



STORMCAPTURE[®] DETENTION SYSTEM COMES TO THE RESCUE

at Nashville Fire Station

Nashville, TN

In order to detain stormwater runoff at Metro Fire Station #21, the City of Nashville and Davidson County elected to remove an aboveground detention pond and construct a new underground stormwater detention system to regain valuable land for a parking lot during renovation of the facility.

Oldcastle Infrastructure provided the stormwater detention system for the reconstructed fire station. The detention system was a key component of the overall renovation project of the 21,000-square foot facility. Thanks in part to the stormwater retention system, the new fire station achieved LEED[®] silver certification.



CONSTRUCTION CHALLENGE

The first design of the new stormwater detention system specified 36-inch corrugated metal pipe, but concerns regarding fire truck traffic loading on the system resulted in a change to 36-inch reinforced concrete pipe. This in turn ultimately could not be used either as it would not fit in the required footprint under the facility's driveway.

DESIGN & CONSTRUCTION TEAM

Owner

City of Nashville & Davidson County

Civil Engineer

Littlejohn Engineering

General Contractor

Messer Construction

Installation Contractor

Summit Constructors, Inc.

Manufacturing Facility

Oldcastle Infrastructure
Lebanon, TN

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In the final design, a StormCapture® underground stormwater management system was chosen and subsequently constructed under the entrance road since it reduced the detention system width and overall footprint by more than 40%, and easily fit under the fire station roadway.

PRECAST SOLUTION

In total, 16 StormCapture modules measuring 3-feet tall were installed offering 3,700 cubic feet of stormwater storage. The 3-foot tall design was desirable due to the presence of shallow bedrock beneath the site. A low-profile, high-capacity system was needed in order to minimize excavation costs and to fit within the tight site footprint.

In addition to the StormCapture system, Oldcastle Infrastructure also provided five catch basins, 15-inch and 18-inch reinforced concrete pipe, and three sanitary manholes. The Oldcastle plant in nearby Lebanon, Tennessee manufactured the precast concrete components.



INSTALLATION

Installed in a single day, the StormCapture detention system was wrapped with a 60-mil polyethylene membrane to provide a watertight system. Excavation and hole prep were both completed the day before the installation, with 6-inches of #57 stone and 2-inches of leveling sand placed at the bottom of the excavation. A layer of filter fabric was installed, then 60-mil membrane, followed by another protective layer of filter fabric.

The StormCapture modules were set on top of the final filter fabric layer. Each module was set in less than 15 minutes, providing an opportunity for the contractor to place and backfill the entire system in a single day, offering a significant time savings over the originally planned pipe system.



The system is designed so that stormwater flows into the catch basins, then into the StormCapture modules. In addition, a grated inlet provides direct water entry from the parking lot, roadway and roof drains. Water then slowly discharges from the system into downstream storm drains.

The StormCapture standard design is HS-20-44 for full truck load plus impact, which allowed the system to have earth cover down to 6-inches in some places with minimal base stone and paving over the top. One of the modules had a thicker top slab (14-inches in total) along with a 4-inch tall collar at one corner to support cast-iron frames and grates for direct entry of roadway water into the StormCapture system. The direct water entry also reduced requirements for additional onsite drainage infrastructure.

About Oldcastle Infrastructure

Oldcastle Infrastructure, A CRH Company, is the leading provider of building materials, products and services for infrastructure projects to several market sectors nationwide, including: Building Structures, Communications, Energy, Transportation and Water.

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