

Field-Fused/Gasket-Free PVC Pipe Enables Utilities to Save Money in Trenchless Water Line Installations

By Gary Sheppard, Underground Solutions, Inc.

The use of field-fused, gasket-free polyvinyl chloride (PVC) pipe is allowing hundreds of North American municipalities and utilities to save substantially on the cost of trenchless water and wastewater line applications, such as horizontal directional drilling (HDD), pipe bursting and slip-lining, as well as traditional direct bury installations.

Traditionally, PVC pipe had not been field-fused on past utility projects. The installation of PVC pipe required gasketed

or solvent cement mechanical joints, and these type of joining techniques have limited or prevented use in trenchless applications. However, new technology from Underground Solutions, Inc. (UGSI) is enabling customers to install continuous, monolithic, gasket-free Fusible PVC™ pipe with high-strength fused joints. Both municipalities and utilities are taking advantage of the hydraulic efficiency, strength, and ease of repair of this type of PVC pipe.

Major advantages of Fusible PVC™ pipe are reduced wall thickness and smaller outside diameter (OD), which result in higher flow rates; smaller bore hole requirements also yield lower installation costs. In addition, the use of standard PVC and ductile iron fittings improves initial and ongoing maintenance costs.

Fusible PVC™ pipe also provides the required tensile capacity to be installed via HDD over distances of more than a mile. In a recent project in South Carolina, the Beaufort Jasper Water & Sewer Authority (BJWSA), the Mears Group, Inc., and UGSI set a new record for the longest single continuous HDD installation of Fusible PVC™ pipe at over 6,400 feet. It was also the longest uncased HDD of any thermoplastic material.

About two years ago, BJWSA gained ownership and operation of the water and wastewater facilities at several area military bases, all of which are being upgraded to provide improved levels of treatment. As part of the plan, wastewater facilities at the Air Station and Marine Corp Recruit Depot at Parris Island are being phased out, with flows directed to a new wastewater reclamation facility on Port Royal Island.

The new force main from the Parris Island base needed to be installed under

an environmentally sensitive creek and marsh area, and this led to the decision to use horizontal directional drilling for the pipe installation. The HDD process allows the contractor to drill from a limited site under the ground or water and steer the downhole tooling both horizontally and vertically to the exit point. The pilot drill is then reamed out to progressively larger sizes until the bore hole is large enough to pull back the product pipe; boring depths typically run from 10 to 60 feet under the surface.

Ed Saxon, the BJWSA Deputy General Manager, explains that this particular project was a design challenge because the narrow causeway linking the island to the mainland was off limits to construction. "Open cutting across the salt marsh would have been very difficult even had it been possible to permit," Saxon says. "The Authority's experience with long HDD installations and recent advances in the technology made drilling the only viable option. Fusible PVC™ pipe was the only practical alternative for us."

Commencing last October, the Mears Group drilled the pilot hole and exited on target without the use of the intersect method. An intersect had been contemplated, whereby pilot drills from both sides are steered to an intersection point and connected to complete the shot. In three subsequent passes, Mears Group personnel reamed out the bore hole to 32 inches in diameter and swabbed it with a barrel reamer.

On December 2, 2009, a continuous 6,400-foot length of fused 16-inch DR 18 FPVC® pipe, supplied by UGSI, was placed on rollers, the pull head was attached to the drill stem, and the pipe was pulled from Horse Island under the existing marsh and Archer's Creek, to Jericho Island. The pipe emerged before dawn the next morning and was subsequently hydrostatically test-



Archer's Creek and Marshland Crossing



Mears Drill Rig Spread



16" FPVC™ Fusion Site

ed to 150 psi for acceptance by BJWSA personnel. When the main line is completed in the future, the new force main will tie-in the flow from the Parris Island facilities to the Port Royal Water Reclamation Plant.

The Engineer for this project was Hussey, Gay, Bell & DeYoung (HGBD), and the firm's Jennifer Oetgen stated that planning and design of the project was critical to a successful outcome. "Early

onsite consultations with representatives from the Mears Group and UGSI confirmed the viability of a 6,400-foot HDD, but the possibility of an intersect drill, staging that length of pipe, and working within the requirements of the military made this project particularly challenging and satisfying", says Oetgen.

Underground Solutions, Inc. is an infrastructure technology and pipeline

rehabilitation company. It has developed and continues to develop unique and proprietary technologies focused on the underground infrastructure industry, including its line of Fusible PVC™ pipe products. Applications include pressure and non-pressure installations in the water and sewer industries. The company provides support services including engineering support, budget preparation, project planning, fusion services and training, and field installation. 

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