Annex – I

(Schedule-A)

Site

Note: All the chainages/ location referred to in Annex-I to Schedule-A shall be existing chainages. The existing Ch. Has been measure with respect to existing Centre

1. *Site*

The Site of the Two-Lane Project Highway comprises the section of National Highway-217 (Old NH-51) Road, "Package-III" Assam Meghalaya State Boarder to West Garo Hills District., Meghalaya, from Km 48+625 to Km 79+830 (From Design Ch .Km 47.075 to Km 77.055, Design Length = 29.980 Km) in the State of Meghalaya. The land, carriageway and structures comprising the Site are described below.

2. *Land*

The Site of the Project Highway comprises the land as described below:

Sl. No.	Existing Chainage		ROW		Total Width of ROW (m)	Remarks
	From	To	LHS (m)	RHS (m)		
(1)	(4)	(5)	(6)	(7)	(8)	(9)
1	48+625	63+200	10.67	10.67	21.34	
2	59+075	61+190	10.67	10.67	21.34	Airport Realignment
3	61+190	63+200	10.67	10.67	21.34	
4	63+200	63+725	10.67	10.67	21.34	Jinjal Bypass
5	63+725	78+050	10.67	10.67	21.34	
6	78+050	78+625	10.67	10.67	21.34	Rongram Bypass
7	78+625	79+830	10.67	10.67	21.34	

3. *Carriageway*

The present carriageway of the Project Highway consists of two lanes/two lanes with paved shoulders with bituminous pavement and earthen shoulders configuration from Ex. Ch. Km 48+625 to Ex. Ch. Km 79+830. The type of the existing pavement of the section is flexible.

Sr. No.	**Existing Chainage (km)**		**Carriageway**	**Remarks**
	From	To		
(1)	(2)	(3)	(4)	(5)
1	48+625	79+830	2-lanes/ 2-lanes with Paved shoulders	7.0 CW/ 10.0 m CW

Note: The Project Highway alignment has been modified due to Minor realignment & Curve improvements all along.

4. *Major Bridges*

The Site includes the following Existing Major Bridges:

Sr. No.	**Existing Chainage (km)**	**Type of Structure**			**No. of Spans with span length (m)**	**Width (m)**
		Found ation	**Sub-Structure**	**Super-structure**		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
NIL						

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

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

S. No.	Existing Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
(1)	(2)	(3)		(4)	(5)	(6)
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	Superstructure		
(1)	(2)	(3)	(4)	(5)	(6)
NIL					

7. *Minor bridges*

The Site includes the following minor bridges:

Sr. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)	Remarks
		Foundation	Sub-Structure	Supper-structure			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	48.475**	Open	Wall Type	T Beam RCC Girder	1X25.0	7.15	
2	51.800	Open	Wall Type	Slab	1X10.0	8.45	

Sr. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)	Remarks
		Foundation	Sub-Structure	Supper-structure			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3	53.400	Open	Wall Type	Slab	1X12.0	8.15	
4	53.925	Open	Wall Type	Slab	1x12.0	8.15	
5	60.575	Open	Wall Type	Slab	1x10.0	11.05	
6	63.775*	Open	Wall Type	Slab	1X20.0	11.00	
7	67.590	Open	Wall Type	Slab	1X10.0	8.45	
8	69.125	Open	Wall Type	Slab	1X10.0	11.55	
9	70.200	Open	Wall Type	T Beam RCC Girder	1X25.0	8.30	
10	74.400	Open	Wall Type	T Beam RCC Girder	1X16.6	11.00	
11	75.830	Open	Wall Type	SLAB	1X10.0	10.40	
12	76.600	Open	Wall Type	Slab	1X10.0	10.5	
13	78.305*	Open	Wall Type	T Beam RCC Girder	1X37.0	10.4	
14	79.300	Open	Wall Type	SLAB	1x6.0	9.25	

Note

* The Project Highway Alignment is being modified at these Minor Bridge locations. The contractor shall maintain this existing bridge in Traffic worthiness during construction.
** The above-mentioned bridge is undertaken by the PWD Meghalaya and hence is not considered in the DPR.

8. *Railway level crossings*

The Site includes the following railway level crossings:

S. No.	**Location (km)**	**Remarks**
(1)	(2)	(3)
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)
(1)	(2)	(3)	(4)	(5)

NIL

10. *Culverts*

The Site has the following culverts:

Sr. No.	Existing Chainage (km)	Type of structure	Span arrangement No of Span x Clear Span (m)	Width of culvert (m)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1	48.670	Pipe	1x1.0	10.25	
2	48.835	Pipe	1x1.0	10.56	
3	49.105	SLAB	1x2.0	9.2	
4	49.180	Pipe	2x1.0	9.1	
5	49.365	Pipe	1x1.0	11.75	
6	49.58	Pipe	1x0.8	10.45	
7	49.670	SLAB	1x3.0	9	
8	49.735	Pipe	1x1.0	10.5	
9	50.310	Pipe	1x1.0	11.85	
10	50.36	SLAB	1x2.65	9.25	
11	50.490	Pipe	1x1.0	9.25	
12	51.000	Pipe	1x1.1	10.7	
13	51.275	Pipe	1x1.0	10.5	
14	51.460	Pipe	2x1.0	10.38	
15	51.650	Pipe	1x1.0	10	
16	51.700	Pipe	1x1.0	10.6	
17	51.950	Pipe	1x1.0	9.25	
18	52.025	Pipe	1x1.0	10.4	
19	52.100	Pipe	2x1.0	10.5	
20	52.310	Pipe	1x1.0	10.45	
21	52.450	Pipe	1x1.0	10.65	
22	52.870	Pipe	1x1.0	11.83	
23	53.025	Pipe	1x1.0	11.7	
24	53.075	SLAB	1x1.8	11	
25	54.025	Pipe	1x1.0	10.4	
26	54.18	SLAB	1X1.7	11.6	
27	54.35	Pipe	1x1.0	10.48	
28	54.38	SLAB	1x3.0	12	
29	54.45	SLAB	1x1.7	20	
30	54.575	Pipe	1x1.0	11	
31	54.680	Pipe	1x1.0	21	
32	54.775	Pipe	1x1.0	11.6	
33	54.890	Pipe	1x1.0	12	
34	54.960	Pipe	1x1.0	12.1	
35	55.125	SLAB	1x1.8	11.25	
36	55.620	Pipe	1x1.0	11.8	
37	55.700	Pipe	1x1.0	11.7	

Sr. No.	Existing Chainage (km)	Type of structure	Span arrangement No of Span x Clear Span (m)	Width of culvert (m)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
38	56.150	Pipe	1x1.0	11.95	
39	56.390	Pipe	1x1.0	11.7	
40	56.750	SLAB	1x3.0	11	
41	57.170	Pipe	1x1.0	11.8	
42	57.225	Pipe	2x1.0	19.5	
43	57.430	Pipe	1x1.0	11.6	
44	57.570	Pipe	1x1.0	11.75	
45	57.680	Pipe	1x1.0	11	
46	57.715	Pipe	1x1.0	16	
47	57.805	Pipe	1x1.0	11.75	
48	57.990	Pipe	1x1.0	13.9	
49	58.245	Pipe	1x1.0	11.85	
50	58.320	Pipe	1x1.0	12	
51	58.400	Pipe	1x1.0	10.7	
52	58.525	SLAB	1x2.0	11.2	
53	58.585	Pipe	1x1.0	10.6	
54	58.745	Pipe	1x1.0	12.15	
55	58.97	Pipe	1x1.0	11.7	
56	59.190	Pipe	1x1.0	10.75	
57	59.320	Pipe	1x1.0		
58	59.820	Pipe	1x1.0		
59	60.900	Pipe	1x0.8		
60	61.125	SLAB	1x5.0		
61	61.580	SLAB	3x1.0		
62	62.415	Pipe	3x1.0		
63	64.000	Pipe	1x0.8		
64	64.155	Pipe	1x0.8		
65	64.310	Pipe	1x1.0		
66	64.710	SLAB	1x3.0		
67	64.785	Pipe	1x0.8		
68	65.845	Pipe	2x1.0		
69	67.275	Pipe	1x1.0		
70	67.920	Pipe	1x0.8		
71	68.075	Pipe	1x0.8		
72	68.325	Pipe	1x1.0		
73	68.360	Pipe	1x0.8		
74	68.440	Pipe	1x1.0		
75	68.725	Pipe	2x1.0		
76	68.845	Pipe	1x1.0		
77	69.580	Pipe	1x1.0		
78	69.800	Pipe	1x1.0		
79	69.880	Pipe	1x1.0		

Sr. No.	Existing Chainage (km)	Type of structure	Span arrangement No of Span x Clear Span (m)	Width of culvert (m)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
80	69.950	Pipe	1x1.0		
81	70.035	Pipe	1x1.0		
82	70.350	Pipe	2x1.0		
83	70.690	SLAB	1x3.0		
84	70.775	Pipe	1x1.0		
85	70.890	Pipe	1x1.0		
86	70.950	Pipe	1x1.0		
87	71.125	Pipe	1x1.0		
88	71.325	Pipe	2x1.2		
89	71.470	Pipe	2x1.2		
90	71.520	Pipe	1x1.2		
91	71.650	Pipe	2x1.2		
92	71.9	Pipe	1x1.2		
93	72.01	SLAB	1x2.0		
94	72.110	Pipe	1x1.2		
95	72.300	SLAB	1x3.0		
96	72.525	Pipe	1x1.2		
97	72.620	Pipe	1x1.2		
98	72.730	SLAB	1x4.0		
99	72.840	Pipe	1x1.2		
100	72.975	Pipe	1x1.2		
101	73.040	Pipe	1x1.2		
102	73.31	Pipe	1x1.2		
103	73.350	Pipe	1x1.2		
104	73.560	Pipe	1x1.2		
105	73.750	Pipe	1x1.2		
106	73.97	SLAB	1x5.0		
107	74.240	Pipe	1x1.2		
108	74.380	Pipe	1x1.2		
109	74.550	Pipe	1x1.0		
110	74.850	Pipe	1x1.0		
111	75.150	Pipe	1x1.0		
112	75.275	Pipe	1x1.0		
113	75.675	Pipe	1x1.0		
114	75.750	Pipe	1x1.0		
115	76.100	SLAB	1x1.0		
116	76.210	SLAB	1x1.0		
117	76.430	Pipe	1x1.0		
118	77.225	Pipe	1x1.0		
119	77.460	Pipe	1x1.0		
120	77.550	Pipe	1x1.0		

Sr. No.	Existing Chainage (km)	Type of structure	Span arrangement No of Span x Clear Span (m)	Width of culvert (m)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
121	77.660	Pipe	2x1.0		
122	77.86	Pipe	1x1.0		
123	78.040	Pipe	1x1.0		
124	78.76	Pipe	1x1.0		
125	78.950	Pipe	2x1.0		
126	79.100	SLAB	1x1.0		
127	79.850	Pipe	2x1.0		

11. *Bus bays*

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

Sl. No.	**Existing Chainage (km)**	**Length (m)**	**Left Hand Side**	**Right Hand Side**
(1)	(2)	(3)	(4)	(5)
NIL				

12. *Truck Lay byes*

The details of truck lay byes are as follows:

SL. No.	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
(1)	(2)	(3)	(4)	(5)
		NIL		

13. *Road side drains*

The details of the roadside drains are as follows:

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	50+890	50+950	RHS		
2	51+695	51+815	LHS		
3	52+180	52+205	LHS		
4	52+220	52+240	LHS		
5	52+318	52+362	RHS		
6	52+330	52+445	LHS		
7	52+367	52+495	RHS		
8	52+495	52+575	LHS		
9	52+540	52+553	RHS		
10	52+655	52+690	RHS		

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
11	52+700	72+730	RHS		
12	52+950	53+188	RHS		
13	53+898	53+988	LHS		
14	54+448	54+515	LHS		
15	54+728	54+822	LHS		
16	55+118	55+198	RHS		
17	55+352	55+428	LHS		
18	55+440	55+558	LHS		
19	56+370	56+415	LHS		
20	56+470	56+485	LHS		
21	56+980	57+062	LHS		
22	57+435	57+515	RHS		
23	57+445	57+525	LHS		
24	57+715	57+965	LHS		
25	57+980	58+065	LHS		
26	59+280	59+315	LHS		
27	59+340	59+460	RHS		
28	59+554	59+604	RHS		
29	59+675	59+782	RHS		
30	59+815	59+835	RHS		
31	59+844	60+022	LHS		
32	59+975	60+025	RHS		
33	60+115	60+277	RHS		
34	60+402	60+670	LHS		
35	60+718	61+132	LHS		
36	60+782	60+950	RHS		
37	61+030	61+132	RHS		
38	61+175	61+228	RHS		
39	61+300	61+350	RHS		
40	61+350	61+475	LHS		
41	61+535	61+660	LHS		
42	62+275	62+335	LHS		
43	62+375	62+410	LHS		
44	62+605	62+718	RHS		
45	62+815	63+015	RHS		
46	63+595	63+625	RHS		
47	63+650	64+450	RHS		
48	64+480	64+535	LHS		
49	64+475	64+535	RHS		
50	64+555	64+880	RHS		
51	64+965	65+025	LHS		
52	65+110	65+305	RHS		

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
53	65+400	65+420	RHS		
54	65+440	65+500	LHS		
55	65+615	65+825	LHS		
56	65+615	65+980	RHS		
57	65+832	66+082	LHS		
58	66+060	66+290	RHS		
59	66+115	66+168	LHS		
60	66+175	66+610	LHS		
61	66+425	66+680	RHS		
62	66+750	67+140	LHS		
63	67+150	67+310	LHS		
64	67+342	67+678	RHS		
65	67+405	67+643	LHS		
66	67+705	67+780	RHS		
67	67+763	67+825	LHS		
68	67+870	68+100	LHS		
69	68+135	68+200	RHS		
70	68+146	68+200	LHS		
71	68+210	68+270	LHS		
72	68+210	68+345	RHS		
73	68+410	68+500	RHS		
74	68+520	68+620	LHS		
75	68+632	68+802	LHS		
76	68+695	68+785	RHS		
77	68+820	68+886	LHS		
78	68+894	68+930	LHS		
79	69+020	69+340	LHS		
80	69+235	69+585	RHS		
81	69+420	69+660	LHS		
82	69+680	69+740	LHS		
83	69+830	69+962	LHS		
84	69+880	69+900	RHS		
85	69+920	69+940	RHS		
86	70+040	70+140	LHS		
87	70+177	70+485	LHS		
88	70+530	70+610	LHS		
89	70+620	70+830	LHS		
90	70+858	70+926	LHS		
91	70+896	71+110	RHS		
92	71+334	71+455	LHS		
93	71+480	71+535	LHS		
94	71+480	71+710	RHS		

S .No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
95	71+550	71+600	LHS		
96	71+643	71+805	LHS		
97	71+838	72+044	LHS		
98	72+066	72+100	LHS		
99	72+150	72+535	LHS		
100	72+544	72+556	LHS		
101	72+660	73+360	LHS		
102	73+384	73+754	LHS		
103	73+780	73+960	LHS		
104	73+910	73+950	RHS		
105	74+000	74+175	RHS		
106	74+046	74+238	LHS		
107	74+500	74+770	RHS		
108	74+876	74+958	RHS		
109	75+182	75+462	RHS		
110	75+490	75+538	LHS		
111	76+110	76+230	RHS		
112	76+453	76+533	LHS		
113	76+654	76+752	LHS		
114	76+970	76+998	LHS		
115	77+035	77+630	LHS		
116	77+678	77+953	LHS		
117	78+190	78+420	LHS		
118	78+274	78+336	RHS		
119	78+432	78+535	LHS		
120	78+440	78+540	RHS		
121	78+550	78+586	LHS		
122	78+662	78+770	LHS		
123	78+790	78+898	LHS		
124	79+350	79+615	LHS		
125	79+640	79+785	LHS		

14. *Major junctions*

The details of major junctions are as follows:

S. No.	**Location**		**At grade**	**Separated**	**Category of Cross Road**			
	From km	**to km**			**NH**	**SH**	**MDR**	**Others**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	63+740		At grade (T)					
2	78+285		At grade (T)					

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

15. *Minor junctions*

The details of the minor junctions are as follows:

S. No.	Location		Sides	Type	
	From km	To km		T -junction	Cross road
(1)	(2)	(3)	**(4)**	(5)	(6)
1	49+724			T	VR
2	50+680			T	VR
3	50+945			Y	VR
4	51+066			Y	VR
5	52+651			T	VR
6	53+691			T	VR
7	55+841			Y	VR
8	57+837			T	VR
9	61+369			T	VR
10	62+498			T	VR
11	62+887			Y	VR
12	63+040			Y	VR
13	64+524			Y	VR
14	65+284			T	VR
15	66+087			Y	VR
16	66+844			T	VR
17	66+950			T	VR
18	68+565			Y	VR
19	69+963			Y	VR
20	70+081			T	VR
21	71+259			Y	VR
22	71+634			Y	VR
23	75+581			Y	VR
24	75+627			Y	VR
25	75+958			T	VR
26	76+340			T	VR
27	76+545			Y	VR
28	76+856			T	VR
29	78+965			T	VR
30	79+071			Y	VR
31	79+522			T	VR

16. *Bypasses*

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

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

17. *Other structures*

S. No.	Type of Structure	Existing Chainage (km) From km to km	Length (in Km)
NIL			

18. Retaining *Walls/ Breast Walls*

The details of the existing Retaining Wells/ Breast Walls are as follows.

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
(1)	(2)	(3)	(4)	(5)	(6)
1	49+090	49+105	LHS		
2	49+690	49+730	LHS		
3	49+812	49+822	RHS		
4	50+215	50+232	RHS		
5	50+240	50+260	LHS		
6	50+685	50+704	LHS		
7	51+050	51+075	RHS		
8	51+398	51+422	RHS		
9	51+825	51+835	RHS		
10	51+960	51+970	RHS		
11	51+977	51+998	RHS		
12	52+032	52+048	RHS		
13	52+650	52+662	LHS		
14	52+700	52+730	LHS		
15	52+735	52+745	LHS		
10	52+812	52+835	LHS		
16	52+910	52+935	LHS		
17	53+005	53+030	LHS		
18	53+140	53+188	LHS		
19	53+198	53+204	LHS		
20	53+225	53+252	LHS		
21	53+596	53+615	RHS		
22	53+700	53+715	RHS		
23	53+760	53+775	RHS		
24	53+795	53+802	RHS		
25	53+898	53+910	RHS		
26	54+382	54+405	RHS		
27	54+410	54+437	RHS		
28	54+495	54+505	RHS		
29	54+583	54+620	RHS		
30	54+635	54+660	RHS		
31	54+650	54+720	LHS		
32	54+775	54+810	RHS		
33	54+905	54+925	RHS		
34	54+925	54+980	LHS		
35	54+990	55+110	LHS		

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
36	55+118	55+154	LHS		
37	55+340	55+365	RHS		
38	55+490	55+500	RHS		
39	55+598	55+628	RHS		
40	55+878	55+940	LHS		
41	55+975	55+988	RHS		
42	56+020	56+035	RHS		
43	56+265	56+300	RHS		
44	56+410	56+435	RHS		
45	56+450	56+470	LHS		
46	56+575	56+615	RHS		
47	56+846	56+858	RHS		
48	56+888	56+910	RHS		
49	56+935	56+970	RHS		
50	57+075	57+152	RHS		
51	57+275	57+282	RHS		
52	57+515	57+540	RHS		
53	57+705	57+715	LHS		
54	57+705	57+720	RHS		
55	57+960	57+963	RHS		
56	58+028	58+075	RHS		
57	58+205	58+225	RHS		
58	58+255	58+265	RHS		
59	58+480	58+545	RHS		
60	58+620	58+635	RHS		
61	58+720	58+740	RHS		
62	58+950	58+985	RHS		
63	59+146	59+170	RHS		
64	59+310	59+335	RHS		
65	59+320	59+352	LHS		
66	59+465	59+485	LHS		
67	59+528	59+543	LHS		
68	59+760	59+790	LHS		
69	60+032	59+106	LHS		
70	60+318	60+327	RHS		
71	60+650	60+675	RHS		
72	60+970	61+030	RHS		
73	63+650	63+678	LHS		
74	64+415	64+445	LHS		
75	64+468	64+480	LHS		
76	64+560	64+615	LHS		
77	65+144	65+195	LHS		
78	65+365	65+415	LHS		

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
79	65+530	65+540	RHS		
80	65+520	65+565	LHS		
81	66+005	66020	RHS		
82	66+695	66+735	RHS		
83	67+003	67+008	RHS		
84	67+040	67+055	RHS		
85	67+190	67+255	RHS		
86	67+360	67+390	LHS		
88	67+675	67+690	RHS		
89	67+690	67+730	LHS		
90	67+828	67+844	RHS		
91	68+105	68+125	RHS		
92	68+575	68+658	RHS		
93	68+785	68+810	RHS		
94	68+837	68+842	RHS		
95	68+990	69+015	RHS		
96	69+140	69+160	RHS		
97	69+352	69+402	LHS		
98	69+730	69+805	RHS		
99	69+970	69+990	RHS		
100	70+050	70+065	RHS		
101	71+720	71+750	RHS		
102	71+785	71+810	RHS		
103	71+825	71+876	RHS		
104	71+960	72+080	RHS		
105	72+320	72+350	RHS		
106	72+426	72+484	RHS		
107	72+980	73+000	RHS		
108	73+030	73+065	RHS		
109	73+140	73+170	RHS		
110	73+960	74+016	LHS		
111	74+022	74+038	LHS		
112	74+180	74+190	RHS		
113	75+090	75+130	LHS		
114	75+538	75+542	LHS		
115	75+538	75+555	RHS		
116	75+880	75+895	RHS		
117	77+000	77+035	RHS		
118	77+122	77+142	RHS		
119	77+660	77+670	RHS		
120	78+678	78+728	RHS		
121	79+062	79+094	LHS		
122	79+076	79+094	RHS		

S. No.	Location (Km)		LHS/RHS/BHS	Type	Remarks (if any)
	From	To			
123	79+537	79+550	RHS		
124	79+750	79+790	RHS		

Sheet-I (Annexure-1 to Schedule-A)

(i) Electrical utilities

The site includes following electrical utilities: -

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

Sr. No.	Chainage (Km)		Length(in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	132KV	66KV

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

Total LT poles =84, Total HT poles 11KV=89, Total HT Poles 33 KV=28 Total Transformers=10 Nos.

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
1	48+354	48+393	64			LHS			
2	48+400						33		
3	48+403	48+5	95			RHS			
4	48+516						57		
5	48+51	48+6	77			LHS			
6	48+609	48+658	74			RHS			
7	48+627	48+635	22			RHS			
8	48+652						62		
9	48+645	49+228	615			LHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
10	48+873						44		
11	48+967						52		
12	49+016						38		
13	49+019						55		
14	49+120						31		
15	49+123	49+251	149			RHS			
16	49+792						67		
17	49+806	49+951	144			RHS			
18	49+939						42		
19	50+321						58		
20	50+715						70		
21	51+016						71		
22	51+177	51+26	100			LHS			
23	51+369						50		
24	51+403	51+609	228			RHS			
25	51+616						36		
26	51+67						47		
27	51+683	51+831	157			RHS			
28	51+742						43		
29	51+969	52+037	92			RHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
30	51+964						61		
31	54+571						65		
32	58+037	58+225	192			LHS			
33	58+075	58+076	23			LHS			
34	58+225						25		
35	58+244	58+26	22			RHS			
36	58+29	58+323	39			RHS			
37	58+334						33		
38	58+349	58+353	18			LHS			
39	58+438	58+465	28			LHS			
40	58+479						40		
41	58+655	58+817	178			RHS			
42	58+859						77		
43	58+894	58+947	51			LHS			
44	58+947						30		
45	58+947	58+966	24			RHS			
46	47+475	47+658		197		RHS			
47	48+402							42	
48	50+752							81	
49	51+013							143	

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
50	51+112	51+246		143		LHS			
51	51+235							36	
52	51+229	51+239				RHS		19	
53	51+407							50	
54	52+073							67	
55	52+184							162	
56	52+245	52+314		62		RHS			
57	52+348							77	
58	53+402							157	
59	55+208							184	
60	55+359	55+519		155		RHS			
61	55+632							70	
62	55+831							75	
63	56+291	56+43		184		RHS			
64	56+607							86	
65	56+851							64	
66	58+045	58+092		48		RHS			
67	58+096							20	
68	58+110							49	
69	58+196							115	

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
70	58+942	59+271		144		LHS			
71	59+285							40	
72	59+312							26	
73	59+312	59+376		64		RHS			
74	47+254								139
75	47+34	47+443			114	LHS			
76	53+697								225
77	53+812	53+949			142	RHS			
78	55+470								77
79	55+505	55+611			102	RHS			
80	55+808								76
81	56+303	56+423			163	RHS			
82	56+616								91
83	56+991								118
84	60119						30		
85	60120	60122	20			LHS			
86	60842	61096	256			RHS			
87	61081						37		
88	61454	61479	35			LHS			
89	61480						27		

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
90	64162						45		
91	64773	64839	77			RHS			
92	64847						32		
93	64861	64876	17			LHS			
94	65325						61		
95	65347	65348	17			LHS			
96	65347	65385	41			LHS			
97	65928						35		
98	65929	65928	10			LHS			
99	66421						52		
100	67130						73		
101	60321							39	
102	60333	60414		78		LHS			
103	60407							36	
104	61441	61451		12		LHS			
105	61475							52	
106	61512							91	
107	61576	61738		163		LHS			
108	61738							64	
109	62027	62183		170		LHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
110	62674							29	
111	62674	62674		26		RHS			
112	63152	63173		23		LHS			
113	63204							48	
114	63219	63258		45		RHS			
115	63509							59	
116	64204							56	
117	64411	64541		144		LHS			
118	64941							46	
119	61763	62074			305	RHS			
120	62115								75
121	65883								55
122	66999	67106			119	RHS			
123	67448	67634			188	RHS			
124	69534						92		
125	69551	69834	296			RHS			
126	71456	71494	40			LHS			
127	71503						46		
128	71820	71824	7			RHS			
129	71931	71974	42			RHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
130	71974						35		
131	71992	72075	120			LHS			
132	72075	72225	173			LHS			
133	72225	72329	113			LHS			
134	72575	72676	135			LHS			
135	72691						42		
136	72718	72808	92			RHS			
137	72760						18		
138	72800	72872	75			RHS			
139	72805						34		
140	72881						45		
141	72917						24		
142	72916	73369	450			LHS			
143	73052						26		
144	73182						36		
145	73282						26		
146	73286						40		
147	73466						40		
148	73465	73513	64			LHS			
149	73512						38		

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
150	73709						35		
151	73704	73734	38			RHS			
152	73733	73823	106			RHS			
153	73825						34		
154	73831	73842	14			LHS			
155	73949						41		
156	74062	74075				RHS	13		
157	74880						53		
158	74886	74893	10			RHS			
159	75088						42		
160	75181						46		
161	75397						61		
162	75413	75536	130			LHS			
163	75615						24		
164	75615	75630	26			RHS			
165	75656	75647	14			RHS			
166	75674						31		
167	75682	75743	64			LHS			
168	75953						27		
169	76065	76105	54			LHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
170	76186	76378	211			LHS			
171	76378	76519	141			LHS			
172	76512						19		
173	76486	76505	28			RHS			
174	76758						105		
175	76790						27		
176	76863						41		
177	76995						44		
178	76987	77008	21			RHS			
179	77023						42		
180	69285	69436		163		RHS			
181	69482							83	
182	69534							91	
183	69561	69612		77		RHS			
184	70800							71	
185	72351							51	
186	73230							36	
187	74091	74126		40		LHS			
188	74139							42	
189	74075	74222		136		RHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
190	74324	74639		329		RHS			
191	74470							61	
192	74798	74872		96		RHS			
193	75216	75280		72		RHS			
194	75281							28	
195	75288							59	
196	76032							48	
197	76262							36	
198	76394							38	
199	76417	76443		27		RHS			
200	76528							120	
201	76763	76824		74		LHS			
202	69023	69077			64	RHS			
203	70849								56
204	70931								197
205	71551	71603			57	LHS			
206	71603								34
207	71948	72290			352	RHS			
208	72329								67
209	72357	72664			323	LHS			

Sr. No.	Chainage (Km)		Length (m)			Location	Crossing (m)		
	From	To	LT	11 KV (HT)	33 KV (HT)	LHS/RHS	LT	11 KV (HT)	33 KV (HT)
210	73671								122
211	73706	74062			354	RHS			
212	74321								141
213	74474								66
214	75513								64

Summary of Electrical Poles and Transformers:

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN CHAINAGE	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/ GALVANIZES IRON)	NORTHING	EASTING
1	48393	50120	LHS	Single pole	1 LT LS GI	237600.08	2848973
2	48407	50141	RHS	Single pole	2 LT RS GI	237581.67	2849001
3	48500	50229	RHS	Single pole	3 RS LT GI	237489.86	2848993
4	48510	50245	LHS	Single pole	LT LS GI	237481.07	2848959
5	48549	50280	LHS	Single pole	4 LT LS GI	237443.08	2848961
6	48635	50399	LHS	Single pole	5 LT LS GI	237336.07	2848965
7	48664	50481	LHS	Single pole	6 LT LS GI	237370.49	2848914
8	48722	50526	LHS	Single pole	7 LT LS GI	237394.74	2848871
9	48771	50574	LHS	Single pole	8 LT LS GI	237390.88	2848819
10	48814	50621	LHS	Single pole	9 LT LS GI	237385.76	2848772

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
11	48872	50680	LHS	Single pole	10 LT LS GI	237380.61	2848714
12	48919	50726	LHS	Single pole	11LTLSGI	237370.69	2848667
13	48945	50754	RHS	Single pole	13RSLTGI	237335	2848650
14	48969	50778	LHS	Single pole	13LSLTGI	237352.4	2848620
15	49015	50822	LHS	Single pole	14LSLTGI	237342.97	2848575
16	49070	50878	LHS	Single pole	15LTLSGI	237316.53	2848525
17	49119	50926	LHS	Single pole	16LTLSGI	237290.32	2848484
18	49123	50933	LHS	Single pole	17LTLSGI	237261.72	2848497
19	49166	50972	RHS	Single pole	20LTRSGI	237240.95	2848451
20	49188	50996	LHS	Single pole	18LTLSGI	237266.68	2848424
21	49205	51012	RHS	Single pole	21LTRSGI	237235.24	2848408
22	49239	51047	LHS	Single pole	19LTLSGI	237266.47	2848374
23	49251	51060	RHS	Single pole	22LTRSWOOD	237235.72	2848360
24	49806	51618	RHS	Single pole	23LTRSGI	237398.94	2847877
25	49856	51670	RHS	Single pole	24LTRSGI	237363.43	2847848
26	49896	51707	RHS	Single pole	25LTRSGI	237328.44	2847832
27	49934	51746	RHS	Single pole	27LTRSGI	237311.21	2847778
28	49945	51763	RHS	Single pole	26LTRSGI	237288.76	2847814
29	50317	52271	RHS	Single pole	LTGI	236981.66	2847608
30	50327	52246	RHS	Single pole	28LTRSGI	236941.78	2847641
31	50713	52638	RHS	Single pole	LTGI	236944.3	2847260

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
32	50715	52650	LHS	Single pole	29LTLSGI	236983.74	2847281
33	50717	52660	RHS	Single pole	LTGI	237006.27	2847293
34	51014	52950	RHS	Single pole	31LTRSGI	236870.02	2847106
35	51018	52955	LHS	Single pole	30LTLSGI	236869.23	2847086
36	51186	53127	RHS	Single pole	32LSLTGI	236757.88	2846971
37	51238	53183	LHS	Double Pole	15LTRSGI	236692.58	2846986
38	51240	53184	RHS		14LTRSGI	236691.37	2846984
39	51260	53203	LHS	Single pole	13LTLSGI	236684.62	2846946
40	51438	53383	RHS	Single pole	35LTRSGI	236517.94	2846874
41	51490	53441	RHS	Single pole	36LTRSGI	236494.74	2846827
42	51551	53501	RHS	Single pole	37LTRSGI	236438.92	2846804
43	51609	53559	RHS	Single pole	38LTRSGI	236385.1	2846781
44	51641	53590	RHS	Single pole	39LTRSGI	236369.27	2846748
45	51683	53634	RHS	Single pole	40LTRSGI	236323.22	2846737
46	51722	53673	RHS	Single pole	41LTRSGI	236294.28	2846710
47	51745	53693	LHS	Single pole	42LTLSGI	236294.88	2846680
48	51755	53712	RHS	Single pole	43LTRSGI	236263.67	2846690
49	51784	53744	RHS	Single pole	44RSLTGI	236237.39	2846674
50	51958	53911	RHS	Single pole	45LSLTGI	236139.96	2846539
51	51984	53947	RHS	Single pole	46LTRSGI	236108.66	2846579
52	52023	53997	RHS	Single pole	47LTRSGI	236057.23	2846573

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
53	54578	56740	RHS	Single pole	49LTRSGI	234427.67	2844932
54	58037	AIRPORT BYPASS	RHS	Single pole	LTGI	232556.32	2842471
55	58077	AIRPORT BYPASS	LHS	Single pole	50LTLSGI	232556.33	2842430
56	58115	AIRPORT BYPASS	LHS	Single pole	51LSLTGI	232549.37	2842389
57	58157	AIRPORT BYPASS	LHS	Single pole	52LTLSGI	232532.97	2842352
58	58225	AIRPORT BYPASS	LHS	Single pole	53LTLSGI	232493.49	2842294
59	58244	AIRPORT BYPASS	RHS	Single pole	54LTRSGI	232471.43	2842283
60	58293	AIRPORT BYPASS	RHS	Single pole	LTRSGI	232440.96	2842243
61	58323	AIRPORT BYPASS	RHS	Single pole	55LTRSGI	232446.74	2842208
62	58349	AIRPORT BYPASS	RHS	Single pole	56LTRSGI	232455.9	2842176
63	58440	AIRPORT BYPASS	LHS	Single pole	59LTLSGI	232451.09	2842096
64	58465	AIRPORT BYPASS	RHS	Single pole	60LTRSGI	232438.03	2842073
65	58494	AIRPORT BYPASS	RHS	Single pole	61LTRSGI	232428.98	2842034
66	58655	AIRPORT BYPASS	RHS	Single pole	62LTRSGI	232590.01	2841997
67	58705	AIRPORT BYPASS	RHS	Single pole	63LTRSGI	232634.15	2841979
68	58753	AIRPORT BYPASS	RHS	Single pole	64LTRSGI	232678.64	2841962
69	58817	AIRPORT BYPASS	LHS	Single pole	65LTLSGI	232739.58	2841941
70	58894	AIRPORT BYPASS	LHS	Single pole	66LTLSGI	232811.94	2841913
71	58920	AIRPORT BYPASS	LHS	Single pole	67LTLSGI	232839.15	2841909
72	58947	AIRPORT BYPASS	RHS	Single pole	69RSLTGI	232851.76	2841877
73	58965	AIRPORT BYPASS	RHS	Single pole	70RSLTGI	232859.85	2841855

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
74	60120	62188	LHS	2LT	Single pole	2840843	232992.7
75	60847	62912	RHS	3LT	Single pole	2840184.1	232745.5
76	60885	62955	RHS	4LT	Single pole	2840151.6	232735.9
77	60924	62991	RHS	5LT	Single pole	2840122.8	232716.1
78	60965	63037	RHS	6LT	Single pole	2840085.5	232701.8
79	61016	63087	RHS	7LT	Single pole	2840053.4	232664.9
80	61308	BYPASS	LHS	LT	Single pole	2839945.1	232395.6
81	61454	BYPASS	LHS	LT	Single pole	2839860.3	232300.4
82	61479	BYPASS	LHS	LT	Single pole	2839848.3	232274.8
83	61489	BYPASS	RHS	LT	Single pole	2839846.3	232254.6
84	64163	66081	RHS	11LT	Single pole	2837820.2	231628.7
85	64781	66700	RHS	12LT	Single pole	2837253	231632.9
86	64839	66758	RHS	13LT	Single pole	2837194.2	231637.4
87	64861	66780	LHS	14LT	Single pole	2837172.8	231660.9
88	65347	67266	LHS	15LT	Single pole	2836727.7	231468.6
89	65929	67859	LHS	16LT	Single pole	2836240.5	231234.9
90	66419	68359	RHS	17LTHI	Single pole	2835833	231088
91	67119	69300	LHS	18LT	Single pole	2835662.4	230629.1
92	67142	69332	RHS	19LT	Single pole	2835707.2	230604.5
93	69635	71913	RHS	LTGI2POL	Single pole	228376.76	2835197
94	69779	72056	RHS	LTGI3POL	Single pole	228310.64	2835112

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
95	71456	73844	LHS	LTGI4POLEND	Single pole	227470.84	2834827
96	71494	73877	LHS	LTGI5POL	Single pole	227444.52	2834797
97	71526	73896	RHS	LTGI6POL	Single pole	227404.88	2834779
98	71615	74002	RHS	LTGI7POL	Single pole	227366.87	2834699
99	71824	74238	LHS	LTGI8POL	Single pole	227233.05	2834564
100	71931	74339	LHS	LTGI9POLEND	Single pole	227143.86	2834511
101	71974	74381	LHS	LTGI10POL	Single pole	227102.76	2834501
102	71992	74400	LHS	LTGI11POL T	Single pole	227085.82	2834492
103	72030	74438	LHS	LTGI12POL	Single pole	227048.36	2834486
104	72074	74484	LHS	LTGI13POL	Single pole	227009.35	2834466
105	72121	74532	LHS	LTGI14POL	Single pole	226979.96	2834430
106	72190	74601	LHS	LTGI15POL	Single pole	226936.25	2834380
107	72224	74635	LHS	LTGI16POL	Single pole	226920.86	2834349
108	72271	74682	LHS	LTGI17POL	Single pole	226896.69	2834309
109	72311	74722	LHS	LTGI18POL	Single pole	226876.55	2834274
110	72575	74987	LHS	LTGI19POL	Single pole	226706.69	2834069
111	72610	75023	LHS	LTGI20POL	Single pole	226667.17	2834067
112	72639	75054	LHS	LTGI21POL	Single pole	226634.46	2834073
113	72676	75092	LHS	LTGI22POL	Single pole	226605.6	2834100
114	72718	75135	LHS	LTGI23POL	Single pole	226578.75	2834133
115	72760	75178	LHS	LTGI24POL	Single pole	226546.72	2834159

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
116	72808	75226	RHS	LTGI25POL	Single pole	226521.56	2834203
117	72872	75291	LHS	LTGI26POL	Single pole	226462.54	2834233
118	72916	75336	LHS	LTGI27POL T	Single pole	226421.27	2834251
119	72959	75379	LHS	LTGI28POL	Single pole	226381.99	2834270
120	73006	75426	LHS	LTGI29POL	Single pole	226342.72	2834295
121	73052	75472	LHS	LTGI30POL	Single pole	226304.64	2834322
122	73098	75518	LHS	LTGI31POL	Single pole	226266.68	2834348
123	73143	75562	LHS	LTGI32POL	Single pole	226229.58	2834372
124	73168	75587	RHS	LTGI34POL	Single pole	226216.96	2834399
125	73191	75611	LHS	LTGI33POL	Single pole	226188.31	2834396
126	73234	75655	LHS	LTGI35POL	Single pole	226149.37	2834413
127	73277	75698	RHS	LTGI37POLEND	Single pole	226113.31	2834445
128	73283	75703	LHS	LTGI36POL	Single pole	226104.47	2834430
129	73369	75792	LHS	LTGI38POLEND	Single pole	226019.77	2834428
130	73465	75888	LHS	LTGI39POL	Single pole	225926.6	2834407
131	73466	75889	RHS	LTGI39APOL	Single pole	225920.76	2834431
132	73510	75937	RHS	LTGI41POL	Single pole	225877.39	2834428
133	73513	75935	LHS	LTGI40POLT	Single pole	225877.32	2834406
134	73712	76136	RHS	LTGI42POL	Single pole	225680.05	2834378
135	73759	76184	LHS	LTGI43POL	Single pole	225641.14	2834343
136	73793	76218	LHS	LTGI44POL	Single pole	225608.38	2834333

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
137	73823	76248	LHS	LTGI45POL T	Single pole	225578.81	2834325
138	73831	76255	RHS	LTGI46POL	Single pole	225566.84	2834344
139	73943	76369	RHS	LTGI48POL	Single pole	225459.32	2834343
140	73953	76378	LHS	LTGI47POL	Single pole	225447.73	2834316
141	74073	76499	RHS	LTGI49POL	Single pole	225326.66	2834340
142	74892	77361	RHS	LTPOL50+51	Single pole	224588.59	2834301
143	75083	77820	LHS	LTGI52POL	Single pole	224458.87	2834157
144	75378	75020	LHS	LTGI55POL	Single pole	224225.48	2834007
145	75411	75020	LHS	LTGI56POL	Single pole	224230.3	2833960
146	75432	75020	LHS	LTGI57POL	Single pole	224202.59	2833958
147	75481	75020	LHS	LTGI58POL	Single pole	224158.7	2833938
148	75529	75020	LHS	LTGI59POLEND	Single pole	224126.31	2833895
149	75615	75020	LHS	LTGI60POL	Single pole	224040.74	2833873
150	75656	75020	LHS	LTGI61POL	Single pole	223999.79	2833863
151	75682	75020	LHS	LTGI62POL	Single pole	223985.03	2833836
152	75708	75020	LHS	LTGI63POL	Single pole	223966.56	2833815
153	75735	75020	LHS	LTGI64POL	Single pole	223943.77	2833801
154	75953	78716	LHS	LTGI65POLEND	Single pole	223776.97	2833673
155	76065	78829	LHS	LTGI1ENDLHS	Single pole	223710.11	2833581
156	76105	78867	LHS	LT2LHS	Single pole	223669.57	2833562
157	76189	78955	LHS	LTGI3LHS	Single pole	223586.47	2833569

DETAILS OF EXISTING ELECTRICAL POLES (LT 440V POLES)							
SL.NO	DESIGN	EXISTING CHAINAGE	SIDE	Type	DETAIL (MILD STEEL/	NORTHING	EASTING
158	76228	78994	LHS	LTGI4LHS	Single pole	223554.59	2833550
159	76273	79039	LHS	LTGI5LHS	Single pole	223517.38	2833524
160	76316	79081	LHS	LTGI6LHS	Single pole	223483.27	2833499
161	76349	79114	LHS	LTGI7LHS	Single pole	223458.09	2833478
162	76378	79145	LHS	LTGI8LHS	Single pole	223438.6	2833458
163	76423	79190	LHS	LTGI9LHS	Single pole	223409.49	2833424
164	76463	79230	LHS	LTGI10LHS	Single pole	223384.52	2833392
165	76485	79252	RHS	LTGI13RHS	Single pole	223356.34	2833387
166	76505	79272	RHS	LT12+11KVGI10RHS	Single pole	223347.07	2833369
167	76519	79285	LHS	LTGI11LHS	Single pole	223348.23	2833349
168	76739	79511	RHS	LTGI14RHS	Single pole	223152.1	2833323
169	76811	79585	LHS	LTGI16LHS	Single pole	223193.22	2833256
170	76979	79752	LHS	LTGI17LHS	Single pole	223089.18	2833184
171	76987	79761	RHS	LTGI18RHS	Single pole	223066.66	2833179
172	77008	79781	RHS	LTGI19RHS	Single pole	223063.3	2833158

TOTAL LT (LOW TENSION)440V POLES=172

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
1	47551	49076	RHS	Single pole	1HT RS GI 11 KV	238287.542	2849356.475
2	49007	50812	RHS	Double Pole	6HTRSGI 11KV	237328.649	2848588.683
3	49008	50813	RHS		7HTRSGI 11KV	237327.652	2848587.966
4	51112		LHS	Single pole	HTLSGI 11KV	236814.5996	523.6088
5	51228	53173	RHS	Double Pole	12HTRSGI 11KV	236707.451	2846973.874
6	51230	53174	RHS		11HTRSGI 11KV	236705.991	2846972.652
7	51246	53190	RHS	Single pole	HTLINE 11KV	236702.019	2846937.786
8	52082	54090	LHS	Double Pole	17HTLSGI 11KV	236043.665	2846489.793
9	52084	54091	LHS		18HTLSGI 11KV	236041.687	2846489.089
10	52245		RHS	Single pole	HTRSGI11KV	235958.6996	2846351.096
11	52314		RHS	Single pole	HTRSGI11KV	235907.1318	2846320.734
12	53378	55462	RHS	Double Pole	20HTRSGI11KV	235145.872	2845748.663
13	53378	55461	RHS		19HTRSGI11KV	235146.892	2845748.913
14	55359	57564	LHS	Double Pole	21HTLSGI	234001.503	2844345.093
15	55359	57564	LHS		22HTLSGI	234000.927	2844346.262
16	55487	57699	LHS	FOUR POLE	23LSHTGI	233877.716	2844300.774
17	55488	57698	LHS		26LSHTGI	233878.696	2844301.131
18	55491	57701	LHS		25LSHTGI	233875.817	2844300.066
19	55491	57701	LHS		24LSHTGI	233875.045	2844301
20	55631	57845	LHS	Double Pole	28HTLSGI11KV	233754.756	2844249.364
21	55632	57847	LHS		27HTLSGI11KV	233753.97	2844248.382

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
22	55828	58078	LHS	Double Pole	27LSHT11KV	233678.611	2844098.986
23	55829	58079	LHS		28LSHT11KV	233679.538	2844098.335
24	56374	58686	RHS	Single pole	HTLINE11KV	233373.572	2843754.163
25	56855	59163	RHS	Double Pole	34 HT 11KV	233068.968	2843466.041
26	56855	59163	RHS		33 HT 11KV	233069.515	2843466.682
27	58045	AIRPORT BYPASS	RHS	Single pole	HTGI	232555.038	2842462.976
28	58070	AIRPORT BYPASS	LHS	Single pole	41HTLSGI11KV	232548.69	2842438.596
29	58093	AIRPORT BYPASS	LHS	Single pole	42HTLSGI11KV	232542.545	2842416.42
30	58109	AIRPORT BYPASS	LHS	Triple Pole	44HILSGI 11KV	232547.975	2842397.165
31	58110	AIRPORT BYPASS	LHS		43HILSGI 11KV	232547.209	2842396.382
32	58110	AIRPORT BYPASS	LHS		45HILSGI 11KV	232546.425	2842396.965
33	58115	AIRPORT BYPASS	LHS	Double Pole	40HTLSGI11KV	232543.697	2842392.058
34	58116	AIRPORT BYPASS	LHS		39HTLSGI11KV	232544.994	2842390.615
35	59163	61196	LHS	Single pole	48LSGIHT 11KV	233002.773	2841725.741
36	59271	61304	LHS	Single pole	49LSGIHT 11KV	233048.223	2841626.257
37	59310	61341	RHS	Double Pole	50RSGIHT 11KV	233064.514	2841590.204
38	59311	61343	RHS		51RSGIHT 11KV	233064.933	2841589.089
39	60312	62381	RHS	511KV	Double Pole	2840701.747	232861.251
40	60314	62383	RHS	511KV		2840700.5	232859.653
41	60333	62401	LHS	311KV	Triple Pole	2840664.822	232875.214
42	60334	62402	LHS	111KV		2840664.477	232873.971

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
43	60334	62402	LHS	211KV		2840663.621	232875.062
44	60400	62469	RHS	9HT	Double Pole	2840630.074	232807.315
45	60401	62471	RHS	10HT		2840628.677	232806.117
46	60414	62480	LHS	6HT	Triple Pole	2840605.682	232823.924
47	60415	62483	LHS	7HT		2840604.705	232822.928
48	60416	62482	LHS	8HT		2840605.037	232824.744
49	61081	63150	LHS	11 11 KV	Single pole	2840016.812	232611.543
50	61450	BYPASS	LHS	11KV12	Double Pole	2839864.36	232301.738
51	61451	BYPASS	LHS	11KV13		2839863.528	232302.619
52	61489	BYPASS	RHS	11KV13C	Double Pole	2839846.067	232255.437
53	61489	BYPASS	RHS	11KV13D		2839846.067	232255.437
54	61576	BYPASS	LHS	HT 11KV	Single pole	2839758.083	232277.337
55	61668	BYPASS	LHS	14HT11KV	Double Pole	2839668.198	232297.313
56	61668	BYPASS	LHS	15HT11KV		2839667.826	232296.535
57	61733	BYPASS	RHS	HT11KV	Single pole	2839595.131	232281.823
58	62076	63976	LHS	18HT11KV	Double Pole	2839302.142	232475.583
59	62076	63976	LHS	19HT11KV		2839301.836	232476.743
60	62170	64070	LHS	21 HT11KV	Double Pole	2839209.805	232437.731
61	62171	64071	LHS	20 HT11KV		2839210.395	232435.801
62	62674	64580	RHS	23HT11KV	Double Pole	2839044.639	231975.971
63	62675	64579	RHS	22HT11KV		2839044.881	231976.966

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
64	63173	65082	LHS	24HT11KV	Double Pole	2838602.527	231970.531
65	63173	65082	LHS	25HT11KV		2838601.935	231971.505
66	63218	65127	RHS	27HT11KV	Double Pole	2838557.368	231953.484
67	63219	65127	RHS	26HT11KV		2838556.734	231954.333
68	63520	65434	LHS	29HT11KV	Double Pole	2838311.463	231863.275
69	63521	65432	LHS	28HT11KV		2838311.474	231864.561
70	64209	66126	RHS	31HT11KV	Double Pole	2837772.018	231641.171
71	64210	66127	RHS	30HT11KV		2837770.981	231641.625
72	64442	66361	LHS	32HT11KV	Single pole	2837563.317	231756.091
73	69371	71652	RHS	HTMSPOL11KV	Double Pole	228521.669	2835366.457
74	69371	71652	RHS	HTMS1+2POL11KV		228522.611	2835366.141
75	69403	71683	RHS	HTMS3POL11KV	Single pole	228516.618	2835334.634
76	69435	71716	RHS	HTMS4+5POL11KV	Double Pole	228511.592	2835304.288
77	69436	71716	RHS	HTMSPOL11KV		228510.321	2835304.387
78	69558	71834	RHS	HTGI6+7+8+9	Four Pole	228429.504	2835268.281
79	69560	71837	RHS	HT+LTMS1POL11KV		228425.763	2835270.088
80	69561	71837	RHS	HTMSPOL11KV		228425.607	2835269.117
81	69562	71838	RHS	HTGI		228424.202	2835269.959
82	70804	73069	RHS	HTMS10+11POL11KV	Double Pole	227953.7	2834976.818
83	70805	73070	RHS	HTMSPOL11KV		227953.147	2834977.954

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
84	72348	74758	LHS	HTGI12+13POL11KV	Double Pole	226856.571	2834243.221
85	72349	74760	LHS	HTGIPOL11KV		226855.7	2834241.64
86	72356	74768	RHS	HTGI14+15POL11KV	Double Pole	226832.663	2834248.117
87	72358	74770	RHS	HTGIPOL11KV		226831.608	2834246.666
88	73229	75649	RHS	11KVGI16+17POL	Double Pole	226159.497	2834424.841
89	73230	75650	RHS	11KVGIPOL		226158.399	2834425.159
90	74126	76551	LHS	11KVGIPOL	Double Pole	225275.399	2834310.687
91	74126	76551	LHS	11KVGI20+21POL		225275.981	2834311.75
92	74164	76589	RHS	11KVGI22+23POL	Double Pole	225243.069	2834339.365
93	74164	76589	RHS	11KVGIPOL		225242.839	2834338.19
94	74209	76633	RHS	11KVGI24POL	Single pole	225208.664	2834363.162
95	74394	76819	RHS	11KVWOOD25POL	Single pole	225038.649	2834438.939
96	74452	76875	RHS	11KGI26POL	Single pole	224976.781	2834445.687
97	74577	77008	RHS	11KVWOOD27POL	Single pole	224861.908	2834414.11
98	74630	77063	RHS	11KVGIPOL	Double Pole	224803.331	2834392.832
99	74631	77063	RHS	11KVGI28+29POL		224803.473	2834391.995
100	74804	77265	RHS	11KVGI30POL	Single pole	224684.873	2834350.121
101	75233	77969	RHS	11KVGIPOL	Triple Pole	224307.633	2834127.335
102	75234	77971	RHS	11KVGIPOL		224306.382	2834126.754
103	75234	77971	RHS	11KVGI31+32+33POL		224307.206	2834126.258

DETAILS OF EXISTING ELECTRICAL POLES (HT 11KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
104	75279	78016	RHS	11KVGIPOL	Triple Pole	224286.843	2834085.112
105	75280	78016	RHS	11KVGIPOL		224285.708	2834084.825
106	75280	78017	RHS	11KVGI34+35+36POL		224286.395	2834084.021
107	75325	78052	LHS	11KVGI39+40POL	Double Pole	224282.512	2834033.631
108	75326	78052	LHS	11KVGIPOL		224281.088	2834033.498
109	76022	78786	LHS	11KVGI1+2LHS	Double Pole	223739.16	2833614.726
110	76023	78787	LHS	11KVGILHS		223739.171	2833613.453
111	76046	78808	RHS	11KVGIRHS	Double Pole	223707.138	2833610.003
112	76047	78809	RHS	11KVGI3+4RHS		223706.601	2833608.712
113	76262	79028	LHS	11KVGI5LHS	Single pole	223528.69	2833527.164
114	76393	79160	LHS	11KVGILHS	Double Pole	223427.71	2833447.715
115	76394	79161	LHS	11KVGI6+7LHS		223427.147	2833446.723
116	76442	79209	RHS	11KVMS8+9RHS	Double Pole	223381.391	2833421.774
117	76444	79210	RHS	11KVMSRHS		223381.055	2833420.58
118	76785	79561	LHS	11KV14+LT15LHS	Single pole	223182.377	2833280.766

TOTAL NO. HT (11 KV) POLES=118

DETAILS OF EXISTING ELECTRICAL POLES (HT 33 KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
1	47339	48864	LHS	Double Pole	1HT LS GI 33KV	238497.163	2849383.841
2	47340	48865	LHS		2 HT LS GI 33 KV	238497.183	2849382.418
3	47438	48962	LHS	Double Pole	4 HT LS GI 33 KV	238396.141	2849360.615
4	47439	48964	LHS		3 HT LS GI 33KV	238394.865	2849361.524
5	53812	55912	RHS	Double Pole	4HTRSGI 33KV	235003.838	2845355.315
6	53813	55912	RHS		5HTRSGI 33KV	235004.869	2845354.116
7	53917	56010	RHS	Single pole	6HTRSGI 33KV	234919.862	2845284.555
8	55506	57713	LHS	Double Pole	15HTLSGI33KV	233862.447	2844303.929
9	55506	57713	LHS		16HTLSGI33KV	233862.447	2844303.929
10	56372	58678	LHS	Double Pole	17LSHT33KV	233366.268	2843760.801
11	56373	58680	LHS		18LSHT33KV	233366.123	2843759.254
12	56961	59333	RHS	Double Pole	HT 33KV	233025.136	2843371.736
13	56962	59336	RHS		HT 33KV	233025.877	2843370.489
14	61826	63730	RHS	HT33KV	Single pole	2839510.46	232330.293
15	61924	63827	RHS	3HT33KV	Double Pole	2839418.01	232373.396
16	61924	63827	RHS	4HT33KV		2839417.38	232372.516
17	61995	63895	RHS	5HT33KV	Single pole	2839361.15	232415.118
18	62074	63967	RHS	6HT33KV	Double Pole	2839307.35	232442.599
19	62074	63967	RHS	7HT33KV		2839307.23	232441.163
20	67008	69192	RHS	8HT33KV	Double Pole	2835682.9	230742.543

DETAILS OF EXISTING ELECTRICAL POLES (HT 33 KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
21	67009	69193	RHS	9HT33KV		2835684.18	230742.166
22	67463	69651	RHS	11HT33KV	Single pole	2835696.96	230283.573
23	67551	69738	RHS	12HT33KV	Double Pole	2835680	230195.876
24	67551	69738	RHS	13HT33KV		2835681.33	230195.773
25	69040	71311	RHS	GIHT33KV	Single pole	228797.971	2835572.308
26	69077	71347	RHS	GIHT33KV	Single pole	228757.806	2835555.116
27	70861	73123	LHS	1LSHTGI33KV	Double Pole	227889.576	2834987.454
28	70863	73124	LHS	2LSHTGI33KV		227888.574	2834988.488
29	71603	73992	LHS	3LSGIHT33KV	Double Pole	227393.986	2834699.83
30	71604	73993	LHS	4LSGIHT33KV		227394.898	2834698.574
31	71964	74371	RHS	10RSGIHT33KV	Single pole	227107.587	2834521.593
32	72013	74420	RHS	11RSGIHT33KV	Single pole	227061.217	2834504.758
33	72057	74465	RHS	12RSGIHT33KV	Double Pole	227016.878	2834488.333
34	72057	74466	RHS	13RSGIHT33KV		227015.952	2834489.328
35	72145	74556	RHS	14RSGIHT33KV	Single pole	226950.945	2834423.301
36	72228	74639	RHS	15RSGIHT33KV	Single pole	226909.184	2834351.449
37	72290	74702	RHS	16RSGIHT33KV	Single pole	226877.673	2834297.646
38	72357	74768	LHS	18LSGIHT33KV	Double Pole	226849.217	2834236.725
39	72357	74768	LHS	17LSGIHT33KV		226848.044	2834237.511
40	72431	74842	LHS	19LSGIHT33KV	Single pole	226809.299	2834174.675

DETAILS OF EXISTING ELECTRICAL POLES (HT 33 KV POLES)							
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**Type**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**EASTING**	**NORTHING**
41	72497	74908	LHS	21LSGIHT33KV	Double Pole	226773.568	2834116.652
42	72497	74908	LHS	20LSGIHT33KV		226772.66	2834117.855
43	72581	74994	RHS	22RSGIHT33KV	Single pole	226693.818	2834084.725
44	72629	75044	LHS	24LSGIHT33KV	Double Pole	226645.115	2834067.47
45	72629	75044	LHS	23LSGIHT33KV		226644.915	2834068.011
46	72639	75054	LHS	26LSGIHT33KV	Double Pole	226632.151	2834064.241
47	72639	75054	LHS	25LSGIHT33KV		226632.275	2834065.641
48	73706	76131	RHS	27RSGIHT33KV	Single pole	225687.576	2834370.981
49	73850	76275	RHS	HT27A33KV	Single pole	225548.039	2834346.996
50	73935	76361	RHS	HT27B33KV	Single pole	225468.541	2834347.34
51	74053	76479	RHS	29RSGIHT33KV	Double Pole	225346.541	2834343.021
52	74053	76479	RHS	28RSGIHT33KV		225346.29	2834344.072
53	74256	76679	RHS	HT33KV	Single pole	225169.052	2834386.693
54	74360	76785	LHS	31LSGIHT33KV	Double Pole	225059.104	2834404.795
55	74361	76785	LHS	30LSGIHT33KV		225059.38	2834406.238
56	75515	75020	LHS	33KVGI34+35POL	Double Pole	224130.556	2833916.561
57	75516	75020	LHS	33KVGIPOL		224129.149	2833917.104

TOTAL HT (33 KV) POLES=57

DETAILS OF EXISTING ELECTRICAL POLES (TRANSFORMER)						
SL.NO	**DESIGN CHAINAGE**	**EXISTING CHAINAGE**	**SIDE**	**DETAIL (MILD STEEL/ GALVANIZES IRON)**	**Type**	**NORTHING**
1	48394	50120	RHS	4 HT TF 25 KV A	Double Pole	2848968.847
2	48396	50121	RHS	5 HT TF 25 KV A		2848966.796
3	49118	50928	RHS	10HTRSTF 63KV	Double Pole	2848501.369
4	49119	50928	RHS	9HTRSTF 63KV		2848500
5	58223	AIRPORT BYPASS	RHS	47HIGIRS 11KV TF	Double Pole	2842298.018
6	58224	AIRPORT BYPASS	RHS	46HIGIRS 11KV TF		2842296.255
7	60316	62386	RHS	Single pole	4 11KV TF 25KV	232857.646
8	61478	BYPASS	RHS	Double Pole	TF	232272.27
9	61479	BYPASS	RHS		TF	232272.466
10	76761	79537	LHS	Triple Pole	11KVTF	2833302.526
11	76764	79540	LHS		11KVTF	2833299.863
12	76764	79541	LHS		11KVTF11+12+13	2833301.077
13	74075	76501	RHS	Double Pole	LTGI18+19POLTF25 KV	2834338.121
14	74075	76501	RHS		LTGIPOLTF25 KV	2834336.163

TOTAL No. of Transformer=14

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

* The site includes the following Public Health utilities:

Sr.No	Chainage (km)		Location	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To	LHS/RHS	With Pumping	With Gravity flow	DIA (mm)	With Pumping	With Gravity flow	DIA (mm)
1	48748							58	15mm
2	48748	48852	RHS		104	15mm			
3	49205	49601	LHS		396	40mm			
4	49601							56	40mm
5	49601	49931	RHS		330	40mm			
6	49931							65	15mm
7	49931							65	40mm
8	49931							65	50mm
9	49931							65	40mm
10	51386							49	40mm
11	51713	51731	RHS		18	40mm			
12	51770	51789	RHS		19	40mm			
13	51910							61	40mm
14	51910							611	40mm
15	52660							90	40mm

Sr.No	Chainage (km)		Location	Length(Km)			Crossings		
	From	To		Water Supply line			Water Supply line		
			LHS/RHS	With Pumping	With Gravity flow	DIA (mm)	With Pumping	With Gravity flow	DIA (mm)
16	52770	52910	RHS		140	40mm			
17	52910							88	40mm
18	57625							101	40mm
19	57625							101	40mm
20	59000							45	15mm
21	59000	59083	RHS		83	15mm			
22	59090							43	40mm
23	59090	59320	RHS		230	40mm			
24	59320							45	40mm
25	59320							45	15mm
26	59320	59356	LHS		36	40mm			
27	59485	60000	LHS		515	40mm			
28	59665							45	15mm
29	59725							45	15mm
1	60000	60126	LHS		126	40			
2	60126							43	40
3	60342	60575			233	40			

Sr.No	Chainage (km)		Location	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To	LHS/RHS	With Pumping	With Gravity flow	DIA (mm)	With Pumping	With Gravity flow	DIA (mm)
4	60363	60517			154	15			
5	60755	61087			332	40			
6	61087							45	40
7	61087							45	50
8	61087							38	50
9	61158							45	40
10	61431							45	40
11	62641							54	40
12	67244	67665			421	40			
13	67732							45	40
1	69441	69476	LHS		54	150 mm			
2	69477							66	150 mm
3	69485	69598	RHS		128	150 mm			
4	70421							75	40 mm
5	70421							75	50 mm
6	70482	70865	RHS		423	40 mm			
7	70482	70865	RHS		423	50 mm			

Sr.No	Chainage (km)		Location	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To	LHS/RHS	With Pumping	With Gravity flow	DIA (mm)	With Pumping	With Gravity flow	DIA (mm)
8	71011							70	40 mm
9	71011	71085	LHS					111	40 mm
10	71145	71211	RHS		79	50 mm			
11	71211							41	50 mm
12	71211	71234	LHS		33	50 mm			
13	71375							45	40 mm
14	72086							43	25 mm
15	72086	72214	LHS		128	25 mm			
16	72353	72402	RHS		51	80 mm			
17	72403							42	80 mm
18	72403	72516	LHS		120	80 mm			
19	72547	73003	LHS		486	80 mm			
20	72554	72705	RHS		142	25 mm			
21	72705							34	25 mm
22	72862							36	25 mm
23	72862							34	25 mm
24	72862							34	25 mm

Sr.No	Chainage (km)		Location	Length(Km)			Crossings		
				Water Supply line			Water Supply line		
	From	To	LHS/RHS	With Pumping	With Gravity flow	DIA (mm)	With Pumping	With Gravity flow	DIA (mm)
25	72862	73075	LHS		121	25 mm			
26	72862	73122	LHS		264	25 mm			
27	73285							36	15 mm
28	73285	73374	LHS		86	15 mm			
29	73608							43	40 mm
30	73608	73782	RHS		142	40 mm			
31	74400	74738	RHS		348	100 mm			
32	74400	74738	RHS		348	40 mm			
33	74740							43	100 mm
34	75845	76137	RHS		279	50 mm			
35	75845	76261	RHS		412	40 mm			
36	76381	76602	LHS		246	40 mm			
37	76796	76816	LHS		32	40 mm			
38	76816	77031	LHS		216	80 mm			
39	77029							34	80 mm

The summary of existing water supplies Pipe lines need to be shifted

S.No	Description	Unit	Nos.

S.No	Description	Unit	Nos.
1	Water pipe line 150 mm dia	mtr	248
2	Water pipe line 100 mm dia	mtr	391
3	Water pipe line 80 mm dia	mtr	949
4	Water pipe line 50 mm dia	mtr	1078
5	Water pipe line 40 mm dia	mtr	6395
6	Water pipe line 25 mm dia	mtr	836
7	Water pipe line 15 mm dia	mtr	701

(ii) Tree Cutting "Total approximately 6000 Non Forest Tree shall be cut by the contractor and transported to the designated Place indicated by Forest Department, Meghalaya".

Note: NHIDCL decided that Joint visits with concerned utilities agencies be conducted and existing Utilities falling within proposed ROW of the Highway Project need to be identified. Based on these site visits concerned utilities agencies have identified the quantum of shifting and any new construction scope if required. The details of existing utilities that need to be shifted and any new utility laying/construction required are provided in schedule-B.

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No.	**From km to km**	**Length (km)**	**Width (m)**	**Date of providing Right of Way***
(1)	**(2)**	**(3)**	**(4)**	**(5)**
(I) Full Right of way (full width)				
(a) Stretch	From Existing Ch. km. 48+625 to Km. 79+830	31.205	As per Clause 1.2 of Schedule-A, Anne-I ROW Details	90 % On appointed date
(ii) Part Right of Way (part width)				
(a) Stretch				
(iii) Balance Right of Way (width)				10 % within 150 days from appointed date
(a) Stretch				

The detail of land after Land acquisition is as follows:

Sl. No.	Design Chainage		ROW		Total Width of ROW (m)	Remarks
	From	To	LHS (m)	RHS (m)		
(1)	(4)	(5)	(6)	(7)	(8)	(9)
1	47.075	48.180	22.500	22.50	45.00	
2	48.180	48.362	35.000	35.00	70.00	
3	48.362	49.959	30.000	30.00	60.00	
4	49.959	50.181	35.000	35.00	70.00	
5	50.181	50.945	40.000	40.00	80.00	
6	50.945	51.340	35.000	35.00	70.00	
7	51.340	51.485	22.500	22.50	45.00	
8	51.485	52.623	30.000	30.00	60.00	

9	52.623	53.932	45.000	45.00	90.00	
10	53.932	54.840	30.000	30.00	60.00	
11	54.840	56.572	40.000	30.00	70.00	
12	56.572	58.463	30.000	30.00	60.00	
13	58.463	60.000	22.500	22.50	45.00	
14	60.000	61.669	22.500	22.500	45.000	
15	61.669	61.820	35.000	35.000	70.000	
16	61.820	63.043	20.000	35.000	55.000	
17	63.043	63.318	22.500	22.500	45.000	
18	63.318	63.471	20.000	35.000	55.000	
19	63.471	64.040	22.500	22.500	45.000	
20	64.040	64.140	20.000	35.000	55.000	
21	64.140	65.039	22.500	22.500	45.000	
22	65.039	65.489	35.000	20.000	55.000	
23	65.489	66.036	22.500	22.500	45.000	
24	66.036	66.419	35.000	25.000	60.000	
25	66.419	66.622	25.000	35.000	60.000	
26	66.622	66.673	22.500	22.500	45.000	
27	66.673	66.723	35.000	25.000	60.000	
28	66.723	66.870	50.000	40.000	90.000	
29	66.870	66.970	22.500	22.500	45.000	
30	66.970	67.146	35.000	25.000	60.000	
31	67.146	68.035	22.500	22.500	45.000	
32	68.035	68.220	35.000	25.000	60.000	
33	68.220	69.000	22.500	22.500	45.000	
34	69.000	69.294	22.50	22.50	45.000	
35	69.294	71.111	35.00	35.00	70.000	
36	71.111	72.641	22.50	22.50	45.000	
37	72.641	73.440	18.00	18.00	36.000	
38	73.440	75.958	22.50	22.50	45.000	
39	75.958	77.055	18.00	18.00	36.000	

*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

Existing & Design Chainage

Sr. No.	**Particular**	**Existing Alignment**	**Design Alignment**
1	Start Chainage (km)	48+625	47.075
2	End Chainage (km)	79+830	77.055
	Length (km)	31.205	29.980

Annex - III

(Schedule-A)

Alignment Plans

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

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

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

Annex – IV

(Schedule-A)

1. ***Environment Clearance***

   Environmental Clearance (EC) is not required for the Project Highway under Schedule 7(f) as per S.O. 2559 (E), MoEF Notification of 22nd August 2013 (as amendment of 14th September 2006) i.e., Expansion of National Highways greater than 100 km involving additional right of way or land acquisition greater than 40m on the existing alignments and 60m on re-alignment or bypasses.

2. ***Wild Life clearances:***

   Not Applicable.

3. ***Forest Clearances****:*

   Not Applicable

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. *Development of the Project Highway*

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

2. *Rehabilitation and augmentation*

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

3. *Specifications and Standards*

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

Annex – I

(Schedule-B)

Description of "Two-Laning"

Note: All the chainages/ location referred to in Annex-I to Schedule-B shall be Design chainages.

1. *Widening of the Existing Highway*

(i) The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for Mountainous and Steep terrain to the extent land is available.

(ii) **Width of Carriageway**

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

Sr. No.	**Built-up stretch (Township)**	**Location Design Chainage (km to km)**		**Width (m)**	**Typical cross section (Ref. to Manual)**
(1)	(2)	(3)	(4)	(5)	**(5)**
1	Asananggre	72.650	73.060	2X7.0 m CW +2x1.5 m Footpath Cum Drain +2.5 m median	TCS 8
2	Jendragre	73.060	74.060	2X7.0 m CW +2x1.5 m Footpath Cum Drain +2.5 m median	TCS 8
3	Chibra Agal	75.960	77.055	2X7.0 m CW +2x1.5 m Footpath Cum Drain +2.5 m median	TCS 8

Note: 1) The Design chainages given in above table are indicative and stretches may increase or decrease depending upon profile designed by the contractor, however, this shall not be treated as change of scope.

(b) Where Toll Plaza, Bus Bays & Truck Lay Byes are constructed as per Schedule C a transition shall be provided as per the Manual.

(c) The entire cross-sectional elements shall be accommodated in the available/proposed ROW. If required, suitable retaining structures shall be provided to accommodate the highway cross section within the available/ proposed ROW and the same shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

2. *Geometric Design and General Features*

(i) General

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

(ii) Design speed

The Ruling design speed shall be 40 km/hr for Mountainous and Steep terrain, as per IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). This provision is in deviation from Manual.

At following locations, speed shall be below 40 km/hr. This Deviation has also been specified in Schedule-D.

S.No.	**Stretch (km)**		**Radius (m)**	**Design Speed (Kmph)**	**Type of deficiency**
	From	**To**			
(1)	(2)	(3)	(4)	(5)	(6)
1	69.665	69.750	40	30	Speed & Radius
2	69.757	69.849	40	30	Speed & Radius
3	70.350	70.498	40	30	Speed & Radius
4	71.093	71.186	30	30	Speed & Radius
5	71.190	71.257	40	30	Speed & Radius
6	76.622	76.768	50	30	Speed & Radius
7	76.802	76.845	15	20	Speed & Radius
8	76.879	76.952	30	20	Speed & Radius

(iii) Improvement of the existing road geometrics

Ruling minimum Radius is 80m as per IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision. This provision is in deviation from Manual.

In the following sections, where improvement of the existing road geometrics to the prescribed standards (Minimum Desirable Radii / Ruling Minimum Radii 80 m) is not possible, the existing road geometrics shall be improved to the extent possible, within the given right of way; and proper road signs and safety measures shall be provided. This Deviation has also been specified in Schedule-D.

S. No.	Stretch (km)		Radius (m)	Design Speed (Kmph)	Type of deficiency
	From	To			
(1)	(2)	(3)	(4)	(5)	(7)
1	62.683	62.824	50	40	Radius
2	65.665	65.770	50	40	Radius
3	69.418	69.526	50	40	Radius
4	69.537	69.663	50	40	Radius
5	69.665	69.750	40	30	Speed & Radius
6	69.757	69.849	40	30	Speed & Radius
7	69.889	70.042	50	40	Radius
8	70.058	70.186	50	40	Radius
9	70.350	70.498	40	30	Speed & Radius
10	70.797	70.940	50	40	Radius
11	70.941	71.082	50	40	Radius
12	71.093	71.186	30	30	Speed & Radius
13	71.190	71.257	40	30	Speed & Radius
14	71.284	71.387	50	40	Radius
15	74.374	74.477	70	40	Radius
16	74.558	74.653	50	40	Radius
17	74.673	74.775	50	40	Radius
18	74.795	74.884	60	40	Radius
19	75.064	75.139	60	40	Radius
20	75.151	75.244	50	40	Radius
21	76.040	76.137	50	40	Radius
22	76.139	76.221	60	40	Radius
23	76.498	76.613	50	40	Radius
24	76.622	76.768	50	30	Speed & Radius
25	76.802	76.845	15	20	Speed & Radius
26	76.879	76.952	30	20	Speed & Radius

(a) Extra Widening on Curves

(i) On horizontal curve roadway width shall be increased to provide for extra widening of curve. The extra widening shall be provided as per Table 6.10 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). This provision is in deviation from Manual and the Deviation is also specified in Schedule-D.

(ii) The width of carriageway at existing/ retained/ reconstructed/ additional new Minor Bridges, shall be same as specified in TCS and Section-7 of Schedule-B and no extra widening shall be required.

(iii) The width of carriageway at reconstructed/additional new Culverts shall attract provision (i) above.

(b) The following bypasses shall be provided :

S. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
(1)	(2)	(3)	(4)
1	From Km. 61.075 to Km. 61.775	0.700	
	From Km. 75.300 to Km. 75.850	0.550	

Total length of Bypasses = 1.250 km.

(c) The following realignment shall be provided :

The following Stretches shall be realigned.

Sl. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
(1)	(2)	(3)	(4)
1	From km 47.1 to km 47.325	0.225	Minor Realignment
2	From km 47.825 to km 48.4	0.575	Minor Realignment
3	From km 48.575 to km 49	0.425	Minor Realignment
4	From km 49.875 to km 50.05	0.175	Minor Realignment
5	From km 50.2 to km 50.35	0.15	Minor Realignment
6	From km 50.425 to km 50.725	0.3	Minor Realignment
7	From km 51.1 to km 51.175	0.075	Minor Realignment
8	From km 51.325 to km 51.4	0.075	Minor Realignment
9	From km 51.7 to km 52.875	1.175	Minor Realignment
10	From km 53.45 to km 54.725	1.275	Minor Realignment
11	From km 54.85 to km 55.25	0.4	Minor Realignment
12	From km 55.425 to km 55.565	0.14	Minor Realignment
13	From km 55.6 to km 55.675	0.075	Minor Realignment
14	From km 55.725 to km 56.675	0.95	Minor Realignment
15	From km 56.675 to km 59.100	2.425	Major Realignment
16	From km 59.1 to km 60.425	1.325	Minor Realignment
17	From km 61.05 to km 61.075	0.025	Minor Realignment
18	From km 61.775 to km 61.825	0.05	Minor Realignment

Sl. No.	Stretch Design Chainage (from km tom)	Length (Km)	Remarks
19	From km 61.9 to km 62.050	0.15	Minor Realignment
20	From km 62.2 to km 62.275	0.075	Minor Realignment
21	From km 62.425 to km 62.55	0.125	Minor Realignment
22	From km 63.475 to km 63.825	0.35	Minor Realignment
23	From km 65.51 to km 65.85	0.34	Minor Realignment
24	From km 65.975 to km 66.35	0.375	Minor Realignment
25	From km 66.65 to km 67.35	0.7	Minor Realignment
26	From km 67.95 to km 68.575	0.625	Minor Realignment
27	From km 69.05 to km 69.225	0.175	Minor Realignment
28	From km 69.5 to km 69.6	0.1	Minor Realignment
29	From km 69.825 to km 70.55	0.725	Minor Realignment
30	From km 70.75 to km 72.075	1.325	Minor Realignment
31	From km 72.675 to km 72.9	0.225	Minor Realignment
32	From km 73.425 to km 73.625	0.2	Minor Realignment
33	From km 74.15 to km 74.625	0.475	Minor Realignment
34	From km 74.7 to km 75.3	0.6	Minor Realignment
35	From km 75.85 to km 76.025	0.175	Minor Realignment
	Total length of realignment =	Km 16.58	

(iv) Right of Way

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

(v) Type of shoulders

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

S. No.	Stretch Design Chainage (from km to km)		Fully paved shoulders/ footpaths	Reference to cross section
(1)	(2)	(3)	(4)	**(5)**
1	72.650	74.060	2x1.50 Footpath cum Drain	TCS 8
2	75.960	77.055	2x1.50 Footpath cum Drain	TCS 8

b. Design and specifications of earthen shoulders, paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

(vi) Median

The details of Width and Type of Median is as follow

S. No.	Design Chainage (from km to km) of the stretch	Width & Type of Median	Reference to cross section

(1)	(2)	(3)	(4)
1	From Km 72.650 to Km 74.060, except at locations of Minor Bridges and Junction Opening	Minimum 2.5 m Raised Median including Kerb Shyness of 0.50 m on each Side.	TCS 8
2	From Km 75.960 to Km 77.055, except at locations of Minor Bridges and Junction Opening		

(vii) Lateral and vertical clearances at underpasses

(a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the provision of relevant Manual.

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

Sl. No.	Location (Design Chainage Km)	Span/ opening (m)	Remarks
(1)	**(2)**	**(3)**	**(4)**
1	61.310	12 m	LVUP
2	61.470	12 m	LVUP
3	61.645	7 m	SVUP

(viii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per the provision of relevant Manual.

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

Sl. No.	**Location (Chainage) (from km to km)**	**Span/ opening (m)**	**Remarks**
(1)	**(2)**	**(3)**	**(4)**
NOT APPLICABLE			

(ix) Service/ Slip roads

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

Sl. No.	**Location of service road (from km to km)**	**Right hand side (RHS)/Left hand side (LHS)/ or Both sides**	**Length (km) of service road**
(1)	**(2)**	**(3)**	**(4)**

NIL

(x) Grade separated structures

Grade separated structures shall be provided as per provision of the relevant Manual. The requisite particulars are given below:

SL No.	Location of Structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
(1)	(2)	(3)	(4)	(5)	(6)
1	61.310	12	1X12	3.92%	Refer Drawing of GAD
2	61.470	12	1X12	0%	
3	61.645	7	1X7	0%	

Note:

~~1) Proposed levels at structure locations as shown in plan & profile specified in Annex III of schedule A are only for guidance and any upward change in the levels shall not constitute any change of scope.~~

~~2) Vertical Clearance of ROB shall be provided as per the Railway Authorities requirements~~

(xi) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location (Design Chainage km)	Type of crossing
(1)	(2)	(3)
NIL		

(xii) Typical cross-sections of the Project Highway

Typical Cross Sections of relevant Manual, modified and additional TCS as per Project requirements are provided below. Deviation of Typical Cross Sections contained in the Manual have also been mentioned in Schedule-D.

TCS Code and indicative details are as follow.

Sr. No.	Particular of TCS	TCS Codes
4	TYPICAL CROSS SECTION -4 New Construction of 2 Lane Road with Paved Shoulders on Both Side	TCS-4
5	TYPICAL CROSS SECTION -5 New Construction of 2 Lane Road with Paved Shoulders on Both Side with High Embankment	TCS-5

Sr. No.	Particular of TCS	TCS Codes
6	TYPICAL CROSS SECTION -7 Construction of 2 Lane Road with Hill Cutting on Both Side	TCS-7
	TYPICAL CROSS SECTION -7 TYPE I Construction of 2 Lane Road with Hill Cutting on Both Side with 4.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type I)
	TYPICAL CROSS SECTION -7 TYPE II Construction of 2 Lane Road with High Hill Cutting on Both Side with 6.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type II)
	TYPICAL CROSS SECTION -7 TYPE III Construction of 2 Lane Road with Hill Cutting on Right Side with 6.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type III)
	TYPICAL CROSS SECTION -7 TYPE IV Construction of 2 Lane Road with Hill Cutting on Left Side with 4.0 m Gabion Wall with Hill Slope Protection Work	TCS-7 (Type IV)
7	TYPICAL CROSS SECTION -8 Construction of 4 Lane Road in Built Up Area	TCS-8
8	2-lane Bridge with Footpath	TCS-9A
9	2-lane Structure without Footpath	TCS-9B
10	2-lane existing bridge on one side without footpath and new 2-lane with paved shoulder with footpath keeping in view of 4 lane widening in future	TCS-9C
11	4-lane Bridge	TCS-10
12	TYPICAL CROSS SECTION -11 Construction of 2 Lane Road with Reinforced Earth with Gabion Facia Panel	TCS-11

Chainage wise Locations of TCS are as follows

Chainagewise TCS details				
Sr. No.	**Chainage (Km)**		**Design Length (Km)**	**TCS Code**
	From	**To**		
(1)	(2)	(3)	(4)	(5)
1	47075	47100	25	MNB
2	47100	47725	625	TCS 4
3	47725	48100	375	TCS 7
4	48100	48175	75	TCS 5
5	48175	48250	75	TCS 7
6	48250	48325	75	TCS 7 type II
7	48325	48575	250	TCS 4
8	48575	48675	100	TCS 5
9	48675	48775	100	TCS 7
10	48775	49925	1150	TCS 4
11	49925	49935	10	MNB

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
12	49935	49950	15	TCS 4
13	49950	50025	75	TCS 7 type II
14	50025	50250	225	TCS 7
15	50250	50850	600	TCS 7 type II
16	50850	51275	425	TCS 7
17	51275	51350	75	TCS 4
18	51350	51384	34	TCS 5
19	51384	51396	12	MNB
20	51396	51800	404	TCS 5
21	51800	51875	75	TCS 7
22	51875	51894	19	TCS 5
23	51894	51906	12	MNB
24	51906	52025	119	TCS 5
25	52025	52100	75	TCS 7
26	52100	52150	50	TCS 5
27	52150	52225	75	TCS 7
28	52225	52325	100	TCS 5
29	52325	52425	100	TCS 7
30	52425	52475	50	TCS 4
31	52475	52675	200	TCS 7
32	52675	54200	1525	TCS 7 type II
33	54200	54600	400	TCS 7
34	54600	54700	100	TCS 7 type II
35	54700	54775	75	TCS 7
36	54775	54875	100	TCS 4
37	54875	54975	100	TCS 7
38	54975	55025	50	TCS 4
39	55025	56000	975	TCS 7
40	56000	56425	425	TCS 7 type II
41	56425	56525	100	TCS 4
42	56525	56675	150	TCS 7 type IV
43	56675	56925	250	TCS 5
44	56925	57050	125	TCS 7
45	57050	57300	250	TCS 7 type II
46	57300	57425	125	TCS 5
47	57425	57525	100	Elevated Via-Duct
48	57525	57550	25	TCS 5
49	57550	57600	50	TCS 7
50	57600	57725	125	TCS 5
51	57725	58350	625	TCS 7 type II
52	58350	58875	525	TCS 5
53	58875	59029	154	TCS 7

Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
54	59029	59041	12	MNB
55	59041	59950	909	TCS 4
56	59950	60250	300	TCS 5
57	60250	61150	900	TCS 4
58	61150	61325	175	TCS 5
59	61325	61450	125	TCS 7 type III
60	61450	61540	90	TCS 5
61	61540	61590	50	MNB
62	61590	61675	85	TCS 5
63	61675	61800	125	TCS 7 type II
64	61800	62175	375	TCS 4
65	62175	62350	175	TCS 7
66	62350	62825	475	TCS 4
67	62825	63150	325	TCS 7
68	63150	65500	2350	TCS 4
69	65500	65510	10	MNB
70	65510	66675	1165	TCS 4
71	66675	66775	100	TCS 7 type IV
72	66775	66875	100	TCS 7 type I
73	66875	66940	65	TCS 5
74	66940	66960	20	MNB
75	66960	67050	90	TCS 5
76	67050	67275	225	TCS 4
77	67275	67350	75	TCS 5
78	67350	67875	525	TCS 4
79	67875	67908	33	TCS 5
80	67908	67933	25	MNB
81	67933	67950	17	TCS 5
82	67950	68350	400	TCS 7
83	68350	68425	75	TCS 4
84	68425	68500	75	TCS 7
85	68500	68550	50	TCS 7 type I
86	68550	68750	200	TCS 7
87	68750	69000	250	TCS 4
88	69000	69275	275	TCS 7
89	69275	70925	1650	TCS 7 type II
90	70925	71125	200	TCS 7
91	71125	71350	225	TCS 7 type IV
92	71350	71400	50	TCS 5
93	71400	71475	75	TCS 7
94	71475	71525	50	TCS 7 type IV
95	71525	71575	50	TCS 5

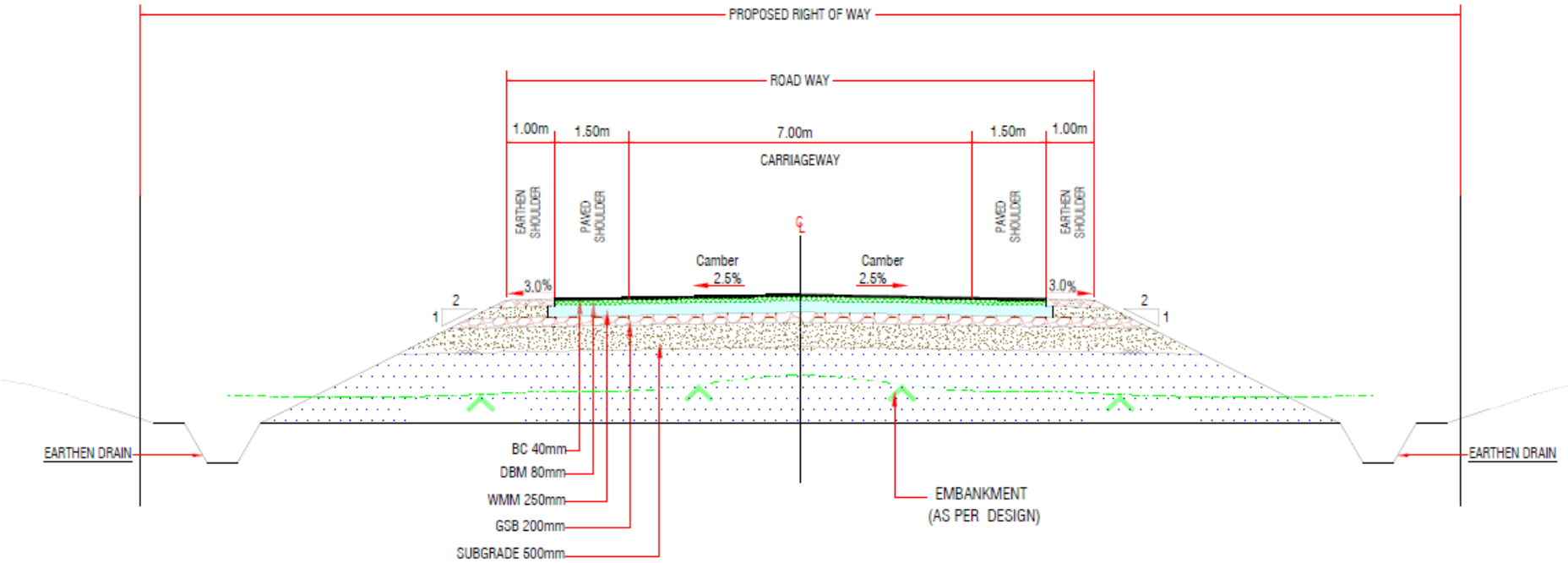
Chainagewise TCS details				
Sr. No.	Chainage (Km)		Design Length (Km)	TCS Code
	From	To		
(1)	(2)	(3)	(4)	(5)
96	71575	71650	75	TCS 7 type IV
97	71650	71700	50	TCS 4
98	71700	71825	125	TCS 7
99	71825	71925	100	TCS 5
100	71925	71992	67	TCS 11
101	71992	72008	16	MNB
102	72008	72225	217	TCS 11
103	72225	72475	250	TCS 5
104	72475	72650	175	TCS 4
105	72650	73410	760	TCS 8
106	73410	73420	10	MNB
107	73420	74060	640	TCS 8
108	74060	74170	110	TCS 4
109	74170	74180	10	MNB
110	74180	74200	20	TCS 4
111	74200	74900	700	TCS 7
112	74900	74975	75	TCS 5
113	74975	75070	95	TCS 4
114	75070	75325	255	TCS 5
115	75325	75525	200	TCS 7
116	75525	75575	50	MNB
117	75575	75710	135	TCS 7 type IV
118	75710	75775	65	TCS 7 type III
119	75775	75960	185	TCS 4
120	75960	76485	525	TCS 8
121	76485	76495	10	MNB
122	76495	77055	560	TCS 8
Total Length			29.980	

Note:

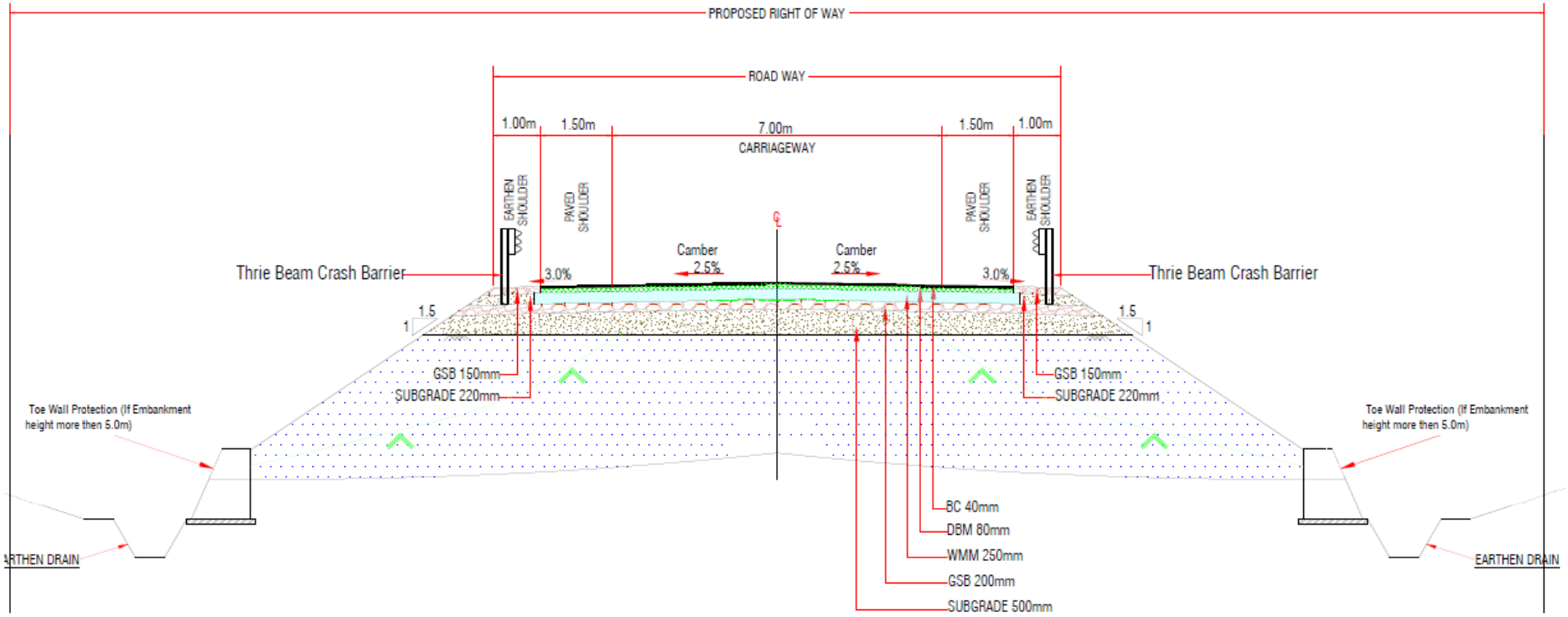
1) The cross-section and Design chainages as given in above table are indicative and stretches may increase or decrease in length depending upon profile designed by contractor, however, this shall not be treated as change of scope.
2) All the cross-sectional elements are to be accommodated within the proposed ROW. If required, suitable retaining structures along with drainage system shall be provided as per site condition and this will not constitute any change of scope.

3) The Contractor shall match the start and end points of Project Highway with Nearby Packages. Increase in length due to this shall not be treated as change of scope.

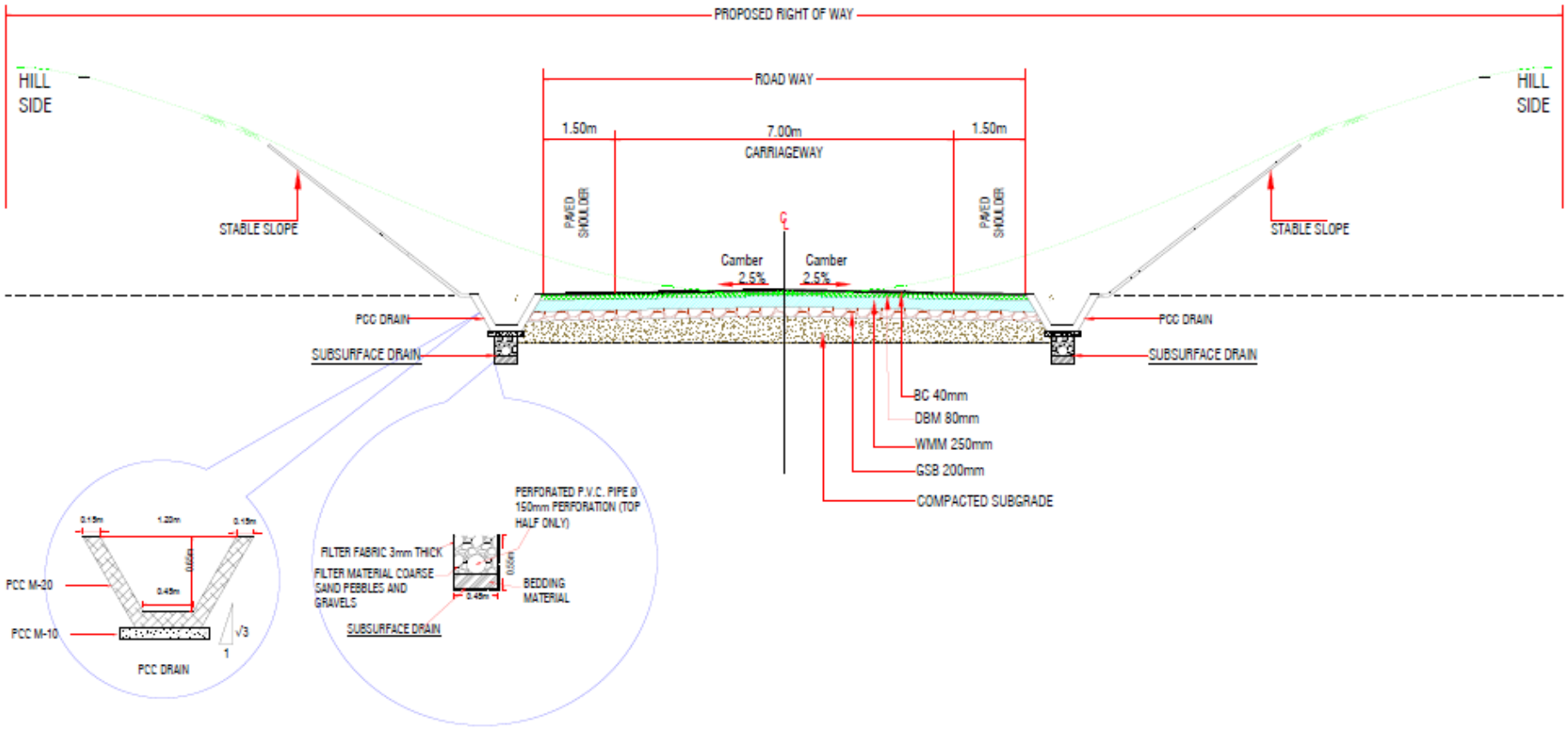
Typical Cross Sections Package-III



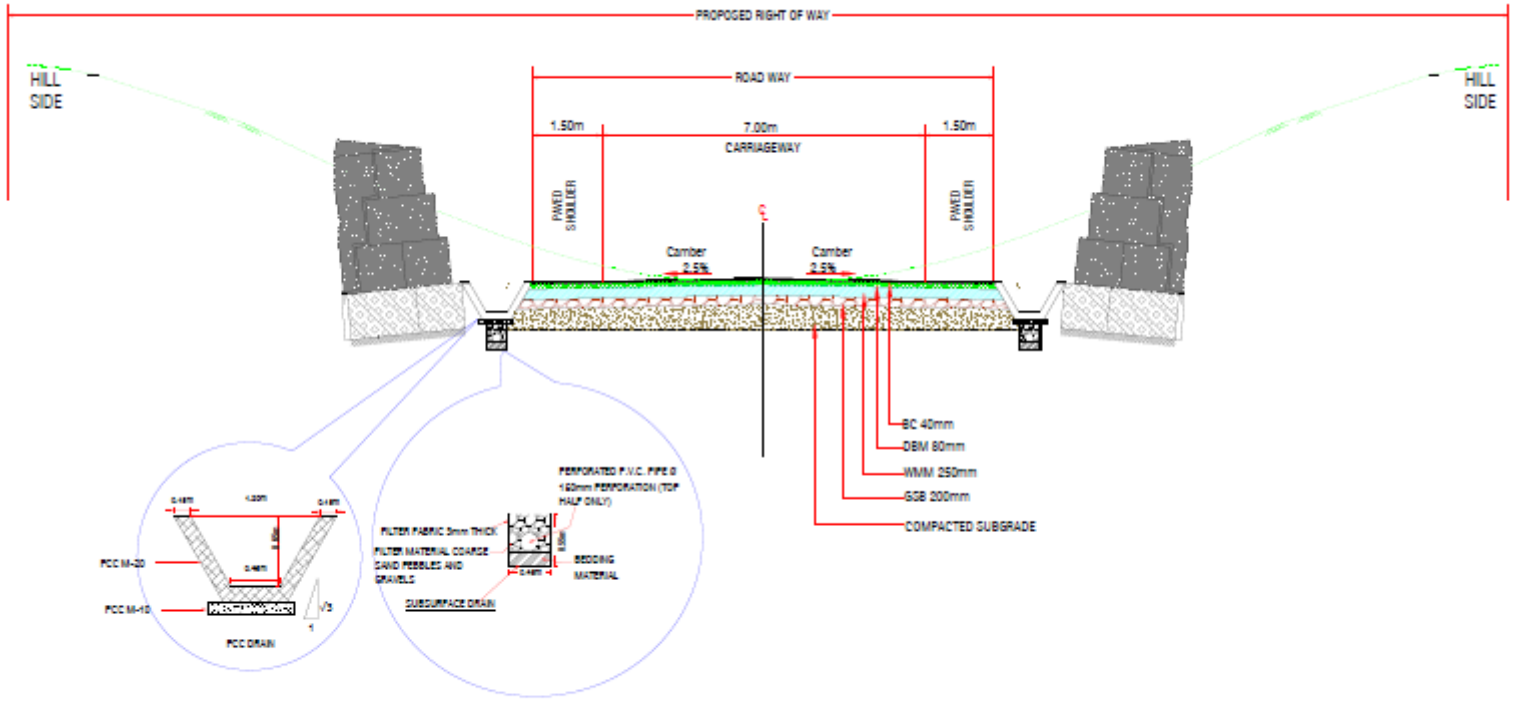
TYPICAL CROSS SECTION -4



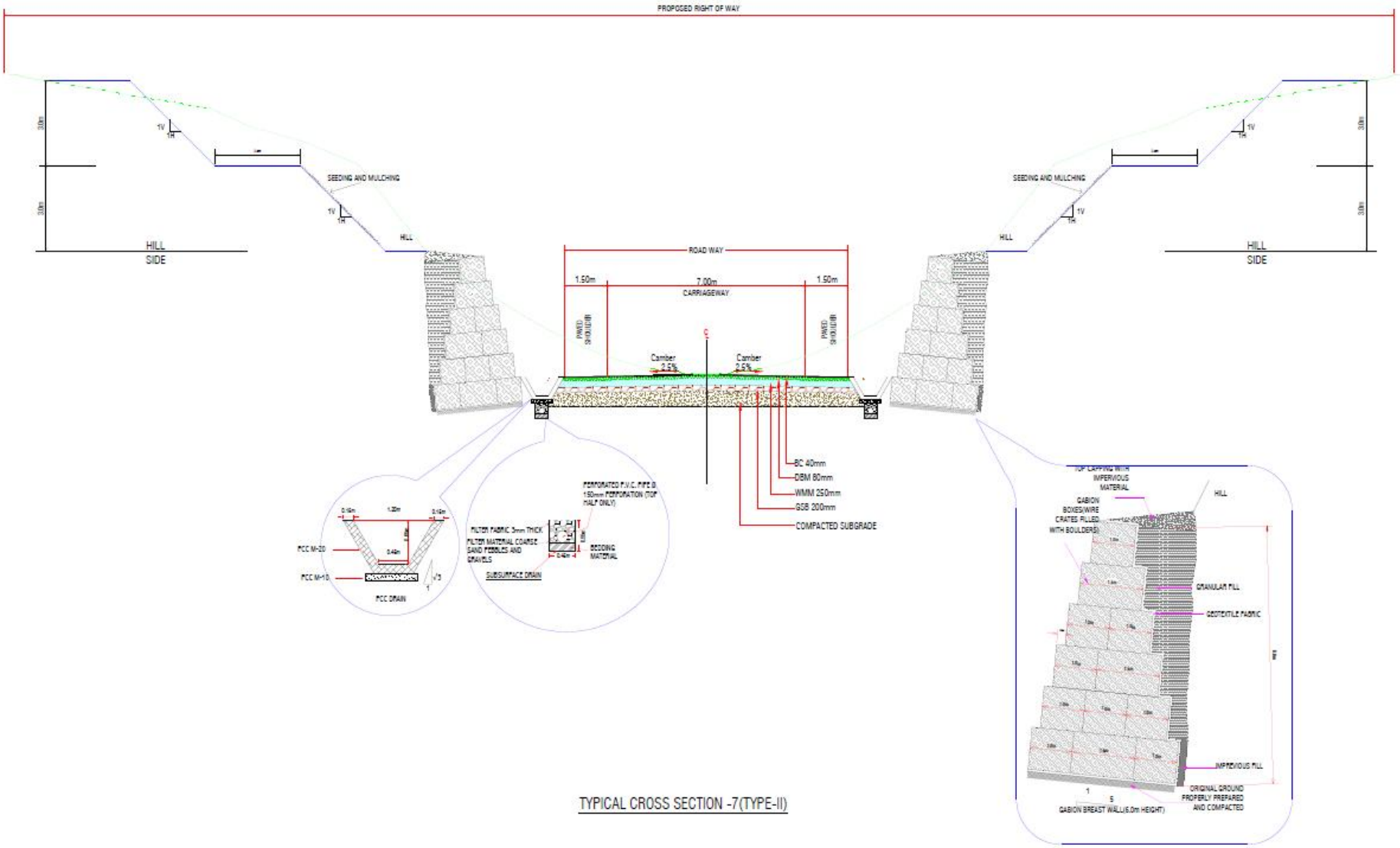
TYPICAL CROSS SECTION -5



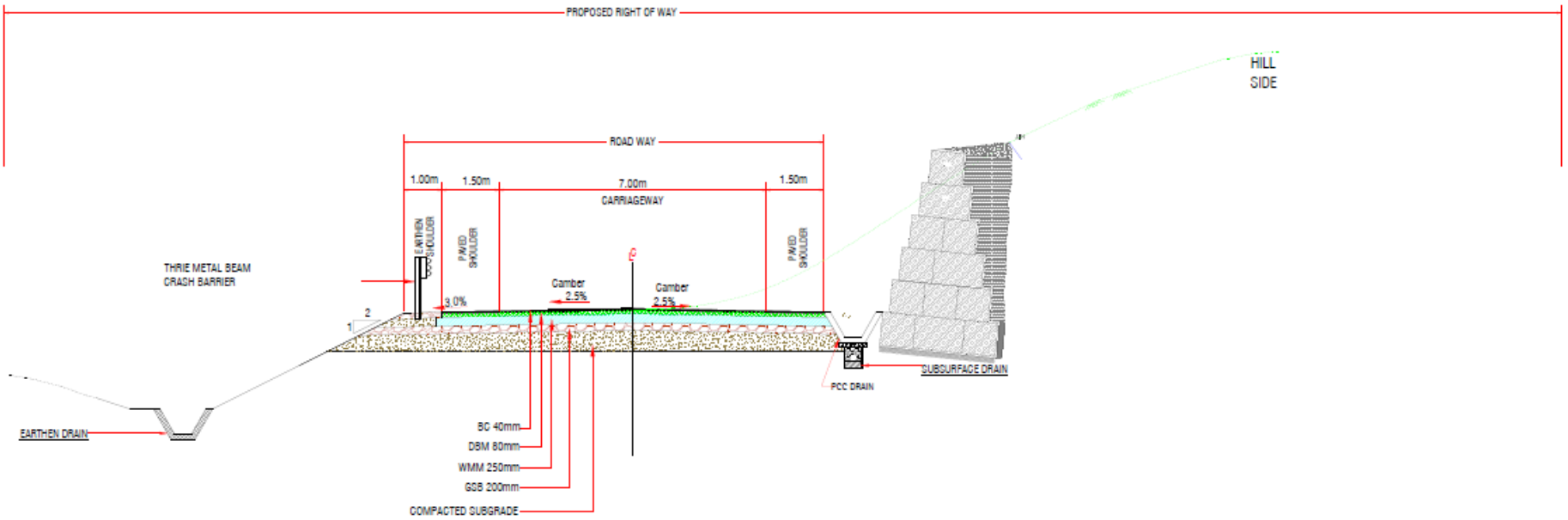
TYPICAL CROSS SECTION -7



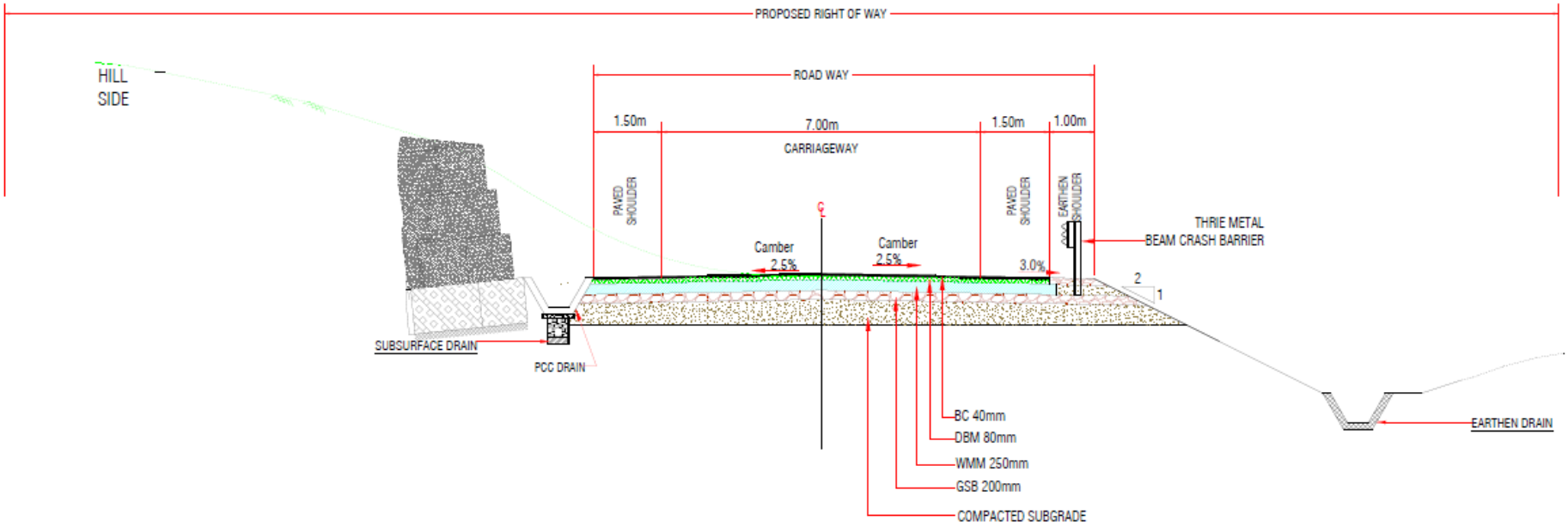
TYPICAL CROSS SECTION -7(TYPE-I)



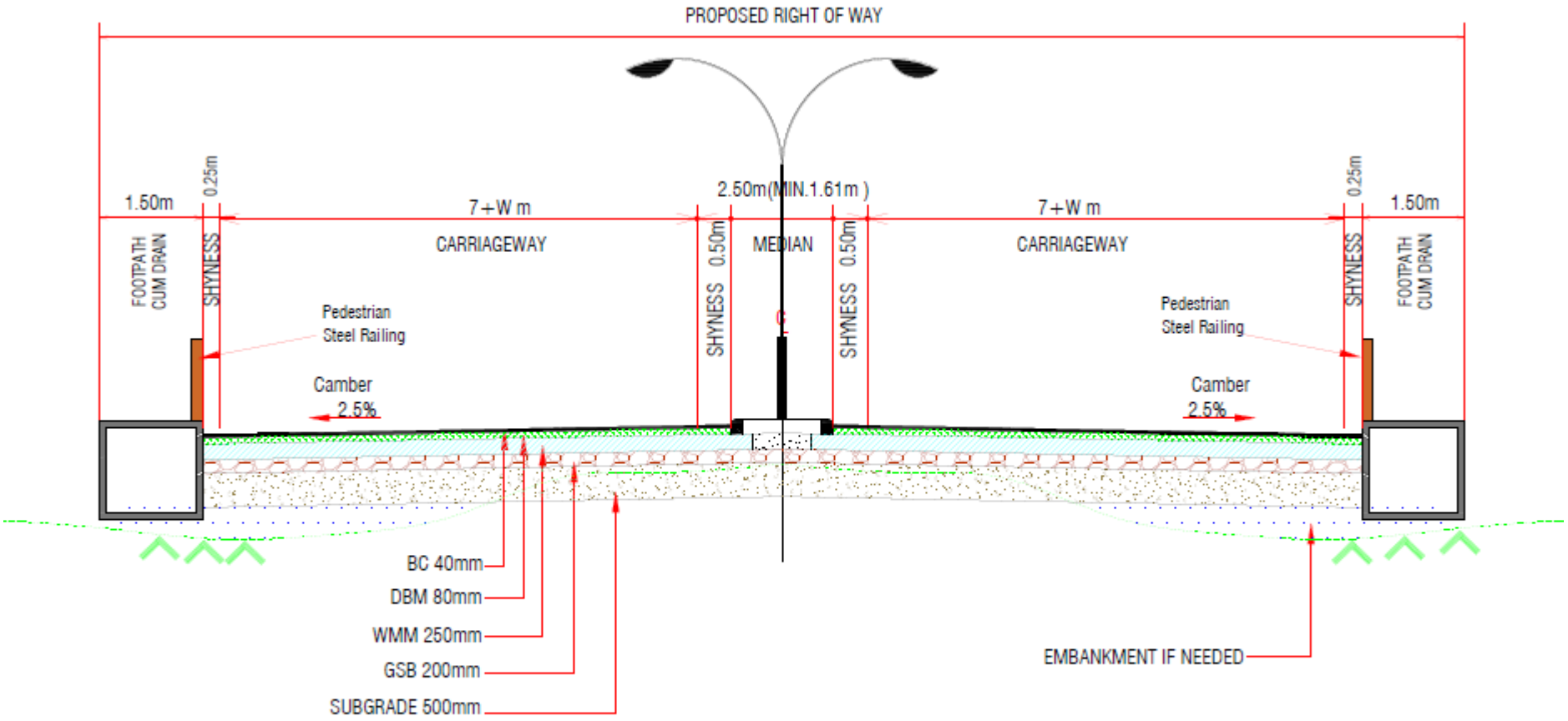
TYPICAL CROSS SECTION -7(TYPE-II)



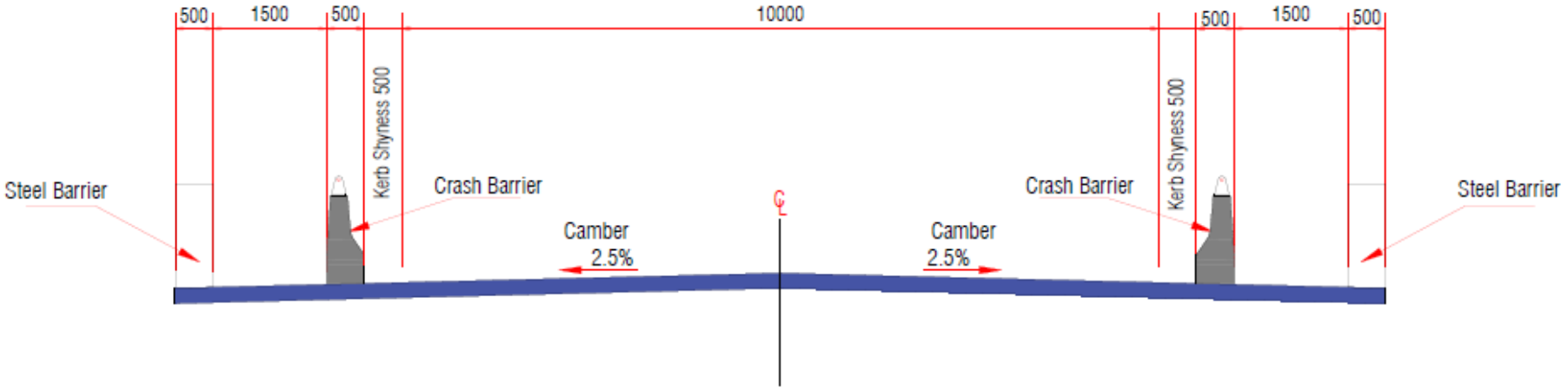
TYPICAL CROSS SECTION -7(TYPE-III)



TYPICAL CROSS SECTION -7(TYPE-IV)

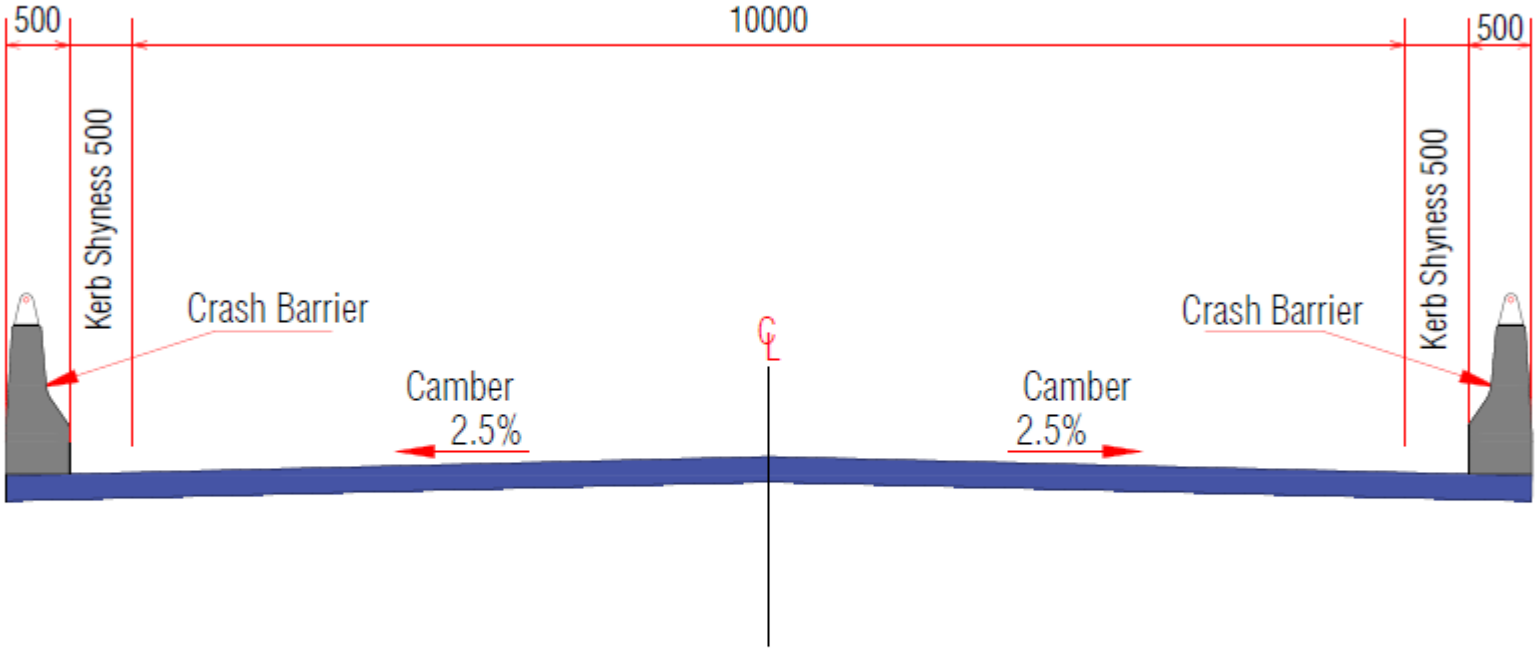


TYPICAL CROSS SECTION -8

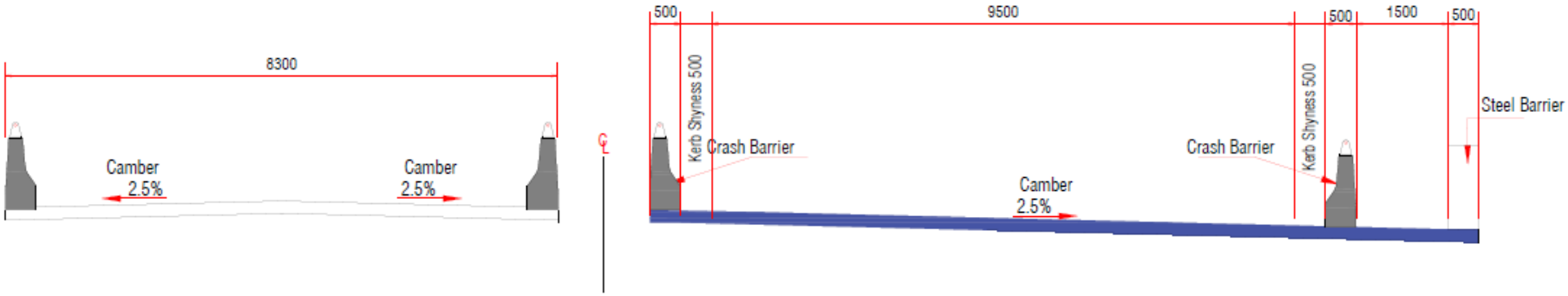


TYPICAL CROSS SECTION 9A

2-Lane Bridge With Footpath on Both Side

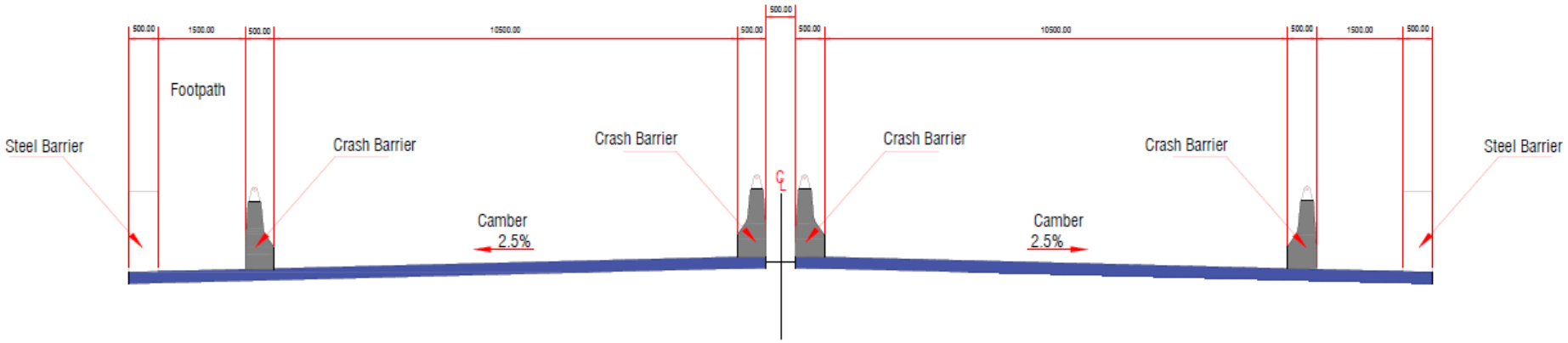


TYPICAL CROSS SECTION 9B



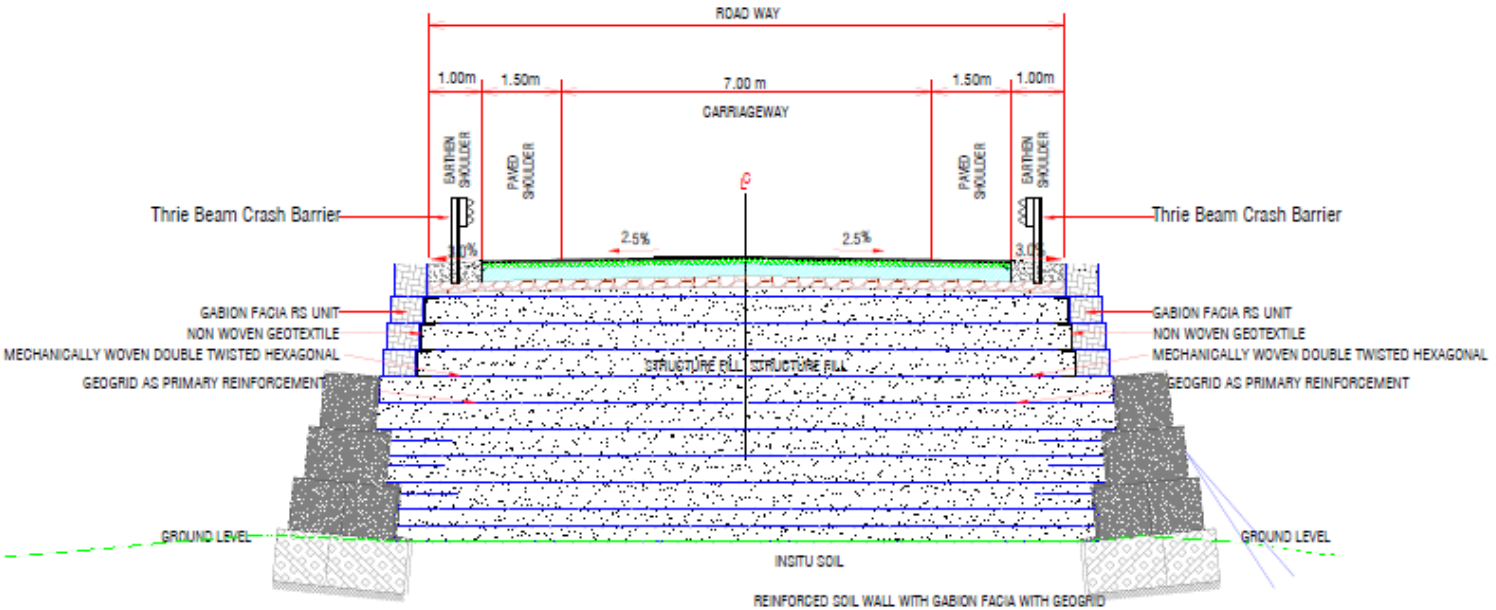
TYPICAL CROSS SECTION - 9C

2 Lane Existing Bridge on one side without footpath and New 2 Lane with Paved Shoulder Bridge with footpath keeping in view of 4 lane widening in future



TYPICAL CROSS SECTION - 10

4 Lane Bridge (2X2 lane) with footpath 2-Lane Highway



TYPICAL CROSS SECTION -11

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 of the types and features given in the tables below:

(i) At-grade intersections

Sl. No.	**Location of intersection(Design Chainage)**	**Type of intersection**	**Other features**
(1)	**(2)**	**(3)**	**(4)**
Major Intersections			
1	56.675	Y	Start of Airport Realignment
2	59.100	Y	End of Airport Realignment
3	61.075	Y	Start of Bypass (Jenjal)
4	61.775	X	End of Bypass (Jenjal)
5	66.875	Y	Realignment
6	72.550	Y	MDR
7	75.300	Y	Start of Bypass (Rongram)
8	75.850	Y	End of Bypass (Rongraml)
Minor Intersections			
1	48.075	T	VR
2	48.875	T	VR
3	49.140	Y	VR
4	49.260	Y	VR
5	50.720	T	VR
6	51.745	T	VR
7	53.745	Y	VR
8	55.625	T	VR
9	59.340	T	VR
10	60.430	T	VR
11	60.820	Y	VR
12	60.970	Y	VR
13	62.620	Y	VR
14	63.375	T	VR
15	64.170	Y	VR
16	64.925	T	VR
17	65.030	T	VR
18	66.625	Y	VR
19	67.775	Y	VR
20	67.890	T	VR
22	69.045	Y	VR
23	69.420	Y	VR
24	73.230	Y	VR
25	73.275	Y	VR

Sl. No.	Location of intersection(Design Chainage)	Type of intersection	Other features
(1)	(2)	(3)	(4)
26	73.600	T	VR
27	73.985	T	VR
28	74.190	Y	VR
29	74.500	T	VR
30	76.270	T	VR
31	76.380	Y	VR
32	76.820	T	VR

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
(1)	(2)	(3)	(4)	(5)
NOT APPLICABLE				

Note:

1) It is clarified that if any other junction is identified during development/Construction of the project highway in addition to those mentioned above, shall also be improved with proper drainage facilities as per standards. They are deemed to be covered within the scope of work. The Numbers, locations & type of junctions shown in above table are minimum and may increase as per actual site conditions. Any increase in number will not constitute change of Scope.
2) The contractor shall take up 'Detailed Engineering study' to ascertain further details of all intersections and treatment of the intersections and all shall be designed in accordance with the latest guidelines mentioned in section-3 of relevant Manual as specified in Schedule-D. The same shall not constitute a Change of Scope, save and except any variations arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

4. *Road Embankment and Cut Section*

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual and the cross sectional details specified in Schedule B. This shall be in addition to (ii) below.

(ii) Deficiencies in plan and profile of the existing road shall be corrected subject to the condition that finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

(iii) Project Specific Provisions

(a) The slopes shall be protected with turfing/geo synthetics /geo green blanket/geo cells/stone pitching or any other method according to the site requirement. These measures are incidental and shall be deemed part of the Scope of work. Any increase in the cost on this account shall not be treated as Change in Scope of Work.

(b) Wherever required, toe wall/retaining wall/other protection works along with drainage system shall be provided. All the features shown in the TCS are to be accommodated in the ROW given.

5. Pavement Design

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

(ii) Type of pavement

The Flexible pavement shall be provided for the entire length of Two-lane with Paved Shoulder Project Highway for Main carriageway, Service road, Bus bays and Truck Lay-Bye.

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement shall be designed for a minimum design period of **20 years**. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for a design traffic for **minimum 20 million standard axles (20 MSA).**

(c) Granular-Sub Base Material

The natural sand material shall not be permitted for Granular Sub-Base construction. Only crushed gravel and crushed stone or combination thereof depending upon the grading requirement shall be used.

(iv) Reconstruction of stretches

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

Sr. No.	Stretch Design Chainage From km to km			Remarks
	From	**To**	**Length**	
-1	-2	-3	-4	-5
1	47.075	47.100	0.025	The existing 2-lane shall
2	47.325	47.825	0.500	

3	48.400	48.575	0.175	be reconstructed as new pavement.
4	49.000	49.875	0.875	
5	50.050	50.200	0.150	
6	50.350	50.425	0.075	
7	50.725	51.100	0.375	
8	51.175	51.325	0.150	
9	51.400	51.700	0.300	
10	52.875	53.450	0.575	
11	54.725	54.850	0.125	
12	55.250	55.425	0.175	
13	55.565	55.600	0.035	
14	55.675	55.725	0.050	
15	60.425	61.050	0.625	
17	61.825	61.900	0.075	
18	62.050	62.200	0.150	
19	62.275	62.425	0.150	
20	62.550	63.475	0.925	
21	63.825	65.510	1.685	
22	65.850	65.975	0.125	
23	66.350	66.650	0.300	
24	67.350	67.950	0.600	
25	68.575	69.050	0.475	
26	69.225	69.500	0.275	
27	69.600	69.825	0.225	
28	70.550	70.750	0.200	
29	72.075	72.675	0.600	
30	72.900	73.425	0.525	
31	73.625	74.150	0.525	
32	74.625	74.700	0.075	
34	76.025	77.055	1.030	
		Total	12.150	

Note:

1) Contractor shall provide 65 mm Wearing coat comprising 40 mm BC & 25 mm Mastic Asphalt on all Structures and culverts which are designed without overburden.

(v) Strengthening of existing road stretches

The following stretches of the existing road shall be Strengthened by Contractor as per Clause 5.9 of relevant Manual as specified in Schedule-D (IRC: SP: 84, 2019) as per the Design Traffic as specified (20 MSA).

Sr. No.	Stretch Design Chainage From km to km		Remarks
	From	**To**	
(1)	(2)	(3)	(4)
-NIL-			

6. *Roadside Drainage*

The design and construction of surface and sub-surface drains for highway drainage and drainage for structures shall be carried out in accordance with the requirement of the Section-6 of relevant Manual as specified In Schedule-D.

(i) Surface Drainage

RCC footpath cum Drain and Open side trapezoidal PCC lined cross section drain shall be provided as per TCS for the project Highway in order to intercept surface water from the carriageway, shoulders and slopes. The drains outfall into the natural water courses i.e. either in culverts or bridges,

Note

1) The Length of the lined drains mentioned above are indicative and minimum. The actual length of the lined drains shall be determined by the Contractor keeping in view the drainage locations and in accordance with the Manual requirements with approval from the Authority/ Authority's Engineer. Any increase in the length of drain as specified in above location shall not constitute a Change of Scope.

2) Invert levels of the longitudinal drains shall be decided as per adjoining draining area and properties. All drains should be connected to nearest natural nallah/Drainage Source.

(ii) Subsurface drainage system

a) Drainage within road body and subgrade: The drainage within road body and subgrade shall be designed as per IRC SP 42, Section 5 Subsurface drainage.
b) Longitudinal Sub Surface Drain: Subsurface drain with perforated pipe of 150 mm internal diameter of PVC, closely jointed, perforations ranging from 3 mm to 6 mm depending upon size of material surrounding the pipe, with 150 mm bedding below the pipe and 300 mm cushion above the pipe, cross section of excavation 450 x 550 mm. Excavated material to be utilized in roadway at site.

(iii) Drainage Plan

The Contractor shall prepare the Detailed Drainage Plan including Surface Drainage and Sub-Surface Drainage Plan. The size of various type of surface Drains and subsurface shall be decided as per the site requirements and relevant codes

The Minimum length of line/unlined drains surface & Sub-surface and other type of drains shall be constructed as follow

S. No.	Proposed Type	Remarks	Length (m)
(1)	(2)	(3)	(4)

S. No.	Proposed Type	Remarks	Length (m)
(1)	(2)	(3)	(4)
1	RCC Rectangular drain Cum Foot PATH	TCS - 8	2X2485
2	PCC Trapezoid Lined Drain on Hill Sides	TCS-7 TCS-7 (Type-I) TCS-7 (Type-II) TCS-7 (Type-III) TCS-7 (Type-IV)	2X6354 2X150 2X5450 1X190 1X735
3	Longitudinal Subsurface Drain	TCS-7 TCS-7 (Type-I) TCS-7 (Type-II) TCS-7 (Type-III) TCS-7 (Type-IV)	2X6354 2X150 2X5450 1X190 1X735

Note

1) The Length of the lined drains mentioned above are indicative and minimum. The actual length of the lined drains shall be determined by the Contractor keeping in view the drainage locations and in accordance with the Manual requirements with approval from the Authority/ Authority's Engineer. Any increase in the length of drain as specified in above location shall not constitute a Change of Scope.

2) Invert levels of the longitudinal drains shall be decided as per adjoining draining area and properties. All drains should be connected to nearest natural nallah/Drainage Source.

7. Design of Structures

(i) General

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

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

Sl. No.	**Bridge Deign Chainage at km**	**Width of carriageway and cross-sectional features***
(1)	(2)	(3)
	Minor Bridge	
1	49.930	TCS 9A: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
2	51.390	TCS 9A: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)

Sl. No.	Bridge Deign Chainage at km	Width of carriageway and cross-sectional features*
(1)	(2)	(3)
3	51.900	TCS 9B: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers)
4	59.035	TCS 9A: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
5	61.565	TCS 9B: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers)
6	65.505	TCS 9A: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
7	66.950	TCS 9B: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers)
8	67.915	TCS 9C: (Existing Bridge+ 2x 0.5m Crash Barriers +2x 0. 5m Shyness + 9.5 m CW +1x1.5 m Footpath +1x0.5 m Steel Barrier)
9	72.000	TCS 9B: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers)
10	73.415	TCS 10: (2x 0.5m Crash Barrier+2x 0.5m Shyness+ 2x 9.5 m CW +2x 0.5m Shyness+ 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
11	74.175	TCS 9A: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)
12	75.550	TCS 9B: (10.0 m CW +2x 0. 5m Shyness + 2x 0.5m Crash Barriers)
13	76.490	TCS 10: (2x 0.5m Crash Barrier+2x 0.5m Shyness+ 2x 9.5 m CW +2x 0.5m Shyness+ 2x 0.5m Crash Barriers +2x1.5 m Footpath +2x0.5 m Steel Barrier)

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

Sl. No.	Location at km	Remarks

(1)	(2)	(3)
	Minor Bridge	
1	49.930	2x1.5 m wide Footpath
2	51.390	2x1.5 m wide Footpath
3	59.035	2x1.5 m wide Footpath
4	65.505	2x1.5 m wide Footpath
5	67.915	2x1.5 m wide Footpath
6	73.415	2x1.0 m wide Footpath
7	74.175	2x1.5 m wide Footpath
8	76.490	2x1.5 m wide Footpath

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

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
All Minor Bridges shall have raised footpath on both sides of the structure for the arrangement of utility services.			

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

(g) IRC Class Special Vehicle loading (385 T) shall be taken into account in the structural design of Elevated Viaduct, Major Bridges /Minor bridges/Flyover/VUP/ROB.

(ii) Culverts

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

(b) Reconstruction of existing culverts:

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

Sl. No.	Design Chainage (Km)	No. of Spans x Clear Span (m)/Opening (mxm)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
1	49.150	1x1.2	Pipe
2	49.780	1x1.2	Pipe
3	50.050	1x1.2	Pipe
4	50.115	1x1.2	Pipe
5	50.875	1x1.2	Pipe
6	51.030	1x1.2	Pipe
7	51.075	1x2x2	Box
8	51.325	2x1.2	Pipe
9	52.280	1x1.2	Pipe
10	52.315	1X3X2	Box
11	52.445	1x2x2	Box

Sl. No.	Design Chainage (Km)	No. of Spans x Clear Span (m)/Opening (mxm)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
12	52.650	1x2x2	Box
13	54.375	1X3X3	Box
14	55.275	1x1.2	Pipe
15	55.315	1x1.2	Pipe
16	55.575	1x1.2	Pipe
17	56.470	1x1.2	Pipe
18	59.170	1x2x2	Box
19	61.950	1X2X2	Box
20	62.110	1X2X2	Box
21	62.265	1x1.2	Pipe
22	62.640	1X3X3	Box
23	62.730	1X2X2	Box
24	63.775	2x1.2	Pipe
25	65.840	1X2X2	Box
26	66.005	1X2X2	Box
27	66.255	1X2X2	Box
28	66.280	1X2X2	Box
29	66.650	2x1.2	Pipe
30	68.465	1x1.2	Pipe
31	68.580	1x1.2	Pipe
32	69.010	2x1.2	Pipe
33	71.210	1x1.2	Pipe
34	71.545	1X5X3	Box
35	72.095	1x1.2	Pipe
36	72.405	1x1.2	Pipe
37	72.700	1x1.2	Pipe
38	72.855	1x1.2	Pipe
39	73.290	1x1.2	Pipe
40	73.745	1X1.5X1.5	Box
41	75.100	1x1.2	Pipe
42	75.260	1x1.2	Pipe
43	76.135	2x1.2	Pipe
44	76.285	1X2X2	Box

* Road level shall be minimum as per Proposed FRL provided in Alignment Plan at Annexure-III Schedule-A.

Note:

1) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.

2) The culvert location planned as Table above shall be adjusted accordingly to the exact location of cross-water stream or existing culvert located based on the topographic survey performed by the Contractor for the final drawings of the Detailed Design. The Contractor shall construct culvert in Skew Angle if required as per the site conditions. This shall be deemed to be included in the Scope of Work.

3) The Contractor shall carry out appropriate Ground improvement works as per the State of Art reports IRC-HRB: SR-13, SR-14 to increase the Safe Bearing

Capacity of in-situ soil and reduce the settlement during the construction & post construction period.

4) The Contractor shall provide Granular Material below the foundation of Box Structure in case of presence of Clayey soils as per clause 23.3 of IRC: SP: 13, 2004.

5) The Contractor shall provide necessary Protection Works on upstream & downstream site of box structure as per Article 23 of IRC: SP: 13, 2018 and Figure 8.5 Culvert with retain wall on U/S & D/S Side, Catch pit, chute, Guide wall and Apron as per IRC: SP:48, 1998, as per the site requirement.

6) On the Culvert location at the end of roadway edges, Only Concrete Crash Barriers shall be provided of minimum 1.1 m height.

7) The Contractor shall provide necessary Barrel length of Box as per the extra widening, embankment Height and site requirement. This shall not constitute Change of Scope.

(c) **Widening of existing culverts**:

Repairs and strengthening of existing structures where required shall be carried out. This shall not constitute any Change of Scope. The list of widening culverts is as follows:

S/No.	Culvert location (km)	No. of Spans x Clear Span (m)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
1	47.210	1x1.0	Pipe
2	47.375	1x1.0	Pipe
3	47.635	1x2.0	Box
4	47.715	2x1.0	Pipe
5	49.410	1x1.0	Pipe
6	49.600	2x1.0	Pipe
7	49.840	1x1.0	Pipe
8	54.800	1x1.0	Pipe
9	54.845	2x1.0	Pipe
10	55.400	1x1.0	Pipe
11	55.880	1x1.0	Pipe
12	56.165	1x1.0	Pipe
13	65.205	1X1.0	Pipe
14	66.355	1X1.0	Pipe
15	67.49	1x1.0	Pipe
16	67.575	1x1.0	Pipe

S/No.	Culvert location (km)	No. of Spans x Clear Span (m)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
17	67.645	1x1.0	Pipe
18	67.725	1x1.0	Pipe
19	68.635	1x1.0	Pipe
20	68.810	1x1.0	Pipe
21	73.225	1x1.0	Pipe
22	73.625	1X1.5X1.5	Box
23	73.975	1x1.0	Pipe
24	75.950	1x1.0	Pipe
25	77.030	2x1.0	Pipe

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

Sl. No.	Culvert location (KM)	No. of Spans x Clear Span (m)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
1	48.125	1X4.0X3.0	Box
2	48.220	1x2.0x2.0	Box
3	48.340	1x2.0x2.0	Box
4	48.620	1x2.0x2.0	Box
5	48.645	1X3.0X2.0	Box
6	48.750	1x2.0x2.0	Box
7	51.785	1x2.0x2.0	Box
8	52.010	1x2.0x2.0	Box
9	52.130	1x2.0x2.0	Box
10	55.040	1x2.0x2.0	Box
11	55.155	1x2.0x2.0	Box
12	55.800	1x2.0x2.0	Box
13	55.975	1x2.0x2.0	Box
14	56.325	1x2.0x2.0	Box
15	56.705	1x2.0x2.0	Box
16	56.870	1x2.0x2.0	Box
17	57.300	1x2.0x2.0	Box
18	58.565	1x2.0x2.0	Box
19	58.670	1x5.0x3.0	Box
20	59.325	1X4.0X3.0	Box
21	59.585	1X4.0X3.0	Box
22	59.615	1X2.0X2.0	Box
23	59.630	1X2.0X2.0	Box
24	59.725	1X2.0X2.0	Box

Sl. No.	Culvert location (KM)	No. of Spans x Clear Span (m)	Remarks (Proposed Type)
(1)	(2)	(3)	(4)
25	60.205	1X3.0X3.0	Box
26	61.125	1X2.0X2.0	Box
27	61.185	1X2.0X2.0	Box
28	61.230	1X2.0X2.0	Box
29	61.83	1X2.0X2.0	Box
30	64.12	1X2.0X2.0	Box
31	64.675	1X2.0X2.0	Box
32	67.275	1X2.0X2.0	Box
33	68.035	1X3.0X2.0	Box
34	68.395	1X3.0X3.0	Box
35	71.380	1X2.0X2.0	Box
36	71.790	1X2.0X2.0	Box
37	71.935	1X2.0X2.0	Box
38	74.940	1X2.0X2.0	Box
39	74.960	1X2.0X2.0	Box
40	75.035	1X3.0X3.0	Box

* Road level shall be minimum as per Proposed FRL provided in Alignment Plan at Annexure-III Schedule-A.

Note:

1) The proposed locations are minimum in number. Any change in number/length/span/height shall not be treated as change in scope of work.

2) The culvert location planned as Table above shall be adjusted accordingly to the exact location of cross-water stream or existing culvert located based on the topographic survey performed by the Contractor for the final drawings of the Detailed Design. The Contractor shall construct culvert in Skew Angle if required as per the site conditions. This shall be deemed to be included in the Scope of Work.

3) The Contractor shall carry out appropriate Ground improvement works as per the State of Art reports IRC-HRB: SR-13, SR-14 to increase the Safe Bearing Capacity of in-situ soil and reduce the settlement during the construction & post construction period.

4) The Contractor shall provide Granular Material below the foundation of Box Structure in case of presence of Clayey soils as per clause 23.3 of IRC: SP: 13, 2004.

5) The Contractor shall provide necessary Protection Works on upstream & downstream site of box structure as per Article 23 of IRC: SP: 13, 2018 and Figure 8.5 Culvert with retain wall on U/S & D/S Side, Catch pit, chute, Guide wall and Apron as per IRC: SP:48, 1998, as per the site requirement.

6) On the Culvert location at the end of roadway edges, Only Concrete Crash Barriers shall be provided of minimum 1.1 m height.

7) The Contractor shall provide necessary Barrel length of Box as per the extra widening, embankment Height and site requirement. This shall not constitute Change of Scope.

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

Sl. No.	Culvert location*	Type	No. of Spans x Clear Span(m) of existing culvert	Repairs to be carried out specify*
(1)	(2)	(3)	(4)	(5)
NIL				

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

(iii) Bridges

(a) Existing bridges to be re-constructed

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

Sl. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
1	2	3	4	5
	Minor Bridge			
1	51.390	1X12.0	1x12	Reconstruction with as per TCS-9A
2	51.900	1x12.0	2X7.5	Reconstruction with as per TCS-9B
3	72.000	1X16.6	2x8.5	Reconstruction with as per TCS-9B
4	73.415	1X10.0	1x12	Reconstruction with as per TCS-10
5	76.49	1x6.0	1x10	Reconstruction with as per TCS-10

*Attach GAD

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done as per the site requirements. Any change in this configuration shall not attract provisions of Article 13 of this Agreement

(ii) The following narrow bridges shall be widened:

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

(1)	(2)	(3)	(4)	(5)
1	49.930	10.65	1X10.0	Reconstruction with as per TCS-9A
2	65.505	7.45	1X10.0	
3	74.175	10.5	1x10.0	
4	67.915	11.55	1x25	Reconstruction with as per TCS-9C

~~@ Attach cross-section~~

(b) Additional new bridges

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

Sl. No	Location (km)	Total length (m)	Remarks, if any
(1)	(2)	(3)	(4)
	Minor Bridge		
1	59.035	1 X 12.0 m	
2	61.565	2 X 25.0 m	
3	66.950	2 x 10.0 m	
4	75.550	2 X 25.0 m	

Notes:

1) The bridge approaches, Abutments and Pier locations shall be protected as per IRC 89: 2019 River Training & control works on bridges.
2) The span and opening of these bridges as specified are indicative. The design of waterway has to be done as per site hydraulic requirement. Any change in this configuration shall not attract any change of Scope.
3) The Start of Bridge shall be match with End of Package-II. The contractor shall do proper coordination with nearby package contractor for smooth construction of Highway. Any incidental work in this regard shall deemed included in scope of work.

(c) The existing bridges shall be retained with minor repairs at the following locations:

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

Sl. No.	Location at km	Remarks
(1)	(2)	(3)

NIL

(e) Drainage system for bridge decks

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

(f) Structures in marine environment
Following is the list of structures to be constructed.

Sr. No.	Design Chainage (Km)	No. of Spans with Span Length (m)	Structure
(1)	(2)	(3)	(4)
NIL			

Notes

~~1) Looking at the salty and corrosive nature of the river, The Contractor shall design & Construct the Structures as per IRC: SP: 80-2008,"Guidelines for Corrosion Prevention, Monitoring and Remedial Measures for Concrete Bridge Structures "~~

(iv) Rail-road bridges

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

(b) Road over-bridges

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

Sl. No.	Location of Level crossing (Chainage km)	Length of Structure (m)	Remarks
(1)	(2)	(3)	(4)
-NIL-			

Notes:

~~1) The proposed span arrangements/ Type of Structure of ROB are tentative and subject to change as per the availability of railway boundaries / requirement of the railways. Increase in ROB structure length/ Change in Span /Type of Structure shall not constitute Change of Scope Work.~~

~~2) ROB shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authorities.~~

~~3) The ROB's shall be constructed and maintained by the Contractor under supervision of Railways.~~

~~4) All the expenditure related to construction, maintenance and supervision of ROB and (except P&E charges) shall be borne by the Contractor.~~

~~5) Instrumentation in Railway Super Structure:~~

~~The Contractor shall do instrumentation in the Railway super structure across Railway bridge portion to ensure and carry out regular monitoring of the health of bridge to meet its serviceability and functionality requirement during the period,~~

~~(I) Phase – I: Installation of sensors and response monitoring during Construction and pre-stressing.~~

~~(II) Phase-II: Study of performance parameters:~~

- ~~Monitoring during Peak Summer~~
- ~~Monitoring during Peak winter~~

(c) Road under-bridges

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

SL. No.	**Location of Level crossing (Chainage km)**	**Length of Structure (m)**	**Remarks**
(1)	**(2)**	**(3)**	**(4)**
NIL			

(v) Grade separated structures

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

a) LVUP

SL No.	**Location of Structure**	**Length (m)**	**Number and length of spans (m)**	**Remarks, if any**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
1	61.310	12 m	1X12.0 m	
2	61.470	12 m	1X12.0 m	

b) SVUP

SL No.	**Location of Structure**	**Length (m)**	**Number and length of spans (m)**	**Remarks, if any**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
1	61.645	7 m	1X7.0 m	

c) Elevated Via-duct

SL No.	Location of Structure	Length (m)	Number and length of spans (m)	Remarks, if any
(1)	(2)	(3)	(4)	(5)
1	57.475	100	1X100.0 m	Contractor shall use innovative technology such as Ultra High-Performance Concrete (UHPC) / Ultra High-Performance Fiber Reinforced Concrete (UHPFRC).

(vi) Repairs and strengthening of bridges and structures

The existing bridges and structures to be repaired/strengthened, and the nature and extent of repairs /strengthening required are given below:

(a) Bridges

Sl. No.	Location of bridge (km)	Nature and extent of repairs /strengthening to be carried out
(1)	(2)	(3)
NIL		

Note:

The Existing retained Bridges and /or Structures shall be inspected by Contractor, checked and assessed for the requirement of repairs and /or Strengthening or reconstruction. If so, required, the repair and/or strengthening or reconstruction work shall be carried out as per the assessment. This shall not constitute any Change of Scope of work.

(b) ROB / RUB

SL. No.	Location of ROB/RUB (km)	Nature and extent of repairs /strengthening to be carried out
(1)	(2)	(3)
NIL		

(c) Overpasses/Underpasses and other structures

Sl. No.	Location of Structure (km)	Nature and extent of repairs /strengthening to be carried out
(1)	(2)	(3)
NIL		

8. *Traffic Control Devices and Road Safety Works*

(i) Traffic control devices and road safety works

Traffic control devices and road safety works shall be provided in accordance with the provision of Section-9 of relevant Manual as specified in Schedule-D. The Minimum number / Quantities of Traffic Control Devices and Road Safety Works are specified in Schedule-C.

(ii) Specifications of the reflective sheeting & Marking

All road signs shall be with Prismatic Grade sheeting corresponding to Class C sheeting described in IRC:67 and any of the sheeting types VIII, IX or XI as per ASTM D 4956-09 fixed over Aluminum or Aluminum composite material (as per 9.2.3 of Manuals). Road markings shall be of hot applied thermoplastic Material with glass reflectorizing beads and design specifications shall be as per IRC 35.

9. *Roadside Furniture*

Roadside furniture like km/Hectometer Stones, Railings, Traffic Impact Attenuators, and Delineator shall be provided in accordance with the provision of section -9 of relevant Manual. The Minimum Numbers / Quantities of Roadside furniture are specified in Schedule-C.

10. *Compulsory Afforestation*

The trees should be planted by the Agency as compensatory afforestation according to The Forest Conservation Act, decided by Forest Department.

11. *Hazardous Locations*

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

Sl. No.	**Design Chainage (Km)**		**LH/RHS/Both**
	From	**To**	
	NIL		

12. *Special Requirement for Hill Roads*

Sl. N.	**Design Chainage (Km)**		**LH/RHS/Both**
	From	**To**	
	As per relevant Manual as specified in Schedule-D		

13. *Protection Works*

The Consultant has specified Minimum Slope protection works. These hereinabove shall be treated as an approximate assessment. The actual quantities and additional type of slope protection works and safety requirements 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/quantities specified in Schedule-B shall not constitute a Change of Scope.

a) Toe Wall (PCC Toe wall of Minimum 2m Height)

Sr. No.	Chainage (Km)		Design Length (Km	TCS Code	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	48100	48175	2X0.075	TCS 5	Both Side
2	48575	48675	2X0.100	TCS 5	Both Side
3	51350	51384	2X0.034	TCS 5	Both Side
4	51396	51800	2X0.404	TCS 5	Both Side
5	51875	51894	2X0.019	TCS 5	Both Side
6	51906	52025	2X0.119	TCS 5	Both Side
7	52100	52150	2X0.050	TCS 5	Both Side
8	52225	52325	2X0.100	TCS 5	Both Side
9	56675	56925	2X0.250	TCS 5	Both Side
10	57300	57425	2X0.125	TCS 5	Both Side
11	57525	57550	2X0.025	TCS 5	Both Side
12	57600	57725	2X0.125	TCS 5	Both Side
13	58350	58875	2X0.525	TCS 5	Both Side
14	59950	60250	2X0.300	TCS 5	Both Side
15	61150	61325	2X0.175	TCS 5	Both Side
16	61450	61540	2X0.090	TCS 5	Both Side
17	61590	61675	2X0.085	TCS 5	Both Side
18	66875	66940	2X0.065	TCS 5	Both Side
19	66960	67050	2X0.090	TCS 5	Both Side
20	67275	67350	2X0.075	TCS 5	Both Side
21	67875	67908	2X0.033	TCS 5	Both Side
22	67933	67950	2X0.017	TCS 5	Both Side
23	71350	71400	2X0.050	TCS 5	Both Side
24	71525	71575	2X0.050	TCS 5	Both Side
25	71825	71925	2X0.100	TCS 5	Both Side
26	72225	72475	2X0.250	TCS 5	Both Side
27	74900	74975	2X0.075	TCS 5	Both Side
28	75070	75325	2X0.255	TCS 5	Both Side

b) Seeding and Mulching

Sr. No.	Design Ch. (Km)		Length (m)	TCS
1	48250	48325	75	TCS 7 type II
2	49950	50025	75	TCS 7 type II
3	50250	50850	600	TCS 7 type II
4	52675	54200	1525	TCS 7 type II
5	54600	54700	100	TCS 7 type II

6	56000	56425	425	TCS 7 type II
7	57050	57300	250	TCS 7 type II
8	57725	58350	625	TCS 7 type II
9	61675	61800	125	TCS 7 type II
10	69275	70925	1650	TCS 7 type II

c) Retaining Wall

Sr. No.	Design Ch. (Km)		Length (m)	TCS	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	48325	48375	50	TCS 4	Dachi Lake
2	71925	71992	67	TCS 11	
4	72008	72225	217	TCS 11	

d) Hill Side Gabion Wall

Sr. No.	Design Ch. (Km)		Length (m)	TCS	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1	48250	48325	75	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
2	49950	50025	75	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
3	50250	50850	600	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
4	52675	54200	1525	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
5	54600	54700	100	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
6	56000	56425	425	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
7	56525	56675	150	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
8	57050	57300	250	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
9	57725	58350	625	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
10	61325	61450	125	TCS 7 type III	Minimum 6 m Height Gabion Wall one side of Hill cutting
11	61675	61800	125	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
12	66675	66775	100	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
13	66775	66875	100	TCS 7 type I	Minimum 4 m Height Gabion Wall both side of Hill cutting
14	68500	68550	50	TCS 7 type I	Minimum 4 m Height Gabion Wall both

Sr. No.	Design Ch. (Km)		Length (m)	TCS	Remarks
	From	To			
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
					side of Hill cutting
15	69275	70925	1650	TCS 7 type II	Minimum 6 m Height Gabion Wall both side of Hill cutting
16	71125	71350	225	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
17	71475	71525	50	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
18	71575	71650	75	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
19	75575	75710	135	TCS 7 type IV	Minimum 4 m Height Gabion Wall one side of Hill cutting
20	75710	75775	65	TCS 7 type III	Minimum 6 m Height Gabion Wall one side of Hill cutting
Total Length OF 4 m wall in Km.			=1x0.735+2x0.150=1.035		
Total Length OF 6 m wall in Km.			=1x0.190+2x5.450=11.09		

14. *Change of Scope*

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths, number and type 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, Number and quantities specified in this Schedule- B shall not constitute a Change of Scope, save and except any variations in the length, Number and Quantities arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

15. *Utility ducts*

Utility ducts in form of NP-4 Hume Pipe diameter 600 mm shall be provided across the Project Highway at one full length crossing in 500 meters and along with inspection chamber and RCC cover at both ends of the duct as directed for crossing all types of utilities anywhere as per IRC: SP:73-2018 (Clause 2.16) requirements. Location for such utility crossing shall be finalized in consultation with Authority Engineer which may not be exact but around at every 500 meters.

(Schedule B-1)

The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority. The details of utilities are as follows:

Sr. No.	**Type of Utility**	**Unit**	**Quantity**	**Location/stretch (LHS/RHS)**
A	Electrical Utilities			
A1	Electrical Poles	Nos.	As per the enclosed Approved estimate of MePDCL	**(LHS/RHS)**
A2	Electrical cables	meters		
A3	Transformers	Nos.		**(LHS/RHS)**
B	Water/Sewage pipeline			
B1	Sewage	meters	Nil	
B2	Water supply	meters	As per the enclosed Approved estimate of PHE	**(LHS/RHS)**
C	Felling of Tress	Nos.	6000	**(LHS/RHS)**

As per the existing and Proposed Utilities shifting plan given in Schedule-B

Annexure-I to Schedule-B 1

Utility Shifting.

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

Notes:

(a) The type/ spacing/ size/ specifications of poles/ towers/ lines/ cables to be used in shifting work shall be as per the guidelines of utility owning department (Power Grid Corporation of India and or Meghalaya Power Distribution Company Limited (MePDCL)) and it is to be agreed solely between the Contractor ~~/ Contractor*~~ and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/ spacing/ size/ specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of utility owning department and/or construction of project highway. The Contractor~~/Contractor*~~ shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor~~/Contractor*~~ to utility owning department whenever asked by the Contractor~~/Contractor*.~~ The decision/ approval of utility owning department shall be binding on the Contractor~~/Contractor*.~~

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

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

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

Note -II **Copy of utility shifting plans enclosed as Annexure-II to Schedule B1.**

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:

i. Toll plaza[s];
ii. Traffic Control Devices and Road Safety Works;

(a) Road Signs

(b) Road Marking

(c) Road Delineator

(d) Reflective Pavement Markers (Road Studs)

(e) Roadside & Median Side Safety Barriers

iii. Pedestrian facilities;
iv. Land Scoping & Tree Plantation
v. Project Facilities

(a) Road Boundary Stone

(b) Kilometre & 200 m Stone

(c) Street Lighting

(d) Truck lay-byes;

(e) bus-bays and bus shelters;

(f) Rest Area

(g) Highway Petro Units

(h) Emergency Medical Services Cranes;

(i) Crane Services

(j) Communication System

(k) Advance Traffic Management System (A.T.M.S).;

(l) Telecom system;

(m) Operation and Maintenance Centre;

vi. Traffic Diversion during Construction
vii. Others

(a) Rain water Harvesting Structures

(b) Utilities Ducts

(c) Boundary Fencing

2. Description of Project Facilities

i. Toll Plaza(s)

Toll Plaza(s) shall be designed and constructed as per Section-10 of relevant the IRC Manual as specified in Schedule-D and it has been provided at following location:

Sl. No.	Project Facility	Location	Design Requirements	Other essential details

(1)	(2)	(3)	(4)	(5)
	Toll Plaza	Not Provided		

ii. Traffic Control Devices and Road Safety Works

The Traffic Control Devices and Road Safety Works shall be provided as per the Section-9 of relevant IRC Manual (IRC SP 73 2018) as specified in Schedule-D. The Contractor shall provide following Traffic Control Devices and Road Safety Works.

(a) Road Signs

The Road Signs shall be designed and provided for the Project Highway as per the Specifications and Standard indicated in Schedule-D. All Traffic Signs for Road Users would be provided as per Manual.

- **Full width Overhead signs: 6 No's**

S/ No.	Chainage (Km)	Location	Size
(1)	(2)	(3)	(4)
1	56.675	At the Start of Airport Realignment	1.8 m x 1.2 m
2	59.100	At the end of Airport Realignment	1.8 m x 1.2 m
3	61.075	At the Start of Bypass	1.8 m x 1.2 m
4	61.775	At the end of Bypass	1.8 m x 1.2 m
5	75.300	At the Start of Bypass	1.8 m x 1.2 m
6	75.850	At the end of Bypass	1.8 m x 1.2 m

- **Cantilever Overhead Signs: 12**

- **Project Information Sign Board: 2**

S/ No.	Chainage (Km)	Location	Size
(1)	(2)	(3)	(4)
1	47.075	At the Start of Project Road	1.8 m x 1.2 m
2	77.055	At the end of Project Road	1.8 m x 1.2 m

- **Mandatory, Cautionary, informatory and Facility Sign Boards**

Sl No	Traffic Signage, Road Marking and other appurtenances	unit	Quantity
(1)	(2)	(3)	(4)
	Main Road		
1	**Right Hand Side Curve**	**Nos.**	Number of sign boards as per Traffic Singing Plan given in
2	Left Hand Side Curve	Nos.	
3	School	Nos.	
4	Side road left	Nos.	
5	Side road right	Nos.	
6	Cross Road	Nos.	
7	Petrol pump/ Filling facility	Nos.	
8	Bus Stop	Nos.	

Sl No	Traffic Signage, Road Marking and other appurtenances	unit	Quantity
(1)	(2)	(3)	(4)
9	Direction Sign	Nos.	Annexure-III of Schedule-A
10	Stop Sign	Nos.	
11	Horn prohibited	Nos.	
12	Hazard Marker (one way)	Nos.	
13	Object Marker (one way)	Nos.	
Junction			
1	Right Hand Side Curve	Nos.	Minimum Number of sign boards as per Traffic Singing Plan given in Annexure-III of Schedule-A
2	Left Hand Side Curve	Nos.	
3	Side Road	Nos.	
4	T Intersection	Nos.	
5	Pedestaling Crossing	Nos.	
6	Stop Sign	Nos.	
7	Speed limit	Nos.	
8	U-Turn prohibited	Nos.	
9	Rumble strip	Nos.	
10	Object Marker (one way)	Nos.	
11	Object Marker (Two way)	Nos.	
12	Direction Sign	Nos.	
13	Direction Sign	Nos.	
14	W-Metal Beam Crash Barrier	Nos.	
15	Lane marking, edge marking	Sqm	
16	Delineator	Nos.	

- Chevron marking sign Boards shall be provided on the outer side of Curves as per IRC: 67-2012.
- Above numbers of Road signs are indicative and minimum in number. The actual numbers of Road signs shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the numbers specified in this Clause of Schedule C shall not constitute a Change of Scope.
- Solar Traffic blinker signal (L.E.D) shall be provided at Major intersections.
- Rumble strips of Thermoplastic paint shall be provided at all cross-road junction as per IRC: 99-2018.

(b) Pavement Markings

The Pavement markings shall be provided for the entire Project Highway as per Clause 9.3 of relevant IRC Manual of Specifications and Standards as Specified in Schedule-D.

(c) Road Delineators

The Design & Construction of Road Delineators shall be carried out as per Clause 9.4 Manual of Specifications and Standards as Specified in Schedule-D. The Road Delineators include Roadway Indicators, Hazards Markers and Object Hazards Markers.
Object Markers shall be provided as given in IRC: 79 and IRC: 67. All physical objects above the Finished Road Level (FRL) that are falling within 3 m from the carriageway edge line shall be illuminated with Object Hazard Markers (OHM). The objects shall include foot path or utility poles or parapet or concrete barrier of Major Bridge, Minor Bridge and Culverts.

(d) Reflective Pavement Markers (RRPM)

The Reflective Pavement Markers (RRPM) for the entire Project Highway at the locations shall be as per Clause 9.5 Manual of Specifications and Standards specified in Schedule-D.

- The Reflective Pavement Markers (RRPM) i.e. road studs shall be provided to improve the visibility in night-time and wet-weather conditions as per Manual. These shall be prismatic retro-reflective type, conforming to ASTM D4280.
- White colour road studs shall be used at locations where lane markings are in white colour. Amber colour shall be used where lane markings is in amber colour. Red colour may be used to indicate no entry/edge markings.

(e) **Roadside & Median Side Safety Barriers**

Contractor shall provide the Roadside & Median side Safety Barriers along the Project Highway in entire length as per TCS and as per Clause 9.7 Manual of Specifications and Standards as specified in Schedule-D.

iii. Pedestrian Facilities

The pedestrian facilities shall be as per the Schedule -B and Schedule-D and include the provision of

- Footpath (Sidewalks): The 1.50 m wide footpath shall be provided as per TCS as given in Clause 2.(xii) of Annexure-1 of Schedule-B
- Pedestrian Guardrail: pedestrian guardrail shall be provided at each bus shelter locations, Truck Lay byes, near School/Hospital and at major junctions. The pedestrian guardrail shall be provided at Foot paths locations
- Pedestrian Crossings: Pedestrian crossing facilities at Junctions shall be provided.

iv. Landscaping and tree plantation

The Contractor shall plant trees and shrubs of required number and type at the appropriate locations as decided by Authority/AE/IE within the Right of Way and in the land earmarked by the Authority for afforestation keeping in view the IRC Guidelines on Landscaping and Tree Plantation. The landscaping and tree plantation shall be done as per IRC- SP: 21 which shall also include provision of the;

- Tree Plantation to the extent of number and species as decided by Environmental / Forest authorities for the entire Project Highway. The Contractor shall provide minimum 500 trees per Km. (minimum 6000 nos.) along the entire Project Highway.
- Median Plantation: at locations where the median width is 2.5m and more.
- Landscaping: A suitable landscape treatment with provision of Fountains and coloured lighting so as to enhance the overall aesthetics shall be provided at toll plazas, grade separators, elevated section, viaducts, traffic islands, bus bays, truck lay byes, rest areas, O&M centre, etc. The landscape treatment shall also be provided for special areas as given in IRC: SP: 21 (Para 8).
- The Contactor shall also do Geo tagging of plants along Project Highways to ensure effective monitoring and to ensure better survival of plantation.

v. Project Facilities

(a) Boundary Stones

Boundary Stones shall be provided @ 50 m space on both sides of the entire Project Highway as per 12.2 relevant Manual of Specifications and Standards as specified in Schedule-D and latest IRC: 25 "Type Designs for Boundary Stones" and as per the latest circular issued by NHAI/MORTH in this regard.

(b) Kilometer Stones & 200 m Stone

The Kilometer and 200 m stones shall be provided as per Clause 12.3 of relevant IRC Manual recommended in Schedule-D for the entire Project Highway.

The Kilometer and 200 m stone shall be provided on BOTH sides of the Project Highway ~~and side shall be decided by Authority~~. The Design and Specifications of Kilometer Stones and 200 m Stones shall be provided as per Latest IRC: 8 and IRC: 26 respectively and latest Circular of MORTH.

(c) Street Lighting

The Lighting shall be provided as per the 12.5 clause of the relevant IRC Manual as specified in Schedule-D.

Street lighting on decorative lamp post with LED /energy efficient lighting system of standard make with minimum 40 Lux capacity shall be provided @ 40m interval. Street lights shall be provided with ~~dual lights on single pole and~~ single lights on single pole. The height of street light pole shall be about 9m above FRL and that of high mast shall be 25m.

The Lighting shall be provided at following locations of the Project Highway.

- **High mast lighting**
  - Provide High mast lighting at toll plazas- NIL
  - Provide High Must Light at Major Junctions: NIL.
- **Street lighting**
  - Built-up sections on the Project Highway both in the median of main carriageway.

Note:

1) Above numbers of street lights are indicative and minimum in number. The actual numbers of street lights shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority/ Authority's Engineer. Any increase in the numbers specified in this Clause of Schedule C shall not constitute a Change of Scope.
2) High mast lighting: High mast lighting shall be provided at ~~Toll Plaza~~ and Major Junctions, using LED / energy efficient lighting system.
3) Solar lights blinkers shall be provided at major junctions etc.
4) The lighting work shall be got done from the qualified specialized agency.
5) The scope includes providing entire lighting systems, trenching, underground / building in cabling, transformers etc and obtaining electric supply / approval from concern Govt. department.
6) The scope includes arrangements of procuring power supply to ensure uninterrupted lighting during night and when visibility is low, including provision of DG sets as stand by arrangements.
7) The scope includes all costs of procurement, installation, running and operation cost of all lighting, including cost of energy consumption etc. in construction period and up to the end of defect liability period.

(d) Truck Lay-Byes

Truck lay byes shall be provided at the following locations for a capacity of 5 bays, in accordance with Clause 12.6 & Figure 12.1 of relevant IRC Manual of Specifications and Standards as referred in Schedule-D.

S.No.	Design Chainage (Km)	Side	Village
(1)	(2)	(3)	(4)
1	60.525	1 Side (LHS)	
2	60.525	1 Side (RHS)	
3	74.050	1 Side (LHS)	
4	74.050	1 Side (RHS)	

The location of these truck lay-bys are tentative and shall be finalised by the Contractor in consultation with the Authority/ Authority Engineer.

(e) Bus-bays and Passenger Shelters

The Bus shelters shall be Designed and Constructed as per Clause 12.7 of relevant IRC Manual of Specifications and Standards as referred in Schedule-D.

Locations of Bus Shelters are provided in ***following Table.***

S.No.	Design Chainage (Km)	Side	Location Name
(1)	(2)	(3)	(4)
1	61.075	LHS	Start of Bypass
2	61.775	RHS	End of Bypass
3	72.650	LHS	Asanang
4	74.060	RHS	Asanang
5	75.300	LHS	Start of Bypass
6	75.850	RHS	End of Bypass
7	77.055	RHS	Rongram

Note: 1) The location/numbers of bus Shelters are tentative and shall be finalised in consultation with the Authority/ Authority Engineer.

(f) Rest Areas

Rest Area shall be provided as per Section 12 clause 12.9 of relevant IRC: as specified in Schedule-D. The locations are given below:

S.No	Design Chainage	Side	Village
(1)	(2)	(3)	(4)
-NIL-			

Note: The locations of these Rest areas are tentative and shall be finalised in consultation with the Authority/ Authority Engineer.

(g) Highway Patrol Units

The Highway Patrol unit shall be provided at proposed ~~toll plazas~~ recommended in Schedule C. Highway Patrol unit (s) shall be provided as per clause 12.10 of relevant IRC Manual as specified Schedule-D.

S.No	Design Chainage	Number
(1)	(2)	(3)
1		1

(h) Emergency Medical Services

The Contractor shall construct Medical Aid Post as per type designs prescribed for Medical Aid buildings by the State Medical Department. The Medical aid post shall be provided at following Locations

S.No	Design Chainage	Number

(1)	(2)	(3)
1		1

The GPS fitted Ambulance shall be provided during the Construction and Operation & Maintenance period as Clause 12.11 of relevant IRC Manual as specified in Schedule-D.

(i) Crane Services

1 (One) number of GPS fitted Crane unit, of minimum 30 MT capacity, shall be provided during entire Construction and O & M period as per Section 12.12 of relevant IRC the Manual as specified in Schedule-D.

(j) Communication System

The Contractor shall provide suitable communication System as per Section 12.13 of the manual as specified Schedule-D.

(k) Advance Traffic Management System (A.T.M.S)

NOT APPLICABLE

(l) Telecom System

NOT APPLICABLE

(m) Operation and Maintenance Centre

NOT APPLICABLE

vi. **Traffic Diversion during Construction**

The traffic diversion plan during construction shall be prepared by Contractors per IRC: SP: 55 for the entire project highway. Separate traffic diversion plan shall be prepared for structures and CD works. Following suggested layouts presented in IRC: SP: 55 are recommended for various construction scenarios. Suiting the specific site requirements, the application steps described therein shall be followed

vii. Others

(a) Measures for Elephant Crossing

The Contractor shall provide Eco sounding System and traffic calming measures and signage Plan at 1 elephant crossing locations in consultation of Forest Department.

(b) Toilet Block

The Contractor shall provide toilet Blocks at two locations as space identified by Authority.

Note: In case of any discrepancy in number or location of any of the Project Facilities mentioned in this Schedule-C, the Authority shall finalize the number/ location of these facilities as per site requirements.

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. *Construction*

The Contractor shall comply with the Specifications and Standards set forth in Annex-I, Annex-II, Annex-III & Annex IV of 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:

- Schedule-D, Annex-I: Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73-2018), referred to herein as the Manual.

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Laning of Highways (IRC: SP: 73- 2018), referred to as the Manual, Indian Road Congress (IRC) Codes and MORTH Specifications for Road and Bridge Works. Where the aforesaid Manuals, guidelines, codes, standards and specifications are silent on any aspect, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. *Deviations from the Specifications and Standards*

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

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

Note 1: Deviations from the aforesaid Specifications and Standards are listed below.

<table>
<tr><th>Sl. No.</th><th>Item</th><th>Clause reference of Manual</th><th>Description of Deviation</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>1</td><td>Design Speed</td><td>Clause 2.2.1 & Table 2.1 of IRC SP-73 2018</td><td>The Ruling Design speed shall be 40 Kmph for Project Highway for Mountainous Terrain as per Clause 6.5.1 Table 6.4 of IRC: 52-2019, Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision).

The ruling design speed shall be below 40 Kmph at following Locations.
<table>
<tr><th colspan="2">Stretch (km)</th><th rowspan="2">Radius (m)</th><th rowspan="2">Design Speed (Kmph)</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>69.665</td><td>69.750</td><td>40</td><td>30</td></tr>
<tr><td>69.757</td><td>69.849</td><td>40</td><td>30</td></tr>
<tr><td>70.350</td><td>70.498</td><td>40</td><td>30</td></tr>
<tr><td>71.093</td><td>71.186</td><td>30</td><td>30</td></tr>
<tr><td>71.190</td><td>71.257</td><td>40</td><td>30</td></tr>
<tr><td>76.622</td><td>76.768</td><td>50</td><td>30</td></tr>
<tr><td>76.802</td><td>76.845</td><td>15</td><td>20</td></tr>
<tr><td>76.879</td><td>76.952</td><td>30</td><td>20</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Item</th><th>Clause reference of Manual</th><th>Description of Deviation</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>2</td><td>Extra Widening</td><td>Clause 2.7 & Table 2.4 of IRC SP-73 2018</td><td>The extra widening shall be provided as per Table 6.10 of IRC: 52- 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision)
<table>
<tr><td>Radii (m)</td><td>Extra Widening (m)</td></tr>
<tr><td>Upto 20</td><td>1.5</td></tr>
<tr><td>21 to40</td><td>1.5</td></tr>
<tr><td>41 to 60</td><td>1.2</td></tr>
<tr><td>61 to 100</td><td>0.9</td></tr>
<tr><td>101 to 300</td><td>0.6</td></tr>
<tr><td>Above 300</td><td>Nil</td></tr>
</table>
Note: Extra Widening shall not be provided at Major & Minor Bridges.</td></tr>
<tr><td>3</td><td>Radii of Horizontal Curves</td><td>Clause 2.9.4 & Table 2.6 of IRC SP-73 2018</td><td>Ruling minimum Radius is 80m as per IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision)
The radius shall be below 80 m at following Locations.
<table>
<tr><th colspan="2">Stretch (km)</th><th rowspan="2">Radius (m)</th><th rowspan="2">Design Speed (Kmph)</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>62.683</td><td>62.824</td><td>50</td><td>40</td></tr>
<tr><td>65.665</td><td>65.770</td><td>50</td><td>40</td></tr>
<tr><td>69.418</td><td>69.526</td><td>50</td><td>40</td></tr>
<tr><td>69.537</td><td>69.663</td><td>50</td><td>40</td></tr>
<tr><td>69.665</td><td>69.750</td><td>40</td><td>30</td></tr>
<tr><td>69.757</td><td>69.849</td><td>40</td><td>30</td></tr>
<tr><td>69.889</td><td>70.042</td><td>50</td><td>40</td></tr>
<tr><td>70.058</td><td>70.186</td><td>50</td><td>40</td></tr>
<tr><td>70.350</td><td>70.498</td><td>40</td><td>30</td></tr>
<tr><td>70.797</td><td>70.940</td><td>50</td><td>40</td></tr>
<tr><td>70.941</td><td>71.082</td><td>50</td><td>40</td></tr>
<tr><td>71.093</td><td>71.186</td><td>30</td><td>30</td></tr>
<tr><td>71.190</td><td>71.257</td><td>40</td><td>30</td></tr>
<tr><td>71.284</td><td>71.387</td><td>50</td><td>40</td></tr>
<tr><td>74.374</td><td>74.477</td><td>70</td><td>40</td></tr>
<tr><td>74.558</td><td>74.653</td><td>50</td><td>40</td></tr>
<tr><td>74.673</td><td>74.775</td><td>50</td><td>40</td></tr>
<tr><td>74.795</td><td>74.884</td><td>60</td><td>40</td></tr>
<tr><td>75.064</td><td>75.139</td><td>60</td><td>40</td></tr>
<tr><td>75.151</td><td>75.244</td><td>50</td><td>40</td></tr>
<tr><td>76.040</td><td>76.137</td><td>50</td><td>40</td></tr>
<tr><td>76.139</td><td>76.221</td><td>60</td><td>40</td></tr>
<tr><td>76.498</td><td>76.613</td><td>50</td><td>40</td></tr>
<tr><td>76.622</td><td>76.768</td><td>50</td><td>30</td></tr>
<tr><td>76.802</td><td>76.845</td><td>15</td><td>20</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Sl. No.</th><th>Item</th><th>Clause reference of Manual</th><th>Description of Deviation</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td></td><td></td><td></td><td><table><tr><td>76.879</td><td>76.952</td><td>30</td><td>20</td></tr></table></td></tr>
<tr><td>4</td><td>Super elevation</td><td>Clause 2.9.3 of IRC SP-73 2018</td><td>The Super elevation shall be as per Clause 6.8.2 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). L</td></tr>
<tr><td>5</td><td>Sight Distance</td><td>Clause 2.9.6 & Table 2.6 of IRC SP-73 2018</td><td>The desirable minimum sight distance for divided carriageway for various design speeds shall be provided as per Table 6.5 of IRC: 52, 2019 Guidelines for the Alignment Survey and Geometric Design of Hill Roads (Third Revision). The Vertical design, especially at grade change location, such as VUP/LVUP, ROB, Bridge locations shall be done using Intermediate Sight distance (Desirable Minimum Sight Distance).<table><tr><th>Speed (km/h)</th><th>Intermediate Sight Distance Design values – meters</th></tr><tr><td>20</td><td>40</td></tr><tr><td>25</td><td>50</td></tr><tr><td>30</td><td>60</td></tr><tr><td>35</td><td>80</td></tr><tr><td>40</td><td>90</td></tr><tr><td>50</td><td>120</td></tr></table></td></tr>
<tr><td>6</td><td>Typical Cross-sections</td><td>Clause 2.16 of IRC SP-73 2018</td><td>Typical Cross-sections shall be as per Schedule B,</td></tr>
<tr><td>7</td><td>Flexible pavement - design period and strategy</td><td>Clause 5.4.1 of IRC: SP:73-2018</td><td>Flexible pavement shall be designed for a minimum design period of 20 years, subject to the condition that design traffic shall not be less than 20 Million Standards Axles (MSA) as per Clause 5.2 of Schedule-B, Annex-I.</td></tr>
<tr><td>8</td><td>Width of the Minor Bridges</td><td>Clause 7.3 iv) IRC:SP:73-2018</td><td>Existing Bridges
Width of the structures at deck Level for Minor Bridge shall be as per TCS as provided in Schedule-B, instead of Fig. 7.6 Typical Cross-Section of Bridge for 2-Lane Highway with Paved Shoulder and Protected Footpath.</td></tr>
</table>

SCHEDULE - E
(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

(i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

(ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of a Force Majeure Event or 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.

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

				Annually	(Sideway-force Coefficient Routine Investigation Machine or equivalent)	Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment		
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82- 2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82- 2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflect meter	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade Structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	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 Coefficient Routine Investigation Machine or equivalent)	RC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**					
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	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 Short Term	For the case d > D/2 Long Term
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, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Seal without delay	Within 7days
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m.	Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	w > 3 mm.	Within 7 days	Within 15days
2.	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle	Within 7 days	Within 15 days
			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.	Full Depth Repair Dismantle and

			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Within 15 days Not Applicable, as it may be full depth	reconstruct affected. 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, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15days

4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate Sub-base, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to	Seal with epoxy seal with epoxy
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	secure broken parts Within 7 days	Within 7 days
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken	IRC:SP: 83-2008) Within 15 days	
			5	three or four corners broken		Reinstate sub-base, and reconstruct the

						slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m2)	0	Nil, not discernible	**Not Applicable, as it may be full depth**	No Action
			1	w < 0.5 mm; L < 3 m/m2		Seal with low viscosity epoxy to secure broken parts. Within 15 days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage Reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
7	Raveling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No Action	
			1	r < 2 %	Local repair of areas Damaged	
			2	r = 2 - 10 %	and liable to be damaged. Within 15 days	
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if	

			4	r = 25 - 50 %	Affecting 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. Within 7days Bonded Inlay within 15 Days	
			2	r = 2 - 10 %		
			3	r = 10 - 20%		
			4	r = 10 - 30%	Reconstruct slab within 30 days	
			5	r>30 % and h> 25mm		
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action	
			1	t > 1 mm		

			2	t = 1 – 0.6 mm		Not Applicable
			3	t = 0.6 – 0.3 mm	Monitor rate of deterioration	
			4	t = 0.3 – 0.1 mm	Diamond Grinding if Affecting	
			5	t < 0.1 mm	50% or more slabs in a Continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole.	
			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	Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	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.	
			2	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in Selected locations. Within 7 days	
			4	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	0	Nil, not discernible	No action.	
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar	

		length)	2 3 4 5	w = 10 - 20 mm, L < 25% w = 20 - 40 mm, L > 25% w = 40 - 80 mm, L > 25% w > 80 mm, and L > 25%	in cracked portion. Within 7 days Partial Depth Repair. Within 15 days 30 - 50 mm deep, h = w + 20% of w, within 30 days 50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	Not Applicable
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0 1	not discernible, < 1 mm f < 3 mm	No action.	No action.
			2 3	f = 3 - 6 mm f = 6 - 12 mm	Determine cause and observe, take action for diamond grinding Diamond Grinding	Replace the slab as appropriate. Within 30days

			4 5	f= 12 - 18 mm f> 18 mm	Raise sunken slab. Strengthen sub-grade and sub-base by grouting and raising sunken slab	Replace the slab as appropriate. Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No Action	
			1 2 3 4 5	h < 6 mm h = 6 - 12 mm h = 12 - 25 mm h > 25 mm shattered slabs, ie 4 or more pieces	Install Signs to Warn Traffic within 7 days Full Depth Repair. Within 30 days 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.	
			1	h = 5 - 15 mm		

			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	Not Applicable
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level if L < 20 m.	
			5	h > 100 mm	Within 30 days	
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic	
			3	h = 30 - 50 mm	within 7 days	
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m.	
			5	h > 100 mm		

					Within 30 days	
17	Bump	h = vertical displacement from normal profile	0 1	h < 4 mm h = 4 - 7 mm	No action 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
			4	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level			**Short Term**	**Long Term**
			0	Nil, not discernible < 3mm	No Action	
			1 2	f = 3 - 10 mm f = 10 - 25 mm	Spot repair of shoulder within 7 days	

			3 4	f = 25 - 50 mm f = 50 - 75 mm	Fill up shoulder within 7 dayss	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2 3 to 4	slight/ occasional Nos < 10% appreciable/ Frequent 10 - 25%	Repair cracks and joints Without delay. Lift or jack slab within 30 days.	Inspect and repair sub-drainage at distressed sections and upstream.
			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	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with O dometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC:SP 84-2014
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	**Visual Assessment as per Annexure-F**	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect -	IRC:35-2015

<table>
<tr><td></td><td></td><td></td><td></td><td>of IRC:35-2015</td><td></td><td>within 2 months</td><td></td></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td rowspan="6">Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="6">Bi-Annually</td><td rowspan="6">As per Annexure-E of IRC:35-2015</td><td rowspan="6">Re - painting</td><td rowspan="6">Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months</td><td rowspan="6">IRC:35-2015</td></tr>
<tr><td></td><td>Design Speed</td><td>(RL) Retro Reflectivity (mcd/m2/lux)</td></tr>
<tr><td></td><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td></td><td>65-100</td><td>250</td><td>120</td></tr>
<tr><td></td><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td></td><td colspan="3">Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td></tr>
<tr><td>Road Signs</td><td>Shape and Position</td><td>Shape and Position as per IRC:67-2012.
Signboard should be clearly visible for
the design speed of the section.</td><td>Daily</td><td>Visual with video/image backup</td><td>Improvement of shape, in case if shape is damaged.

Relocation as Per requirement</td><td>48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of</td><td>IRC:67-2012</td></tr>
</table>

						Gantry/Cantilever Sign boards	
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	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	Rectification	Within 7 days	IRC:SP:84-2014,

				backup			IRC:119- 2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119- 2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC:SP:84-2014
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014

Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

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

		more than 1m aggregatelength					
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concreteapron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	**3** days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement	Not more than 0.25 sq.m	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to 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	6 months	IRC SP: 51-1999.

					capacity		
	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: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes	3 days	MORTH specification 2700.

		silt, debris, clogging of drainage spout collection chamber.		Mobile Bridge Inspection Unit	with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed		
Bridge-substructure	Cracks/ spalling of concrete/ Rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delaminating of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per	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	3 months	MORTH specification 2810 and IRC SP: 40-199.

		side, no rupture of reinforcement or rubber			load transfer on to bearings.		
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 oubt, use Underwater camera for inspection of deep wells in major Rivers.	suitable protection works around pier/abutment	1 months	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days After defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

In addition to above, for hill roads the following provisions for maintenance is also to done.

Hill Roads		
(i)	Damage to Retaining wall/ Breast wall	7 (Seven) days
(ii)	Landslides requiring clearance	12 (Twelve) hours
(iii)	Snow requiring clearance	24 (Twenty Four) hours

Note: For all tables 1 to 5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRTH specifications shall be binding for all maintenance activities.

A. Flexible Pavement

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(b) Granular earth shoulders, side slopes, drains and culverts		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c) Road side furniture including road sign and pavement marking		
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(vi)	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
(vi)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and	15 (fifteen) days

	road structures	
(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 (immediately within 24 hours if posing danger to safety)
(vi)	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 3.1.5(a))

APPLICABLE PERMITS

1. **Applicable Permits**

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 Panchayat 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 inspector of factories or other competent Authority for setting up batching plant.

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

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant; (h) Permission of Village Panchayats and State Government for borrow earth; and

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

Applicable permits, as required, relating to environmental protection and conservation shall have been produced by the Authority in accordance with the provisions of this Agreement

SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I
(See Clause 7.1.1)
Performance Security

To, Authority

……,

……

……,
……

WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the Contractor") and ……, (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the **"*Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work*",** subject to and in accordance with the provisions of the Agreement

(B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs….. cr. (Rupees …… Crore) (the "**Guarantee Amount**").

(C) We, …….. through our branch at ……(the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the **"Guarantee**") by way of Performance Security.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the Construction Period/ Defects Liability Period and Maintenance Period under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall

be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

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

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

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

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the

[$] Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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

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

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

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature) (Name)

(Designation)

(Code Number)

(Address) NOTES:

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

Annex – II
(Schedule - G)
(See Clause 7.5.3)

Form for Guarantee for Withdrawal of Retention Money

To,

Authority ……..

……..

WHEREAS:

(A) name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with ……. (hereinafter called the "**Authority**") **for the** ***"Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work",*** subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the "Retention Money") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

(C) We, …….. through our branch at …….. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. ---------
cr. (Rs ----------Crore) (the "**Guarantee Amount**").

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

1. The Bank hereby unconditionally and irrevocably 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, National Highways Authority of India, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

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

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

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

12. This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and

payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex – III *(Schedule - G)*

(See Clause 19.2)

Form for Guarantee for Advance Payment

To, Authority

……,

……

……,
……

WHEREAS:

(A) name and address of contractor] (hereinafter called the "Contractor") has executed an agreement (hereinafter called the "Agreement") with ……, (hereinafter called the "Authority") for the **"Improvement/Widening to 2-lane with paved shoulders of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 81+740 to km 93+490 (design km 0+000 to km 10+670) & Improvement/Widening to 4-lane with paved shoulders of NH-44 from design length km 0+000 to km 0+930, total length of 11.600 km in the state of Meghalaya for execution of EPC mode under JICA funding (Package – I)-Balance Work",** 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 free 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 three installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second/third} installment of the Advance Payment is Rs. ---- -- cr. (Rupees ------ Crore) and the amount of this Guarantee is Rs. ------- cr. (Rupees--------- Crore) (the **"Guarantee Amount")[$].**

(C) We, …….. through our branch at ..... (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") for the Guarantee Amount.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment 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 National Highways Authority of India), that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences

[$] The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.

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 Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

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 Advance Payment.

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 on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

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

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

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

12. This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made

available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. Intimation regarding issuance of this Bank Guarantee shall be sent to Authority's Bank through SFMS gateway as per the details below:

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the

Bank by: (Signature)

(Signature)

(Name) (Designation)

(Code Number)

(Address)

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

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

Schedule-H

(See Clauses 10.1 (iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	60.53 %	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course and GSB	[Nil]
		(3)Non bituminous Base course (WMM)	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		(6) Widening and repair of Culverts	0.55%
		B.1-Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	61.43%
		(2) Sub-base Course CTSB and GSB	11.20%
		(3)Non bituminous Base course (WMM)	7.18%
		(4)Bituminous Base course	6.99%
		(5) Wearing Coat	5.50%
		B.2-Reconstruction/New 2-Lane Realignment/ Bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course and GSB	[Nil]
		(3)Non bituminous Base course (WMM)	[Nil]
		(4) Bituminous Base course	[Nil]
		(5) Wearing Coat	[Nil]
		C.2- Reconstruction/New Service road (Rigid Pavement)	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(1) Earthwork up to top of the sub- grade	[Nil]
		(2) Sub-base Course	[Nil]
		(3) Dry Lean Concrete (DLC) Course	[Nil]
		(4) Pavement Quality Control (PQC) Course	[Nil]
		D- Reconstruction & New Culverts on existing road, realignments, bypasses Culverts (length <6m)	7.12%
Minor bridge/ Underpasses/ Overpasses	10.15 %	**A.1-widening and repairing of Minor Bridges (length >6 m&<60m)**	
		Minor Bridges	17.93%
		A.2- New Minor bridges (length >6 m and <60m)	73.19%
		(1) Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/pier cap.	59.06%
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. Complete in all respect.	20.29%
		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	19.31%
		(4) Guide Bund sand River Training Works: On completion of Guide Bunds and river Training works complete in all respects.	1.34%
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2-New Underpasses/Overpasses	8.07%
		(1) Foundation + Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, Piers up-to the abutment/pier cap.	42.70%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified.	3.38%
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	53.93%
Major bridge(length>60 m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	4.48 %	**A.1- Widening and repairs of Major Bridges**	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coating excluding expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, River Training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		A.2-New Major Bridges	
		(1) Foundation	[Nil]
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, River Training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		B.1-Widening and repairs of (a) ROB (b) RUB	
		(1) Foundations	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coat(a)in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (Including Retaining walls, Stone Pitching and protection works)	[Nil]
		B.2-New ROB/RUB	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	[Nil]
		(2) Sub-Structure	[Nil]
		(3) Super-Structure (Including bearings)	[Nil]
		(4) Wearing Coating excluding expansion joints	[Nil]
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/Return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.2- New Elevated Section/Flyovers/Grade Separators	100%
		(1) Foundations	57.66%
		(2) Sub-Structure	13.25%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(3) Super-Structure (Including bearings)	19.23%
		(4) Wearing Coating excluding expansion joints	1.46%
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.81%
		(6) Wing walls/Return walls	5.89%
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	1.69%
Other Works	23.76 %	(i) Toll Plaza	[Nil]
		(ii) Roadside drains (RCC, PCC, Sub-Surface & Unlined)	11.30%
		(iii) Road signs, markings, km stones, safety devices safety Barriers etc	12.98%
		(iv) Project facilities	
		a) Bus Bays	[Nil]
		b) Passenger Shelter	0.12%
		c) Truck Lay-byes	0.98%
		d) Rest Area	[Nil]
		e) Roadside Amenities	[Nil]
		f) Streetlight	0.24%
		g) Utility Duct	0.06%
		(v) Toe Wall	15.89%
		(vii)Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]
		(viii) Boundary stone	0.04%
		(ix) Safety & Traffic Management during const.	[Nil]
		(x) Breast Wall	[Nil]
		(xi) Site Clearance & Dismantling	0.58 %
		(xii) Reinforced Earth Wall	[Nil]
		(xiii) Junction & Cross Road Development	1.27 %
		(xiv) Seeding & Mulching	5.12%
		(xvi) Ground Improvement Works	[Nil]
		(xvii) Gabion Structure	45.01%
		(xviii) Stone pitching	[Nil]
		(xix) Tree falling	0.56%
		(xx) Muck Dumping	0.04%
		(xxi) MSE Wall	5.12%
		(xxii) Retaining Wall	0.7%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Electrical utilities and public Health Utilities (Water pipe lines and sewage lines)	1.07 %	(i) EHT line	[Nil]
		(ii) EHT crossings	[Nil]
		(iii) HT/ LT line	46.72 %
		(iv) HT/ LT crossings	
		(v) Water pipeline	53.28 %
		(vi) Water pipeline crossings	

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening &Strengthening of road		
(1) Earthwork up to top of the sub- grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course (GSB)	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3)Non bituminous Base course (WMM)	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	
(6) Widening and repair of culverts	0.55%	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 five culverts.
B.1- Reconstruction/New 2- Lane Realignment/Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	61.43%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course CTSB and GSB	11.20%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous Base course (WMM)	7.18%	
(4) Bituminous Base course	6.99%	
(5) Wearing Coat	5.50%	
B.2- Reconstruction/New 8- Lane Realignment/Bypass (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1)

		Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
C.1- Reconstruction/New Service Road/ Slip Road (Flexible Pavement)		
(1) Earthwork up to top of the sub- grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3)Non bituminous Base course (WMM)	[Nil]	
(4) Bituminous Base course	[Nil]	
(5) Wearing Coat	[Nil]	

Stage of Payment	Percentage weightage	Payment Procedure
C.2- Reconstruction/New Service road (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub-base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC)Course	[Nil]	
(4) Pavement Quality Control (PQC) Course	[Nil]	
D- Reconstruction & New Culverts on existing road, realignments, bypasses including culvert protection work		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 five culverts.
Culverts (length <6m)	7.12%	

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

1.3.2 Minor Bridges and Underpasses / Overpasses.

Procedure for estimating the value of Minor bridge and Underpasses/Overpasses shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1-Widening and repairs Of Minor Bridges(length>6m&<60m)	18.74 %	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of The minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge
Stage of Payment	**Weightage**	**Payment Procedure**
1	2	3
A.2- New Minor Bridges (length>6m& <60m)	73.19%	
(1) Foundation + Substructe : On Completion of the foundation work including wing and return walls, abutments, piers upto the abutment/pier cap.	59.06%	Foundation: Cost of each minor bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation + sub-structure of each bridge subject to completion of atleast two foundations along with sub-structure upto abutments/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road, signs & markings, tests on completion etc. complete in all respect.	20.29%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all and fit for use	19.31%	Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
(4) Guide Bund sand River Training Works :On completion of Guide Bunds and river training works complete in all respects	1.34%	Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bund sand River training Works in all respects as specified
B.1- Widening and repairs of underpasses/overpasses	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/ overpasses. Payment shall be made on the completion of widening &repair works of an underpass/overpass.

Stage of Payment	Weightage	Payment Procedure
1	2	3
B.2- New Underpasses/Overpasses	8.07%	
(1) Foundation + Sub-Structure: On completion of the Foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	42.70%	Foundation: Cost of each Underpass/ Overpass shall be determined on pro- rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of each Underpasses/ Overpasses. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs & Markings, tests on completion etc. complete in all respect. Wearing Coat (a) in case of Overpass-wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including Drainage facility complete in all respects as specified.	3.38%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super- structure of at least one span in all respects as specified in the column of "Stage of Payment" In this sub-clause. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(3) Approaches: On Completion of Approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all Respect and fit for use.	53.93%	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified

1.3.3 Major Bridge works, ROB/RUB and Structures.

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

Table 1.3.3

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

Stage of Payment	Weightage	Payment Procedure
A.2-New Major Bridges		
(1) Foundation	[Nil]	Foundation: Cost of each Major Bridge shall be determined on pro rat abasis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e., not lessthan25% of the scope of sub- structure of major bridge.
(3) Super-structure (including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coating excluding expansion joints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	[Nil]	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	Approaches: Payments shall be made on pro rata basis on completion of 10% of the scope of each stage.
B.1- Widening and repairs of (a)ROB (b)RUB		

Stage of Payment	Weightage	Payment Procedure
(1) Foundations	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m)of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,50%ofthe stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat(a)in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]	Wearing Coat: Payment shall be made on completion (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (Including Retaining walls, Stone Pitching and protection works)	[Nil]	Payments shall be made on prorate basis on completion of 20% of the total area.
B.2- New ROB/RUB		

Stage of Payment	Weightage	Payment Procedure
(1) Foundation	[Nil]	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be Made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of the ROB/RUB.
(2) Sub-structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of sub- structure of ROB/RUB.
(3) Super-structure (including bearing)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	[Nil]	Wearing Coat: Payment shall be made on completion (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) In case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.1- Widening and repairs of Elevated Section/ Flyovers/Grade Separators		

Stage of Payment	Weightage	Payment Procedure
(1) Foundations	[Nil]	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-Structure	[Nil]	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3) Super-Structure (Including bearings)	[Nil]	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects a specified case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coating excluding expansion joints	[Nil]	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	[Nil]	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. Complete in all respects as specified.
(6) Wing walls/Return walls	[Nil]	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
C.2- New Elevated Section/ Flyovers/Grade Separators	100%	
(1) Foundations	57.66%	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. Not less than 25% of the scope of foundation of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Weightage	Payment Procedure
(2) Sub-Structure	13.25%	Sub-structure: Payment against sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure.
(3) Super-Structure (Including bearings)	19.23%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., Completion of super-structure including bearings of at least one span in all respects as specified. In case of structures where pre-cast girders have been proposed by the Contractor,50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(4) Wearing Coat including expansion joints	1.46%	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	0.81%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like handrails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/Return walls	5.89%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	1.69%	Payments shall be made on pro rata basis on completion of 20% of the total area.

Note: (1) In case of innovate Major Bridge projects like cable suspension/cable stayed/Extra Dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of Competent Authority.

(2) The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of Competent Authority.

1.3.4 Other works.

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

Table1.3.4

Stage of Payment	Weightage	Payment Procedure
1	2	3
(1) Toll Plaza	[Nil]	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plaza.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(2) Roadside drains (RCC, PCC, Sub-Surface & Unlined)	11.30 %	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 05% (five percent) of the total length
(3) Road signs, markings, km stones, safety devices etc	12.98%	
(4) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	[Nil]	
b) Passenger Shelter	0.12%	
c) Truck Lay-byes	0.98 %	
d) Rest Area	[Nil]	
e) Roadside Amenities	[Nil]	
f) Streetlight	0.24%	
g) Utility Duct	0.06 %	
(5) Toe Wall	15.89%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent)of the total length.
(6) Roadside Plantation including Horticulture in Wayside Amenities	0.00%	
(7) Repair of Protection Works other than approaches to the bridges, elevated sections/flyover/grade separators and ROBs/ RUBs	[Nil]	
(8) Boundary stone	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length
(9) Safety and traffic management during construction	[Nil]	Payment shall be made on prorate basis every six months.
(10) Breast Wall	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five Percent) of the total length.
(11) Site Clearance & Dismantling	0.58 %	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five Percent) of the total length.
(12) Reinforced Earth Wall	5.12 %	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five Percent) of the total length.
(13) Junction	1.27%	Cost of each Junction shall be determined on pro rata basis with respect to the total number of junctions. Payment shall be made on the completion of at least five junctions.

Stage of Payment	Weightage	Payment Procedure
1	2	3
(14) Seeding & Mulching	5.12%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (Five percent) of the total length.
(15) Surface drains in soil	[Nil]	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (Five percent) of the total length
(16) Ground Improvement	[Nil]	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 5 % (five percent) of the Total length.
(17) Protection Work (Stone Pitching)	[Nil]	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 5 % (five percent) of the Total length.
(18) Gabion Structure	45.01%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a Stage in a length of not less than 5% (five percent) of the total length.
(19) Tree Falling	0.56%	Unit of measurement is in number. Payment shall be made on pro rata basis on completion of a Stage in a number of not less than 5% (five percent) of the total numbers.
(20) Muck Dumping	0.04%	Unit of measurement is in cumec quantity. Payment shall be made on pro rata basis on completion of a Stage in a cumec of not less than 5% (five percent) of the total quantity.
(21) Retaining Wall	0.70%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a Stage in a length of not less than 5% (five percent) of the total length.

1.3.5 Utilities Shifting Works.

Procedure for estimating the value of **Utility Shifting** works done shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	
(i) EHT line	0	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Pol es-20%, (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT crossings	46.72 %	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 4 crossings.
(iii) HT/ LT line (including transformers if any)		Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of LT/ HT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20% (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/ LT crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the Crossings subject to a minimum of 10 crossings.
(v) Water pipeline	53.28 %	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe li ne. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) water pipeline crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 2S% of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines	0.00 %	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-SO%, Charging of line including all miscellaneous works and Dismantling and site clearance-SO%)

Stage of Payment	Weightage	Payment procedure
1	2	3
Utilities Shifting	100 %	
(viii) Sewage line crossings	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe-SO%, Charging of line including all miscellaneous works and Dismantling and site clearance-SO %)

2. Procedure for payment for Maintenance

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

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

SCHEDULE - I

(See Clause 2.1)

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

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

a) Drawings of horizontal alignment, vertical profile and cross section.

b) Drawings of drainage plan and profile.

c) Drawing of cross drainage works.

d) Drawings of major intersections and ROB.

e) Drawing of toll plaza layout, toll collection systems and roadway near toll plaza

f) Drawings of bus-bay and bus shelters with furniture and drainage system.

g) Drawing of road furniture items including traffic signage, markings, safety barriers, etc.

h) Drawings of traffic diversion plans and traffic control measures.

i) Drawings of road drainage measures

j) Drawing of typical details slope protection measures.

k) Drawing of a landscaping and horticulture.

l) Drawings of pedestrian crossings

m) Drawings of street lighting.

n) General arrangement of Base camp and Administrative Block

o) Drawings of catch water drains check drains.

p) Any other drawings which Authority's Engineer may review.

SCHEDULE - J

(See Clause 10.3(ii))

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

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

***2* Project Milestone-I**

(i) Project Milestone-I shall occur on the date falling on the 256th 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 438th 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 per cent) of the Contract Price and should have started construction of all bridges.

***4* Project Milestone-III**

(i) Project Milestone-III shall occur on the date falling on the 621st 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% (sixty 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 730th day from the Appointed Date.

(ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

***6* Extension of time**

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

Schedule-K

(See Clause 12.1.2)

Tests on Completion

1. Schedule for Tests

1.1 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.

1.2 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

2.1 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 (to be decided with Authority's Engineer at the time of physical tests as per relevant IRC/ Code Manual).

2.2 Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of NSV and the maximum permissible roughness for purposes of this Test shall be 2,000 (two thousand) mm for each kilometer.

2.3 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) meters or more shall also be subjected to load testing.

2.4 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.

2.5 Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

2.6 Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

3 Agency for conducting Tests

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

4. Completion Certificate

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

The Authority Engineer will carry out tests with following equipment at his own cost in the presence of contractor's representative –

Sr. No	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface defects of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis Rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey months defined for the state basis Rainy season)
5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis Rainy season)

The First testing with the help of NSV shall be conducted at the time of issue of completion certificate.

SCHEDULE - L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the **"Agreement"**), for the

"Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package III (Km 47.075 to Km 77.055) on EPC Mode through ADB Loan assistance"(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 undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2 Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Project Highway or affect their safety. The Contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid Punch List.

3 In view of the foregoing, I am satisfied that the **Project Highway** ***Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package III (Km 47.075 to Km 77.055) on EPC Mode through ADB Loan assistance"*** can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the …… day of …….. 20…...

ACCEPTED, SIGNED, SEALED AND DELIVERED	SIGNED, SEALED AND DELIVERED
For and on behalf of	For and on behalf of
CONTRACTOR by:	AUTHORITY's ENGINEER by:
(Signature)	(Signature)

COMPLETION CERTIFICATE

1 I, …… (Name of the Authority's Engineer), acting as the Authority's `Engineer, under and in accordance with the Agreement dated …… (the "Agreement"), **for the Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package III (Km 47.075 to Km 77.055) on EPC Mode through ADB Loan assistance"** (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…..

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

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

1.2 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.

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

2. Percentage reductions in lump sum payments

2.1 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%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	

(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidental 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%

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

R=P/IOO x M x L1/L

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

deduction M = Monthly lump-sum payment in accordance with the Bid

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 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 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.

1.2 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

1.1 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 **Authority")** and ..... (the "**Contractor**") for **the "Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package III (Km 47.075 to Km 77.055) on EPC Mode through ADB Loan assistance"** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2 Definitions and interpretation

2.1 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.

2.2 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.

2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3. General

3.1 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.

3.2 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) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

3.3 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.

3.4 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.

3.5 The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

3.6 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

4.1 During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review 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.

4.2 The Authority's Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

4.3 The Authority's Engineer shall review 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.

4.4 The Authority's Engineer shall complete the review 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.

4.5 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.

4.6 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.

4.7 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.

4.8 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.

4.9 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 4.9, 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.

4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, 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.

4.12 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.

4.13 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.

4.14 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.

4.15 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 12.4.

4.16 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.

4.17 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.

4.18 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 or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 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

5.1 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.

5.2 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.

5.3 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.

5.4 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.

5.5 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

6.1 The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

6.2 The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

6.3 The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7. Payments

7.1 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 10.2.4 (d).

7.2 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.

7.3 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.

7.4 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

9.1 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.

9.2 The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

9.4 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.

9.5 The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)
Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) The estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;

(b) Amounts reflecting adjustments in price for the aforesaid claim;

(c) The estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

(e) Total of (a), (b), (c) and (d) above;

(f) Deductions:

(i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

(ii) Any amount towards deduction of taxes; and

(i) Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

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

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(a) the monthly payment admissible in accordance with the provisions of the Agreement;

(b) the deductions for maintenance work not done;

(c) net payment for maintenance due, (a) minus (b);

(d) amounts reflecting adjustments in price under Clause 19.12; and

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

Schedule-P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

1.1. The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the last Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

1.2. The insurance under paragraph 1.1 (a) and (b) above shall cover the Authority and the Contractor against all loss or damage from whatsoever cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover 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

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

The insurance cover shall be not less than the value of the Contract Price.

3.2 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 Agreementexcluding:

(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 **"Up-gradation of National Highway No. 217 (Paikan – Tura Section) to two lane with paved shoulder in the state of Meghalaya Package III (Km 47.075 to Km 77.055) on EPC Mode through ADB Loan assistance"** (the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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