Schedules

SCHEDULE- A

(See Clauses 2.1 and 8.1)

SITE OFTHE PROJECT

1. *TheSite*

- The Project road starts from design km 18.000 (NH Km 145.319), (Reference design km 0.0 at South Pulinpur NH-08, (1.4 km from Khowaichowmuhani, Teliamura towards Agartala)and ends at design km 36.000(NH Km 163.319).

  The Design length of project road is 18.000 km. Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

	NH km	Topo Survey Chainage (km)	Design Chainage (km)
Start of Project	145.319	22.200	18.000
End of Project	163.319	42.050	36.000

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

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

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

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

Annex – I

(Schedule – A)

Site

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

1. Site

- The Project road starts from design km 18.000(NH Km 145.319), (Reference design km 0.0 at South Pulinpur NH-08, (1.4 km from Khowaichowmuhani, Teliamura towards Agartala)and ends at design km 36.000(NH Km 163.319).

  The design length of project road is 18.000 km. Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

2. Land

The Site of the Project highway comprises the land as described below –

Sl. No.	Chainage		Length (m)	PROW (m)		Total PROW (m)	Remarks
	From	To		LHS	RHS		
1	18000	19860	1860	22.5	22.5	45	
2	19860	19950	90	10	10	20	
3	19950	20740	790	15	15	30	
4	20740	21080	340	20	20	40	
5	21080	23860	2780	15	15	30	
6	23860	24300	440	20	20	40	
7	24300	25210	910	15	15	30	
8	25210	25315	105	7.5	7.5	15	School
9	25315	35260	9945	15	15	30	
10	35260	36000	740	22.5	22.5	45	

3. *Carriageway*

Theexistingcarriagewayof the Project highway is as described below –

Sl. No.	Existing Chainage (km)		Carriage way width (m)	Remarks
	From	To		
1	18.000	36.000	3.5 - 4.0	

Thetype of the existingpavementis flexible.

4. *MajorBridges*

TheSiteincludes thefollowingMajorBridge

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

5 Roadover-Bridge (ROB)/ Roadunder-Bridge(RUB)

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

Sl. No.	Chainage (km)	TypeofStructure		No. of Spanswith Span length(m)	Width (m)	ROB/ RUB
		Foundation	Super Structure			
Nil						

6 Gradeseparators

TheSiteincludes thefollowing gradeseparators:

Sl. No.	Chainage (km)	TypeofStructure		No. of Spanswith Spanlength(m)	Width (m)
		Foundation	Super Structure		
Nil					

7 MinorBridge

TheSiteincludes thefollowingminor Bridge:

Sl. No.	Survey Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	23+000	OLD STEEL TRUSS BRIDGE			30	5
2	26+600	OLD WOODEN BRIDGE			30	3
3	29+650	OLD WOODEN BRIDGE			30	3
4	30+400	CONCRETE BRIDGE			11.4	7.4
5	31+050	OLD WOODEN BRIDGE			30	3

8 Railway level crossings

TheSiteincludes thefollowingrailwaylevelcrossings:

Sl.No.	Location (km)	Remarks
Nil		

9 Underpasses (vehicular, Non-vehicular)

TheSiteincludes thefollowingunderpasses:

Sl. No.	Chainage (km)	TypeofStructure	No. of Spanswith Spanlength(m)	Width (m) / Remarks
Nil				

10 Culverts :

TheSitehas thefollowingculverts:

Sl. No.	Existing Chainage(Km)	Type of Structure (Pipe/Slab /Box /Arch)	Span Arrangement		C'Way Width (m)
			No	Vent Width (m) (Clear)	
1	23+500	SLAB	1	1	3.1
2	23+700	SLAB	1	1	3.1
3	24+100	SLAB	1	1.2	3.8
4	24+500	SLAB	1	1.2	3.8
5	26+800	PIPE	1	1	3.4
6	28+300	PIPE	2	1	3.6
7	28+900	PIPE	1	1	4
8	29+550	PIPE	1	1	3.1
9	30+220	PIPE	1	1	3.5
10	30+450	PIPE	1	1	3.5
11	30+650	PIPE	1	0.6	3.7
12	31+150	SLAB	1	1.6	4
13	31+670	SLAB	1	1.6	4
14	33+050	SLAB	1	0.7	3.6
15	34+450	SLAB	1	0.7	3.6
16	35+400	PIPE	1	0.5	3.6
17	36+100	SLAB	1	1.1	3.5
18	36+150	PIPE	1	0.6	3.5
19	36+250	PIPE	1	0.6	3.5
20	36+450	SLAB	1	0.9	3.5
21	36+750	SLAB	1	0.9	3.6
22	37+850	PIPE	3X2	1X0.6	3.7

Sl. No.	Existing Chainage(Km)	Type of Structure (Pipe/Slab /Box /Arch)	Span Arrangement		C'Way Width (m)
			No	Vent Width (m) (Clear)	
23	38+100	SLAB	1	1	3.4
24	38+950	SLAB	1		3.7
25	38+980	SLAB	1		3.7
26	39+450	SLAB	1	0.9	3.4
27	40+330	PIPE	3	1	3.6
28	40+690	SLAB	1	0.9	3.5
29	40+750	PIPE	3	1	3.6
30	40+800	SLAB	1	0.9	3.5
31	41+700	SLAB	1	0.8	3.4
32	41+800	SLAB	1	0.9	3.6
33	42+050	SLAB	1	0.8	3.4

11 Bus Bays

Thedetails of bus baysatsiteare as follows:

SL.NO	Ex. Chainage	LHS	RHS	Remark
1	23+325	LHS		
2	26+950		RHS	
3	30+450		RHS	
4	36+200	LHS		
5	38+100	LHS		
6	42+050		RHS	

12 Truck Lay byes

Thedetailsof truck laybyesareas follows:

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

13 Roadsidedrains

The details of theroadsidedrains areas follows:

Sl. No.	Location (km)		Type	
	From	To	Masonry/cc (Pucca)	Earthen (Kutcha)
Nil				

14 Majorjunctions

Thedetail of major junction are as follows:

Sl. No.	Location (Km)		At grade	Separated	Category of Cross Road			
	From	To			NH	SH	MDR	Others
Nil								

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

15 Minorjunctions

The details of the minor junctions are as follows:-

Sl. No.	Design Chainage (Km)	Side	Type of Junction
1	18+750	BHS	Minor Junction
2	19+430	RHS	Minor Junction
3	19+540	BHS	Minor Junction
4	19+830	RHS	Minor Junction

Sl. No.	Design Chainage (Km)	Side	Type of Junction
5	20+225	LHS	Minor Junction
6	21+700	BHS	Minor Junction
7	21+900	RHS	Minor Junction
8	23+250	RHS	Minor Junction
9	23+580	LHS	Minor Junction
10	23+810	RHS	Minor Junction
11	24+100	BHS	Minor Junction
12	24+700	BHS	Minor Junction
13	25+200	LHS	Minor Junction
14	25+460	RHS	Minor Junction
15	26+025	LHS	Minor Junction
16	27+250	RHS	Minor Junction
17	27+750	RHS	Minor Junction
18	28+320	RHS	Minor Junction
19	28+440	LHS	Minor Junction
20	28+900	BHS	Minor Junction
21	29+000	RHS	Minor Junction
22	29+240	RHS	Minor Junction
23	29+240	LHS	Minor Junction
24	29+950	RHS	Minor Junction
25	30+400	LHS	Minor Junction
26	30+760	RHS	Minor Junction
27	30+900	BHS	Minor Junction

Sl. No.	Design Chainage (Km)	Side	Type of Junction
28	31+480	LHS	Minor Junction
29	31+730	RHS	Minor Junction
30	32+850	BHS	Minor Junction
31	33+340	BHS	Minor Junction
32	33+550	RHS	Minor Junction
33	33+570	RHS	Minor Junction
34	33+800	LHS	Minor Junction
35	34+400	RHS	Minor Junction
36	34+740	BHS	Minor Junction
37	35+200	BHS	Minor Junction
38	35+800	BHS	Minor Junction
39	36+000	BHS	Minor Junction

16 Bypasses

Thedetails of the existing road sections proposed to bebypassed areas follows:

Sl. No.	Name of Bypass (town)	Chainage (Km)		Bypass Length (Km)
		From	To	
1	Ompi Nagar	20.650	24.750	**2.765**

17 Other structures - Nil

Annex-II

(Schedule-A)

Datesfor providing Rightof 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.	From km To km	Length (Km)	Proposed Width (m)	Date of providing ROW*
1	2	3	4	5
(i) Full Right of Way (Full Width) (a) Stretch (b) Stretch (c) Stretch				
(ii) Part Right of Way (Part Width) (a) Stretch (b) Stretch (c) Stretch				
(iii) Balance Right of Way (Width) (a) Stretch (b) Stretch (c) Stretch				

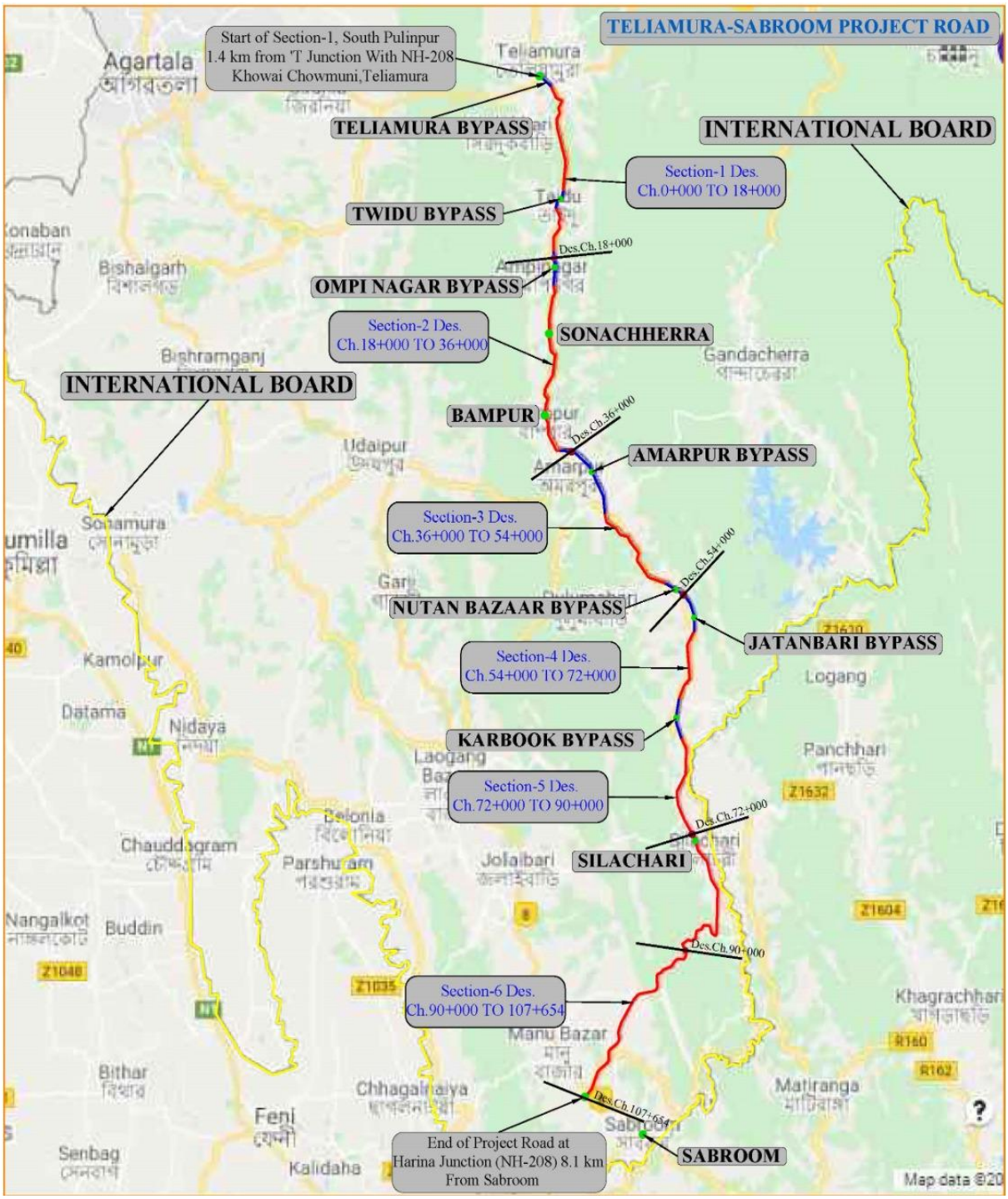
*The dates specified herein shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

Annex-III
(Schedule-A)

Alignment Plans

TheexistingalignmentoftheProjectHighwayshallbemodifiedinthefollowing sections as per thealignment plan indicated below:

An alignment plan is given in soft copy.



(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(differences between FRL & OGL shown in alignment plan shall be maintained). 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 IRC: SP: 99 & IRC: 67.

Annex-IV
(Schedule-A)

Environment Clearances

Thefollowing clearances havebeen obtained:

Sl. No.	Clearances	Present Status
1	Environment clearance	Environment Clearance is not required for Project Highway as per MOEF Notification on 22nd Aug, 2013.
2	Forest Clearance	Under Progress

Annex - V

(Schedule-A)

Electrical Utilities

(i) ELECTRICAL UTILITIES

The site includes the following electrical utilities: -

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

Sr. No	Chainage(km)		Length along NH (in Km)				ROW Crossings (in km)			
	From	**To**	**400KV**	**220KV**	**132KV**	**66KV**	**400KV**	**220KV**	**132KV**	**66KV**
1										

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

Sr. No	Chainage (km)		Length (in Km)				Crossings (no's)				Transformer	
	From	**To**	**33KV**	**22KV**	**11KV**	**LT**	**33KV**	**22KV**	**11KV**	**LT**	**No**	**Capacity**
1	18.00	36.00		5	18				4		3	63KVA
2											2	25KVA

(ii) Public Health Utilities (Water/Sewage pipe lines)*

(a) The site includes the following public health utilities: -

Sr. No	Chainage(km)		Length along NH (in Km)				ROW Crossings (in km)			
	From	**To**	Water Supply line		Sewage line		With pumping		Sewage line	
			With Pumping	With Gravity	With Pumping	With Gravity	With Pumping	With Gravity	With Pumping	With Gravity
1	**33.800**	**34.600**	**1.00KM**			**0.100KM**				
2	**35.400**	**35.600**	**35.600**							

(ii) Any Other Line:

Note: *No change of scope shall be paid for any over-ground utilities. However, for any underground utilities not mentioned in Schedule 'B' shall form change of scope, which shall be worked out as per the estimation of the concerned utility owning department shall be payable.*

Sche

SCHEDULE - B

(See Clause 2.1)

Development of the Project Highway

1 Development of the Project Highway

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

2 Rehabilitation and Augmentation

[Rehabilitation and Augmentation] shall include (Two laning / Four laning and strengthening) of the Project highway as described in Annexure I of this schedule-B & in schedule-C.

3 Specifications and Standards

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

Annex-I
(Schedule-B)

Description of two lane with paved shoulder

The proposal of project road improvement is

- 2 lane with paved shoulder from design km 18+000 (NH km 145.319) (Reference design km 0.0 at South Pulinpur, 1.24 km from Khowai Chowmuhani, Teliamura towards Agartala) to design km 36+000 of NH-08.The design length of project road is 18.000 km (NH km 163.319) after its geometric improvement.

1 Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 7m (seven) wide with 1.5m/2.5m wide paved shoulder on either side of carriage way in accordance with the typical cross sections drawings in the Manual (refer MoRT&H circular dated 17th July 2020).

Sl. No	Design Chainage (Km)		Paved width (m)	Remarks
	From	To		
1	18+000	23+100	10	7m C'way + 1.5m PS
2	23+100	23+300	12	7m C'way + 2.5m PS
3	23+300	36+000	10	7m C'way + 1.5m PS

Provided that in the built-up areas [refer to paragraphs 2.1 (ii) (a) of the Manual and provide necessary details]: the width of the carriageway (Including paved shoulder) shall be as specified in the following table:

Sl. No	Built-up Stretch (Township)	Location / Design Chainage (km)		Paved Width (m)	Typical Cross Section
		From	To		

Sl. No	Built-up Stretch (Township)	Location / Design Chainage (km)		Paved Width (m)	Typical Cross Section
		From	To		
7m Carriage way + 2.5m paved shoulder (b/s) + 1.75m RCC lined drain (b/s), refer TCS 3					

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

2. Geometric design and general features

(i) General

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

(ii) Design speed

The design speed shall be 100kmph (Ruling) /80kmph (minimum) for Plain/Rolling terrain & 60kmph (Ruling) /40kmph (minimum) for Mountainous/steep terrain as per the section 2 of two lane manual IRC - SP: 73:2018.

(iii) Improvement of the existing road geometrics

[Refer to paragraph 2.1 (v) of the manual and provide details]

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

Sl. No.	HORIZONTAL CURVE				Transition length	Speed (Kmph)	Reason for Deviation
	Start Chainage	End Chainage	Radius	Direction			
Nil							

The above deviations are w.r.t. design speed.

(iv) Right of way

Details of Right of Way is given below:

Sl. No.	Chainage		Length	PROW		Total PROW	Remarks
	From	To		LHS	RHS		
1	18000	19860	1860	22.5	22.5	45	
2	19860	19950	90	10	10	20	
3	19950	20740	790	15	15	30	
4	20740	21080	340	20	20	40	
5	21080	23860	2780	15	15	30	
6	23860	24300	440	20	20	40	
7	24300	25210	910	15	15	30	
8	25210	25315	105	7.5	7.5	15	School
9	25315	35260	9945	15	15	30	
10	35260	36000	740	22.5	22.5	45	

(v) Type of shoulders

(a) In Built up sections, Footpath/Fully paved shoulders shall be provided in the following stretches:

Sl. No.	Stretch (design km)		Fully Paved shoulders/Footpath	References to Cross Section
	From	To		
1	23+100	23+300	2.5m paved shoulder & 1.75m wide RCC line drain.	Refer TCS-3

In open country, [paved shoulders of 1.5m width and 1.0m earthen shoulder shall be provided.

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

(vi) Lateral and vertical clearances at underpasses

(a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the provision of two lane manual / four lane manual.

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

Sl. No.	Location (Chainage) (From km to km)	Span / Opening (m)	Remarks
Nil			

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as the provision of relevant Manual.

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

Sl. No.	Location (Chainage) (From km to km)	Span / Opening (m)	Remarks
Nil			

(II) Service roads

Service roads shall be constructed at the locations and for the lengths indicated below: [Refer to the provision of relevant Manual and provide details]

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

(IX) Grade separated structures

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

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Location of structure	Length (m)	Number and length of spans (m)	Approach Gradient	Remarks, If any

Nil

(b) In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows: [Refer to the provision of relevant Manual and specify the type of vehicular under pass/ overpass structure and whether the cross road is to be carried at the existing level, raised or lowered]

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

(X) Cattle and pedestrian underpass /overpass

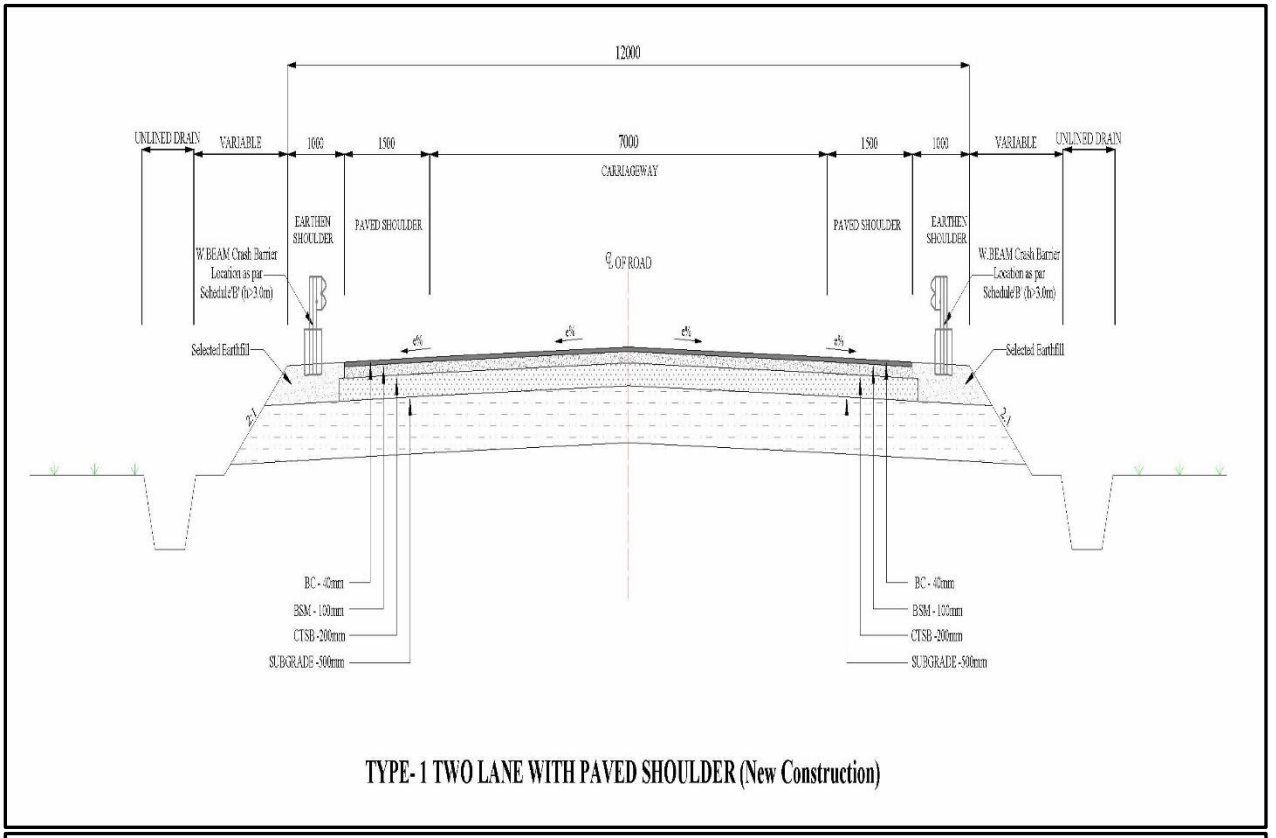
Cattle and pedestrian underpass/ overpass shall be constructed as follows:

[Refer to the provision of relevant Manual and specify the requirements of Cattle and pedestrian underpass/ overpass]

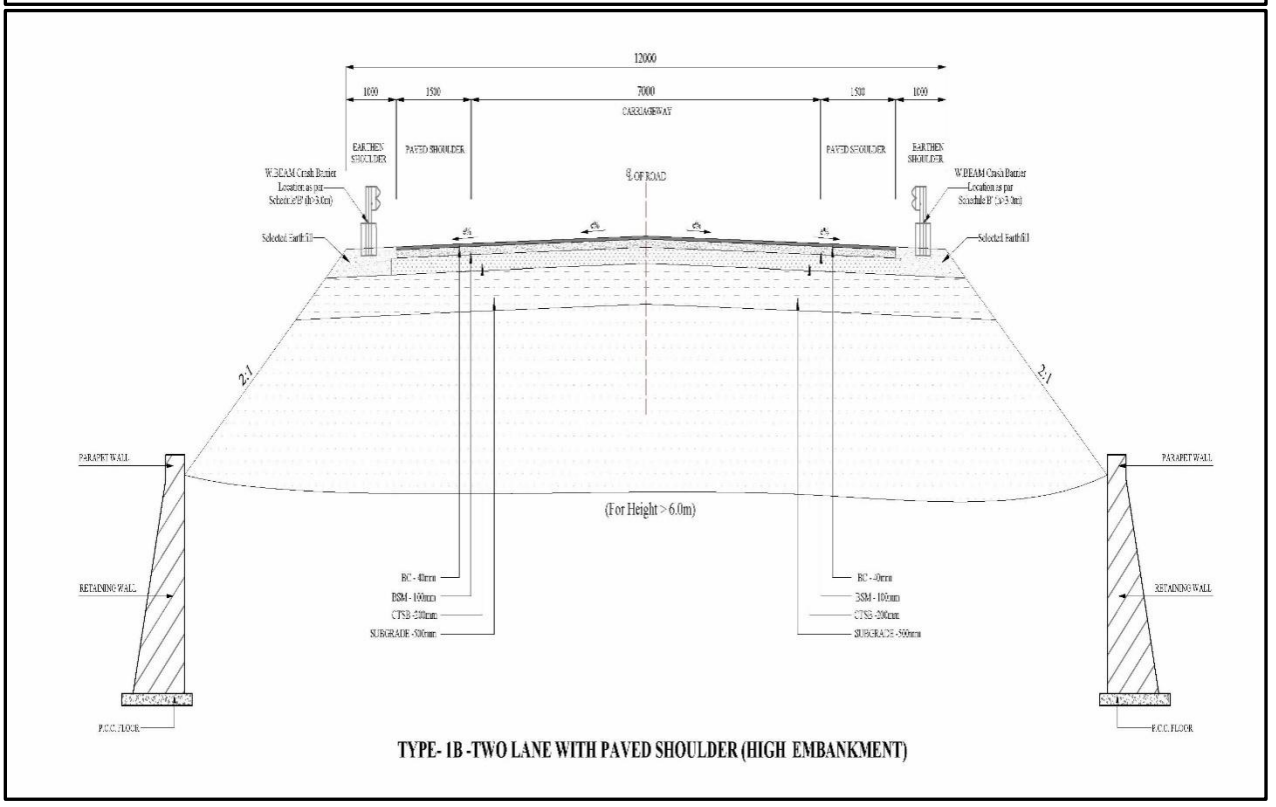
Sl. No.	Location	Type of Crossing
Nil		

(XI) Typical cross-sections of the Project Highway

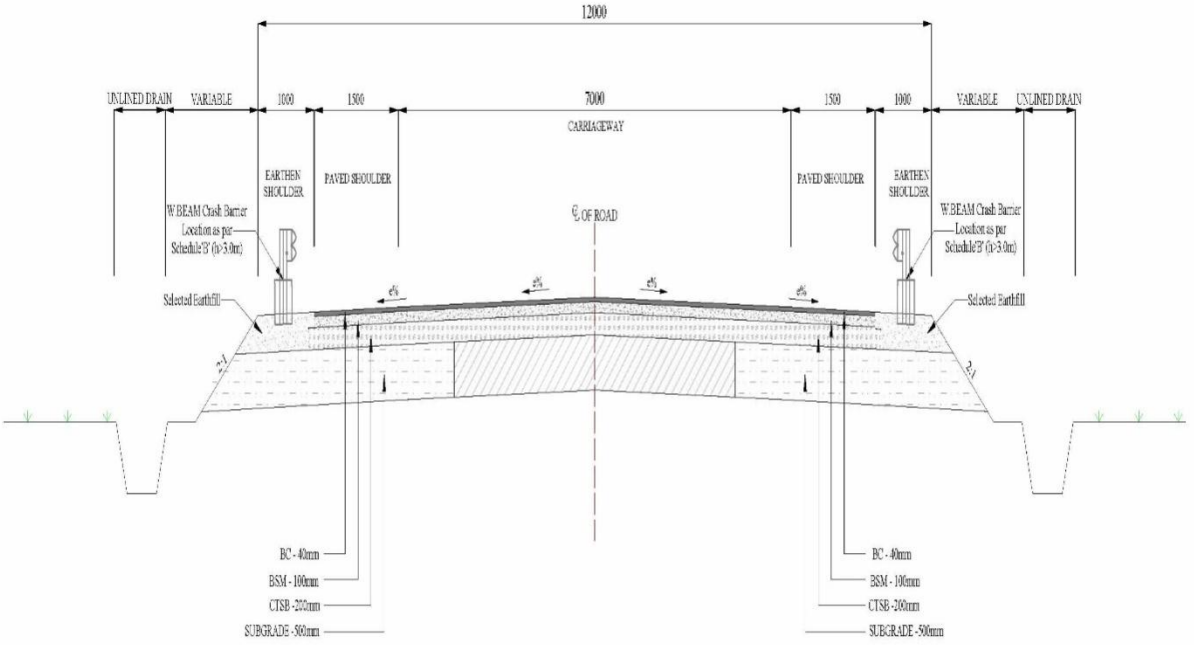
Typical Cross section of Project road is as shown below –



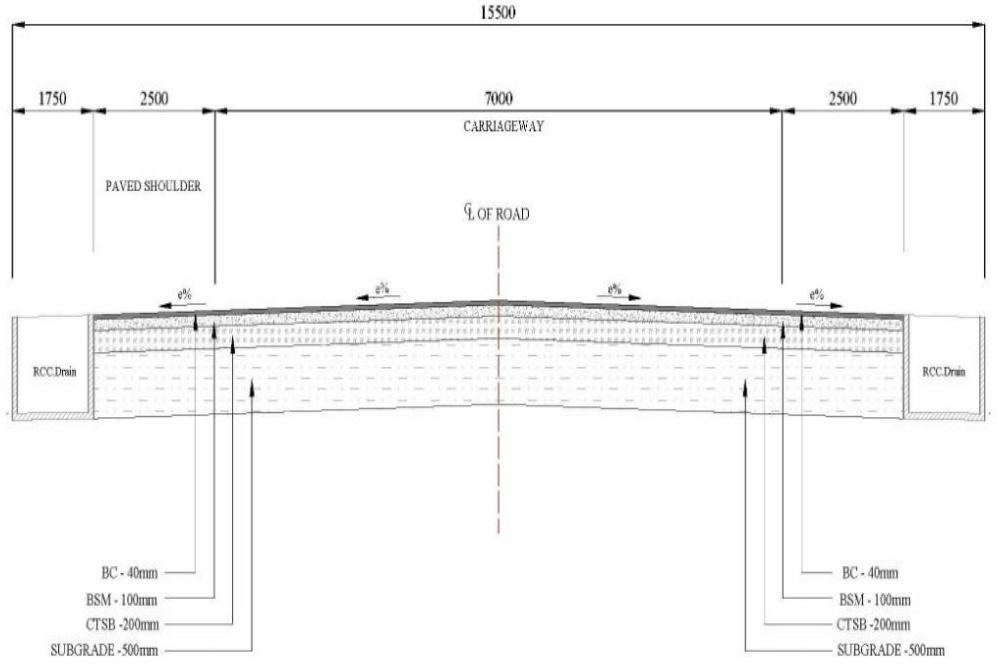
TYPE- 1 TWO LANE WITH PAVED SHOULDER (New Construction)



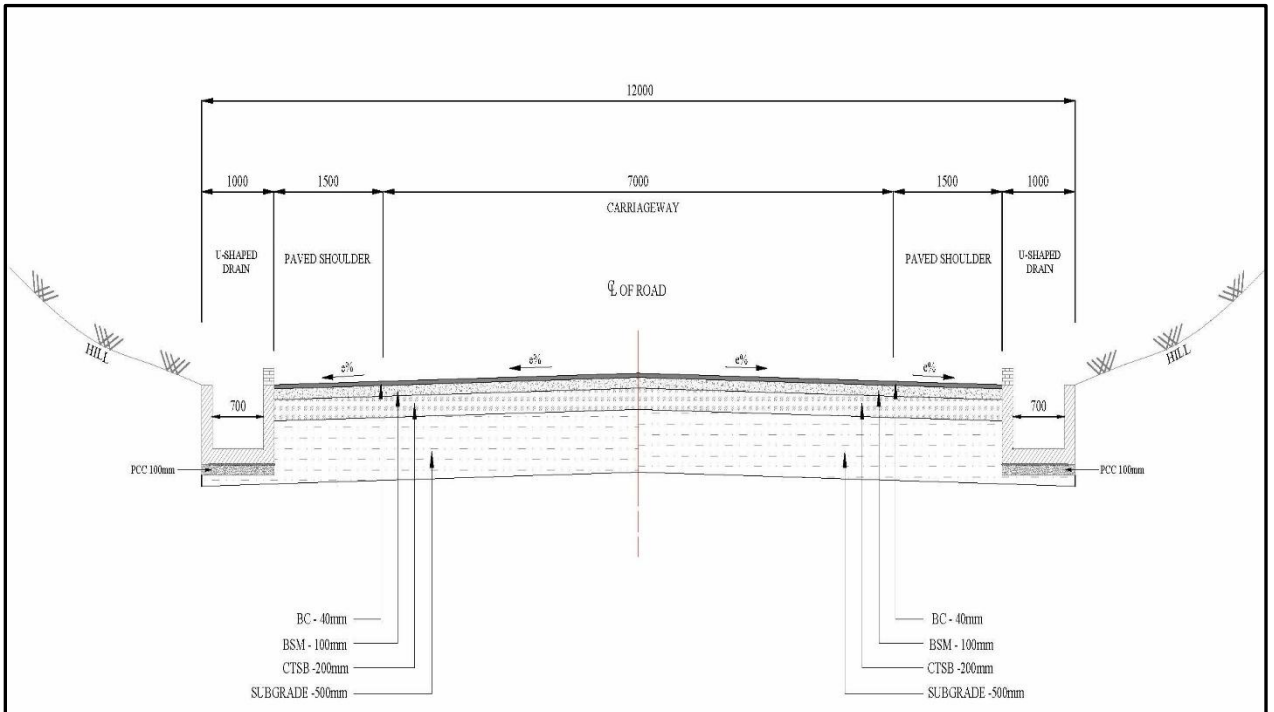
TYPE- 1B -TWO LANE WITH PAVED SHOULDER (HIGH EMBANKMENT)



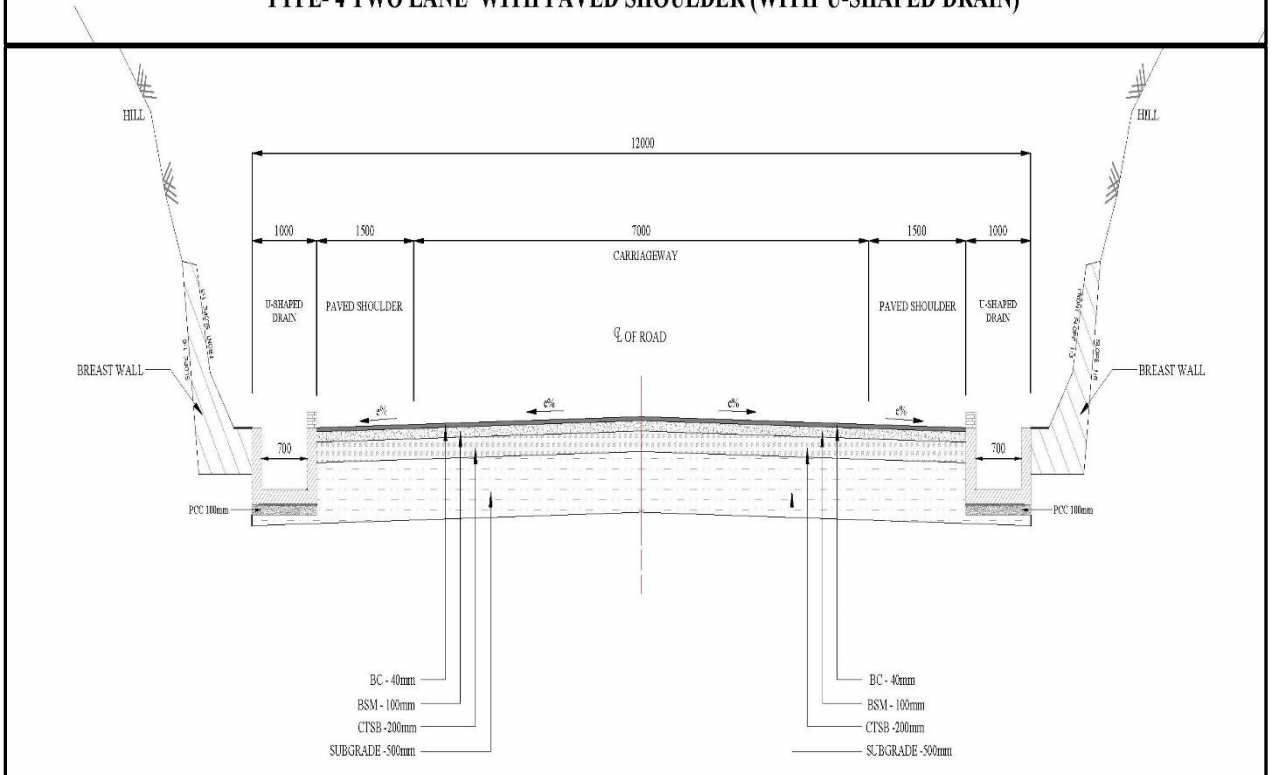
TYPE- 2 TWO LANE WITH PAVED SHOULDER (PARTIALLY EXISTING / NEW ALIGNMENT)



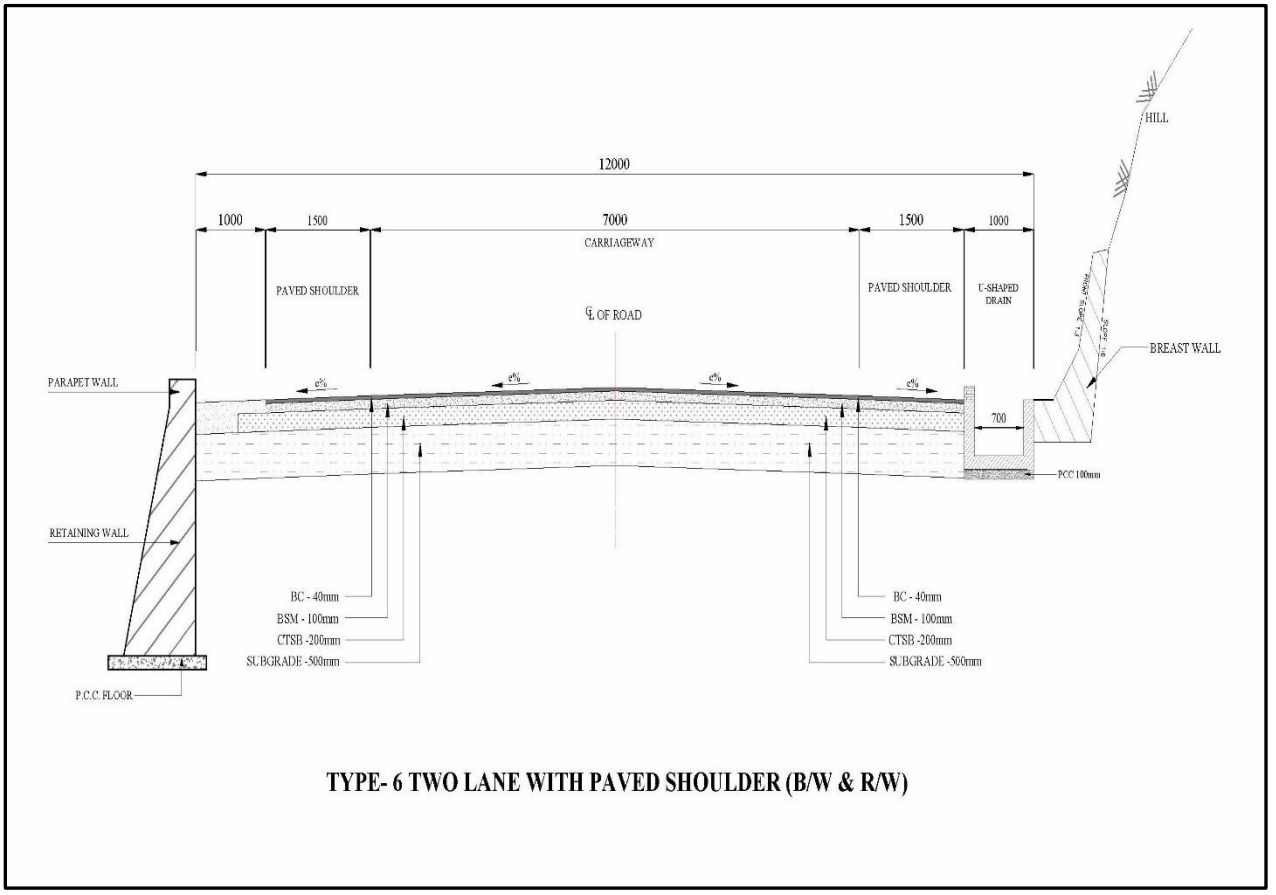
TYPE- 3 TWO LANE WITH PAVED SHOULDER (Built-up Section)



TYPE- 4 TWO LANE WITH PAVED SHOULDER (WITH U-SHAPED DRAIN)



TYPE- 5 TWO LANE WITH PAVED SHOULDER (HILL SIDE PROTECTION WORKS (ONE SIDE /EITHER SIDE)



TYPE- 6 TWO LANE WITH PAVED SHOULDER (B/W & R/W)

Widening Scheme

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description
	From	To				
1	18+000	18+160		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
2	18+160	18+300		0+140	TCS-1	Two Lane With Paved Shoulder (New Construction)
3	18+300	18+540		0+240	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
4	18+540	19+020	40	0+440	TCS-1	Two Lane With Paved Shoulder (New Construction)
5	19+020	19+500		0+480	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
6	19+500	19+600		0+100	TCS-1	Two Lane With Paved Shoulder (New Construction)

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description
	From	To				
7	19+600	19+640		0+040	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
8	19+640	19+820	16	0+164	TCS-1	Two Lane With Paved Shoulder (New Construction)
9	19+820	20+020		0+200	TCS-2	Two Lane With Paved Shoulder
10	20+020	20+440		0+420	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
11	20+440	20+700		0+260	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
12	20+700	21+080		0+380	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
13	21+080	22+400	21	1+299	TCS-1	Two Lane With Paved Shoulder (New Construction)
14	22+400	22+720		0+320	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
15	22+720	22+940		0+220	TCS-2	Two Lane With Paved Shoulder
16	22+940	23+100		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
17	23+100	23+300		0+200	TCS-3	Two lane with paved shoulder (Built-up section)
18	23+300	26+080	129	2+651	TCS-2	Two Lane With Paved Shoulder
19	26+080	26+260		0+180	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
20	26+260	26+480		0+220	TCS-1	Two Lane With Paved Shoulder (New Construction)
21	26+480	26+640		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
22	26+640	26+760		0+120	TCS-2	Two Lane With Paved Shoulder

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description
	From	To				
23	26+760	27+040		0+280	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
24	27+040	28+000		0+960	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
25	28+000	28+840		0+840	TCS-2	Two Lane With Paved Shoulder
26	28+840	29+320		0+480	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
27	29+320	29+620	20	0+280	TCS-1	Two Lane With Paved Shoulder (New Construction)
28	29+620	29+880		0+260	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
29	29+880	30+440		0+560	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
30	30+440	30+600		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
31	30+600	31+440	50	0+790	TCS-2	Two Lane With Paved Shoulder
32	31+440	31+600		0+160	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
33	31+600	32+140		0+540	TCS-2	Two Lane With Paved Shoulder
34	32+140	32+240		0+100	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
35	32+240	32+540		0+300	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)
36	32+540	32+620		0+080	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall
37	32+620	33+500	20	0+860	TCS-1	Two Lane With Paved Shoulder (New Construction)
38	33+500	34+140		0+640	TCS-2	Two Lane With Paved Shoulder
39	34+140	36+000	20	1+840	TCS-1	Two Lane With Paved Shoulder (New Construction) with high

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description
	From	To				
						embankment also
	Total Length..		**316**	**17+684**		
				5+343	**TCS-1**	Two Lane With Paved Shoulder (New Construction)
				6+001	**TCS-2**	Two Lane With Paved Shoulder
				0+200	**TCS-3**	Two lane with paved shoulder (Built-up section)
			5440	2+720	**TCS-4**	Two Lane With Paved Shoulder (b/s PCC drain)
			6840	3+420	**TCS-5**	Two Lane With Paved Shoulder in hill B/s Breast wall
			0+000	0+000	**TCS-6**	Two Lane With Paved Shoulder in hill (BW & RW)

3. Intersection 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.

[Refer to the provision of relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]

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

(i) At-Grade Intersections:

00 – Major Junctions &

39 – Minor Junctions

Sl. No.	Design Chainage (Km)	Side	Type of Junction
1	18+750	BHS	Minor Junction
2	19+430	RHS	Minor Junction
3	19+540	BHS	Minor Junction
4	19+830	RHS	Minor Junction
5	20+225	LHS	Minor Junction
6	21+700	BHS	Minor Junction
7	21+900	RHS	Minor Junction
8	23+250	RHS	Minor Junction
9	23+580	LHS	Minor Junction
10	23+810	RHS	Minor Junction
11	24+100	BHS	Minor Junction
12	24+700	BHS	Minor Junction
13	25+200	LHS	Minor Junction
14	25+460	RHS	Minor Junction
15	26+025	LHS	Minor Junction
16	27+250	RHS	Minor Junction
17	27+750	RHS	Minor Junction
18	28+320	RHS	Minor Junction
19	28+440	LHS	Minor Junction
20	28+900	BHS	Minor Junction

Sl. No.	Design Chainage (Km)	Side	Type of Junction
21	29+000	RHS	Minor Junction
22	29+240	RHS	Minor Junction
23	29+240	LHS	Minor Junction
24	29+950	RHS	Minor Junction
25	30+400	LHS	Minor Junction
26	30+760	RHS	Minor Junction
27	30+900	BHS	Minor Junction
28	31+480	LHS	Minor Junction
29	31+730	RHS	Minor Junction
30	32+850	BHS	Minor Junction
31	33+340	BHS	Minor Junction
32	33+550	RHS	Minor Junction
33	33+570	RHS	Minor Junction
34	33+800	LHS	Minor Junction
35	34+400	RHS	Minor Junction
36	34+740	BHS	Minor Junction
37	35+200	BHS	Minor Junction
38	35+800	BHS	Minor Junction
39	36+000	BHS	Minor Junction

(ii) Grade separated intersection with/without ramps

Sl. No.	Location (km)	Salient features	Minimum length of viaduct to be Provided	Road to be carried over/under the structures
Nil				

4. Road Embankment and cut section

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

(ii) Raising of the existing road [Refer to the provision of relevant Manual and specify sections to be raised]
The existing road shall be raised in the following sections:

Sl. No.	Section (from km To km)	Length	Extent of raising [Top of finished road level]
Refer design plan & profile			

5 Pavement Design

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

(ii) Type of pavement

Flexible pavement shall be adopted for Project Highway.

(iii) Design requirements

(a) Design Period and strategy

i) Flexible pavement for new alignment or for widening & strengthening of the existing pavement shall be designed for a minimum design period of 15 years, subject to the condition that design traffic shall not be less than 20msa,

ii) Stage construction shall not be permitted.

(b) Design Traffic

Pavement design shall be adopted with 8% CBR & 20msa as following –

a) Bituminous concrete (BC) - 40mm,
b) Bituminous stabilized material - 100mm,
c) Cement treated sub base - 200mm &
d) Subgrade - 500mm

(iv) Re-construction of stretches

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

Sl. No.	Stretch (km)		Remarks / Length (m)
	From	To	
1	19+820	19+920	100
2	23+200	23+300	100
3	23+600	23+800	200
4	26+700	26+850	150
5	33+700	34+120	420

6 Road Side Drainage

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

Sl. No.	Design Chainage (km)		Drain Length = (Length – Bridge length) (m)	Side	Remarks
	From	To			
A	**RCC Drain (1.75m wide)**				
1	23+100	23+300	400	BHS	TCS-3
	Total Length (m) (Both Side)		**400**		
B	**PCC Drain**				
	PCC (U-shaped) drain along hill sections (where cut height > 2.5m)		**8960**	Refer TCS 4,5 & 6	Refer fig e of IRC SP 48-1998 (Page71)
C	**Unlined Surface drain**		**22688**		

7 Design of structures

(i) General

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

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

[Refer to the provision of relevant Manual and specify the width of carriageway of new bridges and structures of more than 60 (sixty) meter length, if the carriageway width is different from 7.5 (seven point five) meters in the table below.]

Refer – Two lane manual IRC SP 73 -2018, fig. 7.6 for bridges

Sl. No.	Bridge (km)	Width of carriage way (m) and Cross – Sectional feature
1	18+800	13m c'way + 1.5m paved footpath with Crash barrier (b/s)
2	19+770	-do-
3	21+320	-do-
4	24+060	-do-
5	24+760	-do-
6	24+930	-do-
7	25+340	-do-
8	29+470	-do-
9	31+050	-do-
10	32+870	-do-
11	34+450	-do-

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

[Refer to the provision of relevant Manual and provide details of new Structures with footpath.]

Refer – Two lane manual IRC SP 73 -2018, fig. 7.6 for bridges

Sl. No.	Location (km)	Remarks
1	18+800	Minor Bridge, 1.5m paved footpath (b/s) with crash barrier
2	19+770	-do-
3	21+320	-do-
4	24+060	-do-
5	24+760	-do-
6	24+930	-do-

Sl. No.	Location (km)	Remarks
7	25+340	-do-
8	29+470	-do-
9	31+050	-do-
10	32+870	-do-
11	34+450	-do-

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

[Refer to the provision of relevant Manual and state if there is any exception]

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

Sl. No.	Location (km)	Utility services to be carried	Remarks
1	18800		Minor Bridge
2	19770		Minor Bridge
3	21320		Minor Bridge
4	24060		Minor Bridge
5	24760		Minor Bridge
6	24930		Minor Bridge
7	25340		Minor Bridge
8	29470		Minor Bridge
9	31050		Minor Bridge
10	32870		Minor Bridge
11	34450		Minor Bridge

(f) Cross–section of the new culverts and bridges at deck level for the project highway shall confirm to the typical cross- sections given in the provision of manual.

(ii) Culverts:

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

(b) **Reconstruction of Existing Culverts:**

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

Sl. No.	Design Chainage (Km)	Proposal	Type	Size(m)	Remarks
1	22+770	Reconstruction	Box Culvert	1x3x4	Without Cushion
2	33+665	Reconstruction	Box Culvert	1x3x3	Without Cushion
3	33+720	Reconstruction	Box Culvert	1x2x2	Without Cushion

(c) Widening of existing culverts

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

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

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

Sl. No.	Design Chainage (Km)	Type	Size(m)	Remarks
1	18+090	Box Culvert	1x2x2	Without Cushion
2	18+390	Box Culvert	1x2x2	Without Cushion

Sl. No.	Design Chainage (Km)	Type	Size(m)	Remarks
3	18+740	Box Culvert	1x2x2	Without Cushion
4	19+090	Box Culvert	1x2x2	Without Cushion
5	19+440	Box Culvert	1x2x2	Without Cushion
6	20+090	Box Culvert	1x2x2	Without Cushion
7	20+440	Box Culvert	1x2x2	Without Cushion
8	20+790	Box Culvert	1x2x2	Without Cushion
9	21+090	Box Culvert	1x2x2	Without Cushion
10	21+490	Box Culvert	1x4x5	Cushion
11	21+680	Box Culvert	1x2x2	Without Cushion
12	21+990	Box Culvert	1x2x2	Without Cushion
13	22+285	Box Culvert	1x4x4	Cushion
14	23+000	Box Culvert	1x2x2	Without Cushion
15	23+300	Box Culvert	1x 3x3	Cushion
16	23+690	Box Culvert	1x 3x3	Cushion
17	23+950	Box Culvert	1x3x4	Cushion
18	24+550	Box Culvert	1x2x2	Without Cushion
19	25+440	Box Culvert	1x2x2	Without Cushion
20	25+760	Box Culvert	1x2x2	Without Cushion
21	25+945	Box Culvert	1x 3x3	Cushion
22	26+410	Box Culvert	1x4x5	Cushion
23	26+760	Box Culvert	1x2x2	Without Cushion
24	27+090	Box Culvert	1x2x2	Without Cushion
25	27+400	Box Culvert	1x2x2	Without Cushion
26	27+700	Box Culvert	1x2x2	Without Cushion

Sl. No.	Design Chainage (Km)	Type	Size(m)	Remarks
27	27+960	Box Culvert	1x2x2	Without Cushion
28	28+400	Box Culvert	1x2x2	Cushion
29	28+820	Box Culvert	1x 3x3	Cushion
30	29+060	Box Culvert	1x2x2	Without Cushion
31	29+380	Box Culvert	1x 3x3	Cushion
32	29+630	Box Culvert	1x2x2	Cushion
33	29+820	Box Culvert	1x2x2	Without Cushion
34	30+840	Box Culvert	1x 3x3	Cushion
35	31+090	Box Culvert	1x 3x3	Cushion
36	31+550	Box Culvert	1x2x2	Without Cushion
37	31+950	Box Culvert	1x 3x3	Without Cushion
38	32+300	Box Culvert	1x2x2	Without Cushion
39	32+600	Box Culvert	1x2x2	Without Cushion
40	33+390	Box Culvert	1x4x4	Without Cushion
41	33+600	Box Culvert	1x2x3	Without Cushion
42	33+950	Box Culvert	1x2x3	Without Cushion
43	34+245	Box Culvert	1x3x4	Without Cushion
44	34+630	Box Culvert	1x4x5	Cushion
45	34+890	Box Culvert	1x3x4	Cushion
46	35+300	Box Culvert	1x 3x3	Without Cushion
47	35+590	Box Culvert	1x 3x3	Cushion
48	35+940	Box Culvert	1x2x2	Without Cushion

Note:

i. The location of additional culvert may change as per site with approval of Client/Authority Engineer.

(e) Repairs/ Replacement of Railing/Parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

[Refer to the provision of relevant Manual and provide details]

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

(f) Floor Protection works shall be as specified in the relevant IRC codes and specifications.

(iii) Bridges

(a) Existing Bridges to be re-constructed / Widened

(i) The existing major/minor bridges at the following locations shall be reconstructed as new structures:

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	24+060	PSC Girder			2x23.5	18m
2	25+340	RCC Girder			2x20	18m

Attach GAD*

Note: PCC work shall be done on embankment slope of each bridge approach.

(ii) The following narrow bridges shall be widened:

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

Attach GAD*

(b) Additional New Bridges

(i) Major Bridges: - New major bridge at the following locations on the project highway shall be constructed. GADs for the new bridges are attached in the drawings folder:

Sl. No.	Location (km)	Span Arrangement (m)	Total proposed length(m)	Remarks
Nil				

(ii) **Minor Bridges: -** New minor bridges at the following locations on the project highway shall be constructed. GADs for the new bridges are attached in the drawings folder:

Sl. No.	Location (km)	Span Arrangement (m)	Total Length (m)	Remarks
1	18+800	2x20	40	
2	19+770	2x8	16	
3	21+320	1x21	21	
4	24+760	1x21	21	
5	24+930	1x21	21	
6	29+470	2x10	20	
7	31+050	2x25	50	
8	32+870	1x20	20	
9	34+450	1x20	20	

Note: PCC (M-15 grade) work shall be done on embankment slope of each bridge

approach on both side.

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

[Refer to the provision of relevant Manual and provide details:]

Sl. No.	Location at km	Remarks
Nil		

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

[Refer to the provision of relevant Manual and provide details]

Sl. No.	Location (km)	Remarks
Nil		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

[Refer to the provision of relevant Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable]

(iv) Rail- Road Bridges

Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual. (Refer to the provision of relevant Manual and specify modification, if any)

(a) Road Over-Bridges

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

Sl. No.	Location of Level crossing (km)	Length of RoB (m) except approach length	Type of structure	Remarks

Nil

(b) Road under-Bridges

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

Sl. No.	Location of Level crossings (km)	Number and length of Span (m)
Nil		

(v) Grade separated structures

[Refer to the provision of relevant Manual]

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

(vi) Repairs and strengthening of bridges and structures

[Refer to the provision of relevant Manual and provide details]

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. Overpass / Underpass and Other structures

Sl. No.	Location of Structure (km)	Nature and Extent of Repairs / Strengthening to be carried out
Nil		

(vii) List of Major Bridges and Structures

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

Sl. No.	Location (Design Chainage km)
Nil	

8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

(i) Traffic control devices like **markers, signs and signal devices used to inform, guide and control traffic** and road safety works shall be provided in accordance with the provision of relevant manual adjacent to built-up areas, junctions and as per site requirements.

(ii) Specification of the reflective sheeting. [Refer to the provision of relevant manual]

9. ROADSIDE FURNITURE

(i) Roadside furniture like Sign Boards, Over Head Gantry Boards, Cantilevers, Raised Pavement Markers etc shall be provided in accordance with the provisions of Two lane manual IRC: SP: 73-2018.

(ii) Overhead traffic signs: 2 nos.

Sl. No.	Location of Overhead sign board
1	Km 30+400
2	Km 34+000

The above locations may change as per site requirement in consultation with the Authority's Engineer

10. Compulsory Afforestation

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

11. Hazardous Locations

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

Sl. No.	Location stretch from (km) to (km)	LHS/RHS
This shall be Provided at High Embankment and at sharp curve locations.		

a) Breast Walls - Breast wall shall be used with minimum length:-

Sl. No.	Description	LHS (m)	RHS (m)
1	Breast Wall 1m height	547	603
2	Breast Wall 2m height	785	865
3	Breast Wall 3m height	619	681
4	Breast Wall 4m height	428	472
	Total	**2380**	**2620**

Chainage From	Chainage To	Length (m)	Breast wall (Left) Rm		Chainage From	Chainage To	Length (m)	Breast wall (Right) Rm

Chainage From	Chainage To	Length (m)	Breast wall (Left) Rm
18000	18160	160	Breast wall 1-4 m
18300	18540	240	Breast wall 1-4 m
19040	19500	460	Breast wall 1-4 m
19600	19640	40	Breast wall 1-4 m
20060	20320	260	Breast wall 1-4 m
20720	21060	340	Breast wall 1-4 m
22400	22460	60	Breast wall 1-4 m
22560	22600	40	Breast wall 1-4 m
22980	23080	100	Breast wall 1-4 m
26200	26260	60	Breast wall 1-4 m
26500	26640	140	Breast wall 1-4 m
26760	26840	80	Breast wall 1-4 m
26900	26960	60	Breast wall 1-4 m
27020	27040	20	Breast wall 1-4 m
27200	27220	20	Breast wall 1-4 m
29640	29860	220	Breast wall 1-4

Chainage From	Chainage To	Length (m)	Breast wall (Right) Rm
18000	18160	160	Breast wall 1-4 m
18320	18540	220	Breast wall 1-4 m
19060	19500	440	Breast wall 1-4 m
19600	19620	20	Breast wall 1-4 m
20040	20420	380	Breast wall 1-4 m
20720	21080	360	Breast wall 1-4 m
22400	22440	40	Breast wall 1-4 m
22540	22620	80	Breast wall 1-4 m
22680	22720	40	Breast wall 1-4 m
22960	23080	120	Breast wall 1-4 m
26080	26260	180	Breast wall 1-4 m
26480	26640	160	Breast wall 1-4 m
27020	27040	20	Breast wall 1-4 m
27200	27220	20	Breast wall 1-4 m
29700	29880	180	Breast wall 1-4 m
30460	30480	20	Breast wall 1-4

Chainage From	Chainage To	Length (m)	Breast wall (Left) Rm	Chainage From	Chainage To	Length (m)	Breast wall (Right) Rm
			m				m
30540	30560	20	Breast wall 1-4 m	30520	30560	40	Breast wall 1-4 m
32160	32180	20	Breast wall 1-4 m	32160	32240	80	Breast wall 1-4 m
32580	32620	40	Breast wall 1-4 m	32560	32620	60	Breast wall 1-4 m

Note: **The above length & height of breast wall is minimum & any increase in the length/Qty of Breast wall as per site requirements may not be considered as positive change of scope.**

b) **Retaining wall –** Retaining wall (for embankment protection/ in pond areas / water logged areas shall be used at following locations:-

Sl. No.	Description	LHS (m)	RHS (m)
1	Retaining wall 1.5m height	3115	
2	Retaining wall 3.0m height	445	
3	Retaining wall 1.5m height in Pond areas	850	
	Total	**4410**	

Chainage From	Chainage To	Length (m)	Retaining wall (Left) Rm
19860	19960	100	RW 1.5 & 3.0 m
25200	25320	120	RW 1.5 & 3.0 m

Chainage From	Chainage To	Length (m)	Retaining wall (Right) Rm
18780	18800	20	RW 1.5 & 3.0 m
19720	19780	60	RW 1.5 & 3.0 m
19860	19960	100	RW 1.5 & 3.0 m
21380	21520	140	RW 1.5 & 3.0 m
21800	21860	60	RW 1.5 & 3.0 m
22180	22300	120	RW 1.5 & 3.0 m
22820	22840	20	RW 1.5 & 3.0 m
23320	23420	100	RW 1.5 & 3.0 m
23500	23520	20	RW 1.5 & 3.0 m
23600	24280	680	RW 1.5 & 3.0 m
24720	24940	220	RW 1.5 & 3.0 m
25000	25020	20	RW 1.5 & 3.0 m
25120	25160	40	RW 1.5 & 3.0 m
25200	25320	120	RW 1.5 & 3.0 m
25640	25660	20	RW 1.5 & 3.0 m
25980	26020	40	RW 1.5 & 3.0 m
26360	26440	80	RW 1.5 & 3.0 m
27480	27600	120	RW 1.5 & 3.0 m
29440	29580	140	RW 1.5 & 3.0 m
29960	30000	40	RW 1.5 & 3.0 m
31040	31080	40	RW 1.5 & 3.0 m
31160	31320	160	RW 1.5 & 3.0 m
31880	31940	60	RW 1.5 & 3.0 m
32760	32780	20	RW 1.5 & 3.0 m
32860	32880	20	RW 1.5 & 3.0 m

Chainage From	Chainage To	Length (m)	Retaining wall (Left) Rm	Chainage From	Chainage To	Length (m)	Retaining wall (Right) Rm
				33080	33120	40	RW 1.5 & 3.0 m
				33400	33420	20	RW 1.5 & 3.0 m
				34160	34180	20	RW 1.5 & 3.0 m
				34380	34540	160	RW 1.5 & 3.0 m
				34580	34720	140	RW 1.5 & 3.0 m
				34760	35100	340	RW 1.5 & 3.0 m
				35500	35660	160	RW 1.5 & 3.0 m

Note: The above length & height of retaining wall is minimum & any increase in the length/Qty of retaining wall as per site requirements may not be considered as positive change of scope.

2. W-Beam Crash Barrier (along High Embankment & Bridge approach)

- W Beam crash barrier shall be provided in minimum length of 14100 m,

S. No.	Chainage		Length	Side	Remarks
	From	To			
1	18600	18700	100	BHS	
2	18780	18820	40	BHS	
3	19700	19800	100	BHS	
4	19920	19980	60	BHS	
5	21140	21180	40	BHS	
6	21300	21560	260	BHS	
7	21780	21900	120	BHS	

S. No.	Chainage		Length	Side	Remarks
	From	To			
8	22080	22320	240	BHS	
9	22760	22880	120	BHS	
10	23320	24300	980	BHS	
11	24600	25160	560	BHS	
12	25240	25380	140	BHS	
13	25640	25740	100	BHS	
14	25940	26060	120	BHS	
15	26320	26460	140	BHS	
16	26680	26720	40	BHS	
17	27460	27620	160	BHS	
18	28040	28280	240	LHS	
19	28480	28640	160	BHS	
20	29360	29580	220	BHS	
21	29940	30000	60	BHS	
22	30320	30360	40	LHS	
23	30700	30780	80	RHS	
24	30800	30880	80	BHS	
25	31000	31340	340	BHS	
26	31860	31940	80	BHS	
27	32040	32100	60	BHS	
28	32340	32400	60	BHS	
29	32680	33660	980	BHS	
30	33680	33740	60	LHS	
31	34000	34060	60	LHS	

S. No.	Chainage		Length	Side	Remarks
	From	To			
32	34080	35140	1060	BHS	
33	35280	35340	60	LHS	
34	35360	35720	360	BHS	

Note: The above length of W beam crash barrier is minimum & any increase in the length of crash barrier as per site requirements may not be considered as positive change of scope.

3. **Relocation of common properties resources, boundary wall etc falling within RoW -** Contractor shall relocate all various structure along the alignment falling within RoW of the Project.

4. The traffic signs installed will be minimum but not limited to as specified in under table:-

Item	Ref. to MoRTH Spec.	Description	Unit	Quantity
8.01	803	**Road Marking: - Lane, Centre Line, Pedestrian crossing**	Sqm	**6964.00**
8.02	803	Directional Arrows, letter marking etc.	Sqm	340.00
8.03	801	Advance Direction signs size 1800X1200 mm	Sqm	28.08
8.04	801	Village name boards size 600X900 mm	Sqm	19.44
8.05	801	Place Identification signs size 600X800 mm	Sqm	5.28
8.06	801	90 cm Triangle	Nos.	55.00
8.07	801	90 cm Octagon	Nos.	35.00
8.08	801	Hazard plate 300X900 mm	Sqm	6.75
8.09	801	60 Cm circular	Nos.	20.00

Item	Ref. to MoRTH Spec.	Description	Unit	Quantity
8.10	802	Providing and erecting overhead signs with a corrosion resistance 2mm thick aluminium alloy sheet reflectorized with high intensity rectroreflective sheeting of encapsulated lense type with vertical and lateral clearnace given in clause 802.2 an 802.3 and installed as per clause 802.7 over a designed support system of alumunium alloy or galvinised steel trestless and trusses of section and type as per structural design requirements and approve plans and MorT&H technical specification clause 802		
a		Truss and Vertical support	MT	3.00
b		Allumunium alloy plate for over head sign	Sqm	23.54
8.11	806	Boundary Stone	Nos.	182.00
8.12	804	Reinforced Cement concrete M15 grade kilometre stone of standard design as per IRC 8, fixing in position including printing and painting, etc. as per drawing and MoRTH&H Technical specification clause 804.		
a		5th Km Stone (Precast)	Nos.	4.00
b		Ordinary Km Stone (Precast)	Nos.	14.00
c		Hectometer Stone (Precast)	Nos.	72.00
8.13	805	**Road Delineators -** Supplying and installation of delineators (road way indicators, hazard markers, object marker), 80-100cm high above ground level, painted black and white in 15cm white strips, fitted with 80x100mm rectangular or 75mm dia circular reflectorised panel at the top, buried or pressed into the ground and confirming to IRC 79 and the drawings and MoRTH&H Technical specification clause 805.	Nos.	100.00
8.14		Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces as per MoRT&H technical specification clause 803.	Sqm	21.96

12. Special Requirement for Hill Roads:

[Refer to the provision of relevant Manual and provide details where relevant and required.]

13. Change of Scope

The length of Structures and bridges specified here in above 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 Article13.

14. UTILITY SHIFTING

Shifting of obstructing utilities to an appropriate location in accordance with the standards and specifications of concern utility owning departments is a part of scope of work for the contractor. The bidder may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. Copy of Utility relocation plan is enclosed. The specifications are to be as per the specification of concerned utility owning department.

Brief details of shifting of utilities are as below:

(i) Electrical utilities:

(a) Extra High Tension Lines (EHT lines)

Sr.No	Chainage(km)		Circuit (TC/DC/SC)	Crossings (Nos)		Poles		Conductor		Size of cable
	From	To		Over Head	Under Ground	Tower truss/ Unipole	No.	No.	Size	
1.										

(b) High Tension lines (HT Lines)

Sr. No.	Chainage (km)	Type of	Poles	Conductor	Cable	Crossing	Transformer

	From	To	Circuit (TC/DC/SC)	Type	No.	No/length	Size	No/length	Size	U/G	Overhead	Capacity	No
1.	18.00	36.00		11m Long Steel Pole	12	58.71 KM	ACSR(Weasel)(6/1/2.59mm)	0.25KM	PVC Cable 70sqmm			63KVA	3
2.				9m Long Steel Pole	54			2.0KM	PVC 2.5mm Sq			25KVA	2
3.								0.20KM	PVC 35mm Sq				

© Low Tension lines (LT Lines)

Sr. No.	Chainage(km)		Type of Circuit (TC/DC/SC)	Poles		Conductor		Cable		Crossing		Transformer	
				Type	No.	No/length	Size	No/length	Size	U/G	OH	Capacity	
1.	18.0	36.00		8m Long Steel Pole	20								
2.				9m Long PCC Pole	212								
				8m Long PCC Pole	22								

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

The Site included the following public Health utilities:

Sr. No.	Chainage(km)		Type of Lines (Pressure/Under Gravity)	Pipe			Sluice Valve	Crossings	
	From	**To**		Type	Nos.	Size	Nos.	Nos	length

Sr. No.	Chainage(km)		Type of Lines (Pressure/Under Gravity)	Pipe			Sluice Valve	Crossings	
	From	**To**		Type	Nos.	Size	Nos.	Nos	length
	18.00	36.00		Rigid UPVC Pipe	1	Class 3 40mm OD Lngth (100+100+100+50) M	12	1	100M
	18.00	36.00		Rigid UPVC Pipe	1	Class 3 90mm OD Length (300+1250+300+200)M			
	18.00	36.00		Rigid UPVC Pipe	1	Class 3 110mm OD Length (300+100150+150) M			
	18.00	36.00		Rigid UPVC Pipe	1	Class 3 140mm OD Length (300+150+150)M			
	18.00	36.00		Flexible PVC Pipe	1	Dia 15mm Length (850+150+100+100) and Dia 25mm Length (250+100+50)M			
	18.00	36.00		DI Class 7 Pipe	1	Dia 150mm Length (225+50)M			
	18.00	36.00		DI Class 7 Pipe	1	Dia 125mm Length 225M			
	18.00	36.00		DI Class 7 Pipe	1	Dia 100 Length 125M			
	18.00	36.00		GI Pipe	1	Dia 15mm Length 50M			

Note:-

a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work are as per the guidelines of utility owning department and it is solely

between the Contractor and the utility owning department. No change of scope shall be eligible or no cost shall be eligible or no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing or for making any overhead crossings to underground as per requirement of utility owning department/construction of project highway. The Contractor shall carry out joint inspection with utility owning department and get the estimates sanctioned from utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of contractor to utility owning department whenever asked by the Contractor. The decision/approval of utility owning department shall be binding on the Contractor. No CoS or no cost shall be eligible on any account.

b) The supervision charges at the rates/charges applicable between implementing agencies of MoRT&H and utility owning department shall be paid directly by the Authority to the Utility Owning Entity as and when Contractor furnishing a demand of Utility Owning Department along with a copy of sanctioned estimate.

c) The credit of dismantled materials has been accounted for in the estimated cost. 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. If the Contractor is forced to deposit the dismantled material to utility owning department then the amount of credit for dismantled material indicated in the sanctioned estimates of utility owning department will be reimbursed to the Contractor after submitting the duly authenticated receipt of the dismantled material from utility owning department to the Authority.

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

** The trees felling within proposed RoW have to be shifted by the contractor.

(Schedule B-1)

Teliamura to Sabroom Road from km 18+000 to km 36+000 (Section II)

Sr. No	Type of Utility	Unit	Quantity	Location/Stretch LHS/RHS
A	Electrical Utilities			
A1	**Electrical Poles**	Nos.		Details of location/chainages/sides (RHS/LHS) enclosed as Appendix- A The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/CoS
(i)	Gl S.T pole 11 m H/D (Galvanised)	Nos.	12	
(ii)	Gl S.T pole 9 m H/D (Galvanised)	Nos.	54	
(iii)	Gl S.T pole 8 m H/D (Galvanised)	Nos.	20	
(iv)	9 mt long PCC pole	Nos.	212	
(v)	8 mt long PCC pole	Nos.	22	
A2	**Electrical cables**			
i	ACSR DOG Conductor	kms	72.1	
ii	8 SWG Gl Wire	kgs	3473	
iii	ACSR Weasel Conductor	kms	58.71	
iv	70 sqm. PVC Cable	meters	250	
v	35 sqm PVC Cable	meters	200	
vi	2.5sq mm PVC Cabte	meters	2000	
II	GI Stay wire	Kgs	1064	
A3	**Re-construction/shifting of 11/0.44 KV, 63KVA Sub-station**	**Nos.**	**3**	
A4	**Re-construction/shifting of 11/0.44 KV, 25KVA Sub-station**	**Nos.**	**2**	
B	**Water/Sewage pipeline**			
B1	**Water supply pipeline (Public Health Engineering Dept., PHED)**			
	150 mm GI Pipe dia nominal bore	meters	375	
a	**Supplyng fitting fixing and Laying of G.I. pipes ln trenches including carriage of pipes from stock yard to the site within a distance of 8 km. Except socket joints, all fittings required for the work will be paid extra as per current schedule of rates. Trenching and earth filling is also**			

(i)	10 mm dia nominal bore	meters	500	
(ii)	15mm dia nominal bore	meters	1100	
(iii)	25mm dia nominal bore	meters	1300	
(iv)	40mm dia nominal bore	meters	300	
(v)	80mm dia nominal bore	meters	100	
(vi)	90 mm dia nominal bore	meters	6400	
(vii)	100 mm dia nominal bore	meters	300	
(II)	110 mm dia nominal bore	meters	500	Details of location/chainages/sides (RHS/LHS) enclosed as Appendix- A The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/CoS
(ix)	125 mm dia nominal bore	meters	250	
(x)	140 mm dia nominal bore	meters	350	
(xi)	150 mm dia nominal bore	meters	375	
b	**Labour charge for laying, fitting and fixing of GI Pipe in trenches in line and level with special fitting, fixing & clearing the inside of pipe all complete as directed (old pipes)**			
(i)	10 mm dia nominal bore	meters	500	
(ii)	15mm dia nominal bore	meters	1100	
(iii)	25mm dia nominal bore	meters	1300	
(iv)	40mm dia nominal bore	meters	300	
(v)	80mm dia nominal bore	meters	100	
(vi)	90 mm dia nominal bore	meters	6400	
(vii)	100 mm dia nominal bore	meters	300	
(II)	110 mm dia nominal bore	meters	500	
(ix)	125 mm dia nominal bore	meters	250	
(x)	140 mm dia nominal bore	meters	350	
(xi)	150 mm dia nominal bore	meters	375	
C	**Water/Sewage pipeline**			
C1	**Water supply pipeline** **(Minor Irrigation Scheme., MIS)**			
a	**Supplyng fitting fixing and Laying of G.I. pipes ln trenches including carriage of pipes from stock yard to the site within a distance of 8 km. Except**			

	socket joints, all fittings required for the work will be paid extra as per current schedule of rates. Trenching and earth filling is also			
(i)	75mm dia nominal bore	meters	800	
(ii)	90mm dia nominal bore	meters	100	
(iii)	110mm dia nominal bore	meters	2350	
(iv)	140 mm dia nominal bore	meters	250	
(v)	160 mm dia nominal bore	meters	250	
(vi)	200 mm dia nominal bore	meters	600	
(vii)	250 mm dia nominal bore	meters	530	
(II)	315 mm dia nominal bore	meters	100	
b	**Labour charge for laying, fitting and fixing of GI Pipe in trenches in line and level with special fitting, fixing & clearing the inside of pipe all complete as directed (old pipes)**			Details of location/chainages/sides (RHS/LHS) enclosed as Appendix- A The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/CoS

SCHEDULE- C
(SeeClause2.1)

PROJECT FACILITIES

1 *ProjectFacilities*

TheContractorshallconstructtheProjectFacilitiesinaccordancewiththe provisions of this Agreement. Such Project Facilities shall include:

(a) Toll plaza;

(b) Roadsidefurniture;

(c) Pedestrian facilities;

(d) Treeplantation;

(e) Truck lay-byes;

(f) Bus stop and bus shelters;

(h) Rest areas; and

(i) Others to bespecified

2 *DescriptionofProjectFacilities*

Each of the Project Facilities is described below showing:

(a) Toll Plaza

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

S. No.	Toll Plaza Location (Design Chainage in Km)
Nil	

(b) Road side Furniture

i) Traffic Signs and Pavement Markings:

Traffic signs and pavement markings includes roadside signs, overhead signs, and road marking along the Project Road.

Cautionary, mandatory and informatory signs are provided depending on the situation and function they perform in accordance with the IRC: 67-1997 guidelines for Road Signs. The different types of road signs are proposed to be provided are:

i. Mandatory /Regulatory
ii. Cautionary /Warning
iii. Directional
iv. Hazard Markers
v. Informa Tory

Overhead signboard will be installed as per locations mentioned in schedule 'B". provision has been made in the estimate for installation of road signs of various types.

Markings:

Longitudinal markings

: centre lines

: edge lines

: Width transition

: obstructions ahead

Intersections.

: Stop lines

: Word "Stop"

: Pedestrian crossings.

: Approach to intersection.

: Direction arrows.

: Continuity lines

: Traffic island.

Parking:

: Bus stop

ii) Traffic signs and pavement markings shall include road side signs, overhead signs, curve mounted signs and road marking along the project highway. The location for these provisions shall be finalized as per manual.

iii) Boundary stones -
Boundary stone shall be fixed on either side of the road land opposite every 200m stone and kilometre stone (as per IRC-25).

iv) 5th Km stone/ Hectometre / Kilometre stones – Refer Schedule 'B'

v) Delineators and studs: Studs (100mm*100mm) with reflective panels of duel prismatic cube capable of providing total reflection of light entering the lens face for lane marking and delineators or night time visibility shall be provided for the locations where extra width is proposed.

(c) Pedestrian Facilities

The additional pedestrian facilities in the form of guard rails, footpath, lighting etc shall be provided wherever required as per the provisions of IRC: 103-2012.

(d) Landscaping and Tree Plantation

The landscaping and tree plantation shall be provided. The locations for these provisions shall be finalized in consultation with Authority Engineer.

(e) Truck Lay-byes

Truck lay byes shall be provided at the following locations.

Sl. No.	Proposed Chainage (Km)
1	28.600 (LHS)

(f) Bus Bays

Bus lay byes shall be provided at the following locations.

Sl. No.	Design Chainage (Km)		Remarks
	LHS	RHS	
1	33.140	33.010	

(g) Rest Areas,

Nil.

(h) Others

1. Highway Lighting

Shall be provided as per manual at below locations –

Sl. No	Design Chainage (Km)		Length (m)
	From	To	
1	23+120	23+400	280
2	33+300	34+200	900
		Total Length =	**1+180**

Note: The above length is minimum & any increase in the length/Qty as per site requirements may not be considered as positive change of scope.

2. Highway Patrol

As per manual

3. Ambulances

As per manual

4. Cranes

As per manual

5. Traffic Aid Post

Traffic aid post shall be provided in consultation with Authority Engineer, the tentative locations for Traffic Aid post is as under –

Sl. No.	Location for Traffic Aid Post
1	Near km 35+400

6. Rainwater Harvesting

As per Ministry of Environment and Forests Notification, New Delhi dated 14/01/1997 (as amended on 13/01/1998, 05/01/1999 & 6/11/2000), the construction of Rain water, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board.
In this section the contractor shall provide minimum 43 nos. of rain water harvesting system.

Sl. No.	Location for Rain water harvesting
1	Near km 20+400
2	Near km 23+000
3	Near km 25+400
4	Near km 28+000
5	Near km 30+700
6	Near km 33+300
7	Near km 35+900

The above locations of Rain water Harvesting is tentative and may change as per site requirement on approval of Client/ Authority Engineer.

SCHEDULE- D
(SeeClause2.1)

SPECIFICATIONSAND STANDARDS

1 Construction

TheContractor shall comply with the Specifications and Standards setforth 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 Lanning of Highways(IRC: SP: 73-2018), referred to herein as the Manual.]

[Note: Specify the relevant manual, specification and standards]

3 Design Standards for Utility Shifting

As regards, the work of utility shifting, the relevant specification, relevant rules, regulations and acts of Utility owning Departments/Agencies shall be applicable.

Annex-I
(Schedule-D)

Specificationsand Standardsfor Construction

1 Specifications and Standards

All Materials,works and construction operations shall conform to the ManualofSpecificationsandStandardsforTwo-Lanning ofHighways (IRC:SP:73-2018),referredtoastheManual,andMORTHSpecifications for RoadandBridgeWorks.Wherethespecificationforaworkisnot given, GoodIndustryPracticeshallbeadopted tothe satisfactionoftheAuthority's Engineer.

2 Deviations fromtheSpecifications and Standards

(i) Theterms"**Concessionaire", "IndependentEngineer**"and"**Concession Agreement**" usedintheManualshallbedeemedtobesubstitutedbythe terms"**Contractor","Authority'sEngineer**"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 as set forth below:-

(iii) [Note 1: Deviations from the aforesaid specification and standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project – specify requirements.]

Clause Referred in Manual	Item	Provision as per Manual	Modified Provision	Remarks
2.2.1	Minimum design speed in Plain & Rolling Terrain	100kmph/80kmph	At 1 location listed below, where the horizontal curve radius is not meeting the criteria as per clause 2.9.4 and table 2.5 of IRC:SP:73-2018.	Speed is restricted for Curve having radius listed below -

Clause Referred in Manual	Item	Provision as per Manual	Modified Provision	Remarks
2.2.1	Minimum design speed in Mountainous &Steep Terrain	60kmph/40kmph	No deviation	

3. Deficient curve details:

Horizontal curve which comes under deviation are listed below:

Sl. No.	HORIZONTAL CURVE				Transition length	Speed (Kmph)	Reason for Deviation
	Start Chainage	End Chainage	Radius	Direction			
Nil							

4 Deviations in Vertical improvement of Project Road are –

There is no any vertical curves comes under deviation.

Schedule - E

(See Clauses 2.1 and 14.2)

Maintenance Requirements

1. Maintenance Requirements

(i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

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

(iii) All Materials, works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex – I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit 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, approache	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equip ment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
s of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement t Unit like		2-7 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Bleeding	Nil	< 1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Ravelling / Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricte	Daily			7- 15 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to 30 cm from the edge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other Pavement Distresses			Bi-Annually			2-7 days	IRC:82-2015
	Deflection/ Remaining Life			Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83 - 2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180 days	IRC:SP:83 - 2008

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
approaches of connecting roads, slip roads, lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed (Km/h)**		Coefficient Routine Investigation Machine or equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<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

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

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

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

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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m. Within 7 days	Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			5	w > 3 mm.		
2	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	

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

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

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
				into more than 4 pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			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

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/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
			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		Full depth repair - Cut out and replace

			5	w > 3 mm, L > 3 m/m^2 and deformation		damaged area taking care not to damage reinforcement. Within 30days

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term** No action.	**Long Term** Not Applicable
			1	r < 2 %	Local repair of 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 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	**For the case d > D/2**
					Within 30 days	
			5	r > 50% and h > 25 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 %		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 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		

S. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m²	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m²	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m²		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair. Within 30 days	

Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term** No action.	**Long Term** Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	

			5	Severe; w > 3 mm negligible protection against ingress of water	Clean, widen and reseal the joint. Within 7 days	

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

	in Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
			1	h < 6 mm	No Action	
			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, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade. Reinstate pavement at normal level	

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

		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 to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term** No action.	**Long Term**
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

			4	f = 50 - 75 mm	within 7 dayss	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm		
Drainage						
19	**Pumping**	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	

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

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">As per IRC SP :73-2018, a minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/ image backup</td><td colspan="2" rowspan="5">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.

In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="5">IRC SP :73-2018</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>240</td><td>120</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="3"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="3">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="11"></td><td>Day time Visibility</td><td colspan="3">During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td rowspan="10">Night Time Visibility</td><td colspan="3"><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="10">Bi-Annually</td><td rowspan="10">As per Annexure-E of IRC:35-2015</td><td rowspan="10">Re - painting</td><td rowspan="10">Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td rowspan="10">IRC:35-2015</td></tr>
<tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr>
<tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td colspan="3"><u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u></td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity: 100 mcd/m²/lux Minimum Threshold Level: 50 mcd/m²/lux					
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc	Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	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	hange of ignboard	48 hours in case of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.		Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	RC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	RC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:73-2018 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	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC SP :73-2018
	Traffic Safety Barriers	Functionality: 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	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image	Rectification	Within 7 days	IRC SP :73-2018,

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP-73: 2018, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC: 79 - 1981
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC SP :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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC SP :73-2018
	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 73-2018
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 73-2018

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Cracks wider than 0.3 mm not more than 1m aggregate length		defects			2800

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35- 1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 73-2018 and IRC SP: 40-1993.

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

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

	Debris and dust in strip seal	No dust or debris in expansion joint	Monthly	Detailed condition survey as per IRC SP:35-1990 using	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification s 2600 and

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

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

	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or2	IRC: SP 40-1993 and IRC:SP:13-2004.

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

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

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

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

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

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

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule – G

(See Clauses 7.1 and 19.2)

Annex-I

(See Clause 7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

The Managing Director,
National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the "**Improvement and Widening to 2Lane with Paved Shoulder of Teliamura-Amarpur-Harina Stretch of NH-208 (from km 145.319 to km 163.319) (Package Design Ch. 18.00 to Ch. 36.000) on EPC basis under BHARATMALA in the State of Tripura)-Package-II with Japan International Cooperation Agency (JICA) loan assistance**, 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 ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

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

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

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

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

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

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

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

[$] Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – II

(Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
National Highways & Infrastructural Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street
New Delhi - 110001

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the "**Improvement and Widening to 2Lane with Paved Shoulder of Teliamura-Amarpur-Harina Stretch of NH-208 (from km 145.319 to km 163.319) (Package Design Ch. 18.00 to Ch. 36.000) on EPC basis under BHARATMALA in the State of Tripura)-Package-II with Japan International Cooperation Agency (JICA) loan assistance**, subject to and in accordance with the provisions of the Agreement

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

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

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

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

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

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

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

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

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

S.No.	**Particulars**	**Details**
1	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC CNRB0019062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi

5	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, NewDelhi110001

Signed and sealed this ……. day of ……., 20…… at ……..
SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

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

Schedule-H

(SeeClauses10.1(iv)and19.3)

Contract PriceWeightages

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

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

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
Road works including culverts, widening and repair of culverts.	**40.01%**	**A-Widening and Strengthening of existing road**		
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	1.14%	0.45%
		(2) Sub Base courses	1.19%	0.48%
		(3) Non Bituminous Base Course	0.00%	0.00%
		(4) Bituminous Base Course	1.27%	0.51%
		(5) Wearing coat	0.79%	0.32%
		(6) Widening and repair of culverts	0.00%	0.00%
		B 1- Reconstruction / New two lane alignment / bypass (Flexible pavement)		
		(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	19.94%	7.98%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		(2) Sub Base Course	20.85%	8.34%
		(3) Non Bituminous Base Course	0.00%	0.00%
		(4) Bituminous Base Course	22.31%	8.93%
		(5) Wearing coat	13.93%	5.58%
		B 2- Reconstruction / New two lane alignment / bypass (Rigid pavement)		
		(1) Earthwork up to top of the sub-grade	0.00%	0.00%
		(2) Sub Base Course	0.00%	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%	0.00%
		(4) Pavement Quality Control (PQC) course	0.00%	0.00%
		C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)		
		(1) Earthwork up to top of the sub-grade	0.00%	0.00%
		(2) Sub Base Course	0.00%	0.00%
		(3) Non Bituminous Base Course	0.00%	0.00%
		(4) Bituminous Base Course	0.00%	0.00%
		(5) Wearing coat	0.00%	0.00%
		C 2- Reconstruction / New Service road (Rigid pavement)		
		(1) Earthwork up to top of the sub-grade	0.00%	0.00%
		(2) Sub Base Course	0.00%	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		(4) Pavement Quality Control (PQC) course	0.00%	0.00%
		D - Reconstruction and New culverts on existing road, Realignments, bypasses:		
		Culverts (Length <6m)		
		a - Pipe Culverts	0.00%	0.00%
		b - Box Culverts	18.58%	7.43%
Minor Bridges / underpasses / over passes	**30.76%**	**A 1- Widening and repairs of Minor Bridges (length >6m and<60m)**		
		Minor Bridges	0.00%	0.00%
		A 2- New Minor Bridges (length >6m and<60m)		
		(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	30.00%	9.23%
		(2) Superstructure : on completion of 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.	30.00%	9.23%
		(3) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, test on completion in all respects and fit for use.	30.00%	9.23%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		(4) Guide bunds and river training works: on completion of guide bunds and repair training works complete in all respects.	10.00%	3.08%
		B 1 - Widening and repair of underpasses / overpasses		
		Underpasses / Overpasses	0.00%	0.00%
		B 2 - New Underpasses / Overpasses		
		(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	0.00%	0.00%
		(2) Superstructure : on completion of 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.	0.00%	0.00%
		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.	0.00%	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.	0.00%	0.00%
Major bridge (length >	**0.00%**	**A 1 - Widenng and repair of major**		

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
60m) works and RoB / RUB / Elevated sections / Flyovers including viaducts, if any		**bridges**		
		(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3) Super-structure (including bearings)	0.00%	0.00%
		(4) Wearing Coat including expansion joints	0.00%	0.00%
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	0.00%
		(6) Wing walls/return walls	0.00%	0.00%
		(7) Guide bunds, River Training works etc.	0.00%	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	0.00%
		A 2 - New Major bridges		
		(1) Foundation	0.00%	0.00%
		(2) Sub-structure	0.00%	0.00%
		(3) Super-structure (including bearings)	0.00%	0.00%
		(4) Wearing Coat including expansion joints	0.00%	0.00%
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	0.00%
		(6) Wing walls/return walls upto top	0.00%	0.00%
		(7) Guide bunds, River Training works etc.	0.00%	0.00%
		(8) Approaches (including Retaining walls, stone pitching and protection	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		works)		
		B 1 - Widening and repair of		
		a) RoB		
		b) RuB		
		1) Foundation	0.00%	0.00%
		2) Sub Structure	0.00%	0.00%
		3) Super Structure (Including bearings)	0.00%	0.00%
		4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect as specified	0.00%	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	0.00%
		6) wing walls / return walls	0.00%	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	0.00%
		B 2 - New RoB / RuB		
		a) RoB		
		b) RuB		
		1) Foundation	0.00%	0.00%
		2) Sub Structure	0.00%	0.00%
		3) Super Structure (Including bearings)	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect as specified	0.00%	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	0.00%
		6) wing walls / return walls	0.00%	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	
		C 1 - Widening and repair of Elevated sections / Fly overs / Grade Separators		
		1) Foundation	0.00%	0.00%
		2) Sub Structure	0.00%	0.00%
		3) Super Structure (Including bearings)	0.00%	0.00%
		4) Wearing coat including expansion joints	0.00%	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	0.00%
		6) wing walls / return walls	0.00%	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	
		C 2 - New Elevated sections / Fly overs / Grade Separators		
		1) Foundation	0.00%	0.00%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		2) Sub Structure	0.00%	0.00%
		3) Super Structure (Including bearings)	0.00%	0.00%
		4) Wearing coat including expansion joints	0.00%	0.00%
		5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	0.00%
		6) wing walls / return walls	0.00%	0.00%
		7) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	
Other Works	**28.53%**	**(i) Toll Plaza**	0.00%	0.00%
		(ii) Road side drains		
		Lined Drain (RCC)	0.94%	0.27%
		Lined Drain (PCC)	7.96%	2.27%
		Unlined Drain	0.23%	0.07%
		(iii) Road Signs, markings, km stones, safety devices,Roadfurnitures etc	1.06%	0.30%
		(iv) Project facilities		
		(a) Bus Bays	0.52%	0.15%
		(b) Truck lay byes	0.47%	0.13%
		© Rain water harvesting	0.23%	0.06%
		(d) Others		
		a) Clearing n Grubbing & Dismantling works	0.32%	0.09%
		b) improvement of Junctions	4.05%	1.16%

ITEM	WEIGHTAGE IN PERCENTAGE TO THE CONTRACT PRICE	STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PERCENTAGE WEIGHTAGE vis a vis overall Project
1	2	3	4	5
		c) Turfing and hydroseeding	4.90%	1.40%
		d) Traffic Aid Post	0.10%	0.03%
		e) Lighting works	0.29%	0.08%
		(v) Road side Plantation	0.00%	0.00%
		(vi) Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/RuBs		
		(a) Crash Barrier	8.20%	2.34%
		(b) Retaining wall	21.17%	6.04%
		('c) Breast Wall	49.55%	14.14%
		(d) Pitching work for diversion of nala	0.00%	0.00%
		(vii) Safety and traffic management during construction		
Electrical utilites and public Health Utilities (water pipe lines and sewage lines)	**0.69%**	**(i) EHT Lines**	0.00%	0.00%
		(ii) EHT Crossings	0.00%	0.00%
		(iii) HT/LT line	27.08%	0.19%
		(iv) HT/LT crossings	21.87%	0.15%
		(v) Transformer	3.12%	0.02%
		(vi) Water pipeline	40.66%	0.28%
		(vii) Water pipeline crossings	0.83%	0.01%
		(viii) Water Pipe line (WRD)	6.44%	0.04%

1.3 Procedure of estimating the value of work done

1.3.1 Roadworks

Procedure for estimatingthe value ofroad work done shall be as follows:

Table1.3.1

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
A-Widening and Strengthening of existing road		
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	1.14%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length.
(2) Sub Base courses	1.19%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	1.27%	
(5) Wearing coat	0.79%	
(6) Widening and repair of culverts	0.00%	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of atleast five culverts.
B 1- Reconstruction / New two lane alignment / bypass (Flexible pavement)		
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc	19.94%	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.
(2) Sub Base Course	20.85%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	22.31%	
(5) Wearing coat	13.93%	
B 2- Reconstruction / New two lane alignment / bypass (Rigid pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	Unit of measurement is linear length.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(2) Earthwork in shoulders	0.00%	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.
(3) Sub Base Course	0.00%	
(4) Dry Lean Concrete (DLC) Course	0.00%	
(5) Pavement Quality Control (PQC) course	0.00%	
C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)		
(1) Earthwork up to top of the sub-grade including shoulder	0.00%	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.
(2) Sub Base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing coat	0.00%	
C 2- Reconstruction / New Service road (Rigid pavement)		
(1) Earthwork up to top of the sub-grade	0.00%	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.
(2) Sub Base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) course	0.00%	
D - Reconstruction and New culverts on existing road, Realignments, bypasses:		
Culverts (Length <6m)		Cost of each culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of atleast five culverts.
a - Pipe Culverts	0.00%	
b - Box Culverts	18.58%	

@ 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 xweightage for road work xweightage for bituminous workx (1/L)

Where,

P = Contract Price&L = Total length in km

Similarly, the rates perkm for otherstages shallbe workedout accordingly.

Note: The length affected due to law and orderproblems or litigation during execution due to which the Contractor is unable to execute the work, maybedeductedfromthetotalproject lengthforpaymentpurposes. Thetotallengthcalculatedhereisonlyforpaymentpurposesandwillnotaffect andreferredinotherclauses oftheContractAgreement.

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table 1.3.2

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
A 1- Widening and repairs of Minor Bridges (length >6m and<60m)		
Minor Bridges	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 and repair works of a minor bridge.
A 2- New Minor Bridges (length >6m and<60m)		
(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	30.00%	**(1) Foundation + Sub Structure:** Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment against Foundation + Sub Structure shall be made on pro rata basis on completion of a stage ie. not less than 25% of the scope of Foundation + Sub Structure of each bridge subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
(2) Superstructure :on completion of 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.	30.00%	**(2) Super structure:** Payment shall be made on pro rata basis on completion of a stage ie. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(3) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	30.00%	**(3) Approaches:** Payment shall be made on pro rata basis on completion of a stage ie. completion of approaches in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(4) Guide bunds and river training works: on completion of guide bunds and repair training works complete in all respects.	10.00%	**(4) Guide bunds and river training works:** Payment shall be made on pro rata basis on completion of a stage ie. completion of guide bunds and river training works in all respect as specified.
B 1 - Widening and repair of underpasses / overpasses		
Underpasses / Overpasses	0.00%	Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass. Payment shall be made on completion of widening and repair works of a underpass / overpass.
B 2 - New Underpasses / Overpasses		

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
(1) Foundation + Sub-structure: on completion of foundation work including foundation for wing and return wall, abutments, piers upto the abutment/pier cap.	0.00%	**(1) Foundation + Sub Structure:** Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass. Payment against Foundation + Sub Structure shall be made on pro rata basis on completion of a stage ie. not less than 25% of the scope of Foundation + Sub Structure of each underpass / overpass subject to completion of atleast two foundations along with sub structure upto abutment/pier cap level of each underpass / overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Superstructure :on completion of 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.	0.00%	**(2) Super structure:** Payment shall be made on pro rata basis on completion of a stage ie. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(3) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00%	**(3) Approaches:** Payment shall be made on pro rata basis on completion of a stage ie. completion of approaches in all respect as specified in the column of " Stage of Payment" in this Sub-clause.

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:

Table 1.3.3

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
A 1 - Widening and repair of major bridges		
(1) Foundation	0.00%	**(i)Foundation:** Cost of each Major Bridge shall be determined on prorata 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 atleast 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 were specified.
(2) 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 atleast two sub structures of abutment / pier cap level of the major bridge..
(3) 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 structure including bearings of atleast one span in all respects as specified.
(4) 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.

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls upto top	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/returnwallscompletein all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	**(vii) Guide Bonds, River Training works:** Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(viii) **Approaches**: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A 2 - New Major bridges		
(1) Foundation	0.00%	**(i)Foundation:** Cost of each Major Bridge shall be determined on prorata 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 atleast 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 were specified.
(2) 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 atleast two sub structures of abutment / pier cap level of the major bridge..
(3) 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 structure including bearings of atleast one span in all respects as specified.

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
(4) 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.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	0.00%	**(v) Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls upto top	0.00%	**(vi) Wing walls/return walls:** Payments shall be made on completion of all wing walls/returnwallscompletein all respects as specified.
(7) Guide bunds, River Training works etc.	0.00%	**(vii) Guide Bonds, River Training works:** Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	0.00%	(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 repair of		
a) RoB		
b) RuB		
1) 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 / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the RoB / RuB subject to completion of atleast two foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	0.00%	**(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 atleast two sub structure of abutments / pier cap level of the

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
		RuB/ROB.
3) 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 structure including bearings of atleast one span in all respects as specified.
4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect 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.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching 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 RoB / RuB		
1) 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 / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the RoB / RuB subject to completion of atleast two foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
		include load testing also where specified.
2) 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 atleast two sub structure of abutments / pier cap level of the RuB/ROB.
3) 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 structure including bearings of atleast one span in all respects as specified.
4) Wearing coat (a) in case of **RoB** - wearing coat including expansion joints complete in all respect as specified and (b) in case of **RuB** - rigid pavement under RuB including drainage facility complete in all respect 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.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching 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.

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
C 1 - Widening and repair of Elevated sections / Fly overs / Grade Separators		
1) 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 structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of atleast two foundations of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	0.00%	**(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 structure subject to completion of atleast two sub structure of abutments / pier cap level of the structure.
3) 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 structure including bearings of atleast one span in all respects as specified.
4) 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.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching 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 sections /		

STAGE of PAYMENT	PERCENTAGE WEIGHTAGE	Payment Procedure
Fly overs / Grade Separators		
1) 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 structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of atleast two foundations of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	0.00%	**(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 structure subject to completion of atleast two sub structure of abutments / pier cap level of the structure.
3) 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 structure including bearings of atleast one span in all respects as specified.
4) 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.
5) miscellaneous items like hand rails, crash barrier, road markings etc	0.00%	(v) **Miscellaneous:** Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	0.00%	(vi) **Wing walls/return walls:** Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching 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 caseofinnovateMajor Bridge projects like cablesuspension/cable stayed/Extra Dozedandexceptionallylongspanbridges, theschedulemay bemodifiedasper site requirements before biddingwith due approval ofCompetentAuthority.

(2) The Schedulefor exclusive tunnel projects may be prepared as per site requirements beforebiddingwith dueapproval of CompetentAuthority.

1.3.4 Other works.

Procedureforestimatingthevalueofotherworksdoneshallbeasstatedin table 1.3.4.

Table1.3.4

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
Other Works		
(i) Toll Plaza	0.00%	Unit of measurement is each completed Toll Plaza. Payment of each Toll Plaza shall be made on pro rata basis with respect to the total of all Toll Plaza.
(ii) Road side drains		
Lined Drain (RCC)	0.94%	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten percent) of the total length.
Lined Drain (PCC)	7.96%	
Unlined Drain	0.23%	
(iii) Road Signs, markings, km stones, safety devices,Roadfurnituresetc	1.06%	
(iv) Project facilities		
(a) Bus Bays	0.52%	Payment shall be made on pro rata basis for completed facilities.
(b) Truck lay byes	0.47%	
© Rain water harvesting	0.23%	
(d) Others		
a) Clearing n Grubbing & Dismantling works	0.32%	
b) improvement of Junctions	4.05%	
c) Turfing and hydroseeding	4.90%	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
d) Traffic Aid Post	0.10%	
e) Lighting Works	0.29%	
(v) Road side Plantation	0.00%	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 percent) of the total length.
(vi) Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/RuBs		
(a) Crash Barrier	8.20%	
(b) Retaining wall	21.17%	
(c) Breast Wall	49.55%	
(vii) Safety and traffic management during construction	0.00%	Payment shall be made on pro rata basis every six months.

1.3.5Electrical utilities and public Health Utilities (water pipe lines and sewage lines)

Procedureforestimatingthevalueofutilities shiftingdoneshallbeasstatedin table 1.3.5.

Table1.3.5

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
Electrical utilities and public Health Utilities (water pipe lines and sewage lines)		

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(i) EHT Lines	**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 dismentling 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 total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 4 crossings
(iii) HT/LT Lines	**27.08%**	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 LT/HT 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 dismentling and site clearance -40% (with DTR) and 50% without DTR.
(iv) HT/LT Crossings	**21.87%**	Cost of each crossing shall be determined on pro rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 10 crossings
(v) Transformer	**3.12%**	Cost of each transformer shall be determined on pro rata basis with reference to total no. of transformers. Payment shall be made for completion of each unit shifting.
(vi) Water pipelines	**40.66%**	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 pipe - 50%, charging of line including all miscellaneous works and dismantling and site clearance -50%)

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(vii) Water pipeline crossings	**0.83%**	Cost of each crossing shall be determined on pro rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings.
(viii) Water Pipe line (WRD)	**6.44%**	Cost of each crossing shall be determined on pro rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe - 50%, charging of line including all miscellaneous works and dismantling and site clearance -50%)

2. ProcedureforpaymentforMaintenance

2.1 The cost formaintenanceshall be as stated inClause14.1.1.

2.2 PaymentforMaintenanceshallbemadein quarterly installments in accordance with the provisions of Clause 19.7.

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex – I

(Schedule - I)

List of Drawings

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

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **[35% of the Scheduled Construction Period]** day from the Appointed Date (the "**Project Milestone-I**").

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

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **[60% of the Scheduled Construction Period]** day from the Appointed Date (the "**Project Milestone-II**").

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **[85% of the Scheduled Construction Period]** day from the Appointed Date (the "**Project Milestone- III**").

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

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the 730 day from the Appointed Date.

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the "**Agreement**"), for **Improvement and Widening to 2Lane with Paved Shoulder of Teliamura-Amarpur-Harina Stretch of NH-208 (from km 145.319 to km 163.319) (Package Design Ch. 18.00 to Ch. 36.000) on EPC basis under BHARATMALA in the State of Tripura)-Package-II with Japan International Cooperation Agency (JICA) loan assistance**, through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

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

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

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

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

Where,

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

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule M2=

Monthly lump-sum payment in accordance para 1.2 above of this Schedule L1= Non-

complying length L = Total length of the road,

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule -N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and ..... (the "**Contractor**")# for Improvement and Widening to 2Lane with Paved Shoulder of Teliamura-Amarpur-Harina Stretch of NH-208 (from km 145.319 to km 163.319) (Package Design Ch. 18.00 to Ch. 36.000) on EPC basis under BHARATMALA in the State of Tripura)-Package-II with Japan International Cooperation Agency (JICA) loan assistance,, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall -

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

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

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

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

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

ii. Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

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

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

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for Improvement and Widening to 2Lane with Paved Shoulder of Teliamura-Amarpur-Harina Stretch of NH-208 (from km 145.319 to km 163.319) (Package Design Ch. 18.00 to Ch. 36.000) on EPC basis under BHARATMALA in the State of Tripura)-Package-II with Japan International Cooperation Agency (JICA) loan assistance 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** *****