

Study of General conditions and acceptable Standards For Highway Design and Geometric Design criteria

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Introduction : The Project Highway shall be planned as a “partially access controlled highway” where access to the highway shall be provided only at pre-determined locations from service roads through ramps and or from interchanges. In



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properly designed entry/exit doing so, the concessionaire shall take measures to overcome the physical and operational constraints and plan, design and construct the Project Highway using appropriate methods, management techniques and technologies.

Key Words : Highway, NHAI, Planning, Designing , six laning etc.

General consideration : General consideration shall, without being limited to, be as follows:-

1. The constraints

The physical constraints in the existing highway are in the form of limitation of right of way, un-regulated access, inadequate service roads and underpasses, numerous at-grade junctions, lack of physical separation between local and through traffic etc. The operational constraints arise out of the necessity or possibility of closing a portion of the road for construction and/or diverting the traffic to temporary diversions, thereby reducing the capacity and safety of the existing highway. The solutions evolved by the concessionaire shall be such that these operational constraints are overcome through appropriate planning, design and construction method, techniques and technologies and by adopting suitable traffic management measures.(b)

2. Safety of design

All designs shall be safe to ensure that the Project Highway or any part thereof (for example embankment, pavement, retaining structures, bridges, culverts, etc) does not collapse (global stability) nor its serviceability/performance (for example settlement, roughness, undulations, deflections, etc) deteriorates below acceptable level as prescribed in Schedule K of the Concession Agreement.(c)



Cross Slopes

On a straight length of highway, transverse drainage shall be accomplished by the use of cross fall at a standard rate of 2.5% considering the rainfall and type of wearing course.

Median Widths

The elevated sections of the Mainline are comprised of two parallel structures; one for each carriageway. The parapets of these structural elements will form the edge of the roadway and the inner parapets together with the gap between the structures will result in a median width of 4.5 metres within rural areas. Existing median is retained if its width is more than 2.0m and outside widening is proposed to reduce the construction difficulties.

For the service roads (frontage roads) a suitable gap in the form of median between main carriageway and service road has been kept as per the Manual.

Interchanges

The provision and design of at grade intersections/Interchanges shall be generally in accordance with IRC standard and if IRC is silent about any elements AASHTO shall be referred. For elements where both the standards do not provide any guideline, latest UK standard shall be used.

Lane Provision

The number of lanes has been provided based on the forecast traffic flows.

Generally, lane balance shall be maintained for the highway network by applying lane drop or lane gain criteria as per ASSHTO. Lane drop or gain shall be maximum one lane more or less of total number of lanes before and after drop or gain respectively.

Ramps

By definition, the term Ramp includes all arrangements of turning roadways that connect two or more legs at an interchange; each ramp is made of a connecting highway and a terminal at each end. Ramp roadway widths are calculated from the lane and shoulder widths. Widening shall be provided on all ramps where the horizontal curvature requires it. Standard deceleration and acceleration lanes have been provided at each exit and entry.

Successive Entries/Exits

The minimum spacing between successive entries and/or exits for highway shall be in accordance with the AASHTO.

Merge and Diverge Design



Generally parallel type exit and entry configuration shall be adopted for the project highway. For 2-lane ramps the minimum acceleration and deceleration lengths shall be in accordance with the MOSRTH Standard drawings, but where space is not a constraint then consideration will be given to provide more length to fit in the site conditions.

At-Grade Intersections and U-Turn Closures

Left-in Left-out standards have been employed at selected minor intersections where traffic flow is not significant and have been designed in accordance with acceleration and deceleration lanes. Left-in Left-out has been provided with the service road of the project highway to avoid traffic hazards on the project highway and improve safety for the users. If two or more at grade intersections are found closely spaced they are connected by service road. Some of at-grade intersections are also proposed to be closed.

A few U-Turns are proposed to be closed to maintain the design speed for through traffic and capacity and level of service of the road segments. The project highway is designed as partially access control highway which needed removal of U-Turns but keeping in mind the viability of the project some of them are not closed, moreover a few new median opening is proposed instead provision of underpasses for the users convenience.

- ***Design -Special Cases***

While the design criteria covered the majority of situations arising in the design there were some special cases that needed particular consideration. These are discussed below:

Design Speed on Access road -The access road is designed for speed of 40/50 kph and turning radius has been provided 80/125 m.

Lane Gains and Lane Drops -The guidelines/rules for lane gains and lanes drops are suitably adopted in design as detailed in AASHTO.

Ramp Terminations -Traffic leaving the Mainline via an exit ramp (slip road} will enter into a mini roundabout before exit to the cross road or cross road traffic enter into a roundabout before entry to the project highway.

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