

SCHEDULE-A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. THE SITE

- 1.1. Site of the Two-Lane Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A. The instant work is a balance work of the Project which is currently ongoing. Accordingly, at several locations work has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. Thus, the prospective bidders **are strictly advised to visit the site thoroughly before participating in the bid.** It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.
- 1.2. The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 1.3. An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.
- 1.4. The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the Contractor with minimum FRL as indicated in the alignment plan. The contractor, however, improve/upgrade the Road Profile as indicated in Annexure-III based on site/design requirement.
- 1.5. The status of the environment clearances obtained or awaited is given in Annex-V.
 - 1.6. The instant project is a balance work. The process of termination of the present EPC Contractor is in progress accordingly, the prospective bidders are strongly advised to visit the site and get themselves acquainted with the ground situation during the bidding. The actual scope of work for this project will be decided based on the Joint Inspection of the executed works by the AE, newly appointed EPC Contractor and present EPC Contractor (which will be terminated before appointment of the new EPC Contractor), as on Appointed Date. In case, any work is required to be deleted from the scope of the newly appointed Contractor, the same shall be done and the corresponding amount will be deducted based on the Schedule-H rates of the newly appointed EPC Contractor. In case of any disagreement between the parties, the decision of the AE will prevail and will be binding on the parties.

Annexure - I

(Schedule-A)

1. Site

Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I. The instant work is a balance work of the project which is currently ongoing. Accordingly, at several locations work has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. Thus, the prospective bidders **are strictly advised to visit the site thoroughly before participating in the bid.** It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

The Site of the Project comprises the section of NH-38 commencing from Village Golai Gaon (Design Chainage 27+150) to Ledo (Design Chainage 47+682) on existing Dibrugarh to Ledo section with proposed Margherita - Ledo Bypass (Green Field Alignment) (2-Lane+PS) of NH-38 in Tinsukia District in the State of Assam. The land, carriageway and structures comprising the Site are described below.

Sl. No.	Design Chainage	Existing Chainage	Remarks
NH-38			
1	27+150 to 28+100	28+490 to 29+340	Brownfield
2	28+100 to 47+682	Margherita - Ledo Bypass	Greenfield

2. Land

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

Sl. no.	Road Segment	Design Ch.		Existing Average ROW (m)
		From	To	
Section 5				
1	NH-38	Km 27+150	Km 28+100	25
2		Km 29+650	Km 32+300	45
3		Km 35+500	Km 38+000	45
4		Km 38+700	Km 47+682	45

3. Carriageway

Variable cross-sectional parameters were found for the project road as mentioned below.

Design Chainage (km)		Length (km)	Existing Carriageway		Existing Shoulder	
From	To		Type	Width (m)	Type	Width (m)
Section 5 (NH-38 part)						
Km 27+150	Km 28+100	0.950	Bituminous	7	Earthen	1.0-1.5

KM 28+100	Km 47+682	19.582	Bypass Alignment–Margherita Ledo Bypass
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Presence of roadside drain is not that conspicuous. In general, the project road is predominantly on embankment varying between 1.0m-2.0m height.

The Bypass Alignment–Margherita Ledo Bypass consists of the following which are complete/ incomplete/partially complete and are to be completed in all respect

(a) New 2 lane Realignment/Bypass

Subgrade					
Sl. No.	Chainage		Side	Length (in KM)	Status
	From	To			
1	28+910	29+200	BHS	0.290	Incomplete
2	29+200	29+400	BHS	0.200	Incomplete
3	31+250	31+620	BHS	0.370	Incomplete
4	31+780	32+060	BHS	0.280	Incomplete
5	32+060	32+260	BHS	0.200	Incomplete
6	43+970	44+250	BHS	0.280	Completed
7	44+250	44+660	BHS	0.410	Completed
8	44+660	44+840	BHS	0.180	Incomplete
9	44+960	45+660	BHS	0.700	Completed
10	45+660	45+890	BHS	0.230	Incomplete
11	45+890	46+870	BHS	0.980	Completed
12	46+870	47+350	BHS	0.480	Incomplete
13	47+350	47+420	BHS	0.070	Completed
14	47+420	47+490	BHS	0.070	Incomplete
Total Length				4.740 Km	

SL NO	GSB				Remarks
	From	To	Side	Length(Km)	
1	44+250	44+660	BHS	0.410	Incomplete
2	44+960	45+660	BHS	0.700	Completed
3	45+890	46+870	BHS	0.980	Completed
4	47+350	47+420	BHS	0.070	Incomplete
Total Length				2.160 Km	

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

5. Major Bridges

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

SL NO.	Existing Chainage	No. of Spans	Span Arrangement (m)	Clear Span (m)	Length of Bridge (m)	Clear Roadway Width (m) between kerbs	Total Width (m)	Width of Footpath (m)	Super structure Type
NIL									

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

7. Grade separators

The Site includes the following grade separators:

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

8. Minor bridges

The Site includes the following partially completed minor bridges

SL NO.	Chainage (km)	No. of Spans	Span Arrangement (m)	Length of Bridge (m)	Total Width (m)	Super structure Type	Status
1	45+736	4	1X10 m	10	18	RCC Box	Foundation for Box part Completed but Foundation for Wing wall part is balance
2	46+957	4	1X10 m	10	18	RCC Box	Substructure Completed Superstructure slab for Box completed. However, wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings tests on completion etc.

							to complete the structure in all respect balance.
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8.1 The instant work is a balance work. Accordingly, at several locations work as shown in Para 8 above has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

9. Railway level crossings

The Site includes the following railway level crossings:

Sl.No.	Location (km)	Remarks
NIL		

10. Underpasses (vehicular, non-vehicular)

The Site includes the following partially completed underpasses:

Sl. No.	Chainage (km)	Type of Structure	No. Of Spans with span length (m)	Width (m)	Status
1	31+242	RCC Box	1X7 m	12	Foundation for Box part Completed but Foundation for Wing wall part is balance Substructure Completed Superstructure slab for Box completed. However, wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings tests on completion etc. to complete the structure in all respect balance.

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

11. Culverts

The Site includes the following partially completed culverts,

List of Partially Completed Box Culverts

S. No	Chainage (Km)	Type of Culvert	Span/Opening with span length (m)	Width available as per site (m)	Present Status
1	32+307	Box Culvert	6X3	12	Box Part Completed
2	32+480	Box Culvert	6X3	12	Box Part constructed in a width of 12m. However required to be Widened to the overall width required for 2 lane as per Manual and TCS
3	37+720	Box Culvert	2X3	17.1	Box Part Completed
4	44+065	Box Culvert	6X3	12.6	Box Part Completed
5	44+515	Box Culvert	6X4	12	Box Part constructed in a width of 12m. However required to be Widened to the overall width required for 2 lane as per Manual and TCS
6	45+400	Box Culvert	2X1.5	12	Box Part Completed
7	45+975	Box Culvert	3X4	12	Box Part Completed
8	46+112	Box Culvert	3X3	12	Box Part Completed
9	47+315	Box Culvert	2X2	12	Box Part constructed in a width of 12m. However required to be Widened to the overall width required for 2 lane as per Manual and TCS
10	47+300	Box Culvert	6X3	12	Box Part constructed in a width of 12 m. However required to be Widened to the overall width required for 2 lane as per Manual and TCS

11.1 The instant work is a balance work. Accordingly, at several locations work as shown in Para 11 above has been carried out which may be partially/fully complete. Further, some of the partially/fully completed works might have deteriorated. The EPC Contractor shall have to assess the level of deterioration of such works, carry out the required remedial measures/rectification work as per the satisfaction of the Engineer and then proceed for the next stage of work. It is being stipulated that in case any partially/completed work has failed or deteriorated & rectification work is to be carried out and the same is not discretely mentioned in the Schedules, the same shall not qualify for Change in Scope as per the Article 13 of the EPC Contract Agreement.

12. Bus bays

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

Sl. No.	Chainage (km)	Length (m)	Side
NIL			

13. Truck Lay byes

The details of existing Truck Lay byes on the site are as follows:

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

14. Roadside drains

The details of the roadside drains are as follows:

Sl. No.	Location		Type	
	From km	to km	Masonry/cc (Pucca)	Earthen (Kutchha)
NIL				

15. Major Intersections along project:

The details of major junctions are as follows:

Sl.No.	Existing Chainage (km)	Road Segment	Side	Destination	Surfacing Type	Carriageway Width (m)
NIL						

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

16. Minor Intersections along project:

The details of the existing minor junctions are as follows:

Sl. No.	Chainage (km)	Type of Intersection	Type	Side
1	27+600	At Grade	3 legged	Left
2	27+960	At Grade	3 legged	Left
3	31+266	At Grade	4 legged	Both
4	32+070	At Grade	4 legged	Both
5	33+000	At Grade	4 legged	Both
6	33+910	At Grade	4 legged	Both
7	35+705	At Grade	4 legged	Both
8	37+120	At Grade	4 legged	Both
9	37+300	At Grade	4 legged	Both
10	39+800	At Grade	4 legged	Both
11	40+465	At Grade	4 legged	Both
12	42+050	At Grade	4 legged	Both
13	42+750	At Grade	4 legged	Both
14	43+680	At Grade	4 legged	Both
15	44+880	At Grade	4 legged	Both
16	45+820	At Grade	4 legged	Both

17. Bypasses

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

S. No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
1	Margherita - Ledo	29+340 to 53+000	23.660

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No	Chainage (KM)		Length (m)	Total Width (m)	Date of providing Right of Way
	FROM	TO			
(i) Full Right of Way (full width)	27+150	29+300	2150	40	At appointed date
	29+300	47+682	18382	45	
(ii) Part Right of Way (part width)			NA		
(a) Stretch					
(b) Stretch					
(c) Stretch					
(iii) Balance Right of Way (width)			NA		
(a) Stretch					
(b) Stretch					
(c) Stretch					

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 the relevant specifications/IRC Codes/Manual.

Annexure-I

(Annexure-IV)

Schedule-A

Utilities

The Site includes the following Utilities:

- (i) Electrical utilities

(a) Extra High-tension Lines (EHT Lines)

Sl. no.	Chainage		Length (in Km)				Crossings				
	From	To	400KV	220KV	132KV	66KV	800KV	765KV	400KV	220KV	132KV
NIL											

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

Sr.No	Chainage		Length (in m)			Crossing			DTR	Remark
	From	To	33 kv	11 kv	LT	33 kv	11 kv	LT		
1	27+150	27+220		70	70		1	1		
2	27+220	27+260		40	40					
3	27+280	27+400		120			1	1		
4	27+330	27+500		170	170		1		1	63 kvA
5	27+500	27+720		220	220			1	2	100 kvA
6	27+720	27+800		80			1	1		
7	27+800	27+850			50			1		
8	27+850	27+970		130	130			1	1	100 kvA
9	27+150	28+150	1000							
10	32+600						1	1		
11	33+000							1		
12	35+000					1				
13	35+200						1			
14	35+500							1		
15	37+100						1			
16	37+300							2		
17	39+800							1		
18	40+450							1		
19	42+760						1	1		
20	43+500				50		1	1		
21	43+700				50					
22	43+730							1		

23	43+740						1	25 kvA
24	43+750					1		
25	44+700						2	
26	44+900					1	1	
27	45+500		100	100		1		
28	47+350				1			
29	47+515				1			
30	47+520					1	1	
	Total	1000	930	880	3	13	20	5

(c) Public Health utilities (Water/Sewage Pipe lines):

Sl no.	Chainage		Length (in Km)				Crossings			
	From	To	Water Supply Line		Sewage Line		Water Supply Line		Sewage Line	
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow
1	33+000							1		
2	35+700							1		
3	37+000							1		
4	37+100							1		
5	37+300							1		
6	39+800							1		
7	43+700							1		
8	44+870							1		
9	45+500							1		
10	47+450	47+682						1		

Annexure – V

(Schedule-A)

Environment Clearances

The following environment clearances have been obtained:

Environment Clearances is not applicable for the project

The following environment clearances are awaited:

-NIL-

Schedule-B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

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

2. Rehabilitation and augmentation

Rehabilitation and augmentation shall include 2- lane at grade improvement 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 completed by the Contractor in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annexure - I

(Schedule-B)

Description of Project highway

1. Widening of the Existing Highway

- 1.1.** The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A. Notwithstanding anything to the contrary contained in this Agreement or Manual of Specifications and Standards for two Lanning of Highways (IRC: SP: 73-2018), the proposed profile of the Project Highway as indicated in the Annexure-III of Schedule-A shall be treated as an approximate assessment. Contractor shall design the alignment plan and profile of the Project Highway based on site / design requirement mentioned in Schedule-D with approval from Authority's Engineer within the available Right of Way. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain terrain to the extent land is available. The same shall not constitute a change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provision of Article 13

1.2. Width of Carriageway

- (a) In rural areas, at grade Two-Laning with paved shoulders for NH-38 shall be undertaken. The carriageway shall be 7(seven) m (excluding paved shoulder and kerb shyness) wide in accordance with the typical cross section's drawings in the Manual.

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

Sl. No.	Built-up stretch	Location (km to km)	Width(m)	Typical cross section
1	Golai Gaon	27+150 to 27+230	7.0m carriage way + 2.5m paved shoulders on both side	TCS - 9

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

Sl. No.	Built-up stretch	Location (km to km)	Width(m)
Nil			

2. Geometric Design and General Features

2.1. General

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

2.2. Design speed

The design speed shall be the minimum design speed of 80 kmph for Plain/ Rolling terrain.

2.3. Improvement of the existing road geometrics

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

Details of Proposed Bypasses:

Sl. No.	Design Ch.(km)		Length (m)	Remarks
	From	To		
1	28+100	47+682	19582	Margherita - Ledo Bypass

Details of Realignment:

Sl.no.	From	To	Length	TCS	Description
Nil					

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

2.4. Right of Way

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

2.5. Type of shoulders

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

Sl. NO	Stretch		Length (km)	Width (m)		Remarks
	From (km)	To (km)		Paved shoulder	RCC Covered Drain Cum Footpath	
1	27+150	27+230	0.080	2.5m (on either side)	1.5m (on either side)	Golai Gaon

- (b) In open country area, 1.5 m width paved shoulder on either side and 1.0m width Earthen shoulder has been proposed.
- (c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

2.6. Lateral and vertical clearances at underpasses

- (a) Lateral and vertical clearances and provision of guardrails/crash barriers shall be as per the provision of the Manual.
- (b) Lateral clearance: The width of the opening shall be as follows:

Sl. No	Design Chainage (km)	Type	Lateral clearance (m)	Minimum vertical clearance (m)
1	31+266	SVUP	7	4.0
2	33+000	SVUP	7	4.0
3	33+910	SVUP	7	4.0
4	35+705	LVUP	12	4.0
5	37+293	SVUP	7	4.0
6	39+803	SVUP	7	4.0
7	40+465	SVUP	7	4.0
8	42+050	SVUP	7	4.0
9	42+750	SVUP	7	4.0
10	44+880	SVUP	7	4.0
11	45+820	SVUP	7	4.0
12	47+267	SVUP	7	4.0

2.7. Lateral and vertical clearances at overpasses

- (a) Lateral and vertical clearances at overpasses shall be as per the provision of the Manual.
- (b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sl. No	Design Chainage (km)	Type	Lateral clearance (m)	Minimum vertical clearance (m)
Nil				

2.8. Service roads / Slip roads

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

Design Chainage (km)		Length (m)	TCS	Remarks
From	To			
27+230	27+424	194	TCS-4A	
27+424	28+194	770	TCS-4B	
28+275	28+674	399	TCS-4B	
28+674	29+040	366	TCS-4A	
Total Length (including Both sides)		3458		

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

2.9. Grade separated structures

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

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type
1	SVUP	31+266	1 x 7	7	12.0	RCC Box
2	SVUP	33+000	1 x 7	7	12.0	RCC Box
3	SVUP	33+910	1 x 7	7	12.0	RCC Box
4	LVUP	35+705	1 x 12	12	12.0	RCC Box
5	SVUP	37+293	1 x 7	7	12.0	RCC Box
6	SVUP	39+803	1 x 7	7	12.0	RCC Box
7	SVUP	40+465	1 x 7	7	12.0	RCC Box
8	SVUP	42+050	1 x 7	7	12.0	RCC Box
9	SVUP	42+750	1 x 7	7	12.0	RCC Box
10	SVUP	44+880	1 x 7	7	12.0	RCC Box
11	SVUP	45+820	1 x 7	7	12.0	RCC Box
12	SVUP	47+267	1 x 7	7	12.0	RCC Box

2.10. Cattle and pedestrian underpass /overpass

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

Sl. No.	Location	Type of crossing
NIL		

2.11. Typical cross-sections of the Project Highway

Typical cross section details are given below

Sl No	Chainage		Length (m)	TCS Type	Description
	From	To			
1	27+150	27+230	80	TCS-9	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN BUILT-UP AREA (WIDENING)

2	27+230	27+424	194	TCS-4A	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN APPROACH OF ROB CUM ELEPHANT CORRIDOR FLYOVER WITH SERVICE ROAD ON BOTH SIDE (NEW CONSRUCTION)
3	27+424	28+194	770	TCS-4B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN APPROACH OF ROB CUM ELEPHANT CORRIDOR FLYOVER (VIADUCT PORTION) WITH SERVICE ROAD ON BOTH SIDE (NEW CONSRUCTION)
4	28+194	28+275	81	STR	ROB RDSO Steel Composite Girder
5	28+275	28+674	399	TCS-4B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN APPROACH OF ROB CUM ELEPHANT CORRIDOR FLYOVER (VIADUCT PORTION) WITH SERVICE ROAD ON BOTH SIDE (NEW CONSRUCTION)
6	28+674	29+040	366	TCS-4A	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN APPROACH OF ROB CUM ELEPHANT CORRIDOR FLYOVER WITH SERVICE ROAD ON BOTH SIDE (NEW CONSRUCTION)
7	29+040	29+300	260	TCS-3A	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION)
8	29+300	29+452	152	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
9	29+452	29+462	10	STR	MNB RCC Box (1x10.0) m
10	29+462	30+110	648	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
11	30+110	30+130	20	STR	MNB RCC Box (2 x 10) m
12	30+130	31+263	1133	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
13	31+263	31+270	7	STR	SVUP (1x7.0m)

14	31+270	31+715	445	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
15	31+715	31+766	51	STR	MNB RCC I girder (3x17.0) m
16	31+766	32+997	1231	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
17	32+997	33+004	7	STR	SVUP (1x7.0m)
18	33+004	33+907	903	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
19	33+907	33+914	7	STR	SVUP (1x7.0m)
20	33+914	33+973	59	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
21	33+973	33+988	15	STR	MNB RCC Box (2x7.5) m
22	33+988	35+699	1712	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
23	35+699	35+711	12	STR	LVUP (1x12.0m) -RCC Box
24	35+711	35+800	89	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
25	35+800	35+841	41	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
26	35+841	35+909	68	STR	MJB RCC I Girder (Span 4x17.0m)
27	35+909	37+115	1206	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)

28	37+115	37+155	40	STR	MNB RCC I girder (2x 20.0) m
29	37+155	37+290	135	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
30	37+290	37+297	7	STR	SVUP (1x7.0m)
31	37+297	37+460	163	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
32	37+460	37+470	10	STR	MNB RCC Box (1x10.0) m
33	37+470	38+068	598	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
34	38+068	38+733	665	STR	MJB- PSC I girder (span -19x35.0m)
35	38+733	39+797	1064	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
36	39+797	39+804	7	STR	SVUP (1x7.0m)
37	39+804	39+880	76	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
38	39+880	39+895	15	STR	MNB RCC Box (2x7.5m)

39	39+895	40+462	567	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
40	40+462	40+469	7	STR	SVUP (1x7.0m)
41	40+469	42+047	1578	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
42	42+047	42+054	7	STR	SVUP (1x7.0m)
43	42+054	42+747	693	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
44	42+747	42+754	7	STR	SVUP (1x7.0m)
45	42+754	43+199	445	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
46	43+199	43+214	15	STR	MNB RCC Box (2x7.5) m
47	43+214	44+700	1487	TCS-8	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA IN HIGH EMBANKMENT ZONE (NEW CONSRUCTION)
48	44+700	44+877	177	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
49	44+877	44+884	7	STR	SVUP (1x7.0m)

50	44+884	45+731	848	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
51	45+731	45+741	10	STR	MNB RCC Box (1x10.0) m
52	45+741	45+817	76	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
53	45+817	45+824	7	STR	SVUP (1x7.0m)
54	45+824	46+952	1129	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
55	46+952	46+962	10	STR	MNB RCC Box (1x10.0) m
56	46+962	47+264	302	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
57	47+264	47+271	7	STR	SVUP (1x7.0m)
58	47+271	47+500	229	TCS-3B	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (NEW CONSRUCTION) [ECCENTRIC CONSTRUCTION]
59	47+500	47+682	182	TCS-1	2-LANE CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (WIDENING)
Total Length (m)			20532		

Refer to Typical cross section drawing in Annexure III of schedule A

Note: TCS schedule as given above shall be treated as an approximate assessment. Actual length of section corresponding to a TCS shall be prepared by the EPC Contractor based on detailed investigation, site requirement and detailed design

carried out as per the Standards & Specifications and Manual. Any variation in length of the section corresponding to the respective TCS specified in Schedule-B shall not constitute change of scope, save and except any variations arising out of a change of scope expressly undertaken in accordance with the provisions of Article 13.

3. Intersections and Grade Separators

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

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

(a) At-grade intersections

Properly designed at grade intersections major and minor intersection shall be provided at the locations and of the features given in the table below:

Major Junctions List:

Sl No.	Design Chainage (km)	Road Segment	Side	Destination	Surfacing Type	Carriageway Width (m)
1	47+350	NH-38	RHS	Ledo, Margherita	Bituminous	7.0

Minor Junctions List:

Sl. No.	Design Chainage(km)	Type of Intersection	Type	Side
1	27+600	At Grade	3 legged	Left
2	27+960	At Grade	3 legged	Left
3	32+070	At Grade	4 legged	Both
4	37+120	At Grade	4 legged	Both
5	43+680	At Grade	4 legged	Both

Note: In case any additional junction is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope. The EPC contractor shall develop the junctions to the maximum possible extent, upto the satisfaction of AE, within the provided land only.

(ii) Grade separated intersection with/without ramps

Sl No.	Type of Intersection	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type
1	Major	28+430	Part of ROB cum Elephant Corridor Flyover		19.0	Part of ROB cum Elephant Corridor Flyover
2	Minor	31+266	1 x 7.0	7.0	12.0	RCC Box
3	Minor	33+000	1 x 7.0	7.0	12.0	RCC Box
4	Minor	33+910	1 x 7.0	7.0	12.0	RCC Box
5	Minor	35+705	1 x 12.0	12.0	12.0	RCC Box
6	Minor	37+293	1 x 7.0	7.0	12.0	RCC Box
7	Minor	39+803	1 x 7.0	7.0	12.0	RCC Box
8	Minor	40+465	1 x 7.0	7.0	12.0	RCC Box
9	Minor	42+050	1 x 7.0	7.0	12.0	RCC Box
10	Minor	42+750	1 x 7.0	7.0	12.0	RCC Box
11	Minor	44+880	1 x 7.0	7.0	12.0	RCC Box
12	Minor	45+820	1 x 7.0	7.0	12.0	RCC Box
13	Minor	47+267	1 x 7.0	7.0	12.0	RCC Box

Note: In case any additional junction is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope. The EPC contractor shall develop the junctions to the maximum possible extent, up to the satisfaction of AE, within the provided land only.

4. Road Embankment and Cut Section

- 4.1. Widening and improvement of the existing road embankment/cuttings and constructions of new road embankment/cuttings shall conform to the specifications and standards given in Section 4 of the Manual and the specified cross-sectional details. Notwithstanding anything to the contrary contained in this Agreement or Manual of Specifications and Standards for two Lanning of Highways (IRC: SP: 73-2018), the proposed profile of the Project Highway as indicated in the Annexure-III of Schedule-A shall be deemed to be part of this Schedule-B and shall be treated as an approximate assessment. The contractor may design the alignment plan & profile of the Project Highway based on site / design requirement specified in Schedule-D, with approval from Authority's Engineer within the available Right of Way. However, the EPC Contractor shall have to abide by the already reviewed Plan & Profile (Annexure-III of Schedule-A) as the basis/guiding document and the minimum FRL is to be maintained as per it. Deficiencies in the plan and profile of the existing road shall be corrected within the available ROW. In case there is any change/modification/improvement in the geometrics proposed by the EPC Contractor, with in the ROW, the same shall not qualify for Change of Scope as per Article 13. The instant work is a balance work and at several locations, embankment has been constructed partially/completely. The EPC Contractor shall have to assess the adequacy of the partially completed/completed embankment, carry out rectification (if required) and then proceed further for the Road Work duly incorporating the same in the design. The same shall be considered incidental to the work.

- 4.2. The cross-sections given in the TCS have to be accommodated in the available ROW (Details as per Annexure-II of Schedule-A). In case any requirement of Toe Wall/Retaining Wall arises to accommodate the TCS, in the available ROW, the same shall not qualify for any Change of Scope, as per Article 13.
- 4.3. Raising of the existing road as per Section 4 of the Manual The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length (km)	Extent of raising
Nil			

5. Pavement Design

- (i) Pavement design shall be carried out in accordance with the provision of section 5 of the Manual.
- (ii) Type of pavement

Flexible pavement shall be proposed at the entire project road.

- (iii) Design requirements

Design of new pavement is to be carried out based on IRC: 37-2018 "Guidelines for the design of Flexible Pavements"

- (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 minimum design traffic 24 msa for NH-38. However, in case the traffic is more at the time of design of project highway, then the higher design traffic will be adopted for pavement design.

Service Roads/ Slip Roads shall be designed for 10 msa design traffic.

- (c) Design Subgrade CBR

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum subgrade CBR of 8%.

(iv) Reconstruction of stretches

Contractor shall investigate the existing pavement and finalize the reconstruction stretch in consultation with Authority's Engineer.

Those shall be designed as new pavement.

(v) Overlay stretches

Contractor shall investigate the existing pavement and finalize the overlay stretch in consultation with Authority's Engineer. However, the overlay thickness will not be less than 30mm BC & 50mm DBM.

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 and as per cross section schedule provided as Annexure -I to this schedule.

- Unlined trapezoidal drain needs to be provided at both side in rural area with a minimum length of 35276m.
- RCC Covered drain needs to be provided at both side in built-up area, approach and major junctions location with a minimum length of 3596m.

Note: The length of drains as specified above is indicative. In case any additional length is identified during construction period, the same shall be implemented as per manual and will not qualify for Change of Scope.

The EPC Contractor shall ensure proper functioning of road side drain by designing them as per site condition and considering the outfall location.

7. Design of Structures

7.1 General

(i) General

- (a) All Grade separator, Bridges, culverts and structures shall be designed and constructed in accordance with the section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein.
- (b) Width of the carriageway of new bridges shall be as follows:

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
1	29+457	1 x 10m	18	RCC Box	New Construction	
2	30+120	2 x 10m	18	RCC Box	New Construction	
3	31+740	3 x 17m	18	RCC I girder	New Construction	
4	33+980	2 x 7.5m	18	RCC Box	New Construction	
5	35+875	4 x 17m	18	RCC I girder	New Construction	
6	37+135	2 x 20m	18	RCC I girder	New Construction	
7	37+465	1 x 10m	18	RCC Box	New Construction	
8	38+400	19 x 35m	18	PSC I girder	New Construction	
9	39+887	2 x 7.5m	18	RCC Box	New Construction	
10	43+206	2 x 7.5m	18	RCC Box	New Construction	
11	45+736	1 x 10m	18	RCC Box	New Construction	The work completed has been mentioned in Clause 8 of Sch A. Balance work includes the completion of said Bridge in all respects and fit for use
12	46+957	1 x 10m	18	RCC Box	New Construction	

Width of the carriageway of new grade separator structure shall be as follows:

Sl No.	Type of Underpasses	Design Chainage (km)	Span Arrangement (Nos. x Length in m)	Total Length (m)	Overall Width (m)	Structure Type	Remarks
1	SVUP	31+266	1 x 7	7	12.0	RCC Box	The work completed has been mentioned in Clause 10 of Sch A. Balance work includes the completion of said SVUP in all respects and fit for use
2	SVUP	33+000	1 x 7	7	12.0	RCC Box	
3	SVUP	33+910	1 x 7	7	12.0	RCC Box	
4	LVUP	35+705	1 x 12	12	12.0	RCC Box	
5	SVUP	37+293	1 x 7	7	12.0	RCC Box	
6	SVUP	39+803	1 x 7	7	12.0	RCC Box	

7	SVUP	40+465	1 x 7	7	12.0	RCC Box	
8	SVUP	42+050	1 x 7	7	12.0	RCC Box	
9	SVUP	42+750	1 x 7	7	12.0	RCC Box	
10	SVUP	44+880	1 x 7	7	12.0	RCC Box	Existing SVUP constructed to be dismantled and reconstructed
11	SVUP	45+820	1 x 7	7	12.0	RCC Box	
12	SVUP	47+267	1 x 7	7	12.0	RCC Box	

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

Sl No	Design Chainage (km)	Remarks
1	28+239	ROB cum Elephant Corridor Flyover, Footpath on both sides
2	29+457	MNB, Footpath on both sides
3	30+120	MNB, Footpath on both sides
4	31+740	MNB, Footpath on both sides
5	33+980	MNB, Footpath on both sides
6	35+875	MJB, Footpath on both sides
7	37+135	MNB, Footpath on both sides
8	37+465	MNB, Footpath on both sides
9	38+400	MJB, Footpath on both sides
10	39+887	MNB, Footpath on both sides
11	43+206	MNB, Footpath on both sides
12	45+736	MNB, Footpath on both sides
13	46+957	MNB, Footpath on both sides

(d) All bridges shall be high-level bridges

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
Nil			

(f) Cross-section of the new culverts for the Project Highway shall conform to the typical cross-sections given in the section 7 of the Manual

7.2 Culverts

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

(b) Reconstruction of existing culverts:

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

Sl. No.	Design Chainage (km)	Type of Existing Culvert	Existing Span Arrangement /Dia. (m)	Type of Proposed Culvert	Proposed Span Arrangement (m)	Improvement Proposal	Remarks
NIL							

Note: The span and opening of these culverts as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of “change of scope” article of this Agreement**

(c) Widening of existing culverts:

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

Sl No	Ch. (KM)	Type of Ex. Culvert	Ex. Span Arrangement /Dia. (m)	Type of Prop. Culvert	Prop. Span Arrangement/dia(m)	Improvement Proposal
1	32+480	Box Culvert	6X3	Box Culvert	6x3	Work done has been mentioned in Clause 11 of Sch A. Balance works include Widening to the overall width required for 2 lane as per Manual along with requisite Protection and other miscellaneous works to complete the culvert in all respects
2	44+515	Box Culvert	6X4	Box Culvert	6x4	Work done has been mentioned in Clause 11 of Sch A. Balance works include Widening to the overall width required for 2 lane as per Manual along with requisite Protection and other miscellaneous works

						to complete the culvert in all respects
3	47+315	Box Culvert	2x2	Box Culvert	2x2	Work done has been mentioned in Clause 11 of Sch A. Balance works include Widening to the overall width required for 2 lane as per Manual along with requisite Protection and other miscellaneous works to complete the culvert in all respects
4	47+300	Box Culvert	6x3	Box Culvert	6x3	Work done has been mentioned in Clause 11 of Sch A. Balance works include Widening to the overall width required for 2 lane as per Manual along with requisite Protection and other miscellaneous works to complete the culvert in all respects

Note: The span and opening of these culverts as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of “change of scope” article of this Agreement**

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

Sl. No .	Design Chainage (km)	Type of Proposed Culvert	Proposed Span Arrangement (m)	Improvement Proposal
1	28+880	Box	1 X3 X2	New construction
2	32+635	Box	1 X3 X2	New construction
3	34+428	Box	1 X6X1.6	New construction
4	36+025	Box	1 X2 X3	New construction
5	36+135	Box	1 X2 X3	New construction
6	36+440	Box	1 X6 X6	New construction
7	36+680	Box	1 X3 X4	New construction
8	40+300	Box	1 X2 X2	New construction
9	41+000	Box	1 X2 X2	New construction
10	41+470	Box	1 X6 X4	New construction

11	42+080	Box	1 X2 X2	New construction
12	42+380	Box	1 X2 X2	New construction
13	42+425	Box	1 X2 X2	New construction
14	43+000	Box	1 X2 X2	New construction
15	43+625	Box	1 X6 X4	New construction
16	47+630	Box	1 X 2 X2	New construction

Note: The span and opening of these culverts as specified are indicative.

The design of waterway has to be done considering the site requirements.

Change in this configuration **shall not attract provisions of “change of scope”**

article of this Agreement

- (e) Additionally, the following partially completed culverts are to be completed in all respects as per Manual

S. No	Chainage (Km)	Type of Culvert	Span/Opening with span length (m)	Width (m)	Present Status
1	32+307	Box Culvert	6x3	12	Protection works & Misc. works balance as per manual
2	37+720	Box Culvert	2x3	17.1	Protection works & Misc. works balance as per manual
3	44+065	Box Culvert	6X3	12.6	Protection works & Misc. works balance as per manual
4	45+400	Box Culvert	2x1.5	12	Protection works & Misc. works balance as per manual
5	45+975	Box Culvert	3x4	12	Protection works & Misc. works balance as per manual
6	46+112	Box Culvert	3x3	12	Protection works & Misc. works balance as per manual

- (f) The existing culverts at the following locations shall be retained as per the table below:

Sl. No.	Design Chainage (km)	Type of Culvert	Span Arrangement (m)	Remarks
NIL				

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

Sl. No.	Location at km	Type of repair required
1	Locations as mentioned in Para 7 ii-(c), above.	All necessary repairs as per Manual

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

7.3 Bridges

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

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

Sl No	Design Chainage (km)	Proposed Span Arrangement (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration **shall not attract provisions of “change of scope” article of this Agreement.**

(ii) The following narrow bridges shall be widened:

Sl No	Design Chainage (km)	Proposed Span Arrangement (No. of Span x Span length in m)	Proposed Category	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
Nil								

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. **Change in this configuration shall not attract provisions of “change of scope” article of this Agreement.**

(iii) The following existing bridges shall be retained & repaired:

Sl No	Design Chainage (km)	Span Arrang. (No. of Span x Span length in m)	Category	Total Length (m)	Width of structure (m)	Type of Superstructure	Improvement Proposal	Remarks
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. The details are given below:

Sl No	Design Chainage (km)	Proposed Span Arrang (No. of Span x Span length in m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
1	29+457	1 x 10m	18	RCC Box	New Construction	
2	30+120	2 x 10m	18	RCC Box	New Construction	
3	31+740	3 x 17m	18	RCC I girder	New Construction	
4	33+980	2 x 7.5m	18	RCC Box	New Construction	
5	35+875	4 x 17m	18	RCC I girder	New Construction	
6	37+135	2 x 20m	18	RCC I girder	New Construction	
7	37+465	1 x 10m	18	RCC Box	New Construction	
8	38+400	19 x 35m	18	PSC I girder	New Construction	
9	39+887	2 x 7.5m	18	RCC Box	New Construction	
10	43+206	2 x 7.5m	18	RCC Box	New Construction	

Note: The span and opening of these bridges as specified are indicative. The design of waterway has to be done considering the site requirements. Change in this configuration shall not attract provisions of “change of scope” article of this Agreement.

(c) Additionally the following partially completed bridges are to be completed in all respects as per Manual

Sr No	Chainage	Span	Width of proposed structure (m)	Proposed Type of Superstructure	Remarks
1	45+736	1 x 10m	18	RCC Box	The work already constructed is mentioned in Clause 8 of Sch-A. Balance activities include requisite rectification of the completed works and all the balance works required to complete the New Bridge in all aspects including River Training works if required as per site and fit for use
2	46+957	1 x 10m	18	RCC Box	

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

Sl No	Design Chainage (km)	Proposed Span Arrangement (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

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

Sl No	Design Chainage (km)	Proposed Span Arrangement (No. of Span x Span length in m)	Proposed Total Length (m)	Width of proposed structure (m)	Proposed Type of Superstructure	Improvement Proposal	Remarks
NIL							

(f) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in section 7 of the Manual

(g) Structures in marine environment

NIL

(h) Rail-road bridges:

(i) Design including subsoil investigation, construction and detailing of ROB/RUB shall be as specified in the provision of Manual.

(ii) Road over-bridges

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

Sl. No.	Location of ROB (Chainage km)	Length of bridge (m)	Span Arrangement (m)	Proposed Width (m)	Remarks
1	28+239	1251.28	2x35+14x50+25+31.28+25+50+10x35	1 x19.0	ROB cum Elephant Corridor Flyover

(iii) Road under-bridges

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

Sl.	Location of Level crossing (Chainage	Number and length of
-----	--------------------------------------	----------------------

NIL

(i) Grade separated structures

Design of grade separator shall be as per section 7 of the manual. Locations and type of the grade separated structures specified in paragraphs 2 (ix).

(j) Repairs and strengthening of bridges and structures

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

(a) Bridges

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

(b) ROB /RUB

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

(c) Overpasses/Underpasses and other structures

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

(k) List of Major Bridges and Structures

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

SL. No.	Design Chainage (Km)	Category	Span	Total Width	Superstructure Type
1	35+875	MJB	4 x 17m	18.0	RCC I girder
2	38+400	MJB	19 x 35m	18.0	PSC I girder

(a) Design including subsoil investigation and procurement of Hydrological data from Central Water Commission (CWC) (to be done by the EPC contractor at its own cost.)

(b) Construction and detailing of MJB shall be as specified in the provision of Manual.

*Contractor has the liberty to use alternate Bridge construction technologies such as UHPC girders or modular Bridges in order to reduce time required for bridge construction. Any increase in length /span/height/quantities due to use of alternative bridge construction technologies in the project shall not account for change of scope

8. Traffic Control Devices and Road Safety Works

- (i) Traffic control devices and road safety works shall be provided in accordance with section 9 of the Manual.
- (ii) Specifications of the reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956 – 04.

9. Roadside Furniture

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

- (ii) Overhead traffic signs:

Minimum 6nos. (4nos. cantilever & 2nos. full) overhead traffic signs shall be provided for the project stretch.

Note: The exact location of Signs and size shall be finalized as per provisions in Manual and as per site conditions.

10. Compulsory Afforestation

Compulsory afforestation should be as per section 11 of the manual

11. Hazardous Locations

- ***Metal Beam Crash Barrier:***

Metal Beam Crash Barrier need to be provided as per site requirement with a minimum length of 25560m

Note: The length of crash barrier is indicative. In case any additional length is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope

12. Special Requirement for Hill Roads

NA

13. Special Requirement for marshy land

- ***Ground improvement:***

Ground improvement to be done by any standard technology available in the market as approved by AE for a minimum length of 500 m.

Note: The lengths of these ground improvement works are indicative. In case any additional length is identified during construction period, the same shall be improved as per specifications and will not qualify for Change of Scope.

14. Special Requirement for High Embankment Zone

- ***Toe Wall:***

Toe wall has been proposed in high embankment zone such to restrict the embankment toe within the PROW. Mainly required at TCS-8 (High embankment zone) / TCS 3A / TCS-3B.

Geo-synthetic membrane has been proposed at High embankment zone as per specification.

Note: The lengths of these protection works as per TCS are indicative. In case any additional length is identified during construction period, the same shall be improved as per manual and will not qualify for Change of Scope

15. Utilities

A minimum 2m wide strip of land at the extreme edge of ROW shall be kept for accommodating utilities.

Utility duct shall be provided as per Schedule –C.

16. Change of Scope

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

- 17.** Not-with-standing anything contrary it is clarified that all exposed/ uncovered layer of pavement, viz. subgrade, GSB shall be rectified by the contractor at his own cost to the extent required before laying of the next subsequent layer. There may be reinforcement at various components of the structures. This reinforcement might be rusted or might have been stolen. The Contractor shall make good the exposed reinforcement before executing next layer of the component at his own cost. Since this is a balance work, the final scope of the work to be executed will be determined at the time of preparation of joint inventory on Appointed Date.

(Schedule B-1)

1. The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the shifting of utility shall be the part of the contract price. The details of utilities are as follows:

Sr. No	Type of Utility	Unit	Quantity
A			
A1	33 KV (HT) Pole	Nos.	As mentioned in Schedule-A (Annexure-IV) - Utilities
A2	LT Pole	Nos.	
A3	11 KV Pole	Nos.	
A4	Transformers	Nos.	
B			
B1	Water Pipe Line crossings at 10 locations	meters	As mentioned in Schedule-A (Annexure-IV) - Utilities
C	Felling of Trees	Nos.	52

Sheet-I (Annexure-I to Sch-B1)

Utility Shifting

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and Specification of concern Utility Owning Departments is a part of scope of work for the Contractor/Concessionaire. The bidder may visit the site and assess the quantum of shifting of utilities for the project before submission of the bid. Copy of Utility relocation plan is enclosed. The specifications of concerned Utility Owning Department shall be applicable and followed.

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

asked by the Contractor/Concessionaire. The decision/approval of utility owning department shall be binding on the Contractor/Concessionaire.

(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 / Concessionaire furnishes demand of Utility Owning Department along with a copy of estimates cost given by the utility owning agencies.

(c) The dismantled material /scrap of existing Utility to be shifted/dismantled shall belong to the Contractor/Concessionaire who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor/Concessionaire is required to deposit the dismantled material to utility owning department as per the norms and practice and, in that case the amount of credit for dismantled material may be availed by the Contractor/Concessionaire as per the 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;
- (b) Roadside furniture;
- (c) Street lighting;
- (d) Pedestrian facilities;
- (e) Tree plantation;
- (f) Truck lay-byes;
- (g) bus-bays and bus shelters;
- (h) rest areas; and
- (i) others to be specified

2. Description of Project Facilities

Each of the Project Facilities is described below:

- (a) Toll Plaza

Toll plaza shall be designed as per the guidelines of the manual and it is provided at following locations: -

Sl. No.	Location (Design km)
	Nil

- (b) Road side Furniture

The roadside furniture shall include the provision of the;

- i. Traffic Signs

Traffic signs include roadside signs, overhead signs, curb mounted signs etc. provided for the entire Project Highway as per Manual.

- ii. Pavement Markings

Pavement markings shall cover road marking provided for the

entire Project Highway as per Manual.

iii. LED Traffic Blinkers

LED Traffic Blinker signal provided for entire project as per Manual.

iv. Delineators

Delineators for the entire Project Highway at the locations as suggested in IRC Manual.

v. Boundary stones

For the entire Project Highway as suggested in relevant IRC Manual.

vi. Hectometer / Kilometer stones

For the entire Project Highway as suggested in relevant IRC Manual.

(c) Street Lighting

Lighting shall be provided at the following locations:

- i. Lighting shall be provided at bus stops, and as per manual recommended in Schedule D.
- ii. High Mast Lighting shall be provided at Major Junction.
- iii. Highway Lighting is to be provided as per Clause 12 of Manual at Grade Separated Structures, Major Bridges and ROB.

The EPC Contractor will obtain all permissions / load sanctions / power supply, etc. from the Electricity Authorities. The Contractor shall be solely responsible for submission of application along with all necessary documents to supply authority. Further the Contractor shall be responsible for follow up of the application and getting the release of the supply to lighting. All statutory approvals / permissions have to be obtained by the Contractor for energizing / operating the lights.

Pedestrian facilities;

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with Authority's Engineer and as per manual.

(d) Tree plantation;

Landscaping and Tree plantation shall be provided. The location for these provisions shall be finalized in consultation with Authority Engineer.

(e) Truck lay-byes;

Truck lay bays shall be provided at locations given below:

Sl no.	Design Chainage(km)	Side
Nil		

(f) Bus-bays and bus shelters;

Bus shelters shall be provided at locations given below:

Sl. No.	Design Chainages (km)	Side	Remarks
NH-38			
1	27+700	Both Side	Bus Shelter
2	47+600	Both Side	Bus bay with Bus Shelter

In case during the execution of the project, Bus-bays / Bus Shelters at any other location is required to be provided, the same shall not considered as change of scope. Further, the above locations are indicative and shall be finalized with Authority's Engineer.

(g) Rest Areas

NIL

(h) Utilities

Provision of accommodating utilities shall be made within utility corridor on either side of Project Highway. At an interval of 0.5 Km, utility ducts in form of NP-4 Hume Pipe shall be provided across the Project Highway and along with inspection chamber as per IRC: SP: 73-2018 requirements. Location & diameter for such utility crossing shall be finalized in consultation with Authority Engineer & concerned Utility Agency.

Schedule - D

(See Clause 2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

Manual of Specifications and Standards for two Laning of Highways (IRC: SP: 73 2018), referred to herein as the Manual

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for two-Laning of Highways (IRC: SP:73-2018), referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

- (i) The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.
- (ii) Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

Sl no.	Clause Referred in Manual / Circular	Item	Provision as per Manual / Circular	Modified provision	Remarks
1	MoRT&H Circular No. – RW/NH- 33044/22/2020-S&R(P&B)	Shoulders	Clause referred in circular	Width of paved shoulder in open country rural area is 1.5 m and earthen shoulder in rural area is 1.0m on either side	Circular date – 17 th July 2020

(ii) Table D1: Speed Restricted Stretches at Structure Locations

Sl no	CIRCULER DETAILS				Transition Details				Speed (Kmph)
	Start Chainage	End Chainage	Radius (m)	Direction	Start Chainage	L1	L2	End Chainage	
1	27+318.055	27+340.871	230	Left	27+263.055	55	55	27+395.871	60
2	27+609.733	27+616.247	1800	Right					60
3	27+913.652	28+000.727	301	Right	27+858.652	55	55	28+055.727	60
4	28+116.578	28+157.687	130	Left	28+061.578	55	55	28+212.687	60
5	38+630.023	38+823.372	170	Left	38+560.023	70	70	38+893.372	65

SCHEDULE - E
(See Clauses 2.1 and 14.2)
MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

- 1.1 The Contractor shall, at all times 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 MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

2 Repair/rectification of Defects and deficiencies

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

3 Other Defects and deficiencies

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

4 Extension of time limit

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

5 Emergency repairs/restoration

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

6 Daily inspection by the Contractor

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

7. Pre-monsoon inspection / post-monsoon inspection

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

8. Repairs on account of natural calamities

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

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.tfhr.com/pavement/ltp/ reports/03031/)	24-48 hours	MORT&H Specification 3004.2

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Reference s for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2

	Corrugations and Shoving	Nil	< 0.1% Of area	Daily	Length Measurement Unit like		2-7 days	IRC:82- 2015
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82- 2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, Restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82- 2015

	Roughness BI	2000 mm/km	2400 mm/km	Bi- Annually	Class I Profilometer SCRIM (Sideway- force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer: ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82- 2015
	Skid Number	60SN	50SN	Bi- Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi- Annually			180 days	IRC:82- 2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement)	Roughness BI	2200mm / km	2400mm /Km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC: SP:83-2008

of MCW, Service Road, Grade structure,	Skid	Skid Resistance no. at different speed of vehicles		Bi- Annually	SCRIM (Sideway- force	IRC: SP:83-2008	180 days	IRC: SP:83- 2008
Asset Type Approaches of connecting roads, slip roads, lay byes etc. as applicable)	Performance Parameter	Level of Service (LOS)		Frequency of Inspect ion	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptabl e					
		Minimu m SN	Traffic Speed (Km/h)		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					

		31	95					
		31	110					
Embankment / Slope	Edge drop at shoulders	Nil	40m m	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/c ross fall	Nil	<2% variation in prescribed slope of camber / Cross fall	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15 % variation in prescribe	Daily			7-15 days	MORT&H Specification 408.4

		side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days MORT&H Specification

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

Table -2: **Maintenance Criteria for Rigid Pavements:**

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

			5	w > 3 mm.	Seal, and stitch if L > 1 m. Within 7 days	Retrofit, FDR for affected portion. Within 15days
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, 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

			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	and specifications See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernible from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling.

			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	Within 15 days
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications -
						See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 m.	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle	Within 15 days	
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle		Dismantle, reinstate

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

						slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length(m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m ²	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			2	either w > 0.5 mm or L < 3 m/m ²		
			3	w > 1.5 mm and L < 3 m/m ²		
			4	w > 3 mm, L < 3 m/m ² and deformation		
			5	w > 3 mm, L > 3 m/m ² and deformation		
Surface Defects						

7	Raveling 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 areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting.	
			4	r = 25 - 50 %		

					Within 30 days		
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days		
8	Scaling	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term	Long Term	
					No action.	Not Applicable	
			1	r <2 %	Local repair of areas damaged and liable to be damaged. Within 7days		
			2	r = 2 - 10 %			

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

			5	$t < 0.1 \text{ mm}$	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m ² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m ²	No action.	Not Applicable
			1	d=50-100mm; h<50mm; n<1 per 5 m ²	Partial depth repair 65 mm deep.	
			2	d=50-100mm; h>50mm; n<1 per 5 m ²	Within 15 days	
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5m ²	Partial depth repair 110mm	

			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5m ²	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m ²	Full depth repair. Within 30 days	

Joint Defects						
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	Short Term	Long Term
					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; $w > 3 \text{ mm}$ negligible protection against ingress of water into more than 4 pieces	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	$w < 10 \text{ mm}$	Apply low viscosity epoxy resin/mortar in cracked portion.	
			2	$w = 10 - 20 \text{ mm}$, $L < 25\%$	Within 7 days	
			3	$w = 20 - 40 \text{ mm}$, $L > 25\%$	Partial Depth Repair. Within 15 days	
			4	$w = 40 - 80 \text{ mm}$, $L > 25\%$	30 - 50 mm deep, $h = w \cdot 20\%$ of w, within 30 days	

			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w . 20% of w. Within 30 days	
13	Faulting (or stepping)	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
	in Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.
			3	f = 6 - 12 mm	Diamond Grinding	Within 30days
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate.
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	Within 30days

					Short Term	Long Term
					No Action	
14	Blowup or buckling	h = vertical displacement from normal profile	0	Nil, not discernible		
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm	within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, i.e. 4 or more pieces	Replace broken slabs. Within 30 days	
			0	Not discernible, h < 5 mm	No action.	
			1	h = 5 - 15 mm		

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

		L = length	3	h = 30 - 50 mm	within 7 days	scrabble
			4	h > 50 mm or > 20% joints	Stabilize subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	Bump	h= vertical Displacement from normal profile	0	h < 4 mm	No action	
		h= vertical Displacement from normal profile	1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days

18	Lane Shoulder Dropoff	to f = difference of level	0	Nil, not discernible < 3mm	Short Term	Long Term
					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	
			4	f = 50 - 75 mm	within 7 days	For any 100 m stretch Reconstruct shoulder,
		5	f > 75 mm	if affecting 25% or more of stretch.		
Within 30days						
Drainage						

19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 -25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development >25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	Ponding	Ponding on slabs due to blockage of	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc. within 7 days, Follow up	Action required to stop water

		drains	5	Ponding, accumulation of water observed	-do-	damaging foundation within 30 days.
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(iii) **Table -3: Maintenance Criteria for Safety Related Items and Other Furniture Items:**

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight Distance	As per IRC SP : 84-2014, a minimum of safe stopping sight distance shall be available throughout.			Monthly	Manual Measurements with Odometer along with video/ image backup	Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		IRC: SP 84-2019
		Design Speed , kmph	Desirable Minimum Sight Distance (m)	Safe Stopping Sight Distance (m)					
		100	360	180					
		80	260	130					

Pavement Marking	Wear	<70% of marking remaining	Bi-Annually	Visual Assessment as per Annexure- F of IRC:35- 2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect	IRC:35-2015		
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m²/lux Bituminous Road - 100mcd/m²/lux		Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015	
		<u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u>			As per Annexure-E Of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015	
		Design Speed	(RL) Retro Reflectivity (mcd/m²/lux)						
			Initial (7 days)						Minimum Threshold level (TL) & warranty

	Night Time Visibility			period required up to 2 years	Bi-Annually				
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u>							
		Initial 7 days Retro reflectivity: 100 mcd/m ² /lux Minimum Threshold Level: 50 mcd/m ² /lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc.			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015

Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.	Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testing of each	Change of signboard	48 hours in case of Mandatory	IRC:67-2012
				Signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, cautionary and Informatory Signs (Single and Dual post-signs) 1 Month in case of Gantry/Cantilever Sign boards	
	Kerb 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	Kerb Painting	<u>Functionality:</u> Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
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:73-2018, IRC:35-2015
	Pedestrian Guardrail	<u>Functionality:</u> Functioning	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: SP:73-2018
	Traffic Safety Barriers	<u>Functionality:</u> Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC: SP:73-2018, IRC:119-2015
	End Treatment of Traffic Safety Barriers	<u>Functionality:</u> Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC: SP:73-2018, IRC:119-2015
	Attenuators	<u>Functionality:</u> Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC: SP-2014, IRC:119-2015
	Guard Posts and Delineators	<u>Functionality:</u> Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012

	Traffic Blinkers	<u>Functionality:</u> Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC: SP:73-2018
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:73-2018
		No major failure in the lighting system	Daily	-	Rectification of failure	24 hours	IRC: SP:73-2018
		No minor failure in the lighting system	Monthly	-	Rectification of failure	8 hours	IRC: SP:73-2018
	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:73-2018
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC: SP:73-2018
Trees and Plantation including median	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:73-2018

plantation	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:73-2018
	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 84-2019
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	15 days	IRC: SP 84-2019

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

		Cracks wider than 0.3 mm not more than 1m aggregate length		per IRC SP:35-1990 and recording	followed as per IRC: SP: 40-1993.		2800
	Protection works	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	IRC: SP 40-1993
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge Super Structure	Bumps	No bump	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 2811.

	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection And detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2019 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sqm	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 Specification 1600.
	Spalling of concrete	Not more than 0.50 sqm					
	Delamination	Not more than 0.50 sqm					
	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	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 Specification 2800.
	Rainwater seepage through deck	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH Specifications 2600 & 2700.

	slab			using Mobile			
	Deflection due to permanent loads and live loads	Within design limits.	Once every years	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans More than 30m and every 10 years for spans between 15m to 30 m	Laser displacement sensors or laser vibrometers	Strengthening of super structure	4 months	AA SH TO LR FD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in Strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace seal in	15 days	MORTH specifications 2600 and IRC SP: 40-1993.

		plug and copper strip joint.					
	Debris and dust in strip	No dust or debris in joint expansion gap	Monthly	Detailed condition survey as per IRC SP:35-1990 Using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Drainage spouts	No down	Monthly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	3 days	MORTH specification 2700.
Bridge - substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of Concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repair to substructure	30 days	IRC SP: 40-1993 and specification 2800.

				n Unit	defect noticed		
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater cameras Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, 83-2014, MORTH specification 2500

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days	IRC: SP 40-1993
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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.

(iv) **Table 4: Maintenance Criteria for Structures and Culverts:**

(v) **Table 5: Maintenance Criteria for Hill Roads**

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

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

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

A. Flexible Pavement

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

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

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

[Note: Where necessary, the Authority may modify the time limit for

repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

- (i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:
 - (a) Permission of the State Government for extraction of boulders from quarry;
 - (b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
 - (c) 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 or clearances required under Applicable Laws.
- (ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

SCHEDULE - G
(See Clauses 7.1.and 19.2)
FORM OF BANK GUARANTEE
Annexure-I
(See Clause 7.1)

[Performance Security/Additional Performance Security

The Managing Director,
National Highways & Infrastructural Development Corporation
Ltd.
1st & 2nd Floor, Tower A, World Trade Centre, Nauroji Nagar,
New Delhi-110029

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called the “Contractor”) and National Highways and Infrastructure Development Corporation Ltd. , (here in after called the “Authority”) have entered into an agreement (here in after called the “Agreement”) for “Balance Work of Widening/Improvement from km 27+150 (Golai Gaon) to km 47+682 (Ledo) i.e Proposed Margherita - Ledo Bypass (Green Field and Brownfield of NH-38) of Dibrugarh to Ledo section in the State of Assam on EPC mode (Section-5)” in the state of Assam 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/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs..... cr. (Rupees crore) (the “Guarantee Amount ”).

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

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

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

General Manager in the National Highways& 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 Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between

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

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

Sl.	Particulars	Details
1.	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2.	Beneficiary Bank Account No.	90621010002659
3.	Beneficiary Bank Branch	IFSC SYNB0009062
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.

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.

Annexure - II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
National Highways & Infrastructural Development Corporation
Ltd. 1st & 2nd Floor, Tower A, World Trade Centre, 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 National Highways and Infrastructure Corporation Ltd., (hereinafter called the “**Authority**”) for the “Balance work of Widening/Improvement from km 27+150 (Golai Gaon) to km 47+682 (Ledo) i.e Proposed Margherita – Ledo Bypass (Green Field and Brownfield of NH-38) of Dibrugarh to Ledo section in the State of Assam on EPC mode (section-4)” in the state of Assam on EPC mode“ subject to and in accordance with the provisions of the Agreement

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

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

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

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

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways& Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the

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

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
- 3 It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
- 4 The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
- 5 This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
- 6 Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
- 7 The Guarantee shall cease to be in force and effect on ****.[§] Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have

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

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

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

SIGNED , SEALED AND DELIVERED

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

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

SCHEDULE - H

See Clauses 10.1 (iv) and 19.3

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract	Stage of Payment	Percentage Weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	35.07%	A- Widening and strengthening of existing road (For 2 lane to 4 lane)	
		(1)) Earthwork up to top of sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Non-Bituminous Base Course	0.00%
		(4) Bituminous Base Course	0.00%
		(5) Wearing Coat	0.00%
		(6) Widening and repair of culvert	0.00%
		A.1- Widening and strengthening of existing road (For Strengthening of 2 lane)	
		(1)) Earthwork up to top of sub-grade	0.06%
		(2) Sub Base Course	0.06%
		(3) Non-Bituminous Base Course	0.31%
		(4) Bituminous Base Course	0.09%
		(5) Wearing Coat	0.15%
		(6) Widening and repair of culvert	
		B.1- Reconstruction / New 2-Lane realignment/ bypass (Flexible Pavement)	
		(1) Earthwork up to top of sub-grade	49.10%
		(2) Sub Base Course	13.71%
		(3) Non-Bituminous Base Course	10.50%
		(4) Bituminous Base Course	7.72%
		(5) Wearing Coat	6.37%
		B.2- Reconstruction / New 2-Lane realignment/ bypass (Rigid Pavement)	
		(1) Earthwork up to top of sub-grade	0.00%

		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		C.1- Reconstruction / New Service Road (Flexible Pavement)	0.00%
		(1) Earthwork up to top of sub-grade	1.11%
		(2) Sub Base Course	1.56%
		(3) Non-Bituminous Base Course	1.92%
		(4) Bituminous Base Course	0.99%
		(5) Wearing Coat	0.57%
		C.2- Reconstruction / New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of sub-grade	0.00%
		(2) Sub Base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D- Re-Construction and New culverts on existing road, realignments, bypasses:	
		Culverts (Length <6 m)	5.78%
Minor Bridges / Underpasses / Overpasses	6.50%	A.1- Widening and repairs of Minor Bridges (length>6m and <60m)	
		Minor Bridges	0.00%
		A.2- New Minor Bridges (length>6m and <60m)	
		(1) Foundation: On completion of the foundation work including foundation for wing and return walls, abutments, piers up to the abutment/pier cap.	28.40%
		(2) Sub-Structure:	25.55%
		(3) Super-Structure: On completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings tests on completion etc. complete in all respect.	16.67%
		(4) Approaches: On completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	2.60%
		(5) Guide Bunds and River Training works	

		:	
		On completion of Guide Bunds and river Training works complete in all respects	8.01%
		B.1- Widening and Repair of underpasses/overpasses	
		Underpasses/ Overpasses	0.00%
		B.2- New underpasses/ overpasses	
		(1) Foundation +Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	10.72%
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & makings, tests on completion etc. complete in all respect.	5.95%
		Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified as specified.	0.00%
		(3) Approaches: On completion of approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	2.10%
			0.00%
Major Bridges (Length >60m) works and ROB/RUB/elevated section/flyover including viaducts if any.	46.89%	A.1 - Widening and repairs of Major Bridges	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%

		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		A.2- New Major Bridges	0.00%
		(1) Foundation	20.72%
		(2) Sub-structure	5.20%
		(3) Super-structure (including bearings)	15.64%
		(4) Wearing Coat including expansion joints	0.47%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	1.98%
		(6) Wing walls/return walls	0.00%
		(7) Guide Bunds, River Training works etc.	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.07%
		B.1- Widening and Repair of underpasses/overpasses	
		(a) ROB	0.00%
		(b) RUB	0.00%
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure(including bearings)	0.00%
		(4) Wearing Coat: (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%
		B.2- New ROB/RUB	
		(a) ROB	0.00%
		(b) RUB	0.00%

		(1) Foundation	20.55%
		(2) Sub-structure	4.23%
		(3) Super-structure (including bearings)	25.17%
		(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.	0.66%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	1.50%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	3.81%
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%
		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	0.00%
		(2) Sub-structure	0.00%
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.)	0.00%
		(6) Wing walls/return walls	0.00%

		(7) Approaches (including Retaining walls/ Reinforced Earth wall, stone pitching and protection works)	0.00%
Other works	11.03%	(i) Toll Plaza	0.00%
		(ii) Road side drains	15.76%
		(iii) Road signs, markings, km stones, safety devices,	27.60%
		(iv) Project facilities	0.00%
		(a) Bus Bays & Bus Shelter	0.86%
		(b) Truck lay-byes	0.00%
		(c) Rest areas	0.00%
		(d) Electrical Works	1.28%
		(e) Junctions	13.90%
		(f) others	5.20%
		(v) Road side plantation	4.47%
		(vi) Protection works other than elevated sections/ flyovers/grade separators and ROB/RUBs. (Breast Wall & Retaining Wall/Toe wall	14.78%
		(vii) Marshy land treatment	15.04%
		(viii) Median & Island Filling	1.11%
Electrical utilities and Public Health Utilities (Water pipe lines and sewage lines	0.51%	(i) EHT Line	0.00%
		(ii). EHT crossings	0.00%
		(ii). HT/LT line	55.45%
		(iv). HT/LT crossings	36.97%
		(v). Water pipeline	2.28%
		(vi). Water pipeline crossings	5.30%

1.3 Procedure of estimating the value of work done

1.3.1 Roadworks.

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 (For 2 lane to 4 lane)		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 1.00 km (One Kilometer) in 2 lane carriageways
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-Base Course	0.00%	
(3) Non-Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
(6) Widening and repair of culverts	0.00%	Cost of five completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of five culverts for 2 lane carriageways
A.1-Widening and strengthening of existing road (For Strengthening of 2 lane)		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 1.00 km (One Kilometer) in 2 lane carriageways
(1) Earthwork up to top of the sub-grade	0.06%	
(2) Sub-Base Course	0.06%	
(3) Non-Bituminous Base Course	0.31%	
(4) Bituminous Base Course	0.09%	
(5) Wearing Coat	0.15%	
(6) Widening and repair of culverts	0.00%	Cost of five completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of five culverts for 2 lane carriageways
B.1- Reconstruction/New 2-lane realignment/bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in 500 mtr for 2 Lane carriageway.
(1) Earthwork up to top of the sub-grade	49.10%	
(2) Sub-Base Course	13.71%	
(3) Non-Bituminous Base Course	10.50%	
(4) Bituminous Base Course	7.72%	
(5) Wearing Coat	6.37%	
B.2- Reconstruction / New 2-Lane realignment/ bypass (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever is less.
(1) Earthwork up to top of sub-grade	0.00%	
(2) Sub Base Course	0.00%	

(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
C.1- Reconstruction / New Service Road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever
(1) Earthwork up to top of sub-grade	1.11%	
(2) Sub Base Course	1.56%	
(3) Non-Bituminous Base Course	1.92%	is less.
(4) Bituminous Base Course	0.99%	
(5) Wearing Coat	0.57%	
C.2- Reconstruction / New Service Road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5(five) km. length whichever is less.
(1) Earthwork up to top of sub-grade	0.00%	
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D- Re-Construction and New culverts on existing road, realignments, bypass:		Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least five culvert for 2 lane carriageway
(1) Culverts (Length <6 m)	5.78%	

@. 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 = $P \times \text{weightage for road work} \times \text{weightage for bituminous work} \times (1/L)$

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	Weightage	Payment Procedure
A.1- Widening and repair of minor bridges (length > 6m and <60m)	0.00%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on completion of widening & repair works of a minor bridge.
A.2- New minor bridges		
(i) Foundation : On completion of the foundation work including foundations for wing and return walls.	28.40%	Cost of each minor bridge shall be determined on pro rata basis with respect to 25% each after completion of foundation and substructure, 30% after completion of super-Structure & 20% after completion of protection work
(ii) Sub-structure	25.55%	
(iii) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	16.67%	
(iv) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	2.60%	
(v) Guide Bunds and River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	8.01%	
B.1- Widening and repair of underpasses/overpasses	0.00%	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.
B.2- New Underpasses/Overpasses:	0.00%	

<p>(i) Foundation +Sub-Structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.</p>	10.72%	<p>(i) foundation +Sub-Structure: cost of each Underpass/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpasses/Overpasses. Payment against foundation + sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation +sub- structure of each Underpasses/Overpasses subject to completion of at least two foundations along with sub-structure up to abutment/pier cap each underpass/overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
<p>(ii) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.</p> <p>Wearing coat (a)in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass- rigid pavement including drainage facility complete in all respects as specified.</p>	5.95%	<p>(ii) 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.</p>
<p>(iii) Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.</p>	2.10%	<p>(iii) Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.</p>

1.3.3 Major Bridge works, ROB/RUB and Structures.

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

3. Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
A.1- Widening and repairs of Major Bridges		
(i) Foundation	0.00%	<p>(i) Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
(ii) Sub-structure	0.00%	<p>(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.</p>
(iii) Super-structure (including bearings)	0.00%	<p>(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.</p>
(iv) Wearing Coat including expansion joints	0.00%	<p>(iv) Wearing Coat : Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.</p>
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	<p>(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.</p>
(vi) Wing walls/return walls	0.00%	<p>(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.</p>
(vii) Guide Bunds, River Training works etc.	0.00%	<p>(vii) Guide Bunds, River Training works : Payment shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.</p>

(viii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(viii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
(i) Foundation	20.72%	(i) Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	5.20%	(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	15.64%	(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.47%	(iv) Wearing Coat : Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	1.98%	(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	0.00%	(vii) Guide Bunds, River Training works: Payment shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.

(viii) Approaches (including Retaining walls, stone pitching and protection works)	0.07%	(viii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.1 - Widening and repairs of		
(a) ROB		
(b) RUB		
(i) Foundation	0.00%	(i) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of at least two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/RUB subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the ROB/RUB.
(iii) Super-structure (including bearings)	0.00%	(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	0.00%	(iv) Wearing Coat : Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

(vii) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(vii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B.2 - New	0.00%	
(a) ROB	0.00%	
(b) RUB	0.00%	
(i) Foundation	20.55%	(i) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of at least two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	4.23%	(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the ROB/RUB subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the ROB/RUB.
(iii) Super-structure (including bearings)	25.17%	(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.	0.66%	(iv) Wearing Coat : Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	1.50%	(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	3.81%	(vii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.1- Widening and repairs of Elevated Section/Flyovers/Grade Separators		
(i) Foundation	0.00%	(i) Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	(iv) Wearing Coat : Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.

(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%	(vii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C.2- New Elevated Section/Flyovers/Grade Separators	0.00%	
(i) Foundation	0.00%	(i) Foundation: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure	0.00%	(ii) Sub-structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/piers up to abutment/pier cap level of the major bridge.
(iii) Super-structure (including bearings)	0.00%	(iii) Super-structure : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super-structures including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.00%	(iv) Wearing Coat : Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	0.00%	(v) Miscellaneous : Payment shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	0.00%	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	0.00%	(vii) Approaches : Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

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

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

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll Plaza	0.00%	Rigid pavement, DLC-LHS-10.26%, Rigid pavement PQC-LHS-17.10%, Rigid pavement DLC-10.26% and rigid pavement PQC-RHS-17.10%. Steel truss & canopy-20.21%, Admin building-8.20% and finishing works-16.87%.
(ii) Road side drains	15.76%	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of service drain. Payment shall be made for completed site drain in a length of not less than 1.00 Km (one kilometer) of the total length of service roads for 2 lane carriageway.
(iii) Road signs, Markings, KM stones, Safety devices, ...	27.60%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(iv) Project facilities	0.00%	Payment shall be made on pro rata basis for completed facilities.
a) Bus bays	0.86%	
b) Truck lay-byes	0.00%	
c) Rest areas	0.00%	
d) Electrical Works	1.28%	
e) Junctions	13.90%	
f) others	5.20%	
(v) Roadside plantation	4.47%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(vi) Protection works other than elevated sections/flyovers/grade separators and ROB/RUBs	14.78%	
(vii) Marshy land treatment	15.04%	Payment shall be made on pro rata basis for completed facilities.

(viii) Median & island Filling	1.11%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
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1.3.5 Electrical Utilities and Public Health Utilities (Water pipe lines and sewage lines)

Procedure for estimating the value of Electrical Utilities and Public Health Utilities (Water pipe lines and sewage lines) shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) EHT Line	0.00%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20%, (ii) Conductor stringing including laying of cable-30%, (iii) DTR erection (if involved)- 15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT crossings	0.00%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 4 crossings.
(iii) HT/LT line (including Transformers if any)	55.45%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of HT/LT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of poles-20%, (ii) Conductor stringing including laying of cable-30%, (iii) DTR erection (if involved)- 10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/LT line crossings	36.97%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 10 crossings.

(v) Water pipeline.	2.28%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) Water pipeline crossings.	5.30%	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payments shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines.	-	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vii) Sewage line crossings.	-	Cost of each crossing shall be determined on pro-rata basis with reference to the total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex - I

(Schedule - I)

List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

- (i) Project Milestone-I shall occur on the date falling on the **260th** 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 **480th** 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 **620th** day from the Appointed Date (the “**Project Milestone-III**”).
- (ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

- (i) The Scheduled Completion Date shall occur on the **730th** day from the Appointed Date.
- (ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

2. Tests

- (i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].
- (ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a Network Survey Vehicle (NSV) fitted with latest equipment's 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, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

5	Road signs	Retro-reflectometer	At least twice a year (As per survey months defined for the state basis rainy season)
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The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.

Schedule - L

(See Clause 12.2)

Completion Certificate

- 1 I, (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated (the "**Agreement**"), for "Balance work of Widening/Improvement from km 27+150 (Golai Gaon) to km 47+682 (Ledo) i.e. Proposed Margherita - Ledo Bypass (Green Field and Brownfield of NH-38) of Dibrugarh to Ledo section in the State of Assam on EPC mode (section-5)" through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.
- 2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the.....day of 20..., Scheduled Completed Date for which was the day of20.....

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation)

(Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(a)	Carriageway/Pavement	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	Road, Embankment, Cuttings, Shoulders	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, rain cuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	Bridges and Culverts	
(i)	Desilting, cleaning, vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(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/5 th km stones	5%
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accident vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	Defects in Other Project Facilities	5%

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

$$R = (P/100) \times M \times (L1/L)$$

Where,

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

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

Schedule L1= non-complying length L = Total length of the road,

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

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

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

Schedule - N

(See Clause 18.1 (I))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

Terms of Reference for Authority's Engineer

1. Scope

- (i) These Terms of Reference (the “**TOR**”) for the Authority's Engineer are being specified pursuant to the EPC Agreement dated (the “**Agreement**”), which has been entered into between the [name and address of the Authority] (the “**Authority**”) and

..... (the “Contractor”) #for “Balance Work of Widening/Improvement from km 27+150 (Golai Gaon) to km 47+682 (Ledo) i.e. Proposed Margherita - Ledo Bypass (Green Field and Brownfield of NH-38) of Dibrugarh to Ledo section in the State of Assam on EPC mode (section-5)” and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

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

3. General

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

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

4. Construction Period

- (i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (VI). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended up to 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.
- (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 or the with.
- (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 Programmed 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 Clause14.5.

6. Determination of costs and time

- (i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.
- (ii) The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.
- (iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause18.5.

7. Payments

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

- (iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.
- (v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

- (a) The estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;
- (b) amounts reflecting adjustments in price for the aforesaid claim;
- (c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;
- (d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii)(a);
- (e) total of (a), (b), (c) and (d) above;
- (f) Deductions:
 - i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
 - ii. Any amount towards deduction of taxes; and
 - iii. Total of (i) and (ii) above.
- (g) Net claim: (e) – (f)(iii);
- (h) The amounts received by the Contractor up to 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 affect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non-Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:
 - (a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and
 - (b) Insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.
- (ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

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

****section (km ** to km **) of

****] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of

Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED
(Signature)

(Name and designation of Authority's
Representative)

(Address)

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