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Stabilizing The Soil

At a cut-and-fill site in D.C., 30,000 cubic yards of RAP are being recycled as part of an innovative soil stabilization project.

■ *By Carol Carder*



On the 22-acre former District of Columbia impound lot, GeoConstructors of Leesburg, Virginia, is recycling two massive piles of Recycled Asphalt Pavement (RAP) in an innovative soil stabilization project. In this cut and fill project for K-Mart by Columbia Engineering, Norcross, Georgia, John Driggs Company Inc., Capitol Heights, Maryland, is moving 350,000 cubic yards of dirt. General contractor for site work and the K-Mart is Marathon Corporation, Jenkintown, Pennsylvania.

"We estimate we will recycle 30,000 cubic yards of RAP into the soil reinforcement support system and into back-fill for the segmental retaining walls," says Mike Cowell, president of GeoStructures, the foundation designer, and co-owner of GeoConstructors, the installer. Approximately 30,000 more cubic yards of the RAP will be recycled as base for the 16 acres of parking, according to Ted Lewis, P.E., with GeoConcepts, Leesburg, Virginia, geotechnical consultant.

When Lewis conducted a geotechnical site investigation for the project, he found fill up to 20 feet deep in many areas of the site and underlying Potomac clay soils. He brought in GeoStructures to design a solution to support the 20-foot-tall retaining walls. When Cowell ran comparative costs, he estimated sav-

ings of \$425,000, or 25 percent, using the Geopier® soil reinforcement system.

At first observation, the system appears to be simply multiple medium depth underground columns of crushed RAP compacted in thin layers with a special tamper. However, the patented pier system developed in 1989 by Dr. Nathaniel S. Fox, a geotechnical engineer and president of Geopier Foundation Company, Inc. (GFC) of Scottsdale, Arizona, constitutes a precise engineered solution

calculated to reinforce the slippery Potomac clays and prevent ground failure behind the walls.

To build each Geopier element, GeoConstructors crews start by auguring a 30-inch-diameter shaft 8 to 10 feet deep, depending on location. Then the tamper rams a 12-inch lift of asphalt millings road base grade aggregate to form a bottom bulb extending below the drilled cavity. The pier is built to the top by ramming in 12-inch thick layers of the RAP aggregate at the same high pressure. The beveled sides of the patented tamper head push the aggregate outward into the surrounding soil, adding lateral strength as well as vertical support for the retaining walls.

Cowell credits receiving the opportunity to install the Geopier system on this sloping lot for K-Mart with the name recognition his firm gained from the



Above: The mounds of milled asphalt are approximately 60,000 cubic yards of RAP being used on the project.

Right: Two Cat 315s with Spiradrills and two Bobcat 864 skid steers install Geopier elements for support of the retaining wall.

Stabilizing The Soil

Raleigh, North Carolina, landslide.

"Every geotechnical engineer in Raleigh knows about the Target landslide," says Cowell of the 1998 project that brought the firm notoriety when helicopters from the local TV station and front-page newspaper stories broadcast the fix.

Langan Engineers, Elmwood Park, New Jersey, called in Cowell to stop a 65-foot-high slope that was sliding towards a major thoroughfare. The shopping center construction at the crest of the slope had triggered the slide that was both an eyesore and public relations concern for Target. GeoStructures designed the solution of approximately 600 piers extending through the failure plane to arrest the slide movement, and a gabion-faced MSE wall on top of the reinforced soil zone to provide a berm counter-balance to support the hillside. This alternative solution installed by

GeoConstructors was safer to build and saved the owner \$150,000 compared to the first



planned solution of over-excavation and riprap fill.

GeoConstructors began installation of the 1,500-pier system at the K-Mart site in August, and two weeks later began installation of the segmental retaining walls on top of the reinforced soils. Retaining wall construction is concluding in November. K-Mart will have an



A John Deere 490 and a Samsung 210 work to place six hundred piers to help stabilize the soil and stop a 65-foot-high landslide. A gabion-faced MSE wall provides a berm counter-balance to support the hillside.

112,000-square-foot store, Home Depot an 118,000-square-foot store and Giant a 54,000-square-foot store in this \$22-million center. Site construction began in July 2001; construction of the K-Mart will finish in June 2002. This Brentwood development is expected to jumpstart more development by big retailers. K-Mart is also considering two other D.C. sites for development. □

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INDUSTRY CALENDAR

November 28-30 – (DCA) Fourth Annual Damage Prevention Convention at the Wyndham Anatole Hotel in Dallas, Texas. Contact Scott Odin at (800) 827-8009 or go to www.damageprevention.com.

November 30 – Carolinas AGC Discovery Series-TSP at the Holiday Inn Sunspree in Asheville, N.C. Contact Ginny Bigham or Debbie Winn at (704) 372-1450 or go to www.cagc.org for registration information.

December 2-5 – National Stone, Sand & Gravel Association Supervisory Training Course in Atlanta, GA. Contact JoAnne Calderone at (800) 342-1415 or go to www.nssga.org.

December 3-5 – DCA Advanced Directional Drilling Seminar at the Embassy Suites in Las Vegas. Contact Rob Krzys at (330) 467-7588.

December 4 – ASTM Symposium on Constructing Smooth Hot Mix Asphalt Pavements at the Hyatt Regency Dallas in Dallas, Texas. Attendance fee of \$75 for non-members. Contact Dan Smith, ASTM, at (610) 832-9727 or e-mail dsmith@astm.org.

December 5 – Carolinas AGC Raleigh CEO luncheon at the North Raleigh Hilton. Contact Dave Simpson at (919) 781-3270. □