MATHEMATICAL MODEL STUDIES TO ASSESS THE HYDRAULIC DESIGN PARAMETERS FOR THE CONSTRUCTION OF FLOOD PROTECTION WALL IN RIVER TAPI, SURAT, GUJARAT
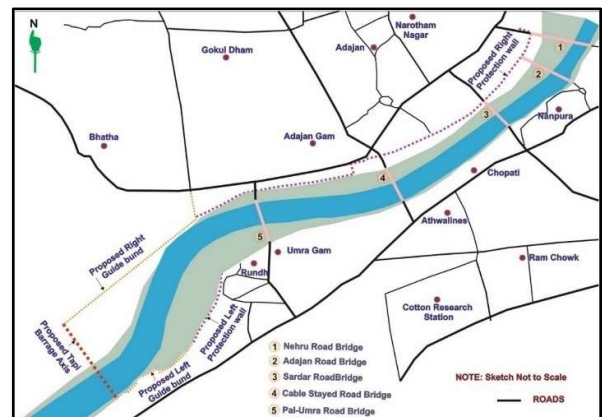

STUDYOVERVIEW

The Surat Municipal Corporation (SMC) has proposed to construct a conventional barrage near Rundh-Bhatha to cater the water supply needs of the Surat city. The said work has been entrusted to M/s Unique Construction, Surat who has desired CWPRS to conduct mathematical model studies to assess the hydraulic design parameters for the design of flood protection wall in river Tapi along upstream of proposed barrage

APPROACH

A 1 D mathematical model was developed at CWPRS to extract the different hydraulic parameters for design of protection wall such as:
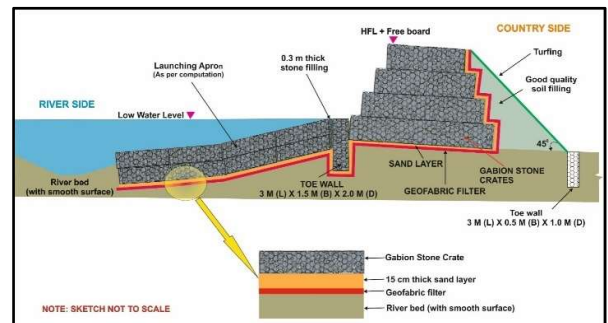
- Average velocity.
- Average discharge intensity.
- High flood level.
- Maximum and average depth of flow.

KEYFINDINGS OF STUDY

- The average velocity of 4.58 m/s and average discharge intensity of 64.47 m3/s/m was computed along the reach under consideration with the proposed barrage, its guide bunds and protection walls.
- The maximum afflux due to construction of protection wall with the barrage is 0.97 m at about 7.2 km upstream of the barrage.
- The different protection work options such as protection works in the form of embankments with stable slope, RCC retaining / Diaphragm wall and gabion stone crated retaining wall was suggested.

IMPACT/SIGNIFICANCE/OUTCOME

- The study provides a validated design basis for the protection wall, ensuring stable hydraulic behavior during various flood scenarios.
- The model study enhances confidence in the structural and hydraulic safety of the protection wall ensuring minimal ecological and morphological impacts upstream of the barrage.
- Ensure the safety to the country side establishments after construction of barrage and protection wall against floods.

Alignment of protection wall

Typical section of proposed protection wall