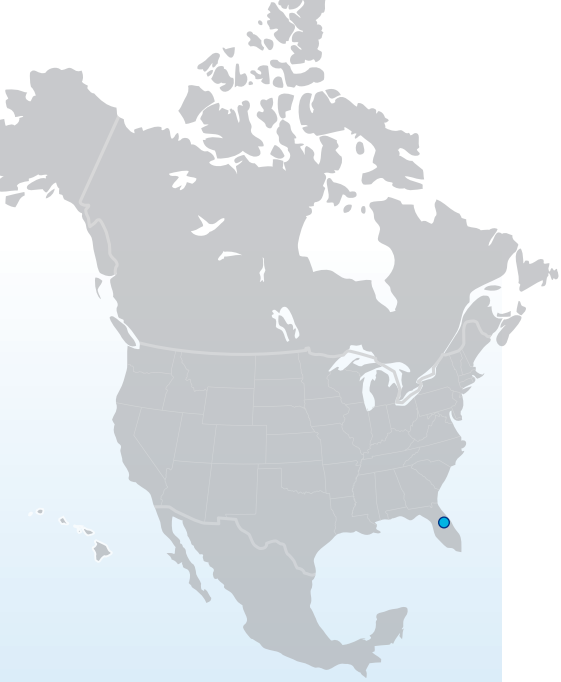

MUNICIPAL
CASE STUDY

CERTA-LOK® RESTRAINT JOINT PVC PIPE SUPPORTS SANITARY SEWER UPGRADE USING THE PATENTED CTHDD METHOD OF TRENCHLESS SEWER AND WATER CONSTRUCTION

With the large number of existing utility lines in the area, including a pressurized gas main that ran parallel to the new sanitary sewer location, the city's engineer was posed with a challenge to find a safe but effective installation solution.

Project Type:
Sanitary Sewer

Application:
Close Tolerance Horizontal Directional Drilling (CTHDD)

Owner:
City of Orlando

Product Used:
16" DR 26 Certa-Lok® RJ Yelomine®

Contractor:
Killebrew, Inc.

Sub-contractor:
Trenchless Consulting, LLC

Engineering:
City of Orlando EOR, Charlie Conklin, P.E.

CHALLENGE

The City of Orlando initiated a $1.8 million wastewater project to increase capacity for an undersized sanitary sewer. The upgrade was needed to support the new growth and development in the immediate area around American Way, an already high-density business area that includes a popular restaurant, many hotels and a multi-story office building.

APPLICATION

The plan for the American Way sanitary sewer project allowed the contractor to use pipe bursting or ArrowBore close tolerance horizontal directional drilling (CTHDD). An existing high-pressure steel gas line was identified 5 ft. away from the proposed sewer pipe alignment which led the contractor to move away from static pipe bursting and choose ArrowBore, a patented close tolerance horizontal directional drilling (CTHDD) process. This provided a safe method of construction with the existing utility constraints and a more precise way to consistently ensure the pipe was on-grade. In addition, ArrowBore offered a construction method to ensure minimal impact to traffic on the nearby seven-lane road. The replacement sanitary sewer line totaled 260 ft. of 16 in. DR 26 Certa-Lok® Yelomine® PVC pipe with restrained joint (RJ) coupled sections.

SOLUTION

To start the ArrowBore CTHDD process, vertical site relief holes were auger drilled, then 18 in. diameter pipe was inserted vertically at 20 ft. intervals. The vertical relief holes are critical to the process

NAPCO PIPE & FITTINGS

MUNICIPAL
CASE STUDY

and are used to sight the drill stem for on-grade measurements as well as reduce drilling fluid pressure build-up when inserting the pipe at such a close tolerance to the surrounding soil. Engineers were able to verify proper grade during installation with the stem depth verified at each relief hole location using a laser sight and measuring rod in the hole. If the drilling head is off grade, it can be adjusted and realigned with a rod hooked to the pilot drill stem. The continual measurement ensures the accuracy of the gravity sewer grade. While the pipe is being pulled into place, the drilling fluid slurry is relieved through the vertical relief holes allowing the contractor to have control of the drilling slurry flow and fluid pressure. This prevents collapse of the bore hole, as well as surface and utility damage. By reducing the drilling fluid volume, the amount of soil removed is only the amount needed to displace the pipe being installed. The excess slurry is then removed using a vacuum truck.

The close tolerance pilot hole was drilled and the location of the drill stem approved before beginning installation of the pipe. The recommended carrier pipe, 16 in. DR26 Certa-Lok® Yelomine® RJ PVC pipe, in 20 ft. lengths, from NAPCO Pipe & Fittings, was installed segmentally in the launch pit as the ArrowBore process progressed and run at a 0.60 percent grade at an average depth of 13 ft. below ground. The outer diameter of the coupling was 17.40 in. and the reamer hole was 17.75 in. The close tolerance back reamer is only 0.25 in.to 0.50 in. larger than the greatest outer diameter of the pipe being installed, which prevents pipe flotation and soil settlement; standard HDD would have used at least a 26 in. bore hole. Once the length of pipe, with the coupling attached, was dropped into the pit, it was placed in a PVC channel. This channel helped ensure the pipe stayed clean for connection to the pipe being pulled and was also used as a guide to assist with pipe alignment. The Certa-Lok cartridge-style assembly measurably reduces the staging area so there is no need to string out lengths of pipe and, as a result, eliminates the need for several hundred feet of working space.

"I have been a proponent of using the ArrowBore technology provided by Trenchless Flowline for many years, and as a result that also means that I'm a proponent of using Certa-Lok PVC pipe." said Charlie Conklin, P.E., project manager/design engineer for the City of Orlando. "For those not familiar with the ArrowBore process, its technical description is Close Tolerance Horizontal Directional Drilling, which is a controlled grade HDD that can be used for gravity or force main sewer construction. We at the City of Orlando have a strong affinity for PVC pipe, so Certa-Lok pipe is our first choice whenever we need restrained joint pipe, such as required for Close Tolerance HDD."

The top few feet of soil was loose sand, the remaining 13 ft. was packed clay and very saturated. In the water table with clay and sand mixture, dewatering was necessary only around the manholes, not for the boring process.

The Certa-Lok restrained joints can be assembled in less than one minute per joint. Since this project was such close tolerance, the sub-contractor felt that cutting the spline would reduce drag. In most cases, the spline does not need to be cut.