UNDERGROUND SOLUTIONS
YOU CAN RELY ON,
BRANDS YOU CAN TRUST

# CORPORATE OVERVIEW

Waterline Renewal Technologies (WRT) is a leading provider of engineered technologies used in the trenchless rehabilitation of wastewater/stormwater infrastructure for municipal, commercial, industrial and residential applications and provides a unique portfolio of products and services through its brands AP/M Permaform, ConShield Technologies, LMK Technologies and Perma-Liner Industries.

We provide trenchless rehabilitation of degraded infrastructure through differentiated products, technologies and services, to prevent inflow and infiltration of sewer systems.

WRT offers unique industry products through its core brands - AP/M Permaform, Centripipe, ConShield Technologies, LMK Technologies and Perma-Liner Industries - to revolutionize the water industry. The brands' experience in designing, patenting and manufacturing trenchless technology continues to rise while producing products that are cost-effective solutions to rehabilitating, without excavation, existing sewer systems.

With a combined eighty-five years of global industry experience through its core brands, WRT continues to transform the water industry through intentional platform development, design and execution, while being one of the most comprehensive sources of education and information in the industry.

WRT's pioneering approach to trenchless rehabilitation is changing how municipal, commercial, industrial and residential sectors repair their water and wastewater infrastructure. Our goal is nothing short of completely revolutionizing the water industry to get water to where it is needed, when it is needed, and to get the right quality of water to satisfy the specific demand.

## MARKETS SERVED

MUNICIPALITY

COMMERCIAL/INDUSTRIAL

RESIDENTIAL

Waterline Renewal Technologies™

800.662.6465 | info@permaform.net | waterlinerenewal.com/brand/apm-permaform

00077 / 2-21

APM
The trenchless solutions company

# CASE STUDY: PREVENTING MICROBIAL DAMAGE, SAVING MONEY: HAMMOND IN SANITARY DISTRICT GETS THE BEST FOR LESS

UNDERGROUND SOLUTIONS
YOU CAN RELY ON,
BRANDS YOU CAN TRUST

# PREVENTING MICROBIAL DAMAGE, SAVING MONEY: HAMMOND IN SANITARY DISTRICT GETS THE BEST FOR LESS

To prevent sewer overflows, the Sanitary District of Hammond, in Hammond, Indiana (population 80,000, part of the Chicago metro area) installed new detention ponds in one of its wastewater treatment plants, and also needed to build a new structure to serve those ponds. A large structure; “We’re building 1,700 feet of 11’6” by 10’6” concrete box to bring combined storm and sanitary waste from existing culverts to the new ponds,” says Marty Zurbriggen, general manager at Ellas Construction Company, Inc.

That’s a big expense, of course, and the expense could have been dramatically increased by a factor well known to sewer network operators. MIC, or microbiologically induced corrosion, has been known to completely destroy concrete sewers in a matter of months, and it’s not an easy challenge to surmount. MIC is caused by Thiobacillus bacteria, which consume hydrogen sulfide gas. You’ve probably encountered hydrogen sulfide; it’s a colorless gas that commonly produces the ‘rotten egg’ odor associated with swamps and other places where organic matter is digested anaerobically. Sewers often present perfect conditions for hydrogen sulfide gas creation; the combination of warm turbulent water, low oxygen levels, and organic matter from sanitary and stormwater flows leads to bacterial breakdown and voilà, rotten smelling gas.

Hydrogen sulfide is bad in itself—it’s poisonous, corrosive, flammable, and explosive—but from the standpoint of sewer network operators, its worst quality is that it feeds and fosters huge colonies of Thiobacillus that consume the gas and excrete sulfuric acid—some strains of Thiobacillus can thrive in acid concentrations as high as 7-percent. The acid attacks concrete and turns it into calcium sulfate, or gypsum; that is, literally more like drywall than concrete.

Preventing MIC is hard, and can rule out the use of concrete sewers in some applications. There are no good ways to prevent gas buildup in most sewers, so operators have tried various external coatings. But coatings often fail, as even small gaps and holes can provide a foothold for Thiobacillus… and if you give Thiobacillus an inch, it will take a sewer.

Since 1996, one solution has emerged that absolutely prevents microbiological corrosion of concrete; ConmicShield®, from ConShield Technologies, is a proven technology that makes concrete anti-microbial for as long as the concrete is in use. It’s not a coating, it’s a liquid concrete admixture that permeates the concrete and makes it intrinsically inhospitable to microorganisms. Thiobacillus can’t find a foothold, so sulfuric acid is never formed.

## HALF A SOLUTION CAN BE BETTER THAN ONE

“We knew this culvert would combine sewage and stormwater in an low oxygen environment,”says Hubbell, Roth & Clark, Inc. (HRC) Senior Associate Dennis Benoit, P.E. “And we wanted to do everything we could to reduce the potential for MIC damage. ConmicShield® is a great idea and there were reliable testimonials, so we specified it for this application.”

ORIGINALLY PUBLISHED IN WATER & WASTES DIGEST, AUGUST 2017

But using ConmicShield® as an admixture for the entire concrete sewer structure—all 1,700 feet of it—could have been prohibitively expensive. So Benoit took advantage of the fact that the sewer would nearly always be about half full (or sure, half empty) with seasonal flows only occasionally raising the water level over six feet. Since hydrogen sulfide and Thiobacillus can’t form underwater, this meant that about half of the sewer didn’t need to be made with ConShield-treated concrete.

Zurbriggen took on the task of building a concrete sewer with two different kinds of concrete. “It’s an ordinary job in most ways,” he says. “The regular concrete and the ConShieldenhanced concrete are the same texture and there’s no issue with bonding. So mainly it’s a matter of ordering the correct mix at the right time, and making sure we’re using the correct truck.”

Ellas Construction is building the culvert in 120-foot sections. First the base and footing are poured, and then the wall is poured in strips that are three feet high. The elevation for the ConShield-enhanced concrete is marked on the plans, and Zurbriggen usually overlaps downward by a foot or so, to be sure all exposed concrete is protected against MIC. Making sure the right concrete is used isn’t difficult but it is a little tedious; Zurbriggen has to monitor wall height, order concrete trucks with the right mix, and double check the truck tickets prior to pour. He’s backed up by subcontracted inspector Paul Knueppel, a senior project manager at Garcia Consulting Engineers. “On a typical day, we’ll go through 21 cubic yards with ConmicShield®, and 32 cubic yards without,” he says. “It’s been relatively smooth—one of my main jobs is to check the ticket and be sure the right mix is being used.”

The concrete is prepared at Smith Ready Mix, in nearby Valparaiso, Indiana. Sales Manager Scott Massom says mixing the ConmicShield® at short notice isn’t a problem; “Our whole process is automated, so once the ConmicShield® is mixed and stored in an admixture tank, it’s not a problem to make a batch at short notice. We just select the tank, and it’s all standard procedure after that.”

Using anti-microbial concrete in just a portion of the concrete box was a good idea, one that significantly reduced the cost of MIC-prevention in this structure. The Sanitary District of Hammond gets the best for less—that is, concrete sewer infrastructure that’s fully protected by the best available anti-microbial technology, at a cost that’s less than half of what it could have been.