

Rehabbing a Century-Old Water Main

The \$4.25-million contract is for New York City's Madison Avenue.

The first section of a water main rehabilitation project beneath New York City's Madison Avenue, one of the busiest streets in the world, has been completed. The city awarded the contract to Insituform Blue®, (www.insituform.com/iblue) Insituform Technologies, Inc.'s potable water business, which is responsible for the rehabilitation of 10,000 ft of 48-in. diameter water line using a high-density polyethylene (HDPE) product that will create a new pipe-within-a-pipe. The company's technology and processes make it possible to rehabilitate the water main line without digging an open trench the entire length of the line. Older rehabilitation technologies would have required a trench 37 blocks long to allow replace-

ment of the old pipeline, disrupting utilities, traffic, and businesses, at great cost to the commerce and taxpayers of the City of New York.

With the PuraGuard™ installation process, lengths of HDPE pipe are first welded together using a fusion process. The HDPE pipe is then folded and banded in place with plastic straps before being inserted into the existing pipe from an entry pit. After insertion, the folded pipe is filled with water and pressurized until the bands snap. The new pipe then reverts to its original shape and expands to form a close-fit with the original pipe. Finally, end fittings are attached to each end of the pipe, it is reconnected to the rest of the system, and service resumes.

The company worked as a subcontractor to Halcyon Construction Corporation (Pleasantville, NY), rehabilitating pipeline from 40th Street north to 75th Street under the administration of the New York City Department of Design and Construction. The work, which occurred primarily on weekends, began in June 2008 and ended the second week in September. The project will resume in April 2009. Here's how the project progressed:

Week 1. From July 26 to the evening of July 27, an Insituform

team worked around the clock to install 530 ft of HDPE starting Friday night between 58th and 61st streets. The pipe being renewed consisted of a 150-year old cast iron water main. The original pipe, 48 in. in diameter, had been out of service for close to ten years due to deterioration and leaking.

Week 2. The weekend of August 1 a 727-ft section of pipe running from 61st Street to 64th Street was renewed. Although the crew faced two significant storms with both wind and rain, weather was not an issue and did not affect the project schedule.

Week 3. Although the project was pushed back a day due to a street festival, engineers successfully installed 834 ft of HDPE pipe in just one day on Sunday, August 10, while in the midst of multiple rain showers. In fact, streets were clear by 2 a.m. on Monday before weekday traffic had even started to pick up.

Week 4. Crews installed another 822 ft of HDPE liner from 64th Street to 67th Street.

Week 5. The weekend of August 22, team members were able to install more than 800 ft of pipeline for the third week in a row. That brought the total installation length up to 3,700 ft.

Week 6. Over 765 ft of pipeline were rehabilitated.

Week 7. The last installation for 2008 was completed. To date, over 5,200 ft of water main over 20 city blocks has been renewed. The next section to be installed runs from 40th to 55th streets.

Additional Jobs

The Madison Avenue project is one of several potable water line rehabilitation projects currently undertaken by



Folded and banded in place with plastic straps, the pipe is inserted into the existing pipe where it will be filled with water and pressurized to snap the straps.

Insituform Blue. In Monroe, MI, the city is addressing problems with leaks, water main breaks, and water quality by having the company rehabilitate 11,500 ft of eight-in. water main.

The \$2.3-million project includes the installation of 230 service connections using the company's new iTAP® robotic device that restores connections from inside the rehabilitated pipe without digging. Traditionally, holes were excavated at each service connection so that service lines could be reconnected when a main line was renewed with a trenchless process. With iTAP, a remote operator uses an innovative, non-visual technology to locate the service connections from inside a lined main and robotically cuts through the liner at each service opening. A water-tight pressure-rated



The HDPE pipe is first folded before being banded.

mechanical seal is achieved when a self-tapping T-nut and gasket are installed in each corporation valve.

Last year, the company renewed 1,900 ft of eight-in. water main with 33 service connections as the city began a complete overhaul of its water system to stop leaks and water loss, increase capacity, and improve hydraulics. Thermopipe®, a close-fit pressure pipe system, was used because it provides a structural liner.

This year marked a milestone in the history of Texas A&M in College Station, TX. For the first time in 132 years, enrollment at the university surpassed 48,000 students. One of the

main goals and responsibilities of campus administration is to provide a fresh and reliable source of clean drinking water to those students.

However, last year the two concrete cylinder water mains feeding the entirety of the campus' water supply were leaking. While corrosion is usually the cause of failure in concrete pipelines, bad bedding had led to the deterioration of these mains and needed to be corrected.

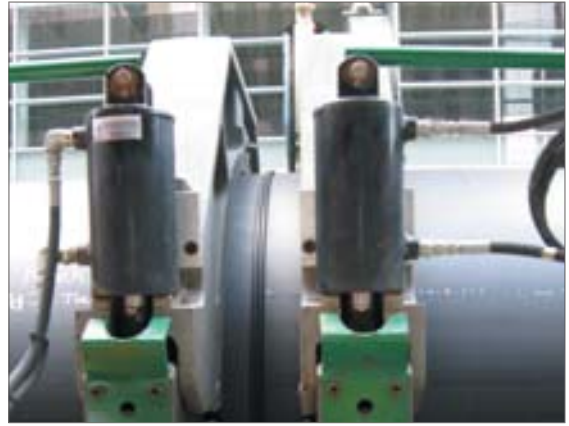
Longitudinal cracks had formed at the 10 o'clock and two o'clock positions as well, causing the ends of the pipe to become oblong. These two main lines feeding the campus were too valuable to risk future failure. Therefore, it was decided that PuraGuard technology would be implemented to extend the useful life of the two mains distributing water to the campus population.

The two lines in question included one 2,000-ft line with a diameter of 24 in. (installed in 1976) and another 1,300-ft long water transmission line 18 in. (installed in 1951) in diameter. The lines run underneath a busy roadway and convenience station, meaning special considerations and precautions had to be taken during installation at the \$568,000-project.

In South Salt Lake City, UT, the company used its Thermopipe product to rehabilitate 1,500 ft of 12-in. steel water line that was threatened by the weight of an interstate highway expansion above it. Dennis Pay, public works director for South Salt Lake City, said the product and the 28 service connections installed using the iTAP system were the perfect solution for the city's situation. This project won the Utah Chapter of APWA's Project of the Year award.

In other projects:

- Officials in a Colorado community were presented with two tough infrastructure challenges. Two sections of pressurized water main needed to be repaired: a 540-ft long, 20-in. main that crossed



Lengths of the HDPE pipe are first welded together using a fusion process.

under a sensitive creek; and a 24-in. line running 500 ft under Interstate 25 and two railroad tracks. The two sections of underground pipe were rehabilitated using PuraGuard, a HDPE close-fit renewal system. The project gave the pipelines a new lease on life and corrected leakage issues without disturbing the creek watershed or closing any lanes of traffic on the highway.

- Water engineers in Carrollton, TX, needed an innovative solution to fix 420 ft of 12-in. water main and tackle four 45-degree bends for a leaking water pipe located in a protected wetlands area. Thermopipe was installed in one day, using only two small access pits, each about four ft by eight ft.
- Albuquerque, NM, was forced to temporarily abandon a water main that was leaking under Interstate 40. Insituform PPL®, a cured-in-place pipe rehabilitation method for structurally sound pipes, was installed within the 12-in. pipe and navigated a total of four 45-degree bends. The host pipe was restored to its original operating pressure.
- When 840 ft of ten-in. diameter welded steel water pipeline was leaking beneath a bridge, professionals in Stanwood, WA, chose the Thermopipe pressure pipe lining system to solve their problem. The system was able to negotiate a total of eight 45-degree bends and renew the pipeline. 