NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
(Ministry of Road, Transport & Highways)
Government of India

Schedules

FOR

"Balance Work of Construction of Two-Lane with hard shoulders of Merangkong Tamlu Mon roa (WakchingTownportion) on EPC basis from existing Km 59+000 to Km73+640 [DesignKm.59+000 to Km.72+450] (DesignLength–13.450Km) (Package-V) in the state of Nagaland under SARDP-NE Phase A on EPC Mode"

Engineering, Procurement & Construction (EPC) Mode

BID DOCUMENT

February 2023

National Highways & Infrastructure Development Corporation Ltd
(A Government of India Undertaking)

Schedule

(See Clause 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the Two-Lane Project Highway shall include the land, buildings, Structures and road works as described in Annex-I of this Schedule-A.

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 modified.

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

Annex – (Schedule-A)

Site

1. Site

‘‘Balance Work of Construction of Two-Lane with hard shoulders of Merangkong Tamlu Mon road (Wakching-Townportion) on EPC basis from existing Km59+000 to Km73+640 [DesignKm.59+000 toKm.72+450] (DesignLength–13.450Km) (**Package-V**)in the state of Nagaland under SARDP-NE Phase A on EPC Mode”

The Land, carriageway and structures comprising the site are described below.

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
1.	59+000	59+187	187	ECW/Widening	No Work	
2.	59+187	59+466	279	Realignment	No Work	
3.	59+466	59+470	4	ECW/Widening	No Work	
4.	59+470	59+490	20	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
5.	59+490	59+785	295	ECW/Widening	GSB	
6.	59+785	59+840	55	ECW/Widening	Subgrade	
7.	59+840	59+870	30	ECW/Widening	No work	
8.	59+870	60+002	132	Realignment	No work	
9.	60+002	60+045	43	ECW/Widening	No work	
10.	60+045	60+095	50	Realignment	No work	
11.	60+095	60+150	55	ECW/Widening	No work	
12.	60+150	60+320	170	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
						present layer shall be done by the appointed contractor
13.	60+320	60+850	530	ECW/Widening	No work	
14.	60+850	61+100	250	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
15.	61+100	61+620	520	ECW/Widening	No work	
16.	61+620	61+700	80	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
17.	61+700	62+151	451	ECW/Widening	No work	
18.	62+151	62+247	96	Realignment	No work	
19.	62+247	62+570	323	ECW/Widening	No work	
20.	62+570	62+800	230	ECW/Widening	Subgrade	Profile corrective course, Camber correction,
21.	62+800	62+910	110	ECW/Widening	GSB	

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
						Desirable thickness & width of present layer shall be done by the appointed contractor
22.	62+910	62+930	20	ECW/Widening	No work	
23.	62+930	63+140	210	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
24.	63+140	63+552	412	ECW/Widening	No work	
25.	63+552	63+570	18	Realignment	No work	
26.	63+570	63+600	30	ECW/Widening	No work	
27.	63+600	63+677	77	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
28.	63+677	63+702	25	Realignment	GSB	
29.	63+702	63+757	55	ECW/Widening	GSB	
30.	63+757	63+772	15	Realignment	GSB	
31.	63+772	63+800	28	ECW/Widening	Subgrade	
32.	63+800	64+050	250	ECW/Widening	No work	
33.	64+050	64+076	26	ECW/Widening	No work	

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
34.	64+076	64+200	124	ECW/Widening	No work	
35.	64+200	64+300	100	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
36.	64+300	64+522	222	ECW/Widening	No work	
37.	64+522	64+600	78	ECW/Widening	No work	
38.	64+600	65+330	730	ECW/Widening	No work	
39.	65+330	65+742	412	ECW/Widening	Subgrade	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
40.	65+742	65+806	64	Realignment	Subgrade	
41.	65+806	65+859	53	ECW/Widening	Subgrade	
42.	65+859	65+883	24	Realignment	Subgrade	
43.	65+883	66+094	211	ECW/Widening	Subgrade	
44.	66+094	66+120	26	Realignment	Subgrade	
45.	66+120	66+136	16	ECW/Widening	Subgrade	
46.	66+136	66+174	38	Realignment	Subgrade	
47.	66+174	66+196	22	ECW/Widening	Subgrade	
48.	66+196	66+210	14	Realignment	Subgrade	
49.	66+210	66+275	65	ECW/Widening	Subgrade	
50.	66+275	66+306	31	Realignment	No work	
51.	66+306	66+430	124	ECW/Widening	No work	
52.	66+430	66+450	20	ECW/Widening	GSB	Profile corrective course, Camber correction, Desirable thickness & width of
53.	66+450	66+476	26	Realignment	GSB	
54.	66+476	66+660	184	ECW/Widening	GSB	
55.	66+660	66+670	10	Realignment	GSB	
56.	66+670	66+835	165	Realignment	Subgrade	
57.	66+835	66+860	25	ECW/Widening	Subgrade	

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
						present layer shall be done by the appointed contractor
58.	66+860	66+885	25	ECW/Widening	No work	
59.	66+885	66+940	55	Realignment	No work	
60.	66+940	66+980	40	Realignment	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
61.	66+980	67+006	26	ECW/Widening	GSB	
62.	67+006	67+030	24	ECW/Widening	Subgrade	
63.	67+030	67+120	90	Realignment	Subgrade	
64.	67+120	67+123	3	Realignment	No work	
65.	67+123	67+220	97	Realignment	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
66.	67+220	67+288	68	Realignment	No work	
67.	67+288	67+390	102	ECW/Widening	No work	
68.	67+390	67+410	20	ECW/Widening	No work	
69.	67+410	67+417	7	ECW/Widening	GSB	Profile corrective course, Camber correction,
70.	67+417	67+450	33	Realignment	GSB	
71.	67+450	67+458	8	Realignment	Subgrade	
72.	67+458	67+500	42	ECW/Widening	GSB	

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
						Desirable thickness & width of present layer shall be done by the appointed contractor
73.	67+500	67+528	28	Realignment	No work	
74.	67+528	67+545	17	Realignment	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
75.	67+545	67+760	215	ECW/Widening	GSB	
76.	67+760	67+770	10	ECW/Widening	Subgrade	
77.	67+770	67+830	60	ECW/Widening	GSB	
78.	67+830	67+840	10	ECW/Widening	Subgrade	
79.	67+840	67+890	50	ECW/Widening	GSB	
80.	67+890	68+022	132	Realignment	GSB	
81.	68+022	68+040	18	ECW/Widening	GSB	
82.	68+040	68+590	550	ECW/Widening	GSB	
83.	68+590	68+944	354	Realignment	GSB	
84.	68+944	69+076	132	ECW/Widening	GSB	
85.	69+076	69+110	34	Realignment	Subgrade	
86.	69+110	69+135	25	Realignment	GSB	
87.	69+135	69+273	138	ECW/Widening	GSB	
88.	69+273	69+290	17	Realignment	GSB	
89.	69+290	69+475	185	ECW/Widening	GSB	
90.	69+475	69+500	25	Realignment	GSB	
91.	69+500	69+600	100	Realignment	Subgrade	
92.	69+600	69+686	86	Realignment	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
93.	69+686	69+701	15	ECW/Widening	GSB	
94.	69+701	69+730	29	ECW/Widening	Subgrade	
95.	69+730	69+780	50	ECW/Widening	GSB	
96.	69+780	70+490	710	Realignment	GSB	
97.	70+490	70+640	150	ECW/Widening	GSB	
98.	70+640	70+693	53	ECW/Widening	No work	

Sl. No.	Design Chainage		Length (In Mt.)	Improvement Proposal	Details of work done by previous contractor	Remarks
	From	To				
99.	70+693	70+905	212	ECW/Widening	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
100.	70+905	70+950	45	Realignment	GSB	
101.	70+950	70+985	35	ECW/Widening	GSB	
102.	70+985	71+040	55	ECW/Widening	Subgrade	
103.	71+040	71+510	470	ECW/Widening	GSB	
104.	71+510	71+640	130	Realignment	GSB	
105.	71+640	71+780	140	Realignment	No work	
106.	71+780	71+788	8	Realignment	No work	
107.	71+788	71+880	92	ECW/Widening	No work	
108.	71+880	71+890	10	Realignment	No work	
109.	71+890	71+930	40	Realignment	No work	
110.	71+930	71+976	46	Realignment	GSB	Profile corrective course, Camber correction, Desirable thickness & width of present layer shall be done by the appointed contractor
111.	71+976	72+020	44	ECW/Widening	GSB	
112.	72+020	72+185	165	ECW/Widening	Subgrade	
113.	72+185	72+250	65	Realignment	Subgrade	
114.	72+250	72+386	136	Realignment	No work	
115.	72+386	72+428	42	ECW/Widening	No work	
116.	72+428	72+446	18	Realignment	No work	
117.	72+446	72+450	4	ECW/Widening	No work	

Note: - Bidders are requested to visit the site/stretch to understand the requirement of rectification as per their own assessment. The locations and length given above are tentative. The distressed locations should be identified with their exact chainages. The distresses should then be marked up in a grid pattern covering the distressed portion and also beyond the distressed portion. Then the entire DBM/WMM/GSB/Sub-Grade layer (as the case may be) within the identified grid must be scrapped off thoroughly. After scrapping of DBM layer, the top WMM surface

must be thoroughly checked with respect to degree of compaction and plasticity (within the grid) randomly by doing the test pits at few locations. Further it should be extended for GSB and subgrade layer with extraction of layer material to observe CBR value. If result does not comply in any of the layers, then in that grid all the material including subgrade should be excavated and reconstructed freshly. If subgrade soil is complying with the physical properties while GSB does not, then excavation should be made up to GSB layer and reconstruction should be done from GSB layer. The same should be done for WMM/GSB/Sub-Grade also.

2. Land

TheSiteoftheProject Highway comprises the land described below: -

SlNo	From	To	RightofWay
1.	59+000	59+200	20
2.	59+200	63+500	45
3.	63+500	66+400	24
4.	66+400	72+450	45

3. Carriageway

The present carriageway of the Project Road is Single Lane / Two lane with average formation width of 6m 1 2 m and carriage way width of 3.5 -4.0 m with earthen / hardshouldersofwidth1.5 m on either side. The actual width of existing c/w may be change in executed length work done by previous contractor and it shall be as per above mentioned table. The type of the existing pavement is flexible otherwise mentioned above in section 1.

4. Major Bridge

The Site includes the following Major Bridges:

S/no	Location in km	Type of Structures			Length of Bridge/ Span Arrangement (m)	Total width (m)
		Super Structure	Sub Structure	Foundation		
			NIL			

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

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

Sl No	Chainage(km)	Type of structure		No of Span with Span length(m)	width (m)	ROB/RUB
		Foundation	Superstructure			

NIL

6. Grade separators

The Site includes the following grade separators:

Sl No	Chainage(km)	Type of structure		No of Span with Span length(m)	width (m)
		Foundation	Superstructure		
NIL					

7. Railway level crossings

The Site includes the following railway level crossings:

Sl No	Location(km)	Remarks
NIL		

8. Underpasses (vehicular, Non vehicular)

The Site includes the following underpasses:

Sl No	Chainage (km)	Type of structure	No of Span with Span length(m)	width (m)
NIL				

9. Truck Lay bays

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

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

10. Road side drains

The details of the roadside drains are as follows:

Sl.no	Chainages		Length (m)	Side	Type of Drain
	From	To			
1	68+618	68+724	106	LHS	Trapezoidal
2	68+765	68+792	27	LHS	Trapezoidal
3	68+805	68+854	49	LHS	Trapezoidal
4	68+896	68+990	94	LHS	Trapezoidal
5	68+993	69+079	86	LHS	Trapezoidal
6	69+103	69+204	101	LHS	Trapezoidal
7	69+582	69+704	122	LHS	Trapezoidal
8	69+732	69+785	53	LHS	Trapezoidal
9	69+810	69+899	89	LHS	Trapezoidal
10	70+445	70+470	25	LHS	Trapezoidal
11	70+694	70+767	73	RHS	Trapezoidal
12	70+808	70+945	137	RHS	Trapezoidal
13	71+361	71+570	209	LHS	Trapezoidal
14	71+529	71+588	59	RHS	Trapezoidal

11. Minor Bridges

The Site includes the following Minor Bridges:

Minor Bridge			
Chainage(Km)	Type of Structure	No of span	Width
	NIL		

12. Culvert

Culverts				
Sl No	**Chainage (Km)**	**Type ofCulvert**	**Día(m)**	**Remark**
1	59+345	PipeCulvert	1x0.90	
2	59+952	PipeCulvert	1x1.00	
3	60+125	SlabCulvert	1x3.05	
4	60+250	SlabCulvert	1x3.05	
5	60+460	SlabCulvert	1x2.955	
6	60+865	Slab Culvert	1x2.00	
7	60+945	Slab Culvert	1x2.00	
8	62+050	Slab Culvert	1x2.00	
9	62+590	PIPE	1x1.00	
10	62+920	Slab Culvert	1x2.00	
11	63+620	Box Culvert	2x2	Incomplete (Raft & 1st lift of wall has been done)
12	64+240	Slab Culvert	1x2.00	
13	64+522	SlabCulvert	1x2.0	
14	64+713	Slab Culvert	1x2.00	
15	64+854	SlabCulvert	1x1.6	
16	65+299	SlabCulvert	1x2.1	
17	65+460	SlabCulvert	1x1.6	
18	65+872	SlabCulvert	1x0.83	
19	66+421	Box Culvert	2x2	Half culvert LHS (Widening & parapet, return wall, protection works of u/s & d/s etc. are pending)
20	66+510	Box Culvert	2x2	(Incomplete Return wall of u/s & d/s, Apron &Catchpit etc.)
21	66+882	Box Culvert	2x2	Half culvert LHS (Widening & parapet, return wall, protection

				works of u/s & d/s etc)
22	67+006	Box Culvert	2x2	(Incomplete Catchpit, return wall LHS & Apron etc.)
23	67+150	Box Culvert	2x2	(Incomplete Catchpit, return wall LHS & Apron etc.)
24	67+400	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)
25	67+505	Box Culvert	2x2	Half culvert LHS (Widening & parapet, return wall, protection works of u/s & d/s etc.)
26	67+535	Box Culvert	2x2	(Incomplete Return Wall LHS & Apron etc.)
27	67+560	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)
28	67+650	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)
29	67+700	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)

30	67+790	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)
31	67+820	Box Culvert	2x2	(Incomplete Return Wall LHS, Catchpit& Apron etc.)
32	68+235	Box Culvert	2x2	(Incomplete Return Wall RHS & Apron etc.)
33	68+757	Box Culvert	2x2	(Incomplete Return Wall LHS & RHS, Catchpit, Apron & Both parapets etc.)
34	68+888	Box Culvert	2x2	(Incomplete Apron etc)
35	69+090	Box Culvert	2x2	(Incomplete Apron etc)
36	69+230	Box Culvert	2x2	(Incomplete Apron etc)
37	69+525	Box Culvert	2x2	(Incomplete Return Wall LHS & RHS, Apron etc.)
38	69+577	Box Culvert	2x2	(Incomplete Apron &Catchpitetc)
39	69+715	Box Culvert	2x2	(Incomplete Apron &Catchpitetc)
40	69+809	Box Culvert	2x2	(Incomplete Return Wall LHS & RHS, Catchpit, Apron & Both parapets etc.)
41	69+937	Box Culvert	2x2	(Incomplete Apron etc)

42	70+440	Slab Culvert	1x1.60	
43	70+675	Box Culvert	2x2	Half culvert LHS (Widening & parapet, return wall, protection works of u/s & d/s etc. are pending)
44	70+785	Box Culvert	2x2	(Incomplete Catchpit, Apron & Both parapets etc.)
45	70+995	Box Culvert	2x2	(Incomplete Return Wall LHS & RHS, Catchpit, Apron etc.)
46	72+173	Slab Culvert	1x1.557	
47	72+095	Box Culvert	2x2	Half culvert LHS (Widening & parapet, return wall, protection works of u/s & d/s etc. are pending)

13. Bus bays

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

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

14. Major Intersections along project:

The details of the minor junctions are as follows:

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	to km			NH	SH	MDR	Others

15. Minor Intersections along project:

The details of the minor intersections are as follows:

Sl No	Location(km)	Type of Junction		Side
	From	T/Y Junction	Cross Road	
1	59+255	Y	-	LHS
2	64+041	T	-	RHS
3	64+720	Y	-	RHS
4	65+120	Y	-	LHS
5	65+160	Y	-	RHS
6	65+360	Y	-	RHS
7	65+780	Y	-	LHS
8	66+020	Y	-	RHS
9	66+300	Y	-	RHS
10	66+720	Y	-	LHS
11	66+680	Y	-	RHS
12	70+138	T	-	LHS
13	70+250	T	-	LHS

16. Bypass

The details of Bypasses are as follows:

Sl No	Name of bypass (town)	Chainage (km)		Length (in km)	Carriageway	
		from (km)	To (km)		Width (m)	Type

NIL

17. Other structures

(i) The details of Breast wall are as follows:

Sl.no	Chainages		Length (m)	Side	Remarks
	From	To			
1	60+260	60+295	35	LHS	
2	67+485	67+498.6	13.6	LHS	
3	67+510	67+528.4	18.4	LHS	
4	67+540	67+559.26	19.26	LHS	
5	67+865	67+939.8	74.8	LHS	
6	70+300	70+360	60	RHS	
7	70+805	70+835	30	RHS	
8	71+027	71+079	52	RHS	
9	71+129	71+170	41	RHS	

(ii) The details of Retaining wall are as follows:

Sl.no	Chainages		Length (m)	Side	Remarks
	From	To			
1	67+870	67+907	37	RHS	3mtr. height
2	67+907	67+948	41	RHS	incomplete

Annex II

(As per clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way

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

Sl. No	Design Chainage		Length (Km)	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To			
i) 90% of ROW (full width)	59.000	72.450	13.450	Varying ROW from minimum 20 m to maximum 45 m at different locations	At Appointment Date
ii) Balance Right of way (width)	-	-	-	Varying ROW from minimum 20 m to maximum 45 m at different locations	-

Annex – IIII

(Schedule-A)

Alignment Plans

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

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

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

Annex – IV

(Schedule-A)

Environment Clearances

As per notification of MOEF F.O. 2559 (E) dated 22/08/2013, the project will not attract Environmental Clearance.

SCHEDULE – B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1 Development of the Project Highway

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

2 Rehabilitation and augmentation

NA

3 Specifications and Standards

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

Annex I
(Schedule-B)

Description of Two Lanning

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

Two-Lanning with hard shoulders shall be undertaken. The paved carriageway shall be 7(seven) m wide. The work and specifications shall be carried out in accordance with Clause 408 of MoRTH specification.

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

Sl. No.	Built-up stretch(Township)	Location (km)		ROW (m)	Typical Cross Section(Refer to Manual)	Remarks
1	WakchingTown	63+500	66+400	24	As per attached TCS drawing	10 m Carriageway

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

2. GEOMETRIC DESIGN AND GENERAL FEATURES

(i) General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the IRC: SP: 73-2018

(ii) Design speed

The design speed shall be as per section 2.2 of IRC 73: 2018 for Mountainous and Steep terrain. However in exceptional cases the minimum design speed of 30 km per hour for hilly and mountainous terrain and 20 km per hour for hair pin bend locations shall be adopted in accordance with IRC SP 48:1998.

(iii) Improvement of the existing road geometrics

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

Improvement due to Realignments:

Sl. No.	Existing Chainage (km)			Design Chainage (km)		
	From	To	Length (m)	From	To	Length (m)
1	60515	60790	275	59187	59466	279
2	61200	61326	126	59870	60002	132
3	61369	61415	46	60045	60095	50
4	63480	63560	80	62151	62247	96
5	64862	64880	18	63552	63570	18
6	65000	65025	25	63677	63702	25
7	65085	65100	15	63757	63772	15
8	67083	67148	65	65742	65806	64
9	67193	67205	12	65859	65883	24
10	67490	67516	26	66094	66120	26
11	67535	67583	48	66136	66174	38
12	67604	67618	14	66196	66210	14
13	67692	67723	31	66275	66306	31
14	67882	67909	27	66450	66476	26
15	68094	68270	176	66660	66835	175
16	68310	68400	90	66885	66980	95
17	68446	68700	254	67033	67288	255
18	68830	68875	45	67417	67458	41
19	68920	68965	45	67500	67545	45
20	69330	69470	140	67890	68022	132
21	70043	70395	352	68590	68944	354
22	70520	70610	90	69076	69135	59
23	70756	70774	18	69273	69290	17
24	70960	71135	175	69475	69686	211
25	71230	71690	460	69780	70490	710
26	72105	72145	40	70905	70950	45
27	72700	72956	256	71510	71788	278
28	73050	73152	102	71880	71976	96
29	73363	73555	192	72185	72386	201

Sl. No.	Existing Chainage (km)			Design Chainage (km)		
	From	To	Length (m)	From	To	Length (m)
30	73600	73615	15	72428	72446	18

Probable location of Sharp Curves having radius less than 40 m:

Sl. No.	Design Chainage		Side	Remarks
	From	To		
1	59+204	59+246	RIGHT	Radius <40
2	59+246	59+290	RIGHT	Radius <40
3	59+747	59+834	LEFT	Radius <40
4	59+870	59+957	RIGHT	Radius <40
5	60+635	60+666	LEFT	Radius <40
6	60+666	60+710	RIGHT	Radius <40
7	60+828	60+863	RIGHT	Radius <40
8	61+144	61+204	RIGHT	Radius <40
9	61+340	61+383	LEFT	Radius <40
10	61+684	61+706	RIGHT	Radius <40
11	61+714	61+748	LEFT	Radius <40
12	61+822	61+858	LEFT	Radius <40
13	62+116	62+158	LEFT	Radius <40
14	62+158	62+200	LEFT	Radius <40
15	62+301	62+343	LEFT	Radius <40
16	62+483	62+512	LEFT	Radius <40
17	62+523	62+563	RIGHT	Radius <40
18	62+565	62+591	LEFT	Radius <40
19	62+800	62+827	RIGHT	Radius <40
20	62+850	62+866	LEFT	Radius <40
21	62+973	63+004	RIGHT	Radius <40
22	63+087	63+120	LEFT	Radius <40
23	63+382	63+405	LEFT	Radius <40
24	63+439	63+497	RIGHT	Radius <40
25	63+542	63+594	LEFT	Radius <40
26	63+710	63+742	LEFT	Radius <40
27	63+908	63+967	LEFT	Radius <40
28	63+984	64+028	RIGHT	Radius <40
29	64+471	64+515	LEFT	Radius <40
30	64+697	64+742	LEFT	Radius <40
31	65+439	65+470	RIGHT	Radius <40
32	65+859	65+898	RIGHT	Radius <40
33	66+094	66+161	LEFT	Radius <40
34	66+173	66+215	RIGHT	Radius <40
35	66+285	66+321	LEFT	Radius <40
36	66+384	66+426	LEFT	Radius <40
37	66+533	66+617	LEFT	Radius <40
38	66+686	66+757	RIGHT	Radius <40
39	66+770	66+854	LEFT	Radius <40

Sl. No.	Design Chainage		Side	Remarks
	From	To		
40	66+870	66+953	RIGHT	Radius <40
41	67+195	67+271	LEFT	Radius <40
42	67+288	67+372	RIGHT	Radius <40
43	67+378	67+423	LEFT	Radius <40
44	67+434	67+485	RIGHT	Radius <40
45	67+547	67+634	LEFT	Radius <40
46	68+011	68+103	RIGHT	Radius <40
47	68+375	68+443	LEFT	Radius <40
48	68+476	68+545	RIGHT	Radius <40
49	68+566	68+606	LEFT	Radius <40
50	68+751	68+795	LEFT	Radius <40
51	68+825	68+877	RIGHT	Radius <40
52	69+041	69+106	RIGHT	Radius <40
53	69+112	69+184	LEFT	Radius <40
54	69+243	69+318	LEFT	Radius <40
55	69+539	69+618	RIGHT	Radius <40
56	70+810	70+857	LEFT	Radius <40
57	70+948	71+017	RIGHT	Radius <40
58	71+298	71+357	RIGHT	Radius <40
59	71+360	71+428	RIGHT	Radius <40
60	71+457	71+529	LEFT	Radius <40
61	71+986	72+048	LEFT	Radius <40
62	72+065	72+151	LEFT	Radius <40
63	72+160	72+276	RIGHT	Radius <40
64	72+319	72+370	LEFT	Radius <40
65	72+370	72+409	RIGHT	Radius <40
66	72+417	72+443	LEFT	Radius <40

(v) Proposed Right of Way

Details of the proposed Right of Way are tabulated below.

SlNo	From	To	PRoW Width (M)
1.	59+000	59+200	20
2.	59+200	63+500	45
3.	63+500	66+400	24
4.	66+400	72+450	45

The Scheduled date on which the Authority shall provide ROW to the contractor is given in Annexure-II of Schedule A

(v) Type of Shoulders

(a) Hard shoulders of 1.5 m width shall be provided with granular material except in built up areas given in paragraph 1(ii).
(b) Design and specifications of hard shoulders and granular material shall conform to the requirements specified in the section 408 of MoRTH specification

(vi) **Lateral and vertical clearances at underpasses**

i. Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.10 of the IRC:SP:73-2018.

ii. Lateral Clearance:

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

Sl.No.	Location (Chainage) (from km to km)	Span/opening(m)	Remarks
Nil			

(vii) Lateral and vertical clearances at overpasses

i. Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the IRC: SP: 73-2018.

ii. *Lateral clearance*: The width of the opening at the overpasses shall be as follows:

Sl No.	Location [Chainage(km)]		Span/Opening (m)	Remarks
	From	To		
Nil				

(viii) Service roads

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

Sl. No.	Location of Service Road (km)		Right Hand Side (RHS) / Left Hand Side (LHS) / Both Sides	Length (km) of Service Road
	From	To		
Nil				

(ix) Grade Separated Structures

i. Grade separated structures shall be provided as per paragraph 2.14 of the IRC: SP: 73-2018. The requisite particulars are given below:

Sl. No.	Location of Structure	Length (m)	Number and Length of Spans (m)	Approach Gradient	Remarks, if any
Nil					

ii. 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:

Sl No.	Location	Type of Structure/Length (m)	Cross Road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

(x) Cattle and pedestrian underpass / Overpass

Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to paragraph 2.14.3 of IRC: SP: 73-2018 and specify the requirements of cattle and pedestrian underpass/overpass.

Sl. No.	Location	Type of Crossing
Nil		

(xi) Typical cross-sections of the Project Highway

The cross section schedule shall be as follows:

TCS I : Typical Cross Section for project road sections in Hill / Valley locations
TCS II : Typical Cross Section for Project Road Sections through Box Cut Locations
Type III : Typical Cross Section for Project Road Section through Town on Ridge

The cross-section schedule shall be as follows:

SL.NO.	DESIGN CHAINAGE		LENGTH	TYPE
	FROM	TO		
1	59000	59385	385	I
2	59385	59429	44	II
3	59429	59869	440	I
4	59869	59939	70	II
5	59939	60008	69	II
6	60008	60061	53	I
7	60061	60098	37	II
8	60098	61821	1723	I
9	61821	61896	75	II
10	61896	62159	263	I
11	62159	62250	91	II
12	62250	62800	550	I
13	62800	62916	116	II
14	62916	63336	420	I
15	63336	63433	97	II
16	63433	63500	67	I
17	63500	65090	1590	II
18	65090	66400	1310	III
19	66400	66491	91	I

SL.NO.	DESIGN CHAINAGE		LENGTH	TYPE
	FROM	TO		
20	66491	66599	108	II
21	66599	66644	45	I
22	66644	66754	110	II
23	66754	66826	72	I
24	66826	67035	209	I
25	67035	67073	38	I
26	67073	67188	115	II
27	67188	67231	43	I
28	67231	67412	181	II
29	67412	67452	40	I
30	67452	67605	153	II
31	67605	67702	97	I
32	67702	67843	141	II
33	67843	67876	33	I
34	67876	67965	89	II
35	67965	68235	270	I
36	68235	68546	311	II
37	68546	68607	61	I
38	68607	68743	136	II
39	68743	68813	70	I
40	68813	68937	124	II
41	68937	69471	534	I
42	69471	69736	265	II
43	69736	69795	59	I
44	69795	69954	159	II
45	69954	70012	58	I
46	70012	70109	97	II
47	70109	70356	247	I
48	70356	70891	535	II
49	70891	71323	432	I
50	71323	71667	344	II
51	71667	71991	324	I
52	71991	72127	136	II
53	72127	72243	116	I
54	72243	72390	147	II
55	72390	72450	60	I

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross section in consultation with the Authority Engineer at the time of construction.

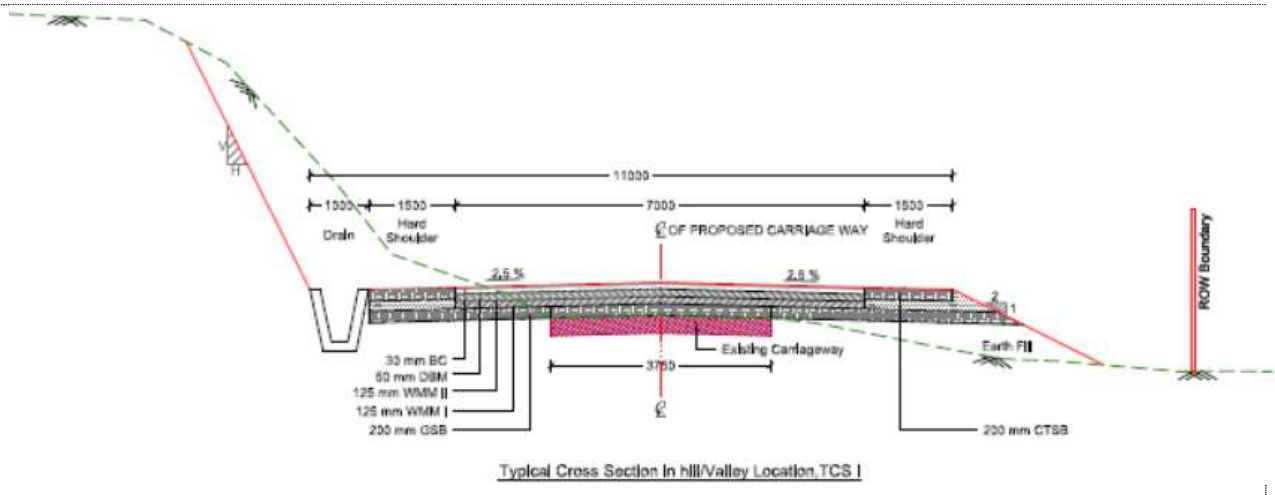

Figure B-1: Typical Cross Section in Hill/Valley Locations, TCS I

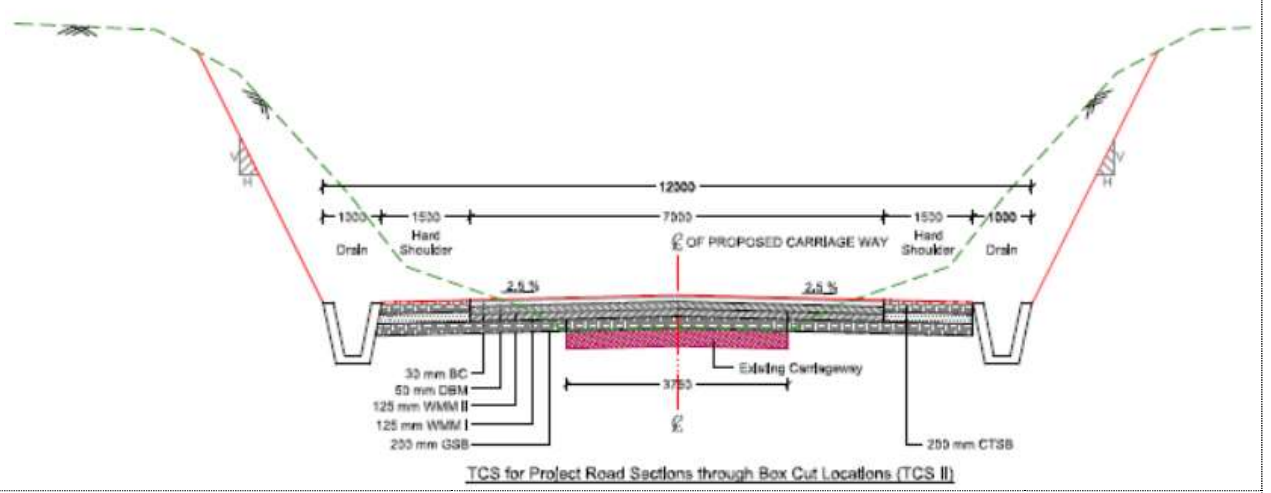

Figure B-2: TCS for Project Road Sections through Box Cut Locations (TCS II)

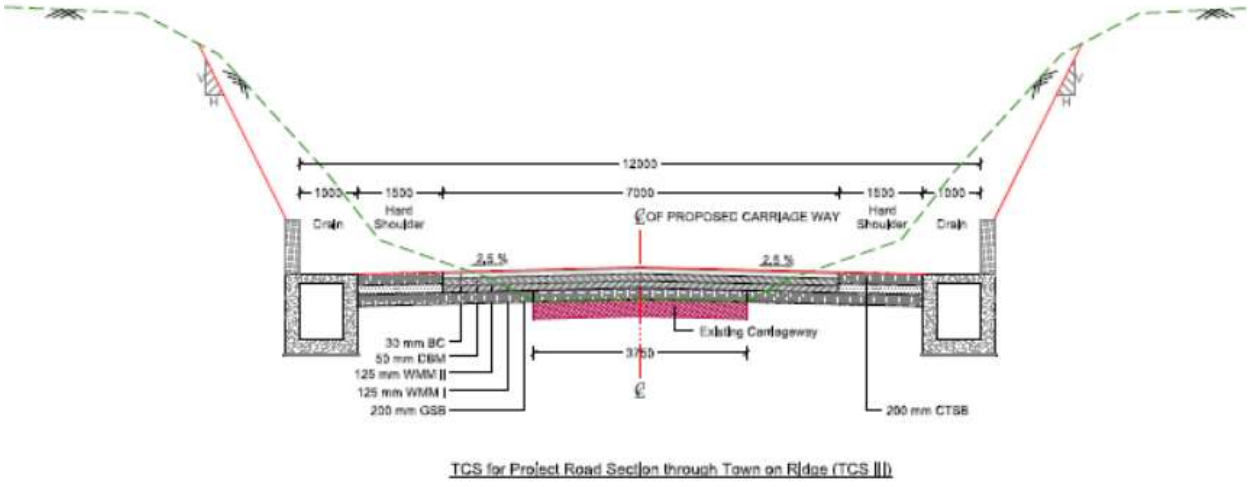

Figure B-3: TCS for Project Road Section through Town on Ridge (TCS III)

3. INTERSECTIONS AND GRADE SEPARATORS

Introduction

All intersections shall be as per Section3 of the IRC: SP: 73-2018. 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:

(i) At-grade Intersections

Major Intersections

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

Details of junction improvements shall be as per IRC SP: 73-2018.

Minor Intersections

Sl. No.	Location of Intersection (Design Chainage, km)	Type of Intersection	Side
1	59+255	Y	LHS
2	64+041	T	RHS
3	64+720	Y	RHS
4	65+120	Y	LHS
5	65+160	Y	RHS
6	65+360	Y	RHS

Sl. No.	Location of Intersection (Design Chainage, km)	Type of Intersection	Side
7	65+780	Y	LHS
8	66+020	Y	RHS
9	66+300	Y	RHS
10	66+720	Y	LHS
11	66+680	Y	RHS
12	70+138	T	LHS
13	70+180	T	LHS

Details of junction improvements shall be as per IRC SP: 73-2018.

(ii) Grade Separated Intersections with/without Ramps

Sl No.	Location (km)	Salient Features	Minimum Length of Viaduct to be Provided (m)	Road to be Carried Over/Under the Structures
Nil				

4. ROAD EMBANKMENT AND CUT SECTION

a. 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.

b. Rising of the existing road.

The existing road shall be raised in the following sections:

Sl No.	Section (km)		Length (km)	Extent of Raising*	Remarks
	From	To			
Nil					

* Difference between levels at proposed c/l and existing road/ground below proposed c/l

5. PAVEMENT DESIGN

(i) Pavement design shall be carried out in accordance with section 5 of the IRC: SP: 73-2018.

(ii) **Type of pavement**

Flexible pavement shall be adopted for Project Highway. Notwithstanding anything contrary contained in this Agreement or the Manual, the pavement shall be designed as given below

(iii) **Design requirements**

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of main carriageway for design traffic of 20 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be

taken for design if less than 10%. Maximum value of CBR to be taken for design shall not exceed 10%.

Bituminous Grade VG 30 or VG 40 shall be used for BC

6. ROAD SIDE DRAINAGE

(i) Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual (IRC: SP: 73-2018).
Lined drain of following length shall be provided:

6.1 Drainage Measures

Following measures shall be adopted:

i) Covered RCC Drain on Hill Side
ii) Open, side, Trapezoidal drains at the hill side for widening at hill sides.

iii) Open, side, Trapezoidal drains at both sides in realignment stretches by hill cut.

Open side trapezoidal cross section drain shall be provided on hill sides of the project highway in order to intercept surface water from the carriageway, shoulders and hill slopes. RCC Lined drains have slopes also been proposed in urban/semi urban/intersection stretches. The concrete drains shall be covered in reaches along commercial establishments and intersections. The drains outfall into the natural water courses i.e. either in culverts or bridges. Table below gives the location of lined drains.

These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

Details of open Drains

SL.NO.	CHAINAGE		LENGTH	TYPE	Side
	FROM	TO			
1.	59000	59385	385	PCC Trapezoidal	Hill Side
2.	59429	59869	440	PCC Trapezoidal	Hill Side
3.	60008	60061	53	PCC Trapezoidal	Hill Side
4.	60098	61821	1723	PCC Trapezoidal	Hill Side
5.	61896	62159	263	PCC Trapezoidal	Hill Side
6.	62250	62800	550	PCC Trapezoidal	Hill Side
7.	62916	63336	420	PCC Trapezoidal	Hill Side
8.	63433	63500	67	PCC Trapezoidal	Hill Side
9.	66400	66491	91	PCC Trapezoidal	Hill Side
10.	66599	66644	45	PCC Trapezoidal	Hill Side
11.	66754	66826	72	PCC Trapezoidal	Hill Side
12.	66826	67035	209	PCC Trapezoidal	Hill Side
13.	67035	67073	38	PCC Trapezoidal	Hill Side
14.	67188	67231	43	PCC Trapezoidal	Hill Side
15.	67412	67452	40	PCC Trapezoidal	Hill Side
16.	67605	67702	97	PCC Trapezoidal	Hill Side
17.	67843	67876	33	PCC Trapezoidal	Hill Side
18.	67965	68235	270	PCC Trapezoidal	Hill Side
19.	68546	68607	61	PCC Trapezoidal	Hill Side
20.	68743	68765	22	PCC Trapezoidal	Hill Side

SL.NO.	CHAINAGE		LENGTH	TYPE	Side
	FROM	TO			
21.	68792	68805	13	PCC Trapezoidal	Hill Side
22.	69079	69103	24	PCC Trapezoidal	Hill Side
23.	69204	69471	267	PCC Trapezoidal	Hill Side
24.	69785	69795	10	PCC Trapezoidal	Hill Side
25.	69954	70012	58	PCC Trapezoidal	Hill Side
26.	70109	70356	247	PCC Trapezoidal	Hill Side
27.	70945	71323	378	PCC Trapezoidal	Hill Side
28.	71667	71991	324	PCC Trapezoidal	Hill Side
29.	72127	72243	116	PCC Trapezoidal	Hill Side
	TOTAL =		**6359**	m	
	G. TOTAL =		**6359**	m	

SL.NO.	CHAINAGE		LENGTH (M)	TOTAL LENGTH (M)	TYPE	Side
	FROM	TO				
1.	59385	59429	44	88	PCC Trapezoidal	Both Side
2.	59869	59939	70	140	PCC Trapezoidal	Both Side
3.	59939	60008	69	138	PCC Trapezoidal	Both Side
4.	60061	60098	37	74	PCC Trapezoidal	Both Side
5.	61821	61896	75	150	PCC Trapezoidal	Both Side
6.	62159	62250	91	182	PCC Trapezoidal	Both Side
7.	62800	62916	116	232	PCC Trapezoidal	Both Side
8.	63336	63433	97	194	PCC Trapezoidal	Both Side
9.	63500	65090	1590	3180	PCC Trapezoidal	Both Side
10.	66491	66599	108	216	PCC Trapezoidal	Both Side
11.	66644	66754	110	220	PCC Trapezoidal	Both Side
12.	67073	67188	115	230	PCC Trapezoidal	Both Side
13.	67231	67412	181	362	PCC Trapezoidal	Both Side
14.	67452	67605	153	306	PCC Trapezoidal	Both Side
15.	67702	67843	141	282	PCC Trapezoidal	Both Side
16.	67876	67965	89	178	PCC Trapezoidal	Both Side
17.	68235	68546	311	622	PCC Trapezoidal	Both Side
18.	68607	68618	11	22	PCC Trapezoidal	Both Side
19.	68724	68743	19	38	PCC Trapezoidal	Both Side
20.	68813	68854	41	41	PCC Trapezoidal	RHS Side
21.	68854	68896	42	84	PCC Trapezoidal	Both Side
22.	68896	68937	41	41	PCC Trapezoidal	RHS Side
23.	69471	69582	111	222	PCC Trapezoidal	Both Side
24.	69582	69704	122	122	PCC Trapezoidal	RHS Side
25.	69704	69736	32	64	PCC Trapezoidal	Both Side
26.	69795	69810	15	30	PCC Trapezoidal	Both Side
27.	69899	69954	55	110	PCC Trapezoidal	Both Side
28.	70012	70109	97	194	PCC Trapezoidal	Both Side
29.	70356	70445	89	178	PCC Trapezoidal	Both Side
30.	70445	70470	25	25	PCC Trapezoidal	RHS Side
31.	70470	70694	224	448	PCC Trapezoidal	Both Side
32.	70694	70767	73	73	PCC Trapezoidal	LHS Side
33.	70767	70808	41	82	PCC Trapezoidal	Both Side
34.	70808	70891	83	83	PCC Trapezoidal	LHS Side
35.	71323	71361	38	76	PCC Trapezoidal	Both Side

SL.NO.	CHAINAGE		LENGTH (M)	TOTAL LENGTH (M)	TYPE	Side
	FROM	TO				
36.	71361	71529	168	168	PCC Trapezoidal	RHS Side
37.	71570	71588	18	18	PCC Trapezoidal	LHS Side
38.	71991	72127	136	272	PCC Trapezoidal	Both Side
39.	72243	72260	17	34	PCC Trapezoidal	Both Side
	TOTAL =		**4895**	**9219**		

Details of RCC Covered Drains

SL.NO.	Left hand Side				Right hand Side			
	CHAINAGE		LENGTH	TYPE	CHAINAGE		LENGTH	TYPE
	FROM	TO			FROM	TO		
1	65090	66400	1310	Cover Drain	65090	66400	1310	Cover Drain
	TOTAL =		**1310**	**m**			**1310**	**m**
	G. TOTAL=	**2620**	**m**					

Note: The length of side drains given above are minimum and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable.

SL.NO.	CHAINAGE	LENGTH (M)	TYPE	Remarks
1	59+000 To 72+450	1020	Sub-Surface Drain	As Per Site Requirements

7. Balance Work of 2 laning: Layer Wise: -

7.1 Minimum balance Earthwork up to Top of Sub-grade

Sl. No.	**Activity**	**Chainages**				
		From	**TO**	**Length**	**Side**	**Side**
1	SG Balance	59+000	59+187	187	BHS	W
2	SG Balance	59+187	59+470	283	BHS	R
3	SG Balance	59+840	59+870	30	BHS	W
4	SG Balance	59+870	60+002	132	BHS	R
5	SG Balance	60+002	60+045	43	BHS	W
6	SG Balance	60+045	60+095	50	BHS	R
7	SG Balance	60+095	60+150	55	BHS	W
8	SG Balance	60+320	60+850	530	BHS	W
9	SG Balance	61+100	61+620	520	BHS	W
10	SG Balance	61+700	62+151	451	BHS	W
11	SG Balance	62+151	62+247	96	BHS	R
12	SG Balance	62+247	62+570	323	BHS	W
13	SG Balance	62+910	62+930	20	BHS	W
14	SG Balance	63+140	63+552	412	BHS	W
15	SG Balance	63+552	63+570	18	BHS	R
16	SG Balance	63+570	63+600	30	BHS	W

17	SG Balance	63+771	63+772	1	BHS	R
18	SG Balance	63+800	64+200	400	BHS	W
19	SG Balance	64300	65330	1030	BHS	W
20	SG Balance	66275	66306	31	BHS	R
21	SG Balance	66306	66430	124	BHS	W
22	SG Balance	66860	66885	25	BHS	W
23	SG Balance	66885	66940	55	BHS	R
24	SG Balance	67220	67288	68	BHS	R
25	SG Balance	67288	67410	122	BHS	W
26	SG Balance	67500	67528	28	BHS	R
27	SG Balance	70640	70693	53	BHS	W
28	SG Balance	71640	71788	148	BHS	R
29	SG Balance	71788	71880	92	BHS	W
30	SG Balance	71880	71930	50	BHS	R
31	SG Balance	72250	72260	10	BHS	R

7.2 Minimum Balance Granular Sub Base Works: -

Sl. No.	**Activity**	**Chainages**			**Alignments**
		From	**TO**	**Length**	
1	GSB Balance	59+000	59+187	187	W
2	GSB Balance	59+187	59+470	283	R
1	GSB Balance	59+470	59+490	20	W
2	GSB Balance	59+785	59+840	55	W
3	GSB Balance	59+840	59+870	30	W
4	GSB Balance	59+870	60+002	132	R
5	GSB Balance	60+002	60+045	43	W
6	GSB Balance	60+045	60+095	50	R
7	GSB Balance	60+095	60+150	55	W
8	GSB Balance	60+150	60+320	170	W
9	GSB Balance	60+320	60+850	530	W
10	GSB Balance	60+850	61+100	250	W
11	GSB Balance	61+100	61+620	520	W
12	GSB Balance	61+620	61+700	80	W
13	GSB Balance	61+700	62+150	450	W
14	GSB Balance	62+151	62+247	96	R
15	GSB Balance	62+247	62+570	323	W
16	GSB Balance	62+570	62+800	230	W
17	GSB Balance	62+910	62+930	20	W
18	GSB Balance	62+930	63+140	210	W
19	GSB Balance	63+140	63+552	412	W
20	GSB Balance	63+552	63+570	18	R
21	GSB Balance	63+570	63+600	30	W
22	GSB Balance	63+600	63+677	77	W
23	GSB Balance	63+772	63+800	28	W
24	GSB Balance	63+800	64+200	400	W

25	GSB Balance	64+200	64+300	100	W
26	GSB Balance	64300	65330	1030	W
27	GSB Balance	65+330	65+742	412	W
28	GSB Balance	65+742	65+806	64	R
29	GSB Balance	65+806	65+859	53	W
30	GSB Balance	65+859	65+883	24	R
31	GSB Balance	65+883	66+094	211	W
32	GSB Balance	66+094	66+120	26	R
33	GSB Balance	66+120	66+136	16	W
34	GSB Balance	66+136	66+174	38	R
35	GSB Balance	66+174	66+196	22	W
36	GSB Balance	66+196	66+210	14	R
37	GSB Balance	66+210	66+275	65	W
38	GSB Balance	66+275	66+306	31	R
39	GSB Balance	66+306	66+430	124	W
40	GSB Balance	66+670	66+835	165	R
41	GSB Balance	66+835	66+860	25	W
42	GSB Balance	66+860	66+885	25	W
43	GSB Balance	66+885	66+940	55	R
44	GSB Balance	67+006	67+030	24	W
45	GSB Balance	67+030	67+120	90	R
46	GSB Balance	67+220	67+288	68	R
47	GSB Balance	67+288	67+410	122	W
48	GSB Balance	67+450	67+458	8	R
49	GSB Balance	67+500	67+528	28	R
50	GSB Balance	67+760	67+770	10	W
51	GSB Balance	67+830	67+840	10	W
52	GSB Balance	69+076	69+110	34	R
53	GSB Balance	69+500	69+520	20	R
54	GSB Balance	69+520	69+580	60	R
55	GSB Balance	69+580	69+600	20	R
56	GSB Balance	69+701	69+730	29	W
57	GSB Balance	70+640	70+693	53	W
58	GSB Balance	71+640	71+788	148	R
59	GSB Balance	71+788	71+880	92	W
60	GSB Balance	71+880	71+930	50	R
61	GSB Balance	72+020	72+185	165	W
62	GSB Balance	72+185	72+250	65	W
63	GSB Balance	72+250	72+260	10	R
64	GSB Balance	72+260	72+386	126	R
65	GSB Balance	72+386	72+428	42	W
66	GSB Balance	72+428	72+446	18	R
67	GSB Balance	72+446	72+450	4	W
Total Quantity (Mt.)				**8495**	**Mtr**

7.3 Balance Work of WMM

Sl.	Activity	Chainages	Alignments	Remarks

No.		From	TO	Length		
1	WMM Balance	59+000	72+450	13.450	Realignment/Widening	

7.4 Balance Work of DBM

Sl. No.	Activity	Chainages			Alignments	Remarks
		From	TO	Length		
1	DBM Balance	59+000	72+450	13.450	Realignment/Widening	

7.5 Balance Work of BC

Sl. No.	Activity	Chainages			Alignments	Remarks
		From	TO	Length		
1	BC Balance	59+000	72+450	13.450	Realignment/Widening	

Note: - Bidders are requested to visit the site/stretch to understand the requirement of rectification as per their own assessment. The locations and length given above are tentative. The distressed locations should be identified with their exact chainages. The distresses should then be marked up in a grid pattern covering the distressed portion and also beyond the distressed portion. Then the entire DBM/WMM/GSB/Sub-Grade layer (as the case may be) within the identified grid must be scrapped off thoroughly. After scrapping of DBM layer, the top WMM surface must be thoroughly checked with respect to degree of compaction and plasticity (within the grid) randomly by doing the test pits at few locations. Further it should be extended for GSB and subgrade layer with extraction of layer material to observe CBR value. If result does not comply in any of the layers, then in that grid all the material including subgrade should be excavated and reconstructed freshly. If subgrade soil is complying with the physical properties while GSB does not, then excavation should be made up to GSB layer and reconstruction should be done from GSB layer. The same should be done for WMM/GSB/Sub-Grade also.

8. DESIGN OF STRUCTURES

The details of culverts shall be provided by the EPC Contractor and locations are given in Clause 7(ii) of Schedule-B.

All the cross-drainage structures and other structures shall be designed in accordance with the design standards set out in **Schedule-D.**

(i) Bridges

i. General

a) All bridges, culverts and structures shall be designed and constructed in accordance withsection 7 of IRC: SP: 73-2018and referred other codes therein and shall conform to the cross- sectional features and other details specified therein

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

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
	Nil	

c) Following structures shall be provided with footpaths:

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
	Nil	

d) All bridges shall be high-level bridges.

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

Sl. No.	Bridge/Structure at km	Width of carriageway and cross-sectional features
	Nil	

f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections of IRC: SP: 73-2018.

(ii) Culverts

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

i) Reconstruction of existing culverts

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

[Refer to paragraph 8.2.3 (i) of the Manual and provide details]. These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

* Specify modifications, if any, required in the road level etc.

SI. No.	Existing Chainage (km)	Design Chainage (km)	Ext. Type	Ext. Size	Proposed Type	Proposed Span (m)	Remarks
1.	60+653	59+345	PIPE	1000mm	BOX	1 x 2 x 2	Re Construction
2.	61+205	59+952	SLAB	2m	BOX	1 x 2 x 2	Re Construction
3.	61+260	60+125	SLAB	3m	BOX	1 x 3 x 3	Re Construction
4.	61+430	60+250	SLAB	3m	BOX	1 x 3 x 3	Re Construction
5.	61+709	60+460	SLAB	3m	BOX	1 x 3 x 3	Re Construction
6.	62+161	60+865	SLAB	2m	BOX	1 x 2 x 2	Re Construction
7.	62+501	60+945	SLAB	2m	BOX	1 x 2 x 2	Re Construction
8.	63+247	62+050	SLAB	2m	BOX	1 x 2 x 2	Re Construction
9.	63+632	62+590	PIPE	1000mm	BOX	1 x 2 x 2	Re Construction
10.	63+816	62+920	SLAB	2m	BOX	1 x 2 x 2	Re Construction
11.	-	63+620	-	-	BOX	1 x 2 x 2	Re Construction
12.	65+574	64+240	SLAB	2m	BOX	1 x 2 x 2	Re Construction

SI. No.	Existing Chainage (km)	Design Chainage (km)	Ext. Type	Ext. Size	Proposed Type	Proposed Span (m)	Remarks
13.	65+857	64+522	SLAB	2m	BOX	1 x 2 x 2	Re Construction
14.	66+048	64+713	SLAB	2m	BOX	1 x 2 x 2	Re Construction
15.	66+193	64+854	SLAB	2m	BOX	1 x 2 x 2	Re Construction
16.	66+630	65+299	SLAB	2m	BOX	1 x 2 x 2	Re Construction
17.	66+797	65+460	SLAB	2m	BOX	1 x 2 x 2	Re Construction
18.	67+228	65+872	SLAB	2m	BOX	1 x 2 x 2	Re Construction
19.	72+221	70+440	SLAB	2	BOX	1 x 2 x 2	Re Construction
20.	73+355	72+173	SLAB	2	BOX	1 x 2 x 2	Re Construction

* All box culverts (excluding the box culverts in cushion) shall be provided with approach slabs on both sides. Moreover, upstream and downstream protection works, including chute drains connecting stream with the culvert, catch pits; baffle piers/blocks etc. shall be provided which must be ascertained as per the site conditions and details given in drawings of culvert.

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

BOX CULVERT DETAILS

SI. No.	Existing Chainage (km)	Design Chainage (km)	Proposed Type	Proposed Span (m)	Remarks
1.	60+372	59+040	BOX	1 x 2 x 2	New Construction
2.	60+786	59+460	BOX	1 x 2 x 2	New Construction
3.	60+934	59+607	BOX	1 x 2 x 2	New Construction
4.	61+090	59+760	BOX	1 x 2 x 2	New Construction
5.	61+534	60+210	BOX	1 x 2 x 2	New Construction
6.	61+933	60+609	BOX	1 x 2 x 2	New Construction
7.	62+059	60+735	BOX	1 x 2 x 2	New Construction
8.	62+873	61+544	BOX	1 x 2 x 2	New Construction
9.	63+467	62+117	BOX	1 x 2 x 2	New Construction
10.	64+075	62+760	BOX	1 x 2 x 2	New Construction
11.	64+251	62+938	BOX	1 x 2 x 2	New Construction
12.	64+860	63+550	BOX	1 x 2 x 2	New Construction
13.	65+072	63+755	BOX	1 x 3 x 3	New Construction
14.	66+409	65+076	BOX	1 x 2 x 2	New Construction
15.	67+000	65+666	BOX	1 x 2 x 2	New Construction
16.	67+133	65+780	BOX	1 x 2 x 2	New Construction
17.	67+505	66+110	BOX	1 x 2 x 2	New Construction
18.	67+900	66+470	BOX	1 x 2 x 2	New Construction
19.	66+927	67+006	BOX	1 x 2 x 2	New Construction
20.	70+701	69+805	BOX	1 x 2 x 2	New Construction
21.	72+240	70+995	BOX	1 x 2 x 2	New Construction

iii) Widening & balance work of constructed half culvert shall be constructed as per particulars given in the table below:

BOX CULVERT DETAILS

SI. No.	Design Chainage (km)	Proposal	Widening Span (m)	Propose Span (m)	Balance Work
1.	66+421	Widening and construction of Balance work in constructed half culvert	As per Site requirement	1 x 2 x 2	Half culvert ,Return walls, Parapet Walls, Catch Pit, flooring & protection works
2.	66+882	Widening and construction of Balance work in constructed half culvert	As per Site requirement	1 x 2 x 2	
3.	67+505	Widening and construction of Balance work in constructed half culvert	As per Site requirement	1 x 2 x 2	
4.	70+675	Widening and construction of Balance work in constructed half culvert	As per Site requirement	1 x 2 x 2	
5.	72+095	Widening and construction of Balance work in constructed half culvert	As per Site requirement	1 x 2 x 2	

iv) Balance work for new constructed culvert (Return walls, Parapet Walls, upstream Catch Pit, downstream protection works) shall be undertaken as follows:

Sl. No.	Design Chainage (km)	Proposal	Proposed Span
1.	66+510	Construction of Balance work (Return wall of u/s & d/s, Apron &Catchpit etc.)	1 x 2 x 2
2.	67+150	Construction of Balance work (Catchpit, return wall LHS & Apron etc.)	1 x 2 x 2
3.	67+535	Construction of Balance work (Return Wall LHS & Apron etc.)	1 x 2 x 2
4.	67+560	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
5.	67+400	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
6.	67+650	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
7.	67+700	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
8.	67+790	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
9.	67+820	Construction of Balance work (Return Wall LHS, Catchpit& Apron etc.)	1 x 2 x 2
10.	68+235	Construction of Balance work (Return Wall RHS & Apron etc.)	1 x 2 x 2
11.	68+757	Construction of Balance work (Return Wall LHS & RHS, Catchpit, Apron & Both parapets etc.)	1 x 2 x 2

Sl. No.	Design Chainage (km)	Proposal	Proposed Span
12.	68+888	Construction of Balance work (Apron etc.)	1 x 2 x 2
13.	69+090	Construction of Balance work (Apron etc.)	1 x 2 x 2
14.	69+230	Construction of Balance work (Apron etc.)	1 x 2 x 2
15.	69+525	Construction of Balance work (Return Wall LHS & RHS, Apron etc.)	1 x 2 x 2
16.	69+577	Construction of Balance work (Apron &Catchpit etc.)	1 x 2 x 2
17.	69+715	Construction of Balance work (Apron &Catchpit etc.)	1 x 2 x 2
18.	69+937	Construction of Balance work (Apron etc.)	1 x 2 x 2
19.	70+785	Construction of Balance work (Catchpit, Apron & Both parapets etc.)	1 x 2 x 2

Note: - Protection work to be constructed for balance culverts and other pending culverts already constructed earlier by M/s CGR & Company as per site condition. The new Contractor shall be fully responsible for the rectification of defects and maintenance for such works including the portion or part of the work done earlier by M/s CGR & Company.

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

(iii) Bridges

i. The existing bridges to be reconstructed/widened

Sl. No.	Bridge location	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance etc.*	Remarks
	(km)	Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
Nil					

ii. The following structures shall be provided with footpaths:

Sl. No.	Location (km)	Remarks
NIL		

iii. Additional New Minor Bridges

New minor bridges at the following locations on the project highways shall be constructed in Package as per manual

Sl. No.	Location (km)	Total Length (m)	Remarks. If any
Nil			

iv. Additional New Major bridges

Sl. No.	Location Designed (km)	Total Length (m)	Remarks
NIL			

v. The railings of existing bridges shall be replaced by crash barriers at the following locations:

Sl. No.	Location (km)	Remarks
Nil		

vi. Repairs/replacements of railings/parapets of the existing bridges shall be undertaken as follows:

Sl. No.	Location (km)	Remarks
Nil		

vii. Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 8.21 of the Manual

viii. Structures in marine environment

NIL

(iv) Rail-road Bridges

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

(b) Road over-bridges

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

Sl No.	Location of Level Crossing (km)	Length of Bridge (m)
Nil		

(c) 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 (km)	Total Length (m)	Remarks. If any
Nil			

(v) Grade Separated Structures

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

Underpasses/Overpasses

There is no Underpass/Overpass proposed on the Project Highway.

(vi) Repairs and strengthening of bridges and structures

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

A. Bridges

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

B. ROB / RUB

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

C. Overpasses / Underpasses and Other Structures

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

(vii) List of Major Bridges and Structures

The following is the list of Major Bridges on Package

Sl No.	Location Design (km)	Total Length (m)	Remarks
NIL			

8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of IRC: SP:73-2018.

(a) Traffic Signs: Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway shall be provided conforming to IRC 67 and section 800 of MoRTH specification.

(b) Pavement Marking: Pavement markings shall cover road marking for the entire Project Highway and shall be provided conforming to IRC 35-2015.

8.2 Specifications of the reflective 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 shall be provided conforming to section 800 of MoRTH specification

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provisions of IRC: SP:73-2018.

(a) Road Boundary Stone: For the entire Project Highway.

(b) Pedestrian: 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.

v) Overhead traffic signs: location and size

(c) Full width Overhead signs: Full width Overhead signs shall be provided as below

Sl. No.	Location (Km)	Size
1	59.000	16m x 1.2m (Double Pole)

(d) Cantilever Overhead signs: Overhead signs shall be provided as below:

Sl. No.	Location (Km)	Remark
1	63.600	
2	68.770	

i) Delineators: Delineators for the entire Project Highway shall be provided at the locations as per section 9.4 of IRC SP 73:2018.

10. COMPULSORY AFFORESTATION

Minimum 1350 nos. trees are required to be planted.

11. HAZARDOUS LOCATIONS

11.1 Metal Beam crash barrier of minimum length of 3000 m (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides of the highway at the locations finalized in consultation with AE. Typical details of metal crash barrier are given in manual. Increase in length if any as per site requirement will not constitute change of scope.

11.2 Rest of the complete length of the project highway shall have parapet wall

as per IRC SP 48:1998.

12. SPECIAL REQUIREMENT FOR HILL ROADS

Refer to section 13 of IRC: SP: 73-2018..

(i) The **minimum quantity** of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Breast wall (2m height)	Rm	1680.94
Breast wall (3m height)	Rm	2100
Breast wall (4m height)	Rm	1275
Retaining Wall (6m height)	Rm	2592
Gabion Retaining Wall	Cum	10000
Seeding and Mulching with Jute Net	sqm	10000
Seeding and Mulching with Coir Net	sqm	10000
Hydro seeding	sqm	38,390
Catch Water Drain (Unlined)	Rm	520
Chute for Culvert		At Every Culvert Location
Parapet Wall	Rm	3837
Tubular Steel Railing on Pre cast RCC Post	Rm	700

Note- ***(i)*** *The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.*

(ii) *Any increase in quantity over and above the minimum qty. as mentioned in above table or through change in specifications will not be considered as change of scope.* ***Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid***

(iii) *The length of Retaining Wall shown above is minimum, to be constructed at site for proper geometrics and will not be converted to Breast Wall. Any reduction in the total length of Retaining Wall constructed at site shall constitute of negative change of scope.*

(iv) *Entire slope/formation which has been cut apart from the above tabulated lengths shall have to be stabilized by the Contractor using techniques approved by AE.*

13. CHANGE OF SCOPE

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

SCHEDULE – C

(See Clause 2.1)

PROJECT FACILITIES

Project Facilities

This schedule indicates the minimum spatial and functional requirements of the facilities to be provided on the **Project Highway (Total length of 17.384 km)**.

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

(a) Toll Plaza - Nil

(b) Pedestrian facilities – As described

(c) Tree plantation – As described

(d) Bus shelters -As described

(e) Others to be specified

Description of Project Facilities

Toll Plaza

NIL

Bus Shelters

To ensure orderly movement of the through traffic, bus shelters have been proposed outside the residential area, away from bridges, and high embankments and not too close to the road intersections.

Bus shelters shall be provided on the Project Highway at 4 locations as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides of the Project Highway. These bus shelters will also have passenger shelter.

Details of Bus shelters

Sl. No.	Project Facility (in Pair)	Design Chainage (km)	Side
1	Bus Shelter	63+940	RHS
2	Bus Shelter	64+000	LHS
3	Bus Shelter	65+000	RHS
4	Bus Shelter	65+040	LHS
5	Bus Shelter	66+450	LHS
6	Bus Shelter	66+550	RHS

Pedestrian Facilities

Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with NHIDCL. This should include (a) minimum Zebra Crossing with flashing Beacon or (b) Zebra Crossing with separate pedestrian path or (c) any other provision as approved by AE.

Landscaping

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The Construction Contractor should plant at least 2000 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

Plantation scheme shall be prepared in consultation with the Forest Department of the Government of Arunachal Pradesh, and AE.

Environment

The Project Highway during design, construction and maintenance period shall conform to the environmental rules and regulations in force. The Construction Contractor shall be responsible for the same.

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 confirm to design requirements set out in the following documents:

Manual of specification and standards for two laning of Highways with paved shoulder (Second revision) IRC:SP:73-2018, Hill road manual IRC:SP:48-1998 and Specification of roads and bridges work (fifth revision), MoRTH.

Annex – I

(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All materials, works and construction operations shall confirm to the Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73 – 2018), referred as the Manual, MORTH Specifications for Road and Bridge Works, and IRC: SP: 48-1998. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

2.1 The terms 'Concessionaire', 'Independent Engineer' and 'Concession Agreement' used in the Manual (IRC: SP 73- 2018) shall be deemed to be substituted by the terms **'Contractor', 'Authority's Engineer' and 'Agreement's** respectively.

2.2 Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, aforesaid Specifications and Standards of following clauses shall be deemed to be amended to the extent set forth below:

S. No.	Clause	Provision asper Manual (IRC:SP:73-2018)	Modified Provision
1	2.2	**Design Speed:** Ruling or minimum Design speed shall be followed	Design speed shall be 30 km/h for project highway excepting hair pin bend locationswhereindesignspeedshallbe20 km/h. The same is mentioned in the Plan&Profile drawings given in **Annexure-III** of **ScheduleA.**
2	2.7.2	**Roadway Width:** On horizontal curves with radius up to 300 m width of pavement and roadway shall be increased as per Table 2.4	On horizontal Curves with radius up to 300 m width of pavement and roadway shall be increased as per Plan &Profile drawings given in Annexure – III of ScheduleA
3	2.9.4	**Radius of Horizontal Curves:**	Radius of Horizontal curves shall be as per the alignment plan shown in Plan and Profile drawings given in Annexure – III of Schedule A

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1. Maintenance Requirements

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

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

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

2. Repair/Rectification of Defects and Deficiencies

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

3. Other Defects and Deficiencies

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

4. Extension of Time Limit

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

5. Emergency Repairs/Restoration

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

6. Daily inspection by the Contractor

The Contractor shall, through its engineer, undertake a daily visual

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

7. Pre-monsoon Inspection / Post-monsoon Inspection

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

8. Repairs on account of natural calamities

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

(Schedule-E)

Repair/rectification of Defects and Deficiencies

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

Nature of Defect or deficiency		Time limit for repair/rectification
ROADS		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Temporaryrestorationoftrafficwithin24hours;permanentrestoration within15(fifteen)days
(ii)	Roughnessvalueexceeding2,200mminastretchof 1km(as measured by a calibrated bump integrator)	120(one hundred and twenty)days
(iii)	Pot holes	24hours
(iv)	Any cracks in road surface	15(fifteen)days
(v)	Anydepressions,ruttingexceeding10mminroad surface	30 (thirty) days
(vi)	Bleeding/skidding	7 (seven) days
(vii)	Any other defect/distress on the road	15(fifteen)days
(viii)	Damage to pavement edges	15(fifteen)days
(ix)	Removal of debris, dead animals	6 hours
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variationbymorethan1%intheprescribedslope of camber/crossfall(shallnotbelessthanthecamber onthemaincarriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variationbymorethan15%intheprescribedside (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	24hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and**	

Nature of Defect or deficiency		Time limit for repair/rectification
	pavement marking	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Road Lighting**	
(i)	Any major failure of the system	24hours
(ii)	Faults and minor failures	8 hours
(e)	**Trees and Plantation**	
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24hours
(ii)	Removal of fallen trees from carriageway	4 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 hours
(ii)	Defects in electrical, water and sanitary installations	24hours
(g)	**Toll Plazas**	
(h)	**Other Project Facilities and Approach Roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay-byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15(fifteen)days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporarymeasures Permanentmeasures	within 48 hours within15(fifteen)daysorasspecified bytheAuthority'sEngineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15(fifteen)days

(c)	**Piers, abutments, return walls and wing walls**	

Nature of Defect or deficiency		Time limit for repair/rectification
(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 (immediatelywithin24hoursifposing dangertosafety)
(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(twentyfour)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 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

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

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

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

c) License for use of explosives;

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

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

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

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

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

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

1.2 Applicable Permits, as required, relating to environmental protection and conservationshallhavebeenprocuredbytheAuthorityinaccordancewiththeprovisionsofthisAgreement.

1.3 The agency need to ensure compliance of AIP and FC stated in schedules 'A', Annexure – IV. The necessary certifications need to be obtained from competent local forest department.

1.4 Muck dumping locations in forest area to be freezed in consultation with the forest department, the necessary certifications from local competent for rest department is to be submitted.

SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause7.1.1)

Performance Security

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

WHEREAS:

_____[name and address of contractor] (hereinafter called the "**Contractor**") and Managing Director, NHIDCL, PTI Building, 3rdFloor, 4, Parliament Street, New Delhi- 110001(hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") for the **RFP for "**Balance work of Construction of two-lane with hard Shoulders of **Merangkong-Tamlu-Mon** road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (**Package-V**) in the state of Nagaland under NHO-NE on EPC mode**"** subject to and in accordance with the provisions of the Agreement

A. 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**").

B. We, ……. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. --------- cr. (Rs. ----------crore) (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 performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with theAgreement, 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 & Infrastructural Development Corporation Ltd, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall notinanywayormanneraffecttheliabilityorobligationoftheBankunderthisGuarantee.

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Retention Money and any of the rights and powers

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

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

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless ademandor claiming writing is made

by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

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

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

12. 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.

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

14. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below:-

Sr. No.	Particulars	Details
1	Name of Beneficiary	MD-NHIDCL
2	Beneficiary Bank Account No	90621010002610
3	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi-110001
4	**Beneficiary Bank Branch IFSC**	**CNRB0019062**
5.	**Email ID:**	cb19062@canarabank.com

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

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

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

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

Annex – III (Schedule - G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

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

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "Contractor") has executed an agreement (hereinafter called the "Agreement") with the Managing Director, Head Office New Delhi (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for Balance work of Construction of two-lane with hard Shoulders of **Merangkong-Tamlu-Mon** road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (**Package-V**) in the state of Nagaland under NHO-NE on EPC mode in the state of Nagaland under SARDP-NE Phase A" subject to and in accordance with the provisions of the Agreement.

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

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

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

1.The Bank hereby unconditionally and irrevocably guarantees the due

and faithful repayment on time of the aforesaid 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.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways & Infrastructural Development Corporation Ltd], 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.

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

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

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any

other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on ****.$ Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly 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 up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

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

vocation.

13. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below: -

Sr. No.	Particulars	Details
1	Name of Beneficiary	MD-NHIDCL
2	Beneficiary Bank Account No	90621010002610
3	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi-110001
4	**Beneficiary Bank Branch IFSC**	**CNRB0019062**
5.	**Email ID:**	cb19062@canarabank.com

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

SIGNED, SEALED AND DELIVERED

For and on

behalf of the

Bank by:

(Signature)

(Name)

(Designatio

n)

(Code

Number)

(Address

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

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

Schedule - H

(See Clauses 10.1 (iv) and 19.3)

Contract Price Weightages

1. The Contract Price for this Agreement is Rs_____ Crore rupees.

1.1 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specifiedbelow:

Item	Weightage in % of CP	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	67.436%	**A- Widening and strengthening**	
		of existing road	
		(1) Earthwork up to top of the sub-grade	5.662%
		(2) Sub-base Course	10.235%
		(3) Non bituminous Base course	11.436%
		(4) Bituminous Base course	6.053%
		(5) Wearing Coat	4.316%
		(6) Widening with Balance work Construction in existing Culverts	0.629%
		(7) Hard Shoulder	4.678%
		B.1- Reconstruction/New 2-Lane	
		Realignment / Bypass (Flexible Pavement)	-
		(1) Earthwork up to top of the	
		sub- grade	1.191%
		(2) Sub-base Course	2.446%
		(3) Non bituminous Base course	4.018%
		(4) Bituminous Base course	2.127%
		(5) Wearing Coat	1.516%
		(6) Hard Shoulder	1.643%
		B.2- Reconstruction/New 2-Lane	
		Realignment / Bypass (Rigid	-
		Pavement)	

		(1) Earthwork up to top of the sub- grade	-
		(2) Sub-base Course	-
		(3) Dry Lean Concrete (DLC) Course	-
		(4) Pavement Quality Control (PQC) Course	-
		C.1- Reconstruction/ New Service Road/ Slip Road (Flexible Pavement)	-
		(1) Earthwork up to top of the sub-grade	-
		(2) Sub-base Course	-
		(3) Non bituminous Base course	-
		(4) Bituminous Base course	-
		(5) Wearing Coat	-
		C.2- Reconstruction/New Service road (Rigid Pavement)	-
		(1) Earthwork up to top of the sub- grade	-
		(2) Sub-base Course	-
		(3) Dry Lean Concrete (DLC) Course	-
		(4) Pavement Quality Control (PQC) Course	-
		D- Reconstruction & New Culverts on existing road, realignments, bypasses Culverts (length <6m)	10.944%
		E- Construction of balance work & associated Protection Works in existing culverts on existing road, realignments, bypasses Culverts (length <6m)	0.542%
Minor bridge/ Underpasses/ Overpasses	0	**A.1- Widening and repairs of Minor Bridges (length>6m &<60m)**	
		Minor Bridges	-
		A.2- New Minor bridges (length >6 m and < 60 m)	
		(1) Foundation + Sub-structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/ pier cap	-
		(2) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings,	

		expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc complete in all respect.	-
		(3) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use	
			-
		(4) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	
			-
		B.1- Widening and repairs of underpasses/overpasses	
		Underpasses/ Overpasses	-
		B.2- New Underpasses/Overpasses	
		(1) Foundation + Sub-structure: On completion of the foundation work including foundations for wing and return walls, abutments, piers upto the abutment/ pier cap	
			-
		(3) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion in all respect.	
		Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified	
			-
		(3) Approaches : On completion of approaches including Retaining walls / Reinforced earth walls, stone pitching, protection works complete in all respect and fit for use	
			-

Major bridge(length>60 m) works and ROB/RUB/		**A.1- Widening and repairs of Major**	
elevated sections/flyovers including viaducts, if any		**Bridges**	
		(1) Foundation:	-
		(2) Sub-structure:	-
		(3) Super-structure: including bearings.	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/return walls upto top	-
		(7) Guide bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-
		A.2- New Major Bridges	
		(1) Foundation:	
		(2) Sub-structure:	
		(3) Super-structure: including bearings.	
		(4) Wearing Coat including expansion joints	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings, lighting etc.	
		(6) Wing walls/return walls upto top	
		(7) Guide bunds, River Training works etc.	
		(8) Approaches (including Retaining walls, stone pitching and protection works)	
		B.1- Widening and repairs of (a) ROB (b) RUB	
		(1) Foundations	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including bearings)	-
		(4) Wearing Coat (a) in case of ROB-	

		wearing coat including expansion joints complete in all respects as specified and	-
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	
			-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
			-
		(6) Wing walls/Return walls	-
		(7) Approaches (including Retaining walls, stone pitching, protection works etc.)	
			-
		B.2- New ROB/RUB	
		(1) Foundations	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including	-
		bearings)	
		(4) Wearing Coat (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and	
			-
		(b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified	
			-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
			-
		(6) Wing walls/Return walls	-
		(7) Approaches (including Retaining/ Reinforced earth walls,	
		stone pitching, protection works etc.)	-
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	
		(1) Foundations	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	
			-
		(6) Wing walls/Return walls	-

		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works etc.)	-
		C.2- New Elevated Section/Flyovers/Grade Separators	
		(1) Foundation	
		(2) Sub-structure	
		(3) Super-structure: including bearings.	
		(4) Wearing Coat including expansion joints	
		(5) Miscellaneous Items like hand rails, crash barrier, road markings, lighting etc.	
		(6) Wing walls/Return walls	
		(7) Approaches (including Retaining/ Reinforced earth walls, stone pitching, protection works etc.)	
Other Works	32.564%	(i) Toll Plaza	-
		(ii) Road side drains	
		Lined Drain	6.903%
		Unlined Drain	-
		(iii) Road signs markings, Km stones, safety Devices etc.	
		a) Pavement Marking	0.439%
		b) All Traffic Signs board, Hazard marker, Object marker	0.531%
		c) Road Boundary pillar / stone, km Stone, 5th km stone, hectometer stone etc.	0.085%
		d) Traffic blinker LED delineator, road stud, reflective payment marker, tree reflector etc.	0.216%
		e) Road Furniture (Overhead sign board, Cantilever sign etc.)	0.113%
		(iv) Project facilities	-
		a) Bus Bays with bus shelter	0.415%
		b) Truck lay byes	
		c) Rest areas	-
		d) Junction (Major & Minor)	2.265%
		(v) Road side plantation	
		(vi) Repair of Protection Works other than approaches to the bridges, elevated sections/	

		flyover/ grade separators and ROBs/ RUBs	
			-
		W-Beam Crash Barrier	2.410%
		Hydro Seeding of Cut Slopes in Soil	0.141%
		Seeding and Mulching with Jute net and coir net	0.206%
		Catch water drain	0.100%
		Breast Wall	6.279%
		Retaining Wall	3.613%
		Gabion Structure on hill side/valley side of varying height between 1 to 6 meter depending upon the slope	6.346%
		Sub Surface drain with perforated pipe for collection of seepage water to avoid sinking of pavement	0.048%
		Parapet Wall	2.454%
		(ix) Safety & Traffic Management during const.	-

1.2 Procedure of estimating the value of work done

1.1.1 Road works

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

Table 1.3.1

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
Table 1.3.1		
A-Widening and Strengthening of existing road		
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc.	5.662	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 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base courses	10.235	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
(3) Non Bituminous Base Course	11.436	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(4) Bituminous Base Course	6.053	500 m.
(5) Wearing coat	4.316	
(6) Widening with construction of balance work in existing Culverts	0.629	Cost of completed culverts shall be determined on pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least five culverts.
(7) Hard Shoulder	4.678	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 500 m.
B 1- Reconstruction / New two lane alignment / bypass (Flexible pavement)		
(1) Earthwork up to top of the sub-grade including excavation in soil, soft rock and hard rock, removal of unserviceable soil etc.	1.191	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 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	2.446	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 500 m.
(3) Non Bituminous Base Course	4.018	
(4) Bituminous Base Course	2.127	
(5) Wearing coat	1.516	
(6) Hard Shoulder	1.643	
B 2- Reconstruction / New two lane alignment / bypass (Rigid pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Earthwork in shoulders	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Sub Base Course	[Nil]	
(4) Dry Lean Concrete (DLC) Course	[Nil]	
(5) Pavement Quality Control (PQC) course	[Nil]	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
C 1- Reconstruction / New Service road/ Slip Road (Flexible pavement)		
(1) Earthwork up to top of the sub-grade including shoulder	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non Bituminous Base Course	[Nil]	
(4) Bituminous Base Course	[Nil]	
(5) Wearing coat	[Nil]	
C 2- Reconstruction / New Service road (Rigid pavement)		
(1) Earthwork up to top of the sub-grade	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill Cutting, the payment procedure will be as under : Hill Cutting : 40% of weightage of A (1) Preparation of Sub-Grade: 60% of weightage of A (1)
(2) Sub Base Course	[Nil]	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry Lean Concrete (DLC) Course	[Nil]	
(4) Pavement Quality Control (PQC) course	[Nil]	
D - Reconstruction and New culverts on existing road, Realignments, bypasses:		
(1) **Reconstruction&NewCulvertsonexistingroad,realignments,bypasses**Culverts(length<6m)	10.944	Cost of each culvert shall be determined on pro rata basis with respect to the total no. of culverts. Payment shall be made on the completion of at least 05 (Five) culvert.
(2) **Construction of balance work & associated Protection Works in existing culverts on existing road, realignments, bypasses Culverts (length <6m)**	0.542	

@ For example, if the total length of bituminous work to be done is 100 km, the cost per km of

bituminous work shall be determined as follows:

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

Where,

P = Contract Price

L = Total length in km

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

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

1.1.2 Minor Bridges andUnderpasses/Overpasses.

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

Table 1.3.2

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
Table 1.3.2 Minor Bridges and Under Pass/Over Pass		
A 1- Widening and repairs of Minor Bridges (length >6m and<60m)	[Nil]	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on completion of widening and repair works of a minor bridge.
A 2- New Minor Bridges (length >6m and<60m)		Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges.
(1) Foundation : on completion of foundation work including foundation for wing and return wall	[Nil]	(1) Foundation: Payment against Foundation shall be made on pro rata basis on completion of atleast two foundations. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap.	[Nil]	(2) Sub Structure: Payment against Sub Structure shall be made on pro rata basis on completion of atleast two sub structures upto abutment / pier cap level of each bridge.
(3) Superstructure : on completion of super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	[Nil]	(3) 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 respect as specified in the column of " Stage of Payment" in this Sub-clause.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(4) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	(4) Approaches: Payment shall be made on pro rata basis on completion of a stage ie. completion of approaches in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(5) Guide bunds and river training works: on completion of guide bunds and repair training works complete in all respects.	[Nil]	(5) Guide bunds and river training works: Payment shall be made on pro rata basis on completion of a stage ie. completion of guide bunds and river training works in all respect as specified.
B 1 - Widening and repair of underpasses / overpasses	[Nil]	Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass. Payment shall be made on completion of widening and repair works of a underpass / overpass.
B 2 - New Underpasses / Overpasses		Cost of each underpass / overpass shall be determined on pro rata basis with respect to the total linear length of the underpass / overpass.
(1) Foundation: on completion of foundation work including foundation for wing and return wall.	[Nil]	(1) Foundation: Payment against Foundation shall be made on pro rata basis on completion of atleast two foundations. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap.	[Nil]	(2) Sub Structure: Payment against Sub Structure shall be made on pro rata basis on completion of atleast two sub structures upto abutment / pier cap level of each underpass / overpass.
(3) Superstructure: on completion of super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	[Nil]	(3) Super structure: Payment shall be made on pro rata basis on completion of a stage ie. completion of super structure of atleast one span in all respect as specified in the column of " Stage of Payment" in this Sub-clause.
(4) Approaches: on completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	[Nil]	(4) Approaches: Payment shall be made on pro rata basis on completion of a stage ie. completion of approaches in all respect as specified in the column of " Stage of Payment" in this Sub-clause.

1.1.3 Major Bridge works, ROB/RUB and Structures.

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

Table 1.3.3

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
Table 1.3.3		
A.1 Widening and repair of Major Bridge		
(1) Foundation	[Nil]	(i) Foundation: Cost of each Major Bridge shall be determined on prorata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge subject to completion of at least two foundations of the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also were specified.
(2) Sub-structure	[Nil]	(ii) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub structures of abutment / pier cap level of the major bridge..
(3) Super-structure (including bearings)	[Nil]	Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) Wearing Coat including expansion joints	[Nil]	(iv)Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	[Nil]	(v) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(6) Wing walls/return walls upto top	[Nil]	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/returnwalls complete in all respects as specified.
(7) Guide bunds, River Training works etc.	[Nil]	(vii) Guide Bonds, River Training works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(8) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	(viii) Approaches: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
A 2 - New Major bridges		Cost of each structure shall be determined on pro rata basis in respect to the total liner length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given in this table.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(1) Foundation: Foundation for abutment, piers	[Nil]	(1) Foundation: 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 a bridge as per weightage given in this table, subject to completion of at least two foundations in all respect. In case load testing is required for foundation, the trigger for first payment shall include load testing also where specified.
(2) Sub-Structure: Sub-Structure for abutment, piers up to abutment/pier cap level	[Nil]	(2) Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of a bridge as per weightage given in this table, subject to completion of atleast two sub-structure upto abutment/pier cap level of a bridge.
(3) Super-structure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)		
a) Super Structure : casting of girder/fabrication of girders (Steel)	[Nil]	(a) Super – structure (casting of girder) : Unit of measurement is numbers. Payment against casting of girders shall be made on pro rata basis with respect to total numbers of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.
(b) Super structure : Casting of segments	[Nil]	(b) Super structure (Casting of segments): Unit measurement is numbers. Payment against casting of segments shall be made on pro rata basis with respect of total numbers of segments required in the structure on completion of a stage i.e. not less than completion of casting at least 10 (ten) segments of the structure.
(c) Super structure : erection of girders, deck slab and bearings	[Nil]	(c) Super structure (Erection of girders, deck slab and bearing) : Payment shall be made on pro rata basis on completion of a stage i.e. completion of supers structure including bearings of at least one span in all respects as specified.
(4) Other Ancillary works : wearing coat, expansion joints hand rails, crash barriers, tests on completion etc. completion in all respect.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(5) Miscellaneous Works : stone pitching, protection works, excluding retaining walls/reinforced earth walls etc.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(6) Wing/Return wall up to full height	[Nil]	Wing/Return wall up to full height: Payment shall be made on completion of all wing wall/return walls for a bridges as per weightage given in this table, completion in all respect as specified.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(7) Guide bunds, River Trainings works etc.	[Nil]	Payment shall be made on pro rata basis on completion of the stage in all respect as specified, for each structure.
(8) Retaining walls/Reinforced earth walls etc.	[Nil]	
a) Panel Casting	[Nil]	a) Panel Casting : Unit of measurement is area in Sqm. Payment against casting of panels shall be made on pro rata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of scope of the RE wall panel of each bridge.
b) Erection of panel / construction of retaining wall	[Nil]	b) Erection of Panel / Construction of Retaining wall : Unit of measurement is area in Sqm. Payment shall be made on pro rata basis on completion of stage i.e. completion of erection of panels/ Construction of retaining wall complete in all respect for atleast 25% scope of work for each structure.
B 1 - Widening and repair of		
a) ROB b) RUB		
1) Foundation	[Nil]	(i)Foundation: Cost of each RoB / RuB shall be determined on pro rata basis with respect to the total linear length (m) of the RoB / RuB. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the RoB / RuB subject to completion of atleast two foundations of the RuB/ROB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	[Nil]	(ii) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e.not less than 25% of the scope of sub-structure of the RoB / RuB subject to completion of atleast two sub structure of abutments / pier cap level of the RuB/ROB.
3) Super Structure (Including bearings)	[Nil]	(iii) Super-structure: Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respects as specified.
4) Wearing coat (a) in case of RoB - wearing coat including expansion joints complete in all respect as specified and (b) in case of RuB - rigid pavement under RuB including drainage facility complete in all respect as	[Nil]	(iv) Wearing Coat: Payment shall be made on completion of (a) in case of ROB- wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
specified		
5) miscellaneous items like hand rails, crash barrier, road markings etc	[Nil]	(v) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	[Nil]	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	(vii) Approaches: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
B 2 - New ROB / RUB		Cost of each structure shall be determined on pro rata basis in respect to the total liner length (m) of all the structures. Payments shall be made on completion of each stage of a structures as per weightage given in this table.
(1) Foundation: Foundation for abutment, piers	[Nil]	(1) Foundation: 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 a ROB/RUB as per weightage given in this table, subject to completion of at least two foundations in all respect. In case load testing is required for foundation, the trigger for first payment shall include load testing also where specified.
(2) Sub-Structure: Sub-Structure for abutment, piers up to abutment/pier cap level	[Nil]	(2) Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of a ROB/RUB as per weightage given in this table, subject to completion of atleast two sub-structure upto abutment/pier cap level of a ROB/RUB.
(3) Super-structure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)		

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
a) Super Structure : casting of girder/fabrication of girders (Steel)	[Nil]	(a) Super – structure (casting of girder): Unit of measurement is numbers. Payment against casting of girders shall be made on pro rata basis with respect to total numbers of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.
(b) Super structure : Casting of segments	[Nil]	(b) Super structure (Casting of segments): Unit measurement is numbers. Payment against casting of segments shall be made on pro rata basis with respect of total numbers of segments required in the structure on completion of a stage i.e. not less than completion of casting at least 10 (ten) segments of the structure.
(c) Super structure : erection of girders, deck slab and bearings	[Nil]	(c) Super structure (Erection of girders, deck slab and bearing): Payment shall be made on pro rata basis on completion of a stage i.e. completion of supers structure including bearings of at least one span in all respects as specified.
(4)Other Ancillary works : wearing coat, expansion joints hand rails, crash barriers, tests on completion etc. completion in all respect.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(5) Miscellaneous Works : stone pitching, protection works, excluding retaining walls/reinforced earth walls etc.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(6) Wing/Return wall up to full height	[Nil]	Wing/Return wall up to full height: Payment shall be made on completion of all wing wall/return walls for each ROB/RUB as per weightage given in this table, completion in all respect as specified.
(7) Retaining walls/Reinforced earth walls etc.	[Nil]	
a) Panel Casting	[Nil]	a) Panel Casting : Unit of measurement is area in Sqm. Payment against casting of panels shall be made on pro rata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of scope of the RE wall panel of each ROB/RUB.
b) Erection of panel / construction of retaining wall	[Nil]	b) Erection of Panel / Construction of Retaining wall : Payment shall be made on pro rata basis on completion of stage i.e. completion of erection of panels/ Construction of retaining wall complete in all respect for atleast 25% scope of work for each ROB/RUB.
C 1 - Widening and repair of Elevated sections / Fly overs / Grade Separators		

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
1) Foundation	[Nil]	(i)Foundation:Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the structure subject to completion of atleast two foundations of the structure. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2) Sub Structure	[Nil]	(ii) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e.not less than 25% of the scope of sub-structure of the structure subject to completion of atleast two sub structure of abutments / pier cap level of the structure.
3) Super Structure (Including bearings)	[Nil]	(iii) Super-structure: Payment shall be made on pro rata basis on completion of a stage i.e. completion of super structure including bearings of atleast one span in all respects as specified.
4) Wearing coat including expansion joints	[Nil]	(iv) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
5) Miscellaneous items like hand rails, crash barrier, road markings etc	[Nil]	(v) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
6) wing walls / return walls	[Nil]	(vi) Wing walls/return walls: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
7) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	(vii) Approaches: Payment shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.
C 2 - New Elevated sections / Fly overs / Grade Separators		Cost of each structure shall be determined on pro rata basis in respect to the total liner length (m) of all the structures. Payments shall be made on completion of each stage of a structures as per weightage given in this table.
(1) Foundation: Foundation for abutment, piers	[Nil]	(1) Foundation: 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 each structure as per weightage given in this table, subject to completion of at least two foundations in all respect. In case load testing is required for foundation, the trigger for first payment shall include load testing also where specified.

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
(2) Sub-Structure: Sub-Structure for abutment, piers up to abutment/pier cap level	[Nil]	(2) Sub-Structure: Payment against sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of each structure as per weightage given in this table, subject to completion of atleast two sub-structure upto abutment/pier cap level of each structure.
(3) Super-structure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)		
a) Super Structure : casting of girder/fabrication of girders (Steel)	[Nil]	(a) Super – structure (casting of girder) : Unit of measurement is numbers. Payment against casting of girders shall be made on pro rata basis with respect to total numbers of girders required in the structure on completion of a stage i.e. not less than completion of casting of at least five girders of the structure.
(b) Super structure : Casting of segments	[Nil]	(b) Super structure (Casting of segments): Unit measurement is numbers. Payment against casting of segments shall be made on pro rata basis with respect of total numbers of segments required in the structure on completion of a stage i.e. not less than completion of casting at least 10 (ten) segments of the structure.
(c) Super structure : erection of girders, deck slab and bearings	[Nil]	(c) Super structure (Erection of girders, deck slab and bearing) : Payment shall be made on pro rata basis on completion of a stage i.e. completion of supers structure including bearings of at least one span in all respects as specified.
(4)Other Ancillary works : wearing coat, expansion joints hand rails, crash barriers, tests on completion etc. completion in all respect.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(5) Miscellaneous Works : stone pitching, protection works, excluding retaining walls/reinforced earth walls etc.	[Nil]	Payment shall be made on pro-rata basis on completion of the stage in all respect as specified, for each structure.
(6) Wing/Return wall up to full height	[Nil]	Wing/Return wall up to full height: Payment shall be made on completion of all wing wall/return walls for each structure as per weightage given in this table, completion in all respect as specified.
(7) Retaining walls/Reinforced earth walls etc.	[Nil]	

STAGE FOR PAYMENT	PERCENTAGE WEIGHTAGE	PAYMENT PROCEDURE
a) Panel Casting	[Nil]	a) Panel Casting : Unit of measurement is area in Sqm. Payment against casting of panels shall be made on pro rata basis with respect to total area panels required for the structure on completion of a stage i.e. not less than completion of casting of 25% of scope of the RE wall panel of each structure.
b) Erection of panel / construction of retaining wall	[Nil]	b) Erection of Panel / Construction of Retaining wall : Unit of measurement is area in Sqm. Payment shall be made on pro rata basis on completion of stage i.e. completion of erection of panels/ Construction of retaining wall complete in all respect for atleast 25% scope of work for each structure.

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

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

1.1.4 Other works.

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

Table 1.3.4

Table 1.3.4		
Other Works	**[**]**	
(i) Toll Plaza	[Nil]	Payment of Toll Plaza shall be made on Pro rata basis as per following completed stages:
		(i) Rigid pavement upto DLC (LHS) -12.5 %
		(ii) Rigid pavement upto DLC (RHS)- 12.5 %
		(iii) PQC (LHS)-25 %
		(iv) PQC (RHS)-25 %
		(v) Admin Building, Maintenance Building & Misc. Works-10% %
		(vi) Canopy, Toll Booth, Safety Items & Miscellaneous Works-12.5 %
		(vii) Toll Plaza Tunnel-2.5 %
(ii) Road side drains	6.903	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than
(iii) Road Signs, Road furniture, Km Stone, safety devices etc	0.730	

(iv) Road Marking & studs	0.654	5% (five percent) of the total length.
(v) Project facilities		Payment shall be made on pro rata basis for Completed facilities
(a) Bus Bays& Passenger Shelter	0.415	
(b) Truck lay byes	[Nil]	
(c) Junction	2.265	
(d) Others	[Nil]	
(vi) Road side Plantation	Nil	
(vii) Protection works other than approaches to the bridges, elevated sections / flyovers / grade separators and RoBs/RuBs	[Nil]	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 5% (five percent) of the total length.
(a) Metal Crash Barrier& Parapet wall	2.410	
(b) Retaining wall	3.613	
(c) Breast Wall	6.279	
(d) Gabion Retaining wall	6.346	
(viii) Site Clearance & Dismantling		
(ix) Safety and traffic management during construction	[Nil]	Payment shall be made on pro-rata basis every six months.
(x) Hydro seeding	0.141	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 5% (Five Percent) of the total length and 10% of the area for Hydro seeding and seeding and mulching.
(xi) Seeding and Mulching through Jute net	0.206	
Catch water drain	0.100	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 5% (Five Percent) of the total length and 10% of the area for Catch water drain.
Sub Surface drain with perforated pipe for collection of seepage water to avoid sinking of pavement	0.048	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 5% (Five percent) of the total length
Parapet Wall	2.454	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 5% (Five percent) of the total length

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause14.1.1.

2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause19.7.

SCHEDULE -I

(See Clause 10.2.4)

DRAWINGS

DRAWINGS

1. 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.

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.]

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

(a) Drawing of plan, profile and cross sections

(b) Drawings of cross drainage works

(c) Drawings of junctions

(d) Drawing of typical cross sections

(e) Drawings of bus-bay and bus shelters with furniture and drainage system

(f) Drawing of a truck parking lay bye with furniture and drainage system

(g) Drawings of road furniture items including traffic signage, marking, safety barriers ,etc.

(h) Drawings of traffic diversions plans and traffic control measures

(i) Drawings of road drainage measures

(j) Drawings of typical details slope protection measures

"Balance Work of Construction of Two-Lane with hard shoulders of MerangkongTamlu Mon road (Wakching Town portion) on EPC basis from existing Km59+000 to Km73+640 [Design Km.59+000 toKm.72+450] (Design Length– 13.450Km) (Package-V) in the state of Nagaland under SARDP-NE Phase Aon EPC Mode"

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 ofeach 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 **[255th]**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 ContractPrice.

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **[438th]** 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**[621st]** 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 anamount not less than 70% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

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

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

6. Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as

the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

SCHEDULE - K

(See Clause 12.1.2)

TESTS ON COMPLETION

1 Schedule for Tests

1.1 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.

1.2 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

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include (to be decided in consultation with Authority's Engineer as per relevant IRC codes/manual).

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

2.3 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 Non-destructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) meters or more shall also be subjected to load testing.

2.4 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.

2.5 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 ApplicablePermits.

2.6 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

SCHEDULE - L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

I, ... (Name of the Authority's Engineer),acting as the Authority's Engineer, underand in accordance with the Agreement dated .....(the "Agreement"), for Balance work of Construction of two-lane with hard Shoulders of **Merangkong-Tamlu-Mon** road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (**Package-V**) in the state of Nagaland under NHO-NE on EPC mode- **Balance work estimates and Schedules-Reg**

1 (the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through …… (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2 Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Project Highway or affect their safety. The Contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid Punch List.

3. In view of the foregoing, I am satisfied that the Project Road ***of*** Construction of two-Lane with hard shoulders of Merangkong – Tamlu – Mon Road on EPC basis from existing Km 20.456 to Km 41.065 [Design Km. 20+000 to Km. 40+000] (Design Length – 20.000 Km) in the state of Nagaland on EPC mode can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the day of …….. 20….....

ACCEPTED,SIGNED ,SEALED	SIGNED, SEALEDAND
ANDDELIVERED	DELIVERED
For and on behalf of	for and on behalf
of CONTRACTOR by:	AUTHORITY's ENGINEER by:
(Signature)	(Signature)

COMPLETION CERTIFICATE

1 I, (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated ..... (the "Agreement"), for Balance work of Construction of two-lane with hard Shoulders of Merangkong-Tamlu-Mon road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (Package-V) in the state of Nagaland under SARDP-NE Phase A (the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of

The Authority's Engineer by:

(Signature)

(Name) (Designation) (Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

1.3 The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph2.

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
S. No.	**Item/Defect/Deficiency**	**Percentage**
(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/5thkm stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidental 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%

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

R=P/IOO x M x L1/L

Where P = Percentage of particular item/Defect/deficiency for deduction M = Monthly lump-sum payment in accordance with the Bid

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 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 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.

1.2 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 Enginee

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1. Scope

1.1 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 National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001the "Authority") and (the "Contractor") Balance work of Construction of two-lane with hard Shoulders of Merangkong-Tamlu-Mon road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (**Package-V**) in the state of Nagaland under NHO-NE on EPC mode in the state of Nagaland under SARDP-NE Phase Aand a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2. Definitions and interpretation

2.1 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.

2.2 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.

2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, mutatis mutandis, to this TOR

3. General

3.1 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.

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. Fifty lakh).

3.3 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.

3.4 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 Clause18.2.

3.5 The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article13.

3.6 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 authenticliterature.

4 Construction Period

4.1 During the Construction Period, the Authority's Engineer shall review 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 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended up to 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

4.2 The Authority'sEngineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving suchDrawings.

4.3 The Authority's Engineer shall review 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, requiredthereto.

4.4 The Authority's Engineer shall complete the review 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 theContractor.

4.5 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 Clause10.4.

4.6 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 suchreport

4.7 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 SafetyConsultant.

4.8 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.

4.9 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 4.9, 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.

4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, 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.

4.12 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.

4.13 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.

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

4.15 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 Clause12.4.

4.16 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.

4.17 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 theAuthority.

4.18 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 or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 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. Maintenace Period

5.1 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

5.2 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 theContractor

5.3 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 thisbehalf.

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

5.5 The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause14.5

6 Determination of costs and time

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

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

6.3 The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause18.5.

7. Payments

7.1 The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4(d).

7.2 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 Clause19.10.

7.3 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.

7.4 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

9.1 A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority'sEngineer 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 Engineerto the Authority forthwith.

9.2 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.

9.3 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.

9.4 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.

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

a. the estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;
b. amounts reflecting adjustments in price for the aforesaid claim;
c. the estimated amount of each Change of Scope Order executed subsequent to the last claim;
d. amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3(a);
e. total of (a), (b), (c) and (d)above;
f. Deductions:
    i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
    ii. Any amount towards deduction of taxes; and
    iii. Total of (i) and (ii) above.
g. Net claim: (e) – (f) (iii);
h. The amounts received by the Contractor upto the last claim:
    i. For the Works executed (excluding Change of Scope orders);
    ii. For Change of Scope Orders, and
    iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work notdone;

(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

1.1 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.

1.2 The insurance under paragraph 1.1 (a) and (b) 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 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

3.1 The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (exceptthingsinsuredunderParagraphs1and 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 value of the contract price

3.2 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

damage which is an unavoidable result of the Contractor's obligations to execute the Works

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, …….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "Agreement"), for "Balance work of Construction of two-lane with hard Shoulders of **Merangkong-Tamlu-Mon** road (Wakching- Town Portion) on EPC basis from existing Km 59+000 to Km 73+640 [Design Km 59+000 to Km 72+450] (Design Length-13.450 Km) (**Package-V**) in the state of Nagaland under NHO-NE on EPC mode) in the state of Nagaland under SARDP-NE Phase A"the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED ANDDELIVERED

Signature

(Name and designation of Authority's Representative Address)