National Highways & Infrastructure Development Corporation Limited

EPC Schedules

FOR

Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work

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

September, 2023

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 Project Highway shall include the land, buildings, structures and road works as described in **Annex-I** of this **Schedule-A**.

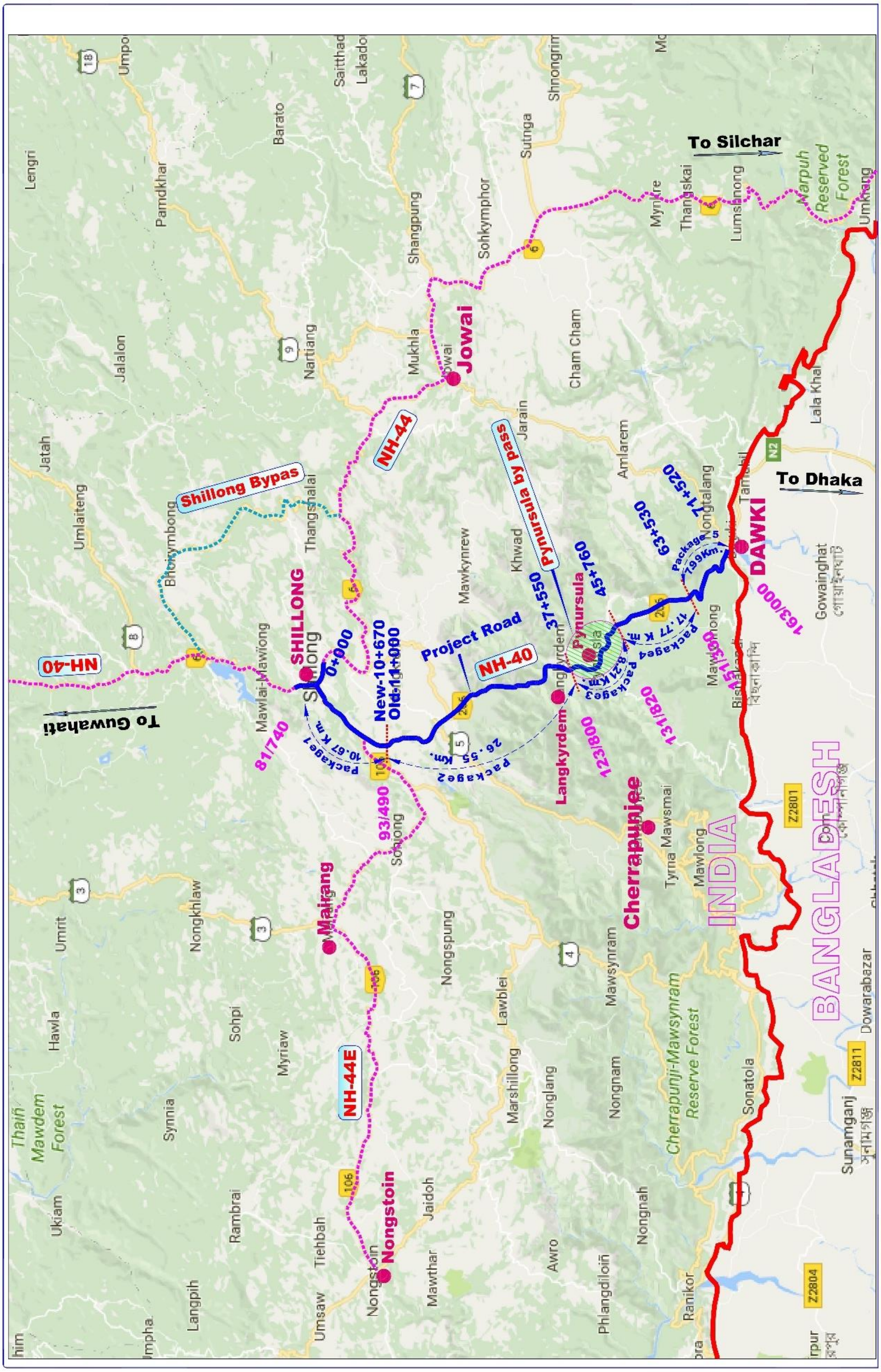
(ii) The dates of handing over the Right of Way to the Contractor are specified in **Annex-II** of this **Schedule-A**.

(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 Highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the road profile indicated in **Annex-III** based on site/design requirement.

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

Index Map



To Guwahati
NH-40
Shillong Bypas
NH-44
Jowai
SHILLONG
0+000
New-10+670
Old-11+000
Project Road
NH-40
Pynursula by pass
37+550
45+760
Pynursula
63+530
71+520
DAWKI
To Silchar
To Dhaka
81/740
93/490
123/800
131/820
151/330
163/000
Langkyrdem
Cherrapunjee
Mairang
Nongstoin
NH-44E
INDIA
BANGLADESH

Annex-I

(Schedule-A)

SITE

1. Site

The project road Shillong to Dawki, Package-IV is a section of NH-40 which starts from existing km.131/820 (design ch. 45+760, at the end of Pynursula Bypass)and ending at existing km.153/330 (design ch. 63+530, near Pomsutia village which is start point of Dawki Realignment) in the State of Meghalaya. The land, carriageway and stretches comprising the site are described below.

2. Land

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

S. No.	Chainage (km)		ROW (m)
	From	To	
1	131/820	151/330	24 m-60m

3. Carriageway

The present carriageway of the Project Highway is two Lane. The type of existing pavement is flexible. The details are given below.

S. no	Existing Chainage. From	Existing Chainage. To	C/W width (m)
1	131/820	151/330	6.5 - 7.0

Work executed by previous Contractor partially and considered in existing road are-

A) Widening and Strengthening of Project Highway:

- A total effective length of 2.890 km of Earthwork upto Subgrade top has been executed.
- A total effective length of 2.380 km of GSB has been partially executed.

B) Reconstruction Realignment / Bypass / Geometric improvement (Flexible Pavement):

- A total effective length of 2.885 km of Earthwork upto Subgrade top has been partially executed and 3.840 km of Earthwork upto Subgrade Top has been completed.
- A total effective length of 1.340 km of CTSB has been executed.
- A total effective length of 2.065 km of GSB has been partially executed.
- A total effective length of 1.340 km of WMM has been executed.
- A total effective length of 1.340 km of DBM has been executed.
- A total effective length of 1.216 km of BC has been executed.

Chainage wise details of partially/ fully executed works-

(i) Earthwork upto Subgrade Top (Widening & Strengthening) (completed works)				
SI No:	Design Chainage		Length	Remarks
	From	To		
1	046+750	047+190	440	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	047+330	047+870	540	
3	048+600	048+820	220	
4	050+100	051+750	1650	
5	054+320	054+360	40	
	Total Length (m) =		**2890**	

(ii) Earthwork upto Subgrade Top (Bypass/ Realignment/ Geometric Improvement) (Completed Works)				
SI No:	Design Chainage		Length	Remarks
	From	To		
1	045+760	046+750	990	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	047+190	047+320	130	
3	047+870	048+260	390	
4	048+320	048+500	180	
5	049+000	049+110	110	
6	051+750	052+000	250	
7	055+300	056+560	1260	
8	063+000	063+530	530	
	Total Length (m) =		**3840**	

(iii) Earthwork upto Subgrade Top (Bypass/ Realignment/ Geometric Improvement) (Partially Executed)				
SI No:	Design Chainage		Length	Remarks
	From	To		
1	048+500	048+600	100	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	048+820	049+000	180	
3	052+000	052+830	830	
4	053+090	053+290	200	
5	053+350	053+545	195	
6	056+620	056+700	80	
7	058+890	059+020	130	
8	059+200	059+260	60	
9	059+450	059+600	150	
10	059+740	059+780	40	
11	059+820	060+000	180	

12	060+100	060+350	250	
13	060+930	061+200	270	
14	062+710	062+850	140	
15	062+920	063+000	80	
	Total Length (m) =		**2885**	

(iv) GSB (Widening & Strengthening) (Partially Executed)				
Sl No:	**Design Chainage**		**Length (m)**	**Remarks**
	From	**To**		
1	046+770	047+190	420	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	047+330	047+580	250	
3	047+660	047+870	210	
4	048+600	048+820	220	
5	050+100	050+250	150	
6	050+450	050+595	145	
7	050+605	051+020	415	
8	051+160	051+650	490	
9	051+670	051+750	80	
	Total Length (m) =		**2380**	

(v) GSB (Bypass/ Realignment/ Geometric Improvement) (Partially Executed)				
Sl No:	**Design Chainage**		**Length**	**Remarks**
	From	**To**		
1	045+760	046+740	980	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	047+190	047+330	140	
3	047+870	048+200	330	
4	048+340	048+400	60	
5	048+440	048+500	60	
6	051+750	052+100	350	
7	053+400	053+545	145	
	Total Length (m) =		**2065**	

(vi) CTSB (Bypass/ Realignment/ Geometric Improvement) (Completed Works)				
Sl No:	**Design Chainage**		**Length**	**Remarks**
	From	**To**		
1	55+320	56+540	1220	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	56+720	56+790	70	
3	58+670	58+720	50	
	Total Length (m) =		**1340**	

(vii) WMM(Bypass/ Realignment/ Geometric Improvement) (Completed Works)				
Sl No:	**Design Chainage**		**Length**	**Remarks**
	From	**To**		
1	55+320	56+540	1220	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	56+720	56+790	70	
3	58+670	58+720	50	
	Total Length (m) =		**1340**	

(viii) DBM(Bypass/ Realignment/ Geometric Improvement) (Completed Works)				
Sl No:	**Design Chainage**		**Length**	**Remarks**
	From	**To**		
1	55+320	56+540	1220	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
2	56+720	56+790	70	
3	58+670	58+720	50	
	Total Length (m) =		**1340**	

(ix) BC(Bypass/ Realignment/ Geometric Improvement) (Completed Works)				
Sl No:	**Design Chainage**		**Length**	**Remarks**
	From	**To**		
1	55+322	56+538	1216	*To be rectified/ completed as per MoRTH specifications and IRC guidelines.*
	Total Length (m) =		**1216**	

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Existing Chainage (Km)	Type of Structure			Span Arrangement (m)	Width (m)
		Foundation	Sub-structure	Super structure		
Nil						

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

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

S. No.	Existing Chainage (Km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Super structure		
Nil					

6. Grade separators

The Site includes the following grade separators:

S. No.	Existing Chainage (Km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Super structure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Existing Chainage/ (Km)	Type of Structure			No of spans with Span Length (m)	Width (m)
		Foundation	Sub structure	Super Structure		
1	137/410	Open	RCC wall	RCC T-beam	1 x 25.0	12
2	142/313	Open	RCC wall/ Circular Pier	RCC T-beam	1x14.0+ 1x24.0+ 1x14.0	12

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	Existing Chainage (Km)	Type of structure	No. of span with Span Arrangement (m)	width (m)
Nil				

10. Culverts

The Site has the following culverts:

(a) Existing Culverts:

S.No.	**Existing Chainage**	**Type of Culvert**	**No. x span length/diameter (m)**	**Width (m)**	**Remarks**
1	131/900	Pipe	1 x 0.90	8.80	
2	131/970	Pipe	1 x 0.90	8.80	
3	132/070	Pipe	1 x 0.90	9.00	
4	132/220	Pipe	1 x 1.00	10.60	

S.No.	Existing Chainage	Type of Culvert	No. x span length/diameter (m)	Width (m)	Remarks
5	132/350	Pipe	1 x 0.90	9.80	
6	132/520	Pipe	1 x 0.90	9.80	
7	132/820	Pipe	1 x 0.90	9.70	
8	132/940	Pipe	1 x 1.10	9.00	
9	133/340	Pipe	1 x 0.90	10.90	
10	133/580	Pipe	1 x 0.90	10.90	
11	133/670	Pipe	1 x 0.90	10.00	
12	133/760	Pipe	1 x 1.20	11.50	
13	133/860	Pipe	1 x 1.20	10.80	
14	133/950	Pipe	1 x 1.20	10.80	
15	134/020	Pipe	1 x 0.90	10.60	
16	134/130	Pipe	1 x 0.90	10.60	
17	134/290	Pipe	1 x 0.90	10.60	
18	134/310	Pipe	1 x 0.90	10.30	
19	134/350	Pipe	1 x 0.90	10.30	
20	134/400	Pipe	1 x 0.90	10.50	
21	134/480	Pipe	1 x 1.00	10.60	
22	134/580	Pipe	1 x 0.90	10.40	
23	134/700	Pipe	1 x 0.90	9.90	
24	134/790	Pipe	1 x 0.90	11.40	
25	134/840	Pipe	1 x 1.10	11.20	
26	134/950	Pipe	1 x 1.20	11.20	
27	135/030	Pipe	1 x 0.90	10.20	
28	135/190	Pipe	1 x 0.90	10.40	
29	135/360	Pipe	1 x 0.90	10.40	
30	135/480	Pipe	2 x 0.90	9.60	
31	135/880	Pipe	1 x 0.90	10.40	
32	136/230	Pipe	1 x 1.00	8.50	
33	136/340	Pipe	1 x 1.00	8.50	
34	136/660	Pipe	4 x 0.90	11.00	
35	136/800	Pipe	1 x 0.90	9.30	
36	136/880	Pipe	1 x 0.90	9.90	
37	136/940	Pipe	1 x 0.90	10.30	
38	137/420	Pipe	1 x 0.90	10.90	
39	137/500	Pipe	1 x 1.00	10.90	
40	137/660	Pipe	1 x 1.00	11.20	
41	138/240	Pipe	1 x 0.90	9.40	

S.No.	Existing Chainage	Type of Culvert	No. x span length/diameter (m)	Width (m)	Remarks
42	138/330	Pipe	1 x 0.90	9.40	
43	138/470	Pipe	1 x 1.00	11.30	
44	138/660	Pipe	1 x 0.60	10.30	
45	139/100	Pipe	1 x 0.90	10.30	
46	139/420	Pipe	2 x 0.90	10.30	
47	139/530	Pipe	1 x 0.90	9.40	
48	139/600	Pipe	1 x 1.00	9.20	
49	139/710	Pipe	1 x 1.00	9.20	
50	140/060	Pipe	1 x 0.90	9.40	
51	140/360	Pipe	1 x 1.00	9.00	
52	140/720	Pipe	1 x 0.90	9.80	
53	141/310	Slab	1 x 0.80	8.20	
54	141/470	Slab	1 x 1.50	8.20	
55	141/720	Pipe	1 x 0.90	9.20	
56	141/860	Pipe	1 x 0.90	9.20	
57	141/870	Pipe	1 x 0.90	9.10	
58	141/920	Pipe	1 x 0.90	9.50	
59	143/060	Pipe	1 x 0.90	9.50	
60	143/110	Pipe	1 x 0.90	9.60	
61	143/210	Pipe	1 x 0.90	9.80	
62	143/400	Pipe	1 x 0.90	9.40	
63	143/550	Pipe	1 x 1.00	9.50	
64	143/650	Pipe	1 x 0.90	11.10	
65	143/988	Pipe	1 x 0.90	10.30	
66	144/080	Pipe	1 x 0.90	10.60	
67	144/130	Pipe	1 x 0.90	8.90	
68	144/260	Pipe	1 x 0.90	10.20	
69	144/480	Pipe	1 x 0.90	9.80	
70	144/640	Pipe	1 x 0.90	10.90	
71	144/780	Pipe	1 x 1.00	11.20	
72	145/440	Pipe	1 x 1.00	9.60	
73	145/530	Pipe	1 x 0.90	10.50	
74	145/560	Pipe	1 x 0.90	10.50	
75	145/770	Pipe	1 x 0.90	12.00	
76	145/780	Pipe	1 x 0.90	10.80	
77	145/880	Pipe	1 x 0.90	10.80	
78	146/120	Pipe	1 x 0.90	10.80	

S.No.	Existing Chainage	Type of Culvert	No. x span length/diameter (m)	Width (m)	Remarks
79	146/480	Pipe	1 x 1.00	10.80	
80	147/120	Pipe	1 x 0.90	10.30	
81	147/220	Pipe	1 x 0.90	9.81	
82	147/380	Pipe	1 x 0.90	10.30	
83	147/480	Pipe	1 x 0.90	10.80	
84	147/580	Pipe	1 x 0.90	10.60	
85	147/860	Pipe	2 x 0.90	10.30	
86	148/020	Pipe	1 x 0.90	10.30	
87	148/120	Pipe	1 x 1.00	9.20	
88	148/220	Pipe	1 x 1.00	12.00	
89	148/440	Pipe	1 x 1.00	9.00	
90	148/580	Pipe	1 x 0.90	9.00	
91	148/690	Pipe	1 x 0.90	9.10	
92	148/700	Pipe	1 x 1.00	9.10	
93	148/870	Pipe	1 x 1.00	9.10	
94	149/000	Pipe	1 x 1.00	9.00	
95	149/180	Pipe	1 x 1.00	11.80	
96	149/300	Pipe	1 x 1.00	11.90	
97	149/500	Pipe	1 x 1.00	11.90	
98	149/600	Pipe	1 x 1.00	10.60	
99	149/710	Pipe	1 x 1.00	10.60	

(b) Additionally, the following Culverts have been executed:

S. No.	Design Chainage	Clear Span (m)	Type of Culvert	Width of Culvert (m)	Remarks
1	45+850	1 x 1.2	Pipe (New)	15.00	Work Executed
2	46+070	1 x 1.2	Pipe (New)	15.00	Work Executed
3	46+250	1 x 1.2	Pipe (New)	12.50	Work Executed
4	46+440	1 x 1.2	Pipe (New)	15.00	Work Executed
5	46+767	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
6	46+987	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
7	47+167	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
8	47+327	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
9	47+507	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
10	47+607	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
11	47+747	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
12	47+867	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed

13	48+007	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
14	48+112	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
15	50+842	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
16	51+657	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
17	52+015	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
18	52+240	1 x 2.0 x 2.0	Box (New)	12.00	Work Executed
19	53+350	1 x 1.2	Pipe (New)	12.50	Work Executed
20	55+480	1 x 2.0 x 2.0	Box (New)	12.00	Work Executed
21	55+790	1 x 2.0 x 2.0	Box (New)	12.00	Work Executed
22	55+925	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
23	56+310	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
24	56+380	1 x 2.0 x 1.5	Box (New)	12.00	Work Executed
25	59+840	1 x 1.2	Pipe (New)	17.5	Work Executed
26	63+095	1 x 1.2	Pipe (New)	12.5	Work Executed
27	63+185	1 x 1.2	Pipe (New)	12.5	Work Executed

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the road side drains are as follows:

(a) Existing Drains:

S. No.	Location		Type & Side	
	From	To	Masonry/cc (Pucca)	Earthen (Kutcha)
1	131/820	133/300	RHS	-
2	133/600	134/100	LHS	-
3	134/100	135/500	RHS	-
4	135/500	135/800	LHS	-
5	138/500	139/400	RHS	-
6	139/400	139/600	BHS	-
7	139/600	139/700	LHS	-
8	141/800	141/900	RHS	-
9	141/900	142/000	RHS	-

S. No.	Location		Type & Side	
	From	To	Masonry/cc (Pucca)	Earthen (Kutcha)
10	142/200	142/400	LHS	-
11	142/400	142/500	RHS	-
12	142/500	142/900	BHS	-
13	142/900	143/100	LHS	-
14	143/100	144/100	RHS	-
15	144/100	144/300	LHS	-
16	145/000	145/400	BHS	-
17	145/400	145/700	RHS	-
18	146/400	147/800	LHS	-
19	147/800	148/100	RHS	-
20	148/300	151/330	RHS	-

(b) Additionally, the following Drains (Hills Side) have been executed partially:

S. No.	Location			Type & Side	
	From	To	Length (m)	Masonry/cc (Pucca)	Earthen (Kutcha)
1	45+800	46+070	270	RHS	-
2	46+070	46+310	240	RHS	
3	46+560	46+765	205	RHS	
	Total Length (m) =		715		

14. Major junctions

The details of major junctions are as follows:

S. No	Existing Chainage	Lane Configuration	Type	Sides	Remarks
Nil					

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

15. Minor junctions

The details of the minor junctions (all at grade) are as follows:

S. No.	Location of Intersection	Type of Intersection	Other features (Road Leading To)	
			LHS	RHS
1	133/570	Y Junction	Nongmadan	-
2	136/265	T Junction	Siatbakon	-
3	136/780	T Junction	Siatbakon	-
4	141/080	T Junction	-	Mawlynnong

S. No.	Location of Intersection	Type of Intersection	Other features (Road Leading To)	
			LHS	RHS
5	142/440	Y Junction	Pongtung	-
6	144/180	+ Junction	Pongtung, Mawshun	Pongtung, Mawshun
7	145/870	T Junction	Mawshun	-
8	150/00	+ Junction	Pomshutia	Pomshutia
9	150/615	Y Junction	-	Lapalang
10	151/330	Y Junction	-	Wahkdait

16. Bypasses

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km)		Design Length (Km)	Carriageway	
					Width (m)	Type
1	Mawshun	142+210	145+880	3.670	6.5 – 7.0	Bituminous

17. Other structures

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

18. Other Protection Works

A total effective length of 0.446 km of **Retaining Wall** has been executed as follows-

Sl. No.	LHS			RHS		
	From	To	Length (m)	From	To	Length (m)
1	46+080	46+130	50.000			
2	46+940	46+980	40.000			
3	46+990	47+050	60.000			
4	51+353	51+410	57.000			
5	54+315	54+360	45.000			
6	54+385	54+400	15.000			
7	55+440	55+469	29.000			
8	56+200	56+305	105.000			
9	56+315	56+360	45.000			
	Total Length(m) :		**446**	**Total Length(m) :**		**0**

19. Design Chainages corresponding to Existing references

Sl. no.	Existing Chainage	Proposed Chainage
1	131/820	45+760
2	132/050	46+000
3	133/000	46+810
4	133/190	47+000
5	134/000	47+710
6	134/290	48+000
7	135/000	48+670
8	135/810	49+000
9	136/000	49+190
10	136/820	50+000
11	137/300	51+000
12	138/000	51+690
13	138/300	52+000
14	139/350	53+000
15	141/400	54+000
16	142/000	54+320
17	142/700	55+000
18	143/000	55+300
19	144/000	56+900
20	145/880	58+720
21	146/000	58+830
22	146/190	59+000
23	147/170	59+850
24	150/000	61+720
25	150/610	62+840
26	151/000	63+190
27	151/330	63+530

Annex – II

(See Clauses 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No	Ch From	Ch To	Length (km)	Width of RoW (m)	Date of providing RoW
1	45+760	63+530	17.770	24 to 60	Minimum 90% on Appointed date and Remaining within 150 days of Appointed date

Note: Total Length = 17.77 km

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 within the available RoW as indicated in **Annex-III** based on site/design requirement.

(ii) Signage plan of the project highway is enclosed. The contractor shall, however, improve/upgrade upon the require to prepare the detailed traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC codes/Manual.

Annex - IV

(Schedule-A)

Environment Clearances

The project highway does not require environment clearance as per MoEF circular F. No. 21-270/2008-1A.III (dated 22 August 2013).

The muck dumping sites in non-forest area should to be identified by the EPC contractor in consultation with the Authority Engineer and forest department Competent Authority for dumping of muck as stated in Schedule F.

Schedule-B

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

Widening and up-gradation shall include Two-Laning with Paved shoulder/4-Laning 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 PROJECT

Site of the Two-lane with paved shoulder/ four lane Highway comprises between Shillong to Dawki section (from design ch. 45+760 to 63+530), Design Length = 17.77 km in the State of Meghalaya for execution on EPC Mode under JICA, Package-IV

1 Widening of existing Highway

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

(ii) Width of Carriageway

(a) Two-Lanning with paved shoulders shall be undertaken. The paved carriageway shall be in accordance with the typical cross sections given in **Appendix B-I of Schedule –B**. Additional widths for widening at horizontal curve shall be as per the Schedule D.

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

S. No.	Built-up Section Township	Design Chainage		Width of Paved carriageway (m)	TCS Type
		From	To		
1	Siatbakon	49+270	50+000	1 x 10	Type 5
2	Siatbahan	50+000	50+380	1 x 10	Type 4
3	Pongtung	54+650	55+250	1 x 10	Type 4

(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.

(c) All the cross-sectional elements are to be accommodated within the proposed ROW. If required, suitable retaining structures along with drainage system shall be provided as per site condition and this will not attract any change of scope.

2 Geometric Design and General Features

(i) **General**

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

(ii) **Design speed**

The design speed shall be ruling speed of 60 km per hour and minimum speed of 40 km per hour.

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;

A)* Reconstruction and *Bypasses/Realignments/ Geometric Improvements:

Sl. No	Exist. Chainage		Exist. Length (m)	Design Chainage		Design Length (m)	Remarks
	Start	End		Start	End		
1	131/820	132/930	1110	45+760	46+750	**990**	
2	133/450	133/660	210	47+190	47+330	**140**	
3	134/210	134/980	770	47+870	48+600	**730**	
4	135/480	136/080	600	48+820	49+280	**460**	
5	138/060	141/990	3930	51+750	54+300	**2550**	
6	142/210	145/880	3670	55+300	58+720	**3420**	Mawshun Bypass
7	145/880	151/330	5450	58+720	63+530	**4810**	
	Total length (m)		**15740**			**13100**	

B) Widening and strengthening of existing road:

Sl. No	Existing Chainage		Existing Length (m)	Design Chainage		Design Length (m)
	Start	End		Start	End	
1	132/930	133/450	520	46+750	47+190	**440**
2	133/660	134/210	550	47+330	47+870	**540**
3	134/980	135/480	500	48+600	48+820	**220**
4	136/080	138/060	1980	49+280	51+750	**2470**
5	141/990	142/210	220	54+300	55+300	**1000**
	Total length (m)		**3770**			**4670**

Total Design Length, A+B = 13100 + 4670 = 17770 m

Work done so far:

Category	Pavement Type		Total Scope (m)	Partially Executed (m)
A) Bypasses and Realignments/ Geometric Improvements	Flexible Pavement	Subgrade	13100	6725
		GSB	13100	3405
		WMM	13100	1340
		DBM	13100	1340
		BC	13100	1216
B) Widening and strengthening	Flexible Pavement	Subgrade	4670	2890
		GSB	4670	2380
		WMM	4670	0
		DBM	4670	0
		BC	4670	0

Balance Work:

Category	Pavement Type		Balance Scope (m)
A) Bypasses and Realignments/ Geometric Improvements	Flexible Pavement	Subgrade	*6375*
		GSB	*9695*
		WMM	*11760*
		DBM	*11760*
		BC	*11884*
B) Widening and strengthening	Flexible Pavement	Subgrade	*1780*
		GSB	*2290*
		WMM	*4670*
		DBM	*4670*
		BC	*4670*

Note:

1. **The contractor will complete the balance work in all respect to achieve the total scope of work as defined in table.**
2. ***The scope of work done and balance work indicated above are for reference purposes only. Contractor has to make his own assessment for completing the work and no Change of Scope/Variation will be given in this regard.***

(iv) Right of Way

The site of the project highway comprises the land as described in **Annex-II** of **Schedule-A.**

(v) Type of shoulders

(a) In built-up sections, Footpaths/covered drains shall be provided as per site condition in accordance with Schedule B, Schedule D and indicative TCS.

(b) In open country, paved shoulders of 1.5m width shall be provided and balance 2.0m width shall be covered with 150mm thick compacted layer of

granular material as per TCS Schedule and the earthen shoulder shall be covered with granular material in full depth up to GSB layer as shown in typical cross section.

(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 paragraph 2.10 of the Manual.

(b) Lateral & Vertical clearance: The width of the opening and vertical clearances at underpasses shall be as follows:

S. No.	Design Chainage	Clear span/ opening (m)	Vertical Clearance (m)	Remarks
1	56+703.5	1 x 10	4.0	SVUP

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the Manual.

(b) Lateral& Vertical clearances at overpasses shall be as follows:

S. No.	Design Chainage	Clear Span (m)	Vertical Clearance (m)	Remarks
Nil				

(viii) Slip Roads/Service Roads

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

Ch. From	Ch. To	Width	Length (m)	Remarks
Nil				

(ix) Grade separated structures

(a) Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below:

i) Overpass

Sl.No.	Design Chainage	Span arrangement(m)	Road to be carried under the structure	Width of Structure (m)
Nil				

ii) Small Vehicular Underpass (SVUP)

Sl. No.	Design Chainage	Span arrangement (m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of Structure (m)
1	56+703.5	1x10	Village Road	4.0	1 x 12

iii) Light Vehicular Underpass

S. No.	Design Chainage	Span arrangement(m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of Structure (m)
Nil					

iv) Vehicular Underpass

S. No.	Design Chainage	Span arrangement(m)	Road to be carried under the structure	Min. Vertical clearance (m)	Width of structure (m)
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:

S. No.	**Location (Design Chainage)**	**Type of Structure**	**Cross road at**		
			Existing level	**Raised Level**	**Lowered Level**
Nil					

(x) Cattle and pedestrian under pass / over pass

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

The schedule of typical cross-sections is given in the table below. Drawings of typical cross-sections are given in **Appendix B-I**.

The indicative TCS for Project Highway are as follows-

S. no.	**Design chainage**		**Length (m)**	**TCS Type**
	From	**To**		
1	45+760	49+270	3510	Type - 4
2	49+270	50+000	730	Type- 5
3	50+000	63+530	13530	Type- 4
Sub-Total =			**17770**	

Note :

(i) The length shown in above table for TCS are minimum and increase

in length for type of TCS will not attract COS.

3 Intersections and Grade Separators

All intersections and grade separators shall be as per section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

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

(i) At grade Intersections

All intersections as per the site requirement shall be designed and constructed in accordance with the manual. A list of intersections is given in below table**.** Draft layout of major junctions is given in indicative Plan & Profile drawings for reference.

Sl. No	Proposed Chainage	Classification of cross road	Type of Junction (T,Y,+)	Type of Cross Road	Side	Road Leading to
	Major Junctions					
Nil						
	Minor Junctions					
1	47+400	Village Road	Y Junction	1-Lane BT	Left	Nongmadan
2	49+425	Village Road	T Junction	1-Lane BT	Left	Saitbakon
3	49+970	Village Road	T Junction	1-Lane BT	Left	Saitbakon
4	54+680	Village Road	T Junction	1-Lane BT	Right	Mawlynnong
5	54+760	Village Road	Y Junction	1-Lane BT	Left	Pongtung
6	56+720	Existing NH-40	+ Junction	2-Lane BT	Both	Pongtung , Mawshun
7	58+720	Existing NH-40	T Junction	1-Lane BT	Left	Mawshun
8	62+275	Village Road	+ Junction	1-Lane BT	Both	Pomshutia
9	62+845	Village Road	Y Junction	1-Lane BT	Right	Lapalang
10	63+530	Existing NH-40	Y Junction	2-Lane BT	Right	Wahkadait

Note: It is clarified that if any other junction is identified during development of the project highway in addition to those mentioned above shall also be improved with proper drainage facilities as per standards. It shall be covered within the scope of work. The Number, location & type of junction shown in above table are minimum and it may increase as per actual site condition and increase in number will not attract change of Scope on this account.

At the locations of geometric improvements, the connectivity of built-up area, along existing road, with the proposed highway shall be provided. All such

locations shall be finalized as per site requirement in consultation with the Authority Engineer and it will not be treated as change in scope of work.

(ii) Grade separated intersection without ramps

S. No.	Design Chainage	Salient Feature (Formation width) (m)	Minimum Length of Viaduct (m)	Road to be carried Under structure	Type of Structure
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/New carriageway

The existing road shall be raised as per design requirements in accordance with the manual in conformity to the minimum FRL.

The Contractor may adopt suitable slope (angle) for the embankment as per the availability of fill material/design requirements. The slopes shall be checked for safety against failure. The slopes shall be protected with turfing/geo synthetics /geo green blanket/geo cells/stone pitching or any other method as per schedule D.

Wherever required, toe wall/retaining wall/other protection works along with drainage system shall be provided to contain the toe of the earthwork, so that all the features shown in the TCS are accommodated in the ROW provided.

(iii) All of surplus cutting soils shall be transported and be disposed to the Spoil Banks in accordance with the clause 3.1 of Schedule D at the cost of EPC Contractor. The locations of these spoil banks will be identified by the EPC contractor in consultation with the Authority Engineer and Competent Authority.

5 Pavement Design

(i) Pavement design shall be carried out in accordance with Section 5 of the Manual.

(ii) Type of pavement

Flexible pavement shall be provided for the entire length of project highway and rigid pavement shall be provided at Toll Plaza approaches.

(iii) Design requirements - as per paragraph 5.4, 5.9 and 5.10 of the manual.

(a) Design Period and strategy

Flexible pavement shall be designed for a minimum design period of 20 years and rigid pavement for 30 years. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of not less than 30 MSA.

(iv) Reconstruction of Stretches

The entire stretch of the existing road shall be reconstructed.

6 Road Side Drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual.

(a) Covered drain / open drain shall be provided in the following stretches

i) Covered Drain Locations						
Sl. No.	**Left**			**Right**		
	From	**To**	**Length(m)**	**From**	**To**	**Length(m)**
1	049+270	050+000	730	043+120	043+400	280
2				049+270	050+000	730
	Total Length (m):		**730**	**Total Length (m):**		**1010**

ii) Lined Open drain locations (Hill side)						
Sl. No.	**Left**			**Right**		
	From	**To**	**Length(m)**	**From**	**To**	**Length(m)**
1	056+900	058+700	1800	045+760	045+800	40
2	059+550	060+800	1250	046+310	046+560	250
3				046+765	049+100	2335
4				050+500	050+920	420
5				053+100	053+350	250
6				054+700	054+960	260
7				055+250	056+650	1400
8				058+420	059+020	600
9				060+860	063+050	2190
	Total Length(m) :		**3050**	**Total Length (m):**		**7745**

iii) Lined Open drain locations (Valley side)						
Sl. No.	**Left**			**Right**		
	From	**To**	**Length(m)**	**From**	**To**	**Length(m)**
1	045+920	046+060	140	056+720	056+800	80
2	047+205	047+310	105	057+460	057+510	50
3	047+910	047+990	80	057+550	057+790	240
4	056+410	056+580	170	057+810	057+860	50

5	058+880	059+000	120	057+990	058+100	110
6	061+330	061+460	130	058+220	058+360	140
7	061+630	061+700	70	059+610	059+810	200
8	061+750	062+020	270	060+120	060+390	270
9	062+110	062+250	140	060+460	060+770	310
	Total Length(m) :		**1225**	**Total Length(m) :**		**1450**

Note: The above locations are minimum. Additional locations, if any, required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work. Open drain has been Executed Partially by previous EPC Contractor in the following stretches, which shall be completed as per MoRTH's specification and IRC guidelines.

S. No.	Left			Right		
	From	To	Length (m)	From	To	Length (m)
1				45+800	46+070	270
2				46+070	46+310	240
3				46+560	46+765	205
				Total Length (m)		**715**

Note: Any rectification required in the above-mentioned drain works shall be done by EPC Contractor without attraction of any CoS or without any additional cost implications.

7 Designs of Structures

(i) General

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

(b) Width of new bridges are shown as follows:

S. No.	Design Chainage	Existing Chainage	Width of structure and cross-sectional features	Remarks
1	49+145	realignment	16.0 m	New 2 lane
2	56+580	realignment	16.0 m	New 2 lane
3	56+840	realignment	16.0 m	New 2 lane
4	60+392.5	realignment	16.0 m	New 2 lane
5	60+825	realignment	16.0 m	New 2 lane

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

S. No.	Design Chainage	Existing Chainage	Remarks
1	49+145	realignment	2 lane bridge with both side footpath

S. No.	Design Chainage	Existing Chainage	Remarks
2	56+580	realignment	2 lane bridge with both side footpath
3	56+840	realignment	2 lane bridge with both side footpath
4	60+392.5	realignment	2 lane bridge with both side footpath
5	60+825	realignment	2 lane bridge with both side footpath

(d) All bridges shall be high level bridges.

(e) The structures shall be designed to carry utility services like electric cable, water pipe line, OFC etc. as per the requirement of site.

(f) Cross-section of the new culverts and bridges at deck level shall conform to the typical cross-sections given in section 7 of the Manual.

(g) IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP/ROB.

(ii) Culverts

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

(b) Reconstruction of existing culverts/ New additional culverts:

Reconstruction of existing culverts / new culverts shall be provided at the following locations:

Sl. No.	Design Chainage	Clear Span (Nos.xLxH/dia.)	Type	Nos.	Proposal for Improvement
1	048+060	1x2x1.50	Box	1	Reconstruction
2	048+285	1x2x1.50	Box	1	New
3	048+485	1x3x3.0	Box	1	New
4	048+635	1x2x2.0	Box	1	Reconstruction
5	048+870	1x2x1.50	Box	1	New
6	049+415	1x4x4.0	Box	1	Reconstruction
7	059+525	1x2x2.0	Box	1	Reconstruction
8	049+842	1x5x4.0	Box	1	Reconstruction
9	049+995	1x2x1.50	Box	1	Reconstruction
10	050+130	1x2x1.50	Box	1	Reconstruction
11	050+600	1x2x1.50	Box	1	Reconstruction
12	051+390	1x2x2.0	Box	1	New
13	052+150	1x2x1.50	Box	1	Reconstruction
14	052+700	1x2x1.50	Box	1	New
15	053+060	1x3x3.0	Box	1	Reconstruction
16	053+170	1x1.20	Pipe	1	Reconstruction
17	053+240	1x1.20	Pipe	1	New

Sl. No.	Design Chainage	Clear Span (Nos.xLxH/dia.)	Type	Nos.	Proposal for Improvement
18	053+950	1x2x2.0	Box	1	New
19	054+265	1x2x2.0	Box	1	New
20	054+870	1x2x1.50	Box	1	Reconstruction
21	055+025	1x3x3.0	Box	1	Reconstruction
22	055+270	1x2x1.50	Box	1	Reconstruction
23	055+410	1x2x1.50	Box	1	New
24	056+110	1x2x1.50	Box	1	New
25	056+665	1x2x2.0	Box	1	New
26	056+950	1x2x2.0	Box	1	New
27	057+150	1x2x1.50	Box	1	New
28	057+275	1x1.20	Pipe	1	New
29	057+380	1x1.20	Pipe	1	New
30	057+530	1x1.20	Pipe	1	New
31	057+680	1x1.20	Pipe	1	New
32	057+800	1x1.20	Pipe	1	New
33	057+930	1x1.20	Pipe	1	New
34	058+180	1x2x2.0	Box	1	New
35	058+390	1x2x2.0	Box	1	New
36	058+550	1x2x2.0	Box	1	New
37	058+830	1x1.20	Pipe	1	New
38	059+290	1x1.20	Pipe	1	New
39	059+645	1x1.20	Pipe	1	New
40	060+090	1x1.20	Pipe	1	New
41	060+455	1x1.20	Pipe	1	New
42	060+600	1x1.20	Pipe	1	New
43	060+995	1x1.20	Pipe	1	New
44	061+110	1x1.20	Pipe	1	Reconstruction
45	061+218	1x1.20	Pipe	1	Reconstruction
46	061+329	1x1.20	Pipe	1	New
47	061+475	1x1.20	Pipe	1	New
48	061+565	1x1.20	Pipe	1	New
49	061+710	1x6x6.0	Slab	1	New
50	061+880	1x1.20	Pipe	1	New
51	062+095	1x2x2.0	Box	1	New
52	062+300	1x2x1.50	Box	1	New
53	062+430	1x1.20	Pipe	1	New
54	062+630	1x2x2.0	Box	1	New
55	062+760	1x2x2.0	Box	1	New
56	062+865	1x1.20	Pipe	1	New

Note:

1. *Proposed span arrangement shall be finalized in consultation with concerned Authority in accordance with the Manual. The proposed locations are minimum. Any change in number/length/span/height shall not be treated as change in scope of work.*
2. *The culvert location planned as Table above shall be adjusted accordingly to the exact location of cross-water stream or existing culvert located based on the topographic survey performed by the Contractor for the final drawings of the Detailed Design.*
3. *Width of culvert shall be in conformity with cross section at that Location.*
4. *Cross road culvert to be provided at the location of Major Junction/ Minor Junctions for proper drainage facilities and utility purposes etc. if required shall be decided by Authority/Authority Engineer and shall not be treated as change of scope.*
5. *The constructed culverts by previous EPC Contractor as mentioned in schedule A, shall be rectified/completed as per MoRTH specification and IRC guidelines and shall not attract any Change of Scope.*

(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 section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

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

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

Sl. No.	Design Chainage	Type	Span (m)	Minimum Vent Height (m)
As given in (ii).b table				

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

S. no.	Location	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:

Sl. No.	Bridge location (Ch)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc.	Remarks
Nil				

(ii) The following narrow bridges shall be widened:

Sl. No.	Design Chainage	Existing Chainage	Span Arrangement	Existing width (m)	Proposed Total Width (m)	Cross-section at deck level for widening
Nil						

(b) Additional new bridges

New bridges shall be constructed at the following locations. GADs for the new bridges are attached in the drawing folder.

S No.	Design Chainage	Existing Chainage	Proposed Span (m)	Proposed width (m)	Remarks
1	49+145	Realignment	1x40	16.0 m	New 2 lane
2	56+580	Realignment	2x30	16.0 m	New 2 lane
3	56+840	Realignment	2x40	16.0 m	New 2 lane
4	60+392.50	Realignment	1x25	16.0 m	New 2 lane
5	60+825	Realignment	2x25	16.0 m	New 2 lane

Note: Proposed span arrangement is minimum and any increase in length/span/height shall not be treated as change in scope of work.

IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP.

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

Sl. No.	Location at Chainage	Remarks
NIL		

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

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

The following bridges shall be retained with repairs:

S. No.	Design Chainage	Existing Chainage	Remarks
1	50+420.67	137/410	• Wearing coat shall be replaced. • Damaged expansion joint shall be replaced • Spalling of Concrete shall be repaired with epoxy grouting. • Abutment quadrant slopes shall be maintained along with stone pitching of slopes and other protection work as per site requirement. • Damages railing /parapet to be replaced. • Missing drainage spouts and gratings with down-take pipe to be provided. • Any other repair required as per site condition to be decided in consent with Authority Engineer/ Authority.
2	54+623.35	160/350	

(e) Drainage system for bridge decks

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

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB shall be as specified in section 7 of the Manual.

(b) Road over-bridges

Road over-bridges (road over rail) shall be provided at the following locations:

Sl. No.	Design Chainage	Route	Span arrangement (m)	Total Length (m)	Width (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 (Ch)	Number and length of span(m)
NIL		

(v) **Grade separated structures**

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (vi), 2 (vii) and 2 (ix) 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:

Bridges

Sl. No.	Location	Nature and extent of repairs to be carried out
As per table on para 7 (iii) d		

ROB / RUB

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

Overpasses/Underpasses and other structures

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

(vii) List of Major/Minor Bridges and Structures

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

Sl. No.	**Location**	**Type**
1	49+145	Minor Bridge
2	56+580	Minor Bridge
3	50+420.67	Existing retained Minor Bridge
4	54+623.36	Existing retained Minor Bridge
5	54+703.5	SVUP
6	56+840	**Major bridge**
7	60+392	Minor Bridge
8	60+825	Minor Bridge

(viii) Slope Protection Structures

Structures for Slope protection and Retaining/ Breast Walls shall be designed and constructed as stipulated in Schedule-D.

Structures to be constructed for slope protection shown in the following Table:

(i) Breast wall

Sl. No.	LHS				RHS			
	From	To	Length(m)	Height above FRL	From	To	Length(m)	Height above FRL
1					061+770	062+020	250	1.5
2					062+450	062+600	150	1.5
	Total Length(m) :		0		Total Length(m) :		400	

Note: The proposed locations are minimum and any change in length/height shall not be treated as change in scope of work.

(ii) Retaining wall

Sl. No.	LHS			RHS		
	From	To	Length (m)	From	To	Length (m)
1	046+550	046+610	60	054+970	055+070	100
2	047+570	047+640	70			
3	048+040	048+130	90			
4	048+270	048+310	40			
5	054+210	054+309	99			
6	054+360	054+385	25			
7	054+970	055+050	80			
8	060+990	061+100	110			
9	061+010	061+100	90			
10	061+190	061+220	30			
11	061+700	061+730	30			
12	061+870	061+900	30			
	Total Length(m) :		754	Total Length(m) :		100

Note:

1) The above proposed locations are minimum and any change in length shall not be treated as change in scope of work.

2) The length of executed slope protection works at site as mentioned in Schedule A, may be rectified/repaired, if required and shall not attract any CoS or any additional cost implications.

(ix) Slope Protection

As the project involves cutting of existing hill slopes, it is imperative that slopes are stabilized for insuring longevity of the slopes and the roads.

The contractor shall be responsible for accurate assessment of the actual requirement as per schedule D & prepare design for slope protection & stabilization as per schedule D.

The scope of the above-mentioned work shall be finalized as per Site Conditions/ requirement in consultation with Authority/ Authority's Engineer during execution of work. Any increase in quantity over the above will not be considered as change of scope. Therefore, the contractor should carry out thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid.

Note: Previous EPC Contractor had partially executed Slope Protection works at some locations, which shall be rectified/completed as per MoRTH's specification and IRC guidelines without attracting any additional cost implications or Change of Scope (CoS).

(x) Disposal of Debris: - As per Manual.

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety devices and road furniture shall be provided in accordance with Section 9 of the Manual.

(a) Traffic/ Road Signs:

Traffic signs viz roadside signs, overhead signs, kerb mounted signs etc. along the entire Project highway shall be provided in accordance with section 9 of the manual.

Overhead traffic signs: - Full Width Overhead signs shall be provided in accordance with section 9 of the manual

(b) Pavement Marking:

Pavement markings shall cover road marking for the entire Project Highway as per manual.

(c) Safety Barrier:

Semi rigid W-beam crash barriers shall be installed all along the project highway on earthen shoulders on either side of main carriageway at the locations given below:

Sl. No	LHS		Length (m)	RHS		Length (m)
	From	To		From	To	
1	45+760	45+830	70	45+760	45+770	10
2	48+410	49+250	840	49+000	49+250	250
3	50+320	50+410	90	50+320	50+410	90
4	50+430	50+530	100	50+430	50+530	100
5	53+500	54+210	710	54+470	54+600	130

Sl. No	LHS		Length (m)	RHS		Length (m)
	From	To		From	To	
6	54+470	54+600	130	54+650	54+670	20
7	54+650	54+740	90	56+800	56+950	150
8	56+800	56+900	100	59+910	60+120	210
9	60+300	60+380	80	60+400	60+450	50
10	61+990	62+190	200	62+070	62+130	60
	Total length (m)		**2410**	**Total length (m)**		**1070**

Note: The above proposed locations are minimum. Crash barrier/other suitable safety barriers along the Project highway shall be provided as per Schedule D. Any change in length shall not be treated as change in scope of work.

(ii) Specifications of the reflecting sheeting

Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-04 in accordance with Clause 9.2.3 of the Manual.

9. Roadside Furniture

Roadside furniture shall be provided in accordance with the provisions of the Manual.

a) Road studs - Road studs shall be provided for the entire Project highway at median openings, bridges, VUP/Interchange/Flyover structures, approaches of bridges, VUP/Interchange/ Flyover, at curves on shoulder edge line, junctions, slip roads on both side of edge lines etc. in accordance with the manual.

b) LED traffic beacons - Shall be provided on entire project highway near pedestrian crossings, public gathering places, junctions etc. in accordance with the manual.

c) Pedestrian Guard Rail: Provide pedestrian guardrail at each bus stop location and other locations as per manual.

d) Delineators: Delineators for the entire Project Highway at the locations as suggested in relevant IRC Manual recommended in Schedule D.

e) Noise barriers: shall be provided in accordance with manual; Locations shall be decided as per site condition in consent with Authority.

f) Concrete Crash Barrier, Metal Beam Crash Barrier, Separators (MS Railings) – as per manual.

g) Traffic Safety Devices wherever required.

h) Hectometer/ Kilometer Stones.

10. COMPULSORY AFFORESTATION

The number of trees which are required to be planted by the Agency as compensatory afforestation should be as per Forest conservation Act, thrice the number trees to be cut.

11. HAZARDOUS LOCATIONS

The safety measures shall be provided at all hazardous/sinking/land slide locations as per the manual in consultation with the Authority's Engineer The safety barriers shall also be provided at the following hazardous structure (Bridges, culverts) locations**:**

Sl. No.	Location stretch from (Ch) to(Ch)	LHS/RHS
As per schedule D		

12. SPECIAL REQUIREMENTS FOR HILL ROADS

In accordance with Section 13 of the Manual (from IRC: SP: 73-2018), IRC: SP:48-1998 & recommended practice for treatment of embankment and road side slopes for erosion control (first revision) IRC: 56-2011 and relevant IRC codes & The cutting slope surface except on Hard Rock classified as per Clause 301.2 of MORTH Specifications for Road and Bridge Works shall be protected by the Seeding and Mulching as per Clause 301.8 of MORTH Specification, and the embankment slope shall be protected by Turfing as per Clause 301.7 of MORTH Specification.

Sl. No.	Design Ch (From)	Design Ch (To)	LHS/RHS
As per schedule D			

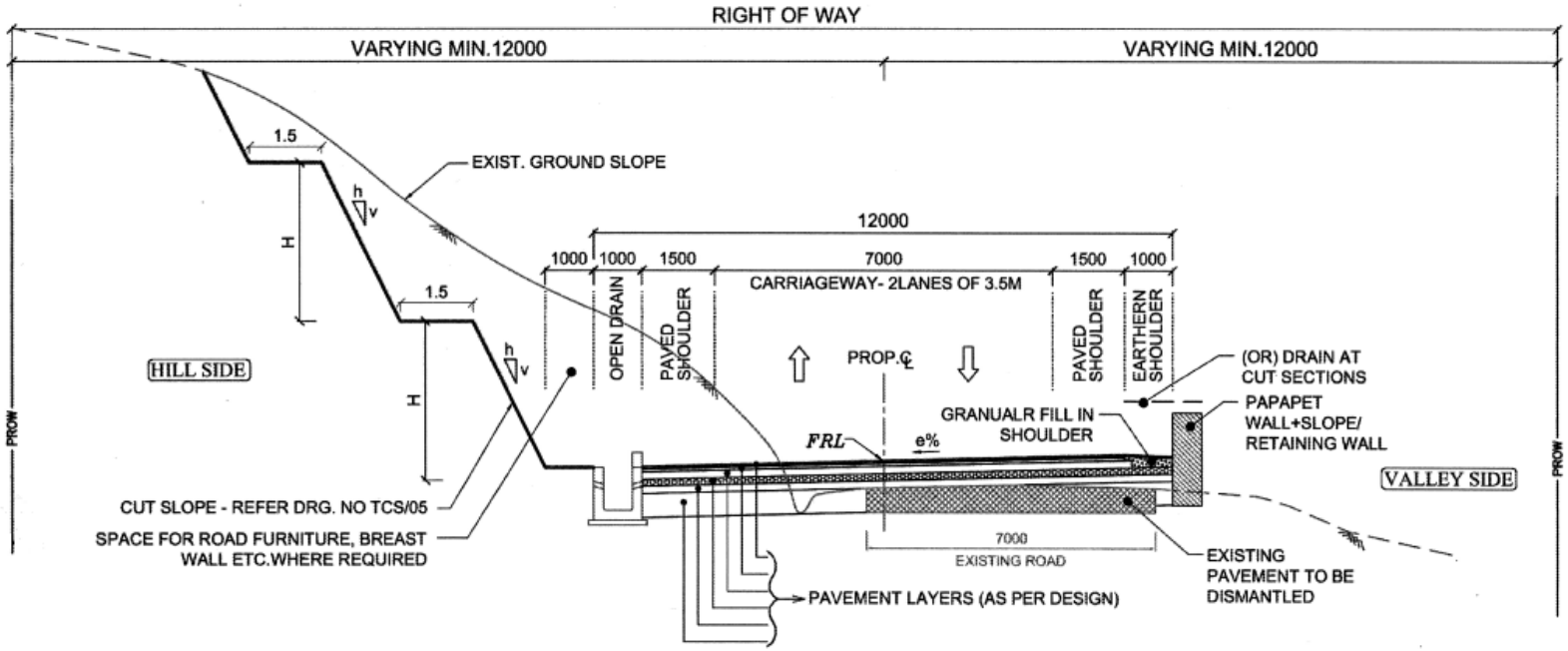
15. UTILITY DUCT

Utility duct across the project highway shall be provided as per manual.

16. CHANGE OF SCOPE

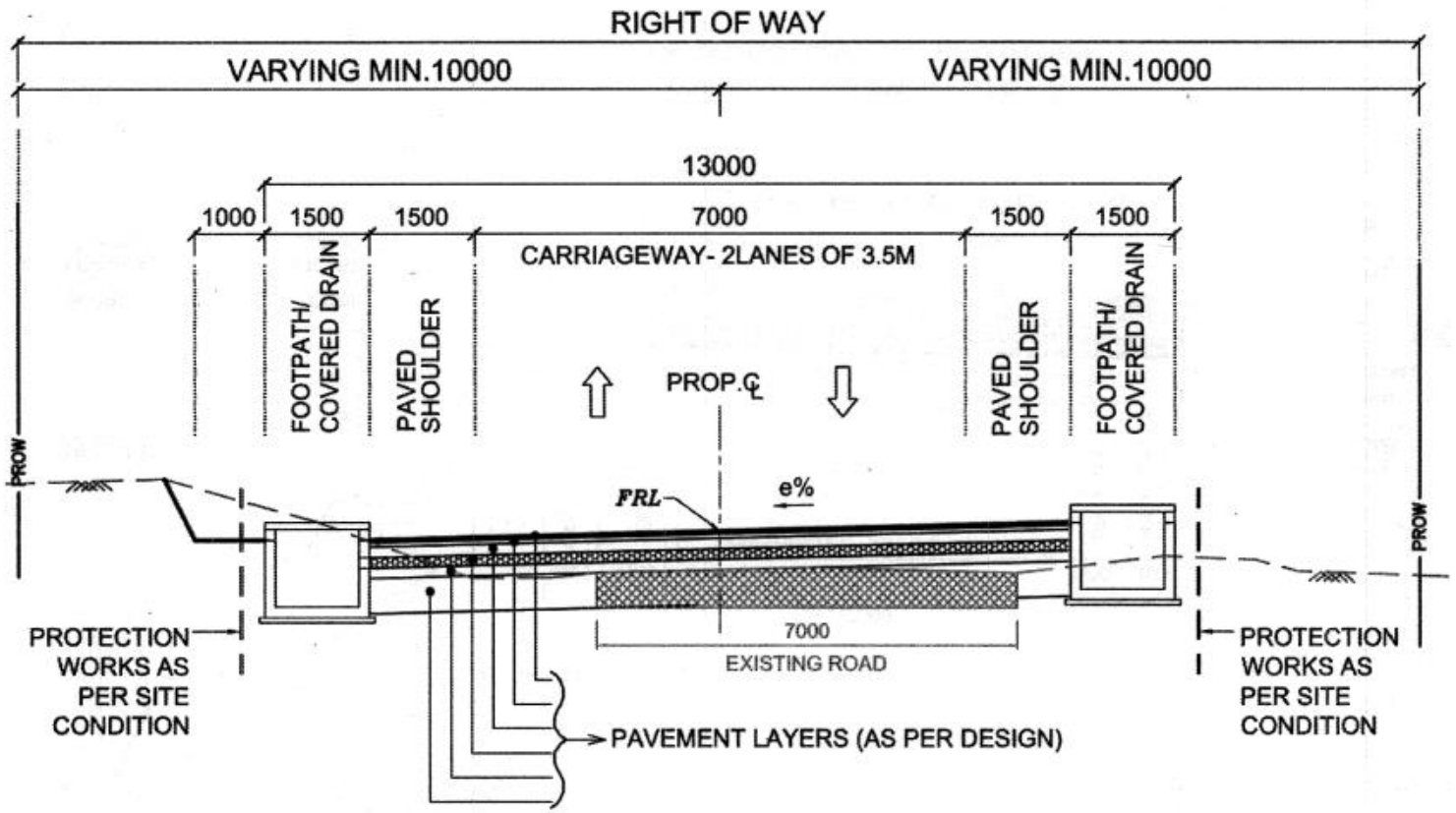
The length of Structures, bridges, culverts, underpasses, flyovers etc. specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. 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.

APPENDIX- B1



Typical Cross Section (Type - 4)
2-lane with paved shoulders at open areas

Fig 2.11: Typical Cross-Section- 4



Typical Cross Section (Type - 5)

2-lane with paved shoulders at built-up areas

Fig 2.12: Typical Cross-Section- 5

Schedule-C

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. The Project Facilities shall include:

(a) Toll plazas;
(b) Roadside furniture;
(c) Pedestrian facilities;
(d) Land Scaping and Tree Plantation;
(e) Truck lay-byes;
(f) Way-side amenities;
(g) Bus-bays and Passenger shelters;
(h) Others;
    1. Highway Patrol Units
    2. Highway lighting
    3. Emergency Medical Services
    4. Crane Services
    5. Communication System
    6. Advance Traffic Management System (A. T. M. S.)
    7. Operation and Maintenance Center

2 Description of Project Facilities

(a) Toll Plazas

Toll Plaza shall be provided as per as stipulated in section 10 of the Manual. Canopy of Toll Plaza should be designed to withstand load of solar panels in addition to other design loads. Location of toll plaza is as per the following details.

Sl. No.	Design Chainage	Existing chainage
NIL		

Note:

- Installation of two number dedicated ETC lane (one lane in each direction) and Hybrid ETC System with provision of medium speed WIM with bending plate technology in each lane, and Static Weigh Bridge (one lane in each direction) at Toll Plaza and Configuration with Advance Traffic Management System.
- Above mentioned toll lanes are indicative. However, the actual requirement of toll lanes shall be assessed by Contractor as per actual site condition and

Manual. The increase in number of toll lanes shall not be treated as change of scope.

- Solar panels shall be erected over the Toll Plaza Canopy to generate the green energy. Same shall be utilized for toll plaza lighting and other energy requirement within toll plaza area along with conventional lighting.

(b) Roadside furniture; as per **clause 9 of Annex-I Schedule B**

(c) Pedestrian facilities;

Pedestrian Guard rails shall be provided at junctions, Truck lay byes, bus bays and near schools and hospitals as per provisions in section 9.8 of the Manual

i. Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location and at other locations as per manual.

ii. Pedestrian Crossings: Provide pedestrian crossing facilities on locations as recommended in Schedule D.

(d) Land Scaping and Tree Plantation;

Land Scaping and tree plantation of the highway shall be provided as per section 11 of the manual. The locations for these provisions shall be finalized in consultation with Authority Engineer.

(e) Truck lay-byes

Truck Lay bye shall be provided at the following locations in accordance with section 12.5 of the manual.

Sl. No	Design Chainage	Side	Remarks
Nil			

(f) Way-side Amenities

As stipulated in section 12.10 of the manual, Way-side Amenities shall be provided at the following locations:

S. No.	Design Chainage	Side
Nil		

(g) **Bus-bays and Passenger shelters**

Minimum 2x4 Nos. of Bus Bays with Bus Shelter shall be provided along the project highway. Tentative locations for Bus Bays are indicated below, however, the same shall

be finalized as per suitability of location and site requirement in consultation with the Authority's Engineer/ Authority. As stipulated in section 12.6 of the Manual, Bus-bays and shelters shall be provided at below indicative locations.

S. No.	Design Chainage		Location
	Left	Right	
1	49+790	49+790	Siatbakan
2	53+600	53+700	Nongshyrngan
3	54+800	54+850	Pongtung
4	62+460	62+530	Pomshutia

Note:However, the location of bus bays and passenger shelters shall be finalized as per suitability of location and site requirement in consultation with Authority. Any change in location shall not treated as change of scope.

(h) Others

1. Highway patrol unit – as per manual
2. Highway LED Lighting: LED Lighting shall be provided at the following locations:
    a. LED Lighting shall be provided at approach to bridges, Flyover, built up areas, Toll Plaza, Bus stops, truck Lay-byes and rest areas as per manual recommended in Schedule D.
    b. Apart from above locations lighting shall be provided at underpasses and ROB/RUB and as per site condition in consultation with Engineer and shall not be treated as change of scope. On all grade separated structures Lightings will be provided on Top & Underside as per clause 12.4 of IRC SP 73-2018.
    c. High Mast Lighting shall be provided at all Major Junctions, Toll Plaza locations or any other location as per clause 12.4.3 of IRC SP 73-2018.Minimum 4 Nos. of High Mast shall be provided.
3. Emergency Medical Services: Emergency medical Services shall be provided as per provisions of the manual.
4. Cranes services: One Cranes with 30 MT Capacity.
5. Communication System: Communication System shall be provided as per provisions of the manual.
6. Advance Traffic Management System (ATMS) as per technical specification: Provisions of other facilities, if required may be made in similar manner.
7. Operation and Maintenance Centre: Operation and Maintenance Centre shall be provided as per provisions of the manual.

Schedule-D

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Construction

The Contractorshall 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:

a) Manual of Specifications and Standards for Two Laning of Highways with paved shoulder (IRC: SP: 73-2018), referred to herein as the Manual.

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Laning of Highways with paved shoulder (IRC: SP:73-2018), referred to as the Manual and Indian Road Congress (IRC) Codes and Standards and MORTH Specifications for Road and Bridge Works.

Where the aforesaid Manuals, guidelines, codes, standards and specifications are silent on any aspect, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

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

2.2 Notwithstanding anything to the contrary contained in the aforesaid Manual, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Manual shall be deemed to be amended to the extent set forth below;

1) IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP.

2) TCS of 2-Lane, Width of bridges & Locations of Utility Duct

Sl. No.	Item	Description of Deviation	As per manual	Clause Reference
1	Width of bridges	Width bridges on hill road – 16m (0.5+1.5+0.5)+(0.5+1.5+7+1.5+0.5)+(0.5+1.5+0.5) = 2.5+11+2.5 1) At Minor bridge 49+145,56+580& 60+392.50 width is 17.2m due to extra widening on sharp curve. 2) At Minor bridge 60+825 width is 16.6m due to extra widening on curve.	Width of bridge on plain/rolling terrain – 18m (0.5+1.5+0.5)+(0.5+2.5+7+2.5+0.5)+(0.5+1.5+0.5) = 2.5+13+2.5	Clause 7.3 (ii) Figure 7.6

Schedule – E

(See Clause 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1. Maintenance Requirements

1.1. The Contractor shall, at all-time maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

1.2 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.

1.3. All Materials, works and construction operations shall conform to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FIFTH REVISION, April 2013)", including latest corrections slips, issued by the Ministry of Surface Transport & Highways, Government of India and published by the Indian Roads Congress.

Where the specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

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: SP:35. 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 torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.

Annex – I
(Schedule-E)
Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
S of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50m 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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
S of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Bleeding	Nil	< 1 % area	Daily	Scale, Tape odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation / Breaking	Nil	< 1 m for any 100m section and width < 0.1m at any location, restricted to 30cm from the edge	Daily			7-15 days	IRC:82-2015

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

	Roughness	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equipment)	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	50SN	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			Annually	Falling W eight Deflectometer	IRC 115:2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTME950(98) :2004 and ASTM E1656-94:2000	180 days	IRC:SP:83-2008
Asset Type	**Performance Parameter**	**Level of Service (LOS)**		**Frequency of Inspection**	**Tools/Equipment**	**Standards and References for Inspection and Data Analysis**	**Time limit for Rectification/ Repair**	**Maintenance Specifications**
		Desirable	**Acceptable**					
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

Approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
Embankment / Slopes	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<20% variation in prescribed slope camber / cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15% variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4
Asset Type	**Performance Parameter**	**Level of Service (LOS)**		**Frequency of Inspection**	**Tools/Equipment**	**Standards and References for Inspection and Data Analysis**	**Time limit for Rectification/ Repair**	**Maintenance Specifications**
		Desirable	**Acceptable**					
			Side slope					
	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						

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
1	**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< 0.2mm.hair cracks		
			2	w= 0.2 -0.5 mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if L >1m. Within 7 days
			3	w= 0.5 -1.5 mm, discernible from fast-moving car		
			4	w= 1.5-3.0 mm	Seal, and stitch if L > 1m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15 days
			5	w > 3 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
			0	Nil, not discernible	No Action	

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	1	w< 0.2mm.hair cracks	Route and seal with epoxy Within 7 days	Staple or Dowel Bar Retrofit. Within 15 days
			2	w= 0.2 -0.5 mm, discernible from slow-moving car		
			3	w= 0.5 - 3.0 mm, discernible from fast-moving car	Route and seal and stitch, if L >1m. Within 7 days	
			4	w= 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications – See Para 5.5 &9.2 Within 15 days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudional Crack intersecting with one or more joints**	w= width of crack L= length of crack d= depth of crack D= depth of slab	0	Nil, Not discernible	No, Action	
			1	w= 0.5 mm, discernible from slow-moving vehicle	Seal with epoxy, if L > 1m. Within 7 days	Staple or Dowel Bar Retrofit. Within 15 days
			2	w= 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1m. 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**
			3	w= 3.0 - 6.0 mm	Staple, if L> 1m. Within 15 days	Partial Depth Repair with stapling. Within15 days
			4	w= 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full depth Repair Dismantle and reconstruct affected portion as per norms and specifications See Para 5.6.4 Within 15 days
4	**Multiple Crack 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 > 1m. Within 15 days	
			2	w= 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w= 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w= 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and /or panel broken into more than 4 pieces		

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	**Corner Break**	w= width of crack L= length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5mm, only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7 days
			2	w < 1.5mm, L < 0.6m, only one corner broken		
			3	w < 1.5mm, L < 0.6m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:83-2008) Within 15 days	Full depth repair
			4	w > 1.5mm, L > 0.6m or three corners broken		
			5	Three or four corners broken		Reinstate sub-base and reconstruct the slab as per norms and specifications Within 30 days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w= width of crack L= length (m/m2)	0	Nil, Not discernible		No, Action
			1	w < 0.5 mm, L< 3m / m^2	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts.
			2	either w > 0.5 mm or L < 3m /m^2		
			3	w > 1.5mm and L < 3m /m^2		
			4	w > 3mm, L < 3m /m^2 and deformation		Full depth repair Cutout and replace damaged area taking care not to damage reinforcement. Within 30 days
			5	w > 3mm, L < 3m /m^2 and deformation		

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
9	**Polished Surface /Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t >1 mm		
			2	t = 1 - 0.6 mm	Monitor rate of deterioration Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm		
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m^2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm ; n < 1 per 5 m^2	No action	
			1	d = 50 – 100 mm; h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep. Within 15 days	Not Applicable
			2	d = 50 – 100 mm; h > 50 mm; n < 1 per 5 m^2		
			3	d = 100 – 300 mm; h < 100 mm; n < 1 per 5 m^2	Partial depth repair 110 mm i.e. 10mm more that the depth of the hole. Within 30 days	
			4	d = 10 – 300 mm; h > 100 mm; n < 1 per 5 m^2		

			5	d > 300 mm; h > 100 mm ; n > 1 per 5 m^2	Full depth repair. Within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length			**Short Term**	**Long Term**
			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%		

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**
Joints Defects						
			3	w = 20 – 40 mm, L > 25%	Partial Depth Repair. Within 15 days	Not Applicable
			4	w = 40 – 80 mm, L > 25%	30 – 50 mm deep, h = w + 20 % of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 – 100 mm deep repair. H = w + 20% of w. Within 30 days	
			0	not discernible, < 1 mm	No action.	No action
			1	f < 3 mm		
			2	f = 3 – 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30 days
			3	f = 6 – 12 mm	Diamond Grinding	

13	**Faulting (or Stepping) in Cracks or Joints**	f = difference of level	4	f = 12 – 18 mm	Raise sunken slab	Replace the slab as appropriate. Within 30 days
			5	f > 18 mm	Strengthen subgrade and sub – base by grouting and raising sunken slab	

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**
Joints Defects						
14	**Blowup or Buckling**	h = vertical displacement from normal profile			**Short Term**	**Long Term**
			0	Nil, not discernible	No action	
			1	h < 6 mm		
			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 slab, ie 4 or more pieces	Replace broken slabs. Within 30 days	
			0	Not discernible, h < 5 mm	No action.	
			1	h = 5 – 15 mm		

15	**Depression**	h = negative vertical displacement from normal profile L = length	2	h = 15 -30 mm, Nos < 20% joints	Install Signs to Warn Traffic Within 7 days	Not applicable
			3	h = 30 – 50 mm		
			4	h > 50 mm or > 20 % joints	Strengthen subgrade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 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**
Joints Defects						
					Short Term	**Long Term**
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible, h < 5 mm	No action	
			1	h = 5 – 15 mm	Follow up	scrabble
			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		
			5	f > 18 mm	Strengthen subgrade and sub – base by grouting and raising sunken slab	
			0	h < 4 mm	No action	

17	**Bump**	h = vertical displacement from normal profile.	1	h = 4 – 7 mm	Grind, in case of new construction Within 7 days	Construction Limit for new Construction
			3	h = 7 – 15 mm	Grind, in case of on going maintenance Within 15 days	Replace in case of new construction. Within 30 days.
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30 days

S.No.	**Type of Distress**	**Measured Parameter**	**Degree of Severity**	**Assessment Rating**	**Repair Action**	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
					Short Term	**Long Term**
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, Not discernible, < 3 mm	No action	
			1	f = 3 – 10 mm	Spot repair of shoulder Within 7 days	
			2	f = 10 – 25 mm		
			3	f = 25 – 50 mm	Fill up shoulder Within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30 days
			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	
		Nos/100m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	not discernible problem	No Action	
			3 to 4	Blockage observed in drains, but water flowing	Clean drains etc within 7days follow up	Action required to stop water damaging foundation within 30 days
			5	Ponding, accumulation of water observed	-do-	

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measuremen t</th><th>Testing Method</th><th colspan="2">Recommended Remedial measures</th><th>Specification s and Standards</th></tr>
<tr><td rowspan="2">Highway</td><td rowspan="2">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="2">Monthly</td><td rowspan="2">Manual Measurement s with Odometer along with video/ image backup</td><td colspan="2" rowspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.

In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest</td><td rowspan="2">IRC:SP 84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stoppin g Sight Distance (m)</td></tr>
</table>

		100 360 180 80 260 130			Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		
Pavemen t 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

Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measuremen t**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specification s and Standards**
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m^2/lux Bituminous Road - 100mcd/m^2/lux	Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
		Initial and Minimum Performance for Dry Retro reflectivity during night time: Design Speed: (RL) Retro Reflectivity (mcd/m^2/lux)		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

	Night Time Visibility		Initial (7 days)	Minimum Threshold level (TL) & warranty period required up to 2 years	Bi-Annually				
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):							
Asset Type	**Performance Parameter**	**Level of Service (LOS)**			**Frequency of Measuremen t**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specification s and Standards**
		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux Minimum Threshold Level: 50 mcd/m^2/lux							

	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
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

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

	Retro reflectivity	As per specification in IRC:67-2012	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance Measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	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

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
	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 failure	8 hours	IRC:SP:84-2014
Trees and Plantatio n including median plantatio n	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay- bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15days	IRC:SP 84-2014

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

	Structurally sound	Delamination of concrete not more than 0.25 sq.m.	Bi-Annually	recording the defects	be followed as per IRC:SP:40-1993		Specifications clause 2800
		Cracks wider than 0.3 mm not more than 1m aggregate length					
Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measuremen t**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specification s and Standards**
	Protection work in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	IRC: SP 40-1993 and IRC:SP: 13-2004.
Bridges including ROBS Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or wearing coat	15 days	MORTH Specification 2811
	Bumps	No bump at expansion joint	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORTH Specification 3004.2 & 2811

Bridge – Super Structure	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspections 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: 84-2004. And IRC SP: 40-1993

Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measuremen t**	**Testing Method**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specification s and Standards**
	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 repair to affected concrete portion with epoxy mortar / concrete.	15 days	IRC:SP: 40-1993. And MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m.					
	Delamination	Not more than 0.50 sq.m.					
	Cracks wider than 0.30 mm	Not more than 1m total length.	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigation causes for cracks development and carry out necessary rehabilitation.	48 hours	IRC:SP: 40-1993. And MORTH Specification 2800.
	Rain seepage through deck slab	Leakage- nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Grouting with slab at leakage areas, waterproofing, repairs to drainage spouts.	1months	MORTH Specification 2600 & 2700.
	Deflection due to permanent	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity.	6months	IRC:SP: 51-1999.

	loads and live loads						

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
	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 30m.	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTOLRFD Specification
	Leakage in Expansion Joints	No damage to elastomeric sealant compound in strip expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH Specification 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH Specification 2600 and IRC SP: 40-1993.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specification s and Standards
	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 sub structure	Cracks/spalli ng of concrete /rusted steel	No cracks spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed.	30 days	IRC:SP: 40-1993. And MORTH Specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/ abutment, all the bearings on that pier/ abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH Specification 2810 and IRC SP: 40-199.
Asset Type	**Performance**					**Time limit for**	

	Parameter	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Rectification	Specification s and Standards
		than 2 locations per side, no rupture of reinforcement or rubber.					
Bridge Foundation s	Scouring around foundations	Scouring shall not be lower than maximum scour level form the bridge	Bi-Annually	Condition survey 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 months	IRC:SP: 40-1993. IRC: 83-2014 MORTH Specification 2500.
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m. damage to 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	MORTH Specification 2810 and IRC SP: 40-199.

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)	Landslids requiring clearance	12 (Twelve) hours
(iii)	Snow requiring clearance	24 (Twenty Four) hours

Note: For all tables 1 to 5 above, latest BIS & IRC standard (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, sides lopes, drains and culvert**	

(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) days
(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)	Damaged to road mark ups	7 (Seven) days
(d)	Road lighting	
(i)	Any major failure of the system	24 (Twenty Four) days
(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) days
(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) days
(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 crossing,[Traffic Aid Posts, Medical Aid Posts], and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	Within 48 (forty eight) hours Within 15 (fifteen) days or as specified by the Authority's Engineer
(b) Foundations		

	Nature of Defect or deficiency	**Time limit for repair/ rectification**
(i)	Scouring and / or cavitation	15 (fifteen) days
(c) Pipers, abutment, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent - holes	3 (three) days

(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damaged 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

	Nature of Defect or deficiency	**Time limit for repair/ rectification**
(iii)	Snow requiring clearance	24 (twenty four) hours

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

Schedule-F

(See Clause 3.1.5(a))

APPLICABLE PERMITS

1. **Applicable Permits**

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

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

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

(c) License for use of explosives;

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

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

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

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

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

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

(j) Royalty permits as applicable under the state govt. rules.

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

Schedule-G

(See Clause 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

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 [**NHIDCL**], (**"the Authority"**) have entered into an agreement (the **"Agreement"**) for "**Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"**, subject to and in accordance with the provisions of the Agreement.

(B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the Construction Period and Defects Liability Period (as defined in the Agreement) in a sum of Rs. …. Crore (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 Construction Period and Defects Liability 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 NHIDCL 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 difference 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 ****[$1]. 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.

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

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

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:

(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

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

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

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

Form for Guarantee for Withdrawal of Retention Money

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

WHEREAS:

[Name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [NHIDCL], (hereinafter called "the Authority") for the **"Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work."** subject to and in accordance with the provisions of the Agreement.

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

(B) We, ……. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. ……Cr. (Rs……. in words) (the "**Guarantee Amount"**).

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL 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 difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever.

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

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

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

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

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

8. The Guarantee shall cease to be in force and effect 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

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

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

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

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex-III
(Schedule-G)
(See Clause 19.2)

Form for Guarantee for Advance Payment

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

WHEREAS:

[name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [**NHIDCL**], (hereinafter called "**the Authority**") for the **"Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"** subject to and in accordance with the provisions of the Agreement.

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

(B) 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 irrevoc**ably, guarantee**s and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid installment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the guarantee amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL, that the Contractor has committed default in the due and

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

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 difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever

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

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

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

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

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

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

[$]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).

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

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

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

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

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

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

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

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)

Schedule-H

(See Clauses10.1 (iv) and 19.3)

1 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:

S. No.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
1	Road works including culverts, widening and repair of culverts	56.83%	**A - Widening and strengthening of existing road (Flexible pavement)**	
			(1) Earthwork up to top of the subgrade	6.16%
			(2) Subbase course (GSB)	2.74%
			(3) Non-bituminous base course (WMM)	3.64%
			(4) Bituminous base	4.76%
			(5) wearing coat	3.17%
			(6) widening and repair of culverts	0.000%
			B.1 – Reconstruction/Realignment/ Bypass/Geometric Improvement (Flexible pavement)	
			(1) Earthwork up to top of the subgrade	24.67%
			(2) Subbase course (GSB)	11.74%
			(3) Non-bituminous base course (WMM)	9.28%
			(4) Bituminous base	12.15%
			(5) wearing coat	8.16%
			B.2 - Reconstruction realignment/ bypass/Geometric Improvement (Rigid Pavement)	
			(1) Earthwork up to top of the subgrade	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Dry lean concrete (DLC)	0.00%
			(4) Pavement quality concrete (PQC) course	0.00%
			C.1 - Reconstruction/ New Service Road (flexible Pavement)	
			(1) Earthwork up to top of the subgrade	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Non-bituminous base course (WMM)	0.00%
			(4) Bituminous base	0.00%
			(5) wearing coat	0.00%
			C.2 - Reconstruction/ New Service Road (Rigid Pavement)	
			(1) Earthwork up to top of the subgrade	0.00%
			(2) Subbase course (GSB)	0.00%
			(3) Dry lean concrete (DLC)	0.00%
			(4) Pavement quality concrete (PQC) course	0.00%
			D. - Reconstruction/ New culverts on existing road, realignment, bypasses, Geometric Improvement	

S. No.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(1) Hume Pipe Culvert	1.70%
			(2) Box culvert	10.90%
			(3) Slab Culvert	0.84%
			(4) Rectification of Partially executed Culverts	0.08%
2	Minor Bridges/ Underpasses/ Overpasses	18.62%	**A.1 - Widening and repairs of Minor Bridges and underpass/Overpass**	
			Widening of existing bridges	0.00%
			Rehabilitation of existing bridges	0.75%
			A.2 - New of Minor Bridges	
			(1) **Foundation:** on completion of foundation work including foundation for wing and return wall **Substructure :** on completion of abutments, piers upto the abutment/pier cap.	28.73%
			(3) **Super-structure**: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	34.36%
3	Major Bridge works and ROB/RUB /elevated sections/flyovers including viaducts, if any		**A.1 - Widening and repairs of existing major bridges**	
			(1) Foundation:	0.00%
			(2) Sub-structure:	0.00%
			(3) Super-structure: (including bearings.)	0.00%
			(4) Wearing Coat including expansion joints	0.00%
			(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%
			(6) Wing walls/return walls	0.00%
			(7) Guide bunds, river training works etc.	0.00%
			(8) Approaches (including retaining walls, stone pitching, protection works).	0.00%
			A.2 - New major bridges	
			(1) Foundation: Foundation for abutment, piers	1.65%
			(2) Sub-structurefor abutment, piers up to abutment/pier cap level	7.10%
			(3) Super-structure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)	22.27%
			(4) Other Ancillary works : wearing coat, expansion joints hand rails, crash barriers, tests on completion etc. completion in all respect.	1.18%
			(5) Approaches of all Major and Minor Bridge (including retaining walls, stone pitching, protection works).	3.96%
			(6) Wing walls/return walls	0.000%

S. No.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	2	3	4
			(7) Guide bunds, river training works etc.	0.00%
			B.1 - Widening and repairs of (a) ROB and (b) RUB	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat: (a) in case of ROB - wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB - rigid pavement under RUB including drainage facility complete in all respect as specified.	0.00%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%
			(6) wing walls/return walls	0.00%
			(7) Approaches (including retaining walls, stone pitching, protection works).	0.00%
			B.2 - New ROB / RUB	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat: (a) in case of ROB - wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB - rigid pavement under RUB including drainage facility complete in all respect as specified.	0.00%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%
			(6) wing walls/return walls	0.00%
			(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%
			C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators	
			(1) Foundation	0.00%
			(2) Sub structure	0.00%
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat including expansion joint	0.00%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%
			(6) wing walls/return walls	0.00%
			(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%
			C.2 - New Elevated section/Flyover/Grade Separators	
			(1) Foundation:	0.00%
			(2) Sub-structure:	0.00%

S. No.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	**2**	**3**	**4**
			(3) Superstructure (including bearing)	0.00%
			(4) wearing coat including expansion joint	0.00%
			(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	0.00%
			(6) wing walls/return walls	0.00%
			(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%
4	**Other works**	27.69%	(i) Toll plaza	0.00%
			(ii) Road side drains	31.50%
			(iii) Road signs, markings, km stones safety Devices etc.	18.10%
			(iv) Project facilities	
			(a) Bus Bay with shelter	0.39%
			(b) Truck laybys	0.000%
			(c) Rest areas	0.000%
			(d) others (to be specified)	
			(i) Street Lighting	1.79%
			(ii) Maintenance of existing road	3.42%
			(iii) Utility Ducts	0.48%
			(iv) Temporary diversion	1.62%
			(v) Junction improvement works including Connecting Road & Junction under Grade separator, noise barrier.	5.24%
			(v) Road side plantation	0.00%
			(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs.	0.00%
			(vii) Protection works Retaining wall/Toe walls other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	21.45%
			(viii) Safety and traffic management during construction	0.45%
			(ix) Side Slope Protection works Turfing and stone pitching	15.57%

1.3 Procedure of estimating the value of work done.

1.3.1 Road works

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

Table1.3.1

Stage of Payment	Percentage -weightage	Payment Procedure
A - Widening and strengthening of existing road		
(1) Earthwork up to top of the sub-grade	6.16%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less. **In case of Hill Cutting, the payment procedure will be as under.**
Hill Cutting		Weightage of Hill cutting shall be 40 % of total cost of Earthwork (B.1 (1) as above). Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m OR Stage in full length, whichever is less.
Preparation of Sub grade		Weightage of Subgrade shall be 60 % of total cost of Earthwork (B.1 (1) as above). Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 OR Stage in full length, whichever is less.
(2) Sub-base Course	2.74%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less.
(3) Non bituminous Base course	3.64%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less.
(4) Bituminous Base course	4.76%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less.

Stage of Payment	Percentage -weightage	Payment Procedure
(5) Wearing Coat	3.17%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less.
B.1 - Reconstruction realignment/ bypass/Geometric Improvement (Flexible pavement)		
(1) Earthwork up to top of the sub-grade	24.67%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less. **In case of Hill Cutting, the payment procedure will be as under:**
Hill Cutting		Weightage of Hill cutting shall be 40 % of total cost of Earthwork (B.1 (1) as above). Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m OR Stage in full length, whichever is less.
Preparation of Sub grade		Weightage of Subgrade shall be 60 % of total cost of Earthwork (B.1 (1) as above). Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 OR Stage in full length, whichever is less.
(2) Sub-base Course	11.74%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less
(3) Non bituminous Base course	9.28%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less

Stage of Payment	Percentage -weightage	Payment Procedure
(4) Bituminous Base course	12.15%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less
(5) Wearing Coat	8.16%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m **OR** Stage in Full length, whichever is less
B.2 - Reconstruction realignment/ bypass/Geometric Improvement (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1 (One) km. length, whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Dry lean concrete (DLC)	0.00%	
(4) Pavement quality concrete (PQC) course	0.00%	
C.1 - Reconstruction/ New Service 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 full length or 1 (One) km length.
(1) Earthwork up to Subgrade top	0.00%	
(2) Subbase course (GSB)	0.00%	
(3) Non-bituminous base course (WMM)	0.00%	
(4) Bituminous base	0.00%	
(5) wearing coat	0.00%	
C.2 - Reconstruction/ New Service Road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 1 (One) km length.
(1) Earthwork up to Subgrade top	0.00%	
(2) Subbase course (GSB)	0.00%	
(3) Dry lean concrete (DLC)	0.00%	
(4) Pavement quality concrete (PQC) course	0.00%	
D. - Reconstruction & New Culverts on existing road, realignments, bypasses, Geometric Improvement		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least 1 (One) culvert.
(1) Hume Pipe Culvert	1.70%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on
	10.90%	

Stage of Payment	Percentage -weightage	Payment Procedure
(2) Box culvert	0.84%	the completion of at least 1 (One) culvert.
(3) Slab Culvert	0.08% 1.70%	
(4) Rectification of partially executed Culverts	10.90%	Payment Shall be made on completion of entire scope in all respect.

@. 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. And L = Total length in km.

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1 - Widening and repairs of Minor Bridges		Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of work in at least 1 bridge in all respects.
Widening of existing bridges	0.00%	
Rehabilitation of existing bridges	0.75%	
A.2 - New of Minor Bridges and Underpasses/ Overpasses		
(1) **Foundation** : On completion of the foundation work including foundations for wing and return walls **Substructure:** on completion of abutments, piers upto the abutment/pier cap.	28.73%	(i) Foundation: Payment against Foundation shall be made on pro rata basis on completion of at least two foundations. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. ii) Sub Structure: Payment against Sub Structure shall be made on pro rata basis on completion of atleast two sub structures upto abutment / pier cap level of each bridge.
(2) **Super-structure**: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	34.36%	iii) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub- clause.
(4) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	0.000%	Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified
B.1 - Widening and repairs of Underpasses/Overpasses	0.00%	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpass/overpasses. Payment shall be made on the completion of widening & repair works of an underpass/overpass.

1.3.3 **Major Bridge works, ROB/RUB and Structures**

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

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
A.1 - Widening and repairs of existing major bridges		
(1) Foundation:	0.000%	Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major bridge.
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure:	0.000%	Payment against Substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(3) Super-structure: (including bearings.)	0.000%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	0.000%	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.000%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.000%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	0.000%	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.000%	Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A.2 - New major bridges		Cost of each structure shall be determined on pro rata basis in respect to the total liner length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given below-
For bridges having span more than 60 m		
(1) Foundation: Foundation for abutment, piers	1.65	Payment procedure shall be as under-

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
In case of Well Foundation	0.000%	Cost of each foundation shall be determined from cost of all foundations as under: Cost of one foundation of depth 'd'= (d/D) * Cost of all foundations D= sum of depth of all foundations; Depth of foundations shall be as per approved designs & drawings by AE. Payment against foundations shall be made on pro-rata basis on completion of a stage as under:
a. Cutting edge + Well curb		Weightage shall be 10 % of total cost of one well foundation. Payment shall be on completion of a stage i.e. completion of cutting edge and well curb.
b. Well staining upto bottom of well cap		Weightage shall be 80 % of total cost of one well foundation. Unit of measurement is linear depth of foundation in meter. Payment shall be made on pro rata basis on completion of a stage in a depth of not less (i) 10 m in first stage and (ii) 5 m in subsequent stages.
c. Bottom Plug+ Top Plug (if provisioned as per design) + Well cap		Weightage shall be 10 % of total cost of one well foundation. Payment shall be on completion of a stage i.e. Bottom Plug+ Top Plug (if provisioned as per design) + Well cap in all respect. In case where load testing is required for foundation, the payment of this stage shall be made after the foundation is passed in the load testing.
In case of Pile Foundation		Cost of each foundation shall be determined from cost of all foundations as under: Cost of one foundation of depth 'd'= (d/D) * Cost of all foundations D= sum of depth of all foundations; Depth of foundations shall be as per approved designs & drawings by AE. Payment against foundations shall be made on pro-rata basis on completion of a stage as under:
a. Piling		Weightage shall be 70 % of total cost of one foundation. Unit of measurement is no. of piles completed till bottom of Pile cap. Payment shall be made on pro rata basis on completion of a stage in nos. of not less than 50 % of total piles.
b. Pile cap		Weightage shall be 30 % of total cost of one foundation. Payment shall be on completion of a stage i.e. completion of Pile cap.
In case of Open Foundations		Cost of each foundation shall be determined from cost of all foundations divided by nos. of all foundations in a Bridge. Payment against foundations shall be made on pro-rata basis on completion of a stage i.e. completion of at least two foundations of the major bridge. In case where load testing is required for foundation, the trigger of first payment

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
		shall include load testing also were specified.
(2) Sub-Structure for abutment, piers up to abutment/pier cap level	7.10%	Cost of one Sub-structure of the Bridge shall be determined from total cost of sub-Structures of a Bridge divided by total nos. of Substructures. Payment shall be on completion of a stage i.e. completion of at least one substructure upto abutment/pier cap level of each structure.
(3) Super-structure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)	22.27%	(a) Super structure (casting of girder): Unit of measurement is numbers. Payment against casting of girders shall be made on pro rata basis with respect to total numbers of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure. (b) Super structure (Casting of segments): Unit measurement is numbers. Payment against casting of segments shall be made on pro rata basis with respect of total numbers of segments required in the structure on completion of a stage i.e. not less than completion of casting at least 10 (ten) segments of the structure. (c) Super structure (Erection of girders, deck slab and bearing): Payment shall be made on pro rata basis on completion of a stage i.e. completion of supers structure including bearings of at least one span in all respects as specified.
(4) Other Ancillary works : wearing coat, expansion joints hand rails, crash barriers, tests on completion etc. completion in all respect.	1.18%	(iv) Other Ancillary works: Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(5) Approaches of all Major and Minor Bridges including retaining walls, stone pitching, protection works.	3.96%	(v) Approaches: Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(6) Wing walls/return walls upto full height	0.000%	(vi) Wing/Return wall up to full height: Payment shall be made on completion of all wing wall/return walls for bridge, complete in all respect as specified.
(7) Guide bunds, River Training works etc.	0.000%	Guide Bunds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
B.1 - Widening and repairs of (a) ROB and (b) RUB		
(1) Foundation	0.000%	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
		ROB/RUB subject to completion of at least two foundations of the ROB/RUB
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.000%	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the ROB/RUB.
(3) Super-structure (including bearing)	0.000%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints in case of ROB. In case of RUB-rigid pavement under RUB including drainage facility as specified	0.000%	Wearing Coat: Payment shall be made on completion of
		(a) in case of ROB- wearing coat including expansion joints complete in all respects as specified
		and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.000%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.000%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including retaining walls, stone pitching, protection works)..	0.000%	Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified
B.2 - New ROB / RUB		
(1) Foundation	0.000%	Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of at least two foundations of the ROB/RUB
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.000%	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of ROB/RUB bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the ROB/RUB.

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
(3) Super-structure (including bearing)	0.000%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints in case of ROB. In case of RUB-rigid pavement under RUB including drainage facility as specified	0.000%	Wearing Coat: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.000%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.000%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls / Reinforced Earth wall, stone pitching and protection works)	0.000%	Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified
C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators		
(1) Foundation	0.000%	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the Structure.
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.000%	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the structure.
(3) Super-structure (including bearing)	0.000%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	0.000%	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.000%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road

Table 1.3.3		
Stage of payment	**Weightage**	**Payment procedure**
		markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.000%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.000%	Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified
C.2 - New Elevated section/Flyover/Grade Separators		
(1) Foundation	0.000%	Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the Structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure	0.000%	Sub-structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of structure subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the structure.
(3) Super-structure (including bearing)	0.000%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super- structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	0.000%	Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.000%	Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls	0.000%	Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(7) Approaches (including Retaining walls / Reinforced Earth wall, stone pitching and protection works)	0.000%	Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified

1.3.4 Other works.

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

1.3.4:

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii) Road side drains	31.50%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length.
(iii) Road signs, markings, km stones safety Devices etc.	18.10%	
(vi) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus bays	0.39%	
b) Truck laybys	0.00%	
(c) Rest areas	0.00%	
d) Others (To be specified)		
(i) Street Lighting	1.79%	
(ii) Maintenance of existing road	3.42%	
(iii) Utility Ducts	0.48%	
(iv) Temporary diversion	1.62%	
(v) Rainwater Harvesting	0.00%	
(vi) Junction improvement works including Connecting Road &Junction under Grade separator etc.	5.24%	
(vi) Road side Plantation	0.00%	Unit of measurement is linear length.
(vii) Repair of protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	0.00%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length.
(vii) Protection works retaining wall/toe walls other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	21.45%	
(viii) Safety and traffic management during construction	0.45%	Payment shall be made on prorate basis every six months.
(ix) Side Slope Protection works Turfing and stone pitching	15.57%	Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length

2. Procedure for payment for Maintenance.

2.1 The cost for maintenance shall be as stated in Clause 14.1.(i)

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))

1. Drawings

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

1. A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

(a) Drawing of horizontal alignment, vertical profile and detailed cross sections;

(b) Drawings of cross drainage works, i.e. Bridges/Culverts/Flyovers and Other Structures;

(c) Drawings for River Training works;

(d) Drawings of interchanges, major intersections and underpasses;

(e) Drawing of control centre;

(f) Drawings of road furniture items including traffic signage, marking, safety barriers, etc;

(g) Drawings of traffic diversions plans and traffic control measures;

(h) Drawings of road drainage measures;

(i) Drawings of typical details slope protection measures;

(j) Drawings of landscaping and horticulture;

(k) Drawings of pedestrian crossing;

(l) Drawings of street lighting;

(m) General Arrangement showing Base Camp and Administrative Block;

(n) Any other drawings as per instruction of Authority Engineer.

(See Clause 10.3.2)

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[$]

2.1 2.1 Project Milestone-I shall occur on the date falling on the 150th (One Hundred and Fifty) day from the Appointed Date (the "**Project Milestone-I**").

2.2 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[$]

3.1 Project Milestone-II shall occur on the date falling on the 360th (Three hundred and Sixty) day from the Appointed Date (the "**Project Milestone-II**").

3.2 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 30% (thirty per cent) of the Contract Price.

4. Project Milestone-III[$]

4.1 Project Milestone-III shall occur on the date falling on the 550th(Five hundred and Fifty) day from the Appointed Date (the "**Project Milestone-III**").

4.2 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 60% (sixty per cent) of the Contract Price.

5 Schedule Completion Date

5.1 The Scheduled Completion Date shall occur on the 730th (Seven Hundred and Thirty) day from the Appointed Date.

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

6 Extension of time

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

Schedule-K

(See Clause 12.1.2)

Tests on Completion

1. **Schedule for Tests**

[$] If total project length is say **'L' km** and the unencumbered length along existing road as handed over on the appointed date is **'L_1' km** (including bypasses, re-alignment, structure etc.) and balance length i.e. **'L2' km(L-L1)** is to be handed over on a later date as per the memorandum signed under provision of Clause 8.2.1 of the Contract Document, then the Project Milestone-I, II and III shall be linked to stage payment statement for amount in percentage of the contract price worked out on prorata basis for the **'L_1' km** length handed over of balance length, the subsequent Project Milestone shall be linked to stage payment statement for amount in percentage of the total contract price.

For example:

If the date for Milestone-I and Milestone-II is 180th and 300th day from appointed date and balance **'L_2' km** length is handed over after 300th day from appointed date, then the stage payment statement required for achieving Milestone-I and Milestone-II should be linked to Contract Price worked out on prorata basis for the **L_1 km length** [**i.e. for Contract Price x L_1/L**]. Subsequent Milestone i.e. Milestone-III will be linked to stage payment statement for amount in percentage of the total contract price. **In no case, there shall be any change in the schedule completion date unless extension of time has been granted by the Authority under Clause 10.3 and 10.5 of the contract agreement.**

In order for the above dispensation to come into operation, it is necessary that a suitable mechanism (like escrow account) is evolved between the parties to the effect that the payments released to the contractor under the above dispensation would be used for completion of the project in the first instance and shall be available to the Contractor only after meeting his project related commitments.

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

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

2 Tests

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

2.2 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 [2,000 (two thousand)] mm for each kilometer.

2.3 Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on 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) meters or more shall also be subjected to load testing.

2.4 Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

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

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

3 Agency for conducting Tests

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

4. **Completion Certificate**

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

Schedule-L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

1. I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …….. (the "**Agreement**"), for construction of the "***Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to***

Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work", through …….(Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

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

3. In view of the foregoing, I am satisfied that that Project Highway from km 8.000 to km 65.000 can be safety and reliably placed in service of the users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the …day of……. 20 ……

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

COMPLETION CERTIFICATE

1. I, …….(Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated ……(the "**Agreement**"), for construction of the "***Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"***, 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 safety and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED
For and on behalf of
The Authority's Engineer by:
(Signature)
(Name)
(Designation)
(Address)

Schedule-M

(See Clauses 14.6., 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(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%

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

R=P/100 x M xL1/L

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

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

L1 = Non-complying length

L = Total length of the road,

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

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

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

Schedule-N

(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof or 'Guidelines for Employment of Consultants under Japanese ODA Loans' or a combination of certain provisions thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

1.2 The Authority shall invite Expression of Interest from Consulting Engineering firms or bodies corporate to undertake and perform the duties and functions set forth in Annexure-I of Schedule-N and thereupon shortlist qualified firms in accordance with pre-determined criteria.

1.3 The Authority shall invite the aforesaid shortlisted firms to submit their respective technical and financial offers, each in separate sealed cover and/or upload online. All the technical bids so received shall be opened and pursuant to the evaluation thereof, the Authority shall open the financial bids in respect of each shortlisted firm and the order of priority as among these firms shall be determined on the basis of a weighted evaluation where technical and financial score shall be assigned respective weights of 80:20.

1.4 In the event of termination of the Technical Consultants appointed in accordance with the provisions of above Paragraphs 1.1 to 1.3, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1. Scope

1.1 These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated..... (the "**Agreement**), which has been entered into between the Ministry of Road Transport and Highways (the "**Authority**") and ..... (the "**Contractor**") for "***Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"***, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time extension;

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

(c) the Termination Payment; or

(d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding 0.2% of Contract Price.

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

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

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

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

4 **Construction Period**

4.1 During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided,

however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended 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.

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

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

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

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

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

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

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

4.9 For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

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

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

4.12 In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

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

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

4.15 The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

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

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

4.18 The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

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

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

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

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

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

6 Determination of costs and time

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

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

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

7. Payments

7.1 The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (d).

7.2 Authority's Engineer shall -

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

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

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

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

8. Other duties and functions

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

9 Miscellaneous

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

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

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

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

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

(ii) Any amount towards deduction of taxes; and

(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.

4. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(f) the monthly payment admissible in accordance with the provisions of the agreement;

(g) the deductions for maintenance work not done;

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

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

(j) amount towards deduction of taxes

5. Contractor's claim for Damages

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

Schedule-P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover for the works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and arises from a cause occurring prior to the issue of Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

3.1. The Contractor shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph l 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. [*****]

3.2 The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this 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 and 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 2,500 (two thousand five hundred) 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 the permissible values are given below: • Area of cracking not more than 2 % area

• Area of rutting with rut depth more than 10 mm - not more than 1 …. % area

• Area of stripping: not more than 2 % area

• Area of potholes: Nil

• Edge drop – Shall not be more than 15 mm

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 "***Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"***, ……. (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 of Authority's Engineer)
(Address)

SCHEDULE-S
(See Clause 17.7.2)

Performance Certificate

I, ……. (Name and designation of the Authority's representative) under and in accordance with the Agreement dated …… (the "Agreement"), for [construction and maintenance of the "***Improvement/ Widening to 2-lane with paved shoulder/4-laning of NH-40 between Shillong to Dawki road upto Bangladesh Border including Dawki bridge from km 131+820 to km 151+330 (design km 45+760 to km 63+530) Design length 17.77 km in the State of Meghalaya for execution of EPC mode under JICA funding (Package – IV)-Balance Work"***, ……. (Name of Contractor), hereby certify that the Contractor has discharged all its obligations under the Agreement and in accordance with Article 17 of the Agreement I hereby issue Performance Certificate to the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)
(Name of Authority's Engineer)
(Address)

SCHEDULE-T
(See Clause 19.1.6)

1.

Name of Currency	**A Amount of Currency**	**B Rate of Exchange* (Local Currency per Unit of Foreign Currency)**	**C Local Currency Equivalent**	**D Percentage of Net Bid Price (NTP) (100 x C) / NTP**
Local Currency (Indian Rupees)				
Foreign Currency 1 (Japanese Yen)				
Foreign Currency 2 (US Dollar)				
Net Bid Price				100.00

* The fixed rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the **Reserve Bank of India**.

1. Change in scope would require agreement between parties on currency.

2. Regarding damages by the Authority, financing charges for a payment delays will be in corresponding currency amounts.

3. Delay damages will be recovered in currencies in proportion which in which contract price is payable.