

## BANK PROTECTION WORKS IN RIVER GANGA ADJACENT TO RESIDENTIAL COMPLEX AT BUDGE BUDGE , KOLKATA

### BANK PROTECTION WORKS

Product: MacBags, Sack Gabions, Gabion Mattress, DT Mesh Netting

#### Problem:

The Cheviot Group of Companies, (Caledium Jute mill) is located along the River Hooghly, at Budge Budge, 24 Paraganas, Kolkata, West Bengal.

Various phenomenon are observed in the seas and oceans where the river mouth opening is funneled into shallow and narrow river sections. Tidal Bore is one such phenomenon which occurs in the estuary zone. There are very few locations around the globe where this phenomenon occurs, Budge Budge region of Kolkata is one such location in India where the phenomenon occurs.

The intense turbulence and the hydraulic jump, caused as result of the Tidal Bore, has lead to damage of the compound wall of Caledium Jute Mill

To mitigate this problem, Cheviot Group of Companies had proposed bank protection works. The anti erosion works were being implemented in a 100 m stretch along the Ganga river along the compound wall of jute mill that was identified as highly affected zone.



Photo 1 : Existing damaged Compound Wall



Photo 2 : Tidal Bore Phenomenon

#### Key Features of the Tidal Bore Phenomenon

Construction during the Tidal Bore is highly challenging and nearly impossible. Large Tidal variation is observed to occur in these regions. The funnel shape increases the tidal range and reduces the tidal duration of the flood tide. Turbulent mixing is generated during the occurrence of Bore Tide, and the effects of it are felt along the certain distances.

Maximum height of the tidal bore observed was approximately 2 m and the velocity was 7—10 m/s. Tidal Bore occurs once or twice in a month and condition extends for a period of 2-6 days occurring once each day.

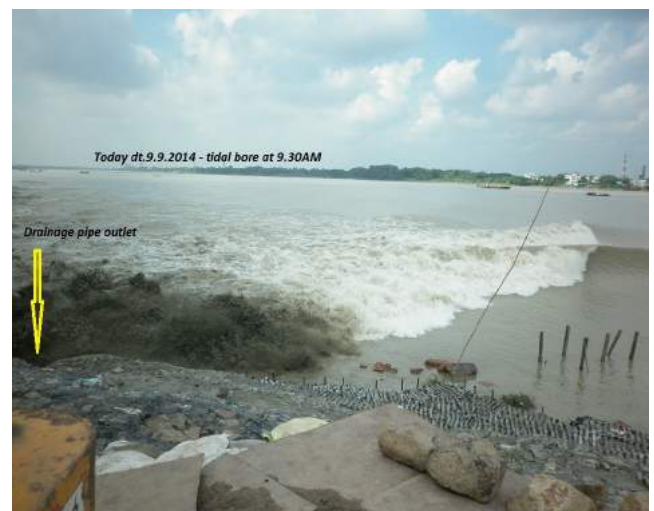


Photo 3 : Occurrence of the Tidal Bore

Client: : CHEVIOT COMPANY LTD

Contractor: - Maccaferri Environmental Solutions Pvt Ltd

Product used: MacBags, Sack Gabions, Gabion Mattress

Quantity: MacBags — 9960 Nos, Sack Gabions — 4765

End of construction: Year 2014

## Solution :

It is important to carryout the construction planning in order that the system sustains in all the worst loading conditions.

The design thickness calculation of the system shall sustain the load imparted from Tidal bore and this has to be done during the construction phase.

Hence the focus was particularly on embankment protection system using Geosystems.

The height of the embankment to be protected was approx. 6 m and slope 1V:2H. The thickness of system was analyzed and considered as approximately 3 m.

Geotextile bag (MacBags) filled with sand are commonly adopted as solution for river hydraulics problems. These Bags shall be preferably produced from woven Polyester Geotextile material.

Maccaferri Sack Gabions lined with Geotextile material containment system which is filled with dry sand and placed in position. These are used for preparation of foundation base for the structures.



Photo 4 : Placed MacBags on the Slope



Photo 5 : Sack Gabions



Photo 6 : Placement of the Gabion Mattress



Photo 7 : Placing the Stones in the Gabion Units



Photo 8 : Arranged MacBags



Photo 9 : System Blend with Atmosphere



Photo 10: System Blend with Atmosphere

## Summary:

Floods that occurred during the year 2013, damaged the compound wall of the Caledium Jute Mill. The anti-erosion works carried out during 2014 got submerged under water during the occurrence of the tidal bore. The erosion measures constructed with MacBags, Sack Gabions, DT Mesh Netting, Gabion Mattress survived the tidal bore and protected the banks. After the occurrence of the last tidal bore considerable amount of silt deposit was noted.

## Present Status of the Project :

The project is completed successfully.

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