



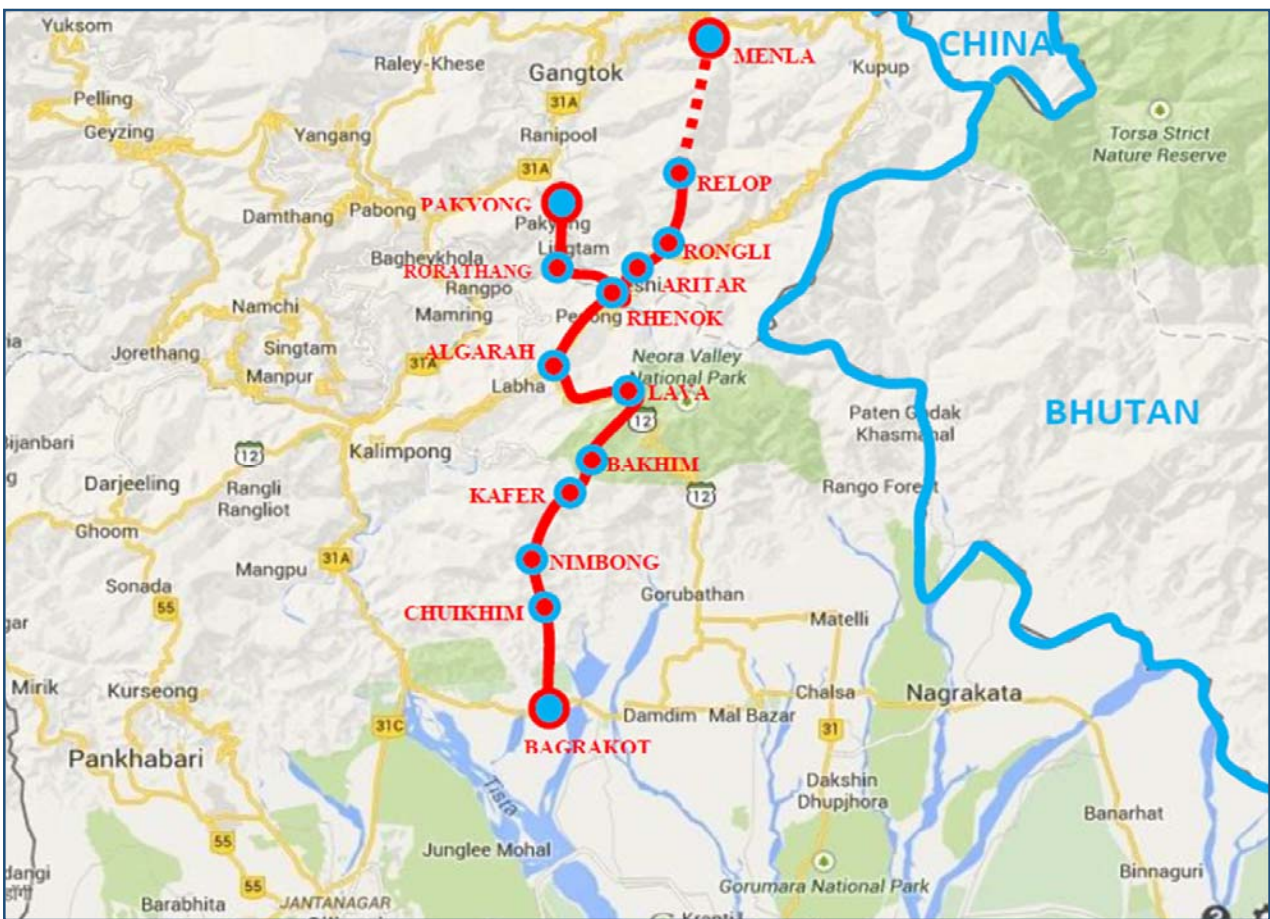
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

(Ministry of Road Transport & Highways)

Consultancy Against Supplementary Agreement dated 05.12.2019 - To execute the work of preparation of DPR as 'Additional work' for Package-H, HI, IV-C and V which forms part of the original Contract Agreement dated 30.09.2014 for Preparation of Feasibility Report cum Preliminary Design for alternative Highway to Gangtok in Sikkim via Bagrakot- Chuikhim - Nimbung-Kafer-BakhimAlgarah-Rhenok in the State of West Bengal and from Rhenok-Rorathang-

Technical Schedules

PKG - IIIA Section of Chochenpheri to Helipad Near Menla from Km 52.000 to



Final Detailed Project Report

July, 2020

SA INFRASTRUCTURE CONSULTANTS PVT. LTD.

IN ASSOCIATION WITH
SPECIALIZED ENGINEERING SERVICES PVT. LTD.
1101A, Xlth Floor, Tower A/2, Corporate Park, Plot No. 7A/1,



SCHEDULE - A
(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

- 1.1 Site of the Chochenpheri - Menla Section of NH-717B Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.
- 1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.(i) of this Agreement.
- 1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the Road Profile as indicated in Annex-III based on site/design requirement.
- 1.5 The status of the environment clearances obtained or awaited is given in Annex IV.

Annex – I
(Schedule – A)
Site

[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 Site of the Two-Lane Project Highway comprises the section of National Highway -717B commencing from Km 52+000 to Km 82+000 i.e. from Chochenpheri to Helipad at Menla section of Chochenpheri to Menla in the State of Sikkim. The land, carriageway and structures comprising the Site are described below.

2. Land

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) described below:

Sr. No.	Chainage (km)		ROW (Meter)
	From	To	
1	52+000	82+000	Nil

3. Carriageway

The project road is greenfield therefore there is no existing road.

Sr. No.	Carriageway					
	Single Lane		Two Lane		Four Lane	
	From	To	From	To	From	To
Nil						

4. Major Bridges

The Site includes the following Major Bridges

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

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

The Site includes the following ROB/RUB:

Sr. No.	Existing Chainage (km)	Type of Structure		No. of Spans with Span length (m)	Width (m)	ROB/ RUB
		Foundation	Super Structure			
NIL						

6. Grade separators

The Site includes the following grade separators:

Sr. No.	Existing Chainage (km)	Type of Structure		No. of Spans with Span length (m)	Width (m)	ROB/ RUB
		Foundation	Super Structure			
NIL						

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

Sr. No.	Existing Chainage (km)	Remarks
NIL		

9. Underpasses (vehicular, Non-vehicular)

The Site includes the following underpasses:

Sr. No.	Existing Chainage (km)	Type of Structure	No. of Spans with Span length (m)	Width (m)
Nil				

10. Culverts and causeway:

The Site has the following exiting culverts:

Sl. No.	Existing Chainage	Type	Size	Remarks
NIL				

11. Bus Stops

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

Sl. No.	Existing Chainage	Sides
NIL		

12. Truck Lay bays

The details of truck lay bays are as follows:

Sr. No.	Existing Chainage (Km)	Length (m)	LHS	RHS
Nil				

13. Road side drains

The details of the roadside drains are as follows:

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim.

Sr. No.	Location		Type	
	From km	To km	Masonry/cc	Earthen
			(Pucca)	(Kutchra)
NIL				

14. Major junctions

The detail of major junction is as follows:

Sr. No.	Existing Chainage	Type	Link	Direction	Remarks
Nil					

15. Minor junctions

The details of the minor junctions are as follows:-

SL. No.	Existing Chainage	Type of intersection	Direction	Type of Road	Going to
			Left/Right	Er/BT/CC	
NIL					

16. Bypasses

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

Sr. No.	Name of Bypass (Town)	Existing Chainage (Km)		Length (Km)	Carriageway	
		From	To		Width (m)	Type
Nil						

17. Other structures

Nil

Annex - II
(Schedule-A)

**Dates for providing Right of Way of
construction Zone**

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

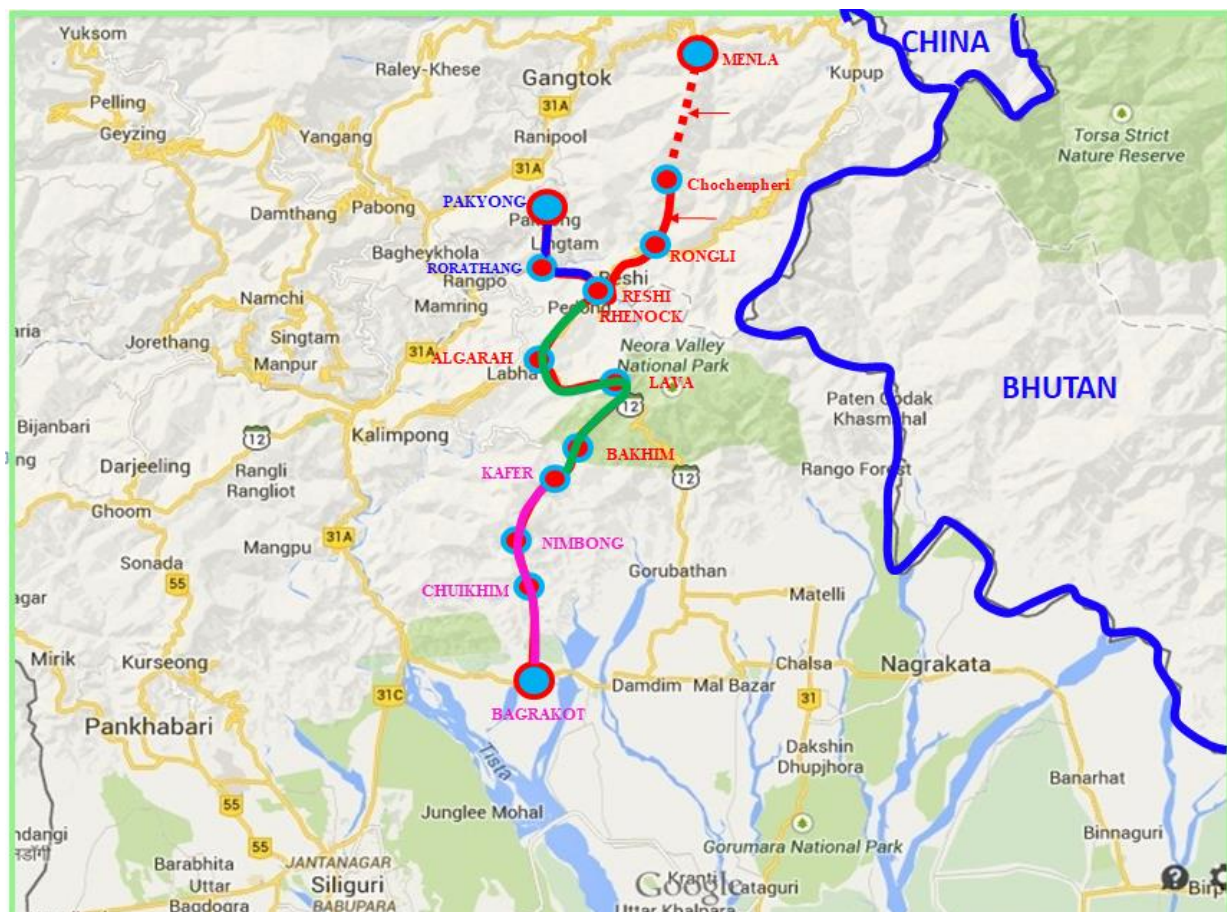
Sr. No.	From km To km	Length (Km)	Proposed ROW (m)	Date of providing ROW*
1	2	3	4	5
Full Right of Way (full width)	Excluding Bypass & Realignment, Bus bays, Truck Lay Bye	-	-	At appointed date
Balance Right of Way (Width)	Greenfield	30.000	24	Within 90 days of declaration of appointed date
	Bypass	-	-	
	Truck Lay Bye	-	-	

*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

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



An alignment plan is given in soft copy.

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

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

The following clearances have been obtained:

Sr. No.	Clearances	Present Status
1	Environment clearance	Not Required
2	Forest Clearance	Required
3	Wildlife Approval	Not Required

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 Two Lane with Paved shoulder

Two laning of new greenfield alignment with construction of paved shoulders as described in Annex-I of this Schedule-B and Annex-I of 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)

1. Description of Two Lane with Paved Shoulder

The Site of the Two-Lane Project Highway comprises the section of National Highway -717B commencing from Chochenpheri at km 52+000 and ends at Helipad at Menla at km 82+000 in the section of Chochenpheri to Menla (Length 30.000 km) in the State of Sikkim. The land, carriageway and structures comprising the Site are described below.

1.1 THE PROJECT HIGHWAY

The Project Highway is Green field shown in the alignment plans specified in Annexure 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.

1.2 WIDTH OF CARRIAGEWAY

Two Lanning with paved shoulder shall be undertaken. The paved carriageway shall be 7m wide with 1.5m paved shoulder on both sides in accordance with the typical cross section drawings and as per IRC:SP:73-2018. On Horizontal Curves, roadways width should be increased to provide for extra widening at Curves as per Cl. 6.8.5 of IRC:SP:48-1998.

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

Sl. No	Built-up Stretch (Township)	Start chainage	End chainage	Length (Km)	Width (m)	Typical Cross Section No.
Nil						

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

2. GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The design speed shall be minimum design speed of 20/40 km per hr. for Mountainous and Steep terrain.

2.3 Improvement of the existing road geometrics

2.3.1 Details of Bypass

Sr. No.	Existing Chainage		Length (m)	Design Chainage		Length (km)	Remarks
	From	To		From	To		
Nil							

2.3.2 New alignment (Green Field) :

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
1	52.000	52.110	0.110	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
2	52.110	52.280	0.170	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
3	52.280	52.410	0.130	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
4	52.410	52.510	0.100	Elevated Structure	IV
5	52.510	53.300	0.790	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
6	53.300	53.490	0.190	Elevated Structure	IV
7	53.490	54.110	0.620	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
13	54.110	54.180	0.070	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
14	54.180	54.270	0.090	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
15	54.270	54.400	0.130	Elevated Structure	IV
16	54.400	54.810	0.410	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
17	54.810	55.110	0.300	Elevated Structure	IV
18	55.110	55.590	0.480	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
19	55.590	55.650	0.060	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
20	55.650	55.690	0.040	Elevated Structure	IV
21	55.690	56.380	0.690	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
22	56.380	56.540	0.160	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
23	56.540	56.580	0.040	Elevated Structure	IV
24	56.580	56.960	0.380	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
25	56.960	57.120	0.160	Elevated Structure	IV
26	57.120	58.000	0.880	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
27	58.000	58.120	0.120	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
28	58.120	58.180	0.060	Elevated Structure	IV
29	58.180	58.280	0.100	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
30	58.280	58.630	0.350	Elevated Structure	IV

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
31	58.630	59.720	1.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
32	59.720	59.840	0.120	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
33	59.840	60.040	0.200	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
34	60.040	60.220	0.180	Elevated Structure	IV
35	60.220	60.410	0.190	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
36	60.410	60.500	0.090	Elevated Structure	IV
37	60.500	61.120	0.620	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
38	61.120	61.300	0.180	Elevated Structure	IV
39	61.300	61.390	0.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
40	61.390	61.700	0.310	Elevated Structure	IV
41	61.700	61.790	0.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
42	61.790	61.910	0.120	Elevated Structure	IV
43	61.910	62.970	1.060	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
44	62.970	63.600	0.630	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
45	63.600	63.800	0.200	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
46	63.800	64.100	0.300	Elevated Structure	IV
47	64.100	64.590	0.490	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
48	64.590	64.850	0.260	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
49	64.850	65.070	0.220	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
50	65.070	65.390	0.320	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
51	65.390	65.500	0.110	Elevated Structure	IV
52	65.500	65.640	0.140	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
53	65.640	65.800	0.160	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
54	65.800	65.900	0.100	Elevated Structure	IV
55	65.900	66.410	0.510	Two lane with Paved shoulder New alignment (Both Side Hill section)	I

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
56	66.410	66.490	0.080	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
57	66.490	66.670	0.180	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
58	66.670	66.870	0.200	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
59	66.870	67.000	0.130	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
60	67.000	67.090	0.090	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
61	67.090	67.430	0.340	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
62	67.430	67.530	0.100	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
63	67.530	67.910	0.380	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
64	67.910	68.100	0.190	Elevated Structure	IV
65	68.100	69.180	1.080	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
66	69.180	69.350	0.170	Elevated Structure	IV
67	69.350	69.790	0.440	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
68	69.790	70.020	0.230	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
69	70.020	70.450	0.430	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
70	70.450	70.850	0.400	Elevated Structure	IV
71	70.850	71.380	0.530	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
72	71.380	71.550	0.170	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
73	71.550	71.790	0.240	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
74	71.790	72.230	0.440	Elevated Structure	IV
75	72.230	72.320	0.090	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
76	72.320	72.450	0.130	Elevated Structure	IV
77	72.450	72.720	0.270	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
78	72.720	72.850	0.130	Elevated Structure	IV
79	72.850	73.200	0.350	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
80	73.200	73.900	0.700	Two lane with Paved shoulder New alignment (Both Side Hill section)	I

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
81	73.900	74.220	0.320	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
82	74.220	74.390	0.170	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
83	74.390	75.050	0.660	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
84	75.050	75.750	0.700	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
85	75.750	76.060	0.310	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
86	76.060	76.320	0.260	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
87	76.320	76.790	0.470	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
88	76.790	77.040	0.250	Elevated Structure	IV
89	77.040	82.000	4.960	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
Total Length (km)			30.000		

2.4 Right of Way

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

2.5 Type of shoulders

In built-up sections, 1.5m footpath cum drain and 2x1.5m paved shoulders shall be provided in the following stretches:

Sl. No.	Design Chainage		Length (m)	Fully Paved Shoulder/Footpath	Reference to Cross Section (TCS)
	From	To			

- (a) In open country, (Paved shoulders of 1.5 m width shall be provided and 1.0m earthen shoulder shall be provided on valley side as per IRC:SP-73-2018).

Sl. No	Proposed Chainage		Length (Km)	TCS	Fully Paved Shoulder/Footpath
	From (Km)	To (Km)			
1	52.000	52.110	0.110	I	Paved Shoulder
2	52.110	52.280	0.170	III	Paved Shoulder
3	52.280	52.410	0.130	I	Paved Shoulder
4	52.510	53.300	0.790	I	Paved Shoulder
5	53.490	54.110	0.620	I A	Paved Shoulder
6	54.110	54.180	0.070	II A	Paved Shoulder
7	54.180	54.270	0.090	I A	Paved Shoulder
8	54.400	54.810	0.410	I A	Paved Shoulder
9	55.110	55.590	0.480	I A	Paved Shoulder
10	55.590	55.650	0.060	II A	Paved Shoulder

Sl. No	Proposed Chainage		Length (Km)	TCS	Fully Paved Shoulder/Foothpath
	From (Km)	To (Km)			
11	55.690	56.380	0.690	I	Paved Shoulder
12	56.380	56.540	0.160	II	Paved Shoulder
13	56.580	56.960	0.380	III	Paved Shoulder
14	57.120	58.000	0.880	I	Paved Shoulder
15	58.000	58.120	0.120	II	Paved Shoulder
16	58.180	58.280	0.100	I	Paved Shoulder
17	58.630	59.720	1.090	I	Paved Shoulder
18	59.720	59.840	0.120	II	Paved Shoulder
19	59.840	60.040	0.200	I	Paved Shoulder
20	60.220	60.410	0.190	I	Paved Shoulder
21	60.500	61.120	0.620	I	Paved Shoulder
22	61.300	61.390	0.090	I	Paved Shoulder
23	61.700	61.790	0.090	I	Paved Shoulder
24	61.910	62.970	1.060	I	Paved Shoulder
25	62.970	63.600	0.630	II	Paved Shoulder
26	63.600	63.800	0.200	I	Paved Shoulder
27	64.100	64.590	0.490	I	Paved Shoulder
28	64.590	64.850	0.260	II	Paved Shoulder
29	64.850	65.070	0.220	I	Paved Shoulder
30	65.070	65.390	0.320	II	Paved Shoulder
31	65.500	65.640	0.140	I	Paved Shoulder
32	65.640	65.800	0.160	II	Paved Shoulder
33	65.900	66.410	0.510	I	Paved Shoulder
34	66.410	66.490	0.080	II	Paved Shoulder
35	66.490	66.670	0.180	I	Paved Shoulder
36	66.670	66.870	0.200	II	Paved Shoulder
37	66.870	67.000	0.130	I	Paved Shoulder
38	67.000	67.090	0.090	II	Paved Shoulder
39	67.090	67.430	0.340	I	Paved Shoulder
40	67.430	67.530	0.100	II	Paved Shoulder
41	67.530	67.910	0.380	I	Paved Shoulder
42	68.100	69.180	1.080	I	Paved Shoulder
43	69.350	69.790	0.440	I	Paved Shoulder
44	69.790	70.020	0.230	II	Paved Shoulder
45	70.020	70.450	0.430	I	Paved Shoulder
46	70.850	71.380	0.530	I	Paved Shoulder
47	71.380	71.550	0.170	II	Paved Shoulder
48	71.550	71.790	0.240	II A	Paved Shoulder
49	72.230	72.320	0.090	II A	Paved Shoulder
50	72.450	72.720	0.270	I A	Paved Shoulder
51	72.850	73.200	0.350	I A	Paved Shoulder

Sl. No	Proposed Chainage		Length (Km)	TCS	Fully Paved Shoulder/Foothpath
	From (Km)	To (Km)			
52	73.200	73.900	0.700	I	Paved Shoulder
53	73.900	74.220	0.320	III	Paved Shoulder
54	74.220	74.390	0.170	I	Paved Shoulder
55	74.390	75.050	0.660	II	Paved Shoulder
56	75.050	75.750	0.700	I	Paved Shoulder
57	75.750	76.060	0.310	II	Paved Shoulder
58	76.060	76.320	0.260	I	Paved Shoulder
59	76.320	76.790	0.470	II	Paved Shoulder
60	77.040	82.000	4.960	I	Paved Shoulder
Total Length (km)			25.540		

- (b) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in paragraphs 5.9.9 and 5.9.10 of the Manual.

2.6 Lateral and vertical clearances at underpasses

- 2.6.1 Lateral and vertical clearances at underpasses and provision of guard rails/crash barriers shall be as per paragraph 2.11 of 2-laning Manual.

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

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

Vertical clearance: Vertical Clearance at underpasses/Flyovers shall not be less than 5.5 m and for Cattle underpass shall not be less than 4.5 m.

2.7 Lateral and vertical clearances at overpasses

- 2.7.1 Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the 2-laning Manual.

- 2.7.2 Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sr. No.	Design Chainage (Km)	Span / Opening (m)	Remarks
Nil			

- 2.7.3 Vertical clearance: A minimum 5.5 m vertical clearance shall be provided at all points of the carriageway of the project highway.

2.8 Service roads

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

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

Details of Slip Road

Sr. No.	Existing Chainage		Design Chainage		Right Hand side(RHS) or Left Hand side (LHS) or Both side	Length Km of Service Road
	From	To	From	To		
NIL						

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.14 of the 2-lanning Manual. The requisite particulars are given below:

[Refer to paragraphs 2.14.1 of the Manual and provide details]

Sr. No.	Location of structure (Existing)	Location of structure (Design)	Length (m)	Number & length of Spans (m)	Approach Gradient	Remarks, if any
NIL						

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows: [Refer to paragraphs 2.14.2 of the 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]

Sr. No.	Location (Design Chainage)	Location (Design Chainage)	Type of Structure Length	Cross road at		
				Existing level	Raised Level	Lowered Level
NIL						

2.10 Cattle and pedestrian underpass /overpass

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

[Refer to paragraphs 2.13.3 of the Manual and specify the requirements of Cattle and pedestrian underpass/ overpass].

2.11 Typical cross-sections of the Project Highway

Indicative typical cross section of the Project highway shall be Fig. 2.8 to 2.9 of the manual (IRC: SP: 73-2018).

Summary of TCS

S.No.	Description	TCS No.	Length (km)
1	Two lane with Paved shoulder New alignment (Both Side Hill)	I	17.900
2	Two lane with Paved shoulder New alignment (Both Side Valley section)	II	4.080
3	Two lane with Paved shoulder New alignment (One Side Hill, One side Valley section)	III	0.870
4	Elevated Structure	IV	4.470
5	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A	2.220

S.No.	Description	TCS No.	Length (km)
6	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A	0.460
		Total	30.000

Indicative Chainage with applicable Typical Cross section :

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
1	52.000	52.110	0.110	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
2	52.110	52.280	0.170	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
3	52.280	52.410	0.130	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
4	52.410	52.510	0.100	Elevated Structure	IV
5	52.510	53.300	0.790	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
6	53.300	53.490	0.190	Elevated Structure	IV
7	53.490	54.110	0.620	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
8	54.110	54.180	0.070	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
9	54.180	54.270	0.090	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
10	54.270	54.400	0.130	Elevated Structure	IV
11	54.400	54.810	0.410	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
12	54.810	55.110	0.300	Elevated Structure	IV
13	55.110	55.590	0.480	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
14	55.590	55.650	0.060	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
15	55.650	55.690	0.040	Elevated Structure	IV
16	55.690	56.380	0.690	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
17	56.380	56.540	0.160	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
18	56.540	56.580	0.040	Elevated Structure	IV
19	56.580	56.960	0.380	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
20	56.960	57.120	0.160	Elevated Structure	IV
21	57.120	58.000	0.880	Two lane with Paved shoulder New alignment (Both Side Hill section)	I

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
22	58.000	58.120	0.120	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
23	58.120	58.180	0.060	Elevated Structure	IV
24	58.180	58.280	0.100	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
25	58.280	58.630	0.350	Elevated Structure	IV
26	58.630	59.720	1.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
27	59.720	59.840	0.120	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
28	59.840	60.040	0.200	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
29	60.040	60.220	0.180	Elevated Structure	IV
30	60.220	60.410	0.190	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
31	60.410	60.500	0.090	Elevated Structure	IV
32	60.500	61.120	0.620	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
33	61.120	61.300	0.180	Elevated Structure	IV
34	61.300	61.390	0.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
35	61.390	61.700	0.310	Elevated Structure	IV
36	61.700	61.790	0.090	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
37	61.790	61.910	0.120	Elevated Structure	IV
38	61.910	62.970	1.060	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
39	62.970	63.600	0.630	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
40	63.600	63.800	0.200	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
41	63.800	64.100	0.300	Elevated Structure	IV
42	64.100	64.590	0.490	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
43	64.590	64.850	0.260	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
44	64.850	65.070	0.220	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
45	65.070	65.390	0.320	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
46	65.390	65.500	0.110	Elevated Structure	IV

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
47	65.500	65.640	0.140	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
48	65.640	65.800	0.160	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
49	65.800	65.900	0.100	Elevated Structure	IV
50	65.900	66.410	0.510	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
51	66.410	66.490	0.080	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
52	66.490	66.670	0.180	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
53	66.670	66.870	0.200	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
54	66.870	67.000	0.130	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
55	67.000	67.090	0.090	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
56	67.090	67.430	0.340	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
57	67.430	67.530	0.100	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
58	67.530	67.910	0.380	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
59	67.910	68.100	0.190	Elevated Structure	IV
60	68.100	69.180	1.080	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
61	69.180	69.350	0.170	Elevated Structure	IV
62	69.350	69.790	0.440	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
63	69.790	70.020	0.230	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
64	70.020	70.450	0.430	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
65	70.450	70.850	0.400	Elevated Structure	IV
66	70.850	71.380	0.530	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
67	71.380	71.550	0.170	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
68	71.550	71.790	0.240	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
69	71.790	72.230	0.440	Elevated Structure	IV
70	72.230	72.320	0.090	Two lane including climbing lane with one side Paved shoulder New alignment (Both side Valley section)	II A
71	72.320	72.450	0.130	Elevated Structure	IV

Sl. No	Proposed Chainage		Length (Km)	Type of alignment	TCS
	From (Km)	To (Km)			
72	72.450	72.720	0.270	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
73	72.720	72.850	0.130	Elevated Structure	IV
74	72.850	73.200	0.350	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	I A
75	73.200	73.900	0.700	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
76	73.900	74.220	0.320	Two lane with Paved shoulder New alignment (one Side Hill, one side Valley section)	III
77	74.220	74.390	0.170	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
78	74.390	75.050	0.660	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
79	75.050	75.750	0.700	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
80	75.750	76.060	0.310	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
81	76.060	76.320	0.260	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
82	76.320	76.790	0.470	Two lane with Paved shoulder New alignment (Both Side Valley section)	II
84	76.790	77.040	0.250	Elevated Structure	IV
85	77.040	82.000	4.960	Two lane with Paved shoulder New alignment (Both Side Hill section)	I
Total Length (km)			30.000		

3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards. Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

3.1 At-Grade Intersection:

3.1.1 Major intersections

At grade major intersections shall be improved at intersecting roads with the Project highway is given below:

Sr. No.	Existing Chainage	Proposed Chainage	Type	Link	Direction	Remarks
Nil						

3.1.2 Minor Intersections

At grade minor intersections shall be improved at intersecting roads with the Project highway is given below:

Sl. No.	Design Chainage	Type of intersection	Direction	Type of Road
			(Left/Right)	(E/BT/CC)
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:

The existing road shall be raised in the following sections:

Sl. No	Proposed Chainage		Length (Km)	Description	TCS
	From (Km)	To (Km)			
Nil					

5. PAVEMENT DESIGN

Pavement design shall be carried out for a design life of 20 years considering 25 MSA as per IRC 37-2018.

Note: 1. The minimum CBR of subgrade is 10%.

5.1 Type of pavement

Flexible pavement shall be adopted for the Main carriageway in the open country and rigid pavement in the built up section as per the details given below:

Crust composition (Minimum) for flexible pavement:

BC 40 mm
BSM 110 mm
CTSB 200 mm
SUBGRADE 500 mm

Crust composition (Minimum) for Rigid pavement:

PQC 300 mm
DLC 150 mm
GSB 150 mm
SUBGRADE 500 mm

5.2 Design requirements

5.2.1 Design Period and strategy

Flexible Pavement shall be designed.

5.2.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 25 million standard axles.

5.3 Reconstruction of stretches

The stretches mention in clause 4 (ii) of the same document shows the table of the existing road that shall be reconstructed.

6. ROAD SIDE DRAINAGE

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

Lined Drain Location:

Sl. No.	Description	Sides	Length (km)	Total Length (km)
1	Two lane with Paved shoulder New alignment (Both Side Hill)	2	17.900	35.800
2	Two lane including climbing lane with one side Paved shoulder New alignment (Both Side Hill section)	2	2.220	4.440
2	Two lane with Paved shoulder New alignment (One Side Hill, One side Valley section)	1	0.870	0.870
Total (km)			20.990	41.11

Catch Water Drains Location on Hill side (Cutting height is more than 10m)

Sr. No.	Left Side (m)	Right Side (m)
1	10660	9960

Therefore, total length of Lined & catch water drain will be **61.730 km**.

Foothpath cum Drains Location:

TCS No.	Description	Length (m)	Side	Total Length (m)
Nil				

7. DESIGN OF STRUCTURES

7.1 General

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

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:
[Refer to paragraph 7.1 (ii) of the 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) meter including kerb shyness in the table below.]

Sr. No.	Bridge (km)	Width of carriageway and Cross - Sectional feature
Nil		

7.1.3 The following structures shall be provided with footpaths:
[Refer to paragraph 7.1 (iii) of the Manual and provide details of new Structures with footpath.]

Sr. No.	Location at km		Remarks
	(Existing Chainage)	(Design Chainage)	

Sr. No.	Location at km		Remarks
	(Existing Chainage)	(Design Chainage)	
Nil			

7.1.4 All bridges shall be high-level bridges.

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

Sr. No.	Bridge (Km)	Utility service to be carried	Remarks
NIL			

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

7.2 Culverts

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

7.2.1 Reconstruction of Existing Culverts:

The existing culverts at the following locations shall be reconstructed as new Box culverts:

Sl. No.	Existing Chainage	Type	Size	Proposed Chainage	Proposed Size	Type	Proposal
Nil							

7.2.2 Widening and Repairing of existing culverts

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

Sl. No.	Culvert Location (Km)	Type , Span, Height and width of existing culvert	Type of Repair Required
Nil			

7.2.3 Additional New culverts shall be constructed as per Particulars given in the table below:

Sl no.	Desing Chainage.	TYPE	Size (m)	Proposal
1.	52+000	Box Culvert	1x3	New
2.	52+280	Box Culvert	1x3	New
3.	54+150	Box Culvert	1x3	New
4.	54+580	Box Culvert	1x3	New
5.	55+640	Box Culvert	1x3	New
6.	56+380	Box Culvert	1x3	New
7.	56+770	Box Culvert	1x3	New
8.	58+040	Box Culvert	1x3	New

Sl no.	Desing Chainage.	TYPE	Size (m)	Proposal
9.	59+480	Box Culvert	1x3	New
10.	59+752	Box Culvert	1x3	New
11.	63+000	Box Culvert	1x3	New
12.	63+330	Box Culvert	1x3	New
13.	63+560	Box Culvert	1x3	New
14.	64+620	Box Culvert	1x3	New
15.	64+790	Box Culvert	1x3	New
16.	65+150	Box Culvert	1x3	New
17.	65+690	Box Culvert	1x3	New
18.	66+440	Box Culvert	1x3	New
19.	66+792	Box Culvert	1x3	New
20.	67+038	Box Culvert	1x3	New
21.	67+480	Box Culvert	1x3	New
22.	68+340	Box Culvert	1x3	New
23.	68+810	Box Culvert	1x3	New
24.	69+900	Box Culvert	1x3	New
25.	70+960	Box Culvert	1x3	New
26.	71+210	Box Culvert	1x3	New
27.	71+480	Box Culvert	1x3	New
28.	73+850	Box Culvert	1x3	New
29.	74+130	Box Culvert	1x3	New
30.	74+450	Box Culvert	1x3	New
31.	75+020	Box Culvert	1x3	New
32.	75+818	Box Culvert	1x3	New
33.	76+000	Box Culvert	1x3	New
34.	76+645	Box Culvert	1x3	New
35.	79+350	Box Culvert	1x3	New
36.	79+620	Box Culvert	1x3	New
37.	82+000	Box Culvert	1x3	New

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

[Refer to paragraph 7.23 of the Manual and provide details]

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Culvert	Span (m)	Type of Repair
NIL					

7.2.5 Floor Protection works shall be as specified in the relevant IRC codes and specifications.

7.3 Bridges

7.3.1 Existing Bridges to be retained

(i) The existing minor bridges at the following locations shall be retained:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Design No. of Spans with span length (m)	Remarks
Nil				

(ii) The following Major bridges shall be reconstructed:

Sr. No.	Existing Chainage (Km)	Design Chainage (Km)	Design no. of Spans with span length (m)	Remarks
Nil				

(iii) The following Minor bridges shall be reconstructed:

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Design no. of Spans with span length (m)	Existing no. of Spans with span length (m)	Existing Structure	Proposed Structure
Nil						

7.3.2 Additional New Bridges

a. 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:

Sr. No.	Location		Span Arrangement	Total length (m)	Remarks
	Existing Chainage (Km)	Design Chainage (Km)			
NIL					

b. 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:

Sr. No.	Design Chainage	Span Arrangement	Total length (m)	Remarks
NIL				

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

Sr. No.	Location (km)	Remarks
Nil		

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

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Existing no. of Spans with span length (m)	Remarks
Nil				

7.3.5 Drainage system for bridge decks

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

7.3.6 Structures in marine environment

[Refer to paragraph 7.22 of the Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable]

7.4 Rail - Road Bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual. (Refer to paragraph 7.19 of the Manual and specify modification, if any)

7.4.2 Road Over-Bridges section

Road over-bridges (road over railway line) shall be provided at the following level crossings, as per manual:

Sl. No.	Location of Level crossing (Chainage km)	Length of bridge (m)	Type of structure	Remarks
NIL				

7.4.3 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		

7.5 Grade separated structures

(Refer to paragraph 7.20 of the Manual)

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

Sr. No.	Design Chainage	Span Arrangement	Total length (m)	Remarks
Nil				

7.6 Repairs and strengthening of bridges and structures

(Refer to paragraph 7.23 of the Manual and provide details)

All 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 / Design Chainage (In km)/Span	Side (LHS/RHS)	Nature and Extent of Repairs / Strengthening to be carried out
Nil			

B. ROB / RUB

Sl. No.	Location / Design Chainage (In km)	Side (LHS/RHS)	Nature and Extent of Repairs / Strengthening to be carried out
Nil			

C. Overpass / Underpass and Other structures

Sr. No.	Location / Design Chainage (In km)	Side (LHS/RHS)	Nature and Extent of Repairs/ Strengthening to be carried out
Nil			

7.7 List of Major Bridges and Structures

Viaduct: The minimum requirement of Viaducts are suggested as following which may vary as per final drawings and design approved by competent authority. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work. Viaduct shall be provided where embankment height is more than 10m. Tentative locations of the Viaduct are given below :

Sr. No.	From	To	Length (m)	Span-Arrangement	Extra Widening (m)
1	52+410	52+510	100	5x20	0.9 m
2	53+300	53+490	190	1x10+9x20	0.9 m
3	54+270	54+400	130	1x10+6x20	0.9 m
4	54+810	55+110	300	6x30+6x20	0.9 m
5	55+650	55+690	40	2x20	0.6 m
6	56+540	56+580	40	2x20	Nil
7	56+960	57+120	160	8x20	0.6 m
8	58+120	58+180	60	3x20	0.9 m
9	58+280	58+630	350	6x20+7x30+1x20	0.9 m
10	60+040	60+220	180	9x20	0.6 m
11	60+410	60+500	90	3x30	Nil
12	61+120	61+300	180	9x20	0.6 m
13	61+390	61+700	310	15x20+1x10	0.6 m
14	61+790	61+910	120	6x20	0.6 m
15	63+800	64+100	300	15x20	0.9 m
16	65+390	65+500	110	1x20+3x30	Nil
17	65+800	65+900	100	5x20	0.9 m
18	67+910	68+100	190	5x20+3x30	0.6 m
19	69+180	69+350	170	5x30+1x20	Nil
20	70+450	70+850	400	7x30+5x20+3x30	1.5 m
21	71+790	72+230	440	22x20	0.9 m
22	72+320	72+450	130	4x30+1x10	Nil
23	72+720	72+850	130	4x30+1x10	Nil
24	76+790	77+040	250	5x30+5x20	0.6 m
Total Length=			4.470 Km.		

***NOTE:-** The viaduct length mention above is exclusive of box abutment length. For total length of the elevated structure refer clause 2.11 and clause 13 of the same document.

TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

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

- (a) Traffic Signs: Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway.
- (b) Pavement Marking: Pavement markings shall cover road marking for the entire Project Highway.
- (c) Safety Barrier: Provide parapet along the project highway at all locations as specified in manual recommended in Schedule D.

8.2 Specifications of the reflecting sheeting.

Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-04 and IRC 67:2010 shall be provided.

8. ROADSIDE FURNITURE

9.1 Roadside furniture shall be provided in accordance with the provisions of section 11 of the Manual.

- (a) Road Boundary Stone: For the entire Project Highway.
- (b) Pedestrian Guard Rail: The pedestrian facilities shall include the provision of the;
 - (i) Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location.
 - (ii) Pedestrian Crossings: Provide pedestrian crossing facilities on Junctions.
- (c) Overhead traffic signs: Location and Size
 - (i) Full width Overhead signs: Full width Overhead signs shall be provided as suggested in manual recommended in Schedule D.
 - (ii) Cantilever Overhead signs: Overhead signs shall be provided as suggested in manual recommended in Schedule D.
 - (iii) Delineators: Delineators for the entire Project Highway at the locations as suggested in manual recommended in Schedule D. The minimum number of 2386 delineators to be provided in the curve portions for the entire project highway.

Note:- The no. of delineators mentioned above is minimum. Any increase in numbers shall not be constitute a Change of Scope.

(iv) Chevrons: Chevrons sign boards for the entire Project Highway at the locations as suggested in manual recommended in Schedule D. The minimum number of 2386 chevrons to be provided in the curve portions for the entire project highway.

Note:- The no. of chevrons mentioned above is minimum. Any increase in numbers shall not be constitute a Change of Scope.

9. COMPULSORY AFFORESTATION

The number of Trees which are required to be planted by the contractor as compensatory afforestation should be as per Forest Conservation Act, twice the number of trees to be cut.

10. HAZARDOUS LOCATIONS

The safety barriers (Parapet wall) shall also be provided at valley side for a length of 9.950 Km. Parapet wall will construct at site as per requirement of location.

11. Special Requirement for Hill Roads

12.1 Retaining Wall: - The minimum requirement of Retaining wall are suggested as following which may vary as per final drawings and design approved by competent authority. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work.

Retaining Walls Locations LHS:

Filling Left					Filling Left				
Sl. No	Chainge From	Chainge To	Length (m)	Height (m)	Sl. No	Chainge From	Chainge To	Length (m)	Height (m)
1	51990	52000	10	7	166	67020	67030	10	8
2	52000	52010	10	6	167	67030	67040	10	8
3	52010	52020	10	6	168	67040	67050	10	7
4	52020	52030	10	5	169	67050	67060	10	5
5	52030	52040	10	4	170	67060	67070	10	4
6	52070	52080	10	5	171	67450	67460	10	5
7	52140	52150	10	4	172	67460	67470	10	7
8	52210	52220	10	4	173	67470	67480	10	8
9	52220	52230	10	5	174	67480	67490	10	8
10	52250	52260	10	5	175	67490	67500	10	7
11	52260	52270	10	8	176	67500	67510	10	4
12	52270	52280	10	10	177	67890	67900	10	4
13	52280	52290	10	10	178	68100	68110	10	7
14	52290	52300	10	8	179	68110	68120	10	5
15	52300	52310	10	4	180	68120	68130	10	4
16	52510	52520	10	8	181	69810	69820	10	5
17	52520	52530	10	7	182	69820	69830	10	5
18	52530	52540	10	6	183	69830	69840	10	6
19	53290	53300	10	5	184	69840	69850	10	7
20	53960	53970	10	6	185	69850	69860	10	8
21	53970	53980	10	5	186	69860	69870	10	9
22	53980	53990	10	5	187	69870	69880	10	11
23	53990	54000	10	4	188	69880	69890	10	11
24	54100	54110	10	5	189	69890	69900	10	11
25	54110	54120	10	6	190	69900	69910	10	11
26	54120	54130	10	7	191	69910	69920	10	10
27	54130	54140	10	8	192	69920	69930	10	10
28	54140	54150	10	9	193	69930	69940	10	9
29	54150	54160	10	10	194	69940	69950	10	9
30	54160	54170	10	11	195	69950	69960	10	8
31	54170	54180	10	11	196	69960	69970	10	7
32	54180	54190	10	6	197	69970	69980	10	7
33	55690	55700	10	5	198	69980	69990	10	6
34	56400	56410	10	5	199	69990	70000	10	5
35	56410	56420	10	6	200	70000	70010	10	4
36	56420	56430	10	6	201	70410	70420	10	5
37	57120	57130	10	4	202	70420	70430	10	5
38	58000	58010	10	5	203	70430	70440	10	6
39	58010	58020	10	8	204	70940	70950	10	6
40	58020	58030	10	10	205	70950	70960	10	5
41	58030	58040	10	11	206	70960	70970	10	5
42	58040	58050	10	10	207	70970	70980	10	4

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Filling Left					Filling Left				
Sl. No	Change From	Change To	Length (m)	Height (m)	Sl. No	Change From	Change To	Length (m)	Height (m)
43	58050	58060	10	8	208	71400	71410	10	6
44	58060	58070	10	5	209	71410	71420	10	7
45	58090	58100	10	5	210	71420	71430	10	8
46	58100	58110	10	7	211	71430	71440	10	9
47	58180	58190	10	5	212	71440	71450	10	10
48	58630	58640	10	8	213	71450	71460	10	11
49	58640	58650	10	7	214	71490	71500	10	11
50	59730	59740	10	5	215	71500	71510	10	11
51	59740	59750	10	6	216	71510	71520	10	11
52	59750	59760	10	5	217	71520	71530	10	10
53	59810	59820	10	4	218	71530	71540	10	10
54	59820	59830	10	4	219	71540	71550	10	9
55	62960	62970	10	5	220	71550	71560	10	8
56	62970	62980	10	7	221	71560	71570	10	7
57	62980	62990	10	9	222	71570	71580	10	6
58	62990	63000	10	10	223	71580	71590	10	6
59	63000	63010	10	11	224	71590	71600	10	6
60	63010	63020	10	10	225	71600	71610	10	5
61	63020	63030	10	8	226	71610	71620	10	5
62	63030	63040	10	8	227	71620	71630	10	5
63	63040	63050	10	8	228	71630	71640	10	5
64	63050	63060	10	7	229	71640	71650	10	6
65	63060	63070	10	6	230	71650	71660	10	6
66	63070	63080	10	6	231	71660	71670	10	7
67	63080	63090	10	5	232	71670	71680	10	7
68	63190	63200	10	5	233	71680	71690	10	8
69	63200	63210	10	5	234	71690	71700	10	8
70	63210	63220	10	5	235	71700	71710	10	8
71	63220	63230	10	4	236	71710	71720	10	8
72	63250	63260	10	4	237	71720	71730	10	8
73	63260	63270	10	5	238	71730	71740	10	8
74	63270	63280	10	5	239	71740	71750	10	7
75	63280	63290	10	6	240	71750	71760	10	7
76	63290	63300	10	7	241	71760	71770	10	6
77	63300	63310	10	9	242	71770	71780	10	5
78	63310	63320	10	10	243	73830	73840	10	4
79	63320	63330	10	10	244	73840	73850	10	4
80	63330	63340	10	9	245	73850	73860	10	4
81	63340	63350	10	9	246	74380	74390	10	5
82	63350	63360	10	8	247	74390	74400	10	7
83	63360	63370	10	7	248	74400	74410	10	8
84	63370	63380	10	6	249	74410	74420	10	10
85	63520	63530	10	7	250	74420	74430	10	10

Filling Left					Filling Left				
Sl. No	Change From	Change To	Length (m)	Height (m)	Sl. No	Change From	Change To	Length (m)	Height (m)
86	63530	63540	10	10	251	74430	74440	10	11
87	63540	63550	10	11	252	74440	74450	10	11
88	63550	63560	10	11	253	74450	74460	10	11
89	63560	63570	10	10	254	74460	74470	10	11
90	63570	63580	10	9	255	74470	74480	10	10
91	63580	63590	10	6	256	74480	74490	10	10
92	64100	64110	10	6	257	74490	74500	10	10
93	64590	64600	10	5	258	74500	74510	10	10
94	64600	64610	10	5	259	74510	74520	10	9
95	64610	64620	10	6	260	74520	74530	10	8
96	64620	64630	10	6	261	74530	74540	10	7
97	64630	64640	10	7	262	74540	74550	10	6
98	64640	64650	10	7	263	74550	74560	10	5
99	64650	64660	10	5	264	74560	74570	10	4
100	64660	64670	10	8	265	74630	74640	10	5
101	64670	64680	10	8	266	74640	74650	10	6
102	64680	64690	10	8	267	74650	74660	10	6
103	64690	64700	10	8	268	74660	74670	10	6
104	64700	64710	10	9	269	74670	74680	10	6
105	64710	64720	10	9	270	74680	74690	10	5
106	64720	64730	10	9	271	74690	74700	10	5
107	64730	64740	10	8	272	74700	74710	10	5
108	64740	64750	10	8	273	74710	74720	10	5
109	64750	64760	10	8	274	74720	74730	10	6
110	64760	64770	10	8	275	74730	74740	10	7
111	64770	64780	10	8	276	74740	74750	10	8
112	64780	64790	10	7	277	74750	74760	10	8
113	64790	64800	10	7	278	74760	74770	10	9
114	64800	64810	10	6	279	74770	74780	10	8
115	64810	64820	10	6	280	74780	74790	10	8
116	64820	64830	10	5	281	74790	74800	10	8
117	64830	64840	10	4	282	74800	74810	10	8
118	65110	65120	10	5	283	74810	74820	10	7
119	65120	65130	10	5	284	74820	74830	10	7
120	65130	65140	10	6	285	74830	74840	10	7
121	65140	65150	10	6	286	74840	74850	10	6
122	65150	65160	10	6	287	74850	74860	10	5
123	65160	65170	10	5	288	74950	74960	10	4
124	65170	65180	10	5	289	74960	74970	10	5
125	65180	65190	10	4	290	74970	74980	10	5
126	65310	65320	10	4	291	74980	74990	10	5
127	65320	65330	10	5	292	74990	75000	10	6
128	65330	65340	10	5	293	75000	75010	10	6

Filling Left					Filling Left				
Sl. No	Change From	Change To	Length (m)	Height (m)	Sl. No	Change From	Change To	Length (m)	Height (m)
129	65340	65350	10	5	294	75010	75020	10	6
130	65350	65360	10	6	295	75020	75030	10	5
131	65360	65370	10	6	296	75810	75820	10	4
132	65370	65380	10	7	297	75820	75830	10	5
133	65490	65500	10	8	298	75830	75840	10	4
134	65500	65510	10	6	299	75980	75990	10	5
135	65640	65650	10	4	300	75990	76000	10	5
136	65650	65660	10	5	301	76000	76010	10	6
137	65660	65670	10	5	302	76010	76020	10	6
138	65670	65680	10	6	303	76020	76030	10	5
139	65680	65690	10	6	304	76500	76510	10	4
140	65690	65700	10	6	305	76510	76520	10	4
141	65730	65740	10	6	306	76520	76530	10	4
142	65740	65750	10	7	307	76600	76610	10	4
143	65750	65760	10	9	308	76610	76620	10	5
144	65760	65770	10	10	309	76620	76630	10	5
145	65770	65780	10	11	310	76630	76640	10	6
146	65780	65790	10	11	311	76640	76650	10	6
147	65900	65910	10	5	312	76650	76660	10	6
148	66420	66430	10	5	313	76660	76670	10	6
149	66430	66440	10	7	314	76670	76680	10	6
150	66440	66450	10	8	315	76680	76690	10	7
151	66450	66460	10	6	316	76690	76700	10	8
152	66730	66740	10	4	317	76700	76710	10	8
153	66740	66750	10	6	318	76710	76720	10	9
154	66750	66760	10	7	319	76720	76730	10	9
155	66760	66770	10	9	320	76730	76740	10	10
156	66770	66780	10	10	321	76740	76750	10	10
157	66780	66790	10	11	322	76750	76760	10	11
158	66790	66800	10	11	323	76760	76770	10	11
159	66800	66810	10	10	324	76770	76780	10	11
160	66810	66820	10	9	325	79320	79330	10	5
161	66820	66830	10	8	326	79330	79340	10	5
162	66830	66840	10	7	327	79340	79350	10	6
163	66840	66850	10	6	328	79350	79360	10	7
164	66850	66860	10	4	329	79360	79370	10	6
165	67010	67020	10	5	330	79370	79380	10	5
					331	81990	82000	10	5
					Total Length(km) = 3.310				

Retaining Walls Locations RHS:

Filling Right					Filling Right				
Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)	Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)
1	52510	52520	10	9	196	68320	68330	10	6
2	52520	52530	10	7	197	68330	68340	10	6
3	53050	53060	10	5	198	68340	68350	10	4
4	53060	53070	10	6	199	68820	68830	10	4
5	53280	53290	10	7	200	69160	69170	10	6
6	53290	53300	10	9	201	69350	69360	10	8
7	54120	54130	10	4	202	69360	69370	10	6
8	54130	54140	10	6	203	69370	69380	10	4
9	54140	54150	10	9	204	69830	69840	10	4
10	54150	54160	10	11	205	69840	69850	10	5
11	54160	54170	10	11	206	69850	69860	10	7
12	54170	54180	10	7	207	69860	69870	10	8
13	54570	54580	10	7	208	69870	69880	10	9
14	54580	54590	10	4	209	69880	69890	10	10
15	54750	54760	10	5	210	69890	69900	10	11
16	54760	54770	10	6	211	69900	69910	10	11
17	54770	54780	10	7	212	69910	69920	10	11
18	54780	54790	10	8	213	69920	69930	10	11
19	54790	54800	10	8	214	69930	69940	10	10
20	55110	55120	10	5	215	69940	69950	10	10
21	56380	56390	10	6	216	69950	69960	10	9
22	56390	56400	10	7	217	69960	69970	10	9
23	56400	56410	10	9	218	69970	69980	10	8
24	56410	56420	10	11	219	69980	69990	10	8
25	56420	56430	10	11	220	69990	70000	10	7
26	56430	56440	10	9	221	70000	70010	10	6
27	56440	56450	10	6	222	70010	70020	10	5
28	56450	56460	10	6	223	70020	70030	10	5
29	56460	56470	10	6	224	70390	70400	10	5
30	56470	56480	10	6	225	70400	70410	10	6
31	56480	56490	10	7	226	70410	70420	10	7
32	56490	56500	10	7	227	70420	70430	10	7
33	56500	56510	10	6	228	70430	70440	10	8
34	56510	56520	10	6	229	71370	71380	10	5
35	56520	56530	10	4	230	71380	71390	10	6
36	56630	56640	10	6	231	71390	71400	10	7
37	56640	56650	10	8	232	71400	71410	10	7
38	56650	56660	10	10	233	71410	71420	10	4
39	56660	56670	10	10	234	71420	71430	10	6
40	56670	56680	10	8	235	71430	71440	10	7
41	56680	56690	10	6	236	71440	71450	10	8
42	56740	56750	10	4	237	71450	71460	10	9

Filling Right					Filling Right				
Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)	Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)
43	56750	56760	10	6	238	71460	71470	10	10
44	56760	56770	10	9	239	71470	71480	10	10
45	56770	56780	10	10	240	71480	71490	10	9
46	56780	56790	10	9	241	71490	71500	10	9
47	56790	56800	10	7	242	71500	71510	10	8
48	56830	56840	10	4	243	71510	71520	10	8
49	56840	56850	10	7	244	71520	71530	10	7
50	56850	56860	10	6	245	71530	71540	10	7
51	56930	56940	10	5	246	71540	71550	10	6
52	56940	56950	10	7	247	71550	71560	10	5
53	58030	58040	10	5	248	71560	71570	10	5
54	58040	58050	10	5	249	71570	71580	10	5
55	59470	59480	10	5	250	71580	71590	10	5
56	59480	59490	10	5	251	71590	71600	10	5
57	59720	59730	10	6	252	71600	71610	10	5
58	59730	59740	10	8	253	71610	71620	10	4
59	59740	59750	10	10	254	71620	71630	10	4
60	59750	59760	10	8	255	71630	71640	10	5
61	59760	59770	10	6	256	71640	71650	10	5
62	59770	59780	10	5	257	71650	71660	10	6
63	59780	59790	10	5	258	71660	71670	10	6
64	59790	59800	10	7	259	71670	71680	10	7
65	59800	59810	10	8	260	71680	71690	10	7
66	59810	59820	10	8	261	71690	71700	10	7
67	59820	59830	10	8	262	71700	71710	10	7
68	59830	59840	10	7	263	71710	71720	10	7
69	59840	59850	10	5	264	71720	71730	10	7
70	60020	60030	10	6	265	71730	71740	10	7
71	60220	60230	10	9	266	71740	71750	10	7
72	60230	60240	10	9	267	71750	71760	10	6
73	60240	60250	10	6	268	71760	71770	10	5
74	60380	60390	10	5	269	71770	71780	10	5
75	60390	60400	10	8	270	72230	72240	10	6
76	60500	60510	10	7	271	72240	72250	10	5
77	60510	60520	10	5	272	72450	72460	10	5
78	60560	60570	10	4	273	74410	74420	10	4
79	60570	60580	10	5	274	74420	74430	10	5
80	60580	60590	10	6	275	74430	74440	10	6
81	60590	60600	10	6	276	74440	74450	10	7
82	60600	60610	10	7	277	74450	74460	10	7
83	60610	60620	10	7	278	74460	74470	10	7
84	60620	60630	10	6	279	74470	74480	10	7
85	60630	60640	10	5	280	74480	74490	10	7

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Filling Right					Filling Right				
Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)	Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)
86	60940	60950	10	5	281	74490	74500	10	7
87	60950	60960	10	6	282	74500	74510	10	7
88	60960	60970	10	4	283	74510	74520	10	7
89	61100	61110	10	5	284	74520	74530	10	6
90	61700	61710	10	5	285	74530	74540	10	5
91	62980	62990	10	4	286	74720	74730	10	4
92	62990	63000	10	4	287	74730	74740	10	6
93	63360	63370	10	5	288	74740	74750	10	6
94	63530	63540	10	5	289	74750	74760	10	7
95	63540	63550	10	7	290	74760	74770	10	8
96	63550	63560	10	7	291	74770	74780	10	7
97	63560	63570	10	5	292	74780	74790	10	7
98	64570	64580	10	4	293	74790	74800	10	6
99	64580	64590	10	5	294	74800	74810	10	5
100	64590	64600	10	6	295	74810	74820	10	5
101	64600	64610	10	6	296	74820	74830	10	4
102	64610	64620	10	7	297	75760	75770	10	4
103	64620	64630	10	8	298	75770	75780	10	5
104	64630	64640	10	8	299	75780	75790	10	6
105	64640	64650	10	9	300	75790	75800	10	6
106	64650	64660	10	9	301	75800	75810	10	7
107	64660	64670	10	10	302	75810	75820	10	7
108	64670	64680	10	10	303	75820	75830	10	7
109	64680	64690	10	11	304	75830	75840	10	7
110	64690	64700	10	11	305	75840	75850	10	7
111	64700	64710	10	11	306	75850	75860	10	6
112	64710	64720	10	11	307	75860	75870	10	6
113	64720	64730	10	11	308	75870	75880	10	6
114	64730	64740	10	11	309	75880	75890	10	5
115	64740	64750	10	11	310	75890	75900	10	5
116	64750	64760	10	11	311	75900	75910	10	5
117	64760	64770	10	11	312	75910	75920	10	4
118	64770	64780	10	11	313	75940	75950	10	4
119	64780	64790	10	10	314	75950	75960	10	5
120	64790	64800	10	10	315	75960	75970	10	6
121	64800	64810	10	9	316	75970	75980	10	7
122	64810	64820	10	9	317	75980	75990	10	8
123	64820	64830	10	8	318	75990	76000	10	9
124	64830	64840	10	7	319	76000	76010	10	9
125	64840	64850	10	6	320	76010	76020	10	8
126	64850	64860	10	5	321	76020	76030	10	6
127	64860	64870	10	5	322	76030	76040	10	4
128	65110	65120	10	4	323	76360	76370	10	4

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Filling Right					Filling Right				
Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)	Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)
129	65120	65130	10	5	324	76370	76380	10	5
130	65130	65140	10	6	325	76380	76390	10	5
131	65140	65150	10	6	326	76390	76400	10	6
132	65150	65160	10	7	327	76400	76410	10	7
133	65160	65170	10	7	328	76410	76420	10	8
134	65170	65180	10	7	329	76420	76430	10	8
135	65180	65190	10	7	330	76430	76440	10	8
136	65190	65200	10	6	331	76440	76450	10	8
137	65200	65210	10	6	332	76450	76460	10	8
138	65210	65220	10	6	333	76460	76470	10	9
139	65220	65230	10	5	334	76470	76480	10	9
140	65230	65240	10	5	335	76480	76490	10	9
141	65240	65250	10	5	336	76490	76500	10	8
142	65250	65260	10	5	337	76500	76510	10	8
143	65260	65270	10	5	338	76510	76520	10	7
144	65270	65280	10	5	339	76520	76530	10	6
145	65280	65290	10	6	340	76530	76540	10	6
146	65290	65300	10	6	341	76540	76550	10	6
147	65300	65310	10	6	342	76550	76560	10	6
148	65310	65320	10	7	343	76560	76570	10	5
149	65320	65330	10	7	344	76570	76580	10	5
150	65330	65340	10	7	345	76580	76590	10	5
151	65340	65350	10	8	346	76590	76600	10	5
152	65350	65360	10	8	347	76600	76610	10	6
153	65360	65370	10	8	348	76610	76620	10	6
154	65370	65380	10	9	349	76620	76630	10	7
155	65500	65510	10	7	350	76630	76640	10	7
156	65510	65520	10	4	351	76640	76650	10	7
157	65630	65640	10	6	352	76650	76660	10	7
158	65640	65650	10	6	353	76660	76670	10	7
159	65650	65660	10	7	354	76670	76680	10	8
160	65660	65670	10	7	355	76680	76690	10	8
161	65670	65680	10	8	356	76690	76700	10	9
162	65680	65690	10	8	357	76700	76710	10	9
163	65690	65700	10	8	358	76710	76720	10	10
164	65700	65710	10	6	359	76720	76730	10	11
165	65710	65720	10	5	360	76730	76740	10	11
166	65720	65730	10	6	361	76740	76750	10	11
167	65730	65740	10	6	362	76750	76760	10	11
168	65740	65750	10	8	363	76760	76770	10	11
169	65750	65760	10	9	364	79280	79290	10	5
170	65760	65770	10	11	365	79290	79300	10	6
171	65770	65780	10	11	366	79300	79310	10	7

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Filling Right					Filling Right				
Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)	Sl. No.	Chainage From	Chainage To	Length (m)	Height (m)
172	65780	65790	10	11	367	79310	79320	10	8
173	65900	65910	10	8	368	79320	79330	10	9
174	65910	65920	10	5	369	79330	79340	10	10
175	66430	66440	10	5	370	79340	79350	10	11
176	66440	66450	10	6	371	79350	79360	10	11
177	66450	66460	10	4	372	79360	79370	10	11
178	66740	66750	10	5	373	79370	79380	10	9
179	66750	66760	10	6	374	79380	79390	10	8
180	66760	66770	10	7	375	79390	79400	10	6
181	66770	66780	10	8	376	79400	79410	10	5
182	66780	66790	10	10	377	79410	79420	10	4
183	66790	66800	10	10	378	79580	79590	10	4
184	66800	66810	10	9	379	79590	79600	10	6
185	66810	66820	10	8	380	79600	79610	10	7
186	66820	66830	10	7	381	79610	79620	10	8
187	66830	66840	10	6	382	79620	79630	10	9
188	66840	66850	10	5	383	79630	79640	10	9
189	67020	67030	10	6	384	79640	79650	10	9
190	67030	67040	10	5	385	79650	79660	10	8
191	67890	67900	10	6	386	79660	79670	10	8
192	68100	68110	10	8	387	79670	79680	10	7
193	68110	68120	10	7	388	79680	79690	10	6
194	68120	68130	10	6	389	79690	79700	10	5
195	68130	68140	10	5	390	79730	79740	10	4
					391	79740	79750	10	4
					Total Length (km) 3.910				

12.2 Breast Wall :

The minimum requirement of 4m height Breast wall are suggested as following which may vary as per final drawings and design approved by competent authority. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work. Hill cutting slope should not exceed 60 degrees, 1.5m benching to be provided at least every 10m height.

Breast Wall	Left Side Length (m)	Right Side Length (m)
	15410	14870

12.3 Hydroseeding

To control soil erosion and re-vegetate areas in hill side, hydroseeding to be provided in total area of 241141 m² by mechanical means where height is between 20-30m.

Note: Any variations in the area specified mentioned above shall not constitute a Change of Scope

12.4 Slope Protection in Hill Cut Sections (4-20m)

At location where hill cutting is between 4m to 20m, required Breast wall to be provided upto 4m height and between 4m to 20m, slope to be protected with Earth anchors, Helical Pins and Turf reinforced mat. The technical specification and item description for Earth anchors, Helical Pins and Turf reinforced mat are given below.

- Providing Flexible Earth Percussion Anchor with three part system consisting of Anchor head with material composition of Zinc-Aluminium Alloy ZA-3, Load bearing plate material composition of Die Cast Zinc-Aluminium Alloy ZA-2 ; Utilizing a Ceramic Roller & Directional Locking Device connected by wire rope tendon which is Zinc Aluminium Coated and a ferrule, Diameter of wire rope tendon ranges from 3mm, 4mm or 6mm . The Anchor assembly Ultimate Strength varies between a minimum of 500kg to a maximum of 1270Kg. The anchor drive depth varies between 0.5m to 2m. Anchor performance is a function of in situ soil strength and therefore the load range in this specification should be regarded as a guide only.
- Providing Helical pins to hold the turf reinforcement mat in position and shall be driven for permanent tie down of the surface protection material in locations specified in the drawings. The pin system shall be made of materials suitable to resist corrosion typically Zinc + Aluminium coated and shall conform to BS10270-1. The top coil of the pin system shall be formed for interaction with installation tools. The pin shall have a minimum drive depth of 0.2m and maximum drive depth of 0.3m
- Providing machine made mat of 100% Coconut fibre matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix is evenly distributed across entire width of mat and stitch bonded between ultra-heavy duty UV stabilised netting with thickness of mat as 18.54mm with heavy duty Helical pins to keep the erosion control mats in position and in close contact with underlying slope with a minimum drive depth of 200mm and maximum drive depth of 300mm, specifically designed for tougher soils and superior performance

The minimum quantity of protection works may be taken as below

Sl no.	Description of item	Side	Unit	Quantity
1	Slope Stabilization with Earth anchors, Helical Pins and Turf reinforced mat	LHS	Sqm	71048.26
2	Slope Stabilization work by Earth anchors, Helical Pins and Turf reinforced mat	RHS	Sqm	66661

Note: Any variations in the area specified mentioned above shall not constitute a Change of Scope

12. CHANGE OF SCOPE

The length of Viaducts, Culverts, Retaining Walls, Breast Walls, Bridges etc. 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 Article 13.

SCHEDULE - C
(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

- (a) Toll plaza;
- (b) Roadside furniture;
- (c) Pedestrian facilities;
- (d) Tree plantation;
- (e) Truck lay-byes;
- (f) Bus stop and shelters;
- (h) Rest areas; and
- (i) Others to be specified

2 Description of Project Facilities

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 following locations:

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

(b) Roadside Furniture

The roadside furniture shall include the provision of the;

i. Traffic Signs

Typical drawings of Traffic signs include roadside signs, overhead signs and curb mounted signs etc provided for the entire Project Highway is given and location of the same shall be as per IRC 67 recommended in Schedule D.

ii. Pavement Markings

Pavement markings shall cover road marking for the entire Project Highway as per manual recommended in Schedule D.

iii. LED Traffic Blinkers

LED traffic blinker signal provided for entire project.

iv. Crash barrier

Provide W-beam crash barrier along the project highway at the locations as suggested in

manual recommended in Schedule D.

v. Delineators

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

vi. Boundary stones

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

vii. Hectometer / Kilometer stones

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

(c) Pedestrian Facilities

The pedestrian facilities shall include the provision of the;

- i. Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location.
- ii. Pedestrian Crossings: Provide pedestrian crossing facilities on locations as recommended in Schedule D.

(d) Landscaping and Tree Plantation

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

(e) Truck Lay-byes

Truck lay byes shall be provided at the following locations for a capacity of minimum 10 trucks at each location.

Sr. No.	Proposed Ch.
	Nil

(f) Bus Shelter

Bus Shelters shall be provided at locations given below:

Sr. No.	Proposed Chainage	Direction
1	57+620	LHS
2	57+720	RHS
3	73+930	LHS
4	74+030	RHS

(g) Rest Areas,

Nil.

(h) Others

1. Highway Lighting

Lighting shall be provided at the following locations (Minimum 40 Lux to be maintained):

- (i) Lighting shall be provided at approach to bridges, Built up areas, Toll plaza, Bus shelter, truck Lay-bys, and as per manual recommended in Schedule D.
- (ii) High Mast Lighting shall be provided at all Major Junctions, Toll plaza locations,

2. Highway Patrol

Not applicable

3. Ambulances

Not applicable

4. Cranes

Not applicable

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Construction

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

2 Design Standards

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

Manual of Specifications and Standards for Two Lanning of Highways (IRC: SP: 73-2018), referred to herein as the Manual.

IRC-37-2018: Guidelines for the design of flexible pavements

Code for Practice of Road Signs IRC 67:2001.

The Hill Road Manual IRC SP 48 -1998 should be referred.

The NGT Order dated 01.11.2018 should be followed for disposal of muck.

Annex – I
(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

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

2 Deviations from the Specifications and Standards

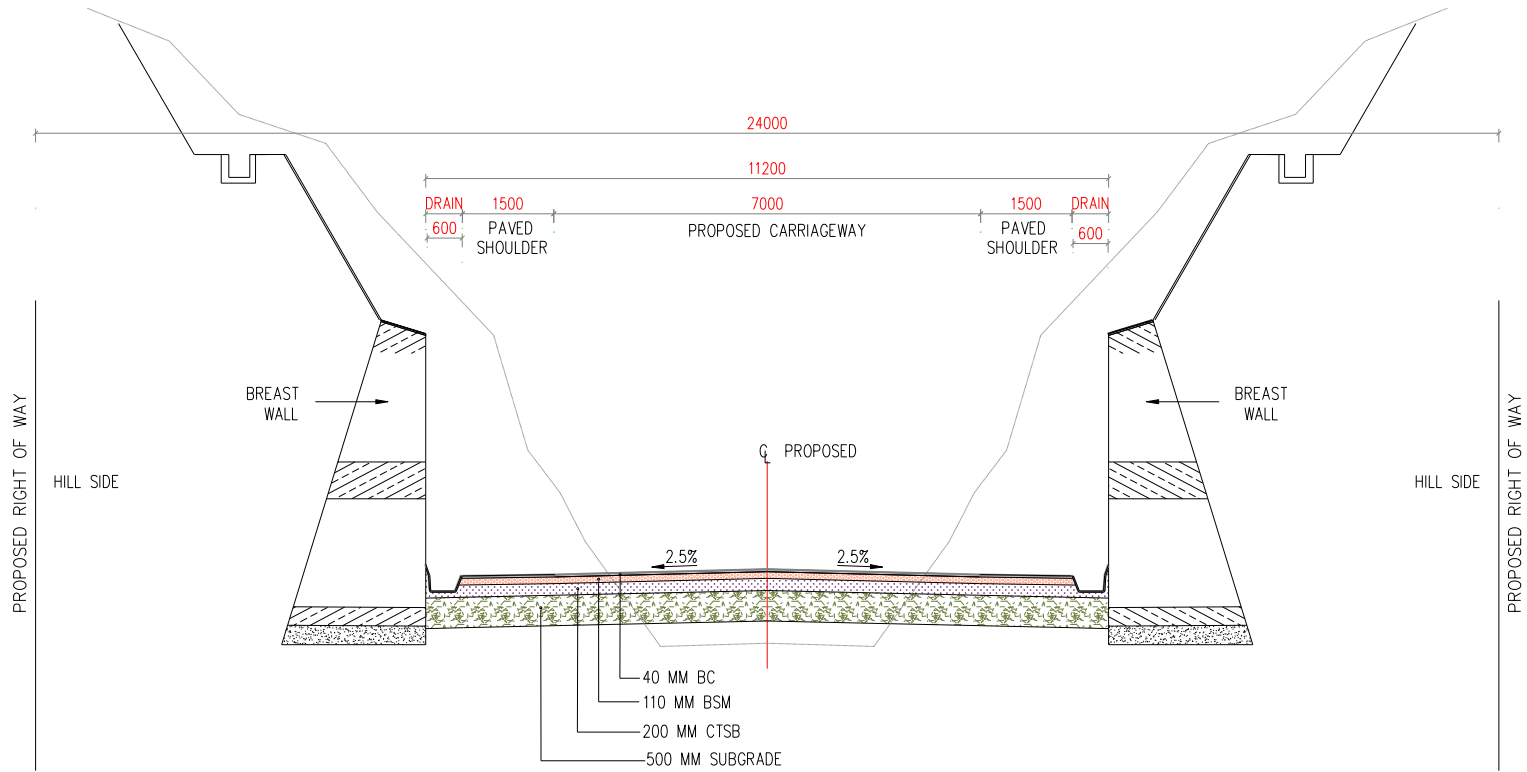
- 1.1** The terms “Concessionaire”, “Independent Engineer” and “Concession Agreement” used in the Manual shall be deemed to be substituted by the terms “Contractor”, “Authority’s Engineer” and “Agreement” respectively.
- 1.2** Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent as set forth below:-

Clause Referred in Manual	Item	Provision as per Manual	Modified Provision	Remarks
2.16	Typical Cross Section	10.0 m Paved and 1.0m Earthen Shoulder	As specified in Schedule B	-
2.2.1	Minimum design speed in hilly terrain.	40 kmph	At some locations , 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 less 50m.

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Applicable Typical Cross Section:

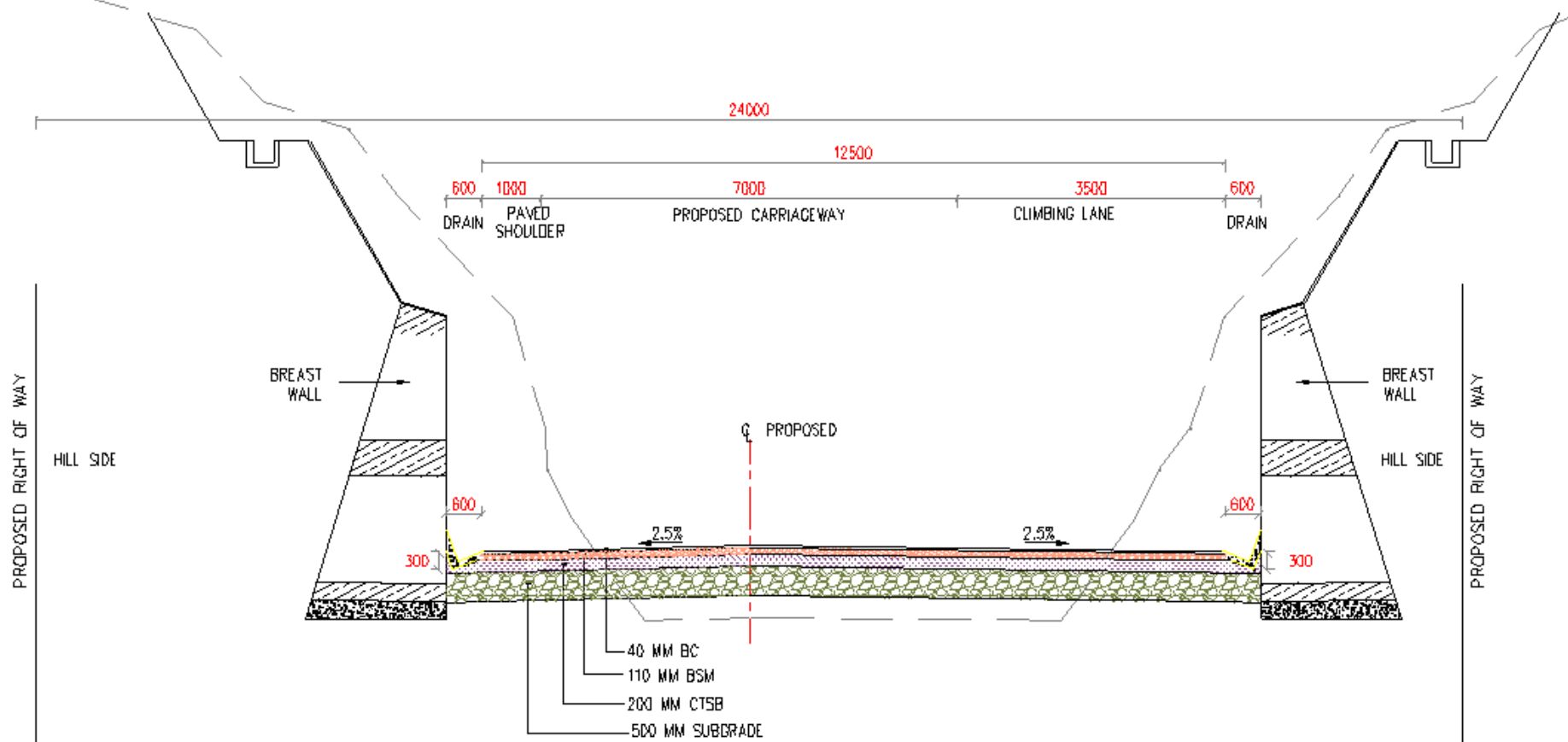
TCS-I



TCS-I
Two Lane With Paved Shoulder New alignment (Both Side Hill Section)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

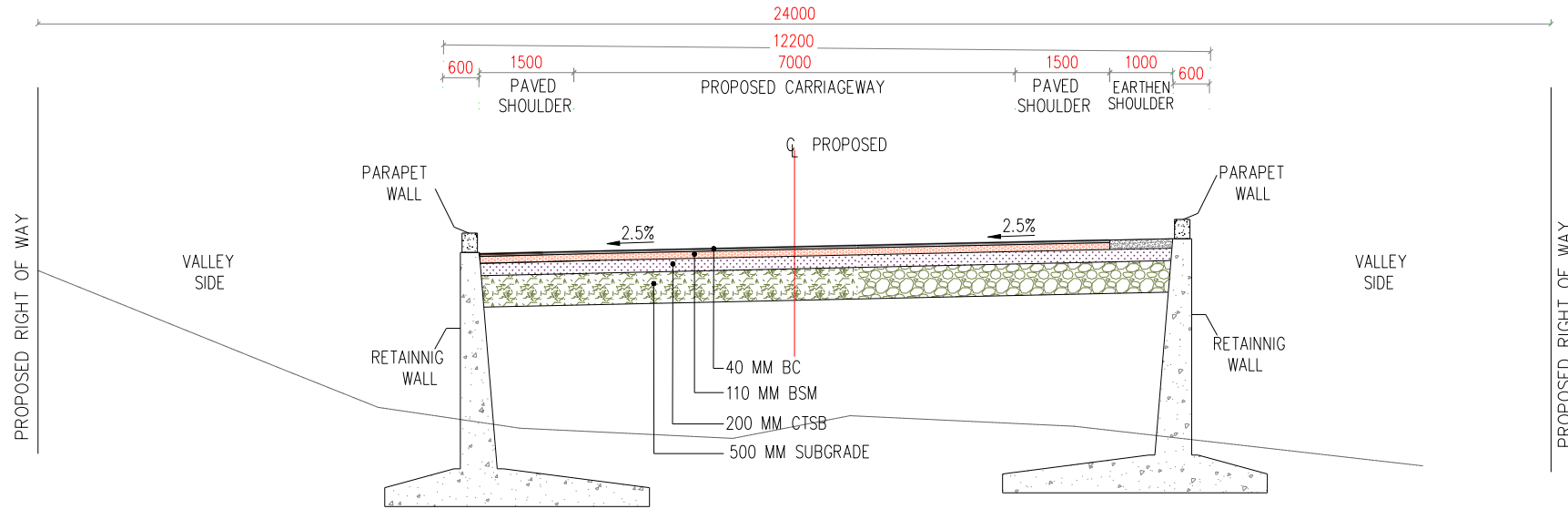
TCS-IA



TCS-IA
Two lane including climbing lane with one side Paved shoulder New alignment
(Both Side Hill section)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

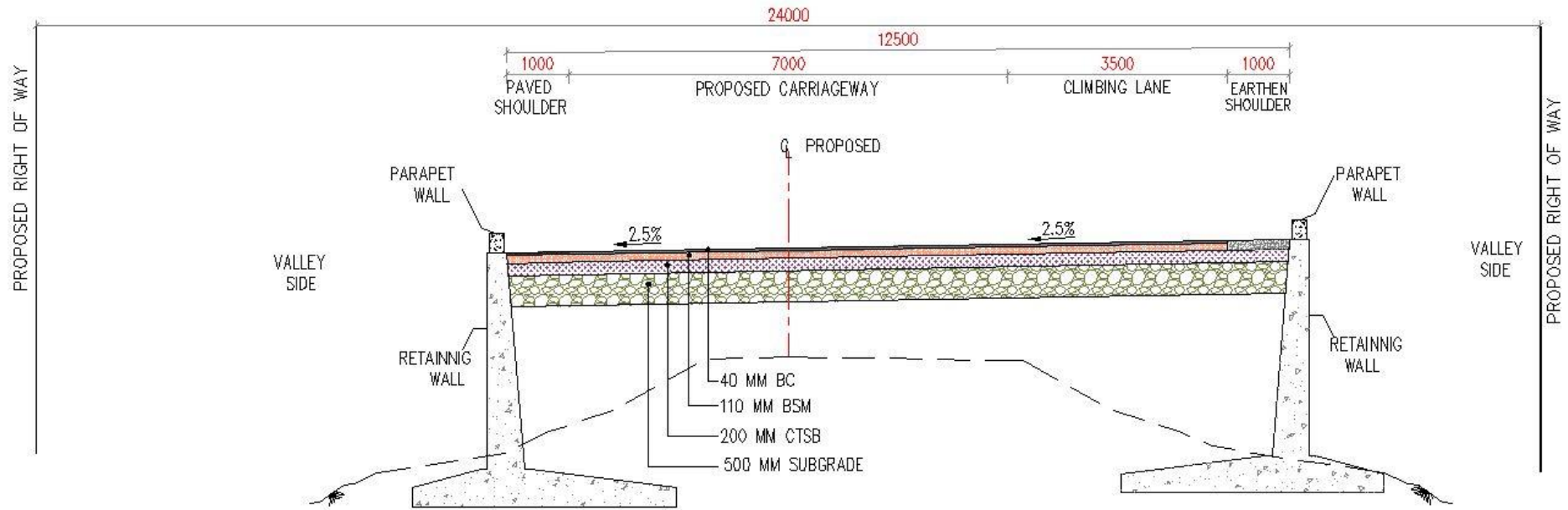
TCS-II



TCS-III
Two Lane With Paved Shoulder (Both Side Valley Section)
(New-Alignment)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

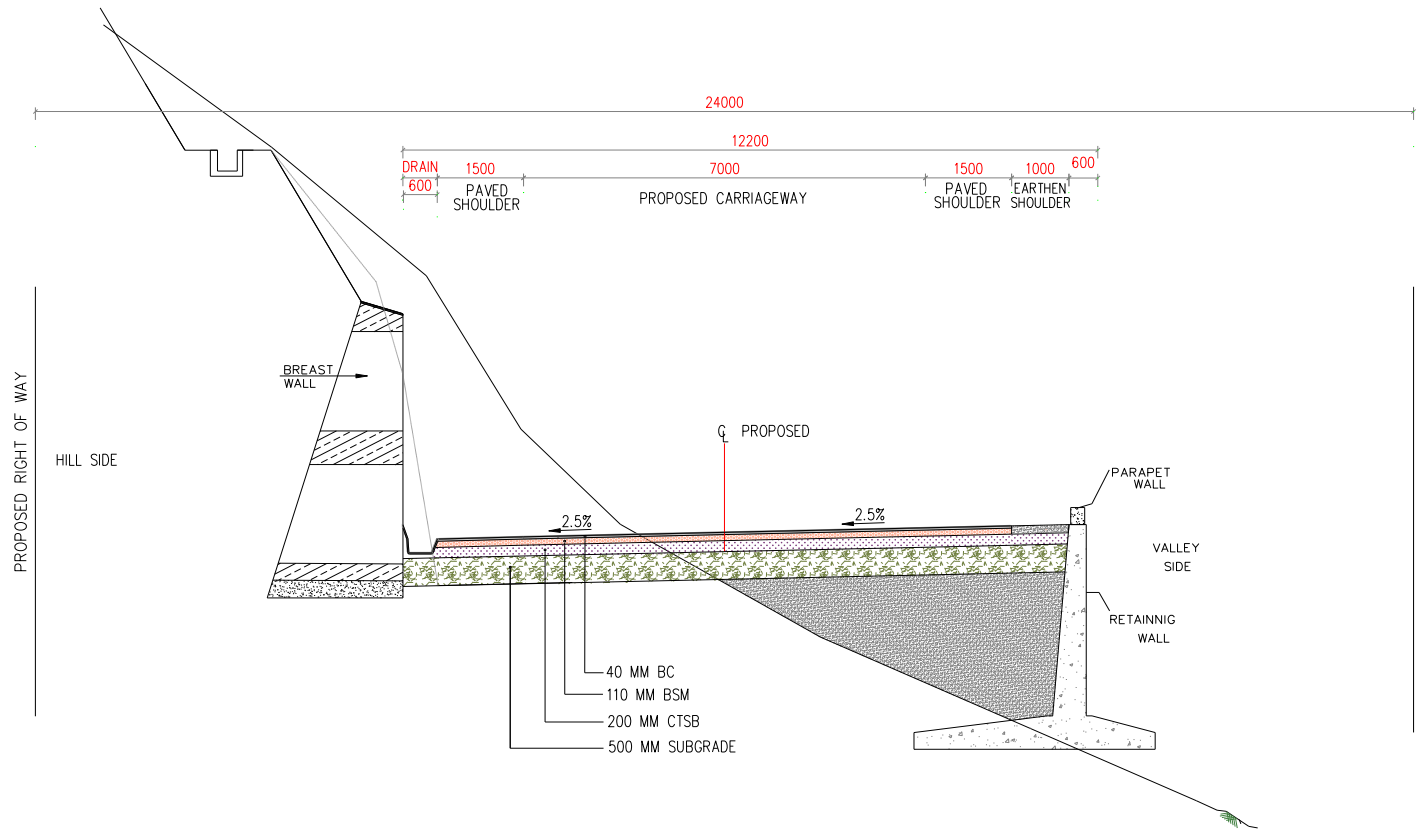
TCS II A



TCS-IIA
Two lane including climbing lane with one side Paved shoulder New alignment
(Both side Valley section)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

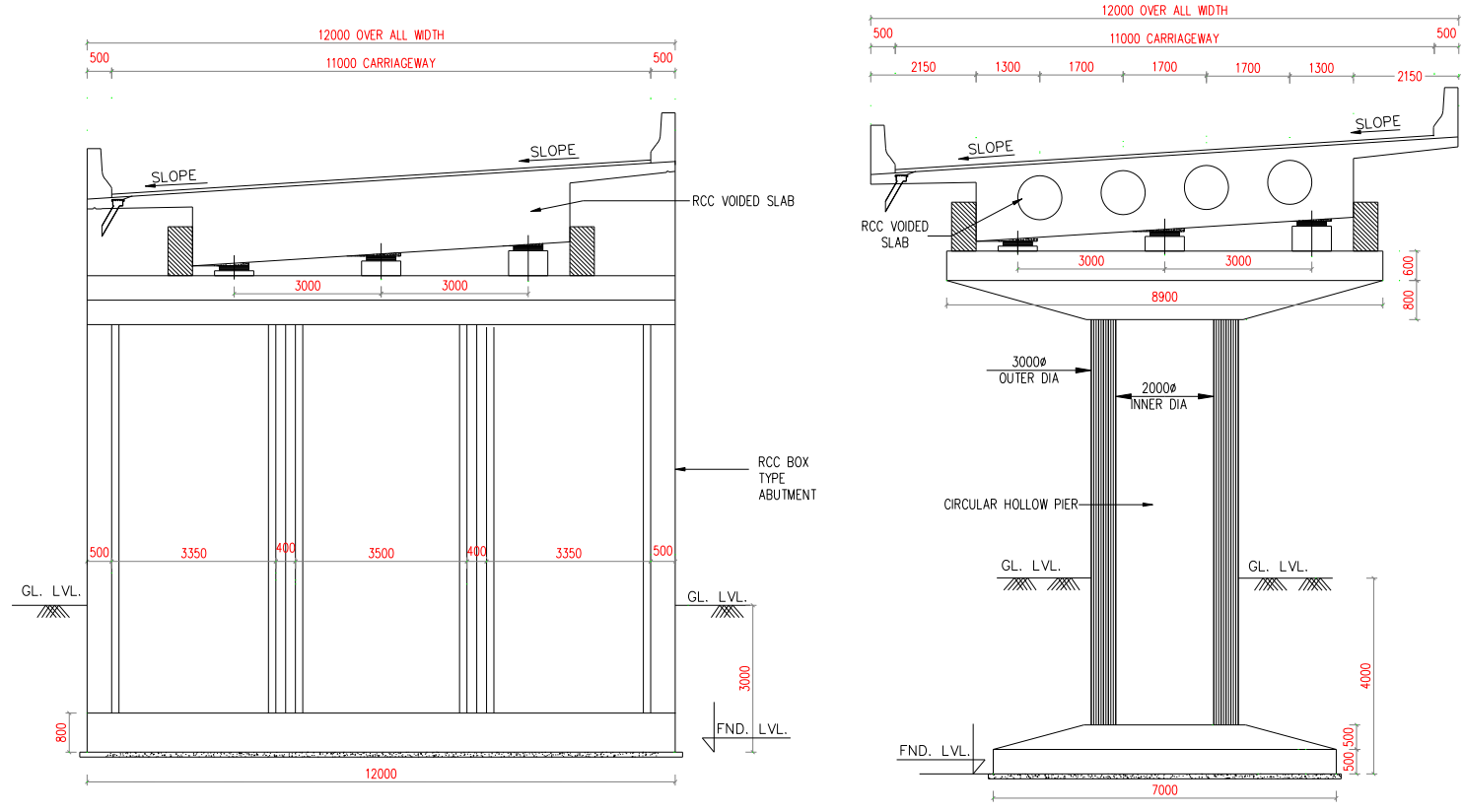
TCS III



TCS-III
Two Lane With Paved Shoulder (One Side Hill One Side Valley Section)
(New-Alignment)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIa on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

TCS-IV



TCS-IV
TYPICAL CROSS SECTION FOR ELEVATED STRUCTURE

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.
- (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)

Annex –I Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	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.tfrc.com/pavement/ltp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually			Class I Profilometer SCRIM (Sideway-force Coefficient Routine)	180 days
	Skid Number	60SN	50SN	Bi-Annually	180 days			BS: 7941-1: 2006
Pavement Condition	3	2.1	Bi-Annually	180 days	IRC:82-2015			

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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																
	Index				Investigation Machine or equivalent)	Inertial Profiling Reference ASTM E1656 -94: 2000-Standard Guide for Classification of Automatic Pavement Condition Survey Equipment													
	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, approaches of connecting roads, slip roads, lay byes etc. as applicable)	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 <table border="1"> <thead> <tr> <th>Minimum SN</th> <th>Traffic Speed (Km/h)</th> </tr> </thead> <tbody> <tr> <td>36</td> <td>50</td> </tr> <tr> <td>33</td> <td>65</td> </tr> <tr> <td>32</td> <td>80</td> </tr> <tr> <td>31</td> <td>95</td> </tr> <tr> <td>31</td> <td>110</td> </tr> </tbody> </table>		Minimum SN	Traffic Speed (Km/h)	36	50	33	65	32	80	31	95	31	110	Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	IRC:SP:83-2008	180 days
Minimum SN	Traffic Speed (Km/h)																		
36	50																		
33	65																		
32	80																		
31	95																		
31	110																		
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 side slope	Daily			7-15 days	MORT&H Specification 408.4											

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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 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:**

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

Sr. 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, discernible from slow moving vehicle	Seal with epoxy, if $L > 1$ m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Route seal and stitch, if $L > 1$ m. Within 15 days	-
			3	$w = 3.0 - 6.0$ mm	Staple, if $L > 1$ m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	$w = 6.0 - 12.0$ mm, usually associated with spalling		
			5	$w > 12$ mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	$w < 0.2$ mm, hair cracks		
			2	$w = 0.2 - 0.5$ mm. discernible from slow vehicle	Seal, and stitch if $L > 1$ m. Within 15 days	-
			3	$w = 0.5 - 3.0$ mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinststate sub-base, Reconstruct whole slab as per specifications within 30 days
			4	$w = 3.0 - 6.0$ mm panel broken into 2 or 3 pieces		
			5	$w > 6$ mm and/or panel broken into more		

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIa on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Sr. 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	$r > 50\%$ and $h > 25$ mm	Within 30 days 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 No action.	Long Term
			1	$r < 2\%$	Local repair of areas damaged and liable to be damaged. Within 7days	Not Applicable
			2	$r = 2 - 10\%$		
			3	$r = 10 - 20\%$	Bonded Inlay within 15 days	
			4	$r = 20 - 30\%$		
			5	$r > 30\%$ and $h > 25$ mm	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action.	
			1	$t > 1$ mm		
			2	$t = 1 - 0.6$ mm	Monitor rate of deterioration	
			3	$t = 0.6 - 0.3$ mm		
			4	$t = 0.3 - 0.1$ mm		
			5	$t < 0.1$ mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m ² d = diameter h = maximum depth	0	$d < 50$ mm; $h < 25$ mm; $n < 1$ per 5 m ²	No action.	Not Applicable
			1	$d = 50 - 100$ mm; $h < 50$ mm; $n < 1$ per 5 m ²	Partial depth repair 65 mm deep. Within 15 days	
			2	$d = 50 - 100$ mm; $h > 50$ mm; $n < 1$ per 5 m ²		
			3	$d = 100 - 300$ mm; $h < 100$ mm $n < 1$ per 5 m ²	Partial depth repair 110mm i.e.10 mm more than the depth of the hole.	
			4	$d = 100 - 300$ mm; $h > 100$ mm; $n < 1$ per 5 m ²		

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Sr. 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	$d > 300$ mm; $h > 100$ mm: $n > 1$ per 5 m^2	Within 30 days 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 and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	$w =$ width on either side of the joint $L =$ length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	$w < 10$ mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	$w = 10 - 20$ mm, $L < 25\%$	Partial Depth Repair. Within 15 days	
			3	$w = 20 - 40$ mm, $L > 25\%$	30 - 50 mm deep, $h = w + 20\%$ of w , within 30 days	
			4	$w = 40 - 80$ mm, $L > 25\%$	50 - 100 mm deep repair. $H = w + 20\%$ of w . Within 30 days	
			5	$w > 80$ mm, and $L > 25\%$		
13	Faulting (or Stepping) in Cracks or Joints	$f =$ difference of level	0	not discernible, < 1 mm	No action.	No action. Replace the slab as appropriate.
			1	$f < 3$ mm		
			2	$f = 3 - 6$ mm	Determine cause and observe, take action for	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Sr. 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	$f = 6 - 12 \text{ mm}$	diamond grinding	Within 30days
			4	$f = 12 - 18 \text{ mm}$	Diamond Grinding	
			5	$f > 18 \text{ mm}$	Raise sunken slab.	Replace the slab as appropriate. Within 30days
					Strengthen subgrade and sub-base by grouting and raising sunken slab	
			14	Blowup or Buckling	h = vertical displacement from normal profile	0
1	$h < 6 \text{ mm}$	No Action				
2	$h = 6 - 12 \text{ mm}$	Install Signs to Warn Traffic within 7 days				
3	$h = 12 - 25 \text{ mm}$					
4	$h > 25 \text{ mm}$	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, $h < 5 \text{ mm}$	No action.	Not Applicable
			1	$h = 5 - 15 \text{ mm}$		
			2	$h = 15-30 \text{ mm}$, Nos $< 20\%$ joints	Install Signs to Warn Traffic within 7 days	
			3	$h = 30 - 50 \text{ mm}$		
			4	$h > 50 \text{ mm}$ or $> 20\%$ joints	Strengthen sub-grade. Reinstate pavement at normal level if $L < 20 \text{ m}$. Within 30 days	
			5	$h > 100 \text{ mm}$		
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. $h < 5 \text{ mm}$	Short Term	Long Term
			1	$h = 5 - 15 \text{ mm}$	No action.	
			2	$h = 15 - 30 \text{ mm}$, Nos $< 20\%$ joints	Follow up.	
			3	$h = 30 - 50 \text{ mm}$	Install Signs to Warn Traffic within 7 days	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIa on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
17	Bump	h = vertical displacement from normal profile	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		
			0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
18	Lane to Shoulder Dropoff	f = difference of level	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
			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 within 7 days	For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			4	f = 50 - 75 mm		
			5	f > 75 mm		
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	Inspect and repair sub-drainage at distressed sections and upstream.
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	
			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	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case $d < D/2$	For the case $d > D/2$
					and subbase. Replace slab. Within 30 days	
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

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

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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)	Minimum Threshold level (TL) & warranty period required up to 2 years					
		Up to 65	200	80					
		65 - 100	250	120					
		Above 100	350	150					
		<u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u> Initial 7 days Retro reflectivity: 100 mcd/m ² /lux Minimum Threshold Level: 50 mcd/m ² /lux							
	Skid Resistance	Initial and Minimum performance for Skid Resistance: Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc			Bi-Annually	As per Annexure-G of IRC:35-2015		Within 24 hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.			Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged.	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and	IRC:67-2012

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

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 defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40- 1993.	15 days	IRC SP 40- 1993 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.					
Cracks wider than 0.3 mm not more than 1m aggregate length							
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.	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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 on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sqm	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	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sqm					
Delamination	Not more than 0.50 sq.m						

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					portion with epoxy mortar / concrete.		
	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 live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
			to 30 m				
	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 expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and 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.

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Bridge-substructure	Cracks/spalling of concrete/rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed	30 days	IRC SP: 40-1993 and MORTH specification 2800.
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				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.			specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
<p>Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.</p>							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b) Granular earth shoulders, side slopes, drains and culverts		
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi- urban areas	24 (twenty four) hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c) Road side furniture including road sign and pavement marking		
(i)	Damage to shape or position, poor visibility or loss of retro- reflectivity	48 (forty eight) hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/ Once every year
(iii)	Damaged/missing signs road requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d) Road lighting		
(i)	Any major failure of the system	24 (twenty four) hours
(ii)	Faults and minor failures	8 (eight) hours
(e) Trees and plantation		
(i)	Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 (twenty four)hours
(ii)	Removal of fallen trees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f) Rest area		
(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(h) Other Project Facilities and Approach roads		

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Nature of Defect or deficiency		Time limit for repair/ rectification
(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	within 48 (forty eight) hours
	Permanent measures	within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	Foundations	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	Piers, abutments, return walls and wing walls	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	Bearings (metallic) of bridges	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	Joints	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	Other items	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	Hill Roads	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(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 : Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

WHEREAS:

_____ [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 Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim.

- (A) on Engineering, Procurement and Construction (the "**EPC**") basis, 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,

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim.

tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on ****¹. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to

¹ Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 of the Agreement).

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.

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

SIGNED, SEALED AND DELIVERED

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

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Annex – II: Form for Guarantee for Advance Payment

[DG (RD) &SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

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 Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim. on Engineering, Procurement and Construction (the "**EPC**") basis, 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**")².
- (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 instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways 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 The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment

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 ****³ Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
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.

³ 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).

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

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

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

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

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

Schedule-H

(See Clause 10.1 (iv) and 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs -----

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	28.406 %	A- Widening and strengthening of existing road	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course/CTSB	0.00%
		(3) Non Bituminous Base Course	0.00%
		(4) Bituminous Base Course/BSM	0.00%
		(5) Wearing Coat/BC	0.00%
		(6) Widening and repair of culvert	0.00%
		B1- Reconstruction/ New 2-Lane realignment/bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	64.005%
		(2) Cement Treated Sub Base (CTSB)	12.509%
		(3) Bituminous Stabilized Material (BSM)	12.310%
		(4) BC	7.312%
		B2- Reconstruction/ New 2-Lane realignment/bypass (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.000%
		(2) Sub-base Course	0.000%
		(3) Dry Lean Concrete (DLC) Course	0.000%
		(4) Pavement Quality Control (PQC) Course	0.000%
		C1- Reconstruction/ New Service Road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Non Bituminous Base Course	0.00%
(4) Bituminous Base Course	0.00%		
(5) Wearing Coat	0.00%		

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		C2- Reconstruction/ New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00%
		(2) Sub-base Course	0.00%
		(3) Dry Lean Concrete (DLC) Course	0.00%
		(4) Pavement Quality Control (PQC) Course	0.00%
		D - Re-Construction and new culverts on existing road, realignments on existing road, realignments, bypasses:	
		Culverts(Length<6m)	3.864%
Minor Bridges/Underpasses/ Overpasses		<u>A1-Widening and Repairs of Minor Bridges (Length>6m and <60m)</u>	
		Minor bridges	0.00%
		<u>A2-New Minor Bridges (Length>6m and <60m)</u>	
		(1) Foundation	
		On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%
		(2) Sub-structure:	
	0.00%	On completion of abutments, piers upto the abutment/ pier cap including wing/ return/ retaining wall upto top	0.00%
		(3) Super Structure:	
		On completion of the super-structure in all respects including Girder, Deck slab, bearings	0.00%
		(4) Approaches:	
		On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	0.00%
		(5) Guide Bund and River Training Works:	
		On completion of Guide Bund and River Training Works complete in all respect.	0.00%
		(6) Other Ancilliary Works:	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
RUB/ROB/elevated sections/flyovers including viaducts, if any		(1) Foundation: on completion of the foundation work including foundations for return walls, abutments, piers	0.00%
		(2) Sub-structure: on completion abutments, piers upto the abutment/Pier cap	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including girder, deck slab, bearings	0.00%
		(4) Wearing coat including expansion joints	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		<u>A.2 -New Major Bridges</u>	
		(1) Foundation: on completion of the foundation work including foundations for return walls, abutments, piers	0.00%
		(2) Sub-structure: on completion abutments, piers upto the abutment/Pier cap	0.00%
		(3) Super-structure: On completion of the super-structure in all respects including girder,deck slab, bearings	0.00%
		(4) Wearing Coat including expansion joints	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Guide bunds, River Training Works etc	0.00%
		(8) Approaches (including retaining walls, stone pitching and protection works)	0.00%
		<u>B.1-Widening and repair of</u>	
		(a) ROB	
		(b) RUB	
		(1) Foundation	0.00%

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage		
		(2) Sub-structure	0.00%		
		(3) Super-structure (including bearings)	0.00%		
		(4) Wearing Coat (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%		
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%		
		(6) Wing walls/Return Walls	0.00%		
		(7) Retaining/Reinforced earth walls	0.00%		
		(8) Approaches and ancillary works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.))	0.00%		
		<u>B.2-New ROB/RUB</u>			
		(a) ROB			
		(b) RUB			
		(1) Foundation	0.00%		
		(2) Sub-structure	0.00%		
		(3) Super-structure (including bearings)	0.00%		
				(4) Wearing Coat (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.	0.00%
				(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
	(6) Wing walls/Return Walls			0.00%	
	(7) Retaining/Reinforced earth walls			0.00%	
	(8) Approaches and ancillary works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.))			0.00%	
	C.1- Widening and repair of Elevated Sections/Flyovers/Grade Separators				
	(1) Foundation			0.00%	
	(2) Sub-structure			0.00%	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		(3) Super-structure (including bearings)	0.00%
		(4) Wearing Coat including expansion joints.	0.00%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	0.00%
		(6) Wing walls/Return Walls	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and ancillary works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.))	0.00%
		C.2.New Elevated Sections / Flyovers / Grade Separators	
		(1) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	6.366%
		(2) Sub-structure: On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	49.777%
		(3) Super-structure: On completion of the super structure in all respects including girder, deck slab, bearings	35.898%
		(4) Wearing Coat including expansion joints.	3.184%
		(5) Miscellaneous items like hand rails, crash barriers, road markings etc.	4.775%
		(6) Wing walls/Return Walls	0.00%
		(7) Retaining/Reinforced earth walls	0.00%
		(8) Approaches and ancillary works (wearing coat, expansion joints, hand rails, crash barriers, road signs & markings, stone pitching, protection works etc.))	0.00%
Other works	28.393%	(i) Toll Plaza	0.00%
		(ii) Catch Water drains	0.000%
		Lined Drain	3.135%
		Cover Drain	0.000%
		(iii) Road signs, markings, km stones, safety devices, ...	1.833%

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
		(iv) Road Studs	0.775%
		(v) Project facilities	0.00%
		a) Bus Shelter	0.00%
		b) Truck lay bye	0.00%
		c) Rest Areas	0.00%
		d) Others (Includes junction and Site Clearance)	0.551%
		(vi) Retaining Wall	33.606%
		(vii) Breast Wall	15.306%
		(viii) RE Wall	0.00%
		(ix) Street Lighting	0.00%
		(x) Utility ducts	0.00%
		(xi) Parapet wall	1.574%
		(xii) Footpath and separators	0.00%
		(xiii) Hydroseeding by mechanical means	11.151%
		(xiv) Road side plantation including horticulture in wayside amenities	0.00%
		(xv) Slope Stabilization work by terra lock pins, terra lock anchors and turf reinforced mat	31.841%
		(xvi) Safety and traffic management during construction	0.228%
		(xvii) Protection works like pitching on side slopes, chutes, crash barrier	0.00%

1.3 Procedure of estimating the value of work done.

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage - weightage	Payment Procedure
A- Widening and strengthening of existing road		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.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course/CTSB	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course/BSM	0.00%	

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

Stage of Payment	Percentage - weightage	Payment Procedure
(5) Wearing Coat/BC	0.00%	
(6) Widening and repair of culvert	0.00%	Cost of completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of atleast five culverts.
B1- Reconstruction / New 2-Lane realignment / bypass (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	64.005 %	
(2) Cement Treated Sub Base (CTSB)	12.509%	
(3) Bituminous Stabilized Material (BSM)	12.310%	
(4) BC	7.312%	
B2- Reconstruction/ New 2-Lane realignment/bypass (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.000%	
(2) Sub-base Course	0.000%	
(3) Dry Lean Concrete (DLC) Course	0.000%	
(4) Pavement Quality Control (PQC) Course	0.000%	
C1- Reconstruction/ New Service Road (Flexible Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Non Bituminous Base Course	0.00%	
(4) Bituminous Base Course	0.00%	
(5) Wearing Coat	0.00%	
C2- Reconstruction/ New Service Road (Rigid Pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length whichever is less.
(1) Earthwork up to top of the sub-grade	0.00%	
(2) Sub-base Course	0.00%	
(3) Dry Lean Concrete (DLC) Course	0.00%	
(4) Pavement Quality Control (PQC) Course	0.00%	
D - Re-Construction and new culverts on existing road, realignments on existing road, realignments, bypasses:		Cost of completed culverts shall be determined pro rate with respect to the total number of culverts. Payment shall be made on the completion of atleast five culverts.
Culverts (Length < 6m)	3.864%	

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@ For calculation of payment stage for main-carriageway the project length shall be converted into equivalent 2 lane length. For example, if the total length of 4 lane main carriageway is 100 km, then the equivalent length for calculation of payment stage will be 2 x 100 km. Now, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

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

Where

P = Contract Price

L = Total equivalent 2-Lane length in km as defined above

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

Note: The length affected due to law and order problems or litigation during execution including the length not handed over to the Contractor under clause 8.3 of this Contract Agreement due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.3.2 Minor Bridge and Underpasses/Overpasses

Procedure for estimating the value of Minor Bridge works and Underpasses/Overpasses shall be stated in table 1.3.2

Table 1.3.2

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
<u>A1-Widening and Repairs of Minor Bridges (Length>6m and <60m)</u>	0.0%	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening and repair works of a minor bridge.
<u>A2-New Minor Bridges</u>		
(i) Foundation:		(i) Foundation: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+sub structure shall be made on pro rata basis on completion of a stage i.e. not less than 25% of the scope of foundation each bridge.
On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%	In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
(ii) Sub-structure:		
On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	0.00%	Sub-structure: Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. 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 each bridge.
(iii) Super Structure:		(ii) Super Structure:

Stage of Payment	Percentage - weightage	Payment Procedure
On completion of the super structure in all respects including girder,deck slab,bearings	0.00%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub- clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(iv) Approaches:		(iii) Approaches:
On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use	0.00%	Payment shall be made on pro rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of " Stage of Payment" in this sub clause.
(v) Guide Bund and River Training Works:		(iv) Guide Bund and River Training Works:
On completion of Guide Bund and River Training Works complete in all respect.	0.00%	Payment shall be made on pro rata basis on completion of a stage i.e. completion of Guide Bunds and River Training Works in all respect as specified.
(6) Other Ancillary Works: On Completion of wearing coat,expansion joints, hand rails, crash barriers, road signs markings, tests on completion in all respect.	0.00%	Other Ancillary Works: Payment shall be made on pro-rata basis on completion of a stage in all respects as specified
B.1- Widening and repair of Underpasses/overpasses		Cost of each overpass/underpass shall be determined on pro rata basis with respect to the total linear length of the underpass/overpass. Payment shall be made on the completion of wiening & repair works of a underpass/overpass.
B.2- New Underpasses/overpasses		
(i) Foundation:		(i) Foundation: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation+sub structure shall be made on pro rata basis on copletion of a stage i.e. not less than 25% of the scope of foundation each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified
On completion of the foundation work including foundations for wing and return walls, abutments, piers.	0.00%	
(ii) Sub-structure:		
On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	0.00%	Sub-structure: Cost of each minor bridge shall be determined on pro- rata basis with respect to the total linear length (m) of the minor bridges. Payment against sub- structure shall be made on pro-rata basis on completion of a stage

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Stage of Payment	Percentage - weightage	Payment Procedure
		i.e. not less than 25% of the scope of sub-structure of each bridge.
(iii) Super Structure:		(ii) Super Structure:
On completion of the super structure in all respects including girder,deck slab,bearings	0.00%	Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of super structure of atleast one span in all respects as specified in the column of "Stage of Payment" in this sub- clause. In case of structures where pre-cast girders have been proposed by the Contractor, 50% of the stage payment shall be due and payable on casting of girders for each span and balance 50% of the stage payment shall be made on completion of stage specified as above
(iv) On completion of Retaining /Reinforced earth walls complete in all respect and fit for use	0.00%	Payments shall be made on pro rata basis on completion of 20% of the Total area.
(iii) Approaches:		(iii) Approaches:
On completion of approaches including Retaining Walls, stone pitching, protection works complete in all respect and fit for use	0.00%	Payment shall be made on pro rata basis on completion of a stage in all respect as specified

1.3.3 Major Bridge Works, ROB/RUB and Structures.

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

Table 1.3.3

Stage of Payment	Percentage - weightage	Payment Procedure
1	2	3
A1-Widening and Repairs of Major Bridges		
(i) Foundation:		(i) Foundation: Cost of each Major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major bridges. 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 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 where specified.
On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap	0.00%	
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/ return/retaining wall upto top	0.00%	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 Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect,	0.00%	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 respect as specified.
(iv) Wearing Coat including expansion joints.		Wearing Coat
	0.00%	Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc.complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls

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Stage of Payment	Percentage - weightage	Payment Procedure
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Guide bunds, River Training Works etc		(vii) Guide bunds, River Training Works etc
	0.00%	Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A2-New Major Bridges		
(i) Foundation:		(i) Foundation: Cost of each Major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major bridges. 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 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 where specified.
On completion of the foundation work including foundations for wing and return walls ,abutments, piers.	0.00%	
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	0.00%	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 Major Bridge subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the major bridge.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respects including girder,deck slab,bearings	0.00%	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 respect as specified.
(iv) Wearing Coat including expansion joints.		Wearing Coat
	0.00%	Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash

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Stage of Payment	Percentage - weightage	Payment Procedure
		barriers, road markings etc. complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Guide bunds, River Training Works etc		(vii) Guide bunds, River Training Works etc
	0.00%	Payment shall be made on completion of all Guide bunds/River Training Works etc. complete in all respect as specified.
(viii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B1 - Widening and repairs of		
(a) ROB		
(b) RUB		
(i) Foundation:	0.00%	(i) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/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 ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap		
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/ return/retaining wall upto top	0.00%	Payment against sub structure shall be made on pro rata basis on completion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the ROB/RUB.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers,road sign & markings, tests on completion etc. complete in all respect,	0.00%	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 respect as specified.

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Stage of Payment	Percentage - weightage	Payment Procedure
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.		(iv) Wearing Coat:
	0.00%	Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B2 - New		
(a) ROB		
(b) RUB		
(i) Foundation:		(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 ROB/RUB subject to completion of atleast two foundations of the ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
On completion of the foundation work including foundations for wing and return walls ,abutments, piers.	0.00%	
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	0.00%	Payment against sub structure shall be made on pro rata basis on completion of a stage i.e. not less than 25% of the scope of sub structure of ROB/RUB subject to completion of atleast two sub structure of the abutment/pier upto

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Stage of Payment	Percentage - weightage	Payment Procedure
		abutment/pier cap level of the ROB/RUB.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respects including girder,deck slab,bearings	0.00%	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 respect as specified.
(iv) Wearing Coat including expansion joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified.		(iv) Wearing Coat:
	0.00%	Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joint complete in all respect as specified and (b) in case of RUB rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C1 - Widening and repairs of Elevated Section/Flyovers/ Grade Separators		
(i) Foundation:	0.00%	(i) Foundation: Cost of each Structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. 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 structures subject to completion of atleast two foundations of the structures. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
On completion of the foundation work including foundations for wing and return walls ,abutments,piers upto the abutment/pier cap		

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Stage of Payment	Percentage - weightage	Payment Procedure
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/ return/retaining wall upto top	0.00%	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 structures subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the structures.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers, road sign & markings, tests on completion etc. complete in all respect.	0.00%	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 respect as specified.
(iv) Wearing Coat including expansion joints.		Wearing Coat
	0.00%	Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	0.00%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C2-New Elevated Section/ Flyovers/ Grade Separators		
(i) Foundation:		(i) Foundation: Cost of each Structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. 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 structures subject to completion of atleast two foundations of the structures.
On completion of the foundation work including foundations for wing and return walls, abutments, piers.	6.366%	

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Stage of Payment	Percentage - weightage	Payment Procedure
		In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub Structure:		(ii) Sub Structure:
On completion of abutments, piers upto the abutment/pier cap including wing/return/retaining wall upto top	49.777%	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 structures subject to completion of atleast two sub structure of the abutment/pier upto abutment/pier cap level of the structures.
(iii) Super Structure		(iii) Super Structure:
On completion of the super structure in all respects including girder, deck slab, bearings	35.898%	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 respect as specified.
(iv) Wearing Coat including expansion joints.		Wearing Coat
	3.184%	Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
(v) Miscellaneous items like hand rails, crash barriers, road markings etc.		(v) Miscellaneous
	4.775%	Payment shall be made on completion of all Miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respect as specified.
(vi) Wing walls/Return Walls		(vi) Wing walls/Return Walls
	0.00%	Payment shall be made on completion of all Wing walls/Return Walls complete in all respect as specified.
(vii) Approaches (including retaining walls, stone pitching and protection works)		(viii) Approaches:
	0.00%	Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll Plaza	0.00%	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii) Road side drains		Unit of measurement is linear length in km.
Lined Drain	3.135%	Payment shall be made on pro rata basis on

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Stage of Payment	Weightage	Payment Procedure
Catch Water Drain	0.000%	completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(iii) Road signs, markings, km stones, safety devices, etc.	1.833%	
(iv) Road Studs	0.775%	
(v) Project facilities	0.00%	Payment shall be made on pro rata basis for completed facilities.
a) Bus Shelter	0.00%	
b) Truck Lay Bye	0.00%	
c) Rest Areas	0.00%	
d) Others (Includes junction and Site Clearance)	0.551%	
(vi) Retaining Wall / Breast wall	33.606% 15.306%	Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(vii) RE Wall	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 per cent) of the total length.
(viii) Street Lighting	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 per cent) of the total length.
(ix) Utility ducts	0.00%	
(x) Parapet wall	1.574%	
(xi) Footpath and separators	0.00%	
(xii) Hydro-seeding by mechanical means	11.151%	
(xiii) Road side plantation	0.00%	
(xiv) Slope Stabilization work by terra lock pins, terra lock anchors and turf reinforced mat	31.841%	
(xv) Safety and traffic management during construction	0.228%	Payment shall be made on prorata basis every six month.
(xvi) Protection works like pitching on side slopes, chutes, crash barrier	0.000%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.

2. Procedure for payment for Maintenance

- 2.1 The cost for maintenance shall be as stated in Clause 14.1(v).
- 2.2 Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Article 14 and Article 19.

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)

Annex –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 **319th** 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 **548th** 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 **776th** 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 **913th** 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 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 Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim on Engineering, Procurement and Construction (the "**EPC**") basis through..... (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

2. It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the day of20....., 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%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	Roadside Drains	
(i)	Cleaning and repair of drains	5%
(e)	Road Furniture	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5 th km stones	5%
(f)	Miscellaneous Items	
(i)	Removal of dead animals, broken down/accident vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	Defects in Other Project Facilities	5%

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex -I
(Schedule - N)

Annex –I: 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 Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim on Engineering, Procurement and Construction (the "**EPC**") basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

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

2. Definitions and interpretation

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

3. General

- (i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.
- (ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:
- (a) any Time Extension;
 - (b) any additional cost to be paid by the Authority to the Contractor;
 - (c) the Termination Payment; or

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- (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

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

- (xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.
- (xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.
- (xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.
- (xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

- (i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.
- (ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.
- (iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.
- (iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of

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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:
 - iv. For the Works executed (excluding Change of Scope orders);
 - v. For Change of Scope Orders, and
 - vi. 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

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase 'A' in the State of Sikkim.

execute the Works.

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I,..... (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated..... (the "**Agreement**"), for Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim on Engineering, Procurement and Construction (the "**EPC**") basis Through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-IIIA on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.

*******END OF THE DOCUMENT*******

Construction of 2 laning with paved shoulder of new greenfield alignment from Chochenpheri at km. 52+000 to Helipad at Menla at km. 82+000 of Rhenok – Menla spur (NH-717B) Package-III A on EPC Basis under SARDP-NE Phase ‘A’ in the State of Sikkim.