CASE HISTORY
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LAKE BOONE TRAIL EROSION REPAIRS
RALEIGH, NORTH CAROLINA, USA

RIVER BANK PROTECTION
Product: Gabions, Reno Mattress

Problem:
Development adjacent to Lake Boone Trail in the north-west of Raleigh, NC, required alteration to the existing storm-water drainage system. The storm-water pipework from a retail area to the north of Lake Boone Trail, and from an office complex to the west of the road, met adjacent to a brand new office building. The increase in water flow had washed out a segmental reinforced blockwork wall retaining the office carpark and severely eroded the channel banks. Above the channel bank is another car park for an apartment block. A solution was needed that could withstand the high erosive forces and retain the channel banks and car parks above.

Solution:
City of Raleigh and their project engineers, Thompson & Associates, approached CFP Inc., Maccaferri’s distributors in the Carolinas, for assistance in designing a gabion retaining wall and erosion protection. The retaining wall was to be a maximum height of 24'.

A number of options were considered including mechanically stabilized earth (MSE) using gabion faced Terramesh®. For this height of structure, the cost of Terramesh® materials alone would have been less than a gabion structure.

However the space to construct an MSE structure was limited by the steep slope above, and the cost of temporary works to support the slope made this proposal uneconomic. Therefore, a traditional gabion wall was selected as the most cost effective, and simplest to install. The flexibility of double twisted woven mesh gabions was also an advantage due to their ability to accommodate large differential settlements without rupturing; a key requirement in this channel environment.

The gabion wall varied in height and thickness depending upon location. Reno mattresses were detailed at the toe of the gabion structure as a scour protection apron and limit erosion undermining the retaining wall.

Client:
CITY OF RALEIGH, RALEIGH, NC
Main contractor:
SOUTHERN SITE INC., RALEIGH, NC
Designer:
THOMPSON & ASSOCIATES, RALEIGH, NC
Products used:
GABIONS, RENO MATTRESS
Date of construction:
SPRING 2004
Where the gabion wall ended, it was ‘returned’ back into the channel bank. This limits erosion of the bank and behind the wall, caused by the turbulence created when water flows past the end of any structure in a water course.

The new storm-water pipework met at a new cast-in place concrete culvert. Mattresses were used at the mouth of the culvert and in the channel bed to provide high performance erosion protection.

Contractor, Southern Site Inc. completed the gabion structures and channel linings. As the gabion wall was constructed, the large washed out area of the channel bank behind was reinstated with a free-draining backfill.

This project illustrated how quickly storm water can erode channel banks, placing infrastructure in jeopardy.

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