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BUILDING COMMUNITY



## City Storm Water Protected By HDPE Pipe In Contaminated Industrial Area

### New Storm Sewer Line Defeated Toxic Waste, Narrow Roads and Hidden Utility Traps

NEWARK, NJ – While many cities and towns find pipe made from high density polyethylene (HDPE) to be highly cost effective, an area in Newark, New Jersey also needed the pipe's superior ability to stand up to extremely harsh environments.

Doremus Avenue, the major street serving the dock areas of Port Newark, was reconstructed in 2004 to widen lanes and shoulders, and install some 9,500 feet of new storm sewer lines that would safely discharge water into the Passaic River.

According to the EPA, the waters and sediments of the Lower Passaic River watershed are contaminated with hazardous substances including dioxin, PCBs, DDT, heavy metals and hydrocarbons, which stay in the soil. Long a heavily industrialized area along the Passaic River in Newark, Doremus Avenue now has nearly 400 large industrial plants dominated by electroplaters, metal finishers, pharmaceutical manufacturers, textile dyers, hospitals, electronic products manufacturers, newsprint recycling mills, oil tank farms, refinery operations and chemical plants. Pollution also comes from residual oil and gas from the thousands of trucks daily using the road.

"This project saved money and protected the community just through the use of a storm water HDPE piping system," stated Tony Radoszewski, executive director of the Plastics Pipe Institute (PPI). "It's a prime example of why more and more



municipalities are calling for HDPE pipe to be used."

During the late 1800s, the area was a world-renowned manufacturing center. Producing carriages, shoes, hats and saddle hardware, it was called the "Ironbound" because of the area's crisscrossing railroad tracks. By World War I, Newark expanded the Ironbound by building Doremus Avenue, soon to be known as Chemical Row due to all the refineries and smelters constructed there. Doremus Avenue was built on salt marsh filled in with industrial slag from local manufacturing operations and garbage from New York City. The Ironbound, like other urban areas, has had a long history of industrial use that has continued to the present time.

While industry provided the pollutants, the low lying area, much of it below sea level, trapped the residue in its soft, mucky soil, making it a prime concern for the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Department of Transportation (NJDOT) and

## From the PPI Director

When it comes to public safety, sometimes the scope of the job goes off the scales and has such severe requirements that money is not a factor. Any price will be paid to fix the problem. We've all faced that situation, and looked for alternatives while tightly clutching the checkbook.

That was the case with this area of Newark, New Jersey. But fortunately in this instance, the price and product were in line to solve a deadly pollution problem. That's because when it comes to rehabilitating underground assets, storm sewer pipe in this instance, corrugated HDPE pipe fit the bill.

No radical measures were needed to be taken or out-of-world budgets set to protect the area's storm water runoff from the toxic make-up of the soil. Corrugated HDPE pipe's superior chemical resistance, joint integrity and favorable economics provided the best solution.

When municipalities select HDPE pipe for the most demanding situations, you can rest assured it's more than up to the task for typical applications including storm water management, natural gas distribution, water and wastewater systems and all other underground utilities. HDPE pipe is a proven performer – the right product for the infrastructure that will last for generations, even in the most critical situation.

Maybe your need isn't as dire, but you'd like more information and facts. We can help. For more than 55 years, the Plastics Pipe Institute has been a leading resource. Our library of knowledge is vast, accurate and impartial.

Mayors, public works officials, civil design engineers, contractors and all the others involved in protecting the environment as well as citizens have become heroes in their community because they know that HDPE pipe is the answer.

Tony Radoszewski  
Executive Director



the new storm water system's design consultant, Louis Berger Associates of East Orange, NJ.

Usually, water-tight seals are specified for storm sewer projects to keep water in a pipeline. But for in this New Jersey DOT installation, exfiltration wasn't the problem – the challenge was to keep pollutants in the surrounding soil from entering the system. Carbro Construction of Hillsborough, New Jersey also found some unexpected surprises once the digging began.

"The only way we could prevent polluted ground water from getting into the new storm drain system was to use pipe that could give us the flow characteristics, stand up to the harsh environment and have a gasket that would securely seal the lengths. We knew from the very beginning, concrete pipe wouldn't work – it wouldn't be able to give us the seal or stand up to the environment," said Hong Sun, Berger's project manager.

"That's why we used corrugated polyethylene pipe. This project needed pipe that

wasn't vulnerable to anything that was in the soil. Plus we knew we'd need custom lengths, as few joints as possible, a product that was easy to handle and wouldn't require a lot of make-ready room which we didn't have."

Due to the toxic severity of the soil, specifications and performance data of the materials were double checked. "We went through a list provided by the DOT that identified chemicals in the soil to make sure the pipe and gasket would be okay. You name it, it was in there," Sun stated.

Additionally, the pipe, connections and seals had to stand up to some pretty heavy loads such as truck traffic and even heavy storage as the area is part of the Port of Newark.

But this wasn't your typical cut and fill operation. The project also required the closest tolerances ever found in a storm sewer project. So tight that exact lengths of the HDPE pipe were manufactured the night before to fit the next day's installation. "The traditional field cut and connecting from manhole

structure to manhole structure had to be eliminated because of the type of joining system that had to be used,” he said.

The big surprises came from underground utilities and structures that weren't identified on the plan or not well noted, after all, this area had been built, rebuilt, dug up, changed and added to for more than 100 years. The site is filled with an uncharted maze of petroleum pipelines, high-pressure gas lines, water and sanitary sewer mains. There are also high-voltage electrical feeds that carry power for New Jersey Transit, PATH trains and Amtrak. Because of this, there were a lot of ‘on the fly’ changes to the storm sewer design.

This challenge fell to Carbro Construction, who found a simple but very uncommon solution. “We just had our pipe supplier’s plant work all night,” said a smiling Tom Tamashullo, supervisor for Carbro.

Tamashullo’s crew would uncover and measure. The piece and adaptor would be manufactured overnight and delivered early the following morning to keep the project rolling.

“We had to do a lot of in-field designing and the system worked like a charm,” he related.” The specifications for the closure – usually a bell and spigot – and stick lengths were given to the factory, and they custom made what we needed and delivered to us on-site by 7AM the next day.” In total, there were some 206 custom-made lengths in diameters ranging from 15 – 60 inches.

“Corrugated HDPE pipe is the ideal storm sewer pipe for this job,” stated Pino Carlomagno,

vice president of Carbro. “It is significantly more resistant to corrosion, chemical attack and abrasion than reinforced concrete pipe – RCP, which is critical as the soil is flagged by the EPA as ID27 meaning dry, industrial solid waste. The HDPE pipe provided joints that are superior and watertight to sanitary sewer standards. Over the 8,200 foot project, we used an assortment of diameters and they all fit perfectly.”

Advanced Drainage Systems (ADS) products were selected. ADS N-12® pipe is made from engineered grades of high density polyethylene. Designed with a corrugated exterior and smooth interior, the ADS pipe provides both strength and maximum flow for water. Named for its excellent Manning’s “n” rating of 0.012, the N-12 pipe was designed in 1987 by ADS specifically for storm sewers, highways, airports and other engineered construction and has been used in these applications ever since.

Because the ADS N-12 HDPE pipe meets the requirements

for Type S pipe under AASHTO M 252 and M 294, it can be specified for culverts, cross drains, storm sewers, underground storm water detention systems and other types of new and rehabilitation construction.

As a flexible conduit, HDPE pipe withstands vertical pressure by transferring virtually all of the load to the surrounding soil. ADS N-12 pipe will support H-25 highway loads with 12-inch minimum cover, and E-80 railroad loads under 24-inches of cover. Another favored factor of the HDPE pipe, even the 60-inch diameter sections, was the ease of use and handling and its versatility.

Because Doremus Avenue is the major truck route, traffic could not be shut down or detoured. This meant the Carbro crew had another challenge to overcome.

“We did the job in two phases,” Tamashullo said. “The first phase required the storm sewer inlets and cross pipes to be constructed on the upstream side of the road. The cross pipes



were constructed to the centerline of the road. The second phase installed the trunk line down the middle of the northbound lane and the continuation of the cross pipes in order to connect to the trunk line. This required the manufacturing of non-standard lengths of pipe.”

The most critical part of the project was correct selection and installation of the gasket needed to seal each pipe joint length.

ADS obtained a copy of the soil and ground water test results showing the types and concentrations of contaminants. The company provided documentation showing that its pipe would not be affected. ADS also determined, however, that the high concentration of petroleum-based contaminants could affect the standard polyisoprene rubber gasket. A nitrile gasket was proposed and approved by the NJDOT and Berger.

For the watertight manhole adapter, the pre-caster used an A-LOK gasket manufactured also using nitrile rubber.

“Overall we’re very pleased with the project, especially the HDPE pipe,” said Carbro’s Tamashullo. “It was what we needed...chemical resistance, excellent joint performance and the custom fabrication. It would have been impossible

for any other product to respond to the needs of the Doremus Avenue project like this.”

ADS is a PPI Member Company. PPI is the major trade association representing all segments of the plastics piping industry. Member companies share a common interest in broadening market opportunities that make effective use of plastic piping for water and gas distribution, sewer and wastewater, oil and gas production, industrial and mining uses, power and communications duct and irrigation. More information is available online at [www.plasticpipe.org](http://www.plasticpipe.org).



## **CORRUGATED POLYETHYLENE PIPE – *The Drainage Solution* – STRONG, RELIABLE, COST-EFFECTIVE**

It is a fact: the next century of storm water technology and solutions is not written in concrete.

During the past several years the specification and use of dual wall HDPE corrugated pipe for storm water systems has increased dramatically based on factors such as the pipe’s strength, durability, joint integrity and long-term cost-effectiveness.

Results show that forward-thinking municipalities are realizing the future of storm water management relies on the best technology. HDPE corrugated pipe is manufactured from the highest quality materials and is the most technologically advanced product available to move storm water and wastewater.

HDPE corrugated pipe is the proven, reliable, cost-effective and safe solution for your long-term drainage needs.

### **Structural Design**

#### **Strength**

HDPE corrugated pipe is a flexible pipe system that performs well in both high cover and low cover applications. Its unique ability to support and distribute live and dead load enables it to meet almost every installation condition.

#### **Durability**

##### **Chemical Inertness**

High-density polyethylene is one of the most chemically inert of all plastics and therefore is extremely chemical and corrosion resistant.

##### **Abrasion Resistance**

HDPE is very resistant to abrasion. These two characteristics give corrugated polyethylene pipe a significant long-term advantage over concrete and metal pipe.

### **Reliability and Security**

#### **Joints**

Silt tight and water tight joints mean that what’s inside the pipe stays inside the pipe, and what’s outside stays outside. This ensures that communities, citizens, ground water supplies and wildlife are safer and more secure in their environment. These integral joints meet the stringent standards mandated by the EPA and comply with ASTM and AASHTO specifications.

#### **Tolerances**

Tight control of production and use of uniform, specified raw materials ensure that HDPE pipe is manufactured to the tightest tolerances. Silt tight and water tight joints continue to perform under moderate deflections.

#### **Quality**

The Plastics Pipe Institute has initiated a tough third-party certification program for manufacturers of corrugated HDPE pipe and resin. The certification program tests for the material, dimensional, and physical performance properties as specified in AASHTO M294/MP7.

### **Economic Advantages**

#### **Installation**

HDPE pipe is light, tough and is manufactured in long lengths. This adds up to significant potential for installation cost savings.

#### **Life Cycle Cost**

Because of HDPE’s resistance to abrasion and to chemicals, polyethylene’s pipe’s life-cycle savings over alternative drainage systems are significant. Users can expect a minimum service life of 100 years in many typical drainage applications.