

# COMMUTER CONVENIENCE

STORMWATER MANAGEMENT SYSTEMS HELP MAXIMIZE PARKING AT FLORIDA'S NEW SUNRAIL STATIONS.

By Steve Cooper

**COMMUTERS USING FLORIDA'S** new SunRail system at the Altamonte Springs and Sand Lake Road stations have something they can't see to thank for making their trip easier. Each of these new Park-and-Ride stations has a stormwater management system under the parking lot. By putting the system underground, 326 cars can park at Altamonte Springs and 429 at Sand Lake.

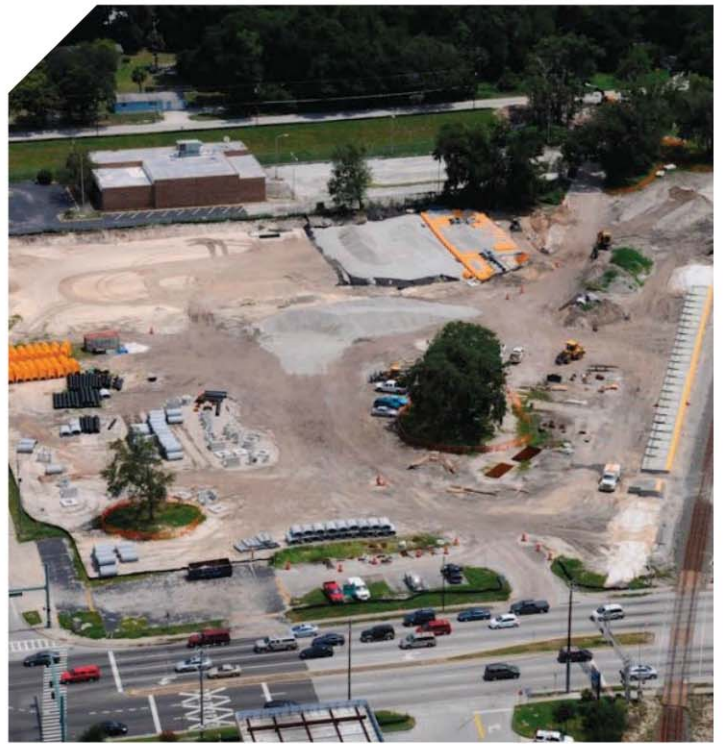
With expected completion of 17 stations scheduled for 2017, the SunRail system will run through Central Florida, north and south of Orlando, and serve an estimated 5,000 passengers a day. First to open, the Sand Lake Station had passenger operations commencing on May 1, 2014.

One of the keys to SunRail's success is the availability of parking. "For a commuter railroad, parking is a critical factor," said Tori Durliat, director of marketing for Advanced Drainage Systems, Inc. (ADS). "If people cannot find a space, they will continue to drive. So there is a convenience component that needs to be considered when a station is designed. SunRail found a way to please customers and provide a way to manage stormwater runoff with underground systems. There are several hundred parking spaces at each of these stations that would not have been possible if the land was used to construct an open pond to hold the stormwater runoff."

The stormwater systems were designed by Bruce Doig, P.E., from the Orlando branch office of Vanasse Hangen Brustlin, Inc. (VHB), an integrated transportation, land development, and environmental services firm.

The systems meet or exceed local water district and U.S. Environmental Protection Agency requirements and detain water after a rain storm so that the runoff can be controlled and infiltrate into the soil. For the Altamonte Springs station located near State Road 436 and Ronald Reagan Blvd, 1,305 StormTech SC-740 chambers from ADS were used to reach a capacity of 100,000 cubic feet of stormwater. The Sand Lake Road station a few miles south has 5,166 SC-310 chambers for a capacity of roughly 161,000 cubic feet of water.

StormTech chambers are designed in accordance with AASHTO Load Resistance Factor Design (LRFD) Bridge Design Specification Section 12.12 Design Standard and ASTM F-2787 Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers in accordance with AASHTO Section 12.12. These standards provide both the assurance of product quality and safe structural design.



SunRail's new stations are using underground stormwater management systems to maximize parking space for commuters.

These standards provide live and dead load safety factors and superior structural integrity. Manufactured using polyethylene and polypropylene, the chambers are rated by ADS for a 75-year service life.

Additionally, each system has the StormTech Isolator Row System, a patented component that provides total suspended solids (TSS) separation and extends maintenance intervals. The manifolds for each system were constructed from ADS N-12 corrugated high-density polyethylene (HDPE) pipe.

"At both stations, there wasn't any room for the required stormwater ponds," VHB's Doig said. "So we offered this underground alternative. We had used it before and explained that it was very easy to work with and provided the necessary stormwater volumes. We designed the Sand Lake station system for a 25-year, 24-hour storm. At the end of the system there is an outfall with a manhole system that includes a weir that holds back water. If the water doesn't reach that weir, it just sits in the StormTech system and perks through the ground. For bigger storms, the water would reach the elevation of that weir and flow out to a stormwater pipe and to other ponds or other drainage systems.

"The Altamonte Springs system is rated for a 25-year, 96-hour storm because it was in a closed basin and had higher criteria," Doig said. "Here, we used a high/low Isolator Row. There's no weir to direct water into it, just a difference in elevation between the 24-inch opening feeding the Isolator Row and the 24-inch main trunk line feeding the rest of the chamber rows."

Incorporated into each system is the StormTech Isolator Row infiltration unit. It is designed to capture the initial rainfall and offers the versatility to be sized on a volume basis or flow rate basis. The Isolator Row is a series of StormTech chambers wrapped in filter fabric and connected to a manhole for easy access. The chambers provide for settling and filtration of sediment as stormwater rises in the Isolator Row and ultimately passes through the filter fabric. The open-bottom chambers allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row, protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers, which filters stormwater and provides a durable surface for maintenance. It also prevents scour of the underlying stone and remains intact during high-pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber.

“The Isolator Row in both systems also makes it easy to maintain the systems. You just have to clean out the Isolator Row and not the entire system,” Doig said.

Strategically located inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes. Maintenance is accomplished with the JetVac process, which uses a high-pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments.

The use of underground stormwater management systems have been increasing in popularity. According to Doig, “Our design for these SunRail systems always called for StormTech. It’s in place now and functioning — in September we had a total of about 11 inches of rain. Now, because more projects are using chambers underground, everyone knows how to design with them and install the units so there’s less apprehension about them. Before, they were a pretty innovative option and now they’re another tool in everyone’s tool box.”



Manifolds for each system were constructed from ADS N-12 corrugated high-density polyethylene pipe.



The Isolator Row (center) is a series of StormTech chambers wrapped in filter fabric and connected to a manhole for easy access.

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