DESIGN OF SUBMERSIBLE BRIDGE ON LARATHI TO LARATHI "B" ROAD ACROSS RIVER SOM

PREAMBLE

Type of Bridge

The bridge shall be a Submersible bridge. The HFL is 99.500 m and the proposed deck level is 99.950 m.

Decking Arrangement

The Deck Slab shall standard RCC deck slabs each 8400 mm wide i.e. 7500 mm carriage way and guard stones on both sides. There shall be 25 mm wide expansion joint between the adjacent deck slabs along the length of the bridge. The location of proposed road is right angle to the direction of flow.

There shall be 11 Nos. of spans. The centre to centre distance for THE spans shall be 8.8 m.

Standard RCC Solid Slab Superstructure with right effective span 8 M without footpath shall be provided in accordance to the Ministry of Surface Transport (Roads Wing), New Delhi drawings.

It is proposed to construct 7500 mm wide slabs of these standard drawings. As per requirement of use in the proposed bridge the deviation with respect to these drawings shall be as follows:-

1. Pier Cap Width 1200 mm [In the reference drawing the pier cap width is 800 mm]. The width of piers shall be 1200 mm. Due to this change the Centre to Centre distance shall be 8800 mm (centre to centre over piers). For all spans the clear span shall be 7600 mm and the centre to centre distance shall be 8800 mm. The length of reinforcement shall be modified as per these geometrical requirements however spacing of the reinforcement shall not be altered.

2. Footpath & Railing: - There shall be guard poles on both sides only.

3. Reinforcement Detailing: - The reinforcement detailing is suitably modified as required for the modifications referred above in points 1 to 2.

The proposed decking arrangement is shown in Drawing – D-01 titled as Decking arrangement.

Design Loads

The following loads have been considered in the design of deck slab and for the stability of the sub structure:-

[A] Maximum of the following cases

I. One lane of IRC class 70R on carriage way
II. One lanes of IRC Class A on carriage way
III. Two lanes of IRC Class A on carriage way
IV. Three lanes of IRC Class A on carriage way

V. One lane of IRC class 70R and one lane of IRC Class A on carriage way

VI. One lane of IRC class AA TRACKED VEHICLE on carriage way

In order to account for two adjacent slabs the resultant reactions and moments have been multiplied by 2 for stability check of the sub structure.

[B] Other Loads

a) Footpath load of 5KN/Sqm.

b) Wearing coat land of 2 KN/Sqm.

Safe Bearing Capacity

The detailed sub soil investigation report for a bridge constructed in the vicinity of the bridge is enclosed.

The foundation rock is safe against the eroding effects of the water flow and other climatic conditions.

As per detailed test of foundation rock the lowest safe bearing capacity for rectangular footing at depth 4.5 m and downwards is 200 kN/ Sq M; Hence the Safe Bearing Capacity adopted for design is 200 kN/ Sq M.

Depth of Foundation/Founding Level

For all the footings no hard rock available hence the foundation shall be laid at 4.5 m depth on gravel base as found uniformally across the river section.

Scour Depth

The maximum scour depth computed is 6.44 M. As per Clause No. 703-2-3-1 of IRC 78-1983 considering Scour at the pier two times of calculated scour depth below the highest flood level. But we shall provide foundation at 1.5 m ANCHORED IN BED ROCK AVAILABLE.

Reinforcement Detail & other Detail of Deck slab

Ministry of surface transport details drawings are enclosed which contains miscellaneous details of deck slab including reinforcement drawing.

The right effective span of the proposed bridge is 7.60 m. The length along the centre line of road between pier centers is 8.80 m.

The deck slab pertaining to 8 m. right effective span shall be provided as given in MOST drawings No. SD/101, SD/102, SD/103, SD/104 AND SD/112.

In the drawing the clear right span is 7600 mm. The proposed bridge shall have clear right span as 7600 mm conforming to the standard drawing adopted.

Bearing detail

Tar paper bearing shall be providing on top of pier cap & abutment cap.

Approach slab

The detail of approach slab is enclosed as drawing D-03.

Pier Cap Detail

Pier cap drawing is enclosed as annexure D-05.