England Water Environmental Association (NEWEA) in recognition of the Excellence of its Active and Effective Safety Program and Safety Record.
- Lee A. Agger Environmental Training Award received in 2001 from JETCC for Meritorious Support and Service in Training Environmental Professionals in the State of Maine.

The Brewer sewage collection system is now almost completely separated and has eliminated 10 CSO discharge locations. As a result, the City will no longer be discharging untreated raw wastewater to the Penobscot River during period of heavy rain and snow melt. The City has also been honored by receiving the following collection system awards:

- National CSO Second Place Award in 2001 from Environmental Protection Agency (EPA) for Combined Sewer Overflow Program Excellence.
- Charles Perry Award in 2002 from Maine Wastewater Control Association (MWWCA) for Excellence in Operation and Maintenance of a Wastewater Collection System.
- Steve Ranney Award in 2007 from Maine Department of Environmental Protection (MDEP) for Stormwater Management Program Excellence.

French explorer Andre Thevet visited the Penobscot River in 1555 and called it the “finest river in the world”. It took over 400 years for pollution to transform the river into an open sewer, but in the last 36 years the tide has turned. The fish are back, boats are docked on moorings, waterfront property values are restored and jobs and the environment coexist.

The economic growth and quality of life of this region has been enhanced by the Penobscot River’s restoration, and the City of Brewer has played an important role in that restoration process.