

Dated: 02.01.2020

Addendum no- 1

Name of Work: Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 130+000 to Km 141+029 (Package-4B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode

Package-4B: from Km 130+000 to Km 141+029

Tender ID: 2019_NHIDC_531271_1

Sr. No	Reference	Addendum
1	Tender ID: 2019_NHIDC_531271_1	Schedules from A to R



(KC Bhatt)
Dy. General Manager (Tech)

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.
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Annex –I

(Schedule-A)

Site

[Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I. All the chainages/ location referred to in Annex-I to Schedule-A shall be existing chainages.]

1. Site

The Site of the [Two-Lane] Project Highway comprises the section of NH-102B commencing from km 149+630 to km 161+440 in Sinzawl Village in the state of Manipur. The land, carriageway and structures comprising the Site are described below.

2. Land

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

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
1	149+630	149+700	6.7	
2	149+700	149+800	6.1	
3	149+800	149+900	5.6	
4	149+900	150+000	6.8	
5	150+000	150+100	5.5	
6	150+100	150+200	6.1	
7	150+200	150+300	5.4	
8	150+300	150+400	8.6	
9	150+400	150+500	6.3	
10	150+500	150+600	6.7	
11	150+600	150+700	7.7	
12	150+700	150+800	7.3	
13	150+800	150+900	7.5	
14	150+900	151+000	5.1	
15	151+000	151+100	7.1	
16	151+100	151+200	7.2	
17	151+200	151+300	9.9	
18	151+300	151+400	8.9	
19	151+400	151+500	9.7	
20	151+500	151+600	8.8	
21	151+600	151+700	6.4	
22	151+700	151+800	7.5	
23	151+800	151+900	7.9	
24	151+900	152+000	7.9	
25	152+000	152+100	6.5	
26	152+100	152+200	6.4	
27	152+200	152+300	6.3	
28	152+300	152+400	6.6	
29	152+400	152+500	8.5	
30	152+500	152+600	8.4	
31	152+600	152+700	7.7	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
32	152+700	152+800	7.9	
33	152+800	152+900	8.4	
34	152+900	153+000	6.2	
35	153+000	153+100	7.3	
36	153+100	153+200	6.8	
37	153+200	153+300	8.4	
38	153+300	153+400	9.2	
39	153+400	153+500	8.0	
40	153+500	153+600	8.4	
41	153+600	153+700	7.9	
42	153+700	153+800	8.9	
43	153+800	153+900	9.0	
44	153+900	154+000	8.4	
45	154+000	154+100	8.8	
46	154+100	154+200	6.0	
47	154+200	154+300	6.3	
48	154+300	154+400	6.9	
49	154+400	154+500	6.8	
50	154+500	154+600	6.5	
51	154+600	154+700	7.3	
52	154+700	154+800	6.9	
53	154+800	154+900	8.0	
54	154+900	155+000	8.1	
55	155+000	155+100	9.9	
56	155+100	155+200	6.3	
57	155+200	155+300	6.7	
58	155+300	155+400	8.2	
59	155+400	155+500	8.5	
60	155+500	155+600	6.6	
61	155+600	155+700	6.1	
62	155+700	155+800	8.1	
63	155+800	155+900	8.5	
64	155+900	156+000	8.1	
65	156+000	156+100	8.6	
66	156+100	156+200	7.4	
67	156+200	156+300	10.2	
68	156+300	156+400	7.2	
69	156+400	156+500	7.0	
70	156+500	156+600	7.1	
71	156+600	156+700	8.6	
72	156+700	156+800	8.8	
73	156+800	156+900	9.6	
74	156+900	157+000	4.5	
75	157+000	157+100	7.4	
76	157+100	157+200	8.5	
77	157+200	157+300	8.2	
78	157+300	157+400	6.9	
79	157+400	157+500	5.0	
80	157+500	157+600	8.4	
81	157+600	157+700	5.2	
82	157+700	157+800	8.1	
83	157+800	157+900	6.9	
84	157+900	158+000	9.4	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
85	158+000	158+100	7.8	
86	158+100	158+200	10.4	
87	158+200	158+300	7.3	
88	158+300	158+400	6.5	
89	158+400	158+500	7.8	
90	158+500	158+600	8.3	
91	158+600	158+700	7.6	
92	158+700	158+800	9.0	
93	158+800	158+900	8.7	
94	158+900	159+000	8.8	
95	159+000	159+100	6.7	
96	159+100	159+200	8.5	
97	159+200	159+300	6.8	
98	159+300	159+400	6.9	
99	159+400	159+500	7.9	
100	159+500	159+600	8.7	
101	159+600	159+700	8.7	
102	159+700	159+800	7.4	
103	159+800	159+900	8.0	
104	159+900	160+000	6.9	
105	160+000	160+100	6.7	
106	160+100	160+200	7.0	
107	160+200	160+300	6.5	
108	160+300	160+400	8.1	
109	160+400	160+500	9.7	
110	160+500	160+600	8.6	
111	160+600	160+700	9.7	
112	160+700	160+800	6.4	
113	160+800	160+900	5.3	
114	160+900	161+000	7.2	
115	161+000	161+100	6.3	
116	161+100	161+200	7.3	
117	161+200	161+300	7.1	
118	161+300	161+440	6.9	

3. Carriageway

The present carriageway of the Project Highway is Two Lane from km 149+630 to km 161+440. The type of the existing pavement is [flexible].

4. Major Bridges

The Site includes the following Major Bridges: -

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
1	161+300	Open	Wall	Bailey Bridge	1x78.00	4.9

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

The Site includes the following ROB (road over railway line)/RUB (road under railway line):

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
Nil						

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location(km)	Remarks
Nil		

9. Underpasses (vehicular, non- vehicular)

The Site includes the following underpasses:

S. No.	Chainage (km)	Type of Structure	No. of Spans with span length (m)	Width (m)
Nil				

10. Culverts

The Site has the following culverts:

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
1	149.920	HP	1 X 0.9M	
2	150.040	HP	1 X 0.9M	2.5
3	150.233	HP	1 X 1.0M	2.7
4	150.366	HP	1 X 1.0M	3
5	150.621	HP	1 X 1.0M	3.4
6	150.874	HP	1 X 1.0M	
7	151.293	HP	1 X 1.0M	3
8	151.373	HP	1 X 0.9M	3
9	151.429	HP	1 X 1.0M	2.5
10	151.589	HP	1 X 1.0M	2.7
11	151.812	HP	1 X 1.2M	2.5
12	152.422	HP	1 X 0.9M	
13	153.285	HP	1 X 1.0M	
14	153.582	HP	1 X 1.0M	3

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
15	154.075	HP	1 X 0.9M	2.5
16	154.413	HP	1 X 0.9M	2.7
17	154.763	HP	1 X 0.9M	3.4
18	154.802	RCC	1 X 2.6M	3.4
19	154.898	HP	1 X 1.2M	3
20	155.107	RCC	1 X 2.86M	3.4
21	155.270	HP	1 X 1.0M	2.7
22	155.400	HP	1 X 1.0M	
23	155.502	HP	1 X 1.0M	
24	155.580	HP	1 X 1.0M	3
25	155.646	HP	1 X 1.0M	
26	155.680	HP	1 X 1.0M	3.4
27	155.905	RCC	1 X 1.38M	3
28	156.030	HP	1 X 0.9M	3
29	156.199	HP	1 X 0.9M	2.7
30	156.233	HP	1 X 1.2M	3.4
31	156.328	HP	1 X 1.0M	
32	156.574	HP	1 X 0.9M	2.5
33	156.587	HP	1 X 1.2M	2.7
34	156.643	HP	1 X 0.9M	3
35	156.657	HP	1 X 0.9M	3
36	156.740	HP	1 X 0.9M	
37	156.835	HP	1 X 0.9M	3.4
38	157.111	HP	1 X 1.0M	
39	157.212	HP	1 X 1.0M	3
40	157.445	HP	1 X 1.0M	2.5
41	157.485	RCC	1 X 1.282M	
42	157.535	HP	1 X 1.5M	2.7
43	157.745	HP	1 X 1.0M	3
44	157.821	HP	1 X 1.0M	2.5
45	157.975	HP	1 X 1.0M	2.7
46	157.035	HP	1 X 1.0M	3
47	157.190	HP	1 X 1.0M	3.4
48	158.270	HP	1 X 1.0M	
49	158.395	HP	1 X 1.0M	3
50	158.565	HP	1 X 1.0M	
51	158.813	HP	1 X 1.0M	
52	159.018	HP	1 X 1.0M	3
53	159.475	HP	1 X 1.0M	2.5
54	159.660	HP	1 X 1.0M	
55	159.778	HP	1 X 1.0M	2.7
56	159.810	HP	1 X 1.0M	3
57	159.880	HP	1 X 1.0M	3.4
58	160.030	HP	1 X 1.0M	3
59	160.362	HP	1 X 1.0M	
60	160.392	RCC	1 X 4.22M	3
61	160.545	HP	1 X 1.0M	2.5
62	160.930	HP	1 X 1.0M	2.7

11. Bus bays

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

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
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Nil

12. Truck Lay byes

The details of truck lay byes are as follows:

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

13. Roadside drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutchra)
1	149+630	161+440	Earthen (Hill Side)	

14. Major junctions

The details of major junctions are as follows:

Sl. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others
Nil								

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Location		Type of intersection	
	From Km	To Km	T-Junction	Cross Road
Nil				

16. Bypasses

The details of the existing road sections proposed to be bypassed are as follows:

S. No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
Nil			

17. Other structures

[Provide details of other structures, if any.]

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sr. No	From (km)	To (Km)	Length (m)	Total RoW Width (m)	Date of providing RoW
1	130+000	141+029	11029	14-24 m	To be filled by NHIDCL

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.
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Annex – IV

(Schedule-A)

Environment Clearances

Environmental Clearance not required for this project.

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-Lanning 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 **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 130+000 to Km 141+029 (Package-4B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode**

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for [Two Lanning 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 shall be specified in this Schedule. In addition to these particulars all other essential project specific details as required should be provided in order to define the Scope of the Project clearly and precisely.]

1. Widening of the Existing Highway

(i) 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 hilly terrain to the extent land is available.

(ii) Width of Carriageway

(a) Two-Lanning [with] hard shoulders shall be undertaken. The paved carriageway shall be [7(seven) m] wide.

Provided that in the built-up areas: the width of the carriageway shall be as specified in the following table:

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Sinzawl	130.000	141.029	7	As per Attached Drawing	7 m Carriageway

(b) Except as otherwise provided in this Agreement the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

For Mountainous terrain design speed shall be the minimum design speed of 40-60 km/hr and for sharp curve and hair pin bend locations speed reduces up to 30kmph & 20 kmph respectively.

(iii) Improvement of the existing road geometrics

The stretches where design speed reduces below 40 kmph are summarized below:

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	130+099 to 130+112	Sharp Bend	Design Speed = 20 Kmph
2	130+179 to 130+200	Sharp Bend	Design Speed = 20 Kmph
3	130+246 to 130+248	Sharp Bend	Design Speed = 30 Kmph
4	130+294 to 130+317	Sharp Bend	Design Speed = 20 Kmph
5	130+356 to 130+365	Sharp Bend	Design Speed = 20 Kmph
6	130+593 to 130+616	Sharp Bend	Design Speed = 20 Kmph
7	131+086 to 131+131	Sharp Bend	Design Speed = 20 Kmph
8	131+200 to 131+208	Sharp Bend	Design Speed = 30 Kmph
9	131+278 to 131+324	Sharp Bend	Design Speed = 20 Kmph
10	131+394 to 131+403	Sharp Bend	Design Speed = 30 Kmph
11	131+467 to 131+472	Sharp Bend	Design Speed = 20 Kmph
12	131+567 to 131+591	Sharp Bend	Design Speed = 20 Kmph
13	131+701 to 131+741	Sharp Bend	Design Speed = 20 Kmph
14	131+893 to 131+935	Sharp Bend	Design Speed = 30 Kmph
15	132+121 to 132+146	Sharp Bend	Design Speed = 20 Kmph
16	132+210 to 132+222	Sharp Bend	Design Speed = 20 Kmph
17	132+304 to 132+320	Sharp Bend	Design Speed = 20 Kmph
18	132+550 to 132+560	Sharp Bend	Design Speed = 30 Kmph
19	132+624 to 132+660	Sharp Bend	Design Speed = 30 Kmph
20	132+711 to 132+724	Sharp Bend	Design Speed = 30 Kmph
21	132+862 to 132+872	Sharp Bend	Design Speed = 30 Kmph
22	133+419 to 133+478	Sharp Bend	Design Speed = 30 Kmph
23	133+699 to 133+776	Sharp Bend	Design Speed = 30 Kmph
24	133+878 to 133+893	Sharp Bend	Design Speed = 30 Kmph
25	133+984 to 134+016	Sharp Bend	Design Speed = 20 Kmph
26	134+274 to 134+285	Sharp Bend	Design Speed = 30 Kmph
27	134+368 to 134+380	Sharp Bend	Design Speed = 30 Kmph
28	134+564 to 134+596	Sharp Bend	Design Speed = 30 Kmph
29	134+637 to 134+653	Sharp Bend	Design Speed = 30 Kmph
30	134+699 to 134+757	Sharp Bend	Design Speed = 30 Kmph
31	134+959 to 134+981	Sharp Bend	Design Speed = 20 Kmph
32	135+089 to 135+117	Sharp Bend	Design Speed = 20 Kmph
33	135+564 to 135+607	Sharp Bend	Design Speed = 20 Kmph
34	135+662 to 135+740	Sharp Bend	Design Speed = 30 Kmph
35	135+870 to 135+879	Sharp Bend	Design Speed = 20 Kmph
36	135+911 to 135+926	Sharp Bend	Design Speed = 20 Kmph
37	135+998 to 136+025	Sharp Bend	Design Speed = 20 Kmph
38	136+071 to 136+114	Sharp Bend	Design Speed = 20 Kmph
39	136+306 to 136+370	Sharp Bend	Design Speed = 30 Kmph
40	136+482 to 136+500	Sharp Bend	Design Speed = 30 Kmph
41	136+570 to 136+578	Sharp Bend	Design Speed = 30 Kmph
42	136+692 to 136+719	Sharp Bend	Design Speed = 30 Kmph
43	137+267 to 137+309	Sharp Bend	Design Speed = 20 Kmph
44	137+453 to 137+476	Sharp Bend	Design Speed = 30 Kmph
45	137+644 to 137+672	Sharp Bend	Design Speed = 20 Kmph
46	137+715 to 137+750	Sharp Bend	Design Speed = 20 Kmph
47	137+824 to 137+862	Sharp Bend	Design Speed = 20 Kmph
48	137+947 to 138+000	Sharp Bend	Design Speed = 20 Kmph
49	138+137 to 138+183	Sharp Bend	Design Speed = 30 Kmph
50	138+385 to 138+433	Sharp Bend	Design Speed = 20 Kmph
51	138+484 to 138+499	Sharp Bend	Design Speed = 20 Kmph
52	138+555 to 138+569	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
53	138+617 to 138+647	Sharp Bend	Design Speed = 20 Kmph
54	138+736 to 138+741	Sharp Bend	Design Speed = 30 Kmph
55	138+811 to 138+820	Sharp Bend	Design Speed = 30 Kmph
56	138+883 to 138+907	Sharp Bend	Design Speed = 20 Kmph
57	139+018 to 139+025	Sharp Bend	Design Speed = 30 Kmph
58	139+157 to 139+178	Sharp Bend	Design Speed = 30 Kmph
59	139+390 to 139+404	Sharp Bend	Design Speed = 20 Kmph
60	139+445 to 139+449	Sharp Bend	Design Speed = 30 Kmph
61	139+809 to 139+822	Sharp Bend	Design Speed = 20 Kmph
62	139+900 to 139+902	Sharp Bend	Design Speed = 30 Kmph
63	139+972 to 139+987	Sharp Bend	Design Speed = 30 Kmph
64	140+140 to 140+147	Sharp Bend	Design Speed = 20 Kmph
65	140+195 to 140+204	Sharp Bend	Design Speed = 20 Kmph
66	140+264 to 140+269	Sharp Bend	Design Speed = 30 Kmph
67	140+563 to 140+597	Sharp Bend	Design Speed = 30 Kmph
68	140+616 to 140+637	Sharp Bend	Design Speed = 30 Kmph

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 existing right of way and proper road signs and safety Measures shall be provided.

(iv) Right of Way

[Refer to provision of relevant Manual]. Details of the Right of Way are given in Annex-II of Schedule-A.

(v) Type of shoulders

[Refer to provision of relevant Manual and specify]

(a) In built-up sections. footpaths/fully paved shoulders shall be provided in the following stretches:

Sl. No.	Stretch (from Km to Km)	Fully Paved shoulders/footpaths	Reference to cross section
Nil			

(b) Hard shoulders of 1.5 m width shall be provided with selected earth wherever applicable as per TCS drawing.

(c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

- (vi) Lateral and vertical clearances at underpasses
 - (a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per requirements specified in the relevant Manual.
 - (b) Lateral clearance: The width of the opening at the underpasses shall be as follows:

Sl. No.	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks
Nil			

- (vii) Lateral and vertical clearances at overpasses
- (a) Lateral and vertical clearances at overpasses shall be as per requirements specified in the relevant Manual.
- (b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sl. No.	Location (Chainage) (from km to km)	Span/Opening (m)	Remarks
Nil			

- (viii) Service roads
Service roads shall be constructed at the locations and for the lengths indicated below: [Refer requirements specified in the relevant Manual]

Sl. No.	Location of service road (from km to km)	Right hand side (RHS)/Left hand side (LHS)/ or Both sides	Length (km) of service road
Nil			

- (ix) Grade separated structures
- (a) Grade separated structures shall be provided as per provision of the Manual. The requisite are given below:

[Refer to requirements specified in the relevant Manual]

Sl. No.	Location of Structure (VUP)	Length (m)	Number and length of spans	Approach gradient	Remarks, if any
Nil					

- (b) 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: [Refer to provision of the Manual and specify the type of vehicular underpass/ overpass structure and whether the cross road is to be carried at the existing Level, raised or lowered]

Sl. No.	Location	Type of structure Length (m)	Cross road at			Remarks. if any
			Existing Level	Raised Level	Lowered Level	
Nil						

- (x) Cattle and pedestrian underpass /overpass
Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to provision of the relevant Manual and specify the requirements of cattle and pedestrian underpass/overpass]

Sl. No.	Location	Type of crossing
		Nil

- (xi) Typical cross-sections of the Project Highway
[Give typical cross-sections of the Project Highway by reference to the Manual] As per attached Drawings

TCS Type	Description	Length (m)
TCS-1	Two Lane carriageway with hard shoulder in built up area with both side footpath cum RCC covered drain (existing pavement)	0
TCS-2	Two Lane carriageway with hard shoulder and one side toe wall & one side retaining wall (existing pavement)	0
TCS-3	Two Lane carriageway with hard shoulder and one side toe wall (existing pavement)	0
TCS-4	Two Lane carriageway with hard shoulder in rural area (existing pavement)	0
TCS-4A	Two Lane carriageway with hard shoulder in rural area (realignment stretch)	0
TCS-5	Two Lane carriageway with hard shoulder and one side toe wall & one side trapezoidal drain (existing pavement)	600
TCS-5A	Two Lane carriageway with hard shoulder and one side toe wall & one side trapezoidal drain (realignment stretch)	0
TCS-6	Two Lane carriageway with hard shoulder and both side trapezoidal drain (existing pavement)	0
TCS-6A	Two Lane carriageway with hard shoulder and both side trapezoidal drain (realignment stretch)	0
TCS-7	Two Lane carriageway with hard shoulder and one side trapezoidal drain (existing pavement)	2209
TCS-7A	Two Lane carriageway with hard shoulder and one side trapezoidal drain (realignment stretch)	0
TCS-8	Two Lane carriageway with hard shoulder and one side breast wall (existing pavement)	2150
TCS-8A	Two Lane carriageway with hard shoulder and one side breast wall (realignment stretch)	0
TCS-9	Two Lane carriageway with hard shoulder and one side breast wall & one side drain (existing pavement)	500
TCS-9A	Two Lane carriageway with hard shoulder and one side breast wall & one side drain (realignment stretch)	0
TCS-10	Two Lane carriageway with hard shoulder and one side retaining wall (existing pavement)	0
TCS-10A	Two Lane carriageway with hard shoulder and one side retaining wall (realignment stretch)	0
TCS-11	Two Lane carriageway with hard shoulder and one side retaining wall & one side drain (existing pavement)	5070
TCS-11A	Two Lane carriageway with hard shoulder and one side retaining wall & one side drain (realignment stretch)	0
TCS-12	Two Lane carriageway with hard shoulder and one side retaining wall & one breast wall (existing pavement)	400
TCS-12A	Two Lane carriageway with hard shoulder and one side retaining wall & one breast wall (realignment stretch)	0
TCS-13	Two Lane carriageway with hard shoulder and both side retaining wall (existing pavement)	0
TCS-13A	Two Lane carriageway with hard shoulder and both side retaining wall (realignment stretch)	0
TCS-14	Two Lane carriageway with hard shoulder and one side toe wall & one side breast wall (existing pavement)	100
TCS-15	Two Lane carriageway with hard shoulder and both side breast wall (existing pavement)	0
TCS-15A	Two Lane carriageway with hard shoulder and both side breast wall (realignment stretch)	0

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
130000	130220	2.6	217.4	TCS-11
130220	130270		50	TCS-8
130270	130370	7.8	92.2	TCS-11
130370	130470		100	TCS-14
130470	130870	2.6	397.4	TCS-8
130870	130920	2.6	47.4	TCS-11
130920	130970		50	TCS-9
130970	131620	7.9	642.1	TCS-11
131620	131770	2.6	147.4	TCS-7
131770	131970	2.6	197.4	TCS-11
131970	132220	2.6	247.4	TCS-8
132220	132570	8	342	TCS-11
132570	132720		150	TCS-9
132720	133020	5.2	294.8	TCS-11
133020	133120		100	TCS-7
133120	133170	2.6	47.4	TCS-11
133170	133220		50	TCS-5
133220	133320		100	TCS-7
133320	133520	2.7	197.3	TCS-11
133520	133620		100	TCS-8
133620	133920	7.8	292.2	TCS-11
133920	134070		150	TCS-7
134070	134320	2.6	247.4	TCS-5
134320	134420	2.6	97.4	TCS-7
134420	134470	2.6	47.4	TCS-11
134470	134570		100	TCS-8
134570	135220	15.6	634.4	TCS-11
135220	135320	2.6	97.4	TCS-8
135320	135370	2.6	47.4	TCS-11
135370	135470		100	TCS-9
135470	135570	2.7	97.3	TCS-11
135570	135770	2.6	197.4	TCS-8
135770	135870	2.6	97.4	TCS-11
135870	135970	2.7	97.3	TCS-5
135970	136020		50	TCS-8
136020	136320	7.9	292.1	TCS-12
136320	136520	10.6	189.4	TCS-7
136520	136770	7.9	242.1	TCS-11
136770	136820		50	TCS-8
136820	136870		50	TCS-11
136870	136970	2.7	97.3	TCS-7
136970	137620	13.1	636.9	TCS-11
137620	137920	2.6	297.4	TCS-7
137920	137970		50	TCS-5
137970	138470	2.7	497.3	TCS-8
138470	138570	2.6	97.4	TCS-7
138570	138670	2.6	97.4	TCS-8
138670	138720	2.6	47.4	TCS-7
138720	138770		50	TCS-11
138770	138820		50	TCS-7
138820	138870	2.6	47.4	TCS-11
138870	138970		100	TCS-7
138970	139170		200	TCS-9
139170	139470	5.2	294.8	TCS-7
139470	139720	8	242	TCS-11

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
139720	139820	2.7	97.3	TCS-12
139820	140020	2.6	197.4	TCS-8
140020	140170	2.6	147.4	TCS-5
140170	140220		50	TCS-8
140220	140620	5.2	394.8	TCS-11
140620	141029	110	299	TCS-7

3. Intersections and Grade Separators

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

[Refer to provision of the relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]

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

(i) At-grade intersections

Major Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features	Remarks
Nil				

Minor Intersections

Sl. No.	Location of intersection (Km)	Type of intersection	Other features
Nil			

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
Nil				

4. Road Embankment and Cut Section

- (i) 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.

- (ii) Raising of the existing road [Refer to provision of the relevant Manual and specify sections to be raised]

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length (km)	Extent of raising [Top of finished road level]
Nil			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with provision of the relevant manual.

(ii) Type of pavement

Flexible Pavement

(iii) Design requirements

[Refer to provision of the relevant Manual and specify design requirements and strategy]

(a) Design Period and strategy

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.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual. The Contractor shall design the pavement for design traffic of 20 msa.

(iv) Reconstruction of stretches

[Refer to provision of the relevant Manual and specify the stretches if any to be reconstructed.]

The following stretches of the existing road shall be reconstructed. These shall be designed as new pavement.

SL NO.	Stretch from Km to Km	Remarks	TCS Type
1	130+000 to 130+220	Reconstruction	TCS-11
2	130+220 to 130+270	Reconstruction	TCS-8
3	130+270 to 130+370	Reconstruction	TCS-11
4	130+370 to 130+470	Reconstruction	TCS-14
5	130+470 to 130+870	Reconstruction	TCS-8
6	130+870 to 130+920	Reconstruction	TCS-11
7	130+920 to 130+970	Reconstruction	TCS-9
8	130+970 to 131+620	Reconstruction	TCS-11
9	131+620 to 131+770	Reconstruction	TCS-7
10	131+770 to 131+970	Reconstruction	TCS-11
11	131+970 to 132+220	Reconstruction	TCS-8
12	132+220 to 132+570	Reconstruction	TCS-11
13	132+570 to 132+720	Reconstruction	TCS-9
14	132+720 to 133+020	Reconstruction	TCS-11
15	133+020 to 133+120	Reconstruction	TCS-7
16	133+120 to 133+170	Reconstruction	TCS-11
17	133+170 to 133+220	Reconstruction	TCS-5
18	133+220 to 133+320	Reconstruction	TCS-7
19	133+320 to 133+520	Reconstruction	TCS-11
20	133+520 to 133+620	Reconstruction	TCS-8
21	133+620 to 133+920	Reconstruction	TCS-11
22	133+920 to 134+070	Reconstruction	TCS-7
23	134+070 to 134+320	Reconstruction	TCS-5
24	134+320 to 134+420	Reconstruction	TCS-7
25	134+420 to 134+470	Reconstruction	TCS-11
26	134+470 to 134+570	Reconstruction	TCS-8
27	134+570 to 135+220	Reconstruction	TCS-11
28	135+220 to 135+320	Reconstruction	TCS-8

SL NO.	Stretch from Km to Km	Remarks	TCS Type
29	135+320 to 135+370	Reconstruction	TCS-11
30	135+370 to 135+470	Reconstruction	TCS-9
31	135+470 to 135+570	Reconstruction	TCS-11
32	135+570 to 135+770	Reconstruction	TCS-8
33	135+770 to 135+870	Reconstruction	TCS-11
34	135+870 to 135+970	Reconstruction	TCS-5
35	135+970 to 136+020	Reconstruction	TCS-8
36	136+020 to 136+320	Reconstruction	TCS-12
37	136+320 to 136+520	Reconstruction	TCS-7
38	136+520 to 136+770	Reconstruction	TCS-11
39	136+770 to 136+820	Reconstruction	TCS-8
40	136+820 to 136+821	Reconstruction	TCS-11
41	136+870 to 136+822	Reconstruction	TCS-7
42	136+970 to 136+823	Reconstruction	TCS-11
43	137+620 to 136+824	Reconstruction	TCS-7
44	137+920 to 136+825	Reconstruction	TCS-5
45	137+970 to 136+826	Reconstruction	TCS-8
46	138+470 to 136+827	Reconstruction	TCS-7
47	138+570 to 136+828	Reconstruction	TCS-8
48	138+670 to 136+829	Reconstruction	TCS-7
49	138+720 to 136+830	Reconstruction	TCS-11
50	138+770 to 136+831	Reconstruction	TCS-7
51	138+820 to 136+832	Reconstruction	TCS-11
52	138+870 to 136+833	Reconstruction	TCS-7
53	138+970 to 136+834	Reconstruction	TCS-9
54	139+170 to 136+835	Reconstruction	TCS-7
55	139+470 to 136+836	Reconstruction	TCS-11
56	139+720 to 136+837	Reconstruction	TCS-12
57	139+820 to 136+838	Reconstruction	TCS-8
58	140+020 to 136+839	Reconstruction	TCS-5
59	140+170 to 136+840	Reconstruction	TCS-8
60	140+220 to 136+841	Reconstruction	TCS-11
61	140+620 to 136+842	Reconstruction	TCS-7

6. Roadside Drainage

Drainage system including surface and subsurface drains for the Project Highway has been provided in the table given below:

RCC Covered Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
Nil			

RR Masonry Trapezoidal Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
130000	130220	One	217
130270	130370	One	92
130870	130920	One	47
130920	130970	One	50
130970	131620	One	642
131620	131770	One	147
131770	131970	One	197
132220	132570	One	342
132570	132720	One	150

Chainage		Side	Net Length (m)
From (m)	To (m)		
132720	133020	One	295
133020	133120	One	100
133120	133170	One	47
133170	133220	One	50
133220	133320	One	100
133320	133520	One	197
133620	133920	One	292
133920	134070	One	150
134070	134320	Both	247
134320	134420	One	97
134420	134470	One	47
134570	135220	One	634
135320	135370	One	47
135370	135470	One	100
135470	135570	One	97
135770	135870	One	97
135870	135970	One	97
136320	136520	One	189
136520	136770	One	242
136820	136870	One	50
136870	136970	One	97
136970	137620	One	637
137620	137920	One	297
137920	137970	One	50
138470	138570	One	97
138670	138720	One	47
138720	138770	One	50
138770	138820	One	50
138820	138870	One	47
138870	138970	One	100
138970	139170	One	200
139170	139470	One	295
139470	139720	One	242
140020	140170	One	147
140220	140620	One	395
140620	141029	One	299
Total Length =			8117

7. Design of Structures

(i) General

(a) All bridges culverts and structures shall be designed and constructed in accordance with provision of the relevant Manual and shall conform to the cross-sectional features and other details specified therein.

(b) Width of the carriageway of new bridges and structures shall be as follows:

[Refer to provision of the relevant Manual and specify the width of carriageway of new bridges and structures of more than 60 (sixty) metre length. if the carriageway width is different from 7.5 (seven point five) metres in the table below.]

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
1	140+880	Carriageway Width = 11.0 m Overall width = 16.0 m

(c) The following structures shall be provided with footpaths:

[Refer to provision of the relevant Manual and provide details of new Structures with footpath]

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
1	140+880	Carriageway Width = 11.0 m Width of Footpath = 2 X 1.5 m Overall width = 16.0 m

(d) All bridges shall be high-level bridges.

[Refer to provision of the relevant Manual and state if there is any exception]

(e) The following structures shall be designed to carry utility services specified in Table below:

[Refer to provision of the relevant Manual and provide details]

Sl. No.	Bridge at km	Utility service to be carried	Remarks
Nil			

(f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in provision of the relevant Manual.

(ii) Culverts

(a) Overall width of all culverts shall be equal to the roadway width of the approaches.

(b) Reconstruction of existing culverts:

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

[Refer to provision of the relevant Manual and provide details]

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
1	130.282	2.0 X 2.0	Single Span
2	130.360	2.0 X 2.0	Single Span
3	130.905	2.0 X 2.0	Single Span
4	131.112	2.0 X 3.0	Single Span
5	131.503	2.0 X 2.0	Single Span
6	131.639	2.0 X 2.0	Single Span
7	131.779	2.0 X 2.0	Single Span
8	132.002	2.0 X 2.0	Single Span
9	132.562	2.0 X 3.0	Single Span
10	133.335	2.0 X 3.0	Single Span
11	133.625	2.0 X 2.0	Single Span
12	134.081	2.0 X 2.0	Single Span
13	134.414	2.0 X 2.0	Single Span
14	134.751	2.0 X 2.0	Single Span
15	134.883	2.0 X 2.0	Single Span
16	135.072	2.0 X 2.0	Single Span
17	135.233	2.0 X 2.0	Single Span
18	135.333	2.0 X 2.0	Single Span
19	135.560	2.0 X 3.0	Single Span
20	135.590	2.0 X 2.0	Single Span
21	135.805	2.0 X 2.0	Single Span
22	135.927	2.0 X 3.0	Single Span
23	136.084	2.0 X 2.0	Single Span
24	136.140	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
25	136.216	2.0 X 3.0	Single Span
26	136.420	2.0 X 3.0	Single Span
27	136.432	2.0 X 3.0	Single Span
28	136.483	2.0 X 2.0	Single Span
29	136.498	2.0 X 2.0	Single Span
30	136.572	2.0 X 3.0	Single Span
31	136.662	2.0 X 2.0	Single Span
32	136.924	2.0 X 3.0	Single Span
33	137.250	2.0 X 3.0	Single Span
34	137.282	2.0 X 2.0	Single Span
35	137.325	2.0 X 2.0	Single Span
36	137.910	2.0 X 2.0	Single Span
37	137.975	2.0 X 3.0	Single Span
38	138.485	2.0 X 2.0	Single Span
39	138.662	2.0 X 2.0	Single Span
40	139.392	2.0 X 2.0	Single Span
41	139.421	2.0 X 2.0	Single Span
42	139.486	2.0 X 2.0	Single Span
43	139.630	2.0 X 3.0	Single Span
44	139.977	2.0 X 2.0	Single Span
45	140.120	2.0 X 2.0	Single Span
46	140.502	2.0 X 2.0	Single Span

*[Specify modifications, if any, required in the road level, etc.]

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the Roadway width of the Project Highway as per the typical cross section given in provision of the relevant Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
Nil			

(d) Additional new culverts shall be constructed as per particulars given in the table below:

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
1	130.093	2.0 X 2.0	Single Span
2	130.308	2.0 X 2.0	Single Span
3	130.778	2.0 X 2.0	Single Span
4	131.212	2.0 X 2.0	Single Span
5	132.248	2.0 X 2.0	Single Span
6	132.420	2.0 X 3.0	Single Span
7	132.786	2.0 X 2.0	Single Span
8	132.984	2.0 X 2.0	Single Span
9	133.167	2.0 X 2.0	Single Span
10	133.681	2.0 X 2.0	Single Span
11	133.788	2.0 X 2.0	Single Span
12	134.461	2.0 X 2.0	Single Span
13	134.652	2.0 X 2.0	Single Span
14	134.932	2.0 X 2.0	Single Span
15	135.190	2.0 X 2.0	Single Span
16	136.724	2.0 X 2.0	Single Span
17	137.158	2.0 X 2.0	Single Span
18	137.378	2.0 X 2.0	Single Span
19	138.711	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
20	138.854	2.0 X 2.0	Single Span
21	139.673	2.0 X 3.0	Single Span
22	139.747	2.0 X 3.0	Single Span
23	140.300	2.0 X 2.0	Single Span

- (e) Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

[Refer provision of the relevant Manual and provide details]

Sl. No.	Location at km	Type of repair required
Nil		

- (f) Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

- (iii) Bridges

- (a) Existing bridges to be re-constructed/widened

[(i) The existing bridges at the following locations shall be re-constructed as new Structures]

[Refer provision of the relevant Manual and provide details]

Sl. No.	Bridge location (km)	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Remarks
		Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	140.880	RCC T BEAM	1 X 78m	Insufficient width and not conform to IRC Loading	

- (ii) The following narrow bridges shall be widened:

Sl. No.	Location (km)	Existing width (m)	Extent of widening (m)	Cross-section at deck level for widening @
Nil				

- (b) Additional new bridges

[Specify additional new bridges if required. And attach GAD]

New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

Sl. No.	Location (km)	Total Length (m)	Remarks. If any
Nil			

- (c) The railings of existing bridges shall be replaced by crash barriers at the following locations:

[Refer provision of the relevant Manual and provide details:]

Sl. No.	Location at km	Remarks
Nil		

- (d) Repairs/replacements of railing/parapets of the existing bridges shall be

undertaken as follows:

[Refer to provision of the relevant Manual and provide details]

Sl. No.	Location at km	Remarks
Nil		

- (e) Drainage system for bridge decks

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

- (f) Structures in marine environment

[Refer to provision of the relevant Manual and specify the necessary measures / treatments for protecting structures in marine environment. Where applicable]

- (v) Rail-road bridges

- (a) Design construction and detailing of ROB/RUB shall be as specified in provision of the relevant Manual [Refer to provision of the relevant Manual and specify modification, if any]

- (b) 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 (Chainage km)	Length of bridge (m)
Nil		

- (c) 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 (Chainage km)	Number and length of span (m)
Nil		

- (v) Grade separated structures

[Refer provision of the relevant Manual]

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2(ix) and 3 of this Annex-I.

- (vi) Repairs and strengthening of bridges and structures

[Refer to provision of the relevant Manual and provide details]

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.	Location of bridge (km)	Nature and extent of repairs /strengthening to be carried out
Nil		

(b) ROB / RUB

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs/strengthening to be carried out
Nil		

(c) Overpasses/Underpasses and other structures

Sl. No.	Location of Structure (km)	Nature and extent of repairs /strengthening to be carried out
Nil		

(vii) List of Major Bridges and Structures

The following is the list of the Major Bridges and Structures:

Sl. No.	Location (Km)
1	140.880 (Span: 1X10+1 x 90+1X10m)

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with provisions of relevant Manual.

Sl. No	Traffic Signages, Road Marking and other appurtenances	unit	Quantity
1	Total No of Street Light=	Nos	10
2	Kilometre stones=	Nos	9
3	5th Kilometre stones=	Nos	2
4	Boundary Stones=	Nos	113
5	Delineators (100 cm long and circular shaped) + Hazard marker =	Nos	950
6	Road Stud=	Nos	4758
7	900 mm Octagonal	Nos	3
8	600 mm circular	Nos	44
9	900 mm Triangular	Nos	69
10	800 mm x 600 mm rectangular	Nos	6
11	Direction Sign < 0.9 sqm	sqm	257
12	Direction Sign > 0.9 sqm	sqm	4
13	Convex Mirror for Blind Curve	Nos	5
14	Rumble Strip=	sqm	21

(ii) Specifications of the reflective sheeting. [Refer to provision of relevant Manual and specify]

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with article 8(i) of this schedule.

(ii) Overhead traffic signs: location and size

Sl. No.	Location (Km)	Size
Nil		

10. Compulsory Afforestation

[Refer to provision of relevant Manual and specify the number of trees which are required to be planted by the concerned department as compensatory afforestation.]

11. Hazardous Locations

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

a) Breast Wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
130220	130270	One	50
130370	130470	One	100
130470	130870	One	397
130920	130970	One	50
131970	132220	One	247
132570	132720	One	150
133520	133620	One	100
134470	134570	One	100
135220	135320	One	97
135370	135470	One	100
135570	135770	One	197
135970	136020	One	50
136020	136320	One	292
136770	136820	One	50
137970	138470	One	497
138570	138670	One	97
138970	139170	One	200
139720	139820	One	97
139820	140020	One	197
140170	140220	One	50
Total Length =			3121

b) Retaining Wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
130000	130220	One	217
130970	131620	One	642
131770	131970	One	197
132220	132570	One	342
132720	133020	One	295
133320	133520	One	197
133620	133920	One	292
134420	134470	One	47
134570	135220	One	634
135770	135870	One	97
136020	136320	One	292
136520	136770	One	242
136820	136870	One	50
136970	137620	One	637
138720	138770	One	50
138820	138870	One	47
139470	139720	One	242
139720	139820	One	97
130270	130370	One	92
130870	130920	Both	47
133120	133170	One	47
135320	135370	One	47
135470	135570	One	97
140220	140620	One	395
Total Length =			5347

c) Toe wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
130370	130470	One	100
133170	133220	One	50
134070	134320	One	247
135870	135970	One	97
137920	137970	One	50
140020	140170	One	147
Total Length =			692

d) Metal Beam Crash Barrier

Chainage		Side	Net Length (m)
From (m)	To (m)		
130000	130220	One	217
130270	130370	One	92
130370	130470	One	100
130870	130920	One	47
130970	131620	One	642
131770	131970	One	197
132220	132570	One	342
132720	133020	One	295
133120	133170	One	47
133170	133220	One	50
133320	133520	One	197
133620	133920	One	292
134070	134320	One	247
134420	134470	One	47
134570	135220	One	634
135320	135370	One	47
135470	135570	One	97
135770	135870	One	97
135870	135970	One	97
136020	136320	One	292
136520	136770	One	242
136820	136870	One	50
136970	137620	One	637
137920	137970	One	50
138720	138770	One	50
138820	138870	One	47
139470	139720	One	242
139720	139820	One	97
140020	140170	One	147
140220	140620	One	395
Total Length =			6039

For Bridge Approaches = 100 m
(Taking 50 m each Approach)

Total length of crash barrier = 6139 m

12. Special Requirement for Hill Roads

[Refer to the provision of relevant Manual and provide details where relevant and required.]

13. Change of Scope

The length of Structures and bridges specified here in above shall be treated as an approximate assessment. The actual lengths as required based on detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this 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.

(Schedule-B1)

1. The shifting of utilities and felling of trees shall be carried out by the concerned department. The cost of the same shall be borne by the Authority.

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

- (a) Toll plaza[s]
- (b) Roadside furniture;
- (c) Pedestrian facilities;
- (d) Truck Lay byes;
- (e) Bus-bays and passenger shelters;
- (f) Rest areas; and
- (g) Others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plaza: -

Sl. No.	Design Chainage(km)	Name of the Place
Nil		

b) Road side furniture: -

Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	Km Stone, 5th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule B	As per Manual
5	Metal beam crash barrier	As per Schedule B	As per Manual

c) Pedestrian Facility: -

Pedestrian facilities in the form of foot path shall be provided in the built-up area (refer typical cross – section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL.

d) Truck Lay bye: -

Sl. No.	Truck lay bye Chainage(Both Side)	Name of the Place
Nil		

e) Bus Bay & Passenger shelter: -

Sl. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
Nil				

f) Rest Areas

Sl. No.	Rest Area Chainage	Name of the Place
Nil		

g) Others to be specified

Street Lighting:

Total 10 Nos. Street lighting shall be provided in junction, passenger shelters & bridge locations.

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

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:

[Manual of Specifications and Standards for Two Lanning of Highways (IRC: SP: 73-2018), referred to herein as the Manual]

[Note: Specify the relevant Manual, Specifications and Standards]

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for [Two-Lanning of Highways (IRC:SP:73-2018)], referred to as the Manual, and MORTH Specifications for Road and Bridge Works. 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

(i) The terms “Concessionaire”, “Independent Engineer” and “Concession Agreement” used in the Manual shall be deemed to be substituted by the terms “Contractor”, “Authority's Engineer” and “Agreement” respectively.

(ii) [Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:]

Item	Manual Clause Reference	Provision as per Manual					Modified Provision				
Shoulder	2.6	<u>Mountainous Terrain</u>					<u>Mountainous Terrain</u>				
		Type of Section		Width of Shoulder (m)			Type of Section		Width of Shoulder (m)		
				Paved	Earthen	Total			Paved	Earthen	Total
		Open Country with Isolated Built-up Area	Hill Side	1.5	-	1.5	Open Country with Isolated Built-up Area	Hill Side	-	-	-
			Valley Side	1.5	1	2.5		Valley Side	-	Up to 1.0 m	1
		Built-up Area and Approaches to grade separated structures/	Hill Side	0.25 m + 1.5 m (Raised)	-	1.75	Built-up Area and Approaches to grade separated structures/	Hill Side	-	-	-
			bridges	Valley Side	0.25 m + 1.5 m (Raised)	-		1.75	bridges	Valley Side	-
Design Speed	2.2	<u>Mountainous Terrain:</u> Ruling : 60 Kmph Minimum : 40 Kmph					<u>Mountainous Terrain:</u> Design Speed followed 40-60 kmph in general. However design speed has been reduced to 20 kmph due to site constraints and to accommodate the proposal within EROW. (Refer Horizontal Alignment Drawing and Table 1.1 below)				
Extra Widening	2.7	Extra Widening has been proposed as per IRC: SP: 73-2015					Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.				
		Radius	Extra Widening				Radius	Extra Widening			
		75-100 m	0.9 m				21-40 m	1.5 m			
		101-300 m	0.6 m				41-60 m	1.2 m			
							61-100 m	0.9 m			
							75-100 m	0.9 m			
							101-300 m	0.6 m			

Item	Manual Clause Reference	Provision as per Manual	Modified Provision		
			Above 300 m	NIL	
Radii Of Horizontal Curve	2.9.4	Mountainous Terrain: Desirable Minimum Radius: 150 m Absolute Minimum Radius: 75 m	Radius below 75 m has been provided in the location listed in table 1.		

Table 1.1: Locations where Design Speed is less than 40 kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	130+099 to 130+112	Sharp Bend	Design Speed = 20 Kmph
2	130+179 to 130+200	Sharp Bend	Design Speed = 20 Kmph
3	130+246 to 130+248	Sharp Bend	Design Speed = 30 Kmph
4	130+294 to 130+317	Sharp Bend	Design Speed = 20 Kmph
5	130+356 to 130+365	Sharp Bend	Design Speed = 20 Kmph
6	130+593 to 130+616	Sharp Bend	Design Speed = 20 Kmph
7	131+086 to 131+131	Sharp Bend	Design Speed = 20 Kmph
8	131+200 to 131+208	Sharp Bend	Design Speed = 30 Kmph
9	131+278 to 131+324	Sharp Bend	Design Speed = 20 Kmph
10	131+394 to 131+403	Sharp Bend	Design Speed = 30 Kmph
11	131+467 to 131+472	Sharp Bend	Design Speed = 20 Kmph
12	131+567 to 131+591	Sharp Bend	Design Speed = 20 Kmph
13	131+701 to 131+741	Sharp Bend	Design Speed = 20 Kmph
14	131+893 to 131+935	Sharp Bend	Design Speed = 30 Kmph
15	132+121 to 132+146	Sharp Bend	Design Speed = 20 Kmph
16	132+210 to 132+222	Sharp Bend	Design Speed = 20 Kmph
17	132+304 to 132+320	Sharp Bend	Design Speed = 20 Kmph
18	132+550 to 132+560	Sharp Bend	Design Speed = 30 Kmph
19	132+624 to 132+660	Sharp Bend	Design Speed = 30 Kmph
20	132+711 to 132+724	Sharp Bend	Design Speed = 30 Kmph
21	132+862 to 132+872	Sharp Bend	Design Speed = 30 Kmph
22	133+419 to 133+478	Sharp Bend	Design Speed = 30 Kmph
23	133+699 to 133+776	Sharp Bend	Design Speed = 30 Kmph
24	133+878 to 133+893	Sharp Bend	Design Speed = 30 Kmph
25	133+984 to 134+016	Sharp Bend	Design Speed = 20 Kmph
26	134+274 to 134+285	Sharp Bend	Design Speed = 30 Kmph
27	134+368 to 134+380	Sharp Bend	Design Speed = 30 Kmph
28	134+564 to 134+596	Sharp Bend	Design Speed = 30 Kmph
29	134+637 to 134+653	Sharp Bend	Design Speed = 30 Kmph
30	134+699 to 134+757	Sharp Bend	Design Speed = 30 Kmph
31	134+959 to 134+981	Sharp Bend	Design Speed = 20 Kmph
32	135+089 to 135+117	Sharp Bend	Design Speed = 20 Kmph
33	135+564 to 135+607	Sharp Bend	Design Speed = 20 Kmph
34	135+662 to 135+740	Sharp Bend	Design Speed = 30 Kmph
35	135+870 to 135+879	Sharp Bend	Design Speed = 20 Kmph
36	135+911 to 135+926	Sharp Bend	Design Speed = 20 Kmph
37	135+998 to 136+025	Sharp Bend	Design Speed = 20 Kmph
38	136+071 to 136+114	Sharp Bend	Design Speed = 20 Kmph
39	136+306 to 136+370	Sharp Bend	Design Speed = 30 Kmph
40	136+482 to 136+500	Sharp Bend	Design Speed = 30 Kmph
41	136+570 to 136+578	Sharp Bend	Design Speed = 30 Kmph
42	136+692 to 136+719	Sharp Bend	Design Speed = 30 Kmph
43	137+267 to 137+309	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
44	137+453 to 137+476	Sharp Bend	Design Speed = 30 Kmph
45	137+644 to 137+672	Sharp Bend	Design Speed = 20 Kmph
46	137+715 to 137+750	Sharp Bend	Design Speed = 20 Kmph
47	137+824 to 137+862	Sharp Bend	Design Speed = 20 Kmph
48	137+947 to 138+000	Sharp Bend	Design Speed = 20 Kmph
49	138+137 to 138+183	Sharp Bend	Design Speed = 30 Kmph
50	138+385 to 138+433	Sharp Bend	Design Speed = 20 Kmph
51	138+484 to 138+499	Sharp Bend	Design Speed = 20 Kmph
52	138+555 to 138+569	Sharp Bend	Design Speed = 20 Kmph
53	138+617 to 138+647	Sharp Bend	Design Speed = 20 Kmph
54	138+736 to 138+741	Sharp Bend	Design Speed = 30 Kmph
55	138+811 to 138+820	Sharp Bend	Design Speed = 30 Kmph
56	138+883 to 138+907	Sharp Bend	Design Speed = 20 Kmph
57	139+018 to 139+025	Sharp Bend	Design Speed = 30 Kmph
58	139+157 to 139+178	Sharp Bend	Design Speed = 30 Kmph
59	139+390 to 139+404	Sharp Bend	Design Speed = 20 Kmph
60	139+445 to 139+449	Sharp Bend	Design Speed = 30 Kmph
61	139+809 to 139+822	Sharp Bend	Design Speed = 20 Kmph
62	139+900 to 139+902	Sharp Bend	Design Speed = 30 Kmph
63	139+972 to 139+987	Sharp Bend	Design Speed = 30 Kmph
64	140+140 to 140+147	Sharp Bend	Design Speed = 20 Kmph
65	140+195 to 140+204	Sharp Bend	Design Speed = 20 Kmph
66	140+264 to 140+269	Sharp Bend	Design Speed = 30 Kmph
67	140+563 to 140+597	Sharp Bend	Design Speed = 30 Kmph
68	140+616 to 140+637	Sharp Bend	Design Speed = 30 Kmph

Table 1.2: Locations where Radii of Horizontal Curve is less than 75 m

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
1	1136	130.099	130.112	50
2	1137	130.179	130.200	20
3	1138	130.246	130.248	60
4	1139	130.294	130.317	20
5	1140	130.356	130.365	40
6	1142	130.593	130.616	30
7	1145	131.086	131.131	30
8	1146	131.200	131.208	60
9	1147	131.278	131.324	40
10	1148	131.394	131.403	60
11	1149	131.467	131.472	50
12	1150	131.567	131.591	20
13	1151	131.701	131.741	30
14	1152	131.893	131.935	50
15	1153	132.121	132.146	20
16	1154	132.210	132.222	40
17	1155	132.304	132.320	40
18	1157	132.550	132.560	60
19	1158	132.624	132.660	40
20	1159	132.711	132.724	60
21	1163	133.419	133.478	50
22	1164	133.699	133.776	60

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
23	1165	133.878	133.893	60
24	1166	133.984	134.016	20
25	1168	134.274	134.285	50
26	1169	134.368	134.380	50
27	1171	134.564	134.596	60
28	1172	134.637	134.653	60
29	1173	134.699	134.757	60
30	1174	134.959	134.981	20
31	1175	135.089	135.117	40
32	1176	135.564	135.607	50
33	1177	135.662	135.740	60
34	1178	135.870	135.879	30
35	1179	135.911	135.926	30
36	1180	135.998	136.025	30
37	1181	136.071	136.114	30
38	1182	136.306	136.370	40
39	1183	136.482	136.500	40
40	1184	136.570	136.578	60
41	1185	136.692	136.719	50
42	1186	136.836	136.898	60
43	1189	137.267	137.309	25
44	1190	137.453	137.476	50
45	1191	137.644	137.672	20
46	1192	137.715	137.750	30
47	1193	137.824	137.862	30
48	1194	137.947	138.000	30
49	1195	138.137	138.183	50
50	1197	138.385	138.433	30
51	1198	138.484	138.499	20
52	1199	138.555	138.569	20
53	1200	138.617	138.647	20
54	1201	138.736	138.741	50
55	1202	138.811	138.820	50
56	1203	138.883	138.907	20
57	1204	139.018	139.025	50
58	1205	139.157	139.178	50
59	1207	139.390	139.404	30
60	1209	139.550	139.586	50
61	1210	139.809	139.822	50
62	1211	139.900	139.902	40
63	1212	139.972	139.987	30
64	1213	140.140	140.147	30
65	1214	140.195	140.204	30
66	1215	140.264	140.269	50
67	1219	140.771	140.809	30
68	1220	140.944	140.999	50

(iii) [Note1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.]

Schedule - E

(See Clauses 2.1 and 14.2)

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 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

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.

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.

Table -1: Maintenance Criteria for Pavements:

Asset Type	Perform ance Paramet er	Level of Service (LOS)		Frequ ency of Inspect ion	Tools/Equip ment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintena nce Specificati ons
		Desirable	Accepta ble					

Flexible Pavement (Pavement of MCW, Service Road, approache	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measuremen t Unit like Scale, Tape, odometer etc.	IRC 82:2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrcc.com/pavement/ltp/reports/03031/)	24-48 hours	MORT&H Specifcation 3004.2
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Asset Type		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					
	Performance Parameter							
sofGrade structure, approaches of connecting roads, slip roads, lay byes etc. as	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3

applicable)	Rutting	Nil	< 5 mm	Daily	Straight Edge	15 -30 days	MORT&H Specificatio n 3004.2
	Corrugatio ns and Shoving	Nil	< 0.1 % of area	Daily	Length Measuremen t Unit like	2-7 days	IRC:82- 2015

Asset Type		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					
	Performance Parameter							
Bleeding			< 1 % of area		Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
		Nil		Daily				
Ravelling /			< 1 % of area				7-15 days	IRC:82-2015 read with IRC SP 81

	Stripping	Nil		Daily		
	Edge Deformation/ Breaking	Nil	<p>< 1 m for any 100 m section and width < 0.1 m at any location, restricted</p>	Daily	7- 15 days	IRC:82-2015

Asset Type		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					
	Performance Parameter							
			ed 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	180 days	IRC:82-2015
	Skid			Bi-Annually	SCRIM (Sideway-		180	

Number	60SN	50SN		force Coefficient Routine Investigation Machine or equivalent)	ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	days	BS: 7941-1: 2006
Pavement Condition Index	3	2.1	Bi- Annuall y			180 days	IRC:82- 2015

Asset Type		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					
	Performance Parameter							
	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

Rigid Pavement (Pavement of MCW) Service Road, Grade structure,	Roughness BI	2200m m/km	2400mm /km	Bi- Annuall y	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- Annuall y	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					
		Minimum SN	Traffic Speed (Km/h)		Coefficient Routine Investigation Machine or equivalent)			
approaches of connecting roads, slip roads, lay byes etc. as applicable)		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					
	Edge drop at shoulders	Nil	40mm	Daily			7-15 days	MORT&H Specification 408.4

Embankment/ Slope	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	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		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					
	Performance Parameter							
			side slope					
	Embankment Protection	Nil	Nil	Daily	N A		7-15 days	MORT&H Specification

	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Speciall y During Rainy Season	N A		7-15 days	MORT&H Specification
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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						
	Single Discrete	w = width of crack L = length of crack d =	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, and stitch if $L >$

1	Cracks intersecting with any joint	Not any	depth of crack D = depth of slab	3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Seal without delay	lm. Within 7days
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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	$w = 1.5 - 3.0 \text{ mm}$		Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	$w > 3 \text{ mm.}$	Seal, and stitch if $L > 1 \text{ m.}$ Within 7 days	Within 15days
			0	Nil, not discernible	No Action	
			1	$w < 0.2 \text{ mm}$, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
	Single Transverse (or	$w = \text{width of crack}$ L	2	$w = 0.2 - 0.5 \text{ mm}$, discernible from slow vehicle	Within 7 days	Within 15days

2	Diagonal) intersecting with one or more joints	Crack = length of crack d = depth of crack D = depth of slab	3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
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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.
			5	$w > 6 \text{ mm}$, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			0	Nil, not discernible	No Action	

3	Single Crack with one or more joints	Longitudinal intersecting	w = width of crack L = length of crack d = depth of crack D = depth of slab	1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
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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	
			4	$w = 6.0 - 12.0$ mm, usually associated with spalling		Partial Depth Repair with stapling. Within 15 days

			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -
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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
			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		

4	Multiple Cracks intersecting with one or more joints	w=width of crack	4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces	Full depth repair within 15 days	Dismantle, Reinstall subbase, Reconstruct whole slab as per specifications within 30 days
			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		
			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		

5	Corner Break	w = width of crack L = length of crack	4	w > 1.5 mm; L > 0.6 m or three corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			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
	Punchout (Applicable to Continuous Reinforced Concrete Pavement)		0	Nil, not discernible		No Action
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$		Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$		
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$		

6	only)	(CRCP)	w = width of crack L = length (m/m2)	4	w > 3 mm, L < 3 m/m ² and deformation	Not Applicable, as it may be full depth	Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
				5	w > 3 mm, L > 3 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						
	Ravelling	$r = \frac{\text{area damaged surface}}{\text{total surface of slab}} \times 100\%$	0	Nil, not discernible	No action.	
			1	$r < 2 \%$	Local repair of areas damaged	
			2	$r = 2 - 10 \%$	and liable to be damaged.	

7	Honeycomb surface	type	maximum depth of damage			Within 15 days	Not Applicable
				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	
		r = damaged	0	Nil, not discernible	Short Term	Long Term
					No action.	

8	Scaling	surface/total surface of slab (%) h = maximum depth of damage	1	$r < 2 \%$	Local repair of areas damaged	Not Applicable
			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	
			0		No action.	
			1	$t > 1 \text{ mm}$		

9	Polished Surface/Glazing	t = texture depth, sand patch test	2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	Not Applicable
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 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	$t < 0.1 \text{ mm}$	<p>Diamond Grinding if affecting</p> <p>50% or more slabs in a</p> <p>continuous stretch of minimum</p> <p>5 km.</p> <p>Within 30 days</p>	

10	Popout (Small Hole) Pothole Refer Para 8.4	n = number/m ² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m ²	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m ²	Partial depth repair 65 mm deep.	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 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 m^2	Partial depth repair 110mm	
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1$ per 5 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 m^2	Full depth repair. Within 30 days	

Joint Defects						
					Short Term	Long Term
					No action.	
					Clean joint, inspect later.	
					Clean and reapply sealant in selected locations.	

1 1	Joint Seal Defects	joint length	3	incompressible material.	Within 7 days	Not Applicable
			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	

				and trapping incompressible material.		
12	Spalling of Joints	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	
					50 - 100 mm deep repair. H = w + 20% of w.	

			5	w > 80 mm, and L > 25%	Within 30 days	
13	Faulting (or Stepping)	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. Within 30days
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	
			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	
					Short Term	Long Term
			0	Nil, not discernible		

14	Blowup or Buckling	h = vertical displacement from normal profile	1	$h < 6 \text{ mm}$	No Action	
			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	
			0	Not discernible, h < 5 mm	No action.	
			1	h = 5 - 15 mm		
		h = negative vertical displacement from	2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic	

15	Depression	normal profile L =length	3	h = 30 - 50 mm	within 7 days	Not Applicable
			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	
			3	h = 30 - 50 mm	within 7 days	
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate	

			5	$h > 100 \text{ mm}$	pavement at normal level if length < 20 m. Within 30 days	
17	Bump	$h = \text{vertical}$	0	$h < 4 \text{ mm}$	No action	

		displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
			0	Nil, not discernible	Short Term	Long Term
				< 3mm	No action.	
			1	f = 3 - 10 mm		

18	Lane Shoulder Dropoff	to f = difference of level	2	f = 10 - 25 mm	Spot repair of shoulder within 7 days	
			3	f = 25 - 50 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.
			5	f > 75 mm		
Drainage						
		quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	

19	Pumping	Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
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20	Ponding	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	Specification s 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	18					

		<table><tr><td></td><td></td><td>0</td></tr><tr><td>80</td><td>260</td><td>130</td></tr><tr><td colspan="3"></td></tr></table>			0	80	260	130								
		0														
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 ² /lux Bituminous Road - 100mcd/m ² /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
		<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 ² /lux)					

Night Time
Visibility

	Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years
U p t o 6 5	200	80
6 5 - 1 0 0	250	120
A b o v e 1 0	350	150

Bi-Annually

	0						
	<u>Initial and Minimum Performance for</u>						
	<u>Night Visibility under wet condition</u>						
	<u>(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 ² /lux Minimum Threshold Level: 50 mcd/m ² /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	
Kerb	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
	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

Other Road Furniture	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 backup	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	Functionality: 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	Functionality: 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	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
		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

Highway Lighting System	Highway Lights	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
	Cleaning of toilets	-	Daily	-	-	Every 4 hours	

Rest Areas	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	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	Free waterway/unobstructed flow section	85% of culvert normal flow area to be 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
		Spalling of concrete not more than 0.25 sqm					
		Delamination of concrete not more					

culverts	Structurally sound	than 0.25 sq.m.	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
		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.
Bridges including ROBs Flyover etc. as applicable	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
	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.

Bridge -Super Structure	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.
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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	1 months	MORTH specifications 2600 & 2700.

				drainage spouts		
	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 vibrometers	Strengthening of structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion	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		Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge	Replace of seal		MORTH specifications

	joints	copper strip joint.	Bi-Annually	Inspection Unit	expansion joint	15 days	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.
Bridge-substructure	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 n 2810 and IRC SP: 40-199.
Bridge Foundations	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	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification n 2500

				Rivers.			
	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>Note: 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

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) Granular earth shoulders, side slopes, drains and culverts		
(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)
(c) Road side furniture including road sign and pavement marking		
(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
(d) Road lighting		
(i)	Any major failure of the system	24 (twenty four) hours

(ii)	Faults and minor failures	8 (eight) hours
(e) Trees and plantation		
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
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h)	Other Project Facilities and Approach roads	
(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
Bridges		

(a) Superstructure		
(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) Foundations		
Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen) days
(c) Piers, abutments, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(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
(g) Hill Roads		
(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]

To,
Managing Director, NHIDCL,
National Highways & Infrastructure Development Corporation Ltd.

- (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 **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 130+000 to Km 141+029 (Package-4B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode.** (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 & Infrastructure Development Corporation Ltd. , 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

^{\$} Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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 operatable at our..... Branch at New Delhi (Complete Address of bank branch is mandatory), 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 there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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, 1 st 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.

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

To,
Managing Director, NHIDCL,
National Highways & Infrastructure Development Corporation Ltd.
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 **Widening to 2 (Two) Lane with Hard shoulder of Churachandpur to Tuivai section of NH 102B from Km 130+000 to Km 141+029 (Package-4B) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode.** (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

§ The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.

Manager in the National Highways & Infrastructure Development Corporation Ltd., 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.

^{\$} Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 19.2 of the Agreement).

- 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 operatable at our..... Branch at New Delhi (Complete Address of bank branch is mandatory), 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 there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
- 12 The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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, 1 st 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)

Contract Price Weightages

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

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

Item	Weightage in % of CP	Stage for Payment	Percentage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	64.52 %	A- Widening and strengthening of existing road	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		(6) Widening and repair of culverts	[Nil]
		B.1-Reconstruction/New 2-Lane Realignment /Bypass(Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	31.35%
		(2) Sub-base Course	20.29%
		(3) Non bituminous Base course	11.63%
		(4) Bituminous Base course	11.67%
		(5) Wearing Coat	6.71%
		B.2-Reconstruction/New 8-Lane Realignment/ Bypass(Rigid Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Non bituminous Base course	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		C.2- Reconstruction/New Service road (Rigid Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		D- Reconstruction & New Culverts on existing road, realignments, bypasses Culverts (length <6m)	18.36%
Minor bridge/ Underpasses/ Overpasses	2.14 %	A.1-widening and repairing of Minor Bridges (length >6 m<60m)	
		Minor Bridges	[Nil]
		A.2- New Minor bridges (length >6	

Item	Weightage in % of CP	Stage for Payment	Percentage
		mand<60m)	
		(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	[Nil]
		(2)Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in all respect.	[Nil]
		(3)Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	[Nil]
		(4) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	[Nil]
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-NewUnderpasses/Overpasses	
		(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	[Nil]
		(2)Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. 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.	[Nil]
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]
Major bridge(length>60 m)work sand ROB/RUB/elevated sections /flyovers including viaducts, if any	0.000 %	A.1- Widening and repairs of Major Bridges	
		(1)Foundation	[Nil]
		(2)Sub-structure	[Nil]
		(3)Super-structure(including bearings)	[Nil]
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7)Guide bunds ,River Training works etc.	[Nil]
		(8)Approaches (including Retaining walls, stone	[Nil]

Item	Weightage in % of CP	Stage for Payment	Percentage
		pitching and protection works)	
		A.2-NewMajorBridges	
		(1)Foundation	24.52%
		(2)Sub-structure	14.44%
		(3)Super-structure (including bearings)	59.58%
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	1.21%
		(6) Wing walls/return walls	[Nil]
		(7)Guide bunds, River Training works etc.	0.25%
		(8)Approaches(including Retaining walls, stone pitching and protection works)	[Nil]
		B.1-Wideningandrepairsof (a) ROB (b) RUB	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4)Wearing Coat(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	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (Including Retaining walls, Stone Pitching and protection works)	[Nil]
		B.2-NewROB/RUB	
		(1)Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4)Wearing Coat (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	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3)Super-Structure(Including bearings)	[Nil]
		(4)Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.2- New Elevated Section/Flyovers/Grade	

Item	Weightage in % of CP	Stage for Payment	Percentage
		Separators	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure(Including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
Other Works	33.34 %	(i) Toll Plaza	[Nil]
		(ii) Road side drains	9.65%
		(iii) Road signs, markings, km stones, safety devices etc	8.34%
		(iv) Project facilities	
		a) Bus Bays	[Nil]
		b) Truck Lay-byes	[Nil]
		c) Passenger Shelter	[Nil]
		d) Rest Area	[Nil]
		(v) Road side Plantation	[Nil]
		(vi) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]
		(vii) Safety & Traffic Management during const.	[Nil]
		(viii) Breast Wall	24.05%
		(ix) Toe Wall	1.68%
		(x) Retaining Wall	52.73%
		(xi) Boundary wall	[Nil]
		(xii) Site Clearance & Dismantling	1.07%
		(xiii) Other Works (Turfig & Hydro-seeding)	2.49%

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening & Strengthening of road		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	
(6) Widening and repair of culverts	[Nil]	Cost of ten completed culverts shall be determined on pro rata basis with respect to the total number of culverts.
B.1- Reconstruction/New 2-Lane Realignment/Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	31.35%	Unit of measurement is linear length. Payment of each stage shall be made on pro-rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(3) Sub-base Course	20.29%	
(4) Non bituminous Base course	11.63%	
(5) Bituminous Base course	11.67%	
(6) Wearing Coat	6.71%	
(7) Widening and repair of culverts		
B.2- Reconstruction/New 8-Lane Realignment/Bypass (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Non bituminous Base course	[Nil]	
(4) Bituminous Basecourse	[Nil]	
(5) Wearing Coat	[Nil]	
C.2- Reconstruction/New Service road (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub-base Course	[Nil]	
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
D- Reconstruction & New Culverts on existing road, realignments, bypasses		
Culverts (length <6m)	18.36%	Cost of each culverts 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 example, 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 length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

Procedure for estimating the value of Minor 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
A.1-Widening and repairs of Minor Bridges (length > 6 m & < 60 m)	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge
A.2- New Minor Bridges (length > 6 m & < 60 m)		
(1) Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	[Nil]	Foundation: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the minor bridges. Payment 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) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in all respect.	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. 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
(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	[Nil]	Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
(4) Guide Bund sand River Training Works: On completion of Guide Bunds and river training works complete in all respects	[Nil]	Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of

Stage of Payment	Percentage weightage	Payment Procedure
		a stage i.e. completion of Guide Bund sand River training Works in all respects as specified
B.1- Widening and repairs of under passes/overpasses	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
B.2- New Underpasses/Overpasses		
(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, pier upto the abutment/pier cap.	[Nil]	Foundation: 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. Incase where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. 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.	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause. 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
(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

1.3.3 Major Bridge works, ROB/RUB and Structures.

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

Table 1.3.3

Stage of Payment	Percentage weightage	Payment Procedure
A.1- Widening and repairs of Major Bridges		
(1)Foundation	[Nil]	Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge. Incase where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of major bridge.
(3)Super-structure(including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4)Wearing Coat including expansion joints	[Nil]	Wearing Coat: 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.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	[Nil]	Wingwalls/return walls : 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.	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8)Approaches(including Retaining walls, stone pitching and protection works)	[Nil]	Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
A.2-NewMajorBridges		
(1)Foundation	24.52%	Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge. Incase where load testing is required for foundation, the trigger of first payment shall include load testing

		also where specified.
(2)Sub-structure	14.44%	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of major bridge.
(3)Super-structure(including bearings)	59.58%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4)Wearing Coat including expansion joints	[Nil]	Wearing Coat: 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.	1.21%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	[Nil]	Wing walls/return walls: 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.	0.25%	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8)Approaches(including Retaining walls, stone pitching and protection works)	[Nil]	Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
B.1- Widening and repairs of (a)ROB (b)RUB		
(1) Foundations	[Nil]	Foundation: 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	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above.
(4)Wearing Coat(a)in case of ROB-	[Nil]	Wearing Coat: Payment shall be made on completion

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		(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 handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (Including Retaining walls, Stone Pitching and protection works)	[Nil]	Payments shall be made on pro rata basis on completion of 20% of the total area.
B.2-NewROB/RUB		
(1) Foundation	[Nil]	Foundation: 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.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of ROB/RUB.
(3)Super-structure (including bearing)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. Completion of super- structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4)Wearing Coat (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	[Nil]	Wearing Coat: 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 handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

works)		
C.1-Wideningandrepairs of Elevated Section/ Flyovers/Grade Separators		
(1) Foundations	[Nil]	Foundation: 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. Incse where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3)Super-Structure(Including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. Completion of super- structure including bearings of at least one span in all respects a specified 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	[Nil]	Wearing Coat: 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.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. Complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7)Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.2- New Elevated Section/ Flyovers/Grade Separators		
(1) Foundations	[Nil]	Foundation: 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	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3)Super-Structure(Including	[Nil]	Super-structure: Payment shall be made on pro-rata

bearings)		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 foreach span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4)Wearing Coat including expansion joints	[Nil]	Wearing Coat: 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.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wingwalls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payments shall be made on pro rata basis on completion of 20% of the total area.

- Note:
- (1) In case of innovate 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 Competent Authority.
 - (2) The S c h e d u l e for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(1) Toll Plaza	[Nil]	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plaza.
(2) Road side drains	9.65%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length. Payment shall be made on pro rata basis for completed facilities.
(3) Road signs, markings, km stones, safety devices, etc.	8.34%	
(4) Project Facilities		
a) Bus Bays	[Nil]	
b) Truck Lay-byes	[Nil]	
c) Passenger Shelter	[Nil]	
d) Rest Area	[Nil]	
(5) Roadside Plantation including Horticulture in Wayside Amenities	[Nil]	Unit of measurement is linear length
(6) Repair of Protection Works other than approaches to the	[Nil]	Unit of measurement is linear length. Payment shall be made

Stage of Payment bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	Percentage weightage	Payment Procedure
		on pro rata basis on completion of a stage in a length of not less than 10% (ten percent) of the total length.
(7) Safety and traffic management during construction	[Nil]	Payment shall be made on pro rata basis every six months.
(8) Protection Works		Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(a) Retaining Wall	52.73%	
(b) Breast Wall	24.05%	
(c) Toe Wall	1.68%	
(9) Site Clearance & Dismantling	1.07%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(10) Other Works (Turfig & Hyrdo-Seeding)	2.49%	Unit of measurement is square meter.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7.

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 Contractor is required to furnish drawings as per standard Manual & specifications 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 **[35% of the Scheduled Construction Period]** 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 **[60% of the Scheduled Construction Period]** 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 **[85% of the Scheduled Construction Period]** 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 [Scheduled Construction Period] 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 the ****section (km ** to km **) of National Highway No. ***] (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 of20.....

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
(a) Carriageway/Pavement		
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b) Road, Embankment, Cuttings, Shoulders		
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c) Bridges and Culverts		
(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%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d) Roadside Drains		
(i)	Cleaning and repair of drains	5%
(e) Road Furniture		
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5 th km stones	5%

S. No.	Item/Defect/Deficiency	Percentage
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	Defects in Other Project Facilities	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.

Annex – I
(Schedule - N)

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 [name and address of the Authority] (the “**Authority**”) and (the “**Contractor**”)[#] for [Two-Laning] of the **** section (km ** to km **) of National Highway No. ** in the State of *** 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: [As per provision]

- (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:

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)

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 the ****section (km ** to km **) of

****] (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)