

DAM STRUCTURE CONTROLS EROSION WEST CORNFIELD, NEW MEXICO, USA

DAMS AND RESERVOIRS

Product: Gabions and Gabion Mats

Problem

The Rio Puerco has a vast watershed in the north west of New Mexico and southern Colorado. The 160,000 acre catchment area is characterized by its fragile soils and sparse vegetative cover.

The climate is semi-arid and although annual precipitation averages 10", most of this occurs in very few 'cloud-bursts'. Therefore erosion can be severe, causing high downstream silt-loads. As a tributary, the Rio Puerco provides 1/16th of the water in the Rio Grande, but over half of its sediment.

In the early 1960s, plans were developed and implemented to confine the movement of sediments to the upper Rio Puerco watershed, and limit further downstream loss.

40 years later, it was observed that erosion in the West Cornfield area was severe due to a concentration of the high storm water flows. Water had eroded slopes into cascades, and significant soil loss was occurring.

As part of the overall area-philosophy of soil containment, a solution was needed. The Bureau of Land Management approached the Tierra Lopez Garcia Group for assistance in solving this local problem.

Solution

Tierra Lopez Garcia and Maccaferri Inc. designed a dam and spillway structure to control the erosion. The dam would impound storm water, slowing its progress downstream, and reducing its erosive energy.

By constructing a 'spillway' over the crest and face of the dam, the release of water from the dam could be controlled. The armored spillway allows the water to loose elevation rapidly without the risk of erosion.

Client:

BUREAU OF LAND MANAGEMENT

Main contractor:

GORDON CONSTRUCTION, ESPANOLA, NM

Designer:

TIERRA LOPEZ GARCIA GROUP

Products used:

GABIONS, GABION MATS

Date of construction

SUMMER 2003



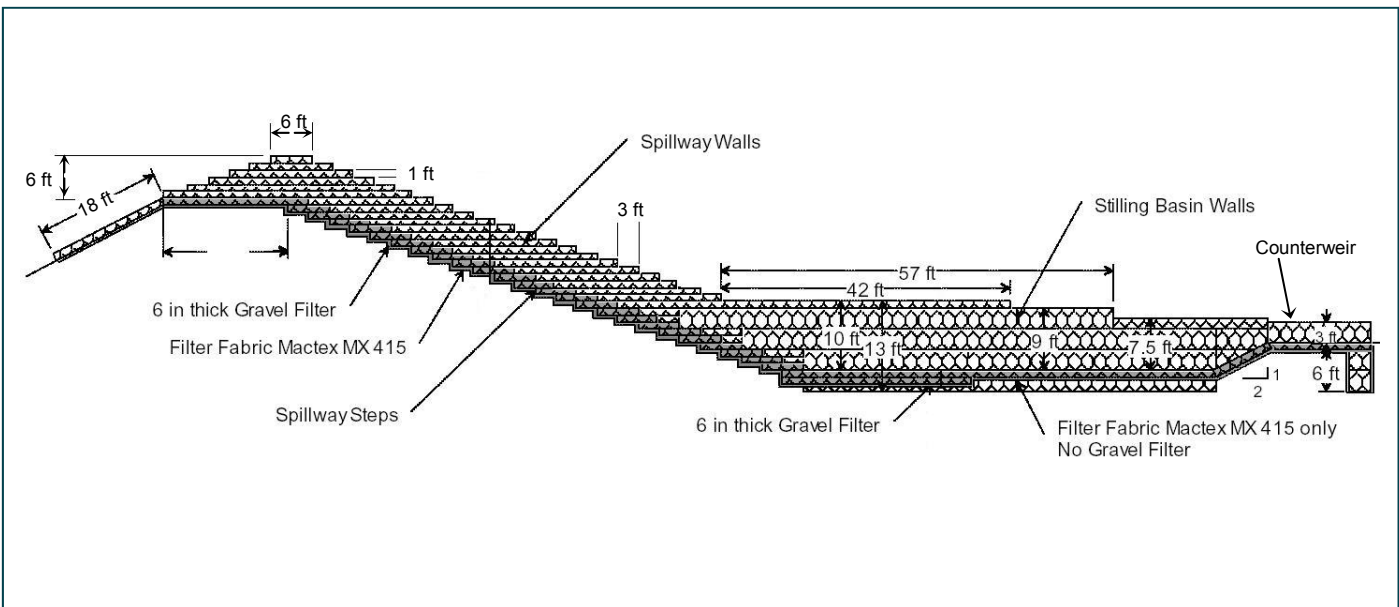
Dam beginning construction



Unrolling gabion mats in stilling basin



Constructing stilling basin gabion retaining walls



Project section

Gabions and gabion mats were selected as the ideal solution as they form durable, flexible and free-draining structures that are economic to install

The gabion spillway had a 25' drop from crest to stilling basin. To ensure that hydraulic jumps were contained within the stilling area, a counterweir was designed to enclose the basin.

To contain and direct the flow through the spillway, gabion walls were specified on either side of the spillway, and as control structures at the entrance and exit to it.

Gordon Construction Inc. completed the construction during Summer 2003.

To prevent the water flow washing out fine soils from behind and beneath the structure, a MacTex MX415 non-woven needlepunched polypropylene geotextile was installed between the ground and the gabion units. Where extreme flow shear forces were expected, a 6" thick gravel filter was also installed beneath the gabions. This provides enhanced shear resistance, reducing the interface flow velocities and minimizing erosion.

On either side of the stilling basin, the 12' high gabion walls were designed as retaining structures to support the ground on either side of the basin.

This project clearly showed the erosive power of water. A large, robust structure was required to confine and control the high water flows, slowing them and reducing the damage they cause to the fragile soils in the area.



Construction nearing completion



Completed dam after storm

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