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 32.835 to Km 48.587 (Package-2A) in the State of Manipur on Engineering, Procurement & Construction (EPC) mode

Package-2A: from Km 32.835 to Km 48.587

Tender ID: 2019_NHIDC_531246_1

Sr. No	Reference	Addendum
1	**Tender ID:** 2019_NHIDC_531246_1	Schedules from A to R

(KC Bhatt)
Dy. General Manager (Tech)

Schedule-A

(See Clauses 2.1and 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 Clause8.2 (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 onsite/design requirement.

(v) The status of the environment clearances obtained or awaited is given in Annex-IV.

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-102Bcommencing from km 34+800 to km 51+147 i.e. Singhgat Village to C. Tuiveljang Villagein 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 total 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	34+800	34+900	8.5	
2	34+900	35+000	8.2	
3	35+000	35+100	8.7	
4	35+100	35+200	9.9	
5	35+200	35+300	9.4	
6	35+300	35+400	7.1	
7	35+400	35+500	9.8	
8	35+500	35+600	8.6	
9	35+600	35+700	8.8	
10	35+700	35+800	9.6	
11	35+800	35+900	9.6	
12	35+900	36+000	8.2	
13	36+000	36+100	7.3	
14	36+100	36+200	8.8	
15	36+200	36+300	9.4	
16	36+300	36+400	8.8	
17	36+400	36+500	7.9	
18	36+500	36+600	8.8	
19	36+600	36+700	7.5	
20	36+700	36+800	7.1	
21	36+800	36+900	8.6	
22	36+900	37+000	11.1	
23	37+000	37+100	8.1	
24	37+100	37+200	9.9	
25	37+200	37+300	8.9	
26	37+300	37+400	8.9	
27	37+400	37+500	9.2	
28	37+500	37+600	7.8	
29	37+600	37+700	7.8	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
30	37+700	37+800	5.7	
31	37+800	37+900	6.8	
32	37+900	38+000	9.8	
33	38+000	38+100	8.5	
34	38+100	38+200	8.6	
35	38+200	38+300	7.4	
36	38+300	38+400	7.0	
37	38+400	38+500	7.4	
38	38+500	38+600	9.0	
39	38+600	38+700	8.8	
40	38+700	38+800	13.1	
41	38+800	38+900	11.5	
42	38+900	39+000	6.2	
43	39+000	39+100	9.7	
44	39+100	39+200	8.1	
45	39+200	39+300	10.2	
46	39+300	39+400	7.2	
47	39+400	39+500	8.5	
48	39+500	39+600	7.6	
49	39+600	39+700	9.9	
50	39+700	39+800	10.6	
51	39+800	39+900	8.0	
52	39+900	40+000	9.8	
53	40+000	40+100	8.7	
54	40+100	40+200	6.5	
55	40+200	40+300	7.2	
56	40+300	40+400	10.6	
57	40+400	40+500	9.4	
58	40+500	40+600	7.7	
59	40+600	40+700	6.9	
60	40+700	40+800	8.1	
61	40+800	40+900	6.8	
62	40+900	41+000	6.8	
63	41+000	41+100	8.9	
64	41+100	41+200	6.7	
65	41+200	41+300	6.9	
66	41+300	41+400	8.2	
67	41+400	41+500	6.7	
68	41+500	41+600	8.7	
69	41+600	41+700	7.3	
70	41+700	41+800	9.3	
71	41+800	41+900	5.6	
72	41+900	42+000	4.9	
73	42+000	42+100	8.7	
74	42+100	42+200	8.6	
75	42+200	42+300	8.8	
76	42+300	42+400	10.1	
77	42+400	42+500	8.7	
78	42+500	42+600	7.6	
79	42+600	42+700	8.9	
80	42+700	42+800	8.9	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
81	42+800	42+900	8.3	
82	42+900	43+000	7.6	
83	43+000	43+100	7.5	
84	43+100	43+200	9.9	
85	43+200	43+300	8.7	
86	43+300	43+400	9.6	
87	43+400	43+500	8.6	
88	43+500	43+600	7.0	
89	43+600	43+700	6.9	
90	43+700	43+800	7.9	
91	43+800	43+900	8.2	
92	43+900	44+000	9.9	
93	44+000	44+100	9.3	
94	44+100	44+200	9.3	
95	44+200	44+300	9.5	
96	44+300	44+400	9.8	
97	44+400	44+500	8.2	
98	44+500	44+600	9.6	
99	44+600	44+700	8.3	
100	44+700	44+800	7.9	
101	44+800	44+900	7.9	
102	44+900	45+000	9.0	
103	45+000	45+100	7.9	
104	45+100	45+200	9.9	
105	45+200	45+300	8.6	
106	45+300	45+400	8.2	
107	45+400	45+500	8.8	
108	45+500	45+600	11.2	
109	45+600	45+700	7.9	
110	45+700	45+800	10.1	
111	45+800	45+900	8.0	
112	45+900	46+000	8.0	
113	46+000	46+100	10.6	
114	46+100	46+200	7.3	
115	46+200	46+300	9.4	
116	46+300	46+400	9.5	
117	46+400	46+500	12.7	
118	46+500	46+600	10.3	
119	46+600	46+700	11.3	
120	46+700	46+800	7.9	
121	46+800	46+900	9.3	
122	46+900	47+000	8.6	
123	47+000	47+100	10.4	
124	47+100	47+200	6.8	
125	47+200	47+300	7.6	
126	47+300	47+400	7.1	
127	47+400	47+500	8.0	
128	47+500	47+600	6.3	
129	47+600	47+700	5.8	
130	47+700	47+800	6.5	
131	47+800	47+900	9.4	

SL No.	Chainage (Km)		Right of Way (m)	Remarks
	From	To		
132	47+900	48+000	9.4	
133	48+000	48+100	6.7	
134	48+100	48+200	7.9	
135	48+200	48+300	7.2	
136	48+300	48+400	8.0	
137	48+400	48+500	8.9	
138	48+500	48+600	8.3	
139	48+600	48+700	8.5	
140	48+700	48+800	6.5	
141	48+800	48+900	8.4	
142	48+900	49+000	8.0	
143	49+000	49+100	8.8	
144	49+100	49+200	7.7	
145	49+200	49+300	9.5	
146	49+300	49+400	8.3	
147	49+400	49+500	9.1	
148	49+500	49+600	8.1	
149	49+600	49+700	7.0	
150	49+700	49+800	7.6	
151	49+800	49+900	9.1	
152	49+900	50+000	7.2	
153	50+000	50+100	7.2	
154	50+100	50+200	8.5	
155	50+200	50+300	8.2	
156	50+300	50+400	9.1	
157	50+400	50+500	8.8	
158	50+500	50+600	8.3	
159	50+600	50+700	6.7	
160	50+700	50+800	7.6	
161	50+800	50+900	8.0	
162	50+900	51+000	10.2	
163	51+000	51+100	8.6	

3. Carriageway

The present carriageway of the Project Highway is Two Lane from km 34+800 to km 51+147. 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		
Nil						

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		
1	45.955	Open	Wall	Bailey Bridge	1x42.65	3.7
2	48.048	Open	Wall	Bailey Bridge	1x42.7	3.7

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	35.700	Slab	1x1.428M.	3.2
2	36.040	Slab	1x1.630M	3
3	36.680	Slab	1X1.615M	3.4
4	38.518	Slab	1X2.327M	2.8
5	39.946	Slab	1X3.186M	3.4

Sl. No.	Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
6	40.364	Slab	1X2.291M	3.6
7	40.461	HP	1.2M DIA	3.2
8	40.663	HP	1M DIA	3.5
9	40.824	Slab	1X6.643M	3
10	41.217	Slab	1X2.030M	3.4
11	41.449	HP	1.2M DIA	2.9
12	41.500	Slab	1X3.557M	3.4
13	41.728	Slab	1X4.168M	3.2
14	42.124	Slab	1X2.669M	3.4
15	42.470	Slab	1X1.693M	2.8
16	42.880	Slab	1X6.159M	2.9
17	43.100	Slab	1X5.794M	3.2
18	43.400	HP	1M DIA	3.6
19	43.573	HP	1.2M DIA	3.2
20	43.650	Slab	1X4.225M	3.5
21	43.834	HP	1.2M DIA	3.4
22	43.911	HP	1M DIA	3.1
23	44.200	Slab	1X3.402M	3.4
24	44.275	Slab	1X2.364M	3.2
25	44.490	Slab	1X2.191M	3.4
26	44.760	Slab	1X2.686M	3.1
27	45.176	Slab	1X2.752M	3.4
28	45.415	HP	1.2M DIA	3.2
29	45.690	HP	1.2M DIA	3.4
30	46.290	Slab	1x2.338M	3.1
31	46.800	Slab	1X2.989M	2.8
32	47.006	HP	1.2M DIA	2.9
33	47.470	HP	1.2M DIA	3.4
34	47.814	HP	1.2M DIA	3.2
35	48.259	HP	1.2M DIA	3
36	48.348	HP	1.2M DIA	3.1
37	48.513	HP	1.2M DIA	2.8
38	48.815	Slab	1X2.520M	3.4
39	49.051	Slab	1X2.408M	3.1
40	49.206	Slab	1X2.417M	3.4
41	49.300	Slab	1X2.417M	3.6
42	49.580	Slab	1X2.026M	3.5
43	49.891	Slab	1X2.509M	3
44	50.080	Slab	1X2.968M	3.4
45	50.295	Slab	1X2.255M	2.8
46	50.572	Slab	1X2.255M	2.9
47	51.147	Slab	1X2.294M	2.8

11. Busbays

The details of bus bays onthe Site are as follows:

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
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. Road side drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	34+800	51+147	Earthen (Hill Side)	

14. Major junctions

The details of major junctions are as follows:

S. 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
1	48+500		T	3-Legged

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	**32.835**	**48.587**	15752	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 onsite/design requirement.

(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs is enclosed. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex – IV

(Schedule-A)

Environment Clearances

The project highway does not require environment clearance as per MoEF Circular dated 22.08.2013.

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 32.835 to Km 48.587 (Package-2A) 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	Singngat	32.835	43.488	7	As per attached TCS drawing	7 m Carriageway
2	Maukot	43.488	45.508	7		7 m Carriageway
3	C. Tuiveljang	45.508	48.587	7		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 upto 30 kmph & 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	32+936 to 32+962	Sharp Bend	Design Speed = 30 Kmph
2	33+017 to 33+039	Sharp Bend	Design Speed = 20 Kmph
3	33+276 to 33+296	Sharp Bend	Design Speed = 20 Kmph
4	33+334 to 33+343	Sharp Bend	Design Speed = 20 Kmph
5	33+381 to 33+462	Sharp Bend	Design Speed = 20 Kmph
6	33+882 to 33+929	Sharp Bend	Design Speed = 30 Kmph
7	33+987 to 34+002	Sharp Bend	Design Speed = 20 Kmph
8	34+16 to 34+179	Sharp Bend	Design Speed = 20 Kmph
9	34+223 to 34+24	Sharp Bend	Design Speed = 20 Kmph
10	34+295 to 34+333	Sharp Bend	Design Speed = 20 Kmph
11	34+416 to 34+443	Sharp Bend	Design Speed = 20 Kmph
12	34+484 to 34+539	Sharp Bend	Design Speed = 20 Kmph
13	34+586 to 34+635	Sharp Bend	Design Speed = 20 Kmph
14	34+676 to 34+7	Sharp Bend	Design Speed = 30 Kmph
15	34+871 to 34+914	Sharp Bend	Design Speed = 20 Kmph
16	34+951 to 34+972	Sharp Bend	Design Speed = 20 Kmph
17	35+033 to 35+044	Sharp Bend	Design Speed = 20 Kmph
18	35+092 to 35+115	Sharp Bend	Design Speed = 30 Kmph
19	35+323 to 35+345	Sharp Bend	Design Speed = 20 Kmph
20	35+446 to 35+455	Sharp Bend	Design Speed = 20 Kmph
21	35+495 to 35+502	Sharp Bend	Design Speed = 30 Kmph
22	35+539 to 35+55	Sharp Bend	Design Speed = 20 Kmph
23	35+589 to 35+608	Sharp Bend	Design Speed = 20 Kmph
24	35+876 to 35+955	Sharp Bend	Design Speed = 30 Kmph
25	37+048 to 37+094	Sharp Bend	Design Speed = 20 Kmph
26	37+309 to 37+317	Sharp Bend	Design Speed = 30 Kmph
27	37+833 to 37+846	Sharp Bend	Design Speed = 30 Kmph
28	37+972 to 37+982	Sharp Bend	Design Speed = 20 Kmph
29	38+116 to 38+136	Sharp Bend	Design Speed = 30 Kmph
30	38+475 to 38+524	Sharp Bend	Design Speed = 30 Kmph
31	38+56 to 38+568	Sharp Bend	Design Speed = 30 Kmph
32	38+641 to 38+663	Sharp Bend	Design Speed = 20 Kmph
33	38+71 to 38+733	Sharp Bend	Design Speed = 20 Kmph
34	38+771 to 38+801	Sharp Bend	Design Speed = 20 Kmph
35	39+332 to 39+346	Sharp Bend	Design Speed = 30 Kmph
36	39+475 to 39+503	Sharp Bend	Design Speed = 20 Kmph
37	39+538 to 39+551	Sharp Bend	Design Speed = 20 Kmph
38	39+631 to 39+656	Sharp Bend	Design Speed = 30 Kmph
39	39+738 to 39+785	Sharp Bend	Design Speed = 30 Kmph
40	39+839 to 39+866	Sharp Bend	Design Speed = 20 Kmph
41	39+974 to 39+993	Sharp Bend	Design Speed = 20 Kmph
42	40+164 to 40+181	Sharp Bend	Design Speed = 20 Kmph
43	40+263 to 40+267	Sharp Bend	Design Speed = 20 Kmph
44	40+322 to 40+337	Sharp Bend	Design Speed = 20 Kmph
45	40+379 to 40+445	Sharp Bend	Design Speed = 20 Kmph
46	40+516 to 40+56	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
47	40+594 to 40+63	Sharp Bend	Design Speed = 20 Kmph
48	40+687 to 40+701	Sharp Bend	Design Speed = 20 Kmph
49	40+735 to 40+748	Sharp Bend	Design Speed = 20 Kmph
50	40+813 to 40+825	Sharp Bend	Design Speed = 30 Kmph
51	41+632 to 41+643	Sharp Bend	Design Speed = 30 Kmph
52	41+888 to 41+965	Sharp Bend	Design Speed = 30 Kmph
53	42+112 to 42+146	Sharp Bend	Design Speed = 30 Kmph
54	43+083 to 43+117	Sharp Bend	Design Speed = 20 Kmph
55	43+193 to 43+284	Sharp Bend	Design Speed = 30 Kmph
56	43+524 to 43+546	Sharp Bend	Design Speed = 20 Kmph
57	43+634 to 43+669	Sharp Bend	Design Speed = 30 Kmph
58	43+911 to 43+951	Sharp Bend	Design Speed = 20 Kmph
59	44+078 to 44+115	Sharp Bend	Design Speed = 30 Kmph
60	44+530 to 44+553	Sharp Bend	Design Speed = 30 Kmph
61	44+660 to 44+687	Sharp Bend	Design Speed = 30 Kmph
62	46+301 to 46+326	Sharp Bend	Design Speed = 20 Kmph
63	46+374 to 46+395	Sharp Bend	Design Speed = 30 Kmph
64	46+610 to 46+62	Sharp Bend	Design Speed = 20 Kmph
65	46+671 to 46+688	Sharp Bend	Design Speed = 20 Kmph
66	47+188 to 47+23	Sharp Bend	Design Speed = 30 Kmph
67	47+487 to 47+492	Sharp Bend	Design Speed = 30 Kmph
68	47+534 to 47+547	Sharp Bend	Design Speed = 20 Kmph
69	47+572 to 47+666	Sharp Bend	Design Speed = 20 Kmph
70	47+699 to 47+721	Sharp Bend	Design Speed = 20 Kmph
71	47+773 to 47+784	Sharp Bend	Design Speed = 30 Kmph
72	47+830 to 47+893	Sharp Bend	Design Speed = 20 Kmph
73	47+935 to 47+954	Sharp Bend	Design Speed = 30 Kmph
74	48+011 to 48+021	Sharp Bend	Design Speed = 30 Kmph
75	48+175 to 48+201	Sharp Bend	Design Speed = 20 Kmph
76	48+239 to 48+276	Sharp Bend	Design Speed = 30 Kmph
77	48+362 to 48+375	Sharp Bend	Design Speed = 30 Kmph
78	48+497 to 48+504	Sharp Bend	Design Speed = 20 Kmph
79	48+570 to 48+588	Sharp Bend	Design Speed = 20 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
1	45+270 to 45+550	2 X 1.0 m width Footpath	TCS-1

(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 under passes 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 over passes 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 particulars 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)	280
TCS 2	Two-Lane carriageway with hard shoulder and one side toe wall & one side ret 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)	450
TCS 6	Two-Lane carriageway with hard shoulder and both side trapezoidal drain (existing pavement)	850
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)	5367
TCS 8	Two-Lane carriageway with hard shoulder and one side breast wall (existing pavement)	5850
TCS 9	Two-Lane carriageway with hard shoulder and one side breast wall & one side drain (existing pavement)	620
TCS 10	Two-Lane carriageway with hard shoulder and one side ret wall (existing pavement)	150
TCS 10A	Two-Lane carriageway with hard shoulder and one side ret wall (realignment stretch)	0
TCS 11	Two-Lane carriageway with hard shoulder and one side ret wall & one side drain (existing pavement)	700
TCS 12	Two-Lane carriageway with hard shoulder and one side ret wall & one breast wall (existing pavement)	1000
TCS 13	Two-Lane carriageway with hard shoulder and both sides retaining wall (existing pavement)	0
TCS-14	Two Lane carriageway with hard shoulder and one side toe wall & one side breast wall (existing pavement)	485

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
32835	32870		35	TCS-14
32870	32920		50	TCS-5
32920	33020		100	TCS-7
33020	33270		250	TCS-8
33270	33420		150	TCS-7
33420	33520		100	TCS-12
33520	33720	2.6	197.4	TCS-11
33720	33820		100	TCS-7
33820	33870	2.7	47.3	TCS-11
33870	34070		200	TCS-6
34070	34170	2.6	97.4	TCS-5
34170	35320	10.4	1139.6	TCS-8
35320	35770	5.2	444.8	TCS-12
35770	36220	2.6	447.4	TCS-8
36220	36470	5.2	244.8	TCS-12
36470	36720		250	TCS-6

Chainage (m)		Length of CD	Net Length (m)	TCS No.
From	To			
36720	37020	2.6	297.4	TCS-8
37020	37070		50	TCS-11
37070	37570	2.6	497.4	TCS-8
37570	38320	13.1	736.9	TCS-7
38320	38970	5.2	644.8	TCS-8
38970	39170	5.2	194.8	TCS-12
39170	39320	5.3	144.7	TCS-7
39320	39820	7.9	492.1	TCS-8
39820	40020		200	TCS-6
40020	40070	2.6	47.4	TCS-10
40070	40220	2.6	147.4	TCS-7
40220	40320		100	TCS-11
40320	41120	10.4	789.6	TCS-8
41120	41220	2.6	97.4	TCS-5
41220	41520	7.8	292.2	TCS-7
41520	41620	5.3	94.7	TCS-10
41620	41720	2.6	97.4	TCS-7
41720	41770		50	TCS-11
41770	41970	5.2	194.8	TCS-7
41970	42070	2.6	97.4	TCS-8
42070	42270	2.6	197.4	TCS-7
42270	42320		50	TCS-11
42320	42520	5.3	194.7	TCS-8
42520	42620	2.6	97.4	TCS-5
42620	43020	2.6	397.4	TCS-7
43020	43120	2.6	97.4	TCS-5
43120	43220		100	TCS-11
43220	43320	2.7	97.3	TCS-7
43320	43370		50	TCS-11
43370	43520	52.96	97.04	TCS-7
43520	43970	2.6	447.4	TCS-9
43970	44570	7.8	592.2	TCS-7
44570	45170	10.4	589.6	TCS-8
45170	45270	2.6	97.4	TCS-7
45270	45550	43.08	236.92	TCS-1
45550	45720		170	TCS-9
45720	46170	10.4	439.6	TCS-7
46170	46220		50	TCS-11
46220	46370	5.2	144.8	TCS-7
46370	46620	10.4	239.6	TCS-14
46620	47270	15.6	634.4	TCS-7
47270	47470	2.6	197.4	TCS-14
47470	47820	7.8	342.2	TCS-8
47820	48020	2.6	197.4	TCS-6
48020	48587	13	554	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
1	45+540	T	3-Legged

(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) Re-construction 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	32+835 to 32+870	Reconstruction	TCS-14
2	32+870 to 32+920	Reconstruction	TCS-5
3	32+920 to 33+020	Reconstruction	TCS-7
4	33+020 to 33+270	Reconstruction	TCS-8
5	33+270 to 33+420	Reconstruction	TCS-7
6	33+420 to 33+520	Reconstruction	TCS-12
7	33+520 to 33+720	Reconstruction	TCS-11
8	33+720 to 33+820	Reconstruction	TCS-7
9	33+820 to 33+870	Reconstruction	TCS-11
10	33+870 to 34+070	Reconstruction	TCS-6
11	34+070 to 34+170	Reconstruction	TCS-5
12	34+170 to 35+320	Reconstruction	TCS-8
13	35+320 to 35+770	Reconstruction	TCS-12
14	35+770 to 36+220	Reconstruction	TCS-8
15	36+220 to 36+470	Reconstruction	TCS-12
16	36+470 to 36+720	Reconstruction	TCS-6
17	36+720 to 37+020	Reconstruction	TCS-8
18	37+020 to 37+070	Reconstruction	TCS-11
19	37+070 to 37+570	Reconstruction	TCS-8
20	37+570 to 38+320	Reconstruction	TCS-7
21	38+320 to 38+970	Reconstruction	TCS-8
22	38+970 to 39+170	Reconstruction	TCS-12
23	39+170 to 39+320	Reconstruction	TCS-7
24	39+320 to 39+820	Reconstruction	TCS-8
25	39+820 to 40+020	Reconstruction	TCS-6
26	40+020 to 40+070	Reconstruction	TCS-10
27	40+070 to 40+220	Reconstruction	TCS-7
28	40+220 to 40+320	Reconstruction	TCS-11
29	40+320 to 41+120	Reconstruction	TCS-8
30	41+120 to 41+220	Reconstruction	TCS-5
31	41+220 to 41+520	Reconstruction	TCS-7
32	41+520 to 41+620	Reconstruction	TCS-10
33	41+620 to 41+720	Reconstruction	TCS-7
34	41+720 to 41+770	Reconstruction	TCS-11
35	41+770 to 41+970	Reconstruction	TCS-7
36	41+970 to 42+070	Reconstruction	TCS-8
37	42+070 to 42+270	Reconstruction	TCS-7
38	42+270 to 42+320	Reconstruction	TCS-11
39	42+320 to 42+520	Reconstruction	TCS-8

SL NO.	Stretch from Km to Km	Remarks	TCS Type
40	42+520 to 42+620	Reconstruction	TCS-5
41	42+620 to 43+020	Reconstruction	TCS-7
42	43+020 to 43+120	Reconstruction	TCS-5
43	43+120 to 43+220	Reconstruction	TCS-11
44	43+220 to 43+320	Reconstruction	TCS-7
45	43+320 to 43+370	Reconstruction	TCS-11
46	43+370 to 43+520	Reconstruction	TCS-7
47	43+520 to 43+970	Reconstruction	TCS-9
48	43+970 to 44+570	Reconstruction	TCS-7
49	44+570 to 45+170	Reconstruction	TCS-8
50	45+170 to 45+270	Reconstruction	TCS-7
51	45+270 to 45+550	Reconstruction	TCS-1
52	45+550 to 45+720	Reconstruction	TCS-9
53	45+720 to 46+170	Reconstruction	TCS-7
54	46+170 to 46+220	Reconstruction	TCS-11
55	46+220 to 46+370	Reconstruction	TCS-7
56	46+370 to 46+620	Reconstruction	TCS-14
57	46+620 to 47+270	Reconstruction	TCS-7
58	47+270 to 47+470	Reconstruction	TCS-14
59	47+470 to 47+820	Reconstruction	TCS-8
60	47+820 to 48+020	Reconstruction	TCS-6
61	48+020 to 48+587	Reconstruction	TCS-7

6. Road side Drainage

Drainage system including surface and sub surfaced rains for the Project Highway has been provided in the table given below:

RCC Covered Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
45270	45550	Both	474
Total Length =			**474**

RR Masonry Trapezoidal Drain

Chainage		Side	Net Length (m)
From (m)	To (m)		
32870	32920	Single side	50
32920	33020	Single side	100
33270	33420	Single side	150
33520	33720	Single side	197
33720	33820	Single side	100
33820	33870	Single side	47
33870	34070	Both side	400
34070	34170	Single side	97
36470	36720	Both side	500
37020	37070	Single side	50
37570	38320	Single side	737
39170	39320	Single side	145
39820	40020	Both side	400
40070	40220	Single side	147
40220	40320	Single side	100
41120	41220	Single side	97
41220	41520	Single side	292

Chainage		Side	Net Length (m)
From (m)	To (m)		
41620	41720	Single side	97
41720	41770	Single side	50
41770	41970	Single side	195
42070	42270	Single side	197
42270	42320	Single side	50
42520	42620	Single side	97
42620	43020	Single side	397
43020	43120	Single side	97
43120	43220	Single side	100
43220	43320	Single side	97
43320	43370	Single side	50
43370	43520	Single side	97
43520	43970	Single side	447
43970	44570	Single side	592
45170	45270	Single side	97
45550	45720	Single side	170
45720	46170	Single side	440
46170	46220	Single side	50
46220	46370	Single side	145
46620	47270	Single side	634
47820	48020	Both side	395
48020	48587	Single side	554
Total Net length=			**8661**

7. Design of Structures

(i)General

(a) All bridges culverts, 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	43+487	Carriageway Width = 11.0 m Overall width = 16.0 m
2	45+500	

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

[Refer to the 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	43+487	Carriageway Width = 11.0 m Width of Footpath = 2 X 1.5m Overall width = 16.0 m
2	45+500	

(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 Manualand provide details]

Sl.No.	Bridgeat km	Utilityservice to be carried	Remarks
Nil			

(f) Cross-section of the new culverts and bridges at deck level for the Project Highways 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	33.690	2.0 X 2.0	Single Span
2	34.635	2.0 X 2.0	Single Span
3	36.426	2.0 X 2.0	Single Span
4	37.832	2.0 X 2.0	Single Span
5	38.226	2.0 X 2.0	Single Span
6	38.317	2.0 X 2.0	Single Span
7	38.511	2.0 X 2.0	Single Span
8	38.640	2.0 X 2.0	Single Span
9	38.997	2.0 X 2.0	Single Span
10	39.281	2.0 X 3.0	Single Span
11	39.486	2.0 X 3.0	Single Span
12	40.173	2.0 X 2.0	Single Span
13	41.022	2.0 X 2.0	Single Span
14	41.194	2.0 X 2.0	Single Span
15	41.270	2.0 X 2.0	Single Span
16	41.452	2.0 X 2.0	Single Span
17	41.527	2.0 X 2.0	Single Span
18	41.784	2.0 X 2.0	Single Span
19	41.859	2.0 X 2.0	Single Span
20	42.076	2.0 X 2.0	Single Span
21	42.325	2.0 X 3.0	Single Span
22	42.724	2.0 X 2.0	Single Span
23	43.224	2.0 X 3.0	Single Span
24	43.818	2.0 X 2.0	Single Span
25	44.315	2.0 X 2.0	Single Span
26	44.531	2.0 X 2.0	Single Span
27	44.976	2.0 X 2.0	Single Span
28	45.314	2.0 X 2.0	Single Span
29	45.764	2.0 X 2.0	Single Span
30	45.994	2.0 X 2.0	Single Span
31	46.285	2.0 X 2.0	Single Span
32	46.521	2.0 X 2.0	Single Span
33	46.766	2.0 X 2.0	Single Span
34	47.040	2.0 X 2.0	Single Span
35	47.352	2.0 X 2.0	Single Span
36	47.538	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
37	47.741	2.0 X 2.0	Single Span
38	48.016	2.0 X 2.0	Single Span
39	48.588	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	33.840	2.0 X 3.0	Single Span
2	34.156	2.0 X 2.0	Single Span
3	34.422	2.0 X 2.0	Single Span
4	34.938	2.0 X 2.0	Single Span
5	35.201	2.0 X 2.0	Single Span
6	35.527	2.0 X 2.0	Single Span
7	35.732	2.0 X 2.0	Single Span
8	35.956	2.0 X 2.0	Single Span
9	36.225	2.0 X 2.0	Single Span
10	36.760	2.0 X 2.0	Single Span
11	37.248	2.0 X 2.0	Single Span
12	37.681	2.0 X 3.0	Single Span
13	38.060	2.0 X 2.0	Single Span
14	39.097	2.0 X 2.0	Single Span
15	39.226	2.0 X 2.0	Single Span
16	39.699	2.0 X 2.0	Single Span
17	39.810	2.0 X 2.0	Single Span
18	40.055	2.0 X 2.0	Single Span
19	40.366	2.0 X 2.0	Single Span
20	40.568	2.0 X 2.0	Single Span
21	40.698	2.0 X 2.0	Single Span
22	41.411	2.0 X 2.0	Single Span
23	41.583	2.0 X 3.0	Single Span
24	41.683	2.0 X 2.0	Single Span
25	41.988	2.0 X 2.0	Single Span
26	42.488	2.0 X 2.0	Single Span
27	42.554	2.0 X 2.0	Single Span
28	43.049	2.0 X 2.0	Single Span
29	44.039	2.0 X 2.0	Single Span
30	44.689	2.0 X 2.0	Single Span
31	44.874	2.0 X 2.0	Single Span
32	45.049	2.0 X 2.0	Single Span
33	45.226	2.0 X 2.0	Single Span
34	45.437	2.0 X 2.0	Single Span
35	45.833	2.0 X 2.0	Single Span
36	46.080	2.0 X 2.0	Single Span

Sl. No.	Culvert Location	Span /Opening (m)	Remarks*
37	46.345	2.0 X 2.0	Single Span
38	46.371	2.0 X 2.0	Single Span
39	46.428	2.0 X 2.0	Single Span
40	46.619	2.0 X 2.0	Single Span
41	46.653	2.0 X 2.0	Single Span
42	46.700	2.0 X 2.0	Single Span
43	46.848	2.0 X 2.0	Single Span
44	47.178	2.0 X 2.0	Single Span
45	47.700	2.0 X 2.0	Single Span
46	48.180	2.0 X 2.0	Single Span
47	48.256	2.0 X 2.0	Single Span
48	48.301	2.0 X 2.0	Single Span
49	48.379	2.0 X 2.0	Single Span
50	48.479	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 atkm	Typeofrepair 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	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Remarks
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	43+487	Bailey Bridge	1x42.65	Insufficient width and not conform to IRC Loading	
2	45+500	Bailey Bridge	1x42.7	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 Manualand 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 Manualand provide details]

Sl. No.	Location at km	Remarks
Nil		

(iv) 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) and3 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)
Nil	

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	48
2	Kilometer stones=	Nos	12
3	5th Kilometer stones=	Nos	3
4	Boundary Stones=	Nos	160

Sl. No	Traffic Signages, Road Marking and other appurtenances	unit	Quantity
5	Delineators (100 cm long and circular shaped) +Hazard marker =	Nos	1783
6	Road Stud=	Nos	7713
7	900 mm Octagonal	Nos	2
8	600 mm circular	Nos	2
9	900 mm Triangular	Nos	278
10	800 mm x 600 mm rectangular	Nos	2
11	Direction Sign < 0.9 sqm	sqm	3.4
12	Direction Sign > 0.9 sqm	sqm	4
13	Convex Mirror for Blind Curve	Nos	6

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

9. Roadside Furniture

(i) Road side 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
1	At G. Bualjang Village (Ch. 69+875 km)	16 m X 1.2 m (Double Pole)

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)		
32835	32870	One	35
33020	33270	One	250
33420	33520	One	100
34170	35320	One	1140
35320	35770	One	445
35770	36220	One	447
36220	36470	One	245
36720	37020	One	297
37070	37570	One	497
38320	38970	One	645
38970	39170	One	195
39320	39820	One	492
40320	41120	One	790
41970	42070	One	97
42320	42520	One	195
43520	43970	One	447
44570	45170	One	590
45550	45720	One	170
46370	46620	One	240
47270	47470	One	197
47470	47820	One	342

Chainage		Side	Net Length (m)
From (m)	To (m)		
Total Length =			**7856**

b) Retaining Wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
33420	33520	One	100
33520	33720	One	197
33820	33870	One	47
35320	35770	One	445
36220	36470	One	245
37020	37070	One	50
38970	39170	One	195
40020	40070	One	47
40220	40320	One	100
41520	41620	One	95
41720	41770	One	50
42270	42320	One	50
43120	43220	One	100
43320	43370	One	50
46170	46220	One	50
33420	33520	One	100
33520	33720	One	197
33820	33870	One	47
35320	35770	One	445
36220	36470	One	245
37020	37070	One	50
38970	39170	One	195
40020	40070	One	47
40220	40320	One	100
41520	41620	One	95
41720	41770	One	50
42270	42320	One	50
43120	43220	One	100
43320	43370	One	50
46170	46220	One	50
Total Length =			**1821**

c) Toe wall

Chainage		Side	Net Length (m)
From (m)	To (m)		
32835	32870	One	35
32870	32920	One	50
34070	34170	One	97
41120	41220	One	97
42520	42620	One	97
43020	43120	One	97
46370	46620	One	240
47270	47470	One	197
Total Length =			**912**

d) Metal Beam Crash Barrier

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

Chainage		Side	Net Length (m)
From (m)	To (m)		
32835	32870	One	35
32870	32920	One	50
33420	33520	One	100
33520	33720	One	197
33820	33870	One	47
34070	34170	One	97
35320	35770	One	445
36220	36470	One	245
37020	37070	One	50
38970	39170	One	195
40020	40070	One	47
40220	40320	One	100
41120	41220	One	97
41520	41620	One	95
41720	41770	One	50
42270	42320	One	50
42520	42620	One	97
43020	43120	One	97
43120	43220	One	100
43320	43370	One	50
46170	46220	One	50
46370	46620	One	240
47270	47470	One	197
Total Length =			**2733**

For Bridge Approaches = 120 m
(Taking 30 m each Approach)
Total length of crash barrier = 2853 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 hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths 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 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
1	Bus Bay &Passenger shelter	46+150 (Both Side)	Bus Bays & Passenger shelter have been placed on both side of proposed roadway	Dimension of Bus Bay (L X B = 59.0 m X 3.0 m) Dimension of Passenger Shelter (L X B = 6.0 m X 2.0 m) (Refer Passenger Shelter Drawing)

f) Rest Areas

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

g) Others to be specified

Street Lighting:
Total 48 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:

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

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:]

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th colspan="6">Provision as per Manual</th><th colspan="6">Modified Provision</th></tr>
<tr><td rowspan="4">Shoulder</td><td rowspan="4">2.6</td><td colspan="6"><u>Mountainous Terrain</u></td><td colspan="6"><u>Mountainous Terrain</u></td></tr>
<tr><td rowspan="2">Type of Section</td><td rowspan="2"></td><td colspan="3">Width of Shoulder (m)</td><td rowspan="2">Type of Section</td><td rowspan="2"></td><td colspan="3">Width of Shoulder (m)</td></tr>
<tr><td>Paved</td><td>Earthen</td><td>Total</td><td>Paved</td><td>Earthen</td><td>Total</td></tr>
<tr><td rowspan="2">Open Country with Isolated Built-up Area</td><td>Hill Side</td><td>1.5</td><td>-</td><td>1.5</td><td rowspan="2">Open Country with Isolated Built-up Area</td><td>Hill Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Valley Side</td><td>1.5</td><td>1</td><td>2.5</td><td>Valley Side</td><td>-</td><td>Up to 1.0 m</td><td>1</td></tr>
<tr><td>Built-up Area and Approaches to grade separated structures/ bridges</td><td>Hill Side</td><td>0.25 m + 1.5 m (Raised)</td><td>-</td><td>1.75</td><td>Built-up Area and Approaches to grade separated structures/ bridges</td><td>Hill Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Valley Side</td><td>0.25 m + 1.5 m (Raised)</td><td>-</td><td>1.75</td><td>Valley Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Design Speed</td><td>2.2</td><td colspan="6"><u>Mountainous Terrain:</u>
Ruling : 60 Kmph
Minimum : 40 Kmph</td><td colspan="6"><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)</td></tr>
<tr><td>Extra Widening</td><td>2.7</td><td colspan="6">Extra Widening has been proposed as per IRC: SP: 73-2015
<table><tr><th>Radius</th><th>Extra Widening</th></tr><tr><td>75-100 m</td><td>0.9 m</td></tr><tr><td>101-300 m</td><td>0.6 m</td></tr></table></td><td colspan="6">Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.
<table><tr><th>Radius</th><th>Extra Widening</th></tr><tr><td>21-40 m</td><td>1.5 m</td></tr><tr><td>41-60 m</td><td>1.2 m</td></tr><tr><td>61-100 m</td><td>0.9 m</td></tr><tr><td>75-100 m</td><td>0.9 m</td></tr><tr><td>101-300 m</td><td>0.6 m</td></tr></table></td></tr>
</table>

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 than40 kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
1	32+936 to 32+962	Sharp Bend	Design Speed = 30 Kmph
2	33+017 to 33+039	Sharp Bend	Design Speed = 20 Kmph
3	33+276 to 33+296	Sharp Bend	Design Speed = 20 Kmph
4	33+334 to 33+343	Sharp Bend	Design Speed = 20 Kmph
5	33+381 to 33+462	Sharp Bend	Design Speed = 20 Kmph
6	33+882 to 33+929	Sharp Bend	Design Speed = 30 Kmph
7	33+987 to 34+002	Sharp Bend	Design Speed = 20 Kmph
8	34+16 to 34+179	Sharp Bend	Design Speed = 20 Kmph
9	34+223 to 34+24	Sharp Bend	Design Speed = 20 Kmph
10	34+295 to 34+333	Sharp Bend	Design Speed = 20 Kmph
11	34+416 to 34+443	Sharp Bend	Design Speed = 20 Kmph
12	34+484 to 34+539	Sharp Bend	Design Speed = 20 Kmph
13	34+586 to 34+635	Sharp Bend	Design Speed = 20 Kmph
14	34+676 to 34+7	Sharp Bend	Design Speed = 30 Kmph
15	34+871 to 34+914	Sharp Bend	Design Speed = 20 Kmph
16	34+951 to 34+972	Sharp Bend	Design Speed = 20 Kmph
17	35+033 to 35+044	Sharp Bend	Design Speed = 20 Kmph
18	35+092 to 35+115	Sharp Bend	Design Speed = 30 Kmph
19	35+323 to 35+345	Sharp Bend	Design Speed = 20 Kmph
20	35+446 to 35+455	Sharp Bend	Design Speed = 20 Kmph
21	35+495 to 35+502	Sharp Bend	Design Speed = 30 Kmph
22	35+539 to 35+55	Sharp Bend	Design Speed = 20 Kmph
23	35+589 to 35+608	Sharp Bend	Design Speed = 20 Kmph
24	35+876 to 35+955	Sharp Bend	Design Speed = 30 Kmph
25	37+048 to 37+094	Sharp Bend	Design Speed = 20 Kmph
26	37+309 to 37+317	Sharp Bend	Design Speed = 30 Kmph
27	37+833 to 37+846	Sharp Bend	Design Speed = 30 Kmph
28	37+972 to 37+982	Sharp Bend	Design Speed = 20 Kmph
29	38+116 to 38+136	Sharp Bend	Design Speed = 30 Kmph
30	38+475 to 38+524	Sharp Bend	Design Speed = 30 Kmph
31	38+56 to 38+568	Sharp Bend	Design Speed = 30 Kmph
32	38+641 to 38+663	Sharp Bend	Design Speed = 20 Kmph
33	38+71 to 38+733	Sharp Bend	Design Speed = 20 Kmph
34	38+771 to 38+801	Sharp Bend	Design Speed = 20 Kmph
35	39+332 to 39+346	Sharp Bend	Design Speed = 30 Kmph
36	39+475 to 39+503	Sharp Bend	Design Speed = 20 Kmph
37	39+538 to 39+551	Sharp Bend	Design Speed = 20 Kmph
38	39+631 to 39+656	Sharp Bend	Design Speed = 30 Kmph
39	39+738 to 39+785	Sharp Bend	Design Speed = 30 Kmph
40	39+839 to 39+866	Sharp Bend	Design Speed = 20 Kmph
41	39+974 to 39+993	Sharp Bend	Design Speed = 20 Kmph
42	40+164 to 40+181	Sharp Bend	Design Speed = 20 Kmph
43	40+263 to 40+267	Sharp Bend	Design Speed = 20 Kmph

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
44	40+322 to 40+337	Sharp Bend	Design Speed = 20 Kmph
45	40+379 to 40+445	Sharp Bend	Design Speed = 20 Kmph
46	40+516 to 40+56	Sharp Bend	Design Speed = 20 Kmph
47	40+594 to 40+63	Sharp Bend	Design Speed = 20 Kmph
48	40+687 to 40+701	Sharp Bend	Design Speed = 20 Kmph
49	40+735 to 40+748	Sharp Bend	Design Speed = 20 Kmph
50	40+813 to 40+825	Sharp Bend	Design Speed = 30 Kmph
51	41+632 to 41+643	Sharp Bend	Design Speed = 30 Kmph
52	41+888 to 41+965	Sharp Bend	Design Speed = 30 Kmph
53	42+112 to 42+146	Sharp Bend	Design Speed = 30 Kmph
54	43+083 to 43+117	Sharp Bend	Design Speed = 20 Kmph
55	43+193 to 43+284	Sharp Bend	Design Speed = 30 Kmph
56	43+524 to 43+546	Sharp Bend	Design Speed = 20 Kmph
57	43+634 to 43+669	Sharp Bend	Design Speed = 30 Kmph
58	43+911 to 43+951	Sharp Bend	Design Speed = 20 Kmph
59	44+078 to 44+115	Sharp Bend	Design Speed = 30 Kmph
60	44+530 to 44+553	Sharp Bend	Design Speed = 30 Kmph
61	44+660 to 44+687	Sharp Bend	Design Speed = 30 Kmph
62	46+301 to 46+326	Sharp Bend	Design Speed = 20 Kmph
63	46+374 to 46+395	Sharp Bend	Design Speed = 30 Kmph
64	46+610 to 46+62	Sharp Bend	Design Speed = 20 Kmph
65	46+671 to 46+688	Sharp Bend	Design Speed = 20 Kmph
66	47+188 to 47+23	Sharp Bend	Design Speed = 30 Kmph
67	47+487 to 47+492	Sharp Bend	Design Speed = 30 Kmph
68	47+534 to 47+547	Sharp Bend	Design Speed = 20 Kmph
69	47+572 to 47+666	Sharp Bend	Design Speed = 20 Kmph
70	47+699 to 47+721	Sharp Bend	Design Speed = 20 Kmph
71	47+773 to 47+784	Sharp Bend	Design Speed = 30 Kmph
72	47+830 to 47+893	Sharp Bend	Design Speed = 20 Kmph
73	47+935 to 47+954	Sharp Bend	Design Speed = 30 Kmph
74	48+011 to 48+021	Sharp Bend	Design Speed = 30 Kmph
75	48+175 to 48+201	Sharp Bend	Design Speed = 20 Kmph
76	48+239 to 48+276	Sharp Bend	Design Speed = 30 Kmph
77	48+362 to 48+375	Sharp Bend	Design Speed = 30 Kmph
78	48+497 to 48+504	Sharp Bend	Design Speed = 20 Kmph
79	48+570 to 48+588	Sharp Bend	Design Speed = 20 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	225	32.867	32.873	70
2	226	32.936	32.962	50
3	227	33.017	33.039	30
4	228	33.147	33.175	50
5	229	33.276	33.296	25
6	230	33.334	33.343	25
7	231	33.381	33.462	60
8	233	33.638	33.655	60
9	234	33.882	33.929	50

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
10	235	33.987	34.002	25
11	237	34.16	34.179	30
12	238	34.223	34.24	25
13	239	34.295	34.333	60
14	240	34.416	34.443	25
15	241	34.484	34.539	27
16	242	34.586	34.635	30
17	243	34.676	34.7	50
18	244	34.871	34.914	25
19	245	34.951	34.972	60
20	246	35.033	35.044	60
21	247	35.092	35.115	40
22	248	35.323	35.345	20
23	249	35.446	35.455	60
24	250	35.495	35.502	50
25	251	35.539	35.55	55
26	252	35.589	35.608	60
27	253	35.697	35.775	70
28	254	35.876	35.955	40
29	261	36.82	36.843	50
30	262	37.048	37.094	30
31	263	37.174	37.188	70
32	268	37.833	37.846	60
33	270	37.972	37.982	20
34	271	38.116	38.136	60
35	275	38.641	38.663	20
36	276	38.71	38.733	40
37	277	38.771	38.801	40
38	281	39.332	39.346	60
39	282	39.475	39.503	20
40	283	39.538	39.551	30
41	284	39.631	39.656	70
42	286	39.839	39.866	20
43	287	39.974	39.993	20
44	289	40.164	40.181	20
45	290	40.263	40.267	20
46	291	40.322	40.337	30
47	292	40.379	40.445	30
48	293	40.516	40.56	20
49	295	40.687	40.701	40
50	296	40.735	40.748	20
51	297	40.813	40.825	50
52	303	41.632	41.643	60

Sl. No.	HIP NO.	CHAINAGE (KM)		RADIUS
		From	To	
53	304	41.888	41.965	60
54	305	42.112	42.146	40
55	308	42.5	42.506	50
56	310	42.774	42.785	50
57	312	43.083	43.117	25
58	313	43.193	43.284	43
59	314	43.351	43.364	50
60	315	43.524	43.546	30
61	319	43.911	43.951	30
62	323	44.53	44.553	60
63	324	44.66	44.687	60
64	329	45.573	45.612	50
65	330	45.726	45.751	50
66	331	45.871	45.899	50
67	334	46.301	46.326	35
68	335	46.374	46.395	50
69	337	46.61	46.62	60
70	338	46.671	46.688	20
71	339	46.835	46.866	55
72	343	47.487	47.492	55
73	344	47.534	47.547	30
74	346	47.699	47.721	20
75	348	47.83	47.893	40
76	350	48.011	48.021	50
77	352	48.239	48.276	40
78	353	48.362	48.375	70
79	354	48.497	48.504	55
80	355	48.57	48.588	40

(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	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					

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.tfhrc.com/pavement/lttp/ reports/03031/)	24-48 hours	MORT&H Specificatio n 3004.2

		Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
	Performance Parameter	Desirable	Acceptable					
Asset Type 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 Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

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

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98)	180 days	IRC:82-2015
	Skid			Bi-Annually	(Sideway-	:2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference	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-Annually			180 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014

Rigid Pavement **(Pavement of MCW, Service Road, Grade structure,**	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

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

	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table Table -2:

Maintenance Criteria for Rigid Pavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
CRACKING						
			0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
	Single Discrete	w = width of crack L = length of crack d =	2	w = 0.2 - 0.5 mm, discernible from slow-moving car		Seal, and stitch if L >

1	**Cracks Not intersecting with any joint**	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

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 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
	Single Transverse (or	w = width of crack L	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		

2	**Diagonal) Crack intersecting with one or more joints**	= 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	

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 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Within 15days
			0	Nil, not discernible	No Action	

3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	
			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 -

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 > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			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, Reinstate 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 secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			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	Full depth repair
			5	ree or four corners broken	IRC:SP: 83-2008) Within 15 days	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
			0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m^2		Seal with low viscosity epoxy to secure broken parts.
			2	either w > 0.5 mm or L < 3 m/m^2		Within 15days
	Punchout (Applicable to Continuous Reinforced Concrete Pavement		3	w > 1.5 mm and L < 3 m/m^2		

6	**(CRCP) only)**	w = width of crack L = length (m/m2)	4	w > 3 mm, L < 3 m/m² 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.
			5	w > 3 mm, L > 3 m/m² and deformation		Within 30days

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 or	r = area damaged surface/total surface of slab (%) h =			Short Term	Long Term
			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 type surface	maximum depth of damage			Within 15 days	Not Applicable
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	r = 25 - 50 %		

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 mm	Reconstruct slabs, 4 or more slabs ifaffecting. Within 30 days	
					Short Term	**Long Term**
			0	Nil, not discernible	No action.	
		r = damaged				

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 mm	Reconstruct slab within 30 days	
			0		No action.	
			1	t > 1 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 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	

10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m²	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m²	Partial depth repair 65 mm deep.	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m²	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 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
					Short Term	**Long Term**
			0	Difficult to discern.	No action.	
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
		loss or damage L = Length as % total		Notable. L > 25% insufficient protection against ingress of water and trapping	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 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.
			3	f = 6 - 12 mm	Diamond Grinding	Within 30days
			4	f= 12 - 18 mm	Raise sunken slab.	
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	Replace the slab as appropriate. Within 30days
					Short Term	**Long Term**
			0	Nil, not discernible		

14	**Blowup or Buckling**	h = vertical displacement from normal profile	1	h < 6 mm	No Action	
			2	h = 6 - 12 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** No action.	**Long Term** scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate	

			5	h > 100 mm	pavement at normal level if length < 20 m. Within 30 days	
17	**Bump**	h = vertical	0	h < 4 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 < 3mm	**Short Term** No action.	**Long Term**
			1	f = 3 - 10 mm		

18	**Lane to Shoulder Dropoff**	f = difference of level	2	f = 10 - 25 mm	Spot repair of shoulder within 7 days	
			3	f = 25 - 50 mm	Fill up shoulder	

					within 7 dayss	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch.
			5	f > 75 mm		Within 30days
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	

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measuremen t</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specification s and Standards</th></tr>
<tr><td rowspan="3">Highway</td><td rowspan="3">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="3">Monthly</td><td rowspan="3">Manual Measurement s with

Odometer along with video/ image backup</td><td rowspan="3">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.</td><td rowspan="3"></td><td rowspan="3">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stoppin g Sight Distance (m)</td></tr>
<tr><td>100</td><td>36
0</td><td>1
8</td></tr>
</table>

				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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measuremen t</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specification s and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road -
130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per
Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td></td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during</u>
<u>night time:</u>
<table><tr><td>Design Speed</td><td>(RL) Retro Reflectivity (mcd/m²/lux)</td></tr></table></td><td></td><td>As per
Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

	Night Time Visibility		Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years	Bi-Annually					
		Upto65	200	80						
		65-1000	250	120						
		Above 10	350	150						

		0						
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):						

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/m²/lux Minimum Threshold Level: 50 mcd/m²/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/Cantileve r Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s 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/Cantilev er 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	Functionality: 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 Furnitur e	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: 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	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s 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	Rectificatio n	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 Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
Trees and Plantatio n including median plantatio n	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 Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
Other Project Facilities and Approac h 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	Performanc e Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab	Free waterway/ unobstructe d flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35- 1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
		Spalling of concrete not more than 0.25 sqm		Detailed inspection			
		Delamination of concrete not more than 0.25 sq.m.					

culverts	Structurally sound	Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	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

	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.

	Rusted reinforcem ent	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 withanti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specificatio n 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delaminatio n	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 vibro-meters	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 specification s 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 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 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 or2	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.	
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.							

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) ofbridges**	
(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 beforeissuing 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 32.835 to Km 48.587 (Package-2A) 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

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[$] 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, 1st Parliament street, New Delhi-110001

Signed and sealed this ……. day of …….., 20…… at ……..
SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

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 32.835 to Km 48.587 (Package-2A) 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, 1st Parliament street, New Delhi-110001

Signed and sealed this ……. day of …….., 20…… at ……..
SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Schedule - H

(See Clauses 10.1 (iv) and 19.3)

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 Basecourse	[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	20.87%
		(2) Sub-base Course	26.61%
		(3) Non bituminous Base course	16.33%
		(4) Bituminous Basecourse	12.79%
		(5) Wearing Coat	7.33%
		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 Basecourse	[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)	16.07%
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 mand<60m)	

Item	Weightage in % of CP	Stage for Payment	Percentage
		(1)Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	60.33%
		(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.	36.31%
		(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	3.36%
		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 upto 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)works and 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 pitching and protection works)	[Nil]

Item	Weightage in % of CP	Stage for Payment	Percentage
		A.2-NewMajorBridges	
		(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 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) incase 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/GradeSeparators	

Item	Weightage in % of CP	Stage for Payment	Percentage
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3)Super-Structure(Including bearings)	[Nil]
		(4)WearingCoatincludingexpansion 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	10.91%
		(iii) Road signs, markings, km stones, safety devices etc	6.13%
		(iv) Project facilities	
		a) Bus Bays	0.7%
		b) Truck Lay-byes	[Nil]
		c) Passenger Shelter	0.09%
		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	57.97%
		(ix) Toe Wall	1.98%
		(x) Retaining Wall	16.49%
		(xi) Boundary wall	[Nil]
		(xii) Site Clearance & Dismantling	1.33%
		(xiii) Protection Works	4.4%

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		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.
(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]	Cost of ten completed culverts shall be determined on pro rata basis with respect to the total number of culverts.

B.1- Reconstruction/New2-Lane Realignment/Bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on prorata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(1)Earthwork up to top of the sub-grade	20.87%	
(3) Sub-base Course	26.61%	
(4) Non bituminous Base course	16.33%	
(5) Bituminous Base course	12.79%	
(6) Wearing Coat	7.33%	
(7) Widening and repair of culverts		
B.2- Reconstruction/New 8-Lane Realignment/Bypass (Rigid Pavement)		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.
(1)Earthwork up to top of the sub-grade	[Nil]	
(2) Sub-base Course	[Nil]	
(3) DryLean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)		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.
(1)Earthwork up to top of the sub-grade	[Nil]	
(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)		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.
(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		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts
Culverts (length <6m)	16.07%	

@ 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 x weightage for road work x weightage for bituminous work x (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 upto the abutment/pier cap.	60.33%	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.	36.31%	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	3.36%	Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of 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, piers 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.

Stage of Payment	Percentage weightage	Payment Procedure
(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 pitchingandprotection 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	[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-ratabasison completion of a stage i.e. not lessthan 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 atleast 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)WearingCoatincludingexpansion joints	[Nil]	WearingCoat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects asspecified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crashbarriers,road markingsetc. completein all respects as specified.
(6) Wing walls/return walls	[Nil]	Wingwalls/return walls:Payments shall bemade on completion of all wing walls/returnwalls complete in all respects as specified.
(7)Guidebunds,RiverTrainingworks etc.	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion ofall guide bunds/river training works etc. complete in all respects as specified.
(8)Approaches(including Retaining walls, stone pitchingand protection works)	[Nil]	Approaches: Payments shall be made on pro ratabasison 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 theROB/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 shallbe made on pro-rata basis on completion of a stage i.e.not lessthan 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-wearing coat including expansion joints complete in all respectsas specified and (b) incase of RUB-rigid pavement under RUB including drainagefacility completein all respects as specified	[Nil]	WearingCoat: 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 underRUB including drainage facility completein 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, crashbarriers,road markingsetc. 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/returnwalls completeinall respects as specified.
(7) Approaches (Including Retaining walls,Stone Pitching and protection works)	[Nil]	Payments shall be made on prorata 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) incase 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	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails,

markings etc.		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.1-Wideningandrepairs of ElevatedSection/ 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. 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 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)WearingCoatincludingexpansion joints	[Nil]	WearingCoat: Payment shall be made on completion of wearingcoat 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, crashbarriers,road markingsetc. 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/returnwalls 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 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 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 Schedule 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	10.91%	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.
(3) Road signs, markings, km stones, safety devices etc	6.13%	

Stage of Payment	Percentage weightage	Payment Procedure
(4) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	0.7%	
b) Truck Lay-byes	[Nil]	
c) Passenger Shelter	0.09%	
d) Rest Area	[Nil]	
(5) Road side Plantation including Horticulture in Wayside Amenities	[Nil]	Unit of measurement is linear length
(6) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten 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	16.49%	
(b) Breast Wall	57.97%	
(c) Toe Wall	1.98%	
(9) Site Clearance & Dismantling	1.33%	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% (ten percent) of the total length.
(10) Other Works (Turfing & Hydro Seeding)	4.4%	Unit of measurement is square metre.

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 the drawings as per standard Manual and speicifications 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 ofeach 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 of ……20…..

SIGNED, SEALED AND DELIVERED
For and on behalf of the Authority's Engineer by:

(Signature)
(Name)
(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(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**	

S. No.	Item/Defect/Deficiency	Percentage
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(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:

$$R = {}^{P}/_{100} \times (M1 \; or \; M2) \times {}^{L1}/_{L}$$

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: Rs. [*****]

(ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor’s performance of this Agreement excluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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)