



SCHEDULES

For

“Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode”

June, 2021 |

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

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June 2021

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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 Design Chainage Km 31.280 (Ngopa Village) to Design Chainage Km 68.170 (near Pawlarang Village) (Package-II) 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 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) 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	32.796	32.900	15.95	Total ROW 14.0 – 24.0 m wide is required
2	32.900	33.000	12.6	
3	33.000	33.100	11.1	
4	33.100	33.200	10.6	
5	33.200	33.300	11.65	
6	33.300	33.400	11.35	
7	33.400	33.500	10.5	
8	33.500	33.600	10.65	
9	33.600	33.700	10.85	
10	33.700	33.800	10.95	
11	33.800	33.900	10.7	
12	33.900	34.000	10.5	
13	34.000	34.100	9.7	
14	34.100	34.200	12.7	
15	34.200	34.300	12.9	
16	34.300	34.400	10.1	
17	34.400	34.500	12.05	
18	34.500	34.600	12.1	
19	34.600	34.700	11.7	
20	34.700	34.800	11.15	
21	34.800	34.900	9.3	
22	34.900	35.000	10	
23	35.000	35.100	11.05	
24	35.100	35.200	10.8	

25	35.200	35.300	10.9
26	35.300	35.400	11.5
27	35.400	35.500	12.85
28	35.500	35.600	12.85
29	35.600	35.700	10.95
30	35.700	35.800	10.6
31	35.800	35.900	11
32	35.900	36.000	10.85
33	36.000	36.100	10.55
34	36.100	36.200	10.45
35	36.200	36.300	10.3
36	36.300	36.400	11.05
37	36.400	36.500	8.55
38	36.500	36.600	6.45
39	36.600	36.700	7.4
40	36.700	36.800	7.4
41	36.800	36.900	8.15
42	36.900	37.000	7.9
43	37.000	37.100	7.3
44	37.100	37.200	7.4
45	37.200	37.300	9.35
46	37.300	37.400	11.6
47	37.400	37.500	10.1
48	37.500	37.600	9.05
49	37.600	37.700	10.05
50	37.700	37.800	9.55
51	37.800	37.900	9.05
52	37.900	38.000	9.45
53	38.000	38.100	10.65
54	38.100	38.200	10.6
55	38.200	38.300	10.4
56	38.300	38.400	10.95
57	38.400	38.500	11.35
58	38.500	38.600	10.5
59	38.600	38.700	10.25
60	38.700	38.800	10.8
61	38.800	38.900	10.15
62	38.900	39.000	12.35
63	39.000	39.100	14.75
64	39.100	39.200	12.15
65	39.200	39.300	10.4
66	39.300	39.400	13.3
67	39.400	39.500	11.6

Total ROW 14.0 – 24.0 m wide is required

68	39.500	39.600	8.8
69	39.600	39.700	12.2
70	39.700	39.800	18.8
71	39.800	39.900	16.3
72	39.900	40.000	9.4
73	40.000	40.100	9.3
74	40.100	40.200	9.35
75	40.200	40.300	9.25
76	40.300	40.400	9.95
77	40.400	40.500	9.5
78	40.500	40.600	12.1
79	40.600	40.700	13.6
80	40.700	40.800	10.55
81	40.800	40.900	8.35
82	40.900	41.000	6.35
83	41.000	41.100	7.3
84	41.100	41.200	10.55
85	41.200	41.300	11
86	41.300	41.400	8.5
87	41.400	41.500	8.9
88	41.500	41.600	8.9
89	41.600	41.700	9.25
90	41.700	41.800	9.95
91	41.800	41.900	7.8
92	41.900	42.000	6.85
93	42.000	42.100	7.55
94	42.100	42.200	8.9
95	42.200	42.300	9.15
96	42.300	42.400	10.5
97	42.400	42.500	10.75
98	42.500	42.600	8.95
99	42.600	42.700	8.75
100	42.700	42.800	9.05
101	42.800	42.900	9.4
102	42.900	43.000	8.95
103	43.000	43.100	8
104	43.100	43.200	9.15
105	43.200	43.300	9.85
106	43.300	43.400	8.95
107	43.400	43.500	8.65
108	43.500	43.600	8.95
109	43.600	43.700	9.35
110	43.700	43.800	7.5

111	43.800	43.900	5.9	Total ROW 14.0 – 24.0 m wide is required
112	43.900	44.000	7.2	
113	44.000	44.100	8.4	
114	44.100	44.200	8.65	
115	44.200	44.300	9.55	
116	44.300	44.400	11.3	
117	44.400	44.500	11.25	
118	44.500	44.600	11.2	
119	44.600	44.700	11.05	
120	44.700	44.800	10.3	
121	44.800	44.900	10.1	
122	44.900	45.000	9.55	
123	45.000	45.100	15.15	
124	45.100	45.200	15.8	
125	45.200	45.300	8.8	
126	45.300	45.400	7.1	Total ROW 14.0 – 24.0 m wide is required
127	45.400	45.500	8.05	
128	45.500	45.600	8.45	
129	45.600	45.700	7.05	
130	45.700	45.800	7.2	
131	45.800	45.900	9.55	
132	45.900	46.000	9.8	
133	46.000	46.100	9.25	
134	46.100	46.200	10	
135	46.200	46.300	9.6	
136	46.300	46.400	9.55	
137	46.400	46.500	9.85	
138	46.500	46.600	9.75	
139	46.600	46.700	9.55	
140	46.700	46.800	9.25	
141	46.800	46.900	10.3	
142	46.900	47.000	10.25	
143	47.000	47.100	8.05	
144	47.100	47.200	6.75	
145	47.200	47.300	6.9	
146	47.300	47.400	6.45	
147	47.400	47.500	6.05	
148	47.500	47.600	6.55	
149	47.600	47.700	9.2	
150	47.700	47.800	9	
151	47.800	47.900	9.35	
152	47.900	48.000	10.1	
153	48.000	48.100	7.95	

154	48.100	48.200	7.5
155	48.200	48.300	7
156	48.300	48.400	6.3
157	48.400	48.500	8.9
158	48.500	48.600	10.65
159	48.600	48.700	10.95
160	48.700	48.800	10.45
161	48.800	48.900	8.5
162	48.900	49.000	8.45
163	49.000	49.100	8.4
164	49.100	49.200	8.3
165	49.200	49.300	8.15
166	49.300	49.400	9.85
167	49.400	49.500	10.25
168	49.500	49.600	9.7
169	49.600	49.700	8.9
170	49.700	49.800	7.4
171	49.800	49.900	8.95
172	49.900	50.000	9.5
173	50.000	50.100	8.5
174	50.100	50.200	9.95
175	50.200	50.300	9.65
176	50.300	50.400	8.3
177	50.400	50.500	8.75
178	50.500	50.600	9.95
179	50.600	50.700	10.6
180	50.700	50.800	9.55
181	50.800	50.900	9
182	50.900	51.000	9.3
183	51.000	51.100	9.1
184	51.100	51.200	9.15
185	51.200	51.300	9.25
186	51.300	51.400	8.4
187	51.400	51.500	6.85
188	51.500	51.600	6.6
189	51.600	51.700	7.9
190	51.700	51.800	8.55
191	51.800	51.900	8.75
192	51.900	52.000	9.15
193	52.000	52.100	9.45
194	52.100	52.200	8.5
195	52.200	52.300	8.5
196	52.300	52.400	8.25

197	52.400	52.500	6.8
198	52.500	52.600	6.15
199	52.600	52.700	6.2
200	52.700	52.800	7.25
201	52.800	52.900	8.9
202	52.900	53.000	9.35
203	53.000	53.100	9.9
204	53.100	53.200	10.35
205	53.200	53.300	8.95
206	53.300	53.400	9.45
207	53.400	53.500	9.3
208	53.500	53.600	7.85
209	53.600	53.700	8.5
210	53.700	53.800	9.05
211	53.800	53.900	10.25
212	53.900	54.000	10.95
213	54.000	54.100	9.05
214	54.100	54.200	8.35
215	54.200	54.300	9.75
216	54.300	54.400	10.1
217	54.400	54.500	9.55
218	54.500	54.600	7.7
219	54.600	54.700	6.4
220	54.700	54.800	7.15
221	54.800	54.900	7.35
222	54.900	55.000	8
223	55.000	55.100	9.55
224	55.100	55.200	10.35
225	55.200	55.300	9.8
226	55.300	55.400	12.55
227	55.400	55.500	12.4
228	55.500	55.600	9.6
229	55.600	55.700	8.4
230	55.700	55.800	6.6
231	55.800	55.900	7.15
232	55.900	56.000	12.15
233	56.000	56.100	13.25
234	56.100	56.200	8.75
235	56.200	56.300	8.3
236	56.300	56.400	9.15
237	56.400	56.500	10.8
238	56.500	56.600	10.9
239	56.600	56.700	7.95

Total ROW 14.0
- 24.0 m wide is
required

240	56.700	56.800	6.6	Total ROW 14.0 – 24.0 m wide is required
241	56.800	56.900	7.05	
242	56.900	57.000	7.95	
243	57.000	57.100	9.45	
244	57.100	57.200	11.55	
245	57.200	57.300	11.9	
246	57.300	57.400	9.05	
247	57.400	57.500	8.35	
248	57.500	57.600	9.65	
249	57.600	57.700	9.6	
250	57.700	57.800	9.95	
251	57.800	57.900	9.85	
252	57.900	58.000	9	
253	58.000	58.100	10.7	
254	58.100	58.200	10.4	
255	58.200	58.300	8.25	
256	58.300	58.400	12.05	
257	58.400	58.500	11.2	
258	58.500	58.600	7.1	
259	58.600	58.700	8.5	
260	58.700	58.800	8.55	
261	58.800	58.900	10.1	
262	58.900	59.000	10.4	
263	59.000	59.100	8.4	
264	59.100	59.200	7.35	
265	59.200	59.300	6.15	
266	59.300	59.400	8.35	
267	59.400	59.500	9.45	
268	59.500	59.600	9.85	
269	59.600	59.700	10.55	
270	59.700	59.800	8.35	
271	59.800	59.900	8.35	
272	59.900	60.000	9.25	
273	60.000	60.100	9.85	
274	60.100	60.200	10.1	
275	60.200	60.300	9.9	
276	60.300	60.400	8.65	
277	60.400	60.500	8.25	
278	60.500	60.600	8.25	
279	60.600	60.700	8	
280	60.700	60.800	9.7	
281	60.800	60.900	8.25	
282	60.900	61.000	7.25	

283	61.000	61.100	8.65
284	61.100	61.200	8
285	61.200	61.300	6.7
286	61.300	61.400	7.55
287	61.400	61.500	9.1
288	61.500	61.600	9
289	61.600	61.700	8.25
290	61.700	61.800	10.85
291	61.800	61.900	11.6
292	61.900	62.000	8.6
293	62.000	62.100	8.15
294	62.100	62.200	8.25
295	62.200	62.300	7.05
296	62.300	62.400	7.7
297	62.400	62.500	8.3
298	62.500	62.600	8.45
299	62.600	62.700	8.9
300	62.700	62.800	8.15
301	62.800	62.900	7.9
302	62.900	63.000	11.4
303	63.000	63.100	12.8
304	63.100	63.200	10.3
305	63.200	63.300	12.1
306	63.300	63.400	11.3
307	63.400	63.500	8.55
308	63.500	63.600	9
309	63.600	63.700	9.35
310	63.700	63.800	9.95
311	63.800	63.900	9.4
312	63.900	64.000	8.75
313	64.000	64.100	9.4
314	64.100	64.200	11.7
315	64.200	64.300	10.55
316	64.300	64.400	13.1
317	64.400	64.500	13.45
318	64.500	64.600	8.5
319	64.600	64.700	7.75
320	64.700	64.800	7.25
321	64.800	64.900	8.6
322	64.900	65.000	8.6
323	65.000	65.100	8.15
324	65.100	65.200	8.7
325	65.200	65.300	8.5

Total ROW 14.0
- 24.0 m wide is
required

326	65.300	65.400	8	
327	65.400	65.500	12	
328	65.500	65.600	13.4	
329	65.600	65.700	10.55	
330	65.700	65.800	10.75	
331	65.800	65.900	10.4	
332	65.900	66.000	9.6	
333	66.000	66.100	8.85	
334	66.100	66.200	9.05	
335	66.200	66.300	9.65	
336	66.300	66.400	8.15	
337	66.400	66.500	8.05	
338	66.500	66.600	9.35	
339	66.600	66.700	9.65	
340	66.700	66.800	10.4	
341	66.800	66.900	9.35	
342	66.900	67.000	8.4	
343	67.000	67.100	8.9	
344	67.100	67.200	9.1	
345	67.200	67.300	8.7	
346	67.300	67.400	8.85	
347	67.400	67.500	8.55	
348	67.500	67.600	7.95	
349	67.600	67.700	8.25	
350	67.700	67.800	9.1	
351	67.800	67.900	10	
352	67.900	68.000	9.25	
353	68.000	68.100	8.8	
354	68.100	68.200	8.6	
355	68.200	68.300	8.15	
356	68.300	68.400	9.75	
357	68.400	68.500	9.9	
358	68.500	68.600	7.8	
359	68.600	68.700	9.65	
360	68.700	68.800	11.6	
361	68.800	68.900	9.75	
362	68.900	69.000	8.25	
363	69.000	69.100	7.75	
364	69.100	69.200	7.25	
365	69.200	69.300	12.85	
366	69.300	69.400	13.15	
367	69.400	69.500	8.25	Total ROW 14.0 –
368	69.500	69.600	8.3	24.0 m wide is

369	69.600	69.700	8.3	required
370	69.700	69.800	7.9	
371	69.800	69.900	9.3	
372	69.900	70.000	10.4	
373	70.000	70.100	8.2	
374	70.100	70.200	7.8	
375	70.200	70.300	9.85	
376	70.300	70.400	9.4	
377	70.400	70.500	7.95	
378	70.500	70.600	9.75	
379	70.600	70.700	9.6	Total ROW 14.0 – 24.0 m wide is required
380	70.700	70.800	8	
381	70.800	70.900	9.8	
382	70.900	71.000	15.05	
383	71.000	71.100	15.95	
384	71.100	71.200	11.25	
385	71.200	71.300	12.5	
386	71.300	71.400	14.55	
387	71.400	71.500	13.85	
388	71.500	71.600	13.05	
389	71.600	71.700	9.75	
390	71.700	71.800	8	
391	71.800	71.900	7.4	
392	71.900	72.030	6.85	

3. Carriageway

The present carriageway of the Project Highway is Single Lane & Intermediate Lane of width 3.75m to 5.50 m from km. 32+796 to km. 72+030. The type of the existing pavement is flexible.

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

Sr.	Chainage (km)	Type of Structure	No. of Spans	Width	ROB/
-----	---------------	-------------------	--------------	-------	------

No.		Foundation	Superstructure	with span length (m)	(m)	RUB
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)
1	47.240	RCC Slab	1 x 7	7.10
2	56.010	Steel (Bailey Bridge	1 x 30.30	5.45

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	32.801	HUME PIPE	1X0.9	7.0
2	33.126	HUME PIPE	1X0.9	7.1
3	33.332	HUME PIPE	1X0.9	7.3
4	33.538	HUME PIPE	1X0.9	7.0
5	33.762	HUME PIPE	1X0.9	7.2
6	33.940	HUME PIPE	1X0.9	7.3

[Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode

June 2021

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
7	33.973	HUME PIPE	1X0.9	7.3
8	34.215	HUME PIPE	1X0.9	7.1
9	34.467	HUME PIPE	1X0.9	7.0
10	34.623	HUME PIPE	1X0.9	6.9
11	34.703	HUME PIPE	1X0.9	7.2
12	34.820	HUME PIPE	1X0.9	7.3
13	35.008	HUME PIPE	1X0.9	7.4
14	35.222	HUME PIPE	1X0.9	7.5
15	35.445	HUME PIPE	1X0.9	7.5
16	35.582	HUME PIPE	1X0.9	7.6
17	35.661	HUME PIPE	1X0.9	7.5
18	35.902	HUME PIPE	1X0.9	7.4
19	36.425	HUME PIPE	1X0.9	7.6
20	36.500	HUME PIPE	1X0.9	7.2
21	36.519	HUME PIPE	1X0.9	7.2
22	36.848	HUME PIPE	1X0.9	7.2
23	37.026	HUME PIPE	1X0.9	7.2
24	37.277	HUME PIPE	1X0.9	7.0
25	37.410	HUME PIPE	1X0.9	7.0
26	37.592	HUME PIPE	1X0.9	6.5
27	37.867	HUME PIPE	1X0.9	6.5
28	37.995	HUME PIPE	1X0.9	7.5
29	38.248	HUME PIPE	1X0.9	7.3
30	38.548	HUME PIPE	1X0.9	7.3
31	38.818	HUME PIPE	1X0.9	7.1
32	38.999	HUME PIPE	1X0.9	7.3
33	39.219	HUME PIPE	1X0.9	7.1
34	39.331	HUME PIPE	1X0.9	7.0
35	39.697	HUME PIPE	1X0.9	7.3
36	39.946	HUME PIPE	1X0.9	7.3
37	40.075	SLAB	1X1.6	7.3
38	40.093	HUME PIPE	1X0.9	7.1
39	40.253	HUME PIPE	1X0.9	7.0
40	40.343	HUME PIPE	1X0.9	7.0
41	40.464	SLAB	1X1.9	7.0
42	40.498	HUME PIPE	1X0.9	7.0
43	40.550	SLAB	1X1.62	7.0
44	41.725	SLAB	1X1.62	7.1
45	41.790	SLAB	1X1.62	7.0
46	41.839	SLAB	1X2.6	7.0
47	41.949	SLAB	1X2.8	7.0

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
48	42.050	SLAB	1X1.27	7.0
49	42.340	SLAB	1X1.2	7.0
50	42.530	SLAB	1X2.6	7.0
51	42.734	HUME PIPE	1X0.9	7.0
52	42.955	SLAB	1X1.6	6.8
53	43.196	SLAB	1X1.6	7.1
54	43.353	SLAB	1X1.9	6.9
55	43.564	SLAB	1X1.8	7.2
56	43.778	HUME PIPE	1X0.9	7.0
57	44.113	HUME PIPE	1X0.9	6.7
58	44.386	SLAB	1X3.7	6.8
59	44.509	HUME PIPE	1X0.9	6.7
60	44.687	SLAB	1X3.7	7.5
61	44.910	HUME PIPE	1X0.9	7.3
62	45.187	SLAB	1X2.2	7.3
63	45.658	SLAB	1X1.3	7.3
64	45.918	SLAB	1X2.1	7.3
65	46.295	SLAB	1X2.9	7.0
66	46.496	SLAB	1X1.52	7.0
67	46.605	SLAB	1X1.7	7.0
68	46.784	HUME PIPE	1X0.9	7.0
69	46.904	SLAB	1X2.1	7.0
70	47.162	SLAB	1X4.5	7.0
71	47.244	SLAB	1X7.5	7.0
72	47.377	HUME PIPE	1X0.9	7.0
73	47.621	HUME PIPE	1X0.9	7.0
74	47.778	SLAB	1X2.8	7.3
75	47.964	HUME PIPE	1X0.9	7.2
76	48.154	SLAB	1X3.1	7.2
77	48.264	SLAB	1X4.5	7.2
78	48.300	SLAB	1X4.5	7.3
79	48.516	SLAB	1X2.6	7.1
80	48.748	SLAB	1X3.2	7.1
81	48.981	HUME PIPE	1X1.2	7.3
82	49.160	SLAB	1X2.5	7.2
83	49.498	BOX	1X1.6	7.1
84	49.600	BOX	1X2.4	7.4
85	49.841	HUME PIPE	1X0.9	7.2
86	50.000	BOX	1X2.24	7.1
87	50.133	BOX	1X2.0	7.0
88	50.202	BOX	1X1.63	6.8

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
89	50.323	BOX	1X3.0	7.1
90	50.495	BOX	1X2.1	7.2
91	50.845	BOX	1X1.8	7.0
92	50.921	BOX	1X2.2	7.2
93	51.149	HUME PIPE	1X1.0	7.2
94	51.209	SLAB	1X2.065	7.0
95	51.538	SLAB	1X1.7	7.7
96	51.703	HUME PIPE	1X0.9	7.5
97	51.922	HUME PIPE	1X0.9	7.2
98	52.055	SLAB	1X2.24	7.8
99	52.170	SLAB	1X2.24	6.7
100	52.334	HUME PIPE	1X0.9	6.5
101	52.720	SLAB	1X2.24	7.0
102	53.047	SLAB	1X2.24	7.0
103	53.348	SLAB	1X2.24	7.0
104	53.980	HUME PIPE	1X0.9	6.5
105	54.054	SLAB	1X2.24	7.3
106	54.289	HUME PIPE	1X0.9	7.3
107	54.379	SLAB	1X2.24	7.2
108	54.881	SLAB	1X2.24	7.3
109	54.983	HUME PIPE	1X0.9	6.6
110	55.118	SLAB	1X2.24	7.3
111	55.506	HUME PIPE	1X0.9	7.1
112	55.581	HUME PIPE	1X0.9	7.3
113	55.745	HUME PIPE	1X0.9	6.5
114	55.903	HUME PIPE	2X0.9	8.1
115	56.351	SLAB	1X1.0	8.0
116	56.427	SLAB	1X1.4	7.7
117	56.570	SLAB	1X1.1	7.4
118	56.764	SLAB	1X1.8	7.6
119	56.876	SLAB	1X1.6	7.3
120	57.144	SLAB	1X1.8	7.4
121	57.217	SLAB	1X1.5	7.3
122	57.290	SLAB	1X1.0	7.3
123	57.392	HUME PIPE	1X0.9	7.5
124	57.552	HUME PIPE	1X0.9	7.3
125	57.674	HUME PIPE	1X0.9	7.2
126	57.749	SLAB	1X2.70	7.1
127	57.801	HUME PIPE	1X0.9	7.4
128	57.886	SLAB	1X1.7	7.3
129	58.100	SLAB	1X4.1	7.5

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
130	58.254	SLAB	1X1.9	7.2
131	58.471	SLAB	1X1.30	7.1
132	58.826	HUME PIPE	1X0.9	7.1
133	59.115	HUME PIPE	1X0.9	7.2
134	59.403	HUME PIPE	1X0.9	7.3
135	60.060	HUME PIPE	1X0.9	6.9
136	60.520	SLAB	1X2.4	7.1
137	61.470	HUME PIPE	1X0.9	7.5
138	61.600	HUME PIPE	1X0.9	7.6
139	62.218	HUME PIPE	1X0.9	7.6
140	62.437	HUME PIPE	1X0.9	7.6
141	62.639	HUME PIPE	1X0.9	6.9
142	63.160	HUME PIPE	1X0.9	7.2
143	63.298	HUME PIPE	1X0.9	7.2
144	63.581	HUME PIPE	1X0.9	7.1
145	63.724	HUME PIPE	1X0.9	7.3
146	64.860	HUME PIPE	1X0.9	7.2
147	64.942	HUME PIPE	1X0.9	7.1
148	65.096	HUME PIPE	1X0.9	7.3
149	65.858	HUME PIPE	1X0.9	7.1
150	66.020	HUME PIPE	1X0.9	7.2
151	66.103	HUME PIPE	1X0.9	6.2
152	66.529	SLAB	1X4.5	6.3
153	66.673	HUME PIPE	1X0.9	6.7
154	66.745	HUME PIPE	1X0.9	7.1
155	66.873	HUME PIPE	1X0.9	7.0
156	67.028	HUME PIPE	1X0.9	7.1
157	67.162	HUME PIPE	1X0.9	7.2
158	67.315	HUME PIPE	1X0.9	7.2
159	67.493	SLAB	1X3.25	7.4
160	67.769	HUME PIPE	1X0.9	7.5
161	67.907	HUME PIPE	1X0.9	7.2
162	68.201	HUME PIPE	1X0.9	7.1
163	68.439	HUME PIPE	1X0.9	7.5
164	68.980	SLAB	1X2.8	7.1
165	69.299	SLAB	1X3.3	7.2
166	69.571	SLAB	1X2.1	7.1
167	69.681	SLAB	1X2.1	7.3
168	69.956	HUME PIPE	1X0.9	7.1
169	70.184	SLAB	1X3.60	7.3
170	70.395	SLAB	1X2.0	7.7

Sl. No.	Existing Chainage (km)	Type of Culvert	Span/Opening with Span Length	Width of Culvert (m)
171	70.590	SLAB	1X2.1	7.8
172	70.893	HUME PIPE	2X0.9	7.3
173	70.944	HUME PIPE	1X0.9	7.0
174	71.158	HUME PIPE	1X0.9	7.1
175	71.464	HUME PIPE	1X0.9	7.5
176	71.607	SLAB	1X2.4	7.4
177	71.697	SLAB	1X3.4	7.3
178	71.867	HUME PIPE	1X0.9	7.8

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.	Location		Type	
	From km	To km	Masonry/cc (Pucca)	Earthen (Kutcha)
1	32.796	39.060	-	6.264
2	39.060	41.730	2.670	-
3	41.730	70.670	-	28.940
4	70.670	71.740	1.070	-
5	71.740	72.030	-	0.290

14. Major junctions

The details of major junctions are as follows:

Sr.	Location	At grade	Separated	Category of Cross Road
-----	----------	----------	-----------	------------------------

No.	(Km)			NH	SH	MDR	Others
Nil							

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Chainage	Type of intersection	
		Junction	Cross Road
1	39.775	Y	3 Legged
2	40.790	+	4 Legged
3	42.440	Y	3 Legged
4	48.408	Y	3 Legged
5	70.308	T	3 Legged
6	70.739	T	3 Legged
7	70.752	T	3 Legged
8	71.170	Y	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	32.800	52.400	-	-	-	-	1.5	-	-	-	-	5

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

Sl. No	Chainage		HT/LT Lines (km)			Transformer	
	From	To	33 KV	11 KV	LT	No	Capacity
1	32.800	52.400	-	5.18	1.4	-	-
2	52.400	72.030		2.8	0.595		
	Total			7.98	1.995		

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

The site includes the following Public Health utilities: -

Sl.No	Chainage		Diameter of Pipe	Gravity Main	Feeding Main	Distribution Main/Village supply water pipe line	Private House Water Connection		Hand Pump	T-Cluster
	From	To					km	Nos		
1	37.590	38.480	32	0.028						
2	37.590	38.480	65	0.176						
3	37.620	39.600	40			0.576				
4	37.620	39.600	32			0.771				
5	Ngopa Village						1.083	42	2	15
6	67.900	73.000	32	5.555						
7	67.500	71.750	32			0.396				
8	67.500	71.750	25			0.71				
	Total			5.759	0	2.453	1.083	42	2	15

(iii) Any Other line: Nil

18. Other structures

Existing Breast Wall

SL No.	Existing Chainage (km)		Length (m)
	From	To	
1	40.040	40.090	50
2	40.205	40.230	25
3	40.470	40.480	10
4	40.810	40.830	20
5	42.382	42.405	23
6	46.310	46.340	30
7	55.615	55.640	25
8	63.750	63.770	20
9	71.680	71.710	30

Existing Retaining Wall

SL No.	Existing Chainage (km)		Length (m)
	From	To	
1	33.640	33.683	43
2	34.810	34.820	10
3	34.980	35.013	33
4	36.018	36.030	12
5	37.938	37.953	15
6	38.630	38.680	50
7	40.770	40.795	25
8	41.340	41.355	15
9	41.735	41.753	18
10	41.772	41.786	14
11	41.935	41.955	20
12	42.040	42.090	50
13	42.430	42.435	5
14	43.037	43.044	7
15	43.928	43.972	44
16	44.490	44.505	15
17	47.090	47.110	20
18	47.140	47.155	15

SL No.	Existing Chainage (km)		Length (m)
	From	To	
19	47.252	47.257	5
20	47.360	47.370	10
21	47.390	47.433	43
22	47.463	47.500	37
23	47.510	47.551	41
24	47.774	47.790	16
25	48.080	48.090	10
26	48.130	48.140	10
27	49.143	49.238	95
28	49.500	49.515	15
29	49.555	49.562	7
30	49.607	49.615	8
31	50.080	50.090	10
32	50.234	50.241	7
33	50.330	50.339	9
34	51.200	51.220	20
35	51.630	51.636	6
36	51.647	51.652	5
37	51.660	51.676	16
38	52.485	52.513	28
39	52.562	52.574	12
40	52.631	52.635	4
41	53.435	53.500	65
42	53.585	53.605	20
43	53.645	53.710	65
44	54.750	54.770	20
45	55.660	55.720	60
46	56.205	56.245	40
47	57.040	57.065	25
48	57.400	57.460	60
49	58.440	58.455	15
50	58.490	58.540	50
51	59.660	59.670	10
52	59.790	59.810	20
53	59.830	59.835	5
54	59.855	59.860	5
55	60.380	60.400	20
56	60.595	60.625	30
57	62.060	62.073	13

SL No.	Existing Chainage (km)		Length (m)
	From	To	
58	62.250	62.330	80
59	63.340	63.352	12
60	63.685	63.697	12
61	63.745	63.760	15
62	64.500	64.560	60
63	64.665	64.695	30
64	64.800	64.830	30
65	66.610	66.660	50
66	66.730	66.760	30
67	66.870	66.880	10
68	67.150	67.160	10
69	67.620	67.640	20
70	67.725	67.770	45
71	69.050	69.065	15
72	69.300	69.315	15
73	69.705	69.720	15
74	70.280	70.290	10
75	70.445	70.455	10
76	70.830	70.845	15
77	70.870	70.890	20
78	71.820	71.860	40
79	71.890	72.030	140

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)	32.796	72.030	39.234	5.9 m-18.80 m	14.0 m to 24.0 m	on Appointed Date
(ii) Balance Right of Way (width)	32.796	72.030	39.234	5.9 m-18.80 m	14.0 m to 24.0 m	Within 150 days after the Appointed Date
(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 as: 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	Ngopa	37+-000	39+470	10	TCS drawing attached	10 m Carriageway + 1.5 m Footpath on both side
2	Pawlarang	66+852	67+870	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	37+020 TO 37+160	TCS-9A
2	37+160 TO 37+240	TCS-9B
3	37+240 TO 37+380	TCS-9A
4	37+380 TO 37+520	TCS-10A
5	37+520 TO 37+620	TCS-9B
6	37+620 TO 37+720	TCS-8B
7	37+720 TO 38+330	TCS-9A
8	38+330 TO 38+410	TCS-10A
9	38+410 TO 39+060	TCS-9A
10	39+060 TO 39+220	TCS-11
11	39+220 TO 39+480	TCS-9A
12	66+860 TO 67+110	TCS-9A
13	67+110 TO 67+760	TCS-10A
14	67+760 TO 67+880	TCS-9B

(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 trapezoidal drain
2	TCS-1B	New construction of 2 Lane carriageway with paved shoulder in open area with both side RR Masonry trapezoidal drain
3	TCS-2A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with both side Retaining wall
4	TCS-2B	New construction 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 trapezoidal drain and Valley side retaining wall

Sl No	TCS Type	Description
6	TCS-3B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal 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 trapezoidal drain
8	TCS-4B	New construction of 2 Lane carriageway with paved shoulder in open area with Hill side RR Masonry trapezoidal drain
9	TCS-5A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall
10	TCS-6A	Reconstruction of 2 Lane carriageway with paved shoulder in open area with Valley side retaining wall and Hill side breast wall with drain
11	TCS-7A	Reconstruction of 2 Lane carriageway with paved shoulder in open area, Hill side breast wall with drain and other side Trapezoidal 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 Trapezoidal drain.
13	TCS-8B	New construction of 2 Lane carriageway with paved shoulder in Built-up area with Both side Breast wall, drain and footpath
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
15	TCS-9B	New construction 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		
31+280	31+380	100	TCS-1B
31+380	31+520	140	TCS-3A
31+520	31+820	300	TCS-4A
31+820	31+960	140	TCS-4B
31+960	32+030	70	TCS-4A
32+030	32+080	50	TCS-3A
32+080	32+920	840	TCS-4A
32+920	32+960	40	TCS-3A
32+960	33+020	60	TCS-4A
33+020	33+370	350	TCS-4B
33+370	33+720	350	TCS-4A
33+720	33+810	90	TCS-1A
33+810	33+960	150	TCS-1B

Design Chainage (Km)		Net Length (m)	TCS No.
From	To		
33+960	34+160	200	TCS-4A
34+160	34+220	60	TCS-5A
34+220	34+320	100	TCS-2A
34+320	34+520	200	TCS-1A
34+520	34+610	90	TCS-3A
34+610	34+720	110	TCS-4A
34+720	34+810	90	TCS-3A
34+810	34+960	150	TCS-4B
34+960	35+080	120	TCS-1B
35+080	35+130	50	TCS-3B
35+130	35+220	90	TCS-4B
35+220	35+360	140	TCS-4A
35+360	35+440	80	TCS-1B
35+440	35+640	200	TCS-4A
35+640	35+760	120	TCS-4A
35+760	35+920	160	TCS-1A
35+920	36+330	410	TCS-4A
36+330	36+390	60	TCS-3A
36+390	36+610	220	TCS-4A
36+610	36+780	170	TCS-1A
36+780	37+020	240	TCS-4A
37+020	37+160	140	TCS-9A
37+160	37+240	80	TCS-9B
37+240	37+380	140	TCS-9A
37+380	37+520	140	TCS-10A
37+520	37+620	100	TCS-9B
37+620	37+720	100	TCS-8B
37+720	38+330	610	TCS-9A
38+330	38+410	80	TCS-10A
38+410	39+060	650	TCS-9A
39+060	39+220	160	TCS-11
39+220	39+480	260	TCS-9A
39+480	39+830	350	TCS-4A
39+830	39+930	100	TCS-3A
39+930	40+120	190	TCS-4A
40+120	40+220	100	TCS-1A
40+220	40+820	600	TCS-4A
40+820	40+880	60	TCS-3A
40+880	41+340	460	TCS-4A
41+340	41+460	120	TCS-3A
41+460	41+610	150	TCS-1B
41+610	41+730	120	TCS-7A
41+730	41+780	50	TCS-6A

Design Chainage (Km)		Net Length (m)	TCS No.
From	To		
41+780	41+830	50	TCS-7A
41+830	41+930	100	TCS-6A
41+930	42+220	290	TCS-4B
42+220	42+380	160	TCS-4A
42+380	42+520	140	TCS-3A
42+520	42+620	100	TCS-4A
42+620	42+660	40	TCS-3A
42+660	42+760	100	TCS-1A
42+760	42+830	70	TCS-3A
42+830	43+230	400	TCS-4A
43+230	43+280	50	TCS-3A
43+280	43+330	50	TCS-4A
43+330	43+380	50	TCS-3A
43+380	43+460	80	TCS-4A
43+460	43+560	100	TCS-1A
43+560	43+760	200	TCS-4B
43+760	43+920	160	TCS-3A
43+920	43+980	60	TCS-4A
43+980	44+120	140	TCS-3A
44+120	44+210	90	TCS-1A
44+210	44+280	70	TCS-3A
44+280	44+320	40	TCS-3B
44+320	44+460	140	TCS-1B
44+460	44+670	210	TCS-4A
44+670	44+754	84	TCS-4B
44+754	44+762	8	Bridge
44+762	44+980	218	TCS-4A
44+980	45+120	140	TCS-5A
45+120	45+360	240	TCS-4A
45+360	45+430	70	TCS-3A
45+430	45+540	110	TCS-4A
45+540	45+580	40	TCS-3B
45+580	45+860	280	TCS-4B
45+860	46+160	300	TCS-4A
46+160	46+280	120	TCS-1A
46+280	46+380	100	TCS-3A
46+380	46+480	100	TCS-4A
46+480	46+660	180	TCS-3A
46+660	46+940	280	TCS-4A
46+940	47+010	70	TCS-4B
47+010	47+130	120	TCS-4A
47+130	47+240	110	TCS-3A
47+240	47+320	80	TCS-4B

Design Chainage (Km)		Net Length (m)	TCS No.
From	To		
47+320	47+360	40	TCS-3B
47+360	47+420	60	TCS-4B
47+420	47+760	340	TCS-1B
47+760	48+080	320	TCS-4A
48+080	48+140	60	TCS-3A
48+140	48+480	340	TCS-4A
48+480	49+180	700	TCS-1A
49+180	49+610	430	TCS-4A
49+610	49+960	350	TCS-3A
49+960	50+160	200	TCS-3B
50+160	50+540	380	TCS-3A
50+540	50+630	90	TCS-4B
50+630	50+780	150	TCS-4A
50+780	50+940	160	TCS-3A
50+940	51+120	180	TCS-4A
51+120	51+220	100	TCS-3A
51+220	51+320	100	TCS-4A
51+320	51+380	60	TCS-3A
51+380	51+440	60	TCS-4A
51+440	51+480	40	TCS-3A
51+480	51+760	280	TCS-4A
51+760	51+810	50	TCS-3A
51+810	52+220	410	TCS-4B
52+220	52+530	310	TCS-1B
52+530	52+620	90	TCS-3A
52+620	52+680	60	TCS-1A
52+680	53+055	375	TCS-3B
53+055	53+118	63	Bridge
53+118	53+360	242	TCS-1B
53+360	53+510	150	TCS-4B
53+510	54+010	500	TCS-4A
54+010	54+120	110	TCS-7A
54+120	54+240	120	TCS-7B
54+240	54+510	270	TCS-4B
54+510	54+930	420	TCS-4A
54+930	55+120	190	TCS-3A
55+120	55+180	60	TCS-1A
55+180	55+580	400	TCS-3A
55+580	55+660	80	TCS-4A
55+660	56+380	720	TCS-3A
56+380	56+780	400	TCS-4A
56+780	56+820	40	TCS-3A
56+820	56+960	140	TCS-4A

Design Chainage (Km)		Net Length (m)	TCS No.
From	To		
56+960	57+020	60	TCS-3A
57+020	57+320	300	TCS-4A
57+320	57+460	140	TCS-3A
57+460	57+730	270	TCS-4A
57+730	57+790	60	TCS-5A
57+790	58+230	440	TCS-4A
58+230	58+440	210	TCS-3A
58+440	58+580	140	TCS-4A
58+580	58+660	80	TCS-1A
58+660	58+820	160	TCS-2A
58+820	59+220	400	TCS-1A
59+220	59+420	200	TCS-1B
59+420	59+580	160	TCS-1A
59+580	59+660	80	TCS-4A
59+660	59+820	160	TCS-1A
59+820	60+930	1110	TCS-4A
60+930	61+060	130	TCS-1B
61+060	61+166	106	TCS-1A
61+166	61+320	154	TCS-4A
61+320	61+520	200	TCS-4B
61+520	61+660	140	TCS-4A
61+660	61+820	160	TCS-1B
61+820	61+960	140	TCS-1A
61+960	62+110	150	TCS-2B
62+110	62+160	50	TCS-3B
62+160	62+260	100	TCS-4B
62+260	62+360	100	TCS-4A
62+360	62+610	250	TCS-1B
62+610	63+160	550	TCS-1A
63+160	63+430	270	TCS-4B
63+430	63+720	290	TCS-1B
63+720	64+310	590	TCS-1A
64+310	64+510	200	TCS-3A
64+510	64+610	100	TCS-4B
64+610	64+860	250	TCS-4A
64+860	65+560	700	TCS-1A
65+560	66+290	730	TCS-1B
66+290	66+510	220	TCS-7A
66+510	66+620	110	TCS-1B
66+620	66+860	240	TCS-1A
66+860	67+110	250	TCS-9A
67+110	67+760	650	TCS-10A
67+760	67+880	120	TCS-9B

Design Chainage (Km)		Net Length (m)	TCS No.
From	To		
67+880	67+940	60	TCS-4A
67+940	67+980	40	TCS-3A
67+980	68+040	60	TCS-4A
68+040	68+170	130	TCS-3A
TOTAL=		36890	

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.	Location of intersection (Km)	Type of intersection	Other features	Remarks
Nil				

Minor Intersections

Sl. No.	Design Chainage (km)	Type of intersection	Other features
1	38.550	+ Type	4-Legged
2	40.200	Y Type	3-Legged
3	45.880	T Type	3-Legged
4	66.510	T Type	3-Legged
5	66.935	T Type	3-Legged
6	66.950	T Type	3-Legged
7	67.340	Y 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	Remarks	TCS Type*
1	31+280 TO 31+380	RECONSTRUCTION	TCS-1B
2	31+380 TO 31+520	RECONSTRUCTION	TCS-3A
3	31+520 TO 31+820	RECONSTRUCTION	TCS-4A
4	31+820 TO 31+960	RECONSTRUCTION	TCS-4B
5	31+960 TO 32+030	RECONSTRUCTION	TCS-4A
6	32+030 TO 32+080	RECONSTRUCTION	TCS-3A
7	32+080 TO 32+920	RECONSTRUCTION	TCS-4A
8	32+920 TO 32+960	RECONSTRUCTION	TCS-3A
9	32+960 TO 33+020	RECONSTRUCTION	TCS-4A
10	33+020 TO 33+370	RECONSTRUCTION	TCS-4B
11	33+370 TO 33+720	RECONSTRUCTION	TCS-4A

SL NO.	Design Chainage	Remarks	TCS Type*
12	33+720 TO 33+810	RECONSTRUCTION	TCS-1A
13	33+810 TO 33+960	RECONSTRUCTION	TCS-1B
14	33+960 TO 34+160	RECONSTRUCTION	TCS-4A
15	34+160 TO 34+220	RECONSTRUCTION	TCS-5A
16	34+220 TO 34+320	RECONSTRUCTION	TCS-2A
17	34+320 TO 34+520	RECONSTRUCTION	TCS-1A
18	34+520 TO 34+610	RECONSTRUCTION	TCS-3A
19	34+610 TO 34+720	RECONSTRUCTION	TCS-4A
20	34+720 TO 34+810	RECONSTRUCTION	TCS-3A
21	34+810 TO 34+960	RECONSTRUCTION	TCS-4B
22	34+960 TO 35+080	RECONSTRUCTION	TCS-1B
23	35+080 TO 35+130	RECONSTRUCTION	TCS-3B
24	35+130 TO 35+220	RECONSTRUCTION	TCS-4B
25	35+220 TO 35+360	RECONSTRUCTION	TCS-4A
26	35+360 TO 35+440	RECONSTRUCTION	TCS-1B
27	35+440 TO 35+640	RECONSTRUCTION	TCS-4A
28	35+640 TO 35+760	RECONSTRUCTION	TCS-4A
29	35+760 TO 35+920	RECONSTRUCTION	TCS-1A
30	35+920 TO 36+330	RECONSTRUCTION	TCS-4A
31	36+330 TO 36+390	RECONSTRUCTION	TCS-3A
32	36+390 TO 36+610	RECONSTRUCTION	TCS-4A
33	36+610 TO 36+780	RECONSTRUCTION	TCS-1A
34	36+780 TO 37+020	RECONSTRUCTION	TCS-4A
35	37+020 TO 37+160	RECONSTRUCTION	TCS-9A
36	37+160 TO 37+240	RECONSTRUCTION	TCS-9B
37	37+240 TO 37+380	RECONSTRUCTION	TCS-9A
38	37+380 TO 37+520	RECONSTRUCTION	TCS-10A
39	37+520 TO 37+620	RECONSTRUCTION	TCS-9B
40	37+620 TO 37+720	RECONSTRUCTION	TCS-8B
41	37+720 TO 38+330	RECONSTRUCTION	TCS-9A
42	38+330 TO 38+410	RECONSTRUCTION	TCS-10A
43	38+410 TO 39+060	RECONSTRUCTION	TCS-9A
44	39+060 TO 39+220	RECONSTRUCTION	TCS-11
45	39+220 TO 39+480	RECONSTRUCTION	TCS-9A
46	39+480 TO 39+830	RECONSTRUCTION	TCS-4A
47	39+830 TO 39+930	RECONSTRUCTION	TCS-3A
48	39+930 TO 40+120	RECONSTRUCTION	TCS-4A
49	40+120 TO 40+220	RECONSTRUCTION	TCS-1A
50	40+220 TO 40+820	RECONSTRUCTION	TCS-4A
51	40+820 TO 40+880	RECONSTRUCTION	TCS-3A
52	40+880 TO 41+340	RECONSTRUCTION	TCS-4A
53	41+340 TO 41+460	RECONSTRUCTION	TCS-3A
54	41+460 TO 41+610	RECONSTRUCTION	TCS-1B

SL NO.	Design Chainage	Remarks	TCS Type*
55	41+610 TO 41+730	RECONSTRUCTION	TCS-7A
56	41+730 TO 41+780	RECONSTRUCTION	TCS-6A
57	41+780 TO 41+830	RECONSTRUCTION	TCS-7A
58	41+830 TO 41+930	RECONSTRUCTION	TCS-6A
59	41+930 TO 42+220	RECONSTRUCTION	TCS-4B
60	42+220 TO 42+380	RECONSTRUCTION	TCS-4A
61	42+380 TO 42+520	RECONSTRUCTION	TCS-3A
62	42+520 TO 42+620	RECONSTRUCTION	TCS-4A
63	42+620 TO 42+660	RECONSTRUCTION	TCS-3A
64	42+660 TO 42+760	RECONSTRUCTION	TCS-1A
65	42+760 TO 42+830	RECONSTRUCTION	TCS-3A
66	42+830 TO 43+230	RECONSTRUCTION	TCS-4A
67	43+230 TO 43+280	RECONSTRUCTION	TCS-3A
68	43+280 TO 43+330	RECONSTRUCTION	TCS-4A
69	43+330 TO 43+380	RECONSTRUCTION	TCS-3A
70	43+380 TO 43+460	RECONSTRUCTION	TCS-4A
71	43+460 TO 43+560	RECONSTRUCTION	TCS-1A
72	43+560 TO 43+760	RECONSTRUCTION	TCS-4B
73	43+760 TO 43+920	RECONSTRUCTION	TCS-3A
74	43+920 TO 43+980	RECONSTRUCTION	TCS-4A
75	43+980 TO 44+120	RECONSTRUCTION	TCS-3A
76	44+120 TO 44+210	RECONSTRUCTION	TCS-1A
77	44+210 TO 44+280	RECONSTRUCTION	TCS-3A
78	44+280 TO 44+320	RECONSTRUCTION	TCS-3B
79	44+320 TO 44+460	RECONSTRUCTION	TCS-1B
80	44+460 TO 44+670	RECONSTRUCTION	TCS-4A
81	44+670 TO 44+754	RECONSTRUCTION	TCS-4B
82	44+754 TO 44+762	RECONSTRUCTION	Bridge
83	44+762 TO 44+980	RECONSTRUCTION	TCS-4A
84	44+980 TO 45+120	RECONSTRUCTION	TCS-5A
85	45+120 TO 45+360	RECONSTRUCTION	TCS-4A
86	45+360 TO 45+430	RECONSTRUCTION	TCS-3A
87	45+430 TO 45+540	RECONSTRUCTION	TCS-4A
88	45+540 TO 45+580	RECONSTRUCTION	TCS-3B
89	45+580 TO 45+860	RECONSTRUCTION	TCS-4B
90	45+860 TO 46+160	RECONSTRUCTION	TCS-4A
91	46+160 TO 46+280	RECONSTRUCTION	TCS-1A
92	46+280 TO 46+380	RECONSTRUCTION	TCS-3A
93	46+380 TO 46+480	RECONSTRUCTION	TCS-4A
94	46+480 TO 46+660	RECONSTRUCTION	TCS-3A
95	46+660 TO 46+940	RECONSTRUCTION	TCS-4A
96	46+940 TO 47+010	RECONSTRUCTION	TCS-4B
97	47+010 TO 47+130	RECONSTRUCTION	TCS-4A

SL NO.	Design Chainage	Remarks	TCS Type*
98	47+130 TO 47+240	RECONSTRUCTION	TCS-3A
99	47+240 TO 47+320	RECONSTRUCTION	TCS-4B
100	47+320 TO 47+360	RECONSTRUCTION	TCS-3B
101	47+360 TO 47+420	RECONSTRUCTION	TCS-4B
102	47+420 TO 47+760	RECONSTRUCTION	TCS-1B
103	47+760 TO 48+080	RECONSTRUCTION	TCS-4A
104	48+080 TO 48+140	RECONSTRUCTION	TCS-3A
105	48+140 TO 48+480	RECONSTRUCTION	TCS-4A
106	48+480 TO 49+180	RECONSTRUCTION	TCS-1A
107	49+180 TO 49+610	RECONSTRUCTION	TCS-4A
108	49+610 TO 49+960	RECONSTRUCTION	TCS-3A
109	49+960 TO 50+160	RECONSTRUCTION	TCS-3B
110	50+160 TO 50+540	RECONSTRUCTION	TCS-3A
111	50+540 TO 50+630	RECONSTRUCTION	TCS-4B
112	50+630 TO 50+780	RECONSTRUCTION	TCS-4A
113	50+780 TO 50+940	RECONSTRUCTION	TCS-3A
114	50+940 TO 51+120	RECONSTRUCTION	TCS-4A
115	51+120 TO 51+220	RECONSTRUCTION	TCS-3A
116	51+220 TO 51+320	RECONSTRUCTION	TCS-4A
117	51+320 TO 51+380	RECONSTRUCTION	TCS-3A
118	51+380 TO 51+440	RECONSTRUCTION	TCS-4A
119	51+440 TO 51+480	RECONSTRUCTION	TCS-3A
120	51+480 TO 51+760	RECONSTRUCTION	TCS-4A
121	51+760 TO 51+810	RECONSTRUCTION	TCS-3A
122	51+810 TO 52+220	RECONSTRUCTION	TCS-4B
123	52+220 TO 52+530	RECONSTRUCTION	TCS-1B
124	52+530 TO 52+620	RECONSTRUCTION	TCS-3A
125	52+620 TO 52+680	RECONSTRUCTION	TCS-1A
126	52+680 TO 53+055	RECONSTRUCTION	TCS-3B
127	53+055 TO 53+118	RECONSTRUCTION	Bridge
128	53+118 TO 53+360	RECONSTRUCTION	TCS-1B
129	53+360 TO 53+510	RECONSTRUCTION	TCS-4B
130	53+510 TO 54+010	RECONSTRUCTION	TCS-4A
131	54+010 TO 54+120	RECONSTRUCTION	TCS-7A
132	54+120 TO 54+240	RECONSTRUCTION	TCS-7B
133	54+240 TO 54+510	RECONSTRUCTION	TCS-4B
134	54+510 TO 54+930	RECONSTRUCTION	TCS-4A
135	54+930 TO 55+120	RECONSTRUCTION	TCS-3A
136	55+120 TO 55+180	RECONSTRUCTION	TCS-1A
137	55+180 TO 55+580	RECONSTRUCTION	TCS-3A
138	55+580 TO 55+660	RECONSTRUCTION	TCS-4A
139	55+660 TO 56+380	RECONSTRUCTION	TCS-3A
140	56+380 TO 56+780	RECONSTRUCTION	TCS-4A

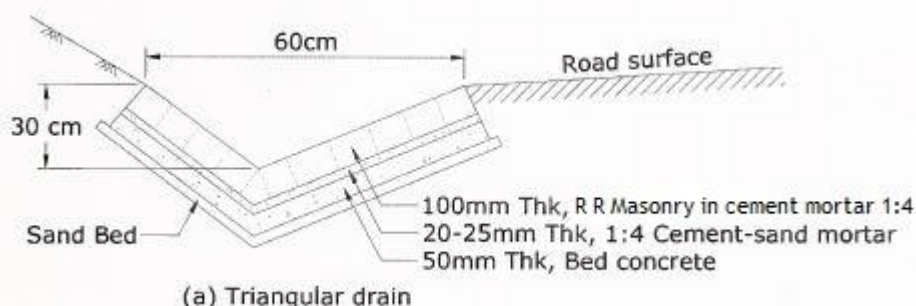
SL NO.	Design Chainage	Remarks	TCS Type*
141	56+780 TO 56+820	RECONSTRUCTION	TCS-3A
142	56+820 TO 56+960	RECONSTRUCTION	TCS-4A
143	56+960 TO 57+020	RECONSTRUCTION	TCS-3A
144	57+020 TO 57+320	RECONSTRUCTION	TCS-4A
145	57+320 TO 57+460	RECONSTRUCTION	TCS-3A
146	57+460 TO 57+730	RECONSTRUCTION	TCS-4A
147	57+730 TO 57+790	RECONSTRUCTION	TCS-5A
148	57+790 TO 58+230	RECONSTRUCTION	TCS-4A
149	58+230 TO 58+440	RECONSTRUCTION	TCS-3A
150	58+440 TO 58+580	RECONSTRUCTION	TCS-4A
151	58+580 TO 58+660	RECONSTRUCTION	TCS-1A
152	58+660 TO 58+820	RECONSTRUCTION	TCS-2A
153	58+820 TO 59+220	RECONSTRUCTION	TCS-1A
154	59+220 TO 59+420	RECONSTRUCTION	TCS-1B
155	59+420 TO 59+580	RECONSTRUCTION	TCS-1A
156	59+580 TO 59+660	RECONSTRUCTION	TCS-4A
157	59+660 TO 59+820	RECONSTRUCTION	TCS-1A
158	59+820 TO 60+930	RECONSTRUCTION	TCS-4A
159	60+930 TO 61+060	RECONSTRUCTION	TCS-1B
160	61+060 TO 61+166	RECONSTRUCTION	TCS-1A
161	61+166 TO 61+320	RECONSTRUCTION	TCS-4A
162	61+320 TO 61+520	RECONSTRUCTION	TCS-4B
163	61+520 TO 61+660	RECONSTRUCTION	TCS-4A
164	61+660 TO 61+820	RECONSTRUCTION	TCS-1B
165	61+820 TO 61+960	RECONSTRUCTION	TCS-1A
166	61+960 TO 62+110	RECONSTRUCTION	TCS-2B
167	62+110 TO 62+160	RECONSTRUCTION	TCS-3B
168	62+160 TO 62+260	RECONSTRUCTION	TCS-4B
169	62+260 TO 62+360	RECONSTRUCTION	TCS-4A
170	62+360 TO 62+610	RECONSTRUCTION	TCS-1B
171	62+610 TO 63+160	RECONSTRUCTION	TCS-1A
172	63+160 TO 63+430	RECONSTRUCTION	TCS-4B
173	63+430 TO 63+720	RECONSTRUCTION	TCS-1B
174	63+720 TO 64+310	RECONSTRUCTION	TCS-1A
175	64+310 TO 64+510	RECONSTRUCTION	TCS-3A
176	64+510 TO 64+610	RECONSTRUCTION	TCS-4B
177	64+610 TO 64+860	RECONSTRUCTION	TCS-4A
178	64+860 TO 65+560	RECONSTRUCTION	TCS-1A
179	65+560 TO 66+290	RECONSTRUCTION	TCS-1B
180	66+290 TO 66+510	RECONSTRUCTION	TCS-7A
181	66+510 TO 66+620	RECONSTRUCTION	TCS-1B
182	66+620 TO 66+860	RECONSTRUCTION	TCS-1A
183	66+860 TO 67+110	RECONSTRUCTION	TCS-9A

SL NO.	Design Chainage	Remarks	TCS Type*
184	67+110 TO 67+760	RECONSTRUCTION	TCS-10A
185	67+760 TO 67+880	RECONSTRUCTION	TCS-9B
186	67+880 TO 67+940	RECONSTRUCTION	TCS-4A
187	67+940 TO 67+980	RECONSTRUCTION	TCS-3A
188	67+980 TO 68+040	RECONSTRUCTION	TCS-4A
189	68+040 TO 68+170	RECONSTRUCTION	TCS-3A

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	6960
RR Masonry Triangular Drain	Both/One Side	40477
Total		47437



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	44.758	15.0 m

2	53.275	15.0 m
---	--------	--------

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

Sl. No.	Bridge/Structure at km	Remarks
1	44.758	As per GAD of Bridges
2	53.275	

(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	44.758	Yes	-
2	53.275	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.

(ii) Culverts

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

(b) Distance between any two culverts shall not be more than 200 m.

(c) Minimum of five culverts per Km shall be provided.

(d) 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	32.801	31.409	2.0 X 2.0
2	33.126	31.727	2.0 X 2.0
3	33.332	31.919	2.0 X 2.0
4	33.538	32.085	2.0 X 2.0

5	33.762	32.304	2.0 X 2.0
6	33.94	32.481	2.0 X 2.0
7	33.973	32.516	2.0 X 2.0
8	34.215	32.763	2.0 X 2.0
9	34.467	33.009	2.0 X 2.0
10	34.623	33.162	2.0 X 2.0
11	34.820	33.344	2.0 X 2.0
12	35.008	33.523	4.0 X 5.0
13	35.222	33.722	2.0 X 2.0
14	35.445	33.936	2.0 X 2.0
15	35.902	34.166	2.0 X 2.0
16	36.425	34.689	2.0 X 2.0
17	36.500	34.763	2.0 X 2.0
18	36.519	34.782	2.0 X 3.0
19	37.277	35.474	2.0 X 2.0
20	37.410	35.597	2.0 X 2.0
21	37.592	35.774	2.0 X 2.0
22	37.867	36.04	2.0 X 2.0
23	37.995	36.174	2.0 X 2.0
24	38.548	36.686	2.0 X 2.0
25	38.818	36.933	2.0 X 2.0
26	38.999	37.112	2.0 X 2.0
27	39.219	37.319	2.0 X 2.0
28	39.331	37.423	2.0 X 2.0
29	39.697	37.77	2.0 X 3.0
30	39.946	37.895	2.0 X 2.0
31	40.075	38.025	2.0 X 2.0
32	40.093	38.038	2.0 X 2.0
33	40.253	38.193	2.0 X 2.0
34	40.343	38.28	2.0 X 2.0
35	40.464	38.402	2.0 X 2.0
36	40.498	38.433	2.0 X 2.0
37	40.550	38.485	2.0 X 2.0
38	41.358	39.291	2.0 X 2.0
39	41.725	39.655	2.0 X 2.0
40	41.790	39.717	2.0 X 2.0
41	41.839	39.768	3.0 X 4.0
42	41.949	39.874	3.0 X 4.0
43	42.340	40.259	2.0 X 2.0
44	42.53	40.441	3.0 X 4.0
45	42.734	40.646	2.0 X 2.0
46	42.955	40.862	2.0 X 2.0
47	43.196	41.102	2.0 X 2.0
48	43.353	41.251	2.0 X 2.0

49	43.565	41.454	2.0 X 2.0
50	43.778	41.656	2.0 X 2.0
51	44.113	41.952	2.0 X 2.0
52	44.386	42.2	4.0 X 5.0
53	44.509	42.313	2.0 X 2.0
54	44.687	42.482	3.0 X 4.0
55	44.910	42.701	2.0 X 2.0
56	45.187	42.972	2.0 X 2.0
57	45.658	43.437	2.0 X 2.0
58	45.918	43.696	2.0 X 2.0
59	46.295	44.038	3.0 X 4.0
60	46.394	44.141	2.0 X 2.0
61	46.605	44.352	2.0 X 2.0
62	46.904	44.615	2.0 X 2.0
63	47.162	44.873	5.0 X 3.0
64	47.621	45.312	2.0 X 2.0
65	47.778	45.463	3.0 X 4.0
66	47.964	45.646	2.0 X 2.0
67	48.516	46.173	3.0 X 4.0
68	48.748	46.404	3.0 X 4.0
69	48.981	46.631	2.0 X 2.0
70	49.160	46.803	3.0 X 4.0
71	49.498	47.131	2.0 X 2.0
72	49.600	47.22	2.0 X 2.0
73	49.841	47.453	2.0 X 2.0
74	50.000	47.596	2.0 X 2.0
75	50.495	48.047	2.0 X 2.0
76	50.845	48.39	2.0 X 2.0
77	50.921	48.458	2.0 X 2.0
78	51.149	48.676	2.0 X 2.0
79	51.538	49.053	2.0 X 2.0
80	51.703	49.21	2.0 X 2.0
81	51.922	49.408	2.0 X 2.0
82	52.055	49.538	2.0 X 2.0
83	52.334	49.816	2.0 X 2.0
84	52.720	50.18	4.0 X 3.0
85	53.047	50.482	3.0 X 4.0
86	53.980	51.397	2.0 X 2.0
87	54.054	51.468	2.0 X 2.0
88	54.289	51.699	2.0 X 2.0
89	54.379	51.794	2.0 X 2.0
90	54.881	52.282	3.0 X 4.0
91	54.983	52.38	2.0 X 2.0
92	56.427	53.454	2.0 X 2.0

93	56.570	53.576	2.0 X 2.0
94	56.764	53.76	2.0 X 2.0
95	56.876	53.872	2.0 X 2.0
96	57.144	54.129	2.0 X 2.0
97	57.217	54.202	2.0 X 2.0
98	57.290	54.277	2.0 X 2.0
99	57.392	54.37	2.0 X 2.0
100	57.552	54.536	2.0 X 2.0
101	57.674	54.648	2.0 X 2.0
102	57.749	54.711	3.0 X 4.0
103	57.801	54.764	2.0 X 2.0
104	57.886	54.844	2.0 X 2.0
105	58.100	55.054	3.0 X 4.0
106	58.254	55.215	2.0 X 2.0
107	58.471	55.418	2.0 X 2.0
108	58.826	55.773	2.0 X 2.0
109	59.115	56.06	2.0 X 2.0
110	59.403	56.346	2.0 X 2.0
111	60.060	56.99	2.0 X 2.0
112	60.520	57.45	3.0 X 4.0
113	61.470	58.385	2.0 X 2.0
114	61.600	58.511	2.0 X 2.0
115	62.218	59.124	2.0 X 2.0
116	63.160	60.016	2.0 X 2.0
117	63.298	60.152	2.0 X 2.0
118	63.581	60.429	2.0 X 2.0
119	63.724	60.554	2.0 X 2.0
120	64.860	61.648	2.0 X 2.0
121	64.942	61.724	2.0 X 2.0
122	65.096	61.876	2.0 X 2.0
123	66.529	63.233	5.0 X 4.0
124	66.673	63.363	2.0 X 2.0
125	67.162	63.761	2.0 X 2.0
126	67.769	64.334	2.0 X 2.0
127	67.907	64.469	2.0 X 2.0
128	68.201	64.764	2.0 X 2.0
129	68.439	64.997	2.0 X 2.0
130	70.184	66.619	4.0 X 3.0
131	70.395	66.827	2.0 X 2.0
132	70.590	67.021	2.0 X 2.0
133	70.893	67.319	2.0 X 2.0
134	70.944	67.37	2.0 X 3.0
135	71.158	67.573	2.0 X 3.0
136	71.464	67.874	2.0 X 3.0

(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	31.636	2.0 X 2.0
2	32.003	2.0 X 2.0
3	32.180	2.0 X 2.0
4	32.376	2.0 X 2.0
5	32.629	2.0 X 2.0
6	32.905	2.0 X 2.0
7	33.090	2.0 X 2.0
8	33.239	2.0 X 2.0
9	34.330	2.0 X 2.0
10	34.450	2.0 X 2.0
11	34.920	2.0 X 2.0
12	35.105	2.0 X 2.0
13	35.250	2.0 X 3.0
14	35.708	2.0 X 3.0
15	36.023	2.0 X 2.0
16	36.500	2.0 X 2.0
17	37.200	2.0 X 2.0
18	38.820	2.0 X 2.0
19	39.350	2.0 X 2.0
20	39.595	2.0 X 2.0
21	40.071	2.0 X 2.0
22	40.140	2.0 X 2.0
23	40.998	2.0 X 2.0
24	41.835	2.0 X 2.0
25	42.065	2.0 X 2.0
26	42.606	2.0 X 2.0
27	42.835	2.0 X 2.0
28	43.098	2.0 X 2.0
29	43.200	2.0 X 2.0

Sl. No.	Design Chainage	Span /Opening (m)
30	43.298	2.0 X 2.0
31	43.570	2.0 X 2.0
32	43.800	2.0 X 2.0
33	44.006	2.0 X 2.0
34	44.122	2.0 X 2.0
35	44.780	2.0 X 2.0
36	45.200	4.0 X 5.0
37	45.367	2.0 X 2.0
38	46.272	2.0 X 2.0
39	46.489	2.0 X 2.0
40	46.570	2.0 X 2.0
41	46.952	2.0 X 2.0
42	47.031	2.0 X 2.0
43	47.362	2.0 X 2.0
44	47.860	2.0 X 2.0
45	47.966	2.0 X 2.0
46	48.174	2.0 X 2.0
57	48.302	2.0 X 2.0
48	48.580	2.0 X 2.0
49	49.930	2.0 X 2.0
50	50.062	2.0 X 2.0
51	51.120	2.0 X 2.0
52	51.260	2.0 X 2.0
53	51.875	2.0 X 2.0
54	52.141	2.0 X 2.0
55	52.790	2.0 X 3.0
56	52.876	4.0 X 5.0
57	52.969	3.0 X 4.0
58	53.049	2.0 X 2.0
59	53.992	2.0 X 2.0
60	54.935	2.0 X 2.0
61	55.274	2.0 X 2.0
62	55.551	2.0 X 2.0
63	55.974	2.0 X 2.0
64	56.440	2.0 X 2.0
65	56.603	2.0 X 2.0
66	56.640	2.0 X 2.0
67	57.148	2.0 X 2.0
68	57.307	2.0 X 2.0
69	57.515	2.0 X 2.0
70	57.679	2.0 X 2.0
71	57.950	2.0 X 2.0
72	58.693	2.0 X 2.0
73	58.780	2.0 X 2.0

Sl. No.	Design Chainage	Span /Opening (m)
74	60.290	2.0 X 2.0
75	60.797	2.0 X 2.0
76	61.072	2.0 X 2.0
77	62.225	2.0 X 2.0
78	63.650	2.0 X 2.0
79	64.660	2.0 X 2.0
80	65.150	2.0 X 2.0
81	66.700	2.0 X 2.0
82	67.206	2.0 X 2.0
83	67.444	2.0 X 2.0
84	67.643	2.0 X 2.0
85	67.715	2.0 X 2.0
86	67.925	2.0 X 2.0
87	68.018	2.0 X 2.0
88	68.090	2.0 X 2.0

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.

- (iii) Bridges

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

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

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)		
1	44.758	RCC Slab	1 x 7.5	1 x 8.0 m	Re-Construction

- (ii) The following narrow bridges shall widened:

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.	Location (km)	Total Length (m)	Remarks. If any
1	53.275	63 m	3 x 21m span

(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	53.275	63 m	3 x 21m

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	30
3	5th Kilometre stones	Nos	8
4	Boundary Stones	Nos	146
5	Delineators (100 cm long and circular shaped) +Hazard marker	Nos	3873
6	Road Stud	Nos	16750
7	900 mm Octagonal Road Sign	Nos	16
8	600 mm circular Road Sign	Nos	416
9	900 mm Triangular Road Sign	Nos	770
10	800 mm x 600 mm rectangular Road Sign	Nos	44
11	Direction Sign < 0.9 Sqm.	sqm	48
12	Painting for Traffic Marking	sqm	12297

- (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	To be decided by Authority's Engineer	Full Width, Area = 36 sqm

10. Compulsory Afforestation

Nil

11. Hazardous Locations

11.1 Metal Beam crash barrier of minimum length of **18500 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 both sides 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	2500
Breast wall of RRM in cement mortar, 3m high	Rm	1000
Retaining wall, 6m high	Rm	50
Retaining wall, 5m high	Rm	350
Retaining wall, 4m high	Rm	1600
Retaining wall, 3m high	Rm	2650
Retaining wall, 2m high	Rm	3000
Gabion Breast Wall	cum	32000
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 specifications & standards stipulated in schedule 'D' 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
1	32.800	52.400	-	-	-	-	1.5	-	-	-	-	5

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

Sl.No	Chainage		HT/LT Lines (km)			Transformer	
	From	To	33KV	11KV	LT	No	Capacity
1	32.800	52.400	-	5.18	1.4	-	-
2	52.400	72.030	-	2.8	0.595	-	-
	Total			7.98	1.995		

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

Sl. No.	Chainage		Diameter of Pipe	Gravity Main	Feeding Main	Distribution Main/Village supply water pipe line	Private House Water Connection*		Borehole & Installation of IM-II HPTW at Hillapui & Ngopa	T-Cluster	Public Hydrant	Public Standpost
	From	To	mm	km	km	km	km	No	No	Nos	Nos	Nos
1	37.590	38.480	32	0.028								
2	37.590	38.480	65	0.176								
3	37.620	39.600	40			0.576						
4	37.620	39.600	32			0.771						
5	Hillapui & Ngopa Village						1.083	42	2	15		
6	67.900	73.000	32	5.555								
7	67.500	71.750	32			0.396						
8	67.500	71.750	25			0.71						
9	Pawlarang Village										4	
10	Pawlarang Village											2
	Total			5.759	0	2.453	1.083	42	2	15	4	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.

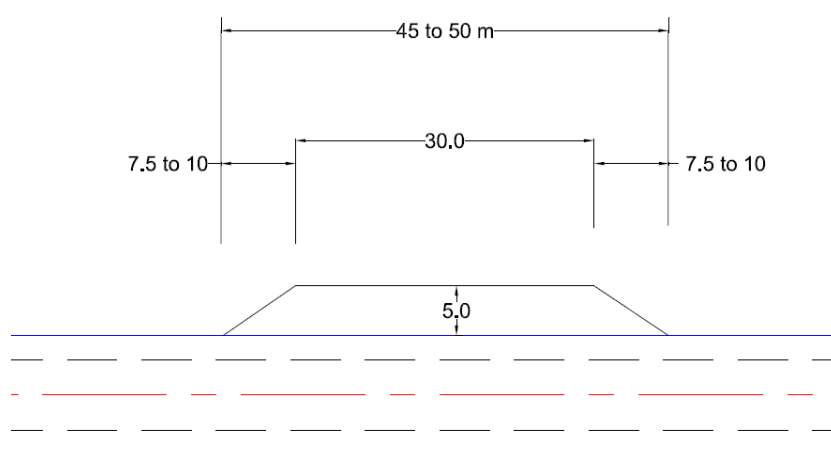
Sl. No.	Description	Location	Design Standard
1	Traffic sign & pavement marking	Entire Length (As per Schedule B)	As per Manual
2	200 m stone, km Stone, 5 th kilometre stone	Entire Length	As per Manual
3	Boundary Stone	Entire Length	As per Manual
4	Roadside Delineator, marker & Road Stud	As per Schedule 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	Location (km)	Other Essential Details
1	Passenger shelter	37.540 (Left)	As per Manual
2	Passenger shelter	38.350 (Right)	
3	Passenger shelter	67.800 (Left)	
4	Passenger shelter	67.850 (Right)	

(f) View Point :-

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

(g) 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 45°. 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.]

Item	Manual Clause Reference	Provision as per Manual		Modified Provision	
Design Speed	2.2	<u>Mountainous or Steep Terrain:</u>		<u>Mountainous or Steep Terrain:</u>	
		<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		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)	
Extra Widening	2.7	Extra Widening has been proposed as per IRC: SP: 73-2018		Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.	
		Radius (in m)	Extra Widening (in m)	Radius (in m)	Extra Widening (in m)
		75-100	0.9	21-40	1.5
		101-300	0.6	41-60	1.2
				61-100	0.9
				75-100	0.9
				101-300	0.6
				Above 300	NIL

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.	Stretch (from km to km)	Type of Deficiency	Remarks
1	31+562 To 31+572	Sharp Bend	Design Speed =30
2	31+761 To 31+770	Sharp Bend	Design Speed =30
3	31+823 To 31+892	Sharp Bend	Design Speed =30
4	31+945 To 31+982	Sharp Bend	Design Speed =30
5	32+089 To 32+116	Sharp Bend	Design Speed =30
6	32+157 To 32+168	Sharp Bend	Design Speed =30
7	32+644 To 32+684	Sharp Bend	Design Speed =30
8	32+733 To 32+784	Sharp Bend	Design Speed =30
9	32+837 To 32+870	Sharp Bend	Design Speed =30
10	32+909 To 32+950	Sharp Bend	Design Speed =30
11	33+019 To 33+029	Sharp Bend	Design Speed =30
12	33+589 To 33+600	Sharp Bend	Design Speed =30
13	33+661 To 33+684	Sharp Bend	Design Speed =30
14	35+451 To 35+466	Sharp Bend	Design Speed =30
15	35+522 To 35+525	Sharp Bend	Design Speed =30
16	35+716 To 35+770	Sharp Bend	Design Speed =30
17	35+859 To 35+894	Sharp Bend	Design Speed =20
18	36+020 To 36+045	Sharp Bend	Design Speed =20
19	36+087 To 36+101	Sharp Bend	Design Speed =30
20	36+504 To 36+551	Sharp Bend	Design Speed =30
21	36+604 To 36+613	Sharp Bend	Design Speed =30
22	36+662 To 36+698	Hairpin Bend	Design Speed =20
23	36+742 To 36+755	Sharp Bend	Design Speed =30
24	36+880 To 36+885	Sharp Bend	Design Speed =30
25	36+933 To 36+952	Sharp Bend	Design Speed =30
26	36+995 To 37+075	Sharp Bend	Design Speed =30
27	37+127 To 37+154	Sharp Bend	Design Speed =30
28	37+237 To 37+295	Sharp Bend	Design Speed =30
29	37+385 To 37+446	Sharp Bend	Design Speed =30
30	37+507 To 37+524	Sharp Bend	Design Speed =30
31	37+580 To 37+618	Sharp Bend	Design Speed =30
32	37+854 To 37+868	Sharp Bend	Design Speed =30
33	38+451 To 38+462	Sharp Bend	Design Speed =30
34	38+508 To 38+527	Sharp Bend	Design Speed =30

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
35	39+017 To 39+047	Sharp Bend	Design Speed =30
36	39+099 To 39+117	Sharp Bend	Design Speed =30
37	39+423 To 39+493	Sharp Bend	Design Speed =30
38	39+540 To 39+545	Sharp Bend	Design Speed =30
39	39+734 To 39+752	Sharp Bend	Design Speed =30
40	39+783 To 39+824	Sharp Bend	Design Speed =30
41	40+030 To 40+039	Sharp Bend	Design Speed =30
42	40+085 To 40+097	Sharp Bend	Design Speed =30
43	40+172 To 40+230	Sharp Bend	Design Speed =30
44	40+261 To 40+270	Sharp Bend	Design Speed =30
45	40+545 To 40+584	Sharp Bend	Design Speed =30
46	40+913 To 40+935	Sharp Bend	Design Speed =30
47	40+990 To 41+009	Sharp Bend	Design Speed =30
48	41+066 To 41+075	Sharp Bend	Design Speed =30
49	41+196 To 41+212	Sharp Bend	Design Speed =30
50	41+275 To 41+287	Sharp Bend	Design Speed =30
51	41+325 To 41+350	Sharp Bend	Design Speed =30
52	41+445 To 41+472	Sharp Bend	Design Speed =30
53	41+573 To 41+613	Sharp Bend	Design Speed =20
54	41+725 To 41+740	Sharp Bend	Design Speed =20
55	41+772 To 41+777	Sharp Bend	Design Speed =30
56	41+832 To 41+837	Sharp Bend	Design Speed =30
57	41+939 To 41+966	Sharp Bend	Design Speed =30
58	42+114 To 42+126	Sharp Bend	Design Speed =30
59	42+189 To 42+217	Sharp Bend	Design Speed =30
60	42+296 To 42+330	Sharp Bend	Design Speed =30
61	42+363 To 42+387	Sharp Bend	Design Speed =30
62	42+424 To 42+447	Sharp Bend	Design Speed =30
63	42+499 To 42+507	Sharp Bend	Design Speed =30
64	42+546 To 42+573	Sharp Bend	Design Speed =30
65	43+494 To 43+537	Sharp Bend	Design Speed =30
66	43+574 To 43+624	Sharp Bend	Design Speed =30
67	44+666 To 44+692	Sharp Bend	Design Speed =30
68	44+752 To 44+772	Sharp Bend	Design Speed =30
69	45+190 To 45+194	Sharp Bend	Design Speed =30
70	45+262 To 45+296	Sharp Bend	Design Speed =20
71	45+384 To 45+415	Sharp Bend	Design Speed =30
72	45+635 To 45+650	Sharp Bend	Design Speed =30
73	45+740 To 45+771	Sharp Bend	Design Speed =30
74	45+859 To 45+930	Sharp Bend	Design Speed =30
75	45+976 To 45+996	Sharp Bend	Design Speed =30
76	46+050 To 46+087	Sharp Bend	Design Speed =30

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
77	46+167 To 46+222	Sharp Bend	Design Speed =30
78	46+270 To 46+307	Sharp Bend	Design Speed =30
79	46+370 To 46+395	Sharp Bend	Design Speed =30
80	46+441 To 46+466	Sharp Bend	Design Speed =30
81	46+512 To 46+536	Sharp Bend	Design Speed =30
82	46+589 To 46+625	Sharp Bend	Design Speed =30
83	46+717 To 46+737	Sharp Bend	Design Speed =30
84	46+827 To 46+844	Sharp Bend	Design Speed =30
85	46+928 To 46+935	Sharp Bend	Design Speed =30
86	47+017 To 47+041	Sharp Bend	Design Speed =30
87	47+301 To 47+319	Sharp Bend	Design Speed =30
88	47+501 To 47+526	Sharp Bend	Design Speed =30
89	47+676 To 47+680	Sharp Bend	Design Speed =30
90	48+243 To 48+278	Sharp Bend	Design Speed =30
91	48+353 To 48+380	Sharp Bend	Design Speed =30
92	48+426 To 48+447	Sharp Bend	Design Speed =30
93	48+533 To 48+548	Sharp Bend	Design Speed =30
94	48+579 To 48+642	Sharp Bend	Design Speed =30
95	48+793 To 48+864	Sharp Bend	Design Speed =30
96	49+074 To 49+098	Sharp Bend	Design Speed =30
97	49+202 To 49+214	Sharp Bend	Design Speed =30
98	49+271 To 49+288	Sharp Bend	Design Speed =20
99	49+322 To 49+347	Sharp Bend	Design Speed =20
100	49+737 To 49+761	Sharp Bend	Design Speed =30
101	49+825 To 49+833	Sharp Bend	Design Speed =30
102	49+889 To 49+911	Sharp Bend	Design Speed =30
103	49+956 To 49+982	Sharp Bend	Design Speed =20
104	50+710 To 50+765	Sharp Bend	Design Speed =30
105	50+800 To 50+840	Sharp Bend	Design Speed =30
106	52+538 To 52+556	Sharp Bend	Design Speed =30
107	52+664 To 52+705	Sharp Bend	Design Speed =30
108	52+756 To 52+768	Sharp Bend	Design Speed =30
109	52+818 To 52+829	Sharp Bend	Design Speed =30
110	52+901 To 52+909	Sharp Bend	Design Speed =30
111	53+240 To 53+331	Sharp Bend	Design Speed =30
112	53+984 To 54+019	Sharp Bend	Design Speed =30
113	54+123 To 54+137	Sharp Bend	Design Speed =30
114	54+222 To 54+266	Hairpin Bend	Design Speed =20
115	54+316 To 54+331	Sharp Bend	Design Speed =30
116	54+966 To 54+978	Sharp Bend	Design Speed =30
117	55+012 To 55+021	Sharp Bend	Design Speed =30
118	55+090 To 55+148	Sharp Bend	Design Speed =30

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
119	55+319 To 55+327	Sharp Bend	Design Speed =30
120	55+361 To 55+391	Sharp Bend	Design Speed =30
121	55+465 To 55+483	Sharp Bend	Design Speed =30
122	55+513 To 55+521	Sharp Bend	Design Speed =30
123	55+556 To 55+583	Sharp Bend	Design Speed =30
124	55+624 To 55+646	Sharp Bend	Design Speed =30
125	55+854 To 55+858	Sharp Bend	Design Speed =30
126	55+905 To 55+915	Sharp Bend	Design Speed =30
127	56+310 To 56+349	Sharp Bend	Design Speed =20
128	56+395 To 56+406	Sharp Bend	Design Speed =30
129	56+440 To 56+445	Sharp Bend	Design Speed =30
130	56+481 To 56+510	Sharp Bend	Design Speed =30
131	58+683 To 58+691	Sharp Bend	Design Speed =30
132	58+729 To 58+741	Sharp Bend	Design Speed =30
133	58+779 To 58+792	Sharp Bend	Design Speed =30
134	58+844 To 58+863	Sharp Bend	Design Speed =30
135	58+906 To 58+928	Sharp Bend	Design Speed =20
136	58+969 To 58+983	Sharp Bend	Design Speed =30
137	59+030 To 59+037	Sharp Bend	Design Speed =30
138	59+642 To 59+678	Sharp Bend	Design Speed =20
139	59+796 To 59+824	Sharp Bend	Design Speed =30
140	59+874 To 59+883	Sharp Bend	Design Speed =30
141	59+934 To 59+962	Hairpin Bend	Design Speed =20
142	60+010 To 60+015	Sharp Bend	Design Speed =30
143	60+056 To 60+060	Sharp Bend	Design Speed =30
144	60+091 To 60+145	Sharp Bend	Design Speed =30
145	60+178 To 60+209	Sharp Bend	Design Speed =30
146	60+250 To 60+298	Hairpin Bend	Design Speed =20
147	61+114 To 61+124	Sharp Bend	Design Speed =30
148	61+173 To 61+191	Sharp Bend	Design Speed =30
149	61+282 To 61+288	Sharp Bend	Design Speed =30
150	61+361 To 61+431	Sharp Bend	Design Speed =30
151	62+037 To 62+065	Sharp Bend	Design Speed =30
152	62+139 To 62+175	Sharp Bend	Design Speed =20
153	62+228 To 62+246	Sharp Bend	Design Speed =30
154	62+988 To 63+011	Sharp Bend	Design Speed =20
155	63+043 To 63+065	Sharp Bend	Design Speed =20
156	63+119 To 63+142	Sharp Bend	Design Speed =20
157	63+455 To 63+467	Sharp Bend	Design Speed =30
158	63+515 To 63+542	Sharp Bend	Design Speed =20
159	63+587 To 63+616	Sharp Bend	Design Speed =30
160	63+661 To 63+670	Sharp Bend	Design Speed =20

Sl. No.	Stretch (from km to km)	Type of Deficiency	Remarks
161	63+706 To 63+735	Sharp Bend	Design Speed =20
162	63+807 To 63+841	Sharp Bend	Design Speed =20
163	63+881 To 63+954	Sharp Bend	Design Speed =30
164	64+074 To 64+113	Sharp Bend	Design Speed =20
165	64+176 To 64+187	Sharp Bend	Design Speed =30
166	64+229 To 64+250	Sharp Bend	Design Speed =30
167	64+412 To 64+483	Sharp Bend	Design Speed =30
168	64+748 To 64+770	Sharp Bend	Design Speed =20
169	64+873 To 64+960	Sharp Bend	Design Speed =30
170	65+065 To 65+090	Sharp Bend	Design Speed =30
171	65+264 To 65+287	Sharp Bend	Design Speed =30
172	65+338 To 65+350	Sharp Bend	Design Speed =30
173	65+437 To 65+458	Sharp Bend	Design Speed =30
174	65+491 To 65+512	Sharp Bend	Design Speed =30
175	65+572 To 65+581	Sharp Bend	Design Speed =30
176	65+691 To 65+704	Sharp Bend	Design Speed =30
177	65+765 To 65+786	Sharp Bend	Design Speed =30
178	65+842 To 65+887	Sharp Bend	Design Speed =20
179	65+929 To 65+964	Sharp Bend	Design Speed =30
180	66+015 To 66+054	Sharp Bend	Design Speed =20
181	66+167 To 66+193	Sharp Bend	Design Speed =30
182	66+431 To 66+446	Sharp Bend	Design Speed =30
183	66+482 To 66+520	Sharp Bend	Design Speed =20
184	66+884 To 66+917	Sharp Bend	Design Speed =30
185	66+963 To 66+982	Sharp Bend	Design Speed =30
186	67+057 To 67+138	Sharp Bend	Design Speed =30
187	67+171 To 67+199	Sharp Bend	Design Speed =20

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

Sl. No	Chainage (m)		Radius (m)
	from	to	
1	31561.733	31572.342	60
2	31631.147	31688.742	60
3	31760.608	31769.629	60
4	31823.059	31892.029	35
5	31944.932	31981.751	30
6	32089.196	32116.100	30
7	32156.749	32167.695	50
8	32260.635	32275.982	70
9	32644.136	32683.875	30

[Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode

June 2021

Sl. No	Chainage (m)		Radius (m)
	from	to	
10	32732.601	32783.818	40
11	32837.325	32869.990	30
12	32909.274	32949.697	60
13	33019.090	33029.408	30
14	33384.547	33399.721	50
15	33496.545	33524.802	60
16	33588.787	33600.165	40
17	33660.956	33684.013	30
18	35320.030	35329.736	60
19	35451.234	35465.742	40
20	35522.346	35525.091	30
21	35716.253	35770.422	30
22	35858.861	35894.298	20
23	36020.460	36044.733	20
24	36086.826	36100.800	60
25	36285.999	36321.410	70
26	36419.646	36448.408	60
27	36504.104	36550.736	30
28	36662.483	36697.752	20
29	36741.853	36755.447	30
30	36880.077	36884.899	60
31	36933.183	36951.675	45
32	36995.342	37075.395	45
33	37126.597	37153.813	50
34	37237.130	37294.696	30
35	37384.881	37446.140	35
36	37507.050	37524.064	50
37	37579.650	37617.830	50
38	37853.532	37867.861	30
39	37945.504	37962.796	60
40	38132.576	38145.149	70
41	38451.270	38461.724	40
42	38508.316	38527.004	60
43	39016.932	39047.490	50
44	39098.782	39116.755	50
45	39423.107	39493.271	60
46	39539.693	39545.092	30
47	39733.976	39752.254	60
48	39782.581	39824.151	30
49	40029.796	40038.682	50
50	40084.564	40097.090	60
51	40171.781	40229.555	60
52	40260.760	40269.831	60
53	40545.452	40584.430	30
54	40912.687	40934.520	45
55	40990.085	41008.777	30

Sl. No	Chainage (m)		Radius (m)
	from	to	
56	41066.151	41074.741	45
57	41195.999	41211.789	40
58	41275.071	41287.372	40
59	41325.321	41350.373	40
60	41444.728	41472.211	40
61	41573.186	41613.448	20
62	41725.062	41739.854	20
63	41771.853	41776.752	40
64	41832.088	41837.036	40
65	41938.888	41966.226	60
66	42114.064	42126.110	60
67	42189.170	42217.119	50
68	42296.419	42330.310	30
69	42363.164	42387.085	40
70	42424.407	42446.819	30
71	42498.722	42507.232	60
72	42545.551	42572.701	30
73	42651.365	42669.916	60
74	43065.947	43080.149	60
75	43356.470	43373.969	60
76	43493.994	43537.152	60
77	43573.835	43623.956	30
78	44305.292	44337.825	50
79	44665.626	44691.947	50
80	44751.729	44771.666	30
81	45073.415	45100.233	50
82	45190.421	45194.493	30
83	45262.020	45296.367	20
84	45384.309	45415.446	30
85	45634.886	45649.930	40
86	45739.841	45771.358	30
87	45858.891	45930.367	60
88	45975.928	45996.065	30
89	46049.823	46086.807	50
90	46167.029	46222.206	40
91	46269.526	46307.481	30
92	46369.552	46394.988	40
93	46441.306	46465.923	60
94	46512.284	46535.765	35
95	46589.418	46624.681	40
96	46716.766	46736.705	40
97	46826.751	46844.303	40
98	46927.766	46935.365	40
99	47017.471	47041.291	30
100	47301.290	47318.504	30
101	47501.183	47526.068	30

Sl. No	Chainage (m)		Radius (m)
	from	to	
102	47675.929	47680.221	50
103	47737.680	47770.802	60
104	47951.459	47960.359	60
105	48136.800	48162.831	60
106	48242.664	48278.348	30
107	48352.922	48379.569	50
108	48426.334	48447.211	35
109	48532.715	48548.131	30
110	48579.240	48641.683	30
111	48793.383	48863.587	40
112	49074.108	49098.467	40
113	49202.234	49213.754	40
114	49270.705	49287.982	20
115	49322.123	49347.180	20
116	49487.957	49501.302	50
117	49609.470	49617.811	50
118	49737.406	49760.532	40
119	49825.426	49833.373	70
120	49888.718	49910.583	35
121	49956.014	49982.204	20
122	50710.286	50764.629	40
123	50800.472	50839.577	40
124	52537.532	52556.486	50
125	52664.173	52704.910	30
126	52756.055	52768.283	60
127	52817.667	52829.305	60
128	52900.681	52909.472	50
129	53240.130	53331.378	50
130	53983.798	54018.609	60
131	54123.037	54136.932	40
132	54221.802	54265.642	20
133	54316.056	54331.028	50
134	54654.374	54663.182	70
135	54872.946	54879.838	60
136	54965.651	54978.403	60
137	55012.249	55021.252	60
138	55089.678	55147.590	42
139	55319.255	55327.075	50
140	55361.124	55390.706	30
141	55464.675	55482.805	40
142	55512.888	55521.377	50
143	55556.192	55582.990	40
144	55624.268	55645.882	40
145	55853.669	55857.794	50
146	55904.655	55914.843	50
147	56309.599	56348.593	20

Sl. No	Chainage (m)		Radius (m)
	from	to	
148	56394.658	56406.344	50
149	56440.120	56445.477	50
150	56481.110	56509.640	50
151	57814.825	57819.306	55
152	58242.349	58255.062	70
153	58682.771	58691.229	50
154	58729.440	58741.188	30
155	58778.705	58791.794	50
156	58844.491	58863.109	35
157	58905.607	58928.020	20
158	58968.875	58982.527	35
159	59029.911	59037.277	50
160	59641.862	59678.232	20
161	59795.725	59824.179	35
162	59873.772	59883.165	50
163	59933.658	59961.665	20
164	60010.010	60014.817	50
165	60056.098	60059.566	40
166	60091.495	60144.755	30
167	60177.922	60209.172	30
168	60250.226	60298.067	30
169	60905.063	60908.074	50
170	61113.685	61123.938	30
171	61173.197	61191.021	30
172	61281.840	61288.264	30
173	61360.766	61430.534	35
174	62036.590	62065.322	50
175	62139.321	62174.826	20
176	62228.445	62245.794	60
177	62605.384	62631.036	50
178	62795.972	62820.747	60
179	62987.971	63011.132	20
180	63042.646	63065.111	20
181	63119.056	63142.380	20
182	63455.025	63467.491	60
183	63514.602	63541.832	25
184	63586.921	63615.891	35
185	63661.452	63669.921	20
186	63706.086	63735.161	20
187	63807.149	63841.265	20
188	63881.495	63954.021	35
189	64073.710	64112.700	20
190	64176.177	64186.826	50
191	64228.748	64250.394	50
192	64412.020	64482.748	30
193	64747.921	64770.341	20

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Sl. No	Chainage (m)		Radius (m)
	from	to	
194	64872.944	64960.120	45
195	65065.216	65089.893	35
196	65263.874	65287.129	40
197	65338.164	65350.481	50
198	65436.812	65457.949	40
199	65491.373	65511.590	60
200	65571.808	65580.684	30
201	65691.342	65704.129	30
202	65764.596	65786.068	40
203	65842.176	65886.902	20
204	65929.119	65964.431	50
205	66014.933	66054.007	30
206	66166.634	66192.779	35
207	66431.168	66446.455	35
208	66481.894	66519.940	20
209	66883.644	66916.650	45
210	66963.198	66982.259	30
211	67056.762	67138.058	35.75
212	67170.827	67199.357	20

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.

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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.tfhr.com/pavement/ltp/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	Class I Profilometer : ASTM E950 (98) :2004 -Standard Test Method for measuring	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually	SCRIM		180 days	BS: 7941-1: 2006

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

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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 > 1m. 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 > 1 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	

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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	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	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	
			0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernible 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	Multiple Cracks intersecting with one or more joints	w = width of crack	4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		
			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
5	Corner Break	w = width of crack L = length of crack	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		
			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		

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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
		4	$w > 1.5$ mm; $L > 0.6$ m or three corners broken	Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days		
		5	three or four corners broken			
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m ²)	0	Nil, not discernible		No Action
			1	$w < 0.5$ mm; $L < 3$ m/m ²	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/m ²		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			3	$w > 1.5$ mm and $L < 3$ m/m ²		
			4	$w > 3$ mm, $L < 3$ m/m ² and deformation		
			5	$w > 3$ mm, $L > 3$ m/m ² 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	Long Term
					No action.	Not Applicable
			1	$r < 2$ %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	$r = 2 - 10$ %	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			3	$r = 10-25$ %		
			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	Long Term
					No action.	Not Applicable
			1	$r < 2$ %	Local repair of areas	

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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	Bonded Inlay within 15 days
			3	$r = 10 - 20\%$	Reconstruct slab within 30 days	
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25 \text{ mm}$		
			9	Polished Surface/Glazing	t = texture depth, sand patch test	0
1	$t > 1 \text{ mm}$	Monitor rate of deterioration				
2 '	$t = 1 - 0.6 \text{ mm}$					
3	$t = 0.6 - 0.3 \text{ mm}$					
4	$t = 0.3 - 0.1 \text{ mm}$					
5	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days				
10	Popout (Small Hole), Pothole Refer Para 8.4	$n = \text{number/m}^2$ $d = \text{diameter}$ $h = \text{maximum depth}$	0	$d < 50 \text{ mm}; h < 25 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	No action.	Not Applicable
			1	$d = 50 - 100 \text{ mm}; h < 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 65 mm deep. Within 15 days	
			2	$d = 50 - 100 \text{ mm}; h > 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days	
			3	$d = 100 - 300 \text{ mm}; h < 100 \text{ mm } n < 1 \text{ per } 5 \text{ m}^2$		
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$		
			5	$d > 300 \text{ mm}; h > 100 \text{ mm}; n > 1 \text{ per } 5 \text{ m}^2$	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

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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, $L < 25\%$	Partial Depth Repair. Within 15 days	
			3	$w = 20 - 40$ mm, $L > 25\%$	30 - 50 mm deep, $h = w + 20\%$ of w , within 30 days	
			4	$w = 40 - 80$ mm, $L > 25\%$	50 - 100 mm deep repair. $H = w + 20\%$ of w . Within 30 days	
			5	$w > 80$ mm, and $L > 25\%$		
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	

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

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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	$h = 4 - 7 \text{ mm}$	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15 \text{ mm}$	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, not discernible < 3mm	Short Term No action.	Long Term
			1	$f = 3 - 10 \text{ mm}$	Spot repair of shoulder within 7 days	
			2	$f = 10 - 25 \text{ mm}$		
			3	$f = 25 - 50 \text{ mm}$		
			4	$f = 50 - 75 \text{ mm}$		
			5	$f > 75 \text{ mm}$	Fill up shoulder within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	Inspect and repair sub-drainage at distressed sections and upstream.
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	Ponding	Ponding on slabs	0-2	No discernible problem	No action.	

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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
			5	Ponding, accumulation of water observed	-do-	30 days.

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

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

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Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Night Time Visibility	<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>			Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m²/lux)						
			Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years					
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u> Initial 7 days Retro reflectivity: 100 mcd/m²/lux Minimum Threshold Level: 50 mcd/m²/lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015

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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	IRC: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	IRC 86:1983
	Kerb Painting	<u>Functionality</u> : Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 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	<u>Functionality</u> : Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014

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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	<u>Functionality:</u> Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of Traffic Safety Barriers	<u>Functionality:</u> Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	Attenuators	<u>Functionality:</u> Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:2014, IRC:119-2015
	Guard Posts and Delineators	<u>Functionality:</u> Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
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

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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	

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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	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate length					

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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 ROB's 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					

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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

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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.

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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.

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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	within 15 (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



[Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode]

June 2021

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

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:



[Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode

June 2021

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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



Schedule - H

(See Clauses 10.1 (iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in % of CP	Stage for Payment	Percentage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	65.00	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	32.00
		(2) Sub-base Course	10.00
		(3) Non bituminous Base course	10.00
		(4) Bituminous Base Course	10.00
		(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)	23.00
Minor bridge	0.20	A.1-widening and repairing of Minor Bridges (length >6 m & <60m)	
		Minor Bridges	[Nil]
		A.2- New Minor bridges (length >6 m and <60m)	
		(1) Foundation + Sub-Structure	85.00
		(2) Super-structure (including bearings)	13.50
		(3) Approaches	1.50
		(4) Guide Bunds and River Training Works	[Nil]
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-New Underpasses/Overpasses	[Nil]
Major bridge	3.80	A.1- Widening and repairs of Major Bridges	
		A.2-New Major Bridges	
		(1) Foundation	41.00



Item	Weightage in % of CP	Stage for Payment	Percentage
		(2)Sub-structure	33.00
		(3)Super-structure (including bearings)	21.00
		(4)Wearing Coat including expansion joints	1.50
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	1.00
		(6) Wing walls/return walls	[Nil]
		(7)Guide Bunds, River Training works etc.	[Nil]
		(8)Approaches (including Retaining walls, stone pitching and protection works)	2.50
		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	30.00	(i) Toll Plaza	[Nil]
		(ii) Road side drains	18.50
		(iii) Road signs, markings, km stones, etc	5.00
		(iv) Project facilities	
		(a) Lay-byes	2.00
		(b) Passenger Shelter	1.00
		(v) Road side Plantation	[Nil]
		(vi) Repair of Protection Works other than approaches to the bridges, elevated sections/ flyover/grade separators and ROB/ RUBs	[Nil]
		(vii) Safety &Traffic Management during const.	[Nil]
		(viii) Breast Wall	9.00
		(ix) Toe Wall	[Nil]
		(x) Retaining Wall	30.00
		(xi) Crash Barrier	10.00
		(xii) Gabion wall	10.00
		(xiii) Hydro Seeding	5.00
		(xiv) Seeding and Mulching with Jute Net	3.00
		(xv) Seeding and Mulching with Coir Net	3.00
		(xvi) Balance Slope Protection work	3.00
		(xv) Junction Improvement	0.50
Electrical Utilities and Public Heath Utilities (Water pipe lines and sewage lines)	1.00	(i) Estimate for Shifting and Re-Alignment of LT Lines.	10.00
		(ii) Estimate for Shifting and Re-Alignment of 11KV Lines	28.00
		(iii) Estimate for shifting and Re-Alignment 132kV lines	36.00
		(iv) Installation of Gravity Main	13.00



Item	Weightage in % of CP	Stage for Payment	Percentage
		(v) Distribution System	6.00
		(vi) Providing Public Hydrant	2.00
		(vii) Providing Public Standpost	0.50
		(viii) Installation of Private House Connections damaged by widening	2.00
		(ix) Drilling of Borehole (HPTW)	2.00
		(x) Installation of T/Cluster	0.50

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/New 2-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	15.00	
(3) Non bituminous Base course	9.00	
(4) Bituminous Base course	10.00	
(5) Wearing Coat	14.50	
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)	21.50	

@ 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:

$$\text{Cost per km} = P \times \text{weightage for road work} \times \text{weightage for bituminous work} \times (1/L)$$

Where,

P = Contract Price



L = Total length in km

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses:

Procedure for estimating the value of Minor bridge and

Underpasses/Overpasses shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	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 + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	85.00	Foundation + Sub-Structure: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation + Sub-Structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation + Sub-Structure of each bridge subject to completion of atleast two foundations along with sub-structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2)Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in all respect.	13.50	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(3)Approaches : On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	1.50	Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
(4) Guide Bunds and River Training Works: On completion of	[Nil]	



Stage of Payment	Weightage	Payment Procedure
Guide Bunds and river training works complete in all respects		
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	41.00	Foundation: Cost of each Major Bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of 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	33.00	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)	21.00	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.	1.00	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 Retaining walls, stone pitching and protection works)	2.50	Approaches: Payments shall be made on both approaches including stone pitching, protection works, etc. complete in all respects as specified.



Stage of Payment	Weightage	Payment Procedure
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	18.50	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 ROB/ 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 percent) of the total length.
(a) Breast Wall	9.00	



Stage of Payment	Weightage	Payment Procedure
(b) Toe Wall	[Nil]	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).
(c) Retaining Wall	30.00	
(c) Crash Barrier	10.00	
(d) Gabion Wall	10.00	
(e) Hydro-seeding	5.00	
(f) Seeding and Mulching with Jute Net	3.00	
(g) Seeding and Mulching with Coir Net	3.00	
(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.	10.00	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	28.00	
(iii) Estimate for shifting and Re-Alignment 132kV lines	36.00	
(iv) Installation of Gravity Main	13.00	
(v) Distribution System	6.00	
(vi) Providing Public Hydrant	2.00	
(vii) Providing Public Standpost	0.50	
(viii) Installation of Private House Connections damaged by widening	2.00	
(ix) Drilling of Borehole (HPTW)	2.00	
(x) Installation of T/Cluster	0.50	

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 of20....., 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/5 th 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:

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

Where,

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

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

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

L1 = Non-complying length L = Total length of the road,

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

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

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



Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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



Annex -I (Schedule - N)

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)



[Up-gradation to 2 lane with paved shoulders of Tuivai - Keifang road, NH-102B of Aizawl - Imphal Economic Corridor from Existing Chainage Km 32.796 (Ngopa Village) to Km 72.030 (near Pawlarang Village) [Design Chainage Km 31.280 to Km 68.170] (Package-II) in the State of Mizoram under Bharatmala Pariyojna on EPC mode]

June 2021

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

