

Moving fast to perform "triple bypass" operation for wastewater treatment plant

After three emergency line breaks in two months, Xylem solves problem with trusted Godwin pumps, miles of HDPE piping and extensive expertise

The first sign of trouble in "America's Hometown" came on December 19, 2015. Plymouth, Massachusetts is the celebrated site where the Pilgrims landed in 1620, but on this day the prominent municipality was facing a major problem: the 4.5-mile force main from the Water Street Pump Station to the Plymouth Wastewater Treatment Plant (WWTP) had given way.

"This was a critical emergency," says Joe Brito, Jr., President of C. Brito Construction Co., Inc. "so we needed to bring in a team that could get it done, and do it right the first time. We called Tom Malone immediately, the New England branch manager at Xylem, who had delivered for us previously. We knew we were in good hands."

By 5 a.m. the next morning, Malone and his team had assessed the situation and determined that there was degradation and a break of the 30-inch force main, approximately one mile from the WWTP. Little did the team know that the exact same situation would play out twice more along the same stretch of pipe in the next two months, but in every case they responded in the exact same way: with immediate response, nimble thinking, on-site expertise, the right products and finally a comprehensive bypass project to facilitate the replacement of the 4.5 mile stretch of force main.

Solution

On the initial call in December, the first step in the repair process was to mobilize what was needed for the bypass. Because the 30-inch pipe handled 5 million to 7 million gallons per day (MGD) of flow, the bypass required two lengths of 18-inch high-density polyethylene (HDPE) pipe run side-by-side to replace the force main and to handle the flow requirements.

The length of the bypass was approximately one mile, so Xylem had to mobilize two miles of 18-inch pipe from various Xylem rental locations along the eastern seaboard. In addition to setting up the bypass so the break could be repaired, a 6-inch line had to be installed to move any flow that leaked from the break back to the WWTP.

Less than 24 hours after the first phone call, Xylem fusion technicians



Three Godwin electric driven HL200 pumps with Variable Frequency Drives were installed to regulate bypass flow rate, and one Godwin critically silenced diesel driven HL200 pump was brought in as a redundant back-up.

CUSTOMER: Plymouth, MA Wastewater Treatment Plant, C. Brito Construction Co., Inc.

CHALLENGE: 3 different emergency bypass events on the same force main, and a final bypass to facilitate the repair and replacement of the entire line.

PRODUCT:

- 4 Godwin HL200 pumps (3 electric drive with Godwin VFDs; 1 critically silenced diesel)
- 51,000 feet of 18" HDPE pipe
- MJK (Xylem brand) Flow meters

RESULT: Xylem personnel responded overnight to three different bypass emergencies on the same 4.5-mile length of force main. After the third emergency, Plymouth facilities staff, along with C. Brito Construction and the Xylem team, decided that a complete line replacement was needed and was ultimately installed.

Xylem's unique ability to secure 51,000 feet of 18-inch HDPE pipe and mobilize 87 truckloads of pipe, pumps, equipment and accessories made them a critical partner to C. Brito and to the Town of Plymouth. Rapid emergency response - along with 24/7 dedication to being close by and always available to get the job done - was key to the success of the project.

were at the job site and assembling pipe. Tractor-trailer access to the actual break location was not possible, so the two miles of pipe was fused 500 feet at a time at a staging area, and then dragged through wooded and rough terrain to get to the break. By 4 p.m. on December 21, the team was able to start moving flow through the 6-inch pipe from the dirty water pond at the break to the WWTP.

Over the next three days, the team operated around the clock – working quickly and efficiently to fuse the 18-inch HDPE pipe, install the piping and make the critical connections to the existing pumps in the Plymouth network. By 5 a.m. on Christmas Eve, wastewater was flowing through the bypass, and the Xylem team had enabled C. Brito Construction to address the immediate need of accessing the force main break and beginning the necessary repairs.

Over the next six weeks, similar emergency situations – and similar Xylem emergency responses – were repeated two more times in other parts of the 4.5 mile stretch of force main. “By the time the second and third breaks took place, back-to-back, we knew the first break wasn’t a fluke and that there were inherent issues with the entire 30-inch line,” says Brito.

Representatives from the Town of Plymouth, C. Brito Construction and Xylem met to discuss how best to implement a single bypass that would connect the three individual bypass sections and make it possible to replace the entire 4.5 mile stretch of force main from the Water Street Pump Station to the WWTP.

For this large-scale solution, Xylem incorporated 18-inch knife valves into the bypass design to control flow. Four Godwin HL200 pumps were brought in to override the pumps at the Water Street Pump Station. Three were electric driven pumps with Godwin Variable Frequency Drives (VFD) to regulate the pumps to handle fluctuations in the bypass flow rate. The fourth pump was a critically silenced diesel-driven pump, installed as a redundant back-up. Xylem’s MJK flow meters were also added to each of the 18-inch lines for enhanced pumping efficiency, triggering pumps on and off depending on predetermined flow rates in the lines.

Result

After weeks of 24/7 emergency repair work, the teams fused the final piece of pipe, tightened the final bolts, and cranked up the Godwin HL200 pumps to push flow through the bypass, circumventing the 30-inch force main once and for all. The Town of Plymouth could now begin to replace the entire failing pipe and deliver a solution that would finally put their town residents’ minds at ease.

As the last component of the bypass and for some additional peace-of-mind, Xylem provided 24/7 pump watch duty, which ensured that all systems ran smoothly, efficiently, and without issue.



The two miles of HDPE pipe had to be fused 500 feet at a time at the work area and then dragged through the woods and over rigorous terrain to get to the break.



Four Godwin HL200 pumps were brought in to override the pumps at the Water Street Pump Station.