



CIPP REHAB OF WATER MAINS RUNNING THROUGH BACKYARDS

Avoiding Disruption Paramount in Wauwatosa, WI Project

By: Geoff Britnell, FER-PAL Infrastructure

With location along the rear yard easement, excavations were designed to impact the residents as little as possible

When water mains were first installed, ease of replacement was not necessarily the first thing on the minds of those who designed the project. In addition, new developments can leave mains that were once easy to access in difficult and precarious situations as their lifespan comes to an end. Some utility owners have avoided replacement, as the cost, along with the disruption, would cause a challenge too hard to overcome. While others, like the municipality of Wauwatosa, have looked to new technologies to help tackle the problem. Through a water main rehabilitation bid process, the Wauwatosa Water Utility was able to work with their hired contractor, FER-PAL Infrastructure, to rehabilitate the water main through cured-in-place pipe (CIPP).

Background

Wauwatosa, Wisconsin is a community of over 46,000 located along the Menomonee River just to the west of Milwaukee.

Originally sourced from ground water, the Wauwatosa Water Utility began purchasing water from the Milwaukee Water Works (MWW) in 1963. The water is sourced from Lake Michigan and treated by MWW. Overall the Utility looks after 202 miles of water main which supplies 15,515 customers with 1,325,223,000 gallons of clean

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fresh water yearly.

The Utility has designed a preventative maintenance program in order to keep the water system functioning at a high level. The goal of this is to keep in line with the Wisconsin State Department of Natural Resources (WIDNR – Chapter NR811) “Requirements for the Operation and

Design of Community Water Systems.” (https://docs.legis.wisconsin.gov/code/admin_code/nr/800/811/)

In order to do this Wauwatosa Water Utility has utilized a mixture of technologies to replace or rehabilitate an annual average of 1% of the water mains in its system.

One technology that has been used to keep the Utility on target with this goal is CIPP. First using CIPP as a pilot project in 2012, Wauwatosa looked to the technology to rehabilitate a section of water main located through a backyard easement. Subsequently, in 2014 and 2015 the Utility budgeted a yearly CIPP program to rehabilitate the existing water mains located within ten foot wide backyard utility easements.

The 2015 CIPP project consisted of 2880 LF of 6-inch cast iron pipe which had 55 residential services located along it. Due to the location along the rear yard easement, strictly replacing the main was not an option. With electric power poles located



Epoxy migrates through the outer jacket of the liner to fill all voids around the services and any existing spaces within the host pipe, creating a full bond to the interior of the old water main

above and a sewer main running adjacent to the water main, CIPP was determined to be the least disruptive approach. Through a review of current technologies and past projects Wauwatosa Water Superintendent, Jim Wojcehovicz, felt that CIPP was the best alternative. "We knew that because of the limited access to the main that CIPP was the only viable option for this main."

The project was bid in May 2015 with FER-PAL Infrastructure of Elgin, Illinois submitting the lowest bid for the project. FER-PAL, a trenchless technology specialist, is a licensed installer of Aqua-Pipe, the leading manufacturer of CIPP liners in North America. Construction work for the project began on June 29th this year.

Challenges

The most significant challenges for this project came with the location of the water main itself. As the main ran directly through the backyards of the residential properties it meant that avoiding disruption would be paramount. In addition to the location several of the most important connection points of the main lay directly under We Energies power poles.

In order to overcome these challenges, FER-PAL worked diligently with their sub-contractor, Mid City Plumbing, and

the Utility to plan a work site that left little impact to the neighborhood. Each tee connection that lay below a power pole was abandoned and repositioned. This allowed for new tees to be connected in a new and more convenient position after the main was lined.

All additional excavations were designed for locations that impacted the residents as little as possible. The pits themselves were designed to be 6ft by 9ft and had specialty shoring designed and built by FER-PAL inserted into the pit to allow a safe working environment.

Lastly FER-PAL looked to utilize a new technology in order to continue the path of least disruption. Through research by cleaning crew Foreman Joe Townsend, the contractor was able to source out a remote flushing unit in order to clean the old water main. The unit was purchased in nearby Joliet, IL and allowed for the pipe to be cleaned and prepped without the use of the usual flusher truck. A flusher truck would need a larger area to be maneuvered into place and would cause more damage to the surrounding landscape. Through the use of the remote unit little to no surface areas were damaged and left in need of restoration. In addition to this, FER-PAL was able to limit the disruption to tracks on the nearby roadways.

Construction

Once the project itself was laid out, a temporary bypass system was set up in order to provide residents with water throughout construction. Excavation was then performed including the use of vacuum trucks to limit the impact and size

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of the access pits. Following this work the water main was cleaned with the remote flushing unit to prepare it for lining. This unit was able to provide enough pressure to clean the tuberculation from the walls of the pipe and restore the main to its original diameter.

After the cleaning process, FER-PAL performed a full video inspection followed by a laser analysis and GPS/GYRO profile of the water main. Both of these tools were developed by FER-PAL in order to ensure a high quality of installation of the CIPP liner. The profiler gives an exact diameter of the main which ensures the product that

is installed fits perfectly and is left without voids between the cured liner and main. The GPS/GYRO tool provides an XYZ coordinate for each service and features along the main with a full elevation profile. The data from these tools allowed the Utility to have a full “as-built” drawing to reference for future projects in the area.

As a final preparation before installing the CIPP liner, service line plugs were robotically inserted into each residential service connection along the main. This prevented any epoxy used in curing from travelling up each service.

Once the interior of the main was prepared, the CIPP liner was pulled into place through rollers on the installation truck and rollers attached to the main. Epoxy resin was injected in between the two layers of the liner as it was pulled through a refrigerated truck and into place inside of the main. Once in place, the liner was capped off on each end, pressurized, and cured with hot water for a period of 1.5 hours. During the curing process epoxy migrates through the outer jacket of the liner to fill all voids around the services as well as any existing spaces within the host pipe. In doing so, it creates a full bond to the interior of the old water main.

Following the curing period, the liner was left to sit overnight under normal working pressure. Each section was then pressure tested to the municipality standard. Finally, each service was reinstated robotically. An operator inside of a camera truck used a robotic drill to drill through the liner and into the service, fully removing the plug and clearing the access to each service along the main.

To complete the work, the water main was reconnected with new valves, hydrants and fittings. This left the main fully rehabilitated and ready to be placed back into service.

Results

The project was successfully completed within the time specified time by the contract. There were no delays and surface disruptions were successfully avoided. Commenting on the project, Lou Magurno, FER-PAL Vice President of Project Management Services praised the FER-PAL Team. “Our crews really worked hard to deliver a high level of customer service” stated Magurno. “We were right in these resident’s back yards which meant daily interaction. This project would not have been a success without a fine attention to customer satisfaction.”

The utility completed this project on time, leaving the neighbourhood residents happy with the finished product. Through projects such as this, CIPP maintains itself as a viable option to open-cut replacement, demonstrating benefits economically as well as socially. 🌱

ABOUT THE AUTHOR:



Geoff Britnell is the National Business Development Manager for US and Canada for FER-PAL Infrastructure. He has been with FER-PAL for over three years specializing in Businesses Development, Government Relations and Communications.

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