



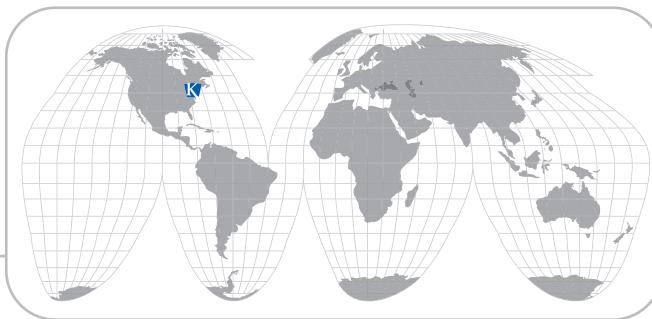
Retaining Excellence™

Orthopedic and Spine Specialists

York, Pennsylvania

Because success is so dependent on good planning, builders place a large amount of importance on their site surveys. Unfortunately, it's not always possible to know exactly what you will find on a job site until you start digging. This was the case with the construction of a three-story, \$30 million facility in York, Pennsylvania.

In the middle of installing an extensive Keystone retaining wall, crews encountered rock deposits that required drilling and blasting to remove. But, instead of scrambling to change the project designs, the project contractors combined their efforts effectively to deliver the completed wall in the timeframe promised. "The flexibility of the Keystone product was central to making this project work," said Phil Ferro of Keystone supplier York Building Products Company. "The wall builders were able to stop where they encountered the rock, blast and excavate, then re-assemble the wall right where they left off. Also, the speed of installation made it possible to make up time on the assembly end of the project."



Project: Orthopedic and Spine Specialists

Location: York, Pennsylvania

Keystone Supplier: York Building Products Company
York, PA

Keystone Product: Keystone Standard Units

Square Feet: 38,000 sq. ft.

Wall Contractor: The Whiting-Turner Contracting Co.,
Baltimore, MD

Wall Installer: Griffith Brothers Landscaping, Inc.
Fallston, MD

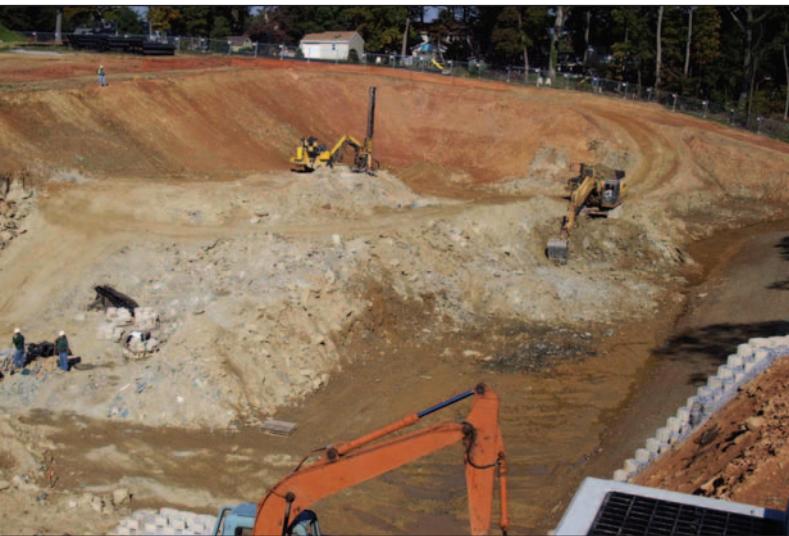
Site Contractor: Stewart and Tate Co.
York, PA

Engineers: Hillis-Carnes Engineering Associates, Inc.
Annapolis, MD



CASE STUDY





The project plans called for the excavation crews to work with the retaining wall crews to provide backfill from the site for each of the two large terraced wall levels. Because rock was encountered at the base level, wall crews had to slow the retaining wall installation to match the capabilities of the site contractor to supply backfill. Although the project took longer than anticipated, all parties involved felt it worked as smoothly as possible due to the heavy rock excavation.

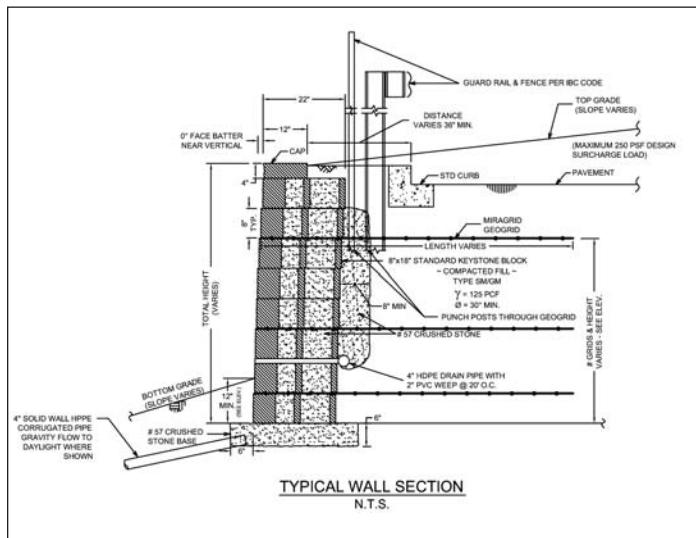
"It was through a series of tailgate meetings that the process was developed," said Daryl Griffith, president of wall contractor Griffith Brothers Landscaping, Inc. "The rock would be blasted on one day and used for backfill on the next. Even with the added difficulty, we were able to keep up with everyone else."



In addition to the rocky conditions, at approximately the five-foot level of backfill, excessive water penetrated the existing slope, interfering with the geogrid backfill. Hillis-Carnes Engineering Associates, Inc., the project engineers, designed a gravel and geogrid back drain system to intercept this water and drain it through the face of the wall using a 6" PVC pipe. The lowest two walls required a little extra care due to the 24" diameter PVC drain pipes connecting the storm water management drain that ran perpendicular to the wall. "Exceptional caution was used during the installation of geogrid and backfill in these areas," said Ferro.

"I think the site geotechnical investigation was as good as it could have been," said wall engineer, Dick Sturtevant P.E., of Hillis-Carnes Engineering. "We knew ahead of time that there might be some challenges with the taller walls on the site. We simply did a field fix for the groundwater and bedrock situations."

The three-wall, two-tier retaining wall for the Orthopedic and Spine Specialists site required 38,000 square feet of Keystone Standard Units. In addition to extensive earthmoving on site, 3,600 tons of #57 stone, supplied by York Building Products Company, were trucked in for footings and backfill- 42,000 cubic yards of backfill were spread and compacted. In total, 14,000 square yards of geogrid was used. The wall structure required 2,700 man-hours at an average rate of 14 square feet per man per hour. Each of the walls in each tier were over 22 feet tall with some single tier wall areas topping 46 feet.



Cooperation of the different teams was vital to the smooth completion of the job. At all times, many different operations were going on simultaneously from hauling rock that was blasted, drilling rock to be blasted, pushing backfill behind the walls and compacting. This contractor cooperation, in concert with the speed of installation and flexibility of the Keystone product, combined to deliver great results on this project.

From excavation to completion, the wall structure took just over three months time. Upon completion, the Orthopedic and Spine Specialists facility will include an emergency treatment center, a rehabilitation center, day and outpatient surgery facilities.

For more information on Keystone products and services, please visit www.keystonewalls.com or call (800) 747-8971.



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