

EROSION CONTROL OF RIVER BANK MANCHESTER, NEW HAMPSHIRE, USA

RIVER BANK PROTECTION

Product: Green Gabion™, Envirolog™

Problem

The Merrimack River in central New Hampshire has a watershed of over 5,000 square miles. It has a normal flow of 3000-7000 CFS, a low flow of 1000 CFS and flood flows of 31,000 CFS.

Two fairways of The Intervale Country Club (ICC) abut the river and 15-20 feet of shoreline has been lost to erosion over the past 20 years. Erosion has been caused by flood, ice scour and mass wasting of large trees, as well as those caused by man through development and recreation. Over the years, many types of erosion control have been attempted. These included rip-rap and concrete walls. Although these measures were successful at limiting erosion, the side affect was to transfer the erosion problem downstream.

Solution

When approached by ICC, New Hampshire Department of Environmental Services recommended a "green solution." Gove Environmental Services (GES) provided design and permitting assistance to the ICC. Permitting was complicated because the area is a winter roosting habitat for the endangered Bald Eagle. Consequently the permit required that there be no cutting of trees over 6" diameter, and no construction from November to April; the winter roosting period.

Maccaferri assisted in the selection of a solution that would provide erosion control, enhance the structural integrity of the river banks and importantly, integrate with the surrounding environment.

Green Gabions™, a trapezoidal gabion, and Envirologs™, a cylindrical gabion, were chosen because the PVC coated woven wire mesh offers the flexibility and the natural porosity of a gabion, with 30-40% voids that can be filled with topsoil. To keep the topsoil in the units, a biodegradable coconut mat lines the wire mesh basket. This also helps to maintain moisture in the topsoil to assist the re-vegetation. The topsoil has two functions; it helps to retain the moisture in the structure for the vegetation and it acts as a substrate for the propagation of the root system between the stones.

Client:

INTERVALE COUNTRY CLUB, NH

Main contractor:

DON WHEELER CONSTRUCTION, BEDFORD, NH

Designer:

GOVE ENVIRONMENTAL SERVICES

Products used:

GREEN GABION™, ENVIROLOG™

Date of construction

JUNE—SEPTEMBER 2002



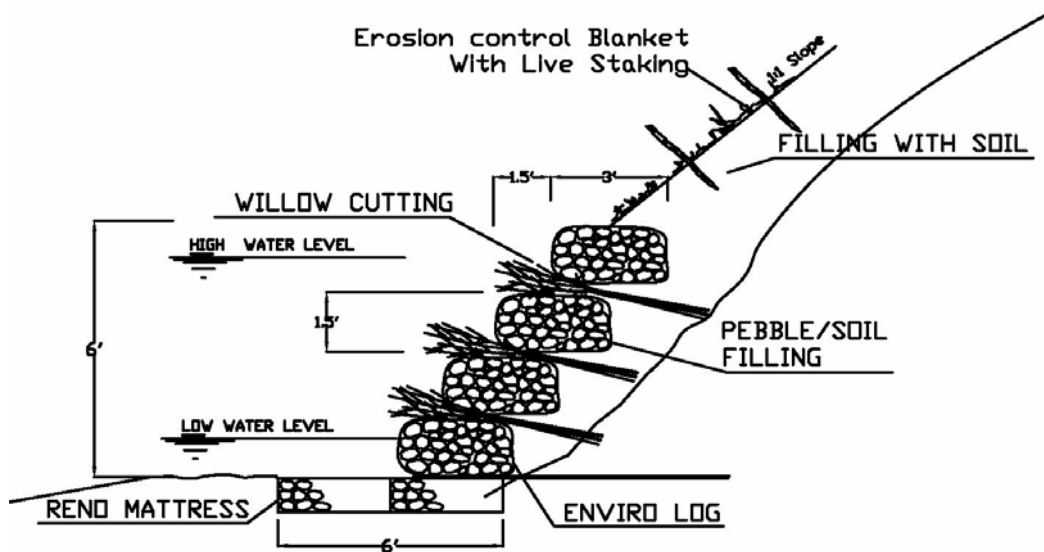
Filling Envirolog™



Completed structure, awaiting live planting



Live planting installed between Envirolog™ layers



Typical cross section through river bank

Analysis was performed to verify the slope stability of the bank (using MacStars™ 2000) and erosion shear resistance (using Macra™ 1).

To prevent any potential scour under the structure, a Reno mattress was detailed at the toe of the structure. If local erosion does occur beneath the Reno mattress, the flexibility of the double twist mesh allows the mattress to settle and continue protection without sustaining damage. This is an important characteristic, particularly in water applications where there is the potential for differential settlement.

The re-vegetation of the project was important. Traditional soil bioengineering techniques such as dormant cuttings and brushlayering could not be used as this would require work during the restricted period. Therefore, potted willow and dogwood shrubs were specified. These were to be planted one plant every square foot of face; nearly 4000 shrubs would be used.

Construction began in June 2002, and was completed in September 2002, well before the restriction period was to start.

Working with Maccaferri

For 125 years, Maccaferri has provided engineering expertise to clients around the world. We believe that the combination of our professionalism, design software, technical and site assistance service and our aim of providing the best products in the market, sets us apart from our competition. We hope you agree.



Vegetation establishing in completed structure



Live planting establishment

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