NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(Ministry of Road, Transport & Highways)

Government of India

SCHEDULES

FOR

"Widening & Strengthening to Two Lane with paved shoulder of Imphal Moreh Section of NH-39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) in the State of Manipur under Engineering and Procurement Mode (EPC)"

Engineering, Procurement & Construction (EPC) Mode

BID DOCUMENT

July-2020

BUILDING INFRASTRUCTURE - BUILDING THE NATION

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

SCHEDULE – A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the "Two Laning of Imphal – Moreh Section of NH 39 from Km 395+680 to 425+411 in the State of Manipur (Package III)".Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

The Road start in Imphal city, first 10 km section has already been undertaken by MoRTH for upgrading to 4 lane carriageway and 6 km from start is already upgraded and remaining 4 km section has been sanctioned for up gradation to 4-lane and is in advance stage of Implementation. Hence the project start has been considered as km 330.000. This project section road (Package-III) starts from Km 395+680 (Khongkhang Village) to Km 425+411 (Moreh Village).

The topography falls under the hilly/rolling terrain of IRC classification and traverse generally through rural area with semi-urban areas in some places.

Majority of the land use along the project road is forest in rural areas and commercial, residential, educational institutions and religious centers etc in built-up sections.

Traffic on this stretch of project road is of mixed type mostly with passenger vehicles and commercial vehicles with very few slow moving vehicles.

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

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's Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

1.2 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 been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified.

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

Annex I
(Schedule-A)

1. Site

The Site of the [Two-Lane] Project Highway comprises the section of NationalHighway-102 (old NH-39) commencing from km 395.680 to km 425.411 i.e. the Khongkhang–Moreh section in the State of Manipur. The land, carriageway and structures comprising the Site are described below.

2. Chainage References (Existing vs Design)

"Existing Chainage" means Km Stones existing on the Project Highway. During topography survey, observations are made to these Km stones and after finalization of alignment by improving the existing geometry the chainage has been referred to "Design Chainage". The relationship between the " Existing Chainage" and the" Design Chainage" as per field surveys of the location of existing Km stones for the "Project Highway" is given below:

Design Chainage (Km)		Existing Chainage (Km)		Remarks
From	To	From	To	
Khongkhang – Moreh				
395+680	425+411	395+680	425+411	NH-39

3. Land

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

S. No.	Chainage (km)		Right of Way (m)	Remarks
	From	To		
1	395.680	395.850	24	
2	395.850	396.450	20	
3	396.450	412.300	24	
4	412.300	413.000	20	
5	413.000	414.400	24	
6	414.400	414.700	20	
7	414.700	420.520	24	
8	420.520	425.411	-	Improvement of existing road

4. Carriageway

The present carriageway of the Project Highway is Two-Lane. The type of the existing pavement is flexible.

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Lane Width (m)	Remarks
	From	To	From	To			
1	395+680	425+411	395+680	425+411	29731	10.00m	The present carriageway width is approximately 7.00 m except few urban locations where it is 9 to 12.00 m. The type of the existing pavement is flexible.

5. Major Bridges

The Site includes the following Major Bridges:

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

6. Railway over-bridges (ROB)

The Site includes the following Railway Over Bridges

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

7. Grade Separators

The Site includes the following Grade separators

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

8. Minor Bridges

The Site includes the following minor Bridges:

S. No	Name of Bridge	Type	Existing Chainage (km)	Width (m)	Span Arrangement (m)	Type of Structure		
						Foundation	Sub-structure	Super-structure
1	Lokchao	Minor	407+450	4.0	1x30.5	Open	Stone Abutment	Bailey Bridge
2	-	Minor	409+000	10.5	1x10	Open	RCC Pier Abutment	RCC Solid Slab
3	-	Minor	412+230	10.5	1x10	Open	RCC Pier Abutment	RCC Solid Slab
4	Khujairok	Minor	428+180	10.5	1x16	Open	RCC Pier Abutment	RCC T Girder
5	Friendship	Minor	430+400	3.5	1x44.1	Open	RCC Pier Abutment	Bailey Bridge

9. Railway level crossings / Railway Track

The Site includes the following railway level crossings:

Sl. No.	Road Segment	Existing Chainage (km)	Remarks
NIL			

10. Underpasses (vehicular, Non Vehicular)

The Site includes the following underpasses:

Sl. No.	Road Segment	Existing Chainage (km)	Type of Structure	No. of Spans with Span Length (m)	Width (m)
NIL					

The site includes the following Pedestrian Underpasses:

S. No.	Location	Type	Existing Chainage (Km)	Width (m)	Span Arrangement	Type of Structure		
						Foundation	Sub-structure	Super-structure
Nil								

11. Culverts

The site includes the following Pipe Culverts:

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
1	-	398.118	Pipe	1	0.9	7	12
2	-	398.450	Pipe	1	0.9	7	12
3	-	399.250	Pipe	1	0.9	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
4	-	399.300	Pipe	1	0.9	7	12
5	-	400.030	Pipe	1	0.9	7	12
6	-	400.400	Pipe	1	0.9	7	12
7	-	400.700	Pipe	1	0.9	7	12
8	-	401.130	Pipe	1	0.9	7	12
9	-	401.400	Pipe	1	0.9	7	12
10	-	402.400	Pipe	1	1.2	7	12
11	-	402.460	Pipe	-	-	8	12
12	-	402.600	Pipe	1	0.6	7	12
13	-	403.050	Pipe	1	1.2	7	14.50
14	-	403.150	Pipe	-	-	7	12
15	-	403.350	Pipe	1	1.2	7	12
16	-	404.100	Pipe	1	1.2	7	18
17	-	404.400	Pipe	1	0.6	7	14
18	-	404.450	Pipe	1	0.6	7	13
19	-	404.600	Pipe	1	0.9	7	12.60
20	-	404.700	Pipe	1	0.9	7	12
21	-	406.500	Pipe	1	0.6	7	12
22	-	406.990	Pipe	1	0.6	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
23	-	408.180	Pipe	1	0.6	7	12
24	-	408.600	Pipe	1	0.6	7	12
25	-	408.800	Pipe	1	0.6	7	12
26	-	408.850	Pipe	1	0.6	7	12
27	-	409.050	Pipe	1	0.9	7	13
28	-	409.150	Pipe	-	-	7	12
29	-	409.300	Pipe	1	0.9	7	13
30	-	409.480	Pipe	-	-	7	12
31	-	409.650	Pipe	1	0.9	7	12
32	-	409.750	Pipe	1	1.2	7	12
33	-	409.800	Pipe	1	0.6	7	14
34	-	409.875	Pipe	-	-	7	12
35	-	410.010	Pipe	1	0.9	8	14.8
36	-	410.140	Pipe	1	0.6	8	10.20
37	-	410.300	Pipe	1	0.6	8	12
38	-	410.440	Pipe	1	0.6	7	14.80
39	-	410.555	Pipe	1	0.6	7	12
40	-	411.042	Pipe	1	0.6	7	12
41	-	411.140	Pipe	1	0.6	7	11.20

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
42	-	411.400	Pipe	1	0.9	7	11.20
43	-	411.435	Pipe	1	0.6	7	12
44	-	411.510	Pipe	1	0.6	7	12
45	-	411.582	Pipe	1	0.6	7	12
46	-	411.681	Pipe	-	-	7	12
47	-	411.830	Pipe	-	-	7	11
48	-	411.863	Pipe	1	0.9	7	14.80
49	-	411.900	Pipe	1	0.6	7	13
50	-	411.990	Pipe	1	0.6	7	14.80
51	-	412.990	Pipe	1	0.6	8	14.50
52	-	413.095	Pipe	1	0.6	7	12
53	-	413.300	Pipe	1	0.6	8	14
54	-	413.900	Pipe	1	0.6	7	18
55	-	413.950	Pipe	1	0.6	7	12
56	-	414.150	Pipe	1	0.9	7	12
57	-	414.180	Pipe	1	0.6	7	12
58	-	414.200	Pipe	1	0.6	7	12
59	-	414.300	Pipe	1	0.6	7	12
60	-	414.330	Pipe	1	0.6	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
61	-	414.365	Pipe	1	0.6	7	12
62	-	414.990	Pipe	1	0.6	7	12
63	-	415.260	Pipe	1	0.6	7	12
64	-	415.280	Pipe	1	0.6	7	12
65	-	415.350	Pipe	1	0.6	7	12
66	-	415.450	Pipe	1	1.0	7	14.50
67	-	415.550	Pipe	1	0.6	7	18
68	-	415.600	Pipe	1	1x0.6	7	14.50
69	-	415.650	Pipe	1	0.6	7	14
70	-	415.670	Pipe	1	0.6	7	12
71	-	416.050	Pipe	1	0.6	7	14
72	-	416.150	Pipe	1	0.9	7	11.80
73	-	416.200	Pipe	1	0.6	7	12
74	-	416.300	Pipe	1	0.9	7	14
75	-	416.900	Pipe	1	0.9	7	14
76	-	418.100	Pipe	1	0.9	7	12
77	-	418.250	Pipe	1	0.9	7	12
78	-	418.270	Pipe	1	0.6	7	12
79	-	418.600	Pipe	1	0.6	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
80	-	418.800	Pipe	1	0.6	7	12
81	-	418.900	Pipe	-	-	7	12
82	-	419.045	Pipe	1	0.6	7	12
83	-	419.140	Pipe	1	0.6	7	12
84	-	419.180	Pipe	1	0.9	7	12
85	-	419.306	Pipe	1	0.6	7	12
86	-	419.380	Pipe	1	0.9	7	12
87	-	419.400	Pipe	1	0.9	7	12
88	-	419.451	Pipe	1	1.2	7	12
89	-	419.671	Pipe	1	0.9	7	12
90	-	419.990	Pipe	-	-	7	12
91	-	420.450	Pipe	1	0.6	7	14.50
92	-	420.530	Pipe	1	0.6	7	13.80
93	-	420.551	Pipe	1	0.9	7	12
94	-	420.650	Pipe	1	0.6	7	14.80
95	-	420.700	Pipe	1	0.6	7	12
96	-	420.900	Pipe	1	0.6	7	12
97	-	421.400	Pipe	1	0.6	7	12
98	-	421.420	Pipe	1	0.6	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab/Pipe	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
99	-	421.450	Pipe	1	0.6	7	12
100	-	421.570	Pipe	-	-	7	10.70
101	-	421.620	Pipe	-	-	7	14.80
102	-	422.000	Pipe	1	0.9	7	10.40
103	-	422.150	Pipe	-	-	7	10.50
104	-	422.200	Pipe	1	0.9	7	11
105	-	422.400	Pipe	1	0.9	7	11
106	-	424.600	Pipe	1	0.9	7	12
107	-	424.700	Pipe	-	-	7	12
108	-	424.900	Pipe	1	0.9	7	12
109	-	424.951	Pipe	1	0.9	7	12
110	-	425.700	Pipe	1	0.9	7	10.50
112	-	425.900	Pipe	1	0.9	7	10.50
113	-	426.900	Pipe	1	0.9	7	10.50
114	-	427.150	Pipe	1	1.2	7	10
115	-	427.400	Pipe	1	1.2	7	10
116	-	427.500	Pipe	1	0.9	7	9.60
117	-	428.100	Pipe	1	0.9	7	13

The site includes the following Slab Culverts:

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
1	-	398.300	Slab	1	1x1.8x1	7	11.8
2	-	399.010	Slab	1	1x1.5x1.5	7	12
3	-	400.300	Slab	1	1x4.5x1.5	7	12
4	-	403.270	Slab	1	1x3x5	7	14
5	-	403.600	Slab	1	1.8	7	12
6	-	403.990	Slab	1	1.3	7	10
7	-	404.600	Slab	1	1.8	7	11.5
8	-	405.200	Slab	1	1.8	7	11.5
9	-	405.300	Slab	1	3.5	7	10
10	-	405.310	Slab	1	1.5	7	10
11	-	405.330	Slab	1	1	7.5	11.5
12	-	405.600	Slab	1	1	7	11.5
13	-	405.700	Slab	1	1	7	11.5
14	-	407.135	Slab	1	4	7	11.5
15	-	407.900	Slab	1	4	7	11.5
16	-	408.300	Slab	1	3	7	12
17	-	409.250	Slab	1	5	7	12
18	-	409.950	Slab	1	3.5	7	11.8
19	-	410.500	Slab	1	3	7	12

S. No	CD No	Existing Chainage (km)	Type of Structure Arch/ Box/Slab	Type of Structure		Carriageway Width (m)	Width of Culvert (m)
				No of Spans	Clear Span (m)		
20	-	411.690	Slab	1	3.3	7	12.5
21	-	413.400	Slab	1	4	7	12
22	-	417.300	Slab	1	1.4	7	10.5
23	-	417.750	Slab	1	1.2	7	10.5
24	-	419.080	Slab	1	1	7	12
25	-	419.100	Slab	1	1	7	12
26	-	420.330	Slab	1	1	7	10.1
27	-	421.200	Slab	1	1.5	7	10.2
28	-	424.500	Slab	1	1.5	7	10
29	-	424.600	Slab	1	1	7	9.8
30	-	429.030	Slab	1	1.5	7	9.8

12. Bus bays

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

S. No.	Chainage(km)	Length (m)	Left Hand Side	Right Hand Side
1	416.800	-	Yes	No

13. Truck Lay Bye

The details of truck lay byes on the Site are as follows:

S. No.	Road Segment	Existing Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
NIL					

14. Road side drains

The details of the road side drains on the Site are as follows:

Sl. No.	Existing Location		Side	Type	
	From (km)	From (km)		Masonry/CC (Pucca)	Earthen (Kutcha)
Nil					

15. Major Junctions

The details of major junctions are as follows:

Sl. No.	Location		At Grade	Separated	Category of Cross Roads			
	Existing Ch.	Design Ch.			NH	SH	MDR	Others
NIL								

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

16. Minor Junctions

The details of major junctions are as follows:

S. No.	Location	Type	
	From km	T -junction	Cross road
1	416.750	Yes	-
2	424+750	Yes	-
3	426+850	Yes	
4	428+800	-	Yes

17. Bypasses

The details of bypasses are as follows:

S. No.	Name of Bypass (Town)	Road Segment	Existing Chainage		Length (km)	Carriageway	
			From (km)	To (km)		Width (m)	Type
NIL							

18. Other Structures/Details

The details of other structures are as follows:

Total number of structures on the Site is noted below:

a) Total No. of Major Bridges - Nil

b) Total No. of Railway Over/Under Bridges - Nil

c) Total No. of Minor Bridges - 5

d) Total No. of Pipe Culverts - 117

e) Total No. of Slab Culverts - 30

f) Total No. of Box Culverts - Nil

g) Total No. of Flyovers - Nil

h) Level Crossings – Nil

i) Pedestrian Underpass – Nil

j) Built Up Locations

The following are the Built-up locations on the Project Road.

S. No.	Esisting Chainage (km)		Length (m)	Name of the Village/Town
	From	To		
1	395.850	396.450	600	Khongkhang
2	412.300	413.000	700	Khudengthabi
3	414.400	414.700	300	Khudengthabi
4	420.520	425.411	4891	Moreh

Annex II

(Schedule-A)

Details for Providing Right of Way

The dates on which the Authority shall provide Right of Way (ROW) to the Contractor on Different stretches of the Site are stated below:

Sl. No	Design Chainage (KM)		Length in (Km)	Existing ROW (m)	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
1	395.68	395.85	0.17	10	24	At appointed date or Within 90 days after the appointed Date as per clause 8.2 of DCA
2	395.85	396.45	0.60	10	20	
3	396.45	412.30	15.85	10	24	
4	412.30	413.00	0.70	10	20	
5	413.00	414.40	1.40	10	24	
6	414.40	414.70	0.30	10	20	
7	414.70	420.52	5.82	10	24	
8	420.52	425.411	4.891	10	Improvement of existing road	

Annex-III
(Schedule-A)

Alignment Plans

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

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

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

The existing alignment plan of the Project Highway is enclosed in digital form.

Annex-IV
(Schedule-A)

Project Clearances

1. **Environmental Clearance:** The highway project does not require environmental clearance as per the latest MoEF&CC, Govt. of India notification dated 23.08.2013. Prior Environmental Clearance for quarrying or river bed material mining from Competent Authority to be taken by the contractor.

2. **Forest Clearance:** "In Principle Approval" is received from MoEF&CC, Govt. of India on 05.03.2019. Payment for the demand received from the forest department is under process and Working Permission will be received after payment completion. In order to get the Final Approval, the contractor has to fulfill their condition(s) imposed by the MoEF&CC, Govt. of India. The contractor shall seek Forest Clearance from MoEF&CC, Govt. of India if additional diversion of forest land is to be made other than project PROW.

3. **Wildlife Clearance:** NBWL has recommended the highway project on 08.12.2017. The contractor shall fulfill the condition in addition to other general conditions imposed by the NBWL, Govt. of India as follows in order to get the Final Approval:

   (i) At least 6(six) corridors for the movement of Wildlife of minimum 6m width are to be provided. The corridors shall be well demarcated on the highway project with caution signages.

   The contractor shall seek Wildlife Clearance from MoEF&CC, Govt. of India if additional diversion of Protected Area / Eco-Sensitive Zone is to be made other than project PROW.

SCHEDULE – B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1 Development of the Project Highway

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

2 Two Laning with Paved Shoulder

Widening /Improvement to 2 (Two) Lane with Paved Shoulder of Imphal - Moreh Section of NH 39/ NH 102 from Km 395.680 to Km 425.411 (Contract Package-III) in the state of Manipur on EPC mode under ADB Funding as a part of SASEC Connectivity Investment Program of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

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

Annex I

(Schedule-B)

Widening /Improvement to 2 (Two) Lane with Paved Shoulder of Imphal - Moreh Section of NH 39/ NH 102 from Km 395.680 to Km 425.411 (Contract Package-III) in the state of Manipur on EPC mode under ADB Funding as a part of SASEC Connectivity Investment Program.

1. WIDENING OF THE EXISTING HIGHWAY

1.1 The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A and Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain /rolling terrain to the extent land is available. The horizontal alignment provided in the plan and profile shall remain unchanged in realignment locations, where if any issue arises, the same shall be finalized in consultation with Authority /Authority Engineer.

1.2 Width of Carriageway

1.2.1 The proposed 2-Lane Carriageway starts from Km 395+680 to Km 425+411. The paved carriageway shall be 10 m (Ten) (2x3.5m + 2x1.5m paved shoulder) wide in accordance with the typical cross sections drawings in the Manual. The width of carriageway in open country, built up areas and approaches of grade separated structures shall be as per the Manual (IRC SP 73:2015) (herein after called the 'Manual') unless otherwise specified in this Schedule-B and Schedule-D.

S. No	Built-up Town	Design Chainage (Km)		Length (m)	TCS Type
		From	To		
1	Khongkhang	395.85	396.45	600	TCS - 2
2	Khudengthabi	412.30	413.00	700	TCS - 2
3	Khudengthabi	414.40	414.70	300	TCS - 2

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to clause 2.7 of the manual.

1.2.3 On horizontal Curves with radius upto 300 meter, width of pavement & roadway in each carriageway shall be increased as per clause 2.7.2 of the manual.

2 GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

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

2.2 Design speed

The design speed shall be Ruling 100 kmph & Minimum 80 Kmph for Plain and Rolling terrain, and Ruling 60 kmph& Minimum 40 Kmph for the mountainous and steep terrain, wherever applicable.

2.3 Improvement of the existing road geometries

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.

2.3.1 Probable location of sharp curve:

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
1	395+711	395+772	Sharp existing curve	250	30
2	395+772	395+840	Sharp existing curve	50	30
3	395+970	396+033	Sharp existing curve	100	30
4	396+033	396+109	Sharp existing curve	40	30
5	396+139	396+170	Sharp existing curve	180	30
6	396+174	396+371	Sharp existing curve	180	30
7	396+371	396+425	Sharp existing curve	250	30
8	396+467	396+555	Sharp existing curve	60	30
9	396+638	396+727	Sharp existing	75	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
10	396+727	396+796	Sharp existing curve	80	30
11	396+922	397+133	Sharp existing curve	310	20
12	397+206	397+274	Sharp existing curve	140	20
13	397+274	397+353	Sharp existing curve	21	20
14	397+353	397+426	Sharp existing curve	150	20
15	397+473	397+540	Sharp existing curve	50	30
16	397+540	397+607	Sharp existing curve	80	30
17	397+607	397+686	Sharp existing curve	40	30
18	397+686	397+763	Sharp existing curve	50	30
19	397+763	397+797	Sharp existing curve	180	30
20	397+797	397+980	Sharp existing curve	250	30
21	397+980	398+316	Sharp existing curve	185	30
22	398+316	398+404	Sharp existing curve	70	30
23	398+404	398+488	Sharp existing curve	40	30
24	398+488	398+544	Sharp existing curve	80	30
25	398+628	398+793	Sharp existing curve	180	20
26	399+020	399+111	Sharp existing curve	80	20
27	399+111	399+188	Sharp existing curve	20	20
28	399+188	399+203	Sharp existing curve	300	20
29	399+188	399+291	Sharp existing	120	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
30	399+276	399+344	Sharp existing curve	30	30
31	399+344	399+389	Sharp existing curve	180	30
32	399+389	399+458	Sharp existing curve	50	30
33	399+458	399+508	Sharp existing curve	80	30
34	399+567	399+668	Sharp existing curve	145	30
35	399+668	399+901	Sharp existing curve	190	30
36	399+901	399+948	Sharp existing curve	80	30
37	399+948	400+036	Sharp existing curve	75	30
38	400+036	400+118	Sharp existing curve	40	30
39	400+118	400+212	Sharp existing curve	45	30
40	400+234	400+296	Sharp existing curve	140	30
41	400+296	400+356	Sharp existing curve	80	30
42	400+356	400+415	Sharp existing curve	100	30
43	400+415	400+450	Sharp existing curve	180	30
44	400+450	400+533	Sharp existing curve	30	30
45	400+533	400+623	Sharp existing curve	30	30
46	400+623	400+759	Sharp existing curve	60	30
47	400+759	400+943	Sharp existing curve	80	30
48	400+943	400+995	Sharp existing curve	80	30
49	401+049	401+146	Sharp existing	90	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
50	401+196	401+294	Sharp existing curve	170	30
51	401+322	401+446	Sharp existing curve	45	30
52	401+446	401+521	Sharp existing curve	40	30
53	401+521	401+639	Sharp existing curve	50	30
54	401+679	401+764	Sharp existing curve	30	30
55	401+764	401+799	Sharp existing curve	180	30
56	401+799	401+857	Sharp existing curve	50	30
57	401+857	401+914	Sharp existing curve	80	30
58	401+914	401+991	Sharp existing curve	60	30
59	401+991	402+067	Sharp existing curve	50	30
60	402+067	402+146	Sharp existing curve	140	30
61	402+146	402+234	Sharp existing curve	30	30
62	402+234	402+331	Sharp existing curve	50	20
63	402+353	402+427	Sharp existing curve	20	20
64	402+467	402+503	Sharp existing curve	80	20
65	402+558	402+647	Sharp existing curve	35	20
66	402+647	402+698	Sharp existing curve	50	20
67	402+698	402+744	Sharp existing curve	40	20
68	402+779	402+840	Sharp existing curve	30	20
69	402+840	402+900	Sharp existing	30	20

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
70	402+900	402+958	Sharp existing curve	300	20
71	403+043	403+101	Sharp existing curve	30	20
72	403+101	403+154	Sharp existing curve	30	20
73	403+256	403+295	Sharp existing curve	1000	20
74	403+352	403+421	Sharp existing curve	20	20
75	403+421	403+457	Sharp existing curve	80	20
76	403+457	403+527	Sharp existing curve	80	20
77	403+527	403+617	Sharp existing curve	30	20
78	403+617	403+664	Sharp existing curve	400	20
79	403+664	403+724	Sharp existing curve	80	30
80	403+724	403+838	Sharp existing curve	90	30
81	403+838	403+887	Sharp existing curve	60	30
82	403+887	404+006	Sharp existing curve	65	30
83	404+006	404+070	Sharp existing curve	40	30
84	404+070	404+166	Sharp existing curve	70	30
85	404+201	404+249	Sharp existing curve	60	30
86	404+249	404+285	Sharp existing curve	180	30
87	404+285	404+395	Sharp existing curve	60	30
88	404+558	404+694	Sharp existing curve	55	30
89	404+694	404+767	Sharp existing	90	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
90	404+794	404+896	Sharp existing curve	30	30
91	404+916	405+003	Sharp existing curve	30	30
92	405+003	405+052	Sharp existing curve	70	30
93	405+052	405+084	Sharp existing curve	170	30
94	405+084	405+182	Sharp existing curve	120	30
95	405+212	405+268	Sharp existing curve	80	30
96	405+278	405+396	Sharp existing curve	75	30
97	405+411	405+442	Sharp existing curve	170	30
98	405+442	405+483	Sharp existing curve	200	30
99	405+483	405+563	Sharp existing curve	30	30
100	405+563	405+653	Sharp existing curve	100	30
101	405+688	405+738	Sharp existing curve	70	30
102	405+738	405+845	Sharp existing curve	30	30
103	405+845	405+861	Sharp existing curve	1500	30
104	405+861	405+954	Sharp existing curve	80	30
105	405+954	406+104	Sharp existing curve	100	30
106	406+104	406+188	Sharp existing curve	55	30
107	406+188	406+268	Sharp existing curve	290	30
108	406+268	406+309	Sharp existing curve	170	30
109	406+309	406+371	Sharp existing	80	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
110	406+371	406+417	Sharp existing curve	800	30
111	406+417	406+520	Sharp existing curve	30	30
112	406+520	406+600	Sharp existing curve	60	30
113	406+600	406+683	Sharp existing curve	50	30
114	406+776	406+855	Sharp existing curve	200	30
115	406+855	406+986	Sharp existing curve	40	30
116	406+986	407+015	Sharp existing curve	170	30
117	407+015	407+033	Sharp existing curve	170	30
118	407+033	407+110	Sharp existing curve	55	30
119	407+110	407+182	Sharp existing curve	70	30
120	407+182	407+227	Sharp existing curve	170	30
121	407+227	407+273	Sharp existing curve	75	30
122	407+273	407+357	Sharp existing curve	30	30
123	407+357	407+441	Sharp existing curve	800	30
124	407+441	407+528	Sharp existing curve	35	30
125	407+528	407+555	Sharp existing curve	200	30
126	407+555	407+643	Sharp existing curve	650	30
127	407+643	407+762	Sharp existing curve	60	30
128	407+762	407+829	Sharp existing curve	50	30
129	407+829	407+901	Sharp existing	170	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
130	407+948	408+029	Sharp existing curve	35	30
131	408+029	408+059	Sharp existing curve	200	30
132	408+144	408+311	Sharp existing curve	55	30
133	408+311	408+386	Sharp existing curve	30	30
134	408+386	408+457	Sharp existing curve	170	30
135	408+457	408+551	Sharp existing curve	35	30
136	408+683	408+730	Sharp existing curve	80	30
137	408+730	408+923	Sharp existing curve	55	30
138	408+923	409+048	Sharp existing curve	50	30
139	409+048	409+091	Sharp existing curve	170	30
140	409+061	409+222	Sharp existing curve	300	30
141	409+192	409+320	Sharp existing curve	30	30
142	409+320	409+383	Sharp existing curve	70	30
143	409+383	409+428	Sharp existing curve	70	30
144	409+428	409+526	Sharp existing curve	90	30
145	409+526	409+589	Sharp existing curve	50	30
146	409+589	409+649	Sharp existing curve	50	30
147	409+683	409+764	Sharp existing curve	35	30
148	409+764	409+825	Sharp existing curve	400	30
149	409+810	409+872	Sharp existing	300	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
150	409+857	409+930	Sharp existing curve	70	30
151	409+930	409+985	Sharp existing curve	50	30
152	409+985	410+039	Sharp existing curve	70	30
153	410+039	410+105	Sharp existing curve	50	30
154	410+105	410+128	Sharp existing curve	400	30
155	410+103	410+182	Sharp existing curve	170	30
156	410+157	410+268	Sharp existing curve	40	30
157	410+380	410+484	Sharp existing curve	30	30
158	410+533	410+636	Sharp existing curve	300	30
159	410+611	410+705	Sharp existing curve	400	30
160	410+680	410+828	Sharp existing curve	40	30
161	410+828	410+856	Sharp existing curve	170	30
162	410+841	410+891	Sharp existing curve	2500	30
163	410+876	410+955	Sharp existing curve	70	30
164	410+955	411+010	Sharp existing curve	70	30
165	411+010	411+032	Sharp existing curve	170	30
166	411+032	411+082	Sharp existing curve	70	30
167	411+082	411+219	Sharp existing curve	45	30
168	411+219	411+325	Sharp existing curve	30	30
169	411+325	411+351	Sharp existing	170	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
170	411+351	411+411	Sharp existing curve	70	30
171	411+411	411+494	Sharp existing curve	30	30
172	411+464	411+549	Sharp existing curve	2000	30
173	411+519	411+602	Sharp existing curve	30	30
174	411+642	411+725	Sharp existing curve	30	30
175	411+725	411+775	Sharp existing curve	170	30
176	411+775	411+874	Sharp existing curve	220	30
177	411+874	411+951	Sharp existing curve	40	30
178	411+971	412+042	Sharp existing curve	50	30
179	412+078	412+190	Sharp existing curve	300	30
180	412+199	412+312	Sharp existing curve	35	30
181	412+319	412+437	Sharp existing curve	35	30
182	412+506	412+575	Sharp existing curve	45	30
183	412+575	412+653	Sharp existing curve	40	30
184	412+666	412+719	Sharp existing curve	30	30
185	412+794	412+913	Sharp existing curve	125	30
186	412+913	412+966	Sharp existing curve	80	30
187	413+039	413+096	Sharp existing curve	90	30
188	413+119	413+197	Sharp existing curve	55	30
189	413+197	413+252	Sharp existing	150	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
190	413+290	413+388	Sharp existing curve	55	30
191	413+404	413+489	Sharp existing curve	50	30
192	413+539	413+615	Sharp existing curve	55	30
193	413+615	413+704	Sharp existing curve	45	30
194	413+704	413+788	Sharp existing curve	30	30
195	413+788	413+850	Sharp existing curve	190	30
196	413+921	413+976	Sharp existing curve	70	30
197	413+976	414+052	Sharp existing curve	70	30
198	414+116	414+174	Sharp existing curve	100	30
199	414+204	414+256	Sharp existing curve	80	30
200	414+256	414+314	Sharp existing curve	125	30
201	414+388	414+423	Sharp existing curve	450	30
202	414+423	414+482	Sharp existing curve	50	30
203	414+482	414+557	Sharp existing curve	40	30
204	414+557	414+619	Sharp existing curve	100	30
205	414+685	414+773	Sharp existing curve	300	30
206	414+776	414+866	Sharp existing curve	30	30
207	414+950	415+020	Sharp existing curve	90	30
208	415+020	415+092	Sharp existing curve	170	30
209	415+092	415+180	Sharp existing	50	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
210	415+180	415+255	Sharp existing curve	40	30
211	415+267	415+345	Sharp existing curve	35	30
212	415+410	415+444	Sharp existing curve	250	30
213	415+631	415+722	Sharp existing curve	90	30
214	415+778	415+864	Sharp existing curve	300	30
215	415+978	416+099	Sharp existing curve	200	30
216	416+099	416+230	Sharp existing curve	70	30
217	416+264	416+334	Sharp existing curve	40	30
218	416+334	416+402	Sharp existing curve	25	20
219	416+402	416+523	Sharp existing curve	30	20
220	416+523	416+601	Sharp existing curve	50	20
221	416+601	416+708	Sharp existing curve	35	20
222	416+708	416+821	Sharp existing curve	50	20
223	416+821	416+908	Sharp existing curve	140	20
224	416+929	417+076	Sharp existing curve	90	20
225	417+076	417+131	Sharp existing curve	60	30
226	417+131	417+188	Sharp existing curve	50	30
227	417+188	417+237	Sharp existing curve	90	30
228	417+237	417+283	Sharp existing curve	80	30
229	417+323	417+386	Sharp existing	50	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
230	417+386	417+454	Sharp existing curve	40	30
231	417+454	417+553	Sharp existing curve	70	30
232	417+553	417+631	Sharp existing curve	35	30
233	417+631	417+693	Sharp existing curve	50	30
234	417+746	417+799	Sharp existing curve	70	30
235	417+836	417+911	Sharp existing curve	30	30
236	417+911	417+944	Sharp existing curve	170	30
237	417+974	418+050	Sharp existing curve	70	30
238	418+090	418+141	Sharp existing curve	90	30
239	418+162	418+288	Sharp existing curve	100	30
240	418+288	418+377	Sharp existing curve	90	30
241	418+377	418+503	Sharp existing curve	125	30
242	418+503	418+548	Sharp existing curve	120	30
243	418+573	418+639	Sharp existing curve	50	30
244	418+639	418+749	Sharp existing curve	45	30
245	418+749	418+821	Sharp existing curve	50	30
246	418+841	418+865	Sharp existing curve	180	30
247	419+037	419+092	Sharp existing curve	170	30
248	419+111	419+137	Sharp existing curve	170	30
249	419+172	419+275	Sharp existing	140	30

SL No.	Stretch		Type of deficiency	Remarks	
	From (KM)	From (KM)		Radius (m)	Design Speed (Km/Hr)
			curve		
250	419+275	419+304	Sharp existing curve	500	30
251	419+403	419+470	Sharp existing curve	80	30
252	419+503	419+522	Sharp existing curve	250	30
253	419+547	419+583	Sharp existing curve	170	30
254	419+612	419+702	Sharp existing curve	120	30
255	419+759	419+830	Sharp existing curve	130	30
256	419+860	419+958	Sharp existing curve	130	30
257	419+958	420+098	Sharp existing curve	100	30
258	420+098	420+194	Sharp existing curve	70	30
259	420+231	420+281	Sharp existing curve	150	30
260	420+281	420+353	Sharp existing curve	80	30
261	420+353	420+407	Sharp existing curve	60	30
262	420+407	420+492	Sharp existing curve	30	30
263	420+492	420+555	Sharp existing curve	25	20

Sr. No.	Chainage		Length(m)	Gradient
	From	To		
1	395.680	397.140	1460	10%
2	397.240	397.650	410	7%
3	398.350	398.400	50	7%
4	398.550	398.710	160	10%
5	398.910	399.040	130	9%
6	400.700	401.330	630	7%
7	401.390	402.680	1290	10%

8	402.720	404.260	1540	8%
9	404.830	405.120	290	8%
10	406.650	406.790	140	7%
11	407.000	407.070	70	7%
12	407.220	407.640	420	7%
13	408.780	410.120	1340	10%
14	410.610	411.400	790	7%
15	411.600	411.830	230	8%
16	412.070	412.220	150	8%
17	412.520	413.190	670	8%
18	413.540	413.840	300	8%
19	415.330	415.580	250	8%
20	416.620	416.760	140	7%
21	416.800	417.940	1140	9.50%
22	419.340	420.460	1120	8%
23	421.010	421.510	500	10%
24	423.390	423.450	60	7%
			13280	

The proposed horizontal and vertical alignment is available in digital format and this is for information and authority shall not be held responsible for any implications of the contract. EPC contractor shall carry out his own survey and investigations and due diligence both during bidding and during design and construction.

2.4 Proposed Right of Way

[Refer to paragraph 2.3 of the Manual]. Details of the proposed Right of Way are tabulated below.

Sl. No	Design Chainage		Length (KM)	Width (m)
	From (KM)	To (KM)		
1	395.68	395.85	0.17	24
2	395.85	396.45	0.60	20
3	396.45	412.30	15.85	24
4	412.30	413.00	0.70	20
5	413.00	414.40	1.40	24
6	414.40	414.70	0.30	20
7	414.70	420.52	5.82	24
8	420.52	425.411	4.891	Improvement of existing road

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

2.5 Type of Shoulders

2.5.1 In built-up sections, footpaths/fully paved shoulders shall be provided in the following stretches:

S. No	Built-up Town	Design Chainage (Km)		Length (m)	TCS Type
		From	To		
1	Khongkhang	395.85	396.45	600	TCS 2
2	Khudengthabi	412.30	413.00	700	TCS 2
3	Khudengthabi	414.40	414.70	300	TCS 2
4	Moreh	420.52	425.411	4891	Improvement of existing road

2.5.2 In open country with isolated built up area, paved shoulders of 1.5 m width shall be provided on both sides and 1.0 m width of shoulder covered with 150 mm thick compacted layer of granular material.

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

2.6 Lateral and vertical clearances at underpasses

2.6.1 Lateral and vertical clearances at underpasses shall be as per paragraph 2.10 of the Manual.

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

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

2.7 Lateral and vertical clearances at overpasses

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

2.7.2 *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				

2.8 Service roads

Service roads shall be constructed at the locations and for the lengths indicated below: [Refer to paragraph 2.12.2 of the Manual and provide details]

S. No	Built-up Town	Design Chainage (Km)		Side	Length (m)	TCS Type
		From	To			
Nil						

2.9 Grade Separated Structures

2.9.1 Grade separated structures shall be provided as per as per paragraph 2.13 of the Manual.

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

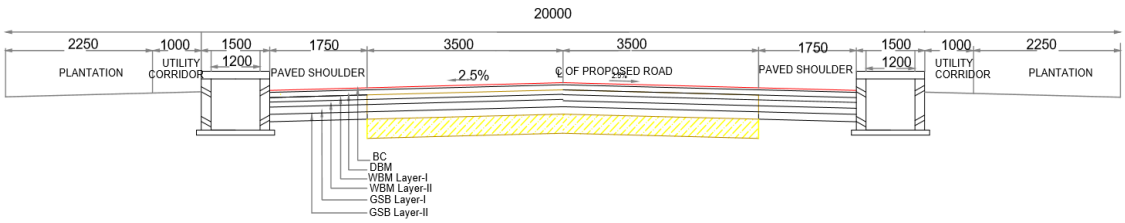
2.10 Cattle and pedestrian underpass / Overpass

Cattle and pedestrian underpass/overpass are to be designed as per paragraph 2.13.2 of the Manual.

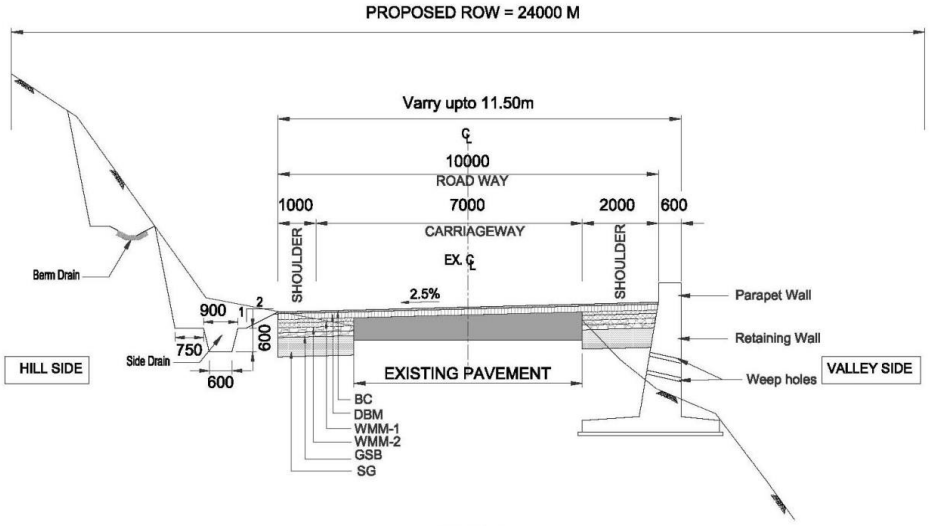
Sl No.	Location	Type of Crossing
Nil		

2.11 Typical cross-sections of the Project Highway

Approximate cross section type (tentative) suitable at various chainages of project highway is as shown below:



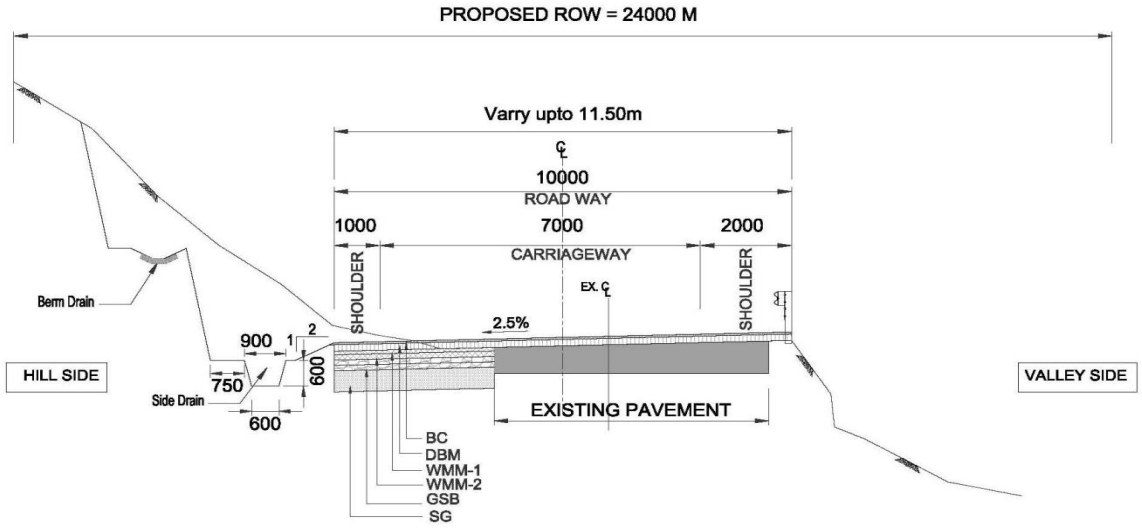
TYPICAL CROSS SECTION IN BUILT-UP AREA OF HILL SECTION (TYPE -2)



TCS - 3

BOTH HILL & VALLEY SIDE WIDENING IN HILL AREAS - TWO LANE CARRIAGEWAY

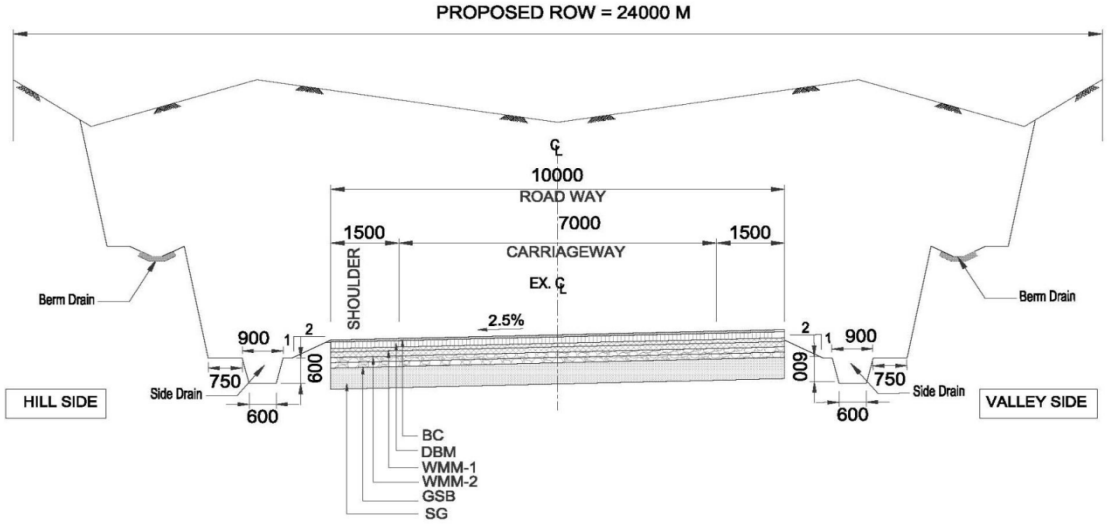
*Note :- Extra Widening as per Cuvature



TCS - 4

HILL SIDE WIDENING IN HILL AREAS - TWO LANE CARRIAGEWAY

*Note :- Extra Widening as per Cuvature



TCS - 7

BOTH SIDE HILL - TWO LANE CARRIAGEWAY

*Note :- Extra Widening as per Cuvature

2.12 Longitudinal Section

As a minimum, the Construction Contractor shall achieve the proposed finished road level as indicated in the plan and profile drawings for this purpose in FDPR. However, the final finished road levels (FRL) will be finalized as per site conditions in consultation with NHIDCL.

2.13 Built-Up Areas

The alignment passes through Built up areas as tabulated below.

Sl.no	Existing Chainage		Design Chainage		Name of Village/town etc
	From (Km)	To (Km)	From (km)	To (km)	
As per Annexure-I of Schedule-A					

2.14 Cross Section Type along the Project Corridor

Approximate cross section type (tentative) suitable at various chainages of project highway is shown in Table below:

Sl. No	Design Chainage (Km)		Length (m)	TCS Type	Type of Widening
	From	To			
1	395680	395850	170	TCS-4	Right Side Widening
2	395850	396450	600	TCS-2	Concentric Widening
3	396450	396500	50	TCS-4	Right Side Widening
4	396500	398100	1600	TCS-7	New Construction
5	398100	399450	1350	TCS-4	Left side widening
6	399450	399900	450	TCS-3	Concentric Widening
7	399900	400000	100	TCS-4	Right Side Widening
8	400000	400450	450	TCS-4	Right Side Widening
9	400450	404350	3900	TCS-7	New Construction
10	404350	407160	2810	TCS-4	Left Side Widening
11	407160	407600	440	TCS-7	New Construction
12	407600	408560	960	TCS-4	Left Side Widening
13	408560	412300	3740	TCS-7	New Construction
14	412300	413000	700	TCS-2	Concentric Widening
15	413000	413870	870	TCS-7	New Construction

16	413870	414400	530	TCS-3	Concentric Widening
17	414400	414700	300	TCS-2	Concentric Widening
18	414700	415620	920	TCS-3	Concentric Widening
19	415620	417000	1380	TCS-4	Left Side Widening
20	417000	418000	1000	TCS-7	New Construction
21	418000	419250	1250	TCS-3	Concentric Widening
22	419250	419800	550	TCS-7	New Construction
23	419800	420520	720	TCS-3	Concentric Widening
24	420520	425411	4891		Improvement of existing road

3 INTERSECTIONS AND GRADE SEPARATORS

3.1 Introduction

All intersections shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

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

3.2 At-grade Intersections

(a) Major Intersections

Sl No.	on of Inters ection :: Existin g Chaina ge	ed Chaina ge (Km)	Type of Inters ection	Other Features
Nil				

Details of junction improvements shall be as per IRC SP: 73-2015.

(b) Minor Intersections

S. No	Existing Chainage (Km)	Type	Type of junction
1	416+750	At-Grade	T
2	424+750	At-Grade	T
3	426+850	At-Grade	T
4	428+800	At-Grade	X

Details of junction improvements shall be as per IRC SP: 73-2015.

3.3 Grade Separated structures

Sl No.	Location of Structure	Spans Arrangement (m)	Remarks, if any
Nil			

4 EMBANKMENT AND CUT SECTIONS

4.1 Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the standards and specifications given in Section 4 of the applicable and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

4.2 Raising of the existing road [Refer to paragraph 4.2 of the Manual and specify sections to be raised].

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

5.1 Pavement design shall be carried out in accordance with section 5 of the Manual. The detailed pavement design including overlay and pavement characteristics requirements of the Project Highway shall be done in accordance with Schedule D.

5.2 Type of pavement

The contractor is to adopt flexible pavement for the project highway as per manual.

5.3 Design requirements

i) Pavement design shall be as per section 5 of the Manual.

5.4 Design Period and strategy

Flexible pavement shall be designed for a minimum design period of 15 years as per IRC-73:2015. Stage construction shall not be permitted.

5.5 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic as following:

From (Km)	To (Km)	Minimum Design Loading in terms of Million Standard Axles
395+680	420+520	20
420+520	425+411	-

5.5.1 Design Parameters

The Minimum crust thickness to be adopted for the rigid pavement shall also be provided as below:

New/Widening Pavement Thickness							
Design MSA	Road sections with 15 year design life	CBR, %	Design Thickness, mm				
			SUBGRADE	GSB	WMM	DBM	BC
20	Khongkhang to New Mongjang	8	500	200	250	80	40

-	New Mongjang to Moreh	-		-	-	-	-

6 HIGHWAY DRAINAGE

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

Trapezoidal PCC Drain = 32150 m
Unlined Drain (Trapezoidal) = 6500 m

7. DESIGN OF STRUCTURES

7.1 General

i) All Structures shall be designed in accordance with the relevant codes, Standards and specifications, special publications and guidelines mentioned in the Section 7 of the manual and shall conform to the cross-sectional features and other details specified therein.

ii) The Project road includes provision of **6 minor bridges** (span<60m) and **33 box culverts**. New bridges and culverts shall be constructed wide enough to accommodate the adjacent road cross section as given in this Schedule-B. The details of existing culverts are given in Schedule–A.

The details of culverts shall be provided by the EPC Contractor and locations are given in Clause 8.2 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.**

The following guidelines shall be followed:

i) All the cross drainage structures for the new carriageway shall be designed in such a way so that the outer most face of railing/parapet shall be in line with the out most edge of shoulder.

ii) The existing culverts to be replaced by new one.

iii) The adequacy of the vent size for all culverts/bridges shall be ascertained through detailed hydrological surveys and finalized in consultation with the IC/Project Company. The highest flood level/maximum supply level shall be properly assessed after collecting flood histories form local authorities/interviews with locals/irrigation authorities.

iv) For drainage purpose the new box culverts of minimum span 2.0 m shall be provided.

v) Suitable river training works, bank protection and embankment protection works ensuring safety of bridge structure and its approaches against damage by flood water / rain water shall be provided.

The cross drainage plan of the highway shall be finalized in consultation with AE/Project Company and if required additional culverts shall be provided.

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

7.2Culverts

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

7.2.2 Reconstruction of existing culverts

All the existing culverts at the following locations shall be re-constructed as new culverts to be replaced with New One:

[Refer to paragraph 7.3 (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.

(i) Reconstruction for Pipe Culverts

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Existing		Recommendation	Proposed	
			Pipe	Dia. (m)		Type	Size. (m)
1	398.118	395+849	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
2	398.450	396+371	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5

3	399.250	397+069	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
4	399.300	397+169	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
5	400.030	397+741	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
6	400.400	-	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
7	400.700	398+573	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
8	401.130	398+885	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
9	401.400	399+155	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
10	402.400	400+087	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
11	402.460	400+125	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
12	402.600	400+323	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
13	403.050	400+624	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
14	403.150	400+807	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
15	403.350	401+087	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
16	404.100	401+521	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
17	404.400	401+720	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
18	404.450	401+822	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
19	404.600	401+972	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
20	404.700	402+143	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
21	406.500	404+039	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
22	406.990	404+211	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
23	408.180	404+848	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
24	408.600	405+080	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
25	408.800	405+336	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
26	408.850	405+386	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5

27	409.050	405+521	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
28	409.150	405+655	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
29	409.300	405+848	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
30	409.480	405+902	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
31	409.650	406+070	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
32	409.750	406+169	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
33	409.800	406+219	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
34	409.875	406+294	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
35	410.010	406+463	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
36	410.140	406+597	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
37	410.300	406+769	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
38	410.440	406+970	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
39	410.555	407+255	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
40	411.042	407+384	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
41	411.140	407+593	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
42	411.400	407+856	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
43	411.435	407+890	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
44	411.510	407+986	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
45	411.582	408+205	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
46	411.681	408+294	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
47	411.830	408+601	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
48	411.863	408+698	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
49	411.900	408+733	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
50	411.990	409+043	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5

51	412.990	409+101	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
52	413.095	409+187	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
53	413.300	409+642	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
54	413.900	409+957	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
55	413.950	409+963	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
56	414.150	410+060	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
57	414.180	410+090	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
58	414.200	410+351	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
59	414.300	410+461	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
60	414.330	410+462	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
61	414.365	410+851	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
62	414.990	411+198	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
63	415.260	411+131	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
64	415.280	411+198	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
65	415.350	411+351	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
66	415.450	411+474	Pipe	1x1.0	Reconstruction	Box	1 X 1.5 X 1.5
67	415.550	411+573	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
68	415.600	411+689	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
69	415.650	411+739	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
70	415.670	411+774	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
71	416.050	411+857	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
72	416.150	411+930	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
73	416.200	412+050	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
74	416.300	412+419	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5

75	416.900	412+778	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
76	418.100	413+852	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
77	418.250	413+953	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
78	418.270	413+973	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
79	418.600	414+204	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
80	418.800	414+422	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
81	418.900	414+568	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
82	419.045	414+713	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
83	419.140	414+812	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
84	419.180	414+855	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
85	419.306	415+142	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
86	419.380	415+262	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
87	419.400	415+276	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
88	419.451	415+304	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
89	419.671	415+524	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
90	419.990	415+629	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
91	420.450	416+141	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
92	420.530	416+176	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
93	420.551	416+199	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
94	420.650	416+352	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
95	420.700	416+746	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
96	420.900	417+008	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
97	421.400	417+028	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
98	421.420	417+028	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5

99	421.450	417+058	Pipe	1x0.6	Reconstruction	Box	1 X 1.5 X 1.5
100	421.570	417+178	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
101	421.620	414+228	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
102	422.000	417+349	Pipe	0.9	Reconstruction	Box	1 X 1.5 X 1.5
103	422.150	417+499	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
104	422.200	417+514	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
105	422.400	417+714	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
106	424.600	419+914	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
107	424.700	420+221	Pipe	-	Reconstruction	Box	1 X 1.5 X 1.5
108	424.900	420+421	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
109	424.951	420+472	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
110	425.700	420+934	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
112	425.900	421+320	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
113	426.900	422+320	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
114	427.150	422+570	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
115	427.400	422+820	Pipe	1x1.2	Reconstruction	Box	1 X 1.5 X 1.5
116	427.500	422+920	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5
117	428.100	423+069	Pipe	1x0.9	Reconstruction	Box	1 X 1.5 X 1.5

(ii) Reconstruction of Slab Culverts to Box Culverts

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Existing		Recommendation	Proposed	
			Slab	Span (m)		Type	Span (m)
1	398.300	395+951	Slab	1x1.8x1	Reconstruction	Box	1 X 2 X 1.5
2	399.010	396+770	Slab	1x1.5x1.5	Reconstruction	Box	1 X 1.5 X 2
3	403.270	400+871	Slab	1x3x5	Reconstruction	Box	1 X 3 X 5.5

4	403.600	401+238	Slab	1x1.8x1.5	Reconstruction	Box	1 X 2 X 2
5	403.990	401+400	Slab	1x1.3x1.4	Reconstruction	Box	1 X 1.5 X 1.5
6	404.600	401+972	Slab	1x1.8x1.5	Reconstruction	Box	1 X 2 X 2
7	405.200	402+519	Slab	1x1.8x1.5	Reconstruction	Box	1 X 2 X 2
8	405.300	402+619	Slab	1x3.5x3	Reconstruction	Box	1 X 3.5 X 3.5
9	405.310	402+673	Slab	1x1.5x2	Reconstruction	Box	1 X 1.5 X 2.5
10	405.330	402+715	Slab	1x1x1.5	Reconstruction	Box	1 X 1.5 X 2
11	405.600	402+897	Slab	1x1x3	Reconstruction	Box	1 X 2 X 3.5
12	405.700	402+950	Slab	1x1x3	Reconstruction	Box	1 X 2 X 3.5
13	407.135	404+325	Slab	1x4x4.5	Reconstruction	Box	1 X 4 X 5
14	407.900	404+708	Slab	1x4x4.5	Reconstruction	Box	1 X 4 X 5
15	408.300	404+971	Slab	1x3x3	Reconstruction	Box	1 X 3 X 3.5
16	409.250	405+780	Slab	1x5x4	Reconstruction	Box	1 X 5 X 4.5
17	409.950	406+323	Slab	1x3.5x3.5	Reconstruction	Box	1 X 3.5 X 4
18	410.500	407+155	Slab	1x3x1	Reconstruction	Box	1 X 3 X 2
19	411.690	408+362	Slab	1x3.3x1	Reconstruction	Box	1 X 3.5 X 2
20	413.400	409+757	Slab	1x4x3.5	Reconstruction	Box	1 X 4 X 4
21	417.300	413+073	Slab	1x1.4x1.5	Reconstruction	Box	1 X 1.5 X 2
22	417.750	413+711	Slab	1x1.2x2.5	Reconstruction	Box	1 X 2 X 3
23	419.080	414+748	Slab	1x1x3.5	Reconstruction	Box	1 X 2 X 4
24	419.100	414+768	Slab	1x1x3.5	Reconstruction	Box	1 X 2 X 4
25	420.330	416+102	Slab	1x1x1	Reconstruction	Box	1 X 1.5 X 1.5
26	421.200	416+902	Slab	1x1.5x2.5	Reconstruction	Box	1 X 2 X 3
27	424.500	419+814	Slab	1x1.5x2.2	Reconstruction	Box	1 X 1.5 X 2.5

28	424.600	419+914	Slab	1x1x1.5	Reconstruction	Box	1 X 1.5 X 2
29	429.030	423+999	Slab	1x1.5x2	Reconstruction	Box	1 X 1.5 X 2.5

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

7.2.3 Widening of existing culverts

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

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
1	420+934	1 X 1.2	As per the typical cross section of existing road width.
2	422+320	1 X 1.2	
3	422+570	1 X 1.2	
4	422+820	1 X 1.2	
5	423+069	1 X 1.2	
6	423+999	1x1.5x2.5	

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

Sl No.	Culvert location		Span/Opening (m)	Remarks
	From	To		
1	395.680	420.520	Box Culvert (1 X 1.5 X 1.5)	Total 23 Nos. additional new Box Culverts

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

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

Sl. No.	Location at km	Type of repair required
1	420+934	Repairs/replacements of railing/parapets, flooring and protection works
2	422+320	
3	422+570	
4	422+820	
5	423+069	

6	423+999	

7.2.3.3 Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

7.3 Bridges

7.3.1 The existing bridges to be reconstructed/widened

The bridges at the following locations shall be re-constructed as new Structures:

S. No	Name of Existing Bridge	Bridge Type	Existing Chainage (km)	Design Chainage (km)	Proposed Structure Type	Proposed Span Arrangement No x Span (m)	Width of Structure (m)	Remarks
Nil								

Note: Extra widening shall be provided over structures falling on curves with radius less than 300m.

7.3.2 The following structures to be widened:

Sl. No.	Location (km)	Existing width (m)	Extent of widening (m)	Cross-section at deck level for widening
1	405.540	10.5	12.9 m	12.9 m
2	408.465	10.5	12.9 m	12.9 m

7.3.3 Additional New Minor Bridges

New minor bridges at the following locations on the project highways shall be constructed

S. No	Name of Existing Bridge	Bridge Type	Existing Chainage (km)	Design Chainage (km)	Proposed Structure Type	Proposed Span Arrangement No x Span (m)	Width of Structure (m)	Remarks
Nil								

7.3.4 Additional new Major bridges

New major bridges at the following locations on the project highways shall be constructed

Sl No.	Bridge at km	Span Arrangement	Remarks
NIL			

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

Sl. No.	Location at km	Remarks
1	405.540	Replace hand rail with Crash Barrier
2	408.465	Replace hand rail with Crash Barrier
3	423.470	Replace hand rail with Crash Barrier

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

Sl. No.	Location at km	Remarks
1	405.540	Repair footpath, provide floor protection, and masonry plaster.
2	408.465	
3	423.470	

7.3.7 Drainage system for bridge decks

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

7.3.8 Structures in marine environment

Sl No.	Location (km)	Remarks
NIL		

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

7.4 Rail-road Bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7

of the Manual. [Refer to paragraph 7.18 of the Manual and specify modification, if any]

Sl No.	Location (km)	Remarks
NIL		

7.4.2 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 (km)	Span Arrangement (m)	Width of Structure (m)
Nil			

7.4.3 Road under-bridges

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

Sl No.	Location of Level Crossing (km)	Number and Length of Span (m)
NIL		

7.4.4 Grade Separated Structures

There is one Grade Separated Structures/ Flyover.

S. No.	Location (km)	Span Arrangement (M)	Remarks
Nil			

7.5 Underpasses/Overpasses

The Vehicular Underpass structure shall be provided at the locations given below:

S. No	Design Chainage (Km)	Name of Intersecting Roads	Proposed Structural Configuration	Proposed Structure Type	Proposed Span Arrangement (m)	Total Width of Structure (m)
NIL						

Note: Extra widening shall be provided for structures falling on curves with radius less than 300m.

The Vehicular Underpass structure shall be provided at the locations given below:

S. No	Design Chainage (Km)	Name of Intersecting Roads	Proposed Structural Configuration	Proposed Structure Type	Proposed Span Arrangement (m)	Total Width of Structure (m)
NIL						

7.6 Repairs and strengthening of bridges and structures

[Refer to paragraph 7.22 of the Manual and provide details]
The existing bridges and structures to be repaired/strengthened, and the nature and extent of repairs/strengthening required are given below:

The existing bridges and structures to be repaired & rehabilitated as per details given below:

A. Major Bridges

S. No	Name of Existing Bridge	Existing Chainage (km)	Design Chainage (km)	Span Arrangement No x Span (m)	Type of Structure			Details of Rehabilitation
					Foundation	Sub-structure	Super-structure	
NIL								

Minor Bridges

S. No	Name of Existing Bridge	Existing Chainage (Km)	Design Chainage (km)	Span Arrangement No x Span (m)	Type of Structure			Details of Rehabilitation
					Foundation	Sub-structure	Super-structure	
1	-	409+000	405+540	1x10	Open	RCC Pier Abutment	RCC Solid Slab	• Repair wearing coat
2	-	412+230	408+465	1x10	Open	RCC Pier Abutment	RCC Solid Slab	• Repair wearing coat
3	Khujairok	428+180	423+470	1x16	Open	RCC Pier Abutment	RCC T Girder	• Repair wearing coat

Note: Repair and Rehabilitation Measures to be carried out for bridges:

A schedule for repair and rehabilitation of bridges to be prepared based on detailed inspection and got to be approved from Engineer before taking up this work subjected to minimum rehabilitation measures that are mentioned in table.

Widening of the bridge shall include widening of deck slab, abutment, pier, return / retaining wall, approach slab (dismantling of existing return wall if necessary) along with associated works including quadrant embankment slopes with stone pitching.

7.7 List of Major Bridges and Structures

The following is the list of Major Bridges

S. No	Design Chainage	Proposed Span	Type of Structure	Road Crossing	Structure Type
1	397.927	9 x 33.0	PSC	2 lane	Viaduct

7.8 Reinforced Earth retaining Structure

Reinforced Earth retaining Structure shall be provided in accordance with Section 8 of the Manual.

The Probable Locations are as:

Design Chainage (Km)		Length (m)	Remarks
From	To		
NIL			

8. MATERIALS

Materials shall be provided in accordance with Section 8 of the Manual.

9. TRAFFIC CONTROL DEVICES AND ROAD SAFETY DEVICES/ROAD SIDE FURNITURE

9.1 General

Traffic control devices, Road safety devices and Road side furniture shall comprise of road signs, road markings, object markers, hazard markers, studs, delineators, attenuators, safety barriers, pedestrian guard rails, boundary stones, Km stones, etc. shall be provided in accordance with Section 9 of the Manual.

9.2 Road Signs

(i) The three types of road signs viz., mandatory/regulatory signs, cautionary/warning signs and informatory signs shall be provided in accordance with clause 9.2 of the Manual.

(ii) Temporary traffic and construction signs are to be provided during construction and maintenance operations for traffic diversion and pedestrian safety.

(iii) All signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. All sign boards of size more than 1.2 m and less than 0.9 m shall be provided at the locations finalized in consultation with NHIDCL.

(iv) Cautionary sign boards (900mm Equilateral Triangle), stop sign (900mm Octagonal) mandatory sign boards (600mm dia), Village name boards (600X900mm), Hazard Plate (300X900mm), chevron signboard (600X750mm),

Facility information sign (600X800mm), Advance direction sign (1800X1200mm), Place identification sign (1200X900mm) shall be provided by the Construction Contractor with suitable interval in consultation with NHIDCL.

(v) Overhead traffic signs: location and size

The overhead signs shall be the reflectorized type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, type VIII and /or type IX of micro prismatic type. The retro reflected sheets of Engineering Grade and high intensity grade (ordinary) shall not be used. The height, lateral clearance, location and instillation shall be as per relevant clauses of MoRTH specifications. Overhead sign shall be installed ahead of major intersections and urban areas as per detailed design requirements. Minimum 4 Cantilever Overhead Signs and 2 Overhead Gantry Sign Board should be provided at suitable location.

9.3 Road Marking

i) Road marking shall be of hot applied thermoplastic materials with glass reflectorizing beads shall be provided in accordance with clause 9.3 of the Manual.

9.4 Road Delineators

i) Roadways indicators, hazard markers and object markers shall be provided in accordance with clause 9.4 of the Manual.

9.5 Reflective pavement markers (Road Studs)

Road studs shall be provided in accordance with clause 9.5 of the Manual.

9.6 Traffic Impact Attenuators

Traffic impact attenuators shall be provided in accordance with clause 9.6 of the Manual.

9.7 Road side and Median safety Barriers

There are two types of safety barriers viz., roadsides safety barriers and median safety barriers. It shall be provided in accordance with clause 9.7 of the Manual.

The minimum quantity of Traffic signages and pavement marking are tabulated here

Retro – reflectorised Traffic Signages, Road Marking and other appurtenances	unit	Minimum Provision
5TH KM Stone#	No.	5
KM Stone#	No.	20
Hectometer Stone#	No.	99
Providing and fixing of PCC M-15 Boundary Pillar@ every 200 m on both sides	No.	471
90cm equilateral triangle	No.	66
Speed limit, 60cm circular	No.	44
80 mm x 60 mm rectangular	No.	14
60 mm x 45 mm rectangular	No.	8
Stop sign,90cm high octagon	No.	4
Other Sign Boards (different sizes)	No.	8
Raised pavement markers (Road studs)	No.	1770
Thermoplastic Paint	Sqm.	9975
Arrows	Sqm.	30
Delineators	No.	164

10. COMPULSORY AFFORESTATION

(i) Greenbelt shall be provided along the periphery of plant sites and camp site by the contractor

(ii) Afforestation as per EMP with local species including maintenance shall be done to the maximum wherever possible by the contractor.

(iii) Afforestation & maintenance to fulfill the FCA,1980 Stage-I mandatory condition to be done by the EPC contractor.

11. HAZARDOUS LOCATIONS

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

i. Breast Wall locations

S. No	Chainage (Km)		Length (m)	Side
	From	To		
1	398000	398140	140	LHS
2	398280	398590	310	LHS
3	398630	398920	290	LHS
4	399030	399120	90	LHS
5	399160	399290	130	LHS
6	399340	400000	660	LHS
7	400000	400050	50	LHS
8	404870	404920	50	LHS
9	404970	404990	20	LHS
10	405060	405300	240	LHS
11	405350	405530	180	LHS
12	405600	405680	80	LHS
13	405780	405870	90	LHS
14	405980	406000	20	LHS
15	406110	406220	110	LHS
16	406340	406380	40	LHS
17	406440	406460	20	LHS
18	406480	406860	380	LHS
19	406920	407300	380	LHS
20	407600	407650	50	LHS
21	407700	407720	20	LHS
22	407760	407920	160	LHS
23	407970	408170	200	LHS
24	408350	408380	30	LHS
25	408470	408520	50	LHS
26	408540	408580	40	LHS
27	408690	408710	20	LHS
28	408790	408810	20	LHS
29	410520	410600	80	LHS
30	410620	410660	40	LHS
31	410740	410880	140	LHS
32	411390	411410	20	LHS
33	411610	411670	60	LHS
34	411920	411940	20	LHS
35	412060	412680	620	LHS
36	412700	413170	470	LHS
37	413210	413520	310	LHS

S. No	Chainage (Km)		Length (m)	Side
	From	To		
44	416870	416910	40	LHS
45	416980	417000	20	LHS
46	417050	417070	20	LHS
47	417830	418250	420	LHS
48	418560	418650	90	LHS
49	418720	418870	150	LHS
50	419060	419120	60	LHS
51	419320	419670	350	LHS
52	419700	419780	80	LHS
53	419810	419930	120	LHS
54	420030	420210	180	LHS
55	420230	420290	60	LHS
56	420340	420520	180	LHS
57	420880	420940	60	LHS
		Total	**8020**	

S. No	Chainage (Km)		Length (m)	Side
	From	To		
1	395680	395700	20	RHS
2	395790	395860	70	RHS
3	395930	395960	30	RHS
4	396070	396310	240	RHS
5	396350	396460	110	RHS
6	397860	397930	70	RHS
7	400170	400250	80	RHS
8	400310	400400	90	RHS
9	401270	401360	90	RHS
10	404320	404340	20	RHS
11	406440	406460	20	RHS
12	410520	410600	80	RHS
13	410620	410660	40	RHS
14	410740	410880	140	RHS
15	411390	411410	20	RHS
16	411480	411520	40	RHS
17	412000	412030	30	RHS
18	413620	413890	270	RHS

38	415940	416220	280	LHS
39	416240	416270	30	LHS
40	416330	416370	40	LHS
41	416500	416530	30	LHS
42	416550	416700	150	LHS
43	416790	416820	30	LHS

19	414020	414050	30	RHS
20	414230	414600	370	RHS
21	414720	415950	1230	RHS
22	419060	419120	60	RHS
23	419320	419670	350	RHS
		Total	**3500**	

ii. Retaining wall locations

S. No	Chainage(m)		Length(m)
	From	To	
1	396260	396300	40
2	399450	399550	100
3	400340	400370	30
4	404340	404570	200
5	404590	404740	150
		Total	**520**

S. No	Chainage(m)		Length(m)
	From	To	
1	399340	399370	30
2	399440	399480	40
3	404340	404570	230
4	404570	404660	90
5	406680	406720	40
6	416200	416210	10
7	416360	416380	20
8	416690	416700	10
9	416900	416950	50
10	417060	417070	10
11	417160	417170	10
13	Material Disposal		500
		Total	**1040**

iii Landscaping/ Hydro seeding on the Hill cutting side

Hydro seeding on the hill cut side shall be done as per the specifications and standards and as directed by Engineer in charge. The minimum total surface area 317650 Sqm. The locations shall be finalized during the execution of work as directed by Engineer in charge.

iv. Details of Metal Beam Crash barrier locations

S.No	From	To	Total Length
1	395680	396500	820
2	398100	399450	1,350
3	400000	400450	450
4	400450	404350	-

5	404350	407160	2,810
6	407160	407600	-
7	407600	408560	960
8	408560	413870	-
9	413870	415620	1,750
10	415620	417000	1,380
		Total	**9,520**

12. SPECIAL REQUIREMENT FOR HILL ROADS

In accordance with section 13 of the manual (from IRC : SP : 73-2015), IRC :SP-1998 and Recommended practices for Treatment of Embankment and Roadside slopes for Erosion control (First Revision), IRC :56-2011 and relevant IRC codes.

12.1 Slope Protection

As the project involves cutting of existing hill slopes, it is imperative that slopes are stabilized for ensuring longevity of the slope and the road. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC : SP: 48-1998. Reference may be drawn from IRC: 56-2011.

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

Sl. No.	Protection works	Unit	Quantity
1	Breast Wall	Rm	11520
2	Retaining wall	Rm	1560
3	Vetiver Plantation, Hydro Seeding and Hydro Mulching etc. including nets if required or similar works are to be done for slope protection and site mitigation measure upto a height of 12-15 m all along the slopes in each cutting locations except hard rock location which needs to be protected with appropriate applicable technologies, if required.	Sqm	317650
4	Metal Beam Crash barrier	Rm	9520

Note;- Length of the protective structure is indicative only. Protective structure shall be designed and provided as per the technical requirement in consultation with the Authority's Engineer.

(ii) Location of existing Slide prone zones-

Sl No.	Design Chainage		Length (m)	Remarks
	From	To		
	NIL			

Note- - *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 consultantand implement it accordingly thereafter.*

Any increase in quantity over and above the tentative 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.*

12.2 ROAD LAND BOUNDARY (As per Clause 12.2 of IRC:73:2015)

Road land (ROW) boundary shall be demarcated by putting RCC boundary pillars of size 60cm x 15cm x 15 cm embedded in concrete (as per IRC:25) along the Project Highway at 200 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with NHIDCL.

12.3 Disposal of Debris: - The Muck generated to be disposed in the designated site(s) only (given in the below table). All the applicable clearance(s) and permit(s) for additional Exploration of muck dumping site(s) is the responsibility of the EPC Contractor. The EPC contractor shall submit a Muck Disposal Plan including restoration and top soil conservation plan along with the construction EMP. All these items to be implemented on site as per standard procedure(s), not violating the Forest (Conservation) Act 1980, Wildlife Protection Act 1972, Environment (Protection) Act 1986 and other applicable laws.

Sr. No.	Identified Dumping area (m^2) approx.	Geo-coordinate		Side (Khongkhang to Moreh)
		Latitude	Longitude	
1	200	24° 20'41".234	94°12' 26".47	Left

2	240	24° 20’21”.09	94°13’ 19”.609	Left
3	140	24° 19’51”.55	94°14’ 04”.285	Left
4	80	24°18’15”.142	94°14’ 14”.091	Left
5	90	24°18’17”.786	94°15’ 25”.372	Both side
6	100	24°17’50”.31	94°16’ 13”.402	Left
7	130	24°16’55”.37	94°16’ 46”.59	Left

13 CHANGE OF SCOPE

The length of Structures, bridges and slope protection works whatsoever in terms of retaining wall, breast wall, gabion wall or under special requirement of hill slope specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths and specifications in this Schedule-B shall not constitute a Change of Scope.

SCHEDULE – C

(See Clause 2.1)

PROJECT FACILITIES

1. Project Facilities

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

(a) Toll plazas;

(b) Roadside furniture;

(c) Street lighting;

(d) Pedestrian facilities;

(e) Landscaping and tree plantation;

(f) Truck lay-byes;

(g) Bus-bays and bus shelters;

(h) Traffic aid posts;

(i) Medical aid posts;

(j) Vehicle rescue posts; and

(k) Others

Annex - I
(Schedule-C)

PROJECT FACILITIES

1 Project Facilities

The EPC Contractor shall construct the Project Facilities described in this Annex-I to form part of the Two-Lane Project Highway. The Project Facilities shall include:

(a) Toll plazas;

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Landscaping and tree plantation;

(e) Truck lay-byes;

(f) Bus-bays and bus shelters;

(g) Highway Patrol Unit;

(h) Emergency Medical Services;

(i) Crane Services; and

(j) Others

2 Description of Project Facilities

Each of the Project Facilities is briefly described below:

(a) Toll Plazas

Nil

(b) Road side Furniture

Road side furniture shall be provided in accordance with Section 9.0 of the Manual of Standards and Specifications.

(c) Pedestrian Facilities

Pedestrian crossing Facilities shall be provided in accordance with Clause 13.2 of the 2 Lane Manual of Standards and Specifications and Typical Cross Section Details provided in Appendix-BI.

(d) Landscaping and Tree Plantation

Highway landscaping and tree plantation shall be provided in accordance with Section 11 of the Manual of Standards and Specifications.

(e) Truck Lay-byes

NIL

(f) Bus-bays and Bus Shelter

Bus-bays and shelters shall be provided in accordance with Clause 12.6 / 12.5 of the 2 Lane / 4 Lane Manual of Standards and Specifications at following locations.

S. No	Design Chainage (km)	Village	Side
1	426+000	Chikim Village	Both Sides
2	431+600	Moreh Village	Both Sides

Note: * refer IRC SP-73:2015.

(g) Highway Patrol Unit

Highway Patrol unit shall be set up in accordance with Clause 12.11 / 12.8 of the 2 Lane / 4 Lane Manual of Standards and Specifications with the provisions of the Contract.

NIL

Emergency Medical Services

Emergency medical Services shall be set up in accordance with Clause 12.12 / 12.9 of the 2 Lane / 4 Lane Manual of Standards and Specifications with the provisions of the Contract.

NIL

(i) Crane Services

Nil

(j) Others

(i) Highway Lighting

Lighting shall be provided at the following locations as per IRC SP 84:2014:

(a) Lighting shall be provided at Truck lay byes and Bus stops as per Schedule D

(b) High Mast Lighting shall be provided at all Major Junctions, Truck lay byes and Grade Separation structures.

SCHEDULE – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

Manual of Standards & Specification for Four Laning of Highways (IRC: SP-73-2015) referred to herein as the Manual]

[Note: Specify the relevant Manual, Specifications and Standards]

Annex – I

(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Standards & Specification for Two laning of Highways (IRC: SP-73-2015), referred to as the Manual, and MORTH Specifications for Road and Bridge Works, IRC: SP: 48-1998 and IRC 56-2011. 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 shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively. Other deviations to the manual are given below.

Sl. No.	Clause No.	Description	Deviation
1	Clause 2.1	General: Provision of Four lane divided carriageway through built-up areas	Lane configuration and width of carriageway shall be provided as per the Typical cross sections given in **Schedule B.**
2	Clause 2.2	Design Speed: Ruling or minimum Design speed shall be followed	Design speed shall be adopted as mentioned in the Plan & Profile drawings given **in Schedule B and clause 2.2 & 2.3**.
3	Clause 2.6	Type and width of Shoulders	Type and Width of shoulders shall be as per the **Typical cross sections given in Schedule B.**
4	Clause 2.9.3	Super-elevation Shall be limited to 7 Percent	Super-elevation shall be limited to **5% (five Percent).**
5	Clause 2.9.4	Radius of Horizontal Curves	Radius of Horizontal curves shall be as per the alignment plan shown in Plan & Profile drawings given in **Schedule A.**
6	Clause 2.9.5	Sight Distance: On two-lane roads, normally	Stopping sight distance shall be provided as a minimum, where ever

Sl. No.	Clause No.	Description	Deviation
		intermediate sight distance should be available throughout.	possible intermediate and over taking sight distance shall be provided.
9	Clause 5.1 & 5.1.1	Provision of Flexible or Rigid pavement	The type of Pavement shall be as per **Clause 5.2 of Schedule B.**
10	Clause 5.9	Widening and strengthening	The project road is recommended for full reconstruction based on the schemes and the designed profiles and as per clause **given inSchedule B.**
11	Clause 6.3.2	Median Drainage: In super-elevated sections, combination of covered longitudinal and cross drains shall be provided	Median cuts shall be provided at the location of super-elevated sections to allow the water to flow from one side carriageway to other side.
12	Fig 7.2, 7.3 & 7.4 of 2 Lane.	Deck Width of bridges	Deck width of Structures and bridges shall be **as per clause 7.0 of Schedule B.**

2.2 Notwithstanding anything to the contrary contained in Paragraph 1 above, the MORTH Specifications for Road and Bridge Works 5th Revision 2013 shall be amended to the extent given in Appendix D-1 to this Schedule D.

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: SP : 35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

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

Annex - I
(Schedule -E)

Repair/rectification of Defects and deficiencies

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

Nature of Defects or deficiency		Time limit for repair/rectification
Roads		
a	**Carriageway and paved shoulders**	
I	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
II	Roughness value exceeding 2,200 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	120 (one hundred and twenty) days
III	Pot holes	24 hours
IV	Any cracks in road surface	15(fifteen) days
V	Any depressions, rutting exceeding 10 mm in road 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

Nature of Defects or deficiency		Time limit for repair/rectification
IX	Removal of debris, dead animals	6 hours
b	**Granular earth shoulders, side slopes, drains and culverts**	
I	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
Nature of defects or deficiency		**Time limit for repair/rectificaation**
II	Edge drop at shoulders exceeding 40mm	7 (seven) days
III	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
IV	Rain cuts/gullies in slope	7 (seven) days
V	Damage to or silting of culverts and side drains	7 (seven) days
VI	Desilting of drains in urban/semi-urban areas	24 hours
VII	Railing, parapets, crash barrier	7 (seven) days (restore immediately if causing safety hazard.
c	**Road side furniture including road sign and pavement**	

Nature of Defects or deficiency		Time limit for repair/rectification
	marking	
I	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
II	Painting of km stone, railing, parapets/crash barrier	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	24 hours
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	24 hours
II	Removal of fallen trees from carriageway	4 hours
III	Deterioration in health of trees and bushes	Timely watering and treatment

Nature of Defects or deficiency		Time limit for repair/rectification
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	24 hours
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 crane	4 (Four) hours
BRIDGES		
a	**Superstructures**	

Nature of Defects or deficiency		Time limit for repair/rectification
I	Any damage, cracks, spalling/scaling Temporary measures Permanent measures	 within 48 hours within 15 (fifteen) days or as specified by the Authority's Engineer
b	**Foundation**	
I	Scouring and/or cavitation	15 (fifteen) days
c	**Piers, abutments, return walls and wing walls**	
I	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
d	**Bearing (metallic) of bridges**	
I	Deformation, damages, tilting or shifting of bearings	14 (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	3 (three) days

Nature of Defects or deficiency		Time limit for repair/rectification
	joints; or clogging of spouts, weep holes and vent-holes	
III	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
IV	Rain cuts or erosion of banks of the side slopes of approaches	7 (seven) days
V	Damage to wearing coat	15 (fifteen) days
VI	Damage or deterioration in Approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
VII	Growth of vegetation affecting the Structure or obstructing the waterway	15 (fifteen) days
g	**Hill Roads**	
I	Damage to retaining wall/breast wall	7 (seven) days
II	Landslides requiring clearance	12 (Twelve) hours
III	Snow requiring clearance	24 (Twenty four) hours

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

SCHEDULE - F
(See Clause 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 Pollution Control Board and Village Panchayat(s)/Land owner for setting up base camp/construction camp;
(b) Permission of Pollution Control Board and Village Panchayat(s) for setting up batching plant, Hot Mix Plant, asphalt plant, crusher plant, and other;
(c) Prior Environmental Clearance and permission from Village Panchayat(s) for extraction of boulders, river bed material mining and sand mining (if used);
(d) Prior Environmental Clearance and permission from Village Panchayat(s) for borrow earth (if used);
(e) Permission of the State Government Authority for drawing surface/ground water (as required);
(f) Permission of Pollution Control Board for storage, handling & transportation of hazardous material (if involved);
(g) License for use of explosives;
(h) License from inspector of factories or other competent Authority for setting up batching plant;
(i) Any other permits or clearances required under Applicable Laws.

1.2 Applicable Permits for Proposed Right of Way (PROW), as required relating to environmental protection shall have been procured by the Authority in accordance with the provisions of this Agreement.

SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

[Performance Security/Additional Performance Security]

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

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called the "Contractor") and National Highways and Infrastructure Development Corporation Ltd. , (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the construction of **"Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode"** subject to and in accordance with the provisions of the Agreement

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement,

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

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

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

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

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

to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

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

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

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

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

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

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.

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

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

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

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Adress)

Notes:

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

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

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

Form for Guarantee for Withdrawal of Retention Money

The Managing Director,
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 National Highways and Infrastructure Development Corporation Ltd., (hereinafter called the "Authority") for the "**Construction of Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode**" subject to and in accordance with the provisions of the Agreement.

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

(C) 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 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 Authority of India, 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 not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

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

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

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

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

8. The Guarantee shall cease to be in force and effect 90 (ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly 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 at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
13. Bank Guarantee has been sent to authority's bank through SFMS gateway as per the details below:-

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

5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Notes:

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

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

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

Form for Guarantee for Advance Payment

The Managing Director,
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 National Highways and Infrastructure Corporation Ltd., (hereinafter called the "Authority") for the **"Construction of Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode"**, subject to and in accordance with the provisions of the Agreement

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

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful

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

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

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

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

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

Sl. No	Particulars	Details
1	Name of the Beneficiary	National Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	Syndicate Bank, Transport Bhawan, 1st Parliament street, New Delhi-110001

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

For and on behalf of the bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Adress)

Notes:

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

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

SCHEDULE - H

(See Clauses10.1.4 and 19.3)

Contract Price Weightages

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

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

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
1	2	3	4
Road works including Culverts, widening and repair of culverts	65.50	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	27.88
		(2) Sub Base Course	4.35
		(3) Non Bituminous Base Course	6.21
		(4) Bituminous Base Course	5.27
		(5) Wearing Coat	2.80
		(6) Widening and repair of culverts	0.45
		B.1- Reconstruction/New 2-lane realignment/bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	20.94
		(2) Sub Base Course	3.34
		(3) Non Bituminous Base Course	4.72
		(4) Bituminous Base Course	4.87
		(5) Wearing Coat	2.59
		B.2- Reconstruction/New 4-lane realignment/ bypass (Rigid Pavement)	0.00
		(1) Earthwork up to top of the sub-grade	0.00
		(2) Sub Base Course	0.00

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		(3) Dry Lean Concrete (DLC) Course	0.00
		(4) Pavement Quality Control (PQC) Course	
		C.1- Reconstruction/New Service road (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00
		(2) Sub Base Course	0.00
		(3) Non Bituminous Base Course	0.00
		(4) Bituminous Base Course	0.00
		(5) Wearing Coat	0.00
		C.2- Reconstruction/New Service road (Rigid Pavement)	
		(1) Earthwork up to top of the sub-grade	0.00
		(2) Sub Base Course	0.00
		(3) Dry Lean Concrete (DLC) Course	0.00
		(4) Pavement Quality Control (PQC) Course	0.00
		D- Reconstruction and New Culverts on Existing Road, Realignments, Bypasses:	
		Culverts (Length < 6)	16.58
Minor Bridges/ Underpasses/ Overpasses	0.14	**A.1- Widening and Repair of Minor Bridges (Length > 6m and < 60m**	
		Minor Bridges	100.00
		A.2- New Minor Bridges (Length > 6m and < 60m	
		(1) Foundation and Substructure: On completion of the foundation work including foundations for	0.00

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		wing and return walls, abutments, piers up to the abutment/pier cap.	
		(2) Superstructure: On completion of the superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc., complete in all respect.	0.00
		(3) Approaches: On completion of the approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	0.00
		(4) Guide Bunds and River Training Works: On completion of Guide Bunds and River Training Works complete in all respect.	0.00
		B.1- Widening and Repair of Underpasses/Overpasses Underpasses/Overpasses	
		B.2- New Underpasses / Overpasses	0.00
		(1) Foundation and Substructure: On completion of the foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap.	0.00
		(2) Superstructure: On	

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		completion of the superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc., complete 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 the approaches including Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	0.00 0.00
Major Bridge (Length > 60m) works and ROB / RUB / Elevated Sections / Flyovers including viaducts, if any	5.45	**A.1- Widening and repairs of Major Bridges** (1) Foundation (2) Substructure (3) Superstructure (including bearings) (4) Wearing Coat including expansion joints (5) Miscellaneous Items like hand rails, crash barriers, road markings etc., (6) Wing walls / return walls (7) Guide Bunds, River Training Works etc., (8) Approaches (including Retaining Walls, stone pitching and protection	 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		works)	
		A.2- New Major Bridges	
		(1) Foundation	
		(2) Substructure	0.00
		(3) Superstructure (including bearings)	0.00 0.00
		(4) Wearing Coat including expansion joints	0.00
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00
		(6) Wing walls / return walls	
		(7) Guide Bunds, River Training Works etc.,	0.00 0.00
		(8) Approaches (including Retaining Walls, stone pitching and protection works)	0.00
		B.1- Widening and repair of	
		(a) ROB &	
		(b) RUB	
		(1) Foundation	
		(2) Substructure	0.00
		(3) Superstructure (including bearings)	0.00 0.00
		(4) Wearing coat: (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-Rigid pavement under RUB including drainage facility complete in all respects as specified	0.00
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00
		(6) Wing walls / return walls	
		(7) Approaches (including	0.00

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		Retaining Walls, stone pitching and protection works)	0.00
		B.2- New ROB / RUB	
		(a) ROB &	
		(b) RUB	
		(1) Foundation	
		(2) Substructure	0.00
		(3) Superstructure (including bearings)	0.00 0.00
		(4) Wearing coat: (a) in case of ROB-wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-Rigid pavement under RUB including drainage facility complete in all respects as specified	0.00
		(5) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00
		(6) Wing walls / return walls	
		(7) Approaches (including Retaining Walls, stone pitching and protection works)	0.00 0.00
		C.1- Widening and repair of Elevated Section/Flyover/ Grade Separators	
		(1) Foundation	
		(2) Substructure	0.00
		(3) Superstructure (including bearings)	0.00 0.00
		(4) Wearing Coat including expansion joints	0.00
		5) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		(6) Wing walls / return walls	
		(7) Approaches (including Retaining Walls, stone pitching and protection works)	0.00 0.00
		C.2- New Elevated Section/ Flyover/ Grade Separators/ViaDuct	
		(1) Foundation	
		(2) Substructure	26.77
		(3) Superstructure (including bearings)	14.86 35.78
		(4) Wearing Coat including expansion joints	9.63
		5) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	12.53
		(6) Wing walls / return walls	
		(7) Approaches (including Retaining Walls, stone pitching and protection works)	0.10 0.33
Other works	28.91	(i) Toll Plaza	0.00
		(ii) Road side drains	8.24
		(iii) Road signs, markings, km stones, safety devices,	2.47
		(iv) Project facilities	
		(a) Bus Bays	0.85
		(b) Truck Lay-Byes	0.00
		(c) Rest Areas	0.00
		(d) Others	0.00
		(v) Road side plantation (Vetiver, Hydro seeding and Mulching or similar techniques etc.) for slope protection on exposed hill slopes as slide mitigation measure.	5.60
		(vi) Repair of protection works	

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage Weightage
		other than approaches to the bridges, elevated sections / flyovers / grade separators and ROBs/RUBs	
		(vii) Safety & traffic management during construction	1.37
		(viii) Protection Work	
		(a) Breast Wall	40.49
		(b) Retaining wall	31.93
		(c) Crash barrier/W metal crash barrier	3.48
		(ix) Rehabilitation of existing road	5.57
		(x) Miscellaneous	0.00

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage Weightage	Payment Procedure
A Widening & Strengthening of existing road		
(1) Earthwork up to top of the sub-grade	27.88	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 05 (five) percent of the total length.
(2) Sub-Base Course	4.35	
(3) Non Bituminous Base Course	6.21	
(4) Bituminous Base Course	5.27	
(5) Wearing Coat	2.80	
(6) Widening and repair of	0.45	Cost of completed culverts shall be

culverts		determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.
B.1 Reconstruction / New 2-lane realignment / bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	20.94	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length which ever less.
(2) Sub Base Course	3.34	
(3) Non-Bituminous Course	4.72	
(4) Bituminous Base Course	4.87	
(5) Wearing Coat	2.59	
B.2 Reconstruction / New 4-lane realignment / bypass (Rigid Pavement)		
(1) Earthwork up to top of the sub-grade	0.00	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length which ever less.
(2) Sub Base Course	0.00	
(3) Dry Lean Concrete (DLC) Course	0.00	
(4) Pavement Quality Control (PQC) Course	0.00	
C.1 Reconstruction / New Service Road (Flexible Pavement)		
(1) Earthwork up to top of the sub-	0.00	

grade (2) Sub Base Course (3) Non-Bituminous Course (4) Bituminous Base Course (5) Wearing Coat	0.00 0.00 0.00 0.00	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length which ever less.
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	0.00 0.00 0.00 0.00	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length which ever less.
D. Reconstruction and New Culverts on existing road, realignments and bypasses: (1) Culverts (Length < 6m)	16.58	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of five culverts.

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

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

Where P= Contract Price

L = Total length in km

Similarly, the rates per km for stages (1), (2) and (4) above shall be worked out.

Note: The length of affected due to law and order problems or litigation during execution due to which the contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for

payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.3.2 Minor Bridges and Underpasses / Overpasses

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

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1Widening and repairs of Minor Bridges **(Length > 6m and < 60m)**	100.00	Cost of each Minor Bridge shall be determined on pro-rata basis with respect to the total linear length of the minor bridges. Payment shall be made on completion of widening and repair works of minor bridge.
A.2New Minor Bridges **(i) Foundation+Substructure**: On completion of the foundation work including foundations for wing and return walls, abutment and piers up to abutment / pier cap	0.00	**(i)Foundation and Substructure**: Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation + substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of foundation + substructure of each bridge subject to completion of atleast two foundations along with substructure up to abutment / pier cap level of each bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. **(ii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of

Stage of Payment	Weightage	Payment Procedure
		superstructure of atleast one span in all respects as specified in the column of "Stage Payment" in this sub clause.
(ii) Superstructure: On completion of the superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc., complete in all respects.	0.00	**(iii)Approaches**: Payment shall be made on pro rata basis on completion of a stage i.e completion of approaches in all respect as specified in the column of "Stage Payment" in this sub clause.
(iii) Approaches: On completion of approaches including retaining walls, stone pitching, protection works complete in all respects & fit for use	0.00	**(iv)Guide Bunds and River Training Works**: Payment shall be made on pro rata basis on completion of a stage i.e completion of Guide Bunds and River Training Works in all respects as specified.
(iv)Guide Bunds and River Training Works: On completion of Guide Bunds and River Training works complete in all respects	0.00	
B.1Widening and repairs of Underpasses / Overpasses	0.00	Cost of each Underpass / Overpass shall be determined on pro rata basis with respect to the total linear length of the Underpasses / Overpasses. Payment shall be made on the completion of widening & repair works of a Underpass / Overpass.

Stage of Payment	Weightage	Payment Procedure
B.2New Underpasses / Overpasses		**(i)Foundation and Substructure**: Cost of each Underpass/Overpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpass/ Overpass.
(i) Foundation+Substructure: On completion of the foundation work including foundations for wing and return walls, abutment and piers up to abutment / pier cap	0.00	Payment against foundation + substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of foundation + substructure of each Underpass / Overpass subject to completion of atleast two foundations along with substructure up to abutment / pier cap level of each Underpass / Overpass. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Superstructure: On completion of the superstructure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc., complete in all respects. 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	0.00	**(ii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure of atleast one span in all respects as specified in the column of "Stage Payment" in this sub clause.

Stage of Payment	Weightage	Payment Procedure
including drainage facility complete in all respects as specified.	0.00	
(iii) **Approaches**: On completion of approaches including Retaining walls/ Reinforced Earth Walls, stone pitching, protection works complete in all respects & fit for use		(iii) **Approaches**: Payment shall be made on pro rata basis on completion of a stage i.e completion of approaches in all respect as specified.

1.3.3 Major Bridge works and ROB/RUB and Structures

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

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
A.1Widening and repairs of Major Bridges **(i) Foundation**	0.00	**(i)Foundation**: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of foundation of the Major Bridge subject to completion of atleast two foundations the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
ii) Substructure	0.00	**(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of Substructure of the Major Bridge subject to completion of atleast two Substructures up to abutment / pier cap level of the major bridge.
(iii) Superstructure (including bearings)	0.00	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including Expansion Joints	0.00	**(iv) Wearing Coat**: Payment shall be made on completion of wearing coat including expansion joints complete in

Stage of Payment	Weightage	Payment Procedure
		all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00	**(v) Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc., complete in all respects as specified.
(vi) Wing Walls / Return Walls	0.00	**(vi) Wing Walls / Return Walls**: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
(vii) Guide Bunds, River Training Works	0.00	**(vii) Guide Bunds, River Training Works**: Payments shall be made on completion of all Guide Bunds, River Training works etc., complete in all respects as specified.
(viii)Approaches (including Retaining Walls, stone pitching and protection works)	0.00	**(viii)Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all respect as specified.
A.2New Major Bridges	0.00	**(i) Foundation**: Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge.
(i) Foundation		Payment against foundation shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of foundation of the Major Bridge subject to completion of at

Stage of Payment	Weightage	Payment Procedure
		least two foundations the major bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
	0.00	**(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of Substructure of the Major Bridge subject to completion of atleast two Substructures up to abutment / pier cap level of the major bridge.
(ii) Substructure	0.00	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of atleast one span in all respects as specified.
	0.00	**(iv) Wearing Coat**: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(iii) Superstructure (including bearings)	1.02	**(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.
(iv) Wearing Coat including Expansion Joints	0.00	

Stage of Payment	Weightage	Payment Procedure
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00	**(vi) Wing Walls / Return Walls**: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
(vi) Wing Walls / Return Walls	0.00	
(vii) Guide Bunds, River Training Works	0.00	**(vii) Guide Bunds, River Training Works**: Payments shall be made on completion of all Guide Bunds, River Training works etc., complete in all respects as specified.
(viii)Approaches (including Retaining Walls, stone pitching and protection works)	0.00	**(viii)Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all respect as specified.
B.1 Widening and repairs of **(a) ROB** **(b) RUB**	0.00	**(i)Foundation**: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB's/RUBs. Payment against foundation shall be made on pro rata basis on completion of a stage i.e not less than 25% of the scope of foundation of the ROB/RUB subject to completion of atleast two foundations of the ROB/RUB.
(i) Foundation	0.00	In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Weightage	Payment Procedure
(ii) Substructure	0.00	**(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of a stage i.e not less than 25% of the scope of Substructure of the ROB/RUB subject to completion of atleast two Substructures up to abutment / pier cap level of the ROB/RUB.
(iii) Superstructure (including bearings)	0.00	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of at least one span in all respects as specified.
(iv) Wearing Coat including Expansion Joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified	00	**(iv) Wearing Coat**: Payment shall be made on completion of (a) in case of ROB-Wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-Rigid pavement under RUB including drainage facility complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00	**(v) Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc., complete in all respects as specified.
	0.00	**(vi) Wing Walls / Return Walls**: Payments shall be made on

Stage of Payment	Weightage	Payment Procedure
(vi) Wing Walls / Return Walls	0.00	completion of all wing walls / return walls complete in all respects as specified.
(vii)Approaches (including Retaining walls, stone pitching and protection works	0.00	**(viii)Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all respect as specified.
B.2 New **(a) ROB** **(b) RUB**	0.00	**(i)Foundation**: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB's/RUBs.
(i) Foundation	0.00	Payment against foundation shall be made on pro rata basis on completion of 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 ROB/RUB. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
	0.00	**(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of Substructure of the ROB/RUB subject to completion of atleast two Substructures up to abutment / pier cap level of the ROB/RUB.

Stage of Payment	Weightage	Payment Procedure
(ii) Sub-structure	0.00	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of atleast one span in all respects as specified.
(iii) Super-structure (including bearings)	0.00	**(iv) Wearing Coat**: Payment shall be made on completion of (a) in case of ROB-Wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-Rigid pavement under RUB including drainage facility complete in all respects as specified.
(iv) Wearing Coat including Expansion Joints in case of ROB. In case of RUB, rigid pavement under RUB including drainage facility as specified	0.00	**(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.
		(vi) Wing Walls / Return Walls: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
		(viii)Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all

Stage of Payment	Weightage	Payment Procedure
		respect as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,		
(vi) Wing Walls / Return Walls		
(vii)Approaches (including Retaining walls / Reinforced Earth walls, stone pitching and protection works)		
C.1 Widening and repairs of Elevated Section/Flyovers/ Grade Separators		**(i)Foundation**: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure.
(i) Foundation	0.00	Payment against foundation shall be made on pro rata basis on completion of 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.

Stage of Payment	Weightage	Payment Procedure
(ii) Substructure	0.00	In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified. **(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of Substructure of the structure subject to completion of atleast two Substructures up to abutment / pier cap level of the structure.
(iii) Superstructure (including bearings)	0.00	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of atleast one span in all respects as specified. **(iv) Wearing Coat**: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
	0.00	**(v) Miscellaneous**: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc., complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
(iv) Wearing Coat including Expansion Joints	0.00	**(vi) Wing Walls / Return Walls**: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	0.00	**(viii)Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all respect as specified.
(vi) Wing Walls / Return Walls	0.00	
(vii)Approaches (including Retaining Walls / Reinforced Earth Walls, stone pitching and protection works)		
C.2New Elevated Section/ Flyovers/ Grade Separators	26.77	**(i)Foundation**: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structure.

Stage of Payment	Weightage	Payment Procedure
(i) Foundation		Payment against foundation shall be made on pro rata basis on completion of 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.
(ii) Sub-structure	14.86	**(ii) Substructure**: Payment against Substructure shall be made on pro rata basis on completion of stage i.e not less than 25% of the scope of Substructure of the structure subject to completion of atleast two Substructures up to abutment / pier cap level of the structure.
(iii) Super-structure (including bearings)	35.78	**(iii) Superstructure**: Payment shall be made on pro rata basis on completion of a stage i.e completion of superstructure including bearings of atleast one span in all respects as specified.
(iv) Wearing Coat including Expansion Joints	9.63	**(iv) Wearing Coat**: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.

Stage of Payment	Weightage	Payment Procedure
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.,	12.53	**(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.
(vi) Wing Walls / Return Walls	0.10	**(vi) Wing Walls / Return Walls**: Payments shall be made on completion of all wing walls / return walls complete in all respects as specified.
(vii)Approaches (including Retaining Walls / Reinforced Earth Walls, stone pitching and protection works)	0.33	**(viii)Approaches**: Payments shall be made on completion of both approaches including stone pitching, protection works, etc., complete in all respect as specified.

Note: 1. In case of innovative Major Bridges 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 DG (RD) & SS, MoRT&H.

2. The Schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of DG (RD) & SS, MoRT&H.

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza	0.00	Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas.
(ii) Road side drains	8.24	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 05 % (five per cent) of the total length.
(iii) Road signs, markings, km stones, safety devices,	2.47	
(iv) Project Facilities		
a) Bus bays	0.85	Payment shall be made on pro rata basis for completed facilities.
b) Truck lay-byes	0.00	
c) Rest areas	0.00	
d) Others	0.00	
(v) Road Side plantation (Vetiver, Hydro seeding and Mulching or similar techniques etc.) for slope protection on exposed hill slopes as slide mitigation measure.	5.60	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(vi) Repairs of protection works other than approaches to the bridges, elevated sections/flyovers / grade separators and ROBs/RUBs	0.00	
(vii) Safety and traffic management during construction	1.37	Payment shall be made on pro-rata basis every six months
(viii) Protection Work		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 05% (five per cent) of the total length.
(a) Breast Wall	40.49	
(b) Retaining wall	31.93	

Stage of Payment	Weightage	Payment Procedure
(c) Crash barrier/W metal crash barrier	3.48	
(ix) Rehabilitation of existing road	5.57	Payment shall be made on pro rata basis for completed facilities.
(x) Miscellaneous	0.00	

2. Procedure for payment for Maintenance

The cost for maintenance shall be as stated in Clause 14.1 (v).

Payment for Maintenance shall be made in accordance with the provisions of Article 14 and Article 19.

SCHEDULE - I
(See Clause 10.2.4)
DRAWINGS

1 **Drawings**

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

2 **Additional Drawings**

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

Annex - I
(Schedule - I)

List of Drawings

[Note : The Contractor is required to furnish all the drawings as per the manual and clause 10.2]

SCHEDULE - J
(See Clause 10.3.2)

PROJECT COMPLETION SCHEDULE

1 **Project Completion Schedule**

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

2 **Project Milestone-I**

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

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

3 **Project Milestone-II**

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

3.2 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 40% (Forty per cent) of the Contract Price.

4 **Project Milestone-III**

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

4.2 Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 80% (Eighty per cent) of the Contract Price.

5 **Scheduled Completion Date**

5.1 The Scheduled Completion Date shall occur on [Scheduled Construction Period] day from the Appointed Date.

5.2 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 all the tests required for quality control or as decided in consultation with the Authority's Engineer at the time of physical tests as per relevant IRC code 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 Applicable Permits.

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**

The Authority's Engineer or such other agency or person shall conduct all Tests set forth in this Schedule-K 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

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated ……. (the "Agreement"), for **"Construction of Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode"** 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 **"Construction of Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) 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, SEALED and
And DELIVERED	DELIVERED
For and on behalf of	For and on behalf of
CONTRACTOR by:	AUTHORITY ENGINEER by:

COMPLETION CERTIFICATE

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "Agreement"), for **"Construction of Two Laning of Imphal – Moreh Section of NH 39**

from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode" 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 Paragraph 2.

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

Sl No	Item/Defect/Deficiency	Percentage (%)
a	**Carriageway/Pavement**	
I	Potholes, cracks, other surface defects	15
II	Repair 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,	20

Sl No	Item/Defect/Deficiency	Percentage (%)
	flooring, parapets, wearing course, footpaths, any damage to foundations	
II	Any Defects in superstructures, bearings and sub-structures	10
III	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers.	5
d	**Roadside drains**	
I	Cleaning and repair of drains	5
e	**Road Furniture**	
I	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones.	5
f	**Miscellaneous Items**	
I	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10
II	Any other Defects in accordance with paragraph 1.	5
g	**Defects in Other Project Facilities**	5

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

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 kilometre, the non-conforming length shall be taken as one kilometre.

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 Engineer.

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. (the "Authority") and ..... (the "Contractor") for the **"Construction of Two Laning of Imphal – Moreh Section of NH 39 from Km 395.680 to Km 425.411 in the State of Manipur (Contract Package III) on EPC mode"**, on Engineering, Procurement, Construction (EPC) basis, and 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 Clause 18.2.

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

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 authentic literature.

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 upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

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, required thereto.

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 the Contractor.

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 Clause 10.4.

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 such report.

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 Safety Consultant.

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 Clause 12.4.

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 the Authority.

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. Maintenance 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 the Contractor.

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 this behalf.

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 Clause 14.5.

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 Clause 18.5.

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 InterimPayment Certificate; and

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

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's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

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 lastclaim

(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 up to the last claim:

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

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

SCHEDULE - P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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 (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences. The insurance cover shall be not less than the project cost.

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

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

4. Insurance to be in joint names

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