

11 Case Study



Metro Fire Station #21 Nashville, TN

Storm Capture Detention System

Project Overview

Remodeling and renovation of the firehouse building and redoing site drainage:

To detain stormwater runoff at the Metro Fire Station # 21, the Metropolitan Government of Nashville and Davidson County elected to remove an above ground detention pond and construct an underground stormwater detention system to gain back valuable land for parking during the recent replacement of the facility.

Oldcastle Precast provided the heavy duty, compact stormwater detention system for this Nashville Fire Station.

The detention system was a portion of the overall project to construct a new 21,000 square foot Fire Station for Nashville's Fire Department. Fire Station #21 is expected to achieve LEED Silver certification.

Construction Challenge

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

In the final design, Oldcastle Precast's Storm Capture® stormwater management system was chosen and subsequently constructed under the entrance road, since it reduced the detention system width and overall footprint by over 40%, and easily fit under the fire station roadway.

Precast Solution

(16) Storm Capture modules at 3' tall for a total of 3700 cubic feet of detention storage were installed on top of 16 base slabs.

The 3' tall design was desirable due to the presence of rock under 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, Oldcastle Precast provided (5) catch basins/storm structures, 15" & 18" reinforced concrete pipe, and (3) sanitary man-holes.

Oldcastle Precast of Lebanon, TN manufactured the stormwater detention system.



Design & Construction Team

GENERAL CONTRACTOR:
Messer Construction

INSTALLER: Summit Constructors, Inc.

ENGINEER: Littlejohn Engineering

OWNER: Metropolitan Government of
Nashville & Davidson County

Contract Amount: \$ 5.5 Million

PRECASTER:



MANUFACTURING FACILITY:
Oldcastle Precast - Lebanon, TN

Installation

Installed in a single day on March 6, 2012, the Storm Capture detention system was wrapped with a 60 mil polyethylene membrane to provide a completely watertight system.

Excavation and hole prep were completed the day before the installation. 6 inches of #57 stone and 2 inches of leveling sand were placed in the bottom of the excavation. A layer of filter fabric was installed, then the 60 mil membrane, followed by another protective layer of filter fabric.

The modules were set on top of the final filter fabric layer. Each module was set in about 10-12 minutes providing an opportunity for the contractor to place and backfill the entire system in a single day, a significant time savings over the originally planned pipe systems.

Stormwater Flow Process

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

Storm Capture's Positive Impact on Design:

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

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Also Offering:

- Stormwater Harvesting
- Retention / Cistern Solutions
- Infiltration & Exfiltration
- Stormwater Treatment
- PermeCapture™