STATION ARRIVAL:

Storm Water Management

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Polymer-coated CSP primes SEPTA station for 100-year service

Part of a complete rehabilition of the Olney train stop in Philadelphia was the creation of an underground storm water discharge and management facility.

Located in the Olney neighborhood of Philadelphia, the SEPTA R8 Fox Chase Line facility now has somewhat of a resurrection story in its 100-year history. Originally constructed by the Reading Co. in 1906, the Olney train station was decommissioned when the Southeastern Pennsylvania Transportation Authority (SEPTA) ceased allowing customers to use the station in the 1980s. In June 2008, the station was demolished to make way for a new facility with high-level platforms. However, building requirements have changed dramatically over the past century, most notably those pertaining to storm water management.

What once would have been an impossible task to accomplish for a small site that hosts some 60 parking spaces has become possible with the advent of underground storage systems. Over the past couple of decades, the traditional detention pond has given place to buried storm water management systems that preserve operational functionality of the much-needed space in the heart of urban development, or in this case, urban redevelopment.

In this vein, corrugated steel pipe (CSP) has found new life and become the leading option available for engineering designers availing themselves of the strength, service life, constructability and size range afforded by this engineering material.

SEPTA's multidisciplined engineering department was able to provide cradle-to-grave site development, beginning with conceptual design and ending with construction management. The reviewing agency responsible for storm water management was the Philadelphia Water Department, who quickly assigned a restricted storm water discharge to mitigate an outlet that had become overtaxed through the years. The restricted storm water discharge assignment necessitated a detention requirement in excess of 15,000 cu ft.

Coated CSP for the Century

With limited area to accommodate this amount of storage, SEPTA engineers decided on a 7-ft-diameter CSP storm water management system with an overall dimensional footprint of 94 ft by 37 ft. Of particular interest is the type of CSP specified by the SEPTA design engineers: polymer-coated CSP.

Polymer-coated CSP was selected for its design service life of 100 years. Of the three major coating types available in the CSP market today (galvanized, aluminized and polymerized), polymer-coated CSP provides the greatest service life and is the premier coating available.

The polymer coating consists of a 10-mil polymer film that is laminated over each side of a galvanized steel coil prior to the pipe manufacturing process. The Trenchcoat protective film is a tough, rugged polyolefin laminate that provides galvanized CSP with a durable barrier that exceeds the corrosion and abrasion resistance of all other coatings.

Another feature of utilizing CSP for underground storage purposes is the ability of the pipe manufacturer to fabricate fittings, manifolds, access risers, flow control structures and any other appurtenances needed to support the hydraulic functions or maintenance of the system. Fabrication is accomplished with experienced welders using the very material specified for the storm water management system—in this case a 7-ft-diameter polymer-coated CSP.

To provide the most efficient use of the available storage and minimize potential clogging, a 3-in. conical, stainless steel vortex valve was used to meet the discharge limit requirements. As part of the detention system's outlet, the valve was easily fastened to a 7-ft-diameter bulkhead.

Unlike an orifice, vortex control increases as the pressure builds, having little control initially and maximum control once the design head is reached. This feature allows the valve to be oversized without exceeding the discharge limit when the system is full.

Station Resurrected

The storm water management system was assembled easily. The facility was located less than 20 miles from the project site. A just-in-time delivery procedure helped manage a very space-limited site and allowed the contractor, D'Angelo Bros., to better manage ingress and egress from one end of the site to the other.

Aside from providing customer parking, SEPTA's construction management team was able to maintain functionality of the Olney Station for its users; evidence of the station's need presented itself with the numerous neighborhood residents walking to and from the site throughout each day during the construction process. The resurrected facility is teeming with new life and prepared for a century of use. WWD

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