

# CITY OF LAWRENCE INSTALLS PARALLEL FORCE MAINS THROUGH WETLANDS TO SERVE NEW WASTEWATER TREATMENT PLANT

## Overview

In 2013 the City of Lawrence published a request for proposal (RFP) for design services for the Wakarusa Wastewater Treatment Plant (WWTP). That RFP also included the design of a major pump station (PS10) and parallel force mains to convey significant amounts of wastewater to the new plant.

The proposed WWTP would be located in close proximity to the Wakarusa River, a tributary of the Kansas River, that runs along the south side of the City of Lawrence. As a result of the existing topography much of the area between PS10 and the WWTP is wetlands. While the preliminary design report had envisioned a force main alignment that would avoid these wetlands, significant savings could be achieved by crossing them. Crossing this environmentally sensitive area would require large amounts of trenchless installation, but the savings available based on less constructed pipe in combination with reduced pumping requirements and long term energy usage would be over two million dollars.

The project team consisted of Black and Veatch as the program manager with Professional Engineering Consultants (PEC) taking the lead design role for the force main and pump station work. The parallel force mains consisted of 16-inch and 24-inch lines that would stretch a total length of 15,500 feet. As part of the overall agreement with Baker University, who owned the wetlands, the lines crossing through the area would be a fully restrained and gasketless, fused pipe system.



3,900 LF assembled and staged - 16-inch DR18 FPVC® pipe



Aerial insertion over drainage canal

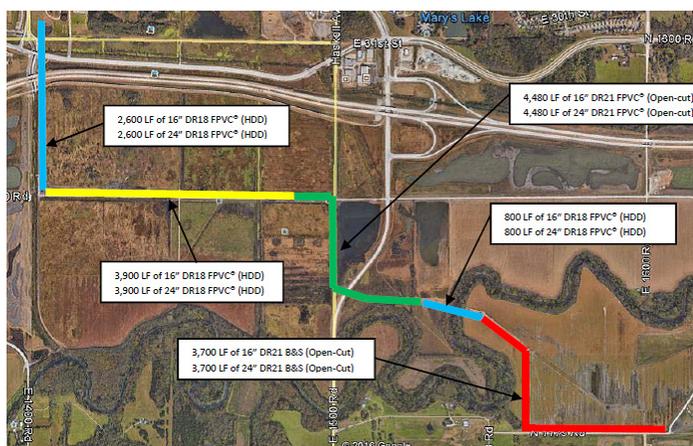
## Pipeline Details and Project Summary

<b>Project:</b>	Wakarusa PS10 Force Mains
<b>Location:</b>	Lawrence, Kansas
<b>Length and Pipe Size:</b>	7,300 LF 16-inch DR18 and 4,480 LF of 16-inch DR21 7,300 LF 24-inch DR18 and 4,480 LF of 24-inch DR21
<b>Installation:</b>	Horizontal directional drill and Open-cut
<b>Owner</b>	City of Lawrence
<b>Engineer:</b>	PEC and Black and Veatch
<b>Contractor:</b>	BRB Construction – Topeka, Kansas
<b>HDD Contractor:</b>	Brooks Construction and Dolan Directional Drilling

Due to the potentially corrosive soils that exist throughout the City of Lawrence and along this alignment, the pipe material selected would be non-metallic. To further complicate matters, approximately 7,300 LF of the overall alignment had to be installed via horizontal directional drill (HDD) with installation lengths consisting of 2,600 LF, 3,900 LF and 800 LF for both the 16-inch and 24-inch pipelines. Based on the required inside diameter and the ability of the material to perform in long HDD applications, PEC selected Fusible PVC® pipe for all sections that required restrained joint pipe. Bell-and-spigot PVC was utilized in other open-cut areas where fused pipe was not required. While HDPE was considered, it was determined to be cost prohibitive based on the required upsize of the pipes to 20-inch and 30-inch in order to meet the inside diameter and pressure carrying requirements of the design. The project was bid in August of 2014. BRB out of Topeka, Kansas was the low bidder and was awarded the project. They selected two HDD subcontractors, Dolan Directional Drilling and Brooks Construction to provide the HDD services on the project.

Dolan Directional would perform the HDDs for both the 16-inch and 24-inch 3,900 foot drills. While Brooks Construction would perform all other drills.

While the construction process was not without challenges. Over the course of 12 months, BRB Construction working with its HDD subcontractors successfully installed over 23,500 feet of Fusible PVC® pipe by horizontal directional drill and open-cut. Once the full length of both lines were installed, they were pressure tested and turned over to the City in December of 2015. The pump station is expected to begin delivery of flows through the parallel force mains to the new WWTP in 2018.



"The City of Lawrence and PEC have utilized Fusible PVC® pipe on past projects with excellent results. The total length and overall complexity of the HDDs for this project made the material choice critical. When we looked at the material properties in combination with the expected forces in the longer HDDs we were confident that the installation could be successful."

*Alex Darby, Project Manager  
PEC*

"We have utilized Fusible PVC® pipe on multiple projects with great results. This project was especially difficult based on the overall lengths and environments of the HDDs but we are pleased with the overall outcome."

*Melinda Harger, Utilities Engineer  
City of Lawrence*

Underground Solutions, Inc. provides infrastructure technologies for water, wastewater and power cable conduit applications. Underground Solutions' Fusible PVC® pipe products, including Fusible C-900® pipe and FPVC® pipe, utilize patented technology to produce a fused monolithic, fully-restrained, gasket-free, leak-free piping system ideal for trenchless (horizontal directional drilling, pipe bursting and sliplining) or conventional "open-cut" installations and are available in 4-inch to 36-inch diameters. The combination of standard fittings and lower weight with higher flow for a given pressure class versus other thermoplastic pipes ensures that Fusible PVC® pipe brings greater economy to most pipeline projects.



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