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LaGrange (Ga.) High School Turns to Corrugated HDPE for Storm Water Project

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Steve Cooper — Aug 01, 2010

While it's not as complex as the Rubik's Cube, putting together a storm water detention system can be quite a puzzle just the same. But for McCoy Grading Inc. of Greenville, Ga., the large, 234,000-gallon, two-unit system it installed for LaGrange (Ga.) High School was easy to assemble because of the preparation work done by the manufacturer of the corrugated high-density polyethylene (HDPE) pipe used on the project.



This type of pipe was selected due to its ability to meet blueprint specifications and because of its history of proven performance. Corrugated HDPE pipe has the highest strength-to-weight ratio available among drainage products and provides durability, performance and favorable cost efficiencies. The reliability of HDPE pipe has made it the product of choice for many contractors, engineers plus county and state agencies. The long-term life of HDPE pipe has been pegged at 100 years or more in some industry studies.

All the components – pipe, 60-inch and 48-inch diameter manifolds with access risers, elbows, tees, etc. – were prefabricated at Southeast Culvert, Inc. to be installed along with classroom additions being constructed at the school in 2009. Due to the site's limited area, the system required a complex network of pipe and connections at odd angles in order to fit the tight space. This also added to the number of fittings that had to be fabricated, which added more pieces to the puzzle.

Considering all the factors such as time constraints, limited on-site storage and the complexity of the assembled system, the advance development of a detailed layout of the underground system prepared by the manufacturer helped the job move quicker.

"The best thing you can do for installing a system of this type is to have numbered the sections that match a blueprint with identifying numbers on the sections," advised Lee Thomas, pipe foreman for McCoy. "It's easy. And because of this and the use of HDPE pipe we were able to complete the job on schedule." For nearly 25 years, McCoy has provided earthwork, sanitary sewer, water and storm drains systems for commercial sites and roadway construction. It is also a Certified Prime D.O.T. Contractor with the State of Georgia.

"We consider ourselves to be detention systems experts," said Michael Johnson, vice president of Southeast Culvert, Inc. "Each underground system receives the same attention to detail from providing an assembly drawing with identifying labels for each fabrication, all the way down to shipping each truckload in the order that the system is going to be assembled. This was critical to the success of the LaGrange project."

Founded in 1903, LaGrange High School serves some 1350 students and is located half way between Atlanta and Montgomery, Alabama. The school size was doubled in 1980 and the latest expansion was completed in January 2010. This new wing added more science classrooms, fine arts facilities and computer labs. The size of the cafeteria was also increased. The expansion, however, did not leave any space for the storm water runoff. The new classrooms would take up most of the available area, so an above ground retention pond would not be possible. This meant putting the retention system under the school's new parking lot.

"Usually, construction crews have plenty of room to work when putting in an underground detention system," commented Tony Radoszewski, executive director of the Plastics Pipe Institute Inc. (PPI). "But here space was at a premium. And because of the new and existing buildings there was no room for a typical open pit detention system. Every available inch of land was taken. The underground detention pond was the only practical solution for handling runoff. Corrugated HDPE pipe provided the design engineers with the versatility needed to accommodate the confines of the space and get the job done. It is also the product of choice because it can be fabricated with complex angles for a tailored fit. I don't know of any other product that has this feature and can perform for more than a 100 years, and probably longer."

The Plastics Pipe Institute is a non-profit trade association representing all segments of the plastic pipe industry.

High-density polyethylene is a tough material that can withstand handling and installation processes. It is the most chemically inert drainage product available. The product used at LaGrange has a brand name called NFLOW and an effective pH range from 2 to 14. No other drainage product material can consistently perform in such a large pH range.

Abrasion can be the most destructive force that drainage pipes will endure, specifically to the invert of the pipe. Abrasion is caused by bedload that is carried by high water velocities. HDPE is highly resistant to abrasive wear due to its physical makeup and ductility.

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The resistivity of soils does not affect the HDPE pipe performance. NFLOW pipe, for example, has been successfully used in both alkali and acidic environments.



At LaGrange, one system used more than 1,130 feet of 60-inch diameter corrugated HDPE pipe to accommodate the design specification for a 160,000 gallon storage capacity, while the other system, rated for 74,000 gallons, used nearly 800 feet of 48-inch diameter pipe. Trench beds measured 95 x 45 feet and 110 x 26 feet. The two detention systems were tied into each other to handle the projected water volume.

The larger system was configured using 16 laterals and 2 manifolds. "The pipe was the easy part," stated Thomas. "Even the long lateral sections were no trouble to put in place. The HDPE pipe is strong, but it's also relatively light, which made it

fast for the crew to move around in the trench. Because of the small area, we had nearly 40 other pieces such as tees and elbows that had to be assembled. These were also made in the factory to specification and shipped directly to the site." Southeast Culvert, Inc. is located in nearby Winder, Georgia, just northeast of Atlanta. The company is a member of the PPI and has been manufacturing HDPE storm drainage products for commercial and state DOT projects in the Atlanta-metro area for more than 5 years.

"Once you get surface on grade, it's easy to get together because you have light weight pipe product. We started off by putting in the manifolds, a 20-foot length of pipe with three stub outs," explained Thomas. "It goes together quickly."

The pipe system was fully perforated to enable water coming off the parking lot to enter the pipe and be slowly released into the native Georgia soil.

Cover was five to six feet for the 60-inch diameter system and six feet for the 48-inch diameter system. The entire area was topped with geotextile fabric to keep mud from infiltrating the pipe through the perforations, followed by gravel and dirt, and then paved with asphalt.

The job was completed on schedule, and this included having to blast rock to cut the pits for the detention systems.

"The only solution for this requirement was to build the system using HDPE pipe," stated Radoszewski. "No other type of pipe would have allowed the design of the system to be drawn and constructed for these close confines or provided the speed of assembly."

For additional information and technical literature, go to: www.plasticpipe.org.

Steve Cooper has been reporting on the industry for more than 25 years and has written numerous articles and visited hundreds of construction sites in North America.

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