NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(Ministry of Road, Transport & Highways)

Government of India

Schedules

FOR

"FOUR LANING OF IMPHAL – MOREH SECTION OF NH 39 FROM KM 330+000 TO 350+000 IN THE STATE OF MANIPUR (PACKAGE I)"

Engineering, Procurement & Construction (EPC) Mode

BID DOCUMENT

Aug-2017

National Highways & Infrastructure Development Corporation Ltd
3rd Floor, PTI Building, 4-Parliament Street, New Delhi-110001

SCHEDULE – A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the **"**Four Laning of Imphal – Moreh Section of NH 39 from Km 330+000 to 350+000 in the State of Manipur (Package I)". 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 upgradation to 4-lane and is in advance stage of Implementation. Hence the project start has been considered as km 330.000. The project concerns upgrading about 20 kilometers of existing National Highway 39 in the State of Manipur which ends at Moreh (Myanmar Border) at its km 425.411. The road run through plain terrain. This project section road (Package-I) starts from Km 330+000 (near Lilong Village) to Km 350+000 (near Wangjing Village).

The topography falls under the plain 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 for agriculture in rural areas and commercial, residential, educational institutions, petrol stations and religious centers etc in built-up sections.

Traffic on this stretch of project road is of mixed type mostly with small passenger's vehicles and two wheelers. The number of commercial vehicles & passenger vehicles are very much less.

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

1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority's Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the project Highway is contemplated, the alignment plan has been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be modified.

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

Annex I
(Schedule-A)

1. Site

The Site of the [Four-Lane] Project Highway comprises the section of Imphal–Wangjing Section of NH 39 from Km 330+000 to 350+000 in the State of Manipur (Package I)

The Index Map is appended at the end of this Schedule–A.

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**	
Lilong – Wangjing				
330+000	350+000	330.000	350.000	NH-39

3. Land

The Site of the Project Highway comprises the land described below:

Sl. No.	Existing Chainage (km)		Design Chainage (km)		Length in m (Design)	Existing/Available ROW (m)	Remarks
	From	To	From	To			
1	330+000	330+150	330+000	330+150	150	As per Annexure-II of Schedule-A	No ROW available in realignment stretches of total Km as given in Para 3.3 of Annexure-1 Schedule B
2	330+150	350+000	330+150	350+000	19850		

4. Carriageway

The present carriageway width is approximately 7.00 m except few urban locations where it is 9 to 16.5 m. 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	330+000	330+150	330+000	330+150	150		The present carriageway width is approximately 7.00 m except few urban locations where it is 9 to 16.5 m. The type of the existing pavement is flexible.

5. Major Bridges

The Site includes the following Major Bridges:

S. No	Name of Bridge	Type	Existing Chainage (Km)	Width (m)	Span Arrangement (m)	Type of Structure		
						Foundation	Sub-structure	Super-structure
1	Lilong	Major	330+150	11.0	1x48.5+1x 48.5	Well	RCC Abutment Pier	PSC I Girder
2	Thoubal	Major	341+780	11.0	2x34.5	Well	RCC Abutment Pier	PSC I Girder

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

S. No	Name of Bridge	Type	Existing Chainage (km)	Width (m)	Span Arrangement (m)	Type of Structure		
						Foundation	Sub-structure	Super-structure
1	Ushoipokpi	Minor	334+330	8.5	5.6+6+5.6	Open	RCC Pier Abutment	RCC Solid Slab
2	Waithou	Minor	336+100	8.7	3X13.2	Open	RCC Pier Abutment	RCC Girder
3	Arong	Minor	344+150	8.4	3X11.0	Open	RCC Pier Abutment	RCC T Girder
4	khangabhok	Minor	347+600	8.0	2x7.0	Open	RCC Pier Abutment	RCC Solid Slab
5	Wangjing	Minor	348+150	10.6	8.8+8+8.8	Open	RCC Pier Abutment	RCC Solid Slab
6	Uningkhom Bridge	Minor	349+900	8.5	2 x 5.8	Open	RCC Pier Abutment	RCC Solid Slab

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 (m)	Type of Structure		
						Foundation	Sub-structure	Super-structure
1	-	PUP	341+875	7.5	1x5.5	Open	RCC Portal	RCC Slab

11. Culverts

The site includes the following Pipe 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)		

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	-	331+015	Pipe	2	0.9	6.50	15.0
2	-	331+800	Pipe	1	0.6	6.50	10.0
3	-	343+120	Pipe	1	0.9	6.50	13.0

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	-	334+590	Slab	1	1.8	7.5	12.0
2	-	334+765	Slab	1	1.5	7.0	11.8
3	-	334+790	Slab	1	2.0	7.0	11.8
4	-	334+820	Slab	1	1	7.0	12.0
5	-	335+005	Slab	1	1.8	7.0	12.0
6	-	335+215	Slab	1	1.8	7.0	12.0
7	-	335+430	Slab	1	1.5	7.0	12.0
8	-	335+710	Slab	1	2.0	7.0	12.0
9	-	336+000	Slab	1	2.0	7.0	12.0
10	-	336+180	Slab	1	2.0	7.0	12.0
11	-	336+330	Slab	1	2.0	7.0	12.0
12	-	336+550	Slab	1	2.0	7.0	12.0
13	-	337+100	Slab	1	2.0	7.0	12.0
14	-	337+230	Slab	1	2.0	7.0	12.0
15	-	337+450	Slab	1	6.0	7.0	9.3
16	-	338+125	Slab	1	1.8	7.0	12.0
17	-	338+250	Slab	1	1.0	7.0	12.0
18	-	338+600	Slab	1	1.0	7.0	12.0.6
19	-	338+782	Slab	1	1.0	7.0	12.0
20	-	339+050	Slab	1	1.0	7.0	12.0
21	-	339+700	Slab	1	6.0	7.0	12.0

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)		
22	-	342+360	Slab	1	1.5	14.0	26.1
23	-	343+110	Slab	1	1.8	7.0	28.4
24	-	343+410	Slab	1	1.0	7.0	29.6
25	-	343+900	Slab	1	1.0	12.0	20.7
26	-	344+960	Slab	1	2.0	7.0	12.0
27	-	345+350	Slab	1	1.0	7.0	12.0
28	-	346+050	Slab	1	2.0	7.0	12.0
29	-	346+350	Box	2	2.5	7.5	11.0
30	-	346+900	Box	1	2.1	7.5	11.5

12. Bus Shelters

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

S. No.	Road Segment	Existing Chainage (km)	Left Hand Side	Right Hand Side
1	Imphal-Wangjing	334+150		√
2		335+300		√
3		338+150		√
4		340+700		√
5		342+600	√	
6		343+800		√

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)

1	321+500	321+600	Both Side	√	
2	323+900	324+000	Both Side	√	
3	324+000	324+100	Both Side	√	
4	326+300	326+400	Both Side	√	
5	330+200	330+300	Both Side	√	
6	331+600	331+700	Both Side	√	
7	332+100	332+200	Both Side	√	
8	332+600	332+700	Both Side	√	
9	332+900	333+000	Both Side	√	
10	334+000	334+100	Both Side	√	
11	335+300	335+400	Both Side	√	

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.	Existing Chainage (Km)	Design Chainage (Km)	Type		Remarks
			'T' Junction	Cross Road both sides	
1	342+600	342+600		√	At grade

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	-	2
b)	Total No. of Railway Over/Under Bridges	-	Nil
c)	Total No. of Minor Bridges	-	6
d)	Total No. of Pipe Culverts	-	3
e)	Total No. of Slab Culverts	-	28
f)	Total No. of Box Culverts	-	2
g)	Total No. of Flyovers	-	Nil
h)	Level Crossings	-	Nil
i)	Pedestrian Underpass	-	1
j)	Built Up Locations		

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

S. No	Existing Chainage (Km)		Length (m)	Name of the Village/Town
	Start	End		
1	330+000	332+400	2400	Lilong bazar
2	333+000	333+600	600	Lilong Hangamthobi
3	334+100	334+400	300	Ushopokpi
4	335+000	335+300	300	Sangomsang
5	335+900	336+200	300	Waiythou
6	338+000	343+100	5100	Thoubal Town
7	344+200	345+300	300	Khangabok
8	346+000	346+400	400	Wangbal
9	347+800	348+700	900	Wangjing

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	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
1	330+000	330+600	600	45	60 m wide for construction work	At appointed date or Within 90 days after the appointed Date as per clause 8.2 of DCA
2	330+600	332+300	1700	41.5		
3	332+300	332+800	500	45		
4	332+800	333+200	400	41.5		
5	333+200	334+000	800	45		
6	334+000	334+300	300	41.5		
7	334+300	338+400	4100	45		
8	338+400	339+850	1450	41.5		
9	339+850	340+700	850	45		
10	340+700	342+240	1540	41.5		
11	342+240	343+600	1360	45		
12	343+600	345+100	1500	41.5		
13	345+100	345+600	500	45		
14	345+600	346+000	400	41.5		
15	346+000	350+000	4000	45		

Annex-III

(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway shall be modified as per the enclosed alignment plan.
ENCLOSED

Annex-IV

(Schedule-A)

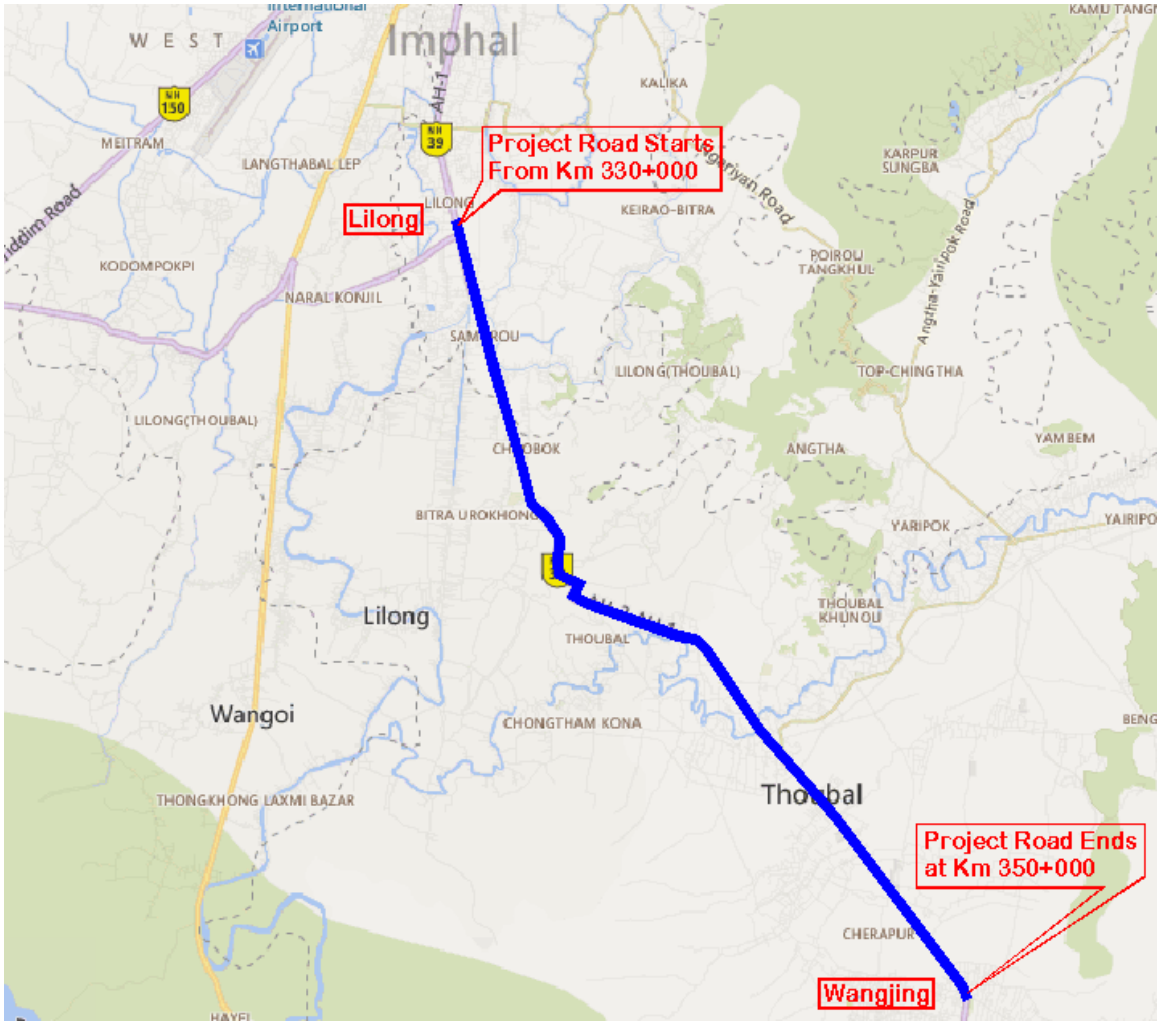
Environmental Clearances

The project highway does not require environment clearance as per MoEF circular dated 22.08.2013.

In addition, the stage-I. clearance is applied online dated 12.08.2016 which is likely to be received shortly. The Money will be deposited with MoEF for final approval on receipt of stage-I clearance. Temporary working provision will be ensured before appointed date. All conditions imposed by MoEF while issuing the approval in principle (AIP) and final forest clearance (FC) to be adhered during construction stage and after construction stage are to be complied with.

The muck dumping sites in forest area stand identified and freezed by forest department to be abided by agency during dumping of muck as stated in Schedule F.

INDEX MAP OF PROJECT HIGHWAY SECTIONS



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 Four Laning with Paved Shoulder

Four Laning shall include construction of flexible pavement 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)

Four Laning of Imphal – Moreh Section of NH 39 from Km 330+000 to 350+000 in the State of Manipur (Package I).

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 4-Lane Carriageway starts from Km 330+000 to Km 350+000. The paved carriageway shall be 17.5m (2x7m + 2x1.5m paved shoulder + 2x0.25 shyness) for 4-Lane in accordance with the typical cross section drawings, except in the areas mentioned in the table below where paved carriageway shall be 18.5m (2x7m + 2x2.0m paved shoulder + 2x0.25 shyness). The width of carriageway in open country, built up areas and approaches of grade separated structures shall be as per the Manual (IRC SP 84:2014) (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	Lilong Bazar	330+600	332+300	1700	4
2	Lilong Hangamthobi	332+800	333+200	400	4
3	Ushopokpi	334+000	334+300	300	4
4	Toubal	338+400	339+850	1450	4
5	Toubal	340+700	342+240	1540	4
6	Toubal	343+600	345+100	1500	7
7	Wangbal	345+600	346+000	400	7

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:

S. No.	From	To	Type of Deficiency	Remarks
1	333+820	333+850	Sharp Existing Curvature	
2	334+070	334+100	Sharp Existing Curvature	
3	334+340	334+380	Sharp Existing Curvature	
4	334+670	334+960	Sharp Existing Curvature	
5	334+960	335+180	Sharp Existing Curvature	
6	335+180	335+460	Sharp Existing Curvature	
7	335+460	335+980	Sharp Existing Curvature	
8	335+980	336+270	Sharp Existing Curvature	
9	336+550	336+790	Sharp Existing Curvature	
10	336+790	337+170	Sharp Existing Curvature	
11	337+320	337+420	Sharp Existing Curvature	
12	338+170	338+220	Sharp Existing Curvature	
13	338+390	338+450	Sharp Existing Curvature	
14	338+690	338+720	Sharp Existing Curvature	
15	339+080	339+260	Sharp Existing Curvature	
16	339+330	339+480	Sharp Existing Curvature	
17	339+480	339+620	Sharp Existing Curvature	

S. No.	From	To	Type of Deficiency	Remarks
18	339+620	339+820	Sharp Existing Curvature	
19	340+360	340+390	Sharp Existing Curvature	
20	340+500	340+530	Sharp Existing Curvature	
21	340+950	340+990	Sharp Existing Curvature	
22	341+440	341+600	Sharp Existing Curvature	
23	341+690	341+830	Sharp Existing Curvature	
24	341+930	342+160	Sharp Existing Curvature	
25	342+160	342+360	Sharp Existing Curvature	
26	342+460	342+610	Sharp Existing Curvature	
27	343+420	343+450	Sharp Existing Curvature	
28	343+740	343+780	Sharp Existing Curvature	
29	344+020	344+150	Sharp Existing Curvature	

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.	330+000	350+000	20	45.00 to 60.00

3.4.1 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

The Shoulders along the project shall be made in accordance with clause 2.6.1 of the Four lane Manual (IRC: SP 84:2014):

S. No	Built-up Town	Design Chainage (Km)		Length (m)	TCS Type
		From	To		
1	Lilong Bazar	330+600	332+300	1700	4
2	Lilong Hangamthobi	332+800	333+200	400	4
3	Ushopokpi	334+000	334+300	300	4
4	Toubal	338+400	339+850	1450	4
5	Toubal	340+700	342+240	1540	4
6	Toubal	343+600	345+100	1500	7
7	Wangbal	345+600	346+000	400	7

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
1	342+535	18.0	

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			
1	Lilong Bazar	330+600	332+300	Both Side	1700	4
2	Lilong Hangamthobi	332+800	333+200	Both Side	400	4
3	Ushopokpi	334+000	334+300	Both Side	300	4
4	Toubal	338+400	339+850	Both Side	1450	4
5	Toubal	340+700	342+240	Both Side	1540	4

S. No	Built-up Town	Design Chainage (Km)		Side	Length (m)	TCS Type
		From	To			
6	VUP Approach	342+240	342+930	Both Side	690	5

2.9 Grade Separated Structures

2.9.1 Grade separated structures shall be provided as per section 3 of the Four Lane Manual (IRC: SP 84:2014).

Sl No.	Location of Structure	Number and Length of Spans (m)	Remarks, if any
1	342+535	1x20	T-Junction

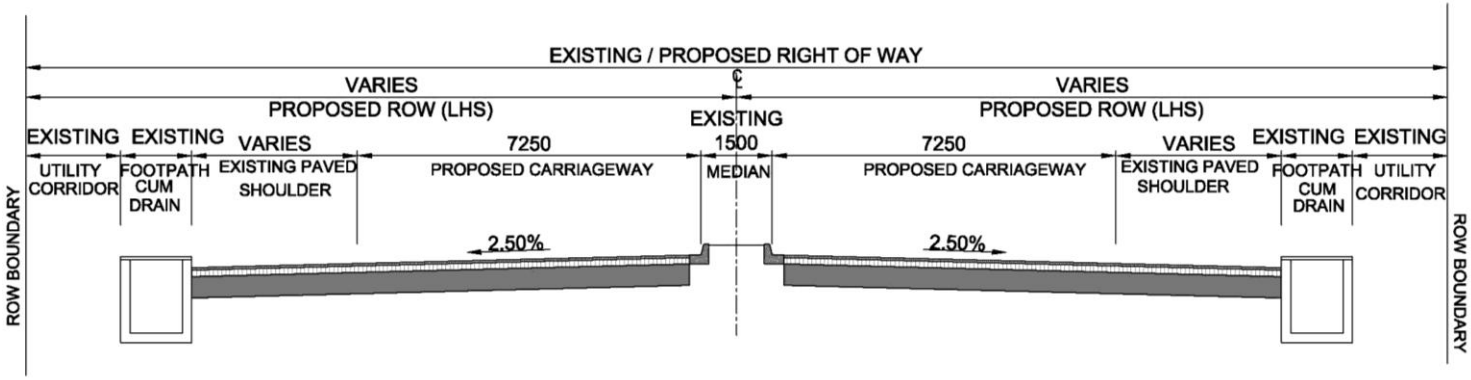
2.10 Cattle and pedestrian underpass / Overpass

Cattle and pedestrian underpass/overpass are to be designed as per the manual (IRC: SP: 84-2014):

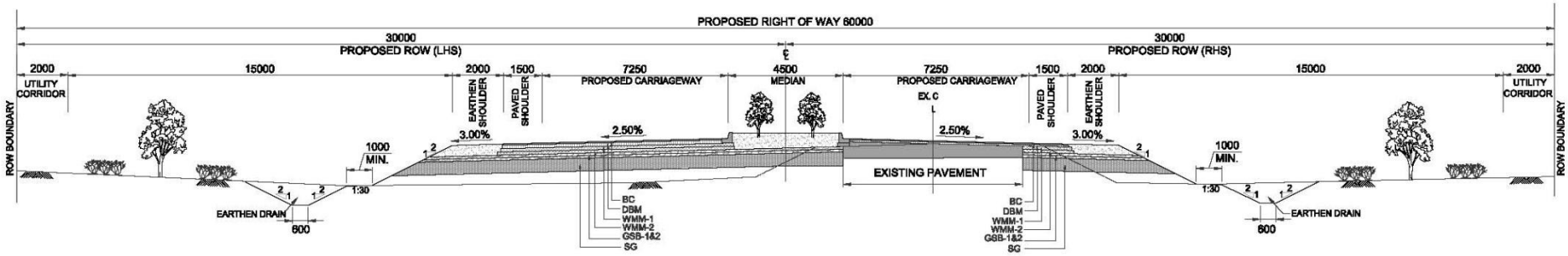
Sl No.	Location	Type of Crossing
1	341+910	-

2.11 Typical cross-sections of the Project Highway

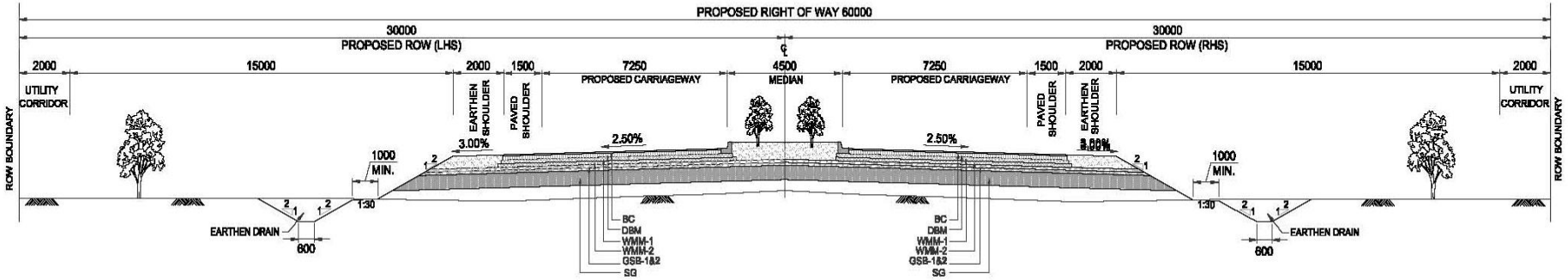
Approximate cross section type (tentative) suitable at various chainages of project highway is as shown below:



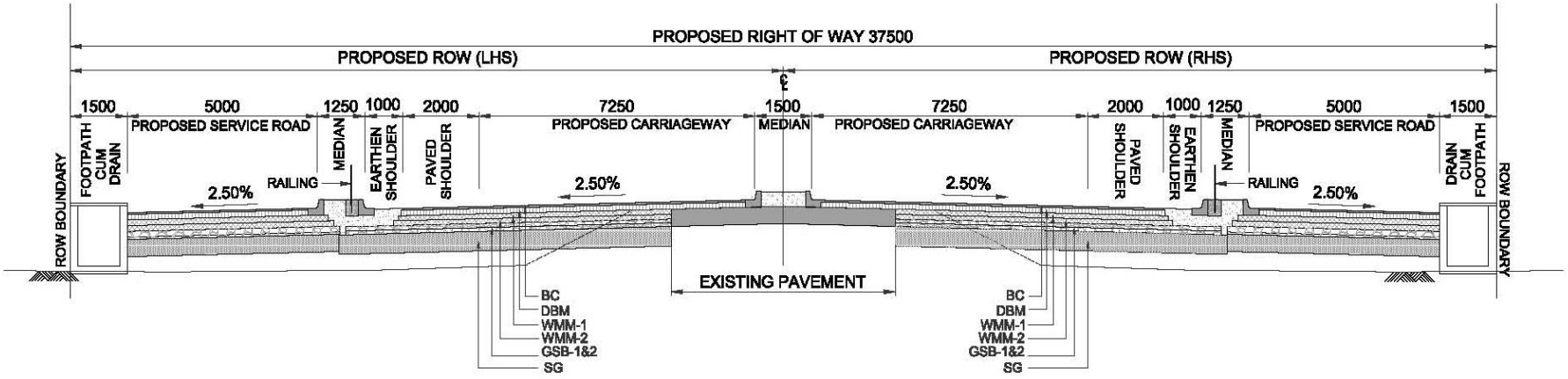
TCS 1- Concentrci Widening in Built-Up Areas – Four Lane Carriageway



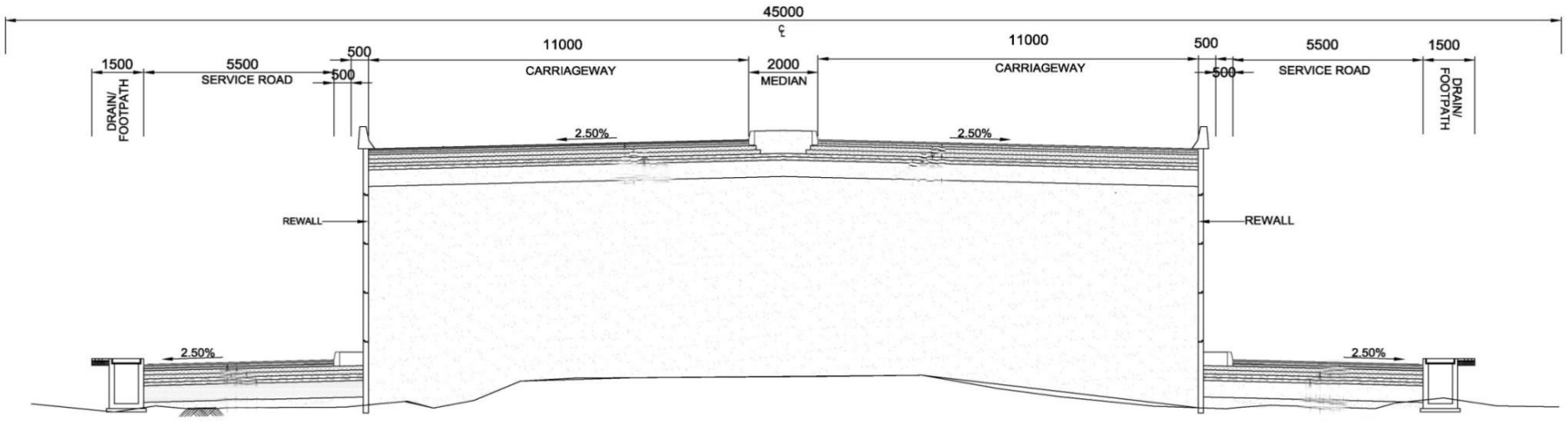
TCS 2- Eccentric Widening in Rural areas – Four Lane Carriageway



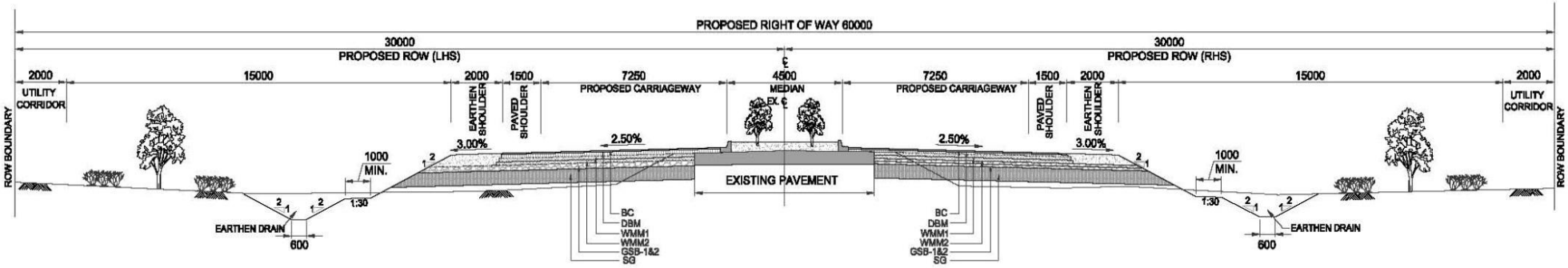
TCS 3- New/Reconstruction in Rural areas – Four Lane Carriageway



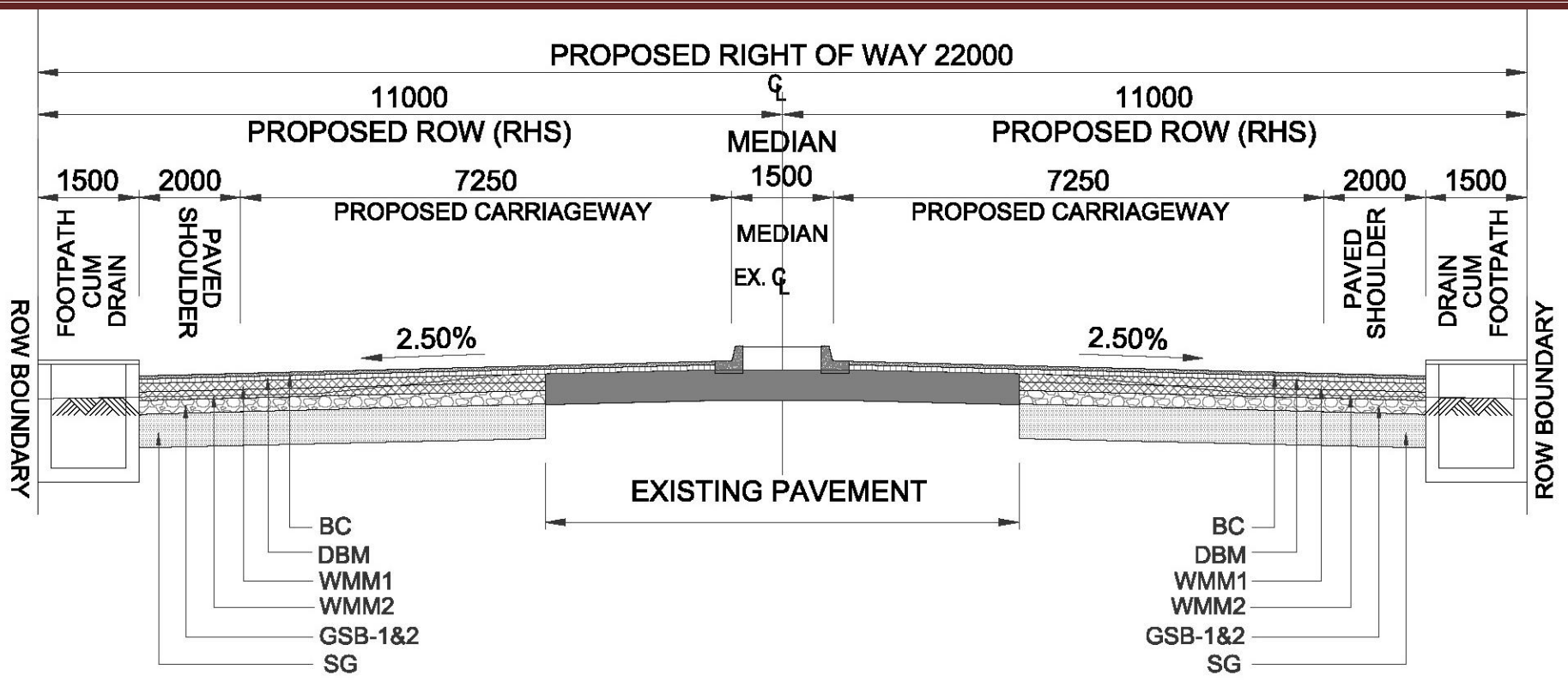
TCS 4 - Concentric Widening for Four lane in Urban/Built-up with Service Road



TCS 5- Typical Cross section for VUP Approach with Service Road



TCS 6- Concentric Widening for Four lane in Rural Area (Plain Terrain)



TCS 7- Concentric Widening for Four lane in Built Up Area (Plain Terrain)

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:

S. No	Design Chainage (m)		Length (m)	TCS Type	Type of Widening
	From	To			
1	330000	330600	600	2	Eccentric
2	330600	332300	1700	4	Concentric
3	332300	332800	500	6	Concentric
4	332800	333200	400	4	Concentric
5	333200	334000	800	6	Concentric
6	334000	334300	300	4	Concentric
7	334300	334700	400	2	Eccentric
8	334700	335060	360	3	New Construction
9	335060	335300	240	6	Concentric
10	335300	335700	400	2	Eccentric
11	335700	336100	400	3	New Construction
12	336100	336600	500	2	Eccentric
13	336600	337560	960	3	New Construction
14	337560	338400	840	6	Concentric
15	338400	339850	1450	4	Concentric
16	339850	340700	850	6	Concentric
17	340700	342240	1540	4	Concentric

S. No	Design Chainage (m)		Length (m)	TCS Type	Type of Widening
	From	To			
18	342240	342930	690	5	Concentric (VUP)
19	342930	343100	170	6	Concentric
20	343100	343600	500	6	Concentric
21	343600	345100	1500	7	Concentric
22	345100	345600	500	6	Concentric
23	345600	346000	400	7	Concentric
24	346000	350000	4000	6	Concentric

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.	Location of Intersection; Existing Chainage (Km)	Proposed Chainage (Km)	Type of Intersection	Other Features
Nil				

Details of junction improvements shall be as per IRC SP: 84-2014.

(b) Minor Intersections

S. No	Existing Chainage (Km)	Type	Type of junction
1	322+900	At-Grade	Y
2	328+600	At-Grade	T
3	331+450	At-Grade	T
4	333+050	At-Grade	T
5	334+200	At-Grade	T
6	348+550	At-Grade	Y

Details of junction improvements shall be as per IRC SP: 84-2014.

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			
1	330+000	334+300	**4.3**	**1m**	
2	343+300	344+300	**1**		
3	345+500	347+500	**2**		
4	349+000	350+000	**1**		

* 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-84:2014. 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
330+000	341+900	25
341+900	350+000	20

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 20 year design life**	**CBR, %**	**Design Thickness, mm**			
			GSB	**WMM**	**DBM**	**BC**
25	Lilong to Wangjing	7	**230**	**250**	**100**	**40**

6 HIGHWAY DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual. RCC covered drain shall be provided at the following stretches of built up areas:

S. No	Built-up Town	Design Chainage (Km)		RCC with Cover Slab Side	Length (m)	TCS Type
		From	To			
1	Lilong Bazar	330+600	332+300	Both Side	1700	4
2	Lilong Hangamthobi	332+800	333+200	Both Side	400	4
3	Ushopokpi	334+000	334+300	Both Side	300	4
4	Toubal	338+400	339+850	Both Side	1450	4
5	Toubal	340+700	342+240	Both Side	1540	4
6	VUP Approach	342+240	342+960	Both Side	720	5
7	Toubal	343+600	345+100	Both Side	1500	7
8	Wangbal	345+600	346+000	Both Side	400	7

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 **2 major bridges** (span>=60m), **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.

7.2 Culverts

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

S. No	Existing Chainage (km)	Design Chainage (km)	Existing		Recommendation	Proposed	
			Type	Dia. (m)		Type	Dia. (m)

1	331+015	331+466	Pipe	2 x 0.9	Reconstruction	Pipe	2 x 1.20
2	331+800	332+183	Pipe	1 x 0.6	Reconstruction	Pipe	1 x 1.20
3	343+120	343+154	Pipe	1 x 0.9	Reconstruction	Pipe	1 x 1.20

(ii) Reconstruction of Slab Culverts to Box Culverts

S. No	Existing Chainage (km)	Design Chainage (km)	Existing		Recommendation	Proposed	
			Type	Span (m)		Type	Span (m)
1	334+590	335+113	Slab	1x1.8x1.8	Reconstruction	Box	1x2.0x2.5
2	334+765	335+144	Slab	1x1.5x1.5	Reconstruction	Box	1x1.5x2.5
3	334+790	335+517	Slab	1x2.0x1.5	Reconstruction	Box	1x2.0x2.0
4	334+820	335+528	Slab	1x1.0x0.8	Reconstruction	Box	1x1.5 x2.0
5	335+005	335+571	Slab	1x1.8x1.5	Reconstruction	Box	1x2.0x2.0
6	335+215	335+644	Slab	1x1.8x1.5	Reconstruction	Box	1x2.0x2.0
7	335+430	335+724	Slab	1x1.5x1.0	Reconstruction	Box	1x1.5 x1.5
8	335+710	336+106	Slab	1x2.0x1.0	Reconstruction	Box	1x2.0x2.5
9	336+000	336+392	Slab	1x2.0x1.3	Reconstruction	Box	1x2.0x1.5
10	336+180	336+577	Slab	1x2.0x1.8	Reconstruction	Box	1x2.0x2.0
11	336+330	337+000	Slab	1x2.0x1.5	Reconstruction	Box	1x2.0x3.5
12	336+550	337+160	Slab	1x2.0x0.8	Reconstruction	Box	1x2.0x1.5
13	337+100	337+576	Slab	1x2.0x1.5	Reconstruction	Box	1x2.0x2.0
14	337+230	337+721	Slab	1x2.0x1.5	Reconstruction	Box	1x2.0x2.5
15	337+450	337+974	Slab	1x6.0x2.0	Reconstruction	Box	1x6.0x3.0
16	338+125	338+576	Slab	1x1.8x2.0	Reconstruction	Box	1x2.0x2.5
17	338+250	338+587	Slab	1x1.0x0.8	Reconstruction	Box	1x1.5x2.0
18	338+600	338+908	Slab	1x1.0x0.8	Reconstruction	Box	1x1.5x2.0
19	338+782	339+103	Slab	1x1.0x0.8	Reconstruction	Box	1x1.5x2.5
20	339+050	339+391	Slab	1x1.0x1.2	Reconstruction	Box	1x1.5x1.5

S. No	Existing Chainage (km)	Design Chainage (km)	Existing		Recommendation	Proposed	
			Type	Span (m)		Type	Span (m)
21	339+700	340+376	Slab	1x6.0x3.5	Reconstruction	Box	1x6.0x3.5
22	342+360	342+564	Slab	1x1.5x1.5	Reconstruction	Box	1x1.5x2.0
23	343+110	343+131	Slab	1x1.8x1.5	Reconstruction	Box	1x2.0x2.5
24	343+410	343+343	Slab	1x1.0x1.5	Reconstruction	Box	1x1.5x3.0
25	343+900	343+949	Slab	1x1.0x1.5	Reconstruction	Box	1x1.5x2.0
26	344+960	345+097	Slab	1x2.0x1.5	Reconstruction	Box	1x2.0x2.0
27	345+350	345+515	Slab	1x1.0x1.5	Reconstruction	Box	1x1.5 x2.0
28	346+050	346+267	Slab	1x2.0x1.2	Reconstruction	Box	1x2.0x2.0
29	346+350	346+492	Box	1x2.1x1.3	Reconstruction	Box	1x2.5x2.0
30	346+900	346+729	Box	1x2.5x1.2	Reconstruction	Box	1x2.5x2.0

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

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

Sl. No.	Existing Chainage (km)	Design Chainage (km)	Proposal	Span (m)
Nil				

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

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
1	Waithou	Minor	336+100	336+289	RCC -T Girder with Open Foundation	2 x 20.0	1 x 12.0	2 Lane in 4 Lane section
2	Wangjing	Minor	348+150	348+475	RCC Portal with Open Foundation	3 x 9.0	1 x 12.0	2 Lane in 4 Lane section

Note: Extra widening shall be provided over structures falling on curves with radius less than 300m. Median gap of 3.5m shall be provided between the bridges in 4 lane section.

7.3.2 The following structures shall be provided with footpaths:

S. No	Location at Km
1	330+380
2	334+640
3	336+289
4	341+857
5	344+240 (MNB)
6	347+900 (MNB)
7	348+475 (MNB)
8	349+878 (MNB)

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
1	Ushoipokpi	Minor	334+330	334+640	RCC -T Girder with Pile Foundation	1 x 18.0	1 x 12.0	2 Lane in 4 Lane section
2	Waithou	Minor	336+100	336+289	RCC -T Girder with Open Foundation	2 x 20.0	1 x 12.0	2 Lane in 4 Lane section
3	Arong	Minor	344+150	344+240	PSC Girder with Pile Foundation	1 x 33.0	1 x 12.0	2 Lane in 4 Lane section
4	Khangabhok	Minor	347+600	347+900	RCC Portal with Open Foundation	2 x 7.0	1 x 12.0	2 Lane in 4 Lane section
5	Wangjing	Minor	348+150	348+475	RCC Portal with Open Foundation	3 x 9.0	1 x 12.0	2 Lane in 4 Lane section
6	Uningkhom	Minor	349+900	349+878	RCC Box	2 x 5.8	1 x 12.0	2 Lane in 4 Lane section

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
1	330+380	2x48.5	New 2 Lane
2	341+857	2x34.5	New 2 Lane

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

Sl No.	Location (km)	Remarks
Provided under Clause 7.6		

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

Sl No.	Location (km)	Remarks
Provided under Clause 7.6		

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)
1	342+535	-	New 4 Lane	RCC T Girder with Pile Foundation	1 x 20m	2 x 12.0

Note: Extra widening shall be provided for structures falling on curves with radius less than 300m. Median gap of 3.5m shall be provided between the structures in 4 lane section.

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)
1	341+910	-	Reconstruction 2L + New 2 L	RCC Box	1 x 5.5 x 2.5	2 x 12.0

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	
1	Lilong	330+150	330+380	2 x 48.5	Well	RCC Abutment & Circular Pier	PSC Girder	• Wearing course shall be replaced. • Damaged Parapet / Railing shall be replaced. • Expansion joints shall be cleaned and damaged joints shall be replaced. • Missing or damaged drainage spouts with gratings & down-take pipe shall be replaced. • Spalling of concrete shall be repaired with epoxy grouting • Bearings shall be cleaned and damaged bearings shall be replaced. • Quadrant embankment slopes shall be maintained.

2	Toubal	341+780	341+857	2 x 34.5	Well	RCC Abutment & Circular Pier	PSC Girder	• Wearing course shall be replaced. • Damaged Parapet / Railing shall be replaced. • Expansion joints shall be cleaned and damaged joints shall be replaced. • Missing or damaged drainage spouts with gratings & down-take pipe shall be replaced. • Spalling of concrete shall be repaired with epoxy grouting • Bearings shall be cleaned and damaged bearings shall be replaced. • Quadrant embankment slopes shall be maintained.

B. 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
					Founda-tion	Sub-structure	Super-structure	
1	Ushoipokpi	334+330	334+640	5.6+6+5.6	Open	RCC Wall Type Abutment& pier	RCC Solid Slab	• Wearing course, Crash barrier / Kerb + Railing, Expansion joints and Drainage spouts with gratings & down-take pipe shall be newly constructed after constructing the widened portion of the of bridge. • Spalling of concrete shall be repaired with epoxy grouting
2	Arong Bridge	344+150	344+240	3x11.0	Open	RCC Wall Type Abutment & pier	RCC T Girder	• Wearing course, Crash barrier with Kerb + Railing, Expansion joints and Drainage spouts with gratings & down-take pipe shall be newly constructed after constructing the widened portion of the of bridge. • Spalling of concrete shall be repaired with epoxy grouting.

S. No	Name of Existing Bridge	Existing Chainage (Km)	Design Chainage (km)	Span Arrangement No x Span (m)	Type of Structure			Details of Rehabilitation
					Founda-tion	Sub-structure	Super-structure	
3	Khangabhok	347+600	347+900	2x7.0	Open	RCC Wall Type Abutment & pier	RCC Solid Slab	• Wearing course, Crash barrier with Kerb + Railing, Expansion joints and Drainage spouts with gratings & down-take pipe shall be newly constructed after constructing the widened portion of the of bridge. • Spalling of concrete shall be repaired with epoxy grouting
4	Uningkhom Bridge	349+900	349+878	2X5.8	Open	RCC Wall Type Abutment & pier	RCC solid slab	• Wearing course, Crash barrier with Kerb + Railing, Expansion joints and Drainage spouts with gratings & down-take pipe shall be newly constructed after constructing the widened portion of the of bridge. • Spalling of concrete shall be repaired with epoxy grouting.

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

Sl No.	Bridge at km	Span Arrangement	Remarks
1	330+380	2x48.5	New 2 Lane
2	341+857	2x34.5	New 2 Lane

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		
342+010	342+810	800	VUP

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.	8
KM Stone#	No.	32
Hectometer Stone#	No.	160
Providing and fixing of PCC M-15 Boundary Pillar@ every 20 m on both sides	No.	800
Centre line & Edge Line at Paved Shoulder marking	sqm	18070.27
Painting lines, Dashes, Arrows etc.(over 10cm & upto 10cm width)	sqm	99
90cm equilateral triangle	No	105
60cm equilateral triangle	No	20
Speed limit, 60cm circular	No	35
80 mm x 60 mm rectangular	No	5
60 mm x 45 mm rectangular	No	4
60 mm x 60 mm square	No	3
Stop sign,90cm high octagon	No	8
Other Sign Boards (different sizes)	No	
Direction and place identification signs upto 0.9 sqm size board	Sqm	6.75
Direction and place identification signs more than 0.9 sqm size board	Sqm	16.20
Metal beam crash barrier single faced both side	m	2216
Road Marker	No	17

Retro – reflectorised Traffic Signages, Road Marking and other appurtenances	**unit**	**Minimum Provision**
Overhead Gantry Sign Board	No	2
Providing and Laying NP-4 pipes of 1000 mm dia for utility culverts at junctions complete as per drawing and Technical Specifications Section 2900 and IRC: SP 13 – 1973.	m	96
Providing and Fixing MS railing for traffic islands/ horizontal curves on high embankments including foundation concrete and painting with approved paint etc., all complete as per drawing and Technical Specification Sections 300, 1500, 1700 and 1900.	m	13780
Providing and Fixing road delineators, Raised pavement markers etc. complete as per drawing and Technical Specifications Clause 805, 812, 813 and as directed by Engineer.		
a) Hazard Markers	No	20
b) Object Markers	No	20
c) Raised pavement markers (Road studs)	No	976
d) Crash barrier indicators	No	132

[#] The marking of all stones will be done considering total length of bypass i.e 35.008 Km on the directions of NHIDCL

10 COMPULSORY AFFORESTATION

[Refer to Section 11 of the Manual and specify the number of trees which are required to be planted by the Contractor as compensatory afforestation.]

11 HAZARDOUS LOCATIONS

Crash Barrier shall be provided in accordance with clause 9.7 of the Manual.

i) Metal Beam crash barrier (Single runner, heavy duty and W-shape) /Wire rope safety barrier length of 10818 m shall be provided at the locations of bridge approaches and high embankments (3.0m and more) on both sides. Heavy duty metal beam crash barriers shall be provided on this project by the Construction Contractor at the locations finalized in consultation with NHIDCL. Typical details of metal crash barrier are given in as per manual.

ii) Reinforced Cement Concrete crash barrier length of 2534 m shall be provided at the locations of Service Road. RCC crash barriers shall be provided on this project by the Contractor at the locations finalized in consultation with NHIDCL. Typical details of RCC crash barrier are given in as per manual.

12 SPECIAL REQUIREMENT FOR HILL ROADS

In accordance with section 13 of the manual (from IRC : SP : 84-2014), 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:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
1. Parapet Wall/ Toe Wall	Rm	NIL
2.Breast wall with PCC	Rm	NIL
3. Breast wall sausage type by gabion/ Specialized treatment for slide protection as specified above-	Rm	NIL
4. Retaining Wall with PCC	Rm	NIL
5. Catch water drain	Rm	NIL
6. Providing and Laying of Turfing on embankment slopes and on median islands with green grass sods as per Technical Specification Clause No. 307	sqm	1,00,623

(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 consultant and 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 9.8 of IRC:84:2014)

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: - As per Manual

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

1.1 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 9.8 / 12.2 of the 2 Lane / 4 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

Approx. Design Chainage	Truck Lay-bye
337+800	1

Note: The location may be suitably modified as per the site condition and as decided by Authority / Authority Engineer.

(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	330+850	Lilong Bazar	Both Sides
2	338+950	Lilong Hangamathobi	Both Sides
3	342+525	Thoubal	Both Sides
4	345+750	Khangabok	Both Sides*
5	348+625	Wangjngiom Village	Both Sides*

Note: * refer IRC SP-84:2014.

(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.

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.

(i) Crane Services

Nil

(j) Others

(i) Highway Lighting

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

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

(ab) 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-84-2014) 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 Four laning of Highways (IRC: SP-84-2014), 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.

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

[Note 1: Deviations from the aforesaid Specifications and Standards shall be listed out here. Such deviations shall be specified only if they are considered essential in view of project-specific requirements].

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 &**

Sl. No.	Clause No.	Description	Deviation
			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 intermediate sight distance should be available throughout.	Stopping sight distance shall be provided as a minimum, where ever 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 in Schedule 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 and Fig 7.2 & 7.4A & 7.4B of 4 Lane Manual	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
IX	Removal of debris, dead animals	6 hours
b	**Granular earth shoulders, side**	

Nature of Defects or deficiency		Time limit for repair/rectification
	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 marking**	

Nature of Defects or deficiency		Time limit for repair/rectification
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
IV	Trees and bushes requiring replacement	30 (thirty) days
V	Removal of vegetation affecting	15 (fifteen) days

Nature of Defects or deficiency		Time limit for repair/rectification
	sight line and road structures	
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**	
I	Any damage, cracks, spalling/scaling Temporary measures Permanent measures	 within 48 hours within 15 (fifteen) days or as specified by

Nature of Defects or deficiency		Time limit for repair/rectification
		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 joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
III	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing

Nature of Defects or deficiency		Time limit for repair/rectification
		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 the State Government for extraction of boulders from quarry;

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

(c) License for use of explosives;

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

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

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

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

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

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

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

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

3.0 Muck dumping locations in forest area to be freezed in consultation with the forest department, the necessary certfications from local competent forest department is to be submitted.

SCHEDULE - G

(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I
(See 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 **"Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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.

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

12. This guarantee is subject to the Uniform Rules for Demand Gurantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

13. 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.

14. 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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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, Minor Bridges, Underpasses, Overpasses, Approaches to ROB / RUB / Major Bridges/ Structures (but excluding service roads)	62.00	**A- Widening and strengthening of existing road**	
		(1) Earthwork up to top of the sub-grade	6.48
		(2) Granular work (Sub base, Base, Shoulders)	30.35
		(3) Dense Bituminous Macadam	21.80 9.84
		(4) Bituminous Concrete	0.00
		(5) Widening and repair of culverts	1.59
		(6) Widening and repair of Minor bridges	
		B- New 2-lane realignment / bypass	
			0.31
		(1) Earthwork up to top of the sub-grade	3.19
		(2) Granular work (Sub base, Base, Shoulders)	2.05
		(3) Dense Bituminous Macadam	0.93 0.00
		(4) Bituminous Concrete	
		(5) CC Pavement	

		C- New Culverts, Minor Bridges, Underpasses, Overpasses on Existing Road, Realignments, Bypasses:	6.90 13.83
		(1) Culverts	0.00
		(2) Minor bridges	0.50
		(3) Cattle Underpasses	
		(4) Pedestrian Underpasses	2.24
		(5) Grade Separated Structures	0.00
		(a) Underpasses	
		(b) Overpasses	
Major Bridge works and ROB / RUB	7.60	**A- Widening and repairs of Major Bridges**	
		(1) Foundation	0.00
		(2) Sub-structure	0.00
		(3) Super-structure (including crash barriers etc. complete)	0.00
		(4) Approaches (excluding Retaining Wall)	0.00
		(5) Retaining Wall	0.00
		B- Widening and repair of	
		(a) ROB & (b) RUB	
		(1) Foundation	0.00
		(2) Sub-structure	0.00
		(3) Super-structure (including crash barriers etc. complete)	0.00
		(4) Approaches (excluding Reinforced Earth Wall)	0.00
		(5) Reinforced Earth Wall	0.00
		C- New Major Bridges	
		(1) Foundation	50.22
		(2) Sub-structure	7.53
		(3) Super-structure (including crash barriers etc. complete)	32.43
		(4) Approaches (excluding Retaining Wall)	9.92

		(5) Retaining Wall **D- New rail-road bridges** (a) ROB & (b) RUB (1) Foundation (2) Sub-structure (3) Super-structure (including crash barriers etc. complete) (4) Approaches (excluding Reinforced Earth Wall) (5) Reinforced Earth Wall	0.00 0.00 0.00 0.00 0.00 0.00
Structures (Elevated Sections, Reinforced Earth)	1.50	(1) Foundation (2) Sub-structure (3) Super-structure (including crash barriers etc. complete) 4) Approaches (excluding Reinforced Earth Wall) (5) Reinforced Earth Wall	0.00 0.00 0.00 0.00 100.00
Other works	28.90	(i) Service roads (ii) Toll Plaza (iii) Road side drains (iv) Road signs, markings, km stones, safety devices, (v) Project facilities (vi) Repairs to bridges/structures a) Providing wearing coat b) Replacement of bearings, joints c) Providing crash barriers d) Other items (vii) Road side plantation (viii) Repair of protection works (ix) Safety & traffic management during construction * (x) Retaining wall (xi) Miscellaneous	20.57 0.00 20.44 16.72 11.53 1.96 2.29 0.98 1.31 0.00 0.00 1.48 10.37 12.35

* The above list is illustrative and may require modification as per the scope of the work.

1.3 Procedure of estimating the value of work done

1.3.1 Road works including approaches to minor bridges, Major Bridges and Structures (excluding service roads).

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		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length. @
(1) Earthwork up to top of the sub-grade	6.48	
(2) Granular work (subbase, base, shoulders)	30.35	
(3) Dense Bituminous Macadam	21.80	
(4) Bituminous Concrete	9.84	
(5) Widening and repair of culverts	0.00	Cost of ten completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of ten culverts.
(6) Widening and repair of minor bridges	1.59	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of a minor bridge.
B New 2-lane realignment, bypass		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.
(1) Earthwork up to top of the sub-grade	0.31	
(2) Granular work (subbase, base, shoulders)	3.19	
(3) Dense Bituminous	2.05	

Macadam		
(4) Bituminous Concrete	0.93	
(5) CC Pavement	0.00	
C New Culverts, Minor bridges on existing road, realignments, bypasses:		
(1) Culverts	6.90	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.
(2) Minor bridges	13.83	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of a minor bridge
Cattle / Pedestrian Underpasses	0.00	Cost of each Cattle / Pedestrian Underpass or Overpasses shall be determined on pro rata basis with respect to the total number of Cattle / Pedestrian Underpasses or Overpasses. Payment shall be made on the completion of the number of Cattle/Pedestrian Underpasses or Overpasses specified below: Total No: Stage for Payment: (i) 1 to 5 - on completion of all, (ii) 6 or more - on completion of five
Pedestrian Overpasses	0.50	Same as for (3) above
(5) Grade Separated Structures		

(a) Underpasses	2.24	Same as for (3) above
(b) Overpasses	0.00	Same as for (3) above

@. 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 weight age for road work x weight age 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.

1.3.2 Major Bridge works and ROB/RUB.

Procedure for estimating the value of Major Bridge works and of ROB/RUB shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A Widening and repairs of Major Bridges		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls	0.00	Cost of each Major Bridge:
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap wing walls, return walls, guide bunds, if any.	0.00	(Widening and repairs) shall be determined on pro-rata basis with respect to the total linear length (m) of the Major Bridges (widening and repairs).
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on	0.00	Payment shall be made on completion of each stage of a Major Bridge as per the weight age given in this table.

completion etc., bridge complete in all respects and fit for use.	0.00	
(4) Approaches : On completion of approaches (excluding retaining wall if any), filter media etc., and complete in all respects & fit for use	0.00	
(5) Retaining Wall : On completion of retaining wall if any in the approaches in all respects		
B Widening and repairs of **(a) ROB & (b) RUB**		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls	0.00	
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap wing walls, return walls, guide bunds, if any.	0.00	
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., bridge complete in all respects and fit for use.	0.00	Cost of each ROB/RUB (widening and repairs) shall be determined on prorate basis with respect to the total linear length (m) of the ROB/RUB (widening and repairs). Payment shall be made on completion of an ROB/RUB
(4) Approaches : On completion of approaches (excluding retaining wall if any), filter	0.00	

media etc., and complete in all respects & fit for use (5) Reinforced Earth Wall : On completion of Reinforced Earth Wall if any in the approaches in all respects	0.00	
C New Major Bridges (1) Foundation: On completion of the foundation work including foundations for wing and return walls (2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap wing walls, return walls, guide bunds, if any. (3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., bridge complete in all respects and fit for use. (4) Approaches : On completion of approaches (excluding retaining wall if any), filter media etc., and complete in all respects & fit for use (5) Retaining Wall : On completion of retaining wall if any in the approaches in all respects	50.22 7.53 32.43 9.92 0.00	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridges. Payment shall be made on completion of each stage of a Major Bridge as per the weight age given in this table
D New Rail-road bridges		

(a) ROB & (b) RUB		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls	0.00	
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap wing walls, return walls, guide bunds, if any.	0.00	Cost of each ROB/RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/RUB. Payment shall be made on completion of each stage of ROB/RUB as per the weightage given in the table.
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, tests on completion etc., bridge complete in all respects and fit for use.	0.00	
(4) Approaches : On completion of approaches (excluding retaining wall if any), filter media etc., and complete in all respects & fit for use	0.00	
(5) Reinforced Earth Wall : On completion of Reinforced Earth Wall if any in the approaches in all respects		

1.3.3 Structures

Procedure for estimating the value of structure work shall be as stated in 1.3.3:

Table 1.3.3

Stage of payment	Weightage	Payment procedure
(1) Foundation: On completion of	0.00	Cost of each structure shall be

the foundation works including foundations for wing and return walls		determined on pro rata basis in respect to the total linear length (m) of all the structures. Payment shall be made on completion of each stage of a structure as per the weight age given in this table.
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap, wing walls & return walls if any.	0.00	
(3) Super-structure: On completion of the Structure along with super structure, including hand rails/crash barriers, tests on completion etc., elevated structure complete in all respects and fit for use.	0.00	
(4) Approaches: On completion of approaches (excluding Reinforced Earth Wall if any), filter media etc., complete in all respects and fit for use	0.00	
(5) Reinforced Earth work	100.00	Payment shall be made on pro rata basis on completion of 25 (twenty five) percent of total area.

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) Service roads	20.57	Unit of measurement is linear length in km. Cost per km shall be determined on pro rata basis with respect to the total length of the service roads. Payment shall be made for completed service road in a length of not less than 20 (twenty) percent of the total length of service roads.
(ii) 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.
(iii) Road side drains	20.44	Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10 % (ten per cent) of the total length.
(iv) Road signs, markings, km stones, safety devices,	16.72	
(v) Project Facilities a) Bus bays b) Truck lay-byes c) Rest areas d) Others	 4.24 2.28 0.00 5.01	Payment shall be made on pro rata basis for completed facilities.
(vi) Repairs to existing bridges/structures a) Providing wearing coat b) Replacement of bearing, joints c) Providing crash barriers d) Other items	 1.96 2.29 0.98 1.31	Payment shall be made on pro rata basis for completed facilities.
(vii) Roadside plantation	0.00	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length.
(viii) Repair of Protection works	0.00	
(ix) Safety and traffic management during construction	1.48	Payment shall be made on pro-rata basis every six months
(x) Retaining wall	10.37	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.

(xi) Miscellaneous	12.35	Payment shall be made on pro rata basis for completed facilities.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

2.2 Payment for Maintenance shall be made in quarterly installments in accordance with the provisions of Clause 19.7.

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 180th (one hundred and eightieth) 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 550th (Five hundred and fiftieth) 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% (Fourty per cent) of the Contract Price.

4 **Project Milestone-III**

4.1 Project Milestone-III shall occur on the date falling on the 915th (Nine hundred and fifteenth) 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 the 1095th (one thousand ninety fifth) 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) metres 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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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, flooring, parapets, wearing course, footpaths, any damage to	20

Sl No	Item/Defect/Deficiency	Percentage (%)
	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 Four Laning of Imphal – Moreh Section of NH 39 from Km 330.000 to Km 350.000 in the State of Manipur (Contract Package I) 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 Interim Payment Certificate; and

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

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 last claim

(d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

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

(f) Deductions:

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

(ii) Any amount towards deduction of taxes; and

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

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor 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.