

**SCHEDULE – A**  
*(See Clauses 2.1 and 8.1)*

**SITE OF THE PROJECT**

**1 The Site**

- (i) Site of the Two-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.
- (ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- (iii) An inventory of the Site including the 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 and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.
- (iv) 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 Annex-III based on site/design requirement.
- (v) The status of the environment clearances obtained or awaited is given in Annex-IV.

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

**1. Site**

- 1.1** The Site of the Two Lane Project Highway comprises the section of National Highway 29 (old NH-150) commencing from existing km 98.380 (near near Chizami) to existing km 120.367 (Kohima – Nagaland/Manipur Border) i.e. Kohima – Manipur Border in the State of Nagaland. The Index Map is appended at the end of this **Schedule–A**.

The land, carriageway and structures comprising the site are described below

**1.2 Chainage References (Existing Vs Design)**

“Existing Chainage” means distance measured along existing roadway/vehicle pathway on the Project Highway. During topography survey, observations are made to these locations and after finalization of alignment by improving the existing geometry the chainage has been referred to “Design Chainage”. The relationship between the “Existing Chainage” and the “Design Chainage” as per field surveys of the location for the “Project Highway” is given below:

<b>S. No.</b>	<b>Existing (km)</b>	<b>Design Chainage</b>
1	99	96307
2	100	97568
3	101	98312
4	102	98405
5	103	99303
6	104	100269
7	105	101258
8	106	103294
9	107	104312
10	108	105314
11	110	107269
12	111	108239
13	112	109244
14	113	110203
15	114	111216
16	115	112081
17	117	114054
18	118	115611
19	119	116047
20	120	116822

**2. Land**

The Site of the Project Highway comprises the land described below:



## 6. Grade Separators

The Site includes the following Grade separators

SI. No.	Chainage (km)	Type of Structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
NIL						

## 7. Minor Bridges

The Site includes the following minor Bridges:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structures			No. of Spans with Span Length (m)	Total Width (m)
			Foundation	Super Structure	Sub-Structure		
1	-	103.638	Open	RCC Girder	RCC	1X17	8.5
2	-	114.338	Open	RCC Girder	RCC	1X15	8.5

## 8. Railway level crossings / Railway Track

The Site includes the following railway level crossings:

Sl. No.	Road Segment	Existing Chainage (km)	Remarks
Nil			

## 9. Underpasses (vehicular, Non Vehicular)

The Site includes the following underpasses:

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

## 10. Culverts

The Site includes 68 Nos. of culverts at the following locations and types:

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
1	98+473	Pipe Arch	1 x 1.0	7.00	Poor Condition
2	98+639	Pipe Arch	1 x 1.0	8.20	Poor Condition
3	98+778	Pipe Arch	1 x 1.0	8.80	Poor Condition
4	98+879	Pipe Arch	1 x 1.0	7.60	Poor Condition
5	99+020	Pipe Arch	1 x 1.0	7.80	Poor Condition
6	99+236	Pipe Arch	1 x 1.0	8.60	Poor Condition
7	99+703	Pipe Arch	1 x 1.0	8.00	Poor Condition
8	99+781	Pipe Arch	1 x 1.0	7.70	Poor Condition
9	100+127	Slab	1 x 2.0	6.50	Poor Condition
10	100+232	Pipe Arch	2 x 1.0	7.60	Poor Condition
11	100+234	Pipe Arch	1 x 1.0	7.06	Poor Condition
12	100+400	Pipe Arch	1 x 1.0	6.25	Poor Condition
13	100+542	Pipe Arch	1 x 1.0	7.10	Poor Condition
14	100+838	Slab	1 x 1.2	6.70	Poor Condition
15	100+885	Pipe Arch	1 x 1.2	7.90	Poor Condition
16	101+256	Pipe Arch	1 x 1.0	6.60	Poor Condition
17	101+386	Pipe Arch	1 x 1.0	7.20	Poor Condition
18	101+639	Pipe Arch	1 x 1.0	7.75	Poor Condition
19	101+837	Pipe Arch	1 x 1.0	7.20	Poor Condition
20	101+942	Pipe Arch	1 x 1.0	7.75	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
21	101+948	Pipe Arch	1 x 1.0	6.40	Poor Condition
22	102+222	Pipe Arch	1 x 1.0	7.20	Poor Condition
23	102+361	Slab	1 x 1.5	6.60	Poor Condition
24	102+439	Slab	1 x 2.5	7.20	Poor Condition
25	102+886	Pipe Arch	1 x 1.0	6.40	Poor Condition
26	103+043	Pipe Arch	1 x 1.0	6.40	Poor Condition
27	103+146	Slab	Under Construction	Under Construction	Under Construction
28	103+760	Pipe Arch	2 x 1.0	7.00	Poor Condition
29	104+094	Slab	1 x 1.0	7.20	Poor Condition
30	104+319	Pipe Arch	1 x 1.0	7.00	Poor Condition
31	104+796	Pipe Arch	1 x 1.0	6.50	Poor Condition
32	105+113	Pipe Arch	1 x 1.0	7.00	Poor Condition
33	105+428	Pipe Arch	1 x 1.0	7.60	Poor Condition
34	105+970	Pipe Arch	1 x 1.0	7.00	Poor Condition
35	106+407	Slab	1 x 2.5	7.00	Poor Condition
36	106+888	Pipe Arch	1 x 1.0	7.50	Poor Condition
37	107+121	Slab	1 x 1.2	6.20	Poor Condition
38	107+354	Pipe Arch	1 x 1.0	7.00	Poor Condition
39	107+608	Pipe Arch	1 x 1.0	8.34	Poor Condition Poor Condition
40	108+057	Pipe Arch	1 x 1.2	6.30	Poor Condition
41	108+349	Pipe Arch	1 x 1.0	7.13	Poor Condition

<b>Sl. No.</b>	<b>Existing Chainage (km)</b>	<b>Type of Structure</b>	<b>Span / Dia. (m)</b>	<b>Width of Structure (m)</b>	<b>Remarks</b>
42	108+759	Slab	1 x 3.0	6.95	Poor Condition
43	108+830	Slab	1 x 1.0	8.00	Poor Condition
44	109+608	Slab	1 x 1.2	7.50	Poor Condition
45	109+661	Pipe Arch	1 x 1.0	7.40	Poor Condition
46	109+959	Pipe Arch	1 x 1.0	7.30	Poor Condition
47	110+069	Pipe Arch	1 x 1.0	6.40	Poor Condition
48	110+665	Pipe Arch	1 x 1.0	7.40	Poor Condition
49	110+971	Slab	1 x 4.0	7.00	Poor Condition
50	111+177	Slab	1 x 1.2	6.95	Poor Condition
51	111+215	Pipe Arch	1 x 1.0	6.72	Poor Condition
52	111+626	Pipe Arch	1 x 1.0	5.95	Poor Condition
53	112+029	Pipe Arch	1 x 1.0	6.00	Poor Condition
54	112+841	Pipe Arch	1 x 1.0	6.00	Poor Condition
55	113+199	Pipe Arch	1 x 1.0	6.40	Poor Condition
56	113+468	Pipe Arch	1 x 1.0	8.00	Poor Condition
57	114+221	Pipe Arch	1 x 1.0	7.60	Poor Condition
58	114+768	Pipe Arch	1 x 1.0	7.60	Poor Condition
59	114+943	Pipe Arch	1 x 1.0	7.60	Poor Condition
60	115+398	Pipe Arch	1 x 1.0	7.60	Poor Condition
61	115+636	Pipe Arch	1 x 1.0	6.00	Poor Condition
62	116+117	Pipe Arch	1 x 1.0	6.50	Poor Condition
63	116+649	Pipe Arch	1.000	7.00	Poor Condition

Sl. No.	Existing Chainage (km)	Type of Structure	Span / Dia. (m)	Width of Structure (m)	Remarks
64	116+712	Pipe	1 x 1.2	6.50	Poor Condition
65	118+028	Pipe Arch	1 x 1.0	6.50	Poor Condition
66	118+298	Pipe Arch	1 x 1.0	7.00	Poor Condition
67	119+715	Slab	1 x 1.0	6.20	Poor Condition
68	119+723	Slab	1 x 1.0	8.20	Poor Condition

#### 11. Bus Shelters

The details of bus shelters on the Site are as follows:

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

#### 12. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

Sl. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

#### 13. Road side drains.

The details of the road side drains on the Site are as follows:

Sl. No.	Existing Location		Side	Type	
	From (km)	To (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
NIL					

#### 14. Major Junctions

The details of major junctions are as follows:

Sl. No.	Location		At Grade	Separated	Category of Cross Roads					
	Existing km	Design km			NH	SH	MDR	Others		
NIL										

(NH: National Highway, SH: State Highway, MDR: Major District Road)



## 15. Minor Junctions

The details of minor junctions are as follows:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Type	
			'T' Junction	Cross Road both sides
1	100.20	99+998	T	Phek Village
2	106.1	105+500	T	Phek Town Losami
3	120.51	119+400	T	Phek Town

## 16. Bypasses

The details of bypass are as follows:

Sl. No.	Name of Proposed Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width m)	Type
NIL							

## 17. Other Structures/Details

The details of other structures are as follows:

Sl. No.	Type	Existing Chainage (km)	Length (m)	Width
Nil				

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

**Details 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:

Sl. No	Design Chainage		Length (Km)	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To			
1	95+700	117+200	21+500	20m - 24 m	90% working front of project highway shall be provided on appointed date .

**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:

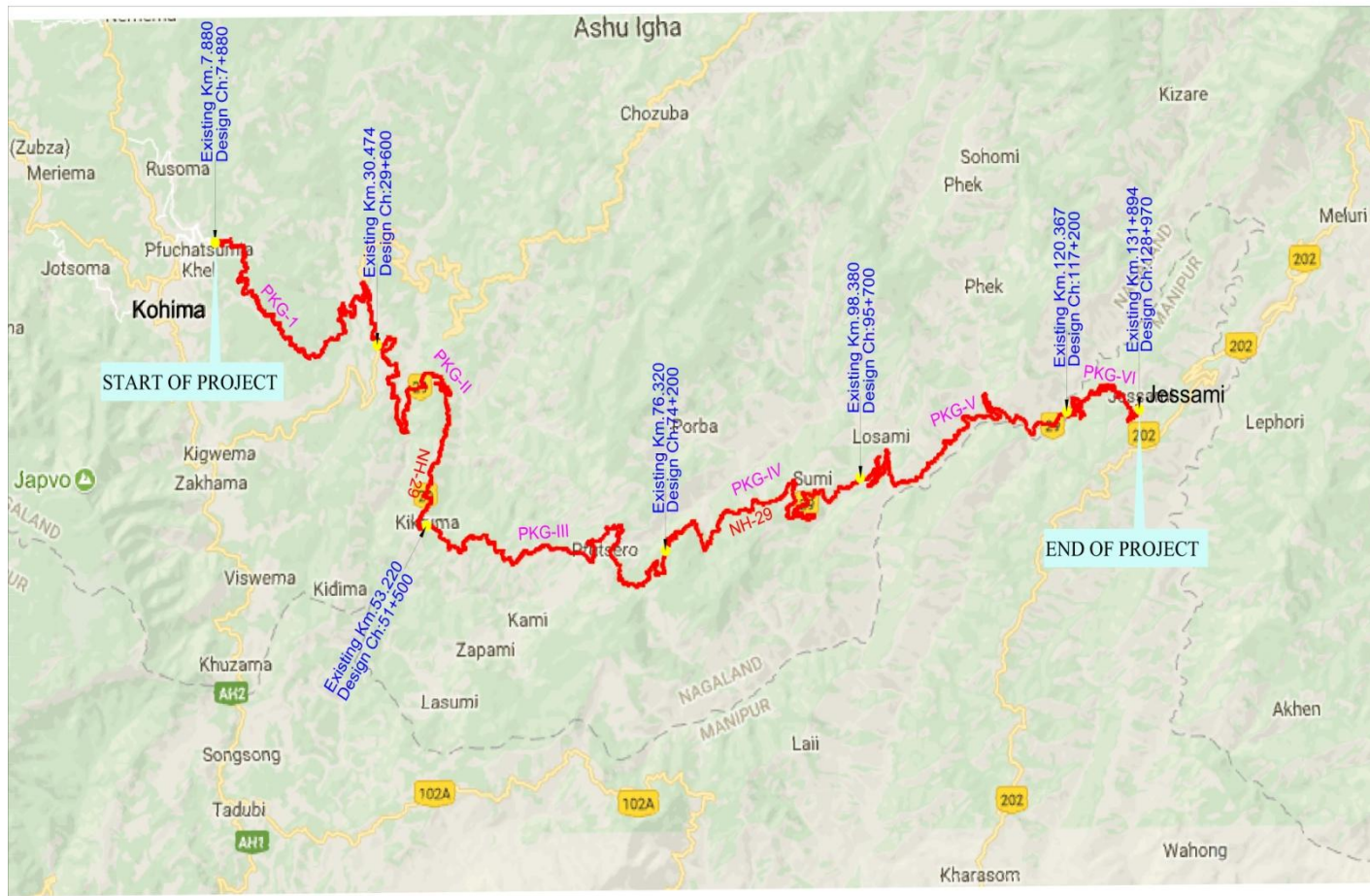
- (i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.
- (ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

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

**Environmental Clearances**

Not applicable

## INDEX MAP OF PROJECT HIGHWAY SECTION



**SCHEDULE – B**  
*(See Clause 2.1)*

**DEVELOPMENT OF THE PROJECT HIGHWAY**

**1      Development of the Project Highway**

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

**2      Rehabilitation and augmentation**

Rehabilitation and augmentation shall include Two-Laning and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in 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 Two Laning**

The particulars specified in this Schedule – B are listed below as per the requirements of the Manual of Specifications and Standards for Two Laning of Highways (IRC SP:73-2018); referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements are specified in this Schedule or Schedule D.

**1.0 SCOPE OF THE PROJECT**

**1.1 GENERAL**

The following sections of this schedule briefly highlight the scope of the work of the 'Project'. The descriptions of the requirements for the various elements of the Project Highway given here in under are the bare minimum requirements for the 'Project'.

In the planning, design and execution of the works and other works in connection with the repair, maintenance or improvement of the Project Highway and functions associated with the construction of the Project Highway and roadside facilities, the Construction Contractor shall take all such actions and do all such things (including, but not limiting to, organizing itself, adopting measures and standards, executing procedures, including inspection procedures and highway patrol, and engaging and managing agents and employees) as will;

- a. enable the NHIDCL to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);
- b. enable the NHIDCL to fulfill its statutory and common law obligations;
- c. enable the NHIDCL to provide a congestion free uninterrupted flow of traffic on the Project Highway;
- d. enable the NHIDCL to provide a level of highway service to the public not inferior to that provided on the trunk road during construction or improvement works;
- e. enable the police, local authorities, and others with statutory duties or functions in relation to the Project Highway or adjoining roads to fulfill those duties and functions;
- f. minimize the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;
- g. minimize the risk of damage, destruction or disturbance to third party property;
- h. ensure that members of the public are treated with all due courtesy and consideration;
- i. provide a safe, clear and informative system of road signs;

- j. comply with any specified programme requirements, including for the completion of the new road;
- k. enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Highway to be achieved throughout the Contract Period;
- l. ensure adequate off-street parking facilities for both passenger and goods vehicles;
- m. provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection;
- n. achieve a high standard in the appearance and aesthetic quality of the Project Highway and achieve integration of the Project Highway with the character of the surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the existing road;
- o. Undertake proper safety audit through an appropriate consultant (i.e. apart from the Authority Engineer)
- p. Carry out accident recording and reporting (to NHIDCL) by type on regular basis; and
- q. Ensure adequate safety of the Project Workers on the work site.

## **2.0 GEOMETRIC DESIGN AND GENERAL FEATURES**

### **2.1.1 General**

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual.

### **2.1.2 WIDENING OF THE EXISTING HIGHWAY**

Notwithstanding the basic alignment plans enclosed with this document the Construction Contractor shall himself carryout and be responsible for engineering surveys, investigation and detailed engineering designs and prepare the working drawings for all the components relevant for the improvement and up-gradation of the Project Highway to fulfill the scope of the project as envisaged herein under. These shall comply with design specifications and standards given in **Schedule-D**. The designs for different project facilities shall follow the locations and indicative designs given in **Schedule-C** and shall comply with design specifications and standards outlined in **Schedule-D**. All the designs and drawings shall be reviewed by the Authority Engineer prior to execution.

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for [plain/rolling] terrain to the extent land is available.

### **2.1.3 Improvement of the existing road geometries**



The hilly gradients shall be corrected in such a way so as to attain a limiting gradient of 6% in order to achieve longitudinal drainage. Also vertical curves shall be improved / introduced so that the vertical curves meet IRC: SP-73 - 2018 standards.

The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule-D**.

In the following 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 proper road signs and safety measures shall be provided:

**Locations where design speed is between 30 to 40 KMPH**

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
95722.7	60	30	Left	1.2
95820.71	40	30	Right	1.5
95878.82	40	30	Right	1.5
96032.34	70	30	Left	0.9
96089.35	35	30	Left	1.5
96123.81	300	50	Left	0.6
96211.06	35	30	Right	1.5
96263.09	35	30	Right	1.5
96391.31	100	40	Right	0.9
96471.32	100	35	Left	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
96589.84	78	30	Left	0.9
96834.44	50	30	Left	1.2
96945.24	80	40	Right	0.9
96997.54	40	30	Right	1.5
97179.39	40	30	Right	1.5
97388.22	30	30	Right	1.5
97683.45	35	30	Right	1.5
97873.38	50	30	Left	1.2
98225.4	30	30	Left	1.5
98363.98	100	35	Left	0.9
98476.83	80	30	Right	0.9
98640.71	35	30	Right	1.5
98711.85	35	30	Left	1.5
99037.11	80	30	Right	0.9
99099.67	45	30	Left	1.2

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
99167.33	60	30	Right	1.2
99280.27	50	30	Right	1.2
99359.7	40	30	Left	1.5
99430.8	60	30	Right	1.2
99550.11	50	30	Right	1.2
99658.35	100	35	Right	0.9
99905.33	70	30	Left	0.9
100029.2	70	40	Left	0.9
100177.2	35	30	Right	1.5
100227.5	50	30	Left	1.2
100439.2	30	30	Right	1.5
100568	100	35	Right	0.9
100725.9	30	30	Right	1.5
101087	60	30	Right	1.2
101254.9	60	30	Left	1.2

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
101333.8	70	30	Left	0.9
101543.6	50	30	Left	1.2
101607.3	80	30	Right	0.9
101705.6	40	30	Left	1.5
101776.7	100	40	Right	0.9
101963	40	30	Left	1.5
102102.4	40	30	Right	1.5
102232.8	45	30	Right	1.2
102420.9	40	30	Right	1.5
102519.4	60	30	Left	1.2
102657.3	80	30	Left	0.9
102853.5	40	30	Left	1.5
102893.7	70	30	Right	0.9
102948.9	30	30	Right	1.5
103061.6	30	30	Right	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
103173.5	80	30	Left	0.9
103287.1	50	30	Right	1.2
103352.2	70	30	Right	0.9
103454.5	80	30	Right	0.9
103494.2	90	35	Left	0.9
103606.3	40	30	Left	1.5
103824.4	30	30	Left	1.5
103956.1	40	30	Left	1.5
104083.9	60	30	Right	1.2
104132.8	50	30	Left	1.2
104433.8	50	30	Left	1.2
104841.2	50	30	Left	1.2
104938.1	30	30	Right	1.5
105010.3	45	30	Left	1.2
105110.2	120	35	Left	0.6

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
105291.6	45	35	Left	1.2
105384.8	40	30	Right	1.5
105490.7	130	40	Left	0.6
105582.2	90	35	Left	0.9
105669.3	50	30	Right	1.2
105753.4	80	30	Left	0.9
105852.9	50	30	Left	1.2
106019.9	50	30	Left	1.2
106158.5	40	30	Right	1.5
106220.4	30	30	Left	1.5
106310.4	46	30	Right	1.2
106433.9	45	30	Left	1.2
106612	120	35	Right	0.6
106682.9	50	30	Left	1.2
106731.4	50	30	Right	1.2

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
106904.8	45	30	Right	1.2
107071.8	60	30	Left	1.2
107239.2	40	30	Right	1.5
107361.8	50	30	Right	1.2
107508.2	85	30	Right	0.9
107641.5	80	30	Left	0.9
107800.3	50	30	Left	1.2
108477.9	40	30	Right	1.5
108792.8	90	35	Left	0.9
109021.3	40	30	Right	1.5
109130.8	80	30	Right	0.9
109204.9	50	30	Right	1.2
109270.8	50	30	Left	1.2
109355.9	50	30	Left	1.2
109419.5	140	40	Right	0.6

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
109520.6	100	35	Left	0.9
109580.1	50	30	Right	1.2
109697.8	50	30	Right	1.2
109911	45	30	Left	1.2
109986.9	40	30	Left	1.5
110119.6	50	30	Right	1.2
110188.7	32	30	Left	1.5
110356.3	35	30	Left	1.5
110404.3	80	30	Right	0.9
110517.5	70	30	Left	0.9
110588.6	70	30	Right	0.9
110686.5	100	35	Right	0.9
110743.2	40	30	Left	1.5
110811.1	60	30	Right	1.2
110874.1	45	30	Left	1.2



<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
110933.3	40	30	Right	1.5
110995	40	30	Right	1.5
111173.9	40	30	Right	1.5
111297.5	150	40	Right	0.6
111346.5	45	30	Left	1.2
111451.8	50	30	Right	1.2
111664.6	35	30	Right	1.5
111806.6	40	30	Left	1.5
111876.2	40	30	Right	1.5
111952	40	30	Left	1.5
112076.2	60	30	Right	1.2
112124.1	150	40	Right	0.6
112292	60	30	Left	1.2
112408.4	40	30	Left	1.5
112475.9	40	30	Left	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
112667.3	50	30	Right	1.2
112721.6	30	30	Left	1.5
112888.5	60	30	Left	1.2
112954.8	40	30	Right	1.5
113041.8	70	30	Right	0.9
113107.5	40	30	Left	1.5
113172.4	30	30	Left	1.5
113226.6	60	30	Right	1.2
113300.1	30	30	Right	1.5
113351.1	30	30	Left	1.5
113407.1	30	30	Left	1.5
113889.5	30	30	Right	1.5
114110.2	70	30	Right	0.9
114182.3	90	35	Left	0.9
114250.4	50	30	Right	1.2

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
114298.8	100	35	Left	0.9
114359.8	100	35	Right	0.9
114464.2	70	30	Right	0.9
114834.5	70	30	Left	0.9
114952.9	55	30	Left	1.2
115092	30	30	Left	1.5
115165.4	50	30	Left	1.2
115212.4	50	30	Left	1.2
115327.9	80	30	Right	0.9
115390.1	70	30	Right	0.9
115527.4	40	30	Left	1.5
115578.6	35	30	Right	1.5
115642.6	50	30	Left	1.2
115742.4	80	40	Right	0.9
115833.3	90	35	Left	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
115951.1	100	35	Left	0.9
116238.6	60	30	Left	1.2
116313.4	40	30	Left	1.5
116386.4	40	30	Right	1.5
116480.2	30	30	Left	1.5
116616.4	60	30	Left	1.2
116697.4	100	35	Left	0.9
116756.8	60	30	Right	1.2
116794.3	90	35	Left	0.9
116838.5	40	30	Right	1.5
116927.7	90	40	Right	0.9
117024.9	70	30	Right	0.9
117106.9	70	30	Right	0.9
117167.2	40	30	Left	1.5

**Locations where design speed is less than 30 KMPH**

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
97316.8115	15	20	Right	1.5
97562.094	15	20	Left	1.5
98897.2365	28	20	Left	1.5
100347.196	15	20	Right	1.5
100483.8005	20	20	Left	1.5
100776.9635	25	20	Left	1.5
100903.2825	15	20	Right	1.5
103010.3235	20	20	Left	1.5
103741.0535	15	20	Right	1.5
104221.9155	20	20	Right	1.5
104690.97	28	25	Right	1.5
106087.994	15	20	Right	1.5
107422.0325	20	20	Left	1.5
113522.5955	20	20	Left	1.5

113804.238	20	20	Right	1.5
113930.8105	20	20	Left	1.5
116533.671	20	20	Left	1.5

## 2.2 Design speed

The design speed shall be as per IRC 73: 2018 however in exceptional cases the minimum design speed of [30 km per hour for hilly and mountainous terrain and 20 km per hour for hair pin bend locations]. The Location of Hair Pin Bends have been shown in Plan & Profile Drawings.

## 2.3 Proposed Right of Way

Details of the Right of way are given in Annex-II of Schedule A.

Contractor has to design and construct the road, if required by provision of retaining walls and/or breast walls/slope stabilization/protection measures within the Right of Way given above and provision of the same shall not constitute a change of scope.

## 2.4 Type of Shoulders

- a) In built-up sections, footpaths/fully paved shoulders shall be provided in accordance with para 2.10 of Annexure I of Schedule B above.
- b) In open country, Hard Shoulder shall be provided with cementitious base as shown in typical cross-section given in para 2.10 of Annex-I of Schedule B.
- (c) Earthen shoulder shall be covered with 150 mm thick compacted layer of granular material as shown in typical cross-section given in para 2.10 of Annex-I of Schedule B.

## 2.5 Width of Carriageway/Roadway width

- 2.5.1 Two-Laning with hard shoulders shall be undertaken. The carriageway shall be [7(seven) m] wide and hard shoulder in accordance with the typical cross sections drawings in the Manual.
- 2.5.2 Except as otherwise provided in this Agreement, the width of the hard shoulder carriageway and cross-sectional features shall conform to Section 2 of the manual.

## 2.6 Lateral and vertical clearances at underpasses

Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.10 of the Manual.

## 2.6.2 Lateral Clearance:

The width of the opening at the underpasses shall be as follows:

Sl. No.	Location [Chainage (km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

## 2.7 Lateral and vertical clearances at overpasses

2.7.2 Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the Manual.

2.7.3 *Lateral clearance:* The width of the opening at the overpasses shall be as follows:

SI No.	Location [Chainage(km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

## 2.8 Service roads

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

Sl. No.	Location of Service Road (km)		Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (km) of Service Road
	From	To		
Nil				

## 2.9 Grade Separated Structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below:

Sl. No.	Location of Structure	Length (m)	Number and Length of Spans (m)	Approach Gradient	Remarks, if any
Nil					

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

SI No.	Location	Type of Structure/Length (m)	Cross Road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

## 2.9.3 Cattle and pedestrian underpass / Overpass

Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to paragraph 2.14.3 of the Manual and specify the requirements of cattle and

pedestrian underpass/overpass.

Sl. No.	Location	Type of Crossing
	Nil	

## 2.10 Typical cross-sections of the Project Highway

2 lanes Section: Cross-section has been developed on the basis of IRC:SP:-73: 2018. 7 / 7.5 m carriageway having lane width of 3.5m has been provided. The hard shoulder width of 0.9 m on both sides is provided. The earthen shoulder of 1m on valley side has been provided at locations where normal embankments slope are provided. Drain has been provided on hill side and parapet wall/ W- beam crash barrier are provided on valley side along with retaining wall

The cross section schedule shall be as follows:

Chaiange		Length	Description	TCS
From	To			
95700	97180	1480	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
97180	97230	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
97230	99400	2170	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
99400	99610	210	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
99610	100000	390	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
100000	100070	70	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
100070	100110	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
100110	100190	80	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
100190	100650	460	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3



Chaiange		Length	Description	TCS
From	To			
100650	100690	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
100690	100912	222	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
100912	100929	17	Typical cross section of Minor Bridge Retained	6
100929	101050	122	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
101050	101210	160	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
101210	102430	1220	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
102430	102980	550	Typical Cross Section of 2- lane Widening in Built-up area	4
102980	103770	790	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
103770	103820	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
103820	107810	3990	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
107810	107850	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
107850	109100	1250	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
109100	109140	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
109140	109580	440	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3

Chaiange		Length	Description	TCS
From	To			
109580	109620	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
109620	109860	240	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
109860	109950	90	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
109950	110580	630	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
110580	110670	90	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
110670	111562	892	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
111562	111577	15	Typical cross section of Minor Bridge Retained	6
111577	112320	744	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
112320	112360	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
112360	112640	280	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
112640	112730	90	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
112730	112970	240	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
112970	113060	90	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
113060	113110	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3

Chaiange		Length	Description	TCS
From	To			
113110	113160	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
113160	113610	450	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
113610	113650	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
113650	113930	280	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
113930	113990	60	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
113990	114210	220	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
114210	114280	70	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
114280	114320	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
114320	114360	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
114360	114410	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
114410	114460	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
114460	114630	170	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
114630	114690	60	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2

Chaiange		Length	Description	TCS
From	To			
114690	114950	260	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
114950	115010	60	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
115010	115770	760	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
115770	115810	40	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
115810	115990	180	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
115990	116060	70	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
116060	116110	50	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
116110	116270	160	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
116270	116330	60	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
116330	116730	400	Typical Cross Section of 2- lane Widening in Built-up area	4
116730	116970	240	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3
116970	117033	63	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas with breast wall on hill side and retaining wall on valley side.	2
117033	117103	71	Typical cross section of Minor Bridge Retained	6
117103	117200	97	Typical Cross Section in Reconstruction of 2 lane with hardshoulder in rural areas	3

Note: The extent of cross section type is indicative and shall be reviewed in

consultation with the Authority Engineer at the time of construction as per the site condition. Type I Cross section consist of two variants as I (a) without retaining wall on valley side and 1(b) with retaining wall on valley side as detailed in figure B1 & B2 respectively. The locations please refer designed cross section @ 50 m interval detailed in Annexure III of Schedule A.

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross section in consultation with the Authority Engineer at the time of construction.

## 2.11 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road level as indicated in the plan and profile drawings for this purpose in FFSR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with NHIDCL.

## 2.12 Built-Up Areas

The alignment passes through Built up areas as tabulated below.

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Name of Village/town
	From	To	From	To	
1	105.13	105.68	102.43	102.98	Losami
2	119.24	119.88	116.33	116.73	Losami

## 3.0 INTERSECTIONS AND GRADE SEPARATORS

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

There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category VRs. The Construction Contractor has to construct the following:

- Typical junction treatments as specified in Final Project Report shall be applied. Design types of intersections are as given below:

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

### (a) At-grade Intersections

#### (i) Major Intersections

Sl. No.	Location of Intersection	Intersection Towards	Existing Configurations				Type of Intersection	Figure No.	Other Features
			Location	Type	Width (m)	Surface			
NIL									

Details of junction improvement shall be as per IRC: SP:73-2018

#### (ii) Minor Intersections

S. No.	Existing (km)	Design Chainage	Type	Leads Towards
--------	---------------	-----------------	------	---------------

1	101.600	98+925	T	Village Road
2	105.587	102+864	Y	Road towards Phake Town (Losami)
3	106.832	104+130	Y	Village Road
4	119.307	116+386	Y	Road towards Phek Town
5	119.390	116+468	Y	Village Road
6	120.000	116+855	Y	Village Road

Details of junction improvements shall be as per IRC SP: 73-2018.

#### (b) Grade Separated Intersections with/without Ramps

SI No.	Location (km)	Salient Features	Minimum Length of Viaduct to be Provided (m)	Road to be Carried Over/Under the Structures
Nil				

### 4.0 ROAD EMBANKMENT AND CUT SECTION

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

4.2 Raising of the existing road

The existing road shall be raised in the following sections:

SI No.	Section (km)		Length (km)	Extent of Raising*	Remarks
	From	To			
Nil					

### 5.0 PAVEMENT DESIGN

5.1 Pavement design shall be carried out in accordance with section 5 of the Manual.

#### 5.2 Type of pavement

Flexible pavement shall be adopted for Project Highway. Notwithstanding anything contrary contained in this Agreement or the Manual, the pavement shall be designed as given below.

#### 5.3 Design requirements

Design requirement for the flexible pavement shall be in accordance with IRC: 37-2018. Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic of 5 million standard axles BC & DBM and 20 million standard axles for granular base and sub-base courses. VG 40

grade of bitumen shall be used for BC and DBM layers. However, in no case the pavement thickness shall be less than as given below;

<b>Pavement Composition</b>	<b>Pavement Type</b>	<b>Thickness (mm)</b>
BC	Flexible pavement with granular base and sub-base layers (Non Cementitious)	30
DBM		50
WMM		250
GSB		200

#### **5.4 Reconstruction of stretches/ Realignment/ Bypass of Sections**

5.4.1 Total Project Road shall be considered as full reconstruction as per IRC-37-2018 and Manual & Specifications.

##### **5.4.3 Rigid Pavement**

No rigid pavement has been considered for the Project Highway.

#### **6.0 ROAD SIDE DRAINAGE**

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual.

The longitudinal drain shall be provided as given below;

- (i) Catch Water Drain – 20.550 m
- (ii) Open Drain – 20.550 m
- (iii) Covered Drain – 0.950 m

Note: Above length of the Catch Water Drain/Open Drain/Covered Drain is indicative and minimum specified. The actual length of the Catch Water Drain/Open Drain/Covered Drain shall be determined by the Contractor in accordance with the IRC:SP:73 requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

#### **7.0 DESIGN OF STRUCTURES**

##### **7.1 General**

7.1.1 The Project road from Chezami to Nagaland/Manipur Border from Km.95+700 to Km.117+200 (design chainages), includes provision of **104 box culverts**. All culverts and other structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein. New culverts shall be constructed wide enough to accommodate the adjacent road cross section as given in this Schedule-B. The details of existing culverts are given in Schedule-A.

7.1.2 Width of the carriageway of new bridges and Structures shall be as per Clause 7.3 of the Manual.

7.1.3 All bridges shall be high-level bridges.

7.1.4 The following structures shall be designed to carry utility services specified in the table below:

Sl. No.	Bridge at Km	Utility service to be carried	Remarks
NIL			

7.1.5 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross sections given in the section 7 of the Manual.

## 7.2 Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches.

### 7.2.2 Reconstruction of existing culverts

The existing culverts at the following locations shall be re-constructed as new culverts:

These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Size (m)	Proposal
1	98+473	95+817	1x2x1.5	RCC Box
2	98+639	95+978	1x2x1.5	RCC Box
3	98+778	96+115	1x2x1.5	RCC Box
4	98+879	96+202	1x2x1.5	RCC Box
5	99+020	96+342	1x2x1.5	RCC Box
6	99+236	96+559	1x2x1.5	RCC Box
7	99+703	97+041	1x2x1.5	RCC Box
8	99+781	97+200	1x2x1.5	RCC Box
9	100+127	97+433	1x2x1.5	RCC Box
10	100+232	97+554	1x2x1.5	RCC Box
11	100+400	97+730	1x2x1.5	RCC Box
12	100+542	97+870	1x2x1.5	RCC Box
13	100+838	98+165	1x2x1.5	RCC Box
14	100+885	98+212	1x2x1.5	RCC Box
15	101+256	98+582	1x2x1.5	RCC Box
16	101+386	98+710	1x2x1.5	RCC Box
17	101+639	99+026	1x2x1.5	RCC Box



18	101+837	99+163	1x2x1.5	RCC Box
19	101+948	99+271	1x2x1.5	RCC Box
20	102+222	99+543	1x2x1.5	RCC Box
21	102+361	99+662	1x2x1.5	RCC Box
22	102+439	99+740	1x2x1.5	RCC Box
23	102+886	100+178	1x2x1.5	RCC Box
24	103+043	100+335	1x2x1.5	RCC Box
25	103+760	101+043	1x4x1.5	RCC Box
26	104+094	101+377	1x2x1.5	RCC Box
27	104+319	101+602	1x2x1.5	RCC Box
28	104+796	102+090	1x2x1.5	RCC Box
29	105+113	102+420	1x2x1.5	RCC Box
30	105+428	102+715	1x2x1.5	RCC Box
31	105+970	103+282	1x2x1.5	RCC Box
32	106+407	103+735	1x2x1.5	RCC Box
33	106+888	104+218	1x2x1.5	RCC Box
34	107+121	104+452	1x2x1.5	RCC Box
35	107+354	104+688	1x2x1.5	RCC Box
36	107+608	104+944	1x2x1.5	RCC Box
37	108+057	105+389	1x2x1.5	RCC Box
38	108+349	105+687	1x2x1.5	RCC Box
39	108+759	106+090	1x2x1.5	RCC Box
40	108+830	106+161	1x2x1.5	RCC Box
41	109+608	106+917	1x2x1.5	RCC Box
42	109+959	107+246	1x2x1.5	RCC Box
43	110+069	107+357	1x2x1.5	RCC Box
44	110+665	107+945	1x2x1.5	RCC Box
45	110+971	108+250	1x2x1.5	RCC Box
46	111+177	108+438	1x2x1.5	RCC Box
47	111+215	108+476	1x2x1.5	RCC Box
48	111+626	108+892	1x2x1.5	RCC Box
49	112+029	109+300	1x2x1.5	RCC Box
50	112+841	110+078	1x2x1.5	RCC Box
51	113+199	110+422	1x2x1.5	RCC Box
52	113+468	110+717	1x2x1.5	RCC Box
53	114+221	111+445	1x2x1.5	RCC Box
54	114+768	111+884	1x2x1.5	RCC Box
55	114+943	112+030	1x2x1.5	RCC Box
56	115+398	112+510	1x2x1.5	RCC Box
57	115+636	112+753	1x2x1.5	RCC Box
58	116+117	113+237	1x2x1.5	RCC Box

59	116+649	113+748	1x2x1.5	RCC Box
60	116+712	113+810	1x2x1.5	RCC Box
61	118+028	115+114	1x2x1.5	RCC Box
62	118+298	115+380	1x2x1.5	RCC Box
63	119+715	116+557	1x2x1.5	RCC Box
64	119+723	116+565	1x2x1.5	RCC Box

\* All box culverts (excluding the box culverts in cushion) shall be provided with approach slabs on both sides. Moreover upstream and downstream protection works, including chute drains connecting stream with the culvert, catch pits; baffle piers/blocks etc. shall be provided which must be ascertained as per the site conditions and details given in drawings of culvert.

**7.2.3 Additional new culverts shall be constructed as per particulars given in the table below:**

#### **CULVERT DETAILS**

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Size (m)
1	-	100+680	Box	1x2x1.5
2	-	101+500	Box	1x2x1.5
3	-	101+704	Box	1x2x1.5
4	-	102+248	Box	1x2x1.5
5	-	102+530	Box	1x2x1.5
6	-	102+992	Box	1x2x1.5
7	-	103+195	Box	1x2x1.5
8	-	103+580	Box	1x2x1.5
9	-	103+951	Box	1x2x1.5
10	-	104+549	Box	1x2x1.5
11	-	104+842	Box	1x2x1.5
12	-	105+290	Box	1x2x1.5
13	-	105+900	Box	1x2x1.5
14	-	106+350	Box	1x2x1.5
15	-	106+781	Box	1x2x1.5
16	-	107+810	Box	1x2x1.5
17	-	108+673	Box	1x2x1.5
18	-	109+071	Box	1x2x1.5
19	-	109+464	Box	1x2x1.5
20	-	109+764	Box	1x2x1.5
21	-	109+915	Box	1x2x1.5
22	-	110+170	Box	1x2x1.5
23	-	110+853	Box	1x2x1.5
24	-	111+052	Box	1x2x1.5
25	-	111+310	Box	1x2x1.5
26	-	111+715	Box	1x2x1.5
27	-	112+280	Box	1x2x1.5
28	-	112+921	Box	1x2x1.5

29	-	113+421	Box	1x2x1.5
30	-	113+521	Box	1x2x1.5
31	-	114+021	Box	1x2x1.5
32	-	114+321	Box	1x2x1.5
33	-	114+580	Box	1x2x1.5
34	-	114+763	Box	1x2x1.5
35	-	114+969	Box	1x2x1.5
36	-	115+590	Box	1x2x1.5
37	-	115+860	Box	1x2x1.5
38	-	116+108	Box	1x2x1.5
39	-	116+900	Box	1x2x1.5

\* Existing chainages of proposed culverts along the realignment section have been left blank.

#### **Widening of Culverts:**

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
1	103+146	100+438	Under construction	

#### **Culverts Under-Construction:**

Sl.No.	Existing Chainage (km)	Design Chainage (km)	Proposed Span (m)	Proposal
NIL				

7.2.4 Repairs/replacements of railing/parapets, flooring and protection. works of the existing culverts shall be undertaken as follows:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Proposed Span
NIL				

7.2.5 Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

### **7.3 Bridges**

#### **7.3.1 The existing bridges to be reconstructed/widened**

- (i) The existing bridges at the following locations shall be reconstructed as new structures (Minor Bridge)

SI No.	Existing Chainage (KM)	Design Chainage (KM)	Proposed Span(m)	Proposed Width(m)	Remarks
NIL					

7.3.2 The following structures shall be provided with footpaths:

Sl. No.	Location (km)	Remarks
NIL		

### 7.3.3 Additional New Minor Bridges

New minor bridges at the following locations on the project highways shall be constructed in Package as per manual

Sr. No.	Designed Chainage (km)	River/ Nallah Name	Proposed Span Arrangement (m)
NIL			

### 7.3.4 Additional new Major bridges

Sl. No.	Location Designed (km)	Total Length (m)	Remarks
NIL			

7.3.5 The railings of existing bridges shall be replaced by crash barriers at the following locations:

Sl. No.	Location (km)	Remarks
Nil		

7.3.6 Repairs/replacements of railings/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location (km)	Remarks
Nil		

### 7.3.7 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual

### 7.3.8 Structures in marine environment

Not Applicable

## 7.4 Rail-road Bridges

- 7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual. [Refer to paragraph 8.19 of the Manual and specify modification, if any]

#### 7.4.2 Road over-bridges

Road over-bridges (road over rail) shall be provided at the following level crossings, as per GAD drawings attached:

Sl No.	Location of Level Crossing (km)	Length of Bridge (m)
Nil		

#### 7.4.3 Road under-bridges

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

Sl No.	Location of Level Crossing (km)	Number and Length of Span (m)
Nil		

#### 7.5 Grade Separated Structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 and 3 of this Annex-I.

#### 7.6 Underpasses/Overpasses

There is no Underpass/Overpass proposed on the Project Highway.

#### 7.7 Repairs and strengthening of bridges and structures

The existing bridges and structures to be repaired /strengthened, and the nature and extent of repairs/strengthening required are given below:

##### A. Bridges

Sl. No	Bridge Location (km)	Salient Details of Existing Bridges					Adequacy or Otherwise of the Existing Waterway, Vertical Clearance etc.	Remarks
		Span Arrangement (m)	Carriageway Width (m)	Total Width (m)	Type of Superstructure	Type of Foundation		

1	100+920	1X17	8.5	8.5	RCC Girder	Open		Existing Retained with Repairing & Maintenance
2	111+569	1X15	8.5	8.5	RCC Girder	Open		Existing Retained with Repairing & Maintenance
3	117+068	1X70.5	8.5	8.5	PSC Box Girder	Open		Existing Retained with Repairing & Maintenance

#### B. ROB / RUB

SI No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

#### C. Overpasses / Underpasses and Other Structures

SI No.	Location of Bridge (km)	Nature and Extent of Repairs/Strengthening to be Carried out
Nil		

### 7.8 List of Major Bridges and Structures

The following is the list of Major Bridges on Package

SI No.	Location Design (km)	Total Length (m)	Remarks
1	117+068	70.50	Major Bridge

## 8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

8.1 Traffic control devices and road safety works shall be provided in accordance

with Section 9 of the Manual.

- 8.2 Specifications of the reflective sheeting: shall be provided in accordance with IRC:SP:73-2018
- 8.3 The minimum quantity of Traffic signages and pavement marking are tabulated here for Package

Sr.No.	CAUTIONARY WARNING SIGNS	Numbers
1	One way Object Hazard Marker (OHM)	154
2	Stop Sign (R1-1)	
3	Give way Sign (R1-2)	
4	Series of Bands (W-42)	59
5	Left Curve (W-19L)	16
6	Right Curve (W-19R)	16
7	over Head Cables (W-27)	42
8	Left Hairpin Band (W-33L)	3
9	Right Hairpin Band (W-33R)	3
10	School Ahead (W-41)	
11	Side Road Right (W-43)	
12	Side Road Left(W-44)	
13	T-Intersection (W-52)	
14	Y-Intersection (W-60L)	
15	Pedestrian Crossing (W-28)	
Sr.No.	SPEED LIMIT & VEHICLE CONTROL SIGN	Numbers
12	Speed Limit Signs (R4-5B)	4
Sr.No.	ROUTE MARKER SIGN	Numbers
1	National Highway Route Sign (I8-1)	2
Sr.No.	DIRECTION & PLACE IDENTIFICATION SIGNS	Numbers
1	SP- 19(A)	
2	IA- 1A	
3	I1-3	10
4	SP- 19(C)	
	<b>TOTAL</b>	<b>309</b>

## 9. ROAD SIDE FURNITURE

- 9.1 Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual IRC: SP: 73-2018.
- 9.2 Overhead traffic signs: location and size

The overhead signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. The retro reflected sheets of Engineering Grade and high intensity grade (ordinary) shall not be used. The height, lateral clearance, location and installation shall be as per relevant clauses of MoRTH specifications. Overhead sign shall be installed ahead of major intersections and urban areas as per detailed design requirements. The minimum number of overhead signs shall be 03 (01 No. of



gantry and 02 No. of Cantilever) as per this manual.

## 10. COMPULSORY AFFORESTATION

Minimum 3644 no. of trees are required to be planted by the contractor as compensatory afforestation in accordance with IRC:SP:73 keeping in view IRC:SP:21-2009. Any increase in no. of trees shall not be treated as change of scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

## 11. HAZARDOUS LOCATIONS

- i) Metal Beam crash barrier length of minimum 18610 (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides. Heavy duty metal beam crash barriers shall be provided on this project by the Construction Contractor at the locations finalized in consultation with NHIDCL. Typical details of metal crash barrier are given in as per manual.

The safety barriers shall also be provided at the following hazardous locations:

### W-Beam crash Barrier-

Sr. No.	Start Ch.	End Ch.	Length(m)
1	95700	97180	1480
2	97230	99400	2170
3	99610	100000	390
4	100070	100110	40
5	100190	100650	460
6	100690	100912	222
7	100912	100929	17
8	100929	101050	122
9	101210	102430	1220
10	102980	103770	790
11	103820	107810	3990
12	107850	109100	1250
13	109140	109580	440
14	109620	109860	240
15	109950	110580	630
16	110670	111562	892
17	111562	111577	15
18	111577	112320	744
19	112360	112640	280
20	112730	112970	240
21	113060	113110	50
22	113160	113610	450
23	113650	113930	280

Sr. No.	Start Ch.	End Ch.	Length(m)
24	113990	114210	220
25	114280	114320	40
26	114360	114410	50
27	114460	114630	170
28	114690	114950	260
29	115010	115770	760
30	115810	115990	180
31	116060	116110	50
32	116270	116330	60
33	116730	116970	240
34	117033	117103	71
35	117103	117200	97

**Parapet location-**

Sr. No.	Start Ch.	End Ch.	Length(m)
1	97180	97230	50
2	99400	99610	210
3	100000	100070	70
4	100110	100190	80
5	100650	100690	40
6	101050	101210	160
7	102430	102980	550
8	103770	103820	50
9	107810	107850	40
10	109100	109140	40
11	109580	109620	40
12	109860	109950	90
13	110580	110670	90
14	112320	112360	40
15	112640	112730	90
16	112970	113060	90
17	113110	113160	50
18	113610	113650	40
19	113930	113990	60
20	114210	114280	70
21	114320	114360	40
22	114410	114460	50
23	114630	114690	60
24	114950	115010	60
25	115770	115810	40
26	115990	116060	70
27	116110	116270	160
28	116330	116730	400
29	116970	117033	63

The safety barriers, protective works shall also be provided at the hazardous location/lengths.

## 12. SPECIAL REQUIREMENT FOR HILL ROADS

In accordance with section 13 of the manual (from IRC: SP: 73-2018), IRC: SP-1998 and Recommended practices for Treatment of Embankment and Roadside slopes for Erosion control (First Revision), IRC: 56-2011 and relevant IRC codes.

### 12.1 Slope Protection

As the project involves cutting of existing hill slopes, it is imperative that slopes are stabilized for ensuring longevity of the slope and the road. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC: SP: 48-1998. Reference may be drawn from IRC: 56-2011.

(i) The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	Unit	Quantity
Parapet Wall	Rm	2476
Breast wall with Stone/PCC/RCC	Rm	15450
RCC Retaining Wall (with application of Geo – synthetic)	Rm	2060
RE Wall with Geo – synthetic	Sqm	nil
Geo Synthetic Mat for Erosion Control, Soil Nailing & Fencing lengths	Sqm	nil
Seeding and Mulching with Polymer Net	Sqm	82200
Hydroseeding	Sqm	51375
Covered Drain	Rm	950
Chute for Culvert		At Every Culvert Location
Soil Nailing Slope protection	Sqm	20550

**Note-** *The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.*

**Any increase in quantity over and above the tentative qty. as mentioned in above table or through change in specifications will not be considered as change of scope. Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.**

### 12.2 ROAD LAND BOUNDARY (Clause 12.2 IRC SP: 73 : 2015)

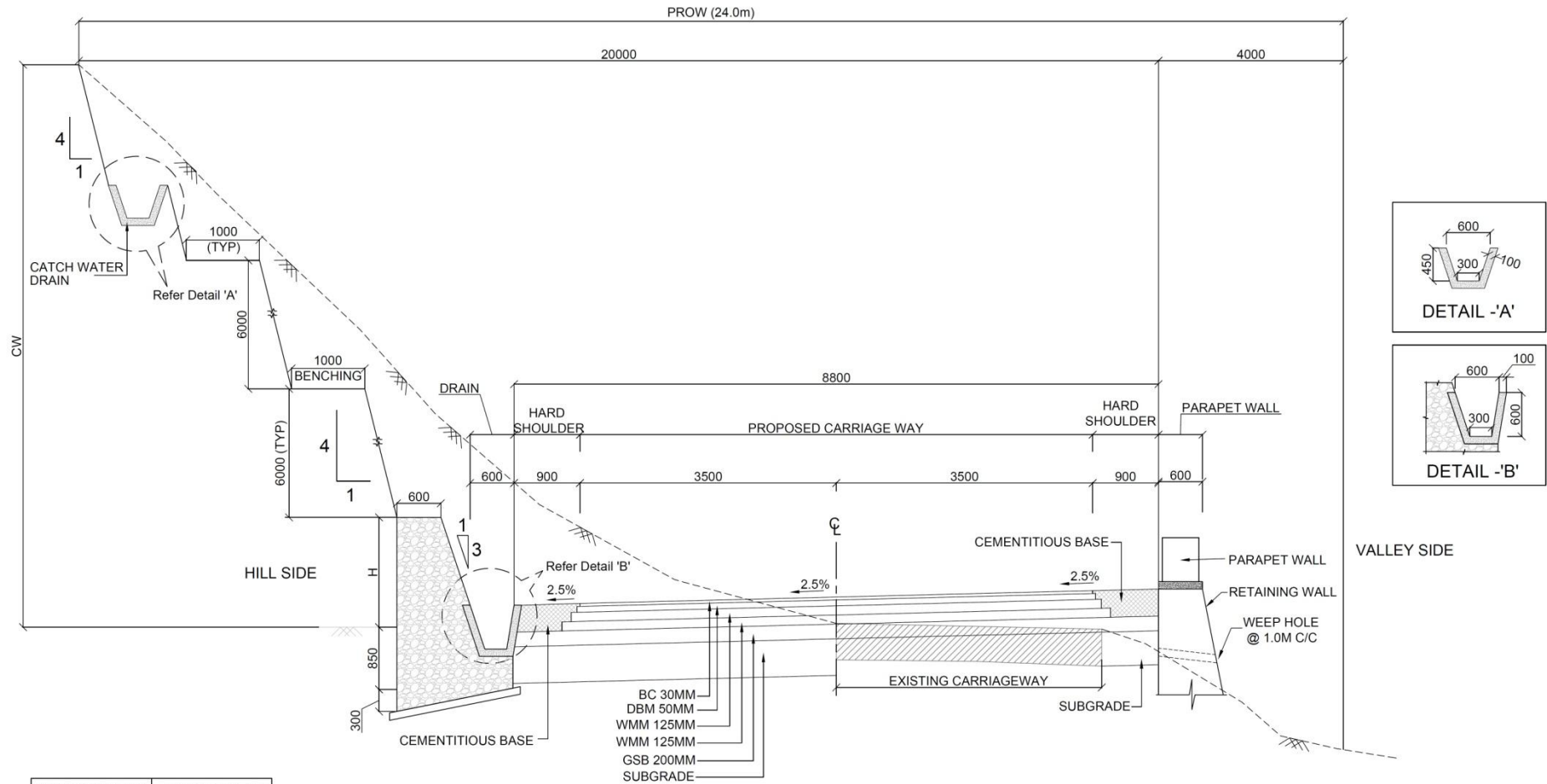
Road land (ROW) boundary shall be demarcated by putting RCC boundary pillars of size 60cm x 15cm x 15 cm embedded in concrete (as per IRC:25) along the Project Highway at 200 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with NHIDCL.

**12.3 Disposal of Debris: - As per Manual**

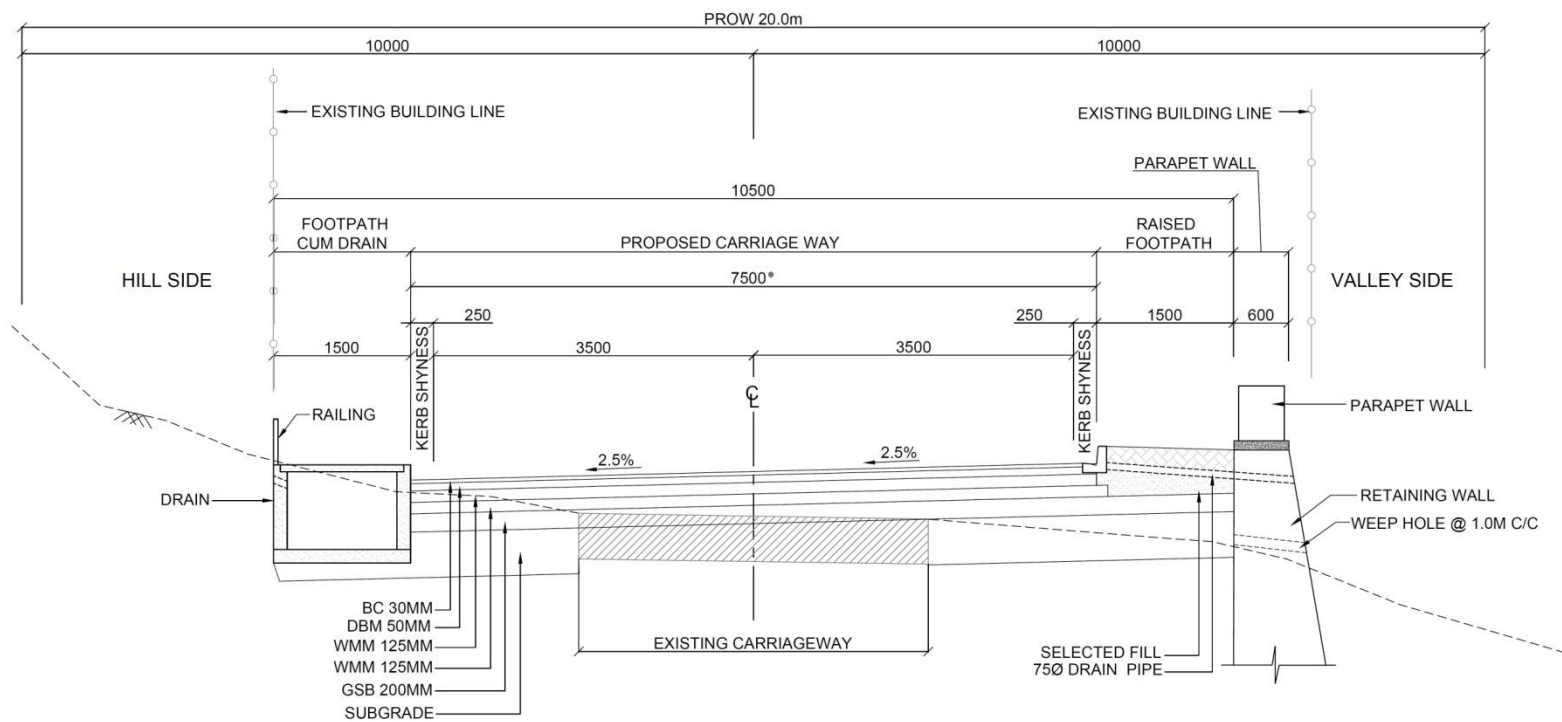
**13. CHANGE OF SCOPE**

The size of Structures, bridges, culverts and slope protection works whatsoever in terms of retaining wall, breast wall, gabion wall, RE wall, chute drain, catch pit, baffle piers/blocks etc. under special requirement of hill slope specified hereinabove shall be treated as an approximate assessment. The actual lengths, heights and widths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths, heights and widths and specifications in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length, height and width arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

## Typical Cross Section drawing

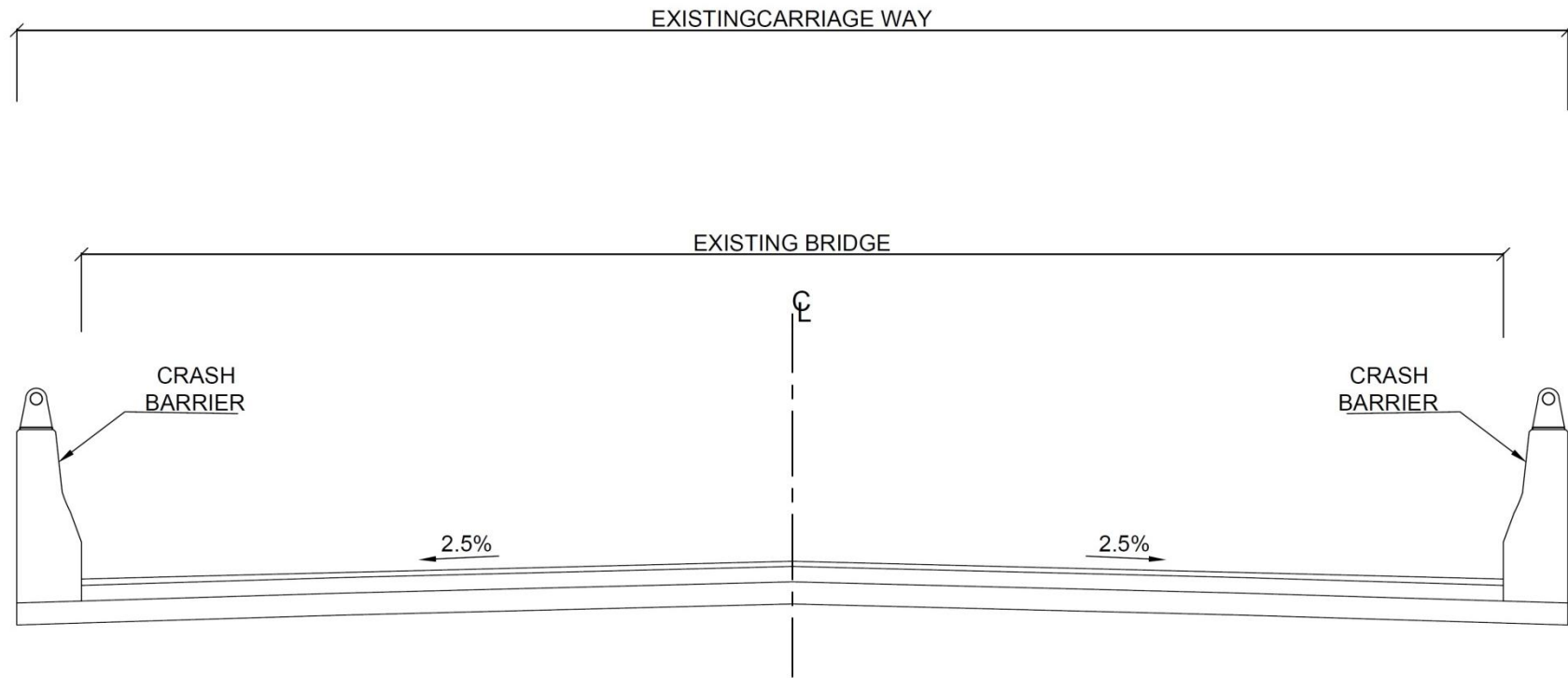


**TCS - 2**  
**TYPICAL CROSS SECTION RECONSTRUCTION / WIDENING OF 2 LANE WITH HARD**  
**SHOULDER IN RURAL AREA**  
**(WITH BREST WALL ON HILL SIDE AND RETAINING WALL ON VALLEY SIDE )**



**TCS - 4**  
**TYPICAL CROSS SECTION OF 2-LANE WIDENING IN BUILT-UP AREA (RECONSTRUCTION)**

\* IF WIDTH OF 7.5m IS NOT AVAILABLE INTERMEDIATE CARRIAGEWAY TO BE PROVIDED.



TCS - 6

TYPICAL CROSS SECTION OF MINOR BRIDGE (RETAINED)

## **SCHEDULE – C**

*(See Clause 2.1)*

### **PROJECT FACILITIES**

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

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the **Project Highway (Total length of 21.50 km)** with an aim to cater to the envisaged demand till the end of the concession period.

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities for Package – II shall include:

- (a) Roadside furniture
- (b) Pedestrian facilities
- (c) Tree plantation
- (d) Bus shelters
- (e) Passing Places
- (f) Truck lay byes and
- (g) Others to be specified

#### **2. Description of Project Facilities**

##### **Toll Plaza**

NIL

##### **Bus Shelters**

To ensure orderly movement of the through traffic, bus shelters have been proposed outside the residential area, away from bridges, and high embankments and not too close to the road intersections. The bus stops have been proposed on one side of the road.

Bus shelters shall be provided on the Project Highway at 6 locations as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides of the Project Highway. These bus shelters will also have passenger shelter.

##### **Details of Bus shelters**

<b>S.No.</b>	<b>Chainage</b>	<b>SIDE</b>
1	97+254	LHS



2	97+395	RHS
3	102+786	LHS
4	102+930	RHS
5	116+310	LHS
6	116+450	RHS

### **Pedestrian Facilities**

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL. This should include (a) minimum Zebra Crossing with flashing Beacon or (b) Zebra Crossing with separate pedestrian phase or (c) any other provision as approved by NHIDCL.

### **Landscaping and Tree Plantation**

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The Construction Contractor should plant at least 14319 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

Plantation scheme shall be prepared in consultation with the Forest Department of the Government of Arunachal Pradesh, and the Independent Consultant/ NHIDCL.

### **Environment**

The Project Highway during design, construction and maintenance during implementation period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.

## **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 Project Highway.

#### **2. Design Standards**

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

Two Lane Manual (IRC: SP 73 – 2018) of Specifications and Standards for Two Laning published by IRC and Hill Road Manual IRC SP 48:1998

Annex – I  
(Schedule – D)

**Specifications and Standards for Construction**

**1 Specifications and Standards**

All materials, works and construction operations shall conform to the Two Lane Manual (IRC: SP 73 – 2018) of Specifications and Standards for Two Laning (IRC: SP: 73 – 2018), referred as the Two Lane Manual (IRC: SP: 73 –2018), and MORTH Specifications for Road and Bridge Works, IRC: SP: 48-1998 and IRC 56-2011. 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 terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Two Lane Manual (IRC: SP 73- 2018) shall be deemed to be substituted by the terms '**Contractor**', '**Authority's Engineer**' and '**Agreement**' respectively.
- 2.2 Notwithstanding anything to the contrary contained in the Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, aforesaid Specifications and Standards of following clauses shall be deemed to be amended to the extent set forth below:

S. No.	Clause	Provision as per Manual ( IRC:SP:73-2018)	Modified Provision
1	2.16	Typical Cross-Sections	Typical Cross-Sections of the Project Highway shall be as specified in Annexure I of Schedule B
2	2.2	<b>Design Speed:</b> Ruling or minimum Design speed shall be followed	Design speed shall be 30 km/h for project highway excepting hair pin bend locations wherein design speed shall be 20 km/h. <b>Refer Appendix D-1.</b>
3	2.7.2	<b>Roadway Width:</b> On horizontal curves with radius up to 300 m width of pavement and roadway shall be increased as per Table 2.4	On horizontal Curves with radius up to 300 m width of pavement and roadway shall be increased as per Plan & Profile drawings given in Annexure – III of Schedule A
4	2.9.4	<b>Radius of Horizontal Curves:</b>	Radius of Horizontal curves shall be as per the alignment plan shown in Plan & Profile

S. No.	Clause	Provision as per Manual ( IRC:SP:73-2018)	Modified Provision
			drawings given in <b>Annexure-III</b> of <b>Schedule A</b> .
5	7.3	Width of structure	Width of the structures shall be as specified in Annexure I of Schedule B

### Appendix D-1

#### Locations where design speed is between 30 to 40 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
95722.7	60	30	Left	1.2
95820.71	40	30	Right	1.5
95878.82	40	30	Right	1.5
96032.34	70	30	Left	0.9
96089.35	35	30	Left	1.5
96123.81	300	50	Left	0.6
96211.06	35	30	Right	1.5
96263.09	35	30	Right	1.5
96391.31	100	40	Right	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
96471.32	100	35	Left	0.9
96589.84	78	30	Left	0.9
96834.44	50	30	Left	1.2
96945.24	80	40	Right	0.9
96997.54	40	30	Right	1.5
97179.39	40	30	Right	1.5
97388.22	30	30	Right	1.5
97683.45	35	30	Right	1.5
97873.38	50	30	Left	1.2
98225.4	30	30	Left	1.5
98363.98	100	35	Left	0.9
98476.83	80	30	Right	0.9
98640.71	35	30	Right	1.5
98711.85	35	30	Left	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
99037.11	80	30	Right	0.9
99099.67	45	30	Left	1.2
99167.33	60	30	Right	1.2
99280.27	50	30	Right	1.2
99359.7	40	30	Left	1.5
99430.8	60	30	Right	1.2
99550.11	50	30	Right	1.2
99658.35	100	35	Right	0.9
99905.33	70	30	Left	0.9
100029.2	70	40	Left	0.9
100177.2	35	30	Right	1.5
100227.5	50	30	Left	1.2
100439.2	30	30	Right	1.5
100568	100	35	Right	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
100725.9	30	30	Right	1.5
101087	60	30	Right	1.2
101254.9	60	30	Left	1.2
101333.8	70	30	Left	0.9
101543.6	50	30	Left	1.2
101607.3	80	30	Right	0.9
101705.6	40	30	Left	1.5
101776.7	100	40	Right	0.9
101963	40	30	Left	1.5
102102.4	40	30	Right	1.5
102232.8	45	30	Right	1.2
102420.9	40	30	Right	1.5
102519.4	60	30	Left	1.2
102657.3	80	30	Left	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
102853.5	40	30	Left	1.5
102893.7	70	30	Right	0.9
102948.9	30	30	Right	1.5
103061.6	30	30	Right	1.5
103173.5	80	30	Left	0.9
103287.1	50	30	Right	1.2
103352.2	70	30	Right	0.9
103454.5	80	30	Right	0.9
103494.2	90	35	Left	0.9
103606.3	40	30	Left	1.5
103824.4	30	30	Left	1.5
103956.1	40	30	Left	1.5
104083.9	60	30	Right	1.2
104132.8	50	30	Left	1.2



<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
104433.8	50	30	Left	1.2
104841.2	50	30	Left	1.2
104938.1	30	30	Right	1.5
105010.3	45	30	Left	1.2
105110.2	120	35	Left	0.6
105291.6	45	35	Left	1.2
105384.8	40	30	Right	1.5
105490.7	130	40	Left	0.6
105582.2	90	35	Left	0.9
105669.3	50	30	Right	1.2
105753.4	80	30	Left	0.9
105852.9	50	30	Left	1.2
106019.9	50	30	Left	1.2
106158.5	40	30	Right	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
106220.4	30	30	Left	1.5
106310.4	46	30	Right	1.2
106433.9	45	30	Left	1.2
106612	120	35	Right	0.6
106682.9	50	30	Left	1.2
106731.4	50	30	Right	1.2
106904.8	45	30	Right	1.2
107071.8	60	30	Left	1.2
107239.2	40	30	Right	1.5
107361.8	50	30	Right	1.2
107508.2	85	30	Right	0.9
107641.5	80	30	Left	0.9
107800.3	50	30	Left	1.2
108477.9	40	30	Right	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
108792.8	90	35	Left	0.9
109021.3	40	30	Right	1.5
109130.8	80	30	Right	0.9
109204.9	50	30	Right	1.2
109270.8	50	30	Left	1.2
109355.9	50	30	Left	1.2
109419.5	140	40	Right	0.6
109520.6	100	35	Left	0.9
109580.1	50	30	Right	1.2
109697.8	50	30	Right	1.2
109911	45	30	Left	1.2
109986.9	40	30	Left	1.5
110119.6	50	30	Right	1.2
110188.7	32	30	Left	1.5

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
110356.3	35	30	Left	1.5
110404.3	80	30	Right	0.9
110517.5	70	30	Left	0.9
110588.6	70	30	Right	0.9
110686.5	100	35	Right	0.9
110743.2	40	30	Left	1.5
110811.1	60	30	Right	1.2
110874.1	45	30	Left	1.2
110933.3	40	30	Right	1.5
110995	40	30	Right	1.5
111173.9	40	30	Right	1.5
111297.5	150	40	Right	0.6
111346.5	45	30	Left	1.2
111451.8	50	30	Right	1.2

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
111664.6	35	30	Right	1.5
111806.6	40	30	Left	1.5
111876.2	40	30	Right	1.5
111952	40	30	Left	1.5
112076.2	60	30	Right	1.2
112124.1	150	40	Right	0.6
112292	60	30	Left	1.2
112408.4	40	30	Left	1.5
112475.9	40	30	Left	1.5
112667.3	50	30	Right	1.2
112721.6	30	30	Left	1.5
112888.5	60	30	Left	1.2
112954.8	40	30	Right	1.5
113041.8	70	30	Right	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
113107.5	40	30	Left	1.5
113172.4	30	30	Left	1.5
113226.6	60	30	Right	1.2
113300.1	30	30	Right	1.5
113351.1	30	30	Left	1.5
113407.1	30	30	Left	1.5
113889.5	30	30	Right	1.5
114110.2	70	30	Right	0.9
114182.3	90	35	Left	0.9
114250.4	50	30	Right	1.2
114298.8	100	35	Left	0.9
114359.8	100	35	Right	0.9
114464.2	70	30	Right	0.9
114834.5	70	30	Left	0.9

<b>Chainage (m)</b>	<b>Radius (m)</b>	<b>Design Speed in KmPh</b>	<b>Hand of curve</b>	<b>Extra Widening (m)</b>
114952.9	55	30	Left	1.2
115092	30	30	Left	1.5
115165.4	50	30	Left	1.2
115212.4	50	30	Left	1.2
115327.9	80	30	Right	0.9
115390.1	70	30	Right	0.9
115527.4	40	30	Left	1.5
115578.6	35	30	Right	1.5
115642.6	50	30	Left	1.2
115742.4	80	40	Right	0.9
115833.3	90	35	Left	0.9
115951.1	100	35	Left	0.9
116238.6	60	30	Left	1.2
116313.4	40	30	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
116386.4	40	30	Right	1.5
116480.2	30	30	Left	1.5
116616.4	60	30	Left	1.2
116697.4	100	35	Left	0.9
116756.8	60	30	Right	1.2
116794.3	90	35	Left	0.9
116838.5	40	30	Right	1.5
116927.7	90	40	Right	0.9
117024.9	70	30	Right	0.9
117106.9	70	30	Right	0.9
117167.2	40	30	Left	1.5

locations where design speed is less than 30 KMPH

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
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Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
97316.8115	15	20	Right	1.5
97562.094	15	20	Left	1.5
98897.2365	28	20	Left	1.5
100347.196	15	20	Right	1.5
100483.8005	20	20	Left	1.5
100776.9635	25	20	Left	1.5
100903.2825	15	20	Right	1.5
103010.3235	20	20	Left	1.5
103741.0535	15	20	Right	1.5
104221.9155	20	20	Right	1.5
104690.97	28	25	Right	1.5
106087.994	15	20	Right	1.5
107422.0325	20	20	Left	1.5
113522.5955	20	20	Left	1.5

Chainage (m)	Radius (m)	Design Speed in KmPh	Hand of curve	Extra Widening (m)
113804.238	20	20	Right	1.5
113930.8105	20	20	Left	1.5
116533.671	20	20	Left	1.5

## ***Schedule - E***

*(See Clauses 2.1 and 14.2)*

### **1. Maintenance Requirements**

#### **1. *Maintenance Requirements***

- (i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- (ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- (iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

[Specify all the relevant documents]

#### **2. *Repair/rectification of Defects and deficiencies***

The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annex - I of this Schedule-E within the time limit set forth therein.

#### **3. *Other Defects and deficiencies***

In respect of any Defect or deficiency not specified in Annex - I of this Schedule-E, the Authority's Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be

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repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

**4. *Extension of time limit***

Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

**5. *Emergency repairs/restoration***

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

**6. *Daily inspection by the Contractor***

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Highway and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

**7. *Pre-monsoon inspection / Post-monsoon inspection***

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

**8. *Repairs on account of natural calamities***

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All damages occurring to the Project Highway on account of a Force Majeure Event or wilful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

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## Annex – I

### (Schedule-E) Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

**1.1.1 Table -1: Maintenance Criteria for Pavements:**

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
<b>Flexible Pavement</b> (Pavement of MCW, Service Road, approach)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 ( <a href="http://www.tfhr.com/pavement/ltp/reports/03031/">http://www.tfhr.com/pavement/ltp/reports/03031/</a> )	24-48 hours	MORT&H Specification 3004.2

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
<b>s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable )</b>	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted	Daily			7- 15 days	IRC:82-2015



Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)		180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
<b>Rigid Pavement (Pavement of MCW, Service Road, Grade structure,</b>	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		Minimum SN	Traffic Speed (Km/h)		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber/cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table Table -

**2: Maintenance Criteria for Rigid Pavements:**

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
CRACKING						
1	Single Discrete Cracks Not intersecting with any joint	$w$ = width of crack $L$ = length of crack $d$ = depth of crack $D$ = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	$w < 0.2$ mm. hair cracks		
			2	$w = 0.2 - 0.5$ mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if $L > 1$ m.  Within 7days
			3	$w = 0.5 - 1.5$ mm, discernible from fast-moving car		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
2	<b>Single Transverse (or Diagonal) Crack intersecting with one or more joints</b>	w = width of crack L = length of crack d = depth of crack D = depth of slab	4	w = 1.5 - 3.0 mm	Seal, and stitch if L > 1 m.  Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion.  Within 15days
			5	w > 3 mm.		
			0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy.  Within 7 days	Staple or Dowel Bar Retrofit.  Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m.  Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			4	$w = 3.0 - 6.0 \text{ mm}$	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected.  Portion with norms and specifications - See Para 5.5 & 9.2
			5	$w > 6 \text{ mm}$ , usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Within 15days
			0	Nil, not discernible	No Action	
3	Single Longitudinal Crack intersecting with one or more joints	$w$ = width of crack $L$ = length of crack $d$ = depth of crack $D$ = depth of slab	1	$w < 0.5 \text{ mm}$ , discernable from slow moving vehicle	Seal with epoxy, if $L > 1 \text{ m}$ .  Within 7 days	Staple or dowel bar retrofit.  Within 15days



S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			2	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Route seal and stitch, if $L > 1$ m. Within 15 days	-
			3	$w = 3.0 - 6.0$ mm	Staple, if $L > 1$ m. Within 15 days	Partial Depth Repair with stapling.
			4	$w = 6.0 - 12.0$ mm, usually associated with spalling	Not Applicable, as it may be full depth	Within 15 days
			5	$w > 12$ mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
						See Para 5.6.4 Within 15 days
4	<b>Multiple Cracks intersecting with one or more joints</b>	<b>w = width of crack</b>	0	Nil, not discernible	No Action	-
			1	$w < 0.2$ mm, hair cracks	Seal, and stitch if $L > 1$ m.	
			2	$w = 0.2 - 0.5$ mm. discernible from slow vehicle	Within 15 days	
			3	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinststate subbase, Reconstruct whole slab as per specifications within 30 days
			4	$w = 3.0 - 6.0$ mm panel broken into 2 or 3 pieces		
			5	$w > 6$ mm and/or panel broken		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
				into more than 4 pieces		
5	Corner Break	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	secure broken parts Within 7 days	Within 7days
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	ree or four corners broken		Reinstate sub-base, and reconstruct the

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
						slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m <sup>2</sup> )	0	Nil, not discernible		No Action
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts.
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$		Within 15days
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement.
			4	$w > 3 \text{ mm}$ , $L < 3 \text{ m/m}^2$ and deformation		Within 30days
			5	$w > 3 \text{ mm}$ , $L > 3 \text{ m/m}^2$ and deformation		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
Surface Defects						
7	Ravelling Honeycomb surface	$r$ = area damaged or surface/total typesurface of slab (%) $h$ = maximum depth of damage	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged	
			2	$r = 2 - 10 \%$	and liable to be damaged.  Within 15 days	
			3	$r = 10-25\%$	Bonded Inlay, 2 or 3 slabs if	
			4	$r = 25 - 50 \%$	affecting.	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					Within 30 days	
			5	$r > 50\%$ and $h > 25 \text{ mm}$	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	Scaling	$r = \frac{\text{damaged surface}}{\text{total surface of slab}} (\%)$ $h = \text{maximum depth of damage}$	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged	
			2	$r = 2 - 10 \%$	and liable to be damaged. Within 7days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			3	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25 \text{ mm}$	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	$t$ = texture depth, sand patch test	0		No action.	Not Applicable
			1	$t > 1 \text{ mm}$		
			2 '	$t = 1 - 0.6 \text{ mm}$	Monitor rate of deterioration	
			3	$t = 0.6 - 0.3 \text{ mm}$		
			4	$t = 0.3 - 0.1 \text{ mm}$		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			5	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	$n$ = number/ $\text{m}^2$ $d$ = diameter $h$ = maximum depth	0	$d < 50 \text{ mm}$ ; $h < 25 \text{ mm}$ ; $n < 1$ per $5 \text{ m}^2$	No action.	Not Applicable
			1	$d = 50 - 100 \text{ mm}$ ; $h < 50 \text{ mm}$ ; $n < 1$ per $5 \text{ m}^2$	Partial depth repair 65 mm deep.	
			2	$d = 50 - 100 \text{ mm}$ ; $h > 50 \text{ mm}$ ; $n < 1$ per $5 \text{ m}^2$	Within 15 days	



S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			3	$d = 100 - 300 \text{ mm}; h < 100 \text{ mm}$ $n < 1$ per $5 \text{ m}^2$	Partial depth repair 110mm	
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1$ per $5 \text{ m}^2$	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	$d > 300 \text{ mm}; h > 100 \text{ mm}; n > 1$ per $5 \text{ m}^2$	Full depth repair. Within 30 days	

Joint Defects						
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	Short Term	Long Term
					No action.	Not Applicable
			1	Discernible, L < 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	

			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	
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				and trapping incompressible material.		
12	<b>Spalling of Joints</b>	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days	
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	<b>Faulting (or Stepping)</b>	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

	in Cracks or Joints		1	$f < 3 \text{ mm}$		
			2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	Within 30days
			4	$f = 12 - 18 \text{ mm}$	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	$f > 18 \text{ mm}$	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	Blowup or Buckling	$h$ = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
					No Action	
			1	$h < 6 \text{ mm}$		
			2	$h = 6 - 12 \text{ mm}$	Install Signs to Warn Traffic	

			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L=length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

			5	h > 100 mm	if L < 20 m. Within 30 days	
16	Heave	h = positive vertical displacement from normal profile.  L = length	0	Not discernible. h < 5 mm	Short Term	Long Term
					No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic  within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	Bump	h = vertical	0	h < 4 mm	No action	

		displacement from normal profile	1	$h = 4 - 7 \text{ mm}$	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15 \text{ mm}$	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	<b>Lane Shoulder Dropoff</b>	to f = difference of level	0	Nil, not discernible $< 3\text{mm}$	<b>Short Term</b>	<b>Long Term</b>
					No action.	
			1	$f = 3 - 10 \text{ mm}$	Spot repair of shoulder within 7 days	
			2	$f = 10 - 25 \text{ mm}$		
			3	$f = 25 - 50 \text{ mm}$	Fill up shoulder	



			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch.  Within 30days
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	Inspect and repair sub-drainage at distressed sections and upstream.
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab.  Within 30 days	

20	<b>Ponding</b>	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	Action required to stop water damaging foundation within 30 days.
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	
			5	Ponding, accumulation of water observed	-do-	

**Table -3: Maintenance Criteria for Safety Related Items and Other Furniture Items:**

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.  In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	Desirable Minimum Sight Distance (m)	Safe Stopping Sight Distance (m)					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	Visual Assessment as per Annexure-F of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards	
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m <sup>2</sup> /lux Bituminous Road - 100mcd/m <sup>2</sup> /lux	Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015	
	Night Time Visibility	<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>		As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015	
		Design Speed	(RL) Retro Reflectivity (mcd/m <sup>2</sup> /lux)					
			Initial (7 days)					Minimum Threshold level (TL) & warranty period required up to 2 years
		Up to 65	200					80
		65 - 100	250					120
		Above 100	350					150
		<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>						

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m <sup>2</sup> /lux Minimum Threshold Level: 50 mcd/m <sup>2</sup> /lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged.  Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs)  15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	Change of signboard	48 hours in case of Mandatory	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs)  1 Month in case of Gantry/Cantilever Sign boards	
<b>Kerb</b>	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	<u>Functionality</u> : Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
<b>Other Road Furniture</b>	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	<u>Functionality</u> : Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	<u>Functionality</u> : Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	<u>Functionality</u> : Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	<u>Functionality:</u> Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	<u>Functionality:</u> Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
<b>Highway Lighting System</b>	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	



<b>Asset Type</b>	<b>Performance Parameter</b>	<b>Level of Service (LOS)</b>	<b>Frequency of Measurement</b>	<b>Testing Method</b>	<b>Recommended Remedial measures</b>	<b>Time limit for Rectification</b>	<b>Specifications and Standards</b>
<b>Other Project Facilities and Approach roads</b>	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate length					

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
<b>Bridges including ROBs Flyover etc. as applicable</b>	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
<b>Bridge -Super Structure</b>	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
Spalling of concrete	Not more than 0.50 sq.m					
Delamination	Not more than 0.50 sq.m					
Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
Deflection due to permanent loads and	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

live loads		than 40 m				
Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
Debris and dust in strip seal	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and

	expansion joint	gap.		Mobile Bridge Inspection Unit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
<b>Bridge-substructure</b>	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
<b>Bridge Foundations</b>	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
<p><b>Note:</b> Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.</p>							

**Table 4: Maintenance Criteria for Structures and Culverts:**



**Table 5: Maintenance Criteria for Hill Roads**

In addition to above, for hill roads the following provisions for maintenance is also to done.

Hill Roads		
(i)	Damage to Retaining wall/ Breast wall	7 (Seven) days
(ii)	Landslides requiring clearance	12 (Twelve) hours
(iii)	Snow requiring clearance	24 (Twenty Four) hours

**1.1.2      Note: For all tables 1 to 5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRTH specifications shall be binding for all maintenance activities.**

**A. Flexible Pavement**

Nature of Defect or deficiency		Time limit for repair/rectification
<b>(b) Granular earth shoulders, side slopes, drains and culverts</b>		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
<b>(c) Road side furniture including road sign and pavement marking</b>		
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
<b>(d) Road lighting</b>		
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
<b>(e) Trees and plantation</b>		

Nature of Defect or deficiency		Time limit for repair/rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
<b>(f) Rest area</b>		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
<b>(g) [Toll Plaza]</b>		
<b>(h)</b>	<b>Other Project Facilities and Approach roads</b>	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
<b>Bridges</b>		
<b>(a) Superstructure</b>		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty eight) hours  within 15 (fifteen) days or as specified by the Authority's Engineer
<b>(b) Foundations</b>		

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
<b>(c) Piers, abutments, return walls and wing walls</b>		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
<b>(d) Bearings (metallic) of bridges</b>		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
<b>(e) Joints</b>		
(i)	Malfunctioning of joints	15 (fifteen) days
<b>(f) Other items</b>		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
<b>(g) Hill Roads</b>		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours

Nature of Defect or deficiency		Time limit for repair/ rectification
(iii)	Snow requiring clearance	24 (twenty four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

## **Schedule – F**

*(See Clause 4.1*

*(vii)(a))* **Applicable**

### **Permits**

#### ***1. Applicable Permits***

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
  - (a) Permission of the State Government for extraction of boulders from quarry;
  - (b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
  - (c) Licence for use of explosives;
  - (d) Permission of the State Government for drawing water from river/reservoir;
  - (e) Licence from inspector of factories or other competent Authority for setting up batching plant;
  - (f) Clearance of Pollution Control Board for setting up batching plant;
  - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
  - (h) Permission of Village Panchayats and State Government for borrow earth; and
  - (i) Any other permits or clearances required under Applicable Laws.
- (ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

## Schedule – G

(See Clauses 7.1 and 19.2)

### Annex-I

(See Clause 7.1)

### Form of Bank Guarantee

#### [Performance Security/Additional Performance Security]

[MD, NHIDCL,

PTI Building] WHEREAS:

- (A) \_\_\_\_\_[name and address of contractor] (hereinafter called the “**Contractor**”) and [name and address of the authority], (hereinafter called the “**Authority**”) have entered into an agreement (hereinafter called the “**Agreement**”) for the construction of the \*\*\*\*\* section of [National Highway No. \*\*] on Engineering, Procurement and Construction (the “**EPC**”) basis, subject to and in accordance with the provisions of the Agreement
- (B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs..... cr. (Rupees ..... crore) (the “**Guarantee Amount**”).
- (C) We, ..... through our branch at.....(the “**Bank**”) have agreed to furnish this bank guarantee (*hereinafter called the “**Guarantee**”*) by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor’s obligations during the {Construction Period/ Defects

Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.
3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating



to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on \*\*\*\*\$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This guarantee shall also be operable at our Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below: -

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659

3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

Signed and sealed this ..... day of ....., 20..... at .....

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- (ii) \_\_\_\_\_  
The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

<sup>§</sup> Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

\_\_\_\_\_

## Annex – II

(Schedule - G)

(See Clause 19.2)

### Form for Guarantee for Advance Payment

[MD, NHIDCL,

PTI Building, 3<sup>rd</sup> Floor, New Delhi] WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “**Contractor**”) has executed an agreement (hereinafter called the “**Agreement**”) with the [name and address of the authority], (hereinafter called the “**Authority**”) for the construction of the \*\*\*\*\* section of [National Highway No. \*\*] on Engineering, Procurement and Construction (the “**EPC**”) basis, subject to and in accordance with the provisions of the Agreement
- (B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called “**Advance Payment**”) equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ----- cr. (Rupees crore) and the amount of this Guarantee is Rs. ----- cr. (Rupees ----- crore) (the “**Guarantee Amount**”)§.
- (C) We, ..... through our branch at.....(the “**Bank**”) have agreed to furnish this bank guarantee (*hereinafter called the “**Guarantee**”*) for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. ~~The Bank hereby unconditionally~~ and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority,

upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
7. The Guarantee shall cease to be in force and effect on \*\*\*\*. Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
11. This guarantee shall also be operable at our Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
12. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below: -

SI. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

5 Beneficiary Bank Address

Syndicate Bank, Transport  
Bhawan, 1st Parliament street,  
New Delhi-110001

Signed and sealed this ..... day of ....., 20..... at .....

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.
- (ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

\_\_\_\_\_

\_\_\_\_\_

## Schedule - H

(See Clauses 10.1 (iv) and 19.3)

### 2. Contract Price Weightages

1. The Contract Price for this Agreement is Rs. \*\*\*\*\*

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
<b>Road works including culverts, Widening and repair of culverts.</b>	46.30%	<b>A- Widening and strengthening of existing road</b>	
		(1) Earthwork up to top of the sub-grade	2.22%
		(3) Sub-Base Course	1.40%
		(4) Non-Bituminous Base course	1.66%
		(5) Bituminous Base course	1.04%
		(5) Wearing Coat	0.60%
		(7) Widening and repair of culverts	0.00%
		(7) Earthwork in shoulders	0.19%
		<b>B.1- Reconstruction/New 2-lane realignment/bypass (Flexible Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	26.91%
		(3) Sub-Base Course	17.86%
		(4) Non-Bituminous Base course	17.75%
		(5) Bituminous Base course	10.80%
		(5) Wearing Coat	6.44%
		(6) Earthwork in shoulders	1.94%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		<b>B.2- Reconstruction/New 2-lane realignment/bypass (Rigid Pavement)</b>	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Earthwork in shoulders	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Concrete (PQC) Course	0.00%
		<b>C.1- Reconstruction/New Service Road (Flexible Pavement)</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	
		<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 Concrete (PQC) Course	0.00%
		<b>D- Reconstruction and New Culverts on existing road, realignments, bypasses Culverts (Length &lt; 6m)</b>	11.19%
<b>Minor Bridges, Underpasses, Overpasses,</b>	0.07%	<b>A.1-Widening and repair of Minor Bridges (Length&gt;6 m and &lt;60 m)</b>	
		Minor Bridges	100.00%
		<b>A.2-New Minor Bridges (Length&gt;6 m and &lt;60 m)</b>	



Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(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 up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%
		(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	0.00%
		(5) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	0.00%
		(6) Other Ancillary Works: On completion of wearing coat, expansion joints, handrails, crash barriers, road signs & markings, tests on completion in all respect.	0.00%
		<b>B.1-Widening and Repair 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.	0.00%
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(4) On completion of Retaining / Reinforced earth walls, complete in all respect and fit for use	0.00%
		(5) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, handrails, crash barriers, stone pitching, protection works, road signs & markings, tests on completion in all respect.	0.00%
		Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified	0.00%
<b>Major Bridge (Length&gt;60m) works and ROB/RUB, Elevated Sections, Flyovers including Viaducts, if any</b>	0.00%	<b>A.1- Widening and repairs of Major Bridges</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 up to the abutment/ pier cap including wing/ return/ retaining wall up to 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 handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Guide Bund, 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 wing	0.00%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		and return walls, abutments, piers.	
		(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to 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 handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Guide Bund, River Training works etc.	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		<b>B.1-Widening and repair of</b>	
		<b>(a) ROB</b>	
		<b>(b) RUB</b>	
		(1) Foundations	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) <b>Wearing coat (a) in case of ROB</b> – wearing coat including expansion joints complete in all respects as specified and <b>(b) in case of RUB</b> – rigid pavement under RUB including drainage facility complete in all respects as specified	0.00%
		(5) Miscellaneous Items (like handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, handrails, 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) <b>Wearing coat (a) in case of ROB</b> – wearing coat including expansion joints complete in all respects as specified and <b>(b) in case of RUB</b> – rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
		(5) Miscellaneous Items (like handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
		<b>C.1-Widening and repair of Elevated sections/Flyover/Grade separators</b>	
		1) Foundations	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing coat <b>including</b> expansion joints	0.00%
		(5) Miscellaneous Items (like handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, handrails, 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 up to the abutment/ pier cap including wing/ return/ retaining wall up to 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 handrails, crash barriers road marking etc.)	0.00%
		(6) Wing walls/return walls up to top	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and Other Ancillary Works (wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works etc.)	0.00%
Other works	53.63%	(1) Toll Plaza	0.00%
		(2) Roadside drains	
		Open Lined Drain	5.41%
		Unlined Drain	0.00%
		Covered Drain	1.44%
		Catchpit Drain	5.54%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(3) Road signs, safety Devices, Road Furniture etc.	0.47%
		(4) Road markings & Studs	2.44%
		(5) Crash Barrier	6.49%
		(6) Project facilities	0.00%
		(a) Bus Bays	0.06%
		(b) Wayside Amenities excluding Slip Roads & but including all internal roads (Service areas including Truck Lay-Byes)	0.00%
		(c) Toe wall	0.00%
		(7) RCC Retaining Wall	22.43%
		(8) Stone Masonry Breast wall	44.21%
		(9) Parapet Wall	0.71%
		(10) RE Wall	0.00%
		(11) Street Lighting	0.00%
		(12) Chequered Tiles	0.30%
		(13) Boundary Wall	0.00%
		(14) ATMS	0.00%
		(15) Rainwater Harvesting	0.00%
		(16) Roadside Plantation including Horticulture in Wayside Amenities	0.00%
		(17) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROB/ RUBs	0.00%
		a) Hydroseeding	0.13%
		b) Mulching	2.72%
		c) Soil nailing for slope protection and copping	6.43%

Item	Weightage in % of CP	Stage for Payment	Percentage Weightage
1	2	3	4
		(18) Safety & Traffic Management during const.	0.00%
		(19) Other miscellaneous works including Connecting road & Junction under Grade separator	0.00%
		(20) Connecting Road Etc	0.00%
		Junction under Grade separator	0.95%
		(21) Site clearance and Dismantling	0.27%
		(22) Maintenance of Road	0.00%

**Procedure of estimating the value of work done**

**(i) Road works**

Procedure for estimating the value of road work done shall be as follows:

**Table 1.3.1**

<b>Stage of Payment</b>	<b>Percentage - Weightage</b>	<b>Payment Procedure</b>
<b>1</b>	<b>2</b>	<b>3</b>
<b>A-Widening and strengthening of Existing Road</b>		
(1) Earthwork up to top of the sub-grade	1.03%	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 5 (Five) percent of the total length.
(3) Sub-Base Course	0.65%	
(4) Non-Bituminous Base course	0.77%	
(5) Bituminous Base course	0.47%	
(5) Wearing Coat	0.28%	
(7) Widening and repair of culverts	0.00%	
(7) Earthwork in shoulders	0.09%	Cost of ten completed culverts shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of 5 culverts.
<b>B.1- Reconstruction/New 8-lane realignment/bypass ( Flexible Pavement)</b>		
(1) Earthwork up to top of the sub-grade	12.46%	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 5 (Five) percent of the total length.
(3) Sub-Base Course	8.27%	
(4) Non-Bituminous Base course	8.22%	



Stage of Payment	Percentage - Weightage	Payment Procedure
1	2	3
(5) Bituminous Base course	5.00%	
(5) Wearing Coat	2.98%	
(6) Earthwork in shoulders	0.90%	
<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 completion of a stage in a length of not less than 5 (Five) percent of the total length.
(2) Sub-Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Concrete (PQC) Course	0.00%	
<b>C.1- Reconstruction/New Service Road (Flexible 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 a length of not less than 5 (Five) 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%	
<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 a length of not less than 5 (Five) percent of the total length.
(2) Sub-Base Course	0.00%	
(3) Dry Lean Concrete (DLC)	0.00%	

Stage of Payment	Percentage - Weightage	Payment Procedure
1	2	3
Course		
(4) Pavement Quality Concrete (PQC) Course	0.00%	
<b>D- Reconstruction and New Culverts on existing road, realignments, bypasses:</b>		
(1) Culverts (Length < 6m)	5.18%	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 five culverts.

@ For calculation of payment stage for main-carriageway the project length shall be 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 =  $P \times \text{weightage for road work} \times \text{weightage for bituminous work} \times (1/L)$

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.

**2.1 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**

(ii) **Minor Bridges and Underpasses/Overpasses**

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

**Table 1.3.2**

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
<b>A.1. Widening and Repair of minor bridges (length &gt;6m and &lt; 60m)</b>	0.07%	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 and repair works of a minor bridge.
<b>A.2.- New Minor bridges</b>		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%	<b>Foundation:</b> 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 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 bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%	<b>Sub-structure:</b> 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 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.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	<b>Super-structure:</b> 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. 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	0.00%	<b>Approaches:</b> 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	0.00%	<b>Guide Bunds and River Training Works:</b> 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.	0.00%	<b>Other Ancillary Works:</b> Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
<b>B.1. Widening and repair of underpasses/overpasses</b>	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 and repair works of a underpass/overpass.
<b>B.2. New Underpasses/Overpasses</b>		

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%	<b>Foundation:</b> 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 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 Underpasses/ Overpasses. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap including wing/ return/ retaining wall up to top	0.00%	<b>Sub-structure:</b> 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 Underpasses/Overpasses.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	<b>Super-structure:</b> 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. 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) 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.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(5) 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%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

**(iii) Major Bridge works, ROB/RUB and Structures**

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

**Table 1.3.3**

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
<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%	<b>Foundation:</b> 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap	0.00%	<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 major bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, Bearings	0.00%	<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. 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). Wearing Coat including expansion joints	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls up to top	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	<b>Guide Bunds, River Training works:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	<b>Approaches:</b> Payments shall be made on pro rata basis on completion of 5 % of the scope of each stage.
<b>A.2. New Major Bridges</b>	0.00%	
(1) Foundation: On completion of the foundation work including foundations for return walls, abutments, piers.	0.00%	<b>Foundation:</b> 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: On completion of abutments, piers up to the abutment/ pier cap	0.00%	<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 major bridge.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, Bearings	0.00%	<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. 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



Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
		be made on completion of stage specified as above
(4). Wearing Coat including expansion joints	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls up to top	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	<b>Guide Bunds, River Training works:</b> Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	<b>Approaches:</b> Payments shall be made on pro rata basis on completion of 5 % of the scope of each stage.
<b>B.1.- Widening and repairs of</b>	0.00%	
(a) ROB	0.00%	
(b) RUB	0.00%	

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(1) Foundation	0.00%	<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/RUB. 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.00%	<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 ROB/RUB.
(3) Super-structure (including bearings)	0.00%	<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. 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) <b>Wearing coat (a) in case of ROB</b> – wearing coat including expansion joints complete in all respects as specified and <b>(b) in case of RUB</b> – rigid pavement under RUB including drainage facility complete in all respects as specified	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items (like hand rails, crash barriers road marking etc.)	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(6) Wing walls/return walls up to top	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) 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 5 % of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
<b>B.2.- New</b>	0.00%	
(a) ROB	0.00%	
(b) RUB	0.00%	
(1) Foundation	0.00%	<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/RUB. 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. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.00%	<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 ROB/RUB.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(3) Super-structure (including bearing)	0.00%	<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. 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) Wearing Coat including expansion joints in case of ROB. In case of RUB-rigid pavement under RUB including drainage facility as specified	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) 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.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
<b>C.1- Widening and repairs of Elevated Section/Flyovers/Grade Separators</b>	0.00%	
(1) Foundation	0.00%	<b>Foundation:</b> Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. 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 structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	0.00%	<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 structure.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	<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. 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) Wearing Coat including expansion joints.	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5). Miscellaneous items like hand rails, crash barriers, road markings etc	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(6) Wing walls/return walls	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) 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 5 % of the total area.
(8) 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%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
<b>C.2- New Elevated Section/Flyovers/Grade Separators</b>	0.00%	
(1) Foundation	0.00%	<b>Foundation:</b> Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. 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 structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	0.00%	<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 structure.
(3) Super-structure: On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%	<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. 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

Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
		and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat including expansion joints.	0.00%	<b>Wearing Coat:</b> Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5). Miscellaneous items like hand rails, crash barriers, road markings etc	0.00%	<b>Miscellaneous:</b> Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.00%	<b>Wing walls/return walls:</b> Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) 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 5 % of the total area.
(8) Approaches and Other Ancillary Works: On completion of wearing coat, expansion joints, handrails, crash barriers, road signs & markings, stone pitching, protection works, tests on completion in all respect.	0.00%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

Note:

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

(2) The Schedule for exclusive tunnel projects may be prepared as per sit requirements before bidding with due approval of DG (RD) &SS, MoRT&H.

## 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
1	2	3
(1) 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 plazas.
(2) Roadside drains	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 5 (Five) percent of the total length.
Open Lined Drain	2.90%	
Unlined Drain	0.00%	
Covered Drain	0.77%	
Catch pit Drain	2.97%	
(3) Road signs, safety Devices, Road Furniture etc.	0.25%	Payment shall be made on pro rata basis for completed facilities.
(4) Road markings & Studs	1.31%	
(5) Crash Barrier	3.48%	
(6) Project facilities	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(a) Bus Bays	0.03%	
(b) Wayside Amenities excluding Slip Roads & but including all internal roads (Service areas including Truck Lay-Byes)	0.00%	Payment shall be made on pro rata basis for completed facilities.
(c) Toe wall	0.00%	
(7) RCC Retaining Wall	12.03%	
(8) Stone Masonry Breast wall	23.71%	
(9) Parapet Wall	0.38%	
(10) RE Wall	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(11) Street Lighting	0.00%	
(12) Chequered Tiles	0.16%	Payment shall be made on pro rata basis for completed facilities.
(13) Boundary Wall	0.00%	
(14) ATMS	0.00%	Payments shall be made on pro rata basis on completion of 5 % of the total area.
(15) Rainwater Harvesting	0.00%	



Stage of Payment	Percentage -Weightage	Payment Procedure
1	2	3
(16) Roadside Plantation including Horticulture in Wayside Amenities	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 5 (Five) percent of the total length.
(17) Protection Works other than approaches to the bridges, elevated sections/ flyover/ grade separators and ROB/ RUBs	0.00%	Payments shall be made on pro rata basis on completion of 5% of the total area.
a) Hydroseeding	0.07%	
b) Mulching	1.46%	
c) Soil nailing for slope protection and capping	3.45%	
(18) Safety & Traffic Management during const.	0.00%	Payment shall be made on prorated basis every six months.
(19) Other miscellaneous works including Connecting road & Junction under Grade separator	0.00%	Payment shall be made on Prorate basis on completion of each stage
(20) Connecting Road Etc	0.00%	
Junction under Grade separator	0.51%	
(21) Site clearance and Dismantling	0.15%	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 5 (Five) percent of the total length.
(22) Maintenance of Road	0.00%	

## 2. 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

## **Schedule - I**

*(See Clause 10.2 (iv))*

### **Drawings**

#### **1. Drawings**

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-I.

#### **2. Additional Drawings**

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

## **Annex – I**

*(Schedule - I)*

### ***List of Drawings***

[**Note:** The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

## **Schedule - J**

*(See Clause 10.3 (ii))*

### **Project Completion Schedule**

#### **1 Project Completion Schedule**

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the **Scheduled Completion Date**. Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

#### **2. Project Milestone-I**

- (i) Project Milestone-I shall occur on the date falling on the **[192<sup>nd</sup>]** day from the Appointed Date (the “**Project Milestone- I**”).
- (ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

#### **3. Project Milestone-II**

- (i) Project Milestone-II shall occur on the date falling on the **[329<sup>th</sup>]** day from the Appointed Date (the “**Project Milestone- II**”).
- (ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 35% (thirty five per cent) of the Contract Price **and should have started construction of all bridges**

#### **4. Project Milestone-III**

- (i) Project Milestone-III shall occur on the date falling on the **[467<sup>th</sup>]** day from the Appointed Date (the “**Project Milestone- III**”).
- (ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and **should have** started construction of all project facilities.

#### **5. Scheduled Completion Date**

- (i) The Scheduled Completion Date shall occur on the [549<sup>th</sup>] day from the Appointed Date.
- (ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

**6. Extension of time**

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

## **Schedule - K**

*(See Clause 12.1 (ii))*

### **Tests on Completion**

#### **1. Schedule for Tests**

- (i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10(ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.
- (ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

#### **2. Tests**

- (i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [\*\*\*].
- (ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.
- (iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

- (iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.
- (v) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.
- (vi) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

### 3. ***Agency for conducting Tests***

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

### 4. ***Completion Certificate***

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

- 5. The Authority Engineer will carry out tests with following equipment at his own cost in the presence of contractor's representative.

Sr. No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year

4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.



## Schedule - L

(See Clause 12.2)

### Completion Certificate

- 1 I, ..... (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the "Agreement"), for **Construction of two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 98.380 (near Chizami Village) to existing km 120.367 (Nagaland/Manipur Border) [Design Km 95.700 to design Km 117.200] [Design Length – 21.500 Km] in the state of Nagaland Under Bharatmala Pariyojna on EPC Mode (Package V) (the "Project Highway")** on Engineering, Procurement and Construction (EPC) basis through .....(Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the ..... day of ..... 20... , Scheduled Completed Date for which was the ..... day of .....20.....

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)

(Designation) (Address)

## Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

### Payment Reduction for Non-Compliance

**1. *Payment reduction for non-compliance with the Maintenance Requirements***

- (i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.
- (ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.
- (iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

**2. *Percentage reductions in lump sum payments on monthly basis***

- (i) The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
<b>(a)</b>	<b>Carriageway/Pavement</b>	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
<b>(b)</b>	<b>Road, Embankment, Cuttings, Shoulders</b>	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
<b>(c)</b>	<b>Bridges and Culverts</b>	

(i)	Desilting, cleaning, vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
<b>S. No.</b>	<b>Item/Defect/Deficiency</b>	<b>Percentage</b>
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
<b>(d)</b>	<b>Roadside Drains</b>	
(i)	Cleaning and repair of drains	5%
<b>(e)</b>	<b>Road Furniture</b>	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5 <sup>th</sup> km stones	5%
<b>(f)</b>	<b>Miscellaneous Items</b>	
(i)	Removal of dead animals, broken down/accident vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
<b>(g)</b>	<b>Defects in Other Project Facilities</b>	5%

- (ii) The amount to be deducted from monthly lump-sum payment for non-compliance of particular item shall be calculated as under:

$$R = \frac{P}{100} \times (M1 \text{ or } M2) \times \frac{L1}{L}$$

Where,

P= Percentage of particular item/Defect/deficiency for deduction

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2=

Monthly lump-sum payment in accordance para 1.2 above of this Schedule L1= Non-

complying length L = Total length of the road,

R= Reduction (the amount to be deducted for non-compliance for a particular item/Defect/deficiency

The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or non-compliance.

For any Defect in a part of one kilometer, the non-conforming length shall be taken as one kilometer.

## **Schedule - N**

*(See Clause 18.1 (i))*

### **Selection of Authority's Engineer**

#### **1. Selection of Authority's Engineer**

- (i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.
- (ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

#### **2. Terms of Reference**

The Terms of Reference for the Authority's Engineer (the "TOR") shall substantially conform with Annex 1 to this Schedule N.

#### **3. Appointment of Government entity as Authority's Engineer**

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Authority's Engineer.

### ***Terms of Reference for Authority's Engineer***

#### **1. Scope**

- (i) These Terms of Reference (the “**TOR**”) for the Authority’s Engineer are being specified pursuant to the EPC Agreement dated ..... (the “**Agreement**”), which has been entered into between the [NHIDCL, PTI Building, Parliament Street, New Delhi-11001] (the “**Authority**”) and

..... (the “**Contractor**”)<sup>#</sup> for **Construction of two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 76.320 (near Mesulumi Village) to existing km 98.380 (near Chizami Village) [Design Length – 21.50 Km] in the state of Nagaland Under Bharatmala Pariyojana on EPC Mode (Package IV)** on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

# - In case the bid of Authority’s Engineer is invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

- (ii) The TOR shall apply to construction and maintenance of the Project Highway.

#### **2. Definitions and interpretation**

- (i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.
- (ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.
- (iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

#### **3. General**

- (i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- (ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:
  - (a) any Time Extension;
  - (b) any additional cost to be paid by the Authority to the Contractor;
  - (c) the Termination Payment; or
  - (d) issuance of Completion Certificate or
  - (e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.
- (iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.
- (iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.
- (v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.
- (vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

#### **4. Construction Period**

- (i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may

be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

- (ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- (iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.
- (iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- (v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- (vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.
- (vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- (viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- (ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.



- (x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
- (xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- (xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.
- (xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
- (xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.
- (xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
- (xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

- (xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

## **5. *Maintenance Period***

- (i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- (ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.
- (iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.
- (iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.
- (v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

## **6. *Determination of costs and time***

- (i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.
- (ii) The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

- (iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

## **7. *Payments***

- (i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).
- (ii) Authority's Engineer shall -
  - (a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and
  - (b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.
- (iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.
- (iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

## **8. *Other duties and functions***

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

## **9. *Miscellaneous***

- (i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.
- (ii) The Authority's Engineer shall retain at least one copy each of all Drawings and

Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

- (iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as- built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.
- (iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.
- (v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

## **Schedule - O**

*(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))*

### **Forms of Payment Statements**

#### **1. *Stage Payment Statement for Works***

The Stage Payment Statement for Works shall state:

- (a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;
- (b) amounts reflecting adjustments in price for the aforesaid claim;
- (c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;
- (d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);
- (e) total of (a), (b), (c) and (d) above;
- (f) Deductions:
  - i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  - ii. Any amount towards deduction of taxes; and
  - iii. Total of (i) and (ii) above.
- (g) Net claim: (e) – (f) (iii);
- (h) The amounts received by the Contractor upto the last claim:
  - i. For the Works executed (excluding Change of Scope orders);
  - ii. For Change of Scope Orders, and
  - iii. Taxes deducted

#### **2. *Monthly Maintenance Payment Statement***

The monthly Statement for Maintenance Payment shall state:

- (a) the monthly payment admissible in accordance with the provisions of the Agreement;
- (b) the deductions for maintenance work not done;
- (c) net payment for maintenance due, (a) minus (b);

- (d) amounts reflecting adjustments in price under Clause 19.12; and
- (e) amount towards deduction of taxes

3. ***Contractor's claim for Damages***

**Note:** The Contractor shall submit its claims in a form acceptable to the Authority.

## **Schedule - P**

*(See Clause 20.1)*

### **Insurance**

#### **1. Insurance during Construction Period**

- (i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:
  - (a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and
  - (b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.
- (ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

#### **2. Insurance for Contractor's Defects Liability**

The Contractor shall effect and maintain insurance cover of not less than 15% of the Contract Price for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

#### **3. Insurance against injury to persons and damage to property**

- (i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit

per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs. [\*\*\*\*\*]

- (ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:
  - (a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and
  - (b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

#### **4. *Insurance to be in joint names***

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.



## **Schedule-Q**

*(See Clause 14.10)*

### **Tests on Completion of Maintenance Period**

**1. *Riding Quality test:***

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (two thousand and two hundred only)] mm for each kilometre.

**2. *Visual and physical test:***

**2.1.1.1 The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and shall be as per the requirement of maintenance mentioned in Schedule-E.**

## Schedule-R

(See Clause 14.10)

### 3. Taking Over Certificate

I, ..... (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated ..... (the "**Agreement**"), for **Construction of two lane with hard shoulder of Kohima-Jessami Road on NH-29 (Old NH-150) from existing km 98.380 (near Chizami Village) to existing km 120.367 (Nagaland/Manipur Border) [Design Km 95.700 to design Km 117.200] [Design Length – 21.500 Km] in the state of Nagaland Under Bharatmala Pariyojna on EPC Mode (Package V) (the "Project Highway")** on Engineering, Procurement and Construction (EPC) basis through ..... (Name of Contractor), hereby certify that the Tests on completion of

Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

**3.1.1 \*\*\*\*\* *End of the Document* \*\*\*\*\***

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