

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction  
(EPC) Mode*

# TECHNICAL SCHEDULE

## **SCHEDULE - A**

**(See Clauses 2.1 and 8.1)**

### **SITE OF THE PROJECT**

The Site- Construction of 6-lane VUP at Km 94+909 including construction of New Service Road, Exit & Entry, drain and Highway Lighting on Kaithal to Rajasthan /Haryana Border section of old NH-65 (new NH -152) in the state of Haryana on EPC Mode shall include the land, buildings, structures and road works as described below.

- 1.1 Site of the Six lane Project Highway shall include land, buildings, structures & road works as described in Annex - I of this Schedule – A.
- 1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 1.3 An inventory of the Site including the vacant and unencumbered land, buildings, structures, road works, trees and any other immovable property on, or attached to, the site shall be prepared jointly by the Authority Representative, the Contractor and Authority's Engineer and such inventory shall form part of the memorandum referred to in clause 8.2.1 of this Agreement.
- 1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor, however, improve/upgrade the Road Profile as indicated in Annexure-III based onsite/design requirement.
- 1.5 The Status of the environment clearances obtained or awaited is given in Annexure-IV.

### **Annex - I (Schedule-A):**

#### 1. The Site

The Site of the project highway is a Construction of 6 lane VUP at Km 94+909 including construction of New Service Road, Exit & Entry, drain and Highway Lighting on Kaithal to Rajasthan /Haryana Border section of old NH-65 (new NH -152) in the state of Haryana on EPC Mode shall include the land, buildings, structures and road works as described below. Description of the Project Highway is as under.

#### 2. Land

The site of the project highway comprises the land as detailed in Annex-II of this Schedule -A.

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) as described below:

|                                               | Sr. No. | Chainage (Km) |        | ROW<br>(m) | Remarks                                      |
|-----------------------------------------------|---------|---------------|--------|------------|----------------------------------------------|
|                                               |         | From          | To     |            |                                              |
| Proposed VUPs (Along existing 4-lane Highway) |         |               |        |            |                                              |
|                                               | 1       | 94.160        | 96.770 | 60         | As per provision of<br>Contract<br>Agreement |

#### 3. Carriageway :

The present carriageway of the project Highway is Four lane Divided Carriageway across which the VUPs are to be constructed. The type of the existing pavement is flexible pavement.

An inventory of the existing carriageway is presented as below.

#### **Existing Carriageway Width**

| Existing Chainage (Km) | Existing Carriageway Width (m) | Service Road (m) |
|------------------------|--------------------------------|------------------|
| 94.160 - 94.460        | 2 x 9 m                        | -                |
| 94.460 - 95.360        | 2 x 9 m                        | -                |
| 95.360 - 95.600        | 2 x 9 m                        | -                |
| 95.600 - 95.675        | 2 x 9 m                        | -                |
| 95.675 - 96.600        | 2 x 9 m                        | -                |
| 96.600 - 96.770        | 2 x 9 m                        | -                |

4. Major Bridges:

| S. No. | Existing Chainage (Km) | Type of Structure |                |                 | No. of Spans with span length (m) | Width (m) |
|--------|------------------------|-------------------|----------------|-----------------|-----------------------------------|-----------|
|        |                        | Foundation        | Sub- structure | Super-structure |                                   |           |
| NIL    |                        |                   |                |                 |                                   |           |

5. Road over-bridges (ROB)/ Road under-bridges (RUB):

| S. No. | Existing Chainage (Km) | Type of Structure |                | No. of Spans with span length (m) | Width (m) | ROB/ RUB |
|--------|------------------------|-------------------|----------------|-----------------------------------|-----------|----------|
|        |                        | Foundation        | Superstructure |                                   |           |          |
| NIL    |                        |                   |                |                                   |           |          |

6. Grade Separators: The Site includes the following grade separators-

| S. No. | Existing Chainage<br>(Km) | Type of Structure |                | No. of Spans with<br>span length (m) | Width<br>(m) |
|--------|---------------------------|-------------------|----------------|--------------------------------------|--------------|
|        |                           | Foundation        | Superstructure |                                      |              |
| NIL    |                           |                   |                |                                      |              |

7. Minor bridges: The Site includes the following existing minor bridges:

| S. No. | Existing Chainage (Km) | Type of Structure |               |                 | No. of Spans with span length (m) | Width (m)                    |
|--------|------------------------|-------------------|---------------|-----------------|-----------------------------------|------------------------------|
|        |                        | Foundation        | Sub-structure | Super-structure |                                   |                              |
| 1      | 96+170                 | open              | RCC           | RCC slab        | 1 span with 12 m span length      | 2 x 11.0 m with 1.5 m median |

8. Railway. Any level crossings:

The Site includes the following railway level crossings:

| Sl. No. | Existing Chainage (Km) | Remarks |
|---------|------------------------|---------|
| NIL     |                        |         |

9. Underpasses (vehicular, non-vehicular):

The Site includes the following existing Underpasses:

| Sl. No. | Existing Chainage (Km) | Type of Structure | No. of Spans with span length (m) | Width (m) |
|---------|------------------------|-------------------|-----------------------------------|-----------|
| NIL     |                        |                   |                                   |           |

10. Culverts :

The Site has the following existing culverts:

| Sl. No.                             | Existing Chainage (Km) | Type of Culvert | Span Arrangement and Total Vent way |                     | Width (m) |
|-------------------------------------|------------------------|-----------------|-------------------------------------|---------------------|-----------|
|                                     |                        |                 | No.                                 | Length/Diameter (m) |           |
| At VUP Locations and the approaches |                        |                 |                                     |                     |           |
| 1                                   | 95+852                 | Box             | 1                                   | 1.00 x 6            | 24.00 m   |

11. Bus Bays :

| Sl. No. | Existing Chainage (km) | Length (m) | Side |
|---------|------------------------|------------|------|
| NIL     |                        |            |      |

12. Truck Lay byes :The details of truck lay byes are as follows:

| Sl. No. | Existing Chainage (km) | Length (m) | Side |
|---------|------------------------|------------|------|
| NIL     |                        |            |      |

13. Road side drains :

The Road Side Drains along the Project Highway is as follows:

| Sl. No. | Existing Chainage (km) |        | Side (Left/Right/Both ) | Type               |                   |
|---------|------------------------|--------|-------------------------|--------------------|-------------------|
|         | From                   | To     |                         | Masonry/CC (Pucca) | Earthen (Kutchha) |
| 1       | 94+160                 | 96.770 | Both                    | -                  | Earthen Drain     |

#### 14 Major junctions

The details of major junctions are as follows:

| Sl. No. | Existing Chainage (km) | At Grade Junction |      | Separated | Category of Cross Road |    |     |        |
|---------|------------------------|-------------------|------|-----------|------------------------|----|-----|--------|
|         |                        | Side              | Type |           | NH                     | SH | MDR | Others |
| 1       | 94+360                 | BHS               | X    | -         | x                      | x  | x   | ✓      |
| 2       | 94+909                 | BHS               | X    | -         | x                      | x  | x   | ✓      |
| 3       | 96+700                 | LHS               | Y    | -         | x                      | x  | ✓   | x      |

#### 15 Minor junctions :

The details of minor junctions are as follows:

| Sl. No. | Location               |      | Type     |            | Side of service road |
|---------|------------------------|------|----------|------------|----------------------|
|         | Existing Chainage (Km) | Side | Junction | Cross road |                      |
|         |                        |      |          |            |                      |

#### 16 Bypasses:

| Sl. No. | Name of Bypass<br>(Town) | Existing Chainage (km) |    | Existing Length<br>(in Km) |
|---------|--------------------------|------------------------|----|----------------------------|
|         |                          | From                   | To |                            |
| NIL     |                          |                        |    |                            |

#### 17 Other structures: -

| Sl. No. | Existing Chainage (km) | Type of Structure | No. of Spans with Span Length (m) | Width (m) |
|---------|------------------------|-------------------|-----------------------------------|-----------|
| Nil     |                        |                   |                                   |           |

#### 18 Details of Existing Utilities:

Electric Supply lines on both side of the main carriageway.

- a. km 94+530 – HT line crossing
- b. km 94+900 – HT line crossing

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**Annex - II  
(Schedule-A)**

**Dates for providing Right of Way**

The dates on which the Authority shall provide Right of Way to the Contractor on different stretches of the Site are stated below:

| <b>S. No.</b> | <b>Chainage</b> |        | <b>Total length (M)</b> | <b>Existing Row (M)</b> | <b>Available</b> | <b>* Date of providing ROW</b>         |
|---------------|-----------------|--------|-------------------------|-------------------------|------------------|----------------------------------------|
| 1             | 94.160          | 96.770 | 2610                    | 60 M                    |                  | As per provision of Contract Agreement |

***\* The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.***

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## **Annex – III**

### **(Schedule-A)**

#### **Alignment**

##### **Plans:**

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan indicated below:

| <b>S. No.</b> | <b>Design Chainage</b> |        | <b>Total length (M)</b> | <b>Proposed Available Row (M)</b> |
|---------------|------------------------|--------|-------------------------|-----------------------------------|
| 1             | 94.160                 | 96.770 | 2610                    | 60                                |

The alignment plan of the Project Highway is enclosed in digital form in soft copy.

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**Annex - IV  
(Schedule-A)**

**Environment Clearances**

As per Initial Environmental Assessment and based on interpretation of amended notification of MoEFCC dated 22.08.2013 "Environmental Clearance "for development of project road is not required.

## SCHEDULE - B

(See Clause 2.1)

### Development of the Project Highway

#### 1. **Development of the Project Highway**

Construction of 6 lane VUP at Km 94+909 including construction of New Service road, Exit & Entry, drain and Highway Lighting on Kaithal to Rajasthan /Haryana Border section of old NH-65 (new NH -152) in the state of Haryana as described in this **Schedule-B and in Schedule-C**. The alignment plans of the Project Highway are specified in Annex-III of Schedule-A and shall be deemed to be part of this Schedule-B. The proposed profile of the project highway as indicated in the Annex-III of Schedule-A shall be treated as an approximate assessment. Based on site / design requirement specified in Schedule-D, the Contractor shall design the alignment plans and profiles of the project highway with approval from Authority Engineer within the available Right of Way.

#### 2. **Rehabilitation and Up-Gradation**

Rehabilitation and Up-Gradation shall be done from KM 94+160 to Km 96+770 of the subject stretch including Construction of 6 lane VUP at Km 94+909 including construction of New Service road, Exit & Entry, drain and Highway Lighting and connecting to the 4 Lane Project Highway as described in **Annex-I** of this **Schedule-B and Schedule-C**.

#### 3. **Specifications and Standards**

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in **Annex-I of Schedule-D**.

## **Annex - I (Schedule-B)**

### **Description of the Project Highway**

1. Construction of 6 lane VUP at Km 94+909 including construction of New Service road, Exit & Entry, drain and Highway Lighting on Kaithal to Rajasthan /Haryana Border section of old NH-65 (new NH -152) in the state of Haryana on EPC Mode.
- 1.1 **Construction of Project Highway :** The Project Highway shall follow the alignment shown in the plan and profile specified in Annexure III of Schedule-A, unless otherwise specified by the Authority. Notwithstanding anything to the contrary contained in this Agreement or IRC: SP: 84-2019 & 87-2019 as required proposed plan & profile, locations of different structures/drains/service & slip road/RE walls, chainages of different structures/ drains/ service & slip road/RE walls, length of different structures/drains/service & slip road/RE walls etc. of the project highway as indicated in the Schedule A, Schedule B, Schedule C and their Annexures shall be treated as an approximate assessment. Based on site/design requirement, the Contractor shall finalise their Detailed Designs (Development Stage) including plan & profile of the project highway and submit the same to Authority & its Engineer for its Consent/Approval and Safety Audit by Safety Auditor, before the start of the execution of project. The designs so approved shall not be in contradiction with the scope of project. For avoidance of doubt, the provisions mentioned in schedule B & C cannot be changed, only the design of the components is to be submitted for consent/approval.
- 1.2 The EPC Contractor shall deploy at its own Cost and Expenses, the Grading/Paving/Compaction Equipment fitted with System of Automated & Intelligent Machine-aided Construction (AI-MC) for finishing of all Grades including Embankment, Subgrade, GSB, WMM. The System of Automated & Intelligent Machine- aided Construction (AI-MC) used by the EPC Contractor shall be capable of delivering accuracy as per the applicable IRC specifications. During the Construction Period, the Concessionaire/ Consultant shall furnish all the Physical Progress Data (All desired type of Surface Grading Data, Compaction and Temperature Data etc.) obtained through System of Automated & Intelligent Machine-aided Construction (AI-MC)/CMS to Authority for monitoring of Construction on Daily Basis. These Digital Data and desired output shall be made available at the Location (Server/Cloud) finalized by Authority.
- 1.3 **WIDTH OF CARRIAGEWAY**
  - 1.3.1 Six-Laning with paved shoulders from KM 94+160 to Km 95+600 as per TCS shall be undertaken (New construction of Main Carriageway shall be from Km. 94+160 to Km. 95+675). The new paved carriageway shall be **2 x 11.00 metre** (including paved shoulder and kerb shyness/edge strip).
  - 1.3.2 The width of slip/service road on both sides shall be 7.50 metre on each side.
  - 1.3.3 Except as otherwise provided in this Agreement, the width shall be adjusted to fit into appropriate plans and cross sections developed in accordance with TCS enclosed.
  - 1.3.4 The entire cross-sectional elements shall be accommodated in the available / proposed ROW.

#### 1.4 Width of Median

1.4.1 The width of median shall be 1.50 meter.

### 2. GEOMETRIC DESIGN AND GENERAL FEATURES

Condition of road should be recorded by NSV, FWD in accordance with Ministry's Circular No. RW/NH-33044/32/2019-S&R (P&B), Dated: 13.11.2019.

Drone Videography to be done a) Before start of work & b) After every month till completion of work for entire stretch of project as per relevant policy circulars / guidelines.

#### 2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the manual. Intermediate Sight distance (Desirable Minimum Sight Distance) shall be followed for design of all vertical curves including structures as well as highways. (clause No. 2.9.5 IRC: SP:84-2019 & 87-2019 as required). If Valley curves are designed for Head Light Sight distance (i.e. Safe Stopping Sight Distance) then speed limit sign shall be fixed for 85th percentile of designed speed.

#### 2.2 Design speed

The design speed shall be the minimum of 100 km per hr for plain /rolling terrain plain and rolling terrain and ~~60 Kmph for mountainous and steep terrain.~~ **(clause No. 2.2 IRC: SP:84-2019 & 87-2019 as required)**

#### 2.3 Improvement of the existing road geometrics: NIL

2.3.1 The existing road geometrics shall be improved as per the codal provisions. In the sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and appropriate road signs, pavement markings and safety measures shall be provided.

| Sr. No.                                                                                                                                                            | Stretch (Design Chainage) Km |    | Type of deficiency | Remarks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----|--------------------|---------|
|                                                                                                                                                                    | From                         | To |                    |         |
| NIL                                                                                                                                                                |                              |    |                    |         |
| * Smooth Transition Vertical Curves to be ensured with existing main carriageway and approaches of the existing structures to avoid Roller coaster like situation. |                              |    |                    |         |

2.3.2 The entire cross-sectional elements shall be accommodated in the available/proposed ROW. If required, suitable full height retaining structures shall be provided to accommodate the highway cross section within the available/ proposed ROW. The details of such sections are mentioned in Schedule-B. In case of any other section not included in Schedule-B, where retaining structures are to be provided, shall constitute a Change of Scope (the design consultant has to mention specifically such areas in Schedule-B).

**2.3.3 Realignments:** The existing road shall be improved to the standards as specified in the manual at the following locations:

| Sr. No. | Existing Chainage (Km) |    | Design Chainage (Km) |    | Length (Km) |
|---------|------------------------|----|----------------------|----|-------------|
|         | From                   | To | From                 | To |             |
| NIL     |                        |    |                      |    |             |

**2.3.4 Bypasses:** The existing road shall be bypassed to the standards as specified in the manual at the following locations:

| Sr.No. | Name of bypass | Existing Chainage (Km) |    | Design Chainage (Km) |    | Length (Km) |
|--------|----------------|------------------------|----|----------------------|----|-------------|
|        |                | From                   | To | From                 | To |             |
| NIL    |                |                        |    |                      |    |             |

## 2.4 Right of Way

Details of the Right of Way are given in Annex II of Schedule A

## 2.5 Type of shoulders

- a. The Design Specification of paved shoulder shall conform to the requirements specified in paragraph 5.10 of the manual.
- b. Paved shoulders and strip on median side shall be of same specification and pavement composition as of main carriageway (clause No. 5.10 IRC: SP:84-2019 & 87-2019 as required)
- c. The overlay on the main carriageway pavement and on the paved shoulders shall be uniform in thickness and composition. (Clause No. 5.10 IRC: SP:84-2019 & 87-2019 as required)
- d. In Built-up sections, footpaths shall be provided with width **1.5m**. (Clause No. 2.15 & clause No. 2.6 IRC: SP:84-2019 & 87-2019 as required)
- e. ~~In open country, paved shoulders of 2.0m width shall be provided. (Clause No. 2.6 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)~~
- f. The Design Specification of paved shoulder shall conform to the requirements specified in paragraph 5.11 of the manual.
- g. ~~The earthen shoulder of 2.0m width on shoulder side shall be provided with top 150 mm on earthen shoulder with well graded naturals and morrum gravel crust stones or combination thereof, confirming to Clause 401 of MoRTH specification. (Clause No. 5.11 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)~~
- h. ~~The earthen shoulder of 1.0m width on median side shall be provided with top 150 mm on earthen shoulder with well graded naturals and morrum gravel crust stones or combination thereof, confirming to Clause 401 of MoRTH specification to fix MBCB and confirm placement requirement of MBCB. (Clause No. 9.7.2 (C) IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)~~

## 2.6 Lateral and Vertical Clearance at Underpasses

2.6.1 In case of VUP/ LVUP/ SVUP, the proposed structure, the finish road level in VUP/ LVUP/ SVUP shall be kept 150 mm above the ground level/service road/ cross road (whichever is higher) to ensure that these VUP/ LVUP/ SVUP don't become water accumulation points. (Clause No. 2.10 IRC: SP:84-2019 & 87-2019 as required)

2.6.2 The vertical and horizontal clearance at the underpasses shall be as per Clause 2.10.2 of the manual.

| Sr. No. | Location Chainage (Km) | Span/opening (m)     | Remarks                   |
|---------|------------------------|----------------------|---------------------------|
| 1       | VUP at 94+909          | 1 x 20 m (Straight)* | Vertical clearance 5.50 m |

\*(Note- 33.43 deg.)

**(MCW – main carriageway, LHS – Left Hand Side and RHS – Right Hand Side)**

## 2.7 Lateral and vertical clearances at Overpasses

2.7.1 Lateral and vertical clearances for overpasses shall be as per paragraph 2.11 of the Manual.

2.7.2 Lateral clearance: The width of the opening at the Overpasses shall be as follows:

## 2.8 Service roads/ Slip Road/ Connecting roads/ RAMP

2.8.1 Service Road: The height of embankment of service road shall confirm to clause 4.2.1.

2.8.2 The Service roads shall be constructed at the locations and for the lengths indicated below:

| Sr. No. | Design Chainage (Km) |        | Length (km) |       | Paved Carriageway Width including shyness (m) | Total  | Remarks                                                         |
|---------|----------------------|--------|-------------|-------|-----------------------------------------------|--------|-----------------------------------------------------------------|
|         | From                 | To     | LHS         | RHS   |                                               |        |                                                                 |
| 1       | 94+160               | 94+460 | 0.300       | 0.300 | 0 to 8.5 m                                    | 600 m  | Entry-Exit (varies) on both side                                |
| 2       | 94+460               | 96+600 | 2.140       | 2.140 | 7.5 m                                         | 4280 m | Construction of new slip Road including provision of diversion. |
| 3       | 96+600               | 96+770 | 0.170       | 0.170 | 0 to 8.5 m                                    | 340 m  | Entry-Exit (varies) on both side                                |

2.8.3 The Parking bays shall be provided along service road (clause No. 2.12.2.1 IRC: SP:84-2019 & 87-2019 as required)

| Sr. No. | Design Chainage of Parking Bay |                  | Remarks |
|---------|--------------------------------|------------------|---------|
|         | LHS Service Road               | RHS Service Road |         |
|         |                                |                  |         |

2.8.4 Slip Road: The height of embankment of slip road shall confirm to clause 4.2.1. (clause No. 4.2.1 IRC: SP: 84-2019 & 87-2019 as required). The Slip roads shall be constructed at the locations and for the lengths indicated below:

| Sr. No. | Design Chainage (Km) |    | Length (km) |     | Paved Carriageway Width including shyness (m) | Total | Remarks |
|---------|----------------------|----|-------------|-----|-----------------------------------------------|-------|---------|
|         | From                 | To | LHS         | RHS |                                               |       |         |
|         |                      |    |             |     |                                               |       |         |

2.8.5 Separator Between Main Carriageway and Service/Slip Road (clause No. 2.15.1 IRC: SP:84-2019 & 87-2019 as required) :- ~~A separator minimum 1.0 m wide between main carriageway and service/slip road shall be provided to prevent the pedestrians, local vehicles and animals entering the highway.~~

Note:

- i. Above length of the service/slip roads is minimum specified. The actual length of the service/slip/connecting roads shall be determined by the EPC Contractor in accordance with the approved plan & profile and design approved from the Independent Engineer. Any increase/decrease up to 5 percent length from the length specified in this Clause of Schedule-B shall not constitute a Change of Scope. Any additional length shall be dealt in Change of Scope.
- ii. The Acceleration, deceleration lane, right turning storage lane, entry/exit lanes to be constructed included in the length given in above table and shall be deemed to be part of the scope and no Change of Scope shall be considered for the same. (Clause No. 2.12.2 & Fig 2.1C IRC: SP:84-2019 & 87-2019 as required)

## **2.9 Grade separated structures (VUP): (clause No. 3.4 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019):**

Grade separated structures shall be constructed as per paragraph 2.13 of the Manual. Proposed levels at structure locations as shown in plan & profile specified in Annexure-III of schedule A are minimum requirement and only for guidance and any increase in levels shall not constitute any change of scope. Entry/Exit arrangement from main carriageway shall be 50m before/after the start/end of approach road to grade separator i.e. start/end of valley curve (clause No. 2.12.2.2 & Fig 2.1C, IRC: SP:84-2019 & 87-2019 as required). RCC barrier shall start from start of valley curve and end after grade separator at end of valley curve.

The sub-structure shall be continued in the median portion with RCC barrier wherever superstructure has not been proposed in median portion. (Clause 7.1 (vii) IRC: SP:84-2019 & 87-2019 as required).

50m long MBCB Safety barriers on structure approaches shall be provided on all four faces of each structure. MBCB provided towards median side of each structures shall be joined on ends in semi-circular shape. (Clause No. 4.3.5 and 4.9 of IRC 119)

1.5m wide footpaths shall be provided at grade intersection below structures for each direction of pedestrian movement (refer fig 3.1 to 3.6 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019).

The requisite particulars are given below:

### **2.9.1 Vehicle Overpass (VOP)**

|  | Design Chainage (Km) | LHS Roadway Width (m) | RHS Roadway Width (m) | Super Structure Provision in Median | Span Arrangement (m) | Minimum Vertical Clearance (m) | Skew Angle (to be specified) | Remarks |
|--|----------------------|-----------------------|-----------------------|-------------------------------------|----------------------|--------------------------------|------------------------------|---------|
|  |                      |                       |                       |                                     |                      |                                |                              |         |

### **2.9.2 Vehicle Underpasses (VUP)**

| Sr. No. | Design Chainage (Km) | LHS Roadway Width (m) | RHS Roadway Width (m) | Super Structure Provision in Median | Span Arrangement (m) | Minimum Vertical Clearance (m) | Skew Angle (to be specified) | Remarks        |
|---------|----------------------|-----------------------|-----------------------|-------------------------------------|----------------------|--------------------------------|------------------------------|----------------|
| 1       | VUP at 94+909        | 11.00                 | 11.00                 | Open to Sky                         | 1 x 20 m (Straight)  | 5.50 m                         | 33.43 deg                    | PSC/RCC girder |

### 2.9.3 Light Vehicle Underpasses (LVUP)

|  | Design<br>Chainage<br>(Km) | LHS<br>Roadway<br>Width (m) | RHS<br>Roadway<br>Width (m) | Super<br>Structure<br>Provision<br>Median | Span<br>in<br>Arrangement (m) | Minimum<br>Vertical<br>Clearance (m) | Skew<br>Angle (to<br>be<br>specified) | Remarks |
|--|----------------------------|-----------------------------|-----------------------------|-------------------------------------------|-------------------------------|--------------------------------------|---------------------------------------|---------|
|  |                            |                             |                             |                                           |                               |                                      |                                       |         |

### 2.9.4 Small Vehicle Underpasses (SVUP)

|  | Design<br>Chainage<br>(Km) | LHS<br>Roadway<br>Width (m) | RHS<br>Roadway<br>Width (m) | Super<br>Structure<br>Provision<br>Median | Span<br>in<br>Arrangement (m) | Minimum<br>Vertical<br>Clearance (m) | Skew<br>Angle (to<br>be<br>specified) | Remarks |
|--|----------------------------|-----------------------------|-----------------------------|-------------------------------------------|-------------------------------|--------------------------------------|---------------------------------------|---------|
|  |                            |                             |                             |                                           |                               |                                      |                                       |         |

### 2.9.5 Cattle and Pedestrian underpasses

|  | Design<br>Chainage<br>(Km) | LHS<br>Roadway<br>Width (m) | RHS<br>Roadway<br>Width (m) | Super<br>Structure<br>Provision<br>Median | Span<br>in<br>Arrangement (m) | Minimum<br>Vertical<br>Clearance (m) | Skew<br>Angle (to<br>be<br>specified) | Remarks |
|--|----------------------------|-----------------------------|-----------------------------|-------------------------------------------|-------------------------------|--------------------------------------|---------------------------------------|---------|
|  |                            |                             |                             |                                           |                               |                                      |                                       |         |

Cattle and pedestrian underpass shall be constructed as follows: (No Clause exists IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)

### 2.9.6 Interchanges (IC) (clause No. 3.4 IRC:SP:84-2019 & 87-2019 as required/ IRC:SP:87-2019)

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction  
(EPC) Mode*

| Sr. No | Design Chainage (km) | Name of structure | Span Arrangement (m) | Total Width (m) | Typical Cross Section | Remarks |
|--------|----------------------|-------------------|----------------------|-----------------|-----------------------|---------|
|        |                      |                   |                      |                 |                       |         |

**Note: Layout, Geometric Design and Typical Cross Sections of Interchange shall be included by DPR consultant in Annexure to schedule-B.**

### 2.9.7 Details of Ramps, Cross Roads and Connecting Roads at Interchanges (IC)

| Sr. No. | Carriageway Widths including Kerb Shyness | Length (m) | Description of Ramps, Crossroads and Connecting Roads | Remarks |
|---------|-------------------------------------------|------------|-------------------------------------------------------|---------|
|         |                                           |            |                                                       |         |

**Note: Layout, Geometric Design and Typical Cross Sections of Interchange shall be included by DPR consultant in Annexure to schedule-B.**

### 2.10 Typical Cross Section (TCS) of the Project Highway (clause No. 2.17 IRC: SP:84-2019 & 87-2019 as required)

The Project Highway shall be constructed to Four lane configuration. Typical cross sections required to be developed in different sections of the Project Highway are given below.

| S.No | Design Chainage (Km) |        | Length (Km) | TCS as per Manual | Remarks                                                                                                                           |
|------|----------------------|--------|-------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|      | From                 | To     |             |                   |                                                                                                                                   |
| 1    | 94+160               | 94+460 | 0.300 km    | TCS-1             | TYPICAL CROSS SECTION FOR EXISTING FOUR LANE DIVIDED CARRIAGEWAY WITH PROPOSED ENTRY-EXIT (VARIES) ON BOTH SIDE AND MEDIAN VARIES |
| 2    | 94+460               | 94+899 | 0.439 km    | TCS-2             | TYPICAL CROSS SECTION FOR VUP APPROACH WITH 1.5M MEDIAN & BOTH SIDES 7.5M SERVICE ROAD IN FILL SECTION                            |
| 3    | 94+899               | 94+919 | 0.020 km    | TCS-3             | TYPICAL CROSS SECTION FOR PROPOSED VUP WITH BOTH SIDES 7.5M SERVICE ROAD                                                          |

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction  
(EPC) Mode*

| S.No | Design Chainage (Km) |        | Length (Km) | TCS as per Manual | Remarks                                                                                                                                         |
|------|----------------------|--------|-------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|      | From                 | To     |             |                   |                                                                                                                                                 |
| 4    | 94+919               | 95+360 | 0.441 km    | TCS-2             | TYPICAL CROSS SECTION FOR VUP APPROACH WITH 1.5M MEDIAN & BOTH SIDES 7.5M SERVICE ROAD IN FILL SECTION                                          |
| 5    | 95+360               | 95+600 | 0.240 km    | TCS-4             | TYPICAL CROSS SECTION FOR 6 LANE DIVIDED CARRIAGEWAY WITH PROPOSED SERVICE ROAD & DRAIN CUM FOOTPATH ON BOTH SIDE                               |
| 6    | 95+600               | 95+675 | 0.075 km    | TCS-5             | TYPICAL CROSS SECTION FOR FOUR LANE DIVIDED CARRIAGEWAY (VARIES) WITH PROPOSED SERVICE ROAD & DRAIN CUM FOOTPATH ON BOTH SIDE AND MEDIAN VARIES |
| 7    | 95+675               | 96+600 | 0.925 km    | TCS-6             | TYPICAL CROSS SECTION FOR EXISTING FOUR LANE DIVIDED CARRIAGEWAY WITH PROPOSED SERVICE ROAD & DRAIN CUM FOOTPATH ON BOTH SIDE                   |
| 8    | 96+600               | 96+770 | 0.170 km    | TCS-7             | TYPICAL CROSS SECTION FOR EXISTING FOUR LANE DIVIDED CARRIAGEWAY WITH PROPOSED ENTRY-EXIT (VARIES) ON BOTH SIDE                                 |

***The Design Consultant shall take full care in designing the cross section confirming to the details given above.***

**Note:**

- Any variations in the lengths specified in the above table shall not constitute a Change of Scope
- Lengths mentioned in the above list for cross section types concerned to structures are inclusive of structure length.

3. Retaining wall/ RE wall shall be provided for full height on all structures.  
**(clause No. 7.1 (iv) IRC: SP:84-2019 & 87-2019 as required)**

4. ~~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.~~

5. Chainages may be adjusted according to location of structures as per drawings.

6. Carriageway width tapering shall be provided 1 in 50 as per manual Clause no 2.5.4. Intermediate Sight Distance (Desirable Minimum Sight Distance) shall be followed for design of all vertical curves (Summit and Valley Curves) including structures as well as highways. **(Clause No. 2.9.5 IRC: SP:84-2019 & 87-2019 as required)**. Provide detailing of placement and specification of Railing, Fencing and electric poles, etc **(Clause No. 2.17 IRC: SP:84-2019 & 87-2019 as required)**

3. **Intersections and Grade Separated Intersections (Section 3, IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

The service road pavement composition shall be continued on cross roads of the intersections for the length specified for at-grade and grade separated intersections.

Properly designed intersections shall be provided at the locations and of the types and features given in the tables below: .

**3.1 At-grade intersections (clause No. 3.2 IRC: SP:84-2019 & 87-2019 as required):**

a. **Major Junctions:**

| Sr. No. | Design Chainage (Km) | Junction Type | Leads to |       | Median Opening | Category of Cross Road | Carriageway width of cross road | Length of cross road to be developed |      |
|---------|----------------------|---------------|----------|-------|----------------|------------------------|---------------------------------|--------------------------------------|------|
|         |                      |               | Left     | Right |                |                        |                                 | LHS                                  | RHS  |
|         |                      |               |          |       |                |                        |                                 |                                      |      |
| 1       | 94+360               | X             | LHS      | RHS   | Yes            | OR                     | 5.5 M                           | 50 m                                 | 50 m |
| 2       | 96+700               | Y             | LHS      | -     | Yes            | OR                     | 15 M                            | 50m                                  | -    |

b. **Minor Intersections:**

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction  
(EPC) Mode*

| Sr.<br>No. | Design<br>Chainage<br>(Km) | Junction<br>Type | Leads to |       | Median<br>Opening | Category of<br>Cross Road | Carriageway<br>width<br>of cross road | Length<br>of cross road to<br>be developed |     |
|------------|----------------------------|------------------|----------|-------|-------------------|---------------------------|---------------------------------------|--------------------------------------------|-----|
|            |                            |                  | Left     | Right |                   |                           |                                       | LHS                                        | RHS |
|            |                            |                  |          |       |                   |                           |                                       |                                            |     |
|            |                            |                  |          |       |                   |                           |                                       |                                            |     |

**Note:** Typical Layout, Geometric Design and Typical Cross Sections of Major Junction shall be included by DPR consultant in Annexure to schedule-B.

1. Type of Junction to be improved as per manual. **(clause No. 3.2.5 IRC: SP:84-2019 & 87-2019 as required)**
2. The Contractor shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in section-3 of the manual. Auxiliary lanes including storage, acceleration and deceleration lane along with physical islands to be provided.

**The cross road at the junctions which are having a level difference from the main carriageway, are to be improved at the level of main carriageway for the length of 30 metre and then to be merged with the cross road at the gradient not more than 1:50. (Clause No. 3.2.2 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

3. For minor / major layout for left-in / left out arrangement with physical islands with hazard marking. Where there is space constraint to provide physical islands, the effect of junction kept wide opened can be avoided by ghost island with marking. **(Fig 3.7, IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**
4. For U-turn, Self-Regulated U-Turn facility shall be created. **(Fig 3.6 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)** as per fig 3.6 of manual (IRC SP 84).

**3.2 At-Grade Intersections below Grade Separators/ Interchanges:** These shall be provided as given at para 2.9 of this Annexure-I of the Schedule B. **(clause No. 3.4.7 of IRC: SP:84-2019 & 87-2019 as required)**

|   | Design<br>Chainage (Km) | Junction<br>Type | Leads to |       | U-Turn<br>provision in<br>Viaduct<br>Spans | Category of<br>Cross Road | Carriageway<br>width<br>of cross road | Length<br>of cross road to<br>be developed |      |
|---|-------------------------|------------------|----------|-------|--------------------------------------------|---------------------------|---------------------------------------|--------------------------------------------|------|
|   |                         |                  | Left     | Right |                                            |                           |                                       | LHS                                        | RHS  |
| 1 | 94+909                  | 4-way            |          | ✓     | Yes                                        | OR                        | 5.5 m                                 | 50 m                                       | 50 m |

**Note:**

1. The Contractor shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in section-3 of manual.
2. **Junction improvement under grade separators shall be carried out as per manual with proper entry/exit to cross roads and slip/service roads, etc. Auxiliary lanes including storage, acceleration and deceleration lane along with physical islands to be provided.**
3. Location of grade-separated structures are indicative. Exact location should be decided in consultation with Independent Engineer
4. Intersection Layout, Entry/Exit, Right Turning Lane, U-Turns, Geometric Design and Typical Cross Sections of Interchange shall be included by DPR consultant in Annexure to schedule-B.
5. Only Entry or Exit shall be designed at any location (provision of entry/exit by ghost island not permitted). **(Clause No. 2.13.1 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

4. **ROAD EMBANKMENT AND CUT SECTION:**

Construction of road embankment/cuttings shall conform to the Specifications and Standards given in **section 4** of the manual. Notwithstanding anything to the contrary contained in this Agreement or Manual, the proposed profile of the project highway as indicated in the Annex-III of Schedule A shall be treated as minimum requirement.

Based on site/design requirement, the Contractor shall design the alignment plans and profiles of the project highway based on site/design requirement mentioned in Schedule B with approval from the Independent Engineer/Authority Engineer within

the available Right of Way. However, it is clarified that bottom of subgrade level shall be at-least 1500 mm above HFL/Existing ground level for a greenfield/ bypass stretch.

The side slopes shall not be steeper than 2H:1V. In case, there is a ROW constraint than, suitable soil retaining structures shall be provided. **(Clause No. 4.2 IRC: SP:84-2019 & 87-2019 as required)**

**For stability of slope upto 3 metre height the turfing can be adapted. For the slope from 3-6 metre suitable, geocell, geo-grid, geo-green etc. can be provided with suitable drainage chutes as per IRC 56. For the slope more than 6 metre height, a complete slope stability analysis as per IRC:75 shall be done and the slopes shall be compulsory protected with stone pitching within stone masonry grid structure of 4x4 metre and suitable drains/chutes etc. shall be provided for effective drainage of the water.**

**Use of Pond Ash and Design of Pond Ash embankment shall be specified (Clause No. 4.2.4 & 4.4.4.i (d) IRC: SP:84-2019 & 87-2019 as required)**

## 5. PAVEMENT DESIGN

5.1. Pavement design shall be carried out in accordance with section 5 of IRC: SP: 84 – 2019, IRC: 37 – 2018 , Existing Pavement on main carriageway has to be dismantled and has to be reconstructed as per detail given in para 5.2 below .

5.2. **Type of Pavement and Design requirement (Clause No. 5.4 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019):** The pavement shall be flexible type for entire length of project highway except for toll plaza locations where rigid pavement shall be provided. ***(The design consultant will carry out life cycle cost analysis for flexible and as well as rigid pavement. The cost-effective solution shall be proposed for the project.)***

5.2.1 Design Period and Strategy Pavement shall be constructed for the entire length of Project Highway including paved shoulders. Flexible Pavement shall be designed for a minimum design period of 20 years and minimum sub grade CBR of 8% and maximum subgrade CBR of 10%. whereas Rigid pavement shall be designed for a minimum design period of 30 years. Stage construction shall not be permitted.

5.2.2 Recommended Pavement Design Notwithstanding anything to the contrary contained in this Agreement or the manual, the Contractor shall design the pavement of main carriageway for design traffic of 40 MSA.

5.2.3 The pavement for service road/slip roads shall be designed for projected traffic of 10 MSA subject to minimum as follows: **(Clause No.**

**5.5.4 IRC: SP:84-2019 & 87-2019 as required)**

- i ~~Service Roads in Builtup areas for minimum 20 MSA~~
- ii ~~Slip Roads for minimum 10 MSA~~
- iii Service Roads in Rural Area for minimum 10 MSA

5.3 In order to meet the intended functional requirement of respective pavement layers on main carriageway, the minimum thickness of respective pavement layers for main carriageway and connecting cross roads/ service roads/ slip roads/ entry/exit locations, acceleration/ deceleration lane, right turning lanes shall, however, in no case be less than as given below:

**5.3.1 Main carriageway, paved shoulder, median side paved strip, entry/exit locations, acceleration/ deceleration lane, right turning lanes (Flexible) with GSB/WMM**

| Pavement Composition | Minimum Crust Thickness (mm) |
|----------------------|------------------------------|
| Subgrade             | 500                          |
| GSB                  | 200                          |
| WMM                  | 250                          |
| DBM                  | 100                          |
| BC                   | 40                           |

**5.3.2 Main carriageway, paved shoulder, median side paved strip, entry/exit locations, acceleration/ deceleration lane, right turning lanes (Flexible) with CTB/CTSB**

| Pavement Composition | Minimum Crust Thickness (mm) |
|----------------------|------------------------------|
|----------------------|------------------------------|

|          |  |
|----------|--|
| Subgrade |  |
| CTSB     |  |
| WMM      |  |
| DBM      |  |
| BC       |  |

**5.3.3 Main carriageway, paved shoulder, median side paved strip, entry/exit locations, acceleration/ deceleration lane, right turning lanes (Rigid) -For Toll Plaza location.**

| Pavement Composition | Minimum Crust Thickness (mm) |
|----------------------|------------------------------|
| Subgrade             |                              |
| GSB                  |                              |
| DLC                  |                              |
| PQC                  |                              |

**5.3.4 Crossroads/ service roads/ slip roads**

| Pavement Composition | Minimum Crust Thickness (mm) |
|----------------------|------------------------------|
| Subgrade             | 500                          |
| GSB                  | 200                          |
| WMM                  | 250                          |
| DBM                  | 60                           |
| BC                   | 30                           |

**Note:** The design Consultant shall mention the crust thickness based on the design traffic assessed during traffic survey and CBR.

**5.4 Reconstruction of Stretches with New pavement (Clause No. 5.9.4 IRC: SP:84-2019 & 87-2019 as required)**

The following stretches of the existing road main carriageway shall be dismantled/milled and reconstructed. These shall be designed as new pavement.

| Sr. No. | Design Chainage | Pavement Composition | Remarks |
|---------|-----------------|----------------------|---------|
|---------|-----------------|----------------------|---------|

|   | From   | To     |               |  |
|---|--------|--------|---------------|--|
| 1 | 94+300 | 95+600 | Same as 5.3.1 |  |

### 5.5 Bituminous Mix for Overlay (Clause No. 5.9.8 IRC: SP:84-2019 & 87-2019 as required)

The following stretches of the existing road main carriageway shall be provided bituminous overlay as follows:

| Sr. No. | Design Chainage |    | Overlay     | Pavement | Remarks |
|---------|-----------------|----|-------------|----------|---------|
|         | From            | To | Composition |          |         |
|         |                 |    |             |          |         |

## 6. ROAD SIDE DRAINAGE

6.1 **Drainage system** including surface and subsurface drains for the Project Highway including crossroads shall be provided as per section 6 of the manual. RCC Drain shall conform to the cross-sectional features and other details as given in Annexures to Schedule-B and shall be provided as under:

**Details of RCC Drain (Clause No. 2.13 & 6.2.6 IRC: SP: 84-2019 & 87-2019 as required/ IRC: SP: 87-2019)**

| Sr. No. | Design Chainage (Km) |        | Length (m) |      | Width of Drain (m) | Total Length (m) |
|---------|----------------------|--------|------------|------|--------------------|------------------|
|         | From                 | To     | LHS        | RHS  |                    |                  |
| 1       | 94+160               | 96+770 | 2610       | 2610 | 1.50               | 5220             |

6.2 **Unlined Drains** other than above mentioned locations shall be provided in the entire project length which gets terminated at all crossroad locations. In case, the definite outfall is not available, a rainwater harvesting system shall be provided at the deepest location for dispersal of water.

### 6.3 Median Drain (Clause No. 6.3 IRC: SP:84-2019 & 87-2019 as required)

Lined drain shall be provided in the center of the median at super elevation locations and depressed median. Draining of storm water from one carriageway to other carriageway is not permitted. the Concessionaire shall design the median drain based on site/design requirement mentioned in Schedule D with approval from the Authority Engineer and shall be connected with the nearest culvert/outfall.

**6.4 Drainage arrangement between Main Carriageway and Service/Slip Roads (Clause No. 2.15 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019):** A suitable drainage arrangement for draining storm water of main carriageway shall be provided. Storm water of main carriageway to service road is not permitted.

**6.5 Drainage where Embankment Height is more than 3m: (Clause No. 6.4 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019) :** Drainage chutes shall be provided at suitable interval on embankment slopes. The drainage arrangement shall include kerb, cement concrete drainage channel at the edge roadway, Cement Concrete Chutes, CC bedding, energy dissipation basin, etc. Mountable Kerb shall be provided beyond the post of MBCB to channelize storm water into chute. (Clause No. 6.8.2.4 of IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)

**6.6 Drainage for Structures: (Clause No. 6.8 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019):** A suitable drainage arrangement for draining storm water from deck slab shall be provided. Water shall not fall on any surface of the structures, or remain standing or flowing over the road below structure.

**6.7 Drainage for Underpass and Subways Structures (Clause No. 6.8.3 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019) :** A suitable drainage arrangement for draining storm water from Underpass and Subways shall be provided.

**6.8 Drainage arrangement of Retaining Structures (No Clause in IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019):** Vertical Drop-down drainage pipes with suitable cleaning provision shall be provided at suitable interval. Drainage fixtures and dropdown pipes shall be of rigid, corrosion resistant material not less than 100mm dia. The Storm water of main carriageway draining on service road is not permitted.

## **7. DESIGN OF STRUCTURES**

### **7.1 General**

Project Highway is proposed to be constructed to Four lane configuration with provision for widening to six lane configuration in future. As such, superstructure of all bridges, culverts and structures is to be designed for edge movement of the vehicle considering stitching of new superstructure in future due to widening for additional lane. **Special vehicle loading is to be considered in design of all bridges, culverts and structures.**

**All structures except wherever expansion joints have been provided, The pavement layers WMM, DBM & BC shall be continued over the structures for smooth riding quality of the project highway.** These structures shall be designed considering the dead load of pavement (WMM, DBM, BC, etc) layers.

**All major structures will be designed preferably as continuous slab to reduce the number of expansion joints on the MJB/ ROBs/ flyover/ Interchange etc.**

**7.1.1** All bridges, culverts and structures shall be designed for IRC class Special Vehicle (SV) loading as per IRC: 6 and constructed in accordance with section-7 of the manual and shall conform to the cross-sectional features and other details specified therein.

**7.1.2** The overall width of the structures shall be as given in Para 7.3 of Annex-I of Schedule-B. **(Clause No. 7.3 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

**7.1.3** The Safety Barrier and Footpath on Bridges and RoB shall continue on approaches. The footpath shall be provided with paved surface & railing till the embankment height is more than 3m. **(Clause No. 7.17 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

Details of Structures with footpaths **(Clause No. 7.2 ii IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

| Sr. No. | Location at km | Skew Angle | Footpath Width (m) |       | Remarks |
|---------|----------------|------------|--------------------|-------|---------|
|         |                |            | Left               | Right |         |
|         |                |            |                    |       |         |

**7.1.4** All bridges shall be high level bridges.

**7.1.5** All structures shall be designed to carry utility services on outer side of RCC barrier/Railing as per site requirement.

**7.1.6** Cross section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross sections given in ----- of the Schedule-B.

**7.2 Culverts (Clause No. 7.3 i IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

**7.2.1** Overall width of all culverts shall be equal to the roadway width of the approaches. The overall width of culverts shall be including width of main carriageway and slip/service roads/Entry ramps/Exit Ramps/ Acceleration/Deceleration lanes, etc. All culverts shall also be continued in median and in gap between main carriageway and service road.

**7.2.2 New/Reconstruction of existing RCC pipe culverts:** The existing culverts at the following locations shall be re-constructed as new culverts:

| Sr.No | Design Chainage | Culvert Type | Skew Angle | Span/ Opening (m) | New/ Reconstruction | Culvert Crossing Type (Balancing/Stream, etc) | Remarks |
|-------|-----------------|--------------|------------|-------------------|---------------------|-----------------------------------------------|---------|
|       |                 |              |            |                   |                     |                                               |         |

**7.2.3 Widening of existing RCC pipe culverts (Clause No. 7.3 iii IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

All existing culverts which are to be retained shall be widened to the proposed roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

| Sr. No | Design Chainage | Culvert Type | Skew Angle | Span/ Opening (m) | Repairs Rehabilitation proposals | Culvert Crossing Type (Balancing/ Stream, etc) | Remarks |
|--------|-----------------|--------------|------------|-------------------|----------------------------------|------------------------------------------------|---------|
|        |                 |              |            |                   |                                  |                                                |         |

#### 7.2.4 Construction of Box Culverts:

New culverts (given in table below) shall be constructed for width equal to the proposed roadway width of the Project Highway & as per typical cross-section given in schedule B. The details are given as under:

##### Box Culverts (Clause No. 7.3 i IRC: SP:84-2019 & 87-2019 as required)

| Sr. No | Design Chainage (km) | Span Arrangement (m) | Skew Angle | Culvert Type | Crossing | Remarks |
|--------|----------------------|----------------------|------------|--------------|----------|---------|
|        |                      |                      |            |              |          |         |

#### 7.2.5 Widening of existing box culverts

All existing culverts which are to be retained shall be widened to the proposed roadway width of the Project Highway as per the typical cross section given in Schedule-B. Repairs and strengthening of existing structures where required shall be carried out. **(Clause No. 7.3 iii IRC: SP:84-2019 & 87-2019 as required)**

| Sr. No | Design Chainage | Culvert Type | Skew Angle | Span/ Opening (m) | Repairs Rehabilitation proposals | Culvert Crossing Type (Balancing/Stream, etc) | Remarks                                                         |
|--------|-----------------|--------------|------------|-------------------|----------------------------------|-----------------------------------------------|-----------------------------------------------------------------|
| 1      | 95+852          | Box          | 0          | 6 m               | Widening                         | Balancing                                     | Extension below proposed Service Road as per same configuration |

#### 7.2.6 Culverts on Crossroads:

| Sr. No | Design Chainage (km) | Span Arrangement (m) | Type (Box/Pipe) | Length of Culvert | Remark |
|--------|----------------------|----------------------|-----------------|-------------------|--------|
|        |                      |                      |                 |                   |        |

7.2.7 Utility ducts in bypasses (Greenfield as well as Brownfield which is being upgraded) in form of NP-4 RCC Pipe dia 600 mm shall be provided across the Project Highway @ 0.50 km c/c and along with inspection chamber where directed for crossing of utilities anywhere as per manual (Clause 2.16) requirements. (Clause No. 2.16 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)

#### Location for utility Ducts

| Sr. No | Design Chainage (km) |    | Remark |
|--------|----------------------|----|--------|
|        | From                 | To |        |
|        |                      |    |        |

### 7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened:

i. Existing bridges proposed for reconstructed as new structures: **(Details to be given by DPR Consultant) (Clause No. 7.3 iv(a) IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

ii. Existing narrow bridges proposed to be retained and widened: **(Details to be given by DPR Consultant) (Clause No. 7.3 iv IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

| Sr. No | Design Chainage | Bridge Type  | Skew Angle | Span/ Opening (m) | Repairs / Rehabilitation proposals                                                      | Remarks |
|--------|-----------------|--------------|------------|-------------------|-----------------------------------------------------------------------------------------|---------|
| 1      | 96+170          | Minor Bridge | 0          | 12 m              | Widening below Proposed Service Road as per same configuration and as per GAD enclosed. |         |

7.3.2 Additional New Bridges: New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder. (Clause No. 7.3 ii IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)

| Sr. No | Design Chainage (Km) | Total Proposed length (m) | Type of Crossing | Total Proposed width (m) |    | Typical Cross Section of Manual | Skew Angle |
|--------|----------------------|---------------------------|------------------|--------------------------|----|---------------------------------|------------|
|        |                      |                           |                  | MCW                      | SR |                                 |            |
|        |                      |                           |                  |                          |    |                                 |            |

7.3.3 The railings of existing bridges shall be replaced by crash barriers at the following locations: the specific locations are to be mentioned by DPR Consultant. (Clause No. 7.17 iv IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)

| Sr. No | Design Chainage |    | Length (km) | Remarks |
|--------|-----------------|----|-------------|---------|
|        | From            | To |             |         |
|        |                 |    |             |         |

7.3.4 The existing bridges/ RoB/ Grade Separators/ RUB retained on the project highway shall be upgraded and rehabilitation measures/proposals shall be specified as follows: **(Clause No. 7.3 iv(b) IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

| Sr. No. | Location at km | Rehabilitation Proposals | Remarks |
|---------|----------------|--------------------------|---------|
|         |                |                          |         |

**7.3.5 Structures** in marine environment: - the specific locations are to be mentioned by DPR Consultant.

**7.4 Railroad Bridges (ROB/RUB) (Clause No. 7.18 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

**7.4.1** Design, construction and detailing of ROB/RUB shall be as specified in Section 7 of the manual.

**7.4.2** Road over bridges (road over rail) shall be provided at the following locations, as per GAD drawings attached:

| Sr. No. | Design Chainage (Km) | Proposed Span Arrangement (m) | Type of super-structure (i.e. Bow string, simply supported structure etc. composite) | Name of crossing | Total Width (m) | Skew Angle | Remarks |
|---------|----------------------|-------------------------------|--------------------------------------------------------------------------------------|------------------|-----------------|------------|---------|
|         |                      |                               |                                                                                      |                  |                 |            |         |

**Note:**

i. The details of span and type of super-structure have to be mentioned by the DPR Consultant as per approved GAD by the railways. If the length/width of the span/ type of super-structure is changed due to any reason the COS shall be considered.

ii. ROB shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plan shall be prepared in consultation with the concerned railway authority.

iii. The ROB shall be constructed and maintained by the concessionaire under supervision of the Railways. All charges payable to the Railways like D&G, capitalized maintenance, signaling, cabling, OHE modification, earthing etc. except P&E charges shall be borne by the Concessionaire.

7.4.3 Road under bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

| Sr. No. | Design Chainage | Proposed Span Arrangement (m) | Name of crossing | Total Width (m) | Skew Angle | Remarks |
|---------|-----------------|-------------------------------|------------------|-----------------|------------|---------|
|         |                 |                               |                  |                 |            |         |

The DPR Consultant should exercise the caution that wherever the ROB is being provided in lieu of existing level crossing, the RUB must be proposed so that the existing railway crossing must be closed.

#### **7.5 Grade Separated Structures (Clause No. 7.19 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9, 2.10 and 3 of Annexure-I of Schedule-B.

#### **7.6 FoB/Skywalks (Clause No. 10 IRC: 103 and Clause No. 9.8.5 IRC: SP:84-2019 & 87-2019 as required)**

FoB/Skywalks shall be provided in built-up areas/ near schools. DPR Consultant to provide detailed drawings of FoB in schedule B

| Sr. No. | Location at km | FoB Type | Remarks |
|---------|----------------|----------|---------|
|         |                |          |         |

#### **7.7 A summary of Culverts, Bridges and Structures shall be presented as follows:**

| Sr. No. | Name of the Structure | Total Numbers | Remarks |
|---------|-----------------------|---------------|---------|
| 1       | Pipe Culvert          | 0             |         |

| Sr. No. | Name of the Structure      | Total Numbers | Remarks                                                   |
|---------|----------------------------|---------------|-----------------------------------------------------------|
| 2       | Box RCC Culvert            | 1             | Extension below proposed service road                     |
| 3       | Grade Separated Structures | 1             |                                                           |
| 4       | Minor Bridge               | 1             | Extension below proposed service road as per GAD enclosed |

**8 Traffic Control Devices and Road Safety Works :** Traffic control devices and road safety works shall be provided in accordance with Section 9 of the IRC:SP: 84 - 2019.

**8.1 Traffic Signs:** Traffic signs shall be provided as per IRC 67-2022 and MoRT&H circular RT-25035/07/2023-RS(Part) (221534) dated 20.07.2023 as mentioned in Schedule-C.

**8.2 Pavement Marking:** Pavement markings shall be completed as per IRC 35-2015 as mentioned in Schedule-C.

**8.3 Safety Barrier:** The safety barriers shall be provided in accordance with Section-9 of the Clause 9.7 of the manual.

**The Safety Barrier length proposed are excluding the safety barrier already proposed on Culverts, Grade Separated Structures, Interchange, Bridges, RoB and RUB as applicable cross sections respectively.**

End Treatment of Steel barriers/Rope Barrier shall be specified i.e. **MELT or P-4 confirming to EN 1317-4**, TT, MBCB barrier to Concrete Barrier (**Clause No. 9.7.2 (b) IRC: SP:84-2019 & 87-2019 as required**)

End Treatment to Concrete barrier shall be done as specified in **Clause No. 9.7.3 (b) IRC: SP:84-2019 & 87-2019 as required**. The details of the location are as below:

| S.No. | Item                    | LHS    |        | RHS    |        | Total Length (m) | Remarks                               |
|-------|-------------------------|--------|--------|--------|--------|------------------|---------------------------------------|
|       |                         | (From) | (To)   | (From) | (To)   |                  |                                       |
| 1     | MBCB                    | 94+160 | 96+770 | 94+160 | 96+770 | 5220             | On the median                         |
| 2     | Concrete crash barrier* | 95+360 | 96+600 | 95+360 | 96+600 | 2480             | Between MCW and proposed service Road |

\*(Excluding the length on Structures)

## 9. Roadside Furniture

It shall be provided as per the details mentioned in Schedule-C.

## 10. Hazardous Locations

The safety barriers shall be provided at the following hazardous location such as ponds, well, electric sub-station, Electric tower, spilt carriageway, etc.

| Sr. No. | Location Stretch |         | Type of Safety Barrier | LHS/RHS |
|---------|------------------|---------|------------------------|---------|
|         | From (Km)        | To (Km) |                        |         |
|         |                  |         |                        |         |

## 11. Special Requirement:

Retaining Structure and protection works shall be provided at locations as indicated below and as provided in TCS schedule in cl. 2.11 of schedule-B.

| Sr. No. | Design Chainage (Km) |        | Length (m) | Side | Height (m)         | Retaining Structure/<br>Toe Wall | Type of Safety Barrier | Remarks                                                                                                |
|---------|----------------------|--------|------------|------|--------------------|----------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|
|         | From                 | To     |            |      |                    |                                  |                        |                                                                                                        |
| 1       | 94+460               | 95+360 | 900        | BHS  | Vary as per design | RE Wall                          | Concrete crash barrier | Full Height RE Wall has to be constructed on the approaches along with friction concrete crash barrier |

As per NHAI-HQ circular number 18.11/2025 dated 21.10.2025, following remedial / corrective measures shall be adopted to avoid the nature of failures presently happening w.r.to RS wall structures:

- (i) Construction practices for gap slabs, closing / back RS walls with column type abutments shall be avoided. Only earth retaining abutment with dirt wall i/c bracket to support the approach slab shall be provided.
- (ii) Construction of RS walls with partial height / surcharge shall be avoided. If required due to site constraints, only RCC retaining walls of either full height or partial height with surcharge shall be provided.
- (iii) Provision of R S walls as wing walls of grade separated structures or any other structures shall be avoided. Only RCC wing walls shall be provided.

(iv) Placement of Geo-composite membrane (as a drainage layer) at the back of the facing RS walls shall be avoided. A drainage bay of minimum 600mm width at the back of the facing RS walls shall be provided as per gradation mentioned in Table:2 of IRC:SP: 102.

(v) Construction of RS walls over 10m height (w.r.t. NGL) shall be avoided. Wherever, height of approaches in grade separated structures / ROB etc. is over 10m height, the length of viaduct portion shall be increased to achieve the maximum height limit of RS wall approaches i.e. 10m.

(vi) To avoid transfer of vertical load of approach slab on RCC return wall, the approach slab shall not be provided on RCC return wall. The same shall be placed on abutment's dirt wall bracket and approach fill. The crash barrier to be cast along with RCC return wall independently without any overlapping support on/with approach slab.

(vii) In case of RS walls approaches, the crash barrier with friction slab shall be provided as an independent unit without any monolithic/integral connection with RCC approach slab/PQC pavement. The friction slab of crash barrier shall invariably be provided below the approach slab, PQC pavement/road crust of flexible pavement.

## **12. Open Well within RoW**

The Open well shall be identified and appropriate treatment shall be provided.

| Sr. No. | Design Chainage | Well Dimension | Well Depth | Filling Material for Well | Slab on Top of Well Yes/No | Remarks |
|---------|-----------------|----------------|------------|---------------------------|----------------------------|---------|
|         |                 |                |            |                           |                            |         |

## **13. Shifting of Utilities**

The Contractor shall undertake the work of shifting of any utility (including electric lines, water pipes, gas pipelines and telephone cables) and those which has been indicated in Schedule A to an appropriate location or alignment, in accordance with the provisions of Concession Agreement and in accordance with the standards and specifications of concerned Utility Owning Department which is part of the scope of work of the Contractor. The specifications of concerned Utility Owning Department shall be applicable and followed.

### **Note :-**

a. The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of Utility Owning Department and it is to be agreed solely between the Contractor and the Utility Owning Department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/ size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossings

e. The utilities shall be handed over after shifting work is completed to Utility Owning Department to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

The traffic diversion plans shall be prepared as per IRC SP 55 for smooth flow of traffic and safety. A diversion plan shall be proposed for construction of Culvert, Grade Separated Structures, Bridges, RoB/RUB, etc. and traffic management plan for widening/ reconstruction of carriageway.

[illegible]

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction  
(EPC) Mode*

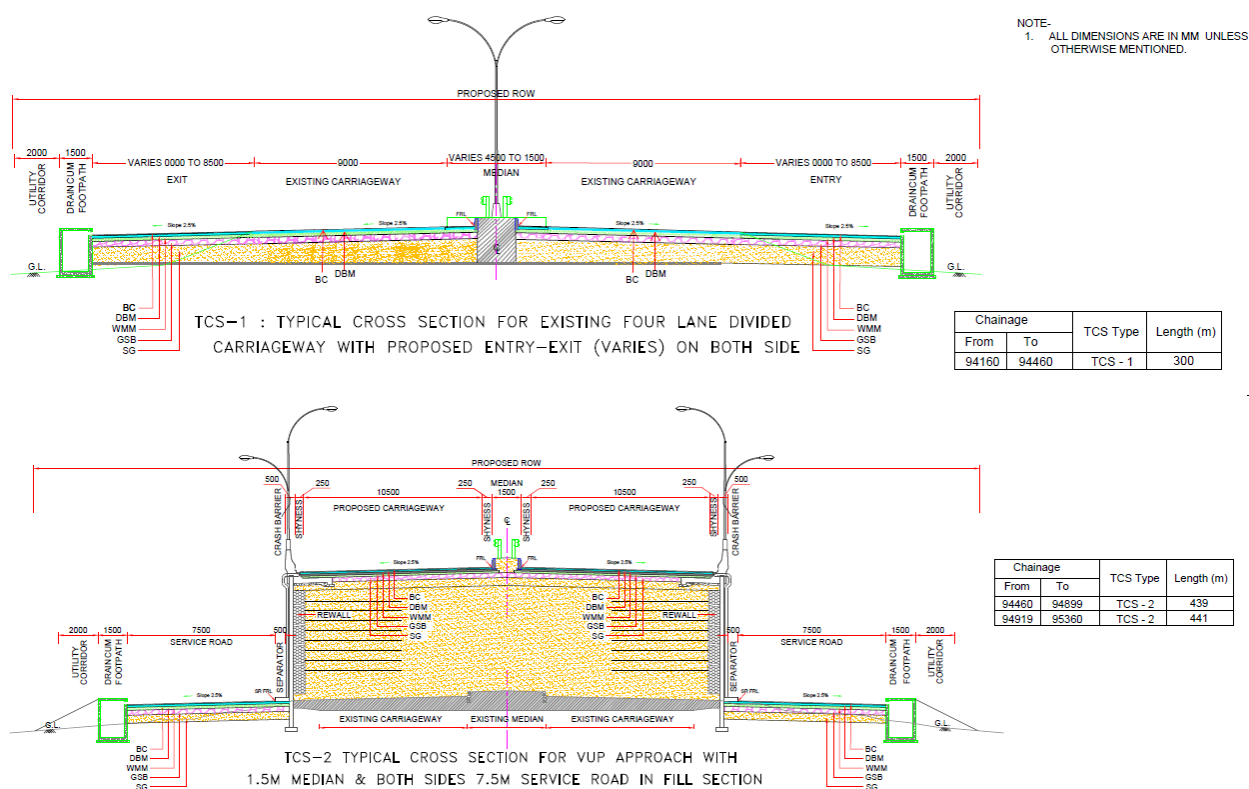
|   |        |        |     |     |     |     |     |  |
|---|--------|--------|-----|-----|-----|-----|-----|--|
| 1 | 94+160 | 96+770 | VUP | Yes | Yes | Yes | Yes |  |
|---|--------|--------|-----|-----|-----|-----|-----|--|

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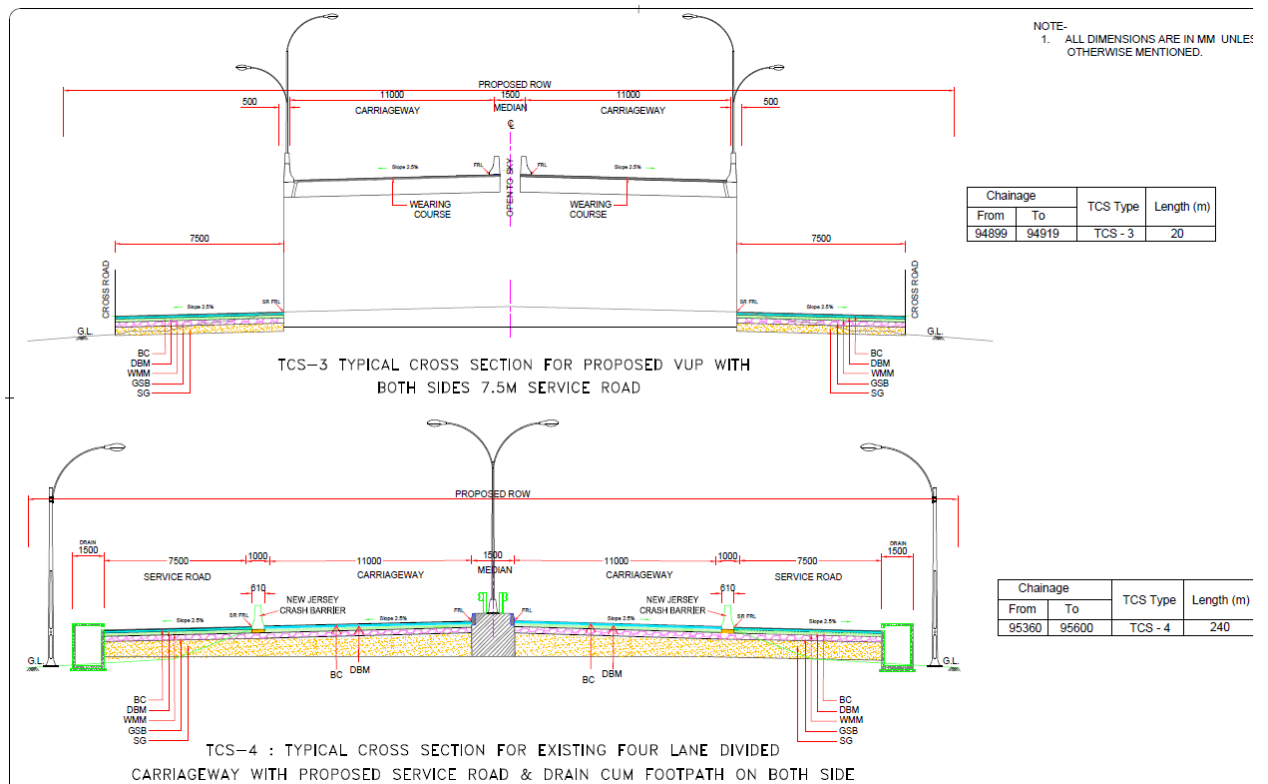
## Appendix -B1

a. GAD of VUP – Enclosed in Annexure -1

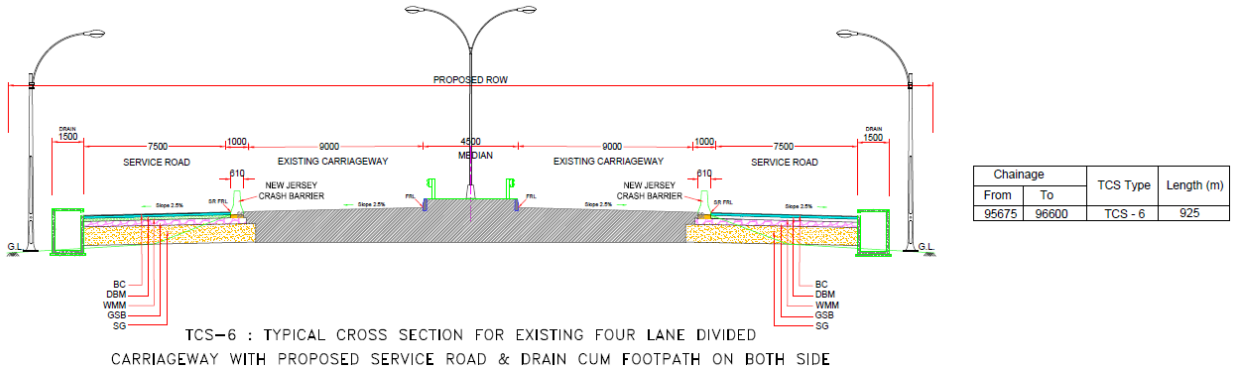
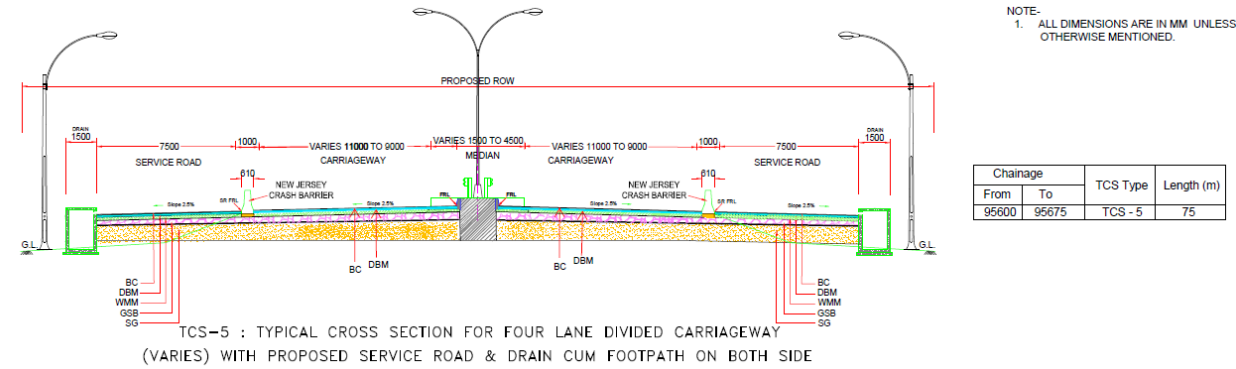
b. TCS is as follow



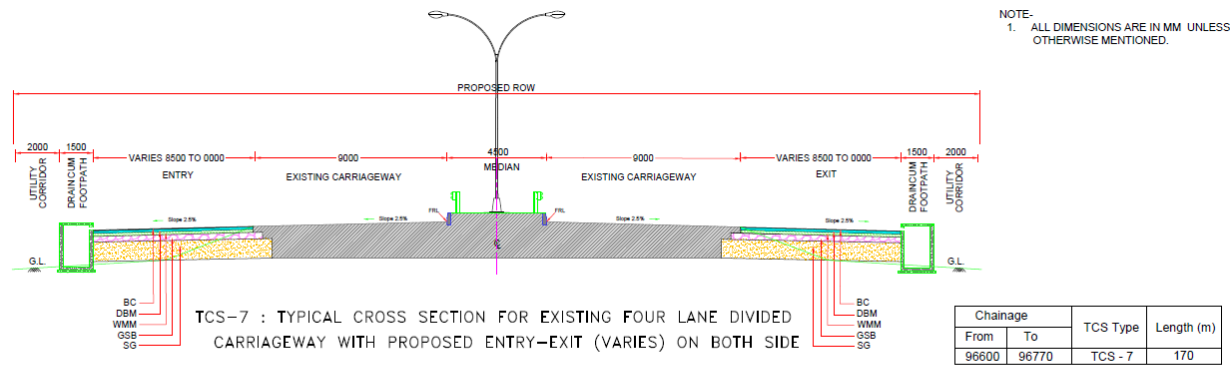
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## **SCHEDULE –C**

**(See Clause 2.1)**

### **PROJECT FACILITIES**

#### **1. Project Facilities**

The Contractor shall construct the project facilities in accordance with the provisions of this agreement. Such Project facilities shall include:

- a) ~~Toll Plaza~~**
- b) Road side furniture**
  - i. Kilometer and Hectometer Stones
  - ii. Traffic Signs
  - iii. Overhead Signs
  - iv. Road Marking
  - v. Road Delineators
  - vi. Reflective Pavement Markers & Solar Studs
  - vii. Traffic Impact Attenuators
  - viii. Boundary wall and Fencing
- c) ~~Operation and Maintenance centers~~**
- d) ~~Way side Amenities / Service Areas~~**
- e) ~~Truck lay byes~~**
- f) Bus Bay and Bus shelter**
- g) Pedestrian Facilities**
- h) Highway Lighting**
- i) Rainwater Harvesting**
- j) Environmental Management Plan**
- k) Land Scaping and Tree Plantation**
- l) ~~Advanced Traffic Management System (ATMS)~~**
- m) ~~Highway Patrol Units~~**
- n) ~~Emergency medical services~~**
- o) ~~Crane Service~~**

- 1.1.** Project Facilities to be completed on or before project completion date have been described in Annexure-I of this Schedule-C.

**Annexure-I**

**(Schedule –C)**

**PROJECT FACILITIES**

**1. Project Facilities**

The Contractor shall construct the project facilities in accordance with the provisions of this agreement.

Such Project facilities shall include:

- ~~a) Toll Plaza~~
  - b) Road side furniture
    - i. Kilometer and Hectometer Stones
    - ii. Traffic Signs
    - iii. Overhead Signs
    - iv. Road Marking
    - v. Road Delineators
    - vi. Reflective Pavement Markers & Solar Studs
    - vii. Traffic Impact Attenuators
    - viii. Boundary wall and Fencing
  - ~~c) Operation and Maintenance centers~~
  - ~~d) Way side Amenities / Service Areas~~
  - ~~e) Truck lay-byes~~
  - f) Bus Bay and Bus shelter
  - g) Pedestrian Facilities
  - h) Highway Lighting
  - i) Rainwater Harvesting
  - j) Environmental Management Plan
  - k) Land Scaping and Tree Plantation
  - ~~l) Advanced Traffic Management System (ATMS)~~
  - ~~m) Highway Patrol Units~~
  - ~~n) Emergency medical services~~
-

**e) Crane Service**

**Description of Project Facilities**

Each of the Project Facilities is briefly described below:

**1. Toll Plaza**

~~Tolling system shall be provided in entire length of the project and the same is integrated with the adjoining packages. The Toll Plazas shall be provided as per NHAI circular No. 17.5.82 dated 24/5/2021 and Schedule D. Minimum Lane requirement in the opening year are as follows.~~

~~Toll Plaza shall be provided conforming to (Clause No. 10.2 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019) at the following locations:~~

|  | Location of Toll Plaza (Km) |                  | Direction (Entry: to highway, Exit: from Highway) | Minimum number of Toll Lanes |      |
|--|-----------------------------|------------------|---------------------------------------------------|------------------------------|------|
|  | Existing Chainages          | Design Chainages |                                                   | Entry                        | Exit |
|  | -                           | -                | -                                                 | -                            | -    |

~~The Sub Items of toll Plaza are as follows~~

| S.No. | Item | Number | Remarks |
|-------|------|--------|---------|
|       | -    | --     |         |

**2. Roadside furniture**

**2.1. Kilometer and Hectometer Stones (Clause No. 12.3 IRC: SP:84-2019 & 87-2019 as required)**

| S.No. | Item                            | Number       | Remarks                                                                                                                              |
|-------|---------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
|       | <b>Kilometer Marker/ Stones</b> | 2 X 2X2 Nos. | The KM/ Hectometer stones/ marker can be Concrete/ Stones and shall be placed on both outer edge of the shoulder/ median/ separator. |

|  |                                  |                   |                                                                                                                                                                                                                                                                                                                                                                         |
|--|----------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Hectometer Marker/ Stones</b> | 11 X 2 X2<br>Nos. | <p>In case KM/ Hectometer marker are to be fixed on separator between Main Carriageway &amp; Service Road then these should be fixed as reflective signs.</p> <p>Km/ Hectometer stones are required to provide on main carriageway and Service Road, both if continuous service road is provided throughout project length (Service Road length is more than 1 Km).</p> |
|--|----------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**2.2. Traffic Signs (Clause No. 9.2 IRC: SP:84-2019 & 87-2019 as required) & MoRT&H circular no. RT-25035/07/2023-RS(Part) (221534) dated 20.07.2023**

Traffic Signs include roadside signs, overhead signs and kerb mounted signs etc. shall be provided along the entire Project Highway and on all Side, Roads joining the main carriageway/service road. A QR code shall be marked on back of each sign as per IRC 67-2022.

All sign shall be of Micro Prismatic Grade Sheeting Corresponding to Class C sheeting as per ASTM D 4956 Type VIII, IX and XI. **(Clause No. 9.2.3 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

All shoulder mounted signs shall be supported on GI Pipes. Overhead Signs shall be placed on a structurally sound gantry or cantilever structure made of GI pipes. **(Clause No. 9.2.4 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

On multi lane roads (6 lanes or above), signs shall be mounted overhead. **(Clause No. 4.6 of IRC: 67 2022)**

The siting of signs shall confirm to Table 4.1 and Fig 4.1 of IRC 67. **(Clause No. 4.7 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**. The two successive signs shall be placed at a minimum distance of  $0.6 \times V$  metre (V is design speed in Kmph). **(Clause No. 4.8 IRC 67 2022)**.

The overhead gantry signs shall be placed as given below: **(Clause No. 16.3.2 of IRC 67 2022)**

| S.No. | Item | Carriageway<br>(Left, Right, Both) |
|-------|------|------------------------------------|
| -     | -    | -                                  |

The detailed minimum number of signages indicating places, direction, distances, and other features shall be marked on the alignment plan and submitted, which are as mentioned below.

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| S. No. | Road Signs                                   | Number | Remarks |
|--------|----------------------------------------------|--------|---------|
|        | <b>Mandatory/Regulatory</b>                  |        |         |
|        | Stop signs                                   | 6      |         |
|        | Give Way Signs                               | 4      |         |
|        | Prohibitory signs                            | -      |         |
|        | No Parking signs                             | 4      |         |
|        | No Stopping signs                            | 4      |         |
|        | Speed Limit signs (Circular)                 | 6      |         |
|        | Speed Limit signs (Vehicle Type)             | 4      |         |
|        | Vehicle Control signs                        | -      |         |
|        | Restriction Ends sign                        | -      |         |
|        | Compulsory Direction Control and other signs | 2      |         |
|        | <b>Cautionary/Warning</b>                    |        |         |
|        | Left/Right Curve                             | 4      |         |
|        | Left / Right Curve with side road            | -      |         |
|        | Right/Left Hairpin Bend                      | -      |         |
|        | Right/Left Reverse Bend                      | -      |         |
|        | Series of Bends                              | -      |         |
|        | 270 Degree Loop                              | -      |         |
|        | Side Road                                    | -      |         |
|        | Y-intersection                               | 2      |         |
|        | Cross Road                                   | 2      |         |
|        | Roundabout                                   | -      |         |
|        | Traffic Signals                              | -      |         |
|        | T-Intersection                               | 3      |         |
|        | Major Road Ahead                             | 4      |         |
|        | Staggered Inter-section                      | -      |         |
|        | Merging Traffic Ahead                        | 4      |         |

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| S. No. | Road Signs                                            | Number | Remarks |
|--------|-------------------------------------------------------|--------|---------|
|        | Narrow Road Ahead                                     | -      |         |
|        | Road Widens                                           | 2      |         |
|        | Narrow Bridge Ahead                                   | -      |         |
|        | Steep Ascent/Descent                                  | -      |         |
|        | Reduced Carriageway                                   | -      |         |
|        | Start /End of Dual Carriageway                        | -      |         |
|        | Gap in Median                                         | 2      |         |
|        | Pedestrian Crossing                                   | 8      |         |
|        | Pedestrian crossing with backing board                | -      |         |
|        | School Ahead                                          | -      |         |
|        | Built Up Area                                         | -      |         |
|        | Two Way Operation (on main carriage way /service road | -      |         |
|        | Two Way Traffic on Cross Road Ahead                   | -      |         |
|        | Danger Warning Sign                                   | -      |         |
|        | Deaf or Blind Persons Likely on Road Ahead            | -      |         |
|        | Cycle Crossing                                        | -      |         |
|        | Cycle Route Ahead (Warning for Cycles on road ahead)  | -      |         |
|        | Dangerous Dip                                         | -      |         |
|        | Speed Breaker                                         | -      |         |

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| S. No. | Road Signs                              | Number | Remarks |
|--------|-----------------------------------------|--------|---------|
|        | Rumble Strip                            | 4      |         |
|        | Rough Road                              | -      |         |
|        | Dangerous Ditch                         | -      |         |
|        | Slippery Road                           | -      |         |
|        | Slippery Road because of Ice            | -      |         |
|        | Opening or Swing Bridge                 | -      |         |
|        | Overhead Cable                          | 4      |         |
|        | Play Ground Ahead                       | -      |         |
|        | Quay Side or River Bank                 | -      |         |
|        | Sudden Side Winds                       | -      |         |
|        | Tunnel Ahead Warning                    | -      |         |
|        | Falling Rocks                           | -      |         |
|        | Cattle Crossing                         | -      |         |
|        | Wild Animals likely to be on Road Ahead | -      |         |
|        | Queues Likely Ahead                     | -      |         |
|        | Low flying Air Craft                    | -      |         |
|        | Unguarded Railway Crossing              | -      |         |
|        | Guarded Railway Crossing                | -      |         |
|        | Crash prone area ahead                  | -      |         |

| S. No. | Road Signs                                                                              | Number | Remarks |
|--------|-----------------------------------------------------------------------------------------|--------|---------|
|        | U- Turn                                                                                 | -      |         |
|        | <b>Chevron Signs</b>                                                                    |        |         |
|        | Single Chevron                                                                          | 12     |         |
|        | Double Chevron                                                                          | -      |         |
|        | Triple Chevron                                                                          | -      |         |
|        | <b>Object Hazard Marker Sign</b>                                                        |        |         |
|        | Left /Right side Object Hazard Marker                                                   | 12     |         |
|        | Two way Object Hazard Marker                                                            | 6      |         |
|        | <b>Informatory/Guide</b>                                                                |        |         |
|        | Direction and Place Identification signs                                                | 4      |         |
|        | Stack Type Advance Direction Sign (Shoulder Mounted)                                    | 4      |         |
|        | Stack Type Advance Direction Sign with cautionary / regulatory signs (Shoulder Mounted) | -      |         |
|        | Map Type Advance Direction Sign (Shoulder Mounted)                                      | -      |         |
|        | Map Type Advance Direction Sign for roundabout (Shoulder Mounted)                       | -      |         |
|        | Flag Type Direction Sign                                                                | -      |         |
|        | Reassurance Sign                                                                        | -      |         |
|        | Place Identification Sign                                                               | -      |         |
|        | Truck Lay -By                                                                           | -      |         |
|        | Toll Booth Ahead                                                                        | -      |         |
|        | Weigh Bridge Ahead                                                                      | -      |         |
|        | Shoulder Mounted Sign in Advance of a Grade Separated Junction/ Interchange             | -      |         |

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| S. No. | Road Signs                                                                   | Number | Remarks                                                                                 |
|--------|------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------|
|        | Expressway Sign                                                              | -      |                                                                                         |
|        | Gantry Mounted advance Direction Sign Ahead of a Flyover in Urban/City Roads | -      | Instead of continuous sign board, Separate Signs shall be provided for each information |
|        | Gantry Mounted advance Direction Sign Ahead of a Grade Separated Junction    | -      |                                                                                         |
|        | Gantry Mounted advance Direction Sign Ahead of a At Grade Intersection       | 2      |                                                                                         |
|        | Gantry Mounted Advance Direction Sign for Interchange                        | -      |                                                                                         |
|        | Cantilever Gantry Mounted Advance Direction Sign for Interchange             | -      |                                                                                         |
|        | Lane Dedicated Gantry Sign                                                   | -      |                                                                                         |
|        | Definition/Supplementary Plates                                              | -      |                                                                                         |
|        | Tourism Related Sign                                                         | -      |                                                                                         |
|        | Tourist Destination Direction Information Signs Without Photograph           | -      |                                                                                         |
|        | Tourist Destination Direction Information Signs With Photograph              | -      |                                                                                         |
|        | Finger Destination direction Information Sign for Pedestrians                | -      |                                                                                         |
|        | Tourist Map Information Sign                                                 | -      |                                                                                         |
|        | Boundary Sign at Entrance to a City/Place                                    | -      |                                                                                         |
|        | Boundary Sign at Entrance to a Tourist Destination                           | -      |                                                                                         |
|        | <b>Facility Information signs</b>                                            |        |                                                                                         |
|        | Eating Place                                                                 | -      |                                                                                         |
|        | Light Refreshment                                                            | -      |                                                                                         |
|        | Resting Place                                                                | -      |                                                                                         |

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| S. No. | Road Signs                                     | Number | Remarks |
|--------|------------------------------------------------|--------|---------|
|        | First Aid Post                                 | -      |         |
|        | Toilet                                         | -      |         |
|        | Filling Station(Fuel Pump)                     | -      |         |
|        | Hospital                                       | -      |         |
|        | U-Turn Ahead                                   | -      |         |
|        | Pedestrian Subway                              | -      |         |
|        | Police Station                                 | -      |         |
|        | Picnic Site                                    | -      |         |
|        | Repair Facility                                | -      |         |
|        | Railway Station/Metro Station/Monorail Station | -      |         |
|        | Industrial Area                                | -      |         |
|        | Cycle Rickshaw Stand                           | -      |         |
|        | Taxi Stand                                     | -      |         |
|        | Auto Rickshaw Stand                            | -      |         |
|        | Home Zone                                      | -      |         |
|        | Camp Site                                      | -      |         |
|        | Airport                                        | -      |         |
|        | Golf Course                                    | -      |         |
|        | National Heritage                              | -      |         |
|        | No Through Road                                | -      |         |
|        | No Through Side Road                           | -      |         |

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| S. No. | Road Signs                            | Number | Remarks |
|--------|---------------------------------------|--------|---------|
|        | Toll Road Ahead                       | -      |         |
|        | Guide Sign on Toll Lane Portal        | -      |         |
|        | Country Border                        | -      |         |
|        | Entry Ramp for Expressway             | -      |         |
|        | Exit Ramp for Expressway              | -      |         |
|        | Expressway Symbol                     | -      |         |
|        | End of Expressway                     | -      |         |
|        | Bus Stop                              | -      |         |
|        | Bus Lane                              | -      |         |
|        | Contra Flow Bus Lane                  | -      |         |
|        | Cycle Lane                            | -      |         |
|        | Contra Flow Cycle Lane                | -      |         |
|        | Holiday Chalets                       | -      |         |
|        | Emergency Exit                        | -      |         |
|        | <b>Other Useful Information Signs</b> |        |         |
|        | Signs For Persons With Disabilities   | -      |         |
|        | International symbol of Accessibility | -      |         |
|        | Parking Information                   | -      |         |
|        | Parking Areas                         | -      |         |
|        | Ramped Entrance to Subway/Over Bridge | -      |         |
|        | Telephone Facilities                  | -      |         |

| S. No. | Road Signs                                        | Number | Remarks |
|--------|---------------------------------------------------|--------|---------|
|        | Toilet Facilities                                 | -      |         |
|        | Way Finding                                       | -      |         |
|        | Parking Signs                                     | -      |         |
|        | Auto Rickshaw Parking                             | -      |         |
|        | Cycle Parking                                     | -      |         |
|        | Cycle Rickshaw Parking                            | -      |         |
|        | Scooter and Motorcycle Parking                    | -      |         |
|        | Taxi Parking                                      | -      |         |
|        | Park and Ride                                     | -      |         |
|        | Parking Restrictions Signs for Traffic Management | -      |         |
|        | Flood Gauge Sign                                  | -      |         |
|        | <b>Route Maker Signs</b>                          |        |         |
|        | State Highway Route Marker Sign                   | -      |         |
|        | National Highway Route Marker Sign                | -      |         |
|        | Asian Highway Route Marker Sign                   | -      |         |
|        | Expressway Route Marker Sign                      | -      |         |

**Note:** The locations of the placement of signages shall be finalized in consultation with Independent Engineer/ NHAI, as per site requirement.

### **2.3. Road Marking (Clause No. 9.2 IRC: SP:84-2019 & 87-2019 as required)**

Road Markings shall be Hot applied thermoplastic materials with reflectorized beads to achieve visibility confirming to clause 2.7.2 of IRC 35. **(Clause No. 2.2 IRC: 35)**

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The cold applied plastics pavement markings shall be used for School Zone Markings, Audible Raised Profile Edge Lines and Block Markings (BM 01/02/03). **(Clause No. 2.4 of IRC: 35)**

| S. No. | Item                                                       | Unit       |        | Remarks |
|--------|------------------------------------------------------------|------------|--------|---------|
|        |                                                            | Length (m) | Number |         |
| 1      | Longitudinal Marking                                       | 2300       | 6      |         |
|        |                                                            | 50         | 10     |         |
| 2      | Transverse Marking                                         | -          | -      |         |
| 3      | Hazard Marking                                             | -          | -      |         |
| 4      | Block Marking                                              | -          | -      |         |
| 5      | Arrow Marking                                              | -          | 16     |         |
| 6      | Directional Marking                                        | -          | -      |         |
| 7      | Facility Marking                                           | -          | -      |         |
| 8      | Center Line                                                | 2300       | 6      |         |
|        |                                                            | 50         | 5      |         |
| 9      | Traffic Lane Lines                                         | -          | -      |         |
| 10     | No Overtaking Lines                                        | -          | -      |         |
| 11     | Warning Lines                                              | -          | -      |         |
| 12     | Border or Edge Lines                                       | -          | -      |         |
| 13     | Longitudinal Markings for Undivided Roads                  | -          | -      |         |
| 14     | Longitudinal Markings for divided Roads                    | -          | -      |         |
| 15     | Longitudinal Markings for Ramps/Slip Roads/One Way Streets | -          | -      |         |
| 16     | Stop Line                                                  | -          | -      |         |
| 17     | Give Way Lines                                             | -          | 4      |         |
| 18     | Diagonal Markings                                          | -          | -      |         |
| 19     | Chevron Markings                                           | -          | 12     |         |

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
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| S. No. | Item                                                                    | Unit       |        | Remarks          |
|--------|-------------------------------------------------------------------------|------------|--------|------------------|
|        |                                                                         | Length (m) | Number |                  |
| 20     | Continuity Line                                                         | -          | -      |                  |
| 21     | Word Messages                                                           | -          | -      |                  |
| 22     | Lane Change                                                             | -          | -      |                  |
| 23     | Merging/Diverging Markings                                              | -          | 4      |                  |
| 24     | Hatch Markings                                                          | -          | -      |                  |
| 25     | Raised Profile Edge Lines                                               | -          | -      |                  |
| 26     | Lane Reduction / Narrowing Situations and Transitions (lane Balancing)  | -          | -      |                  |
| 27     | Directional Arrows                                                      | -          | -      |                  |
| 28     | Mandatory Turn Arrows                                                   | -          | -      |                  |
| 29     | Guidance Arrows                                                         | -          | -      |                  |
| 30     | Deflection Arrows                                                       | -          | -      |                  |
| 31     | Bifurcation Arrows                                                      | -          | -      |                  |
| 32     | Arrows on Side Road Approaches                                          | -          | -      |                  |
| 33     | Arrows on Main Road Approaches                                          | -          | -      |                  |
| 34     | Word Messages                                                           | -          | -      |                  |
| 35     | Yellow Box Markings                                                     | -          | -      |                  |
| 36     | Ghost Island                                                            | -          | -      |                  |
| 37     | Marking for Speed Breakers                                              | -          | 4      |                  |
| 38     | Pedestrian Crossing                                                     | -          | 8      |                  |
| 39     | Markings when highway passes through settlement fig 9.4 of IRC SP 84/87 | -          | -      |                  |
| 40     | Transverse Bar Markings                                                 | -          | 45     | 5-15mm<br>18-5mm |
| 41     | Busbay Marking                                                          | -          | -      |                  |

| S. No. | Item                                                              | Unit       |        | Remarks |
|--------|-------------------------------------------------------------------|------------|--------|---------|
|        |                                                                   | Length (m) | Number |         |
| 42     | Truck Lay-by Markings                                             | -          | -      |         |
| 43     | Toll Plaza Marking                                                | -          | -      |         |
| 44     | School Zone Markings                                              | -          | -      |         |
| 45     | Object Markings within Carriageway                                | -          | -      |         |
| 46     | Objects Markings Adjacent to Carriageway                          | -          | -      |         |
| 47     | i. Subway Piers, Abutments, Culverts Head Walls, Concrete Barrier | -          | -      |         |
| 48     | ii. Electrical Poles                                              | -          | -      |         |
| 49     | iii. Guard Rails                                                  | -          | -      |         |
| 50     | iv. Trees                                                         | -          | -      |         |
| 51     | v. Kerbs                                                          | -          | -      |         |
| 52     | Directional Markings as per Annexure: A 6                         | -          | -      |         |
| 53     | Facility Markings as per Annexure A.7 of IRC 35                   | -          | -      |         |

**Note:** The locations of the marking shall be finalized in consultation with Independent Engineer/NHAI, as per site requirement.

#### **2.4. Road Delineators (Clause No. 9.4 IRC: SP:84-2019 & 87-2019 as required)**

| S.No. | Item                                                             | Number/ Length (m) | Remarks               |
|-------|------------------------------------------------------------------|--------------------|-----------------------|
| 1     | Roadway Indicators                                               |                    | Throughout the length |
| 2     | Median Marker on Median/RCC Barrier<br>(Clause 4 of IRC 79 2019) | -                  |                       |
| 3     | Object Markers                                                   | -                  |                       |

| S.No. | Item                                                                                                                                                                                         | Number/ Length (m) | Remarks |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------|
| 4     | Flexible Object Markers ( <b>Clause 6 of IRC 79 2019</b> )<br>i. On Metal Beam Barrier<br>ii. On Toll Booth/Toll Island<br>iii. On Entry/Exit of Tunnel<br>iv. On Exit from Main carriageway | -                  |         |
| 5.    | Solar Blinkers on Median Opening, on exit from main carriageway and traffic islands of grade separated intersections                                                                         | 6                  |         |

**Note:** The locations of the marking shall be finalized in consultation with Independent Engineer/NHAI, as per site requirement.

**2.5. Reflective Pavement Markers & Solar Studs (Clause No. 9.5 IRC: SP:84-2019 & 87-2019 as required)**

**The Prismatic Retro-Reflective type conforming to ASTM D-4280 Pavement Markers & Solar Power Studs on Highway shall be provided in accordance with Schedule - D.**

| S.No.                              | Item                                               | Number | Location                                                                                                                       | Remarks                     |
|------------------------------------|----------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>A. – For 4/ 6 Lane Projects</b> |                                                    |        |                                                                                                                                |                             |
| 1                                  | White Colour one coloured face Road Studs          | 800    | Traffic lane line & center of carriageway                                                                                      | Uni-directional carriageway |
| 2                                  | Red Colour one coloured face Road Studs            | 650    | Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron/diagonal markings on gorge |                             |
| 3                                  | Yellow / Amber Colour one coloured face Road Studs | 600    | Median side edge line, zebra crossing                                                                                          |                             |

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| S.No.                            | Item                                                                            | Number | Location                                                                                                                                                                           | Remarks                    |
|----------------------------------|---------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 4                                | Green Colour one coloured face Road Studs                                       | 62     | Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in acceleration/deceleration lanes involving lane changing  |                            |
| <b>B– For 2 Lane PS Projects</b> |                                                                                 |        |                                                                                                                                                                                    |                            |
| 5                                | White Colour Two coloured face Road Studs                                       | -      | Traffic lane line & center of carriageway                                                                                                                                          | Bi-directional carriageway |
| 6                                | Red Colour Two coloured face Road Studs                                         | -      | Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron/diagonal markings on gorge                                                     |                            |
| 7                                | Green Colour Two coloured face Road Studs                                       | -      | Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in acceleration/ deceleration lanes involving lane changing |                            |
| 8.                               | Solar Studs on Major/Minor bridge, RoB, and all structures (Interchange/Flyover | -      |                                                                                                                                                                                    |                            |

**2.6.**

| S.No. | Item                                                                                            | Number | Location | Remarks |
|-------|-------------------------------------------------------------------------------------------------|--------|----------|---------|
|       | /VUP) and Builtup areas, In storage lane of median opening and Exit/Entry from main carriageway |        |          |         |

**Traffic Impact Attenuators (Clause No. 9.6 IRC: SP:84-2019 & 87-2019 as required)**

**2.6.1. Provide Impact Attenuators in Gore Areas, It shall be self-restoring confirming to section 10.6 of IRC SP 99 i.e. Manual of Specifications and Standards for Expressways at following locations**

| S.No. | Item                                                               | Chainage / Number | Remarks |
|-------|--------------------------------------------------------------------|-------------------|---------|
| 1     | On flyover/grade separated structure at exit from main carriageway | -                 |         |
| 2     | On Island of Toll Plaza                                            | -                 |         |
| 3     | Any other location which Safety Hazard                             | -                 |         |

**2.6.2. Providing End Terminals ( IRC SP 99)**

Provide End Terminals P-4 type confirming to EN 1317-4 to Parapet Walls of Culverts, Structures ends for the safety of approaching traffic etc.

| S.No. | Item                                   | Chainage / Number | Remarks |
|-------|----------------------------------------|-------------------|---------|
| 1     | Culvert Ends                           | -                 |         |
| 2     | Structures Ends                        | -                 |         |
| 3     | Any other location which Safety Hazard | -                 |         |

**2.7. Boundary wall and Fencing (Clause No. 12.2 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

~~Boundary wall shall be provided along the entire length on either side (including transverse requirements at structure locations) as per the detail given below in accordance with IRC: SP:84/87. Road boundary~~

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walls shall be provided at the boundary on both sides of the right of way available under the control of the Authority, except at ingress and egress points. The boundary walls shall be of reinforced cement concrete as per figure enclosed as Annexure A.

At all CD structure locations, the boundary wall shall be discontinued by turning and joining it with the wing/return wall to allow crossing through these structures during dry seasons.

In case Chainlink fencing, provide detailed drawings as Annexure A.

In case of Pre cast panel fencing, provide cast in situ coping beam on top of fencing. provide detailed drawings as Annexure A

**3. ~~Operation and Maintenance centers (Clause No. 12.15 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)~~**

~~There shall be operation and maintenance center(s) as per Clause 12.15 of Schedule D, either near the toll plaza location or at any other location along the Project Highway, as identified by the Contractor. The minimum land for O & M center shall be 2000 sq.m and shall be acquired by the Contractor at his own cost and risk. Dedicated operation and maintenance center shall be provided in accordance to Schedule D.~~

**4. Way side Amenities / Service Areas/Rest Area (Clause No. 12.6 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

| S.No | Item                                 | Existing Chainage (Km) | Side | Remarks                        |
|------|--------------------------------------|------------------------|------|--------------------------------|
| 1    | <del>Way side Amenities-<br/>1</del> | -                      |      | <del>Tentative<br/>area=</del> |
| 2    | <del>Way side Amenities-<br/>2</del> | -                      |      | <del>Tentative<br/>area=</del> |

~~The Site needs to levelled/ graded for the whole of Way side Amenities area and boundary wall of the height of 1.5m shall be constructed along the periphery of the area.~~

**5. Truck lay-byes: (Clause No. 12.6 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

**5.1.** ~~The truck lay bye shall be provided at below given location and as per the design mentioned in Schedule D.~~

| Sr. No. | Design Chainage | Side | Remarks |
|---------|-----------------|------|---------|
| 1       | -               | -    | -       |
| 2       | -               | -    | -       |

**5.2. ~~Toilet block along with Janitor room on each Truck Lay bye shall be provided. The toilet block shall consist of atleast 1 block for bathing, atleast 2 fixtures each for urinals, WC and wash basin. There shall be 24 hour lighting facility in toilet block. These toilets facilities must be functional round the clock including proper maintenance. For arrangement of water, 1 no. of boring along with water pump shall be provided to keep the toilet clean. For upkeep and maintenance of Toilet, 3 Safai wale (1 in each 8 hour shift) shall be engaged and is in the scope throughout contract period.~~**

**5.3. ~~Truck Lay Bye Pavement:~~** Provide pavement composition (Flexible/Rigid/ Paver Blocks) as follows:

|                                                     |
|-----------------------------------------------------|
| Pavement Composition (Flexible/Rigid/ Paver Blocks) |
| -                                                   |

**6. Bus Bay and Bus shelter: (Clause No. 12.7 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

Provision of Busbay and bus shelter on highways as per **IRC 80 : 2022** including paving of layby, signs, markings, speed calming measures, drainage, lighting etc., in builtup areas, intersections of NH/SH/MDR and roads leading to large settlements is as follows:

**6.1. Bus Bays** with tapers shall be provided along with passenger's shelters shall be constructed at the following locations:

| Sr. No. | Design (Existing) Chainage (Km) |       | Entry Taper Length | Bus Bay Lenth | Exit Taper Length | Remark |
|---------|---------------------------------|-------|--------------------|---------------|-------------------|--------|
|         | Left                            | Right |                    |               |                   |        |
| 1       |                                 |       |                    |               |                   |        |
| 2       |                                 |       |                    |               |                   |        |

**6.2. Kerb Side Bus Stop with Pedestrian shelter** shall be provided at the following locations.

| Sr. No. | Design (Existing) Chainage (Km) |       | Pedestrian Shelter Length | Remark |
|---------|---------------------------------|-------|---------------------------|--------|
|         | Left                            | Right |                           |        |
|         |                                 |       |                           |        |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**6.3. Bus Bay Pavement:** Provide pavement composition (Flexible/Rigid/ Paver Blocks) as follows:

|                                                     |
|-----------------------------------------------------|
| Pavement Composition (Flexible/Rigid/ Paver Blocks) |
|                                                     |
|                                                     |
|                                                     |
|                                                     |

**7. Pedestrian Facilities (Clause No. 9.8 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019**

Pedestrian Facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Clause 9.8 of Schedule D and IRC 103 2022. This shall consist of footpath (sidewalks), pedestrian guard rails and pedestrian crossing.

The details are as mentioned below:

| S.No. | Pedestrian facilities                                                                                                                                                                                                               | Chainage |    | Side | Remarks |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|------|---------|
|       |                                                                                                                                                                                                                                     | From     | To |      |         |
| 1     | Pedestrian guardrails shall be 150 mm from Carriageway/Paved Shoulder<br><br>i. Hazardous Locations on Straight Stretches<br>ii. At Junctions/Intersections<br>iii. Schools<br>iv. Bus Stop/Railway Stations<br>v. Overpass, Subway |          |    |      |         |

| S.No. | Pedestrian facilities                              | Chainage |        | Side | Remarks                                                                                |
|-------|----------------------------------------------------|----------|--------|------|----------------------------------------------------------------------------------------|
|       |                                                    | From     | To     |      |                                                                                        |
|       | vi. Central Reserve                                |          |        |      |                                                                                        |
| 2     | Footpath paving including fixing of Tactile pavers | 94+160   | 96+770 | BHS  | Footpath cum drain of minimum width 1.5 m Paver Block of 80 mm thick shall be provided |
| 3     | Pedestrian Crossing With Zebra Marking             | 94+160   | 96+770 | BHS  | At Intersections                                                                       |

**8. Highway Lighting (Clause No. 12.5 IRC: SP:84-2019 & 87-2019 as required)**

The street light poles shall be 1 piece, continuous-tapered, Octagonal poles and shall be manufactured from one length of steel sheet, formed in continuous tapered tube, with one continuous arc-welded vertical seam. The minimum wall thickness for lighting poles shall not be less than 4 mm. The Bottom Diameter shall be minimum 175 mm. The Top Diameter shall be minimum 75 mm. The door on window of pole shall be antitheft. All electrical cable should be concealed. All electrical lighting fixers shall be LED. The fixtures shall be concealed except on poles. Lighting poles shall be fixed on outer side of steel/concrete barrier. The lighting shall be providing at the following locations:

| S.No. | Lighting facilities                                                                                                                     | Chainage |    | Side | Lighting Source:<br>Electricity Board/<br>Generator/ Solar |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|----|------|------------------------------------------------------------|
|       |                                                                                                                                         | From     | To |      |                                                            |
|       | <del>Toll Plaza area: The lighting in and around toll plaza, toll booths, office building, on the approach road, etc. shall be as</del> |          |    |      |                                                            |

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| S.No. | Lighting facilities                                                                                                                                                                                                                                                                                                                                                                        | Chainage |    | Side | Lighting Source:<br>Electricity Board/<br>Generator/ Solar |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|------|------------------------------------------------------------|
|       |                                                                                                                                                                                                                                                                                                                                                                                            | From     | To |      |                                                            |
|       | <del>per Section 12 of the Manual. In addition to at least two high mast light shall be provided on either side of toll plaza</del>                                                                                                                                                                                                                                                        |          |    |      |                                                            |
|       | <del><b>Rest Areas:</b> The entire Rest areas shall be provided with lighting with average illumination to 40 Lux</del>                                                                                                                                                                                                                                                                    |          |    |      |                                                            |
|       | <del><b>Truck lay bye:</b> The entire area of truck lay byes and 50m length of the project highway on its either side shall be illuminated at night to provide an average illumination of 40Lux. Suitable designed electric poles having aesthetic appeal and energy saving bulbs (LED) may be used to provide required illumination. Alternatively, photo voltaic lamps may be used</del> |          |    |      |                                                            |
|       | <del><b>Bus Bay &amp; bus shelter locations:</b> The entire bus bay &amp; bus shelter area shall be provided with Lighting (Average illumination of 40Lux.).</del>                                                                                                                                                                                                                         |          |    |      |                                                            |

| S.No. | Lighting facilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Chainage |        | Side                | Lighting Source:<br>Electricity Board/<br>Generator/ Solar                                                                                                                             |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | From     | To     |                     |                                                                                                                                                                                        |
| 5     | <b>Grade separated structures, interchanges, flyovers, underpasses (vehicular/ pedestrian) and Vehicle overpasses:</b> Lighting requirement shall be as per section 12 of the manual. The top and underside of the grade separated structures including service road/ slip road, interchange area at the ground level up to 50m beyond the point from where flaring of the main carriageway takes place shall be provided with lighting. Also, on all legs of at grade interchange/ crossings the lighting shall be provided 50m beyond the point of Centre on all legs. The minimum illumination shall be 40 Lux., at the extreme edge of the Highway | 94+160   | 96+770 | BHS<br>(as per TCS) | Electricity Board and highway light has to be installed as per TCS enclosed in Schedule B in median , approach of the VUP and on the extreme edge of the ROW beside drain cum footpath |
|       | <del>Built-up sections on the project highway both in the median of main carriageway and on the service roads on both sides</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |        |                     |                                                                                                                                                                                        |
|       | <del>On Median Openings provide 1 nos. high mast lighting of 25m height</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |        |                     |                                                                                                                                                                                        |
|       | <del>On Major Bridges and its approaches higher than 3m</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |        |                     |                                                                                                                                                                                        |

## 9. Rainwater Harvesting

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The provision of rainwater harvesting shall be provided at every 500m staggered in the entire project length and shall be executed as per requirement of IRC SP: 42-2014 and IRC SP: 50-2013. Additionally, wherever urban drains are provided, which do not have a definite outfall for discharge of water, at such location one pit for rain water harvesting shall be provided along the side drains at the lowest point/ where the water stagnates. The type and location of rain water harvesting is as follows:

| S.No. | Rain water Harvesting Type                      | Chainage                | Side | Depth of Recharge Structure       |
|-------|-------------------------------------------------|-------------------------|------|-----------------------------------|
| 1     | Type 1 confirming to clause 10.7.2 of IRC SP 42 |                         |      |                                   |
| 2     | Type 2 confirming to clause 10.7.3 of IRC SP 42 |                         |      |                                   |
| 3     | Type 3 confirming to clause 10.7.4 of IRC SP 42 |                         |      |                                   |
| 4     | Type 4 confirming to clause 10.7.5 of IRC SP 42 | As per site requirement | BHS  | Depending upon ground water table |

#### **10. Environmental Management Plan**

The Contractor shall implement the Environmental Management plan & action Plan for undertaking possible mitigation measures in accordance with environmental clearance accorded by Ministry of Environment and Forests and climate change. The conditions & directions stipulated by the MOEF shall be complied by the contractor/ concessionaire.

#### **11. Land Scaping and Tree Plantation (Section 11 of IRC SP 84 2019)**

The Contractor shall plant trees and shrubs of required numbers and types at the appropriate locations within Right of Way and in the land earmarked by the Authority for afforestation as per Schedule D at the following areas.

1. Median Plantation as per space availability at the site.

#### **12. Advanced Traffic Management System (ATMS)**

~~The Contractor is required to design, install, operate and maintain Advanced Traffic Management System (ATMS) as part of the project facilities. Advanced Traffic Management System shall be provided as per standards and specifications specified in the manual and as per NHAI circular .....~~and shall be maintained throughout the contract period.

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The ATMS components to be deployed shall inter alia include:

**13. Highway Patrol Units (Clause No. 12.10 IRC: SP:84-2019 & 87-2019 as required)**

~~Highway Patrol units shall be established and operate at toll plaza location as per Schedule-D Clause 12.10 (strictly as per details mentioned in Annexure-C), which shall continuously patrol the highway in a stretch not exceeding 50 km (if the stretch is more than 50 km additional 1 number of patrol vehicle per 50 km or less shall be provided). The vehicle shall be brand new with fuel, driver, and insurance all inclusive for the entire contract period. Highway Patrol units shall be fitted with GPS and GSM based vehicle tracker system. Highway Patrol Vehicles shall be stationed on layby constructed on Project Highway @ every 20 km of each Toll Plaza.~~

**14. Emergency medical services (Clause No. 12.11 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

~~The Contractor shall, at its own cost, construct a medical aid post at each toll plaza with a minimum size of 5 x 5 sq.m with a toilet (to be used for the patients of minimum size of 3 x3 sq.m) and hand it over to the Authority, no later than 30 (thirty) days prior to PCOD/COD. The Medical Aid Post(s) shall be deemed to be part of the project and shall vest in the Authority. Medical Aid Post shall be set up at Administrative Block with round the clock services for victims of accidents on the Project Highway.~~

~~One number Ambulance shall be provided in a stretch not exceeding 50 km (if the stretch is more than 50 km additional 1 number of ambulances per 50 km or less shall be provided). The Ambulance shall be brand new with fuel, driver, medical staff and insurance all inclusive for the entire contract period. Ambulance fitted with GPS and GSM based vehicle tracker system shall be provided to be integrated with the Video Incident Detection System with ATMS, as per Schedule-D, Clause 12.11 (strictly as per details mentioned in Annexure-D), along with all necessary manpower (including paramedical staff), medicines, equipment's etc. and shall be maintained in an effective manner throughout the contract period starting from the appointed date. Ambulance shall be stationed on layby constructed on Project Highway @ every 20 km of each Toll Plaza~~

**15. Crane Service: (Clause No. 12.12 IRC: SP:84-2019 & 87-2019 as required/ IRC: SP:87-2019)**

~~Crane Service shall be provided on project highway, as specified in the manual Clause 12.12. One number crane shall be provided in a stretch not exceeding 50 km (if the stretch is more than 50 km additional 1 number of crane per 50 km or less shall be provided). Crane having capacity of minimum 20T shall be~~

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~~made available. The crane shall be brand new with fuel, driver, and insurance all inclusive for the entire contract period. Cranes shall be stationed on layby constructed on Project Highway @ every 20 km of each Toll Plaza.~~

## 16. Highway Mast

Nil

**Note:** The Lighting work includes power supply cabling from source to project, independent transformer and standby generator, designed to capacity; in consultation with Authorities and Engineers. All the charges for electricity connection and monthly recurring charges of operation of lightning during maintenance /DLP period shall be paid and borne by the contractor as its obligation.

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## **SCHEDULE – D**

**(See Clause 2.1)**

### **SPECIFICATIONS AND STANDARDS**

**1. Construction**

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the VUPs, slip roads and the service roads along the Project Highway.

**2. Design Standards**

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (Second Revision) published by the Indian Roads Congress – IRC: SP: 84-2019 & 87-2019 as required.

**Annex – I**  
**(Schedule-D)**

**Specifications and Standards for Construction of Two-Laning**

**1 Specifications and Standards**

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (Second Revision) published by the Indian Roads Congress – IRC: SP: 84-2019 & 87-2019 as required with all amendments and additions till date (referred to as “Manuals” in this Schedule) and MORTH Specifications for Road and Bridge Works (5<sup>th</sup> revision). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority’s Engineer.

**2 Deviations from the Specifications and Standards**

2.1 The term “Concessionaire”, “Independent Engineer” and “Concession Agreement” used in the Manuals shall be deemed to be substituted by the term “Contractor”, “Authority’s Engineer” and “Agreement” respectively.

Notwithstanding anything to the contrary contained in the aforesaid Manual, the following specifications and standards shall apply to the four-lane project highway, and for purposes of this agreement, the aforesaid manual shall be deemed to be amended to the extent set forth below:

| Sr. No. | Manuals                                | Clause No. | Details of Item                                           | Description of Deviation                                                                                       |
|---------|----------------------------------------|------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1       | IRC: SP: 84-2019 & 87-2019 as required | 2.10       | Lateral & Vertical clearance at Grade Separated Structure | The Lateral & Vertical clearance of all at Grade Separated Structure and VUP shall be as given in Schedule - B |
| 2       | IRC: SP: 84-2019 & 87-2019 as required | 2.17       | Typical Cross Section                                     | The typical cross - section shall be as given in Schedule - B                                                  |
| 3       | IRC: SP: 84-2019 & 87-2019 as required | 7.3        | Overall width of structures                               | The Overall Deck Configuration of all structures shall be as per Schedule B.                                   |

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### Schedule-H

(See Clauses 10.1.4 and 19.3)

#### Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs .... Crore

1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:

| Item                                                           | Weightage in % of CP | Stage for Payment                                                                | Percentage Weightage |
|----------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------|----------------------|
| (1)                                                            | (2)                  | (3)                                                                              | (4)                  |
| Road Works including Culverts, widening and repair of culverts | 57.33%               | <b>A- Widening and strengthening of existing service /slip road</b>              |                      |
|                                                                |                      | (1) Earthwork up to top of the sub- grade                                        | 0.00%                |
|                                                                |                      | (2) Earthwork in Shoulders                                                       | 0.00%                |
|                                                                |                      | (3) Sub-base Course                                                              | 0.00%                |
|                                                                |                      | (4) Non-bituminous Base course                                                   | 0.00%                |
|                                                                |                      | (5) Bituminous Base course                                                       | 0.00%                |
|                                                                |                      | (6) Wearing Coat                                                                 | 0.00%                |
|                                                                |                      | (7) Widening and repair of culverts                                              | 0.00%                |
|                                                                |                      | <b>B.1- Reconstruction/New 4/6-Lane Realignment / Bypass (Flexible Pavement)</b> |                      |
|                                                                |                      | (1) Earthwork up to top of the sub- grade                                        | 13.5 %               |
|                                                                |                      | (2) Earthwork in Shoulders                                                       | 0.00%                |
|                                                                |                      | (3) Sub-base Course                                                              | 2.19 %               |
|                                                                |                      | (4) Non-bituminous Base course                                                   | 2.75 %               |
|                                                                |                      | (5) Bituminous Base course                                                       | 7.74 %               |
|                                                                |                      | (6) Wearing Coat                                                                 | 3.52 %               |
|                                                                |                      | <b>B.2- Reconstruction/New 4-Lane Realignment / Bypass (Rigid Pavement)</b>      |                      |
|                                                                |                      | (1) Earthwork up to top of the sub- grade                                        | 0.00%                |
|                                                                |                      | (2) Earthwork in Shoulders                                                       | 0.00%                |

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|  |                                                                                                                                    |               |
|--|------------------------------------------------------------------------------------------------------------------------------------|---------------|
|  | (3) Sub-base Course                                                                                                                | 0.00%         |
|  | (4) Dry Lean Concrete (DLC) Course                                                                                                 | 0.00%         |
|  | (5) Pavement Quality Control (PQC) Course                                                                                          | 0.00%         |
|  | <b>C.1- Reconstruction/ New Service Road / Slip Road (Flexible Pavement)</b>                                                       |               |
|  | (1) Earthwork up to top of the sub- grade                                                                                          | 36.91%        |
|  | (2) Earthwork in Shoulders                                                                                                         | 0.00%         |
|  | (3) Sub-base Course                                                                                                                | 8.06 %        |
|  | (4) Non-bituminous Base course                                                                                                     | 8.65%         |
|  | (5) Bituminous Base course                                                                                                         | 12.32 %       |
|  | (6) Wearing Coat                                                                                                                   | 7.05 %        |
|  | <b>C.2- Reconstruction/New Service road (Rigid Pavement)</b>                                                                       |               |
|  | (1) Earthwork up to top of the sub- grade                                                                                          | 0.00%         |
|  | (2) Sub-base Course                                                                                                                | 0.00%         |
|  | (3) Dry Lean Concrete (DLC) Course                                                                                                 | 0.00%         |
|  | (4) Pavement Quality Control (PQC) Course                                                                                          | 0.00%         |
|  | <b>D- Widening of Culverts on existing road, realignments, bypasses<br/>Culverts (length &lt;6m)</b>                               | <b>0.74%</b>  |
|  | <b>E - Dismantling of flexible pavements &amp; existing structures and<br/>Rebate towards salvage value of dismantled material</b> | <b>-3.43%</b> |

|                                                        |               |                                                                                                                                  |       |
|--------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Minor bridge /<br/>Underpasses /<br/>Overpasses</b> | <b>22.56%</b> | <b>A.1- Widening and repairs of Minor Bridges (length&gt;6m &amp; &lt;60m)</b>                                                   |       |
|                                                        |               | Minor Bridges                                                                                                                    | 0.00% |
|                                                        |               | <b>A.2- Widening Minor bridges (length &gt;6 m and &lt; 60 m)</b>                                                                |       |
|                                                        |               | (1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.          | 4%    |
|                                                        |               | (2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap including wing/ return/ retaining wall upto top | 2%    |
|                                                        |               | (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings                  | 3%    |

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|  |                                                                                                                                                                                                                                             |       |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  | (4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use                                                         | 2%    |
|  | (5) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects                                                                                                                    | 0%    |
|  | (6) Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.                                                                          | 1%    |
|  | <b>B.1- Widening and repairs of underpasses / overpasses</b>                                                                                                                                                                                |       |
|  | Underpasses / Overpasses                                                                                                                                                                                                                    | 0.00% |
|  | <b>B.2- New Underpasses / Overpasses</b>                                                                                                                                                                                                    |       |
|  | (1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.                                                                                                                     | 4%    |
|  | (2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap including wing/ return/ retaining wall upto top                                                                                                            | 7%    |
|  | (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings.                                                                                                                            | 5%    |
|  | (4) On completion of Retaining / Reinforced earth walls, complete in all respect and fit for use                                                                                                                                            | 39%   |
|  | (5) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, stone pitching, protection works, road signs & markings, tests on completion in all respect.                         | 31%   |
|  | (6) Wearing Coat<br>(a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified | 2%    |

|                                                                                                                |              |                                                                                                                  |       |
|----------------------------------------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------|-------|
| <b>Major Bridge (length&gt;60 m) works and ROB/RUB/elevated sections / flyovers including viaducts, if any</b> | <b>0.00%</b> | <b>A.1- Widening and repairs of Major Bridges</b>                                                                |       |
|                                                                                                                |              | (1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.   | 0.00% |
|                                                                                                                |              | (2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap                                 | 0.00% |
|                                                                                                                |              | (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings. | 0.00% |
|                                                                                                                |              | (4) Wearing Coat including expansion joints                                                                      | 0.00% |
|                                                                                                                |              | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                       | 0.00% |
|                                                                                                                |              | (6) Wing walls/return walls upto top                                                                             | 0.00% |
|                                                                                                                |              | (7) Guide bunds, River Training works etc.                                                                       | 0.00% |
|                                                                                                                |              | (8) Approaches (including Retaining walls, stone pitching and protection works)                                  | 0.00% |
|                                                                                                                |              | <b>A.2- New Major Bridges</b>                                                                                    |       |
|                                                                                                                |              | (1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.   | 0.00% |
|                                                                                                                |              | (2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap                                 | 0.00% |
|                                                                                                                |              | (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings. | 0.00% |
|                                                                                                                |              | (4) Wearing Coat including expansion joints                                                                      | 0.00% |
|                                                                                                                |              | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                       | 0.00% |
|                                                                                                                |              | (6) Wing walls/return walls upto top                                                                             | 0.00% |
|                                                                                                                |              | (7) Guide bunds, River Training works etc.                                                                       | 0.00% |
|                                                                                                                |              | (8) Approaches (including Retaining walls, stone pitching and protection works)                                  | 0.00% |
|                                                                                                                |              | <b>B.1- Widening and repairs of</b><br><b>(a) ROB</b><br><b>(b) RUB</b>                                          |       |
|                                                                                                                |              | (1) Foundations                                                                                                  | 0.00% |
|                                                                                                                |              | (2) Sub-Structure                                                                                                | 0.00% |

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|  |                                                                                                                                                                                                                                            |       |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  | (3) Super-Structure (Including bearings)                                                                                                                                                                                                   | 0.00% |
|  | (4) Wearing Coat<br>(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified | 0.00% |
|  | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                                                                                                                                                 | 0.00% |
|  | (6) Wing walls/Return walls                                                                                                                                                                                                                | 0.00% |
|  | (7) Retaining / Reinforced earth walls                                                                                                                                                                                                     | 0.00% |
|  | (8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)                                                                        | 0.00% |

|  |                                                                                                                                                                                                                                           |       |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  | <b>B.2- New ROB/RUB</b>                                                                                                                                                                                                                   |       |
|  | (1) Foundations                                                                                                                                                                                                                           | 0.00% |
|  | (2) Sub-Structure                                                                                                                                                                                                                         | 0.00% |
|  | (3) Super-Structure (Including bearings)                                                                                                                                                                                                  | 0.00% |
|  | (4) Wearing Coat<br>(a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified | 0.00% |
|  | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                                                                                                                                                | 0.00% |
|  | (6) Wing walls/Return walls                                                                                                                                                                                                               | 0.00% |
|  | (7) Retaining / Reinforced earth walls                                                                                                                                                                                                    | 0.00% |
|  | (8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.)                                                                       | 0.00% |
|  | <b>C.1- Widening and repair of Elevated Section / Flyovers / Grade Separators</b>                                                                                                                                                         |       |
|  | (1) Foundations                                                                                                                                                                                                                           | 0.00% |
|  | (2) Sub-Structure                                                                                                                                                                                                                         | 0.00% |

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|  |  |                                                                                                                                                                     |       |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  |  | (3) Super-Structure (Including bearings)                                                                                                                            | 0.00% |
|  |  | (4) Wearing Coat including expansion joints                                                                                                                         | 0.00% |
|  |  | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                                                                          | 0.00% |
|  |  | (6) Wing walls/Return walls                                                                                                                                         | 0.00% |
|  |  | (7) Retaining / Reinforced earth walls                                                                                                                              | 0.00% |
|  |  | (8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.) | 0.00% |
|  |  | <b>C.2- New Elevated Section / Flyovers / Grade Separators</b>                                                                                                      |       |
|  |  | (1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.                                             | 0.00% |
|  |  | (2) Sub-structure: On completion of abutments, piers upto the abutment / pier cap including wing / return/ retaining wall upto top                                  | 0.00% |
|  |  | (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings.                                                    | 0.00% |
|  |  | (4) Wearing Coat including expansion joints                                                                                                                         | 0.00% |
|  |  | (5) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                                                                          | 0.00% |
|  |  | (6) Wing walls/Return walls                                                                                                                                         | 0.00% |
|  |  | (7) Retaining / Reinforced earth walls                                                                                                                              | 0.00% |
|  |  | (8) Approaches and Other Ancillary Works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.) | 0.00% |

|                    |                |                                                        |       |
|--------------------|----------------|--------------------------------------------------------|-------|
| <b>Other Works</b> | <b>20.11 %</b> |                                                        |       |
|                    |                | (i) Toll Plaza                                         | 0.00% |
|                    |                | (ii) Road side drains                                  |       |
|                    |                | Lined Drain                                            | 38%   |
|                    |                | Unlined Drain                                          | 0.00% |
|                    |                | (iii) Road signs, safety Devices, Road Furnitures etc. | 3%    |
|                    |                | (iv) Road markings & Studs                             | 2%    |
|                    |                | (v) Crash Barrier                                      | 22%   |

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|  |                                                                                                                                 |        |
|--|---------------------------------------------------------------------------------------------------------------------------------|--------|
|  | (vi) Project facilities                                                                                                         | 0.00%  |
|  | a) Bus Bays                                                                                                                     | 0.00%  |
|  | b) Wayside Amenities excluding Slip Roads & but including all internal roads<br>(Service areas including Truck Lay-Byes)        | 0.00%  |
|  | (vii) Utility Shifting                                                                                                          | 11%    |
|  | (viii) Precast divider (Kerb Stone), Median Filling & Drain Side kerb                                                           | 2%     |
|  | (ix) Retaining Wall                                                                                                             | 0.00%  |
|  | (x) Street Lighting                                                                                                             | 10%    |
|  | (xi) Utility Ducts                                                                                                              | 0.00 % |
|  | (xii) Boundary wall                                                                                                             | 0.00%  |
|  | (xiii) ATMS                                                                                                                     | 0.00%  |
|  | (xiv) Rain Water Harvesting                                                                                                     | 0%     |
|  | (xv) Road side Plantation including Horticulture                                                                                | 0.00%  |
|  | (xvi) Protection Works other than approaches to the bridges, elevated sections/ flyover/<br>grade separators and ROBs/ RUBs     | 0.00%  |
|  | (xvii) Safety & Traffic Management during const.                                                                                | 3.5%   |
|  | (xviii) Other miscellaneous works including Connecting road, minor junction, anti<br>glarevane & Junction under Grade separator | 8.5 %  |

1.3 Procedure of estimating the value of work done.

1.3.1 Road works.

Procedure for estimating the value of road work done shall be as stated in table 1.3.1:

**Table 1.3.1**

| Stage of Payment                                                               | Percentage - Weightage | Payment Procedure                                                                                                                                                                       |
|--------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A- Widening and strengthening of existing service /slip road</b>            |                        |                                                                                                                                                                                         |
| (1) Earthwork up to top of the sub- grade                                      | 0.00%                  | Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length. |
| (2) Earthwork in Shoulders                                                     | 0.00%                  |                                                                                                                                                                                         |
| (3) Sub-base Course                                                            | 0.00%                  |                                                                                                                                                                                         |
| (4) Non-bituminous Base course                                                 | 0.00%                  |                                                                                                                                                                                         |
| (5) Bituminous Base course                                                     | 0.00%                  |                                                                                                                                                                                         |
| (6) Wearing Coat                                                               | 0.00%                  |                                                                                                                                                                                         |
| (7) Widening and repair of culverts                                            | 0.00%                  | Cost of completed culverts shall be determined on pro rata basis with respect to the total number of culverts. The payment shall be made on the completion of at least five culverts.   |
| <b>B.1- Reconstruction/New 6-Lane Realignment / Bypass (Flexible Pavement)</b> |                        |                                                                                                                                                                                         |
| (1) Earthwork up to top of the sub- grade                                      | 13.5 %                 | Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1.0 (one) km length, whichever is less.          |
| (2) Earthwork in Shoulders                                                     | 0.00%                  |                                                                                                                                                                                         |
| (3) Sub-base Course                                                            | 2.19 %                 |                                                                                                                                                                                         |
| (4) Non-bituminous Base course                                                 | 2.75 %                 |                                                                                                                                                                                         |
| (5) Bituminous Base course                                                     | 7.74 %                 |                                                                                                                                                                                         |
| (6) Wearing Coat                                                               | 3.52 %                 |                                                                                                                                                                                         |
| (7) Widening and repair of culverts                                            | 13.5 %                 |                                                                                                                                                                                         |
| <b>B.2- Reconstruction / New 8-Lane Realignment / Bypass (Rigid Pavement)</b>  |                        |                                                                                                                                                                                         |
| (1) Earthwork up to top of the sub- grade                                      | 0.00%                  | Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on                                                                                          |

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|                                                                                        |         |                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (2) Earthwork in Shoulders                                                             | 0.00%   | completion of a stage in full length or 1.0 (one) km length, whichever is less.                                                                                                       |
| (3 )Sub-base Course                                                                    | 0.00%   |                                                                                                                                                                                       |
| (4) Dry Lean Concrete (DLC) Course                                                     | 0.00%   |                                                                                                                                                                                       |
| (5) Pavement Quality Control (PQC) Course                                              | 0.00%   |                                                                                                                                                                                       |
| <b>C.1- Widening / Reconstruction/ New Service Road/ Slip Road (Flexible Pavement)</b> |         |                                                                                                                                                                                       |
| (1) Earthwork up to top of the sub- grade                                              | 36.91%  | Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1 (one) km length, whichever is less.          |
| (2) Earthwork in Shoulders                                                             | 0.00%   |                                                                                                                                                                                       |
| (3) Sub-base Course                                                                    | 8.06 %  |                                                                                                                                                                                       |
| (4) Non-bituminous Base course                                                         | 8.65%   |                                                                                                                                                                                       |
| (5) Bituminous Base course                                                             | 12.32 % |                                                                                                                                                                                       |
| (6) Wearing Coat                                                                       | 7.05 %  |                                                                                                                                                                                       |
| <b>C.2- Reconstruction/New Service road (Rigid Pavement)</b>                           |         |                                                                                                                                                                                       |
| (1) Earthwork up to top of the sub- grade                                              | 0.00%   | Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 0.5 (point five) km length, whichever is less. |
| (2) Sub-base Course                                                                    | 0.00%   |                                                                                                                                                                                       |
| (3) Dry Lean Concrete (DLC) Course                                                     | 0.00%   |                                                                                                                                                                                       |
| (4) Pavement Quality Control (PQC) Course                                              | 0.00%   |                                                                                                                                                                                       |

|                                                                                                                                |               |                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>D- Widening of Culverts on on existing road, realignments, bypasses.</b>                                                    |               |                                                                                                                                                                                       |
| (1) Culverts (length < 6m)                                                                                                     | <b>0.74%</b>  | Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least three culverts.          |
| <b>E - Dismantling of flexible pavements &amp; existing structures and Rebate towards salvage value of dismantled material</b> | <b>-3.43%</b> | <b>Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1.0 (one) km length, whichever is less.</b> |

@ For calculation of payment stage for main-carriageway the project length shall converted into equivalent 2 lane length. For example, if the total length of 4 lane main carriageway is 100 km, then the equivalent length for calculation of payment stage will be 2 x 100 km. Now, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

---

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where P = Contract Price

L = Total equivalent 2-Lane length in km as defined above

Similarly, the rates per km for other stages shall be worked out accordingly.

**Note: The length affected due to law and order problems or litigation during execution including the length not handed over to the Contractor under clause 8.3 of this Contract Agreement due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement**

#### 1.3.2 Minor Bridges and Underpasses/ Overpasses.

Procedure for estimating the value of Minor Bridges and Underpasses/ Overpasses shall be as stated in table 1.3.2:

**Table 1.3.2**

| Stage of Payment                                                                                                                                                                    | Percentage - Weightage | Payment Procedure                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A.1 - Widening and repair of Minor Bridges (length > 6m and < 60m)                                                                                                                  | 0%                     | Cost of each Minor Bridge shall be determined on pro-rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge.                                                                                                                                                                                                        |
| A.2- Widening and repair of Minor Bridges (length>6m & <60m)<br>(1) Foundation: On completion of foundation work including foundations for wing and return walls, abutments, piers. | 4%                     | Foundation: Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment foundation shall be made on basis on completion of a stage not less than 25% of the scope of foundation of each bridge.<br><br>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. |

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| (2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap including wing/ return/ retaining wall upto top                                   | 2%    | Sub-structure: Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges.<br>Payment against sub- structure shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of each bridge.                                                                                                                                                                                       |
| (3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings                                                    | 3%    | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub- clause.<br>In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above |
| (4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use                    | 2%    | Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.                                                                                                                                                                                                                                                                                                           |
| (5) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects                                           | 0%    | Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified                                                                                                                                                                                                                                                                                                              |
| (6) Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect. | 1%    | Other Ancillary Works: Payment shall be made on pro- rata basis on completion of a stage in all respects as specified                                                                                                                                                                                                                                                                                                                                                                                    |
| B.1- Widening and repairs of underpasses / overpasses                                                                                                              | 0.00% | Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening & repair works of a underpass / overpass.                                                                                                                                                                                                                                                              |

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| <p><b>B.2- New Underpasses/Overpasses</b></p> <p>(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.</p>                                                   | <p>4%</p>  | <p><b>Foundation: Cost of each Underpass/ Overpass shall be determined on pro-rata basis with respect to the total linear length (m) of the underpass / overpass. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of each Underpass / Overpass.</b></p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>                         |
| <p>(2) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap including wing/ return/ retaining wall upto top</p>                                                                                        | <p>7%</p>  | <p><b>Sub-structure: Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/ Overpasses. Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of each Underpass / Overpass.</b></p>                                                                                                                                                        |
| <p>(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings</p>                                                                                                         | <p>5%</p>  | <p><b>Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above</b></p> |
| <p>(4) On completion of Retaining / Reinforced earth walls complete in all respect and fit for use</p>                                                                                                                         | <p>39%</p> | <p><b>Payments shall be made on pro rata basis on completion of 20% of the total area.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>(5) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs &amp; markings, stone pitching, protection works, tests on completion in all respect.</p> | <p>31%</p> | <p><b>Payment shall be made on pro-rata basis on completion of a stage in all respects as specified</b></p>                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <b>Wearing Coat</b><br>(a) in case of Overpass-<br>wearing coat including expansion<br>joints complete in all respects as<br>specified and<br>(b) in case of underpass rigid<br>pavement including drainage facility<br>complete in all respects as specified | 2% |  |
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### 1.3.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of Major Bridge works, ROB/RUB and Structures shall be as stated in table 1.3.3:

**Table 1.3.3**

| Stage of Payment                                                                                               | Percentage Weightage | Payment Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A.1- Widening and repairs of Major Bridges</b>                                                              |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (i) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers. | 0.00%                | Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the Major Bridge subject to completion of at least two foundations of the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. |
| (ii) Sub-Structure: On completion of abutments, piers upto the abutments / pier cap                            | 0.00%                | Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/ piers up to abutment/ pier cap level of the Major Bridge.                                                                                                                                                                                                        |

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| (iii) Super-Structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings   | 0.00% | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above |
| (iv) Wearing Coat including expansion joints                                                                        | 0.00% | Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.                                                                                                                                                                                                                                                                                                                              |
| (v) Miscellaneous Items like hand rails, crash barriers, road markings etc.                                         | 0.00% | Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                         |
| (vi) Wing walls/ return walls upto top                                                                              | 0.00% | Wing walls/ return walls: Payment shall be made on completion of all wing walls/ return walls complete in all respects as specified.                                                                                                                                                                                                                                                                                                                             |
| (vii) Guide Bunds, River Training works etc.                                                                        | 0.00% | Guide Bunds, River Training works: Payment shall be made on completion of all guide bunds/ river training works etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                                      |
| (viii) Approaches (including Retaining walls, stone pitching and protection works)                                  | 0.00% | Approaches: Payment shall be made on pro-rata basis on completion of of a stage i.e. not less than 25% of the scope of sub-structure of a major bridge.                                                                                                                                                                                                                                                                                                          |
| <b>A.2- New Major Bridges</b>                                                                                       |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (i) Foundation: On with completion of the foundation work including foundations for return walls, abutments, piers. | 0.00% | Foundation: Cost of each Major Bridge shall be determined on pro rata basis respect to the total linear length of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge.<br>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.                           |
| (ii) Sub-structure: On completion of abutments, piers upto the abutment/ pier cap                                   | 0.00% | Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of substructure of major bridge.                                                                                                                                                                                                                                                                                       |

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| (iii) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings | 0.00% | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified.<br><br>In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above |
| (iv) Wearing Coat including expansion joints                                                                      | 0.00% | Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.                                                                                                                                                                                                                                                                                                                                     |
| (v) Miscellaneous Items like hand rails, crash barrier, road markings etc.                                        | 0.00% | Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                               |
| (vi) Wing walls/ return walls upto top                                                                            | 0.00% | Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.                                                                                                                                                                                                                                                                                                                                     |
| (vii) Guide bunds, River Training works etc.                                                                      | 0.00% | Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                                             |
| (viii) Approaches (including Retaining walls, stone pitching and protection works)                                | 0.00% | Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>B.1- Widening and repairs of</b>                                                                               |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (a) ROB                                                                                                           |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (b) RUB                                                                                                           |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| (i) Foundation                                                                                                    | 0.00% | Foundation: Cost of each ROB/ RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/ RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/ RUB subject to completion of at least two foundations of the ROB/ RUB.                                                                                                          |

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|                                                                                                                                                 |       | In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.                                                                                                                                                                                                                                                                                                                                |
| (ii) Sub-Structure                                                                                                                              | 0.00% | Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/ RUB subject to completion of at least two sub-structures of abutments/ piers up to abutment/ pier cap level of the ROB/ RUB.                                                                                                                                                                 |
| (iii) Super-Structure<br>(including bearings)                                                                                                   | 0.00% | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified.<br>In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above |
| (iv) Wearing Coat including expansion joints in case of ROB. In case of RUB- rigid pavement under RUB including drainage facility as specified. | 0.00% | Wearing Coat: Payment shall be made on completion of<br>(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.                                                                                                                                                                                    |
| (v) Miscellaneous Items like hand rails, crash barriers, road markings etc.                                                                     | 0.00% | Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                            |
| (vi) Wing walls/ return walls                                                                                                                   | 0.00% | Wing walls/ return walls: Payment shall be made on completion of all wing walls/ return walls complete in all respects as specified.                                                                                                                                                                                                                                                                                                                                |
| (vii) On completion of retaining / reinforced earth walls complete in all respect and fit for use                                               | 0.00% | Payments shall be made on pro-rata basis on completion of 20% of the total area                                                                                                                                                                                                                                                                                                                                                                                     |
| (viii) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs &          | 0.00% | Payments shall be made on pro-rata basis on completion of a stage in all respects as specified.                                                                                                                                                                                                                                                                                                                                                                     |

|                                                                                                                                                        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| markings, stone pitching, protection works, tests on completion in all respect.                                                                        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>B.2- New</b>                                                                                                                                        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>(a) ROB</b>                                                                                                                                         |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>(b) RUB</b>                                                                                                                                         |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>(i) Foundation</b>                                                                                                                                  | <b>0.00%</b> | <p><b>Foundation:</b> Cost of each ROB/ RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/ RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/ RUB subject to completion of at least two foundations of the ROB/ RUB.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p> |
| <b>(ii) Sub-Structure</b>                                                                                                                              | <b>0.00%</b> | <p><b>Sub-Structure:</b> Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/ RUB subject to completion of at least two sub-structures of abutments/ piers up to abutment/ pier cap level of the ROB/ RUB.</p>                                                                                                                                                                                                        |
| <b>(iii) Super-Structure (including bearings)</b>                                                                                                      | <b>0.00%</b> | <p><b>Super-structure:</b> Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified.</p> <p>In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above</p>                                    |
| <b>(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB- rigid pavement under RUB including drainage facility as specified.</b> | <b>0.00%</b> | <p><b>Wearing Coat:</b> Payment shall be made on completion of</p> <p>(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and</p> <p>(b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.</p>                                                                                                                                                                                                                   |

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| (v) Miscellaneous Items like hand rails, crash barriers, road markings etc.                                                                                                                                            | 0.00% | Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified. |
| (vi) Wing walls/ return walls                                                                                                                                                                                          | 0.00% | Wing walls/ return walls: Payment shall be made on completion of all wing walls/ return walls complete in all respects as specified.                                     |
| (vii) On completion of retaining / reinforced earth walls complete in all respect and fit for use                                                                                                                      | 0.00% | Payments shall be made on pro-rata basis on completion of 20% of the total area                                                                                          |
| (viii) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect. | 0.00% | Payments shall be made on pro-rata basis on completion of a stage in all respects as specified.                                                                          |

**C.1- Widening and repairs of Elevated Section/ Flyovers/ Grade Separators**

|                                                                             |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) Foundation                                                              | 0.00% | Foundation: Cost of each ROB/ RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/ RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/ RUB subject to completion of at least two foundations of the ROB/ RUB.<br><br>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. |
| (ii) Sub-Structure                                                          | 0.00% | Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/ RUB subject to completion of at least two sub-structures of abutments/ piers up to abutment/ pier cap level of the ROB/ RUB.                                                                                                                                                                                                        |
| (iii) Super-structure: On completion of the super-structure in all respects | 0.00% | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified.                                                                                                                                                                                                                                                                                                                 |

|                                                                                                                                                                                                                        |       |                                                                                                                                                                                                                                                                                  |
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| including Girder, Deck slab, bearings                                                                                                                                                                                  |       | In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above            |
| (iv) Wearing Coat including expansion joints                                                                                                                                                                           | 0.00% | Wearing Coat: Payment shall be made on completion of<br>(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified. |
| (v) Miscellaneous Items like hand rails, crash barriers, road markings etc.                                                                                                                                            | 0.00% | Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.                                                                                                         |
| (vi) Wing walls/ return walls                                                                                                                                                                                          | 0.00% | Wing walls/ return walls: Payment shall be made on completion of all wing walls/ return walls complete in all respects as specified.                                                                                                                                             |
| (vii) On completion of retaining / reinforced earth walls complete in all respect and fit for use                                                                                                                      | 0.00% | Payments shall be made on pro-rata basis on completion of 20% of the total area                                                                                                                                                                                                  |
| (viii) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect. | 0.00% | Payments shall be made on pro-rata basis on completion of a stage in all respects as specified.                                                                                                                                                                                  |

**C.2- New Elevated Section/ Flyovers/ Grade Separators**

|                |       |                                                                                                                                                                                                                                                                                                                                                                |
|----------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) Foundation | 0.00% | Foundation: Cost of each ROB/ RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/ RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/ RUB subject to completion of at least two foundations of the ROB/ RUB. |
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|                                                                                                                                                                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|                                                                                                                                                                  |       | In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.                                                                                                                                                                                                                                                                                                                            |
| (ii) Sub-Structure                                                                                                                                               | 0.00% | Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/ RUB subject to completion of at least two sub-structures of abutments/ piers up to abutment/ pier cap level of the ROB/ RUB.                                                                                                                                                             |
| (iii) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings                                                | 0.00% | Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-castgirders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above |
| (iv) Wearing Coat including expansion joints                                                                                                                     | 0.00% | Wearing Coat: Payment shall be made on completion of<br>(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and<br>(b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.                                                                                                                                                                                |
| (v) Miscellaneous Items like hand rails, crash barriers, road markings etc.                                                                                      | 0.00% | Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.                                                                                                                                                                                                                                                                                        |
| (vi) Wing walls/ return walls                                                                                                                                    | 0.00% | Wing walls/ return walls: Payment shall be made on completion of all wing walls/ return walls complete in all respects as specified.                                                                                                                                                                                                                                                                                                                            |
| (vii) On completion of retaining / reinforced earth walls complete in all respect and fit for use                                                                | 0.00% | Payments shall be made on pro-rata basis on completion of 20% of the total area                                                                                                                                                                                                                                                                                                                                                                                 |
| (viii) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, | 0.00% | Payments shall be made on pro-rata basis on completion of a stage in all respects as specified.                                                                                                                                                                                                                                                                                                                                                                 |

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|--------------------------------------------------------------|--|--|
| <b>protection works, tests on completion in all respect.</b> |  |  |
|--------------------------------------------------------------|--|--|

**Note:**

- (1) In case of innovative Major Bridge projects like cable suspension/ cable stayed/ Extra Dozed and exceptionally long span bridges, the schedule.
- (2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of DG (RD) & SS, MoRT&H.

1.3.4 Other Works

Procedure for estimating the value of other works done shall be as stated in table 1.3.4:

**Table 1.3.4**

| Stage of Payment                                                                                                      | Percentage Weightage | Payment Procedure                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) Toll Plaza                                                                                                        | 0.00%                | Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plaza.                         |
| (ii) Road side drains                                                                                                 |                      | Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length. |
| Lined Drain                                                                                                           | 38%                  |                                                                                                                                                                                   |
| Unlined Drain                                                                                                         | 0.00%                |                                                                                                                                                                                   |
| (iii) Road signs, safety Devices, Road Furnitures etc.                                                                | 3%                   |                                                                                                                                                                                   |
| (iv) Road markings & Studs                                                                                            | 2%                   |                                                                                                                                                                                   |
| (v) Crash Barrier                                                                                                     | 22%                  |                                                                                                                                                                                   |
| (vi) Project facilities                                                                                               | 0.00%                |                                                                                                                                                                                   |
| a) Bus Bays                                                                                                           | 0.00%                | Payment shall be made on pro-rata basis for completed facilities.                                                                                                                 |
| b) Wayside Amenities excluding Slip Roads & but including all internal roads (Service areas including Truck Lay-Byes) | 0.00%                |                                                                                                                                                                                   |
| (vii) Utility Shifting                                                                                                | 11%                  |                                                                                                                                                                                   |

*Construction of 6 lane VUP at Km. 94+900 with slip roads on both sides  
on Kaithal to Rajasthan Border of NH-152/65 in the state of Haryana on Engineering, Procurement & Construction (EPC) Mode*

|                                                                                                                                                     |               |                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(viii) Precast divider (Kerb Stone),<br/>Median Filling &amp; Drain Side kerb</b>                                                                | <b>2%</b>     |                                                                                                                                                                                    |
| <b>(ix) RE Wall</b>                                                                                                                                 | <b>0.00%</b>  |                                                                                                                                                                                    |
| <b>(x) Street Lighting</b>                                                                                                                          | <b>10%</b>    | <b>Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.</b> |
| <b>(xi) Utility Ducts</b>                                                                                                                           | <b>0.00 %</b> |                                                                                                                                                                                    |
| <b>(xii) Boundary wall</b>                                                                                                                          | <b>0.00%</b>  |                                                                                                                                                                                    |
| <b>(xiii) ATMS</b>                                                                                                                                  | <b>0.00%</b>  |                                                                                                                                                                                    |
| <b>(xiv) Rain Water Harvesting</b>                                                                                                                  | <b>0%</b>     |                                                                                                                                                                                    |
| <b>(xv) Road side Plantation<br/>including Horticulture in Wayside<br/>Amenities</b>                                                                | <b>0.00%</b>  |                                                                                                                                                                                    |
| <b>(xvi) Protection Works other than<br/>approaches to the bridges, elevated<br/>sections/ flyover/ grade separators<br/>and ROBs/ RUBs</b>         | <b>0.00%</b>  | <b>Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.</b> |
| <b>(xvii) Safety &amp; Traffic Management<br/>during const.</b>                                                                                     | <b>3.5%</b>   | <b>Payment shall be made on pro-rata basis every six months.</b>                                                                                                                   |
| <b>(xviii) Other miscellaneous works<br/>including Connecting road, minor<br/>junction, anti glarevane &amp; Junction<br/>under Grade separator</b> | <b>8.5 %</b>  | <b>Payment should be made on pro rata basis on completion of each stage</b>                                                                                                        |

Procedure for payment for Maintenance

- (a) The cost for maintenance shall be as stated in Clause 14.1 (v).
- (b) Payment for Maintenance shall be made in accordance with the provisions of Article-14 and Article-19.