

## CONSTRUCTION OF LEFT AFFLUX BUND AT JOSHIYARA BARRAGE UTTARKASHI, UTTARAKHAND, INDIA

### Slope Protection

#### Problem

Joshiyara Barrage is located on the river Alaknanda in the state of Uttarakhand. The barrage is designed to divert water into a head race tunnel to generate electricity through a power station of 4X76 MW constructed at Dharasu. Due to rapid flow fluctuations, the entire stone pitching over the left afflux bund was disturbed leading to the erosion of the bund. The height of bund was another issue pertaining to the increasing threats of flooding of the adjacent/nearby areas in HFL conditions.

#### Solution

Uttarakhand Jal Vidyut Nigam Ltd. (UJVNL), Govt. of Uttarakhand, had decided to reconstruct the left afflux bund using prefilled / in-situ filled gabion / mattress.

The main purpose was to provide a permanent and flexible solution which can easily withstand the rapid flow fluctuations and can counter the flooding of nearby areas in high flood conditions.

For this the solution system provided was intended to:

- Prevent the toe instability.
- Prevent the bund from surficial erosion.
- Prevent the scouring at toe.
- Prevent the adjacent/nearby areas from flooding.
- Prevent the country side slope of the bund from surficial erosion.

The toe instability was prevented by providing a gabion wall over the already present RCC toe wall followed by a gabion mattress and a reno mattress as a revetment over the gabion wall for the surficial protection and a gabion mattress just below the gabion wall and in front of the RCC toe wall, for protection against scouring at toe for the river side.

A similar pattern was adopted for the country side facing of the bund. The solution included a considerable increase in the height of the bund upto the required HFL with safe free board for prevention against flooding of the adjoining areas (country side).

**Client:** UJVN Ltd, Maneri Bhali Stage- II

**Designer / Consultant:** CBRI Roorkee

**Contractor:** Maccaferri Environmental Solutions Pvt Ltd

#### Products used (Qty.)

- Gabion	10,981 cum
- Reno Mattress	7,892.5 sqm
- MacTex N	10,335 sqm

**Date of construction:** 10/2012 - 03/2016



Photo 1: Eroded afflux bund



Photo 2: Eroded afflux bund





Photo 3: Afflux bund during construction



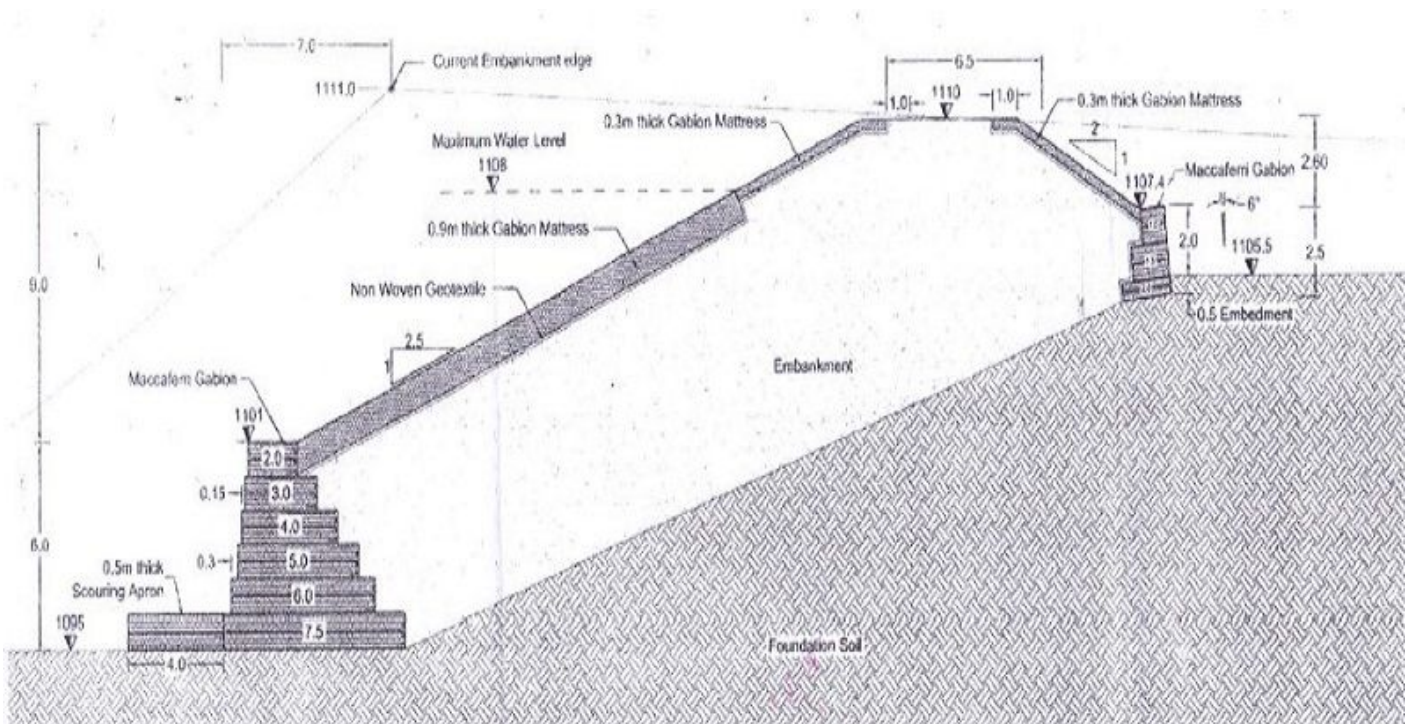
Photo 4: Gabion filling during construction



Photo 5: Completed structure- river side



Photo 6: Completed structure- country side



Cross sectional drawing