

Schedule A
(See Clause 2.1 and 8.1)
SITE OF THE PROJECT

1 The Site

- 1.1 Site of the Four-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A. The instant work is a balance work. Accordingly, at several locations work has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. Thus, the prospective bidders **are strictly advised to visit the site thoroughly before participating in the bid.** It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.
- 1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 1.3 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 8.2.1 of this Agreement.
- 1.4 The alignment plans of the project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the Contractor with minimum FRL as indicated in the alignment plan. The contractor, however, improve/upgrade the Road Profile as indicated in Annexure-III based on site/design requirement.
- 1.5 The status of the environment clearances obtained or awaited is given in Annex-IV.

Annex-I
(Schedule-A)
Site

1. Site

1.5 The Site of the Project Highway comprises the section of National Highway 37 commencing from Km 490.800 (Design Chainage) to Km 534.800 (Design Chainage) in the state of Assam. The land carriageway and structures comprising the site are described below. The instant work is a balance work. Accordingly, at several locations work has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. Thus, the prospective bidders **are strictly advised to visit the site thoroughly before participating in the bid.** It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

2. Land

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

Design Chainage (Km)		Total PROW (inm)	Remarks
From	To		
490.800	514.290	60	In the section from Km 490.898 to Km 493.609, the PROW is 24m (RHS) & 36m (LHS), measured from the centre line of the existing road.
514+290	514+970	40	
514+970	515+100	23.5	
515+100	515+400	40	
515+400	524+945	60	
524+945	525+545	120	Toll Plaza
525+545	534+800	60	

3. Carriageway

The existing carriageway consists of the following which are complete/ incomplete/partially complete and are to be completed in all respect.

(a) Main Carriage Way (Widening Portion of existing 2-lane)

Subgrade Widening Portion					
Sl. No.	Chainage (Km)		Length (Km)	Side	Status
	From	To			
1	501+280	501+800	520	RHS	SG Completed
2	502+840	504+720	1880	LHS	SG Completed
3	503+020	503+560	540	RHS	SG Completed
4	503+750	504+980	1230	RHS	SG Completed
5	505+150	507+740	2590	LHS	SG Completed
6	505+455	507+500	2045	RHS	SG Completed
7	507+535	507+940	405	RHS	SG Completed
8	508+820	509+480	660	RHS	SG Completed
9	509+060	509+480	420	LHS	SG Completed
10	509+920	510+480	560	RHS	SG Completed
11	510+000	513+400	3400	LHS	SG Completed
12	510+500	513+650	3150	RHS	SG Completed
13	513+710	514+250	540	RHS	SG Completed
14	514+360	515+570	1210	RHS	SG Completed
15	514+380	514+480	100	LHS	SG Completed
16	514+600	514+980	380	LHS	SG Completed
17	515+360	515+570	210	LHS	SG Completed
18	516+100	516+960	860	LHS	SG Completed
19	516+380	516+650	270	RHS	SG Completed
20	517+200	519+400	2200	LHS	SG Completed
21	517+600	519+380	1780	RHS	SG Completed
22	519+610	519+880	270	LHS	SG Completed
23	519+950	520+270	320	RHS	SG Completed
24	519+960	520+370	410	LHS	SG Completed
25	520+450	520+670	220	LHS	SG Completed
26	520+500	520+700	200	RHS	SG Completed
27	520+955	521+855	900	RHS	SG Completed
28	521+000	521+320	320	LHS	SG Completed
29	521+370	521+470	100	LHS	SG Completed
30	521+520	523+180	1660	LHS	SG Completed
31	522+140	525+560	3420	RHS	SG Completed
32	523+300	524+350	1050	LHS	SG Completed
33	524+350	526+700	2350	LHS	SG Completed
34	525+600	526+700	1100	RHS	SG Completed
35	527+460	528+400	940	LHS	SG Completed
36	527+460	528+400	940	RHS	SG Completed

37	528+900	532+750	3850	LHS	SG Completed
38	528+900	532+750	3850	RHS	SG Completed
39	532+900	533+240	340	RHS	SG Completed
40	534+090	534+800	710	LHS	SG Completed
41	534+200	534+800	600	RHS	SG Completed
Sub-Total			48500		Subgrade Completed
1	493+700	494+080	380	LHS	SG Partially Completed
2	496+660	496+850	190	LHS	SG Partially Completed
3	500+100	500+480	380	LHS	SG Partially Completed
4	501+390	501+800	410	LHS	SG Partially Completed
5	502+400	502+590	190	LHS	SG Partially Completed
6	502+400	502+520	120	RHS	SG Partially Completed
7	503+650	503+750	100	RHS	SG Partially Completed
8	507+940	508+400	460	LHS	SG Partially Completed
9	508+470	508+540	70	LHS	SG Partially Completed
10	508+810	509+060	250	LHS	SG Partially Completed
11	513+400	513+680	280	LHS	SG Partially Completed
12	513+750	514+380	630	LHS	SG Partially Completed
13	514+480	514+600	120	LHS	SG Partially Completed
14	514+980	515+280	300	LHS	SG Partially Completed
15	515+330	515+360	30	LHS	SG Partially Completed
16	516+100	516+380	280	RHS	SG Partially Completed
17	516+960	517+200	240	LHS	SG Partially Completed
18	520+370	520+450	80	LHS	SG Partially Completed
19	520+670	520+700	30	LHS	SG Partially Completed
20	521+470	521+520	50	LHS	SG Partially Completed
Sub-Total			4590		Subgrade Partially Completed
GSB Widening Portion					
1	505+650	507+740	2090	LHS	GSB Completed
2	507+430	507+500	70	RHS	GSB Completed
3	508+820	509+480	660	RHS	GSB Completed
4	509+060	509+480	420	LHS	GSB Completed
5	509+920	510+480	560	RHS	GSB Completed
6	510+000	510+440	440	LHS	GSB Completed
7	510+500	512+900	2400	RHS	GSB Completed
8	511+160	513+000	1840	LHS	GSB Completed
9	513+260	513+350	90	RHS	GSB Completed
10	514+100	514+250	150	RHS	GSB Completed
11	514+360	514+980	620	RHS	GSB Completed
12	514+600	515+570	970	RHS	GSB Completed
13	516+380	516+650	270	RHS	GSB Completed
14	517+200	517+910	710	LHS	GSB Completed

15	518+280	518+820	540	LHS	GSB Completed
16	517+600	519+380	1780	RHS	GSB Completed
17	519+610	519+880	270	LHS	GSB Completed
18	519+950	520+270	320	RHS	GSB Completed
19	519+960	520+370	410	LHS	GSB Completed
20	520+450	520+670	220	LHS	GSB Completed
21	520+500	520+700	200	RHS	GSB Completed
22	521+000	521+320	320	LHS	GSB Completed
23	521+000	521+855	855	RHS	GSB Completed
24	521+370	521+470	100	LHS	GSB Completed
25	521+820	523+180	1360	LHS	GSB Completed
26	522+140	525+560	3420	RHS	GSB Completed
27	523+820	524+350	530	LHS	GSB Completed
28	524+500	525+700	1200	LHS	GSB Completed
29	525+600	526+520	920	RHS	GSB Completed
30	526+640	526+700	60	RHS	GSB Completed
31	527+460	528+400	940	LHS	GSB Completed
32	527+460	527+650	190	RHS	GSB Completed
33	528+900	532+750	3850	LHS	GSB Completed
34	529+800	532+750	2950	RHS	GSB Completed
35	532+900	533+240	340	RHS	GSB Completed
36	534+090	534+800	710	LHS	GSB Completed
37	534+200	534+800	600	RHS	GSB Completed
Sub-Total			33375	GSB Completed	
1	501+280	501+800	520	RHS	GSB Partially Completed
2	505+650	505+800	150	RHS	GSB Partially Completed
3	514+380	514+480	100	LHS	GSB Partially Completed
4	514+600	514+980	380	LHS	GSB Partially Completed
5	515+360	515+570	210	LHS	GSB Partially Completed
6	516+100	516+300	200	LHS	GSB Partially Completed
7	518+820	519+400	580	LHS	GSB Partially Completed
8	521+520	521+820	300	LHS	GSB Partially Completed
9	526+380	526+700	320	LHS	GSB Partially Completed
Sub -Total			2760	GSB Partially Completed	
WMM Widening Portion					
1	509+060	509+480	420	LHS	WMM Completed
2	509+060	509+480	420	RHS	WMM Completed
3	509+920	510+480	560	RHS	WMM Completed
4	510+000	510+440	440	LHS	WMM Completed
5	511+160	512+900	1740	LHS	WMM Completed
6	511+210	512+900	1690	RHS	WMM Completed
7	514+600	514+980	380	RHS	WMM Completed
8	517+570	517+910	340	LHS	WMM Completed

9	517+600	519+360	1760	RHS	WMM Completed
10	518+280	518+820	540	LHS	WMM Completed
11	519+230	519+400	170	LHS	WMM Completed
12	520+500	520+700	200	RHS	WMM Completed
13	522+120	523+000	880	LHS	WMM Completed
14	522+140	522+760	620	RHS	WMM Completed
15	524+200	524+350	150	LHS	WMM Completed
16	524+500	525+620	1120	LHS	WMM Completed
17	524+500	524+960	460	RHS	WMM Completed
18	525+600	526+520	920	RHS	WMM Completed
19	526+640	526+700	60	RHS	WMM Completed
20	527+460	528+400	940	LHS	WMM Completed
21	527+460	527+650	190	RHS	WMM Completed
22	528+900	532+750	3850	LHS	WMM Completed
23	529+800	532+750	2950	RHS	WMM Completed
24	532+900	533+240	340	RHS	WMM Completed
25	534+090	534+800	710	LHS	WMM Completed
	534+200	534+700	500	RHS	WMM Completed
Sub-Total			22350		WMM Completed
1	517+200	517+570	370	LHS	WMM Partially Completed
2	519+960	520+350	390	LHS	WMM Partially Completed
3	520+450	520+670	220	LHS	WMM Partially Completed
4	521+000	521+300	300	LHS	WMM Partially Completed
5	521+370	521+470	100	LHS	WMM Partially Completed
6	525+620	525+700	80	LHS	WMM Partially Completed
Sub-Total			1460		WMM Partially Completed
DBM Widening Portion					
1	509+920	510+400	480	RHS	DBM Completed
2	511+210	512+760	1550	LHS	DBM Completed
3	511+210	512+900	1690	RHS	DBM Completed
4	514+600	514+980	380	RHS	DBM Completed
5	517+570	517+910	340	LHS	DBM Completed
6	517+600	519+360	1760	RHS	DBM Completed
7	518+280	518+820	540	LHS	DBM Completed
8	519+230	519+400	170	LHS	DBM Completed
9	520+500	520+700	200	RHS	DBM Completed
10	522+140	522+760	620	RHS	DBM Completed
11	522+160	522+990	830	LHS	DBM Completed
12	525+600	526+520	920	RHS	DBM Completed
13	527+460	527+650	190	RHS	DBM Completed
14	527+920	528+400	480	LHS	DBM Completed
15	528+900	529+360	460	LHS	DBM Completed

16	529+500	530+000	500	LHS	DBM Completed
17	529+800	530+940	1140	RHS	DBM Completed
18	530+150	530+860	710	LHS	DBM Completed
19	531+900	532+750	850	LHS	DBM Completed
20	534+270	534+670	400	RHS	DBM Completed
21	534+380	534+680	300	LHS	DBM Completed
Sub-Total			14510	DBM Completed	
1	524+500	525+589	1089	LHS	DBM Completed
2	524+500	524+960	460	RHS	DBM Completed
3	527+460	527+920	460	LHS	DBM Completed
4	529+360	529+500	140	LHS	DBM Completed
5	530+000	530+150	150	LHS	DBM Completed
6	531+520	531+900	380	LHS	DBM Completed
7	531+540	532+750	1210	RHS	DBM Completed
8	532+900	533+240	340	RHS	DBM Completed
Sub-Total			4229	DBM Completed	
BC Widening Portion					
1	511+300	512+900	1600	RHS	BC Completed
2	517+600	519+360	1760	RHS	BC Completed
3	518+280	518+820	540	LHS	BC Completed
4	519+230	519+400	170	LHS	BC Completed
5	522+140	522+760	620	RHS	BC Completed
6	522+160	522+365	205	LHS	BC Completed
7	527+920	528+400	480	LHS	BC Completed
8	528+900	529+040	140	LHS	BC Completed
9	530+070	530+860	790	LHS	BC Completed
10	534+380	534+680	300	LHS	BC Completed
Sub-Total			6605	BC Completed	

(b) Main Carriage Way (New 2-Lane Construction/4-Lane in Realignment)

Subgrade New 2-lane / Realignment Portion					
Sl. No.	Chainage (Km)		Length (Km)	Side	Status
	From	To			
1	497+000	497+300	300	LHS	SG Completed
2	497+000	497+300	300	RHS	SG Completed
3	509+480	510+000	520	LHS	SG Completed
4	509+480	509+920	440	RHS	SG Completed
5	515+570	515+660	90	LHS	SG Completed
6	515+570	515+650	80	RHS	SG Completed
7	519+400	519+460	60	LHS	SG Completed
8	520+700	521+000	300	RHS	SG Completed

9	521+000	521+855	855	RHS	SG Completed
10	526+700	527+460	760	LHS	SG Completed
11	526+700	527+460	760	RHS	SG Completed
12	528+400	528+900	500	LHS	SG Completed
13	528+400	528+900	500	RHS	SG Completed
14	532+750	532+900	150	LHS	SG Completed
15	532+750	532+900	150	RHS	SG Completed
Sub Total			5765	Subgrade Completed	
1	496+190	496+660	470	LHS	SG Partially Completed
2	496+190	496+660	470	RHS	SG Partially Completed
3	501+800	502+400	600	LHS	SG Partially Completed
4	501+870	502+240	370	RHS	SG Partially Completed
5	502+260	502+400	140	RHS	SG Partially Completed
6	508+720	508+810	90	LHS	SG Partially Completed
7	515+660	516+070	410	LHS	SG Partially Completed
8	516+080	516+100	20	RHS	SG Partially Completed
9	520+700	521+000	300	LHS	SG Partially Completed
Sub-Total			2870	Subgrade Partially Completed	
GSB New 2-lane / Realignment Portion					
1	509+480	510+000	520	LHS	GSB Completed
2	509+480	509+920	440	RHS	GSB Completed
3	515+570	515+650	80	RHS	GSB Completed
4	519+400	519+460	60	LHS	GSB Completed
5	520+700	521+000	300	RHS	GSB Completed
6	526+700	527+460	760	RHS	GSB Completed
7	526+730	527+460	730	LHS	GSB Completed
8	528+400	528+900	500	LHS	GSB Completed
9	532+750	532+900	150	LHS	GSB Completed
10	532+750	532+900	150	RHS	GSB Completed
Sub-Total			3690	GSB Completed	
1	515+570	515+660	90	LHS	GSB Partially Completed
Sub-Total			90	GSB Partially Completed	
WMM New 2-lane / Realignment Portion					
1	509+480	510+000	520	LHS	WMM Completed
2	509+480	509+920	440	RHS	WMM Completed
3	515+570	515+660	90	LHS	WMM Completed
4	519+400	519+410	10	LHS	WMM Completed
5	526+700	527+460	760	RHS	WMM Completed
6	526+730	527+460	730	LHS	WMM Completed
7	528+400	528+900	500	LHS	WMM Completed
8	532+750	532+900	150	LHS	WMM Completed
9	532+750	532+900	150	RHS	WMM Completed

Sub-Total			3350	WMM Completed	
1	519+410	519+460	50	LHS	WMM Partially Completed
Sub-Total			50	WMM Partially Completed	
DBM New 2-lane / 4-lane Realignment Portion					
1	519+400	519+410	10	LHS	DBM Completed
2	526+900	527+400	500	LHS	DBM Completed
3	526+900	527+300	400	RHS	DBM Completed
4	527+350	527+460	110	RHS	DBM Completed
5	528+400	528+900	500	LHS	DBM Completed
6	532+750	532+900	150	LHS	DBM Completed
Sub-Total			1670	DBM Completed	
1	532+750	532+820	70	RHS	DBM Completed
2	532+820	532+900	80	RHS	DBM Completed
Sub-Total			150	DBM Completed	

(c) Service Road:

Sl. No.	Chainage (Km)		Length (Km)	Side
	From	To		
Subgrade Completed				
1	532+900	533+600	0.350	LHS
2	500+960	501+900	0.470	RHS
3	502+000	502+450	0.225	RHS
4	500+960	501+140	0.090	LHS
5	513+050	513+350	0.150	RHS
6	533+600	534+700	0.550	LHS
7	534+400	534+700	0.150	RHS
8	532+900	534+400	0.750	RHS
Sub-Total			2.735	
GSB Completed				
1	532+900	533+600	0.350	LHS
2	534+400	534+580	0.090	RHS
3	500+960	501+140	0.090	LHS
4	501+100	501+280	0.090	RHS
5	501+720	501+860	0.070	RHS
6	534+100	534+700	0.300	LHS
7	534+580	534+700	0.060	RHS
Sub-Total			1.050	
WMM Completed				
1	532+900	533+600	0.350	LHS
2	534+100	534+550	0.225	LHS
Sub-Total			0.575	

3.1 The instant work is a balance work. Accordingly, at several locations work as shown above in Table a, b & c has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

4. Major Bridges

(a) The site includes the following existing 2-lane Major Bridges:

Sl. No.	Design Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)
		Foundation	Sub Structure	Super Structure		
1	508+454	Well	RCC Wall	PSC I Beam(3 Girder)	4X39.89	11.4
2	523+271	Well	RCC Wall	PSC I Beam(3 Girder)	1X42.9+1X44.52+1X42.2 8	8.4

(b) New 2-lane Major Bridge Partially completed:

Sl. No.	Design Chainage (km)	Type of Structure & Status			No. of Spans with span length in m	Width (m)
		Foundation	Sub structure	Super structure		
1	508+454	Pile	RCC Wall	PSC	4X41.550	11.4
		&	&	&		
		A1= Completed. P1=1 st Lift Completed,P2= Pile Cap Completed. P3= Pile Cap Completed. A2= Completed. PSC Girders-16 nos. completed.However, Pre-Stressing is	A1= Abutment completed. P2= Pier Completed. P3= Pier Completed. A2= Completed.	Nil.		

		balance.It will be the responsibility of the EPC Contractor to check the strength of the girder(s) before stressing/launching . In case, all or any girder is failed, the same shall be re-cast without any financial implication to the Authority.				
		Pile &	RCC Wall &	PSC &		
2	523+271	A1= Pile Cap Completed. P1= Pile Cap Completed. P2= Pile Cap Completed. A2= Pile Cap Completed. PSC-12 nos.completed.However, Pre-Stressing is balance. It will be the responsibility of the EPC Contractor to check the strength of the girder(s) before stressing/launching . In case, all or any girder is failed, the same shall be re-cast without any financial implication to the Authority.	A1= Abutment Shaft completed. P1= Pier shaft Completed. P2= Completed. A2= Completed.	Nil.	1X43.7+1 X43.7+1X 43.7	8.4

Note: The Drawings have already been reviewed and the same has to be followed. The EPC Contractor may also propose changes as per the codes/specifications. However, the same shall not attract any Change of Scope as per Article 13.

4.1 The instant work is a balance work. Accordingly, at several locations work as per table in para 4, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have

to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

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

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

Sl. No.	Chainage (km)	Type of Structures		No. of Spans with span length (m)	Total Width (m)	ROB/RUB
		Foundation	Super Structure			
Nil						

6. Grade Separators

The Site includes the following grade separators.

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

7. Minor bridges

The Site includes the following minor bridges in existing 2-lane:

Sl. No.	Design Chainage (km)	Type of Structures			No. of Spans with span length in m	Width (m)
		Foundation	Sub Structure	Super Structure		
1	490+889	Shallow	RCC Wall	Solid Slab	1x8.68 m	7.9
2	492+351	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.0 m	7.9
3	493+609	Shallow	RCC Wall	Solid Slab	1x6.230 +1x6.230 m	7.9

4	498+787	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.0 m	7.9
5	500+578	Shallow	PCC Wall	Solid Slab	1x41.55 m	11.4
6	502+270	Shallow	PCC Gravity Wall	Solid Slab	1x21.71 m	8.4
7	516+938	Shallow	PCC Wall	Solid Slab	1x27.45+2x12.2 m	8.4
8	533+784	Shallow	PCC Gravity Wall	Solid Slab	1x12.460 m	8.4
9	534+719	Shallow	PCC Wall	Solid Slab	2x6.6 m	8.4

Minor Bridge(Partially completed)

New Minor Bridge (Partially completed):

Sl. No.	Design Chainage (km)	Type of Structures			No. of Spans with span length in m	Status
		Foundati on	Sub Structure	Super Structure		
1	490+889	Shallow	RCC Wall	Solid Slab	1x8.68 m	New 2-lane bridge; Completed-RHS
2	492+351	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.0 m	New 2-lane bridge; Completed-RHS
3	493+609	Shallow	RCC Wall	Solid Slab	1x6.230 +1x6.230 m	New 2-lane bridge; Completed-RHS
4	498+787	Shallow	PCC Gravity Wall	Solid Slab	1 x 6.0 m	New 2-lane bridge; Completed up to 1st lift of LHS side of abutment wall
5	500+578	Pile	PCC Wall	Solid Slab	1x41.55 m	New 2-lane bridge; up to substructures of abutment A1 & A2 completed-LHS

6	502+270	Shallow	PCC Gravity Wall	Solid Slab	1x21.71 m	New 2-lane bridge Completed
7	516+938	Pile	PCC Wall	Solid Slab	1x27.45+2x12.2 m	New 2-lane bridge; Completed up to substructures of abutment A1, pier P1, Pier P2 & abutment A2 completed, all i.e., 2nos of PSC I girders casted, stressing done, all i.e., 6nos. of R.C.C girders erected, cross girders of span A1-P1 & P2-A2 casted, reinforcement fixing of deck slab of span A1-P1 & P2-A2 completed.
8	533+784	Shallow	PCC Gravity Wall	Solid Slab	1x12.460 m	New 2-lane bridge; Completed up to 15m of width on LHS, the concreting has been completed up to final lift in 11m width on LHS concreted, fixing of reinforcement has been completed for deck slab of 11m width on RHS.

9	534+719	Shallow	PCC Wall	Solid Slab	2x6.6 m	New 2-lane bridge completed-BHS
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Widening of Minor Bridge (Partially completed):

Sl. No.	Design Chainage	Width (m)	Span Arrangement	Type of structure			Details of widening
				Foundation	Sub structure	Super Structure	
1	490+889	7.9	1x9.1 = 9.1 m	Shallow	RCC Wall	Solid Slab	Widened to the required overall Width
2	492+351	7.9	1 x 6.5 = 6.5 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
3	493+609	7.9	1x6.5 +1x6.75 = 13.25 m	Shallow	RCC Wall	Solid Slab	Widened to the required overall Width
4	498+787	7.9	1 x 6.0 = 6.0 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
5	500+578	11.4	1x41.5 = 41.5 m	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width
6	502+270	8.4	9x2.5=22.25 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
7	516+938	8.4	1x27.45+ 2x12.2 = 51.85 m	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width
8	533+784	8.4	1x6.5+1x 6.75=13.25 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
9	534+719	8.4	1x6.5+1x 6.75=13.25 m	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width

7.1 The instant work is a balance work. Accordingly, at several locations work as shown in Para 7 above has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

8. Railway level crossings

The Site includes the following railway level crossings:

Sl. No.	Existing chainage (km)	Number of Tracks	Remarks
Nil			

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses.

Underpasses (Partially Completed):

Sl. No.	Design Chainage (Km)	Type of Structures	No. of Spans with span length (m)	Status
1	500+978	VUP	1 x 12	Structure Completed for BHS.
2	505+085	VUP	1 x 12	Structure Completed up to top Slab for BHS
3	533+630	VUP	1 x 12	Structure Completed up to Slab for BHS
4	502+550	PUP	1 x 7	Structure Completed for LHS, RHS Partially Completed

Details of RE Wall in approaches of VUP (Partially Completed):

Sl. No.	Design Chainage (Km)	Type of Structures	Status	Remarks
1	500+978	VUP	Not yet Started	
2	505+085	VUP	8098.2 Sqm RE	

			panel casted at site.	
3	533+630	VUP	Not yet Started	
4	502+550	PUP	4701.8 Sqm RE panel casted at site.	

Note: At site approx. 12800Sqm of RE panel are available. However, adequacy of such panels to be used, are to be assessed by the EPC contractor in consultation with the Engineer. In case, the panels are not found to be adequate as per the design of the EPC contractor, the same shall be re-cast and shall not qualify for Change of Scope as per Article 13 of EPC Contract Agreement.

9.1 The instant work is a balance work. Accordingly, at several locations work as shown in Para 9 above has been carried out which may be partially/fully completed. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

10. Culverts

The Site includes the following culverts,

List of Existing Box Culverts, in 4-lane width

Sl. No.	Design Chainage	Type of Structure	Span Arrangement	Present Status
1	496+530	Box Culvert	1x 4.3x3.061m	Completed up to deck slab
2	497+298	Box Culvert	1x 4.7x2.59 m	Completed up to deck slab
3	505+455	Box Culvert	1x4.1x2.538 m	Completed up to deck slab
4	505+886	Box Culvert	1x2.1x2.205 m	Completed up to deck slab
5	506+257	Box Culvert	1x2.0x2.916 m	Completed up to deck slab
6	507+537	Box Culvert	1x4.5x3.137 m	Completed up to deck slab
7	509+240	Box Culvert	1x3.7x2.497 m	Completed up to deck slab
8	509+693	Box Culvert	2x3.7x2.484 m	Completed up to deck slab
9	509+922	Box Culvert	1x5.0x2.465 m	Completed up to deck slab
10	510+943	Box Culvert	1x2.0x2.272 m	Completed up to deck slab
11	511+387	Box Culvert	1x2.0x2.1 m	Completed up to deck slab
12	511+893	Box Culvert	1x1.7x1.928 m	Completed up to deck slab
13	513+051	Box Culvert	1x1.8x1.815 m	Completed up to deck slab

Sl. No.	Design Chainage	Type of Structure	Span Arrangement	Present Status
14	513+670	Box Culvert	1x2.1x2.167 m	Completed up to deck slab LHS
15	514+345	Box Culvert	1x3.0x3.296 m	Only 2-lane Culvert on existing carriageway
16	515+315	Box Culvert	1x1.3x1.901 m	Only 2-lane Culvert on existing carriageway
17	520+367	Box Culvert	1x3.0x2.255 m	Only 2-lane Culvert on new carriageway
18	523+818	Box Culvert	1x3.0x3.107 m	Completed up to deck slab
19	524+457	Box Culvert	1x4.4x3.141 m	Completed up to deck slab
20	525+588	Box Culvert	1x3.2x3.031 m	Completed up to deck slab
21	526+780	Box Culvert	1x1.55x1.858 m	Completed up to deck slab
22	529+536	Box Culvert	1x4.4x2.407 m	Completed up to deck slab
23	531+494	Box Culvert	1x5.9x2.515 m	Completed up to deck slab
24	532+078	Box Culvert	1x1.5x1.77 m	Completed up to deck slab

Pipe Culvert (partially completed)

Sl. No.	Existing Chainage	Design Chainage	Site Chainage	Existing Type of Structure	Existing (m) span Arrangement	Existing Width in m	Status
NIL							

10.1 The instant work is a balance work. Accordingly, at several locations work as per Table in Para 10, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

11. Bus Bays

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

Sl. No.	Chainage (km)	Side	Location
NIL			

12. Truck Lay Bys

The details of truck lay bys are as follows:

Sl. No.	Chainage (km)	Side	Remarks
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1	517+150	RHS	up to WMM completed
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12.1 The instant work is a balance work. Accordingly, at several locations work as per Table in para 12, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

13. Road side drains

The details of road side drains completed/partially completed and to be completed:

Drain Status RHS					
Sl.No.	Chainage		Length (Km)	Present Status	Remarks
	From	To			
1	500+866	500+886	0.20	Completed	
2	500+896	500+937	0.41	Completed	
3	500+948	500+978	0.30	Completed	
4	501+030	501+081	0.51	Completed	
5	501+100	501+322	0.222	Completed	
6	501+360	501+798	0.438	Completed	
7	504+860	504+872	0.12	Completed	
8	504+877	504+897	0.14	Completed	
9	532+914	532+921	0.7	Completed	
10	532+930	532+952	0.22	Completed	
11	532+974	533+992	0.18	Completed	
12	533+006	533+032	0.26	Completed	
13	533+080	533+092	0.12	Completed	
14	533+107	533+126	0.19	Completed	
15	533+140	533+155	0.15	Completed	
16	533+168	533+196	0.28	Completed	
17	533+210	533+267	0.57	Completed	
18	533+279	533+299	0.20	Completed	
19	533+319	533+353	0.36	Completed	
20	533+367	533+397	0.30	Completed	
21	533+407	533+420	0.13	Completed	
22	533+540	533+561	0.21	Completed	

23	533+572	533+593	0.21	Completed	
24	533+600	533+696	0.96	Completed	
25	534+708	534+756	0.48	Completed	
26	534+814	534+855	0.41	Completed	
27	534+864	534+876	0.12	Completed	
28	534+886	534+908	0.22	Completed	
29	534+916	534+926	0.10	Completed	

Drain Status LHS					
Sl.No.	Chainage		Length (Km)	Present Status	Remarks
	From	To			
1	500+890	500+933	0.43	Completed	
2	500+998	501+170	0.172	Completed	
3	501+179	501+223	0.44	Completed	
4	501+600	501+620	0.20	Completed	
5	502+904	502+938	0.34	Completed	
6	502+944	502+970	0.26	Completed	
7	503+013	503+037	0.24	Completed	
8	504+870	504+884	0.14	Completed	
9	504+890	504+912	0.22	Completed	
10	532+914	533+588	0.674	Completed	
11	533+800	533+807	0.7	Completed	
12	533+812	533+823	0.11	Completed	
13	533+828	533+838	0.10	Completed	
14	533+844	533+865	0.21	Completed	
15	533+870	533+881	0.11	Completed	
16	533+883	533+894	0.11	Completed	
17	533+899	533+918	0.19	Completed	
18	533+926	533+970	0.44	Completed	
19	533+979	534+020	0.41	Completed	
20	534+041	534+208	0.167	Completed	
21	534+218	534+260	0.42	Completed	
22	534+270	534+293	0.23	Completed	
23	534+307	534+335	0.28	Completed	
24	534+345	534+451	0.112	Completed	
25	534+509	534+559	0.50	Completed	
26	534+566	534+573	0.7	Completed	
27	534+633	534+646	0.13	Completed	
28	534+655	534+681	0.26	Completed	
29	534+689	534+713	0.24	Completed	

13.1 The instant work is a balance work. Accordingly, at several locations work as per Table in para 13, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

14. Major junctions

The details of major junctions are as follows: -

Sl. No	Design Chainage	Category of Road	Type of Junction	Remarks
1	516+600	Existing NH	3-Legged	End of Existing Sivasagar By pass
2	533+560	ODR	4-Legged	Demow Junction

15. Minor Junctions

The details of minor junctions are noted below: -

Sl. No.	Design Chainage	Side (Left/Right)	Carriageway Width in m	
			Left	Right
1	492+770	Left	4.25	-
2	493+340	Right	-	3.75
3	495+260	Right	-	3.50
4	495+515	Right	-	4.25
5	496+240	Right	-	4.00
6	497+825	Right	-	4.25
7	498+000	Left	4.00	-
8	498+380	Right	-	4.00
9	499+560	Left	4.00	-
10	500+800	Left	3.75	-
11	500+940	Left	3.50	-
12	502+550	Left	4.00	-
13	504+500	Left	4.00	-
14	505+040	Right	-	5.50
15	506+770	Left	4.25	-
16	506+800	Right	-	4.00
17	507+150	Left	5.00	-
18	508+500	Both Side	3.75	3.75
19	509+670	Left	5.25	-

20	511+560	Right	-	4.00
21	513+300	Both Side	4.25	4.25
22	513+655	Both Side	3.50	3.50
23	518+500	Left	3.75	-
24	520+750	Left	5.50	-
25	521+850	Left	4.00	-
26	523+360	Left	3.50	-
27	524+100	Right	-	4.25
28	524+300	Left	3.50	-
29	526+240	Left	3.75	-
30	528+380	Left	4.00	-
31	528+730	Right	-	3.50
32	529+125	Right	-	4.00
33	530+850	Left	4.50	-
34	531+910	Left	5.50	-
35	533+443	Right	-	4.00
36	533+550	Both Side	3.50	3.50
37	534+120	Right	-	4.50

Note: In addition to the above listed Minor Junctions, in case any additional Minor Junction is identified at site, the same shall be developed, as per the availability of land and shall not constitute a Change of Scope under Article 13.

16. Bypasses

The details of bypasses are as follows:-

Sl. No.	Name of Bypass (town)	Chainage (km) from.... to	Length in Km	Carriageway	
				Width (m)	Type
Nil					

17. Other Structures

Nil

Annex-II
(Schedule-A)
Dates for Providing Right of Way

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

Sl. No.	From Km	To Km	Length of Hindrance (Km)	Width (m)	Date of Providing ROW	
1	2	3	4	5	6	
(a) Right of Way Full Width	1	490.800	491.120	0.320	60.000	On Appointed Date
	2	491.125	491.160	0.035	60.000	
	3	491.180	491.240	0.060	60.000	
	4	491.260	491.280	0.020	60.000	
	5	491.320	491.580	0.260	60.000	
	6	491.625	492.800	1.175	60.000	
	7	492.825	496.640	3.815	60.000	
	8	496.700	500.740	4.040	60.000	
	9	500.800	501.020	0.220	60.000	
	10	501.030	501.080	0.050	60.000	
	11	501.100	501.300	0.200	60.000	
	12	501.360	501.370	0.010	60.000	
	13	501.380	501.740	0.360	60.000	
	14	501.745	502.860	1.115	60.000	
	15	502.870	502.875	0.005	60.000	
	16	502.910	503.710	0.800	60.000	
	17	503.730	503.990	0.260	60.000	
	18	504.040	509.000	4.960	60.000	
	19	509.005	510.440	1.435	60.000	
	20	510.460	514.150	3.690	60.000	
	21	514.155	514.290	0.135	60.000	
	22	514.290	514.310	0.020	40.000	
	23	514.315	514.375	0.060	40.000	
	24	514.380	514.970	0.590	40.000	
	25	514.970	515.100	0.130	23.500	
	26	515.100	515.400	0.300	40.000	
	27	515.400	516.010	0.610	60.000	
	28	516.025	516.120	0.095	60.000	
	29	516.130	519.500	3.370	60.000	
	30	519.650	519.920	0.270	60.000	
	31	519.950	520.110	0.160	60.000	
	32	520.150	520.365	0.215	60.000	

	33	520.450	520.880	0.430	60.000	
	34	520.890	521.320	0.430	60.000	
	35	521.370	521.700	0.330	60.000	
	36	521.710	521.900	0.190	60.000	
	37	521.905	523.230	1.325	60.000	
	38	523.240	524.945	1.705	60.000	
	39	525.545	534.050	8.505	60.000	
	40	534.055	534.065	0.010	60.000	
	41	534.070	534.140	0.070	60.000	
	42	534.150	534.200	0.050	60.000	
	43	534.220	534.230	0.010	60.000	
	44	534.250	534.800	0.550	60.000	
(b) Right of Way Part Width	1	491.120	491.125	0.005	25.000	On Appointed Date
	2	491.160	491.180	0.020	25.000	
	3	491.240	491.260	0.020	25.000	
	4	491.280	491.320	0.040	25.000	
	5	491.580	491.600	0.020	25.000	
	6	491.600	491.625	0.025	25.000	
	7	492.800	492.825	0.025	25.000	
	8	496.640	496.700	0.060	25.000	
	9	500.740	500.790	0.050	25.000	
	10	500.790	500.800	0.010	25.000	
	11	501.020	501.030	0.010	25.000	
	12	501.080	501.100	0.020	25.000	
	13	501.300	501.360	0.060	25.000	
	14	501.370	501.380	0.010	25.000	
	15	501.740	501.745	0.005	25.000	
	16	502.860	502.870	0.010	25.000	
	17	502.875	502.890	0.015	25.000	
	18	502.890	502.910	0.020	25.000	
	19	503.710	503.730	0.020	25.000	
	20	503.990	504.020	0.030	25.000	
	21	504.020	504.040	0.020	25.000	
	22	509.000	509.005	0.005	25.000	
	23	510.440	510.460	0.020	25.000	
	24	514.150	514.155	0.005	25.000	
	25	514.310	514.315	0.005	25.000	
	26	514.375	514.380	0.005	25.000	
	27	516.010	516.025	0.015	25.000	
	28	516.120	516.130	0.010	25.000	
	29	519.500	519.510	0.010	25.000	
	30	519.510	519.520	0.010	25.000	

	31	519.520	519.570	0.050	25.000	
	32	519.570	519.610	0.040	25.000	
	33	519.610	519.650	0.040	25.000	
	34	519.920	519.940	0.020	25.000	
	35	519.940	519.950	0.010	25.000	
	36	520.110	520.120	0.010	25.000	
	37	520.120	520.130	0.010	25.000	
	38	520.130	520.140	0.010	25.000	
	39	520.140	520.150	0.010	25.000	
	40	520.365	520.390	0.025	25.000	
	41	520.390	520.420	0.030	25.000	
	42	520.420	520.450	0.030	25.000	
	43	520.880	520.890	0.010	25.000	
	44	521.320	521.330	0.010	25.000	
	45	521.330	521.340	0.010	25.000	
	46	521.340	521.355	0.015	25.000	
	47	521.355	521.370	0.015	25.000	
	48	521.700	521.710	0.010	25.000	
	49	521.900	521.905	0.005	25.000	
	50	523.230	523.240	0.010	25.000	
	51	524.945	525.545	0.600	25.000	
	52	534.050	534.055	0.005	25.000	
	53	534.065	534.070	0.005	25.000	
	54	534.140	534.150	0.010	25.000	
	55	534.200	534.220	0.020	25.000	
	56	534.230	534.250	0.020	25.000	
(c) Right of Way Part Width	1	491.120	491.125	0.005	35.000	On Appointed Date
	2	491.160	491.180	0.020	35.000	
	3	491.240	491.260	0.020	35.000	
	4	491.280	491.320	0.040	35.000	
	5	491.580	491.600	0.020	35.000	
	6	491.600	491.625	0.025	35.000	
	7	492.800	492.825	0.025	35.000	
	8	496.640	496.700	0.060	35.000	
	9	500.740	500.790	0.050	35.000	
	10	500.790	500.800	0.010	35.000	
	11	501.020	501.030	0.010	35.000	
	12	501.080	501.100	0.020	35.000	
	13	501.300	501.360	0.060	35.000	
	14	501.370	501.380	0.010	35.000	
	15	501.740	501.745	0.005	35.000	
	16	502.860	502.870	0.010	35.000	

17	502.875	502.890	0.015	35.000
18	502.890	502.910	0.020	35.000
19	503.710	503.730	0.020	35.000
20	503.990	504.020	0.030	35.000
21	504.020	504.040	0.020	35.000
22	509.000	509.005	0.005	35.000
23	510.440	510.460	0.020	35.000
24	514.150	514.155	0.005	35.000
25	514.310	514.315	0.005	15.000
26	514.375	514.380	0.005	15.000
27	516.010	516.025	0.015	35.000
28	516.120	516.130	0.010	35.000
29	519.500	519.510	0.010	35.000
30	519.510	519.520	0.010	35.000
31	519.520	519.570	0.050	35.000
32	519.570	519.610	0.040	35.000
33	519.610	519.650	0.040	35.000
34	519.920	519.940	0.020	35.000
35	519.940	519.950	0.010	35.000
36	520.110	520.120	0.010	35.000
37	520.120	520.130	0.010	35.000
38	520.130	520.140	0.010	35.000
39	520.140	520.150	0.010	35.000
40	520.365	520.390	0.025	35.000
41	520.390	520.420	0.030	35.000
42	520.420	520.450	0.030	35.000
43	520.880	520.890	0.010	35.000
44	521.320	521.330	0.010	35.000
45	521.330	521.340	0.010	35.000
46	521.340	521.355	0.015	35.000
47	521.355	521.370	0.015	35.000
48	521.700	521.710	0.010	35.000
49	521.900	521.905	0.005	35.000
50	523.230	523.240	0.010	35.000
51	524.945	525.545	0.600	95.000
52	534.050	534.055	0.005	35.000
53	534.065	534.070	0.005	35.000
54	534.140	534.150	0.010	35.000
55	534.200	534.220	0.020	35.000
56	534.230	534.250	0.020	35.000

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 as indicated in the alignment plan shall be considered as minimum FRL and in any case, the finished road level of the project highway should not be less than those indicated in the alignment plan. The contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

**Annex-IV
(Schedule-A)
Environment Clearances**

The following environment clearance have been obtained: Not Applicable

The following environment clearance are awaited: NIL

(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. The alignment plan of the Project Highway is specified in Annexure-III of Schedule A. The proposed profile of the Project Highway as indicated in the Annexure-III of Schedule-A shall be treated as an approximate assessment. Contractor shall design the alignment plans and profiles of the Project Highway based on site / design requirement mentioned in Schedule-D with approval from Authority's Engineer within the available Right of Way.

1.1 The instant work is a balance work. Accordingly, at several locations work has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

2 Rehabilitation and augmentation

Rehabilitation and augmentation shall include Four- laning and strengthening of the Project Highway as described in Annex-1 of this Schedule-B and in Schedule-C.

3 Specification 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 Four Lanning and strengthening

1. Widening of the Existing Highway

1.1 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. Notwithstanding anything to the contrary contained in this Agreement or IRC:SP:84-2014, the proposed profile of the Project Highway as indicated in the Annexure-III of Schedule-A shall be treated as an approximate assessment. Contractor shall design the alignment plan and profile of the Project Highway based on site / design requirement mentioned in Schedule-D with approval from Authority's Engineer within the available Right of Way. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain terrain to the extent land is available. The same shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provision of Article 13.

1.2 Width of carriageway

1.2.1 The paved carriageway shall be as per IRC: SP: 84-2014.

1.2.2 Provided that in following Built-up/urban stretches, the service road shall be provided with the main carriageway as per IRC: SP: 84-2014.

Sl. No.	Name of Township	Design Chainage (km)	
		From	To
1	Amguri	491+000	491+500
2	Namdang, Gaurisagar	500+650	502+796
3	BaliaGhat	502+800	503+150
4	Vatiapar	504+700	505+500
5	Jengan-Katia Pragati	513+460	513+860
6	Demow	532+900	534+800

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

2. Geometric Design and General Features

2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual IRC SP 84-2014.

2.2 Design Speed

The design speed shall be as per IRC: SP: 84-2014.

2.3 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.

Design Chainage in km		Length in m	Type of Deficiency	Remarks
From	To			
496+190	496+660	470	Curve Improvement	Gaga Ali Village
497+000	497+560	560	Curve Improvement	
501+800	502+400	600	Historical Bridge on Namdang river	
508+540	508+810	270	To follow existing alignment	Major Bridge
509+480	510+000	520	Curve Improvement	
515+570	516+100	530	Curve Improvement	Historical Jamunapar Pond
519+400	519+600	200	Curve Improvement	
520+700	521+000	300	Curve Improvement	
526+700	527+460	760	Historical ThowraDol Temple	
528+400	528+900	500	Curve Improvement	
532+750	532+900	150	Curve Improvement	

Note: The above locations are tentative. In case there are additional locations identified, which have to be geometrically improved, the same are to be carried out within the available ROW, without any Change of Scope as per Article 13.

2.4 Right of Way

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

2.5 Type of Shoulders

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

Sl.No.	Design Chainage (Km)		Reference to cross section	Remarks
	From	To		
1	500+650	502+796	Figure 2.5/2.6	Namdang,Gaurisagar
2	502+800	503+150	Figure 2.5/2.6	BaliaGhat
3	504+700	505+500	Figure 2.5/2.6	Vatiapar
4	513+460	513+860	Figure 2.5/2.6	Jengan-Katia Pragati
5	532+900	534+800	Figure 2.5/2.6	Demow

Note: Figure 2.5 and Figure 2.6 refer Manual IRC: SP:84-2014 of Clause 2.16

Sl. No.	Stretch (from km to km)	Fully paved shoulders/footpath	Reference to cross section
As per TCS reviewed by Engineer in conformity with the Manual			

- (b) In open country, PavedShouldersof1.50mwidth and Earthen Shoulders for a width of 2.00 m will be provided.
- (c) Design andspecification so fpaved shouldersandgranularmaterialshall conform to the requirements specifiedin paragraphs 5.10, 5.11 and 5.12 of the manual.

2.6 Lateral and Vertical Clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the paragraph 2.11 of the Manual.

2.6.2 Lateral clearance: - The width/size of the opening at the underpasses shall be as follows:

Sl. No.	Design Chainage	Span (No. x length) in m	Minimum Length of RE wall(m)	Remarks
1	513+345	1 x 12	550	VUP
2	500+978	1 x 12	350	VUP
3	505+085	1 x 12	550	VUP
4	513+708	1 x 12	350	VUP
5	533+630	1 x 12	570	VUP
6	502+550	1 x 7	350	PUP

Note: RE wall length includes wall in front of abutments. Further, the span arrangements/width of the structures are tentative and are to be actually designed by the EPC Contractor & approved by AE. Any change shall not constitute Change of Scope as per the Article 13. Additionally, the length of the RE Wall specified is minimum and the any increase in the length shall not constitute Change of Scope as per the Article 13.

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at over passes shall be as per paragraph 2.12 of the Manual.

NIL

2.7.2 Lateral clearances: The size of the opening at the overpasses shall be as follows:

Sl. No.	Location (chainage) From km to km	Number and length of spans	Remarks
Nil			

2.8 Service roads/Slip Road

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

Sl. No.	Design Chainage		Length (m)	Width (m)	Side
	From	To			
1	491+000	491+500	500	7.0	LHS & RHS
2	500+650	502+796	2146	7.0	LHS & RHS
3	502+800	503+150	350	7.0	LHS & RHS
4	504+700	505+500	800	7.0	LHS & RHS
5	513+460	513+860	400	7.0	LHS & RHS
6	532+900	534+800	1900	7.0	LHS & RHS

Note: The width of Service Road is subject to availability of the land, as indicated in Schedule-A. In case, the PROW is not made available for construction of the Service Road, the same shall be constructed in the available land without attracting any Change of Scope.

2.9 Grade separated structures

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

Sl.No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
NIL						

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

Sl. No.	Location	Type of Structure Length(m)	Cross road at			Remarks
			Existing level	Raised Level	Lowered Level	
Nil						

2.10 Cattle and Pedestrian Underpass/Overpass

Pedestrian Underpass (PUP) shall be constructed as follows:

Sl. No.	Design Chainage	Proposed span arrangement
1	502+550	1x7.0x3.5

2.10.1 Vehicular Underpasses (VUP) shall be constructed as follows:

Sl. No.	Design Chainage	Span (No. x length) in m	Minimum Length of RE wall(m)	Remarks	
1	513+345	1 x 12	550	VUP	Details of partially completed work described in Schedule-A. Balance activities include requisite rectification of the completed works and all the balance works required to complete the VUP and including the balance work of the RE Wall
2	500+978	1 x 12	350	VUP	
3	505+085	1 x 12	550	VUP	
4	513+701	1 x 12	350	VUP	
5	533+630	1 x 12	570	VUP	

2.11 Typical cross-sections of the Project Highway

Different type of cross sections for different segments of Four lane stretch shall be developed as provided in 'Manual of Specifications & Standard for Four Laning of Highways through Public Private Partnership' (IRC:SP:84-2014) referred in schedule-D

Sl.No.	Design Chainage (Km)		Length of 4-lane Lane in (m)	Widening side /Scheme/Remarks
	From	To		
1	490+800	491+600	800	Eccentric (RHS) widening
2	491+600	492+150	550	Eccentric (RHS) widening
3	492+150	492+550	400	Eccentric (RHS) widening
4	492+550	493+700	1250	Eccentric (RHS) widening
5	493+700	493+800	100	Eccentric (RHS) widening
6	493+800	497+100	3300	Eccentric (LHS) widening
7	497+100	497+500	400	Eccentric (RHS) widening
8	497+500	500+640	3140	Service Road Eccentric (LHS) widening
9	500+640	501+280	640	VUP/PUP approaches with RE wall and Service Road on BHS
10	501+280	501+890	610	Built-up Section, Concentric Widening
11	501+890	502+290	400	Built-up Section with Service Road
12	502+290	502+810	520	VUP/PUP approaches with RE wall and service road on BHS
13	502+810	503+160	350	Built-up Section, Eccentric RHS Widening
14	503+160	504+680	1520	Eccentric (RHS) widening
15	504+680	505+460	780	VUP/PUP approaches with RE wall and service road on BHS
16	505+460	507+870	2410	Eccentric (RHS) widening
17	507+870	507+910	40	Concentric widening
18	507+910	508+380	470	Eccentric (LHS) widening
19	508+380	508+830	450	C/W without service road
20	508+830	509+590	760	Eccentric (LHS) widening
21	509+590	509+700	110	Concentric widening
22	509+700	513+300	3600	Eccentric (LHS) widening
23	513+300	514+100	800	VUP/PUP approaches with RE wall and service road on BHS
24	514+100	514+360	260	Concentric widening RHS
25	514+360	515+020	660	Eccentric (RHS) widening
26	515+020	515+110	90	Eccentric (RHS) widening
27	515+110	515+390	280	Eccentric (RHS) widening without service road

28	515+390	515+550	110	Eccentric (LHS) widening
29	515+550	515+740	240	Concentric widening
30	515+740	516+040	300	Eccentric (LHS) widening
31	516+040	516+090	500	Concentric widening
32	516+090	516+260	170	Eccentric (RHS) widening
33	516+260	516+360	100	Concentric widening
34	516+360	519+470	3110	Eccentric (LHS) widening
35	519+470	519+610	140	Realignment/Reconstruction concentric widening
36	519+610	520+880	1270	Eccentric (LHS) widening
37	520+880	520+960	80	Realignment/Reconstruction concentric widening
38	520+960	526+720	5760	Eccentric (LHS) widening
39	526+720	526+820	100	Realignment/Reconstruction concentric widening
40	526+820	526+910	90	Eccentric (RHS) widening
41	526+910	527+500	590	Realignment/Reconstruction concentric widening
42	527+500	530+950	3450	Eccentric (RHS) widening
43	530+950	531+000	50	concentric widening
44	531+000	532+900	1900	Eccentric (LHS) widening
45	532+900	533+240	340	Eccentric (LHS) widening
46	533+240	534+010	770	VUP/PUP approaches with RE wall and service road
47	534+010	534+370	360	concentric widening
48	534+370	534+800	430	Built-up section with service road

Note:

TCS schedule as given above shall be treated as an approximate assessment. Actual length of section corresponding to a TCS shall be prepared by the EPC Contractor based on detailed investigation, site requirement and detailed design carried out as per the Standards & Specifications and Manual. Any variation in length of the section corresponding to the respective TCS specified in Schedule-B shall not constitute change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 13.

3.0 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 types and features given in the tables below:

(a) At-grade intersections

i) Major Junction

Sl.no	Design Chainage	Category of Road	Type of Junction	Remarks
1	516+600	Existing NH	3-legged	End of Existing Sibsagar Bypass
2	533+560	ODR	4-legged	Demow Junction

ii) Minor Junctions

The details of minor junctions are noted below: -

Sl. No.	Design Chainage	Side (Left/Right)	Carriageway Width in m	
			Left	Right
1	492+770	Left	4.25	-
2	493+340	Right	-	3.75
3	495+260	Right	-	3.50
4	495+515	Right	-	4.25
5	496+240	Right	-	4.00
6	497+825	Right	-	4.25
7	498+000	Left	4.00	-
8	498+380	Right	-	4.00
9	499+560	Left	4.00	-
10	500+800	Left	3.75	-
11	500+940	Left	3.50	-
12	502+550	Left	4.00	-
13	504+500	Left	4.00	-
14	505+040	Right	-	5.50
15	506+770	Left	4.25	-
16	506+800	Right	-	4.00
17	507+150	Left	5.00	-
18	508+500	Both Side	3.75	3.75
19	509+670	Left	5.25	-
20	511+560	Right	-	4.00
21	513+300	Both Side	4.25	4.25
22	513+655	Both Side	3.50	3.50
23	518+500	Left	3.75	-
24	520+750	Left	5.50	-
25	521+850	Left	4.00	-
26	523+360	Left	3.50	-
27	524+100	Right	-	4.25
28	524+300	Left	3.50	-
29	526+240	Left	3.75	-
30	528+380	Left	4.00	-
31	528+730	Right	-	3.50

32	529+125	Right	-	4.00
33	530+850	Left	4.50	-
34	531+910	Left	5.50	-
35	533+443	Right	-	4.00
36	533+550	Both Side	3.50	3.50
37	534+120	Right	-	4.50

Note: In addition to the above listed Minor Junctions, in case any additional Minor Junction is identified at site, the same shall be developed, as per the availability of land and shall not constitute a Change of Scope under Article 13.

(b) Grade separated intersection without ramps

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

Note:

1. Type of junction to be improved as per IRC: SP:84-2014 and MOST type design for intersection on National Highways.
2. Any other junction not mentioned above but observed during construction of the Project Highway shall be improved as per IRC: SP:84-2014 requirements to the best possible extent within the ROW provided. Any additional junction shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 13.
3. The Contractor shall take up 'Detailed Engineering Study' to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned out in Section 3 of IRC: SP:84-2014. The same shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 13.

4. Road embankment and cut section

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the specifications and standards given in Section 4 of the Manual and the specified cross-sectional details. Notwithstanding anything to the contrary contained in this Agreement or IRC: SP:84-2014, the proposed profile of the Project Highway as indicated in the Annexure-III of Schedule-A shall be deemed to be part of this Schedule-B and shall be treated as an approximate assessment. The contractor may design the alignment plan & profile of the Project Highway based on site / design requirement specified in Schedule-D, with approval from Authority's Engineer within the available Right of Way. However, the EPC Contractor shall have to abide

by the already reviewed Plan & Profile (Annexure-III of Schedule-A) as the basis/guiding document and the minimum FRL is to be maintained as per it. Deficiencies in the plan and profile of the existing road shall be corrected within the available ROW. In case there is any change/modification/improvement in the geometrics proposed by the EPC Contractor, within the ROW, the same shall not qualify for Change of Scope as per Article 13. The instant work is a balance work and at several locations, embankment has been constructed partially/completely. The EPC Contractor shall have to assess the adequacy of the partially completed/completed embankment, carry out rectification (if required) and then proceed further for the Road Work duly incorporating the same in the design. The same shall be considered incidental to the work.

4.2 The cross-sections given in the TCS have to be accommodated in the available ROW (Details as per Annexure-II of Schedule-A). In case any requirement of Toe Wall/Retaining Wall arises to accommodate the TCS, in the available ROW, the same shall not qualify for any Change of Scope, as per Article 13.

5.0 Pavement design

5.1 Pavement design shall be carried out in accordance with Section-5 of IRC: SP:84-2014, IRC:37-2018 and IRC:58-2015.

5.2 Type of pavement

The type of the pavement for the entire stretch shall be of flexible type pavement except the following location, where the pavement shall be rigid.

Sl. No.	Design Chainage (Km)		Length (m)	Location
	From	To		
1	524.945	525.545	600	Proposed Toll Plaza with taper approach

5.3 Design requirements

5.3.1 Design Period and Strategy

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

Rigid pavement shall be constructed at proposed toll plaza location including taper portion on both sides. Pavement shall be designed for a minimum design period of 30 years.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement of the Manual, the contractor shall design the pavement for design traffic of not less than 60 million standard axles (msa) or as per the actual traffic whichever is higher from Design km 490.800 to km 534.800.

5.4 Reconstruction of stretches

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

Design Chainage in km		Length in m	Remarks
From	To		
496+190	496+660	470	
497+000	497+560	560	
501+800	502+400	600	
508+540	508+810	270	
509+480	510+000	520	
515+570	516+100	530	
520+700	521+000	300	
526+700	527+460	760	

6. Roadside drainage

6.1. Drainage system including surface drains for the Project Highway shall be provided as per section 6 of the Manual. Covered RCC Drains shall be provided in the following stretches.

Design Chainage in km		Length in m	Side
From	To		
491+000	491+050	50	Both Side
491+350	491+500	150	Both Side
501+170	501+800	630	Both Side
501+800	502+400	600	Both Side
502+700	502+796	96	Both Side
502+800	503+150	350	Both Side
504+700	504+850	150	Both Side
505+350	505+500	150	Both Side
513+460	513+510	50	Both Side
513+810	513+860	50	Both Side
532+900	533+300	400	Both Side
533+820	534+350	530	Both Side
534+350	534+800	450	Both Side

Location of Line Drain

Design Chainage in Km		Length In m	Side
From	To		
491+050	491+350	300	Both side
500+650	501+170	520	Both side
502+400	502+700	300	Both side
504+850	505+350	500	Both side
513+510	513+810	300	Both side

533+300	533+820	520	Both side
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Status of RCC drain completed/Partially completed as per Schedule A

RCC drain (Covered) partially completed in the following stretches to be completed in all respect

Drain Status RHS					
Sl.No.	Chainage		Length (Km)	Present Status	Remarks
	From	To			
1	500+866	500+886	0.20	Completed	
2	500+896	500+937	0.41	Completed	
3	500+948	500+978	0.30	Completed	
4	501+030	501+081	0.51	Completed	
5	501+100	501+322	0.222	Completed	
6	501+360	501+798	0.438	Completed	
7	504+860	504+872	0.12	Completed	
8	504+877	504+897	0.14	Completed	
9	532+914	532+921	0.7	Completed	
10	532+930	532+952	0.22	Completed	
11	532+974	533+992	0.18	Completed	
12	533+006	533+032	0.26	Completed	
13	533+080	533+092	0.12	Completed	
14	533+107	533+126	0.19	Completed	
15	533+140	533+155	0.15	Completed	
16	533+168	533+196	0.28	Completed	
17	533+210	533+267	0.57	Completed	
18	533+279	533+299	0.20	Completed	
19	533+319	533+353	0.36	Completed	
20	533+367	533+397	0.30	Completed	
21	533+407	533+420	0.13	Completed	
22	533+540	533+561	0.21	Completed	
23	533+572	533+593	0.21	Completed	
24	533+600	533+696	0.96	Completed	
25	534+708	534+756	0.48	Completed	
26	534+814	534+855	0.41	Completed	
27	534+864	534+876	0.12	Completed	
28	534+886	534+908	0.22	Completed	
29	534+916	534+926	0.10	Completed	

Drain Status LHS

Sl.No.	Chainage		Length (Km)	Present Status	Remarks
	From	To			
1	500+890	500+933	0.43	Completed	
2	500+998	501+170	0.172	Completed	
3	501+179	501+223	0.44	Completed	
4	501+600	501+620	0.20	Completed	
5	502+904	502+938	0.34	Completed	
6	502+944	502+970	0.26	Completed	
7	503+013	503+037	0.24	Completed	
8	504+870	504+884	0.14	Completed	
9	504+890	504+912	0.22	Completed	
10	532+914	533+588	0.674	Completed	
11	533+800	533+807	0.7	Completed	
12	533+812	533+823	0.11	Completed	
13	533+828	533+838	0.10	Completed	
14	533+844	533+865	0.21	Completed	
15	533+870	533+881	0.11	Completed	
16	533+883	533+894	0.11	Completed	
17	533+899	533+918	0.19	Completed	
18	533+926	533+970	0.44	Completed	
19	533+979	534+020	0.41	Completed	
20	534+041	534+208	0.167	Completed	
21	534+218	534+260	0.42	Completed	
22	534+270	534+293	0.23	Completed	
23	534+307	534+335	0.28	Completed	
24	534+345	534+451	0.112	Completed	
25	534+509	534+559	0.50	Completed	
26	534+566	534+573	0.7	Completed	
27	534+633	534+646	0.13	Completed	
28	534+655	534+681	0.26	Completed	
29	534+689	534+713	0.24	Completed	

6.2. Unlined Drain is to be constructed at all other locations as per Manual.

6.3. Median Drain is also to be provided as per Manual and Site Requirement.

6.4 The instant work is a balance work. Accordingly, at several locations work as per table in Para 6.1, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall

have to assess the level of deterioration of such works, carry out the required remedial measures/rectification works as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

6.5 The EPC Contractor shall have to design the drains adequately and ensure their functionality duly taking into account the Site Conditions and Outfall locations.

7. Design of structures

7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the manual and the existing design of partially completed structures. These together shall conform to the cross-sectional features and other details.

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

All new structures shall be minimum carriageway as per Manual Fig. 7.2 and fig. 7.3

7.1.3 The following structures shall be provided with footpaths:

Sl. No	Bridge at Km	Utility service to be carried	Remarks
All new bridges/Bridges proposed to be widened shall have provisions for footpath			

7.1.4 All bridges shall be high-level bridges

7.1.5 Utility services to be carried over the structures

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

Sl. No	Bridge at Km	Utility service to be carried	Remarks
All new bridges/Bridges proposed to be widened shall have provisions for utility services to be carried over			

7.1.6 Cross - section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual.

7.2 Culverts

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

7.2.2 Reconstruction of existing culverts.

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

Sl. No.	Existing Chainage	Design Chainage	Proposed Type of Structure	Recommendation	Proposed span Arrangement (m)	Over all Width in (m)
NIL						

Status of Culvert (Reconstruction) completed/Partially completed as per Schedule A

Culvert (Reconstruction) Work partially completed and to be completed up to final stage

Sl. No.	Design Chainage	Existing Type of Structure	Existing (m) span Arrangement	Present Status
1	496+530	Box Culvert	1x 4.3x3.061m	Completed up to deck slab
2	497+298	Box Culvert	1x 4.7x2.59 m	Completed up to deck slab
3	505+455	Box Culvert	1x4.1x2.538 m	Completed up to deck slab
4	505+886	Box Culvert	1x2.1x2.205 m	Completed up to deck slab
5	506+257	Box Culvert	1x2.0x2.916 m	Completed up to deck slab
6	507+537	Box Culvert	1x4.5x3.137 m	Completed up to deck slab
7	509+240	Box Culvert	1x3.7x2.497 m	Completed up to deck slab
8	509+693	Box Culvert	2x3.7x2.484 m	Completed up to deck slab
9	509+922	Box Culvert	1x5.0x2.465 m	Completed up to deck slab
10	510+943	Box Culvert	1x2.0x2.272 m	Completed up to deck slab
11	511+387	Box Culvert	1x2.0x2.1 m	Completed up to deck slab,
12	511+893	Box Culvert	1x1.7x1.928 m	Completed up to deck slab, parapet wall and
13	513+051	Box Culvert	1x1.8x1.815 m	Completed up to deck slab

Sl. No.	Design Chainage	Existing Type of Structure	Existing (m) span Arrangement	Present Status
14	513+670	Box Culvert	1x2.1x2.167 m	Completed up to deck slab
15	514+345	Box Culvert	1x3.0x3.296 m	Only 2 lane culverts on existing carriageway& to be completed as per 4 lane width
16	515+315	Box Culvert	1x1.3x1.901 m	Only 2 lane culverts on existing carriageway& to be completed as per 4 lane width
17	520+367	Box Culvert	1x3.0x2.255 m	Only 2 lane culverts on new carriageway& to be completed as per 4 lane width
18	523+818	Box Culvert	1x3.0x3.107 m	Completed
19	524+457	Box Culvert	1x4.4x3.141 m	Completed
20	525+588	Box Culvert	1x3.2x3.031 m	Completed
21	526+780	Box Culvert	1x1.55x1.858 m	Completed up to deck slab for BHS
22	529+536	Box Culvert	1x4.4x2.407 m	Completed up to deck slab
23	531+494	Box Culvert	1x5.9x2.515 m	Completed up to deck slab
24	532+078	Box Culvert	1x1.5x1.77 m	Completed up to deck slab

7.2.2.1 The instant work is a balance work. Accordingly, at several locations work as per Table in Para 7.2.2, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

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

7.2.3 Widening of Existing Culverts

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

Sl. No.	Design Chainage	Proposed Type of Structure	Recommendation	Proposed (m) span Arrangement	Overall Width in m	Status
1	514+345	Box Culvert	New Construction to be Done	1x3.0x3.296 m	4-Lane	Not Yet Started
2	515+315	Box Culvert	New Construction to be Done	1x1.3x1.901 m	4-Lane	Not Yet Started

7.2.3.1 The instant work is a balance work. Accordingly, at several locations work as shown in Table of Para 7.2.2 has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

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

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

Sl. No.	Design Chainage (km)	Proposed Type of culvert	Span Arrangement No. x Length /No. x Día(m)	Overall Width
1	501.890	Single Row Hume Pipe Culvert of Día 1200mm	As per Site	
2	516.365	Double Row Hume Pipe Culvert of Día 1200mm	As per Site	

7.2.5 Repairs/replacement of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

As per site condition,

Repairs/replacement of railing/parapets and any other defects noticed at the time of construction shall be undertaken by the contractor for all the retained culverts along with repair/construction of flooring and protection works.

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

7.2.7 In case of culverts proposed for widening / repair as per details in Clause 7.2.3 above, the same shall be re-constructed if the design shows that these are unsafe for design loads. No change of scope shall be considered in such cases.

7.3 Bridges

7.3.1 Existing bridges to be re-construction/widened/Repairs

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

a) Major Bridges

Nil

b) Minor Bridges

Sl. No.	Design Chainage	Proposed Structure configuration	Proposed span arrangement (No. x L)
1	502+270	New 4-Lane Bridge on MCW+New 2 lane Bridge on Service Road on Both Side	1x21.71 m
2	533+784	New 4-Lane Bridges on MCW+ New 2-lane Bridges on service road on both side	1x12.460 m

(ii) The following existing bridges shall be Repaired and Strengthened:

a) Major Bridges

Sl. No.	Chainage (km)	Width (m)	Span Arrangement	Type of structure			Details of Repair
				Foundation	Sub structure	Super structure	
1	508+454	11.40	4x39.89	Well	RCC walls type	PSC I Beam(3 Girder)	Wearing coat, Bearings, Railings Drainage spout and expansion gap need repair
2	523+271	8.4	42.90+44.52+4 2.28	Well	RCC walls type	PSC I Beam (3 Girder)	Wearing coat, Bearings,

							Railings Drainage spout and expansion gap need repair
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Note: Widening of major bridges is not applicable due to RCC Box Girder type superstructure. However, the above minimum measures to be taken for Repair of the Existing Bridges.

b) Minor Bridges: Already widened however, have to be completed in all respect:

Sl. No.	Design Chainages	Span Arrangement	Type of structure			Details of widening
			Found-ation	Sub structure	Super Structure	
1	490+889	1x8.68 = 8.68 m	Shallow	RCC Wall	Solid Slab	Widened to the required overall Width
2	492+351	1 x 6.0 = 6.0 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
3	493+609	1x6.230 +1x6.230= 12.46 m	Shallow	RCC Wall	Solid Slab	Widened to the required overall Width
4	498+787	1 x 6.0 = 6.0 m	Shallow	PCC Gravity Wall	Solid Slab	Widened to the required overall Width
5	500+578	1x41.55 = 41.55 m	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width
6	516+938	1x27.45+2 x12.2 = 51.85 m	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width
7	534+725	2x6.6=13.2	Shallow	PCC Wall	Solid Slab	Widened to the required overall Width

7.3.2 Additional new bridges

New bridges at the following location on the Project Highway shall be constructed.

Major bridges (2-Lane)

Sl.	Name of	Design	Proposed span	Remarks
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No.	Bridges	Chainage	arrangement (No.x1)	
1	Dikhow River	508+454	4x41.55 m	Details of partially completed work described in Schedule-A. Balance activities include requisite rectification of the completed works and all the balance works required to complete the New 2 lane Major Bridge in all respect including River Training works if required as per site.
2	Dessang River	523+271	42.755+44.10+42.755	

Minor Bridges (2/4-Lane):

Sl. No.	Design Chainage	Span arrangement	Remarks
1	490+889	1x8.68 m	Details of partially completed work described in Schedule-A. Balance activities include requisite rectification of the completed works and all the balance works required to complete the New 2 lane Minor Bridge in all respect including River Training works if required as per site.
2	492+351	1 x 6.0 m	
3	493+609	1x6.230 +1x6.230 m	
4	498+787	1 x 6.0 m	
5	500+578	1x41.55 m	
6	502+270	1x21.71 m	
7	516+938	1x27.45+2x12.2 m	
8	533+784	1x12.460 m	
9	534+719	2x6.6 m	

7.3.3 The railing of existing bridges shall be replaced by crash barriers at the following locations:

Sl. No.	Location at km	Remarks
“As per site condition and where ever technically feasible”		

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

Sl. No.	Location at km	Remarks
In all the retained bridges which are proposed for widened, railing/parapets shall be replaced.		

7.3.5 Drainage system for bridges decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual.

7.3.6 Structure in marine environment

Nil

7.3.7 The instant work is a balance work. Accordingly, at several locations work, as per Tables in Para 7, has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement. Further, as far as the Major/Minor Bridges are concerned, there may be balance activities which include requisite rectification of the completed works also, carrying out river training works, parapet/railing works, etc, as per site requirement, so as to complete the bridges as per Standards & Specifications.

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

7.4 Rail-road bridges

7.4.1. Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

7.4.2 Road over bridges (road over rail) shall be provided at the following crossing, as per GAD drawing attached:

Sl. No.	Design Chainage(km)	Span arrangement/length of span in m	Remarks
		Nil	

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

Road under bridges

Sl. No.	Location of level crossing	Number and length of span
		Nil

7.5 Grade separated structure

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

7.6 Repairs and strengthening of structures

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

A-Bridges

i) Major Bridges

Sl. No.	Nature and extent of repairs/ strengthening to carried out	
	Design Chainage	
1	508+454	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Repairing replacement are required for damaged bearings, railings, expansion joints, drainage spouts and wearing coat. Two coat of cement wash in entire bridge
2	523+271	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Repairing replacement are required for damaged bearings, railings, expansion joints, drainage spouts and wearing coat. Two coat of cement wash in entire bridge

ii) Minor Bridges

Sl. No.	Design chainage	Details of widening
1	490+889	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
2	492+351	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
3	493+609	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
4	498+787	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width

5	500+578	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
6	502+270	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
7	516+938	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
8	533+784	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width
9	534+719	Repair and Sealing of cracks in foundation, Sub structure, Super Structure etc. Bridge painting. Repair/Replacement of Wearing coat, approach slab, bearings, expansion joints, railings, drainage spouts, waterway and all other works as per site requirement and Manual. Deck slab, Approach slab, substructure and foundations are required to be widened to the required overall width

B-ROB/RUB

Sl. No.	Location of structure (km)	Nature and extent of repair/strengthening to be carried out
Nil		

C- Overpasses/ Underpasses and other structures

Sl. No.	Location of structure (km)	Nature and extent of repair/strengthening to be carried out
Nil		

The following is the list of the New Major Bridges and structures: -

Sl. No	Location		Remarks
	Existing Chainage (km)	Design chainage (km)	
Nil			

8. Traffic control devices and road safety works

8.1 Traffic control devices and road safety works shall be provided in accordance with section 9 of the manual.

8.2 Specifications of the reflecting sheeting: As per the clause 9.3 of the Manual of specifications and standards.

9. Roadside furniture

Roadside Furniture shall be provided in accordance with the provision of section 11 of the Manual.

9.1 Overhead traffic signs: locations and size

Minimum 5 No's overhead shall be provided excluding toll-Plaza locations. The locations are to be decided by the Authority's Engineer.

10. Compulsory Afforestation

Compulsory / Compensatory afforestation to be carried out at locations as directed by the Authority

11. Hazardous locations

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

Sl No.	Location stretches from (km) to (km)	LHS/RHS
This shall be provided at high embankment and at sharp curve locations.		

12. Special requirements for hill roads

Nil

13. Change of Scope

The length of structures and bridges specified herein above shall be treated as an approximate assessment. The proposed span arrangement of above structures may be changed (keeping overall length same) based on innovative design of structure, latest construction techniques and aesthetics of structures and 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 increase 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 expressly undertaken in accordance with the provisions of Article 13.

Schedule-C
(See Clause 2.1)
PROJECT FACILITIES

1 Project Facilities

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

- a) Toll plaza[s];
- b) Roadside facilities;
- c) Pedestrian facilities;
- d) Tree plantation;
- e) Truck lay-byes;
- f) Bus-bays and bus shelters;
- g) Rest areas; and
- h) Other to be specified

2 Description of Project Facilities

Each of the Project Facilities is described below showing:

a) Toll Plaza:

1 No. of toll plaza shall be provided at design chainage Km 525+245 Specifications and other requirements of the toll plazas shall be strictly as per schedule "D". Rigid pavement shall be constructed for the Toll Plaza area including the transition portion. Further, the Toll Plaza shall have provisions for Electronic Toll Collection (ETC), as per the extant policy.

Road side Furniture

- (i) Traffic Signs and Pavement Markings
Traffic signs and pavement marking shall include road side, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalised as per manual.
- (ii) Concrete Crash Barrier, Metal beam crash barrier, Separators (MS railings) wherever required as per manual.
- (iii) Traffic Safety Devices wherever required
- (iv) Boundary Stones
- (v) Hectometre/ Kilometre Stones
- (vi) Traffic Blinker Signal (L.E.D) shall be provided at all At-grade junctions, median opening, schools, hospitals, police station, places of worship and institutional buildings etc.
- (vii) Overhead signs: Minimum 5 Nos.(Excluding overhead signs at Toll Plaza location which are as given in Schedule D) shall be provided.
- (viii) Delineators and Studs(100mmx 100mm) with reflective panels of dual prismatic cube capable of providing total reflection of light entering the lens face for lane

marking and delineators for night time visibility shall be provided for the entire project Highway.

b) Pedestrian Facilities

The additional pedestrian facilities in the form of guard rails, footpath, lighting etc. It Shall be provided wherever required.

c) Landscaping and Tree Plantation

Landscaping of the highway shall be done on, but not limited to the following:

- Median
- Grade Separated intersections
- Entry and Exit ramp
- At grade islands of intersection locations
- Toll Plaza Area

(e) **Truck Lay-byes:** Truck Lay-byes shall be provided at following locations:

Sl. No.	Design Chainage	Side
1	516+150	Left

(f) **Bus-bays and Bus Shelter:** Bus-bays shall be provided locations:

Locations of Bus bays

Sl. No.	Chainage (km)	Side	Location
1	495+400	BHS	Gogurali/Charing
2	501+450	BHS	Gaurisagar
3	512+600	BHS	Konwarpur
4	521+500	BHS	Sukhanpukdi
5	528+900	BHS	Rajmai
6	533+850	BHS	Demow/Dehajan

Note: The locations are tentative and shall be decided by the Authority's Engineer. Further, any addition in the number of Bus-Bays will not be considered as a Change of Scope.

(g) Others

- 1 Highway Lighting shall be provided as per schedule D(Manual of Specifications and Standard for 4-Laning of Highway) IRC:SP:84-2014).
- 2 The EPC Contractor will obtain all permissions/load sanctions/power supply, etc. from the Electricity Authorities. The Contractor shall be solely responsible for submission of application along with all necessary documents to the Power Authorities and take electric connection of required load and capacity. Further the Contractor shall be responsible for follow up of the application and getting the release of the supply to lighting. All statutory approvals/permissions have to be obtained by the Contractor for energizing/operating the lights. The fixed and

monthly electric charges upto the DLP of the project has to be borne by the EPC Contractor.

2. Highway Patrol

The Concessionaire shall provide Highway Patrol vehicles in adequate number as per manual and this agreement.

3. Medical Aid Post: As per Article 21.

4. Cranes

The Concessionaire shall provide one mobile Cranes having the capacity to lift a truck with a gross vehicle weight of 30,000(thirty thousand) kilogram and such posts shall be located at the toll plaza location in consultation with the IC/Authority.

5. Traffic Aid Post

6. ECB (Emergency Call Boxes)

ECBs (Emergency Call Boxes) with loud speaker, micro phone, activation button with LED indicating conversation, shall be housed in a vandal proof casing and operate in full to play mode in noise level of upto 95 decibels within built diagnostic features for automatic detection in case of damage by any object. Mobile communication system shall comprise the mobile radio base stations and control equipment. It shall have provision for mounted mobile set on ambulances, trains & patrolling vehicles. The system shall have the facility to connect mobile to mobile, mobile to controller, and controller to mobile along with the systems for waiting, holding and transfer of call. The system shall use pair frequencies to be allotted to the concessionaire with the approval of wireless planning & coordination (WPC), Department. Of Telecommunications and shall operate for full duplex mode.

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

Schedule-D
(See Clause 2.1)
SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

Manual of Standards and Specifications for Four Laning manual published by the Indian Road Congress-IRC: SP:84-2014

**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 four laning of Highways (IRC: SP-84: -2014) referred to as the Manual for four laning of Highways published by IRC and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

2.1 The term "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 Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below.

Sl. No.	Item	Clause referred in Manual	Provision as per Manual	Modified Provision
1	Typical Cross section	IRC: SP: 84-2014	Typical Cross Section	Typical Cross section shall be as per Manual

Schedule - E
(See Clauses 2.1 and 14.2)
Maintenance Requirements

1. Maintenance Requirements

- (i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.
- (ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- (iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2.

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

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

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit setforth 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, approach)	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/lhttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2

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)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

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					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted	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					
				0 to 30 cm from the edge				
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 -Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 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					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200m m/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008

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					
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					

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edge drop at shoulders	Nil	40m m	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribed	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						
1	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	Not applicable
			1	$w < 0.2$ mm. hair cracks		
			2	$w = 0.2 - 0.5$ mm, discernible from slow-moving car	Seal without delay	Seal, and stitch if $L > 1m$. Within 7days
			3	$w = 0.5 - 1.5$ mm, discernible from fast-moving car		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
2	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	4	$w = 1.5 - 3.0$ mm	Seal, and stitch if $L > 1$ m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	$w > 3$ mm.		
			0	Nil, not discernible	No Action	
			1	$w < 0.2$ mm, hair cracks	Route and seal with epoxy.	Staple or Dowel Bar Retrofit.
			2	$w = 0.2 - 0.5$ mm, discernible from slow vehicle	Within 7 days	Within 15days
			3	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Route, seal and stitch, if $L > 1$ m. Within 7 days	

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling.
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
						See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstatement 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		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
				into more than 4 pieces		
5	Corner Break	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to	Seal with epoxy seal with epoxy Within 7 days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken	secure broken parts Within 7 days	
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	ree or four corners broken		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
						slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m ²)	0	Nil, not discernible		No Action
			1	$w < 0.5 \text{ mm}; L < 3 \text{ m/m}^2$	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either $w > 0.5 \text{ mm}$ or $L < 3 \text{ m/m}^2$		
			3	$w > 1.5 \text{ mm}$ and $L < 3 \text{ m/m}^2$		
			4	$w > 3 \text{ mm}$, $L < 3 \text{ m/m}^2$ and deformation		
			5	$w > 3 \text{ mm}$, $L > 3 \text{ m/m}^2$ and deformation		
					Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days	

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 Honeycomb surface	r = area damaged or surface/total type surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term	Long Term
					No action.	Not Applicable
			1	$r < 2 \%$	Local repair of areas damaged	
			2	$r = 2 - 10 \%$	and liable to be damaged. Within 15 days	
			3	$r = 10-25\%$	Bonded Inlay, 2 or 3 slabs if	
			4	$r = 25 - 50 \%$	affecting.	

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

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	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30 \%$		
			5	$r > 30 \%$ and $h > 25 \text{ mm}$	Reconstruct slab within 30 days	
			0		No action.	
			1	$t > 1 \text{ mm}$		
9	Polished Surface/Glazing	t = texture depth, sand patch test	2'	$t = 1 - 0.6 \text{ mm}$	Monitor rate of deterioration	Not Applicable
		3	$t = 0.6 - 0.3 \text{ mm}$			
		4	$t = 0.3 - 0.1 \text{ mm}$			

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
			5	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole) Refer Para 8.4 n = number/m ² d = diameter h = maximum depth		0	$d < 50 \text{ mm}; h < 25 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	No action.	Not Applicable
			1	$d = 50 - 100 \text{ mm}; h < 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	Partial depth repair 65 mm deep.	
			2	$d = 50 - 100 \text{ mm}; h > 50 \text{ mm}; n < 1 \text{ per } 5 \text{ m}^2$	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	$d = 100 - 300 \text{ mm}; h < 100 \text{ mm}$ $n < 1$ per 5 m^2	Partial depth repair 110mm	
			4	$d = 100 - 300 \text{ mm}; h > 100 \text{ mm}; n < 1$ per 5 m^2	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	$d > 300 \text{ mm}; h > 100 \text{ mm}; n > 1$ per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
					Short Term	Long Term
					0	Difficult to discern.
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.	Clean, widen and reseal the joint. Within 7 days				

				and trapping incompressible material.		
12	Spalling of Joints	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	Faulting (or Stepping)	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

	in Cracks or Joints		1	$f < 3 \text{ mm}$		
			2	$f = 3 - 6 \text{ mm}$	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	$f = 6 - 12 \text{ mm}$	Diamond Grinding	
			4	$f = 12 - 18 \text{ mm}$	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	$f > 18 \text{ mm}$	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	Short Term	Long Term
			1	$h < 6 \text{ mm}$	No Action	
			2	$h = 6 - 12 \text{ mm}$		

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

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

		displacement from normal profile	1	$h = 4 - 7 \text{ mm}$	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	$h = 7 - 15 \text{ mm}$	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	$h > 15 \text{ mm}$	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, not discernible < 3mm	Short Term	Long Term
					No action.	
			1	$f = 3 - 10 \text{ mm}$	Spot repair of shoulder within 7 days	
			2	$f = 10 - 25 \text{ mm}$		
3	$f = 25 - 50 \text{ mm}$	Fill up shoulder				

			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if a Within 30days
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	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/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	

20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications 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																														
	Night Time Visibility	<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u> <table border="1" data-bbox="515 622 985 1228"> <tr> <td>Design</td> <td colspan="2">(RL) Retro</td> </tr> <tr> <td>Speed</td> <td colspan="2">Reflectivity</td> </tr> <tr> <td></td> <td colspan="2">(mcd/m²/lux)</td> </tr> <tr> <td></td> <td>Initial</td> <td>Minimum</td> </tr> <tr> <td></td> <td>(7 days)</td> <td>Threshold level</td> </tr> <tr> <td></td> <td></td> <td>(TL) & warranty</td> </tr> <tr> <td></td> <td></td> <td>period required up to 2 years</td> </tr> <tr> <td>Up to 65</td> <td>200</td> <td>80</td> </tr> <tr> <td>65 - 100</td> <td>250</td> <td>120</td> </tr> <tr> <td>Above 100</td> <td>350</td> <td>150</td> </tr> </table> <u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>	Design	(RL) Retro		Speed	Reflectivity			(mcd/m ² /lux)			Initial	Minimum		(7 days)	Threshold level			(TL) & warranty			period required up to 2 years	Up to 65	200	80	65 - 100	250	120	Above 100	350	150	Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect - within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
Design	(RL) Retro																																				
Speed	Reflectivity																																				
	(mcd/m ² /lux)																																				
	Initial	Minimum																																			
	(7 days)	Threshold level																																			
		(TL) & warranty																																			
		period required up to 2 years																																			
Up to 65	200	80																																			
65 - 100	250	120																																			
Above 100	350	150																																			

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications 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
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	change of signboard	48 hours in case of Mandatory	RC: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
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	<u>Functionality:</u> Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
	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
Other Road Furniture	Pedestrian Guardrail	<u>Functionality:</u> Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Barriers	<u>Functionality:</u> Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	<u>Functionality:</u> Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC:SP:84-2014,

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

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

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 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 inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rusted reinforcement	Not more than 0.25 sq.m	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and	Within design limits.	Once in every 10 years for spans more	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

	live loads		than 40 m						
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of structure	of	super	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of expansion joint	seal	in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly			3 days	MORTH specifications 2600 and

	expansion joint	gap.		Mobile Bridge Inspection Unit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damage to solid apron (concrete apron) not more than 1 sq.m				weeks before onset of rainy season whichever is earlier.	
<p>Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.</p>							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h) Other Project Facilities and Approach roads		
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	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) Piers, abutments, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(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 4.1 (vii)(a))
Applicable Permits

1. Applicable Permits

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
- (a) Permission of the State Government for extraction of boulders from quarry;
 - (b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
 - (c) Licence for use of explosives;
 - (d) Permission of the State Government for drawing water from river/reservoir;
 - (e) Licence from inspector of factories or other competent Authority for setting up batching plant;
 - (f) Clearance of Pollution Control Board for setting up batching plant;
 - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
 - (h) Permission of Village Panchayats and State Government for borrow earth; and
 - (i) Any other permits or clearances required under Applicable Laws.
- (ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

Schedule - G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

To,
National Highways & Infrastructure Development Corporation Ltd. New Delhi

WHEREAS _____ [name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. Dated_ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs..... cr. (Rupees crore) (the "**Guarantee Amount**"¹).

AND WHEREAS we, through our branch at (the "**Bank**") have agreed to furnish this Bank Guarantee (hereinafter called the "**Guarantee**") by way of Performance Security.

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways & Infrastructure Development Corporation Ltd], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be

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

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder
8. The Guarantee shall cease to be in force and effect on ****§. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
12. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.
13. 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.
14. This guarantee shall also be operatable at our.....Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
15. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [MoRT&H/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001

Signed and sealed this day of, 20

at _____

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designatio)

(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.

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

Form for Guarantee for Advance Payment

To,
National Highways & Infrastructural Development Corporation Ltd.

WHEREAS:

- (A) [name and address of contractor] (hereinafter called the “**Contractor**”) has executed an agreement (hereinafter called the “**Agreement**”) with the National Highways and Infrastructure Corporation Ltd., (hereinafter called the “**Authority**”) for the “Widening/Improvement to 4 (Four) Lane with Paved Shoulder from KM 581+700 to Km 606+300 on existing Dibrugarh-Lahoal-Chabua Bypass of NH 37 i.e. Lepetkata– Kandulibari Grant Gaon Section (Section 1) in the state of Assam on EPC mode” subject to and in accordance with the provisions of the Agreement
- (B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest free advance payment (herein after called “ **Advance Payment**”) equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in three installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second/third} installment of the Advance Payment is Rs. --- --- cr. (Rupees ----- crore) and the amount of this Guarantee is Rs. ----- cr. (Rupees ----- crore) (the “**Guarantee Amount**”) ^s.
- (C) We, through our branch at (the “**Bank**”) have agreed to furnish this bank guarantee (hereinafter called the “**Guarantee**”) for the Guarantee Amount.

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

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

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways& Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.
2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the

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

- 5 This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
- 6 Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
- 7 The Guarantee shall cease to be in force and effect on *****.⁵ Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
11. This Guarantee shall also be opratable at our Branch in Guwahati, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demand under the said invocation.
12. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below:-
- 13.

Sl.	Particulars	Details
1	Name of the Beneficiary	RO NHIDCL PROJECTS
2	Beneficiary Bank Account No.	73653210000013
3	Beneficiary Bank Branch	Canara Bank (Erstwhile Syndicate Bank)
4	Beneficiary Bank IFSC Code	CNRB0017365
5	Beneficiary Bank Branch Name	Dispur, Guwahati
6	Beneficiary Bank Address	Upasana Complex, Dr. R. P. Road, Ganeshguri, Dispur, Guwahati.

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

SIGNED , SEALED AND DELIVERED

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

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

Schedule-H
(See Clause 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs 271,12,02,160

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

Item	Weightage in Percentage to the Contract Price	Activity	Percentage Weightage in Payment Schedule
Road Works Including Culverts, widening and repair of culverts	74.19%	A) Widening and Strengthening of Existing Road to 2-Lane with Paved Shoulder including Rectification	
		(1) Earth Work up to Top of the Sub Grade	4.45%
		(2) Sub base course (GSB,Shoulders)	5.73%
		(3) Non-Bituminous Base Course (WMM)	11.01%
		(4) Bituminous Base Course (DBM)	29.07%
		(5) Wearing Coat (BC)	22.88%
		(6) Widening and repair of culverts	0.46%
		B.1 -Reconstruction/new 2 Lane realignment/ Bypass (Flexible Pavement) including Rectification	
		(1) Earth Work up to Top of the Sub Grade	2.05%
		(2) Sub base course (GSB,Shoulders)	3.71%
		(3) Non-Bituminous Base Course (WMM)	4.99%
		(4) Bituminous Base Course (DBM)	5.29%
		(5) Wearing Coat (BC)	4.10%
		C.1- Reconstruction/new Service Road (Flexible Pavement) including Rectification	
		(1) Earth Work up to Top of the Sub Grade	0.64%
		(2) Sub base course (GSB,Shoulders)	1.08%
		(3) Non-Bituminous Base Course (WMM)	1.51%
		(4) Bituminous Base Course (DBM)	1.76%
		(5) Wearing Coat (BC)	1.21%
D-Re-Construction and New culverts on existing road, realignments, bypasses including Rectification			
Culverts (Length<6m)	0.06%		
Minor Bridges/Under pass/Overpass	6.92%	A.1. - Widening and repairs of minor bridges (length >6m and <60m) including Rectification	
		(1) Minor Bridges	2.44%
		A.2 - New minor bridges (Length>6m and <60m) including Rectification	
		1) Foundation + Sub structure	0.08%
		2) Super-Structure	13.76%
		3) Approaches	7.40%
		B.2. New Underpasses/Overpasses including Rectification	
1) Foundation + Sub structure	13.00%		

		2) Super-Structure	6.02%
		3) Wearing Coat	5.23%
		4) Approaches	
		i) Casting of Panels @ 50%	17.36%
		ii) Erection of Panels @ 50%	34.71%
Major Bridge (Length>60m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	6.81%	A.1. - Widening and repairs of major bridges including Rectification	
		1) Foundation	0.01%
		2) Sub-Structure	0.01%
		3) Super Structure (including bearings)	0.20%
		4) Wearing coat including expansion joints	0.20%
		5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.21%
		A.2 - New major bridges including Rectification	
		1) Foundation	0.20%
		2) Sub-Structure	12.35%
		3) Super Structure (including bearings)	
		3.1) Casting of Girder @ 40%	0.60%
		3.2) Deck Slab @ 60%	66.63%
		4) Wearing coat including expansion joints	6.22%
		5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	6.22%
6) Wing walls /return walls	0.40%		
7) Approaches (including retaining walls, stone pitching and protection works)	6.75%		
Other Works	12.08%	A) Other Works	
		1) Toll Plaza	28.75%
		2) Roads Side Drains (including Rectification)	15.15%
		3) Road Signs, Markings, K.M. Stones, Safety Devices, etc.	23.83%
		4) Project Facilities (Others)	
		a) Bus Bays	6.81%
		b) Truck lay-bayes	0.60%
		c) Other Items (Junctions)	19.00 %
		5) Road Site Plantation	2.18%
		6) Repair of protection works other than approaches to the bridges, elevated sections/flyovers/grade separators and ROB/RUBs.	1.37%
7) Retaining wall	2.31%		

Note: * The above list is illustrative and may require modification as per the scope of the work.

1.3.Procedure of estimating the value of work done.

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

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

Table 1.3.1

Stage of payment	% Weightage	Payment procedure
A) Widening and Strengthening of Existing Road to 2-Lane with Paved Shoulder including Rectification		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 1 (One) Km in 2 lane.
(1) Earthwork up to top of the sub-grade	4.45%	
(2) Granular work (sub-base)	5.73%	
3) Non-Bituminous Base Course (WMM)	11.01%	
4) Bituminous Course(Dense Bituminous Macadam)	29.07%	
5) Wearing Course (Bituminous Concrete)	22.88%	
(4) Widening and repair of culverts	0.46%	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 2 (two) culverts for 2 lane carriageways. Further, 80% payment will be made for each culvert constructed in 4 lane equivalent width without protection work. Further 20% will be released after completion of Protection work
B.1 -Reconstruction/new 2 Lane realignment/ Bypass (Flexible Pavement) including Rectification		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of each stage in full length or 5 Km. whichever is less
(1) Earthwork up to top of the sub-grade	2.05%	
(2) Granular work (sub-base)	3.71%	
3) Non-Bituminous Base Course (WMM)	4.99%	
4) Bituminous Course(Dense Bituminous Macadam)	5.29%	
5) Wearing Course (Bituminous Concrete)	4.10%	
C- Reconstruction/new Service Road (Flexible Pavement) including Rectification		Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of the service roads. Payment shall be made completion of a stage in a length of not less than 1 Km in 2 lane.
1) Earth Work up to Top of the Sub Grade	0.64%	
2) Sub base course (GSB,Shoulders)	1.08%	
3) Non-Bituminous Base Course (WMM)	1.51%	
4) Bituminous Base Course (DBM)	1.76%	
5) Wearing Coat (BC)	1.21%	

D-Re-Construction and New culverts on existing road, realignments, bypasses including Rectification		
(1) Culverts	0.06%	
A.1. - Widening and repairs of minor bridges (length >6m and <60m) including Rectification	2.44%	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 a 2-lane minor bridge.
A.2 - New minor bridges (Length>6m and <60m) including Rectification		
1) Foundation + Sub structure	0.08%	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 each foundation & substructure.
2) Super-Structure	13.76%	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 each span of minor bridge.
3) Approaches	7.40%	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 each Approaches
B.2. New Underpasses/Overpasses including Rectification		
1) Foundation + Sub structure	13.00%	Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length of the Underpass. Payment shall be made on the completion of each foundation & substructure.
2) Super-Structure	6.02%	Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length of the Underpass. Payment shall be made on the completion of each span of minor bridge.
3) Wearing Coat	5.23%	Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length of the Underpass. Payment shall be made on the completion of each Approaches
4) Approaches		
i) Casting of Panels @ 50%	17.36%	Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length of the
ii) Erection of Panels @50%	34.71%	

		Underpass. Payment shall be made on the completion of each Approaches
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@ For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows;

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

Where P = Contract Price

L = Total length in km

Similarly, the rates per km for stages (1), (2) & (4) above shall be worked out.

1.3.2 Major Bridge works and ROB/RUB

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

Table 1.3.2

Stage of payment	% weightage	Payment Procedure
A- Widening and repairs of Major Bridges including Rectification		
Foundation: On completion of the Foundation work including Foundations for wing and return walls	0.01%	Cost of each Major Bridge (widening and repairs) shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges (widening and repairs). Payment shall be made on completion of each stage of a Major Bridge as per the weightage given in this table.
Sub-structure: On completion of abutments, piers up to the abutment/pier cap	0.01%	
Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guide bunds, if any, tests on completion etc., bridge complete in all respects and fit for use.	0.20%	
4)Wearing coat including expansion joints	0.20%	
5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.21%	
B- New Major Bridges including Rectification		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls.	0.20%	For Pile foundation payment shall be made on pro rata basis on completion of each foundation as follows: i) Pile Group-90% ii) Pile Cap-10%
(2) Sub-structure: On completion of abutments, piers up to	12.35%	Cost of each major bridges shall be determined on pro rata basis with respect to the total linear length (m) of the major bridges. Payment shall be made on completion of each stage of a major bridge in 2-lanes as per the weightage given in this table.
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guide bunds, if any, tests on completion etc., complete in all respects and fit for use	-	
3.1) Casting of Girder @ 40%	0.60%	

Stage of payment	% weightage	Payment Procedure
3.2) Deck Slab @ 60%	66.63%	
4) Wearing coat including expansion joints	6.22%	
5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	6.22%	
6) Wing walls /return walls	0.40%	
7) Approaches (including retaining walls, stone pitching and protection works)	6.75%	

1.3.3 Other Engineering works

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

Stage of payment	% weightage	Payment procedure
(i) Toll plaza	28.75%	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	15.15%	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 10% (ten percent) of the total length in 2-lane.
(iii) Road signs, markings, km stones, safety devices.	23.83%	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 10% (ten per cent) of the total length.
(iv) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus bays	6.81%	
b) Truck lay-bays	0.60%	
c) Others (Junctions)	19.00%	
(vii) Roadside plantation	2.18%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(viii) Repair & Protection works	1.37%	
(ix) Retaining wall	2.31 %	Payment shall be made on prorated on completion of a stage in a length of not less than 10% (ten per cent) of the total length.

2. Procedure for payment for Maintenance

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

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

Schedule - I
(See Clause 10.2 (iv))
Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

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

- a) Drawings of horizontal alignment, vertical profile and detailed cross sections.
- b) Drawings of all Major and Minor Bridges.
- c) Drawings of cross-drainage works.
- d) Drawings of Major intersections.
- e) Drawing of Toll Plaza layout and building.
- f) Drawing of bus-bay and bus shelters.
- g) Drawing of road furniture including traffic signage, marking, safety barriers etc.
- h) Drawing of traffic diversion plan.
- i) Drawing as per instruction of Authority's Engineer.
- j) General arrangement showing area of base camp and administrative block

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **192th** day from the Appointed Date (the "**Project Milestone- I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **328th** day from the Appointed Date (the "**Project Milestone- II**").

(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 35% (thirty five per cent) of the Contract Price **and should have started construction of all bridges**

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **465th** day from the Appointed Date (the "**Project Milestone- III**").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and **should have started construction of all project facilities.**

5. **Scheduled Completion Date**

- (i) The Scheduled Completion Date shall occur on the **548th** day from the Appointed Date.
- (ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6. **Extension of time**

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

- (i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.
- (ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2. Tests

- (i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [to be decided in consultation with Authority's Engineer as per relevant IRC Code/Manual].
- (ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.
- (iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.
- (iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

- (v) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.
- (vi) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

3. Agency for conducting Tests

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

4. Completion Certificate

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

- 5. The Contractor will carry out tests with following equipment in the presence of Authority's Engineer.

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

- 1 I,.....(Name of the Authority’s Engineer), acting as the Authority’s Engineer, under and in accordance with the Agreement dated.....(the “Agreement”), for [construction of the ****section (km ** to km **) of National Highway No. ***] (the “Project Highway”) on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the day of 20, Scheduled Completed Date for which was the day of..... 20.....

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name

)(Designation)

(Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

1. Payment reduction for non-compliance with the Maintenance Requirements
 - (i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.
 - (ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.
 - (iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.
2. Percentage reductions in lump sum payments on monthly basis
 - (i) The following percentages shall govern the payment reduction:

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

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	Roadside Drains	
(i)	Cleaning and repair of drains	5%
(e)	Road Furniture	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5 th km stones	5%
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	Defects in Other Project Facilities	5%

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

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

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

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

2. Definitions and interpretation

- (i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.
- (ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.
- (iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

3. General

- (i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- (ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

- (a) any Time Extension;
 - (b) any additional cost to be paid by the Authority to the Contractor;
 - (c) the Termination Payment; or
 - (d) issuance of Completion Certificate or
 - (e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.
- (iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.
- (iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.
- (v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.
- (vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4. Construction Period

- (i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.
- (ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.
- (iii) The Authority's Engineer shall review and approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

- (iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.
- (v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.
- (vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.
- (vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.
- (viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.
- (ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.
- (x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.
- (xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.
- (xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

- (xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.
- (xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.
- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.
- (xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
- (xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.
- (xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

- (i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- (ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

- (iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.
- (iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.
- (v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6. Determination of costs and time

- (i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.
- (ii) The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.
- (iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7. Payments

- (i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).
- (ii) Authority's Engineer shall -
 - (a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and
 - (b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the

Contractor, after adjustments in accordance with the provisions of Clause 19.10.

- (iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.
- (iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

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

9. Miscellaneous

- (i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.
- (ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.
- (iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.
- (iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.
- (v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

Schedule - 0

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

- (a) The estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;
- (b) Amounts reflecting adjustments in price for the aforesaid claim;
- (c) The estimated amount of each Change of Scope Order executed subsequent to the last claim;
- (d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);
- (e) Total of (a), (b), (c) and (d) above;
- (f) Deductions:
 - i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
 - ii. Any amount towards deduction of taxes; and
 - iii. Total of (i) and (ii) above.
- (g) Net claim: (e) – (f) (iii);
- (h) The amounts received by the Contractor upto the last claim:
 - i. For the Works executed (excluding Change of Scope orders);
 - ii. For Change of Scope Orders, and
 - iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

- (a) the monthly payment admissible in accordance with the provisions of the Agreement;
- (b) the deductions for maintenance work not done;
- (c) net payment for maintenance due, (a) minus (b);
- (d) amounts reflecting adjustments in price under Clause 19.12; and
- (e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

- (i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:
 - (a) Insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and
 - (b) Insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.
- (ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

- (a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and
- (b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

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

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

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

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