

HDD Sewer Installations In The Nick Of Time



The picturesque seaside village of Ogunquit, ME, recently completed improvements to its sanitary sewer system which reduces infiltration problems, increases capacity and bypasses much of the old, ductile iron infrastructure with new HDPE pipelines.

Because much of the system was put in place before recent growth in the town – structures have been built directly over existing sewer lines. Therefore, much of the new pipe has been installed by horizontal directional drilling. Routes of other pipelines were completed by HDD because site conditions made other methods of construction impractical or impossible.

“Directional drilling was the only way these segments of pipe could be installed,” said Phil Pickering, district manager of the Ogunquit Sewer District, owner of the project.

The recent completion of the Pump Station Number 2 Force Main project was the last segment of the improvement program that began in 2005, said Pickering. Construction was designed to limit overflows frequently caused by heavy rains and high tides. Work included two HDD shots crossing beach areas submerged during high tides and, therefore, could not be open cut. Pipe installed was 10-inch diameter HDPE pipe.

Both installations were made by Enterprise Trenchless Technology Inc. (ETTI), Lisbon Falls, ME.

First drill

The first drill was 1,800 feet and ran from the sewer pumping station under a section of tidal area to a man-made storm sea



wall. The second installation was 1,650 feet across a tidal river to an air release station. Depths ranged from 20 to 49 feet. Both installations were made with a Ditch Witch JT8020 Mach 1 HDD drilling unit. Locating was done with Subsite walk-over equipment between tide cycles to avoid a wire-line operation.

“A gravel road had to be constructed in order to get support equipment to the site,” said Scott Kelly, ETTI president. “A walking foot bridge that spanned a river to our west was utilized to transport water and slurry to the drill from a remote parking lot. After the pilot hole was completed, a pass was made with an 18-inch Ditch Witch Beaver-tail backreamer and then the final pullback was completed. Maximum pull load on the installation was 47,000 pounds and it took 74,000 gallons of slurry to complete.”

The same 18-inch reamer was used on the second shot, but reaming and product

could be pulled in one pass because fluid slurry was retained from the first 1,800-foot installation, said Kelly. Reamer and pipe were pulled through the pilot hole with only 41,000 pounds of pullback load.

“Not having to pre-ream the second shot saved time and helped complete the work before heavy rains and high tides arrived,” Kelly added.

The JT8020 drill unit is powered by a 275-horsepower liquid-cooled diesel engine, and the machine develops 80,000 pounds of pullback, 10,000 foot pounds of torque and spindle speeds to 210 rpm. Drilling fluid was mixed with a Ditch Witch FM50 mud mixing unit. Pipe was fused with a McElroy 618 Trac Star fusing machine and the pipe string was handled with a poly horse system. Support equipment included two Ditch Witch vacuum excavation units. Baroid drilling fluid products were utilized with a combination mix of Bore Gel, No Sag, Quik Trol LV, Soda Ash and EZ mud gold.

Complications

Several complications occurred during the installation.

“First,” said Kelly, “the salt water was affecting the slurry by dropping the cuttings out before reaching the pits. A few mud changes were made, notably No Sag was used to combat the salt water affects and maintain the flowing ratio of cuttings we wanted.”

Environmental issues also had to be addressed. “Another problem crews faced,” said Kelly, “was an endangered bird nesting area in the sea wall dunes at our location.

Environmentalists established a very small window to complete the work or the job would be shut down."

The weather also caused time concerns and provided additional pressure to complete the jobs without delay. With heavy rains forecast, ETTI crews, sewer district personnel and an excavation contractor worked around the clock to get the system completed before the rains arrived.

"The line was tested on a Saturday and began flowing the next day, ready to assist with future storm water flows – which came very quickly," said Kelly. "With an extremely high tide and nine inches of rain, by Monday four feet of water covered the areas where our equipment had been working. This line couldn't have come at a more crucial time."

Pickering said Ogunquit is very familiar with the benefits of directional drilling and has used the trenchless procedure in the past.

During the first phase of the sewer improvement project in 2005, ETTI completed an 1,100-foot installation of 8-inch diameter HDPE pipe along an intricate route that crossed under an existing sewer main, two water mains, around a bridge and hotel to an offshore sand bar and back to land under a high-flow sewer main.

ETTI has been in business since 1995 and has completed more than 2,100 HDD installations under rivers, streams, wetlands and roads with pipes ranging in size from one to 30 inches in diameter. In addition to sewer and water construction, ETTI serves natural gas, electric, telecommunications and cable television markets, and installs horizontal environmental wells with its di-

rectional drilling equipment. ETTI serves clients throughout the northeast.

FOR MORE INFORMATION:

HDD contractor:

Enterprise Trenchless Technologies Inc,
(207) 353-5000, hdd-etti.com

Consulting engineer:

Brian Dorwart, Haley & Aldrich, 603) 625-5353, bcd@haleyaldrich.com

HDD rigs, vacs, mud systems:

Ditch Witch, (800) 654-6481,
ditchwitch.com

Fusion equipment:

McElroy Manufacturing, (918) 836-8611,
mcelroy.com

Drilling mud/additives:

Baroid Industrial Drilling Products,
(877) 379-7412, baroididp.com

Benefits Of Planning

ETTI President Scott Kelly said original plans for the Ogunquit sewer main installations called for shots of 2,000 and 1,850 feet, respectively. Because of the complexity of the project, ETTI hired Consulting Engineer Brian Dorwart, Haley & Aldrich Engineering, to design the HDD shots.

"Brian did a pull load calculation and figured the pressure would be nearly to the safe limit for 10-inch HDPE pipe," said Kelly. "After many meetings and planning, the sewer installations were rerouted, shortening them both to within pull load limits. Brian's calculations were nearly perfect and prevented damaging the pipe on final pullback. The design depth was also calculated to save a possible frac-out situation. Certainly the engineering paid huge dividends in the success of the project."