National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

SCHEDULES

FOR

Rehabilitation and Up-gradation to 2-lane with paved shoulders of Chawngtlai-Champai section (International Corridor) of NH-6 from Ex chainage Km 115+000 to Km 150+000 (Design Chainage 104+460 to Km 135+500) (Pkg-II) in the state of Mizoram under Bharatmala Pariyojna on EPC Mode.

on

ENGINEERING, PROCUREMENT & CONSTRUCTION (EPC) MODE

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD
(MINISTRY OF ROAD TRANSPORT & HIGHWAYS, GOVT. OF INDIA)

JANUARY, 2020

NHIDCL, 3RD FLOOR, PRESS TRUST OF INDIA BUILDING, 4, PARLIAMENT STREET, NEW DELHI – 110001

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the Two-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

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

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

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

Annex – I

(Schedule-A)

Site

[Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I. All the chainages/ location referred to in Annex-I to Schedule-A shall be existing chainages.]

1. Site

The Site of the Two-Lane Project Highway comprises the section of National Highway 06 commencing **from km 115+000 (Chawngtlai) to km150+000 (Champai) i.e. the Chawngtlai - Champai section of Champai Seling NH-6 road in the State of Mizoram**. The land, carriageway and structures comprising the Site are described below.

Package No.	Existing Chainages	Design Chainages	Design Length
Package II	From Km 115+000 to Km 150+000	From Ch 104.460 to Ch.135.500	31.040

2. Land

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

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	115+000	116+000	7.80	**International Corridor-Package II Starts At Km 115+000**
2	116+000	116+400	7.50	
3	116+400	117+600	7.80	
4	117+600	119+200	8.00	
5	119+200	120+000	7.80	
6	120+000	120+400	7.50	
7	120+400	120+800	7.00	
8	120+800	123+000	7.80	
9	123+000	123+200	6.80	
10	123+200	123+400	7.00	
11	123+400	124+400	7.50	
12	124+400	126+000	7.80	
13	126+000	128+000	8.00	
14	128+000	129+600	7.80	
15	129+600	130+000	9.00	
16	130+000	130+600	7.50	

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
17	130+600	131+800	7.80	
18	131+800	132+000	7.60	
19	132+000	132+800	7.80	
20	132+800	133+000	7.60	
21	133+000	135+000	7.80	
22	135+000	135+400	7.60	
23	135+400	136+200	7.80	
24	136+200	137+200	7.50	
25	137+200	138+400	8.00	
26	138+400	139+000	7.00	
27	139+000	139+600	8.00	
28	139+600	140+000	7.80	
29	140+000	140+600	8.00	
30	140+600	141+000	7.80	
31	141+000	142+000	8.00	
32	142+000	142+400	7.50	
33	142+400	142+600	7.80	
34	142+600	142+800	7.50	
35	142+800	143+000	8.50	
36	143+000	143+400	7.80	
37	143+400	143+600	8.00	
38	143+600	144+000	8.10	
39	144+000	144+200	8.00	
40	144+200	144+400	8.10	
41	144+400	144+600	8.00	
42	144+600	144+800	8.20	
43	144+800	145+000	8.30	
44	145+000	145+200	7.80	
45	145+200	145+400	7.20	
46	145+400	146+000	8.20	
47	146+000	146+200	8.00	
48	146+200	146+400	8.10	
49	146+400	146+600	7.50	
50	146+600	147+000	8.10	
51	147+000	147+200	8.40	
52	147+200	147+400	8.00	
53	147+400	147+600	7.80	
54	147+600	147+800	8.00	
55	147+800	148+000	5.00	
56	148+000	148+400	7.80	
57	148+400	149+000	7.50	
58	149+000	149+200	7.70	
59	149+200	149+400	7.80	
60	149+400	149+600	9.30	
61	149+600	150+000	9.00	**International Corridor- Package II Ends At Km 150+000**

3. Carriageway

The present carriageway of the Project Highway is Single Lane about 69.920 Km. The type of the existing pavement is flexible.

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Super-structure		
01	130+070	Open Foundation	RCC	PSC	1 x 19.70 + 1 x 31.40 + 1 x 19.20	8.30

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

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
-----NIL-----						

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
-----NIL-----		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

(a) Slab/Box Culverts: - 142 Nos.

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
1	115+190	Slab Culvert	1 x 2.30	6.70
2	115+620	Slab Culvert	1 x 2.50	6.60
3	115+765	Slab Culvert	1 x 3.80	7.00
4	115+940	Slab Culvert	1 x 2.80	6.70
5	116+150	Slab Culvert	1 x 1.00	6.60
6	116+505	Slab Culvert	1 x 1.30	6.70
7	116+800	Slab Culvert	1 x 2.00	6.80
8	116+962	Slab Culvert	1 x 2.30	6.70
9	117+135	Slab Culvert	1 x 3.30	6.60
10	117+200	Slab Culvert	1 x 2.50	6.50
11	117+260	Slab Culvert	1 x 2.00	6.70
12	117+330	Slab Culvert	1 x 2.50	6.70
13	117+955	Slab Culvert	1 x 3.50	6.60
14	118+695	Slab Culvert	1 x 2.00	6.80
15	118.760	Slab Culvert	1 x 1.30	6.70
16	118+860	Slab Culvert	1 x 3.00	6.70
17	119+060	Slab Culvert	1 x 3.00	chock-up
18	119+510	Slab Culvert	1 x 1.30	6.70
19	119+775	Slab Culvert	1 x 3.00	6.70
20	119+970	Slab Culvert	1 x 1.30	6.70
21	120+035	Slab Culvert	1 x 1.00	6.80
22	120+255	Slab Culvert	1 x 1.30	6.90
23	120+450	Slab Culvert	1 x 2.00	6.80
24	120+492	Slab Culvert	1 x 1.50	6.70
25	120+860	Slab Culvert	1 x 2.00	7.00
26	121+005	Slab Culvert	1 x 1.50	6.80

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
27	121+145	Slab Culvert	1 x 1.30	7.00
28	121+255	Slab Culvert	1 x 1.50	6.70
29	121+738	Slab Culvert	1 x 1.30	6.70
30	122+050	Slab Culvert	1 x 1.30	6.80
31	122+277	Slab Culvert	1 x 2.00	6.80
32	122+600	Slab Culvert	1 x 2.50	6.80
33	122+925	Slab Culvert	1 x 1.10	6.80
34	123+015	Slab Culvert	1 x 2.00	6.60
35	123+220	Slab Culvert	1 x 2.00	6.70
36	123+410	Slab Culvert	1 x 1.30	6.60
37	123+985	Slab Culvert	1 x 2.00	6.60
38	124+100	Slab Culvert	1 x 3.00	6.60
39	124+180	Slab Culvert	1 x 1.50	6.60
40	124+335	Slab Culvert	1 x 1.70	6.90
41	124+740	Slab Culvert	1 x 1.50	6.80
42	124+831	Slab Culvert	1 x 1.50	6.60
43	125+025	Slab Culvert	1 x 1.30	6.70
44	125+680	Slab Culvert	1 x 2.50	6.80
45	125+935	Slab Culvert	1 x 1.00	6.90
46	126+125	Slab Culvert	1 x 1.30	7.00
47	126+415	Slab Culvert	1 x 2.00	6.80
48	126+525	Slab Culvert	1 x 1.50	6.70
49	126+695	Slab Culvert	1 x 1.30	6.60
50	126+925	Slab Culvert	1 x 1.30	7.00
51	127+105	Slab Culvert	1 x 1.50	6.50
52	127+350	Slab Culvert	1 x 1.30	6.60
53	127+510	Slab Culvert	1 x 1.50	6.70
54	127+875	Slab Culvert	1 x 1.50	6.80
55	128+100	Slab Culvert	1 x 2.20	6.70
56	128+205	Slab Culvert	1 x 1.30	6.80
57	128+532	Slab Culvert	1 x 1.50	6.40
58	128+720	Slab Culvert	1 x 1.30	6.70
59	128+825	Slab Culvert	1 x 1.30	6.80
60	128+985	Slab Culvert	1 x 1.50	6.70
61	129+265	Slab Culvert	1 x 1.50	6.60
62	129+378	Slab Culvert	1 x 4.70	7.30
63	129+610	Slab Culvert	1 x 1.20 m	6.700
64	129+720	Slab Culvert	1 x 1.30	6.970
65	130+210	Slab Culvert	1 x 1.30	6.80
66	130+355	Slab Culvert	1 x 2.80	6.80
67	130+675	Slab Culvert	1 x 2.00	6.80
68	131+040	Slab Culvert	1 x 2.50	6.60
69	131+250	Slab Culvert	1 x 1.50	6.60
70	131+440	Slab Culvert	1 x 2.00	6.60
71	132+035	Slab Culvert	1 x 1.50	6.80

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
72	132+185	Slab Culvert	1 x 1.50	6.70
73	132.275	Slab Culvert	1 x 2.50	7.00
74	132+560	Slab Culvert	chock-up	-
75	132+710	Slab Culvert	1 x 1.50	6.80
76	132+830	Slab Culvert	1 x 1.30	6.70
77	133+025	Slab Culvert	1 x 1.30	6.60
78	133+330	Slab Culvert	1 x 2.00	6.70
79	133+640	Slab Culvert	1 x 1.30	6.80
80	133+895	Slab Culvert	1 x 1.50	6.70
81	133+955	Slab Culvert	1 x 1.50	6.60
82	134+330	Slab Culvert	1 x 1.30	6.70
83	134+790	Slab Culvert	1 x 1.70	6.80
84	135+035	Slab Culvert	1 x 1.30	7.00
85	135+390	Slab Culvert	1 x 1.30	7.10
86	135+515	Slab Culvert	1 x 1.30	6.70
87	135+660	Slab Culvert	1 x 2.00	6.80
88	135+870	Slab Culvert	chock-up	6.90
89	136+055	Slab Culvert	1 x 1.30	6.80
90	136+225	Slab Culvert	1 x 4.00	6.70
91	136+420	Slab Culvert	1 x 2.00	6.70
92	136+570	Slab Culvert	1 x 1.30	6.80
93	136+685	Slab Culvert	1 x 1.30	6.90
94	137+025	Slab Culvert	1 x 1.30	6.80
95	137+170	Slab Culvert	1 x 1.30	6.90
96	137+460	Slab Culvert	1 x 1.30	6.80
97	137+870	Slab Culvert	1 x 2.50	6.70
98	138+045	Slab Culvert	1 x 1.30	6.90
99	138+325	Slab Culvert	1 x 1.30	6.80
100	138+620	Slab Culvert	1 x 1.30	6.80
101	138+780	Slab Culvert	1 x 1.30	7.00
102	139.000	Slab Culvert	1 x 1.00	6.80
103	139+255	Slab Culvert	1 x 1.30	6.70
104	139+510	Slab Culvert	1 x 1.50	7.10
105	139+630	Slab Culvert	1 x 1.30	6.90
106	139+885	Slab Culvert	1 x 1.30	6.70
107	140+760	Slab Culvert	Chock-up	6.70
108	141+065	Slab Culvert	1 x 1.30	6.70
109	141+222	Slab Culvert	1 x 1.00	6.80
110	141+785	Slab Culvert	1 x 1.00	6.70
111	141+1050	Slab Culvert	1 x 1.00	7.10
112	141+1155	Slab Culvert	1 x 1.30	6.70
113	141+1670	Slab Culvert	1 x 3.70	6.80
114	142+510	Slab Culvert	1 x 2.50	6.90
115	143+305	Slab Culvert	1 x 1.00	6.60
116	143+572	Slab Culvert	1 x 2.50	6.70

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
117	144+110	Slab Culvert	1 x 1.30	6.70
118	144+220	Slab Culvert	1 x 1.30	6.90
119	144+350	Slab Culvert	1 x 2.00	6.70
120	145+115	Slab Culvert	1 x 1.00	6.70
121	145+325	Slab Culvert	1 x 2.00	6.80
122	145+550	Slab Culvert	1 x 1.60	6.90
123	146+193	Slab Culvert	1 x 1.30	6.80
124	146+310	Slab Culvert	1 x 1.50	7.00
125	146+477	Slab Culvert	1 x 1.50	7.00
126	147+170	Slab Culvert	1 x 1.30	5.80
127	147+660	Slab Culvert	1 x 1.30	6.80
128	147+835	Slab Culvert	1 x 1.50	6.70
129	148+545	Slab Culvert	chock-up	-
130	148+690	Slab Culvert	1 x 1.20	7.00
131	149+200	Slab Culvert	1 x 1.30	6.80
132	149+390	Slab Culvert	1 x 1.30	6.70
133	149+510	Slab Culvert	1 x 1.00	6.80
134	149+620	Slab Culvert	1 x 1.30	6.70
135	149+675	Slab Culvert	1 x 2.00	6.70
136	149+808	Slab Culvert	1 x 2.00	6.80
137	149+885	Slab Culvert	1 x 2.00	6.80
138	149+1115	Slab Culvert	1 x 1.00	6.70
139	149+1215	Slab Culvert	1 x 1.00	6.60
140	148+1395	Slab Culvert	1 x 1.80	6.70
141	149+1505	Slab Culvert	1 x 2.00	7.00
142	149+1878	Slab Culvert	1 x 1.30	7.00

(b) HP Culverts: - 03 Nos.

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
Package II				
1	126+285	HPC	1 x 1000 Ø	6.80
2	140+550	HPC	1 x 1200 Ø	7.50
3	149+990	HPC	1 x 600 Ø	6.70

11. Bus bays

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

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
1	124+110	-	LHS	-
2	133+480	-	LHS	-

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
3	134+400	-	LHS	-

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the roadside drains are as follows:

Sr. No	Location		Type	
	From Km	to Km	Masonry/CC (Pucca)	Earthern (Kutcha)
1	115+000	124+400	-	RHS
2	125+600	131+600	-	RHS
3	131+800	132+200	-	RHS
4	133+000	133+800	-	RHS
5	134+000	134+200	-	RHS
6	136+600	137+400	-	RHS
7	137+600	142+000	-	RHS
8	142+000	142+090	RHS	-
9	142+090	145+000	-	RHS
10	147+400	148+600	-	LHS
11	149+000	149+600	-	LHS
12	149+600	149+1235		LHS
13	149+1235	149+1455	LHS	-
14	149+1455	149+1655	LHS	LHS
15	149+1655	149+1710	-	LHS
16	149+1710	149+1810	LHS	-

14. Major junctions

The details of major junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	Chainage	Location			NH	SH	MDR	Others
1	146+310	Zokawthar	Y	-	NH	-	-	-

(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		Type	
	Chainage	Location	T -junction	Cross road
1	147+820	Towards Petrol Pump	Y	-
2	147+850	LHS: Champai RHS: Central Jail	-	X
3	148+000	Towards Village (champai)	Y	-
4	149+930	Towards Village (champai)	Y	-

16. Bypasses

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

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

17. Other structures- NIL

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sr.no	Design Chainage		Design Length	PROW	Remark
	From	To			
1	104.460	105.050	0.590	24	Minimum 90% on Appointed Date. Remaining within 150 days of Appointed Date.
2	105.050	105.060	0.010	36	
3	105.060	105.940	0.880	24	
4	105.940	105.950	0.010	26	
5	105.950	112.380	6.430	24	
6	112.380	112.410	0.030	30	
7	112.410	122.640	10.230	24	
8	122.640	122.660	0.020	32	
9	122.660	122.790	0.130	24	
10	122.790	122.800	0.010	34	
11	122.800	123.900	1.100	24	
12	123.900	123.920	0.020	38	
13	123.920	124.570	0.650	24	
14	124.570	124.590	0.020	28	
15	124.590	135.060	10.470	24	
16	135.060	135.500	0.440	12	

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

Annex - III

(Schedule-A)

Alignment Plans

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

(i) The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the contractor as 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 & location of traffic signs is enclosed. The contractor shall, however, imp

(iii) rove/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex – IV

(Schedule-A)

Environment Clearances

Environmental Clearance is not required as per new Notification of MoEF dated 22/08/2013.

Schedule – B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and augmentation

Rehabilitation, upgradation and augmentation shall include Two-Laning with Paved Shoulder and widening/reconstruction/ new construction and Strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex – I

(Schedule-B)

Description of Two-Laning with Paved Shoulder

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 10 (ten) m wide in accordance with the typical cross sections drawings in the Manual (IRC: SP 73-2018).

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

Sl. No.	Built-up stretch (Township)	Location (km to km)		Width (m)	Typical cross section (Ref. to Manual)
		From	To		
Package II					
1	Tuipui	117.000	117.550	11.00	Fig No.06
2	Tuipui	117.650	118.200	11.00	Fig No.06
3	---	128.800	129.100	11.00	Fig No.06
4	---	129.150	129.300	11.00	Fig No.06
5	---	129.350	129.600	11.00	Fig No.06
6	---	131.800	131.950	11.00	Fig No.06
7	Champai	134.200	134.450	11.00	Fig No.06
8	Champai	134.550	134.650	11.00	Fig No.06
9	Champai	134.750	134.900	11.00	Fig No.06
10	Champai	134.950	135.500	11.00	Fig No.06

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

2. Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual IRC: SP 73-2018.

(ii) Design speed

The design speed shall be the minimum design speed of 30/40 km per hour for

mountainous and steep terrain.

(iii) Improvement of the existing road geometrics

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

Sl. No.	Stretch/Design Chainages	Type of deficiency		Remarks
		Radius of curve	Design Speed	
1	117.537	20	20	Major Bridge Retained At Tuipui
2	117.687	20	20	Major Bridge Retained At Tuipui
3	135.242	20	20	Built Up Location At Champai

(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:

Sl. No.	Stretch (from km to km)		Fully paved shoulders/ footpaths	Reference to cross section
Package II				
1	117.000	117.550	1.5m Footpath	Fig No.06
2	117.650	118.200	1.5m Footpath	Fig No.06
3	128.800	129.100	1.5m Footpath	Fig No.06
4	129.150	129.300	1.5m Footpath	Fig No.06
5	129.350	129.600	1.5m Footpath	Fig No.06
6	131.800	131.950	1.5m Footpath	Fig No.06
7	134.200	134.450	1.5m Footpath	Fig No.06
8	134.550	134.650	1.5m Footpath	Fig No.06
9	134.750	134.900	1.5m Footpath	Fig No.06
10	134.950	135.500	1.5m Footpath	Fig No.06

(b) In open country, paved shoulders of 1.5 m width shall be provided and balance 1.0m width shall be covered with 150 mm thick compacted layer of granular material.

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

(vi) Lateral and vertical clearances at underpasses

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

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

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

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at 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
NIL			

(viii) Service 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
NIL			

(ix) Grade separated structures

(a) 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
NIL					

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

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

(x) Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

(xi) Typical cross-sections of the Project Highway

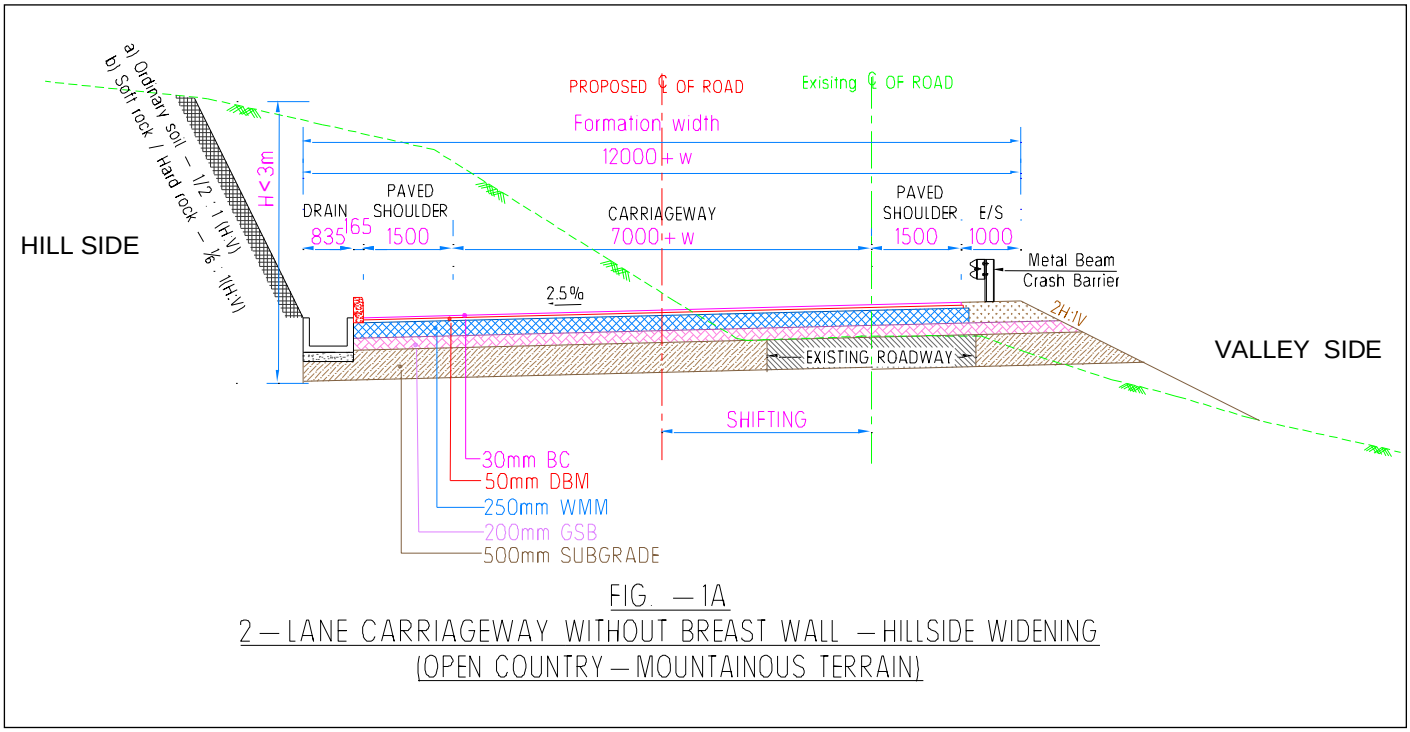

FIG. – 1A
2 – LANE CARRIAGEWAY WITHOUT BREAST WALL – HILLSIDE WIDENING
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

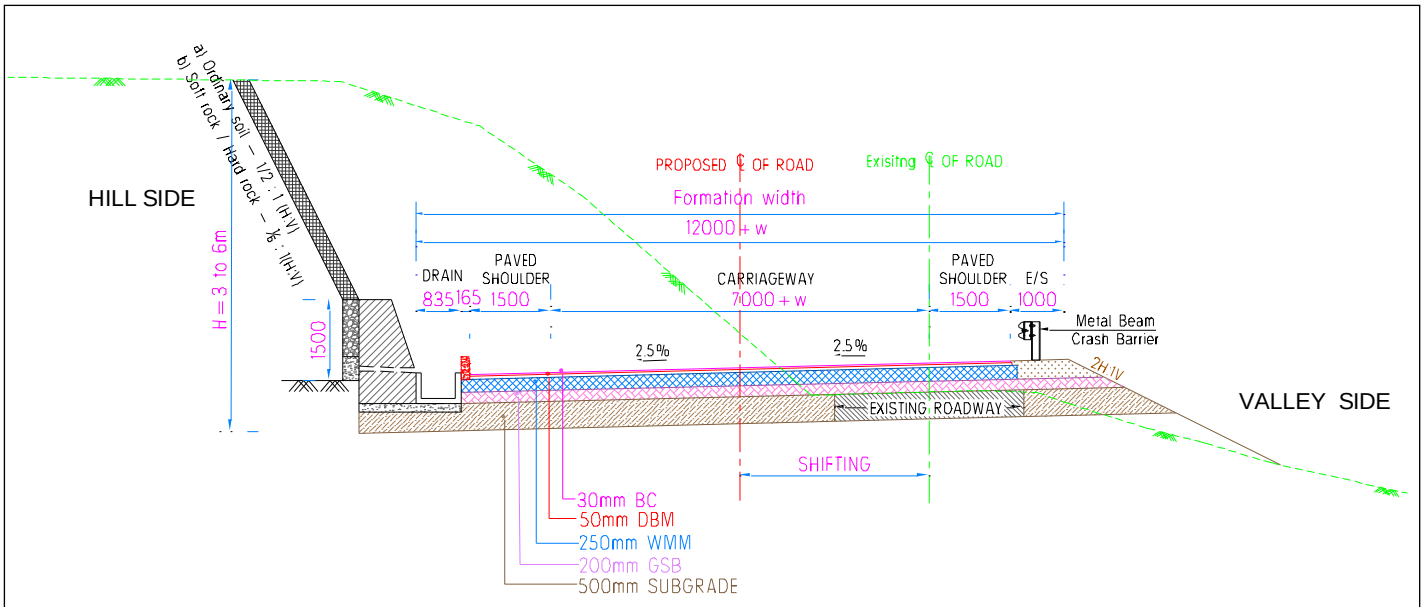

FIG. – 1B

2 – LANE CARRIAGEWAY WITH BREAST WALL OF 1.5M HEIGHT – HILLSIDE WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

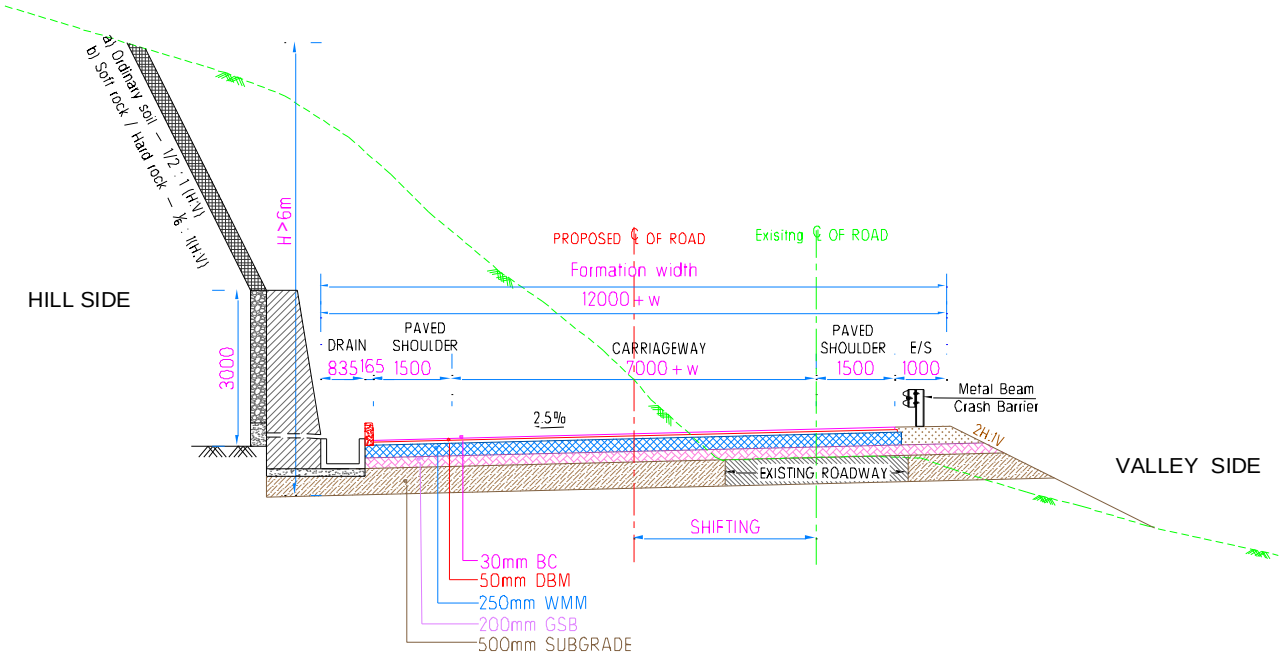

FIG. – 1C

2 – LANE CARRIAGEWAY WITH BREAST WALL OF 3M HEIGHT – HILLSIDE WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

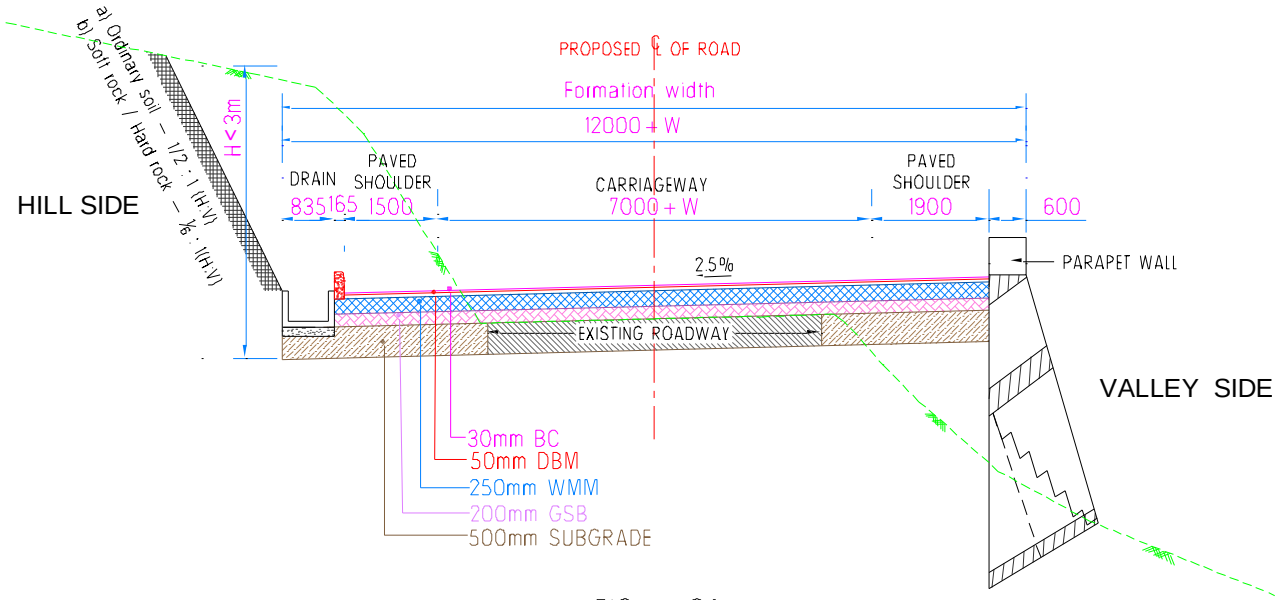

FIG. – 2A
2 – LANE CARRIAGEWAY WITHOUT BREAST WALL
AND WITH RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

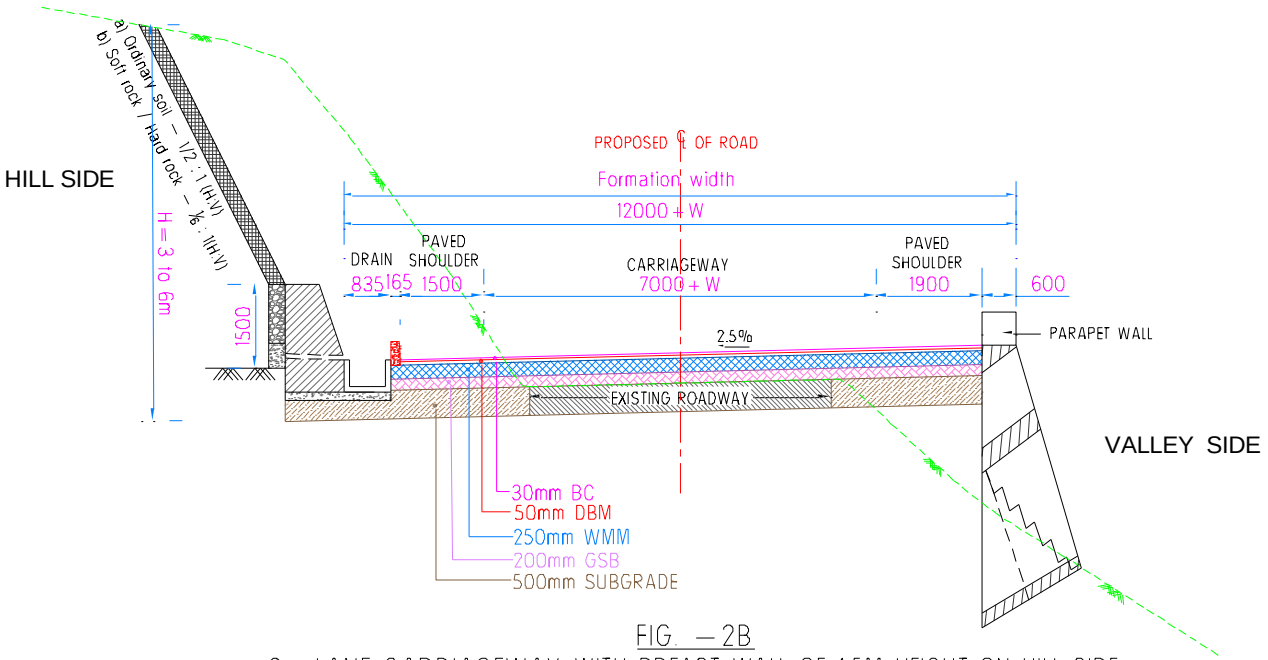

FIG. – 2B
2 – LANE CARRIAGEWAY WITH BREAST WALL OF 1.5M HEIGHT ON HILL SIDE
AND RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

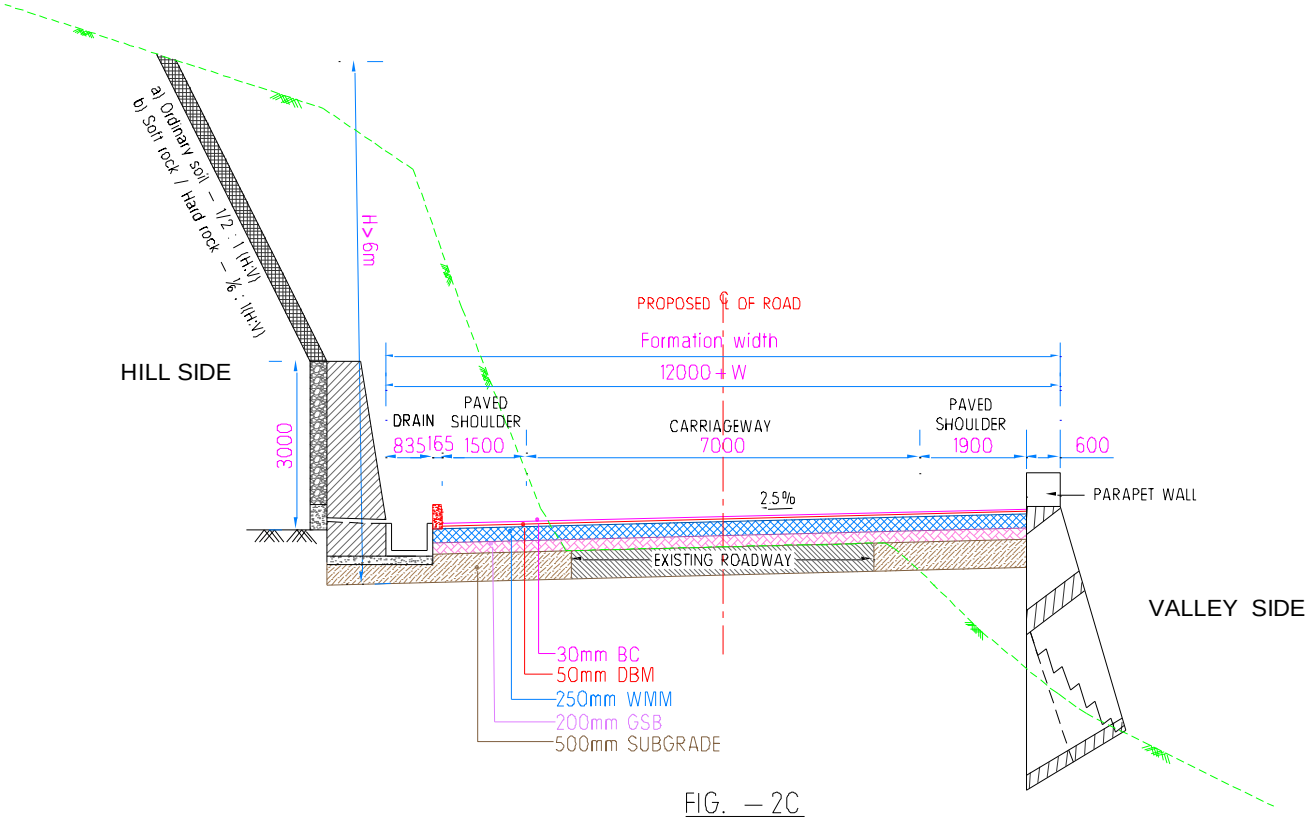

FIG. – 2C
2 – LANE CARRIAGEWAY WITH BREAST WALL OF 3M HEIGHT ON HILL SIDE AND RETAINING WALL ON VALLY SIDE – CONCENTRIC WIDENING (OPEN COUNTRY – MOUNTAINOUS TERRAIN)

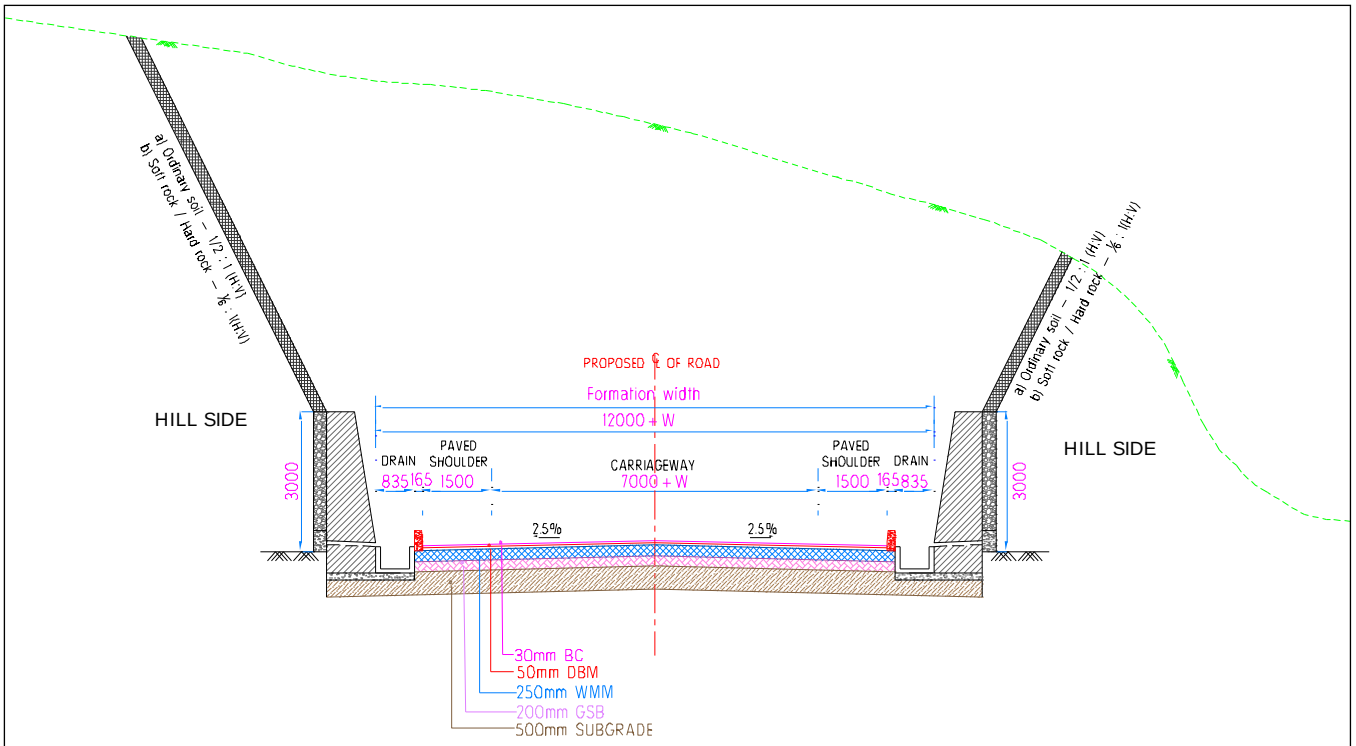

FIG. – 4
2 – LANE CARRIAGEWAY WITH BREAST WALL WITH BOX CUTTING – REALIGNMENT FROM HILL SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

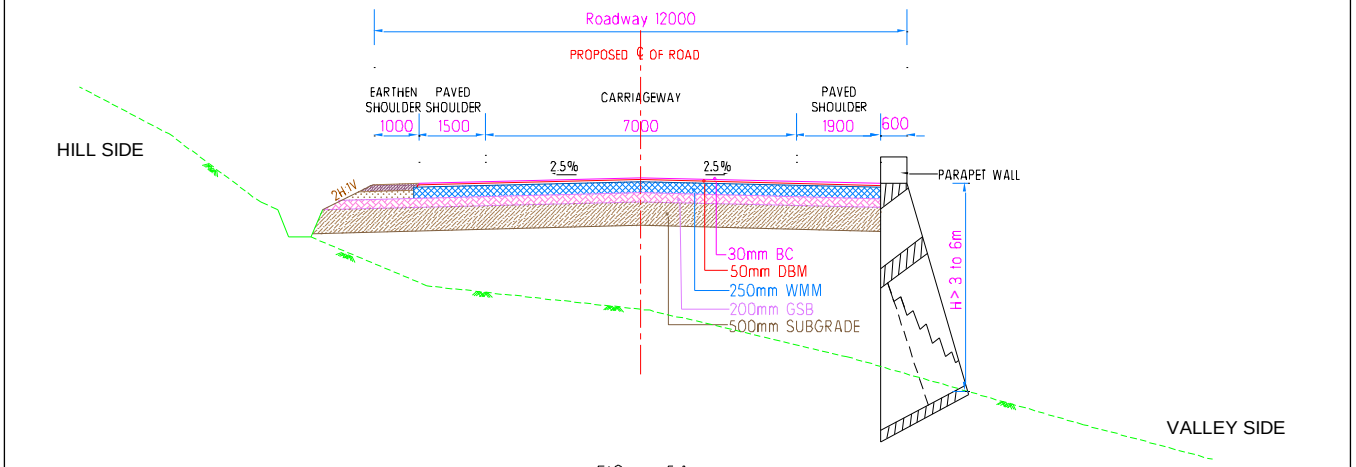

FIG. – 5A
2 – LANE CARRIAGEWAY WITH RETAINING WALL/REINFORCED EARTH
RETAINING WALL – REALIGNMENT FROM VALLEY SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

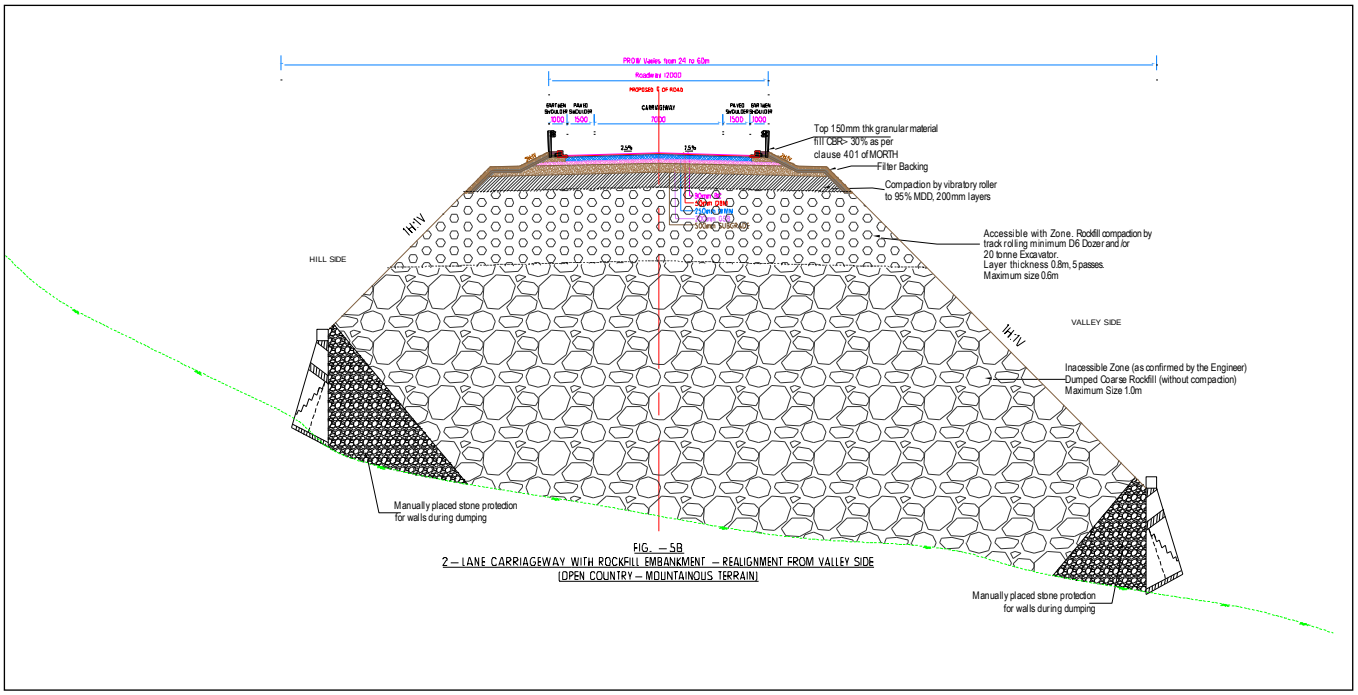

FIG. – 5B
2 – LANE CARRIAGEWAY WITH ROCKFILL EMBANKMENT – REALIGNMENT FROM VALLEY SIDE
(OPEN COUNTRY – MOUNTAINOUS TERRAIN)

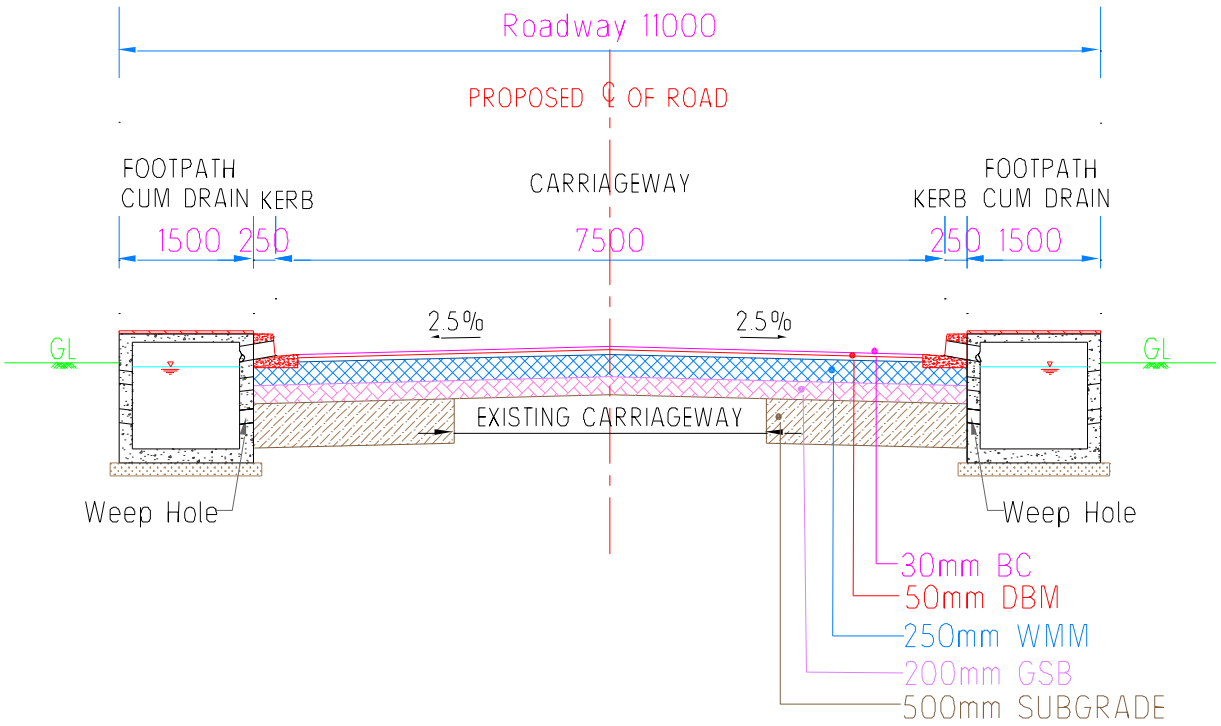

FIG. – 6
2 – LANE CARRIAGEWAY WITHOUT BREAST AND RETAINING WALL
(BUILT UP AREA – MOUNTAINOUS TERRAIN)

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of Section 3 of the Manual (IRC: SP 73-2018). Existing intersections which are deficient shall be improved to the prescribed standards.

Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

(i) At-grade intersections

(a) Major Junction – NIL.

Sl. No.	Location of intersection	Type of intersection	Other features
NIL			

(b) Minor Junction – 02 Nos.

Sl. No.	Location of intersection	Type of intersection	Other features
1	131.940	X	--
2	133.380	T	--

(ii) Grade separated intersection with/without ramps

Sl. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
NIL				

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) **Raising of the existing road**

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length	Extent of raising [Top of finished road level]
NIL			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the provision of Section 5 of the Manual (IRC: SP 73-2018), IRC relevant codes and International Standards.

(ii) Type of pavement

Flexible Pavement – Flexible Pavement shall be constructed in entire length of 31.04 km (from km 104.460 to km 135.500) project highway.

Flexible Pavement shall be constructed in full length of Main Carriageway of project highway.

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and reconstruction of the existing pavement shall be designed for a minimum design period of 15 (Fifteen) years and minimum CBR of subgrade should be 8%. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 million standard axles (MSA) for WMM, GSB and Sub-grade and 5 MSA for DBM & BC. Minimum pavement composition should be adopted for new pavement/reconstruction of road as below:-

i. Main Carriageway:-

S. No.	Description	Minimum Crust Composition of Flexible Pavement
1	BC	30 mm
2	DBM	50 mm
3	WMM	250 mm
4	GSB	200 mm
5	Sub-grade	500 mm
	Total	**1030 mm**

ii. The Crust Composition for Truck Lay Byes shall be as per Main Carriageway Clause 5.3.2 (a) above.

iii. The Crust composition for Minor roads, Bus bay shall be as per section 5 of IRC: SP: 73-2018.

(iv) Reconstruction of stretches

The following stretches of the existing road shall be reconstructed. These shall be

designed as new pavement.

Sr. No.	Package Detail	Design Length (Km)
1	Existing Ch. from Km 115+000 to Km 150+000 (Design Ch. from Ch 104.460 to Ch.135.500)	15.140

6. Roadside Drainage

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

Sr. No.	Package Detail	Design Length (Km)
1	Existing Ch. from Km 115+000 to Km 150+000 (Design Ch. from Ch 104.460 to Ch.135.500)	(i) CC Open Drain= 5.674 Km (ii) RCC Covered Drain= 4.05 Kms (iii) L Shape Stone masonry Drain= 23.98 kms

On hill side open CC Drain with kerb shall be provided for typical cross sections mentioned in Clause 2.11 of Schedule B and as per cross section type given at Schedule D. In all built up areas RCC covered drains with Footpath shall be provided. Suitable crossing shall be provided at approaches to properties etc. invert levels of drains shall be decided on the basis of ground slopes of adjoining properties and open grounds.

In cutting portions CC open drain of suitable size shall be constructed for a minimum length of **5.674 Kms** as per typical cross sections mentioned in Clause 2.11 of Schedule B in consultation with Authority Engineer.

7. Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of section 7 of the Manual (IRC: SP 73-2018) and shall conform to the cross- sectional features and other details specified therein.

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features*
NIL		

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

Sl. No.	Location at km	Remarks
NIL		

(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
NIL			

(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 section 7 of the Manual (IRC:SP: 73-2018) and deviations given at Schedule D.

(ii) Culverts

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

(b) Reconstruction of existing culverts:

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

Refer to the provision of 7.3 (ii) of the Manual (IRC: SP 73-2018)

SLAB CULVERT: 21 Nos.

SI. No.	Culvert location		Proposed Span/ Opening (m.)	Proposed Width (m)	Remark
	Existing Chainage (Km)	Design Chainage (Km)			
1	115+940	105.190	1 x 2.0 x 2.0	12.00	
2	117+260	106.355	1 x 3.0 x 3.0	12.00	
3	117+955	106.935	1 x 6.0	12.00	
4	118+695	107.650	1 x 3.0 x 3.0	12.00	
5	118.760	107.700	1 x 2.0 x 2.0	12.00	
6	120+860	109.620	1 x 3.0 x 3.0	12.00	
7	123+985	112.320	1 x 2.0 x 2.0	12.00	
8	126+525	114.250	1 x 2.0 x 2.0	12.00	
9	128+100	115.660	1 x 2.0 x 2.0	12.00	
10	129+378	116.890	1 x 6.0	12.00	
11	130+355	117.880	1 x 2.0 x 2.0	12.00	
12	130+675	118.175	1 x 2.0 x 2.0	12.00	
13	133+330	120.645	1 x 2.0 x 2.0	12.00	
14	136+570	123.435	1 x 2.0 x 2.0	12.00	
15	141+1670	128.860	1 x 2.0 x 2.0	12.00	
16	144+350	130.340	1 x 3.0 x 3.0	12.00	
17	145+325	130.840	1 x 2.0 x 2.0	12.00	
18	149+675	134.280	1 x 2.0 x 2.0	12.00	
19	149+808	134.395	1 x 2.0 x 2.0	12.00	
20	149+885	134.480	1 x 2.0 x 2.0	12.00	
21	149+1505	135.040	1 x 2.0 x 2.0	12.00	

PIPE CULVERTS: 78 Nos.

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed Span/ Opening (No. x Dia.) (m)	Proposed Width (m)	Remark
1	115+190	104.670	1 x 1200	12.00	Reconstruction
2	115+620	104.940	1 x 1200	12.00	Reconstruction
3	116+505	105.750	1 x 1200	12.00	Reconstruction
4	116+962	106.103	1 x 1200	12.00	Reconstruction
5	117+330	106.420	1 x 1200	12.00	Reconstruction
6	119+060	107.955	1 x 1200	12.00	Reconstruction
7	119+510	108.400	1 x 1200	12.00	Reconstruction
8	119+775	108.630	1 x 1200	12.00	Reconstruction
9	119+970	108.760	1 x 1200	12.00	Reconstruction
10	120+035	108.840	1 x 1200	12.00	Reconstruction
11	120+255	109.050	1 x 1200	12.00	Reconstruction
12	120+450	109.300	1 x 1200	12.00	Reconstruction
13	120+492	109.440	1 x 1200	12.00	Reconstruction
14	121+005	109.780	1 x 1200	12.00	Reconstruction
15	121+145	109.925	1 x 1200	12.00	Reconstruction
16	121+255	110.030	1 x 1200	12.00	Reconstruction
17	121+738	110.420	1 x 1200	12.00	Reconstruction
18	122+277	110.900	1 x 1200	12.00	Reconstruction
19	122+925	111.420	1 x 1200	12.00	Reconstruction
20	123+015	111.490	1 x 1200	12.00	Reconstruction
21	123+410	111.850	1 x 1200	12.00	Reconstruction
22	124+180	112.515	1 x 1200	12.00	Reconstruction
23	126+415	114.155	1 x 1200	12.00	Reconstruction
24	126+695	114.400	1 x 1200	12.00	Reconstruction
25	126+925	114.600	1 x 1200	12.00	Reconstruction
26	127+350	114.950	1 x 1200	12.00	Reconstruction
27	127+875	115.460	1 x 1200	12.00	Reconstruction
28	128+205	115.765	1 x 1200	12.00	Reconstruction
29	128+532	116.083	1 x 1200	12.00	Reconstruction
30	128+720	116.265	1 x 1200	12.00	Reconstruction
31	128+825	116.420	1 x 1200	12.00	Reconstruction
32	128+985	116.525	1 x 1200	12.00	Reconstruction
33	129+265	116.760	1 x 1200	12.00	Reconstruction
34	129+610	117.115	1 x 1200	12.00	Reconstruction
35	129+720	117.230	1 x 1200	12.00	Reconstruction
36	130+210	117.750	1 x 1200	12.00	Reconstruction
37	131+440	118.890	1 x 1200	12.00	Reconstruction
38	132+035	119.465	1 x 1200	12.00	Reconstruction
39	132+560	119.885	1 x 1200	12.00	Reconstruction
40	132+710	120.035	1 x 1200	12.00	Reconstruction
41	132+830	120.150	1 x 1200	12.00	Reconstruction
42	133+025	120.325	1 x 1200	12.00	Reconstruction
43	133+895	121.180	1 x 1200	12.00	Reconstruction
44	133+955	121.240	1 x 1200	12.00	Reconstruction
45	134+330	121.600	1 x 1200	12.00	Reconstruction

SI. No.	Existing Chainage (Km)	Design Chainage (Km)	Proposed Span/ Opening (No. x Dia.) (m)	Proposed Width (m)	Remark
46	135+515	122.555	1 x 1200	12.00	Reconstruction
47	136+420	123.300	1 x 1200	12.00	Reconstruction
48	136+685	123.550	1 x 1200	12.00	Reconstruction
49	137+460	124.200	1 x 1200	12.00	Reconstruction
50	138+620	125.265	1 x 1200	12.00	Reconstruction
51	138+780	125.420	1 x 1200	12.00	Reconstruction
52	139.000	125.630	1 x 1200	12.00	Reconstruction
53	139+255	125.860	1 x 1200	12.00	Reconstruction
54	139+630	126.140	1 x 1200	12.00	Reconstruction
55	140.550	126.800	1 x 1200	12.00	Reconstruction
56	140+760	126.997	1 x 1200	12.00	Reconstruction
57	141+065	127.325	1 x 1200	12.00	Reconstruction
58	141+222	127.470	1 x 1200	12.00	Reconstruction
59	141+785	128.040	1 x 1200	12.00	Reconstruction
60	141+1050	128.300	1 x 1200	12.00	Reconstruction
61	141+1155	128.405	1 x 1200	12.00	Reconstruction
62	142+510	129.355	1 x 1200	12.00	Reconstruction
63	143+572	129.960	1 x 1200	12.00	Reconstruction
64	144+220	130.200	1 x 1200	12.00	Reconstruction
65	145+115	130.645	1 x 1200	12.00	Reconstruction
66	145+550	131.065	1 x 1200	12.00	Reconstruction
67	146+193	131.300	1 x 1200	12.00	Reconstruction
68	146+310	131.410	1 x 1200	12.00	Reconstruction
69	146+477	131.580	1 x 1200	12.00	Reconstruction
70	147+170	131.860	1 x 1200	12.00	Reconstruction
71	147+660	132.345	1 x 1200	12.00	Reconstruction
72	148+690	133.290	1 x 1200	12.00	Reconstruction
73	149+390	133.960	1 x 1200	12.00	Reconstruction
74	149+510	134.090	1 x 1200	12.00	Reconstruction
75	149+620	134.215	1 x 1200	12.00	Reconstruction
76	149+1115	134.680	1 x 1200	12.00	Reconstruction
77	149+1215	134.780	1 x 1200	12.00	Reconstruction
78	149+1878	135.400	1 x 1200	12.00	Reconstruction

(c) Widening of existing culverts:

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

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

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

BOX CULVERT: 23 Nos.

SI. No.	Design Chainage (Km)	Proposed Span/ Opening (m.)	Proposed Width (m)	Type	Remark
Package II					
1	104.750	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
2	105.060	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
3	105.960	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
4	106.270	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
5	107.775	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
6	111.160	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
7	111.700	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
8	112.400	1 x 6.0 x 6.0	12.00	Box Culvert	New Construction
9	112.950	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
10	113.685	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
11	113.900	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
12	114.745	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
13	118.490	1 x 6.00	12.00	Box Culvert	New Construction
14	119.595	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
15	119.655	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
16	121.925	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
17	122.660	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
18	122.800	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
19	123.115	1 x 4.0 x 4.0	12.00	Box Culvert	New Construction
20	123.810	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction
21	124.580	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
22	129.710	1 x 3.0 x 3.0	12.00	Box Culvert	New Construction
23	134.930	1 x 2.0 x 2.0	12.00	Box Culvert	New Construction

PIPE CULVERTS: 44 Nos.

Sr. No.	Design Chainage (Km)	No. x Dia.(mm)	Proposed Width (m)	Type	Remark
Package II					
1	105.410	1 x 1200	12.00	HPC	New Construction
2	105.565	1 x 1200	12.00	HPC	New Construction
3	106.750	1 x 1200	12.00	HPC	New Construction
4	109.680	1 x 1200	12.00	HPC	New Construction
5	110.695	1 x 1200	12.00	HPC	New Construction
6	111.050	1 x 1200	12.00	HPC	New Construction
7	112.150	1 x 1200	12.00	HPC	New Construction
8	112.640	1 x 1200	12.00	HPC	New Construction
9	112.875	1 x 1200	12.00	HPC	New Construction
10	113.100	1 x 1200	12.00	HPC	New Construction
11	113.540	1 x 1200	12.00	HPC	New Construction
12	114.040	1 x 1200	12.00	HPC	New Construction
13	115.120	1 x 1200	12.00	HPC	New Construction

Sr. No.	Design Chainage (Km)	No. x Dia.(mm)	Proposed Width (m)	Type	Remark
14	118.720	1 x 1200	12.00	HPC	New Construction
15	119.035	1 x 1200	12.00	HPC	New Construction
16	119.735	1 x 1200	12.00	HPC	New Construction
17	120.950	1 x 1200	12.00	HPC	New Construction
18	122.035	1 x 1200	12.00	HPC	New Construction
19	122.130	1 x 1200	12.00	HPC	New Construction
20	122.320	1 x 1200	12.00	HPC	New Construction
21	122.450	1 x 1200	12.00	HPC	New Construction
22	122.960	1 x 1200	12.00	HPC	New Construction
23	123.910	1 x 1200	12.00	HPC	New Construction
24	124.710	1 x 1200	12.00	HPC	New Construction
25	124.970	1 x 1200	12.00	HPC	New Construction
26	125.160	1 x 1200	12.00	HPC	New Construction
27	125.810	1 x 1200	12.00	HPC	New Construction
28	126.065	1 x 1200	12.00	HPC	New Construction
29	126.380	1 x 1200	12.00	HPC	New Construction
30	126.530	1 x 1200	12.00	HPC	New Construction
31	127.745	1 x 1200	12.00	HPC	New Construction
32	128.510	1 x 1200	12.00	HPC	New Construction
33	128.740	1 x 1200	12.00	HPC	New Construction
34	129.240	1 x 1200	12.00	HPC	New Construction
35	130.090	1 x 1200	12.00	HPC	New Construction
36	130.715	1 x 1200	12.00	HPC	New Construction
37	132.110	1 x 1200	12.00	HPC	New Construction
38	132.530	1 x 1200	12.00	HPC	New Construction
39	132.680	1 x 1200	12.00	HPC	New Construction
40	133.145	1 x 1200	12.00	HPC	New Construction
41	133.520	1 x 1200	12.00	HPC	New Construction
42	133.760	1 x 1200	12.00	HPC	New Construction
43	134.565	1 x 1200	12.00	HPC	New Construction
44	135.155	1 x 1200	12.00	HPC	New Construction

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

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

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

(iii) Bridges

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

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

Refer to the provision of 7.3.2 of the Manual (IRC: SP 73-2018)

MAJOR BRIDGES: - Nil

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrang-ement	Width of Structure (m)	Span Arrang-ement	Proposed Width (m)	Type of Bridge	
--NIL--									

MINOR BRIDGES: - Nil

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Details of Existing Structure			Details of Proposed structure			Remark
			Type of Structure	Span Arrang-ement	Width of Structure (m)	Span Arrang-ement*	Proposed Width (m)	Type of Bridge	
--NIL--									

(ii) The following narrow bridges shall be widened:

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

@ 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 in the drawings folder.

Major Bridges: NIL

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

Minor Bridges:

Sr. No.	Location km (Design Ch.)	Total Length of bridge (m)	Total Width (m)
NIL			

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

Sl. No.	Location at km	Remarks

NIL

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

Sl. No.	Location at km	Remarks
NIL		

(e) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in the provision of paragraph 7.21 of the Manual IRC SP 73 2018.

(f) Structures in marine environment: NIL

(iv) Rail-road bridges: NIL

(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 bridge (m)
NIL		

(c) Road under-bridges

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

Sl. No.	Location of Level crossing (Chainage km)	Number and length of span (m)
NIL		

(v) Grade separated structures: NIL

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges
Major Bridges:

Sr. No.	Location of Bridge (km)	Nature and extent of repairs /strengthening to be carried out
1	Ch. 117.600	Replacement of expansion joints & wearing coat, providing crash barrier and approach slab on bridge, painting & bed protection work and other repair work, if any..

Minor Bridges:

Sr. No.	Location of Bridge (km)	Nature and extent of repairs /strengthening to be carried out
-----NIL-----		

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl. No.	Location
Ch. 117.600	

(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 the Manual.

(ii) Specifications of the reflective sheeting shall be provided in accordance with Section 9 of the Manual.

8. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provision of Section 9 of the Manual.

(ii) Overhead traffic signs: location and size

S. No	Location (Design Chainage)	Type	Remark
Nil			

9. Compulsory Afforestation

Deleted

10. Hazardous Locations

The safety barriers shall be provided at the hazardous locations as per Clause 7.18 of the Manual (IRC:SP 73-2018). W-Beam metal crash barriers shall however be provided for a minimum length of 4.030 Km. at all hazardous locations. All hazardous locations shall be finalized in consultation with the Authority Engineer.

Above length of the W-Beam metal crash barriers is indicative and minimum specified. The actual length of the W-Beam metal crash barriers shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

a) RCC Retaining Wall : Retaining Wall shall be constructed as per typical cross sections as per Schedule D and at other locations mentioned below:

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
104+770	104+790	20.000	104+760	104+770	10.000
105+040	105+050	10.000	104+780	104+790	10.000
105+930	105+940	10.000	105+030	105+040	10.000
111+140	111+160	20.000	105+060	105+070	10.000
112+370	112+380	10.000	105+260	105+280	20.000
112+410	112+420	10.000	105+380	105+400	20.000
112+940	112+950	10.000	105+640	105+650	10.000
113+090	113+110	20.000	105+910	105+930	20.000
113+670	113+690	20.000	105+950	105+960	10.000
115+100	115+110	10.000	106+250	106+270	20.000
115+120	115+130	10.000	106+340	106+360	20.000
121+910	121+920	10.000	106+410	106+440	30.000
122+130	122+150	20.000	106+730	106+750	20.000
122+780	122+790	10.000	107+050	107+060	10.000
122+800	122+810	10.000	107+070	107+080	10.000
122+940	122+950	10.000	107+550	107+580	30.000
123+100	123+110	10.000	108+310	108+340	30.000
123+800	123+810	10.000	108+380	108+390	10.000

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
123+890	123+900	10.000	108+400	108+410	10.000
124+180	124+190	10.000	108+900	108+930	30.000
124+380	124+390	10.000	109+030	109+040	10.000
124+590	124+600	10.000	109+050	109+060	10.000
126+040	126+070	30.000	109+420	109+450	30.000
126+370	126+380	10.000	110+410	110+440	30.000
132+660	132+690	30.000	110+800	110+810	10.000
133+130	133+150	20.000	111+020	111+030	10.000
133+500	133+510	10.000	111+140	111+170	30.000
133+520	133+540	20.000	111+690	111+710	20.000
134+030	134+050	20.000	111+950	111+970	20.000
134+280	134+290	10.000	112+120	112+140	20.000
134+920	134+930	10.000	112+150	112+160	10.000
		-	112+220	112+230	10.000
		-	112+300	112+320	20.000
		-	112+360	112+380	20.000
		-	112+410	112+420	10.000
		-	112+640	112+650	10.000
		-	112+940	112+950	10.000
		-	113+110	113+120	10.000
		-	113+500	113+530	30.000
		-	113+570	113+580	10.000
		-	113+660	113+700	40.000
		-	113+890	113+900	10.000
		-	114+030	114+040	10.000
		-	114+580	114+590	10.000
		-	115+080	115+100	20.000
		-	115+110	115+120	10.000
		-	115+320	115+350	30.000
		-	115+360	115+370	10.000
		-	115+650	115+660	10.000
		-	116+180	116+200	20.000
		-	116+510	116+520	10.000
		-	117+620	117+630	10.000
		-	118+730	118+740	10.000
			120+250	120+290	40.000
			120+300	120+320	20.000
			120+930	120+940	10.000
			120+950	120+960	10.000
			121+470	121+490	20.000
			121+590	121+600	10.000
			121+610	121+620	10.000
			121+900	121+910	10.000
			121+930	121+940	10.000
			122+020	122+030	10.000
			122+120	122+130	10.000
			122+140	122+150	10.000
			122+250	122+280	30.000

Retaining Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
			122+300	122+320	20.000
			122+410	122+460	50.000
			122+520	122+540	20.000
			122+630	122+640	10.000
			122+660	122+670	10.000
			122+770	122+780	10.000
			122+810	122+820	10.000
			122+960	122+970	10.000
			123+100	123+120	20.000
			123+650	123+660	10.000
			123+790	123+810	20.000
			123+880	123+890	10.000
			123+930	123+940	10.000
			124+050	124+060	10.000
			124+160	124+170	10.000
			124+190	124+200	10.000
			124+590	124+600	10.000
			124+700	124+710	10.000
			124+960	124+970	10.000
			125+160	125+170	10.000
			125+180	125+190	10.000
			125+200	125+230	30.000
			125+410	125+420	10.000
			125+490	125+520	30.000
			125+800	125+810	10.000
			126+050	126+070	20.000
			126+340	126+350	10.000
			127+560	127+570	10.000
			128+600	128+640	40.000
			128+730	128+740	10.000
			128+830	128+840	10.000
			128+870	128+900	30.000
			129+280	129+300	20.000
			129+340	129+350	10.000
			129+700	129+710	10.000
			129+780	129+800	20.000
			129+850	129+870	20.000
			129+930	129+940	10.000
			130+080	130+100	20.000
			131+790	131+800	10.000
			134+920	134+930	10.000
	TOTAL	**430.000**		**TOTAL**	**1,700.000**

Above length of the Retaining Wall is indicative and minimum specified. The actual length of the Retaining Wall shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

b) Breast Wall: Breast Retaining Wall shall be constructed as per typical cross sections as per Schedule D and at other locations mentioned below:

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
104+470	104+480	10.000	104+910	104+920	10.000
104+530	104+540	10.000	105+410	105+420	10.000
104+560	104+570	10.000	106+320	106+330	10.000
105+010	105+020	10.000	106+850	106+860	10.000
105+070	105+080	10.000	106+960	106+970	10.000
105+160	105+170	10.000	107+510	107+520	10.000
105+210	105+230	20.000	107+740	107+760	20.000
105+280	105+290	10.000	107+770	107+790	20.000
105+340	105+350	10.000	107+860	107+870	10.000
105+430	105+440	10.000	108+550	108+560	10.000
105+450	105+470	20.000	109+660	109+670	10.000
105+500	105+520	20.000	110+640	110+650	10.000
105+530	105+540	10.000	111+100	111+110	10.000
105+560	105+600	40.000	111+450	111+460	10.000
105+610	105+620	10.000	111+770	111+780	10.000
105+670	105+690	20.000	112+000	112+010	10.000
105+750	105+760	10.000	112+190	112+200	10.000
105+780	105+810	30.000	112+690	112+700	10.000
105+980	105+990	10.000	113+060	113+070	10.000
106+050	106+060	10.000	113+210	113+220	10.000
106+280	106+290	10.000	113+430	113+440	10.000
106+450	106+480	30.000	113+460	113+470	10.000
106+490	106+530	40.000	113+910	113+920	10.000
106+770	106+780	10.000	114+070	114+080	10.000
106+940	106+950	10.000	114+160	114+170	10.000
107+040	107+050	10.000	114+210	114+220	10.000
107+320	107+350	30.000	114+290	114+300	10.000
107+580	107+590	10.000	114+430	114+440	10.000
107+620	107+640	20.000	114+620	114+630	10.000
107+760	107+770	10.000	114+660	114+670	10.000
107+780	107+790	10.000	115+560	115+570	10.000
107+880	107+900	20.000	115+610	115+620	10.000
107+910	107+940	30.000	115+680	115+690	10.000
107+970	107+980	10.000	116+680	116+690	10.000
107+990	108+000	10.000	116+820	116+840	20.000
108+040	108+080	40.000	116+940	116+950	10.000
108+100	108+110	10.000	116+960	116+970	10.000
108+240	108+250	10.000	117+480	117+490	10.000
108+270	108+300	30.000	117+510	117+520	10.000
108+350	108+360	10.000	117+660	117+670	10.000
108+560	108+570	10.000	117+700	117+710	10.000
108+630	108+640	10.000	117+850	117+860	10.000
108+660	108+680	20.000	117+900	117+910	10.000
108+710	108+720	10.000	117+940	117+950	10.000
108+730	108+740	10.000	118+450	118+460	10.000
108+970	108+990	20.000	119+160	119+170	10.000

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
109+140	109+160	20.000	119+330	119+340	10.000
109+170	109+180	10.000	119+610	119+630	20.000
109+480	109+490	10.000	120+140	120+150	10.000
109+540	109+550	10.000	120+620	120+630	10.000
109+760	109+770	10.000	120+660	120+670	10.000
109+820	109+830	10.000	120+710	120+720	10.000
109+840	109+860	20.000	121+120	121+130	10.000
109+910	109+920	10.000	121+160	121+170	10.000
109+930	109+960	30.000	121+960	121+970	10.000
110+030	110+040	10.000	121+990	122+000	10.000
110+050	110+070	20.000	122+560	122+570	10.000
110+080	110+090	10.000	123+000	123+020	20.000
110+150	110+160	10.000	123+710	123+710	-
110+200	110+210	10.000	124+280	124+290	10.000
110+260	110+270	10.000	124+730	124+740	10.000
110+510	110+530	20.000	125+570	125+580	10.000
110+610	110+620	10.000	125+590	125+600	10.000
110+660	110+670	10.000	125+890	125+900	10.000
110+750	110+760	10.000	126+120	126+130	10.000
110+770	110+780	10.000	126+400	126+410	10.000
110+990	111+000	10.000	126+490	126+560	70.000
111+100	111+110	10.000	126+910	126+920	10.000
111+270	111+280	10.000	127+190	127+200	10.000
111+350	111+360	10.000	127+340	127+350	10.000
111+480	111+520	40.000	128+330	128+350	20.000
111+570	111+580	10.000	128+430	128+440	10.000
111+730	111+740	10.000	128+450	128+460	10.000
111+870	111+890	20.000	128+920	128+940	20.000
111+920	111+940	20.000	128+960	128+970	10.000
111+970	111+980	10.000	129+210	129+220	10.000
112+040	112+060	20.000	129+410	129+420	10.000
112+080	112+110	30.000	129+440	129+450	10.000
112+530	112+560	30.000	129+480	129+490	10.000
112+580	112+590	10.000	129+620	129+640	20.000
112+670	112+680	10.000	129+670	129+680	10.000
112+710	112+720	10.000	130+570	130+580	10.000
112+790	112+800	10.000	130+690	130+700	10.000
112+790	112+800	10.000	130+760	130+790	30.000
112+970	112+980	10.000	131+140	131+160	20.000
113+000	113+030	30.000	131+690	131+700	10.000
113+360	113+370	10.000	131+990	132+000	10.000
113+390	113+400	10.000	132+010	132+020	10.000
113+480	113+490	10.000	132+080	132+090	10.000
113+630	113+650	20.000	132+110	132+120	10.000
113+760	113+770	10.000	132+190	132+200	10.000
113+780	113+790	10.000	132+240	132+280	40.000
113+810	113+820	10.000	132+330	132+350	20.000
113+830	113+860	30.000	132+450	132+480	30.000
113+910	113+920	10.000	132+490	132+500	10.000

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
113+990	114+000	10.000	133+290	133+300	10.000
114+090	114+100	10.000	133+450	133+460	10.000
114+220	114+240	20.000	133+570	133+580	10.000
114+340	114+370	30.000	133+680	133+690	10.000
114+490	114+500	10.000	133+750	133+790	40.000
114+510	114+520	10.000	133+830	133+840	10.000
114+550	114+560	10.000	133+860	133+870	10.000
114+690	114+700	10.000	134+290	134+300	10.000
114+790	114+800	10.000	134+380	134+390	10.000
114+850	114+860	10.000	134+460	134+490	30.000
114+880	114+900	20.000	134+500	134+520	20.000
114+910	114+920	10.000	134+680	134+690	10.000
115+020	115+040	20.000	134+710	134+740	30.000
115+200	115+210	10.000	134+750	134+760	10.000
115+250	115+260	10.000	134+800	134+810	10.000
115+390	115+400	10.000	134+820	134+830	10.000
115+430	115+440	10.000	134+900	134+910	10.000
115+530	115+540	10.000	134+500	134+510	10.000
115+740	115+750	10.000	135+000	135+010	10.000
115+870	115+890	20.000	135+120	135+130	10.000
115+920	115+950	30.000	135+170	135+180	10.000
116+000	116+020	20.000	135+350	135+360	10.000
116+080	116+090	10.000	135+390	135+400	10.000
116+150	116+160	10.000			
116+440	116+450	10.000			
116+600	116+630	30.000			
116+790	116+800	10.000			
117+010	117+020	10.000			
117+030	117+040	10.000			
117+130	117+140	10.000			
117+180	117+220	40.000			
117+280	117+290	10.000			
117+430	117+440	10.000			
117+520	117+530	10.000			
117+660	117+670	10.000			
117+870	117+890	20.000			
117+960	117+980	20.000			
118+130	118+140	10.000			
118+340	118+360	20.000			
118+380	118+390	10.000			
118+400	118+410	10.000			
118+520	118+530	10.000			
118+590	118+620	30.000			
118+960	118+970	10.000			
119+000	119+030	30.000			
119+080	119+090	10.000			
119+120	119+130	10.000			
119+480	119+520	40.000			
119+600	119+610	10.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
119+800	119+810	10.000			
119+880	119+890	10.000			
120+020	120+030	10.000			
120+120	120+130	10.000			
120+140	120+150	10.000			
120+160	120+190	30.000			
120+330	120+340	10.000			
120+390	120+400	10.000			
120+470	120+480	10.000			
120+500	120+530	30.000			
120+640	120+650	10.000			
120+920	120+930	10.000			
121+320	121+340	20.000			
121+410	121+430	20.000			
121+490	121+500	10.000			
121+540	121+550	10.000			-
121+610	121+620	10.000			-
121+640	121+650	10.000			
121+700	121+710	10.000			-
121+800	121+810	10.000			-
121+820	121+830	10.000			
121+870	121+880	10.000			
121+010	121+020	10.000			
122+760	122+770	10.000			
122+830	122+840	10.000			
123+340	123+350	10.000			
123+510	123+520	10.000			
123+550	123+570	20.000			
123+600	123+620	20.000			
123+770	123+780	10.000			
123+830	123+840	10.000			
123+950	123+980	30.000			
123+990	124+000	10.000			
124+070	124+080	10.000			
124+150	124+160	10.000			
124+210	124+220	10.000			
124+320	124+340	20.000			
124+400	124+420	20.000			
124+440	124+450	10.000			
124+490	124+500	10.000			
124+630	124+640	10.000			
124+720	124+730	10.000			
124+800	124+820	20.000			
124+900	124+930	30.000			
124+990	125+000	10.000			
125+070	125+090	20.000			
125+480	125+490	10.000			
125+540	125+550	10.000			
125+610	125+630	20.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
125+670	125+680	10.000			
125+730	125+740	10.000			
125+770	125+780	10.000			
125+830	125+850	20.000			
125+860	125+870	10.000			
126+010	126+020	10.000			
126+320	126+330	10.000			
126+520	126+540	20.000			
126+600	126+610	10.000			
126+620	126+640	20.000			
126+700	126+720	20.000			-
126+800	126+810	10.000			-
127+050	127+080	30.000			-
127+240	127+250	10.000			
127+460	127+470	10.000			
127+500	127+510	10.000			
127+590	127+600	10.000			
127+710	127+720	10.000			
127+760	127+770	10.000			
128+020	128+030	10.000			
128+050	128+060	10.000			
128+170	128+180	10.000			
128+240	128+260	20.000			
128+370	128+380	10.000			-
128+410	128+420	10.000			-
128+490	128+510	20.000			-
128+640	128+650	10.000			
128+720	128+730	10.000			
128+800	128+810	10.000			
128+910	128+920	10.000			
129+180	129+190	10.000			
129+250	129+260	10.000			
129+540	129+560	20.000			
129+680	129+690	10.000			
129+720	129+730	10.000			
129+770	129+780	10.000			
129+880	129+890	10.000			
129+900	129+910	10.000			
129+980	129+990	10.000			
130+000	130+010	10.000			
130+050	130+070	20.000			-
130+300	130+310	10.000			
130+350	130+360	10.000			
130+440	130+450	10.000			
130+460	130+480	20.000			
130+490	130+510	20.000			
130+530	130+540	10.000			
130+550	130+560	10.000			-
130+610	130+620	10.000			

Breast Wall Chainages (HT 1.5m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
130+720	130+730	10.000			
130+900	130+910	10.000			
130+940	130+950	10.000			
131+000	131+020	20.000			
131+030	131+040	10.000			
131+060	131+070	10.000			
131+120	131+190	70.000			
131+260	131+270	10.000			
131+450	131+460	10.000			
131+600	131+610	10.000			
131+710	131+750	40.000			
131+890	131+910	20.000			
132+280	132+290	10.000			
132+320	132+330	10.000			
132+400	132+410	10.000			
132+570	132+580	10.000			
132+700	132+710	10.000			
133+460	133+470	10.000			
133+700	133+710	10.000			
133+890	133+900	10.000			
133+940	133+990	50.000			
134+000	134+010	10.000			
134+160	134+200	40.000			
134+250	134+260	10.000			
134+330	134+340	10.000			-
134+600	134+610	10.000			-
134+650	134+660	10.000			-
134+960	134+970	10.000			-
134+980	134+990	10.000			
135+480	135+500	20.000			
	TOTAL	**3,920.000**		**TOTAL**	**1,480.000**

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
104+450	104+470	20.000	104+580	104+620	40.000
104+480	104+530	50.000	104+680	104+740	60.000
104+570	104+650	80.000	104+850	104+910	60.000
104+670	104+740	70.000	105+080	105+160	80.000
104+810	105+010	200.000	106+290	106+320	30.000
105+080	105+160	80.000	106+860	106+900	40.000
105+230	105+240	10.000	106+970	107+030	60.000
105+290	105+340	50.000	107+140	107+160	20.000
105+440	105+450	10.000	107+210	107+290	80.000
105+520	105+530	10.000	107+710	107+740	30.000
105+600	105+610	10.000	107+790	107+860	70.000
105+690	105+730	40.000	108+490	108+550	60.000
105+760	105+780	20.000	108+770	108+800	30.000
105+810	105+900	90.000	109+220	109+260	40.000

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
105+990	106+050	60.000	109+630	109+660	30.000
106+200	106+240	40.000	110+350	110+400	50.000
106+290	106+330	40.000	110+480	110+510	30.000
106+480	106+490	10.000	111+070	111+100	30.000
106+780	106+920	140.000	111+750	111+770	20.000
106+950	107+040	90.000	112+180	112+190	10.000
107+090	107+320	230.000	112+250	112+280	30.000
107+350	107+530	180.000	112+900	112+910	10.000
107+590	107+620	30.000	113+050	113+060	10.000
107+710	107+750	40.000	113+150	113+200	50.000
107+790	107+880	90.000	113+440	113+460	20.000
107+900	107+910	10.000	113+920	113+980	60.000
107+940	107+970	30.000	114+060	114+070	10.000
107+980	107+990	10.000	114+170	114+210	40.000
108+000	108+040	40.000	114+300	114+320	20.000
108+080	108+100	20.000	114+400	114+430	30.000
108+110	108+240	130.000	114+630	114+660	30.000
108+430	108+560	130.000	115+550	115+560	10.000
108+640	108+660	20.000	115+690	115+730	40.000
108+750	108+820	70.000	116+690	116+740	50.000
108+840	108+880	40.000	116+840	116+860	20.000
108+940	108+970	30.000	116+910	116+940	30.000
108+990	109+020	30.000	117+490	117+510	20.000
109+070	109+140	70.000	117+670	117+700	30.000
109+180	109+410	230.000	117+800	117+850	50.000
109+490	109+500	10.000	117+910	117+940	30.000
109+510	109+540	30.000	118+460	118+480	20.000
109+550	109+600	50.000	118+800	118+830	30.000
109+620	109+660	40.000	119+300	119+330	30.000
109+720	109+760	40.000	119+670	119+710	40.000
109+790	109+820	30.000	120+210	120+220	10.000
109+830	109+840	10.000	120+570	120+620	50.000
109+960	110+000	40.000	120+670	120+710	40.000
110+040	110+050	10.000	120+810	120+830	20.000
110+160	110+190	30.000	121+020	121+040	20.000
110+270	110+400	130.000	121+130	121+160	30.000
110+460	110+480	20.000	121+260	121+300	40.000
110+620	110+660	40.000	121+510	121+520	10.000
110+760	110+770	10.000	121+650	121+680	30.000
110+970	110+990	20.000	121+970	121+990	20.000
111+060	111+100	40.000	122+060	122+090	30.000
111+280	111+290	10.000	122+480	122+500	20.000
111+360	111+400	40.000	122+570	122+620	50.000
111+430	111+480	50.000	122+680	122+750	70.000
111+520	111+570	50.000	123+020	123+080	60.000
111+620	111+660	40.000	123+170	123+280	110.000
111+740	111+790	50.000	123+460	123+500	40.000
111+890	111+900	10.000	123+720	123+770	50.000
111+910	111+920	10.000	124+230	124+280	50.000

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
111+980	112+040	60.000	124+740	124+750	10.000
112+060	112+080	20.000	125+280	125+320	40.000
112+170	112+210	40.000	125+440	125+470	30.000
112+250	112+290	40.000	125+580	125+590	10.000
112+330	112+370	40.000	126+100	126+120	20.000
112+430	112+460	30.000	126+410	126+490	80.000
112+590	112+610	20.000	127+350	127+430	80.000
112+680	112+710	30.000	128+440	128+450	10.000
112+720	112+730	10.000	128+910	128+920	10.000
112+740	112+780	40.000	128+940	128+960	20.000
112+800	112+840	40.000	129+370	129+410	40.000
112+890	112+920	30.000	129+450	129+480	30.000
112+980	113+000	20.000	129+640	129+670	30.000
113+030	113+070	40.000	130+370	130+410	40.000
113+130	113+270	140.000	130+660	130+690	30.000
113+350	113+360	10.000	130+740	130+760	20.000
113+400	113+480	80.000	130+790	130+800	10.000
113+590	113+630	40.000	131+650	131+690	40.000
113+770	113+780	10.000	132+000	132+010	10.000
113+920	113+990	70.000	132+090	132+110	20.000
114+050	114+090	40.000	132+200	132+240	40.000
114+130	114+220	90.000	132+280	132+330	50.000
114+260	114+340	80.000	132+350	132+430	80.000
114+370	114+490	120.000	132+550	132+590	40.000
114+500	114+510	10.000	132+620	132+650	30.000
114+520	114+530	10.000	132+700	132+750	50.000
114+610	114+690	80.000	132+810	132+860	50.000
114+760	114+790	30.000	133+170	133+270	100.000
114+800	114+810	10.000	133+300	133+400	100.000
114+900	114+910	10.000	133+690	133+750	60.000
115+140	115+200	60.000	133+790	133+830	40.000
115+260	115+320	60.000	133+870	134+020	150.000
115+400	115+430	30.000	134+140	134+260	120.000
115+540	115+640	100.000	134+300	134+380	80.000
115+670	115+740	70.000	134+390	134+460	70.000
115+830	115+870	40.000	134+490	134+500	10.000
116+020	116+070	50.000	134+520	134+530	10.000
116+090	116+150	60.000	134+560	134+670	110.000
116+220	116+240	20.000	134+690	134+710	20.000
116+630	116+750	120.000	134+760	134+800	40.000
116+800	116+870	70.000	134+810	134+820	10.000
116+900	117+010	110.000	134+830	134+900	70.000
117+040	117+130	90.000	134+950	135+000	50.000
117+140	117+180	40.000	135+060	135+120	60.000
117+290	117+430	140.000	135+130	135+170	40.000
117+440	117+520	80.000	135+310	135+340	30.000
117+670	117+730	60.000	135+380	135+390	10.000
117+780	117+860	80.000	135+400	135+500	100.000
117+890	117+960	70.000			

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
117+980	118+130	150.000			
118+200	118+280	80.000			
118+290	118+340	50.000			
118+430	118+490	60.000			
118+530	118+590	60.000			
118+620	118+690	70.000			
118+760	118+930	170.000			
118+970	119+000	30.000			
119+030	119+050	20.000			
119+090	119+120	30.000			
119+130	119+400	270.000			
119+520	119+570	50.000			
119+610	119+630	20.000			
119+670	119+720	50.000			
119+750	119+800	50.000			
119+820	119+880	60.000			
119+890	120+020	130.000			
120+030	120+120	90.000			
120+150	120+160	10.000			
120+190	120+240	50.000			
120+340	120+390	50.000			
120+440	120+470	30.000			
120+480	120+490	10.000			
120+530	120+640	110.000			
120+650	120+920	270.000			
120+970	121+170	200.000			
121+250	121+320	70.000			
121+340	121+410	70.000			
121+430	121+450	20.000			
121+500	121+540	40.000			
121+550	121+580	30.000			
121+650	121+700	50.000			
121+710	121+800	90.000			
121+830	121+870	40.000			
121+950	122+010	60.000			
122+050	122+100	50.000			
122+320	122+410	90.000			
122+470	122+510	40.000			
122+560	122+620	60.000			
122+680	122+760	80.000			
122+840	122+920	80.000			
122+980	123+090	110.000			
123+160	123+340	180.000			
123+350	123+400	50.000			
123+450	123+510	60.000			
123+520	123+530	10.000			
123+590	123+600	10.000			
123+700	123+770	70.000			
123+840	123+870	30.000			

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
124+000	124+030	30.000			
124+080	124+150	70.000			
124+220	124+320	100.000			
124+500	124+540	40.000			
124+640	124+650	10.000			
124+730	124+770	40.000			
125+000	125+070	70.000			
125+270	125+400	130.000			
125+430	125+480	50.000			
125+550	125+610	60.000			
125+630	125+670	40.000			
125+740	125+770	30.000			
125+870	126+010	140.000			
126+090	126+250	160.000			
126+260	126+320	60.000			
126+400	126+520	120.000			
126+540	126+600	60.000			
126+640	126+700	60.000			
126+730	126+800	70.000			
126+810	127+050	240.000			
127+080	127+240	160.000			
127+250	127+460	210.000			
127+510	127+540	30.000			
127+600	127+710	110.000			
127+770	128+020	250.000			
128+070	128+080	10.000			
128+190	128+240	50.000			
128+260	128+290	30.000			
128+310	128+370	60.000			
128+420	128+490	70.000			
128+510	128+590	80.000			
128+650	128+720	70.000			
128+750	128+800	50.000			
128+920	129+180	260.000			
129+190	129+250	60.000			
129+360	129+500	140.000			
129+560	129+680	120.000			
129+730	129+770	40.000			
129+890	129+900	10.000			
129+910	129+920	10.000			
130+010	130+050	40.000			
130+120	130+180	60.000			
130+210	130+300	90.000			
130+360	130+440	80.000			
130+480	130+490	10.000			
130+560	130+610	50.000			
130+650	130+700	50.000			
130+730	130+820	90.000			
130+950	131+000	50.000			

Breast Wall Chainages (HT 3m) International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
131+020	131+030	10.000			
131+070	131+120	50.000			
131+230	131+260	30.000			
131+640	131+710	70.000			
131+750	131+770	20.000			
132+290	132+320	30.000			
132+360	132+400	40.000			
132+550	132+570	20.000			
132+710	132+730	20.000			
133+710	133+750	40.000			
133+900	133+940	40.000			
133+990	134+000	10.000			
134+200	134+250	50.000			
134+310	134+330	20.000			
134+410	134+460	50.000			
134+570	134+600	30.000			
134+620	134+650	30.000			
134+970	134+980	10.000			
	TOTAL	**14,050.000**		**TOTAL**	**4,530.000**

Above length of the Breast Wall is indicative and minimum specified. The actual length of the Breast Wall shall be determined by the Contractor in accordance with the Manual requirements with approval from the Authority's Engineer. Any increase in the length specified in this Clause of Schedule B shall not constitute a Change of Scope.

RE WALL (International Corridor)

RE Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
105+960	105+970	10.000	104+770	104+780	10.000
115+110	115+120	10.000	104+790	104+800	10.000
133+510	133+520	10.000	105+040	105+050	10.000
134+270	134+280	10.000	105+930	105+940	10.000
134+910	134+920	10.000	107+060	107+070	10.000
135+020	135+040	20.000	108+390	108+400	10.000
		-	109+040	109+050	10.000
		-	112+140	112+150	10.000
		-	113+090	113+110	20.000
		-	113+530	113+570	40.000
		-	115+100	115+110	10.000
		-	115+350	115+360	10.000
		-	115+370	115+380	10.000
		-	115+760	115+770	10.000
		-	117+610	117+620	10.000
		-	118+700	118+730	30.000
		-	120+940	120+950	10.000
		-	121+910	121+930	20.000

RE Wall Chainages International Corridor					
RHS			LHS		
From	To	Length	From	To	Length
		-	122+030	122+040	10.000
		-	122+130	122+140	10.000
		-	122+280	122+300	20.000
		-	122+780	122+790	10.000
		-	122+810	122+820	10.000
		-	122+930	122+960	30.000
		-	123+890	123+900	10.000
		-	123+930	123+940	10.000
		-	124+170	124+190	20.000
		-	124+690	124+700	10.000
		-	125+140	125+160	20.000
		-	125+190	125+200	10.000
		-	126+350	126+380	30.000
		-	128+590	128+600	10.000
		-	128+840	128+870	30.000
	Total	**70.000**		**Total**	**490.000**

Rock Fill Chainages - (International Corridor)

SR. No.	Chainage		Length
	From	To	
Package II: From De. Ch 104.460 to Ch. 135.500(Chawngtlai to Champai)			
1	105050	105060	10
2	105940	105950	10
3	112380	112410	30
4	122640	122660	20
5	122790	122800	10
6	123900	123920	20
7	124570	124590	20
		TOTAL	**120**

11. Special Requirement for Hill Roads

The special requirements for Hill road as per Section 13 of Manual IRC: SP-73-2018 and IRC: SP-48-1988 Hill Road Manual, shall be constructed & provided as per requirements with approval from the Authority's Engineer.

12. Change of Scope

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

(a) toll plaza[s];

(b) roadside furniture;

(c) pedestrian facilities;

(d) tree plantation;

(e) truck lay-byes;

(f) bus-bays and bus shelters;

(g) rest areas

(h) street lighting & high mast lighting

(i) Advanced Traffic Management System (ATMS)

(j) Rain Water Harvesting

(k) others

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plazas : NIL

Toll Plaza	Design Chainage (in km)
Package II	
NIL	

The tentative location is mentioned as above however the exact location identified shall be finalised in consultation with the Authority Engineer.

Specifications and other requirements of the toll plazas shall be strictly as per Section 10 of Manual IRC SP 73-2018. Toll Plaza should be design such that roof canopy fixed with solar panels.

b) Road side Furniture shall be provided as follows: -

(i) Traffic Signs and Pavement Markings.

Traffic signs and pavement markings shall include road side signs, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalised in consultation with Authority's Engineer and as per latest IRC Standard.

(ii) Concrete Crash Barrier, Metal beam crash barrier, Separators (MS railings)

*The minimum length of **4.030 Km** Metal beam crash barrier, shall be provided as per Schedule D and for safety of traffic & users.*

(iii) Traffic Safety Devices in consultation with Authority's Engineer & Latest IRC standards

(iv) Boundary Stones shall be placed throughout the project road as per schedule 'D'

(v) Hectometer / Kilometer Stones as per schedule 'D'

(vi) Solar Traffic blinker signal (L.E.D) shall be provided at intersections.

c) Pedestrian Facilities

The additional pedestrians' facilities in the form of guard rails, footpath, lighting etc. shall be provided in built-up area.

d) Landscaping and Tree Plantation

Landscaping and road side plantation shall be provided in accordance with the Manual of Specifications and Standards as referred in Schedule B and D. Contractor Shall be responsible for implementation of Environment management Plan (EMP) on the project. The cost of EMP shall be Bourne by Contractor.

e) Truck Lay-byes

Truck Lay byes shall be provided at locations given below on both side of highway on each location as per Manual.

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Side
Package II			
1	145+680	131.190	LHS

The tentative location is mentioned as above however the exact location identified shall be finalised in consultation with the Authority Engineer.

f) Bus-byes and Bus Shelter,

Bus Lay bye with bus shelter & bus shelter shall be provided at locations given below.

Sr. No.	Existing Chainage (km)	Design Chainage (Km)	Side	Village Name
Package II				
1	129+890	117.440	RHS	TUIPUI
2	130+190	117.730	RHS	TUIPUI
3	136+350	123.240	LHS	--
4	141+700	128.880	RHS	CHHUNGTE
5	142+550	129.400	LHS	CHHUNGTE
6	147+230	131.920	RHS	CHAMPAI OUTSKIRTS
7	149+315	134.870	LHS	CHAMPAI OUTSKIRTS

Note: The locations of Bus Lay byes with bus shelter/ Bus shelter are tentative & shall be got approved / provided in consultation with the Authority / Authority's Engineer.

g) Rest Area: NIL.

h) Street Lighting & High Mast Lighting - Nil

i) Advanced Traffic Management System (ATMS) - Nil

j) Rain Water Harvesting System - Nil

k) Slope protection

The slope protection by lawn or any other method using green technology will be provided as per Manual and as directed by Authority.

l) Utility pipe ducts

Utility pipe ducts in C.C. Pipe – 600mm @ 1000.00m c/c for rural & urban length of project road across road with proper inlet and chamber for crossing service lines such as irrigation pipe lines and cables. In urban areas the ducts shall be constructed along the project road for linear underground utility lines. The ducts shall be laid at a suitable depth as approved by Authority Engineer

m) Utilities

Utilities to be identified at site and certified by the Authority Engineer then shifting may be taken by contractor.

Note: In case of any discrepancy in numbers or locations of any of the project facilities mentioned in this Schedule C, shall be constructed and provided in consultation with the Authority Engineer as per site/design requirement.

Schedule - D

(See Clause

2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

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 with Paved Shoulder of Highways (IRC:SP:73-2018) and Hill Road manual (IRC:SP:48-1988) referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

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

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

S. No.	Clause No.	Provisions in Clause	Variation Proposed in Brief
1	Clause 2.2	For Mountainous and Steep terrain, Ruling and Minimum Speed is 60kmph and 40kmph respectively.	For Mountainous and Steep terrain, Ruling and Minimum Speed is 40kmph and 30kmph respectively.
2	Clause 2.16	Typical Cross Sections	Fig. 1, 2A, 2B, 3, 4 & 5 as Per Schedule-B

(iii) Note 1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.

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 willful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, Approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003	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	< 1 % of area	Daily				
	Ravelling / Stripping	Nil	< 1 % of area	Daily				
	Edge Deformation/	Nil	< 1 m for any 100m	Daily				

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Breaking		section and width < 0.1 m at any location, restricted to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50 SN	Bi-Annually			180 days	BS: 7941-1:2006
	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			Bi-Annually	Falling Weight Deflectometer	IRC 115: 2014		IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
approaches of connecting roads, Slip roads, lay byes etc. as applicable)	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent)	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**	Bi-Annually			180 days	
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	**IRC**	7-15 days	MORT&H Specification 408.4
		Nil	<2% variation in prescribed slope of camber/cross fall	Daily			7-15 days	MORT&H Specification 408.4
		Nil		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	For the case d > D/2
CRACKING						
1	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L >lm. 3 Within 7days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm. hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car		
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 1.5 - 3.0 mm	Dowel Bar Retrofit Within 15 days	Full Depth Repair Dismantle and reconstruct affected
			5	w > 3 mm.	Not Applicable, as it may be full depth	Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1m. 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	Not Applicable, as it may be full depth	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling		
			5	w > 12 mm, usually associated		Full Depth Repair Dismantle

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
				with spalling, and/or slab rocking under traffic		and reconstruct affected portion as per norms and specifications See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	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		0	Nil, not discernible	No Action	
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days Full depth repair
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m2)	0	Nil, not discernible	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 15days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	w > 3 mm, L > 3 m/m2 and deformation		
SURFACE DEFECTS						
					Short Term	**Long Term**
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No action.	Not Applicable
			1	r < 2 %	Local repair of areas Damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm		
8	Scaling	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No action.	Not Applicable
			1	r < 2 %	Local repair of areas Damaged and liable to be damaged Within 7days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay within 15 days	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	t= texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if Affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m2	No action	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m2	Partial depth repair 65 mm deep Within 15 days	

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m2	Partial depth repair 110mm i.e.10 mm more than the Depth of the hole. Within 30 days Full depth repair Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m2		
JOINT DEFECTS						
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.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%		
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0	not discernible, < 1 mm	No action	No action
			1	f < 3 mm	Determine cause and observe, take	Replace the slab as appropriate. Within 30days
			2	f = 3 - 6 mm		

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					action for diamond grinding Diamond Grinding	
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f = 12 - 18 mm	Raise sunken slab.	
			5	f> 18 mm		
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
			1	h < 6 mm	No Action	
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm	Strengthen subgrade Reinstate pavement at normal level if L < 20 m. Within 30 days	
			4	h > 50 mm or > 20% joints		
			5	h > 100 mm		
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	Short Term No action	Long Term scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	Bump	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15	Replace in case of new construction Within
			5	h > 15 mm		

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
					days Full Depth Repair within 30 days	30days Full Depth Repair Within 30days
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, not discernible < 3mm	Short Term No action	Long Term
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days Fill up shoulder within 7 days	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm		
			4	f = 50 - 75 mm		
			5	f > 75 mm		
DRAINAGE						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days	
			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		

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	As per IRC SP :84-2014, a minimum of safe stopping sight distance shall	Monthly	Manual Measurement	Removal of obstruction within 24 hours, in case of sight line affected by		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
	Distance	be available throughout.				s with Odometer along with video/ image backup	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.		
		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 of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect -within 2 months	IRC:35-2015
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road - 100mcd/m2/lux			Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect within 2 months	IRC:35-2015
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time:			Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
		Design Speed	(RL) Retro Reflectivity (mcd/m2/lux)						
			Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years					
		Up to 65	**250**	**80**					
		65 - 100	**250**	**120**					

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Above 100	**300**	**150**					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity): Initial 7 days Retro reflectivity: 100 mcd/m2/lux Minimum Threshold Level: 50 mcd/m2/lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.			Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/ Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012			Bi-Annually	Testing of each signboard using Retro	Change of signboard	48 hours in case of Mandatory	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry / Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	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 backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-2014, IRC:119-2015
	Guard Posts And Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image	Rectification	Within 15 days	IRC:67-2012

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	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, bus shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily		Rectification	15 days	IRC:SP:84-2014
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints.	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993	**15 Days**	IRC SP 40-1993 and MORTH Specifications clause 2800
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before	Condition survey as	Repairs to damaged aprons and pitching	30 days after defect	IRC: SP 40-1993 and

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		sqm, damage to solid apron (concrete apron) not more than 1 sqm	and after rainy season)	per IRC SP:35-1990		observation or 2 weeks before onset of rainy season whichever is earlier.	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 /	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					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					concrete.		
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 month	MORTH specifications 2600 & 2700
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	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	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Inspection Unit			
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap	Monthly	Detailed condition survey as per IRCSP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge substructure	Cracks/spalling of concrete/ rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing	Bi-Annually	Detailed	In case of failure of	3 months	MORTH

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber		condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.		specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring Around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protecton 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
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road lighting**	
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e)	**Trees and plantation**	

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest area**	
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g)	**[Toll Plaza]**	
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Temporary measures Permanent measures	within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	

	Nature of Defect or deficiency	Time limit for repair/ rectification
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, 4, Parliament Street,
New Delhi-110001

WHEREAS:

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

(B) 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 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.

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.

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

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, 4, Parliament Street,
New Delhi-110001

WHEREAS:

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

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the

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

Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the 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 between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under

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

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

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

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

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

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.

[$] Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 19.2 of the Agreement).

(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 Clause 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs (******** Cr.).

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 to Particular item (col.2)
1	**2**	**3**	**4**
Road works including culverts, widening and repair of culverts.	**61.02%**	**A- Widening and reconstruction of existing road (Flexible Pavement)**	
		(1) Earthwork up to top of the sub-grade	7.90%
		(2) Sub-base Course	3.91%
		(3) Non Bituminous Base Course	8.20%
		(4) Bituminous Base Course	5.34%
		(5) Wearing Coat	3.49%
		(6) Shoulder	0.67%
		B.1- Reconstruction/New 2 - lane realignment/ bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	22.34%
		(2) Sub-base Course	10.93%
		(3) Non Bituminous Base Course	8.63%
		(4) Bituminous Base Course	5.62%
		(5) Wearing Coat	3.67%
		B.2- Reconstruction/New 2 - lane realignment/ bypass (Rigid Pavement)	0.00%
		C.1 - Reconstruction/New Service Road (Flexible Pavement)	0.00%
		C.2 - Reconstruction/New Service Road (Rigid Pavement)	0.00%
		D - Reconstruction/New Culverts on existing road, realignment, bypasses	
		Culverts (length <6m)	19.30%
Other works	**38.98%**	(i) Toll Plaza	0.00%
		(ii) Road side drains	10.24%
		(iii) Road signs, markings, km stones, safety devices etc.	5.58%
		(iv) Project facilities	
		(a) Bus Bays	0.21%
		(b) Truck lay-byes	0.21%
		(c) Rest areas	0.00%
		(d) others	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage to Particular item (col.2)
		I. Stone Masonry Retaining wall	9.54%
		II. Stone Masonry Breast wall (1.50m Height)	8.79%
		III. Stone Masonry Breast wall (3.00m Height)	57.75%
		IV. RE Wall including Anchor Bolts	3.46%
		V. Stone Masonry Toe wall (1.00m Height)	0.12%
		VI. Turfing with Sods	0.13%
		VII. Junction Improvement	0.22%
		VIII. Utility Pipe Ducts	0.15%
		IX. Dismantling of Structures	3.60%

1.3 Procedure of estimating the value of work done.

1.3.1 Road works including approaches to Minor bridges, Major Bridges and Structures (excluding service roads).

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

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A- Widening and reconstruction of existing road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than **250 m.**
(1) Earthwork up to top of the sub-grade	7.90%	
(2) Sub-base Course	3.91%	
(3) Non Bituminous Base Course	8.20%	
(4) Bituminous Base Course	5.34%	
(5) Wearing Coat	3.49%	
(6) Shoulder	0.67%	
B.1- Reconstruction/New 2 - lane realignment/ bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than **250 m.**
(1) Earthwork up to top of the sub-grade	22.34%	
(2) Sub-base Course	10.93%	
(3) Non Bituminous Base Course	8.63%	

(4) Bituminous Base Course	5.62%	
(5) Wearing Coat	3.67%	
B.2- Reconstruction/New 2 - lane realignment/ bypass (Rigid Pavement)	0.00%	
C.1 - Reconstruction/New Service Road (Flexible Pavement)	0.00%	
C.2 - Reconstruction/New Service Road (Rigid Pavement)	0.00%	
D - Reconstruction/New Culverts on existing road, realignment, bypasses		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of **each** culvert.
Culverts (length <6m)	19.30%	

@ 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 stages (1), (2) and (4) above shall be worked out.

1.3.2 Major Bridge works-

Procedure for estimating the value of Major Bridge works shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Percentage - weightage	Payment Procedure
NIL		

1.3.3 Rail-road bridges

Procedure for estimating the value of Rail-road bridges works shall be as stated in table 1.3.3:

Table 1.3.3

Stage of Payment	Percentage - weightage	Payment Procedure
NIL		

1.3.4 Other Works

Procedure for estimating the value of other work done shall be as stated in table 1.3.4:

Table 1.3.4

Stage of Payment	Percentage - weightage	Payment Procedure
(i) Toll Plaza	0.00%	
(ii) Road side drains	10.24%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of stage in a length of not less than **250 m.**
(iii) Road signs, markings, km stones, safety devices, ….	5.58%	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 **01 (one) km**.
(iv) Project facilities		
(a) Bus Bays	0.21%	Payment shall be made on pro rata basis for completed facilities.
(b) Truck lay-byes	0.21%	
(c) Rest areas	0.00%	
(d) others		
I. Stone Masonry Retaining wall	9.54%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 % (ten per cent) of the total length.
II. Stone Masonry Breast wall (1.50m Height)	8.79%	
III. Stone Masonry Breast wall (3.00m Height)	57.75%	
IV. RE Wall including Anchor Bolts	3.46%	
V. Stone Masonry Toe wall (1.00m Height)	0.12%	
VI. Turfing with Sods	0.13%	
VII. Junction Improvement	0.22%	
VIII. Utility Pipe Ducts	0.15%	
IX. Dismantling of Structures	3.60%	

2. Procedure for payment for Maintenance

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

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

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

During 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 **255th** 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 five per cent) of the Contract Price and should have started construction of all bridges.

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **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% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the **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 (ii))

Tests on Completion

1. Schedule for Tests

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10(ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

(ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2. Tests

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometer.

(iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5,but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated ……. (the "**Agreement**"), for [construction of the ****section (km ** to km **) of National Highway No. ***] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the ……. day of ……. 20….. , Scheduled Completed Date for which was the ……. day of …….20…..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%

S. No.	Item/Defect/Deficiency	Percentage
(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/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and ..... (the "**Contractor**")# for [Two-Laning] of the **** section (km ** to km **) of National Highway No. ** in the State of *** on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

(ii) The TOR shall apply to construction and maintenance of the Project Highway.

2. Definitions and interpretation

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

(ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.

(iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

3. General

(i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

(e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

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

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4. Construction Period

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

(iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the

Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry

out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6. Determination of costs and time

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

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

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

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause

19.10.

(iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

(iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9. Miscellaneous

(i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

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

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

(iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

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

Schedule - O

(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;

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

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

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause

20.1)

Insurance

1. Insurance during Construction Period

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

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

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

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

The insurance cover shall be not less than: Rs. [*****]

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and shall be as per the requirement of maintenance mentioned in Schedule-E.

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …….. (the "**Agreement**"), for [construction of the ****section (km ** to km **) of

****] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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