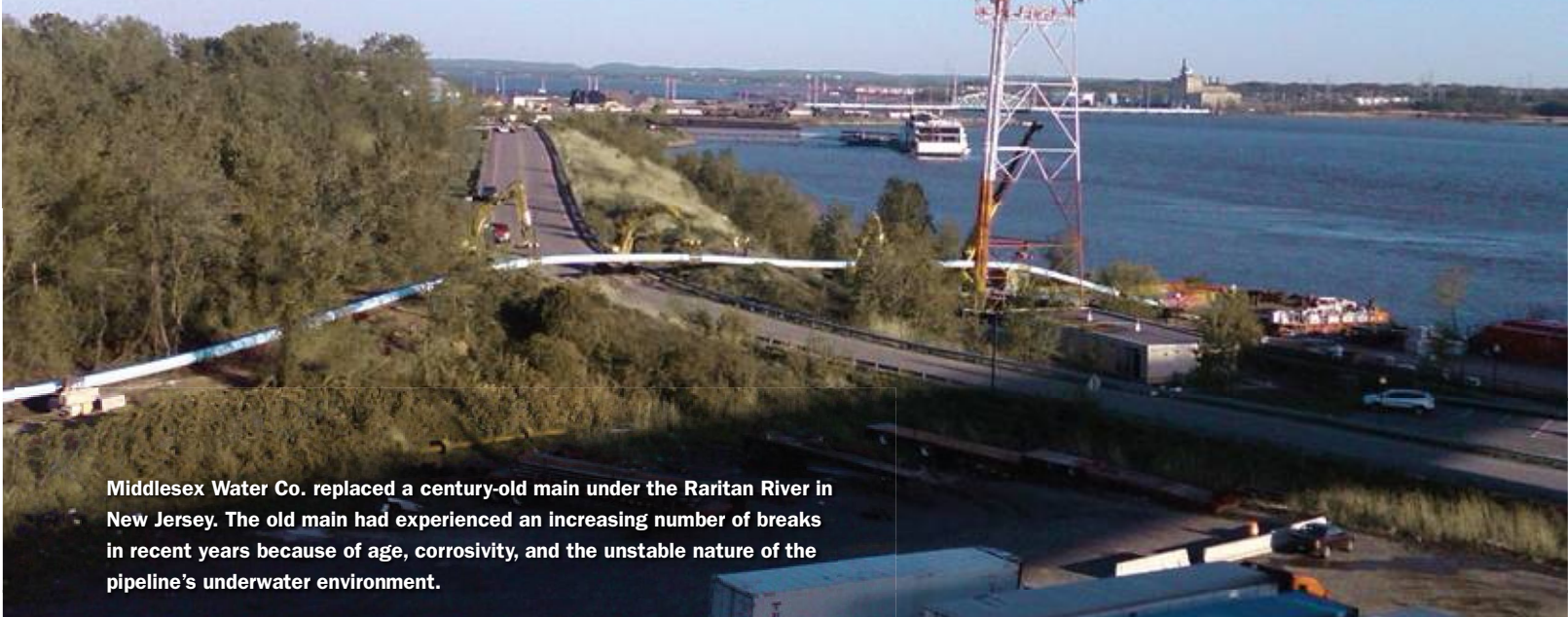


Finished Water

A PHOTOGRAPHIC PROFILE



Middlesex Water Co. replaced a century-old main under the Raritan River in New Jersey. The old main had experienced an increasing number of breaks in recent years because of age, corrosivity, and the unstable nature of the pipeline's underwater environment.

PIPE REPLACEMENT PROJECT SETS WORLD RECORD

Established in 1897, the Middlesex Water Co. provides a full range of water, wastewater, and related utility services to 59,800 customers, primarily in north-central New Jersey and Delaware. To maintain a high level of customer service, the utility replaced a 104-year-old, 24-in. cast-iron water main. A 5,365-ft-long new 24-in. water main was installed, with almost 4,800 ft of the main beneath the Raritan River and adjacent marshland. At its deepest point, the main ran 60 ft below the river's surface.

The water company explored numerous alternatives for drilling under water over a great distance, including microtunneling, trenching, and horizontal directional drilling (HDD). Ultimately, HDD

was the approach selected as the most cost-effective and minimally invasive to the environment and marine traffic and for its sustainability and permitting requirements. Multiple sections of nearly 5,400 ft of fusible polyvinylchloride (PVC) pipe were strung out and fused together so the pipe could be pulled as a continuous length beneath the riverbed. The project has been chronicled as the world's longest fusible PVC pullback of 24-in. or greater diameter completed to date.

PROJECT SPECIFICS

Project Name: Middlesex Water Transmission Main

Owner: Middlesex Water Co.

Engineer: CDM

General/HDD Contractor: Northeast Remsco Construction/Mears Group

Pipeline Supplier: Underground Solutions

Completion Date: May 2010, following a successful 175-psi pressure test and reconnection

Technology: HDD and pull-in of fusible PVC pipe

Project Cost: \$5.3 million

Physical Size: The 190-ton pipeline was installed with three intermediate fusions completed during the pull-in. The drill alignment was more than 60 linear ft deep under the Raritan River. A maximum pull force of 165,000 lb was recorded during the 23-hr pull-in.

PHOTOGRAPHS: UNDERGROUND SOLUTIONS