A culvert constructed to perform as a bridge structure and conduit, at least 80 feet below the surface of a road, must be comprised of specially designed products and a material that will perform over very long period. Such a culvert exists in the northeast corridor of Georgia in the Blue Ridge Mountains of Rabun County, Georgia.

Wesley Taylor, Facilities Manager for Rabun County School System, reported that the purchase of 137 acres of National Forest land on Boggs Mountain Road in 2010 enabled the connection of the high/medium school site and elementary site into one contiguous 263 acre campus to house all Rabun County Schools. Development of the campus required the extension of Wildcat Hill Drive to allow buses to access US 441, a four lane divided highway at Boggs Mountain Road, via an overpass located at the high school. With the extension, buses would not have to make at-grade crossings on US 441, thereby increasing the level of safety for the students and bus drivers. Construction of the Wildcat Hill Drive extension required a considerable amount of fill, because of the mountainous topography of the region characterized by open valleys, swift streams, the Chattooga River, the Little Tennessee River, waterfalls and lakes.

David Spivey, Landscape Architect with Southern A&E in Austell, Georgia specified reinforced concrete pipe (RCP) to provide the drainage under the road extension. RCP was the only option because it would be produced with a concrete mix and reinforcement that would provide the strength and long-term performance to handle an eighty foot backfill in the valley of Boggs Mountain near Tiger, Georgia. Concrete was considered to be the safest, most reliable and proven material. This, combined with the cost effectiveness of precast concrete pipe, made it the right choice on behalf of the client, Rabun County School System.

Rinker Materials Concrete Pipe Division – CEIXM (Stoebridge, GA) was awarded a contract in the spring of 2010 by Simpson Grading and Trucking to provide concrete pipe for a storm drain structure that would meet the challenge posed by 80 feet of fill. Rinker’s design team in Houston delivered the design of a reinforced concrete pipe that would meet the special design parameters. It was submitted and approved in June 2011. The 36-inch diameter pipe design included double circular cigans, an 8.25-inch wall heavy cast pipe, flush bell gaskets, and 8-foot lengths with a minimum concrete design strength of 6,000 psi. Rinker began producing the pipe at its Stockbridge, GA plant in late July and finished in early August.

Before delivery of the pipe, Simpson was moving 15,000 to 18,000 cubic yards of material at the primary school site per day to prepare the site for delivery and installation. Some cuts were greater than 100 feet to achieve the initial elevation where the specially designed RCP would be installed. In less than 3 days after the pipe was installed, there was 30 feet of soil compacted over the concrete pipe. The 36-inch diameter heavy wall double reinforced concrete pipe was performing as designed. The pipe installation began in early October and was completed by the end of the same month.

The new Rabun County Primary School with a finished floor elevation is 2,268 feet above sea level was under construction in the spring, 2012. Charles Black Construction Company, Inc. from Cleveland, GA is the Construction Manager-At-Risk for the project. The school is scheduled for occupancy in August, 2013.

Rinker Materials Concrete Pipe Division – CEIXM

Good Specification – The Right Choice

RCP Selected for Stormwater Detention

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A 10-year, $110 million Capital Improvement Plan at the Akron-Canton Airport (Akron, Ohio) includes parking lots to accommodate passenger traffic that doubled between 2000 and 2006. Reinforced concrete pipe (RCP) was supplied by Rinker Materials Concrete Pipe Division – CEIXM from its Diamond, Ohio facility, for the construction of an underground storm detention system under one of the lots. Concrete pipe was selected by the contractor because there was a choice of materials in a well-considered specification. The project was originally designed and bid as 60-inch diameter high density polyethylene (HDPE) conduit with HDPE pipe fittings or 72-inch diameter RCP with short joints.

The contractor, Wenger Excavation (Dolton, Ohio) chose RCP to reduce the structure’s footprint, footage of pipe to be installed, and the amount of work required to complete the load requirements of the installation. In addition, a RCP structure provided security and strength below the 10 to 15 feet of fill and live load of the parking area. The original design had a layout of five different runs, connected by a series of bends and tees (13 fabricated fittings plus multiple short joints).

Through value engineering, Rinker re-designed the detention system to accommodate 4 equal runs of pipe, 8 fabricated fittings, and no short joints. The re-design reduced the spacing of the pipes from 5 feet to 32 inches, resulting in a significant saving in structural backfill material. Designed by the Floyd Browne Group (Akron, Ohio) the underground detention system required approximately 230,000 gallons to be stored and controlled-released to a sand filter system. The structure is comprised of approximately 1,100 feet of 72-inch diameter Class III RCP, D-ring gasket joint, with an 8-inch wall. Rinker supplied 10 – 10-foot long pipe units with standard joints, three 72-inch x 72-inch x 72-inch bell tees, two 72-inch x 72-inch x 72-inch spigot tees, and three 72-inch x 72-inch 90-degree bends. The 10-foot long pipe units were produced to accommodate the tee fabrication and to reduce the number of joints to be installed.

The contractor excavated the entire footprint and installed up to 20 units per day on all four lines to ensure that the system would close as designed. The project began in the fall of 2011 and was commissioned in 2012.

RCP has many advantages over HDPE conduit when it comes to the construction of stormwater detention systems under parking lots. While HDPE conduit manufacturers claim a service life of over 50 years, experience shows otherwise. The Corps of Engineers assigns a service life of up to 100 years for concrete pipe. Experienced contractors know that manufacturers of RCP supply quality-certified products. Designers of concrete pipe stormwater management systems can choose from five different pipe classes and special designs, and four installation types. HDPE conduit offers limited choice and an installation method that does not meet the needs of all projects, such as deep fills or live loads with shallow cover. Concrete pipe structures make sense at airports because they are durable and non-flammable.

LINKS
1. www.rinkerpipe.com
3. www.floydbrowne.com
7. www.charlesblackconstruction.com

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• Keyword Search on American Concrete Pipe Association Website (installation, deep, bury, fits, culvert, wall)
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