Protecting Landfills with Rolled Erosion Control Products

Introduction

ALTHOUGH active landfill sites are potential sources for sediment-laden runoff, they do not have to be a dirty business when it comes to erosion and stormwater control. Properly managed landfills can operate efficiently and economically, while protecting the environment.

Top: Landfill expansion continues behind stormwater ponds. Below: Overflow structures in stormwater pond.

Active landfills contain numerous phases from dumping sites to final capping sections and landfills generally encompass a large land area, thus they become a large drainage area when it rains. Phase II litigations require rainfall-induced erosion and runoff to be minimized with BMPs.

Background

The Augusta Richmond County Solid Waste Facility in Georgia operates within the Augusta city government. The 1,300 acre site has been operational since 1985 and will be active for approximately 150 more years.

From January 2005 through June 2005, 163,873 tons of total solid waste and 9,056 tons of total inert waste were disposed in the landfill. The need for additional space for waste triggered a large expansion phase at the landfill that commenced in February 2005. A small creek and wetland bordered the expansion site, which required the erosion and stormwater plan to be fool-proof.

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Erosion/Stormwater Plan and BMPs

Environmental regulations in the state of Georgia required stormwater ponds for the landfill expansion based on the drainage area that will be disturbed. Stormwater ponds minimize flooding by

retaining runoff that would otherwise exit the site and potentially end up in nearby water bodies. In addition, sediments in the runoff settle out as flow velocities are greatly reduced in ponds.

The new section of the landfill contained an approximate 80 acre drainage area. Jordan, Jones, and Goulding, project engineer from Norcross, GA, designed two stormwater ponds for the site. The three acre and five acre ponds were designed to a 25 year storm event

Rock check dam in ditch.

for the east central Georgia location.

The general contractor for the expansion project, Cooper, Barnette, and Page (CBP) from Statham, GA, completed all earthwork activities including the excavation of both stormwater ponds. Rock rip rap check dams were installed to reduce flow velocities in down chutes leading to the ponds. CBP also installed silt fence lined with straw bales around the headwall of the rip rap structures to prevent sediment from filling in the down chutes.

Slopes surrounding the ponds ranged from 4H:1V to 3H:1V in gradient and 30 ft to 80 ft in length. The native soil onsite is a highly erodible sandy clay material. Straw erosion control blankets (ECBs) were originally specified for the slopes. CBP consulted with Billy Egan of Engineered Fabric Specialists (EFS) from Norcross, GA, for his expertise regarding ECBs. Both groups mutually decided to select Curlex I, a single net ECB with engineered curled and barbed excelsior fibers manufactured by American Excelsior Company, Arlington, TX, in lieu of a straw ECB. Bruce Page from CBP said, "There may be a slight difference in cost between Curlex and other ECBs, but we had to be sure the products would do their job. We have had great success with the curled excelsior product in the past and we were confident it would be our best solution to the highly erodible soils."

The first step to protecting the slopes was to spread three inches of topsoil material across the surface. The topsoil material provided the necessary nutrients and organic matter for the vegetation to become established. The curled excelsior matrix of the ECBs enhanced the establishment of vegetation by storing moisture and slowly releasing it to the soil. The addition of topsoil coupled with the ECBs ensured a dense stand of vegetation that would ultimately provide permanent erosion protection to the pond slopes.

All slopes were seeded with a mixture of Brown Top Millet (*Panicum ramosum*), Common Bermuda grass (*Cynodon dactylon*), and the Pensacola variety of Bahia grass (*Paspalum notatum*). Brown Top Millet is an annual grass that provides excellent temporary erosion control because of its rapid germination. Brown Top Millet was used in conjunction with the slower germinating, but perennial Bermuda and Pensacola Bahia grasses. Common Bermuda grass is a drought-tolerant turf grass that spreads quickly via creeping stems that are located both above and below ground. Pensacola Bahia grass tolerates cooler temperatures and has an extensive root system that grows to depths of 7 ft to 10 ft.

A crew of five individuals from EFS installed the ECBs on the approximate 12 acres of slopes that surround the ponds. Six inch wire turf staples were used to anchor the ECBs to the soil surface.

Results

The vegetation flourished as it grew through the excelsior matrix. This is important because vegetation may struggle to penetrate denser and thicker products, which causes the product to be lifted upward. This process is sometimes referred to as product "tenting" and results in the loss of intimate contact between the product and the soil surface. Intimate contact between an ECB and the subgrade is a critical component to successful erosion control before vegetation becomes established.

Vegetated side slope of stormwater pond.

Little maintenance will be required at the site for years to come. Proper erosion control and stormwater planning prevented many potential maintenance issues. Silt fence lined with straw bales successfully kept the rip rap down chutes free of sediment. Rock check dams successfully reduced flow velocities,

Wildlife enjoying the benefits of a stormwater pond.

which prevented scouring in the areas of concentrated flow. Erosion control blankets successfully protected the erodible slopes, which kept the soil on the slopes and out of the stormwater ponds. Lastly, the stormwater ponds safely and effectively contained runoff volumes from the drainage area.

Mark Johnson, Director of Solid Waste at the Augusta Richmond County Solid Waste Facility was very pleased with the results. He said "We challenged Cooper, Barnette, and Page (CBP) to provide us with a bullet-proof solution for slope erosion control at the landfill. The solution had to reduce erosion and increase vegetation on the highly erodible slopes, which would prevent pond maintenance and ultimately reduce our overall cost. CBP's bullet-proof solution was Curlex, which was money well spent because today we have great vegetation at our landfill and no sedimentation in our ponds."

Today, wildlife enjoys the aesthetic ponds and surrounding vegetation. The site has received multiple storms that were equal to or exceeded the 25 year event the system was designed for. Little to no erosion has occurred on the landfill expansion area and both stormwater ponds have handled all runoff from the drainage area. Perhaps the most important result of the project is the creek and wetland were untouched from the activities at the landfill.

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Lesson Learned

The main lesson learned was that there is no one single solution to erosion and stormwater control. The system of BMPs used at the landfill collectively addressed soil and water runoff issues in an efficient, economic, and environmentally friendly manner. **L&W**

For more information on this project contact American Excelsior Company, 850 Avenue H East, P.O. Box 5067, Arlington, TX 76005-5067, 1-800-777-SOIL, email: info-curlex@curlex.com.