

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

Schedules

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

- 1. The Site**
- 1.1 Site of the Two-Lane Project Highway shall include the road works as described in Annex-I of this Schedule-A.
- 1.2 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.

Annex - I
(Schedule-A)

Site

1. The Site

The Site of the Two-Lane Project Highway comprises the section of National Highway -39 (New NH-2) from Mao (Nagaland /Manipur Border) (Ex Km 212+328 of NH-39) to Senapati (Ex km 264+313) in the state of Manipur. The land, carriageway and structures comprising the Site are described below:

2. Land

The Site of the Project Highway comprises the land (existing right of way (ROW)) as described below:

Details of ROW (Chainage wise) as per site :

S. No	Existing Chainage (Km)		Length	Existing ROW (m)	Remarks
1	212+328	212+970	642.00	11.00	TCS-1
2	212+970	213+590	620.00	11.00	TCS-5
3	213+590	213+650	60.00	14.60	TCS-6
4	213+650	216+000	2350.00	11.00	TCS-1
5	216+000	217+000	1000.00	10.20	TCS-3
6	217+000	217+700	700.00	11.00	TCS-1
7	217+700	217+800	100.00	14.60	TCS-6
8	217+800	218+140	340.00	11.00	TCS-1
9	218+140	218+200	60.00	14.60	TCS-6
10	218+200	218+640	440.00	11.00	TCS-1
11	218+640	218+740	100.00	14.60	TCS-6
12	218+740	219+300	560.00	11.00	TCS-1
13	219+300	219+350	50.00	14.60	TCS-6
14	219+350	219+650	300.00	11.00	TCS-1
15	219+650	219+950	300.00	11.00	TCS-5
16	219+950	220+620	670.00	11.00	TCS-1
17	220+620	220+690	70.00	14.60	TCS-6
18	220+690	222+000	1310.00	11.00	TCS-1
19	222+000	222+100	100.00	14.60	TCS-7
20	222+100	222+175	75.00	11.00	TCS-1
21	222+175	222+275	100.00	14.60	TCS-8
22	222+275	222+280	5.00	11.00	TCS-1
23	222+280	222+370	90.00	14.60	TCS-8
24	222+370	222+960	590.00	11.00	TCS-1
25	222+960	223+120	160.00	14.60	TCS-7
26	223+120	224+000	880.00	11.00	TCS-1

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27	224+000	224+300	300.00	10.20	TCS-3
28	224+300	224+410	110.00	14.60	TCS-7
29	224+410	224+520	110.00	10.20	TCS-3
30	224+520	224+610	90.00	14.60	TCS-6
31	224+610	225+660	1050.00	10.20	TCS-3
32	225+660	225+750	90.00	14.60	TCS-6
33	225+750	226+493	743.00	10.20	TCS-3
34	226+493	226+507	14.00	Bridge	
35	226+507	226+800	293.00	10.20	TCS-3
36	226+800	226+895	95.00	14.60	TCS-6
37	226+895	227+200	305.00	10.20	TCS-3
38	227+200	227+280	80.00	14.60	TCS-6
39	227+280	227+300	20.00	10.20	TCS-3
40	227+300	227+550	250.00	14.60	TCS-7
41	227+550	227+790	240.00	10.20	TCS-3
42	227+790	227+860	70.00	14.60	TCS-6
43	227+860	227+960	100.00	10.20	TCS-3
44	227+960	228+080	120.00	14.60	TCS-6
45	228+080	228+430	350.00	11.00	TCS-1
46	228+430	228+480	50.00	14.60	TCS-6
47	228+480	228+790	310.00	11.00	TCS-1
48	228+790	228+860	70.00	14.60	TCS-6
49	228+860	228+890	30.00	11.00	TCS-1
50	228+890	228+980	90.00	14.60	TCS-6
51	228+980	229+140	160.00	11.00	TCS-1
52	229+140	229+260	120.00	14.60	TCS-7
53	229+260	230+000	740.00	11.00	TCS-1
54	230+000	230+550	550.00	10.20	TCS-3
55	230+550	230+700	150.00	14.60	TCS-7
56	230+700	231+340	640.00	10.20	TCS-3
57	231+340	231+440	100.00	14.60	TCS-6
58	231+440	232+000	560.00	10.20	TCS-3
59	232+000	232+625	625.00	11.00	TCS-1
60	232+625	232+665	40.00	Bridge	
61	232+665	233+600	935.00	11.00	TCS-1
62	233+600	233+880	280.00	14.60	TCS-6
63	233+880	233+940	60.00	11.00	TCS-1
64	233+940	234+050	110.00	14.60	TCS-6
65	234+050	234+210	160.00	11.00	TCS-1
66	234+210	234+260	50.00	14.60	TCS-6
67	234+260	234+300	40.00	11.00	TCS-1
68	234+300	234+330	30.00	14.60	TCS-8
69	234+330	234+950	620.00	11.00	TCS-1
70	234+950	234+990	40.00	14.60	TCS-6
71	234+990	235+150	160.00	11.00	TCS-1
72	235+150	235+230	80.00	14.60	TCS-6
73	235+230	235+580	350.00	11.00	TCS-5
74	235+580	235+610	30.00	11.00	TCS-2

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75	235+610	235+740	130.00	14.60	TCS-6
76	235+740	235+780	40.00	11.00	TCS-1
77	235+780	235+820	40.00	14.60	TCS-6
78	235+820	236+000	180.00	14.60	TCS-6
79	236+000	236+500	500.00	11.00	TCS-1
80	236+500	236+550	50.00	14.60	TCS-6
81	236+550	236+800	250.00	11.00	TCS-1
82	236+800	237+400	600.00	11.00	TCS-5
83	237+400	237+470	70.00	14.60	TCS-6
84	237+470	238+500	1030.00	11.00	TCS-1
85	238+500	238+540	40.00	14.60	TCS-6
86	238+540	241+900	3360.00	11.00	TCS-1
87	241+900	242+050	150.00	11.00	TCS-5
88	242+050	243+620	1570.00	11.00	TCS-1
89	243+620	243+660	40.00	14.60	TCS-6
90	243+660	245+800	2140.00	11.00	TCS-1
91	245+800	246+050	250.00	14.60	TCS-7
92	246+050	250+360	4310.00	11.00	TCS-1
93	250+360	250+510	150.00	14.60	TCS-6
94	250+510	251+170	660.00	11.00	TCS-1
95	251+170	251+220	50.00	14.60	TCS-6
96	251+220	252+550	1330.00	11.00	TCS-1
97	252+550	252+780	230.00	14.60	TCS-6
98	252+780	254+644	1864.00	11.00	TCS-1
99	254+644	254+754	110.00	Bridge	
100	254+754	255+150	396.00	11.00	TCS-1
101	255+150	255+230	80.00	11.00	TCS-5
102	255+230	256+000	770.00	11.00	TCS-1
103	256+000	257+900	1900.00	10.20	TCS-3
104	257+900	258+150	250.00	14.60	TCS-6
105	258+150	259+123	973.00	11.00	TCS-1
106	259+123	259+171	48.00	Bridge	
107	259+171	259+400	229.00	11.00	TCS-1
108	259+400	259+800	400.00	9.00	TCS-4
109	259+800	263+854	4054.00	11.00	TCS-1
110	263+854	263+868	13.50	Bridge	
111	263+868	264+313	445.00	11.00	TCS-1

3. Carriageway

The present carriageway of the Project Highway is Two-Lane from existing Chainage km 212+328 to km 264+313. The type of the existing pavement is flexible, and the road width details are as below:

S.No.	Chainage		Length (m)	(Hill side paved shoulder + Carriage way + Valley side paved shoulder)	Type	Width (m)
	From	To				
1	212+325	213+000	675.00	0.50+7.0+1.50	BT	9.00

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2	213+000	213+600	600.00	1.0+7.0+1.0	BT	9.00
3	213+600	216+000	2400.00	0.50+7.0+1.50	BT	9.00
4	216+000	217+000	1000.00	0.60+7.0+0.60	BT	8.20
5	217+000	219+650	2650.00	0.50+7.0+1.50	BT	9.00
6	219+650	219+850	200.00	1.0+7.0+1.0	BT	9.00
7	219+850	224+000	4150.00	0.50+7.0+1.50	BT	9.00
8	224+000	228+000	4000.00	0.60+7.0+0.60	BT	8.20
9	228+000	230+000	2000.00	0.50+7.0+1.50	BT	9.00
10	230+000	232+000	2000.00	0.60+7.0+0.60	BT	8.20
11	232+000	235+400	3400.00	0.50+7.0+1.50	BT	9.00
12	235+400	235+700	300.00	1.0+7.0+1.0	BT	9.00
13	235+700	241+900	6200.00	0.50+7.0+1.50	BT	9.00
14	241+900	242+050	150.00	1.0+7.0+1.0	BT	9.00
15	242+050	255+150	13100.00	0.50+7.0+1.50	BT	9.00
16	255+150	255+230	80.00	1.0+7.0+1.0	BT	9.00
17	255+230	256+000	770.00	0.50+7.0+1.50	BT	9.00
18	256+000	258+000	2000.00	0.60+7.0+0.60	BT	8.20
19	258+000	259+400	1400.00	0.50+7.0+1.50	BT	9.00
20	259+400	259+800	400.00	0.0+7.0+0.0	BT	7.00
21	259+800	264+313	4513.00	0.50+7.0+1.50	BT	9.00

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Ex. Chainage (km)	Type of Structure			Ex. Span arrangement (No. x Span)	Width (m)
		Foundation	Substructure	Superstructure		
1	254+699	Well	RCC	PSC	3 x 36.65	7.5

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

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

S.No.	Existing Chainage (KM)	Type of Structure		No. of Spans with span length(m)	Width (m)	ROB /RUB	Remarks
		Foundation	Super-structure				
NIL							

6. Grade separators

The Site includes the following grade separators:

S.No.	Existing Chainage (KM)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Super structure		
NIL					

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7. Minor bridges

The Site includes the following minor bridges:

S. No.	Ex. Chainage (Km)	Ex. Span arrangement (No. x Span)	Width (m)	Type of Structure		
				Foundation	Substructure	Superstructure
1	226+500	1 x 14.0	7.50	Open	RCC	T-Beam
2	232+645	1 x 40.00	7.50	Open	RCC	PSC Box
3	259+147	1x48.00	10.50	Well	RCC	PSC I Beam With RCC Deck
4	263+861	1x13.50	11	Open	RCC wall type	RCC T-Beam

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location/ Existing Chainage (KM)	Remarks
NIL		

9. Underpasses (Vehicular, Non-Vehicular)

The Site includes the following underpasses:

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

10. Culverts

10.1 Pipe Culverts:

The Site has the following existing pipe culverts:

Sl. No.	Structure No.	Type of Culverts
1	212/C-1	0.60 m stone slab
2	212/C-2	1.00 m span RCC slab
3	212/C-3	0.60 m stone slab
4	212/C-4	0.60 m stone slab
5	212/C-5	1.00 m span RCC slab
6	212/C-6	6.00 m span RCC slab
7	213/C-1	0.90 m span RCC slab
8	213/C-2	0.90 m span RCC slab
9	213/C-3	1.00 m span RCC slab
10	213/C-4	1.00 m span RCC slab
11	213/C-5	0.60 m stone slab

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Sl. No.	Structure No.	Type of Culverts
12	213/C-6	1.50 m span RCC slab
13	213/C-7	1.00 m span RCC slab
14	213/C-8	1.50 m span RCC slab
15	213/C-9	0.60 m stone slab
16	214/C-1	0.90 m span RCC slab
17	214/C-2	1.00 m span RCC slab
18	214/C-3	0.90 m span RCC slab
19	214/C-4	0.90 m span RCC slab
20	214/C-5	2.00 m span RCC slab
21	214/C-6	0.90 m span RCC slab
22	214/C-7	1.00 m span RCC slab
23	214/C-8	1.00 m span RCC slab
24	214/C-9	1.00 m span RCC slab
25	214/C-10	0.90 m span RCC slab
26	215/C-1	0.90 m span RCC slab
27	215/C-2	1.50 m span RCC slab
28	215/C-3	0.60 m stone slab
29	215/C-4	0.90 m span RCC slab
30	215/C-5	0.60 m stone slab
31	215/C-6	1.00 m span RCC slab
32	215/C-7	1.00 m span RCC slab
33	215/C-8	0.60 m stone slab
34	215/C-9	0.60 m stone slab
35	215/C-10	0.90 m span RCC slab
36	215/C-11	0.90 m span RCC slab
37	215/C-12	0.90 m span RCC slab
38	215/C-13	0.60 m stone slab
39	216/C-1	0.90 m span RCC slab
40	216/C-2	1.50 m span RCC slab
41	216/C-3	0.60 m stone slab
42	216/C-4	0.60 m stone slab
43	216/C-5	0.90 m span RCC slab
44	216/C-6	1.00 m span RCC pipi (double)
45	216/C-7	0.60 m stone slab
46	216/C-8	1.00 m span RCC pipe (double)
47	216/C-9	2.00 m span RCC slab
48	216/C-10	1.50 m span RCC slab
49	216/C-11	0.90 m span RCC slab
50	216/C-12	0.90 m span RCC slab
51	216/C-13	1.00 m span RCC slab
52	216/C-14	1.00 m span RCC pipe (double)
53	216/C-15	0.90 m span RCC pipe (single)
54	216/C-16	1.50 m span RCC slab
55	216/C-17	0.90 m span RCC pipe (single)
56	217/C-1	1.00 m span RCC pipe (double)
57	217/C-2	0.90 m span RCC pipe (single)
58	217/C-3	0.90 m span RCC slab
59	217/C-4	1.50 m span RCC slab
60	217/C-5	0.90 m span RCC pipe (double)
61	217/C-6	1.50 m span RCC slab
62	217/C-7	1.50 m span RCC slab

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Sl. No.	Structure No.	Type of Culverts
63	217/C-8	2.00 m span RCC slab
64	217/C-9	1.00 m span RCC pipe (double)
65	217/C-10	1.00 m span RCC slab
66	217/C-11	1.00 m span RCC slab
67	217/C-12	1.50 m span RCC slab
68	217/C-13	0.90 m span RCC pipe (single)
69	217/C-14	1.00 m span RCC slab
70	218/C-1	0.90 m span RCC slab
71	218/C-2	0.90 m span RCC slab
72	218/C-3	1.00 m span RCC pipe (double)
73	218/C-4	1.00 m span RCC pipe (double)
74	218/C-5	1.50 m span RCC slab
75	218/C-6	1.50 m span RCC slab
76	218/C-7	1.00 m span RCC pipe (double)
77	218/C-8	1.00 m span RCC pipe (double)
78	218/C-9	1.00 m span RCC pipe (double)
79	218/C-10	1.50 m span RCC slab
80	218/C-11	0.60 m stone slab
81	219/C-1	1.00 m span RCC pipe (double)
82	219/C-2	0.90 m span RCC slab
83	219/C-3	0.90 m span RCC slab
84	219/C-4	0.60 m stone slab
85	219/C-5	0.60 m stone slab
86	219/C-6	0.90 m span RCC slab
87	219/C-7	1.00 m span RCC pipe (double)
88	220/C-1	0.90 m span RCC slab
89	220/C-2	0.60 m stone slab
90	220/C-3	0.60 m stone slab
91	220/C-4	0.60 m stone slab
92	220/C-5	0.90 m span RCC slab
93	220/C-6	0.60 m stone slab
94	220/C-7	0.90 m span RCC slab
95	220/C-8	0.90 m span RCC slab
96	220/C-9	1.00 m span RCC pipe (double)
97	220/C-10	0.90 m span RCC slab
98	220/C-11	0.90 m span RCC slab
99	221/C-1	1.00 m span RCC pipe (double)
100	221/C-2	2.00 m span RCC slab
101	221/C-3	0.60 m stone slab
102	221/C-4	1.00 m span RCC pipe (double)
103	221/C-5	1.00 m span RCC slab
104	221/C-6	1.00 m span RCC slab
105	221/C-7	1.00 m span RCC pipe (double)
106	221/C-8	0.90 m span RCC slab
107	221/C-9	1.00 m span RCC pipe (double)
108	222/C-1	1.00 m span RCC slab
109	222/C-2	0.90 m span RCC slab
110	222/C-3	1.00 m span RCC slab
111	222/C-4	1.00 m span RCC pipe (double)
112	222/C-5	0.90 m span RCC slab
113	222/C-6	0.90 m span RCC slab

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Sl. No.	Structure No.	Type of Culverts
114	222/C-7	0.90 m span RCC slab
115	222/C-8	1.00 m span RCC pipe (double)
116	222/C-9	1.00 m span RCC slab
117	222/C-10	1.00 m span RCC slab
118	222/C-11	1.00 m span RCC slab
119	223/C-1	0.90 m span RCC slab
120	223/C-2	0.90 m span RCC slab
121	223/C-3	1.00 m span RCC pipe (double)
122	223/C-4	1.00 m span RCC pipe (double)
123	223/C-5	0.90 m span RCC slab
124	223/C-6	0.90 m span RCC slab
125	223/C-7	1.00 m span RCC pipe (double)
126	223/C-8	0.90 m span RCC slab
127	223/C-9	0.90 m span RCC slab
128	224/C-1	0.90 m span RCC slab
129	224/C-2	1.00 m span RCC pipe (double)
130	224/C-3	0.90 m span RCC slab
131	224/C-4	1.00 m span RCC pipe (double)
132	224/C-5	1.00 m span RCC pipe (double)
133	224/C-6	0.90 m span RCC slab
134	224/C-7	0.90 m span RCC slab
135	224/C-8	1.00 m span RCC pipe (double)
136	224/C-9	0.90 m span RCC slab
137	224/C-10	1.00 m span RCC pipe (double)
138	224/C-11	0.60 m stone slab
139	224/C-12	0.60 m stone slab
140	224/C-13	0.90 m span RCC slab
141	225/C-1	1.00 m span RCC pipe (double)
142	225/C-2	1.00 m span RCC pipe (double)
143	225/C-3	1.00 m span RCC pipe (double)
144	225/C-4	1.00 m span RCC pipe (double)
145	225/C-5	0.90 m span RCC slab
146	225/C-6	1.00 m span RCC pipe (double)
147	226/C-1	1.00 m span RCC pipe (double)
148	226/C-2	2.00 m span RCC slab
149	226/C-3	0.90 m span RCC slab
150	226/C-4	0.60 m stone slab
151	226/C-5	1.00 m span RCC pipe (double)
152	226/C-6	0.90 m span RCC slab
153	226/C-7	0.90 m span RCC slab
154	226/C-8	2.00 m span RCC slab
155	226/C-9	1.00 m span RCC pipe (double)
156	226/C-10	1.00 m span RCC pipe (double)
157	226/C-11	1.00 m span RCC slab
158	227/C-1	1.00 m span RCC slab
159	227/C-2	1.00 m span RCC slab
160	227/C-3	0.90 m span RCC slab
161	227/C-4	1.00 m span RCC slab
162	227/C-5	1.50 m span RCC slab
163	228/C-1	0.60 m stone slab
164	228/C-2	1.00 m span RCC slab

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Sl. No.	Structure No.	Type of Culverts
165	228/C-3	0.90 m span RCC slab
166	228/C-4	1.00 m span RCC pipe (double)
167	228/C-5	1.00 m span RCC pipe (double)
168	228/C-6	1.00 m span RCC pipe (double)
169	228/C-7	1.00 m span RCC pipe (double)
170	228/C-8	1.00 m span RCC pipe (double)
171	229/C-1	1.00 m span RCC pipe (double)
172	229/C-2	1.00 m span RCC pipe (double)
173	229/C-3	1.00 m span RCC pipe (double)
174	229/C-4	0.60 m stone slab
175	229/C-5	1.00 m span RCC pipe (double)
176	229/C-6	0.60 m stone slab
177	230/C-1	0.60 m stone slab
178	230/C-2	1.00 m span RCC pipe (double)
179	230/C-3	0.90 m span RCC slab
180	230/C-4	3.00 m span RCC slab
181	230/C-5	1.5 m stone slab
182	230/C-6	1.00 m span RCC pipe (single)
183	230/C-7	0.60 m stone slab
184	230/C-8	1.00 m span RCC pipe (double)
185	230/C-9	1.00 m span RCC pipe (double)
186	230/C-10	0.90 m span RCC slab
187	230/C-11	1.00 m span RCC pipe (double)
188	230/C-12	0.90 m span RCC slab
189	230/C-13	1.00 m span RCC pipe (double)
190	231/C-1	1.00 m span RCC pipe (double)
191	231/C-2	1.00 m span RCC pipe (double)
192	231/C-3	3.00 m span RCC slab
193	231/C-4	0.90 m span RCC slab
194	231/C-5	1.00 m span RCC pipe (double)
195	231/C-6	0.90 m span RCC slab
196	232/C-1	1.00 m span RCC slab
197	232/C-2	1.00 m span RCC slab
198	232/C-3	1.00 m span RCC slab
199	232/C-4	1.00 m span RCC slab
200	232/C-5	3.00 m span RCC slab
201	232/C-6	1.50 m span RCC slab
202	232/C-7	0.90 m span RCC slab
203	232/C-8	1.00 m span RCC pipe (double)
204	233/C-1	1.00 m span RCC slab
205	233/C-2	1.00 m span RCC slab
206	233/C-3	0.60 m stone slab
207	233/C-4	1.50 m span RCC slab
208	233/C-5	0.90 m span RCC slab
209	233/C-6	1.00 m span RCC pipe (double)
210	233/C-7	1.00 m span RCC pipe (double)
211	233/C-8	0.90 m span RCC slab
212	233/C-9	1.50 m span RCC slab
213	233/C-10	1.00 m span RCC slab
214	234/C-1	0.60 m stone slab
215	234/C-2	1.00 m span RCC pipe (double)

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Sl. No.	Structure No.	Type of Culverts
216	234/C-3	0.60 m stone slab
217	234/C-4	0.60 m stone slab
218	234/C-5	1.00 m span RCC pipe (double)
219	234/C-6	1.00 m span RCC pipe (double)
220	234/C-7	0.60 m stone slab
221	234/C-8	0.60 m stone slab
222	234/C-9	0.90 m stone slab
223	234/C-10	0.60 m stone slab
224	235/C-1	0.90 m span RCC slab
225	235/C-2	1.00 m span RCC pipe (double)
226	235/C-3	0.90 m span RCC slab
227	235/C-4	0.60 m stone slab
228	235/C-5	0.60 m stone slab
229	235/C-6	1.00 m span RCC pipe (double)
230	235/C-7	1.00 m span RCC pipe (double)
231	235/C-8	1.00 m span RCC pipe (single)
232	236/C-1	1.00 m span RCC pipe (single)
233	236/C-2	1.00 m span RCC slab
234	236/C-3	1.00 m span RCC pipe (single)
235	236/C-4	1.00 m span RCC pipe (single)
236	236/C-5	1.00 m span RCC pipe (single)
237	236/C-6	1.00 m span RCC pipe (single)
238	236/C-7	1.00 m span RCC pipe (single)
239	236/C-8	1.00 m span RCC pipe (single)
240	236/C-9	1.00 m span RCC pipe (single)
241	236/C-10	1.00 m span RCC pipe (single)
242	237/C-1	2.00 m span RCC slab
243	237/C-2	1.00 m span RCC pipe (single)
244	237/C-3	1.00 m span RCC pipe (single)
245	237/C-4	1.00 m span RCC pipe (single)
246	237/C-5	1.00 m span RCC slab
247	237/C-6	1.00 m span RCC slab
248	237/C-7	1.00 m span RCC slab
249	237/C-8	1.00 m span RCC slab
250	237/C-9	1.00 m span RCC pipe (single)
251	238/C-1	1.00 m span RCC pipe (single)
252	238/C-2	1.00 m span RCC pipe (single)
253	238/C-3	1.00 m span RCC pipe (single)
254	238/C-4	1.00 m span RCC pipe (single)
255	238/C-5	1.00 m span RCC pipe (single)
256	238/C-6	1.00 m span RCC pipe (single)
257	239/C-1	1.00 m span RCC slab
258	239/C-2	1.00 m span RCC slab
259	239/C-3	1.00 m span RCC pipe (single)
260	239/C-4	1.00 m span RCC pipe (single)
261	239/C-5	1.00 m span RCC pipe (single)
262	239/C-6	1.00 m span RCC pipe (single)
263	239/C-7	1.00 m span RCC pipe (single)
264	239/C-8	1.00 m span RCC pipe (single)
265	239/C-9	1.00 m span RCC pipe (single)
266	240/C-1	1.00 m span RCC pipe (single)

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Sl. No.	Structure No.	Type of Culverts
267	240/C-2	1.00 m span RCC pipe (single)
268	240/C-3	1.00 m span RCC pipe (single)
269	240/C-4	1.00 m span RCC pipe (single)
270	240/C-5	1.00 m span RCC pipe (single)
271	240/C-6	1.00 m span RCC pipe (single)
272	240/C-7	1.00 m span RCC pipe (single)
273	241/C-1	1.00 m span RCC slab
274	241/C-2	1.00 m span RCC slab
275	241/C-3	0.60 m stone slab
276	241/C-4	1.00 m span RCC slab
277	241/C-5	1.00 m span RCC pipe (single)
278	241/C-6	1.00 m span RCC pipe (single)
279	241/C-7	1.00 m span RCC pipe (single)
280	242/C-1	1.00 m span RCC pipe (single)
281	242/C-2	1.00 m span RCC pipe (single)
282	242/C-3	1.00 m span RCC pipe (single)
283	242/C-4	1.00 m span RCC pipe (single)
284	242/C-5	1.00 m span RCC slab
285	242/C-6	1.00 m span RCC pipe (single)
286	242/C-7	1.00 m span RCC pipe (single)
287	242/C-8	1.00 m span RCC pipe (single)
288	243/C-1	1.00 m span RCC slab
289	243/C-2	1.00 m span RCC slab
290	243/C-3	1.00 m span RCC pipe (single)
291	243/C-4	1.00 m span RCC slab
292	243/C-5	1.00 m span RCC pipe (single)
293	243/C-6	1.00 m span RCC pipe (single)
294	243/C-7	1.00 m span RCC pipe (single)
295	243/C-8	1.00 m span RCC slab
296	243/C-9	1.00 m span RCC pipe (single)
297	243/C-10	1.00 m span RCC pipe (single)
298	243/C-11	1.00 m span RCC pipe (single)
299	243/C-12	1.00 m span RCC pipe (single)
300	244/C-1	1.00 m span RCC pipe (single)
301	244/C-2	1.00 m span RCC pipe (single)
302	244/C-3	1.00 m span RCC pipe (single)
303	244/C-4	1.00 m span RCC pipe (single)
304	244/C-5	1.00 m span RCC pipe (single)
305	244/C-6	1.00 m span RCC pipe (single)
306	244/C-7	1.00 m span RCC pipe (single)
307	244/C-8	1.00 m span RCC pipe (single)
308	245/C-1	1.00 m span RCC slab
309	245/C-2	1.00 m span RCC pipe (single)
310	245/C-3	1.00 m span RCC pipe (single)
311	245/C-4	1.00 m span RCC pipe (single)
312	245/C-5	1.00 m span RCC pipe (single)
313	245/C-6	1.00 m span RCC pipe (single)
314	245/C-7	1.00 m span RCC pipe (single)
315	245/C-8	1.00 m span RCC pipe (single)
316	245/C-9	1.00 m span RCC pipe (single)
317	245/C-10	1.00 m span RCC pipe (single)

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

Sl. No.	Structure No.	Type of Culverts
318	245/C-11	1.00 m span RCC pipe (single)
319	246/C-1	1.00 m span RCC pipe (single)
320	246/C-2	1.00 m span RCC pipe (single)
321	246/C-3	1.00 m span RCC pipe (single)
322	246/C-4	1.00 m span RCC pipe (single)
323	246/C-5	1.00 m span RCC pipe (single)
324	246/C-6	1.00 m span RCC pipe (single)
325	246/C-7	1.00 m span RCC pipe (single)
326	246/C-8	1.00 m span RCC pipe (single)
327	246/C-9	1.00 m span RCC pipe (single)
328	246/C-10	1.00 m span RCC pipe (single)
329	247/C-1	1.00 m span RCC pipe (single)
330	247/C-2	1.00 m span RCC pipe (single)
331	247/C-3	1.00 m span RCC pipe (single)
332	247/C-4	1.00 m span RCC pipe (single)
333	247/C-5	1.00 m span RCC pipe (single)
334	247/C-6	1.00 m span RCC pipe (single)
335	247/C-7	1.00 m span RCC pipe (single)
336	247/C-8	1.00 m span RCC pipe (single)
337	247/C-9	1.00 m span RCC pipe (single)
338	247/C-10	1.00 m span RCC pipe (single)
339	247/C-11	1.00 m span RCC pipe (single)
340	248/C-1	1.00 m span RCC pipe (single)
341	248/C-2	1.00 m span RCC pipe (single)
342	248/C-3	1.00 m span RCC pipe (single)
343	248/C-4	1.00 m span RCC pipe (single)
344	248/C-5	1.00 m span RCC pipe (single)
345	248/C-6	3.00 m span RCC slab
346	248/C-7	1.00 m span RCC pipe (single)
347	248/C-8	1.00 m span RCC pipe (single)
348	249/C-1	1.00 m span RCC pipe (single)
349	249/C-2	1.00 m span RCC pipe (single)
350	249/C-3	3.00 m span RCC slab
351	249/C-4	1.00 m span NP3 RCC pipe
352	249/C-5	1.00 m span RCC pipe (single)
353	249/C-6	1.00 m span RCC pipe (single)
354	249/C-7	1.00 m span RCC pipe (single)
355	249/C-8	1.00 m span RCC pipe (single)
356	250/C-1	1.00 m span RCC pipe (single)
357	250/C-2	1.00 m span RCC pipe (single)
358	250/C-3	1.00 m span RCC pipe (single)
359	250/C-4	1.00 m span RCC pipe (single)
360	250/C-5	1.00 m span RCC pipe (single)
361	250/C-6	3.00 m span RCC slab
362	251/C-1	1.00 m span RCC pipe (single)
363	251/C-2	1.00 m span RCC pipe (single)
364	251/C-3	1.00 m span RCC pipe (single)
365	251/C-4	1.00 m span RCC pipe (single)
366	251/C-5	1.00 m span RCC pipe (single)
367	251/C-6	1.00 m span RCC pipe (single)
368	251/C-7	1000 mm dia NP3 RCC pipe

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

Sl. No.	Structure No.	Type of Culverts
369	252/C-1	3.00 m span RCC slab
370	252/C-2	1.00 m span RCC pipe (single)
371	252/C-3	1.00 m span RCC pipe (single)
372	252/C-4	1000 mm dia NP3 RCC pipe
373	252/C-5	1001 mm dia NP3 RCC pipe
374	252/C-6	3.00 m span RCC slab
375	253/C-1	1.00 m span RCC pipe (single)
376	253/C-2	3.00 m span RCC slab
377	253/C-3	1.00 m span RCC pipe (single)
378	253/C-4	1000 mm dia NP3 RCC pipe
379	253/C-5	1001 mm dia NP3 RCC pipe
380	254/C-1	3.00 m span RCC slab
381	254/C-2	1.00 m span RCC pipe (single)
382	254/C-3	1.00 m span RCC pipe (single)
383	255/C-1	1.00 m span RCC slab
384	255/C-2	1.00 m span RCC pipe (single)
385	255/C-3	1.00 m span RCC pipe (single)
386	255/C-4	1.00 m span RCC slab
387	255/C-5	1.00 m span RCC pipe (single)
388	256/C-1	6.00 m span RCC slab
389	256/C-2	1.00 m span RCC slab
390	256/C-3	1.00 m span RCC slab
391	256/C-4	1.00 m span RCC slab
392	256/C-5	1.00 m span RCC slab
393	257/C-1	1.00 m span RCC slab
394	257/C-2	1.00 m span RCC slab
395	257/C-3	1.00 m span RCC slab
396	257/C-4	1.50 m span RCC slab
397	257/C-5	1.50 m span RCC slab
398	257/C-6	1.50 m span RCC slab
399	257/C-7	1.50 m span RCC slab
400	257/C-8	1.50 m span RCC slab
401	258/C-1	1.50 m span RCC slab
402	258/C-2	1.50 m span RCC slab
403	258/C-3	1.50 m span RCC slab
404	258/C-4	1.50 m span RCC slab
405	258/C-5	6.00 m span RCC slab
406	258/C-6	1.00 m span RCC slab
407	258/C-7	1.00 m span RCC slab
408	258/C-8	1.50 m span RCC slab
409	259/C-1	NP3 pipe culvert
410	259/C-2	NP3 pipe culvert
411	259/C-3	NP3 pipe culvert
412	213+210	(1 x 3m) Span Slab Culvert
413	214+840	(1 x 3m) Span Slab Culvert
414	221+400	(1 x 3m) Span Slab Culvert
415	221+800	(1 x 3m) Span Slab Culvert
416	225+800	(1 x 3m) Span Slab Culvert
417	226+060	(1 x 3m) Span Slab Culvert
418	227+200	(1 x 3m) Span Slab Culvert
419	228+256	(1 x 3m) Span Slab Culvert

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Sl. No.	Structure No.	Type of Culverts
420	228+450	(1 x 3m) Span Slab Culvert
421	229+600	(1 x 3m) Span Slab Culvert
422	230+850	(1 x 3m) Span Slab Culvert
423	231+200	(1 x 3m) Span Slab Culvert
424	234+880	(1 x 3m) Span Slab Culvert
425	235+700	(1 x 3m) Span Slab Culvert
426	258+370	(1 x 3m) Span Slab Culvert

11 Bus Bays & Bus Shelters

The details of existing bus stops on the site are as follows:

S.No.	Ex. Chainage (Km)	Side	Remarks
1	231+040	LHS	Makhan Centre
2	231+668	LHS	Makhan Centre
3	246+730	RHS	Pofsemai
4	254+997	RHS	kathikho
5	258+000	RHS	Senapati
6	259+318	RHS	Senapati

12 Truck Lay byes

The details of truck lay byes are as follows:

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

13 Road side drains

COVERED DRAIN					
S.No.	Existing Chainage (Km)		RHS (Hill Side)	LHS (Valley Side)	Total Length (m)
	From	To			
1.	213+000	213+600	600.00	600.00	1200.00
2.	219+650	219+850	200.00	200.00	400.00
3.	235+400	235+700	300.00	300.00	600.00
4.	237+000	237+500	500.00	500.00	1000.00
5.	241+900	242+050	150.00	150.00	300.00
6.	255+150	255+230	80.00	80.00	160.00
7.	259+400	259+800	400.00	400.00	800.00
One side length (m)					2230.00
BHS Total length (m)					4460

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LINED DRAIN					
S. No.	From	To	Hill Side	Total Length (in m)	Remarks
1.	212+328	213+000	Hill side	672	
2.	213+600	219+650	Hill side	6050	
3.	219+850	226+493	Hill side	6643	
4.	226+507	232+625	Hill side	6118	
5.	232+665	235+400	Hill side	2735	
6.	235+700	237+000	Hill side	1300	
7.	237+500	241+900	Hill side	4400	
8.	242+050	254+644	Hill side	12594	
9.	254+754	255+150	Hill side	396	
10.	255+230	259+123	Hill side	3893	
11.	259+171	259+400	Hill side	229	
12.	259+800	263+854	Hill side	4054	
13.	263+868	264+313	Hill side	445	
Total Length (in mtr)				49529	

14 Major junctions

The details of Major junctions are as follows:

S. No.	Ex. Chainage (Km)	At Grade/ Grade Separated	Details of Cross Road		
			Side (LHS/RHS)	Type	Road Type (NH/SH/MDR/Others)
1	213+500	At Grade	LHS	Y	Village road
2	219+300	At Grade	LHS	Y	Village road
3	237+430	At Grade	LHS	Y	Village road
4	259+700	At Grade	RHS	Y	Village road

15 Minor junctions

The details of the minor junctions are as follows:

S. No	Existing Chainage (Km)	At Grade/ Grade Separated	Details of Cross Road		
			Side (LHS/RHS)	Type	Road Type (NH/SH/MDR/Others)
1	214+800	At Grade	RHS	T	Village road
2	245+000	At Grade	LHS	Y	Village road
3	235+700	At Grade	RHS	Y	Village road
4	258+100	At Grade	RHS	Y	Village road

16 Bypasses

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km)	Length	Carriageway	
		From ----to	(in Km)	Width (m)	Type

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Nil

17 Other structures

(i) Retaining Wall (C.C.)

Sl. No.	Existing Chainage		Retaining Wall		Remarks
	From	To	Hill Side	Valley Side	
1	231+100	231+150		50	
2	231+400	231+440		40	
3	234+500	234+530		30	
4	257+900	257+930		30	
5	258+920	259+000		80	
Total Length				230	

(ii) High Retaining Wall

Sl. No.	Existing Chainage		High Retaining Wall		Remarks
	From	To	Hill Side	Valley Side	
1	225+720	225+775		55	
Total Length				55	

(iii) Breast Wall

Sl. No.	Existing Chainage		Breast Wall		Remarks
	From	To	Hill Side	Valley Side	
1	225+050	225+080	30		
2	229+000	229+030	30		
3	234+700	234+730	30		
4	236+000	236+030	30		
5	239+800	239+820	20		
6	243+600	243+630	30		
7	247+600	247+630	30		
8	247+700	247+730	30		
9	252+300	252+330	30		
10	257+100	257+200	100		
11	258+400	258+450	50		
Total Length			410		

(iv) Gabion Breast Wall

Sl. No.	Existing Chainage		Gabion Breast Wall		Remarks
	From	To	Hill Side	Valley Side	
1	216+200	216+220	20		
2	217+800	217+820	20		
3	222+700	222+730	30		
4	223+100	223+130	30		
5	233+800	233+830	30		
6	243+200	243+230	30		
7	248+100	248+140	40		
8	252+900	252+930	30		
9	254+300	254+340	40		

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10	212+450	212+550	100		
11	217+150	217+200	50		
12	217+400	217+500	100		
13	218+500	218+550	50		
14	219+100	219+180	80		
15	221+600	221+900	300		
16	222+150	222+250	100		
17	223+250	223+350	100		
18	223+450	223+550	100		
19	227+500	227+800	300		
20	230+700	230+800	100		
21	225+600	225+850	250		
Total Length			1900		

(v) Median

Sl. No.	Existing Chainage		Median Length	Remarks
	From	To		
1	259+550	259+900	350	
Total Length			350	

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 (ROW) of Construction zone to the Contractor are stated below:

Details of ROW (Chainage wise) to be mentioned specifically as per site

S. No	Existing Chainage (Km)		Length	Existing ROW (m)	Remarks
1	212+328	212+970	642.00	11.00	100% ROW shall be handed over to the Contractor on the Appointment Date.
2	212+970	213+590	620.00	11.00	
3	213+590	213+650	60.00	14.60	
4	213+650	216+000	2350.00	11.00	
5	216+000	217+000	1000.00	10.20	
6	217+000	217+700	700.00	11.00	
7	217+700	217+800	100.00	14.60	
8	217+800	218+140	340.00	11.00	
9	218+140	218+200	60.00	14.60	
10	218+200	218+640	440.00	11.00	
11	218+640	218+740	100.00	14.60	
12	218+740	219+300	560.00	11.00	
13	219+300	219+350	50.00	14.60	
14	219+350	219+650	300.00	11.00	
15	219+650	219+950	300.00	11.00	
16	219+950	220+620	670.00	11.00	
17	220+620	220+690	70.00	14.60	
18	220+690	222+000	1310.00	11.00	
19	222+000	222+100	100.00	14.60	
20	222+100	222+175	75.00	11.00	
21	222+175	222+275	100.00	14.60	
22	222+275	222+280	5.00	11.00	
23	222+280	222+370	90.00	14.60	
24	222+370	222+960	590.00	11.00	
25	222+960	223+120	160.00	14.60	
26	223+120	224+000	880.00	11.00	
27	224+000	224+300	300.00	10.20	
28	224+300	224+410	110.00	14.60	
29	224+410	224+520	110.00	10.20	
30	224+520	224+610	90.00	14.60	
31	224+610	225+660	1050.00	10.20	
32	225+660	225+750	90.00	14.60	
33	225+750	226+493	743.00	10.20	
34	226+493	226+507	14.00	Bridge	
35	226+507	226+800	293.00	10.20	
36	226+800	226+895	95.00	14.60	

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

37	226+895	227+200	305.00	10.20
38	227+200	227+280	80.00	14.60
39	227+280	227+300	20.00	10.20
40	227+300	227+550	250.00	14.60
41	227+550	227+790	240.00	10.20
42	227+790	227+860	70.00	14.60
43	227+860	227+960	100.00	10.20
44	227+960	228+080	120.00	14.60
45	228+080	228+430	350.00	11.00
46	228+430	228+480	50.00	14.60
47	228+480	228+790	310.00	11.00
48	228+790	228+860	70.00	14.60
49	228+860	228+890	30.00	11.00
50	228+890	228+980	90.00	14.60
51	228+980	229+140	160.00	11.00
52	229+140	229+260	120.00	14.60
53	229+260	230+000	740.00	11.00
54	230+000	230+550	550.00	10.20
55	230+550	230+700	150.00	14.60
56	230+700	231+340	640.00	10.20
57	231+340	231+440	100.00	14.60
58	231+440	232+000	560.00	10.20
59	232+000	232+625	625.00	11.00
60	232+625	232+665	40.00	Bridge
61	232+665	233+600	935.00	11.00
62	233+600	233+880	280.00	14.60
63	233+880	233+940	60.00	11.00
64	233+940	234+050	110.00	14.60
65	234+050	234+210	160.00	11.00
66	234+210	234+260	50.00	14.60
67	234+260	234+300	40.00	11.00
68	234+300	234+330	30.00	14.60
69	234+330	234+950	620.00	11.00
70	234+950	234+990	40.00	14.60
71	234+990	235+150	160.00	11.00
72	235+150	235+230	80.00	14.60
73	235+230	235+580	350.00	11.00
74	235+580	235+610	30.00	11.00
75	235+610	235+740	130.00	14.60
76	235+740	235+780	40.00	11.00
77	235+780	235+820	40.00	14.60
78	235+820	236+000	180.00	14.60
79	236+000	236+500	500.00	11.00
80	236+500	236+550	50.00	14.60
81	236+550	236+800	250.00	11.00
82	236+800	237+400	600.00	11.00
83	237+400	237+470	70.00	14.60
84	237+470	238+500	1030.00	11.00

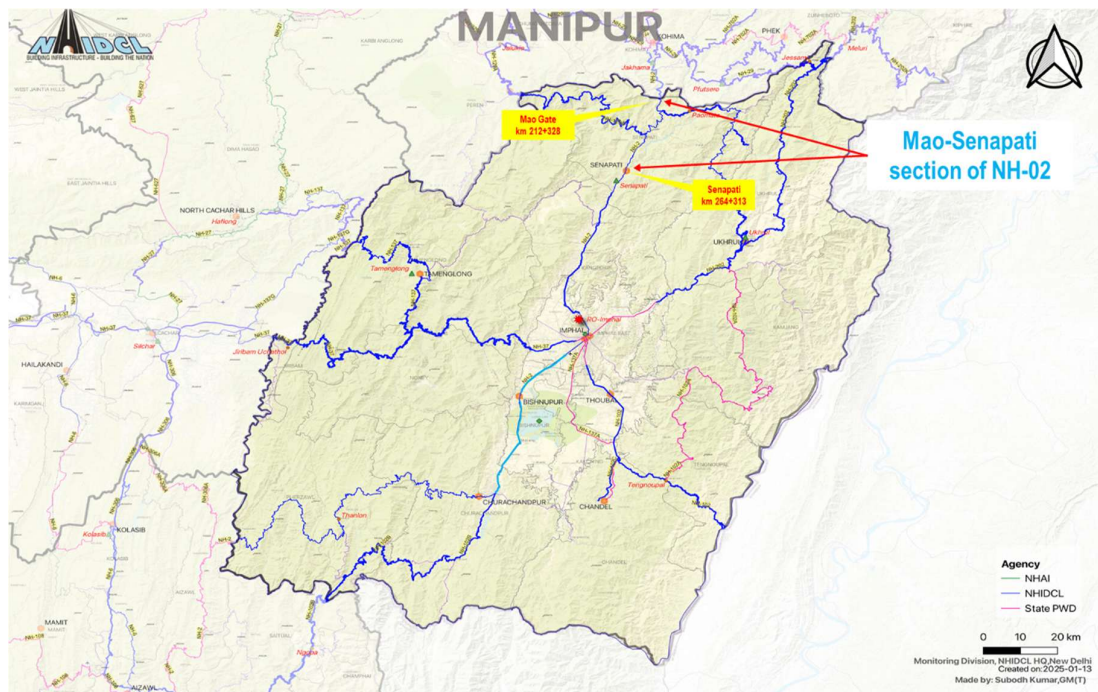
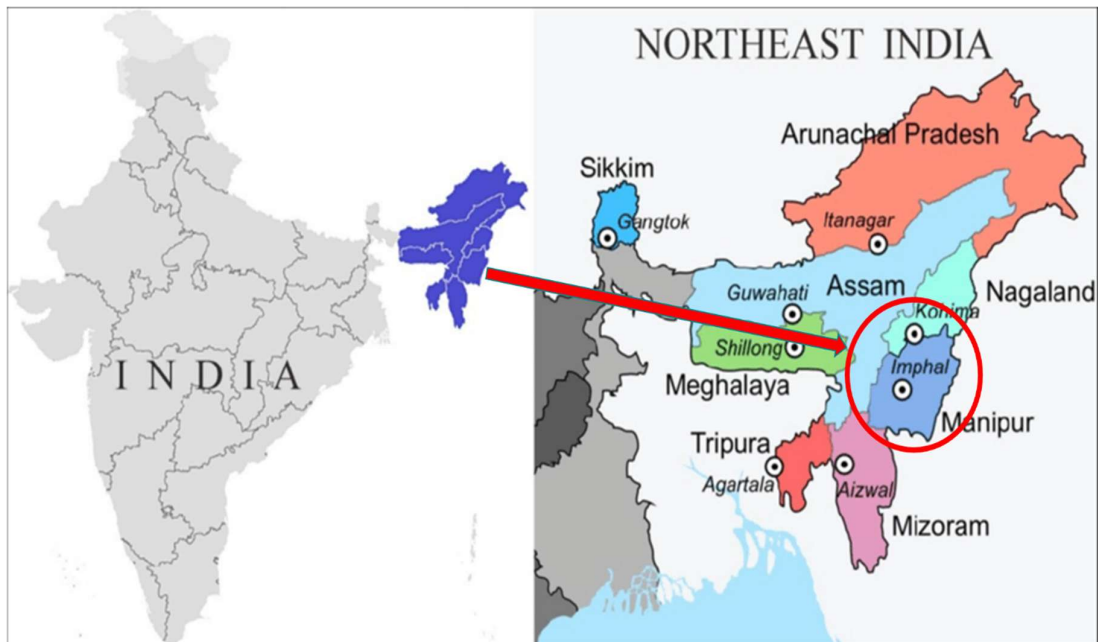
Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

85	238+500	238+540	40.00	14.60
86	238+540	241+900	3360.00	11.00
87	241+900	242+050	150.00	11.00
88	242+050	243+620	1570.00	11.00
89	243+620	243+660	40.00	14.60
90	243+660	245+800	2140.00	11.00
91	245+800	246+050	250.00	14.60
92	246+050	250+360	4310.00	11.00
93	250+360	250+510	150.00	14.60
94	250+510	251+170	660.00	11.00
95	251+170	251+220	50.00	14.60
96	251+220	252+550	1330.00	11.00
97	252+550	252+780	230.00	14.60
98	252+780	254+644	1864.00	11.00
99	254+644	254+754	110.00	Bridge
100	254+754	255+150	396.00	11.00
101	255+150	255+230	80.00	11.00
102	255+230	256+000	770.00	11.00
103	256+000	257+900	1900.00	10.20
104	257+900	258+150	250.00	14.60
105	258+150	259+123	973.00	11.00
106	259+123	259+171	48.00	Bridge
107	259+171	259+400	229.00	11.00
108	259+400	259+800	400.00	9.00
109	259+800	263+854	4054.00	11.00
110	263+854	263+868	13.50	Bridge
111	263+868	264+313	445.00	11.00

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

Annex - III (Schedule-A) Alignment Plans

The existing horizontal alignment of the Mao (Nagaland/Manipur Border) to Senapati section of NH-02 shall be followed in general.



Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

Annex - IV

(Schedule-A)

Environment Clearances

The existing road is proposed only for Strengthening/Overlay work. Hence, the environmental clearance is not required.

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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. Strengthening of existing road with paved shoulder

Strengthening of existing road with paved shoulders 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

1.1. Strengthening of the Existing Highway

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority or shown in the alignment plan 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 Mountainous/Steep terrain to the extent land is available.

1.2. Width of Carriageway

1.2.1 Two-laning with paved shoulder from Mao (Km 212+328) (Nagaland/ Manipur Border) to Senapati (Km 264+313). The width of the carriageway shall be in accordance with the Typical Cross Section (TCS) drawing manuals.

Provided that the carriageway with paved shoulder shall be as specified in the following table:

S. No.	Built-up stretch (Township)	Existing Chainage (Km)		(Hill side Paved shoulder + Main Carriage way + Valley side Paved Shoulder) (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To		
1	Mao Gate to Mao Bazar	212+328	212+970	0.50+7.0+1.50	TCS-1
2	Mao Bazar Area	212+970	213+590	1.0+7.0+1.0	TCS-5
3		213+590	213+650	0.50+7.0+1.50	TCS-6
4		213+650	216+000	0.50+7.0+1.50	TCS-1
5		216+000	217+000	0.60+7.0+0.60	TCS-3
6		217+000	217+700	0.50+7.0+1.50	TCS-1
7		217+700	217+800	0.50+7.0+1.50	TCS-6
8		217+800	218+140	0.50+7.0+1.50	TCS-1
9		218+140	218+200	0.50+7.0+1.50	TCS-6
10		218+200	218+640	0.50+7.0+1.50	TCS-1
11		218+640	218+740	0.50+7.0+1.50	TCS-6
12		218+740	219+300	0.50+7.0+1.50	TCS-1
13		219+300	219+350	0.50+7.0+1.50	TCS-6
14		219+350	219+650	0.50+7.0+1.50	TCS-1
15	Tadubi Bazar Area	219+650	219+950	1.0+7.0+1.0	TCS-5

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km
212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length
51.985 Km)

S. No.	Built-up stretch (Township)	Existing Chainage (Km)		(Hill side Paved shoulder + Main Carriage way + Valley side Paved Shoulder) (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To		
16		219+950	220+620	0.50+7.0+1.50	TCS-1
17		220+620	220+690	0.50+7.0+1.50	TCS-6
18		220+690	222+000	0.50+7.0+1.50	TCS-1
19		222+000	222+100	0.50+7.0+1.50	TCS-7
20		222+100	222+175	0.50+7.0+1.50	TCS-1
21		222+175	222+275	0.50+7.0+1.50	TCS-8
22		222+275	222+280	0.50+7.0+1.50	TCS-1
23		222+280	222+370	0.50+7.0+1.50	TCS-8
24		222+370	222+960	0.50+7.0+1.50	TCS-1
25		222+960	223+120	0.50+7.0+1.50	TCS-7
26		223+120	224+000	0.50+7.0+1.50	TCS-1
27		224+000	224+300	0.60+7.0+0.60	TCS-3
28		224+300	224+410	0.50+7.0+1.50	TCS-7
29		224+410	224+520	0.60+7.0+0.60	TCS-3
30		224+520	224+610	0.50+7.0+1.50	TCS-6
31		224+610	225+660	0.60+7.0+0.60	TCS-3
32		225+660	225+750	0.50+7.0+1.50	TCS-6
33		225+750	226+493	0.60+7.0+0.60	TCS-3
34		226+493	226+507	-	MNB
35		226+507	226+800	0.60+7.0+0.60	TCS-3
36		226+800	226+895	0.50+7.0+1.50	TCS-6
37		226+895	227+200	0.60+7.0+0.60	TCS-3
38		227+200	227+280	0.50+7.0+1.50	TCS-6
39		227+280	227+300	0.60+7.0+0.60	TCS-3
40		227+300	227+550	0.50+7.0+1.50	TCS-7
41		227+550	227+790	0.60+7.0+0.60	TCS-3
42		227+790	227+860	0.50+7.0+1.50	TCS-6
43		227+860	227+960	0.60+7.0+0.60	TCS-3
44		227+960	228+080	0.50+7.0+1.50	TCS-6
45		228+080	228+430	0.50+7.0+1.50	TCS-1
46		228+430	228+480	0.50+7.0+1.50	TCS-6
47		228+480	228+790	0.50+7.0+1.50	TCS-1
48		228+790	228+860	0.50+7.0+1.50	TCS-6
49		228+860	228+890	0.50+7.0+1.50	TCS-1
50		228+890	228+980	0.50+7.0+1.50	TCS-6
51		228+980	229+140	0.50+7.0+1.50	TCS-1
52		229+140	229+260	0.50+7.0+1.50	TCS-7
53		229+260	230+000	0.50+7.0+1.50	TCS-1
54		230+000	230+550	0.60+7.0+0.60	TCS-3
55		230+550	230+700	0.50+7.0+1.50	TCS-7
56		230+700	231+340	0.60+7.0+0.60	TCS-3
57		231+340	231+440	0.50+7.0+1.50	TCS-6
58		231+440	232+000	0.60+7.0+0.60	TCS-3
59		232+000	232+625	0.50+7.0+1.50	TCS-1
60		232+625	232+665	-	MNB
61		232+665	233+600	0.50+7.0+1.50	TCS-1
62		233+600	233+880	0.50+7.0+1.50	TCS-6
63		233+880	233+940	0.50+7.0+1.50	TCS-1

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

S. No.	Built-up stretch (Township)	Existing Chainage (Km)		(Hill side Paved shoulder + Main Carriage way + Valley side Paved Shoulder) (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To		
64		233+940	234+050	0.50+7.0+1.50	TCS-6
65		234+050	234+210	0.50+7.0+1.50	TCS-1
66		234+210	234+260	0.50+7.0+1.50	TCS-6
67		234+260	234+300	0.50+7.0+1.50	TCS-1
68		234+300	234+330	0.50+7.0+1.50	TCS-8
69		234+330	234+950	0.50+7.0+1.50	TCS-1
70		234+950	234+990	0.50+7.0+1.50	TCS-6
71		234+990	235+150	0.50+7.0+1.50	TCS-1
72		235+150	235+230	0.50+7.0+1.50	TCS-6
73		235+230	235+580	1.0+7.0+1.0	TCS-5
74	Maram Bazar	235+580	235+610	1.0+7.0+1.0	TCS-2
75		235+610	235+740	0.50+7.0+1.50	TCS-6
76		235+740	235+780	0.50+7.0+1.50	TCS-1
77		235+780	235+820	0.50+7.0+1.50	TCS-6
78		235+820	236+000	0.50+7.0+1.50	TCS-6
79		236+000	236+500	0.50+7.0+1.50	TCS-1
80		236+500	236+550	0.50+7.0+1.50	TCS-6
81		236+550	236+800	0.50+7.0+1.50	TCS-1
82		236+800	237+400	1.0+7.0+1.0	TCS-5
83		237+400	237+470	0.50+7.0+1.50	TCS-6
84		237+470	238+500	0.50+7.0+1.50	TCS-1
85		238+500	238+540	0.50+7.0+1.50	TCS-6
86		238+540	241+900	0.50+7.0+1.50	TCS-1
87	Lairou Bazar Area	241+900	242+050	1.0+7.0+1.0	TCS-5
88		242+050	243+620	0.50+7.0+1.50	TCS-1
89		243+620	243+660	0.50+7.0+1.50	TCS-6
90		243+660	245+800	0.50+7.0+1.50	TCS-1
91		245+800	246+050	0.50+7.0+1.50	TCS-7
92		246+050	250+360	0.50+7.0+1.50	TCS-1
93		250+360	250+510	0.50+7.0+1.50	TCS-6
94		250+510	251+170	0.50+7.0+1.50	TCS-1
95		251+170	251+220	0.50+7.0+1.50	TCS-6
96		251+220	252+550	0.50+7.0+1.50	TCS-1
97		252+550	252+780	0.50+7.0+1.50	TCS-6
98		252+780	254+644	0.50+7.0+1.50	TCS-1
99		254+644	254+754	-	MJB
100		254+754	255+150	0.50+7.0+1.50	TCS-1
101	Karong Bazar Area	255+150	255+230	1.0+7.0+1.0	TCS-5
102		255+230	256+000	0.50+7.0+1.50	TCS-1
103		256+000	257+900	0.60+7.0+0.60	TCS-3
104		257+900	258+150	0.50+7.0+1.50	TCS-6
105		258+150	259+123	0.50+7.0+1.50	TCS-1
106		259+123	259+171	-	MNB
107		259+171	259+400	0.50+7.0+1.50	TCS-1
108	Senapati Bazar	259+400	259+800	0.0+7.0+0.0	TCS-4

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S. No.	Built-up stretch (Township)	Existing Chainage (Km)		(Hill side Paved shoulder + Main Carriage way + Valley side Paved Shoulder) (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To		
109		259+800	263+854	0.50+7.0+1.50	TCS-1
110		263+854	263+868	-	MNB
111		263+868	264+313	0.50+7.0+1.50	TCS-1

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.2.1 above.

2. Geometric Design and General Features

2.1. General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual IRC: SP:73-2023.

2.2. Design speed

Deleted.

2.3. Improvement of the existing road geometrics

Strengthening work with special treatment of sinking zones are to be carried out along the existing alignment; therefore, no curve improvement is proposed.

2.4. Right of Way

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

2.5. Type of shoulders

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

S. No.	Existing Chainage (Km)		Length (m)	Fully Paved Shoulders(m)	Both side footpath cum drains beyond paved shoulder (m)	Ref. to TCS	Remarks
	From	To					
1	212+970	213+590	620.00	1.00+1.00	1.00	TCS-5	Minimum depth of drain to be provided is 1.00 m
2	219+650	219+950	300.00	1.00+1.00	1.00	TCS-5	
3	235+230	235+580	350.00	1.00+1.00	1.00	TCS-5	
4	236+800	237+400	600.00	1.00+1.00	1.00	TCS-5	

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S. No.	Existing Chainage (Km)		Length (m)	Fully Paved Shoulders(m)	Both side footpath cum drains beyond paved shoulder (m)	Ref. to TCS	Remarks
	From	To					
5	241+900	242+050	150.00	1.00+1.00	1.00	TCS-5	
6	255+150	255+230	80.00	1.00+1.00	1.00	TCS-5	

(b) In open country, paved shoulders shall be provided as per the ref. TCS in paragraph 1.2.1.

(c) Design and specifications of paved shoulders shall confirm to the requirements specified in IRC:SP:73- 2023.

2.6. Lateral and vertical clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provisions of guard rails/ crash barriers shall be as per the provision of relevant Manual.

2.6.2 Lateral Clearance: The width of the openings at underpasses shall be as follows:

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

2.7. Lateral and vertical clearances at overpasses

2.7.1 Lateral and vertical clearances at overpasses and provision of guard rails/crash barriers shall be as per the provision of relevant Manual.

2.7.2 Lateral Clearance: The size of the openings at overpasses shall be as follows:

S. No.:	Location (Chainage) (from km to km)	Span/opening (m)	Remarks
NIL			

2.8. Service roads / Slip roads

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

S. No.	Location (Chainage) (from km to km)	RHS / LHS/ or Both sides	Length (km)
NIL			

2.9. Grade separated structures:

2.9.1 Grade separated structures shall be as per the provision of relevant Manual.

The requisite particulars are given below:

S. No.	Location of Structure	Deck Width (m)	Number and length of spans	Approach gradient	Remarks, if any
NIL					

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

ocation

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

2.10. Cattle and Pedestrian under pass / over pass

Cattle and Pedestrian underpass/ overpass shall be constructed as follows:

S.No.	Location	Type of crossing
NIL		

2.11. Typical Cross Section of the Project Highway

Typical Cross Sections (TCS) have been developed as TCS-1 to TCS-2, TCS-3, TCS-4, TCS-5, TCS-6, TCS-7 and TCS-8 showing configuration along with a schedule of their applicability is presented in Appendix B-1 to this Schedule-B.

3. Intersections and Grade Separators

All intersections and Grade separators shall be as per the provision of relevant 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.

(a) At-grade intersections

(i) Major Junctions: -

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S. No.	Ex. Chainage (Km)	Details of Cross Road		
		Side (LHS/RHS)	Type of Intersection	Remarks (leading towards)
1	213+500	LHS	Y	-
2	219+300	LHS	Y	-
3	237+430	LHS	Y	-
4	259+700	RHS	Y	-

(ii) Minor junctions

S. No.	Existing Chainage (Km)	Details of Cross Road		
		Side (LHS/RHS)	Type	Remarks (leading towards)
1	214+800	RHS	T	-
2	245+000	LHS	Y	-
3	235+700	RHS	Y	-
4	258+100	RHS	Y	-

(b) Grade-separated intersection with/without ramps

S. 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

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in IRC: SP: 73-2023.

4.2 Raising of the Existing Road

The profile of the existing road at the following locations shall be raised:

S. No.	Chainage		Length	Extent of raising
	From	To		
NIL				

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

5. Pavement Design

5.1. Pavement design

Pavement design shall be carried out in accordance with IRC: SP:73-2023.

S.No.	Chainage		Length (m)	Pavement Design	Remarks
	From	To			
1	216+000	217+000	1000.00	WMM: 150mm DBM: 70 mm BC: 40 mm	Strengthening
2	217+000	217+700	700.00		Strengthening
3	217+800	218+140	340.00		Strengthening
4	218+200	218+640	440.00		Strengthening
5	218+740	219+300	560.00		Strengthening
6	219+350	219+650	300.00		Strengthening
7	219+650	219+950	300.00		Strengthening
8	219+950	220+620	670.00		Strengthening
9	220+690	222+000	1310.00		Strengthening
10	222+370	222+960	590.00		Strengthening
11	223+120	224+000	880.00		Strengthening
12	224+000	224+300	300.00		Strengthening
13	224+410	224+520	110.00		Strengthening
14	236+000	236+500	500.00		Strengthening
TOTAL			8000.00		

S.No.	Chainage		Length (m)	Pavement Design	Remarks
	From	To			
1	212+328	212+970	642.00	DBM: 70 mm BC: 40 mm	Overlay
2	212+970	213+590	620.00		Overlay
3	213+650	216+000	2350.00		Overlay
4	222+100	222+175	75.00		Overlay
5	222+275	222+280	5.00		Overlay
6	224+610	225+660	1050.00		Overlay
7	225+750	226+447	697.00		Overlay
8	226+461	226+800	339.00		Overlay
9	226+895	227+200	305.00		Overlay
10	227+280	227+300	20.00		Overlay
11	227+550	227+790	240.00		Overlay
12	227+860	227+960	100.00		Overlay
13	228+080	228+430	350.00		Overlay
14	228+480	228+790	310.00		Overlay
15	228+860	228+890	30.00		Overlay

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

16	228+980	229+140	160.00	Overlay
17	229+260	230+000	740.00	Overlay
18	230+000	230+550	550.00	Overlay
19	230+700	231+340	640.00	Overlay
20	231+440	232+000	560.00	Overlay
21	232+000	232+560	560.00	Overlay
22	232+600	233+600	1000.00	Overlay
23	233+880	233+940	60.00	Overlay
24	234+050	234+210	160.00	Overlay
25	234+260	234+300	40.00	Overlay
26	234+330	234+950	620.00	Overlay
27	234+990	235+150	160.00	Overlay
28	235+230	235+580	350.00	Overlay
29	235+580	235+610	30.00	Overlay
30	235+740	235+780	40.00	Overlay
31	236+550	236+800	250.00	Overlay
32	236+800	237+400	600.00	Overlay
33	237+470	238+500	1030.00	Overlay
34	238+540	241+900	3360.00	Overlay
35	241+900	242+050	150.00	Overlay
36	242+050	243+620	1570.00	Overlay
37	243+660	245+800	2140.00	Overlay
38	246+050	250+360	4310.00	Overlay
39	250+510	251+170	660.00	Overlay
40	251+220	252+550	1330.00	Overlay
41	252+780	254+420	1640.00	Overlay
42	254+524	255+150	626.00	Overlay
43	255+150	255+230	80.00	Overlay
44	255+230	256+000	770.00	Overlay
45	256+000	257+900	1900.00	Overlay
46	258+150	258+976	826.00	Overlay
47	259+024	259+400	376.00	Overlay
48	259+400	259+800	400.00	Overlay
49	259+800	263+854	4054.00	Overlay
50	263+868	264+313	445.00	Overlay
TOTAL			39320.00	

Table-3					
Details of Sinking Zone Sections					
S.No.	Chainage		Length (m)	Pavement Design	Remarks
	From	To			
1	213+590	213+650	60.00	Sub grade: 500 mm GSB: 200 mm WMM: 250 mm	SZ
2	217+700	217+800	100.00		SZ
3	218+140	218+200	60.00		SZ
4	218+640	218+740	100.00		SZ

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5	219+300	219+350	50.00	DBM: 70 mm BC: 40 mm	SZ	
6	220+620	220+690	70.00		SZ	
7	222+000	222+100	100.00		CSZ 10	
8	222+175	222+275	100.00		CSZ 8	
9	222+280	222+370	90.00		CSZ 9	
10	222+960	223+120	160.00		CSZ 7	
11	224+300	224+410	110.00		CSZ 6	
12	224+520	224+610	90.00		SZ	
13	225+660	225+750	90.00		SZ	
14	226+800	226+895	95.00		SZ	
15	227+200	227+280	80.00		SZ	
16	227+300	227+550	250.00		CSZ 5	
17	227+790	227+860	70.00		SZ	
18	227+960	228+080	120.00		SZ	
19	228+430	228+480	50.00		SZ	
20	228+790	228+860	70.00		SZ	
21	228+890	228+980	90.00		SZ	
22	229+140	229+260	120.00		CSZ 4	
23	230+550	230+700	150.00		CSZ 3	
24	231+340	231+440	100.00		SZ	
25	233+600	233+880	280.00		SZ	
26	233+940	234+050	110.00		SZ	
27	234+210	234+260	50.00		SZ	
28	234+300	234+330	30.00		CSZ 2	
29	234+950	234+990	40.00		SZ	
30	235+150	235+230	80.00		SZ	
31	235+610	235+740	130.00		SZ	
32	235+780	235+820	40.00		SZ	
33	235+820	236+000	180.00		SZ	
34	236+500	236+550	50.00		SZ	
35	237+400	237+470	70.00		SZ	
36	238+500	238+540	40.00		SZ	
37	243+620	243+660	40.00		SZ	
38	245+800	246+050	250.00		CSZ 1	
39	250+360	250+510	150.00		SZ	
40	251+170	251+220	50.00		SZ	
41	252+550	252+780	230.00		SZ	
42	257+900	258+150	250.00		SZ	
TOTAL			4445.00			

5.2. Type of pavement

The type of pavement is flexible.

5.3. Design requirements

Strengthening/Overlay and reconstruction work is to be carried out on the

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

existing road for a design traffic of 15 MSA.

5.3.1 Design Period and Strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of **15** years. Stage construction shall not be permitted.

5.3.2 Design Traffic

The Contractor shall design the pavement for design traffic of 15 million standard axles.

5.4. Reconstruction stretches

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

SINKING ZONE					
Sl. No.	Existing Chainage (km)		Length (m)	Ref. TCS No.	Remarks
	From	To			
1	213+590	213+650	60	TCS-6	SZ
2	217+700	217+800	100	TCS-6	SZ
3	218+140	218+200	60	TCS-6	SZ
4	218+640	218+740	100	TCS-6	SZ
5	219+300	219+350	50	TCS-6	SZ
6	220+620	220+690	70	TCS-6	SZ
7	222+000	222+100	100	TCS-7	CSZ 10
8	222+175	222+275	100	TCS-7	CSZ 8
9	222+280	222+370	90	TCS-7	CSZ 9
10	222+960	223+120	160	TCS-7	CSZ 7
11	224+300	224+410	110	TCS-7	CSZ 6
12	224+520	224+610	90	TCS-6	SZ
13	225+660	225+750	90	TCS-6	SZ
14	226+800	226+895	95	TCS-6	SZ
15	227+200	227+280	80	TCS-6	SZ
16	227+300	227+550	250	TCS-7	CSZ 5
17	227+790	227+860	70	TCS-6	SZ
18	227+960	228+080	120	TCS-6	SZ
19	228+430	228+480	50	TCS-6	SZ
20	228+790	228+860	70	TCS-6	SZ
21	228+890	228+980	90	TCS-6	SZ
22	229+140	229+260	120	TCS-7	CSZ 4

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23	230+550	230+700	150	TCS-7	CSZ 3
24	231+340	231+440	100	TCS-6	SZ
25	233+600	233+880	280	TCS-6	SZ
26	233+940	234+050	110	TCS-6	SZ
27	234+210	234+260	50	TCS-6	SZ
28	234+300	234+330	30	TCS-7	CSZ 2
29	234+950	234+990	40	TCS-6	SZ
30	235+150	235+230	80	TCS-6	SZ
31	235+610	235+740	130	TCS-6	SZ
32	235+780	235+820	40	TCS-6	SZ
33	235+820	236+000	180	TCS-6	SZ
34	236+500	236+550	50	TCS-6	SZ
35	237+400	237+470	70	TCS-6	SZ
36	238+500	238+540	40	TCS-6	SZ
37	243+620	243+660	40	TCS-6	SZ
38	245+800	246+050	250	TCS-7	CSZ 1
39	250+360	250+510	150	TCS-6	SZ
40	251+170	251+220	50	TCS-6	SZ
41	252+550	252+780	230	TCS-6	SZ
42	257+900	258+150	250	TCS-6	SZ

Note: SZ – Sinking zone, CSZ – Critical Sinking Zone

6. Roadside Drainage

6.1 Cement concrete L-Shape drain of minimum inner cross-sectional area 0.6m² (net area) in 49.265 km length of the project highway is to be provided on the hillside as per the relevant Manual.

6.2 Covered Drain cum Footpath is to be provided as per TCS drawing at the following sections of the project road:

Cover Drain with Footpath (on Both sides)			
S. No.	Existing Chainage (Km)		Length (m)
	From	To	
1	212+970	213+590	620.00
2	219+650	219+950	300.00
3	235+230	235+580	350.00
4	236+800	237+400	600.00
5	241+900	242+050	150.00
6	255+150	255+230	80.00
7	259+400	259+800	400.00 (No Paved shoulder)
Total length (m)			2500.00

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TOTAL LENGTH BHS (m)	5000.00
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7. Design of Structures

7.1. General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:

S. No.	Bridge (Km)	Carriageway width and cross-section Features
NIL		

7.1.3 The following structures shall be provided with footpaths:

S. No.	Location at Km	Remarks
NIL		

7.1.4 All bridges shall be high-level bridges.

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

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

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections for Project Highway.

7.2. Culverts

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

7.2.2 Reconstruction of Existing Culverts:

(i) Reconstruction of Existing Slab Culvert to New Box Culvert

The following existing pipe/slab culverts are proposed for reconstruction to new box culverts:

S. No.	Existing Chainage (km)	Type of Culvert	Proposed Span (m)
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1	218+130	RCC Box Culvert	1x2x2
2	220+600	RCC Box Culvert	1x2x2
3	222+000	RCC Box Culvert	1x2x2
4	222+550	RCC Box Culvert	1x2x2
5	224+190	RCC Box Culvert	1x2x2
6	229+200	RCC Box Culvert	1x2x2
7	233+890	RCC Box Culvert	1x2x2
8	234+000	RCC Box Culvert	1x2x2
9	239+040	RCC Box Culvert	1x2x2
10	245+920	RCC Box Culvert	1x2x2
11	248+780	RCC Box Culvert	1x2x2
12	249+100	RCC Box Culvert	1x2x2
13	251+650	RCC Box Culvert	1x2x2
14	253+700	RCC Box Culvert	1x2x2
15	259+200	RCC Box Culvert	1x2x2

7.2.3 Widening of Existing Culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in IRC: SP:13. Repairs and strengthening of existing structures where required shall be carried out.

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

7.2.4 Additional New culverts shall be constructed as per particulars given in the table below:

SL No.	Culvert location	Span/Opening (m)
NIL		

7.2.5 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		

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

7.3. Bridges

7.3.1 Existing bridges to be re-constructed/widened

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

S. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
NIL				

(ii) The following bridges shall be retained/widened:

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

7.3.2 Additional New bridges:

New bridges at the following locations on the Project Highway shall be constructed. The GADs of new bridges are attached in Volume II: Drawings folder.

Sl. No.	Location at km	Total length (m)	Remarks, if any
NIL			

7.3.3 The railing of existing bridges shall be replaced by Crash Barriers at the following locations:

Sl. No.	Location at km	Remarks, if any
NIL		

7.3.4 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location at km	Remarks, if any
NIL		

7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in

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the provision of relevant Manual.

7.3.6 Structures in marine environment - **NIL**

7.4. Rail-road bridges- **NIL**

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual.

7.4.2 Road over-bridges- **NIL**

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

Sl. No.	Location of Level Crossing (Chainage Km)	Length of bridge (m)
NIL		

7.4.3 Road under-bridges

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

Sl. No.	Location of Level Crossing (Chainage Km)	No. and Length of Span (m)
NIL		

7.5. Grade separated structures

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

7.6. 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

S. No.	Ex. Chainage (Km)	Span Arrangement	Remarks
1	226+500	1x14 m	Existing wearing coat is to be removed and replaced with mastic asphalt wearing coat on the Structure & approach slab. CC flooring of
2	232+645	1x40.50 m	
3	259+147	1x48 m	
4	264+019	3x13.50 m	

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5	254+699	3x34.65 m	Approach slab, Gap slab & Painting of Structure is to be done.
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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		

7.7. List of Major Bridges and Structures

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

Sl. No.	Location (km)

8. Traffic Control Devices and Road Safety Works

8.1 Traffic control devices and road safety works shall be provided in accordance with the provisions of relevant Manual.

Sl. No.	Traffic Signages, Road Marking and other appurtenances	Unit	Quantity
1.	Boundary Stones	Nos	1,040
2.	5th km. Stones	Nos	11
3.	Km. Stones	Nos	42
4.	Hectometer stones	Nos	208
5.	Directional arrows	Nos	25
6.	Retro-reflectorised type signboards/signs		
i.	Octagonal stop sign 900mm size.	Nos	10
ii.	Triangular sign 900mm side.	Nos	20
iii.	Circular sign 600mm dia.	Nos	10
iv.	Facility information signs 800mm x 600mm	Nos	100

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Sl. No.	Traffic Signages, Road Marking and other appurtenances	Unit	Quantity
v.	Route marker signs 450mm x 600mm	Nos	30
7.	Direction & place identification signboards		
i.	Rectangle 900 x 1500 mm	Nos	21
ii.	Rectangle 600 x 800 mm	Nos	35
iii.	Rectangle 1500 x 950 mm	Nos	13
8.	Overhead Sign		
i.	Cantilever-type overhead sign	Nos	10
ii.	Full-width overhead sign	Nos	2
9.	Retro-reflectorised Road indicators		
i.	Cluster of Red Reflector	Nos	40
ii.	Two-way hazard marker	Nos	80
iii.	Roadway delineator	Nos	3,530
10.	Raised pavement marker (Road studs/cat eyes)	Nos	2,883
11.	Chevron 600 x 750 mm	Nos	5

8.2 Specifications of the reflective sheeting. [Refer to the provision of relevant Manual]

9. Roadside Furniture

a) Roadside furniture shall be provided in accordance with the provisions of the relevant Manual and as per article 8.1 of this schedule.

b) Overhead traffic signs: location and size

Overhead traffic signs are provided as per site requirements according to the relevant Manual and as given in Schedule-C.

10. Compulsory Afforestation

NIL

11. Hazardous Locations

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

a) W- BEAM METAL CRASH BARRIER

The W beam crash Barriers are proposed where the embankment height is more than 3m or deep valley. The minimum length of the Crash Barrier to be provided is **5000 m**.

b) BREAST WALL

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The minimum Breast Wall locations shall be provided at the following locations:

S.No.	Existing Chainage		Side	Length (m)	Remarks
	From	To			
1	217+240	217+290	Hill	50.00	Landslide prone area
2	217+300	217+330	Hill	30.00	
3	223+460	223+540	Hill	80.00	
4	223+460	223+540	Hill	80.00	Landslide prone area
5	225+200	225+250	Hill	50.00	
6	225+200	225+300	Hill	100.00	Landslide prone area
7	225+750	225+840	Hill	90.00	Landslide prone area
8	225+850	225+880	Hill	30.00	
9	240+300	240+400	Hill	100.00	Landslide prone area
10	243+080	243+130	Hill	50.00	
11	243+080	243+100	Hill	20.00	Landslide prone area
12	244+210	244+240	Hill	30.00	
13	246+670	246+700	Hill	30.00	Landslide prone area
14	247+750	247+800	Hill	50.00	
15	247+750	247+800	Hill	50.00	Landslide prone area
16	248+350	248+450	Hill	100.00	Landslide prone area
17	249+100	249+250	Hill	150.00	
18	249+400	249+520	Hill	120.00	
19	249+420	249+500	Hill	80.00	Landslide prone area
20	249+700	249+750	Hill	50.00	
21	249+760	249+850	Hill	90.00	Landslide prone area
22	251+300	251+360	Hill	60.00	
23	251+300	251+350	Hill	50.00	Landslide prone area
24	254+800	254+850	Hill	50.00	
25	256+250	256+350	Hill	100.00	
26	256+400	256+500	Hill	100.00	Landslide prone area
27	257+400	257+430	Hill	30.00	
28	259+900	259+960	Hill	60.00	
29	260+850	260+910	Hill	60.00	
30	261+700	261+800	Hill	100.00	Landslide prone area
Total Net Length (m)				2,040.00	

c) GABION WALL

GABION WALL AT SINKING ZONES				
Sl. No.	Existing Chainage (km)		Side	Length (m)
	From	To		
1	213+590	213+650	Valley	60
2	217+700	217+800	Valley	100
3	218+140	218+200	Valley	60
4	218+640	218+740	Valley	100
5	219+300	219+350	Valley	50

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6	220+620	220+690	Valley	70
7	224+520	224+610	Valley	90
8	225+660	225+750	Valley	90
9	226+800	226+895	Valley	95
10	227+320	227+400	Valley	80
11	227+790	227+860	Valley	70
12	227+960	228+080	Valley	120
13	228+430	228+480	Valley	50
14	228+790	228+860	Valley	70
15	228+890	228+980	Valley	90
16	231+340	231+440	Valley	100
17	233+600	233+880	Valley	280
18	233+940	234+050	Valley	110
19	234+310	234+360	Valley	50
20	234+950	234+990	Valley	40
21	235+150	235+230	Valley	80
22	235+610	235+740	Valley	130
23	235+780	235+820	Valley	40
24	235+820	236+000	Valley	180
25	236+500	236+550	Valley	50
26	237+400	237+470	Valley	70
27	238+500	238+540	Valley	40
28	243+620	243+660	Valley	40
29	250+360	250+510	Valley	150
30	251+170	251+220	Valley	50
31	252+550	252+780	Valley	230
32	257+900	258+150	Valley	250
Total Length in (m)				3085

GABION WALL OTHER THAN SINKING ZONES

Sl. No.	Existing Chainage (km)		Side	Length (m)
	From	To		
1	217+740	217+770	Valley	30
2	218+140	218+220	Valley	80
3	220+610	220+650	Valley	40
4	222+130	222+180	Valley	50
5	222+260	222+280	Valley	20
6	225+280	225+320	Valley	40
7	226+620	226+690	Valley	70
8	226+850	226+900	Valley	50
9	227+360	227+400	Valley	40
10	230+850	230+900	Valley	50
11	233+190	233+270	Valley	80
12	233+460	233+510	Valley	50
13	233+510	233+550	Valley	40
14	233+630	233+660	Valley	30
15	242+400	242+470	Valley	70
16	243+890	243+920	Valley	30
17	244+670	244+710	Valley	40

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

18	247+020	247+050	Valley	30
19	247+200	247+230	Valley	30
20	252+010	252+050	Valley	40
21	252+070	252+100	Valley	30
22	252+370	252+385	Valley	15
23	252+880	252+910	Valley	30
24	253+100	253+180	Valley	80
25	253+670	253+690	Valley	20
26	260+820	260+860	Valley	40
Total Length in (m)				1125

d) PARAPET WALL: Minimum 2000m CC parapet wall to be provided as per the required.

e) SINKING MEASURE

(i) Typical Vertical cut-off drains as presented in TCS-6 of Appendix-B1 of this Schedule B are proposed at the following locations:

SINKING ZONES					
Sl. No.	Existing Chainage (km)		Length (m)	No. of Vertical Drains	TCS No.
	From	To			
1.	213+590	213+650	60	3	TCS-6
2.	217+700	217+800	100	4	TCS-6
3.	218+140	218+200	60	3	TCS-6
4.	218+640	218+740	100	4	TCS-6
5.	219+300	219+350	50	2	TCS-6
6.	220+620	220+690	70	3	TCS-6
7.	224+520	224+610	90	4	TCS-6
8.	225+660	225+750	90	4	TCS-6
9.	226+800	226+895	95	4	TCS-6
10.	227+320	227+400	80	3	TCS-6
11.	227+790	227+860	70	3	TCS-6
12.	227+960	228+080	120	5	TCS-6
13.	228+430	228+480	50	2	TCS-6
14.	228+790	228+860	70	3	TCS-6
15.	228+890	228+980	90	4	TCS-6
16.	231+340	231+440	100	4	TCS-6
17.	233+600	233+880	280	10	TCS-6
18.	233+940	234+050	110	4	TCS-6
19.	234+310	234+360	50	2	TCS-6
20.	234+950	234+990	40	2	TCS-6
21.	235+150	235+230	80	3	TCS-6
22.	235+610	235+740	130	5	TCS-6
23.	235+780	235+820	40	2	TCS-6
24.	235+820	236+000	180	7	TCS-6
25.	236+500	236+550	50	2	TCS-6

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

26.	237+400	237+470	70	3	TCS-6
27.	238+500	238+540	40	2	TCS-6
28.	243+620	243+660	40	2	TCS-6
29.	250+360	250+510	150	6	TCS-6
30.	251+170	251+220	50	2	TCS-6
31.	252+550	252+780	230	8	TCS-6
32.	257+900	258+150	250	9	TCS-6

- (i) Solution for Critical Sinking Zones with Reinforced Shored Wall Construction (Type-1) and Reinforced Shored Wall Construction + Soil Nailing (Type-2) as presented in TCS-7 & TCS-8 of Appendix-B1 of this Schedule-B are proposed at the following locations:

CRITICAL SINKING ZONES					
Sl. No.	Existing Chainage (km)		Length (m)	TCS No.	Proposed Solution
	From	To			
1.	222+000	222+100	100	TCS-7	Reinforced Shored Wall Construction
2.	222+175	222+275	100	TCS-8	Reinforced Shored Wall Construction + Soil Nailing
3.	222+280	222+370	90	TCS-8	Reinforced Shored Wall Construction + Soil Nailing
4.	222+960	223+120	160	TCS-7	Reinforced Shored Wall Construction
5.	224+300	224+410	110	TCS-7	Reinforced Shored Wall Construction
6.	227+300	227+550	250	TCS-7	Reinforced Shored Wall Construction
7.	229+140	229+260	120	TCS-7	Reinforced Shored Wall Construction
8.	230+550	230+700	150	TCS-7	Reinforced Shored Wall Construction
9.	234+300	234+330	30	TCS-8	Reinforced Shored Wall Construction + Soil Nailing
10.	245+800	246+050	250	TCS-7	Reinforced Shored Wall Construction

- (ii) The minimum cumulative quantities of the various items as indicated herein shall mandatorily be executed at site. Any requirement of any item(s) in excess of the indicated quantities shall be supplied and executed at site strictly in accordance with the final approved design, without any additional entitlement unless otherwise provided for under the terms and conditions of the contract.

SN	Description	Unit	Quantity
1	Flexible fascia system using welded wire mesh / drapery system as given in IRS SP: 48 2023, designed to be done as per chapter 7 of IS: 18591: 2024	SQM	12469
2	Erosion control blanket made from bio-degradable, non-woven coconut fibre reinforced with closely woven very fine HDPE nets on both sides	SQM	12469
3	Soil Nail fully threaded solid geotechnical bars having yield strength $\geq 670\text{N/mm}^2$ and ultimate tensile strength $\geq 800\text{N/mm}^2$.	R/M	58884

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

4	Supply and Fitting of 75 mm dia UPVC/PVC pipe	R/M	3055
5	Drainage geocomposites with mini-pipes DRAINTUBE	SQM	22779
6	Design, supply and installation of Shored/Hybrid Reinforced Soil structure	SQM	8457
7	Supply and laying of selected backfill soil as per MoRT&H's specification	CUM	42284
8	Supply and laying of 120-150mm dressed boulders in front of the Reinforced Earth facia	CUM	3806

12. Special Requirement for Hill Roads

12.1 In accordance with the Manual and recommended practices for treatment of Embankment and roadside slope erosion control.

SN	Description of Item	Remarks
1	Breast Wall	As per Schedule B
2	Parapet Wall	As per Schedule B
3	Gabion Wall	As per Schedule B

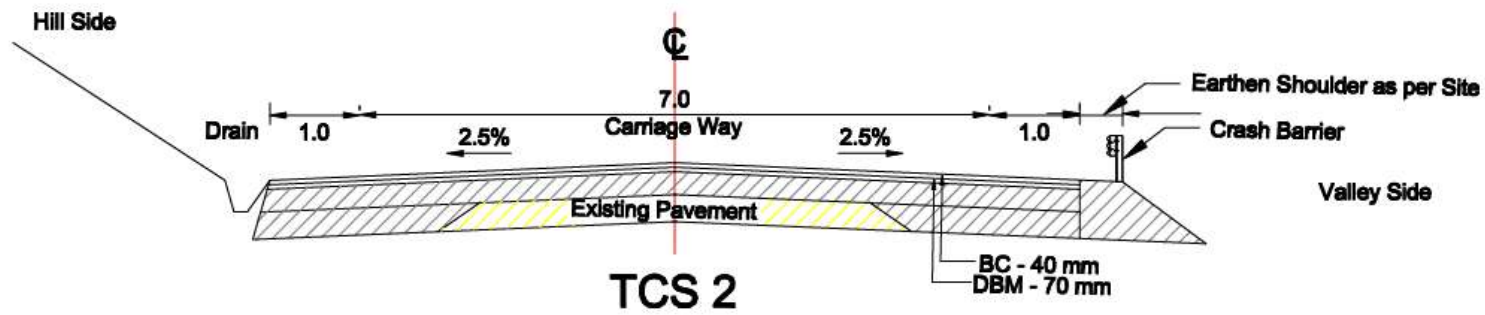
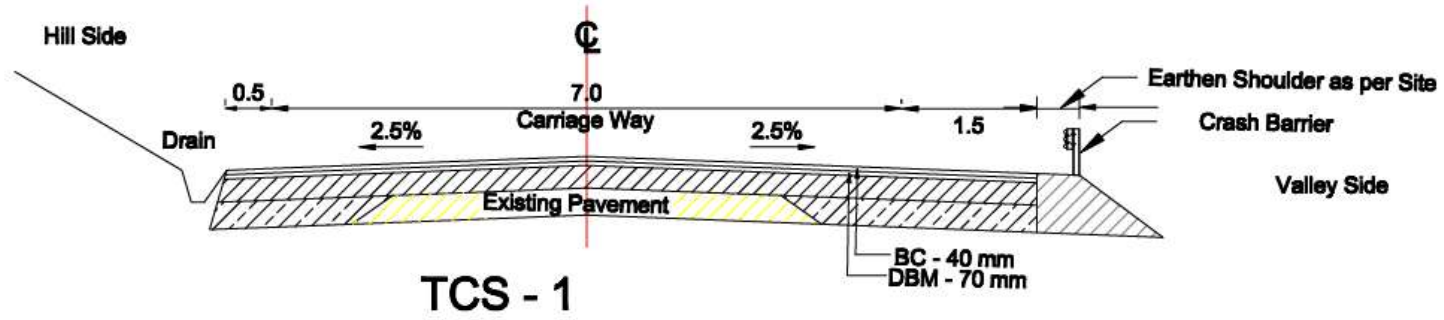
12.2 The quantities given in this schedule are the minimum required. However, the actual requirement may vary as per site conditions. Any increase in quantity shall not qualify for the Change of scope.

13. Change of Scope

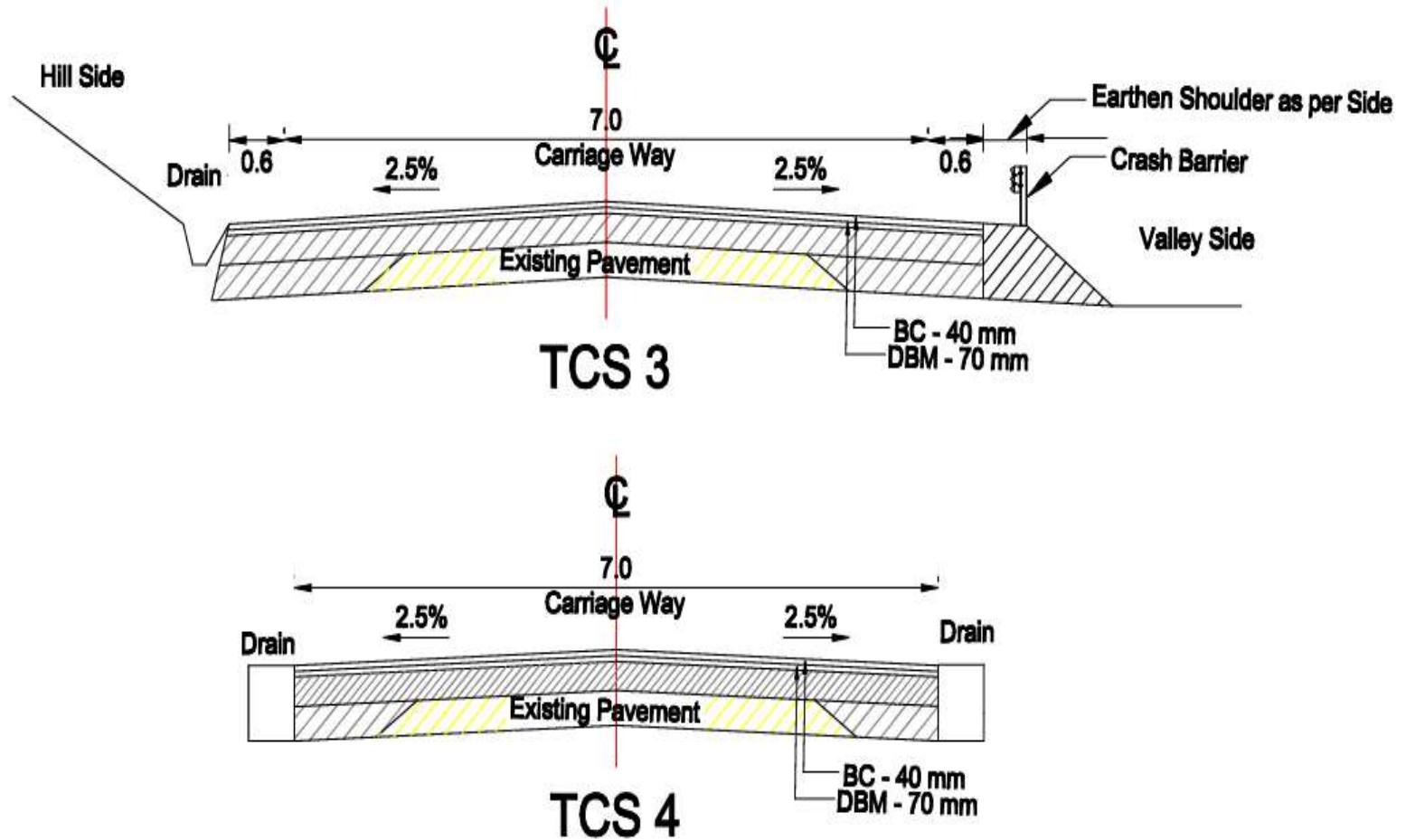
The length of structures and bridges specified herein above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule – B shall not constitute a Change of Scope.

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

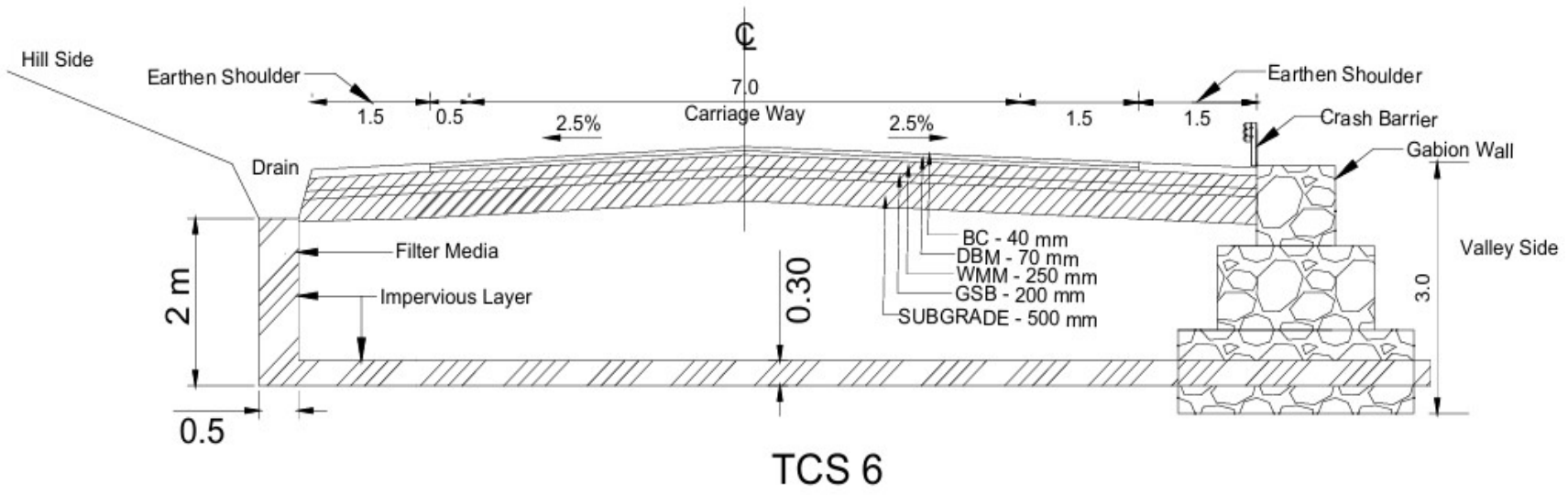
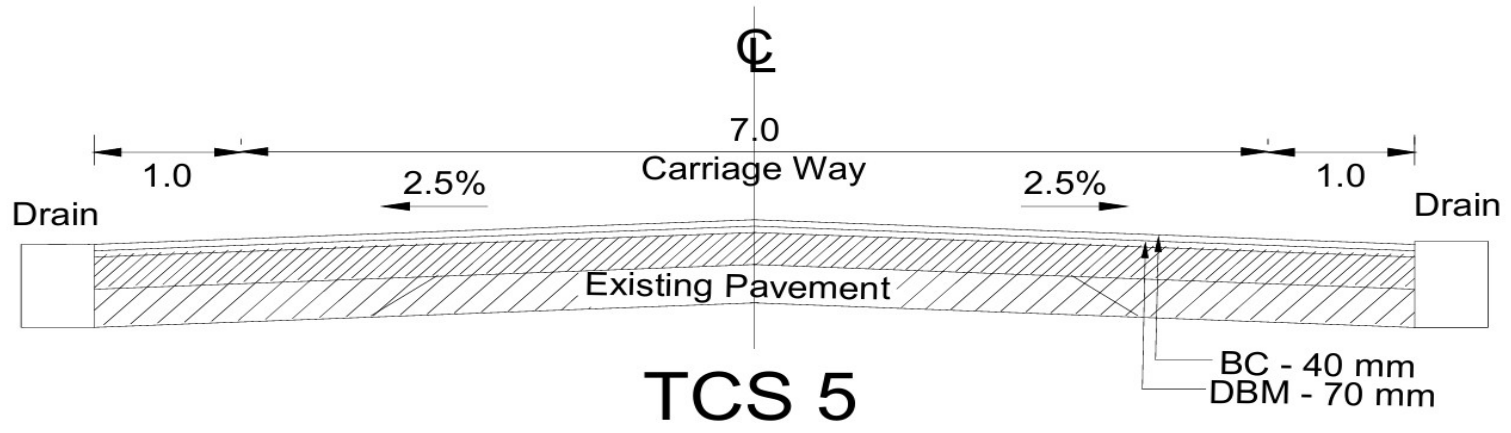
Appendix B1 - Typical Cross Sections



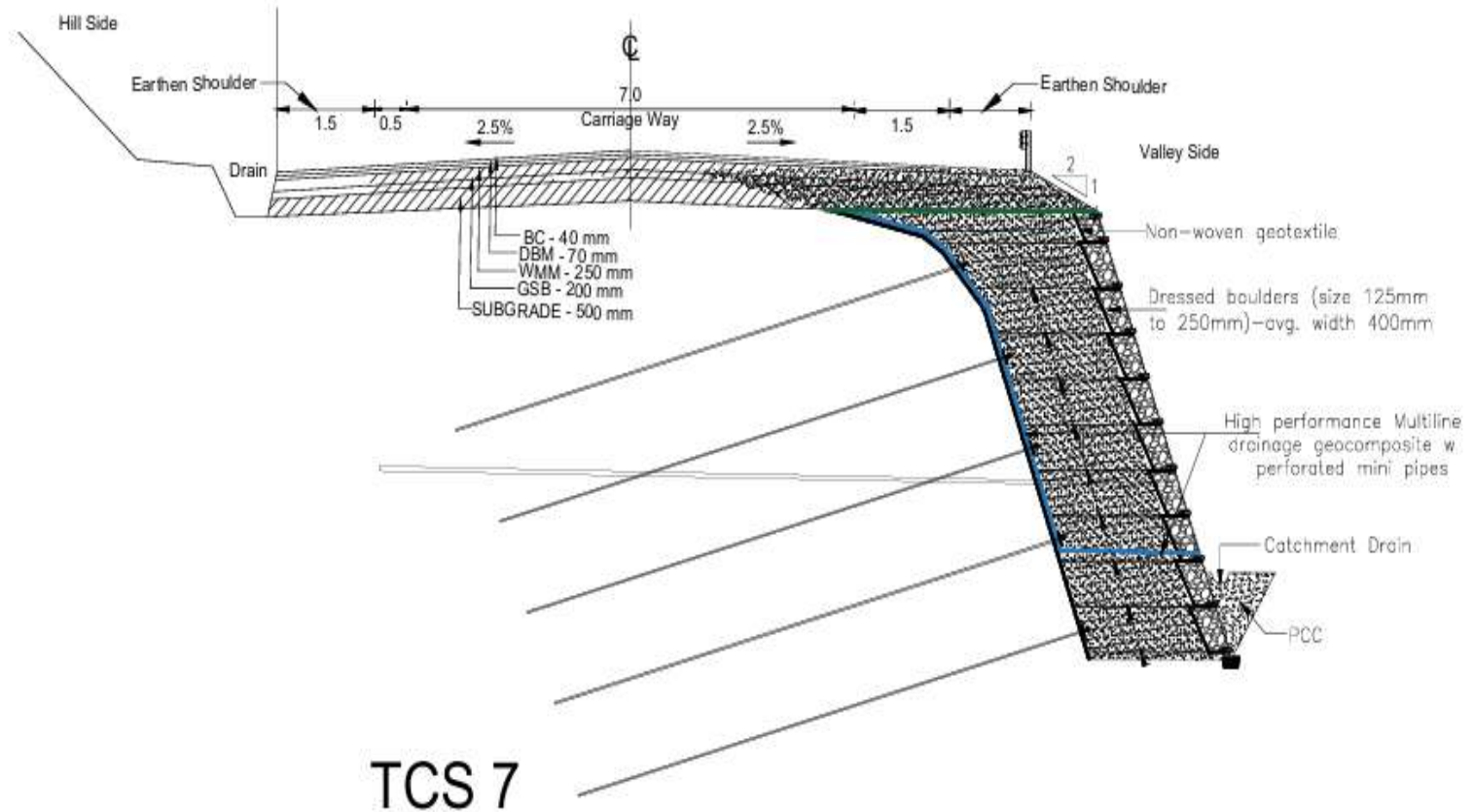
Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



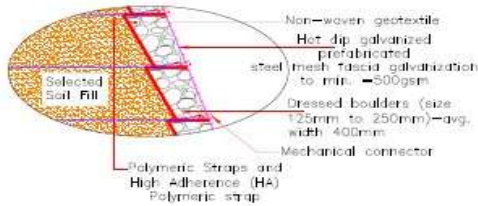
Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



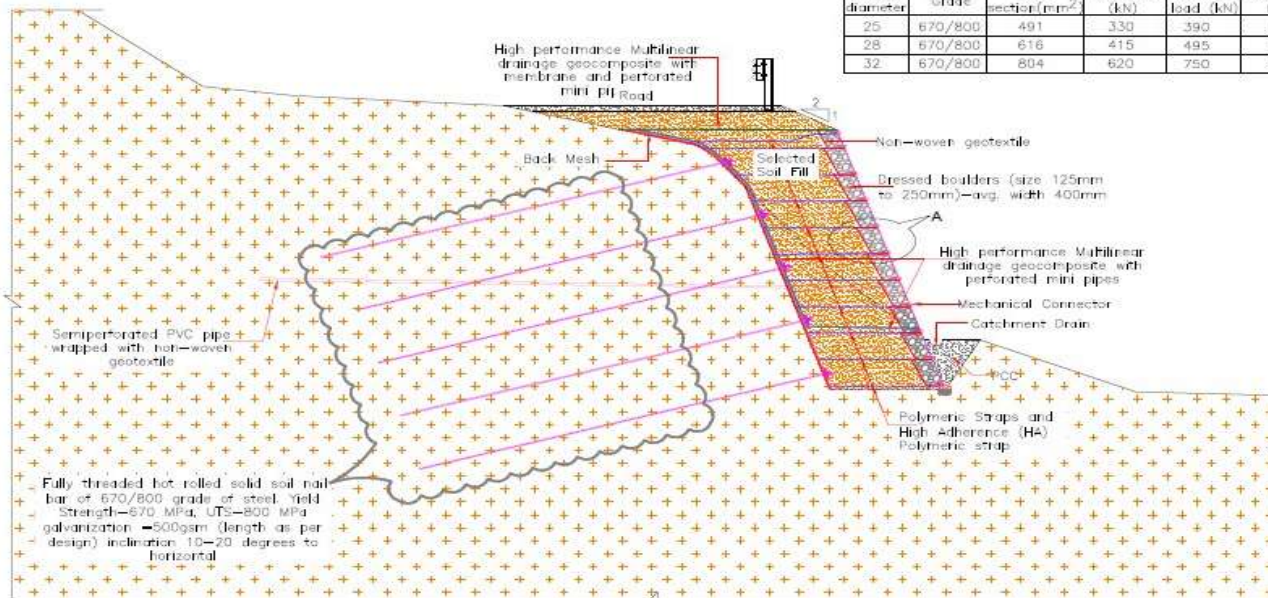
Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



Detail - 'A'



Typical Cross Section with Hybrid Shored Structure

High Adherence (HA) Polymeric strap:
 High Adherence (HA) Polymeric strap is 49mm wide polymeric strap with trapezoidal groove like ribs (lateral teeth) on both side of the strap to generate high friction. HA Polymeric Geostap consist of discrete channels of closely packed high tenacity polyester tendons encased in a linear low density polyethylene sheath (LLDPE).

High Adherence (HA) Polymeric strap Specification			
Properties	Test Method	Unit	Minimum average roll value
Ultimate Tensile Strength	Inclined or International standard	kN	25HA
Width	International standard	mm	49

Steel mesh:-
 (A) Steel used for mesh shall conform to grade b500b (or) b550c and hot dip galvanized to minimum 500 gsm.
 (B) Two consecutive units of steel mesh to be joined horizontally, using the tie bar which shall be connected using min.16 gauge wire.

Non-Woven geotextile:
 The Non-woven geotextile shall have a mass per unit Area of 200 g/m², satisfying the other minimum criteria as per section 700 of MoRTH specification.

Material specification of Soil Nail					
Nominal diameter	Grade	cross section (mm ²)	Yield load (kN)	Ultimate load (kN)	Elongation (%)
25	670/800	491	330	390	5
28	670/800	616	415	495	5
32	670/800	804	620	750	5

Polymeric Straps - Polymeric straps shall be 49mm wide polymeric with smooth edges It consists of discrete channels or closely packed high tenacity polyester tendons encased in a linear low density polyethylene sheath (LLDPE)

Polymeric Straps Specification											
Properties	Test Method	Unit	Minimum average roll value								
Ultimate Tensile Strength	Inclined or International standard	kN	25	30	40	50	60	70	80	90	100
			49	49	49	49	49	49	49	49	49
Width	International standard	mm	49								

High performance Multilinear drainage geocomposite with membrane and perforated mini pipes
 High performance Multilinear drainage geocomposite with membrane and perforated mini pipes is comprised of filter layer, a drainage mat made of polypropylene geotextile, a PE film of 110µ thick and a series of perforated polypropylene mini-pipes arranged across the width. These components are securely bonded using a unique needle-punching technique.

Characteristics	Standards	Reference	Value	Unit
Mechanical characteristics(Geocomposite)				
Thickness	EN ISO 9863-1	Under 2kPa	3.2	mm
		Under 20kPa	2.4	
Tensile strength	EN ISO 10319	Machine Direction	14	kN/m
		Cross Direction	14	
Tensile elongation	EN ISO 10319	Machine Direction	60	%
		Cross Direction	60	

Mechanical characteristics(Mini-pipe)				
Mini-pipe Diameter	EN 61386-1	External Diameter	24.5	mm
Mini-pipe stiffness at 5% deflection	ASTM D2412	-	3000	kPa
Spacing of Mini-pipe	1 Mini-pipes every one meter widthways			

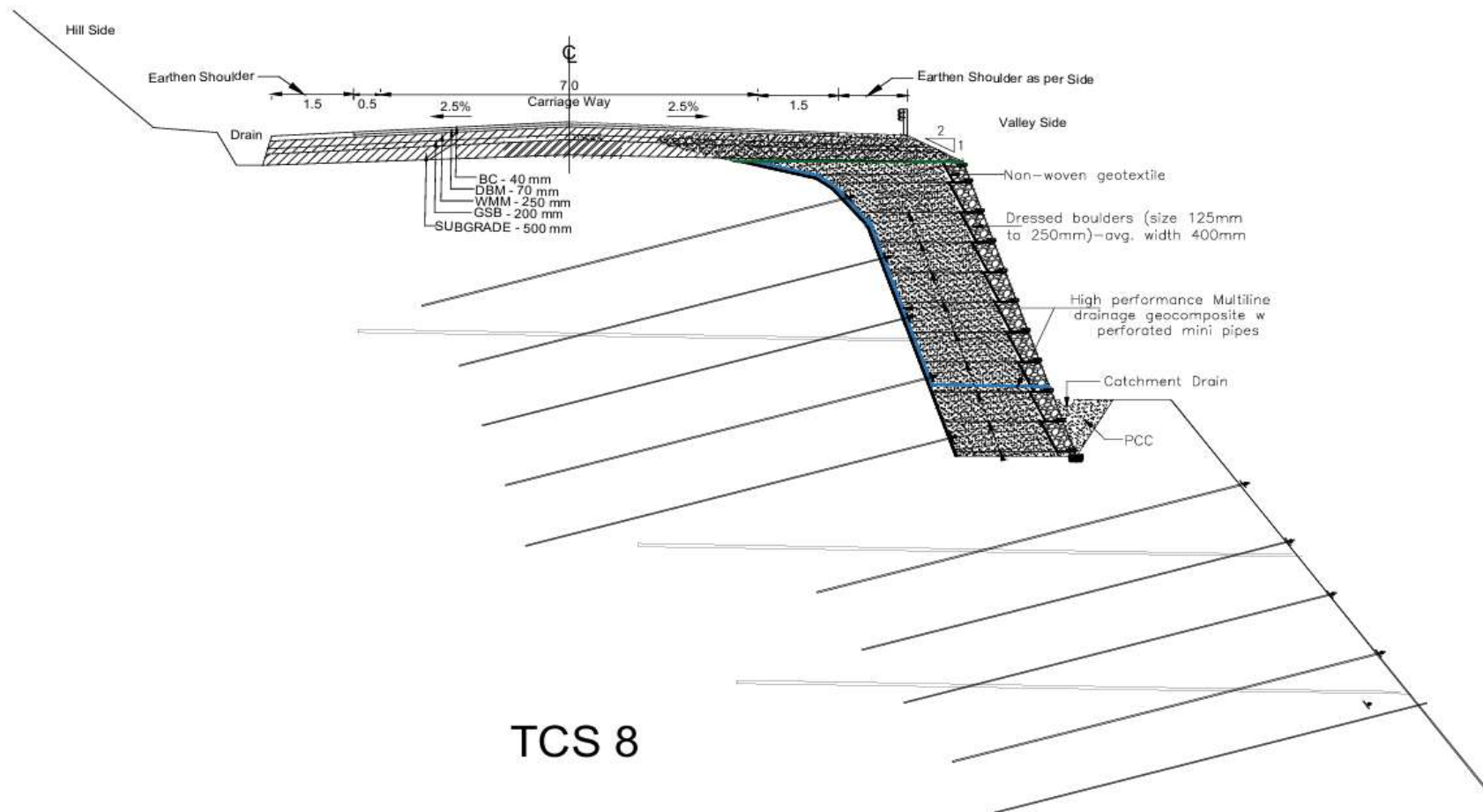
High performance Multilinear drainage geocomposite with perforated mini pipes
 High performance Multilinear drainage geocomposite with perforated mini pipes is comprised of two filter layers and a drainage mat made of polypropylene geotextile, and a series of perforated polypropylene mini-pipes arranged across the width. These components are securely bonded using a unique needle-punching technique.

Characteristics	Standards	Reference	Value	Unit
Mechanical characteristics(Geocomposite)				
Thickness	EN ISO 9863-1	Under 2kPa	4.0	mm
		Under 20kPa	3.2	
Tensile strength	EN ISO 10319	Machine Direction	14	kN/m
		Cross Direction	14	
Tensile elongation	EN ISO 10319	Machine Direction	60	%
		Cross Direction	60	

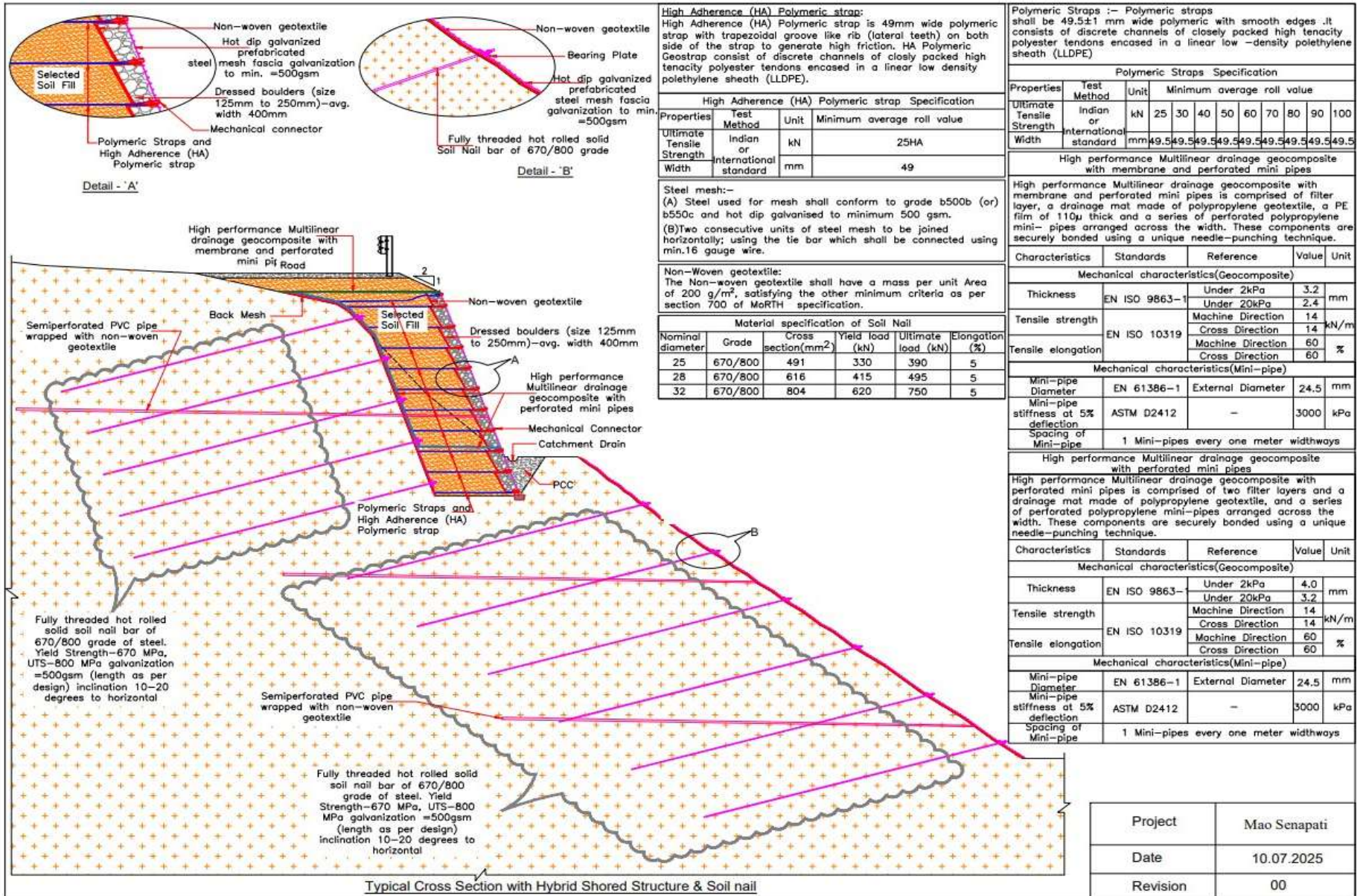
Mechanical characteristics(Mini-pipe)				
Mini-pipe diameter	EN 61386-1	External Diameter	24.5	mm
Mini-pipe stiffness at 5% deflection	ASTM D2412	-	3000	kPa
Spacing of Mini-pipe	1 Mini-pipes every one meter widthways			

Project	Mao Senapati
Date	10.07.2025
Revision	00

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)



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) Tree plantation;
- (e) Truck lay-byes;
- (f) Bus-bays and bus shelters;
- (g) Rest areas; and
- (h) Others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plaza: - Nil

b) Roadside furniture: -

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

c) Pedestrian Facility: -

Pedestrian facilities in the form of footpath 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 the safety of pedestrians while crossing in consultation with NHIDCL.

d) Tree plantations: - Nil

e) Truck Lay bye: - Nil

Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)

- f) Bus Bay & Passenger shelter: - Nil**
- g) Rest Areas: - Nil**
- h) Others to be specified: - Nil**

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
(Refer Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the Project Highway.

2. Design Standards

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

Hill Road Manual (IRC: SP:48-2023) and Manual of Specifications and Standards for Two-laning of Highways with paved shoulder (IRC: SP: 73-2023), referred to herein as the Manual.

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

Annex - I
(Schedule-D)

Specifications and Standards for Construction of Project Highway

1. Specifications and Standards

All Materials, works and construction operations shall either conform to Hill Road Manual (IRC: SP:48-2023) or Manual of Specifications and Standards for Two laning of Highways with paved shoulder (IRC: SP: 73-2023), referred to as the Manual and MoRT&H Specifications for Road and Bridge Works (Fifth Revision 2013). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

2.1 The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority Engineer" and "Agreement" respectively.

Bricks Bat or similar material should not be use in any layer of the pavement even if the same is recommended by any IRC Code manual.

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 the occurrence of any breach hereunder, the Authority shall be entitled to effect a reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

(iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex - I

(Schedule-E)

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 like Unit Scale, odometer Tape, etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfrc.com/pavement/ltp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm any for 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 like Unit		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling /Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82- 2015 read

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					
								with IRC SP 81
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
	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 SCRM (Sideway-force Coefficient Routine Investigation Machine equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer	180 days	IRC:82- 2015
	Skid Number	60SN	50SN	Bi- Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi- Annually			Established Inertial Profiling Reference Machine or ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days
	Other Pavement Distresses			Bi- Annually			2-7 days	IRC:82- 2015
	Deflection/ Remaining Life			Annual ly	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115- 2014

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					
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting road, slip roads, lay byes etc. as applicable)	Roughness BI	2200m m/km	2400mm /km	Bi- Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi- Annually	SCRIM (Sideway- force	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN 36 33 32 31 31	Traffic Speed (Km/h) 50 65 80 95 110			Coefficient Routine Investigation Machine equivalent)		
Embankment/Slope	Edge drop at shoulders	Nil	40m	Daily		IRC	7-15 days	MORT&H Specificatio n 408.4
	Slope of camber/c ross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily	Length Measuremen t Unit like Scale, Tape, odometer etc.		7-15 days	MORT&H Specificatio n 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specificatio n 408.4

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

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

Table -2: Maintenance Criteria for Rigid Pavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
CRACKING						
1	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	$w < 0.2$ mm. hair cracks		
			2	$w = 0.2 - 0.5$ mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if $L > 1m$. Within 7days
			3	$w = 0.5 - 1.5$ mm, discernible from fast-moving car		
			4	$w = 1.5 - 3.0$ mm		
5	$w > 3$ mm.	Seal, and stitch if $L > 1m$. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days			
2	Single Transverse (or Diagonal) Crack	w = width of crack L = length of crack d =	0	Nil, not discernible	No Action	
			1	$w < 0.2$ mm, hair cracks	Route and seal	Staple or Dowel Bar

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
	intersecting with one or more joints	depth of crack D = depth of slab	2	w = 0.2 - 0.5 mm, discernible from slow vehicle	with epoxy. Within 7 days	Retrofit. Within 15days
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected.
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, 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.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms And specifications - See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	Dismantle, Reinststate subbase, Reconstruct whole slab as per specifications within 30 days
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	m. Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	Corner Break	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only		Within

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action		
					For the case $d < D/2$	For the case $d > D/2$	
						7days	
				corner broken	Within 7 days		
			3	$w < 1.5 \text{ mm}; L < 0.6 \text{ m}$, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008)	Full depth repair Reinstatement sub-base, and reconstruct the slab as per norms and specifications within 30days	
		4	$w > 1.5 \text{ mm}; L > 0.6 \text{ m}$ or three corners broken				
		5	three or four corners broken	Within 15 days			
6	Punch out (Continuous Concrete Pavement only)	Applicable to Reinforced Concrete (CRCP) $w = \text{width of crack}$ $L = \text{length (m/m}^2)$	0	Nil, not discernible		No Action	
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$	Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days	
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$			
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$			
			4	$w > 3 \text{ mm}$, $L < 3 \text{ m/m}^2$ and deformation			Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	$w > 3 \text{ mm}$, $L > 3 \text{ m/m}^2$ and deformation			
7	Raveling Honeycomb	$r = \text{area damaged surface/total}$	0	Nil, not discernible			Short Term

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
	surface r type	surface of slab (%) h = maximum depth of damage			No action.	Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged and liable to be damaged.	
			2	$r = 2 - 10 \%$	Within 15 days	
			3	$r = 10-25\%$	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	$r = 25 - 50 \%$	Within 30 days	
			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 (%) h = maximum depth of damage	0	Nil, not discernible	Short Term No action.	Long Term
			1	$r < 2 \%$	Local repair of areas damaged and liable to be damaged.	Not Applicable
			2	$r = 2 - 10 \%$	Within 7days	
			3	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25$ mm	Reconstruct slab within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm	Monitor rate of deterioration	
			2	t = 1 - 0.6 mm		
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm	Diamond Grinding 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
5	t < 0.1 mm					
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m ² d	0	d < 50 mm; h < 25 mm; n < 1 per 5 m ²	No action.	
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m ²	Partial depth repair mm deep. Within days	Not Applicable
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m ²		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m ²		
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m ²		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			5	$d > 300$ mm; $h > 100$ mm: $n > 1$ per 5 m ²		
Joint Defects						
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	Short Term	Long Term
					No action.	Not Applicable
			1	Discernible, $L < 25\%$ but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. $L > 25\%$ insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
5	Severe; $w > 3$ mm negligible protection against ingress of water 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.	
			1	$w < 10$ mm	Apply low viscosity	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			2	$w = 10 - 20 \text{ mm}, L < 25\%$	epoxy resin/ mortar in cracked portion. Within 7 days	Not Applicable
			3	$w = 20 - 40 \text{ mm}, L > 25\%$	Partial Depth Repair. Within 15 days	
			4	$w = 40 - 80 \text{ mm}, L > 25\%$	30 - 50 mm deep, $h = w + 20\%$ of w , within 30 days	
			5	$w > 80 \text{ mm}, \text{ and } L > 25\%$	50 - 100 mm deep repair. $H = w + 20\%$ of w . Within 30 days	
			13	Faulting (or Stepping) in Cracks or Joints	$f =$ difference of level	
			1	$f < 3 \text{ mm}$		
			2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace slab as the appropriate.
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	Within 30days
			4	$f = 12 - 18 \text{ mm}$	Raise sunken slab.	Replace slab as the appropriate.
			5	$f > 18 \text{ mm}$	Strengthen subgrade and sub-base by grouting and raising sunken slab	Within 30days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
					No Action	
			1	$h < 6$ mm		
			2	$h = 6 - 12$ mm	Install Signs to Warn Traffic	
			3	$h = 12 - 25$ mm	within 7 days	
			4	$h > 25$ mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L = length	0	Not discernible, $h < 5$ mm	No action.	Not Applicable
			1	$h = 5 - 15$ mm		
			2	$h = 15-30$ mm, Nos $<20\%$ joints	Install Signs to Warn Traffic within 7 days	
			3	$h = 30 - 50$ mm		
			4	$h > 50$ mm or $> 20\%$ joints	Strengthen subgrade. Reinstate pavement at normal level	
			5	$h > 100$ mm	if $L < 20$ m. Within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
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	Stabilise subgrade.	
			5	$h > 100$ mm	Reinstate pavement at normal level if length < 20 m. Within 30 days	
17	Bump	h = vertical displacement from normal profile	0	$h < 4$ mm	No action	
			1	$h = 4 - 7$ mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	$h = 7 - 15$ mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15$ mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, not discernible < 3 mm	Short Term	Long Term
					No action.	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			4	f = 50 - 75 mm		
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos Nos/100 m stretch	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair subdrainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 25%	Lift or jack slab within 30 days.	
			5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab.	
					Within 30 days	
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification 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 Measurement with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014		
		Design Speed, kmph						Desirable Minimum Sight Distance (m)	Safe Stopping Distance (m)
		100						360	180
		80						260	130
Pavement Marking	Wear	<70% of marking remaining	Bi- Annually	Visual Assessment as per Annexure-F of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect within 2 months-	IRC:35-2015		
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road - 100mcd/m2/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		

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time: Design Speed (RL) Retro Reflectivity (mcd/m2/lux)	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
		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					
		Initial and Minimum Performance for Night Visibility under wet					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
		condition (<u>Retro reflectivity</u>):					
		Initial 7 days Retro reflectivity: 100 mcd/m ² /lux Minimum Threshold Level: 50 mcd/m ² /lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
		locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc					
Road Signs	Shape Position and	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 Damaged. as	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
	Retro reflectivity	As per specifications in IRC:672012	Bi-Annually	Testing of each Signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Relocation or change requirement of signboard	post signs) 15 Days in case of Gantry/Cantilever Sign boards 48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	RC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84 2014 and IRC: 35-2015, unless specified in Schedule-B.				Within 2 months	IRC:SP:84-
	Pavement Markers (Road Studs)	per specifications in IRC:SP:84 2014 and IRC: 35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation		2014, IRC:35-2015

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014,
	Traffic Safety Barriers						IRC:119-2015
	Attenuators	Functionality: Functioning	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic	Functionality: Functioning of	Daily	Visual with		Within 7 days	IRC:SP:84-

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
	Blinkers	Traffic Blinkers as intended		video/image backup	Rectification		2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with	Improvement in Lighting System	24 hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification and Standards
				luxmeter			
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Trees 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	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 842014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in			-	Rectification	24 hours	
	electrical, water and sanitary installations	-	Daily				
Other				-	Rectification	15 days	IRC:SP 84-

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				2014
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
		Spalling of concrete not more than 0.25 sqm					

	Structurally sound	Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40- 1993 and MORTH Specifications clause 2800
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13200 4.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:351990	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:351990	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 Spalling of concrete Delamination	Not more than 0.25 sq.m Not more than 0.50 sq.m Not more than 0.50 sq.m	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar /	15 days	IRC SP: 40-1993 and MORTH Specification 1600.

				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.
			Detailed			

Rainwater seepage through deck slab	Leakage - nil	Quarterly	condition survey as per IRC SP: 35-1990 using Mobile B ridge 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 structure of super	4 months	AASHTO LRFD specifications

	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of expansion joint seal in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust debris expansion or in 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.

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 defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
		Delamination of bearing reinforcement not more	Bi-Annually	Detailed condition survey	In case of failure of even one bearing on	3 months	MORTH specification
	Bearings	than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber		as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.		2810 and IRC SP: 40-199.

Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 Using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera 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 or rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35- 1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.
		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
<p>Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.</p>							

Table 1: Maintenance Criteria for Structures and Culverts:

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-2019 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:40-2019 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:40-2019.	15 days	IRC SP 40-2019 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 Sqm.					
Cracks wider than 0.3 mm not more than 1m aggregate length							
Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-2019 and IRC: SP:13-2004.	
Bridges including ROBs Flyover	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	MORTH Specification

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
etc. as applicable							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: 5-2015, IRC SP: 73-2018 and IRC SP: 40-2019.
	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-2019 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-2019 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Inspection Unit			
	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: 51-2015.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-2019.
	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	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-2019.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Inspection Unit			
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-2019 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, IRC 83 and IRC SP: 40-2019.
Bridge	Scouring around	Scouring shall not be lower than maximum	Bi-Annually	Condition survey and	Suitable protection works	1 month	IRC SP: 40-2019, MORTH

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Foundation	foundations	scour level for the bridge		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.	around pier/abutment		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 40-2019 and IRC: SP:13-2022.
Slope Protection (Landslide & Sinking)	Movement & deformation in landslide & sinking zones	Movement & deformation beyond permissible limit should be made good to the design standard	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	Refer the Schedule B and Schedule D
	Any material or defect development in workmanship used in protection work	The material and workmanship specification should be in accordance with Schedule B and Schedule D	14 Days	Once in month/ as when noticed	Standard method as approved by the Authority QA/QC plan of the contractor	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	Refer the Schedule B and Schedule D

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 MoRT&H specifications shall be binding for all maintenance activities.

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b) Granular earth shoulders, side slopes, drains and culverts		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty-four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c) Road side furniture including road sign and pavement marking		
(i)	Damage to shape or position, poor visibility or loss of retro reflectivity	48 (forty-eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d) Road lighting		
(i)	Any major failure of the system	24 (twenty-four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e) Trees and plantation		
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty-four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		

(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty-four) hours
(g) [Toll Plaza]		
(h) Other Project Facilities and Approach roads		
(i)	Damage in approach roads, pedestrian facilities, truck lay-byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 (forty-eight) hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		
(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 with (Immediately if posing danger to
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days

(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g) Hill Roads		
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(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) License for use of explosives.
 - (d) Permission of the State Government for drawing water from river/reservoir.
 - (e) License from the inspector of factories or other competent Authority for setting up the batching plant;
 - (f) Clearance of Pollution Control Board for setting up batching plant;
 - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant.
 - (h) Permission of Village Panchayats and State Government for borrow earth; and
 - (i) Any other permits or clearances required under Applicable Laws.
- ii. Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

Schedule - G
(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

To,
The Managing Director,
National Highways & Infrastructure Development Corporation Ltd.,
1st & 2nd floor, Tower-A, World Trade Centre, Nauroji Nagar,
New Delhi - 110029

WHEREAS _____ [name and address of Contractor]
(hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _____ Dated _____ for construction of **"Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)** (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:

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.

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

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

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

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

of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

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

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

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

14. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank IFSC	SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara 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)

Note- For further details and step by step process regarding e-BG and online payment, NHIDCL Circular No.-21 dated 22.02.2024 may be referred, which is attached as Appendix-A.

(See Clauses 2.21)

Format of Insurance Surety Bond
[Performance Security/Additional Performance Security]

To

The Managing Director,
National Highways & Infrastructure Development Corporation Ltd.
1st & 2nd floor, Tower-A,
World Trade Centre, Nauroji Nagar,
New Delhi - 110029

WHEREAS _____ [name and address of Contractor]
(hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _____ Dated _____ for construction of **"Strengthening of Mao to Senapati section of old NH-39 (new NH-02) from existing Chainage km 212+328 (Mao Gate) to km 264+313 (Taphou Kuki) in the State of Manipur on EPC mode (Total Length 51.985 Km)** (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 "Surety Bond amount").

AND WHEREAS we, through our branch at (the "Surety Insurer") have agreed to furnish this Surety Bond by way of Performance security.

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

1. The Surety Insurer 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 Surety Bond Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein
2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager 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 Surety Insurer. The Surety Insurer 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 Surety Insurer, 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 Surety Bond, the Authority shall be entitled to act as if the Surety Insurer were the principal debtor and any/Change in the constitution of the Contractor and/or

the Surety Insurer, 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 Surety insurer under this Surety Bond

4. It shall not be necessary, and the Surety Insurer hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Surety Insurer its demand under this Surety Bond.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Surety Insurer under this Surety Bond, 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 Surety Insurer 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 Surety Insurer from its liability and obligation under this Surety Bond and the Surety Insurer hereby waives all of its rights under any such law
6. This Surety Bond is in addition to and not in substitution of any other Surety Bond 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 Surety Insurer under this Surety Bond is restricted to the Surety Bond Amount and this Surety Bond 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 Surety Insurer under this Surety Bond all rights of the Authority under this Surety Bond shall be forfeited and the Surety Insurer shall be relieved from its liabilities hereunder
8. The Surety Bond shall cease to be in force and effect on ****\$. Unless³ a demand or claim under this Surety Bond is made in writing before expiry of the Surety Bond, the Surety Insurer shall be discharged from its liabilities hereunder.
9. The Surety Insurer undertakes not to revoke this Surety Bond 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 Surety Bond and the undersigned has full powers to do so on behalf of the Surety Insurer.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Surety Insurer 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

³Insert date atleast 2 (two) years from the date of issuance of this Surety Bond (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.

course of post 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 Surety Bond 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 Surety Bond 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 Surety Bond shall also be operatable at our, branch at New Delhi , from whom, confirmation regarding the issue of this Surety Bond or extension/renewal thereof shall be made available on demand. In the contingency of this Surety Bond being invoked and payment hereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
14. The Insurance Surety Bond shall be verified from the specific portal created for this purpose.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Surety Insurer by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Annex – II
(Schedule - G)
(See Clause 19.2)

Form for Insurance Surety Bond for Advance Payment

To,
The Managing Director,
National Highways & Infrastructure Development Corporation Ltd.,
1st & 2nd floor, Tower-A, World Trade Centre, Nauroji Nagar,
New Delhi - 110029

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 Insurance Surety Bond by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ----- cr. (Rupees crore) and the amount of this Guarantee is Rs. ----- cr. (Rupees ----- crore) (the “**Guarantee Amount**”)\$.
- (C) We, through our branch at (the “**Bank**”) have agreed to furnish this Insurance Surety Bond (hereinafter called the “**Guarantee**”) for the Guarantee Amount.

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

(1) The Insurance company 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. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways & Infrastructure Development Corporation Ltd], that the Contractor has committed default in the due and faithful performance of all or any of its obligations 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 Insurance company.

The Insurance company 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 Insurance company, 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 Insurance Surety Bond, the Authority shall be entitled to act as if the Insurance company were the principal debtor and any change in the constitution of the Contractor and/or the Insurance company, 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 Insurance company under this Guarantee.
4. It shall not be necessary, and the Insurance company hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Insurance company its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Insurance company 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 Insurance company 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 Insurance company from its liability and obligation under this Guarantee and the Insurance company hereby waives all of its rights under any such law.
6. This Insurance Surety Bond 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.
7. Notwithstanding anything contained hereinbefore, the liability of the Insurance company 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 Insurance company under this Guarantee all rights of the Authority under this Insurance Surety Bond shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Insurance Surety Bond shall cease to be in force and effect on ***. \$ Unless a demand or claim of one year more than the vailidity under this Guarantee is made in writing on or before the aforesaid date, the Insurance company shall be discharged from its liabilities hereunder.
9. The Insurance company 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 Insurance company.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Insurance company at its above referred branch, which shall be deemed

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

11. This Insurance Surety Bond 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.

\$ 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)

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Insurance company by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (i) The Insurance Surety Bond should contain the name, designation and code number of the officer(s) signing the Insurance Surety Bond.

The address, telephone number and other details of the head office of the Insurance company 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:

Table: 1.2.1

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage	Payment Procedure
1	2	3	4	
Part-A				
Roadworks including Strengthening, New Culverts, Widening and Repair of Existing structure	50.17%	A-Widening and Strengthening of Existing Road		
		(1) Earthwork up to top of the sub-grade	2.87%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of 10(ten) percent of total length or 500m, whichever is less.
		(2) Sub Base Course	1.79%	
		(3) Non-Bituminous Base Course (WMM)	9.62%	
		(4) Bituminous Base Course (DBM)	50.28%	
		(5) Wearing Coat (Bituminous Concrete)	32.53%	
B.- Construction of new culvert on existing road				

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage	Payment Procedure
		(1) Culverts (length <6m)	2.27%	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts. 75% of the cost will be payable on completion of box/abutments and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return/wing wall and any other work associated with culverts
		C. Repair and Rehabilitation of the existing Structures (Minor Length >6m & <60m) and Major Bridge (length >60m)	0.64%	Cost of each repair and rehabilitation work on Minor & Major Bridge shall be determined on pro rata basis with respect to the total linear length of the Bridges. Payment shall be made on the completion of repair and rehabilitation work in all respect of at least 2 Bridges.
Other Works	16.61%	(i) Road Side Drain	25.18%	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of one km.
		(ii) Road/traffic signs, markings, km stones, safety devices etc.	6.00%	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than one km on both sides.

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage	Payment Procedure
		(iii) Protection works a) Breast Wall b) Parapet Wall c) Gabion Wall d) Crash Barrier	20.00% 5.72% 35.00% 6.38%	Unit of measurement is linear length. Payment against items (a), (b), (c) & (d) shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length or 100 m whichever is less.
		(iv) Safety and Traffic Management during Construction	1.72%	Payment shall be made on pro-rata basis every two months.
Part-B (Treatment of sinking Zones at 32 locations)				
Treatment and protection of 32 sinking zones	5.59%	Cost of each location shall be determined on pro rata basis with respect to the total length of 32 locations. Payment against treatment of sinking zone shall be made on completion of at least one location in all aspect.		
Part-C (Treatment of Critical Sinking Zones – 10 Locations)				
Treatment of 10 nos of Critical Sinking Zones	27.62%	Cost of each location shall be determined on pro rata basis with respect to the total length of 10 locations. Payment against treatment of sinking zone shall be made on completion of at least one location in all aspect.		

For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)
Where P= Contract Price

L = Total length in km

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

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

2. Procedure for payment for Maintenance

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

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

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex - I

(Schedule - I)

List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

During the 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 **128th (One hundred and Twenty-Eighth)** 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 **219th (Two hundred and Nineteen)** 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 percent) 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 **310th (Three hundred and Ten)** 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 365th (Three hundred and Sixty-Five) 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
Tests on Completion
(See Clause 12.1 (ii))

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: The riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with the latest equipment's 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 Non-destructive 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. Test for slope protection / Sinking Zone: The Authority's Engineer may require the Contractor to carry out or cause to be carried required tests like Pull Out test of anchor , structural member/item(s) strength, Bulging of slope, water ponding and surface depression, in accordance with Good Industry Practice, for determining the structural stability and safety and ensure completion of the work with Specifications and Standards
- v. 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.
- vi. Environmental audit: The Authority's Engineer shall carry out a check to determine the conformity of the Project Highway with the environmental requirements set forth in

Applicable Laws and Applicable Permits.

- vii. 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.

1. 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.

2. Completion Certificate

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

- 3. 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 Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
2	Roughness of pavement	Network Vehicle Survey (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)

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

Schedule – L
Completion Certificate

(See Clause 12.2)

- 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 (Name of the project), subject to and by the provisions of the Agreement. (the “**Project Highway**”) on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the day of 20....., Scheduled Completed Date for which was theday 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 outlined 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 since weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2. Percentage reductions in lump sum payments every month

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, rain cuts, disturbed pitching, vegetation growth, pruning of trees	5%
I	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%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	Roadside Drains	
(i)	Cleaning and repair of drains	5%
I	Road Furniture	
(i)	Cleaning, painting, and replacement of road signs, delineators, road markings, 200 m/km/5 th km stones	5%
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accident vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	Defects in Other Project Facilities	5%
(h)	Defects in Slope Protection / Sinking zone	
(i)	Cracks in joints / walls	5%
(ii)	Surface depression	5%
(iii)	Water ponding	5%
(iv)	Bulging of slopes	5%

- viii. The amount to be deducted from the monthly lump-sum payment for non-compliance of a particular item shall be calculated as under:

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

(i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

(ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority’s Engineer

1. Scope

(i) These Terms of Reference (the “**TOR**”) for the Authority’s Engineer are being specified pursuant to the EPC Agreement dated (the “**Agreement**), which has been entered into between the [name and address of the Authority] (the “**Authority**”) and(the “**Contractor**”)# for(Name of project), and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

(ii) The TOR shall apply to the 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 geotechnical 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 up to 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 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 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 of 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 microfilm 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 the 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 by 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 after the last claim.
- (d) amounts reflecting adjustment in price, if any, for (c) above by 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 by the provisions of the Agreement except taxes.
 - ii. Any amount towards deduction of taxes; and
 - iii. Total of (i) and (ii) above.
- (g) Net claim: (e) – (f) (iii);
- (h) The amounts received by the Contractor upto the last claim:
 - i. For the Works executed (excluding Change of Scope orders);
 - ii. For Change of Scope Orders, and
 - iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

- (i) the monthly payment admissible in accordance with the provisions of the Agreement.
- (j) the deductions for maintenance work not done.
- (k) net payment for maintenance due, (a) minus (b);
- (l) amounts reflecting adjustments in price under Clause 19.12; and
- (m) amount towards the 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 the Construction Period

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:

- (n) insurance of Works, Plant, and Materials and an additional sum of [15 (fifteen)] percent 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
- (o) 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.

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 that are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than Rs. 2,00,00,000 /- (Two Crore only)

(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(Name of the project), 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)

SCHEDULE - S

Procedure for Dispute Resolution Board

The parties to the Contract Agreement mutually agree as follows:

1. The Board shall comprise of three Members having experience in the field of construction or have been involved in the Works related to construction and with the interpretation of contractual documents. One Member shall be selected by each of the Authority and the Contractor from the list maintained by NHIDCL hosted on its website website (<https://nhidcl.com/>). In the event the parties fail to select the member within 28 days of the date of the signing of Contract agreement, in that eventuality, upon the request of either or both parties such Member shall be selected by SAROD within 14 days. The third Member shall be selected by the other two members from the same list. If the two Members selected by or on behalf of the parties fail to select the third Member within 14 days after the later of their selections, then upon the request of either or both parties such third Member shall be selected by SAROD within 14 days. The third Member shall serve as DG (Road & Development) of the Board.
2. The Board shall be constituted when each of the three Board Members has signed a Board Member's declaration of Acceptance as required by the DRB's rules and procedures (which, along with the declaration of acceptance form, are attached as Annexure herewith).
3. In the event of death, disability, or resignation of any Member, such Member shall be replaced in the same manner as the Member being replaced was selected. If for any other reason, a Member fails or is unable to serve, the Managing Director, NHIDCL (or failing the action of the Managing Director then either of the other Members) shall inform the Parties and such non-serving Member shall be replaced in the same manner as the Member being replaced was selected. Any replacement made by the parties shall be completed within 28 days after the event giving rise to the vacancy on the Board, failing which the replacement shall be made by SAROD in the same manner as described above. Replacement shall be considered complete when the new Member signs the Board Member's Declaration of Acceptance. Throughout any replacement process, the Members not being replaced shall continue to serve and the Board shall continue to function and its activities shall have the same force and effect as if the vacancy had not occurred, provided, however that the Board shall not conduct a hearing nor issue a decision until the replacement is completed.
4. If either the Authority or the Contractor is dissatisfied with any decision of the Board, and/or if the Board fails to issue its decision within 56 days after receipt of all the pleadings (along with the supporting documents) of the parties by the DG (Road & Development) of the Board or any extension mutually agreed upon by the Authority and the Contractor, in such a case, either the Authority or the Contractor may, within 28 days after his receipt of the decision, or within 28 days after the expiry of the said period, as the case may be, give notice to the other party, with a copy for information to the Authority's Engineer, of his intention to refer the matter to the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement.
5. It is mandatory to refer all the disputes to DRB before issuance of completion certificate and satisfactory completion of punch list items. No dispute shall be entertained after completion of aforementioned date.
6. If the Board has issued a decision to the Authority and the Contractor within the said 56 days or any extension mutually agreed upon by the Authority and the Contractor and no notice of intention to commence Conciliation by the Conciliation Committee of Independent Experts (CCIE) of the Authority for Conciliation/amicable settlement as to such dispute has been given by either the Authority or the Contractor within 28 days after the parties received such decision from the Board, the decision shall become final and binding upon the Authority and Contractor.

7. Whether or not it has become final and binding upon the Authority and the Contractor, a decision shall be admissible as evidence in any subsequent dispute resolution procedure, including any arbitration or litigation having any relation to the dispute to which the decision relates.
8. All decision of DRB which have become final and binding or till they have been reversed in subsequent conciliation/Arbitration process shall be implemented by the parties forthwith. Such implementation shall also include any relevant action of the Authority's Engineer.
9. If during the Contract Period, the Authority and the Contractor are of the opinion that the Disputes Resolution Board is not performing its functions properly, the Authority and the Contractor may together disband the Disputes Resolution Board and reconstitute it. In that case, a new board shall be selected in accordance with the provisions applying to the selection of the original Board as specified above, except that words "within 28 days after the signing of this Contract agreement" shall be replaced by the words "within 28 days after the date on which the notice disbanding the original Board became effective".
10. The Authority and the Contractor shall jointly signed a notice specifying that the Board shall stand disbanded with effect from the date specified in the notice. The notice shall be posted by the email to each member of the Board. A Member shall be deemed to have received the email even if he refuses to have received the same.
11. All other terms and conditions of the original Contract Agreement shall remain unaltered/unaffected and the parties shall remain bound by terms and conditions as contained therein.

Annexure to Schedule [S]

Disputes Resolution Board's Rules and Procedures

1. Except for providing the services required hereunder, the Board Members shall not give any advice to either party or to the Authority's Engineer concerning conduct of the Works. The Board Members:
 - a. Shall have no financial interest in any party to the Contract, or the Authority's Engineer, or a financial interest in the contract, except for payment for services on the Board.
 - b. Shall have had no previous employment by, or financial ties to, any party to the Contract Agreement, or the Authority's Engineer, except for fee based consulting services/advisers on other projects, and/or be Retired Government Officers (not connected in whole or part with the project), all of which must be disclosed in writing to both parties prior to appointment to the Board.
 - c. Shall have disclosed in writing to both parties prior to appointment to the Board any and all recent or close professional or personal relationships with any director, officer, or employee of any party to the Contract, or the Authority's Engineer, and any and all prior involvement in the project to which the Contract relates:
 - d. Shall not, while Board member, be employed whether as a consultant or adviser or otherwise by either party to the Contract, or the Authority's Engineer, except as a Board Member, without the prior consent of the parties and the other Board Members;
 - e. Shall not, while a Board Member, engage in discussion or make any agreement with any party to the Contract, or with the Authority's Engineer, regarding employment whether as a consultant or otherwise whether after the Contract is completed or after service as a Board Member is completed.
 - f. Shall remain and be impartial and independent of the parties and shall disclose in writing to the Authority, the Contractor and one another any fact or circumstance which might be such as to cause either the Authority or the Contractor to question the continued existence of the impartiality and independence required of Board Members, and
 - g. Shall be fluent in the language of the Contract.
2. Except for its participation in the Board's activities as provided in the Contract Agreement and in this Agreement none of the Authority, the Contractor, and or the Authority's Engineer shall solicit advice or consultation from the Board or the Board Members on matters dealing with the conduct of the Works.
3. The Contractor shall:
 - a. Furnish to each Board member one copy of all documents which the Board may request including Contract Agreement, progress reports and other documents pertinent to the performance of the Contract Agreement.
 - b. In cooperation with the Authority, coordinate the site visits of the Board, including conference facilities, and secretarial and copying service.
4. The Board shall begin its activities following the signing of a Board Member's Declaration of Acceptance by all three Board Members, and it shall terminate these activities as set forth below:
 - a. The Board shall terminate its regular activities when either (i) issuance of completion certificate and completion of punch list items or (ii) the parties have terminated the contract and when, in either case, the Board has communicated to the parties and the Authority's Engineer its decision on all disputes previously referred to it.

- b. Once the Board has terminated its regular activities as provided by the previous paragraph, the Board shall remain available to process any dispute referred to it by either party. In case of such a referral, Board Members shall receive payments as provided in paragraphs 7(a) (ii), (iii) and (iv).
5. Board Members shall not assign or subcontract any of their work under these Rules and Procedures.
6. The Board Members are Independent and not employees or agents of either the Authority or the Contractor.
7. Payments to the Board Members for their services shall be governed by the following provisions.
 - a. Each Board Member will receive payments as follows:
 - i. A retainer fee per calendar month as specified in the schedule of fee made part of this Schedule and its revision from time to time. This retainer fee shall be considered as payment in full for:
 - A. Being available, on 7 days' notice, for all hearings, Site Visits, and other meetings of the Board.
 - B. Being conversant with all project developments and maintaining relevant files.
 - C. All offices and overhead expenses such as secretarial services, photocopying and office supplies (but not include telephone calls, faxes and telexes) incurred in connection with the duties as a Board Member.
 - ii. A daily fee as specified in the schedule of fee in respect of fee for site visit & meeting, fee for meeting/ hearing not at site and extra charges for days max. of 02 days for travel on each occasion) other than hearing / meeting days.
 - iii. Expenses, in addition to the above, all reasonable and necessary travel expenses (including economy class air fare, subsistence, and other direct travel expenses). Receipts for all expenses in excess of Rs. 2000/- (Rupees Two Thousand only) shall be provided.
 - iv. Reimbursement of any taxes that may be levied on payments made to the Board Member pursuant to this paragraph 7.
 - b. The retainer fee and other fees shall remain fixed for the period of each Board Member's term until revised by NHIDCL.
 - c. Phasing out of monthly retainer fee. Beginning with the next month after the completion certificate (or, if there are more than one, the one issued last) has been issued, the Board members shall receive only one-third of the monthly retainer fee till next one year. Beginning with the next month after the Board has terminated its regular activities pursuant to paragraph 4(a) above, the Board members shall no longer receive any monthly retainer fee.
 - d. Payments to the Board Members shall be shared equally by the Authority and the Contractor. The concerned Project Implementation Unit (PIU) of Authority shall pay members' invoices within 30 calendar days after receipt of such invoices and shall invoice the Contractor for one-half of the amounts of such invoices. The Contractor shall pay such invoices within 30 days' time period after receipt of such invoices.
8. Board Site Visits:
 - a. The Board shall visit the Site and meet the representatives of the Authority, the Contractor and the Authority's Engineer at regular intervals, at times of critical construction events, at the written request of either party, and in any case not less than 6 times in any period or 12 months. The timing of Site visits shall be as agreed among the Authority, the Contractor and the Board, but failing agreement shall be fixed by the Board.

- b. Site visits shall include an informal discussion of the status of the construction of the Works. Site visits shall be attended by personnel from the Authority, the Contractor and the Authority's Engineer.
- c. At the conclusion of each Site visit, the Board shall prepare a report covering its activities during the visit and shall send copies to the parties and to the Authority's Engineer.

9. Procedure for Dispute Referral to the Board

- a. If either party objects to any action or inaction of the other party or the Authority's Engineer, the objecting party may file a written Notice of Dispute to the other party with a copy to the Authority's Engineer stating that it is given pursuant to the Agreement and state clearly and in details the basis of the dispute.
- b. The party receiving the Notice of Dispute will consider it and respond to it in writing within 14 days after receipt.
- c. This response shall be final and conclusive on the subject, unless a written appeal to the response is filed with the responding party within 10 days after receiving the response and call upon Authority's Engineer to mediate and assist the parties in arriving an amicable settlement thereof. Both parties are encouraged to pursue the matter further to attempt to settle the dispute.
- d. If the Authority's Engineer receiving the Notice of Dispute fails to provide a written response within 14 days after receipt of such Notice or failing mediation by Authority's Engineer, either party may require such dispute to be referred to the Board, either party may refer the dispute to the Board by written Request to the Board. The Request for decision shall state clearly and in full detail the specific issues of the dispute (s) to be considered by Board and shall be addressed to the DG (Road & Development) of the Board, with copies to the other Board Members, the other party, and the Authority Engineer, and it shall state that it is made pursuant to this Agreement.
- e. When a dispute is referred to the Board, and the Board is satisfied that the dispute requires the Board's assistance, the Board decide when to conduct a hearing on the dispute. The Board may request that written documentation and arguments from both parties be submitted to each Board Member before the hearing begins. The parties shall submit insofar as possible agreed statements of the relevant facts.
- f. During the hearing, the Contractor, the Authority, and the Authority's Engineer shall each have ample opportunity to be heard and to offer evidence. The Board's decision for resolution of the dispute will be given in writing to the Authority, the Contractor and the Authority's Engineer as soon as possible, and in any event not more than 56 days or any mutually extended period between the Authority and the Contractor. The time period of 56 days of issuance of DRB decision will reckon/start from the day of first hearing that begins after submission of complete pleadings (including supporting documents, if any) by the parties.

10. Conduct of Hearings:

- a. Normally hearings will be conducted at the Site, but any location that would be more convenient and still provide all required facilities and access to necessary documentation may be utilized by the Board. Private session of the Board may be held at any cost-effective location convenient to the Board. Video recordings of all hearings shall invariably be made.
- b. The Authority, the Authority's Engineer and the Contractor shall be given opportunity to have representatives at all hearings. Parties should restrain to bring any Advocate/Law Firm during DRB hearings.
- c. During the hearings, no Board Member shall express any opinion concerning the merit of the respective arguments of the parties.
- d. After the hearings are concluded, the Board shall meet privately to formulate its decision. The private meeting (s) of the Board shall not exceed 3 sittings. All Board deliberations shall be conducted in private, with all

Members' individual views kept strictly confidential. The Board's decisions, together with an explanation of its reasoning shall be submitted in writing to both parties and to the Authority's Engineer. The decision shall be based on the pertinent contract provisions, applicable laws and regulations and the facts and circumstances involved in the dispute.

- e. The Board shall make every effort to reach a unanimous decision. If this proves impossible the majority shall decide and the dissenting Member may prepare a written minority report together with an explanation of its reasoning for submission to both parties and to the Authority's Engineer
11. In all procedural matters, including the furnishing of written documents and arguments relating to disputes, site visits and conduct of hearings, the Board shall have full and the final authority. If a unanimous decision on any such matter proves impossible, the majority shall prevail.
 12. After having been selected and where necessary approved each Board Member shall sign two copies of the following declaration and make one copy available each to the Authority and to the Contractor.

BOARD MEMBER'S DECLARATION OF ACCEPTANCE

WHEREAS

- a. A Contract Agreement (the Contract) for the _____ project [fill in the name of project] has been signed on _____ [fill in date] between _____ [name of Authority] and _____ name of Contractor] (the Contractor);
- b. The provisions of Agreement and Dispute Resolution Board's rules and procedure provided for establishment and operation of Dispute Resolution Board (DRB).
- c. The undersigned has been selected to serve as a Board Member on said Board;

NOW THEREFORE, the undersigned Board Member hereby declares as follows

- 1. I accept the selection as a Board Member and agree to serve on the Board and to be bound by the provisions of Contract Agreement and rules and procedure provided for establishment and operation of Dispute Resolution Board DRB).
- 2. With respect to paragraph 1 of Dispute Resolution Board's Rules and Procedure. said Annex A, I declare
 - a. that I have no financial interest of the kind referred to in subparagraph (a):
 - b. that I have had no previous employment nor financial ties of the kind referred to in subparagraph (b); and
 - c. that I have made to both parties any disclosures that may be required by sub- paragraphs (b) and (c).
- 3. I declare that I have _____no. of Arbitrations (list enclosed) and _____ no. of DRBs (list enclosed) in progress and that I will give sufficient time for the current assignment.

BOARD MEMBER

_____ [insert name of Board Member)

Date: _____

Schedule of expenses and fees payable to the Member(s) of Dispute Resolution Board (DRB)

The fee and other expenses payable to the Members of DRB shall be as under

S. No.	Particular	Amount Payable
1	Retainer-ship fee, secretarial assistance and incidental charges (telephone, fax, postage etc)	Rs. 50,000/- per month for one package and maximum of Rs. 75,000/- per month for 2 or more packages
2(i)	Fee for site visit or meetings at site	Rs. 25,000/- per day
(ii)	Fee for meetings/hearings not at site	Rs. 10,000/- per day
3	Traveling expenses	Economy class by air, AC first class by train and AC taxi by road
4	Lodging & Boarding	Rs. 15,000/- per day (Metro Cities): or Rs. 10,000/- per day (in other cities); or Rs. 5,000/- per day (own arrangement)
5	Extra charges for days other than hearing/meeting days (travel days maximum of 2 days on each occasion)	Rs. 5,000/-
6	Local conveyance	Rs. 2,000/-

Notes:

- i. Lodging, boarding and travelling expenses will be allowed only for those members who are residing 100 kms away from the place of meeting.
- ii. Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad shall be considered as Metro Cities.
- ii. The above schedule of fee and expenses shall be applicable on or after the date of issue of this circular.
- iv. The expenses are to be shared equally by the parties i.e. Authority and Contractor.

******* End of the Document *******