Design Stage RSA
Case Studies

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DPR Stage Safety Audit

Inception Report
Crash Analysis and Road Safety Inspection Report (Existing) and Development of Short Term Countermeasures, Cost Estimate & BOQ

Draft Feasibility Report
Draft Detailed Project Report
Technical Schedules
Traffic Circulation Plan for Access Control Highway

➢ 7 nos. MO with Cross Roads
➢ 4 nos. MO Closed
➢ Proposed 3 nos. Grade Separated Intersection
➢ Expected Congestion on SR and Intersections

Geometric Design

Design of Vertical Alignment with Intermediate Sight Distance

Summit Curves are designed for ISD

Valley Curves are designed for Head Light Sight Distance i.e. SSD and not for ISD, (Clause No. 2.9.5 IRC: SP:84-2019/ IRC: SP:87-2019)

In case Speed limit signs fixed for 100 kmph, the valley curves may cause rear end accidents

Proposed Summit & Valley Curves shall be designed for ISD
Sharp Horizontal Curve

Cross Section: Flush and Depressed

Flush and Depressed median shall be provided with 0.6m paved edge strip towards median side.

In case MBCB is to be fixed on median side then slope in front of MBCB shall be 1:10 and MBCB shall be 0.7m to 1m away from the outer edge of the paved strip.

It is observed 0.5m edge strip is provided in place of 0.6m for Flush Median and MBCB Beam installed in line of the outer edge of the paved strip.

IRC SP 99: Provide Paved shoulder at the edge of the carriageway, shyness on the median side, earthen shoulders on either side.

It is proposed 1m wide earthen shoulder with 150/200 mm thick Granular Material on median side in case of flush median also as in Expressways.
Split Carriageway without Safety Barrier

Partly RE wall (6m high) and partly Embankment Slopes proposed to provide Metal Crash Barrier
Unsafe Entry/Exit on Horizontal Curve

Unsafe Exit/Entry
Unsafe Median Plantation

Recommended to avoid/restrict median plantation at median opening as per Clause A.4.3 of IRC:SP:21

Lateral and Vertical Clearance

Finish road level in VUP/ LVUP/ SVUP shall be kept 150 mm above the ground level/service road/ cross road (whichever is higher) (Clause No. 2.10 IRC: SP:84-2019/ IRC: SP:87-2019)
Grade Separated Structures

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Design Chainage (Km)</th>
<th>LHS Roadway Width (m)</th>
<th>RHS Roadway Width (m)</th>
<th>Super Structure Provision in Median</th>
<th>Span Arrangement (m)</th>
<th>Minimum Vertical Clearance (m)</th>
<th>Skew Angle (to be specified)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.1</td>
<td>15.1</td>
<td>15.1</td>
<td>No</td>
<td>20+1x30+1x20</td>
<td>5.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15.1</td>
<td>15.1</td>
<td>Yes</td>
<td>1x20</td>
<td></td>
<td>5.5</td>
<td>16°</td>
<td></td>
</tr>
</tbody>
</table>

1. Retaining wall/ RE wall shall be provided for full height on all structures. *(clause No. 7.1 (iv) IRC:SP:84/87)*

2. Toe wall (0.6m ht) to be provided where ROW is restricted and water bodies along the proposed highway on the sections specified in Schedule-B

3. Carriageway width tapering shall be provided 1 in 50 as per manual

4. Provide detailing of placement and specification of Railing, Fencing and electric poles, etc. *(clause No. 2.17 IRC:SP:84/87)*

5. RCC barrier shall start from start of valley curve and end after grade separator at end of valley curve

6. 50m long MBCB Safety barriers on structure approaches shall be provided

Retaining Structure

Retaining Wall/ RE Wall shall be provided upto 7.5m height (or full height on VUP/LVUP/SVUP) on all structures refer clause No. 7.1 (iv) IRC:SP:84-2019/ IRC:SP:87-2019

Partial Retaining wall/ RE Not Permitted

i. Unsafe due to MBCB Provision

ii. Wastage of precious land

iii. Future extension of wall to full height is difficult and cost extensive
Grade Separated Intersections

➢ Slip Roads provided steep gradient before turning below Grade Separator
➢ Intersection without Flaring leading to blind corners

Pedestrian Movement through Islands
Strip Plan Showing Signs

Confusing Road Signs


Night Visibility on Project Highway

Merging & Diverging Markings

The merging and diverging at high speed situations will be critical, the length of nose length to be provided shall be the function of approach speed and the taper rate for diagonal or chevron.

<table>
<thead>
<tr>
<th>Speed (kmph)</th>
<th>Désirable Minimum Taper</th>
<th>Absolute Minimum Taper</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 kmph</td>
<td>1:35</td>
<td>1:20</td>
</tr>
<tr>
<td>50 to 65 kmph</td>
<td>1:40</td>
<td>1:25</td>
</tr>
<tr>
<td>66 to 80 kmph</td>
<td>1:45</td>
<td>1:30</td>
</tr>
<tr>
<td>&gt;80 kmph</td>
<td>1:50</td>
<td>1:40</td>
</tr>
</tbody>
</table>

Table 7.2: Taper Rate of Diagonal/Chevrons Marking

Fig 7.2: Nose Length at High Speed Situations
Fixing of Lighting Poles

Safety Barrier
Night Visibility of Metal Crash Barrier

Impact Attenuators in Gore Area