National Highways and Infrastructure Development Corporation Ltd.

Technical Schedules

FOR

Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from Design Chainage km 118+850 to km 132+037 (Package-4A) in the State of Manipur on EPC Mode

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

February, 2025

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

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

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

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

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

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

Annex-I

(Schedule-A)

SITE

1. Site

The Site of the Two-Lane Project Highway comprises the section of NH-102B commencing from existing Chainage km 134+270 to km 149+630 (Design Chainage km 118+850 to km 132+037) i.e., Khuanggin Village to Sinzawl Village in the State of Manipur. The land, carriageway and stretches comprising the site are described below.

2. Land

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

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Right of Way (m)
	From	To	From	To	
1	134+270	149+630	118+850	132+037	20-24

3. Carriageway

The present carriageway of the Project Highway is single-lane except in few sections where 2-laning with hard shoulder works have been carried out as summarized in following tables. Type of existing pavement is flexible.

(i) Already completed work for Earthwork upto Top of Sub-grade layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	120+852	2.002
2	120+938	126+924	5.986
3	130+807	132+037	1.230
		Total	**9.218**

(ii) Already completed work for GSB layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	120+852	2.002
2	120+974	126+411	5.437
3	130+807	132+037	1.230
		Total	**8.669**

(iii) Already completed work for WMM layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	120+780	1.930
2	120+974	125+263	4.289
3	130+807	132+037	1.230
		Total	**7.449**

(iv) Already completed work for DBM layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	120+750	1.900
2	120+974	125+260	4.286
3	130+807	132+037	1.230
		Total	**7.416**

(v) Already completed work for BC layer is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	120+746	1.896
2	120+974	125+260	4.286
3	130+807	132+037	1.230
		Total	**7.412**

4. Major Bridges

The Site includes the following Major Bridges:

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure			Span Arrangement (m)	Width (m)
			Foundation	Sub-structure	Super-structure		
1	-	120+895	Completed	A1 & A2 Abutment wall partly completed	Balance	2 Nos x 43 m	16 m

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

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

Sl. No.	Existing Chainage (km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Superstructure		
Nil					

6. Grade separators

The Site includes the following grade separators:

Sl.No.	Existing Chainage (km)	Type of Structure		Span Arrangement (m)	Width (m)
		Foundation	Superstructure		
Nil					

7. Minor bridges

The Site includes the following minor bridges:

Sl. No.	Existing Chainage (km)	Type of Structure			No of spans with Span Length (m)	Width (m)
		Foundation	Sub-structure	Super Structure		
1	136+526	Open	Wall	Bailey Bridge	1 x 55	6.38

8. Railway level crossings

The Site includes the following railway-level crossings:

Sl.No.	Location (km)	Remarks
Nil		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following Box Type culverts:

Sl.No.	Design Chainage (km)	Size
1	118+966	2 x 2
2	119+080	2 x 2
3	119+180	2 x 2
4	119+281	2 x 2
5	119+361	2 x 2
6	119+555	2 x 2
7	119+743	2 x 2
8	119+860	2 x 2
9	119+869	2 x 2
10	119+910	2 x 2
11	120+220	2 x 2
12	120+359	2 x 2
13	120+515	2 x 2
14	120+739	2 x 2
15	121+382	2 x 2
16	122+106	2 x 2
17	122+301	2 x 2
18	122+380	2 x 2
19	122+645	2 x 2
20	122+675	2 x 2
21	122+966	2 x 2
22	123+121	2 x 2
23	123+261	2 x 2

Sl.No.	Design Chainage (km)	Size
24	123+550	2 x 2
25	123+575	2 x 2
26	123+750	2 x 2
27	124+019	2 x 2
28	124+065	2 x 2
29	124+368	2 x 2
30	124+381	2 x 2
31	124+941	2 x 2
32	125+150	2 x 2
33	125+360	2 x 2
34	128+920	2 x 2
35	129+090	2 x 2
36	129+120	2 x 2
37	129+390	2 x 2
38	129+513	2 x 2
39	129+640	2 x 2
40	129+900	2 x 2
	Total	**40 Nos.**

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

The details of the road side drains are as follows:

Sl. No.	Location		Length (km)	Type	
	From	To		Masonry/cc (Pucca)	Earthen (Kutcha)
1	119+050	119+080	0.030	Pucca lined drain	
2	119+135	119+195	0.060		
3	119+203	119+280	0.077		
4	119+365	119+518	0.153		
5	119+565	119+743	0.178		
6	120+250	120+280	0.030		
7	121+590	122+040	0.450		
8	124+820	124+900	0.080		
9	125+500	125+700	0.200		
10	125+900	125+980	0.080		
11	126+150	126+250	0.100		
12	130+957	131+147	0.190		
13	131+167	131+367	0.200		
	Total		**1.828**		

14. Major junctions

The details of major junctions are as follows:

Sl. No.	Location (Existing)		At Grade	Separated	Category of Cross Road			
	From	To			NH	SH	MDR	Others
1	148+900		Yes					Village Road

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

15. Minor junctions

The details of the minor junctions are as follows:

Sl. No.	Location (Existing km)	Type of intersection	
		Type of Junction	Cross Road
1	141+330	Y	Village Road
2	148+330	Y	Village Road

16. Bypasses

The details of the bypasses are as follows:

Sl.No.	Name of bypass (town)	Chainage (km)	Length (in km)
Nil			

17. Other structures

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

18. Hazardous Locations

a) Already completed work of Retaining Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118.860	118.920	0.060
2	119.035	119.070	0.035
3	119.090	119.150	0.060
4	119.190	119.260	0.070
5	119.367	119.470	0.095
6	119.470	119.520	0.050
7	119.520	119.540	0.020
8	119.560	119.600	0.040
9	119.628	119.720	0.092
10	119.720	119.740	0.020
11	119.750	119.800	0.050
12	119.800	119.815	0.015
13	119.920	120.030	0.110
14	120.225	120.245	0.020
15	120.260	120.349	0.089
16	120.373	120.504	0.131

Sl. No.	Design Chainage		Length (km)
	From	To	
17	120+520	120+612	0.092
18	121+390	121+540	0.150
19	121+731	121+800	0.069
20	121+800	121+837	0.037
21	122+075	122+100	0.025
22	122+115	122+220	0.105
23	122+230	122+282	0.052
24	122+305	122+320	0.015
25	122+320	122+360	0.040
26	122+360	122+375	0.015
27	122+385	122+400	0.015
28	122+400	122+460	0.060
29	122+480	122+530	0.050
30	122+560	122+570	0.010
31	122+570	122+600	0.030
32	122+600	122+610	0.010
33	122+610	122+645	0.035
34	122+650	122+685	0.035
35	122+685	122+705	0.020
36	122+766	122+951	0.185
37	122+956	122+970	0.014
38	122+970	123+090	0.117
39	123+133	123+188	0.055
40	123+188	123+278	0.090
41	123+268	123+318	0.049
42	123+328	123+518	0.189
43	123+528	123+548	0.020
44	123+760	123+965	0.205
45	124+110	124+285	0.175
46	124+295	124+335	0.040
47	124+420	124+455	0.035
48	124+470	124+490	0.020
49	124+904	124+926	0.021
50	124+992	125+108	0.116
51	125+110	125+130	0.020
52	127+967	127+982	0.015
53	131+407	131+547	0.140
54	131+557	131+667	0.110
55	131+707	131+857	0.150
56	131+907	131+927	0.020
57	131+927	132+037	0.106
	Total		**3.714**

b) Already completed work of Breast Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	118+850	118+960	0.110
2	118+970	119+050	0.080
3	119+290	119+340	0.050

Sl. No.	Design Chainage		Length (km)
	From	To	
4	119+750	119+848	0.098
5	119+870	119+920	0.047
6	119+930	119+980	0.050
7	120+230	120+270	0.040
8	120+370	120+490	0.115
9	120+565	120+655	0.090
10	120+185	120+215	0.029
11	120+310	120+350	0.049
12	120+655	120+675	0.020
13	121+115	121+190	0.075
14	121+200	121+377	0.177
15	121+390	121+590	0.200
16	122+130	122+290	0.160
17	122+300	122+360	0.059
18	122+420	122+630	0.190
19	122+650	122+725	0.075
20	123+345	123+500	0.150
21	123+580	123+690	0.110
22	123+690	123+710	0.017
23	123+758	123+788	0.029
24	123+788	123+958	0.170
25	124+080	124+260	0.180
26	124+385	124+815	0.430
27	130+875	130+937	0.062
28	131+420	131+537	0.116
29	131+561	131+671	0.110
30	131+690	131+948	0.258
31	131+957	132+037	0.174
	Total		**3.520**

c) Already completed work of Toe Wall is as under:

Sl. No.	Design Chainage		Length (km)
	From	To	
1	119+285	119+325	0.040
2	119+812	119+833	0.021
3	119+843	119+864	0.021
4	119+877	119+917	0.040
5	120+034	120+059	0.025
6	120+613	120+663	0.050
7	121+576	121+698	0.122
8	123+572	123+732	0.160
9	123+732	123+809	0.075
10	124+790	124+903	0.108
11	130+887	131+186	0.262
	Total		**0.924**

19. Existing Utilities

(i) The site includes the following electrical utilities:

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

Sl. No	Chainage		Length (in km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
Nil										

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

Sl. No.	Chainage		HT/LT Lines (Length/Nos+)			Distribution Station	
	From	To	33KV	11KV	LT	No	Capacity
Nil							

(ii) Public Health utilities (Water/Sewage Pipe Lines) *

- The site includes the following Public Health utilities: -

Sl. No.	Chainage		Pipe line	Distribution Tank	Reservoir	Community Sanitary Complex	IHHL
	From	To	(in km)	Nos.	Nos.	Nos.	Nos.
Nil							

(* This illustrative and may change as per features of existing utilities.)

Contractor shall inspect the project highway for existing utilities and undertake shifting in accordance with Annexure – I of Schedule – B and as per the Utility Relocation Plan approved by the concerned Utility Owning Dept.

Annex – II

(See Clauses 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No.	Ch From	Ch To	Length (km)	Width (m)	Date of providing RoW
1	118+850	132+037	13.187	24	100% on Appointed date

The Construction of Project Highway will be implemented as per Manual, details of which are already given in Article-2 of Annexure – I of Schedule–A.

Annex - III

(Schedule-A)

Alignment Plans

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

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

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

Annex - IV

(Schedule-A)

Environment Clearances

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

SCHEDULE - B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1 Development of the Project Highway

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

2. Rehabilitation and Augmentation

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

3 Specifications and Standards

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

Annex - I

(Schedule-B)

DESCRIPTION OF PROJECT

The Site of the Two-Lane Project Highway comprises the section of NH-102B commencing from Design Chainage km 118+850 to km 132+037 i.e., Khuanggin Village to Sinzawl Village in the State of Manipur. The land, carriageway and stretches comprising the site are described below.

1. Widening of existing Highway

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

(ii) Width of Carriageway

(a) Two-Lanning with hard shoulders shall be undertaken. The paved carriageway shall be 7 (Seven) m wide in accordance with the typical cross section drawings in the Manual.

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

Sl. No.	Built-up stretch (Township)	Location		Width (m)	Typical Cross Section (Refer to Manual)	Remarks
1	Khuanggin	120+070	120+220	7	As per attached TCS drawing	7 m Carriageway
2	Sinzawl	129+531	130+681	7	As per attached TCS drawing	7 m Carriageway

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1 (i) & (ii) above.

2. Geometric Design and General Features

(i) **General**

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

(ii) **Design speed**

For Mountainous terrain design speed shall be the minimum design speed of 40-60 km/hr and for sharp curve and hair pin bend locations speed reduces up to 30 km/hr & 20 km/hr, respectively.

(iii) **Improvement of the existing road geometrics**

In accordance with Paragraph 2.1(v) of Manual, as far as possible, uniformity of design standards shall be maintained throughout the length. In case of any change, it shall be effected in a gradual manner.

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

Sl.No.	Chainage	Radius (m)	Type of deficiency	Design Speed (km/hr)
1	118.877	50	Sharp bend	30
2	119.012	50	Sharp bend	25
3	119.086	20	Sharp bend	20
4	119.241	30	Sharp bend	20
5	119.371	40	Sharp bend	30
6	119.512	40	Sharp bend	30
7	119.625	60	Sharp bend	35
8	119.704	30	Sharp bend	20
9	119.836	24	Sharp bend	20
10	120.011	50	Sharp bend	35
11	120.119	50	Sharp bend	35
12	120.215	50	Sharp bend	35
13	120.273	50	Sharp bend	35
14	120.391	50	Sharp bend	25
15	120.822	30	Sharp bend	20
16	120.966	30	Sharp bend	20
17	121.280	50	Sharp bend	35
18	121.367	50	Sharp bend	35
19	121.464	50	Sharp bend	35
20	121.534	50	Sharp bend	25
21	121.638	20	Sharp bend	20
22	121.738	30	Sharp bend	20
23	121.799	50	Sharp bend	25
24	122.313	20	Sharp bend	20
25	122.383	20	Sharp bend	20
26	122.708	20	Sharp bend	20

Sl.No.	Chainage	Radius (m)	Type of deficiency	Design Speed (km/hr)
27	122.848	30	Sharp bend	20
28	122.936	30	Sharp bend	20
29	123.119	20	Sharp bend	20
30	123.189	50	Sharp bend	25
31	123.280	40	Sharp bend	30
32	123.542	20	Sharp bend	20
33	123.668	20	Sharp bend	20
34	123.920	50	Sharp bend	35
35	124.000	20	Sharp bend	20
36	124.064	20	Sharp bend	20
37	124.212	30	Sharp bend	20
38	124.604	60	Sharp bend	30
39	125.088	60	Sharp bend	35
40	126.539	20	Sharp bend	20
41	126.737	30	Sharp bend	25
42	126.793	30	Sharp bend	25
43	127.007	20	Sharp bend	20
44	127.086	60	Sharp bend	35
45	127.149	40	Sharp bend	30
46	127.205	25	Sharp bend	25
47	127.398	20	Sharp bend	20
48	127.558	35	Sharp bend	30
49	127.680	60	Sharp bend	30
50	127.864	25	Sharp bend	25
51	127.906	20	Sharp bend	20
52	127.986	30	Sharp bend	25
53	128.223	30	Sharp bend	25
54	128.306	20	Sharp bend	20
55	129.656	30	Sharp bend	25
56	128.647	30	Sharp bend	25
57	128.910	40	Sharp bend	30
58	126.531	20	Sharp bend	20
59	129.060	50	Sharp bend	30
60	129.133	50	Sharp bend	30
61	129.180	60	Sharp bend	30
62	129.214	25	Sharp bend	25
63	129.716	25.5	Sharp bend	25
64	129.807	30	Sharp bend	25
65	129.851	30	Sharp bend	25
66	130.496	20	Sharp bend	20
67	130.560	60	Sharp bend	30
68	130.630	40	Sharp bend	30
69	130.687	25	Sharp bend	25
70	130.763	30	Sharp bend	25
71	130.843	65	Sharp bend	30
72	130.973	40	Sharp bend	30
73	131.028	20	Sharp bend	20
74	131.092	20	Sharp bend	20
75	131.135	50	Sharp bend	25
76	131.450	50	Sharp bend	25

Sl.No.	Chainage	Radius (m)	Type of deficiency	Design Speed (km/hr)
77	131.532	30	Sharp bend	20
78	131.809	60	Sharp bend	35
79	131.875	20	Sharp bend	20
80	131.937	30	Sharp bend	20

(iv) Right of Way

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

(v) Type of shoulders

(a) In built-up sections, footpaths/ covered drains shall be provided in the following stretches:

Sl. No.	Stretch (from km to km)	Fully Paved shoulders/footpaths	Reference to cross section
1	120+070 to 120+220	2 x 1 m wide footpath	TCS-1
2	129+531 to 130+681	2 x 1 m wide footpath	TCS-1

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

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

(vi) Lateral and vertical clearances at underpasses

(a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.10 of the Manual.

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

Sl. No.	Design Chainage	Clear span/ opening (m)	Vertical Clearance (m)	Remarks
Nil				

(vii) Lateral and vertical clearances at overpasses

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

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

Sl. No.	Design Chainage	Clear span/ opening (m)	Vertical Clearance (m)	Remarks
Nil				

(viii) Service Roads

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

Sl. No.	Location of service road (from km to km)	Right hand side (RHS)/Left-hand side (LHS)/or Both sides	Length (km) of Service Road
Nil			

(ix) Grade-separated structures

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

i) Overpass

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

ii) Vehicular Underpass (VUP)

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

iii) Light Vehicular Underpass

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

iv) Small Vehicular Underpass

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

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

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

(x) Cattle and pedestrian underpass/overpass

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

Sl.No.	Location	Type of crossing
Nil		

(xi) Typical cross-sections of the Project Highway

The schedule of typical cross-sections is given in the table below. Drawings of typical cross-sections are attached. The indicative TCS for Project Highway are as follows-

TCS Type	Description	Length (m)
TCS-1	Two Lane carriageway with hard shoulder in built up area with both side footpath cum RCC covered drain (existing pavement)	1300
TCS-5	Two Lane carriageway with hard shoulder and one side toe wall & one side trapezoidal drain (existing pavement)	1099
TCS-6	Two Lane carriageway with hard shoulder and both side trapezoidal drain (existing pavement)	1262
TCS-7	Two Lane carriageway with hard shoulder and one side trapezoidal drain (existing pavement)	1487
TCS-8	Two Lane carriageway with hard shoulder and one side breast wall (existing pavement)	1237
TCS-9	Two Lane carriageway with hard shoulder and one side breast wall & one side drain (existing pavement)	2084
TCS-10	Two Lane carriageway with hard shoulder and one side retaining wall (existing pavement)	100
TCS-11	Two Lane carriageway with hard shoulder and one side retaining wall & one side drain (existing pavement)	3204
TCS-12	Two Lane carriageway with hard shoulder and one side retaining wall & one breast wall (existing pavement)	815
TCS-13	Two Lane carriageway with hard shoulder and both side retaining wall (existing pavement)	47
TCS-14	Two Lane carriageway with hard shoulder and one side toe wall & one side breast wall (existing pavement)	322
	CD length	229
	Total	**13187**

Sr. No.	Chainage		Length of TCS (m)	Length of CD (m)	Net Length (m)	TCS No.
	From	To				
1	118850	118920	70		70	TCS-12
2	118920	119020	100	2.6	97.4	TCS-8
3	119020	119070	50		50	TCS-12
4	119070	119120	50	2.7	47.3	TCS-13
5	119120	119370	250	8	242	TCS-5
6	119370	119470	100		100	TCS-14
7	119470	120070	600	13.1	586.9	TCS-11
8	120070	120220	150		150	TCS-1
9	120220	120620	400	8	392	TCS-11
10	120620	120720	100		100	TCS-5
11	120720	120970	250	74.6	175.4	TCS-7
12	120970	121870	900	2.6	897.4	TCS-9
13	121870	122070	200	2.7	197.3	TCS-7
14	122070	122120	50	2.7	47.3	TCS-11
15	122120	122220	100		100	TCS-8
16	122220	122620	400	2.6	397.4	TCS-12
17	122620	123320	700	13.1	686.9	TCS-11
18	123320	123470	150		150	TCS-14
19	123470	123620	150	2.6	147.4	TCS-5
20	123620	123720	100		100	TCS-8
21	123720	124020	300	5.2	294.8	TCS-11

Sr. No.	Chainage		Length of TCS (m)	Length of CD (m)	Net Length (m)	TCS No.
	From	To				
22	124020	124320	300	2.7	297.3	TCS-8
23	124320	124370	50	2.6	47.4	TCS-12
24	124370	124820	450	5.2	444.8	TCS-9
25	124820	124970	150	2.6	147.4	TCS-7
26	124970	125070	100		100	TCS-11
27	125070	125170	100		100	TCS-7
28	125170	125220	50		50	TCS-10
29	125220	125370	150	2.6	147.4	TCS-7
30	125370	125406	36	2.6	33.4	TCS-11
31	125406	125456	50		50	TCS-5
32	125456	125506	50		50	TCS-6
33	125506	125556	50		50	TCS-7
34	125556	125581	25		25	TCS-10
35	125581	125606	25		25	TCS-7
36	125606	125681	75		75	TCS-9
37	125681	125706	25		25	TCS-10
38	125706	125806	100		100	TCS-8
39	125806	125856	50	2.6	47.4	TCS-11
40	125856	125881	25		25	TCS-8
41	125881	125931	50		50	TCS-5
42	125931	125956	25		25	TCS-14
43	125956	126031	75	2.6	72.4	TCS-8
44	126031	126081	50	3.84	46.16	TCS-11
45	126081	126156	75		75	TCS-6
46	126156	126206	50	2.6	47.4	TCS-5
47	126206	126256	50	2.6	47.4	TCS-6
48	126256	126381	125		125	TCS-11
49	126381	126531	150		150	TCS-12
50	126531	126656	125	2.7	122.3	TCS-5
51	126656	126706	50		50	TCS-11
52	126706	126731	25		25	TCS-6
53	126731	127031	300	5.4	294.6	TCS-11
54	127031	127056	25		25	TCS-7
55	127056	127156	100		100	TCS-9
56	127156	127356	200	2.7	197.3	TCS-11
57	127356	127506	150	3.84	146.16	TCS-6
58	127506	127556	50		50	TCS-5
59	127556	127606	50		50	TCS-11
60	127606	128031	425	6.44	418.56	TCS-6
61	128031	128256	225	5.2	219.8	TCS-9
62	128256	128381	125		125	TCS-6
63	128381	128456	75	2.6	72.4	TCS-8
64	128456	128506	50		50	TCS-6
65	128506	128581	75		75	TCS-11
66	128581	128806	225	2.6	222.4	TCS-8
67	128806	129006	200		200	TCS-7
68	129006	129081	75		75	TCS-6
69	129081	129381	300	6.44	293.56	TCS-7
70	129381	129531	150	2.6	147.4	TCS-11

Sr. No.	Chainage		Length of TCS (m)	Length of CD (m)	Net Length (m)	TCS No.
	From	To				
71	129531	130681	1150		1150	TCS-1
72	130681	130807	126		126	TCS-7
73	130807	130857	50		50	TCS-9
74	130857	131157	300	10.5	289.5	TCS-5
75	131157	131407	250		250	TCS-6
76	131407	131707	300	2.6	297.4	TCS-9
77	131707	131807	100		100	TCS-12
78	131807	131907	100		100	TCS-8
79	131907	131957	50	2.6	47.4	TCS-14
80	131957	132007	50		50	TCS-8
81	132007	132037	30		30	TCS-11
	Total		**13187**	**229**	**12958**	

3. Intersections and Grade Separators

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

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

(i) At grade Intersections

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

Major Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features	Remarks
Nil				

Minor Intersections

Sl. No.	Location of intersection (km)	Type of intersection	Other features
1	129+000	T-Type	3-Legged
2	129+700	T-Type	3-Legged
3	130+500	T-Type	3-Legged

(ii) Grade-separated intersection without ramps

Sl. No.	Design Chainage	Salient Feature (Formation width) (m)	Minimum Length of Viaduct (m)	Road to be carried Under the structure	Type of Structure
NIL					

4. Road Embankment and Cut Section

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

(ii) Raising of the existing road/New carriageway

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

5. Pavement Design

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

(ii) Type of pavement

Flexible pavement shall be provided for the entire length of the project highway.

(iii) Design requirements - as per paragraphs 5.4, 5.9 and 5.10 of the manual and extant relevant IRC Guidelines.

(a) Design Period and strategy

Flexible pavement for new pavement or for widening and strengthening of the Existing pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

(b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of not less than 20 MSA.

(iv) Reconstruction of stretches:

The following stretches of the existing road shall be reconstructed. These shall be designed as new pavement. The details may be referred from Para 2 (ix) above.

6. Road Side Drainage

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

RCC covered drain

Sl.No.	Design Chainage		Length (m)	Side	Remarks	TCS
	From (km)	To (km)				
1	120.070	120.220	300	Both Side	Khuanggin Village	TCS-01
2	130.681	131.831	2300	Both Side	Sinzawl Village	TCS-01
Total			**2600**			

RR Masonary Trapezoidal drain

Sl.No.	Design Chainage (km)		Side	Length (m)	TCS No.
	From	To			
1	119120	119135	Single Side	15	TCS-5
2	119195	119203	Single Side	8	TCS-5
3	119280	119365	Single Side	85	TCS-5
4	119518	119565	Single Side	47	TCS-11
5	119743	120070	Single Side	327	TCS-11
6	120220	120250	Single Side	30	TCS-11
7	120280	120620	Single Side	340	TCS-11
8	120620	120720	Single Side	100	TCS-5
9	120720	120970	Single Side	250	TCS-7
10	120970	121590	Single Side	620	TCS-9
11	122040	122070	Single Side	30	TCS-7
12	122070	122120	Single Side	50	TCS-11
13	122620	123320	Single Side	700	TCS-11
14	123470	123620	Single Side	150	TCS-5
15	123720	124020	Single Side	300	TCS-11
16	124370	124820	Single Side	450	TCS-9
17	124900	124970	Single Side	70	TCS-7
18	124970	125070	Single Side	100	TCS-11
19	125070	125170	Single Side	100	TCS-7
20	125220	125370	Single Side	150	TCS-7
21	125370	125406	Single Side	36	TCS-11
22	125406	125456	Single Side	50	TCS-5
23	125456	125500	Both Side	88	TCS-6
24	125881	125931	Single Side	50	TCS-5
25	126031	126081	Single Side	50	TCS-11
26	126081	126156	Both Side	150	TCS-6
27	126100	126152	Single Side	52	TCS-5
28	126256	126381	Single Side	125	TCS-11
29	126531	126656	Single Side	125	TCS-5
30	126656	126706	Single Side	50	TCS-11
31	126706	126731	Both Side	50	TCS-6
32	126731	127031	Single Side	300	TCS-11
33	127031	127056	Single Side	25	TCS-7
34	127056	127156	Single Side	100	TCS-9
35	127156	127356	Single Side	200	TCS-11
36	127356	127506	Both Side	300	TCS-6
37	127506	127556	Single Side	50	TCS-5
38	127556	127606	Single Side	50	TCS-11
39	127606	128031	Both Side	850	TCS-6
40	128031	128256	Single Side	225	TCS-9
41	128256	128381	Both Side	250	TCS-6

Sl.No.	Design Chainage (km)		Side	Length (m)	TCS No.
	From	To			
42	128456	128506	Both Side	100	TCS-6
43	128506	128581	Single Side	75	TCS-11
44	128806	129006	Single Side	200	TCS-7
45	129006	129081	Both Side	150	TCS-6
46	129081	129381	Single Side	300	TCS-7
47	129381	129531	Single Side	150	TCS-11
48	130681	130807	Single Side	126	TCS-7
49	130807	130857	Single Side	50	TCS-9
50	130857	130957	Single Side	100	TCS-5
51	131147	131157	Single Side	10	TCS-5
52	131157	131167	Both Side	20	TCS-6
53	131367	131407	Both Side	80	TCS-6
54	131407	131707	Single Side	300	TCS-9
55	132007	132037	Single Side	30	TCS-11
Total				**8789**	**m**

PCC chute drain

Sl. No.	Chainage		Length (km)	CD length (m)	Length (m)	Net Length (m)	Remarks
	From	To					
1	121.000	121.800	0.800	2.6	1600	1594.8	Both Side
2	126.950	127.000	0.050		100	100	Both Side
3	128.450	128.671	0.221	2.6	300	294.8	Both Side
				Sub-Total		**1989.6**	
				Total		**3979**	

RCC Cover Drain= 2600 m
Trapezoidal Drain= 8789 m
Chute Drain= 3979 m
Total= 15368 m

7. Designs of Structures

(i) General

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

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

Sl. No.	Design Chainage	Width of structure and cross-sectional features	Remarks
1	120+895	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

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

Sl. No.	Design Chainage	Width of structure and cross-sectional features	Remarks
1	120+895	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

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

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

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

(ii) Culverts

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

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

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

Sl.No.	Culvert Location	Span /Opening (m)
1	122520	2 x 2
2	125823	2 x 2
3	125991	2 x 2
4	126041	3 x 3
5	126167	2 x 2
6	126254	2 x 2
7	126556	2 x 3
8	126741	2 x 3
9	126901	2 x 3
10	127181	2 x 3
11	127421	3 x 3
12	127919	2 x 2
13	127997	3 x 3

Sl.No.	Culvert Location	Span /Opening (m)
14	128084	2 x 2
15	128226	2 x 2
16	128395	2 x 2
17	128659	2 x 2
18	129131	2 x 2
19	129334	3 x 3
20	129381	2 x 2
21	129731	2 x 2
22	129856	2 x 2
23	130081	2 x 2
24	130562	2 x 2
25	130724	2 x 2
	Total	**25**

(c) Widening of existing culverts

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

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

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

Sl.No.	Culvert Location	Span /Opening (m)
Nil		

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

Sl.No.	Location	Type of repair required
Nil		

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

(iii) Bridges

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

(i) The existing bridges at the following locations shall be re-constructed:

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

(ii) The following narrow bridges shall be widened:

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

(b) **Additional new bridges:** New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

Sl. No.	Design Chainage	Name of Nallah	Span arrange-ment (m)	Width of structure and cross-sectional features	Remarks
1	120+895	Tuivai River	2 x 43 m	Carriageway width= 11.0 m, Footpath width = 2 x 1.5 m, RCC Crash Barrier = 2 x 0.5 m, RCC Railing = 2 x 0.5m, Overall width= 16 m	Works already completed at site may be referred from Para 4 of Annx-I of Schedule-A.

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

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

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

Sl.No.	Location at Chainage	Remarks
NIL		

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

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

The following bridges shall be retained with repairs:

Sl. No.	Design Chainage	Existing Chainage	Remarks
NIL			

(e) Drainage system for bridge decks

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

(iv) Rail-road bridges

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

(b) Road over-bridges

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

Sl. No.	Design Chainage	Route	Span arrangement (m)	Total Length (m)	Width (m)
NIL					

(c) Road under-bridges

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

Sl.No.	Location of Level crossing (Ch)	Number and length of span(m)
Nil		

(v) Grade-separated structures

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

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

(b) ROB / RUB

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

(c) Overpasses/Underpasses and other structures

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

(vii) List of Major Bridges and Structures

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

Sl.No.	Location	Type
1	120+895 (Tuivai River)	RCC Steel Girder

8. Traffic Control Devices and Road Safety Works

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

Sl.No.	Traffic Signages, Road Marking and other appurtenances	Unit	Quantity
1	Total No of Street Light=	Nos	47
2	Kilometer stones=	Nos	9
3	5th Kilometer stones=	Nos	2
4	Boundary Stones=	Nos	114
5	Delineators (100 cm long and circular shaped) +Hazard marker =	Nos	974
6	Road Stud=	Nos	5367
7	900 mm Octagonal	Nos	5
8	600 mm circular	Nos	52
9	900 mm Triangular	Nos	135
10	800 mm x 600 mm rectangular	Nos	10
11	Direction Sign < 0.9 sqm	sqm	229
12	Direction Sign > 0.9 sqm	sqm	10
13	Convex Mirror for Blind Curve	sqm	8
14	Rumble Strip	sqm	35

(ii) Specifications of the reflective sheeting.

9. Roadside Furniture

(i) Road side furniture shall be provided in accordance with article 8(i) of this schedule.

(ii) Overhead traffic signs: location and size

Sl.No.	Location (km)	Size
Nil		

10. COMPULSORY AFFORESTATION

[Refer to provision of relevant Manual and specify the number of trees which are required to be planted by the Contractor as compensatory a forestation]

11. HAZARDOUS LOCATIONS

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

a) Retaining Wall -

Sl. No.	Chainage		Side	Length (m)
	From	To		
1	126656	126706	Single	50
2	126731	126800	Single	69
3	126950	127000	Single	50
4	127000	127031	Single	31
5	127156	127210	Single	54

Sl. No.	Chainage		Side	Length (m)
	From	To		
6	127307	127350	Single	43
7	127556	127606	Single	50
8	128506	128581	Single	75
9	129381	129531	Single	150
	Total			**572**

b) Breast Wall –

Sl. No.	Chainage		Side	Length (m)
	From	To		
1	125706	125806	Single	100
2	125856	125881	Single	25
3	125931	125956	Single	25
4	126381	126531	Single	150
5	127056	127156	Single	100
6	128031	128256	Single	225
7	128381	128456	Single	75
8	128581	128806	Single	225
9	130807	130857	Single	50
	Total			**975**

c) Toe Wall

Sl. No.	Chainage		Side	Length (m)
	From	To		
1	123320	123414	Valley side	94
2	123470	123572	Valley side	102
3	125931	125956	Valley side	25
4	126156	126206	Valley side	50
5	126531	126656	Valley side	125
6	127506	127556	Valley side	50
7	130857	130887	Valley side	30
8	131907	131957	Valley side	50
	Total			**526**

d) Metal Beam Crash Barrier

Sl. No.	Chainage		Side	Length (m)
	From	To		
1	119120	119250	Single Side	130
2	119319	119370	Single Side	51
3	119370	119470	Single Side	100
4	119470	119552	Single Side	82
5	119577	119790	Single Side	213
6	119812	119830	Single Side	18
7	119872	119950	Single Side	78
8	119980	120070	Single Side	90
10	120620	120720	Single Side	100
13	122083	122120	Single Side	37
14	122120	122220	Single Side	100

Sl. No.	Chainage		Side	Length (m)
	From	To		
15	122220	122540	Single Side	320
16	122600	122620	Single Side	20
17	122620	122778	Single Side	158
18	122789	123320	Single Side	531
19	123320	123470	Single Side	150
21	123726	123930	Single Side	204
22	123952	123970	Single Side	18
23	124040	124090	Single Side	50
24	124124	124320	Single Side	196
25	124355	124370	Single Side	15
26	124937	124970	Single Side	33
27	124970	125070	Single Side	100
28	125070	125170	Single Side	100
29	125370	125406	Single Side	36
30	125406	125456	Single Side	50
31	125506	125556	Single Side	50
32	125581	125606	Single Side	25
33	125681	125706	Both Side	50
34	125706	125806	Single Side	100
35	125806	125856	Single Side	50
36	125856	125881	Single Side	25
37	125881	125931	Single Side	50
38	125931	125956	Single Side	25
39	125956	126031	Single Side	75
40	126031	126081	Single Side	50
41	126156	126206	Single Side	50
42	126256	126381	Single Side	125
43	126381	126531	Single Side	150
44	126531	126656	Single Side	125
45	126656	126706	Single Side	50
46	126731	127031	Single Side	300
47	127031	127056	Single Side	25
48	127156	127356	Single Side	200
49	127506	127556	Single Side	50
50	127556	127606	Single Side	50
51	128381	128456	Single Side	75
52	128506	128581	Single Side	75
53	128581	128806	Single Side	225
54	128806	129006	Single Side	200
55	129081	129381	Single Side	300
56	129381	129531	Single Side	150
57	130681	130807	Single Side	126
58	130857	130983	Single Side	126
59	131082	131091	Single Side	9
60	131134	131152	Single Side	18
62	131957	132007	Single Side	50
63	132007	132037	Single Side	30
	Total			**5989**

For Bridge Approaches = 100m
(Taking 50 m each approach)

Total length of crash barrier = 6089 m

e) Turfing:

Sr.No.	Chainage (km)		Side	Net Length (m)
	From (km)	To (km)		
1	119120	119370	One Side	242
2	120620	120720	One Side	100
3	123470	123620	One Side	147.4
4	125406	125456	One Side	50
5	125881	125931	One Side	50
6	126156	126206	One Side	47.4
7	126531	126656	One Side	122.3
8	127506	127556	One Side	50
9	130857	131157	One Side	289.5
10	120720	120970	One Side	175.4
11	121870	122070	One Side	197.3
12	124820	124970	One Side	147.4
13	125070	125170	One Side	100
14	125220	125370	One Side	147.4
15	125506	125556	One Side	50
16	125581	125606	One Side	25
17	127031	127056	One Side	25
18	128806	129006	One Side	200
19	129081	129381	One Side	293.56
20	130681	130807	One Side	126
21	118920	119020	One Side	97.4
22	122120	122220	One Side	100
23	123620	123720	One Side	100
24	124020	124320	One Side	297.3
25	125706	125806	One Side	100
26	125856	125881	One Side	25
27	125956	126031	One Side	72.4
28	128381	128456	One Side	72.4
29	128581	128806	One Side	222.4
30	131807	131907	One Side	100
31	131957	132007	One Side	50
32	125170	125220	Both Side	100
33	125556	125581	Both Side	50
34	125681	125706	Both Side	50
35	119470	120070	One Side	586.9
36	120220	120620	One Side	392
37	122070	122120	One Side	47.3
38	122620	123320	One Side	686.9
39	123720	124020	One Side	294.8
40	124970	125070	One Side	100
41	125370	125406	One Side	33.4

Sr.No.	Chainage (km)		Side	Net Length (m)
	From (km)	To (km)		
42	125806	125856	One Side	47.4
43	126031	126081	One Side	46.16
44	126256	126381	One Side	125
45	126656	126706	One Side	50
46	126731	127031	One Side	294.6
47	127156	127356	One Side	197.3
48	127556	127606	One Side	50
49	128506	128581	One Side	75
50	129381	129531	One Side	147.4
51	132007	132037	One Side	30
52	118850	118920	One Side	70
53	119020	119070	One Side	50
54	122220	122620	One Side	397.4
55	124320	124370	One Side	47.4
56	126381	126531	One Side	150
57	131707	131807	One Side	100
58	119070	119120	Both Side	94.6
59	119370	119470	One Side	100
60	123320	123470	One Side	150
61	125931	125956	One Side	25
62	131907	131957	One Side	47.4
	Total length			**8458.52**
	Width of Turfing=			**4.56**
	Quantity (sqm)=			**38571**

f) Hydroseeding:

Sl.No.	Chainage (km)		Side	Net Length (m)
	From (km)	To (km)		
1	126206	126256	One Side	47.4
2	126706	126731	One Side	25
3	127356	127506	One Side	146.16
4	127606	128031	One Side	418.56
5	128256	128381	One Side	125
6	129006	129081	One Side	75
7	131157	131407	One Side	250
8	120720	120970	One Side	175.4
9	121870	122070	One Side	197.3
10	124820	124970	One Side	147.4
11	125070	125170	One Side	100
12	125220	125370	One Side	147.4
13	125506	125556	One Side	50
14	125581	125606	One Side	25
15	127031	127056	One Side	25
16	128806	129006	One Side	200
17	129081	129381	One Side	293.56
18	130681	130807	One Side	126
19	118920	119020	One Side	97.4
20	122120	122220	One Side	100

Sl.No.	Chainage (km)		Side	Net Length (m)
	From (km)	To (km)		
21	123620	123720	One Side	100
22	124020	124320	One Side	297.3
23	125706	125806	One Side	100
24	125856	125881	One Side	25
25	125956	126031	One Side	72.4
26	128381	128456	One Side	72.4
27	128581	128806	One Side	222.4
28	131807	131907	One Side	100
29	131957	132007	One Side	50
30	120970	121870	One Side	897.4
31	124370	124820	One Side	450
32	125606	125681	One Side	75
33	127056	127156	One Side	100
34	128031	128256	One Side	225
35	130807	130857	One Side	50
36	131407	131707	One Side	298.48
	Total length			**5906.96**
	Width of Hydroseeding =			**5.3**
	Quantity (sqm)=			**31307**

12. SPECIAL REQUIREMENTS FOR HILL ROADS

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

Sl.No.	Design Ch (From)	Design Ch (To)	LHS/RHS
Whenever necessary to be notified by Authority's Engineer.			

13. CHANGE OF SCOPE

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

Annexure-I to Schedule-B1

Utility Shifting

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

Notes:

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

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

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

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

Note-II: Copy of utility shifting plans enclosed as Annexure – II to Schedule B1

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

(a) Toll plaza[s]

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Truck Lay byes;

(e) Bus-bays and passenger shelters;

(f) Rest areas; and

(g) Others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Toll Plaza: -

Sl. No.	Design Chainage (km)	Name of the Place
Nil		

b) Roadside furniture: -

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

C) Pedestrian Facility: -

Pedestrian facilities in the form of foot path shall be provided in the built-up area (refer typical cross – section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL.

d) Truck Lay bye: -

Sl. No.	Truck lay bye Chainage (Both Side)	Name of the Place
Nil		

e) Bus Bay & Passenger shelter: -

Sl. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
1	Bus Bay & Passenger shelter	119+950 (Both side)	Bus Bays & Passenger shelter have been placed on both side of proposed roadway.	Dimension of Bus Bay (L X B = 59.0 m X 3.0 m) Dimension of Passenger Shelter (L X B = 6.0 m X 2.0 m) (Refer Passenger Shelter Drawing)
2	Bus Bay & Passenger shelter	125+260 (Both side)	Bus Bays & Passenger shelter have been placed on both side of proposed roadway.	Dimension of Bus Bay (L X B = 59.0 m X 3.0 m) Dimension of Passenger Shelter (L X B = 6.0 m X 2.0 m) (Refer Passenger Shelter Drawing)
3	Bus Bay & Passenger shelter	129+260 (Both side)	Bus Bays & Passenger shelter have been placed on both side of proposed roadway.	Dimension of Bus Bay (L X B = 59.0 m X 3.0 m) Dimension of Passenger Shelter (L X B = 6.0 m X 2.0 m) (Refer Passenger Shelter Drawing)

Note: Location of Passenger and Bus Bay are to be finalized in consultation with Authority and Authority's Engineer.

f) Rest Areas

Sl. No.	Rest Area Chainage	Name of the Place
Nil		

g) Others to be specified

Street Lighting:

Total 10 Nos. Street lighting shall be provided in junction, passenger shelters & bridge locations.

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:

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

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

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

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

2 Deviations from the Specifications and Standards

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

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

<table>
<tr><th>Item</th><th>Manual Clause Reference</th><th colspan="5">Provision as per Manual</th><th colspan="5">Modified Provision</th></tr>
<tr><td rowspan="6">Shoulder</td><td rowspan="6">2.6</td><td colspan="5"><u>Mountainous Terrain</u></td><td colspan="5"><u>Mountainous Terrain</u></td></tr>
<tr><td rowspan="2">Type of Section</td><td rowspan="2"></td><td colspan="3">Width of Shoulder (m)</td><td rowspan="2">Type of Section</td><td rowspan="2"></td><td colspan="3">Width of Shoulder (m)</td></tr>
<tr><td>Paved</td><td>Earthen</td><td>Total</td><td>Paved</td><td>Earthen</td><td>Total</td></tr>
<tr><td rowspan="2">Open Country with Isolated Built-up Area</td><td>Hill Side</td><td>1.5</td><td>-</td><td>1.5</td><td rowspan="2">Open Country with Isolated Built-up Area</td><td>Hill Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Valley Side</td><td>1.5</td><td>1</td><td>2.5</td><td>Valley Side</td><td>-</td><td>Up to 1.0 m</td><td>1</td></tr>
<tr><td rowspan="2">Built-up Area and Approaches to grade separated structures/ bridges</td><td>Hill Side</td><td>0.25 m + 1.5 m (Raised)</td><td>-</td><td>1.75</td><td rowspan="2">Built-up Area and Approaches to grade separated structures/ bridges</td><td>Hill Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Valley Side</td><td>0.25 m + 1.5 m (Raised)</td><td>-</td><td>1.75</td><td>Valley Side</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Design Speed</td><td>2.2</td><td colspan="5"><u>Mountainous Terrain:</u>
Ruling: 60 Kmph
Minimum: 40 Kmph</td><td colspan="5"><u>Mountainous Terrain:</u>
Design Speed followed 40-60 kmph in general. However, design speed has been reduced to 20 kmph due to site constraints and to accommodate the proposal within EROW.
(Refer Horizontal Alignment Drawing and Table 1.1 below)</td></tr>
<tr><td rowspan="5">Extra Widening</td><td rowspan="5">2.7</td><td colspan="5">Extra Widening has been proposed as per IRC: SP: 73-2015</td><td colspan="5">Extra Widening has been proposed as per IRC: SP: 48-1998 (Table 6.9) of Hill Road Manual.</td></tr>
<tr><td>Radius</td><td>Extra Widening</td><td colspan="3" rowspan="3"></td><td>Radius</td><td>Extra Widening</td><td colspan="3" rowspan="3"></td></tr>
<tr><td>75-100 m</td><td>0.9 m</td><td>21-40 m</td><td>1.5 m</td></tr>
<tr><td>101-300 m</td><td>0.6 m</td><td>41-60 m</td><td>1.2 m</td></tr>
<tr><td colspan="5" rowspan="2"></td><td>61-100 m</td><td>0.9 m</td><td colspan="3" rowspan="2"></td></tr>
<tr><td>75-100 m</td><td>0.9 m</td></tr>
<tr><td>Radii Of Horizontal Curve</td><td>2.9.4</td><td colspan="5"><u>Mountainous Terrain:</u>
Desirable Minimum Radius: 150 m
Absolute Minimum Radius: 75 m</td><td colspan="5">Above 300 m | NIL
Radius below 75 m has been provided in the location listed in table 1.1 below.</td></tr>
</table>

Table 1.1: Locations where Design Speed is less than 40 kmph & Radius of Curve is less than 75 m

[Note1: Deviations from the aforesaid Specifications and standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements.]

Sl. No.	Chainage	Radius (m)	Type of deficiency	Design Speed (km/hr)
1	118.877	50	Sharp bend	30
2	119.012	50	Sharp bend	25
3	119.086	20	Sharp bend	20
4	119.241	30	Sharp bend	20
5	119.371	40	Sharp bend	30
6	119.512	40	Sharp bend	30
7	119.625	60	Sharp bend	35
8	119.704	30	Sharp bend	20
9	119.836	24	Sharp bend	20
10	120.011	50	Sharp bend	35
11	120.119	50	Sharp bend	35
12	120.215	50	Sharp bend	35
13	120.273	50	Sharp bend	35
14	120.391	50	Sharp bend	25
15	120.822	30	Sharp bend	20
16	120.966	30	Sharp bend	20
17	121.280	50	Sharp bend	35
18	121.367	50	Sharp bend	35
19	121.464	50	Sharp bend	35
20	121.534	50	Sharp bend	25
21	121.638	20	Sharp bend	20
22	121.738	30	Sharp bend	20
23	121.799	50	Sharp bend	25
24	122.313	20	Sharp bend	20
25	122.383	20	Sharp bend	20
26	122.708	20	Sharp bend	20
27	122.848	30	Sharp bend	20
28	122.936	30	Sharp bend	20
29	123.119	20	Sharp bend	20
30	123.189	50	Sharp bend	25
31	123.280	40	Sharp bend	30
32	123.542	20	Sharp bend	20
33	123.668	20	Sharp bend	20
34	123.920	50	Sharp bend	35
35	124.000	20	Sharp bend	20
36	124.064	20	Sharp bend	20
37	124.212	30	Sharp bend	20
38	124.604	60	Sharp bend	30
39	125.088	60	Sharp bend	35
40	126.539	20	Sharp bend	20
41	126.737	30	Sharp bend	25
42	126.793	30	Sharp bend	25
43	127.007	20	Sharp bend	20
44	127.086	60	Sharp bend	35

Sl. No.	Chainage	Radius (m)	Type of deficiency	Design Speed (km/hr)
45	127.149	40	Sharp bend	30
46	127.205	25	Sharp bend	25
47	127.398	20	Sharp bend	20
48	127.558	35	Sharp bend	30
49	127.680	60	Sharp bend	30
50	127.864	25	Sharp bend	25
51	127.906	20	Sharp bend	20
52	127.986	30	Sharp bend	25
53	128.223	30	Sharp bend	25
54	128.306	20	Sharp bend	20
55	129.656	30	Sharp bend	25
56	128.647	30	Sharp bend	25
57	128.910	40	Sharp bend	30
58	126.531	20	Sharp bend	20
59	129.060	50	Sharp bend	30
60	129.133	50	Sharp bend	30
61	129.180	60	Sharp bend	30
62	129.214	25	Sharp bend	25
63	129.716	25.5	Sharp bend	25
64	129.807	30	Sharp bend	25
65	129.851	30	Sharp bend	25
66	130.496	20	Sharp bend	20
67	130.560	60	Sharp bend	30
68	130.630	40	Sharp bend	30
69	130.687	25	Sharp bend	25
70	130.763	30	Sharp bend	25
71	130.843	65	Sharp bend	30
72	130.973	40	Sharp bend	30
73	131.028	20	Sharp bend	20
74	131.092	20	Sharp bend	20
75	131.135	50	Sharp bend	25
76	131.450	50	Sharp bend	25
77	131.532	30	Sharp bend	20
78	131.809	60	Sharp bend	35
79	131.875	20	Sharp bend	20
80	131.937	30	Sharp bend	20

Schedule – E

(See Clause 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1. Maintenance Requirements

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

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

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

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

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / post-monsoon inspection

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP:35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

All damages occurring to the Project Highway on account of torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.

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

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/ reports/03031/)	24-48 hours	MORT&H Specification 3004.2
S of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15-30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015

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

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Roughness	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equipment)	Class I Profilometer: ASTM E950 (98): 2004 – Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656-94:2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection /Remaining Life			Annually	Falling Weight Deflectometer	IRC 115:2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm /km	Bi-Annually	Class I Profilometer	ASTME950(98) :2004 and ASTM E1656-94:2000	180 days	IRC:SP:83-2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
Approaches of connecting roads, slip roads, lay byes etc. as applicable)	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					
Embankment / Slopes	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<20% variation in prescribed slope camber / cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15% variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

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

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

Table -2: Maintenance Criteria for Rigid Pavements:

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			3	w= 3.0 - 6.0 mm	Staple, if L> 1m. Within 15 days	Partial Depth Repair with stapling. Within15 days
			4	w= 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full depth Repair Dismantle and reconstruct affected portion as per norms and specifications See Para 5.6.4 Within 15 days
4	**Multiple Crack intersecting with one or more joints**	w= width of crack	0	Nil, Not discernible	No, Action	-
			1	w < 0.2 mm, hair cracks	Seal and stitch if L > 1m. Within 15 days	
			2	w= 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w= 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w= 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and /or panel broken into more than 4 pieces		

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

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

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length			**Short Term**	**Long Term**
			0	Difficult to discern	No action	Not Applicable
			1	Discernible, L < 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25%insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin / mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
			3	w = 20 – 40 mm, L > 25%	Partial Depth Repair. Within 15 days	Not Applicable
			4	w = 40 – 80 mm, L > 25%	30 – 50 mm deep, h = w + 20 % of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 – 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping) in Cracks or Joints**	f = difference of level	0	not discernible, < 1 mm	No action.	No action
			1	f < 3 mm		
			2	f = 3 – 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30 days
			3	f = 6 – 12 mm	Diamond Grinding	
			4	f = 12 – 18 mm	Raise sunken slab	Replace the slab as appropriate. Within 30 days
			5	f > 18 mm	Strengthen subgrade and sub – base by grouting and raising sunken slab	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
14	**Blowup or Buckling**	h = vertical displacement from normal profile			**Short Term**	**Long Term**
			0	Nil, not discernible	No action	
			1	h < 6 mm		
			2	h = 6 – 12 mm	Install Signs to Warn Traffic Within 7 days	
			3	h = 12 – 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slab, ie 4 or more pieces	Replace broken slabs. Within 30 days	
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 if L < 20 m. Within 30 days	
			5	h > 100 mm		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
Joints Defects						
					Short Term	**Long Term**
16	**Heave**	h = positive vertical displacement from normal profile. L = length	0	Not discernible, h < 5 mm	No action	
			1	h = 5 – 15 mm	Follow up	scrabble
			2	h = 15 – 30 mm, Nos < 20% joints	Install Signs to Warn Traffic Within 7 days	
			3	h = 30 – 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
			5	f > 18 mm	Strengthen subgrade and sub – base by grouting and raising sunken slab	
17	**Bump**	h = vertical displacement from normal profile.	0	h < 4 mm	No action	
			1	h = 4 – 7 mm	Grind, in case of new construction Within 7 days	Construction Limit for new Construction
			3	h = 7 – 15 mm	Grind, in case of on going maintenance Within 15 days	Replace in case of new construction. Within 30 days.
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30 days

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

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP :84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.

In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC:SP 84-2014</td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m^2/lux
Bituminous Road - 100mcd/m^2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Night Time Visibility</td><td>Initial and Minimum Performance for Dry Retro reflectivity during night time:
<table>
<tr><th>Design Speed</th><th colspan="2">(RL) Retro Reflectivity (mcd/m^2/lux)</th></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty 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>
Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Retro reflectivity	As per specification in IRC:67-2012	Bi-Annually	Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance Measuring tape	Raising Kerb Height	Within 1 Month	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119-2015

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

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

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

Asset Type	Performance Paramete	Level of Service (LOS)	Frequency of Measuremen t	Testing Method	Recommended Remedial measures	Time limit for Rectificatio	Specification s and Standards
Pipe/Box/ slab culverts	Free waterway/ unobstructe d flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of	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	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993	15 days	IRC SP:40-1993 and MORTH Specification s clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregate					

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Protection work in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	IRC: SP 40-1993 and IRC:SP: 13-2004.
Bridges including ROBS Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or wearing coat	15 days	MORTH Specification 2811
Bridge – Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspections per IRCSP:35-1990	Repairs to BC or either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORTH Specification 3004.2 & 2811
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspections and detailed condition survey as per IRC SP:35-1990	Repairs and replacement of safety barriers as the case may be	3 days	IRC: 5-1998 IRC:SP: 84-2004. And IRC SP: 40-1993

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Rusted reinforcement	Not more than 0.25 sq.m.	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti- corrosive coating before carrying out the repair to affected concrete portion with epoxy mortar / concrete.	15 days	IRC:SP: 40-1993. And MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m.					
	Delamination	Not more than 0.50 sq.m.					
	Cracks wider than 0.30 mm	Not more than 1m total length.	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigation causes for cracks development and carry out necessary rehabilitation.	48 hours	IRC:SP: 40-1993. And MORTH Specification 2800.
	Rain seepage through deck slab	Leakage- nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Grouting with slab at leakage areas, waterproofing, repairs to drainage spouts.	1months	MORTH Specification 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity.	6months	IRC:SP: 51-1999.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz.	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30m.	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTOLRFD Specification
	Leakage in Expansion Joints	No damage to elastomeric sealant compound in strip expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi- Annually	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH Specification 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH Specification 2600 and IRC SP: 40-1993.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Monthly	Detailed condition survey as per IRC SP: 35-1990 Using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH Specification 2700
Bridge sub structure	Cracks/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	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/ abutment, all the bearings on that pier/ abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH Specification 2810 and IRC SP: 40-199.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		than 2 locations per side, no rupture of reinforcement or rubber.					
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level form the bridge	Bi-Annually	Condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/ abutment	1 months	IRC:SP: 40-1993. IRC: 83-2014 MORTH Specification 2500.
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m. damage to apron (concrete apron) not more than 1 sq.m.	2 times in a year (before and after rainy season)	Condition survey as per IRC SP: 35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier	MORTH Specification 2810 and IRC SP: 40-199.

Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

	Nature of Defect or deficiency	**Time limit for repair/ rectification**
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (Twenty Four) days
(ii)	Removal of fallen trees from carriageway	4 (Four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (Twenty Four) days
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossing,[Traffic Aid Posts, Medical Aid Posts], and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/ scaling Temporary measures	Within 48 (forty eight) hours Within 15 (fifteen) days or as

	Permanent measures	specified by the Authority's Engineer
(b) Foundations		

	Nature of Defect or deficiency	**Time limit for repair/ rectification**
(i)	Scouring and / or cavitation	15 (fifteen) days
(c) Pipers, abutment, return walls and wing walls		
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d) Bearings (metallic) of bridges		
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e) Joints		
(i)	Malfunctioning of joints	15 (fifteen) days
(f) Other items		
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent - holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damaged to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs,	30 (thirty) days

	pitching apron, toes, floor or guide bunds	
(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**

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

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

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

(c) License for use of explosives;

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

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

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

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

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

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

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

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

Schedule-G
(See Clause 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I
(See Clause 7.1.1)

PERFORMANCE SECURITY

The Managing Director,
NHIDCL,
1st & 2nd Floor, Tower A,
World Trade Center, Nauroji Nagar
New Delhi-110029

WHEREAS:

(A)_____ [name and address of contractor] (hereinafter called "the Contractor") and [**NHIDCL**], (**"the Authority"**) have entered into an agreement (the **"Agreement"**) for "**Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode"**, subject to and in accordance with the provisions of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

8. The Guarantee shall cease to be in force and effect on ****[$1]. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

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

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

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

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

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

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

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

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

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

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

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

NOTES:

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

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

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

Form for Guarantee for Withdrawal of Retention Money

The Managing Director,
NHIDCL,
1st & 2nd Floor, Tower A,
World Trade Center, Nauroji Nagar
New Delhi-110029
WHEREAS:

[Name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [NHIDCL], (hereinafter called "the Authority") for the **"Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode."** subject to and in accordance with the provisions of the Agreement.

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

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

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

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

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the

Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

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

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

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

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

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

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

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

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

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

Form for Guarantee for Advance Payment

The Managing Director,
NHIDCL,
1st & 2nd Floor, Tower A,
World Trade Center, Nauroji Nagar
New Delhi-110029

WHEREAS:

[name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [**NHIDCL**], (hereinafter called "**the Authority**") for the **"Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode"** subject to and in accordance with the provisions of the Agreement.

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

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

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

NOW, THEREFORE, the Bank hereby, unconditionally and irrevoc**ably, guarantee**s and affirms as follows:

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

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the NHIDCL, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any difference between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other Authority or body, or by the discharge of the Contractor for any reason whatsoever

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

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

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

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

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

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

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

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

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

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

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

S.No.	Particulars	Details
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062

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

4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)
(Address)

Annex-IV

(Schedule - G)

(See Clause 7.1)

Form of Insurance Surety Bond

[Performance Security/Additional Performance Security]

National Highways & Infrastructural Development Corporation Ltd.

1st & 2nd Floor, Tower A,
World Trade Center, Nauroji Nagar
New Delhi-110029

WHEREAS:

(A) _[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the "********** EPC Mode" subject to and in accordance with the provisions of the Agreement

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

…….. crore) (the "**Surety Bond Amount**").

(C) We, …….. through our branch at (the "**Surety Insurer**") have agreed to

furnish this bank guarantee (*hereinafter called the* "**Surety Bond**") by way of Performance Security.

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

1. The **Surety Insurer** hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the 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 **Surety Bond** Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of

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

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

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the **Surety Insurer** under this **Surety Bond**, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment 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 **Surety Insurer** shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the **Surety Insurer** from its liability and obligation under this **Surety Bond** and the **Surety Insurer** hereby waives all of its rights under any such law.

6. This **Surety Bond** is in addition to and not in substitution of any other **Surety Bond** or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, 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 **Surety Insurer** under this **Surety Bond** is restricted to the **Surety Bond** Amount and this **Surety Bond** will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the **Surety Insurer** under this **Surety Bond** all rights of the Authority under this **Surety Bond** shall be forfeited and the Surety Insurer shall be relieved from its liabilities hereunder.

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

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

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the **Surety Insurer** at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due 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 **Surety Bond** shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

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

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

14. The Insurance Surety Bond shall be verified from the branch concerned/ specific

portal created for this purpose.

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

(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 Clauses10.1 (iv) and 19.3)

1 Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
I. Road works including culverts, widening and repair of culverts	66.97%	**A-Widening and strengthening of existing road**	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Non bituminous Base Course	[Nil]
		(5) Bituminous Base Course	[Nil]
		(6) Wearing Coat	[Nil]
		(7) Widening and repair of culverts	[Nil]
		B.1-Reconstruction/ New realignment/ bypass (Flexible pavement)	
		(1) Earthwork up to top of the embankment	30.36%
		(2) Sub-Grade	2.77%
		(3) Sub-Base Course	4.05%
		(4) Non bituminous Base Course	9.20%
		(5) Bituminous Base Course	7.65%
		(6) Wearing Coat	36.99%
		B.2-Reconstruction/ realignment/ bypass/Geometric Improvement (Rigid Pavement)	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Dry Lean Concrete (DLC) Course	[Nil]
		(5) Pavement Quality Concrete (PQC) Course	[Nil]
		C.1-Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Non bituminous Base Course	[Nil]
		(5) Bituminous Base Course	[Nil]
		(6) Wearing Coat	[Nil]
		C.2-Reconstruction/ New Service Road	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(Rigid Pavement)	
		(1) Earthwork up to top of the embankment	[Nil]
		(2) Sub-Grade	[Nil]
		(3) Sub-Base Course	[Nil]
		(4) Dry Lean Concrete (DLC) Course	[Nil]
		(5) Pavement Quality Concrete (PQC) Course	[Nil]
		D-Reconstruction and New culverts on existing road, realignment, bypasses:	
		Culverts (length < 6m)	8.98%
II. Minor Bridges/ Underpasses/ Overpasses	0.00%	**A.1-Widening and repairs of Minor Bridges (length > 6m and < 60m)**	
		Minor Bridges	
		(1) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]
		(2) **Sub-structure**: On completion of abutments and piers with abutment/ pier cap.	[Nil]
		(3) **Super-structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs and markings, tests on completion etc. complete in all respect.	[Nil]
		(4) **Approaches**: On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope, etc. complete in all respect and fit for use.	[Nil]
		A.2-New of Minor Bridges (length > 6m and < 60m)	
		(1) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]
		(2) **Sub-structure:** On completion of abutments and piers with abutment/ pier cap.	[Nil]
		(3) **Super-structure**: On completion of the super-structure upto deck slab including bearings.	[Nil]
		(4) **Miscellaneous Works:** On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on bridge.	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(5) **Approaches:** On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	[Nil]
		(6) **Guide Bunds and River Training Works:** On completion of Guide Bunds and river Training Works complete in all respect.	[Nil]
		B.1-Widening and repairs of Underpasses/Overpasses	
		Underpasses/ Overpasses	[Nil]
		B.2 - New Underpasses/Overpasses	
		(1) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]
		(2) **Sub-structure:** On completion of abutments and piers with abutment/ pier cap	[Nil]
		(3) **Super-structure**: On completion of the super-structure upto deck slab including bearing	[Nil]
		(4) **Miscellaneous Works**: On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	[Nil]
		(5) **Approaches**: On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]
III. Major Bridge (length > 60 m) works and ROB/RUB/elevated sections/flyovers including viaducts, if any	13.99%	**A.1-Widening and repairs of existing major bridges**	
		(1) Foundation:	[Nil]
		i) Pile Foundation	
		ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings.)	[Nil]
		(4) Wearing Coat including expansion joints	[Nil]
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Guide bunds, river training works etc.	[Nil]
		(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope etc.)	[Nil]
		A.2-New major bridges	
		(1) Foundation	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-Structure	17.06%
		(3) Super-structure (including bearings)	76.55%
		(4) Wearing Coat including expansion joints	2.32%
		(5) Miscellaneous Items (like hand rails, crash barriers, road markings etc.)	3.48%
		(6) Wing walls/return walls	[Nil]
		(7) Guide Bunds, River Training works etc.	0.59%
		(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	[Nil]
		B.1-Widening and repairs of **(a) ROB** **(b) RUB**	
		(1) Foundation:	[Nil]
		(i) Pile Foundation	
		(ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings.)	[Nil]
		(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
		B.2-New ROB / RUB	
		(a) ROB	
		(b) RUB	
		(1) Foundation	[Nil]
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearings)	[Nil]
		(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		including drainage facility complete in all respects as specified.	
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]
		(6) Wing walls/return walls	[Nil]
		7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.1-Widening and repairs of Elevated section / Flyover / Grade Separators	
		(1) Foundation	[Nil]
		(i) Pile Foundation	
		(ii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Superstructure (including bearing)	[Nil]
		(4) wearing coat including expansion joint	[Nil]
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]
		(6) wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
		C.2-New Elevated section/Flyover/Grade Separators	
		(1) Foundation	[Nil]
		(i) Well Foundation	
		(ii) Pile Foundation	
		(iii) Open Foundation	
		(2) Sub-structure	[Nil]
		(3) Super-structure (including bearing)	[Nil]
		(4) wearing coat including expansion joint	[Nil]
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]
		(6) wing walls/return walls	[Nil]
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]
IV. Other works	19.04%	(i) Toll plaza	[Nil]
		(ii) Road side drains	20.25%
		(a) Drain	
		(b) Cover Slab	
		(iii) Road signs, markings, km stones safety Devices etc.	10.61%
		(iv) Overhead gantry mounted signs	[Nil]
		(v) Project facilities	1.31%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(a) Bus Bays/Junctions (b) Truck lay-byes (c) Passenger Shelter/Rest areas (d) Others	
		(vi) Road side plantation	[Nil]
		(vii) Protection works # other than approaches to the bridges, elevated sections, flyovers/grade separators and ROBs/RUBs.	
		(a) Crash Barrier	18.07%
		(b) Retaining Wall	7.78%
		(c) Breast Wall	28.63%
		(d) Toe Wall	4.15%
		(e) Hydroseeding and Turfing	9.20%
		(viii) Safety and traffic management during construction	[Nil]

1.3 Procedure of estimating the value of work done.

1.3.1 Road Works- Procedure for estimating the value of road work done shall be as follows:

Table 1.3.1

Stage of Payment	Percentage -weightage	Payment Procedure
A-Widening and strengthening of existing road		
(1) Earthwork up to top of the embankment	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of total length of 500m, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Non bituminous Base Course	[Nil]	
(5) Bituminous Base Course	[Nil]	
(6) Wearing Coat	[Nil]	
(7) Widening and repair of culverts	[Nil]	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts. 75% of the cost will be payable on

Stage of Payment	Percentage -weightage	Payment Procedure
		completion of box/abutments and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return/wing wall and any other work associated with culverts.
B.1-Reconstruction/ New realignment/ bypass (Flexible pavement)		
(1) Earthwork up to top of the embankment	30.36%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500 m length, whichever is less.
(2) Sub-Grade	2.77%	
(3) Sub-Base Course	4.05%	
(4) Non bituminous Base Course	9.20%	
(5) Bituminous Base Course	7.65%	
(6) Wearing Coat	36.99%	
B.3-Reconstruction/ realignment/ bypass/Geometric Improvement (Rigid Pavement)		
(1) Earthwork up to top of the embankment	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Dry Lean Concrete (DLC) Course	[Nil]	
(5) Pavement Quality Concrete (PQC) Course	[Nil]	
C.1-Reconstruction/ New Service Road (Flexible Pavement)		
(1) Earthwork up to top of the embankment	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Non bituminous Base Course	[Nil]	
(5) Bituminous Base Course	[Nil]	
(6) Wearing Coat	[Nil]	
C.2-Reconstruction/ New Service Road (Rigid Pavement)		
(1) Earthwork up to top of the embankment	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 500 m length, whichever is less.
(2) Sub-Grade	[Nil]	
(3) Sub-Base Course	[Nil]	
(4) Dry Lean Concrete (DLC) Course	[Nil]	
(5) Pavement Quality Concrete (PQC) Course	[Nil]	
D-Reconstruction and New culverts on existing road, realignment, bypasses:		
Culverts (length < 6m)	8.98%	Cost of completed culverts shall be determined on pro rata basis with

Stage of Payment	Percentage -weightage	Payment Procedure
		respect to the total no. of culverts. The payment shall be made on the completion of at least one culverts. 75% of the cost will be payable on completion of box/abutments and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return/wing wall and any other work associated with culverts.

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

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

Where P= Contract Price

L = Total length in km

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

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

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

Table 1.3.2

Stage of Payment	Percentage -weightage	Payment Procedure
A.1-Widening and repairs of Minor Bridges (length > 6m and < 60m) (i) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. (i) **Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of atleast two foundations of each bridge. In case where load testing is specified for foundation, the trigger of

Stage of Payment	Percentage -weightage	Payment Procedure
		first payment shall include load testing also.
(ii) **Sub-structure**: On completion of abutments and piers with abutment/ pier cap.	[Nil]	(ii) **Sub-structure:** Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) **Super-structure:** On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, handrails, crash barriers, road signs and markings, tests on completion etc. complete in all respect.	[Nil]	(iii) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iv) **Approaches**: On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope, etc. complete in all respect and fit for use.	[Nil]	(iv) **Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of “Stage of Payment” in this sub-clause for each bridge.
A.2-New of Minor Bridges (length > 6m and < 60m) (i) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. (i) **Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of atleast two foundations of each bridge. In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(ii) **Sub-structure:** On completion of abutments and piers with abutment/ pier cap.	[Nil]	(ii) **Sub – structure:** Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) **Super-structure**: On completion of the super-structure upto deck slab including bearings.	[Nil]	(iii) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span in all respects as specified in

Stage of Payment	Percentage -weightage	Payment Procedure
		the column of "Stage of Payment" in this sub-clause. If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(iv) **Miscellaneous Works:** On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on bridge.	[Nil]	(iv) **Miscellaneous Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of wearing coat, expansion joint, crash barrier, railing, protection works, drainage and any other remaining work associated to bridge including tests on bridge for each bridge.
(v) **Approaches:** On completion of approaches including wing walls/ return walls, Retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	[Nil]	(v) **Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of “Stage of Payment” in this sub-clause for each bridge.
(vi) **Guide Bunds and River Training Works:** On completion of Guide Bunds and river Training Works complete in all respect.	[Nil]	(vi) **Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified for each bridge.
B.1-Widening and repairs of Underpasses/Overpasses	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
B.2-New Underpasses/Overpasses (i) **Foundation:** On completion of the foundation work of abutments and piers	[Nil]	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. (i) **Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of foundation(s) of each

Stage of Payment	Percentage -weightage	Payment Procedure
		underpass/overpass. In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(ii) **Sub-structure:** On completion of abutments and piers with abutment/ pier cap	[Nil]	(ii) **Sub-structure:** Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.
(iii) **Super-structure**: On completion of the super-structure upto deck slab including bearing	[Nil]	(iii) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span upto deck slab including bearing as specified in the column of "Stage of Payment" in this sub-clause: If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(iv) **Miscellaneous Works**: On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	[Nil]	(iv) **Miscellaneous Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of wearing coat, expansion joint, crash barrier, railing, protection works and any other remaining work associated to bridge including tests on bridge for each bridge.
(v) **Approaches**: On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	(v) **Approaches:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing wall/ return wall, retaining walls, Reinforced Earth walls, stone pitching, protection works complete in all respect for each bridge**.**

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

Table 1.3.3

Stage of Payment	Percentage -weightage	Payment Procedure
A.1-Widening and repairs of existing major bridges **(1) Foundation:**	[Nil]	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges. **(1) Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the major Bridge as specified hereinunder.
(i) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Open Foundation		(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	**(2) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments /piers upto abutment/pier cap level of each of the major bridge.
(3) Super-structure (including bearings.)	[Nil]	**(3) Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here

Stage of Payment	Percentage -weightage	Payment Procedure
		in under: If pre-cast RCC/PSC/Steel girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat including expansion joints	[Nil]	**(4) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
(6) Wing walls/return walls	[Nil]	**(6) Wing walls/return walls:** Payments shall be made on completion of all Wing walls/return walls complete in all respects as specified for each major bridge.
(7) Guide bunds, river training works etc.	[Nil]	**(7) Guide bunds, river training works:** Payments shall be made on completion of all Guide bunds, river training works etc complete in all respects as specified for each major bridge.
(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope etc.)	[Nil]	**(8) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each major bridge.
A.2-New major bridges **(1) Foundation**	[Nil]	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. (1) **Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the major

Stage of Payment	Percentage -weightage	Payment Procedure
		Bridge as specified here in under:
(i) Well Foundation (a) On completion of Cutting Edge + Well Curb (b) Wellsteining: On completion of well steining upto bottom of well cap. (c) On completion of bottom plug + top plug (if provisioned as per design) + well cap		(i) Well Foundation (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Wellsteining: Payment of 65% shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill, top plug and well cap.
(ii) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(ii) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-Structure	17.06%	**(2) Sub-Structure**: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the major bridge.

Stage of Payment	Percentage -weightage	Payment Procedure
(3) Super-structure (including bearings)	76.55%	(3) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here in under: If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. (For cable stayed bridge and suspension cable bridge, detailed payment stage may be included on case-to-case basis)
(4) Wearing Coat including expansion joints	2.32%	**(4) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
(5) Miscellaneous Items (like hand rails, crash barriers, road markings etc.)	3.48%	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
(6) Wing walls/return walls	0.00%	**(6) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each major bridge.
(7) Guide Bunds, River Training works etc.	0.59%	**(7) Guide Bunds, River Training works:** Payments shall be made on completion of all guide bunds, river training works etc. complete in all respects as specified for each major bridge.
(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	0.00%	**(8) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each major bridge.

Stage of Payment	Percentage -weightage	Payment Procedure
B.1-Widening and repairs of **(a) ROB** **(b) RUB** (1) Foundation:	[Nil]	Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. (1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the ROB/RUB as specified here in under.
(i) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Open Foundation		(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	**(2) Sub-Structure**: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the ROB/RUB.
(3) Super-structure (including bearings.)	[Nil]	(3) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here in under: If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from

Stage of Payment	Percentage -weightage	Payment Procedure
		MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]	**(4) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified for each of the ROB and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified for each of the RUB.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
(6) Wing walls/return walls	[Nil]	**(6) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
(7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	**(7) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the ROB/RUB.
B.2-New **(a) ROB** **(b) RUB** (1) Foundation	[Nil]	Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROBs/RUBs. (1) **Foundation:** Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the ROB/RUB as specified here in under:
(i) Well Foundation (a) On completion of Cutting Edge + Well Curb. (b) Wellsteining: On completion of well steining upto bottom of well cap.		(i) Well Foundation (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Wellsteining: Payment of 65%

Stage of Payment	Percentage -weightage	Payment Procedure
(c) On completion of bottom plug + top plug (if provisioned as per design) + well cap.		shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill, top plug and well cap.
(ii) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(ii) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-Structure	[Nil]	**(2) Sub-Structure**: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the ROB/RUB.
(3) Super-structure (including bearings)	[Nil]	(3) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under:

Stage of Payment	Percentage -weightage	Payment Procedure
		If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility complete in all respects as specified.	[Nil]	**(4) Wearing Coat:** Payment shall be made on completion of (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified for each of the ROB and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified for each of the RUB.
(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.	[Nil]	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
(6) Wing walls/return walls	[Nil]	**(6) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	**(7) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the ROB/RUB. If reinforced soil wall is used with facia panel/blocks, interim payment shall be made @75% of the Cost of that element as derived from MoRTH data Book. Applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures.
C.1-Widening and repairs of Elevated section / Flyover / Grade Separators	[Nil]	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e.

Stage of Payment	Percentage -weightage	Payment Procedure
(1) Foundation		completion of atleast one foundation of each of the structure as specified here in under:
(i) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Open Foundation		(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	**(2) Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the structure.
(3) Superstructure (including bearing)	[Nil]	(3) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under: If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing coat including expansion joint	[Nil]	**(4) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified

Stage of Payment	Percentage -weightage	Payment Procedure
		for each of the structure.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
(6) Wing walls/return walls	[Nil]	**(6) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	**(7) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified for each of the structure.
C.2-New Elevated section/Flyover/Grade Separators (1) Foundation	[Nil]	Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. (1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one foundation of each of the structure as specified here in under:
(i) Well Foundation (a) On completion of Cutting Edge + Well Curb. (b) Wellsteining: On completion of well steining upto bottom of well cap. (c) On completion of bottom plug + top plug (if provisioned as per design) + well cap.		(i) Well Foundation (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Wellsteining: Payment of 65% shall be made on completion of well steining upto bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion upto 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom plug + top plug (if provisioned as per design) + well cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, back fill,

Stage of Payment	Percentage -weightage	Payment Procedure
		top plug and well cap.
(ii) Pile Foundation (a) Piling - On completion of pile upto bottom of pile cap. (b) Pile Cap – On completion of pile cap.		(ii) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling upto bottom of pile cap for each pile on prorate basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(iii) Open Foundation		(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	[Nil]	**(2) Sub-Structure**: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/pier cap level of each of the structure.
(3) Super-structure (including bearing)	[Nil]	(3) **Super-structure:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified herein under: If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing coat including expansion joint	[Nil]	**(4) Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each of the structure.

Stage of Payment	Percentage -weightage	Payment Procedure
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	[Nil]	**(5) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
(6) Wing walls/return walls	[Nil]	**(6) Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	[Nil]	**(7) Approaches:** Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified here in under: If reinforced soil wall is used with facia panel/blocks, interim payment shall be made @75% of the Cost of that element as derived from MoRTH data Book. Applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Percentage -weightage	Payment Procedure
(i) Toll plaza	[Nil]	Unit of measurement is each completed toll plaza. Payment for each toll plaza shall be made on pro-rata basis with respect to the total of all toll plazas as specified here in under:
(a) DLC (LHS)		(a) DLC (LHS): Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(b) DLC (RHS)		(b) DLC (RHS): Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(c) PQC (LHS)		(a) PQC (LHS): Payment of 25% on pro-rata basis shall be made on

Stage of Payment	Percentage -weightage	Payment Procedure
		completion of a stage i.e., completion of DLC on LHS.
(d) PQC (RHS)		(b) PQC (RHS): Payment of 25% on pro-rata basis shall be made on completion of a stage i.e., completion of DLC on LHS.
(e) Admin Building		(e) Admin Building: Payment of 10% on pro-rata basis shall be made on completion of a stage i.e. completion of Admin Building and miscellaneous works.
(f) Toll Booth, canopy, safety items and all other associated works		(f) Toll Booth, canopy, safety items and all other associated works: Payment of 15% on pro-rata basis shall be made on completion of a stage i.e. completion of Toll Booth, canopy, safety items and all other associated works.
(ii) Road side drains	20.25%	
(a) Drains		(a) Drains: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(b) Cover Slabs		(b) Cover slabs: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(iii) Road signs, markings, km stones, safety devices, …	10.61%	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than one km on both sides.
(iv) Overhead gantry mounted signs	[Nil]	Unit of measurement is each number. Payment shall be made on pro-rata basis on completion of each overhead gantry mounted sign.
(v) Project facilities (a) Bus Bays (b) Truck lay-byes (c) Rest areas (d) Others	1.31%	Unit of measurement is each number. Payment shall be made on pro-rata basis for completed facilities.
(vi) Road side plantation	[Nil]	Unit of measurement is linear length in km. Payment shall be made on pro-rata basis on completion of one km.
(vii) Protection works # other than approaches to the bridges, elevated		

Stage of Payment	Percentage -weightage	Payment Procedure
sections, flyovers/grade separators and ROBs/RUBs.		
(a) Crash Barrier	18.07%	Unit of measurement is linear length. Payment against items (a), (b) & (c) 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 and 100 m whichever is less.
(b) Retaining Wall	7.78%	
(c) Breast Wall	28.63%	
(d) Toe Wall	4.15%	
(e) Hydroseeding and Turfing	9.20%	
(viii) Safety and traffic management during construction	[Nil]	Payment shall be made on pro-rata basis every six months.

Note:

(1) (a) In order to maintain cash flow in the project, the Authority shall also make interim monthly payments to the Contractor for the work done during the month for which the corresponding stage, as mentioned in Schedule-H, has not been achieved. Such work shall be measured, in a length, number or area as specified in corresponding stage of Schedule-H and valued in accordance with the proportion of the weightage of Contract Price assigned to that stage in Schedule-H. '90% of value of such work shall be paid as an 'Interim Monthly Payment' under clause 19.3 (i) of Contract Agreement.

(b) For Pre cast/ pre-fabricated elements to be used in permanent works, interim payments to be made @ 75% of cost of that element (to be derived from MoRT&H data book) as per schedule H.

(c) Upon completion of the defined 'stage', a reconciliation of the interim payments shall be carried out, and any balance amount shall be paid. For the avoidance of doubt, it is clarified that the interim monthly payments are made solely to maintain cash flow in the project. In the event of termination of the project, under Clause23.1, 23.2 or 23.3, as the case may be, such interim payments shall be dealt with as per Clause 23.5 (i) (b) of the Contract Agreement.

Schedule - I

(See Clause 10.2 (iv))

1. Drawings

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

2. Additional Drawings: -

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

Annex – I

(Schedule - I)

List of Drawings

[Note: The Contractor is required to furnish drawings as per standard Manual & specifications under Clause 10.2.]

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

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

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

(c) Drawings for River Training works;

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

(e) Drawing of control centre;

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

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

(h) Drawings of road drainage measures;

(i) Drawings of typical details slope protection measures;

(j) Drawings of landscaping and horticulture;

(k) Drawings of pedestrian crossing;

(l) Drawings of street lighting;

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

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

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 **[35% of the Scheduled Construction Period]** 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 **[60% of the Scheduled Construction Period]** 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 **[85% of the Scheduled Construction Period]** 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 [Scheduled Construction Period] day from the Appointed Date.

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

6. Extension of time

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

Schedule-K

(See Clause 12.1.2)
Tests on Completion

1. **Schedule for Tests**

(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 all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometer.

(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) meters 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.

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

3. Agency for conducting Tests

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

4. **Completion Certificate**

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

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

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

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

Schedule-L

(See Clause 12.2)

COMPLETION CERTIFICATE

1. I, ……(Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated ……(the "**Agreement**"), for construction of the "***Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode"***, through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safety and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)
(Name)
(Designation)
(Address)

Schedule-M

(See Clauses 14.6., 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

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

(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

R=P/100 x M xL1/L

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

M = Monthly lump-sum payment in accordance with the para 1.2 of this Schedule

L1 = Non-complying length

L = Total length of the road,

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

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

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

Schedule-N

(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

(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 Ministry of Road Transport and Highways (the "**Authority**") and ..... (the "**Contractor**") for "***Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode"***, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

(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 Clauses 1.2, 1.3 and 1.4 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.

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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 10.2.4 (d).

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

(i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
(ii) Any amount towards deduction of taxes; and
(iii) Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

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

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

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

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 last Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

(i) The Contractor shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph l and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences. The insurance cover shall be not less than: Rs. 2.0 Crore.

(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 and unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

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

SCHEDULE-Q
(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be 2,500 (two thousand five hundred) mm for each kilometer.

2. Visual and physical test:

The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and 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 "***Balance work of Widening to 2 (Two) lane with hard shoulder of Churachandpur to Tuivai section of NH-102B from km 130.000 to km 141.029 (Package-4B) in the State of Manipur on EPC Mode"***, ……. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has Taken over the Project Highway from the Contractor on this day .....

SIGNED, SEALED AND DELIVERED

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