

EROSION CONTROL AT LANDFILL EMPIRE LANDFILL, RANSOM TOWNSHIP, PA, USA

CHANNEL LININGS & CULVERTS

Product: Gabions

Problem

In 1987, Empire Sanitary Landfill was a 600 acre disposal area located near to Scranton, PA. Water run-off can cause great problems for landfills due to the large open areas. The landfill design had to incorporate measures to ensure that run-off and any subsequent erosion was controlled.

Empire Landfill was designed and constructed as a state-of-the-art waste containment site with all phases of construction to meet or exceed the (then) current guidelines.

For the areas where erosion would be most severe, an economic, hard wearing erosion control solution was required. Due to the possibility of the landfill settling, the solution also had to be flexible.

Solution

Project designers, Martin and Martin Inc. were familiar with stormwater management, and selected gabions to provide long-term high performance erosion control. Maccaferri double twist woven steel mesh gabions with a PVC coating were specified for the perimeter ditches and downchutes.

In some locations, gabion and mattress drop structures were used to reduce the local gradient of the slope. This approach slows the water flow, reducing the shear forces applied to the channel, limiting erosion.

Where the perimeter ditches passed beneath access roads, or joined local water systems, gabions were used to construct headwalls and culvert surrounds. Maccaferri double twisted woven steel wire mesh gabion baskets form permeable, monolithic and flexible structures and erosion control systems. The woven mesh allows these gabions to accommodate large differential settlements without rupturing or unzipping.



Gabions and Reno mattresses protecting culvert



Gabion culvert retaining structure supporting accessway



Gabion culvert protection

Client:

EMPIRE SANITARY LANDFILL, INC.

Main contractor:

EMPIRE SANITARY LANDFILL, INC.

Designer:

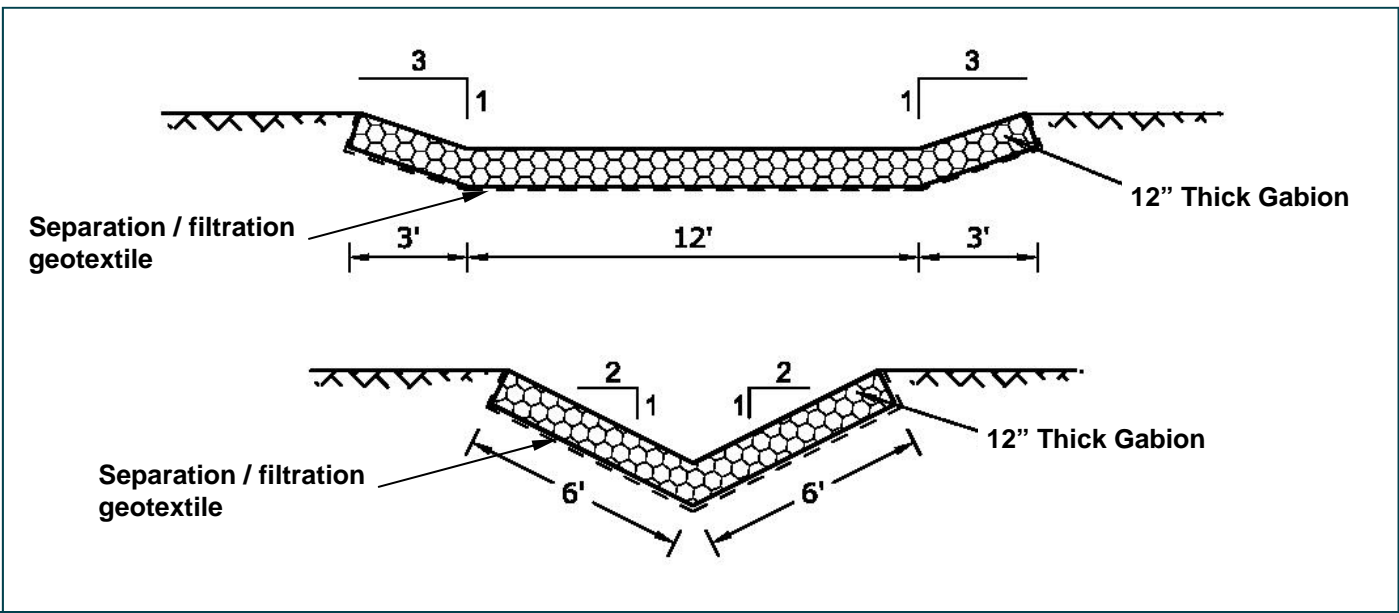
MARTIN & MARTIN, INC., PA

Products used:

7,020 CY GABIONS/RENO MATTRESSES

Date of construction

1987-2002



Typical sections through downchutes

For the high storm water flows on this landfill cap, a hard armor erosion control was required, as vegetated TRMs would not have offered the level of shear resistance necessary. Maccaferri gabions and Reno mattresses provided the solution.

A geotextile was used underneath the gabions and Reno mattresses. As storm water flows down the channels, the gabions and mattresses accommodate the shear force of the flow. However, a residual slow-flow of water will still exist beneath the erosion protection, in contact with the landfill cap. The presence of the 'filter fabric' limits the possibility of wash-out of fine material from underneath the units due to this residual flow.

4,200 CY of 18" thick gabions and 3,020 CY of 9" thick Reno Mattresses were used to provide erosion control to the landfill over a 5 year project period. Reno mattresses and gabions provide over twice the erosion protection as loose rip-rap (for the same sized stone). Therefore, by using gabions, the client was able to halve the amount of rip-rap required on the project.

This project demonstrated the versatility of gabions and Reno mattresses. The units can be used in many applications by stacking them in different configurations to suit project requirements.



12" thick gabions protecting downchute



12" thick gabions used on downchutes

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