RIVER BANK PROTECTION

Product: Gabions

Problem
The town of Amesbury in Massachusetts was settled by Europeans in 1645, due to its location between two rivers, the Powwow and the Merrimack. A 90’ drop in the Powwow provided crucial water power to the fledgling shipbuilding, shipping and fishing industries that soon supported the town.

Later, these industries were replaced by textiles, ironworks and saw-mills. The first chain suspension bridge in the USA was constructed in 1791 over the Merrimack between Amesbury and Newburyport, MA.

Amesbury marks the junction between the Powwow and Merrimack Rivers. The movement of water here had caused extensive erosion on the banks of the rivers and land was being lost.

The US Army Corps of Engineers were approached by the Town of Amesbury, to provide a solution. Due to the close proximity to the Atlantic Ocean, the water in this location was brackish.

Solution
Two different solutions were required depending upon the location:

- Merrimack River - a 2:1 slope required robust long term erosion control
- Powwow River - A 12’ high retaining wall was required

For the Merrimack River, 1’ thick gabions were specified on the 2:1 slope. A 3’ gabion was installed as a toe-wall at the foot of the slope to stop erosion undermining the erosion protection revetment.

At high tide, the lower gabions were just covered by water. By taking appropriate precautions and marking the positions of the gabions, filling could continue during high tides. Once these lower units were completed, the construction continued without tidal interruption.

On the Powwow River, gabions were specified as mass gravity retaining structures to support the failing river banks.

Client:

| TOWN OF AMESBURY, MA |

Main contractor:

| LOCAL CONSTRUCTION CREWS |

Designer:

| US ARMY CORPS OF ENGINEERS, NEW ENGLAND |

Products used:

| GABIONS |

Date of construction

| SUMMER 1979 |
The gabion retaining structure was embedded 3’ into the river bed to stop the water flow undermining the toe of the structure.

Both the retaining structure and the revetment were constructed upon woven polypropylene geotextiles. The presence of the geotextile limits the wash out of soils and fine material from behind and beneath the gabions.

Due to the brackish water, the gabions were specified with a galvanized and heavy duty PVC coating.

Maccaferri provided field assistance and site training to the installation contractor. This ensured that the quality of installation met the clients’ objectives.

Maccaferri gabions are manufactured from double twist steel wire mesh. These offer advantages over traditional retaining structures such as concrete and steel sheet piling:

- Free-draining, thereby limiting the build up of pore water pressure
- Flexible enough to accommodate large differential settlements without unzipping or rupturing
- Can be amended on site to suit local obstructions
- High capacity long term erosion protection.

The gabion retaining structure and erosion control revetment were constructed in Summer 1979. They are still in active service 25 years later.