

Large-Diameter Restrained-Joint PVC Pipe Helps Chicago Suburb Get Relief From Sewer Backups

By NAPCO Pipe & Fittings

Faced with boring through wetlands and under a creek to address much needed improvements to its sanitary sewer system, the City of Elmhurst, Ill., turned to new large diameter restrained-joint PVC pipe and horizontal directional drilling (HDD) to get the job done.

After area homes were plagued with sanitary sewer backups following a severe storm in 2010, the Chicago suburb launched the \$10 million Southwest Elmhurst Wet Weather Control Facility project. This was not the first time the City had faced storm-related backflow problems, and the new project aimed to alleviate sewer backups in as many as 2,300 homes in the southwest corner of the City, the area hit hardest by sewer backups.

The initiative included the installation of a deeper, 24-in. gravity sewer line that can accommodate higher flow rates delivered to an upgraded lift station, which includes larger pumps, enhanced controls and an expanded wet well. From the station, sewage is currently pumped by way of a 10-in. dry-weather force main to the existing gravi-

ty interceptor. A new 18-in. wet-weather force main is also being constructed that zigzags beneath the City toward a new, 2 million-gal storage tank at the city's Water Reclamation Facility.

The main goal of the City and its engineers was to divert excess sewage generated by extreme weather from entering and overwhelming the Water Reclamation Facility and causing sewer backups in area homes. They knew they needed the larger diameter pipe, but also had to contend with the challenges of working in a residential area and boring in difficult ground conditions.

Catherine Morley, P.E., senior project manager with RJN Group of Wheaton, Ill., explained that in order to address the problematic sanitary overflows, the City needed to approach its sewer system in a new way.

"Essentially, we redefined the pump station by making it both a dry weather and wet weather station," she said. "We will still pump the sewage to the interceptor during small rain events via the dry-weather force main, but when that interceptor is overloaded during extreme conditions the addition of the

18-in. force main and the above-ground storage facility will enable the station to pump higher flows without overloading the Water Reclamation Facility and downstream sewers."

Morley says it took a good deal of planning to figure out how to essentially divert large volumes of excess flow from the City's residential area to the treatment plant and storage facility. "To get there was tricky because we would be working in residential areas and having to cross a creek to reach the treatment plant, we had limited routes with which we could work," she said.

The City needed 5,000 ft of 18-in. force main; however, a good portion of this line would have to run beneath flood plain, under levees and cross under a creek and wetlands. For these more sensitive areas, RJN specified nearly 2,000 ft of 18-in. Certa-Lok C905 restrained-joint specialty PVC pipe from North American Pipe Corp. (NAPCO) to be installed via horizontal directional drilling.

"We were required to bore through wetlands because the open-cut method is not feasible in these areas. Part of the project also required the pipe to go under Salt Creek, and the county required we bore that part of the project, as well," explained Garry Sementa, project manager with Archon Construction Co. Inc., of Addison, Ill.

Morley said they chose Certa-Lok PVC pipe for its ability to hold up in the unstable ground of the wetlands. Its easy-to-assemble restrained joints would also prove useful because the crew had limited space in which to assemble the pipe when working near the creek. Fortunately NAPCO had recently begun manufacturing the time-tested Certa-Lok pipe in an 18-in. size, which was a perfect solution for this project.

Certa-Lok C905 RJ is the industry's original non-metallic, mechanically re-



Horizontal Directional Drilling Guide

strained-joint piping system designed for use in force main sewer systems, water and other applications. It utilizes precision-machined grooves on the pipe and in the coupling which, when aligned, allow a spline to be inserted, locking the pipes together. A flexible elastomeric seal, or O-ring, in the coupling provides a hydraulic seal. This is the first time Elmhurst's superintendent of water and wastewater distribution Christopher Dufort has worked with Certa-Lok.

"It's been a learning experience for me. Seeing how it works. I was pretty amazed at how well it operates and how much force you can use to pull those pipes together with their spline. I'm impressed so far. We did three bores with it and it worked out great," he said.

The drills that ran the Certa-Lok force main beneath the berms, the creek and the wetland were undertaken in typical fashion. At each of those sites, Archon Construction set up the boring ma-

chines, drilled the hole, treated it with bentonite drilling fluid, reamed it, then pulled the pipe through. Vacuum trucks were nearby to extract sludge and slurry. The creek, however, was a little different.

This phase of the project totaled more than 1,000 ft. The crew initially installed 165 ft of 30-in. steel casing beneath the creek for protection, which is a county requirement. To bore the pipe, the crew dug pits on either side of the creek, with the access pit about 800 ft away on the east side, outside of the flood berm. The crew bored the initial hole, then during pullback it installed the casing spacers onto the last 170 ft of the Certa-Lok. This work was done while the crew was 15 ft deep in the entry pit with only 40 ft available to prepare the final sections of pipe for insertion into the casing. During this final phase, the crew pushed the Certa-Lok joints close to their maximum tolerance, reaching 67,500 lbs pull pressure at times.

"The limited amount of space we had to work on the west side of the creek to get the pipe back to elevation was interesting," Sementa said. "Certa-Lok's ability to bend was a huge benefit in this case, and everything held together."

Morley agreed. "It is a great pipe. This is the fourth project in which we've used Certa-Lok. In this project, especially where we needed shorter lengths, it was ideal. The standard length is 40 ft but for some of the installs the manufacturer provided 20-ft pipe sections. We had limited space in which to work so we needed a pipe that we wouldn't need to be fused together," she said.

This phase of the Southwest Elmhurst Wet Weather Control Facility project was expected to be completed in June. The City expects the entire project to be up and running in 2016, when the team completes the pump station and storage tank.

www.horizontaltech.com

drill@horizontaltech.com

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