Welcome to the inaugural issue of Design • Build • Done.

With this quarterly newsletter we will keep you informed about interesting projects and technology that may be useful on upcoming projects of your own.

In each issue you will see highlights of innovative uses of technology for foundation and earth support on commercial, industrial and transportation projects. Likewise, we will point out the benefits of the design-build approach that can add value to owners and general contractors in terms of saved time and money.

Please enjoy this first issue, and I look forward to hearing your feedback.

Mike Cowell, P.E.
President of GeoStructures

GeoStructures, Inc.
Engineered Earth Structures & Foundations

DESIGN • BUILD • DONE

Spring 2009 Volume 1, Issue 1

Micropiles Keep Difficult Geology in Check at Water Treatment Plant

Any operation that processes 25 million gallons of water a day exerts a lot of load on a foundation support system. Add to that complex site geology with alternating layers of highly weathered rock and soft soils and there is a high potential for settlement and costly repairs.

Load testing of the micropile support system at New Design Road Water Treatment Plant in Frederick, Md.

A case in point was a project to expand the New Design Road Water Treatment Plant in Frederick, Maryland. Plans called for construction of the filter building over a former pond where post-treatment sludge was deposited prior to disposal. Because of the karst geology, there was concern about voids underground and the potential for sinkholes to develop. Proper design and construction of the foundation system for this structure and the sedimentation basin had to transfer the sizeable loads of the building 60 to 80 feet down to suitable rock. Further complicating the project was that the plant had to remain operational during construction.

“It takes a lot of intricate coordination to install temporary water and chemical lines while you dig up the old ones when excavating for a new tank or building,” says Eric Klein, P.E., of geotechnical firm RK&K, which has worked on several water treatment plants in the area.

There were few options for general contractor Fru-Con Construction and the water treatment plant’s owner, the Frederick County, Md. Division of Utilities and Solid Waste Management.

Conventional piles? They would not easily penetrate to the bedrock layer because of the intermittent layers of weathered rock.

Undercut and replace? Possible, but costly and time consuming because of the large amount of soft material.

The solution: GeoStructures designed and installed 361 small-diameter, 200-kip micropiles at an average depth of 70 feet. Pre-production load testing optimized the load-transfer mechanism, and as a quality control measure selected production piles were tested to confirm their capacity.

“There’s an irony somewhere in us having to fix the underground, water-caused problems before we can provide the above-ground water treatment,” says Brad Smith of Fru-Con Construction. “But that’s what can happen and it’s a significant enough issue that it can alter scheduling.”

The Team:

Geotechnical and Structural Engineer: Rummel, Klepper & Kahl, LLC, Baltimore, Md.
General Contractor: Fru-Con Construction, Woodbridge, VA
Owner: Frederick County, Md. Division of Utilities and Solid Waste Management

---

Parking Garage Project Highlights Value of Design Build

Gary Gilliam of Donley's LLC

For Donley's LLC Gary Gilliam, construction of the parking garage at George Mason University (GMU) was one of those occasions that demonstrates why the design-build model continues to win more converts.

"It offers more flexibility, but even more important there is a less adversarial relationship between participants, so owners, general contractors, architects and engineers all work more cohesively to meet the timeline, he says."

As project manager on the GMU job, Gary had to implement a significant change order for expanding the five-bay, 300-foot wide garage to eight bays covering 480 feet while soil reinforcement and other site work progressed. This change under a traditional design-bid-build process normally would cause a major delay while waiting for approval of the expansive design changes. But in this instance, the collaborative environment between the design and field forces mitigated delays. In fact, the changes allowed GeoStructures to exceed projected production rates because it could reinforce other areas first with some of the roughly 1,600 total Geopier® elements installed on site.

As stated by Gary, "With design-build, the reporting structure is more centralized and we can get approvals or at least a consensus among team members within a few days at the most. Constructability reviews allow for streamlining the design and construction processes to ultimately maximize overall project efficiency."

Another indicator of this efficiency was that ground-improvement costs were reduced by one-third based on the structural engineer's agreement to relax the total settlement criteria to 1.5 inches from the standard one inch. With this settlement tolerance, the Geopier-element installation was more economical and still maintained the structural integrity of the parking garage.

Now in his fifth year with Donley's LLC, Gary continues to lead teams for the company's higher education projects. Asked what he looks for in his teams of subcontractors, he cites the traits experienced at GMU: "proactive team players with good communication skills who share the common goal of a successful project."

The Team:

Geotechnical Engineer: Schnabel Engineering, Sterling, VA
Structural Engineer: Desman Associates, Vienna, VA
Civil/Mechanical/Electrical Engineer: Clark Nexsen, Alexandria, VA
Architect: Wisnewski Blair & Associates, Ltd., Alexandria, VA
General Contractor: Donley's LLC, Richmond, VA

Geo-Briefs

Use us to boost your LEED credits! Many of GeoStructures' office and field staff are recent graduates of the Green Advantage® program, the only environmental certification for construction-related practitioners. Consisting of a one-day course and exam covering green building principles, materials and techniques, Green Advantage can mean builders get a LEED innovation credit if 30 percent of the building team is certified prior to construction.

GREEN ADVANTAGE®
ENVIRONMENTAL CERTIFICATION
COMMERCIAL

Design • Build • Done is a quarterly publication of GeoStructures.

What keeps those top-heavy windmills from falling over? In one of its last issues, Constructioneer Magazine ran the story on a GeoStructures project in Wethersfield, New York that used Impact Pier elements to support the foundation loads.
Photo courtesy of Noble Environmental Power

GeoStructures' Groundhog Day, held in February at Clyde's in Tysons Corner, Virginia, has become a signature gathering for contractors and geotechnical firms. The buzz this year? The federal stimulus legislation, which has $131 billion allocated for construction-related spending. And the Groundhog saw his shadow!