CASE HISTORY
Ref: US / CH / HW178 — Rev: 01, March 2018

FARMERS CREEK WATERSHED
DEBRIS BASIN SITE NO. 116 & 117
CITY OF MONTAGUE, MONTAGUE COUNTY, TEXAS

HYDRAULIC WORKS
Product: PVC GABIONS, MACTEX N

Montague County in northern Texas is well known for its abundance of lake and other waterways, unlike the rest of the state. The U.S. Department of Agriculture - Natural Resources Conservation Service identified the area for a Debris Basin Site but first needed to solve the erosion control issues that effected the area near each site.

Problem
Montague County is located in north eastern Texas, an area rich with lakes and other waterways. This combined with its topography and soil conditions, plagues the area with common erosion control issues. The US Department of Agriculture - Natural Resources Conservation Service had previously defined and mapped Debris Basin Sites in this area that would be instrumental for a flood control system. The basins were designed to capture sediment, gravel, boulders, and vegetative debris that are washed out of the canyon during storms. This debris basin would allow water to flow downstream through the storm drain system, reducing flood risk for communities in the surrounding area.

Erosion control issues were identified affecting the spillway at the critical Debris Basin Sites 116 and 117 due to a change of elevation of the Farmer Creek. Following

Client:
U.S. DEPT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE

Main Contractor:
BERNALL CONSTRUCTION

Designer:
U.S. DEPT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE

Products used:
PVC GABION, MACTEX N

Date of Construction:
FEBRUARY 2017 - JUNE 2017

Engineering a Better Solution
the discovery, funds were collected from the Upper Elm-Red Soil and Water Conservation District, the Farmers Creek Watershed Authority, the Montague County Commissioners Court, and the USDOA-NRCS to fix and stabilize the spillway and the slopes along the channel.

**Solution**

The main challenge with this project was to identify a solution that would put an end to the erosion issues on the spillway and the slopes of the channel, and be strong enough to withstand the high flows, volumes and velocities of the water. More importantly, the solution needed to be able to absorb any possible deformation of the soil due to the presence of water, protecting the spillway from erosion through a system designed to slow down the velocity of the water, dissipating its energy during the process.

The final solution adopted by the engineer was an energy dissipation structure (one per site). Each structure consisted of a gabion stepped weir with a pool at the bottom and a lose riprap extension immediately after the gabion structure. Gabions were ideal for this type of hydraulic and erosion control application due to their permeable design, allowing water to easily pass through voids between the rocks contained in the gabions, while dissipating energy and flow. Additionally, the gabions accommodate large and uneven deformations. The exposed gabion steps were superficially covered and lined with concrete to protect against the abrasion.