National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

Ministry of Road Transport & Highways,
(Govt. of India)

SCHEDULES

For

"Up-gradation to 2 lane with paved shoulders of Pawlrang – Rulchawm section of NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage km 72.030 to km 104.129 including 2.459 km re-alignment section from Tuivawl River to Rulchawm connecting km 48.150 of NH-6 [Design Chainage km 68.170 to km 98.579] (Package-III) in the State of Mizoram under Bharatmala Pariyojna on EPC mode"

July , 2021

National Highways & Infrastructure Development Corporation Ltd
3rd floor, PTI Building, 4-Parliament Street,
New Delhi – 110001

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Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) Site of the **"Tuivai - Keifang road, NH-102B from Existing Chainage Km 72.030 (near Pawlarang Village) to km 101.670 and 2.459 km re-alignment section from Tuivawl River to Rulchawm village connecting km 48.150 of NH-06 [Design Chainage km 68.170 to km 98.579] (Package-III) in the State of Mizoram"** Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

(ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

(iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.

(iv) The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the contractor with FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the Road Profile as indicated in Annex-III based on site/design requirement.

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

Annex -I

(Schedule-A)

Site

1. Site

The Site of the **"Tuivai - Keifang road, NH-102B from Existing Chainage Km 72.030 (near Pawlarang Village) to km 101.670 and 2.459 km re-alignment section from Tuivawl River to Rulchawm village connecting km 48.150 of NH-06 [Design Chainage km 68.170 to km 98.579] (Package-III) in the State of Mizoram"** Project Highway comprises the section of NH-102B commencing from km 32+796 to km 72+030 i.e. Ngopa Village to Near Pawlarang Village in the state of Mizoram. The land, carriageway and structures comprising the Site are described below.

2. Land

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

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
1	72.030	72.300	10.300	Total ROW 14.0 - 24.0 m width
2	72.300	72.400	10.000	
3	72.400	72.500	10.550	
4	72.500	72.600	10.000	
5	72.600	72.700	11.300	
6	72.700	72.800	10.400	
7	72.800	72.900	8.550	
8	72.900	73.000	9.500	
9	73.000	73.100	10.450	
10	73.100	73.200	10.750	
11	73.200	73.300	9.950	
12	73.300	73.400	9.250	
13	73.400	73.500	10.200	
14	73.500	73.600	10.800	
15	73.600	73.700	8.850	
16	73.700	73.800	7.750	
17	73.800	73.900	10.650	
18	73.900	74.000	10.950	
19	74.000	74.100	9.650	
20	74.100	74.200	9.900	
21	74.200	74.300	8.800	
22	74.300	74.400	9.700	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
23	74.400	74.500	15.150	
24	74.500	74.600	14.700	
25	74.600	74.700	8.950	
26	74.700	74.800	7.100	
27	74.800	74.900	9.000	
28	74.900	75.000	9.950	
29	75.000	75.100	9.500	Total ROW 14.0 - 24.0 m width
30	75.100	75.200	10.300	
31	75.200	75.300	9.350	
32	75.300	75.400	8.450	
33	75.400	75.500	7.950	
34	75.500	75.600	7.350	
35	75.600	75.700	7.250	
36	75.700	75.800	7.600	
37	75.800	75.900	8.200	
38	75.900	76.000	9.300	
39	76.000	76.100	8.900	
40	76.100	76.200	9.000	
41	76.200	76.300	9.300	
42	76.300	76.400	8.450	
43	76.400	76.500	9.750	
44	76.500	76.600	10.350	
45	76.600	76.700	10.450	
46	76.700	76.800	11.350	
47	76.800	76.900	11.500	
48	76.900	77.000	11.850	
49	77.000	77.100	10.400	
50	77.100	77.200	9.850	
51	77.200	77.300	10.200	
52	77.300	77.400	9.300	
53	77.400	77.500	9.200	
54	77.500	77.600	8.650	
55	77.600	77.700	8.900	
56	77.700	77.800	9.300	
57	77.800	77.900	8.800	
58	77.900	78.000	8.650	
59	78.000	78.100	8.550	
60	78.100	78.200	9.050	
61	78.200	78.300	8.350	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
62	78.300	78.400	7.900	
63	78.400	78.500	9.150	
64	78.500	78.600	9.500	
65	78.600	78.700	9.550	
66	78.700	78.800	8.850	
67	78.800	78.900	8.000	
68	78.900	79.000	7.700	
69	79.000	79.100	9.350	
70	79.100	79.200	10.350	
71	79.200	79.300	9.900	
72	79.300	79.400	9.650	
73	79.400	79.500	9.150	
74	79.500	79.600	9.100	Total ROW 14.0 - 24.0 m width
75	79.600	79.700	10.500	
76	79.700	79.800	16.450	
77	79.800	79.900	15.100	
78	79.900	80.000	9.400	
79	80.000	80.100	9.300	
80	80.100	80.200	10.650	
81	80.200	80.300	12.850	
82	80.300	80.400	13.850	
83	80.400	80.500	14.600	
84	80.500	80.600	14.350	
85	80.600	80.700	14.650	
86	80.700	80.800	16.550	
87	80.800	80.900	13.600	
88	80.900	81.000	9.400	
89	81.000	81.100	10.700	
90	81.100	81.200	10.050	
91	81.200	81.300	8.950	
92	81.300	81.400	9.550	
93	81.400	81.500	9.150	
94	81.500	81.600	11.400	
95	81.600	81.700	11.400	
96	81.700	81.800	10.250	
97	81.800	81.900	10.950	
98	81.900	82.000	10.200	
99	82.000	82.100	10.300	
100	82.100	82.200	14.050	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
101	82.200	82.300	13.450	
102	82.300	82.400	9.950	
103	82.400	82.500	10.500	
104	82.500	82.600	11.050	
105	82.600	82.700	9.650	
106	82.700	82.800	8.950	
107	82.800	82.900	9.100	
108	82.900	83.000	10.400	
109	83.000	83.100	12.300	
110	83.100	83.200	9.750	
111	83.200	83.300	8.400	
112	83.300	83.400	11.300	
113	83.400	83.500	11.950	
114	83.500	83.600	9.950	
115	83.600	83.700	10.150	
116	83.700	83.800	9.400	
117	83.800	83.900	8.300	
118	83.900	84.000	10.450	
119	84.000	84.100	10.850	Total ROW 14.0 - 24.0 m width
120	84.100	84.200	12.200	
121	84.200	84.300	13.300	
122	84.300	84.400	13.550	
123	84.400	84.500	11.600	
124	84.500	84.600	9.850	
125	84.600	84.700	10.350	
126	84.700	84.800	11.700	
127	84.800	84.900	11.700	
128	84.900	85.000	8.750	
129	85.000	85.100	9.000	
130	85.100	85.200	8.800	
131	85.200	85.300	8.750	
132	85.300	85.400	13.500	
133	85.400	85.500	13.850	
134	85.500	85.600	11.050	
135	85.600	85.700	12.550	
136	85.700	85.800	12.050	
137	85.800	85.900	10.350	
138	85.900	86.000	11.100	
139	86.000	86.100	10.950	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
140	86.100	86.200	9.150	
141	86.200	86.300	11.900	
142	86.300	86.400	14.050	
143	86.400	86.500	11.750	
144	86.500	86.600	11.250	
145	86.600	86.700	11.950	
146	86.700	86.800	10.100	
147	86.800	86.900	9.250	
148	86.900	87.000	10.100	
149	87.000	87.100	10.200	
150	87.100	87.200	13.600	
151	87.200	87.300	13.450	
152	87.300	87.400	11.050	
153	87.400	87.500	10.800	
154	87.500	87.600	11.850	
155	87.600	87.700	13.750	
156	87.700	87.800	13.450	
157	87.800	87.900	11.900	
158	87.900	88.000	9.650	
159	88.000	88.100	8.950	
160	88.100	88.200	9.200	
161	88.200	88.300	8.850	
162	88.300	88.400	8.300	
163	88.400	88.500	9.350	
164	88.500	88.600	10.050	Total ROW 14.0 - 24.0 m width
165	88.600	88.700	8.950	
166	88.700	88.800	8.500	
167	88.800	88.900	9.450	
168	88.900	89.000	9.850	
169	89.000	89.100	9.150	
170	89.100	89.200	8.800	
171	89.200	89.300	9.300	
172	89.300	89.400	12.350	
173	89.400	89.500	11.400	
174	89.500	89.600	9.150	
175	89.600	89.700	11.300	
176	89.700	89.800	9.700	
177	89.800	89.900	11.300	
178	89.900	90.000	12.850	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
179	90.000	90.100	10.850	
180	90.100	90.200	11.200	
181	90.200	90.300	9.050	
182	90.300	90.400	7.400	
183	90.400	90.500	8.250	
184	90.500	90.600	14.050	
185	90.600	90.700	15.100	
186	90.700	90.800	11.650	
187	90.800	90.900	10.850	
188	90.900	91.000	7.950	
189	91.000	91.100	9.250	
190	91.100	91.200	12.500	
191	91.200	91.300	11.250	
192	91.300	91.400	8.350	
193	91.400	91.500	9.150	
194	91.500	91.600	14.350	
195	91.600	91.700	13.450	
196	91.700	91.800	8.050	
197	91.800	91.900	7.850	
198	91.900	92.000	8.250	
199	92.000	92.100	8.800	
200	92.100	92.200	9.800	
201	92.200	92.300	9.300	
202	92.300	92.400	7.450	
203	92.400	92.500	6.800	
204	92.500	92.600	7.700	
205	92.600	92.700	7.500	
206	92.700	92.800	6.000	
207	92.800	92.900	6.450	
208	92.900	93.000	7.550	
209	93.000	93.100	7.400	
210	93.100	93.200	7.500	
211	93.200	93.300	9.800	
212	93.300	93.400	11.000	
213	93.400	93.500	9.050	
214	93.500	93.600	15.300	
215	93.600	93.700	15.000	
216	93.700	93.800	8.650	
217	93.800	93.900	11.050	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
218	93.900	94.000	10.550	
219	94.000	94.100	8.550	
220	94.100	94.200	8.100	Total ROW 14.0 - 24.0 m width
221	94.200	94.300	8.750	
222	94.300	94.400	8.900	
223	94.400	94.500	8.300	
224	94.500	94.600	10.200	
225	94.600	94.700	12.100	
226	94.700	94.800	11.100	
227	94.800	94.900	10.500	
228	94.900	95.000	9.700	
229	95.000	95.100	8.650	
230	95.100	95.200	8.100	
231	95.200	95.300	7.500	
232	95.300	95.400	8.250	
233	95.400	95.500	7.850	
234	95.500	95.600	7.550	
235	95.600	95.700	7.600	
236	95.700	95.800	6.400	
237	95.800	95.900	5.900	
238	95.900	96.000	6.850	
239	96.000	96.100	7.400	
240	96.100	96.200	7.700	
241	96.200	96.300	9.400	
242	96.300	96.400	10.350	
243	96.400	96.500	8.100	
244	96.500	96.600	6.900	
245	96.600	96.700	8.550	
246	96.700	96.800	9.100	
247	96.800	96.900	8.450	
248	96.900	97.000	8.300	
249	97.000	97.100	8.000	
250	97.100	97.200	9.250	
251	97.200	97.300	9.950	
252	97.300	97.400	8.350	
253	97.400	97.500	7.050	
254	97.500	97.600	6.000	
255	97.600	97.700	6.700	
256	97.700	97.800	9.550	

Sl. No.	Existing Chainage (km)		Existing ROW (m)	Remarks
	From	To		
257	97.800	97.900	11.150	Total ROW 14.0 - 24.0 m width
258	97.900	98.000	11.150	
259	98.000	98.100	12.050	
260	98.100	98.200	11.700	
261	98.200	98.300	8.750	
262	98.300	98.400	7.850	
263	98.400	98.500	8.150	
264	98.500	98.600	8.000	
265	98.600	98.700	8.050	
266	98.700	98.800	7.150	
267	98.800	98.900	7.250	
268	98.900	99.000	7.450	
269	99.000	99.100	6.750	
270	99.100	99.200	9.150	
271	99.200	99.300	10.650	
272	99.300	99.400	7.400	
273	99.400	99.500	7.050	
274	99.500	99.600	9.150	
275	99.600	99.700	8.950	
276	99.700	99.800	7.800	
277	99.800	99.900	7.950	
278	99.900	100.000	10.350	
279	100.000	100.100	11.000	
280	100.100	100.200	8.700	
281	100.200	100.300	9.500	
282	100.300	100.400	10.450	
283	100.400	100.500	8.700	
284	100.500	100.600	7.850	
285	100.600	100.700	8.550	
286	100.700	100.800	8.900	
287	100.800	100.900	8.500	
288	100.900	101.000	7.950	
289	101.000	101.100	8.600	
290	101.100	101.200	8.200	
291	101.200	101.300	7.250	
292	101.300	101.400	10.000	
293	101.400	101.500	12.400	
294	101.500	101.670	12.700	
295	101.670	104.129	Nil	Re-alignment in Green field

3. Carriageway

The present carriageway of the Project Highway is Single Lane of width 3.75 m from km 72+030 to km 101.670 with flexible pavement and from 101.670 km to 104.129 km, there is no existing road..

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Existing Chainage (km)	Type of Structure	No. of Spans with span length (m)	Width (m)
1	101.610	Steel truss Bridge	1 x 65.00	6.0

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

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

Sr. 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:

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

8. Railway level crossings

The Site includes the following railway level crossings

Sr. 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.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
1	72.146	HUME PIPE	1X0.9	7.4
2	72.361	SLAB	1X5.1	7.3
3	72.502	SLAB	1X2.0	6.5
4	72.578	HUME PIPE	1X0.9	6.5
5	72.719	SLAB	1X2.9	7.1
6	72.873	HUME PIPE	1X0.9	6.7
7	73.025	HUME PIPE	1X0.9	7.3
8	73.100	HUME PIPE	1X0.9	7.3
9	73.357	SLAB	1X3.5	7.2
10	73.443	HUME PIPE	1X0.9	7.5
11	73.657	SLAB	1X2.6	7.2
12	73.745	SLAB	1X3.0	7.2
13	73.821	SLAB	1X2.2	7.5
14	73.943	HUME PIPE	1X0.9	7.5
15	74.085	HUME PIPE	1X0.9	7.3
16	74.260	HUME PIPE	1X0.9	8.5
17	74.383	SLAB	1X2.70	7.2
18	74.410	SLAB	1X2.70	7.5
19	74.502	HUME PIPE	1X0.9	7.5
20	74.585	HUME PIPE	1X0.9	8.0
21	74.754	SLAB	1X2.8	7.1
22	74.856	HUME PIPE	1X0.9	7.2
23	74.877	HUME PIPE	1X0.9	7.4
24	75.038	SLAB	1X2.0	6.5
25	75.198	HUME PIPE	1X0.9	7.2
26	75.458	HUME PIPE	1X0.9	7.0
27	75.875	SLAB	1X1.6	7.1
28	76.122	SLAB	1X2.1	7.3
29	76.364	HUME PIPE	1X0.9	7.2
30	76.450	SLAB	1X2.2	7.0
31	76.555	SLAB	1X2.3	7.0
32	76.701	HUME PIPE	1X0.9	7.1
33	76.763	SLAB	1X2.0	7.0
34	76.933	SLAB	1X1.4	6.5

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
35	77.033	HUME PIPE	1X0.9	6.5
36	77.135	SLAB	1X2.0	7.1
37	77.319	SLAB	1X2.0	6.7
38	77.574	HUME PIPE	1X0.9	7.3
39	78.056	SLAB	1X2.3	7.3
40	78.375	SLAB	1X1.9	7.2
41	78.555	HUME PIPE	1X1.0	7.5
42	78.780	SLAB	1X1.8	7.2
43	79.045	SLAB	1X2.04	7.2
44	79.227	HUME PIPE	1X1.0	7.5
45	79.465	SLAB	1X1.5	7.5
46	79.638	HUME PIPE	1X0.9	7.3
47	79.753	SLAB	1X0.7	8.5
48	80.213	HUME PIPE	1X0.9	7.2
49	80.583	HUME PIPE	1X0.9	7.5
50	80.820	HUME PIPE	1X0.9	7.5
51	81.678	HUME PIPE	1X0.9	8.0
52	82.004	SLAB	1X2.0	7.2
53	82.340	SLAB	1X2.8	7.5
54	82.586	HUME PIPE	1X0.9	7.5
55	82.913	HUME PIPE	1X0.9	7.3
56	83.279	HUME PIPE	1X0.9	8.5
57	83.561	HUME PIPE	1X0.9	7.2
58	83.811	HUME PIPE	1X0.9	7.5
59	84.349	HUME PIPE	1X0.9	7.5
60	84.690	SLAB	1X2.6	8.0
61	84.975	SLAB	1X2.8	7.1
62	85.124	HUME PIPE	1X0.9	7.2
63	85.798	HUME PIPE	1X0.9	7.4
64	86.086	HUME PIPE	1X0.9	6.5
65	86.447	HUME PIPE	1X0.9	7.2
66	87.371	HUME PIPE	1X0.9	7.0
67	87.720	HUME PIPE	1X0.9	7.1
68	88.330	HUME PIPE	1X0.9	7.3
69	88.733	HUME PIPE	1X0.9	7.2
70	88.964	HUME PIPE	1X0.9	7.2
71	89.383	HUME PIPE	1X0.9	7.5
72	89.505	HUME PIPE	1X0.9	7.5
73	89.784	HUME PIPE	1X0.9	7.3
74	90.314	HUME PIPE	1X0.9	8.5
75	90.857	HUME PIPE	1X0.9	7.2
76	91.417	HUME PIPE	1X0.9	7.5
77	92.122	HUME PIPE	1X0.9	7.5
78	92.227	HUME PIPE	1X0.9	8.0

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
79	92.690	HUME PIPE	1X0.9	7.1
80	93.168	HUME PIPE	1X0.9	7.2
81	94.115	HUME PIPE	1X0.9	7.4
82	94.351	HUME PIPE	1X0.9	6.5
83	94.512	HUME PIPE	1X0.9	7.2
84	95.163	HUME PIPE	1X0.9	7.0
85	95.683	HUME PIPE	1X0.9	7.1
86	95.980	HUME PIPE	1X0.9	7.3
87	96.573	HUME PIPE	1X0.9	7.2
88	96.939	HUME PIPE	1X0.9	7.0
89	97.113	HUME PIPE	1X0.9	7.6
90	97.428	HUME PIPE	1X0.9	7.5
91	97.609	HUME PIPE	1X0.9	7.4
92	98.312	HUME PIPE	1X0.9	7.6
93	98.660	HUME PIPE	1X0.9	7.2
94	99.065	HUME PIPE	1X0.9	7.2
95	99.220	HUME PIPE	1X0.9	7.2
96	99.601	HUME PIPE	1X0.9	7.2
97	99.948	HUME PIPE	1X0.9	7.0
98	100.346	HUME PIPE	1X0.9	7.0
99	100.710	HUME PIPE	1X0.9	6.5
100	101.028	HUME PIPE	1X0.9	6.5
101	101.504	HUME PIPE	1X0.9	7.5

11. Bus bays

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

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

S. No.	Existing Chainage	Type

S. No.	Existing Chainage		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	72.030	78.900	-	6.870
2	78.900	79.950	1.050	-
3	79.950	89.850	-	9.900
4	89.850	91.020	1.170	-

14. Major junctions

The details of major junctions are as follows:

Sr. No.	Location (Km)	At grade	Separated	Category of Cross Road			
				NH	SH	MDR	Others
1	75+280	Hliappui	3-legged		SH		

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Existing Chainage	Type of intersection	
		Junction	Cross Road
1	84.065	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. Existing Utilities

(i) Electrical utilities

The site includes the following electrical utilities: -

a) Extra High-Tension Lines (EHT Lines) *

SL. NO	Chainage		Length (in km)					Crossings				
	From	To	400KV	220KV	110KV	66KV	132KV	400KV	220KV	110KV	66KV	132KV
1	-	-	-	-	-	-	-	-	-	-	-	-

b) High Tension/Low Tension Lines (HT/LT Lines) *

SL. No.	Chainage		HT/LT Lines (km)			Crossings			Transformer	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
1	72.030	88.265	-	0.840	-	-	-	3	-	-
2	72.030	88.265	-	-	0.560	-	-	-	-	-
3	88.265	101.600	-	-	0.960	-	-	-	-	-

(ii) Public Health utilities (Water/Sewage Pipe Lines) *

The site includes the following Public Health utilities: -

Sl. No.	Existing Chainage/ Location		Diameter of Pipe	Gravity Main	Feeding Main	Distribution Main/Village supply water pipe line	Private House Water Connection		Hand Pump	T-Cluster	Remarks
	From	To	mm	km	km	km	km	Nos	Nos	Nos	
1	73.480	73.800	32	0.440							Changzawl Village
2	73.83	74.53	50	0.77							Hliappui Village
3	74.74	75.43	65			0.935					
4	74.74	75.43	50			0.825					
5	74.74	75.43	40			0.55					
4	Hliappui						1.157	171			
5	77.4	84.24	65	3.784							Saichal Village
6	77.4	84.24	40	0.22							Saichal Village
7	84.24	86.2	65			1.518					
8	Saichal						1.414	209			
9	Hliappui								5		
	Total			**5.214**	**0**	**3.828**	**2.571**	**380**	**5**	**0**	

(iii) Any Other line: Nil

18. Other structures

Existing Breast Wall

SL No.	Existing Chainage (km)		Length (m)
	From	To	
1	77.880	77.915	35
2	79.750	79.765	15
3	86.970	87.010	40

SL No.	Existing Chainage (km)		Length (m)
	From	To	
4	90.260	90.280	20
5	90.700	90.710	10
	Total		**120**

Existing Retaining Wall

SL No.	Existing Chainage (km)		Length (m)
	From	To	
1	72.110	72.130	20
2	72.280	72.310	30
3	72.345	72.360	15
4	73.710	73.750	40
5	74.250	74.270	20
6	74.400	74.420	20
7	74.800	74.810	10
8	74.990	75.010	20
9	79.000	79.030	30
10	88.480	88.520	40
11	90.150	90.170	20
12	90.300	90.345	45
13	91.638	91.648	10
14	92.490	92.540	50
15	93.920	93.950	30
16	94.110	94.130	20
17	96.640	96.650	10
18	99.930	99.950	20
19	100.010	100.050	40
	Total		**490**

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:

Sl. No	Existing Chainage(km)		Length in km	Existing ROW	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 90% Right of Way (full width)	72.030	101.670	27.950	6.0 m-12.70 m	14.0 m to 24.0 m	on Appointed Date
	101.670	104.129	2.459	6.0 m-12.70 m	24.0 m	
(ii) Balance Right of Way (width)	72.030	101.670	27.950	6.0 m-12.70 m	14.0 m to 24.0 m	Within 150 days after the Appointed Date
	101.670	104.129	2.459	6.0 m-12.70 m	24.0 m	
(iii) ROW for Project facilities	At specified locations		-	-	14.0 m to 36.0 m	Within 240 days after the Appointed Date

Annex - III

(Schedule-A)

Alignment Plans

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

(i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as FRL. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

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

Annex - IV

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained: NA

The following environment clearances are awaited: NA

Environmental Clearances are not required for the project.

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and Augmentation

Rehabilitation and augmentation shall include Two Laning with Paved shoulder and Strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex -I

(Schedule –B)

Description of Two –Laning with Paved Shoulder

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 paved shoulders shall be undertaken. The paved carriageway shall be **10 (ten) m wide**.

Provided that in the built-up area 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	HLIAPPUI	74+400	75+280	10	TCS drawing attached	10 m Carriageway + 1.5 m Footpath on both side
2	SAICHAL	84+260	86+050	10	TCS drawing attached	10 m Carriageway + 1.5 m Footpath on both side

(b) Except as otherwise provided in this Agreement the width of the paved carriageway and cross-sectional features shall conform to paragraph 1 (ii) 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

The design speed shall be as per section 2.2 of IRC 73: 2018 for Mountainous and Steep terrain. However, in exceptional cases the minimum design speed of 30 km per

hour may be adopted and 20 km per hour for hair pin bend locations shall be adopted in accordance with IRC SP 48:1998.

(iii) Improvement of the existing road geometrics

In the sections where improvement of the road geometrics to the prescribed standards is not possible, the 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

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

(v) Type of shoulders

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

Sl. No.	Design Chainage	Reference to cross section
1	74+410 To 74+560	TCS-10A
2	74+560 To 74+730	TCS-9A
3	74+730 To 74+820	TCS-10A
4	74+820 To 74+880	TCS-11
5	74+880 To 75+090	TCS-10A
6	84+910 To 85+160	TCS-9A
7	85+160 To 85+240	TCS-11
8	85+240 To 85+380	TCS-10A
9	85+380 To 85+620	TCS-9A
10	85+620 To 85+820	TCS-10A
11	85+820 To 86+060	TCS-9A

(b) Width of Shoulders in open country shall be as mentioned in the following table:

Type of Section		Width of Shoulder (m)		
		Paved	Earthen	Total
Open Country with isolated built-up area	Hill Side	1.5	-	1.5
	Valley Side	1.5	1.0	2.5

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

Nil

(b) Lateral clearance: The width of the opening at the under passes shall be as follows:

Nil

(vii) Lateral and vertical clearances at overpasses

Nil

(viii) Service roads

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

Nil

(ix) Grade separated structures

Nil

(x) Cattle and pedestrian underpass /overpass:

Nil

(xi) Typical cross-sections of the Project Highway

Typical cross-section of the Project Highway is as per attached Drawings.

Sl No	TCS Type	Description
1	TCS-1A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with both side RR Masonry Triangular drain
2	TCS-1B	New construction of 2 Lane carriageway with paved shoulder in open area with both side RR Masonry Triangular drain
3	TCS-2A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with both side Retaining wall
5	TCS-3A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry Triangular drain and Valley side retaining wall
6	TCS-3B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry Triangular drain and Valley side retaining wall
7	TCS-4A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry Triangular drain
8	TCS-4B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry Triangular drain
9	TCS-5A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall

Sl No	TCS Type	Description
11	TCS-7A	Reconstruction of 2 Lane carriageway with paved shoulder in open area, Hill side breast wall with drain and other side Triangular drain.
12	TCS -7B	New construction of 2 Lane carriageway with paved shoulder in open area, Hill side breast wall with drain and other side Triangular drain.
14	TCS-9A	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up Area with Hill side Breast wall and Both side drain cum footpath
16	TCS-10A	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up Area with Both side drain cum footpath
17	TCS-11	Reconstruction of 2 Lane carriageway with paved shoulder in Built-up Area with Hill side Breast wall, Valley side Retaining wall and Both side drain cum footpath

The following TCS shall be adopted in these sections:

Design Chainage (km)		Net Length (m)	TCS No.
From	To		
68+170	68+660	490	TCS-4A
68+660	68+760	100	TCS-4B
68+760	68+860	100	TCS-1B
68+860	69+060	200	TCS-4B
69+060	69+620	560	TCS-4A
69+620	69+920	300	TCS-4B
69+920	70+260	340	TCS-4A
70+260	70+430	170	TCS-1B
70+430	70+520	90	TCS-3B
70+520	70+580	60	TCS-1B
70+580	70+730	150	TCS-4B
70+730	70+820	90	TCS-3B
70+820	70+910	90	TCS-4B
70+910	71+030	120	TCS-4A
71+030	71+090	60	TCS-3A
71+090	71+160	70	TCS-4A
71+160	71+280	120	TCS-3A
71+280	71+470	190	TCS-4A
71+470	71+760	290	TCS-4B
71+760	71+920	160	TCS-4A
71+920	71+970	50	TCS-3A
71+970	72+140	170	TCS-4A
72+140	72+680	540	TCS-4B
72+680	72+830	150	TCS-1B
72+830	73+260	430	TCS-4B
73+260	73+580	320	TCS-4A
73+580	73+680	100	TCS-3A
73+680	74+410	730	TCS-4A
74+410	74+560	150	TCS-10A
74+560	74+730	170	TCS-9A
74+730	74+820	90	TCS-10A

Design Chainage (km)		Net Length (m)	TCS No.
From	To		
74+820	74+880	60	TCS-11
74+880	75+090	210	TCS-10A
75+090	75+310	220	TCS-1B
75+310	77+460	2150	TCS-1A
77+460	77+610	150	TCS-7A
77+610	79+310	1700	TCS-1A
79+310	79+460	150	TCS-7A
79+460	79+660	200	TCS-1A
79+660	79+740	80	TCS-4A
79+740	80+160	420	TCS-3A
80+160	80+340	180	TCS-4A
80+340	80+580	240	TCS-3A
80+580	80+680	100	TCS-3A
80+680	80+780	100	TCS-2A
80+780	80+840	60	TCS-3A
80+840	81+560	720	TCS-4A
81+560	81+640	80	TCS-1A
81+640	81+680	40	TCS-4A
81+680	82+060	380	TCS-3A
82+060	82+160	100	TCS-2A
82+160	82+220	60	TCS-3A
82+220	82+460	240	TCS-4A
82+460	83+380	920	TCS-1A
83+380	83+410	30	TCS-1A
83+410	83+660	250	TCS-7A
83+660	83+760	100	TCS-1B
83+760	84+360	600	TCS-1A
84+360	84+460	100	TCS-1B
84+460	84+560	100	TCS-1A
84+560	84+760	200	TCS-4A
84+760	84+810	50	TCS-1B
84+810	84+910	100	TCS-4A
84+910	85+160	250	TCS-9A
85+160	85+240	80	TCS-11
85+240	85+380	140	TCS-10A
85+380	85+620	240	TCS-9A
85+620	85+820	200	TCS-10A
85+820	86+060	240	TCS-9A
86+060	86+160	100	TCS-4A
86+160	86+480	320	TCS-3A
86+480	86+720	240	TCS-4A
86+720	86+820	100	TCS-1B
86+820	86+880	60	TCS-3A
86+880	87+080	200	TCS-4A
87+080	87+180	100	TCS-4B
87+180	87+260	80	TCS-4A
87+260	87+560	300	TCS-3A

Design Chainage (km)		Net Length (m)	TCS No.
From	To		
87+560	88+210	650	TCS-4A
88+210	88+260	50	TCS-1B
88+260	88+360	100	TCS-4A
88+360	88+480	120	TCS-3A
88+480	88+630	150	TCS-2A
88+630	88+680	50	TCS-5A
88+680	88+730	50	TCS-5A
88+730	88+960	230	TCS-4A
88+960	89+760	800	TCS-1A
89+760	89+860	100	TCS-1B
89+860	90+210	350	TCS-1A
90+210	90+320	110	TCS-1B
90+320	91+560	1240	TCS-1A
91+560	91+760	200	TCS-7A
91+760	92+060	300	TCS-1A
92+060	92+220	160	TCS-1B
92+220	92+720	500	TCS-1A
92+720	92+960	240	TCS-1B
92+960	95+110	2150	TCS-1A
95+110	95+330	220	TCS-1B
95+330	95+460	130	TCS-4B
95+460	95+540	80	TCS-7B
95+540	95+620	80	TCS-1B
95+620	96+030	410	TCS-3B
96+030	96+102	72	Bridge
96+102	96+230	128	TCS-1B
96+230	96+420	190	TCS-4B
96+420	96+560	140	TCS-1B
96+560	96+628	68	TCS-3B
96+628	96+668	40	Bridge
96+668	96+820	152	TCS-1B
96+820	96+980	160	TCS-4B
96+980	97+020	40	TCS-3B
97+020	97+230	210	TCS-4B
97+230	97+320	90	TCS-3B
97+320	97+360	40	TCS-4B
97+360	97+420	60	TCS-3B
97+420	97+820	400	TCS-1B
97+820	97+880	60	TCS-4B
97+880	98+060	180	TCS-3B
98+060	98+120	60	TCS-4B
98+120	98+230	110	TCS-3B
98+230	98+320	90	TCS-4B
98+320	98+420	100	TCS-3B
98+420	98+579	159	TCS-4B
TOTAL=		**30409**	

2. Inter sections 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. 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.	Design Chainage (km)	Type of intersection	Other features	Remarks
1	75.280	3 Legged	At-Grade 3-Legged junction	Junction at Hillapui with state highway
2	98.579	3 Legged	At-Grade 3-Legged junction	with NH-6

Minor Intersections

Sl. No.	Design Chainage (km)	Type of intersection	Other features
1	79.290	T Type	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 (IRC: SP: 73-2018) 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

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]
As per attached plan profile drawing			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with section 5 of the IRC: SP: 73-2018.

(ii) Type of pavement: Flexible Pavement

(iii) Design requirements

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of main carriageway for design traffic of 20 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be taken for design if less than 8%. Maximum value of CBR to be taken for design shall not exceed 8%.

Bituminous Grade VG 30 or VG 40 shall be used for BC.

(iv) Reconstruction of stretches.

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

Sl. No.	Design Chainage (from km to km)	Remarks	TCS Type
1	68+170 To 68+660	RECONSTRUCTION	TCS-4A
2	68+660 To 68+760	RECONSTRUCTION	TCS-4B
3	68+760 To 68+860	RECONSTRUCTION	TCS-1B
4	68+860 To 69+060	RECONSTRUCTION	TCS-4B
5	69+060 To 69+620	RECONSTRUCTION	TCS-4A
6	69+620 To 69+920	RECONSTRUCTION	TCS-4B
7	69+920 To 70+260	RECONSTRUCTION	TCS-4A
8	70+260 To 70+430	RECONSTRUCTION	TCS-1B
9	70+430 To 70+520	RECONSTRUCTION	TCS-3B
10	70+520 To 70+580	RECONSTRUCTION	TCS-1B
11	70+580 To 70+730	RECONSTRUCTION	TCS-4B
12	70+730 To 70+820	RECONSTRUCTION	TCS-3B
13	70+820 To 70+910	RECONSTRUCTION	TCS-4B
14	70+910 To 71+030	RECONSTRUCTION	TCS-4A
15	71+030 To 71+090	RECONSTRUCTION	TCS-3A
16	71+090 To 71+160	RECONSTRUCTION	TCS-4A
17	71+160 To 71+280	RECONSTRUCTION	TCS-3A
18	71+280 To 71+470	RECONSTRUCTION	TCS-4A
19	71+470 To 71+760	RECONSTRUCTION	TCS-4B
20	71+760 To 71+920	RECONSTRUCTION	TCS-4A
21	71+920 To 71+970	RECONSTRUCTION	TCS-3A

Sl. No.	Design Chainage (from km to km)	Remarks	TCS Type
22	71+970 To 72+140	RECONSTRUCTION	TCS-4A
23	72+140 To 72+680	RECONSTRUCTION	TCS-4B
24	72+680 To 72+830	RECONSTRUCTION	TCS-1B
25	72+830 To 73+260	RECONSTRUCTION	TCS-4B
26	73+260 To 73+580	RECONSTRUCTION	TCS-4A
27	73+580 To 73+680	RECONSTRUCTION	TCS-3A
28	73+680 To 74+410	RECONSTRUCTION	TCS-4A
29	74+410 To 74+560	RECONSTRUCTION	TCS-10A
30	74+560 To 74+730	RECONSTRUCTION	TCS-9A
31	74+730 To 74+820	RECONSTRUCTION	TCS-10A
32	74+820 To 74+880	RECONSTRUCTION	TCS-11
33	74+880 To 75+090	RECONSTRUCTION	TCS-10A
34	75+090 To 75+310	RECONSTRUCTION	TCS-1B
35	75+310 To 77+460	RECONSTRUCTION	TCS-1A
36	77+460 To 77+610	RECONSTRUCTION	TCS-7A
37	77+610 To 79+310	RECONSTRUCTION	TCS-1A
38	79+310 To 79+460	RECONSTRUCTION	TCS-7A
39	79+460 To 79+660	RECONSTRUCTION	TCS-1A
40	79+660 To 79+740	RECONSTRUCTION	TCS-4A
41	79+740 To 80+160	RECONSTRUCTION	TCS-3A
42	80+160 To 80+340	RECONSTRUCTION	TCS-4A
43	80+340 To 80+580	RECONSTRUCTION	TCS-3A
44	80+580 To 80+680	RECONSTRUCTION	TCS-3A
45	80+680 To 80+780	RECONSTRUCTION	TCS-2A
46	80+780 To 80+840	RECONSTRUCTION	TCS-3A
47	80+840 To 81+560	RECONSTRUCTION	TCS-4A
48	81+560 To 81+640	RECONSTRUCTION	TCS-1A
49	81+640 To 81+680	RECONSTRUCTION	TCS-4A
50	81+680 To 82+060	RECONSTRUCTION	TCS-3A
51	82+060 To 82+160	RECONSTRUCTION	TCS-2A
52	82+160 To 82+220	RECONSTRUCTION	TCS-3A
53	82+220 To 82+460	RECONSTRUCTION	TCS-4A
54	82+460 To 83+380	RECONSTRUCTION	TCS-1A
55	83+380 To 83+410	RECONSTRUCTION	TCS-1A
56	83+410 To 83+660	RECONSTRUCTION	TCS-7A
57	83+660 To 83+760	RECONSTRUCTION	TCS-1B
58	83+760 To 84+360	RECONSTRUCTION	TCS-1A
59	84+360 To 84+460	RECONSTRUCTION	TCS-1B
60	84+460 To 84+560	RECONSTRUCTION	TCS-1A
61	84+560 To 84+760	RECONSTRUCTION	TCS-4A
62	84+760 To 84+810	RECONSTRUCTION	TCS-1B
63	84+810 To 84+910	RECONSTRUCTION	TCS-4A
64	84+910 To 85+160	RECONSTRUCTION	TCS-9A
65	85+160 To 85+240	RECONSTRUCTION	TCS-11
66	85+240 To 85+380	RECONSTRUCTION	TCS-10A

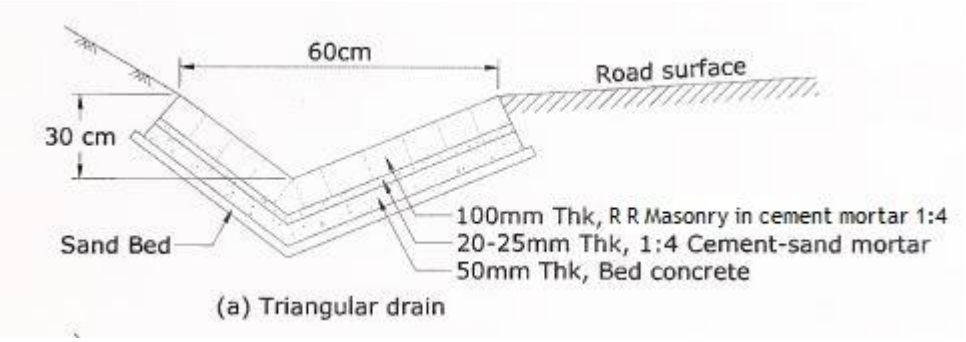
Sl. No.	Design Chainage (from km to km)	Remarks	TCS Type
67	85+380 To 85+620	RECONSTRUCTION	TCS-9A
68	85+620 To 85+820	RECONSTRUCTION	TCS-10A
69	85+820 To 86+060	RECONSTRUCTION	TCS-9A
70	86+060 To 86+160	RECONSTRUCTION	TCS-4A
71	86+160 To 86+480	RECONSTRUCTION	TCS-3A
72	86+480 To 86+720	RECONSTRUCTION	TCS-4A
73	86+720 To 86+820	RECONSTRUCTION	TCS-1B
74	86+820 To 86+880	RECONSTRUCTION	TCS-3A
75	86+880 To 87+080	RECONSTRUCTION	TCS-4A
76	87+080 To 87+180	RECONSTRUCTION	TCS-4B
77	87+180 To 87+260	RECONSTRUCTION	TCS-4A
78	87+260 To 87+560	RECONSTRUCTION	TCS-3A
79	87+560 To 88+210	RECONSTRUCTION	TCS-4A
80	88+210 To 88+260	RECONSTRUCTION	TCS-1B
81	88+260 To 88+360	RECONSTRUCTION	TCS-4A
82	88+360 To 88+480	RECONSTRUCTION	TCS-3A
83	88+480 To 88+630	RECONSTRUCTION	TCS-2A
84	88+630 To 88+680	RECONSTRUCTION	TCS-5A
85	88+680 To 88+730	RECONSTRUCTION	TCS-5A
86	88+730 To 88+960	RECONSTRUCTION	TCS-4A
87	88+960 To 89+760	RECONSTRUCTION	TCS-1A
88	89+760 To 89+860	RECONSTRUCTION	TCS-1B
89	89+860 To 90+210	RECONSTRUCTION	TCS-1A
90	90+210 To 90+320	RECONSTRUCTION	TCS-1B
91	90+320 To 91+560	RECONSTRUCTION	TCS-1A
92	91+560 To 91+760	RECONSTRUCTION	TCS-7A
93	91+760 To 92+060	RECONSTRUCTION	TCS-1A
94	92+060 To 92+220	RECONSTRUCTION	TCS-1B
95	92+220 To 92+720	RECONSTRUCTION	TCS-1A
96	92+720 To 92+960	RECONSTRUCTION	TCS-1B
97	92+960 To 95+110	RECONSTRUCTION	TCS-1A
98	95+110 To 95+330	NEW CONSTRUCTION	TCS-1B
99	95+330 To 95+460	NEW CONSTRUCTION	TCS-4B
100	95+460 To 95+540	NEW CONSTRUCTION	TCS-7B
101	95+540 To 95+620	NEW CONSTRUCTION	TCS-1B
102	95+620 To 96+030	NEW CONSTRUCTION	TCS-3B
103	96+030 To 96+102	NEW CONSTRUCTION	Bridge
104	96+102 To 96+230	NEW CONSTRUCTION	TCS-1B
105	96+230 To 96+420	NEW CONSTRUCTION	TCS-4B
106	96+420 To 96+560	NEW CONSTRUCTION	TCS-1B
107	96+560 To 96+628	NEW CONSTRUCTION	TCS-3B
108	96+628 To 96+668	NEW CONSTRUCTION	Bridge
109	96+668 To 96+820	NEW CONSTRUCTION	TCS-1B
110	96+820 To 96+980	NEW CONSTRUCTION	TCS-4B
111	96+980 To 97+020	NEW CONSTRUCTION	TCS-3B

Sl. No.	Design Chainage (from km to km)	Remarks	TCS Type
112	97+020 To 97+230	NEW CONSTRUCTION	TCS-4B
113	97+230 To 97+320	NEW CONSTRUCTION	TCS-3B
114	97+320 To 97+360	NEW CONSTRUCTION	TCS-4B
115	97+360 To 97+420	NEW CONSTRUCTION	TCS-3B
116	97+420 To 97+820	NEW CONSTRUCTION	TCS-1B
117	97+820 To 97+880	NEW CONSTRUCTION	TCS-4B
118	97+880 To 98+060	NEW CONSTRUCTION	TCS-3B
119	98+060 To 98+120	NEW CONSTRUCTION	TCS-4B
120	98+120 To 98+230	NEW CONSTRUCTION	TCS-3B
121	98+230 To 98+320	NEW CONSTRUCTION	TCS-4B
122	98+320 To 98+420	NEW CONSTRUCTION	TCS-3B
123	98+420 To 98+579	NEW CONSTRUCTION	TCS-4B

6. Road side Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual (IRC: SP: 73-2018).

Drain Type	Side	Net length (m)
RCC Covered Drain	Both Side	3660
RR Masonry Triangular Drain	Both/One Side	41137
Total		**44797**



Note 1: The length of side drains given above are minimum and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable.

Note 2: Box cut sections will have drains on both sides.

7. Design of Structures

(i) General

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

and other details specified therein.

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

Sl. No.	Bridge/Structure at km	Width
1	96.066	As per Manual/MoRT&H Guidelines
2	96.695	As per Manual/MoRT&H Guidelines

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

Sl. No.	Bridge/Structure at km	Remarks
1	96.066	As per GAD of Bridges

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

Provision of the Manual of Specifications and Standards for Two Lanning of Highways with Paved Shoulder IRC: SP:73-2018 shall be followed.

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
1	96.066	Yes	-
2	96.695	Yes	-

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

(iii) 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 following locations shall be re-constructed as new box culverts:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Span /Opening (m)
1	72.146	68.237	4.0 X 3.0
2	72.361	68.526	2.0 X 2.0
3	72.502	68.738	5.0 X 3.0
4	72.578	68.872	4.0 X 3.0
5	72.719	68.943	2.0 X 2.0

6	72.873	69.059	3.0 X 4.0
7	73.025	69.211	2.0 X 2.0
8	73.100	69.345	2.0 X 2.0
9	73.357	69.421	2.0 X 2.0
10	73.443	69.678	4.0 X 5.0
11	73.657	69.761	2.0 X 2.0
12	73.745	69.939	4.0 X 3.0
13	74.085	70.019	3.0 X 4.0
14	74.260	70.296	2.0 X 2.0
15	74.383	70.456	2.0 X 2.0
16	74.410	70.579	3.0 X 4.0
17	74.585	70.609	3.0 X 4.0
18	75.038	70.764	2.0 X 2.0
19	75.458	70.994	2.0 X 2.0
20	75.875	71.388	2.0 X 2.0
21	76.122	71.807	2.0 X 2.0
22	76.364	72.034	2.0 X 2.0
23	76.450	72.271	2.0 X 2.0
24	76.555	72.355	2.0 X 2.0
25	76.701	72.461	2.0 X 2.0
26	76.763	72.609	2.0 X 2.0
27	76.933	72.669	2.0 X 2.0
28	77.033	72.829	2.0 X 2.0
29	77.135	72.927	2.0 X 2.0
30	77.319	73.022	2.0 X 2.0
31	77.574	73.194	2.0 X 2.0
32	78.056	73.447	2.0 X 2.0
33	78.375	73.905	2.0 X 2.0
34	78.555	74.22	2.0 X 2.0
35	78.780	74.401	2.0 X 2.0
36	79.045	74.613	2.0 X 2.0
37	79.227	74.874	2.0 X 2.0
38	79.465	75.055	2.0 X 2.0
39	84.690	75.293	2.0 X 2.0
40	84.975	80.234	3.0 X 4.0
41	85.124	80.519	3.0 X 4.0
42	85.798	80.669	2.0 X 2.0
43	86.086	81.316	2.0 X 2.0
44	86.447	81.581	2.0 X 2.0
45	89.505	81.955	2.0 X 2.0
46	89.784	84.931	2.0 X 2.0
47	90.314	85.202	2.0 X 2.0
48	90.857	85.723	2.0 X 2.0
49	91.417	86.256	2.0 X 3.0

50	92.122	86.812	2.0 X 2.0
51	92.227	87.45	2.0 X 2.0
52	92.690	87.549	2.0 X 2.0
53	93.168	88.008	2.0 X 2.0

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the Road way 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
Nil			

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

Sl. No.	Design Chainage	Span /Opening (m)
1	68.294	2.0 X 2.0
2	68.690	2.0 X 2.0
3	68.823	2.0 X 2.0
4	69.284	2.0 X 2.0
5	69.516	2.0 X 2.0
6	69.815	2.0 X 2.0
7	70.080	3.0 X 4.0
8	70.170	2.0 X 2.0
9	70.690	2.0 X 2.0
10	70.820	2.0 X 2.0
11	71.130	2.0 X 2.0
12	71.708	2.0 X 2.0
13	72.146	2.0 X 2.0
14	72.716	2.0 X 2.0
15	73.316	2.0 X 2.0
16	73.706	2.0 X 2.0
17	74.005	2.0 X 2.0
18	74.288	2.0 X 2.0
19	74.484	2.0 X 2.0
20	74.722	2.0 X 2.0
21	75.184	2.0 X 2.0
22	75.599	2.0 X 2.0
23	76.424	2.0 X 2.0
24	76.999	2.0 X 2.0
25	78.249	2.0 X 2.0

Sl. No.	Design Chainage	Span /Opening (m)
26	78.949	2.0 X 2.0
27	80.866	3.0 X 4.0
28	81.094	3.0 X 4.0
29	81.782	2.0 X 2.0
30	81.882	2.0 X 2.0
31	82.096	2.0 X 2.0
32	82.210	2.0 X 2.0
33	82.494	4.0 X 5.0
34	83.548	2.0 X 2.0
35	84.800	2.0 X 2.0
36	85.403	2.0 X 2.0
37	85.538	2.0 X 2.0
38	85.897	2.0 X 2.0
39	86.400	2.0 X 2.0
40	86.565	2.0 X 2.0
41	87.012	2.0 X 2.0
42	87.246	2.0 X 2.0
43	87.853	2.0 X 2.0
44	88.811	2.0 X 3.0
45	89.033	3.0 X 4.0
46	89.135	2.0 X 2.0
57	90.649	2.0 X 2.0
48	91.124	2.0 X 2.0
49	92.274	2.0 X 2.0
50	92.824	2.0 X 2.0
51	93.599	2.0 X 2.0
52	94.887	2.0 X 2.0
53	95.731	2.0 X 2.0
54	96.022	2.0 X 2.0
55	96.094	2.0 X 3.0
56	96.215	4.0 X 5.0
57	96.598	2.0 X 2.0
58	96.755	2.0 X 3.0
59	97.082	2.0 X 2.0
60	97.366	2.0 X 2.0
61	97.648	3.0 X 4.0
62	97.820	2.0 X 2.0
63	98.020	2.0 X 2.0
64	98.292	2.0 X 2.0
65	98.598	2.0 X 2.0
66	98.688	2.0 X 2.0
67	98.765	2.0 X 3.0

Note : The above Chainages are indicative and may vary as per site requirement to be

approved by Authority's Engineer.

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

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

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

(iv) Bridges

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

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

Sl. No.	Bridge location	Salient details of existing bridge		Span and Length to be provided	Remarks
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
Nil					

(ii) The following narrow bridges shall rewidened:

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

(b) Additional new bridges

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

Sl. No.	Design Chainage (km)	Total Length (m)	Remarks. If any
1	96.066	72 m	Single span Steel Truss bridge to be provided
2	96.695	40 m	Single span bridge to be provided

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

Sl.No.	Location at km	Remarks
Nil		

(d) Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location of bridge	Nature and extent of repairs /strengthening to be carried
1	Nil	

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

Nil

(v) Rail-road bridges

(a) Design construction and detailing of ROB/RUB shall be as specified in provision of the relevant Manual

Nil

(b) Road over-bridges

Road over-bridges (road over ail) 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

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

(vi) Repairs and strengthening of bridges and structures

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	Nature and extent of repairs /strengthening to be carried
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)	Total length (m)	Remarks
1	96.066	72 m	

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 Signage, Road Marking and other appurtenances	Unit	Quantity
1	200 meter stones	Nos.	146
2	Kilometre stones	Nos	25
3	5th Kilometre stones	Nos	7
4	Boundary Stones	Nos	120
5	Delineators (100 cm long and circular shaped) +Hazard marker	Nos	3027
6	Road Stud	Nos	14096
7	900 mm Octagonal Road Sign	Nos	12
8	600 mm circular Road Sign	Nos	21
9	900 mm Triangular Road Sign	Nos	627
10	800 mm x 600 mm rectangular Road Sign	Nos	41
11	Direction Sign < 0.9 Sqm.	sqm	42
12	Painting for Traffic Marking	sqm	10136

(ii) Specifications of the reflective sheeting as per Manual.

9. Road side 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)	Remarks
1	98.579	Full Width, Area = 36 sqm

10. Compulsory Afforestation

Nil

11. Hazardous Locations

11.1 Metal Beam crash barrier of minimum length of **11000 m (single runner, heavy duty and W-shape)** shall be provided at the locations of bridge approaches, high embankments (3.0m and more) and at sharp curves on valley side of the highway, at the locations finalized in consultation with AE. Typical details of metal crash barrier are given in manual. Increase in length if any as per site requirement will not constitute change of scope.

11.2 Rest of the complete length of the project highway shall have parapet wall as per IRC SP 48:1998.

12. Special Requirement for Hill Roads

Refer to section 13 of IRC: SP: 73-2018. The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Breast wall of RRM in cement mortar, 2m high	Rm	1500
Breast wall of RRM in cement mortar, 3m high	Rm	400
Retaining wall, 5m high	Rm	100
Retaining wall, 4m high	Rm	1500
Retaining wall, 3m high	Rm	2400
Retaining wall, 2m high	Rm	650
Gabion Breast Wall	cum	11250
Seeding and Mulching with Jute Net	sqm	15000
Seeding and Mulching with Coir net	sqm	15000
Hydro seeding/ Hydro Mulching	sqm	50000
Chute for Culvert	No.	At Every Culvert Location

Note-

(i) The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the latest specifications & standards and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.

(ii) Any increase in quantity over and above the minimum qty. as mentioned in above table will not be considered as change of scope**. Therefore contractor shall make**

thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.

(iii) The length of Retaining Wall shown above is minimum, to be constructed at site for proper geometrics and will not be converted to Breast Wall. Any reduction in the total length of Retaining Wall constructed at site shall constitute of negative change of scope.

(iv) **Entire slope/formation which has been cut, apart from the above tabulated lengths/area shall have to be stabilized by the Contractor using techniques approved by AE.**

(v) Hydro seeding/ Hydro Mulching and Seeding and Mulching with Jute Net/Coir net to be done as per IRC 56: 2011.

13. Change of Scope

The length of Protection works, structures and bridges specified here in above shall be treated as an approximate assessment. The actual lengths as required based on detailed investigations shall be determined by the Contractor in accordance with the Specification and Standards. Any variations in the lengths and size or area 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.

14. Utility Shifting

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. The specifications of concerned Utility Owning Department shall be applicable and followed.

Note-I:

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

utility owning department and/or construction of project highway. The Contractor shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to utility owning department whenever asked by the Contractor. The decision/ approval of utility owning department shall be binding on the Contractor.

(b) The supervision charges at the rates/ charges applicable of the utility owning department shall be paid directly by the Authority to the Utility Owning department as and when Contractor furnishes demand of Utility Owning Department along with a copy of estimated cost given by the later.

(c) The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor as per estimate agreed between them.

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

Note-II:

Utility Shifting/Relocation Plan and drawings incorporating the details, such as the length and category of lines, types of circuits, type and number of poles, size and type of conductor/cable, the number and type of crossings and the capacity and the number of transformer, the length and category of pipes etc., shall be prepared by the Contractor in consultation with Utility Owning Department and the Authority's Engineer as per the site requirement.

(Schedule-B1)

1. The shifting of utilities

(i) Electrical utilities

The site includes the following electrical utilities: -

a) Extra High-Tension Lines (EHT Lines)

Sl. No.	Chainage		Length (in km)					Crossings				
	From	To	400KV	220KV	110KV	66KV	132KV	400KV	220KV	110KV	66KV	132KV
	-	-	-	-	-	-	-	-	-	-	-	-

b) High Tension/Low Tension Lines (HT/LT Lines)

Sl. No.	Chainage		HT/LT Lines (km)			Crossings			Transformer	
	From	To	33 KV	11 KV	LT	33 KV	11 KV	LT	No	Capacity
1	72.030	88.265	-	0.840	-	-	-	3	-	-
2	72.030	88.265	-	-	0.560	-	-		-	-
3	88.265	101.600	-		0.960	-		-	-	-

(i) Public Health utilities (Water/Sewage Pipe Lines)

Sl. No.	Existing Chainage/ Location		Dia. of Pipe	Gravity Main	Distribution Main/ Village supply water pipe line	Private House Water Connection*		T-Cluster	Borehole & Installation of IM-II HPTW at Hillapui & Ngopa	Public Hydrant	Public Standpost	Villages
	From	To	mm	km	km	km	Nos	Nos	Nos	Nos	Nos	
1	73.480	73.800	32	0.440								Changzawl
2	73.830	74.530	50	0.77								Hliappui
3	74.740	75.430	65		0.935							
4	74.740	75.430	50		0.825							
5	74.740	75.430	40		0.55							
4	Hliappui					1.157	171					
5	77.400	84.240	65	3.784								Saichal
6	77.400	84.240	40	0.22								Saichal
7	84.240	86.200	65		1.518							
8	Saichal					1.414	209	25		2	1	
9	Hliappui							9	5	3	1	
	Total			**5.214**	**3.828**	**2.571**	**380**	**34**	**5**	**5**	**2**	

* Installation of Private House Water Connections also includes cost of connection to individual House damaged by proposed construction.

(ii) Any Other line: Nil

Note: Variation upto 10% in quantities of Utilities to be shifted will not constitute Change of Scope.

Annex-II

(Schedule-B)

Description of Two-Lanning with Paved Shoulder

1. GAD of Bridges to be followed is enclosed.
2. Typical Cross sections of the Project Highway to be followed in enclosed.

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

S. No.	Toll Plaza Location (Design Chainage in Km)
Nil	

(b) Roadside Furniture

The roadside furniture shall be provided in accordance with section 9.0 of the Manual of the standards and Specifications.

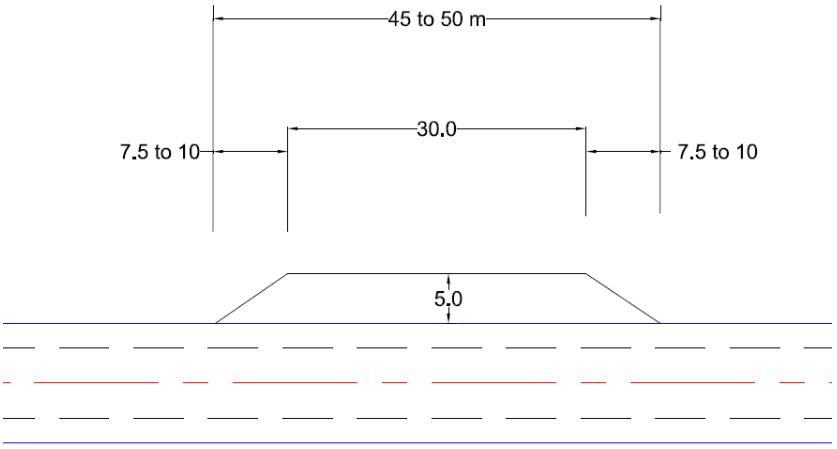
Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	200 m stone, km Stone, 5th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule B	As per Manual
5	Metal beam crash barrier	As per Schedule B	As per Manual

(c) Pedestrian Facilities

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 Authority's Engineer.

(d) Lay-byes

Six lay byes, three on either side of size 30m x 5m as shown below are to be provided every 8 to 10 kms on straight stretches. Exact locations are to be decided in consultation with the Authority's Engineer.



(e) Bus Bays & Passenger Shelter:

Bus Bays/Passenger Shelter shall be provided at locations given below:

Sl. No.	Project Facility	Design Chainage (km)	Other Essential Details
1	Passenger shelter	74.350 (Left)	As per Manual
2	Passenger shelter	75.200 (Right	
3	Passenger shelter	85.000 (Left)	
4	Passenger shelter	86.120 (Right)	

(f) Rest Areas: -

Sl. No.	Rest Area Design Chainage	Name of the Place
1	86.910	Near Saichal Village

(g) View Point : -

Sl. No.	View Point Chainage	Name of the Place

Sl. No.	View Point Chainage	Name of the Place
All existing view points at project site to be improved by EPC Contractor.		

(h) Others: NIL

Environment

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

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 Manual of Specifications and Standards for Two-Laning of Highways (IRC: SP: 73-2018) referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

The Hill Road Manual IRC SP 48 -1998 and IRC 56 : 2011 should also be referred.

THE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH, NEW DELHI on 01th Nov, 2018

Following recommendations and suggestions have been made for dumping muck & dumping yard:-

a. Before dumping muck at the dumping yard first of all retaining/ gabion walls of specified capacity and suitable design should be constructed.

b. All the dumping sites should be properly designed with retaining wall/gabion structures and should be maintained regularly in order to check the spillage of the muck down the slope and into the rivers and other places.

c. Wherever boulders are rolling down along with much, gabion structures/retaining wall should have sufficient foundation and bottom width should be 4-5 m. Length of one gabion structure should not be more than 6-8 m. Wherever more length of gabion structure is required one gabion structure should be bound with another

d. If any new dumping sites are identified in future, then the retaining / gabion structures should be constructed at suitable vertical interval of 5-6 m so that entire disposed muck may not exert pressure only at one wall/ toe wall rather the load of muck should be distributed on different walls.

e. Angle of repose of muck should be maintained between 30 to 450. Long slopes should be intercepted to several short ones with the help of 1.5 to 2.0 m wide berms / terraces/ benches in between in order to maintain less than critical velocity for runoff water and simultaneously mass erosion with

be controlled.

f. The capacity/ volume of muck disposal site should be more than volume of muck to be disposed.

g. Proper sign boards indicating the name, number, location, dumping capacity, etc. should be installed at all the dumping sites.

h. Dumping sites which are full of their capacity they should be rehabilitated with local grass or shrubs. Jute geo textile (JGT) may also be used for establishment of vegetation at vulnerable sites.

i. Gabion walls should be constructed above HFL of River. If slope is very high to construct a gabion wall then a RCC/stone masonry retaining wall should be given at bank of River after proper design including foundation. Height of this wall should be well above the HFL of River.

j. All construction sites should follow and comply with the provisions of the Construction and Demolition Waste Management Rules, 2016".

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-Laning of Highways (IRC SP73: 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:]

(iii) [Note 1: 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.]

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th colspan="2">Provision as per Manual</th><th colspan="2">Modified Provision</th></tr>
<tr><td rowspan="2">Design Speed</td><td rowspan="2">2.2</td><td colspan="2"><u>Mountainous or Steep Terrain:</u></td><td colspan="2"><u>Mountainous or Steep Terrain:</u></td></tr>
<tr><td colspan="2"><u>As per IRC SP 73: 2018</u>
Ruling: 60 km/ hr
Minimum: 40 km/ hr

<u>As per IRC SP 48: 1998/IRC 52: 2019</u>
Ruling: 40 km/ hr
Minimum: 30 km/ hr</td><td colspan="2">Minimum design speed of 30 km/hr has been taken as per IRC SP 48: 1998/IRC 52: 2019 and at some locations, design speed has been reduced to 20 km/ hr due to site constraints. The design speed shall be as per IRC 73: 2018. However in exceptional cases, the minimum design speed of 30 km per hour may be adopted and at hair pin bends, design speed may be reduced to 20 km per hour due to site constraints. (Refer Horizontal Alignment Drawing and Table 2.1 below)</td></tr>
<tr><td rowspan="7">Extra Widening</td><td rowspan="7">2.7</td><td colspan="2">Extra Widening has been proposed as per IRC: SP: 73-2018</td><td colspan="2">Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.</td></tr>
<tr><td>Radius (in m)</td><td>Extra Widening (in m)</td><td>Radius (in m)</td><td>Extra Widening (in m)</td></tr>
<tr><td>75-100</td><td>0.9</td><td>21-40</td><td>1.5</td></tr>
<tr><td>101-300</td><td>0.6</td><td>41-60</td><td>1.2</td></tr>
<tr><td colspan="2"></td><td>61-100</td><td>0.9</td></tr>
<tr><td colspan="2"></td><td>75-100</td><td>0.9</td></tr>
<tr><td colspan="2"></td><td>101-300</td><td>0.6</td></tr>
<tr><td colspan="2"></td><td>Above 300</td><td>NIL</td></tr>
</table>

Item	Manual Clause Reference	Provision as per Manual	Modified Provision
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 2.2.

Table 2.1: Locations where Design Speed is less than 40 kmph due to Sharp Bend

Sl. No.	Design Chainage (from km to km)	Design Speed (in km / hr)
1	68+485 To 68+518	30
2	68+992 To 69+056	30
3	69+113 To 69+152	30
4	69+274 To 69+292	30
5	69+368 To 69+429	30
6	69+469 To 69+515	30
7	69+578 To 69+588	30
8	69+634 To 69+738	30
9	69+788 To 69+798	30
10	70+031 To 70+091	30
11	70+251 To 70+314	30
12	70+562 To 70+587	30
13	70+641 To 70+680	30
14	70+712 To 70+756	30
15	74+160 To 74+188	30
16	74+257 To 74+293	30
17	74+431 To 74+452	30
18	74+520 To 74+545	30
19	74+585 To 74+595	30
20	74+693 To 74+708	30
21	74+962 To 74+972	30
22	75+003 To 75+009	30
23	75+274 To 75+296	30
24	75+355 To 75+359	30
25	75+501 To 75+553	30
26	75+708 To 75+735	30
27	75+786 To 75+811	30
28	75+897 To 75+918	30
29	76+91 To 76+100	30
30	76+139 To 76+167	30
31	76+422 To 76+437	30
32	76+509 To 76+542	30
33	76+606 To 76+644	20
34	76+732 To 76+742	30
35	76+794 To 76+797	30
36	77+396 To 77+405	30
37	77+437 To 77+481	20

Sl. No.	Design Chainage (from km to km)	Design Speed (in km / hr)
38	77+523 To 77+540	30
39	77+615 To 77+625	30
40	78+376 To 78+421	30
41	78+458 To 78+590	30
42	78+971 To 78+984	30
43	79+040 To 79+063	30
44	79+125 To 79+169	30
45	79+222 To 79+227	30
46	79+264 To 79+308	20
47	79+358 To 79+364	30
48	79+475 To 79+501	30
49	79+563 To 79+575	30
50	79+642 To 79+670	30
51	79+706 To 79+714	30
52	79+799 To 79+813	30
53	79+890 To 79+899	30
54	80+091 To 80+110	30
55	80+165 To 80+179	30
56	80+247 To 80+257	30
57	80+305 To 80+317	30
58	80+458 To 80+472	30
59	80+523 To 80+540	30
60	80+615 To 80+641	30
61	80+802 To 80+820	30
62	80+861 To 80+878	30
63	80+947 To 80+960	30
64	80+996 To 81+018	30
65	81+078 To 81+086	30
66	81+156 To 81+174	30
67	81+217 To 81+228	30
68	81+259 To 81+295	30
69	81+326 To 81+364	30
70	81+423 To 81+461	30
71	81+492 To 81+525	30
72	81+590 To 81+610	30
73	81+652 To 81+676	30
74	81+988 To 82+005	30
75	82+041 To 82+065	30
76	82+131 To 82+167	20
77	82+224 To 82+242	30
78	82+282 To 82+294	30
79	82+347 To 82+385	30
80	82+662 To 82+686	30
81	82+743 To 82+773	30
82	82+836 To 82+856	30

Sl. No.	Design Chainage (from km to km)	Design Speed (in km / hr)
83	82+905 To 82+913	30
84	82+958 To 82+971	30
85	83+072 To 83+083	30
86	83+212 To 83+233	30
87	83+266 To 83+278	30
88	83+434 To 83+481	30
89	83+606 To 83+650	20
90	83+718 To 83+730	30
91	83+847 To 83+925	30
92	83+983 To 84+021	30
93	84+085 To 84+103	30
94	84+330 To 84+372	30
95	84+823 To 84+856	30
96	84+888 To 84+940	30
97	85+587 To 85+592	30
98	85+632 To 85+650	30
99	86+324 To 86+341	30
100	86+488 To 86+517	30
101	86+896 To 86+939	20
102	88+667 To 88+680	30
103	88+733 To 88+797	20
104	88+842 To 88+879	30
105	89+935 To 89+966	30
106	90+033 To 90+063	30
107	90+975 To 90+999	20
108	91+033 To 91+045	30
109	91+100 To 91+152	30
110	91+224 To 91+233	30
111	91+412 To 91+422	30
112	91+458 To 91+469	20
113	91+510 To 91+549	20
114	91+588 To 91+594	30
115	91+629 To 91+646	30
116	91+683 To 91+695	30
117	91+754 To 91+771	30
118	91+940 To 91+972	20
119	92+004 To 92+012	30
120	92+051 To 92+054	30
121	92+218 To 92+280	30
122	92+481 To 92+484	30
123	93+135 To 93+165	20
124	93+201 To 93+217	30
125	93+775 To 93+789	30
126	93+843 To 93+883	30
127	93+928 To 93+932	30

Sl. No.	Design Chainage (from km to km)	Design Speed (in km / hr)
128	94+366 To 94+395	20
129	94+440 To 94+508	30
130	94+559 To 94+579	20
131	94+647 To 94+669	30
132	94+704 To 94+715	20
133	94+751 To 94+759	30
134	94+792 To 94+831	30
135	94+863 To 94+868	20
136	94+924 To 94+939	20
137	94+972 To 94+994	30
138	95+039 To 95+041	30
139	95+080 To 95+080	30
140	95+112 To 95+127	30
141	95+161 To 95+182	30
142	95+227 To 95+242	30
143	95+294 To 95+325	20
144	95+408 To 95+418	30
145	95+452 To 95+492	20
146	95+561 To 95+581	30
147	95+616 To 95+651	20
148	95+718 To 95+740	30
149	95+932 To 96+012	30
150	96+128 To 96+154	30
151	96+358 To 96+413	30
152	96+477 To 96+515	30
153	96+562 To 96+605	30
154	96+689 To 96+694	30
155	97+510 To 97+565	20
156	97+666 To 97+708	20
157	98+294 To 98+304	30
158	98+352 To 98+398	30

Table 2.2: Locations where Radii of Horizontal Curve is less than 75 m

Sl. No	Design Chainage (m)		Radius (m)
	from	to	
1	68484.996	68517.679	40
2	68992.443	69056.094	30
3	69113.173	69151.773	50
4	69273.962	69292.060	35
5	69367.510	69428.598	30
6	69468.812	69514.648	30
7	69577.756	69588.009	50
8	69634.381	69737.570	44

Sl. No	Design Chainage (m)		Radius (m)
	from	to	
9	69787.834	69797.605	50
10	70031.424	70090.688	30
11	70250.544	70313.990	30
12	70561.537	70587.298	30
13	70640.983	70680.409	30
14	70711.929	70755.629	30
15	73540.172	73585.115	50
16	73808.332	73829.979	70
17	73893.289	73907.327	70
18	74160.064	74187.811	35
19	74257.122	74293.479	30
20	74430.618	74452.012	50
21	74520.010	74545.052	35
22	74585.083	74595.418	35
23	74692.914	74708.445	70
24	74881.607	74891.002	70
25	74961.555	74972.300	30
26	75003.453	75008.907	70
27	75274.460	75295.949	30
28	75355.315	75359.324	60
29	75501.288	75552.738	35
30	75707.842	75735.004	60
31	75786.052	75811.484	40
32	75897.148	75918.066	40
33	76090.936	76099.645	60
34	76138.760	76166.705	60
35	76422.025	76436.818	35
36	76509.245	76541.522	60
37	76605.990	76643.970	20
38	76732.244	76741.591	55
39	76793.736	76797.220	55
40	76867.999	76876.863	60
41	77396.480	77404.567	30
42	77437.059	77481.356	20
43	77522.964	77539.630	50
44	77614.554	77625.242	35
45	78376.140	78421.137	30
46	78457.630	78590.200	70
47	78971.041	78984.180	40
48	79040.473	79062.880	40
49	79124.645	79169.348	40
50	79221.798	79226.760	60
51	79264.420	79308.099	20
52	79357.543	79364.178	70
53	79475.380	79500.537	40
54	79562.806	79574.864	30

Sl. No	Design Chainage (m)		Radius (m)
	from	to	
55	79641.508	79670.053	30
56	79705.943	79713.810	50
57	79799.133	79812.528	50
58	79890.058	79899.282	50
59	79961.229	79997.783	50
60	80091.463	80110.437	60
61	80165.248	80179.395	30
62	80247.355	80257.106	40
63	80304.843	80316.673	60
64	80458.314	80471.733	40
65	80522.603	80539.945	40
66	80615.058	80640.880	40
67	80801.899	80819.520	30
68	80860.800	80878.321	30
69	80946.803	80960.411	30
70	80995.772	81018.488	30
71	81078.042	81085.628	40
72	81156.039	81173.809	30
73	81217.156	81227.777	30
74	81258.994	81294.981	30
75	81325.648	81363.774	30
76	81423.367	81460.826	30
77	81492.240	81525.127	30
78	81590.000	81610.239	30
79	81651.620	81676.008	30
80	81806.685	81820.106	70
81	81898.376	81928.162	70
82	81987.671	82004.812	35
83	82040.797	82065.420	40
84	82131.235	82166.874	20
85	82224.169	82241.860	30
86	82282.199	82293.610	30
87	82346.803	82385.160	30
88	82587.659	82599.899	70
89	82662.480	82685.695	40
90	82742.918	82773.196	30
91	82836.166	82856.088	60
92	82904.533	82912.731	40
93	82958.066	82971.485	50
94	83071.741	83082.937	50
95	83212.200	83233.451	40
96	83266.050	83277.536	40
97	83433.801	83481.176	30
98	83606.268	83650.352	20
99	83717.587	83730.080	60
100	83847.076	83925.067	50

Sl. No	Design Chainage (m)		Radius (m)
	from	to	
101	83983.472	84021.112	30
102	84084.836	84103.154	40
103	84329.534	84371.737	50
104	84571.247	84582.408	60
105	84727.180	84736.572	70
106	84823.335	84855.940	50
107	84887.782	84940.033	65
108	85500.449	85504.173	60
109	85586.608	85592.470	60
110	85631.592	85650.493	35
111	86324.086	86340.643	35
112	86488.338	86517.301	35
113	86635.440	86653.028	50
114	86895.507	86938.571	20
115	87016.899	87079.425	60
116	87260.358	87307.532	60
117	87428.002	87446.567	70
118	88223.084	88264.545	50
119	88666.918	88680.379	40
120	88733.230	88797.232	28
121	89222.697	89242.261	50
122	89935.484	89966.109	35
123	90033.421	90063.230	35
124	90542.444	90581.478	60
125	90683.818	90711.448	70
126	90975.225	90999.295	20
127	91032.881	91045.204	40
128	91099.595	91152.231	45
129	91223.998	91233.354	35
130	91411.921	91422.269	35
131	91457.803	91469.313	25
132	91510.101	91549.491	20
133	91588.410	91593.667	62
134	91629.106	91646.097	62
135	91683.120	91694.540	62
136	91754.288	91771.374	30
137	91940.369	91971.983	20
138	92003.767	92011.879	40
139	92050.713	92053.507	50
140	92218.292	92279.577	60
141	92481.244	92484.468	30
142	92734.772	92747.551	60
143	93042.382	93049.175	50
144	93134.719	93165.063	20
145	93200.737	93216.688	30
146	93774.796	93788.881	35

Sl. No	Design Chainage (m)		Radius (m)
	from	to	
147	93843.189	93883.301	30
148	93927.602	93932.303	45
149	94365.731	94395.365	20
150	94440.143	94507.871	50
151	94558.502	94579.451	20
152	94647.206	94669.196	60
153	94703.863	94715.215	20
154	94750.882	94758.914	30
155	94791.820	94830.841	30
156	94863.112	94867.915	20
157	94924.481	94939.049	20
158	94972.046	94993.844	30
159	95038.693	95040.518	70
160	95079.537	95080.419	40
161	95112.139	95127.080	30
162	95161.140	95182.349	30
163	95227.323	95241.681	30
164	95293.730	95325.102	20
165	95408.071	95417.942	60
166	95452.004	95492.245	20
167	95561.499	95581.128	40
168	95616.287	95651.431	20
169	95717.846	95740.331	60
170	95932.397	96011.622	50
171	96128.239	96154.340	50
172	96242.571	96282.618	50
173	96357.825	96413.344	40
174	96476.664	96514.822	50
175	96561.870	96605.401	50
176	96688.616	96694.313	40
177	97219.834	97226.050	60
178	97333.161	97348.126	60
179	97509.647	97565.257	25
180	97666.342	97708.189	20
181	98231.270	98240.924	70
182	98294.050	98304.339	30
183	98351.749	98397.635	30

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-fulfillment 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.

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)

Annex –I 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, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006

<table>
<tr><th rowspan="2">Asset Type</th><th rowspan="2">Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th rowspan="2">Frequency of Inspection</th><th rowspan="2">Tools/ Equipment</th><th rowspan="2">Standards and References for Inspection and Data Analysis</th><th rowspan="2">Time limit for Rectification/Repair</th><th rowspan="2">Maintenance Specifications</th></tr>
<tr><th>Desirable</th><th>Acceptable</th></tr>
<tr><td rowspan="3"></td><td>Pavement Condition Index</td><td>3</td><td>2.1</td><td>Bi-Annually</td><td rowspan="2">(Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td rowspan="2">Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment</td><td>180 days</td><td>IRC:82-2015</td></tr>
<tr><td>Other Pavement Distresses</td><td></td><td></td><td>Bi-Annually</td><td>2-7 days</td><td>IRC:82-2015</td></tr>
<tr><td>Deflection/ Remaining Life</td><td></td><td></td><td>Annually</td><td>Falling Weight Deflectometer</td><td>IRC 115: 2014</td><td>180 days</td><td>IRC:115-2014</td></tr>
<tr><td rowspan="2">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/ km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td>Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles
<table><tr><th>Minimum SN</th><th>Traffic Speed (Km/h)</th></tr><tr><td>36</td><td>50</td></tr><tr><td>33</td><td>65</td></tr><tr><td>32</td><td>80</td></tr><tr><td>31</td><td>95</td></tr><tr><td>31</td><td>110</td></tr></table></td><td>Bi-Annually</td><td>SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>IRC:SP:83-2008</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td rowspan="3">Embankment / Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="3">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="3">IRC</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Slopes</td><td>Nil</td><td><15 % variation in prescribe side slope</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Embankment 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:

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
CRACKING						
1	**Single Discrete Cracks Not intersecting with any joint**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L > lm. Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			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.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

Sr. 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 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
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	0	Nil, not discernible	No Action	
			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
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 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	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to 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		

Sr. 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	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m²	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m²		
			3	w > 1.5 mm and L < 3 m/m²		
			4	w > 3 mm, L < 3 m/m² and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m² and deformation		
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%)	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < **2** %	Local repair of areas	

Sr. 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
		h = maximum depth of damage	2	r = 2 - 10 %	damaged and liable to be damaged. Within 7days	
			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	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			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. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m²		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m²	Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m²		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m²	Full depth repair. Within 30 days	
Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total	0	Difficult to discern.	**Short Term**	**Long Term**
					No action.	Not Applicable

Sr. 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
		joint length	1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
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. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	

Sr. 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
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen sub-grade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 mm		
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical	0	h < 4 mm	No action	

Sr. 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**
		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
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 days	
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			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.	
		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	0-2	No discernible problem	No action.	

Sr. 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
		due to blockage of drains	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>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">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>IRC:SP 84-2014</td></tr>
<tr><td rowspan="2">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F 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>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>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="2"></td><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>
<table>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
</table>
<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>
Initial 7 days Retro reflectivity: 100 mcd/m²/lux
Minimum Threshold Level: 50 mcd/m²/lux</td><td>Bi-Annually</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>
<tr><td>Skid Resistance</td><td>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</td><td>Bi-Annually</td><td>As per Annexure-G of IRC:35-2015</td><td></td><td>Within 24 hours</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	RC:67-2012
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
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

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

Table 4: Maintenance Criteria for Structures and Culverts:

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sqm	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	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sqm					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Delamination	Not more than 0.50 sq.m			the repairs to affected concrete portion with epoxy mortar / concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and 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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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 Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	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.
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 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	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban	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**	
(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

Nature of Defect or deficiency		Time limit for repair/ rectification
(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	within 48 (forty eight) hours
	Permanent measures	within15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days

Nature of Defect or deficiency		Time limit for repair/ rectification
(g)	**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: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

(i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:

(a) Permission of the State Government for extraction of boulders from quarry;

(b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;

(c) Licence for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) Licence from inspector of factories or other competent Authority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

(i) Any other permits or clearances required under Applicable Laws.

(ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

Schedule - G

(See Clauses 7.1 and 19.2)

Annex-I : Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____[name of Authority]

_____ [address of Authority]

WHEREAS_____[name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _Dated__ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS 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 Contract, 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.

[1] Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], 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 Contract 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 Contract 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 Contract 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 Contract 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 Contract 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 Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

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 authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

13. This guarantee shall also be operatable at our…….Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

14. 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:

[$]Insert date atleast 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 2.21 of the RFP). The Contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire DLP.

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch IFSC	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile 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)

Annex – II: Form for Guarantee for Advance Payment

To

_____[name of Authority]

_____ [address of Authority]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the ***** section of [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs._____cr. (Rupees_____crore) and the amount of this Guarantee is Rs._____cr. (Rupees_____crore) (the "**Guarantee Amount**")[2].

(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.

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

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

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

7. The Guarantee shall cease to be in force and effect on ****[3] Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

11. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

12. This guarantee shall also be operatable at our…….Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. 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:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch IFSC	CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

3 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).

5	Beneficiary Bank Address	Canara Bank (erstwhile 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 Clauses10.1 (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	70.00	**A- Widening and strengthening of existing road**	
		B.1-Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	30.00
		(2) Sub-base Course	10.00
		(3) Non bituminous Base course	15.00
		(4) Bituminous Base Course	15.00
		(5) Wearing Coat	15.00
		B.2-Reconstruction/New 8-Lane Realignment/ Bypass (Rigid Pavement)	
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		C.2- Reconstruction/New Service Road (Rigid Pavement)	
		D- Reconstruction & New Culverts on existing road, realignments, bypasses Culverts (length <6m)	15.00
Minor bridge	2.00	**A.1-widening and repairing of Minor Bridges (length >6 m&<60m)**	
		Minor Bridges	[Nil]
		A.2- New Minor bridges (length >6 mand<60m)	
		(1) Foundation	40.00
		(2) Sub-Structure	30.00
		(3) Super-structure (including bearings)	28.50
		(4) Approaches	1.50
		(5) Guide Bunds and River Training Works	[Nil]
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-NewUnderpasses/Overpasses	[Nil]
Major bridge	7.00	**A.1- Widening and repairs of Major Bridges**	
		A.2-NewMajorBridges	

Item	Weightage in % of CP	Stage for Payment	Percentage
		(1)Foundation	27.50
		(2)Sub-structure	7.00
		(3)Super-structure (including bearings)	63.00
		(4)Wearing Coat including expansion joints	1.50
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.50
		(6) Wing walls/return walls	[Nil]
		(7)Guide Bunds, River Training works etc.	[Nil]
		(8)Approaches (including Retaining walls, stone pitching and protection works)	0.50
		B.1-Wideningandrepairsof (a) ROB (b) RUB	
		B.2-NewROB/RUB	
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		C.2- New Elevated Section/Flyovers/Grade Separators	
Other Works	20.50	(i) Toll Plaza	[Nil]
		(ii) Road side drains	20.00
		(iii) Road signs, markings, km stones, etc	5.00
		(iv) Project facilities	
		(a) Lay-byes	2.00
		(b) Passenger Shelter, Rest Area	1.00
		(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	8.50
		(ix) Toe Wall	[Nil]
		(x) Retaining Wall	26.00
		(xi) Crash Barrier	10.00
		(xii) Gabion wall	7.00
		(xiii) Hydro Seeding	7.00
		(xiv) Seeding and Mulching with Jute Net	5.00
		(xv) Seeding and Mulching with Coir Net	5.00
		(xvi) Balance Slope Protection work	3.00
		(xv) Junction Improvement	0.50
Electrical Utilities and Public Heath Utilities (Water pipe lines and sewage lines)	0.50	(i) Estimate for Shifting and Re-Alignment of LT Lines.	13.00
		(ii) Estimate for Shifting and Re-Alignment of 11KV Lines	7.00
		(iii) Installation of Gravity Main	35.00
		(iv) Distribution System	23.00

Item	Weightage in % of CP	Stage for Payment	Percentage
		(v) Providing Public Hydrant	5.00
		(vi)Providing Public Standpost	1.00
		(vii) Installation of Private House Connections damaged by widening	8.00
		(viii) Drilling of Borehole (HPTW)	6.00
		(ix) Installation of T/Cluster	2.00

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	[Nil]	
B.1- Reconstruction/New2-Lane Realignment/Bypass(Flexible Pavement)		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.
(1) Earthwork up to top of the sub-grade	30.00	
(2) Sub-base Course	10.00	
(3) Non bituminous Base course	15.00	
(4) Bituminous Base course	15.00	
(5) Wearing Coat	15.00	
B.2- Reconstruction/New 8-Lane Realignment/Bypass (Rigid Pavement)	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)	[Nil]	
C.2- Reconstruction/New Service Road (Rigid Pavement)	[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 three culverts.
Culverts (length <6m)	15.00	

@ 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.

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	**Weightage**	**Payment Procedure**
1	2	3
A.1-Widening and repairs of Minor Bridges (length>6m&<60m)	Nil	
A.2- New Minor Bridges (length > 6m & < 60m)		
(1)**Foundation:** On completion of the foundation work including foundations for wing and return walls, abutments, piers.	40.00	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 each foundation of the bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) **Sub-Structure:** On completion of abutments, piers up to the abutment/pier cap.	30.00	Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the minor bridges. Payment against Sub-Structure shall be made on pro-rata basis on completion of each Sub-Structure upto abutment/pier cap level of each bridge.
(3)**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.	28.50	Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(4)**Approaches :** On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	1.50	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.

Stage of Payment	Weightage	Payment Procedure
(5) **Guide Bunds and River Training Works:** On completion of Guide Bunds and river training works complete in all respects	[Nil]	
B.1- Widening and repairs of underpasses/overpasses	[Nil]	
B.2- New Underpasses/Overpasses	[Nil]	

1.3.3 Major Bridge works, ROB/RUB and Structures: Not Applicable

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	Weightage	Payment Procedure
A.1- Widening and repairs of Major Bridges		
A.2-New Major Bridges		
(1) Foundation	27.50	**Foundation:** Cost of each Major Bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of atleast two foundations of major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	7.00	**Sub-structure:** Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of major bridge subject to completion of atleast two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(3) Super-structure (including bearings)	63.00	**Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structure including bearings of atleast one span in all respects as specified.
(4) Wearing Coat including expansion joints	1.50	**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.	0.50	**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]	
(7) Guide bunds, River Training works etc.	[Nil]	
(8) Approaches (including	0.50	**Approaches:** Payments shall be made on both approaches

Stage of Payment	Weightage	Payment Procedure
Retaining walls, stone pitching and protection works)		including stone pitching, protection works, etc. complete in all respects as specified.
B.1- Widening and repairs of (a)ROB (b)RUB	[Nil]	
B.2-New ROB/RUB	[Nil]	
C.1-Widening and repairs of Elevated Section/ Flyovers/Grade Separators	[Nil]	
C.2-New Elevated Section/ Flyovers/Grade Separators	[Nil]	

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	Weightage	Payment Procedure
1	2	3
(1) Toll Plaza	[Nil]	
(2) Roadside drains	20.00	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.	5.00	
(4) Project Facilities		Payment shall be made on pro-rata basis for completed facilities.
(a) Lay-byes	2.00	
(b) Passenger Shelter	1.00	
(5) Road side Plantation including Horticulture in Wayside Amenities	[Nil]	
(6) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	
(7) Safety and traffic management during construction	[Nil]	
(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

Stage of Payment	Weightage	Payment Procedure
(a) Breast Wall	8.50	percent) of the total length.
(b) Toe Wall	[Nil]	
(c) Retaining Wall	26.00	
(c) Crash Barrier	10.00	
(d) Gabion Wall	7.00	
(e) Hydro-seeding	7.00	Unit of measurement is Sqm. Payment shall be made on pro-rata basis on completion of a stage in an area of not less than 5% (five percent) of the total quantity. Payment shall be made on successful growth of grass of minimum 6 inches (and not on the plantation of grass).
(f) Seeding and Mulching with Jute Net	5.00	
(g) Seeding and Mulching with Coir Net	5.00	
(h) Balance Slope Protection work	3.00	
(9) Junction Improvement	0.50	Payment shall be made on pro rata basis for completed facilities.

1.3.4 Utility Shifting.
Procedure for estimating the value of Utility Shifting done shall be as stated in table 1.3.5.

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
1	2	3
(i) Estimate for Shifting and Re-Alignment of LT Lines.	13.00	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost. Payment shall be made for completed activity.
(ii) Estimate for Shifting and Re-Alignment of 11KV Lines	7.00	
(iii) Installation of Gravity Main	35.00	
(iv) Distribution System	23.00	
(v) Providing Public Hydrant	5.00	
(vi)Providing Public Standpost	1.00	
(vii) Installation of Private House Connections damaged by widening	8.00	
(viii) Drilling of Borehole (HPTW)	6.00	
(ix) Installation of T/Cluster	2.00	

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 installments 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)

Annex –I: List of Drawings

A minimum list of the drawings of the various components / elements of the Project Highway and project facilities required to be submitted by the Contractors given below:

a) Drawings of horizontal alignment, vertical profile and detailed cross sections.
b) Drawings of all Major and Minor Bridges.
c) Drawings of cross-drainage works.
d) Drawings of Major intersections, Grade Separated Structures, Viaduct.
e) Drawing of Toll Plaza layout and building.
f) Drawing of bus-bay and bus shelters.
g) Drawing of road furniture including traffic signage, marking, safety barriers etc.
h) Drawing of traffic diversion plan.
i) General arrangement showing area of base camp and administrative block.
j) Any other Drawing as per instruction of Authority's Engineer.

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **150th** 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 **270th** 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 **420th** 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 **540th 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-re flectometer	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**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	

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

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

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)

Annex –I: 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:

iv. For the Works executed (excluding Change of Scope orders);

v. For Change of Scope Orders, and

vi. 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 the value of the contract price.

(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)

*******END OF THE DOCUMENT*******