National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

Ministry of Road Transport & Highways,
(Govt. of India)

SCHEDULES

For

"2-laning of Zorinpui - Longmasu section of NH-502A from km 0.000 to km 28.244 in the State of Mizoram on EPC mode"

October, 2022

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

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Schedules

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) Site of the two lane Project Highway shall include land, buildings, structures and road works as described in **Annex-I** of this Schedule-A**.**

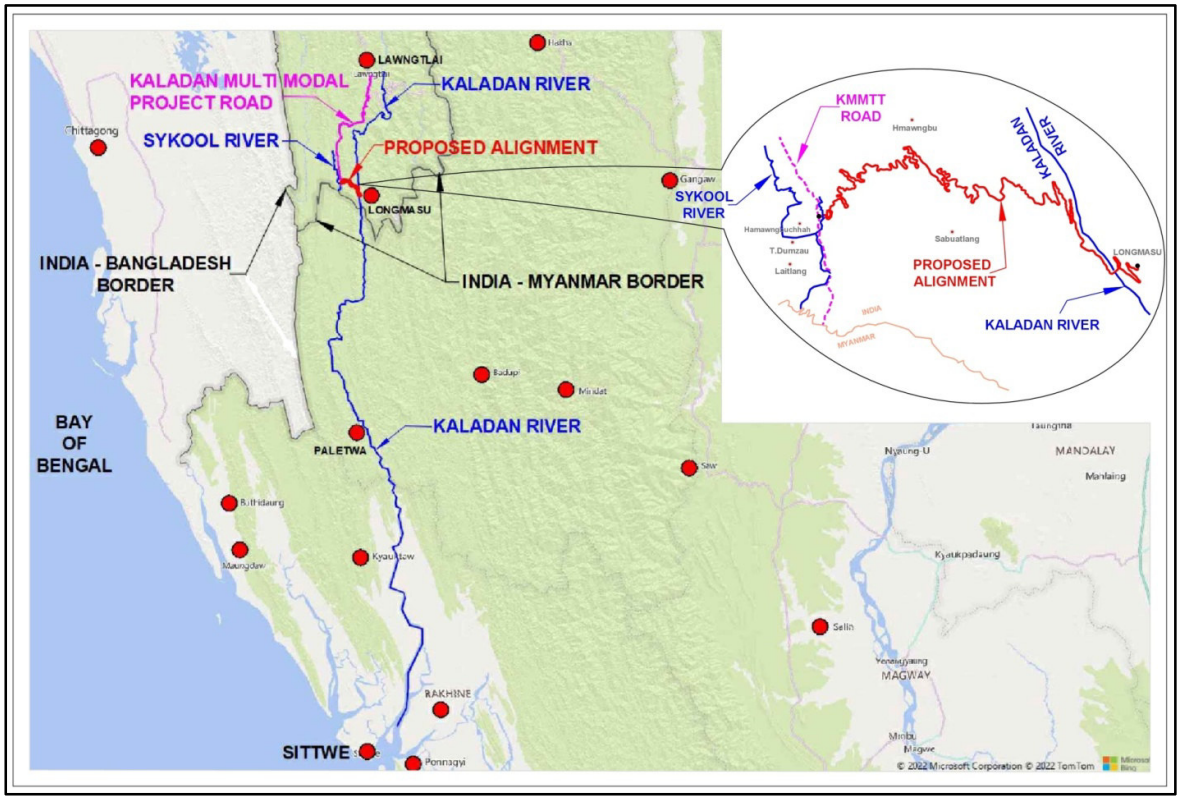
(ii) The dates of handing over the Right of Way to the Contractor are specified in **Annex-II** of this Schedule-A.

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

(iv) The alignment plans of the Project Highway are specified in **Annex-III.**

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

INDEX MAP OF PROJECT ROAD



Annex – I

(Schedule-A)

Site for the Project

1. Site

The Site of the two lane Project Highway comprises of the section of National Highway NH-502A commencing from Km 0 (from Kaladan Multi Model project near Zorinpui) to km 28.244 (Longmasu) in the State of Mizoram. The land, carriageway and structures comprising the Site are described below.

2. Land

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

S. No.	Chainage (km)		Existing Right of Way (m)	Proposed Right of Way (m)
	From	To		
Nil (Green field alignment)				

3. Carriageway

Not Applicable, as there is no existing road.

4. Major Bridges

The Site includes the following Major Bridges:

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

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

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

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

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

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

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
Nil		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

S. No.	Chainage (km)	Type of Structure	No. of Spans with span length (m)	Width (m)
Nil				

10. Culverts

The Site has the following culverts:

S. No.	Chainage (km)	Type of Culvert	Span /Opening with span length (m)	Width (m)
Nil				

11. Bus bays

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

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

12. Truck Lay byes

The details of truck lay byes are as follows:

S. No.	Chainage (km)	Length (m)	Left Hand Side	Right Hand Side
Nil				

13. Road side drains

The details of the roadside drains are as follows:

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

14. Major junctions

The details of major junctions are as follows:

S. No.	Location	At Grade	Grade Separated	Category of Cross Road			
				NH	SH	MDR	Others
Nil							

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

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Location	Type	
		T -junction	Cross road
Nil			

16. Bypasses

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
Nil			

17. Details of Existing utilities

The existing utilities are as below:

17.1 Electrical utilities

The site includes the following electrical utilities:-

(a) Extra High-Tension Lines (EHT Lines)

SL.	Chainage		Length (in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
Nil										

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

SL.	Chainage		No of poles affected			Transformers	
	From	To	33KV	11KV	LT	No	Capacity
1.	Km 0+000	Km 28+244	Nil	Nil	7	Nil	

17.2 Public Health utilities (Water/Sewage Pipelines)

(a) The site includes the following Public Health utilities:-

S. No	Chainage		Length (in Km)
	From	To	Water Supply line
1.	26+500	28+244	1.744

(b) Bore well/Hand Pump within RoW – **Nil**

(c) Water Tank within RoW - **Nil**

17.3 Any Other Lines: **No**

18. Other Structures: **NIL**

Annex – II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl. No	Existing Chainage (km)		Length in km	Existing ROW	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To				
(i) 90% of Right of Way (full width)	Km 0.000	Km 28.244	25.420	Nil	24/30/40	on Appointed Date
(ii) Balance Right of Way (width)	Km 0.000	Km 28.244	2.824	Nil	24/30	Within 150 days after the Appointed Date

Annex - III

(Schedule-A)

Alignment Plans

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

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

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

Annex – IV

(Schedule-A)

Environment Clearances

The proposed project does not require Environmental clearance as per the MoEF&CC Notification No S.O. 3194(E) dated 14th July, 2022. However, as per draft gazette Notification No. 402 dated 28th January 2021 regarding Eco sensitive Zone (ESZ) of "**Tokalo Wildlife Sanctuary"**, the proposed project is outside the ESZ boundary of the sanctuary, however from Ch. 7 + 325 to Ch. 28+244, the project road falls within 10 km radius from the boundary of "Tokalo Wildlife Sanctuary". Since the notification is in draft stage and as per office memorandum F. No. 22-43/2018-IA.III dated 8th August 2019 point No. 4 (iii) ***"Proposals involving developmental activity/project located within 10 km of National Park/Wildlife Sanctuary wherein final ESZ notification is not notified (or) ESZ notification is in draft stage, prior clearance from Standing Committee of the National Board for Wildlife (SCNBWL) is mandatory"***. Therefore, Wild Life clearance is required.

Schedule - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. 2-Laning with Earthen Shoulder

Two laning shall include constriction of the Two Lane with earthen shoulder 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)

Description of Two-Laning with Earthen Shoulder

The Site of the two-lane with earthen shoulder of "Zorinpui-Longmasu section" starts from Km 0 (from Kaladan Multi Model project near Zorinpui) and ends at km 28.244 near Longmasu in the state of Mizoram.

Coordinates of Start and End of Project Stretch

Location		UTM Co-ordinate	
Description	**Design Chainage**	**Easting (m)**	**Northing (m)**
Start of Project Road	0+000	476917.80	2449530.09
End of Project Road	28+244	484409.11	2444711.82

1. Widening of the Existing Highway

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

(ii) Width of Carriageway

(a) Two-Laning with earthen shoulders shall be undertaken. The earthen carriageway shall be in accordance with the typical cross sections drawings in the manual "Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC – SP 73-2018". The typical drawings attached in schedules.

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

Sl. No.	Built-up stretch (Township)	Location (km to km)	Width (m) of carriageway	Typical cross section (Ref. to Manual)	Remarks
Nil					

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

2. Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with "Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC – SP 73-2018".

(ii) Design speed

The design speed shall be as per IRC: 52-2019 and IRC: SP 48 -1998.

(iii) Improvement of the existing road geometrics

Not Applicable due to Green Field Alignment.

(iv) Right of Way

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

(v) Type of shoulders

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

Sl. No.	Stretch (from km to km)	Fully paved shoulders/ footpaths	Reference to cross section
Nil			

(b) Width of Shoulder in open country shall be as per following Table:

Type of Section	Side	Width of Shoulder (m)		
		Hard	Earthen	Total
Open Country with isolated built-up area	Hill Side	-	1.0	1.0
	Valley Side	-	2.0	2.0

[Earthen shoulders shall be covered with 150mm thick compacted layer of granular material].

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

(vi) Lateral and vertical clearances at underpasses

(a) Lateral and vertical clearances at underpasses and provision of guardrails/ crash barriers shall be as per the provision of relevant Manual.

Nil

(b) Lateral clearance: The width of the opening at the underpasses shall be as per provision of relevant manual:

Nil

(vii) Lateral and vertical clearances at overpasses

Nil

(viii) Service roads

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

Nil

(ix) Grade separated structures

Nil

(x) Cattle and pedestrian underpass /overpass

Nil

(xi) Typical cross-sections of the Project Highway is as per attached Drawings

TCS Number	TCS Description
TCS-1	2 lane carriageway with retaining wall on one side & breast wall on other side
TCS-2	2 lane carriageway with breast wall on one side
TCS-3	2 lane carriageway with one side retaining wall and other side Trapezoidal Open Drain
TCS-4	2 lane carriageway with both side Trapezoidal Open Drain
TCS-5	2 lane carriageway with both side breast wall
TCS-6	2 lane carriageway with one side breast wall and other side Trapezoidal Open Drain
TCS-7	2 lane carriageway with one side retaining wall
TCS-8	2lane carriageway with both side retaining wall
TCS-9	2lane carriageway with earthen shoulder
TCS -10	2lane carriageway with earthen shoulder on valley side & other side trapezoidal open drain

Details of applicable TCS:

From	To	Length	TCS Type
0	10	10	TCS-9
50	130	80	Bridge
150	160	10	TCS-9
170	190	20	TCS-3
200	250	50	TCS-6
270	320	50	TCS-6
340	360	20	TCS-3
440	460	20	TCS-6
470	500	30	TCS-6
520	550	30	TCS-6
560	610	50	TCS-3
620	690	70	TCS-5
710	730	20	TCS-4
760	790	30	TCS-6
810	830	20	TCS-3
860	940	80	TCS-3
960	970	10	TCS-3
980	1020	40	TCS-3
1030	1040	10	TCS-3
1080	1170	90	TCS-6
1570	1590	20	TCS-6
1710	1780	70	TCS-6
1790	1820	30	TCS-6
1840	1900	60	TCS-1
1930	1940	10	TCS-3
1960	1980	20	TCS-3
2000	2010	10	TCS-3
2020	2080	60	TCS-5
2090	2130	40	TCS-5
2150	2160	10	TCS-1
2280	2290	10	TCS-8
2340	2370	30	TCS-6
2480	2560	80	TCS-8
2570	2580	10	TCS-8
2630	2640	10	TCS-1
2690	2790	100	TCS-4
2820	2860	40	TCS-4
2890	3050	160	TCS-4
3060	3080	20	TCS-5

From	To	Length	TCS Type
10	50	40	TCS-4
130	150	20	TCS-8
160	170	10	TCS-4
190	200	10	TCS-4
250	270	20	TCS-5
320	340	20	TCS-4
360	440	80	TCS-4
460	470	10	TCS-4
500	520	20	TCS-4
550	560	10	TCS-1
610	620	10	TCS-4
690	710	20	TCS-6
730	760	30	TCS-3
790	810	20	TCS-4
830	860	30	TCS-4
940	960	20	TCS-8
970	980	10	TCS-8
1020	1030	10	TCS-4
1040	1080	40	TCS-4
1170	1570	400	TCS-5
1590	1710	120	TCS-5
1780	1790	10	TCS-5
1820	1840	20	TCS-3
1900	1930	30	TCS-6
1940	1960	20	TCS-8
1980	2000	20	TCS-8
2010	2020	10	TCS-4
2080	2090	10	TCS-6
2130	2150	20	TCS-6
2160	2280	120	TCS-3
2290	2340	50	TCS-3
2370	2480	110	TCS-3
2560	2570	10	TCS-3
2580	2630	50	TCS-3
2640	2690	50	TCS-6
2790	2820	30	TCS-6
2860	2890	30	TCS-6
3050	3060	10	TCS-6
3080	3130	50	TCS-6

From	To	Length	TCS Type
3130	3150	20	TCS-4
3170	3210	40	TCS-6
3830	3850	20	TCS-6
3910	3930	20	TCS-8
3960	3970	10	TCS-4
4030	4090	60	TCS-1
4150	4160	10	TCS-4
4180	4250	70	TCS-1
4310	4320	10	TCS-1
4330	4460	130	TCS-5
4510	4520	10	TCS-4
4550	4560	10	TCS-4
4580	4590	10	TCS-4
4620	4670	50	TCS-4
4700	4740	40	TCS-8
4770	4790	20	TCS-4
4830	4850	20	TCS-5
4860	4880	20	TCS-5
4910	4920	10	TCS-10
4930	4960	30	TCS-6
5000	5170	170	TCS-3
5240	5250	10	TCS-3
5270	5310	40	TCS-3
5350	5360	10	TCS-3
5380	5390	10	TCS-3
5400	5410	10	TCS-6
5430	5480	50	TCS-5
5510	5520	10	TCS-3
5580	5610	30	TCS-3
5640	5670	30	TCS-3
5710	5740	30	TCS-6
5760	5810	50	TCS-6
5820	5880	60	TCS-3
5900	6030	130	TCS-5
6060	6320	260	TCS-5
6330	6350	20	TCS-3
6360	6450	90	TCS-6
6460	6470	10	TCS-8
6480	6500	20	TCS-6
6550	6580	30	TCS-6
6600	6650	50	TCS-6

From	To	Length	TCS Type
3150	3170	20	TCS-5
3210	3830	620	TCS-5
3850	3910	60	TCS-3
3930	3960	30	TCS-3
3970	4030	60	TCS-3
4090	4150	60	TCS-3
4160	4180	20	TCS-3
4250	4310	60	TCS-3
4320	4330	10	TCS-6
4460	4510	50	TCS-6
4520	4550	30	TCS-3
4560	4580	20	TCS-6
4590	4620	30	TCS-3
4670	4700	30	TCS-3
4740	4770	30	TCS-3
4790	4830	40	TCS-6
4850	4860	10	TCS-6
4880	4910	30	TCS-6
4920	4930	10	TCS-4
4960	5000	40	TCS-1
5170	5240	70	TCS-8
5250	5270	20	TCS-4
5310	5350	40	TCS-8
5360	5380	20	TCS-8
5390	5400	10	TCS-4
5410	5430	20	TCS-4
5480	5510	30	TCS-6
5520	5580	60	TCS-6
5610	5640	30	TCS-1
5670	5710	40	TCS-4
5740	5760	20	TCS-1
5810	5820	10	TCS-4
5880	5900	20	TCS-6
6030	6060	30	TCS-6
6320	6330	10	TCS-6
6350	6360	10	TCS-1
6450	6460	10	TCS-4
6470	6480	10	TCS-3
6500	6550	50	TCS-5
6580	6600	20	TCS-1
6650	6670	20	TCS-5

From	To	Length	TCS Type
6670	6740	70	TCS-6
6750	6790	40	TCS-6
6800	6830	30	TCS-6
6840	6930	90	TCS-3
6960	6990	30	TCS-3
7000	7010	10	TCS-6
7180	7200	20	TCS-6
7230	7280	50	TCS-6
7290	7300	10	TCS-3
7340	7390	50	TCS-3
7400	7410	10	TCS-4
7470	7480	10	TCS-1
7570	7600	30	TCS-1
7620	7630	10	TCS-8
7710	7730	20	TCS-6
7820	7830	10	TCS-6
7950	7970	20	TCS-1
7980	7990	10	TCS-1
8030	8040	10	TCS-1
8150	8160	10	TCS-8
8170	8220	50	TCS-1
8240	8270	30	TCS-3
8280	8290	10	TCS-6
8310	8330	20	TCS-3
8360	8410	50	TCS-3
8450	8480	30	TCS-3
8490	8510	20	TCS-6
8520	8550	30	TCS-3
8610	8670	60	TCS-3
8690	8720	30	TCS-1
8730	8760	30	TCS-8
8790	8830	40	TCS-5
8840	8850	10	TCS-1
8870	8880	10	TCS-1
8910	8940	30	TCS-1
8970	8980	10	TCS-3
8990	9030	40	TCS-6
9040	9060	20	TCS-6
9120	9150	30	TCS-6
9200	9220	20	TCS-1
9260	9270	10	TCS-6

From	To	Length	TCS Type
6740	6750	10	TCS-1
6790	6800	10	TCS-2
6830	6840	10	TCS-4
6930	6960	30	TCS-8
6990	7000	10	TCS-1
7010	7180	170	TCS-5
7200	7230	30	TCS-5
7280	7290	10	TCS-1
7300	7340	40	TCS-1
7390	7400	10	TCS-6
7410	7470	60	TCS-3
7480	7570	90	TCS-3
7600	7620	20	TCS-3
7630	7710	80	TCS-3
7730	7820	90	TCS-5
7830	7950	120	TCS-3
7970	7980	10	TCS-3
7990	8030	40	TCS-3
8040	8150	110	TCS-3
8160	8170	10	TCS-3
8220	8240	20	TCS-6
8270	8280	10	TCS-1
8290	8310	20	TCS-1
8330	8360	30	TCS-8
8410	8450	40	TCS-6
8480	8490	10	TCS-1
8510	8520	10	TCS-1
8550	8610	60	TCS-1
8670	8690	20	TCS-6
8720	8730	10	TCS-3
8760	8790	30	TCS-3
8830	8840	10	TCS-6
8850	8870	20	TCS-3
8880	8910	30	TCS-6
8940	8970	30	TCS-6
8980	8990	10	TCS-1
9030	9040	10	TCS-1
9060	9120	60	TCS-3
9150	9200	50	TCS-3
9220	9260	40	TCS-3
9270	9290	20	TCS-5

From	To	Length	TCS Type
9290	9300	10	TCS-6
9320	9340	20	TCS-6
9390	9400	10	TCS-4
9410	9440	30	TCS-1
9450	9480	30	TCS-3
9490	9520	30	TCS-3
9540	9550	10	TCS-3
9570	9610	40	TCS-3
9620	9630	10	TCS-6
9640	9670	30	TCS-4
9680	9700	20	TCS-8
9720	9730	10	TCS-4
9770	9780	10	TCS-6
9820	9830	10	TCS-6
9840	9850	10	TCS-3
9860	9870	10	TCS-6
9880	9890	10	TCS-8
9900	9950	50	TCS-6
9990	10000	10	TCS-4
10010	10050	40	TCS-3
10110	10120	10	TCS-6
10130	10210	80	TCS-3
10230	10460	230	TCS-3
10490	10670	180	TCS-3
10680	10790	110	TCS-3
10830	10840	10	TCS-10
10900	10950	50	TCS-3
10970	10980	10	TCS-3
10990	11020	30	TCS-3
11040	11050	10	TCS-8
11060	11070	10	TCS-3
11090	11130	40	TCS-6
11170	11220	50	TCS-3
11250	11290	40	TCS-1
11340	11400	60	TCS-1
11430	11440	10	TCS-6
11520	11560	40	TCS-3
11570	11590	20	TCS-6
11650	11690	40	TCS-1
11710	11730	20	TCS-1
11740	11810	70	TCS-5

From	To	Length	TCS Type
9300	9320	20	TCS-5
9340	9390	50	TCS-3
9400	9410	10	TCS-6
9440	9450	10	TCS-6
9480	9490	10	TCS-4
9520	9540	20	TCS-1
9550	9570	20	TCS-8
9610	9620	10	TCS-1
9630	9640	10	TCS-3
9670	9680	10	TCS-3
9700	9720	20	TCS-3
9730	9770	40	TCS-5
9780	9820	40	TCS-1
9830	9840	10	TCS-1
9850	9860	10	TCS-4
9870	9880	10	TCS-3
9890	9900	10	TCS-3
9950	9990	40	TCS-3
10000	10010	10	TCS-1
10050	10110	60	TCS-1
10120	10130	10	TCS-1
10210	10230	20	TCS-1
10460	10490	30	TCS-4
10670	10680	10	TCS-8
10790	10830	40	TCS-4
10840	10900	60	TCS-4
10950	10970	20	TCS-4
10980	10990	10	TCS-4
11020	11040	20	TCS-4
11050	11060	10	TCS-4
11070	11090	20	TCS-4
11130	11170	40	TCS-1
11220	11250	30	TCS-6
11290	11340	50	TCS-3
11400	11430	30	TCS-5
11440	11520	80	TCS-1
11560	11570	10	TCS-1
11590	11650	60	TCS-3
11690	11710	20	TCS-6
11730	11740	10	TCS-6
11810	11820	10	TCS-4

From	To	Length	TCS Type
11820	11840	20	TCS-3
11850	11940	90	TCS-3
11950	11960	10	TCS-3
11970	11980	10	TCS-6
12010	12070	60	TCS-6
12080	12200	120	TCS-3
12210	12240	30	TCS-6
12250	12540	290	TCS-6
12600	12630	30	TCS-6
12660	12670	10	TCS-4
12680	12730	50	TCS-5
12740	12750	10	TCS-3
12760	12770	10	TCS-3
12810	12830	20	TCS-3
12870	12900	30	TCS-3
12910	12930	20	TCS-6
12940	12950	10	TCS-8
13010	13030	20	TCS-1
13040	13060	20	TCS-5
13070	13110	40	TCS-1
13130	13190	60	TCS-1
13200	13240	40	TCS-5
13270	13280	10	TCS-2
13300	13340	40	TCS-1
13360	13370	10	TCS-8
13380	13400	20	TCS-6
13450	13460	10	TCS-6
13470	13490	20	TCS-3
13520	13540	20	TCS-6
13550	13560	10	TCS-6
13760	13800	40	TCS-3
13810	13830	20	TCS-3
13850	13860	10	TCS-3
13870	13890	20	TCS-6
13940	13960	20	TCS-6
13970	13990	20	TCS-8
14000	14010	10	TCS-1
14030	14130	100	TCS-5
14140	14150	10	TCS-3
14220	14230	10	TCS-3
14250	14270	20	TCS-6

From	To	Length	TCS Type
11840	11850	10	TCS-8
11940	11950	10	TCS-8
11960	11970	10	TCS-1
11980	12010	30	TCS-1
12070	12080	10	TCS-4
12200	12210	10	TCS-1
12240	12250	10	TCS-1
12540	12600	60	TCS-5
12630	12660	30	TCS-3
12670	12680	10	TCS-6
12730	12740	10	TCS-6
12750	12760	10	TCS-8
12770	12810	40	TCS-1
12830	12870	40	TCS-8
12900	12910	10	TCS-1
12930	12940	10	TCS-3
12950	13010	60	TCS-3
13030	13040	10	TCS-6
13060	13070	10	TCS-6
13110	13130	20	TCS-3
13190	13200	10	TCS-6
13240	13270	30	TCS-6
13280	13300	20	TCS-6
13340	13360	20	TCS-3
13370	13380	10	TCS-3
13400	13450	50	TCS-5
13460	13470	10	TCS-8
13490	13520	30	TCS-1
13540	13550	10	TCS-2
13560	13760	200	TCS-5
13800	13810	10	TCS-4
13830	13850	20	TCS-8
13860	13870	10	TCS-1
13890	13940	50	TCS-5
13960	13970	10	TCS-3
13990	14000	10	TCS-3
14010	14030	20	TCS-6
14130	14140	10	TCS-6
14150	14220	70	TCS-8
14230	14250	20	TCS-4
14270	14350	80	TCS-5

From	To	Length	TCS Type
14350	14370	20	TCS-6
14380	14460	80	TCS-8
14470	14480	10	TCS-4
14630	14650	20	TCS-6
14660	14680	20	TCS-1
14690	14710	20	TCS-6
14830	14850	20	TCS-6
14860	14880	20	TCS-8
14890	14960	70	TCS-5
14980	15030	50	TCS-4
15060	15070	10	TCS-6
15100	15120	20	TCS-6
15140	15150	10	TCS-6
15170	15190	20	TCS-1
15230	15270	40	TCS-8
15330	15340	10	TCS-4
15370	15400	30	TCS-8
15440	15450	10	TCS-8
15460	15470	10	TCS-1
15510	15530	20	TCS-1
15550	15560	10	TCS-1
15580	15590	10	TCS-6
15620	15640	20	TCS-6
15660	15680	20	TCS-3
16390	16420	30	TCS-5
16430	16450	20	TCS-8
16520	16540	20	TCS-1
16590	16610	20	TCS-4
16670	16700	30	TCS-5
16710	16720	10	TCS-5
16740	16780	40	TCS-1
16830	16850	20	TCS-6
16880	16890	10	TCS-6
16910	16920	10	TCS-6
16940	16950	10	TCS-3
16960	16970	10	TCS-6
17010	17030	20	TCS-6
17090	17100	10	TCS-7
17130	17150	20	TCS-3
17160	17390	230	TCS-5
17400	17420	20	TCS-1

From	To	Length	TCS Type
14370	14380	10	TCS-3
14460	14470	10	TCS-7
14480	14630	150	TCS-5
14650	14660	10	TCS-2
14680	14690	10	TCS-3
14710	14830	120	TCS-5
14850	14860	10	TCS-3
14880	14890	10	TCS-4
14960	14980	20	TCS-6
15030	15060	30	TCS-5
15070	15100	30	TCS-4
15120	15140	20	TCS-5
15150	15170	20	TCS-3
15190	15230	40	TCS-3
15270	15330	60	TCS-3
15340	15370	30	TCS-3
15400	15440	40	TCS-3
15450	15460	10	TCS-3
15470	15510	40	TCS-6
15530	15550	20	TCS-6
15560	15580	20	TCS-3
15590	15620	30	TCS-5
15640	15660	20	TCS-1
15680	16390	710	TCS-1
16420	16430	10	TCS-6
16450	16520	70	TCS-3
16540	16590	50	TCS-3
16610	16670	60	TCS-3
16700	16710	10	TCS-6
16720	16740	20	TCS-6
16780	16830	50	TCS-3
16850	16880	30	TCS-1
16890	16910	20	TCS-5
16920	16940	20	TCS-1
16950	16960	10	TCS-8
16970	17010	40	TCS-5
17030	17090	60	TCS-3
17100	17130	30	TCS-8
17150	17160	10	TCS-6
17390	17400	10	TCS-6
17420	17440	20	TCS-6

From	To	Length	TCS Type
17440	17500	60	TCS-5
17510	17530	20	TCS-8
17560	17580	20	TCS-6
17630	17640	10	TCS-4
17650	17710	60	TCS-5
17720	17730	10	TCS-4
17760	17830	70	TCS-3
17840	17850	10	TCS-4
17890	17940	50	TCS-4
17960	17970	10	TCS-6
17980	18010	30	TCS-3
18020	18050	30	TCS-5
18070	18090	20	TCS-3
18120	18130	10	TCS-4
18210	18250	40	TCS-6
18260	18270	10	TCS-4
18290	18460	170	TCS-3
18480	18490	10	TCS-3
18510	18530	20	TCS-3
18570	18590	20	TCS-6
18600	18610	10	TCS-3
18640	18650	10	TCS-3
18670	18680	10	TCS-4
18720	18740	20	TCS-6
18780	18790	10	TCS-6
18810	18820	10	TCS-6
18840	18860	20	TCS-6
18900	18920	20	TCS-6
18950	19100	150	TCS-8
19110	19120	10	TCS-1
19130	19140	10	TCS-4
19180	19190	10	TCS-3
19250	19260	10	TCS-6
19300	19310	10	TCS-10
19320	19490	170	TCS-3
19510	19550	40	TCS-5
19560	19580	20	TCS-8
19600	19670	70	TCS-6
19700	19730	30	TCS-8
19780	19890	110	TCS-1
19910	19920	10	TCS-5

From	To	Length	TCS Type
17500	17510	10	TCS-4
17530	17560	30	TCS-3
17580	17630	50	TCS-3
17640	17650	10	TCS-6
17710	17720	10	TCS-6
17730	17760	30	TCS-8
17830	17840	10	TCS-6
17850	17890	40	TCS-3
17940	17960	20	TCS-3
17970	17980	10	TCS-4
18010	18020	10	TCS-4
18050	18070	20	TCS-4
18090	18120	30	TCS-6
18130	18210	80	TCS-3
18250	18260	10	TCS-5
18270	18290	20	TCS-8
18460	18480	20	TCS-1
18490	18510	20	TCS-8
18530	18570	40	TCS-5
18590	18600	10	TCS-4
18610	18640	30	TCS-8
18650	18670	20	TCS-6
18680	18720	40	TCS-3
18740	18780	40	TCS-1
18790	18810	20	TCS-5
18820	18840	20	TCS-1
18860	18900	40	TCS-5
18920	18950	30	TCS-3
19100	19110	10	TCS-3
19120	19130	10	TCS-6
19140	19180	40	TCS-8
19190	19250	60	TCS-5
19260	19300	40	TCS-4
19310	19320	10	TCS-7
19490	19510	20	TCS-6
19550	19560	10	TCS-3
19580	19600	20	TCS-3
19670	19700	30	TCS-3
19730	19780	50	TCS-3
19890	19910	20	TCS-6
19920	19940	20	TCS-6

From	To	Length	TCS Type
19940	19970	30	TCS-4
20030	20050	20	TCS-4
20060	20080	20	TCS-1
20090	20100	10	TCS-5
20110	20130	20	TCS-3
20140	20150	10	TCS-8
20180	20190	10	TCS-4
20210	20300	90	TCS-5
20320	20380	60	TCS-5
20390	20420	30	TCS-6
20430	20440	10	TCS-8
20460	20470	10	TCS-8
20490	20520	30	TCS-5
20540	20550	10	TCS-3
20560	20590	30	TCS-6
20620	20630	10	TCS-8
20650	20680	30	TCS-4
20700	20760	60	TCS-5
20780	20840	60	TCS-4
20900	20940	40	TCS-8
21110	21120	10	TCS-8
21150	21190	40	TCS-6
21200	21210	10	TCS-4
21260	21280	20	TCS-6
21290	21310	20	TCS-8
21320	21340	20	TCS-6
21350	21390	40	TCS-3
21420	21450	30	TCS-3
21460	21490	30	TCS-5
21500	21510	10	TCS-8
21520	21530	10	TCS-4
21580	21590	10	TCS-6
21600	21610	10	TCS-7
21620	21640	20	TCS-5
21670	21680	10	TCS-4
21700	21710	10	TCS-4
21730	21740	10	TCS-1
21750	21760	10	TCS-8
21770	21820	50	TCS-4
21840	21850	10	TCS-8
21860	21910	50	TCS-4

From	To	Length	TCS Type
19970	20030	60	TCS-6
20050	20060	10	TCS-2
20080	20090	10	TCS-6
20100	20110	10	TCS-6
20130	20140	10	TCS-7
20150	20180	30	TCS-3
20190	20210	20	TCS-6
20300	20320	20	TCS-6
20380	20390	10	TCS-4
20420	20430	10	TCS-4
20440	20460	20	TCS-3
20470	20490	20	TCS-6
20520	20540	20	TCS-4
20550	20560	10	TCS-4
20590	20620	30	TCS-3
20630	20650	20	TCS-3
20680	20700	20	TCS-6
20760	20780	20	TCS-6
20840	20900	60	TCS-3
20940	21110	170	TCS-3
21120	21150	30	TCS-3
21190	21200	10	TCS-3
21210	21260	50	TCS-5
21280	21290	10	TCS-4
21310	21320	10	TCS-3
21340	21350	10	TCS-4
21390	21420	30	TCS-1
21450	21460	10	TCS-6
21490	21500	10	TCS-4
21510	21520	10	TCS-3
21530	21580	50	TCS-5
21590	21600	10	TCS-4
21610	21620	10	TCS-6
21640	21670	30	TCS-6
21680	21700	20	TCS-3
21710	21730	20	TCS-6
21740	21750	10	TCS-3
21760	21770	10	TCS-3
21820	21840	20	TCS-3
21850	21860	10	TCS-3
21910	22010	100	TCS-3

From	To	Length	TCS Type
22010	22020	10	TCS-4
22080	22110	30	TCS-6
22130	22340	210	TCS-3
22350	22390	40	TCS-3
22400	22420	20	TCS-3
22430	22450	20	TCS-4
22500	22520	20	TCS-8
22570	22590	20	TCS-4
22600	22620	20	TCS-8
22660	22690	30	TCS-4
22700	22710	10	TCS-1
22750	22780	30	TCS-4
22850	22860	10	TCS-4
22900	22910	10	TCS-1
22920	22980	60	TCS-6
22990	23060	70	TCS-3
23070	23090	20	TCS-6
23100	23150	50	TCS-3
23210	23220	10	TCS-4
23230	23280	50	TCS-4
23320	23330	10	TCS-8
23350	23370	20	TCS-1
23470	23480	10	TCS-5
23500	23520	20	TCS-5
23540	23550	10	TCS-1
23560	23580	20	TCS-6
23600	23650	50	TCS-6
23660	23750	90	TCS-6
23790	23840	50	TCS-6
23850	23860	10	TCS-3
23880	23930	50	TCS-6
24060	24070	10	TCS-6
24083	24118	35	Bridge
24140	24150	10	TCS-3
24540	24590	50	TCS-6
24610	24680	70	TCS-6
24690	24700	10	TCS-1
24720	24730	10	TCS-6
24790	24810	20	TCS-6
24830	24950	120	TCS-6
24960	24970	10	TCS-3

From	To	Length	TCS Type
22020	22080	60	TCS-3
22110	22130	20	TCS-4
22340	22350	10	TCS-4
22390	22400	10	TCS-8
22420	22430	10	TCS-1
22450	22500	50	TCS-3
22520	22570	50	TCS-3
22590	22600	10	TCS-3
22620	22660	40	TCS-3
22690	22700	10	TCS-3
22710	22750	40	TCS-6
22780	22850	70	TCS-3
22860	22900	40	TCS-6
22910	22920	10	TCS-3
22980	22990	10	TCS-1
23060	23070	10	TCS-1
23090	23100	10	TCS-2
23150	23210	60	TCS-6
23220	23230	10	TCS-6
23280	23320	40	TCS-3
23330	23350	20	TCS-3
23370	23470	100	TCS-6
23480	23500	20	TCS-6
23520	23540	20	TCS-6
23550	23560	10	TCS-3
23580	23600	20	TCS-5
23650	23660	10	TCS-2
23750	23790	40	TCS-5
23840	23850	10	TCS-4
23860	23880	20	TCS-8
23930	24060	130	TCS-5
24070	24083	13	TCS-3
24118	24140	22	TCS-8
24150	24540	390	TCS-5
24590	24610	20	TCS-5
24680	24690	10	TCS-10
24700	24720	20	TCS-3
24730	24790	60	TCS-5
24810	24830	20	TCS-1
24950	24960	10	TCS-1
24970	24990	20	TCS-8

From	To	Length	TCS Type
24990	25000	10	TCS-3
25010	25040	30	TCS-3
25050	25060	10	TCS-3
25080	25090	10	TCS-4
25140	25150	10	TCS-4
25170	25190	20	TCS-6
25200	25380	180	TCS-5
25390	25395	5	TCS-8
25565	25580	15	TCS-8
25590	25640	50	TCS-6
25680	25720	40	TCS-6
25750	25860	110	TCS-5
25870	26150	280	TCS-5
26170	26210	40	TCS-6
26230	26240	10	TCS-1
26250	26260	10	TCS-5
26290	26300	10	TCS-4
26350	26360	10	TCS-6
26400	26420	20	TCS-6
26440	26450	10	TCS-6
26470	26590	120	TCS-5
26630	26640	10	TCS-4
26840	26850	10	TCS-1
26860	26880	20	TCS-1
26930	27000	70	TCS-8
27010	27100	90	TCS-6
27130	27210	80	TCS-6
27230	27320	90	TCS-6
27330	27350	20	TCS-8
27450	27460	10	TCS-1
27480	27500	20	TCS-3
27550	27590	40	TCS-3
27600	27630	30	TCS-6
27640	27670	30	TCS-6
27770	27780	10	TCS-4
27790	27800	10	TCS-3
27850	27860	10	TCS-4
27880	27890	10	TCS-4
27960	27970	10	TCS-8
28050	28060	10	TCS-4
28090	28100	10	TCS-4

From	To	Length	TCS Type
25000	25010	10	TCS-1
25040	25050	10	TCS-6
25060	25080	20	TCS-8
25090	25140	50	TCS-6
25150	25170	20	TCS-3
25190	25200	10	TCS-3
25380	25390	10	TCS-4
25395	25565	170	Bridge
25580	25590	10	TCS-3
25640	25680	40	TCS-5
25720	25750	30	TCS-4
25860	25870	10	TCS-6
26150	26170	20	TCS-4
26210	26230	20	TCS-3
26240	26250	10	TCS-6
26260	26290	30	TCS-6
26300	26350	50	TCS-3
26360	26400	40	TCS-5
26420	26440	20	TCS-5
26450	26470	20	TCS-4
26590	26630	40	TCS-6
26640	26840	200	TCS-3
26850	26860	10	TCS-6
26880	26930	50	TCS-3
27000	27010	10	TCS-4
27100	27130	30	TCS-1
27210	27230	20	TCS-4
27320	27330	10	TCS-3
27350	27450	100	TCS-3
27460	27480	20	TCS-6
27500	27550	50	TCS-8
27590	27600	10	TCS-1
27630	27640	10	TCS-1
27670	27770	100	TCS-5
27780	27790	10	TCS-8
27800	27850	50	TCS-6
27860	27880	20	TCS-3
27890	27960	70	TCS-3
27970	28050	80	TCS-3
28060	28090	30	TCS-5
28100	28110	10	TCS-3

From	To	Length	TCS Type
28110	28140	30	TCS-4
28150	28160	10	TCS-8
28190	28240	50	TCS-8

From	To	Length	TCS Type
28140	28150	10	TCS-3
28160	28190	30	TCS-3
28240	28244	4	TCS-10

3. Intersections and Grade Separators

All intersections and grade separators shall be as per Section 3 of the IRC SP 73-2018. Existing intersections which are deficient shall be improved to the prescribed standards.

All intersections as per the site requirement shall be designed and constructed in accordance with the manual. List of minor intersections is given in below table.

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

(i) At-grade intersections Major Intersections

Sl. No.	Location of Intersection (km)	Type of intersection	Other features	Remarks
Nil				

(ii) Minor Intersections

Sl. No.	Location of Intersection (km)	Type of intersection	Other features
1	0.000	T-Type	3-Legged
2	10.800	Y-Type	3-Legged
3	11.050	Y-Type	3-Legged
4	20.100	Y-Type	3-Legged
5	28.100	Y-Type	3-Legged

Note : *It is clarified that if any other junction is identified during development of the project highway in addition to those mentioned above shall also be improved with proper drainage facilities and adequate protection measures as per standard. It shall be covered within the scope of work. The number, location and type of junction shown in above table are minimum and it may increase as per actual site condition and increase in number will not attract change of scope on this account.*

(iii) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in IRC: 52-2019 and IRC: SP 48 -1998 and the specified typical cross section. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length	Extent of raising [Top of finished road level]
Nil			

5. Pavement Design

(i) Pavement design shall be carried out in accordance with IRC 37-2018 and IRC: 52-2019 and IRC: SP 48 -1998.

(ii) Type of payment

Type of payment shall be as per IRC 37-2018 and IRC:52-2019 and IRC: SP 48 -1998

(iii) Design requirements

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of main carriageway for design traffic of 10 MSA for bituminous layers and 20 MSA for granular layers with a minimum design period of 20 years with 90% reliability irrespective of the design traffic. CBR value as obtained at site shall be taken for design if CBR is less than 8%. Maximum value of CBR to be taken for design shall not exceed 8%. Bituminous Grade VG 40 shall be used for BC.

(a) Design Period and strategy

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

(b) Design Traffic

The contractor shall design the pavement for design traffic of not less than 10 million standard axles (MSA) for bituminous layers and 20 MSA for granular layers.

(iv) Reconstruction of stretches

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

Sl. No.	Stretch From km to km	Remarks	TCS Type
Nil			

6. Roadside Drainage

(i) Drainage system including surface and subsurface drains for the Project Highway shall be provided as per IRC: 52-2019 and IRC: SP 48 -1998 and IRC SP 73-2018.

Drain Type	Side	Total Length (m)
Stone masonry with cement mortar	Both/one side as per TCS	40567m (including drain along Breast wall)
Total =		**40567 m**

Note 1: The length of side drains given above are minimum and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable.

Note 2: Box cut sections will have drains on both sides.

Note 3: Drain section shall be designed as per hydrology requirement.

Note 4: In cut section, line / unlined drain shall be provided at top of cut slope. All measures shall be taken to prevent ingress of county side runoff entering into road formation width.

7. Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the IRC SP 73-2018 and shall conform to the cross-sectional features and other details specified therein.

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features
1	0+090	Deck width of bridge : 12.0 m Carriageway width : 7.5m Footpath : 1.5 m on both sides Safety crash barriers: 0.450 m RCC on both sides Railing : 0.30m RCC on both side
2	24+100	
3	25+480	

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

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features
1	0+090	Footpath : 1.5m on both sides
2	24+100	Footpath : 1.5m on both sides
3	25+480	Footpath : 1.5m on both sides

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

(e) The structures shall be designed to carry utility services like electric cable, water pipeline, OFC etc. as per the requirement of site.

(f) Cross-section of the new culverts shall conform to the typical cross-sections given in GAD of Box culvert in the drawings.

(ii) Culverts

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

(b) **Reconstruction of existing culverts:**

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

Sl. No.	Design Chainage (km)	Size (m)
Nil		

(c) **Widening of existing culverts:**

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway.

Sl. No.	Culvert location	Span/ Opening	Remarks, if any
Nil			

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

S. No.	Chainage	Span Arrangement			
		Nos	Length	Height	Size
1	0+890	1	2.0	2.0	1 X 2.0 X 2.0
2	0+940	1	2.0	2.0	1 X 2.0 X 2.0
3	1+950	1	2.0	2.0	1 X 2.0 X 2.0
4	1+980	1	2.0	2.0	1 X 2.0 X 2.0
5	2+310	1	2.0	2.0	1 X 2.0 X 2.0
6	2+530	1	2.0	2.0	1 X 2.0 X 2.0
7	2+975	1	2.0	2.0	1 X 2.0 X 2.0
8	3+900	1	2.0	2.0	1 X 2.0 X 2.0
9	4+100	1	2.0	2.0	1 X 2.0 X 2.0
10	4+600	1	2.0	2.0	1 X 2.0 X 2.0
11	4+705	1	2.0	2.0	1 X 2.0 X 2.0
12	5+105	1	2.0	2.0	1 X 2.0 X 2.0
13	5+340	1	2.0	2.0	1 X 2.0 X 2.0
14	6+330	1	2.0	2.0	1 X 2.0 X 2.0
15	6+450	1	2.0	2.0	1 X 2.0 X 2.0
16	6+920	1	2.0	2.0	1 X 2.0 X 2.0
17	7+300	1	2.0	2.0	1 X 2.0 X 2.0
18	7+510	1	2.0	2.0	1 X 2.0 X 2.0
19	7+610	1	2.0	2.0	1 X 2.0 X 2.0
20	7+850	1	2.0	2.0	1 X 2.0 X 2.0
21	8+060	1	2.0	2.0	1 X 2.0 X 2.0
22	8+150	1	2.0	2.0	1 X 2.0 X 2.0
23	8+340	1	2.0	2.0	1 X 2.0 X 2.0
24	8+650	1	2.0	2.0	1 X 2.0 X 2.0
25	8+740	1	2.0	2.0	1 X 2.0 X 2.0
26	8+870	1	2.0	2.0	1 X 2.0 X 2.0
27	9+075	1	2.0	2.0	1 X 2.0 X 2.0
28	9+105	1	2.0	2.0	1 X 2.0 X 2.0
29	9+165	1	2.0	2.0	1 X 2.0 X 2.0
30	9+245	1	2.0	2.0	1 X 2.0 X 2.0
31	9+500	1	2.0	2.0	1 X 2.0 X 2.0
32	9+565	1	2.0	2.0	1 X 2.0 X 2.0
33	9+600	1	2.0	2.0	1 X 2.0 X 2.0
34	9+680	1	2.0	2.0	1 X 2.0 X 2.0
35	9+850	1	2.0	2.0	1 X 2.0 X 2.0
36	9+880	1	2.0	2.0	1 X 2.0 X 2.0
37	9+970	1	2.0	2.0	1 X 2.0 X 2.0
38	10+310	1	2.0	2.0	1 X 2.0 X 2.0

S. No.	Chainage	Span Arrangement			
		Nos	Length	Height	Size
39	10+380	1	2.0	2.0	1 X 2.0 X 2.0
40	10+550	1	2.0	2.0	1 X 2.0 X 2.0
41	10+670	1	2.0	2.0	1 X 2.0 X 2.0
42	10+850	1	2.0	2.0	1 X 2.0 X 2.0
43	11+050	1	2.0	2.0	1 X 2.0 X 2.0
44	11+185	1	2.0	2.0	1 X 2.0 X 2.0
45	11+310	1	2.0	2.0	1 X 2.0 X 2.0
46	11+560	1	2.0	2.0	1 X 2.0 X 2.0
47	11+600	1	2.0	2.0	1 X 2.0 X 2.0
48	11+850	1	3.0	3.0	1 X 3.0 X 3.0
49	11+910	1	2.0	2.0	1 X 2.0 X 2.0
50	11+940	1	2.0	2.0	1 X 2.0 X 2.0
51	12+200	1	2.0	2.0	1 X 2.0 X 2.0
52	12+660	1	2.0	2.0	1 X 2.0 X 2.0
53	12+770	1	2.0	2.0	1 X 2.0 X 2.0
54	12+870	1	3.0	3.0	1 X 3.0 X 3.0
55	12+945	1	2.0	2.0	1 X 2.0 X 2.0
56	13+130	1	2.0	2.0	1 X 2.0 X 2.0
57	13+350	1	2.0	2.0	1 X 2.0 X 2.0
58	13+470	1	2.0	2.0	1 X 2.0 X 2.0
59	13+840	1	2.0	2.0	1 X 2.0 X 2.0
60	13+980	1	2.0	2.0	1 X 2.0 X 2.0
61	14+190	1	2.0	2.0	1 X 2.0 X 2.0
62	14+520	1	2.0	2.0	1 X 2.0 X 2.0
63	14+860	1	2.0	2.0	1 X 2.0 X 2.0
64	15+250	1	2.0	2.0	1 X 2.0 X 2.0
65	15+435	1	2.0	2.0	1 X 2.0 X 2.0
66	15+555	1	2.0	2.0	1 X 2.0 X 2.0
67	15+660	1	2.0	2.0	1 X 2.0 X 2.0
68	15+750	1	2.0	2.0	1 X 2.0 X 2.0
69	16+060	1	2.0	2.0	1 X 2.0 X 2.0
70	16+190	1	2.0	2.0	1 X 2.0 X 2.0
71	16+430	1	2.0	2.0	1 X 2.0 X 2.0
72	16+640	1	2.0	2.0	1 X 2.0 X 2.0
73	16+780	1	2.0	2.0	1 X 2.0 X 2.0
74	17+110	1	3.0	3.0	1 X 3.0 X 3.0
75	17+520	1	2.0	2.0	1 X 2.0 X 2.0
76	17+600	1	2.0	2.0	1 X 2.0 X 2.0
77	17+740	1	2.0	2.0	1 X 2.0 X 2.0
78	18+000	1	2.0	2.0	1 X 2.0 X 2.0

S. No.	Chainage	Span Arrangement			
		Nos	Length	Height	Size
79	18+180	1	2.0	2.0	1 X 2.0 X 2.0
80	18+280	1	2.0	2.0	1 X 2.0 X 2.0
81	18+500	1	2.0	2.0	1 X 2.0 X 2.0
82	18+620	1	2.0	2.0	1 X 2.0 X 2.0
83	18+830	1	2.0	2.0	1 X 2.0 X 2.0
84	18+980	1	2.0	2.0	1 X 2.0 X 2.0
85	19+060	1	2.0	2.0	1 X 2.0 X 2.0
86	19+150	1	2.0	2.0	1 X 2.0 X 2.0
87	19+320	1	2.0	2.0	1 X 2.0 X 2.0
88	19+560	1	2.0	2.0	1 X 2.0 X 2.0
89	19+720	1	2.0	2.0	1 X 2.0 X 2.0
90	20+190	1	2.0	2.0	1 X 2.0 X 2.0
91	20+150	1	2.0	2.0	1 X 2.0 X 2.0
92	20+455	1	2.0	2.0	1 X 2.0 X 2.0
93	20+625	1	2.0	2.0	1 X 2.0 X 2.0
94	20+865	1	2.0	2.0	1 X 2.0 X 2.0
95	20+930	1	2.0	2.0	1 X 2.0 X 2.0
96	21+120	1	2.0	2.0	1 X 2.0 X 2.0
97	21+310	1	2.0	2.0	1 X 2.0 X 2.0
98	21+375	1	2.0	2.0	1 X 2.0 X 2.0
99	21+510	1	2.0	2.0	1 X 2.0 X 2.0
100	22+060	1	2.0	2.0	1 X 2.0 X 2.0
101	22+200	1	2.0	2.0	1 X 2.0 X 2.0
102	22+510	1	2.0	2.0	1 X 2.0 X 2.0
103	22+615	1	2.0	2.0	1 X 2.0 X 2.0
104	23+020	1	3.0	3.0	1 X 3.0 X 3.0
105	23+320	1	3.0	3.0	1 X 3.0 X 3.0
106	23+350	1	2.0	2.0	1 X 2.0 X 2.0
107	23+870	1	2.0	2.0	1 X 2.0 X 2.0
108	24+410	1	3.0	3.0	1 X 3.0 X 3.0
109	24+990	1	2.0	2.0	1 X 2.0 X 2.0
110	25+070	1	2.0	2.0	1 X 2.0 X 2.0
111	25+150	1	2.0	2.0	1 X 2.0 X 2.0
112	26+710	1	2.0	2.0	1 X 2.0 X 2.0
113	26+960	1	2.0	2.0	1 X 2.0 X 2.0
114	27+330	1	2.0	2.0	1 X 2.0 X 2.0
115	27+550	1	2.0	2.0	1 X 2.0 X 2.0
116	27+970	1	2.0	2.0	1 X 2.0 X 2.0
117	28+020	1	2.0	2.0	1 X 2.0 X 2.0
118	28+140	1	2.0	2.0	1 X 2.0 X 2.0

Note:

(i) The above Design Chainages are indicative and may vary as per site requirement to be approved by Authority's Engineer.

(ii) The numbers of culverts shown above are minimum. Any additional culvert required as per site condition shall be provided as per manual. Any increase in number / length / span/ height of culvert shall not be considered as change of scope.

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

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

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

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

(iii) Bridges

(a) **Existing bridges to be re- constructed/widened**

(i) The existing bridges at the following locations shall be re-constructed as new Structures.

Sl. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
Nil				

(ii) The following narrow bridges shall be widened:

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

(b) **Additional new bridges**

New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings.

Sl. No.	Location (km)	Total length (m)	Type of Super-structure
1	0+090	1 x 80	Steel Truss
2	24+100	1 x 35	Steel Plate Girder
3	25+480	1x35+1x100+1x35	Steel Plate Girder+ Steel Truss+ Steel Plate Girder

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

Sl. No.	Location at km	Remarks
Nil		

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

Sl. No.	Location at km	Remarks
Nil		

(e) **Drainage system for bridge decks**

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

(f) **Structures in marine environment**

Sl. No.	Location at km	Remarks
Nil		

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the IRC SP 73 2018.

(b) **Road over-bridges**

Road over-bridges (road over rail) shall be provided at the following level crossings:

Sl. No.	Location of Level crossing (Chainage km)	Length of bridge (m)
Nil		

(c) **Road under-bridges**

Road under-bridges (road under railway line) shall be provided at the following level crossings:

Sl. No.	Location of Level crossing (Chainage km)	Number and length of span (m)
Nil		

(v) Grade separated structures

Nil

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

Sl. No.	Location of bridge (km)	Nature and extent of repairs / strengthening to be carried out
Nil		

(b) ROB / RUB

Sl. No.	Location of ROB/RUB (km)	Nature and extent of repairs/ strengthening to be carried out
Nil		

(c) Overpasses/Underpasses and other structures

Sl. No.	Location of Structure (km)	Nature and extent of repairs/ strengthening to be carried out
Nil		

(vii) List of Major Bridges and Structures

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

Sl. No.	Location (km)
Nil	

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with Section 9 of the IRC SP 73-2018. The minimum requirement may be taken as below:

Sl. No.	Size	Quantity (Nos.)
1	90 cm high octagon(STOP) sign	5

2	60 cm circular signs	226
3	Route marker sign (450 x 600mm)	6
4	90 cm equilateral triangle sign	248
5	Hazard marker	484
6	Speed Breaker Sign	12
7	Facility Signs (800mm x 600mm)	6
8	Direction Signs (<than 0.9 sqm size)	6
9	Direction Signs (>than 0.9 sqm size)	6
10a	Chevron sign (Single)	343
10b	Chevron sign (Double)	657
11	Stud	9415
12	Delineator	5509
13	Gantry signs	2

Note: Any additional requirement as per site condition shall not be considered as change in scope.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provisions of Section 9 of the IRC SP 73-2018.

a) Pedestrian crossing: As per manual.

b) Pedestrian Guard Rail : As per manual

c) Delineators: As per manual

d) Noise barriers: Shall be provided in accordance with manual; Locations shall be decided as per site condition in consent with Authority.

e) Overhead traffic signs: As per manual

10. Compulsory Afforestation

Compensatory afforestation shall be in accordance with section 11 of IRC SP 73 2018.

11. Hazardous Locations

Parapet walls of minimum length 15351 m should be provided as per manual. Increase in length if any as per site requirement will not constitute change of scope.

12. Special Requirement for Hill Roads

Retaining wall / Breast wall :

12.1 The minimum quantity of protection work may be taken as below:

Type of Protection Work		
Protection Work	**Unit**	**Quantity**
Breast wall, 2.0m height	Running Meter	12340
Breast wall, 3.0m height	Running Meter	9290
Toe wall, 1m height	Running Meter	2963
Toe wall, 2m height	Running Meter	2040
Retaining wall, 3m height	Running Meter	2260
Retaining wall, 4m height	Running Meter	1950
Retaining wall, 5m height	Running Meter	1710
Retaining wall, 6m height	Running Meter	2242
Retaining wall, 7m height	Running Meter	1020
Retaining wall, 8m height	Running Meter	740
Retaining wall, 9m height	Running Meter	540
Retaining wall, 10m height	Running Meter	302
Retaining wall, 11m height	Running Meter	140
Retaining wall, 12m height	Running Meter	240
Hydro seeding	Sqm	286662
Chute for Culvert	No.	At Every Culvert location

Note:

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

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

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

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

12.2 RAINWATER HARVESTING

(i) As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rainwater, harvesting structure is mandatory in and around water crisis area, notified by the Central Ground Water Board.

(ii) Rainwater harvesting structures shall be provided at every 1000m on either side.

(iii) Rainwater harvesting structure shall be provided as per IRC: SP:42-2014 (Guideline for road drainage) and IRC:SP:50-2013 (Guidelines on Urban Drainage).

13. Change of Scope

The number, length and height/width of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual numbers, lengths and sizes as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule-B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

14. Utility Shifting

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specification of concerned Utility Owning Department is part of the scope of work of the Contractor/Concessionaire. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. The specification of concerned Utility Owning Department shall be applicable and followed.

Note-I:

a) The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the contractor/Concessionaire and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossing to underground as per requirement of utility owning department and/or construction of project highway. The contractor/concessionaire shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding

letter on the proposal of contractor/concessionaire to utility owning department whenever asked by the contractor/concessionaire. The decision/ approval of utility owning department shall be on the contractor/concessionaire.

b) The supervision charges at the rates/charges applicable of the utility owning department shall be paid directly by the Authority to the utility Owning department as and when contractor/concessionaire furnishes demand of utility Owning Department along with a copy of estimated cost given by later.

c) The dismantled material/scrap of existing Utility to be shifted/Dismantled shall belong to the contractor/concessionaire who would be free to dispose-off the dismantled material as deemed fit by them unless the contractor/concessionaire is required to deposit the dismantled material may be availed by the contractor/concessionaire as per estimate agreed between them.

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

Note-II: Copy of utility shifting plan is enclosed.

14.1 Details of proposed Utilities

Utilities Relocation Plan and its Schedule initially prepared by DPR consultant followed by joint verification with P&E and PHE department in presence of NHIDCL officers dully certified details as shown below:

14.2 Electrical Utilities

The site includes the following electrical utilities:-

a) Extra High-Tension Lines (EHT Lines)

Sl. No.	Chainage		Length (in Km)				Crossings			
	From	To	400KV	220KV	110KV	66KV	400KV	220KV	110KV	66KV
	NIL									

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

Sl.No.	Chainage		No of poles affected			Transformers	
	From	To	33KV	11KV	LT	No	Capacity
	Km 0+000	Km 28+244	Nil	Nil	7	Nil	

14.3 Public Health utilities (Water/Sewage Pipe Lines)

(a) The site includes the following Public Health utilities:-

S. No.	Chainage		Length(in Km)
	From	To	Water Supply line
1.	26+500	28+244	1.744

(b) Bore well / Hand Pump within ROW – **NIL**

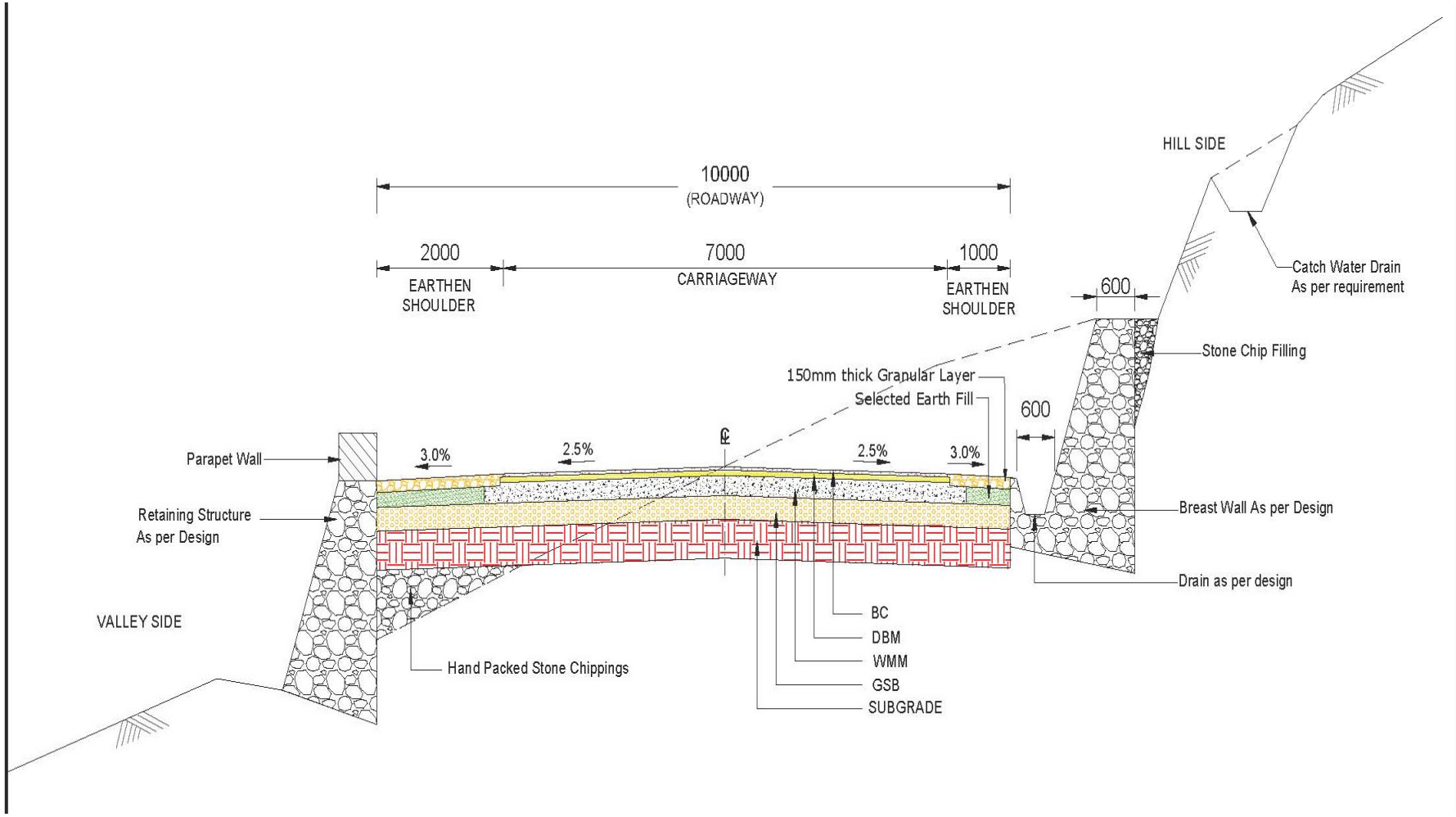
(c) Water Tank - **NIL**

14.4 Any Other line: NIL

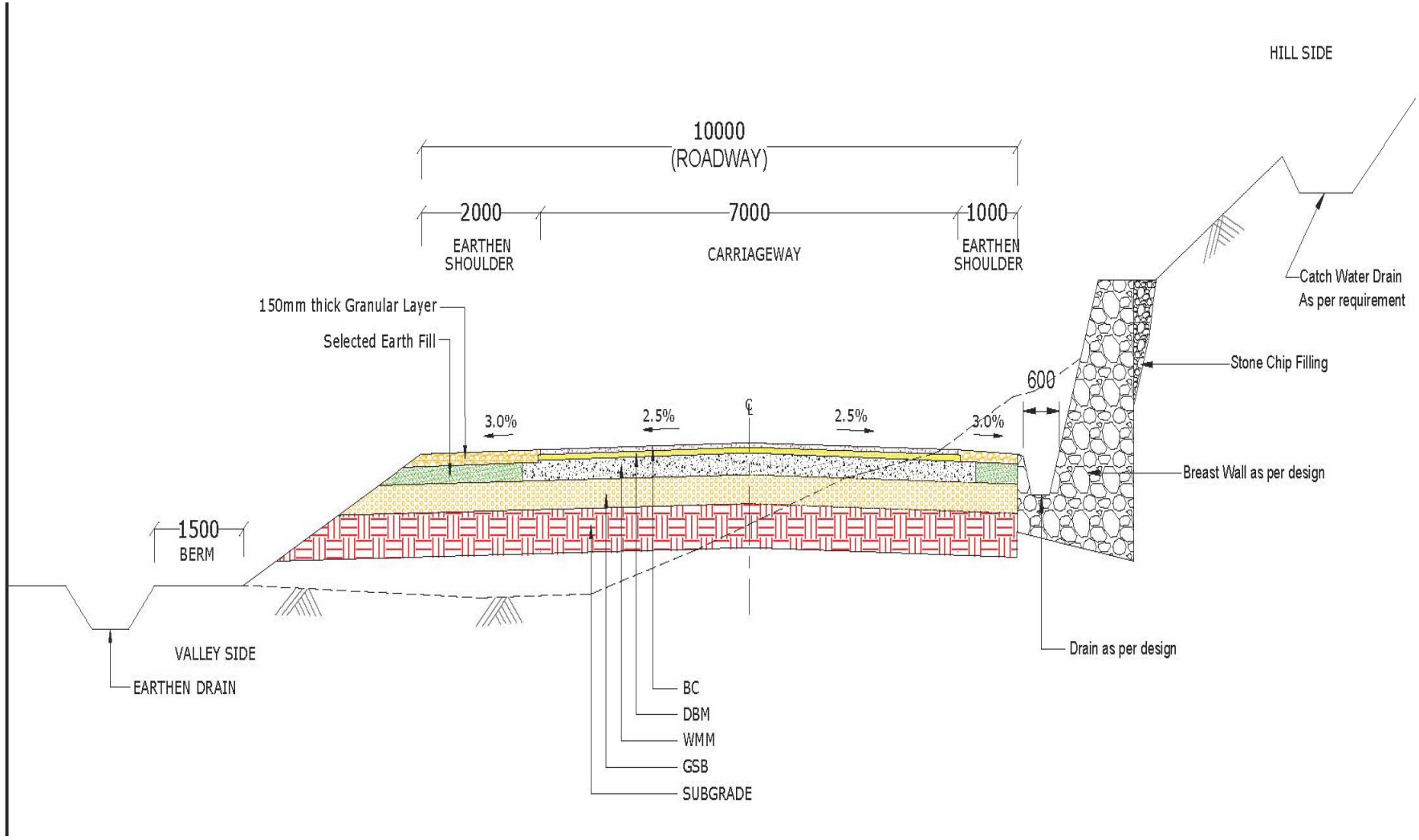
15 Utility Duct: NIL

Note: Variation upto 10% in quantities of Utilities to be shifted will not constitute Change of Scope.

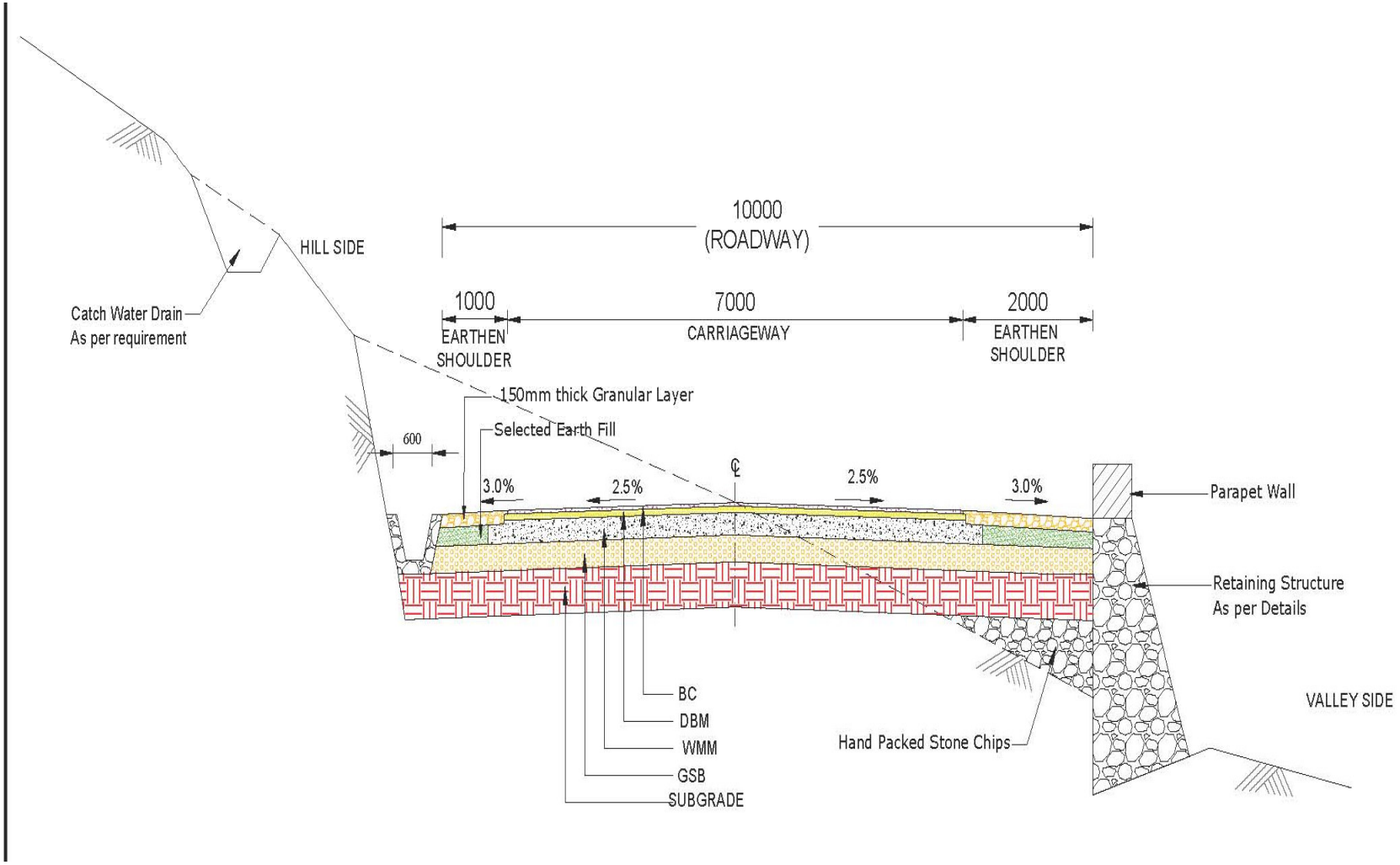
Typical Cross-sections along the Project Highway



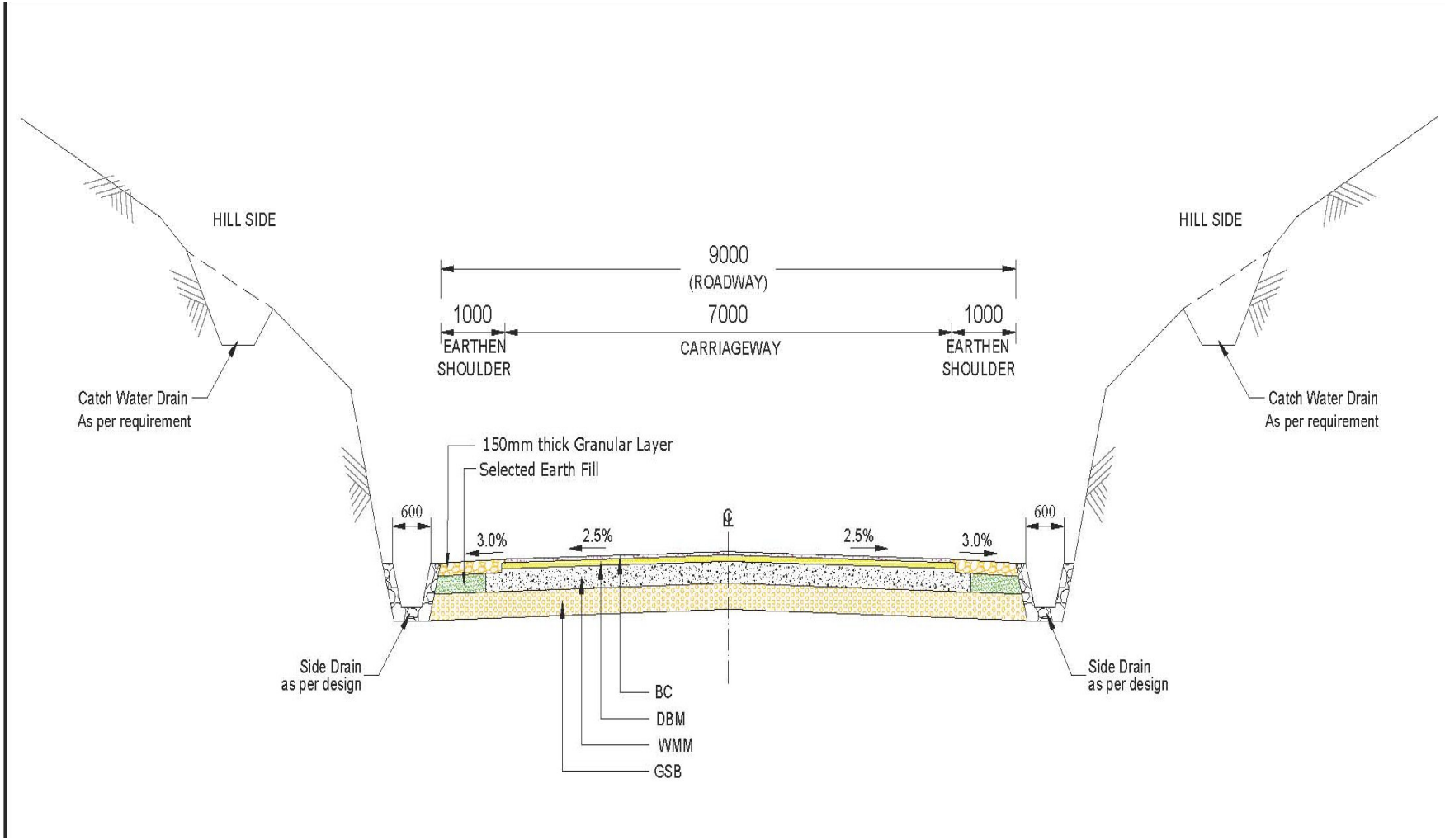
TCS-1: 2-Lane Carriageway with Retaining Wall on One side & Breast Wall on Other side



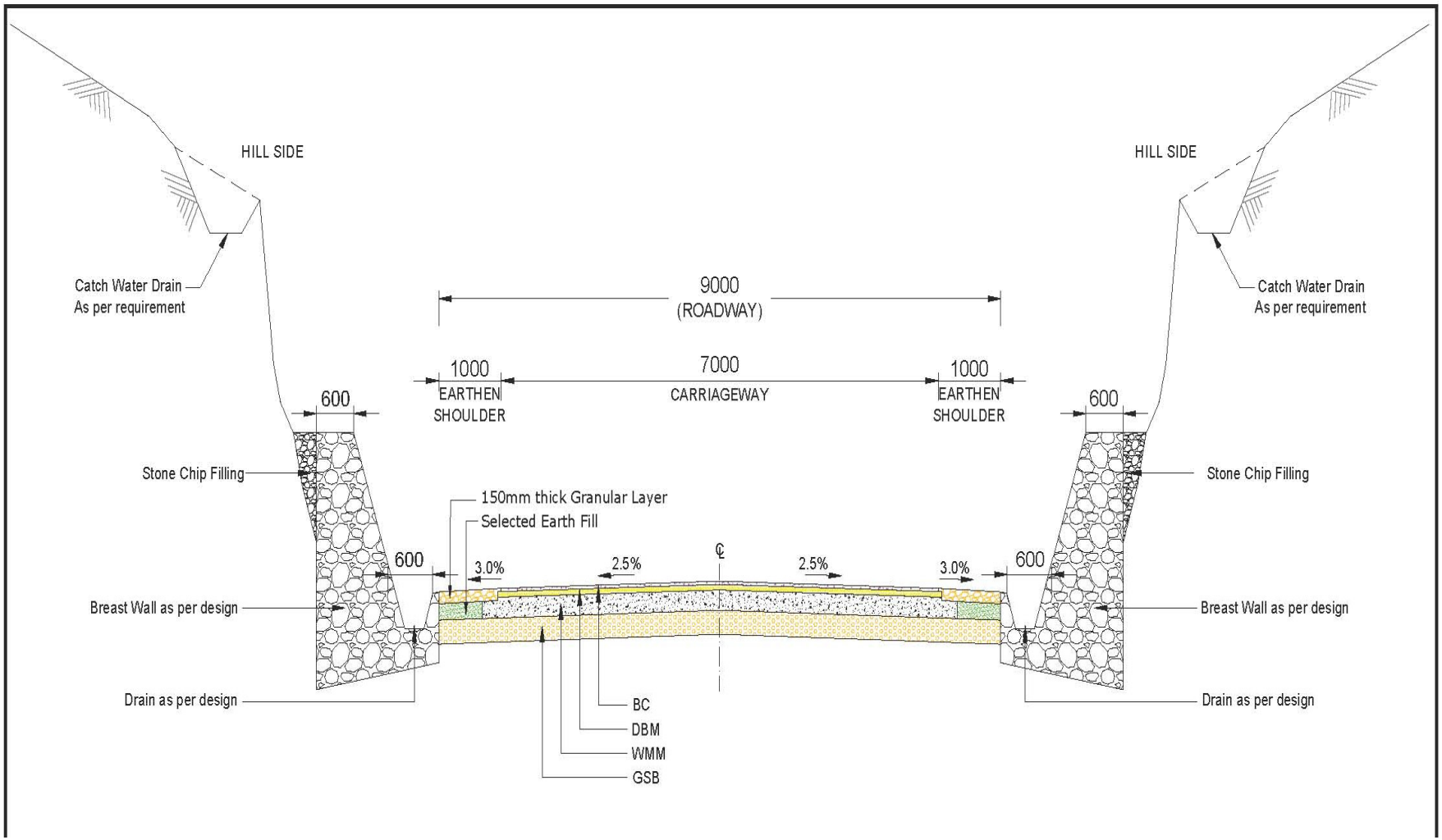
TCS-2: 2-Lane Carriageway with Breast Wall on One side



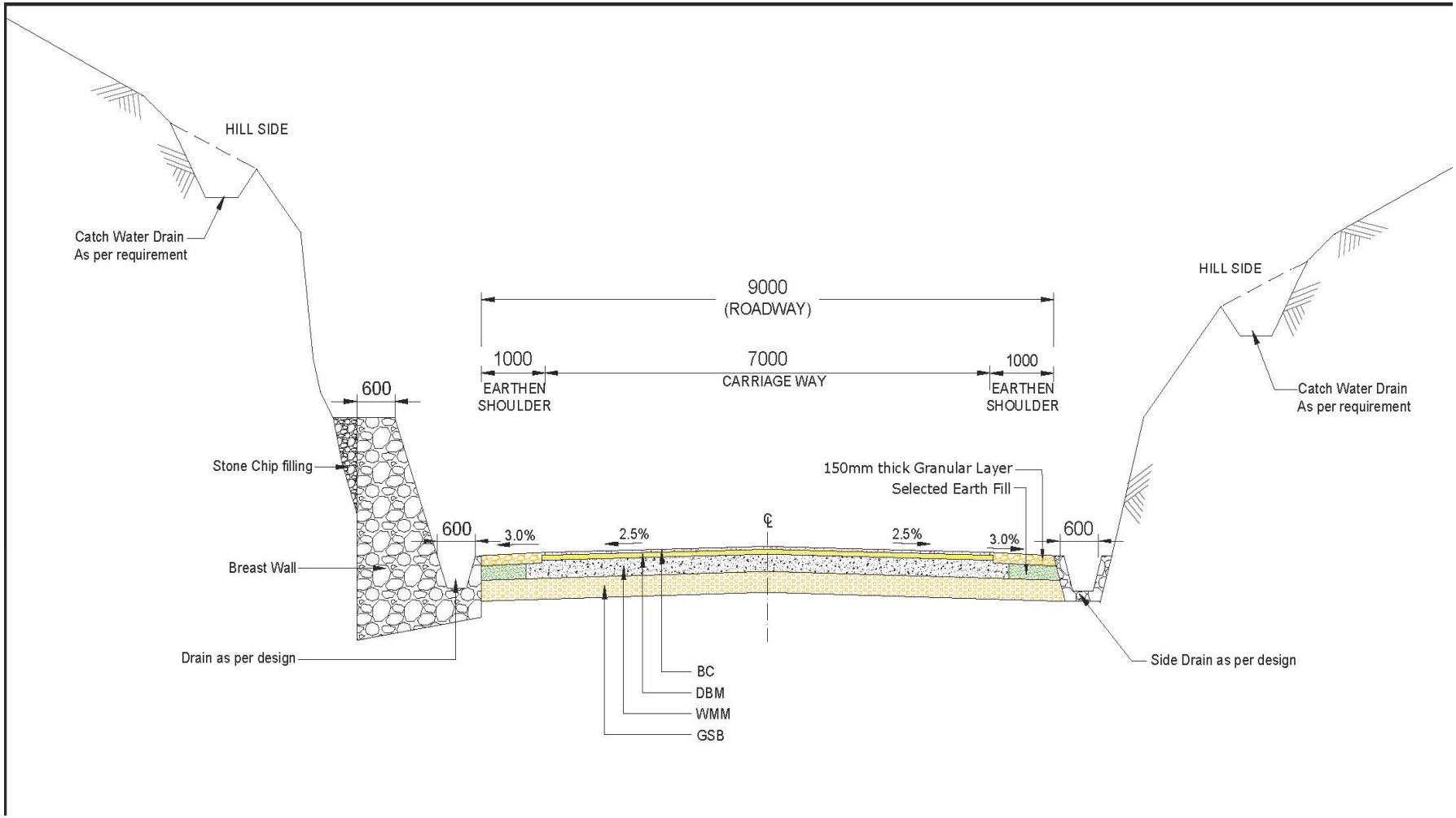
TCS-3: 2-Lane Carriageway with One side Retaining Wall & Other Side Trapezoidal Open Drain



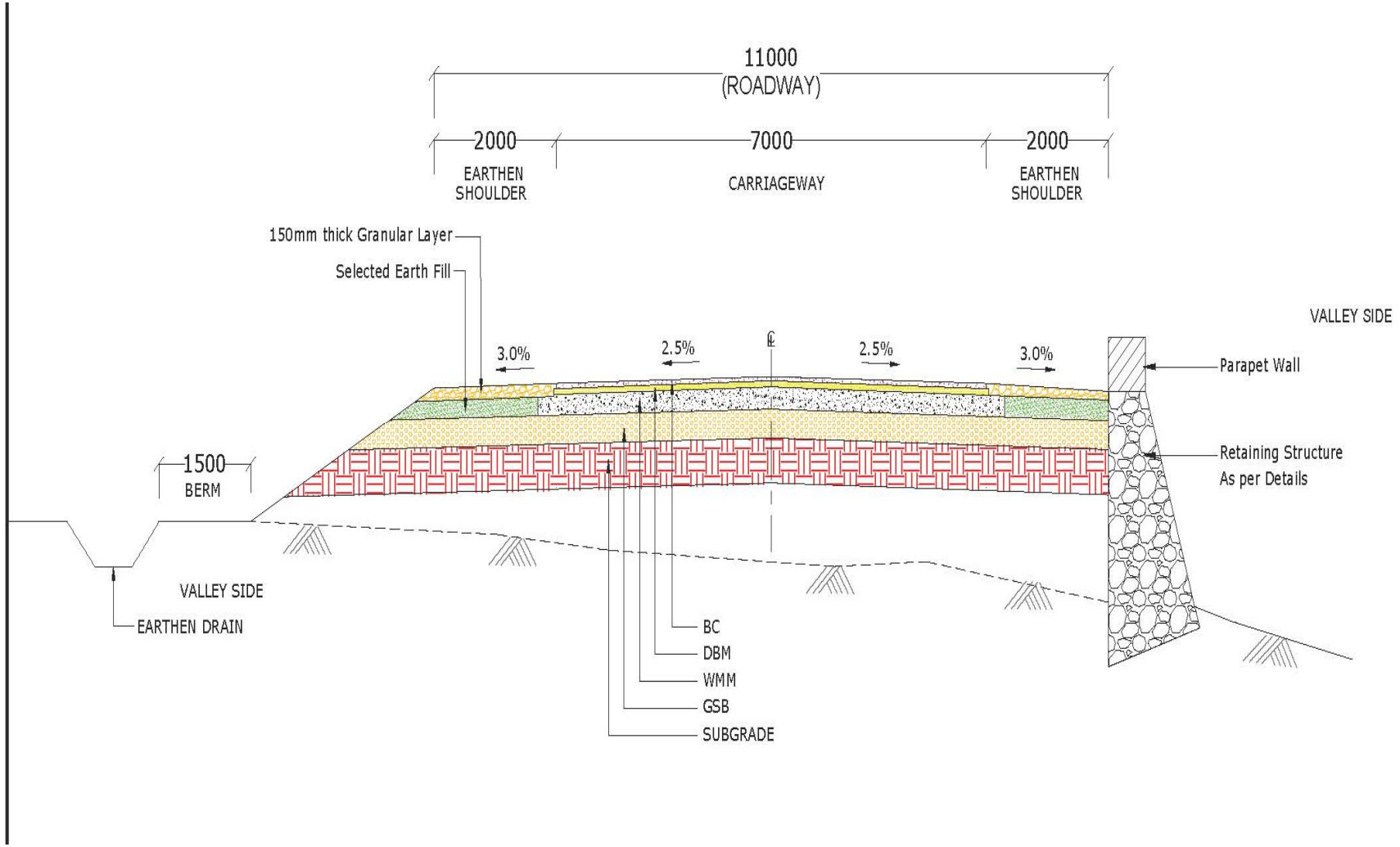
TCS-4: 2-Lane Carriageway with Both Side Trapezoidal Open Drain



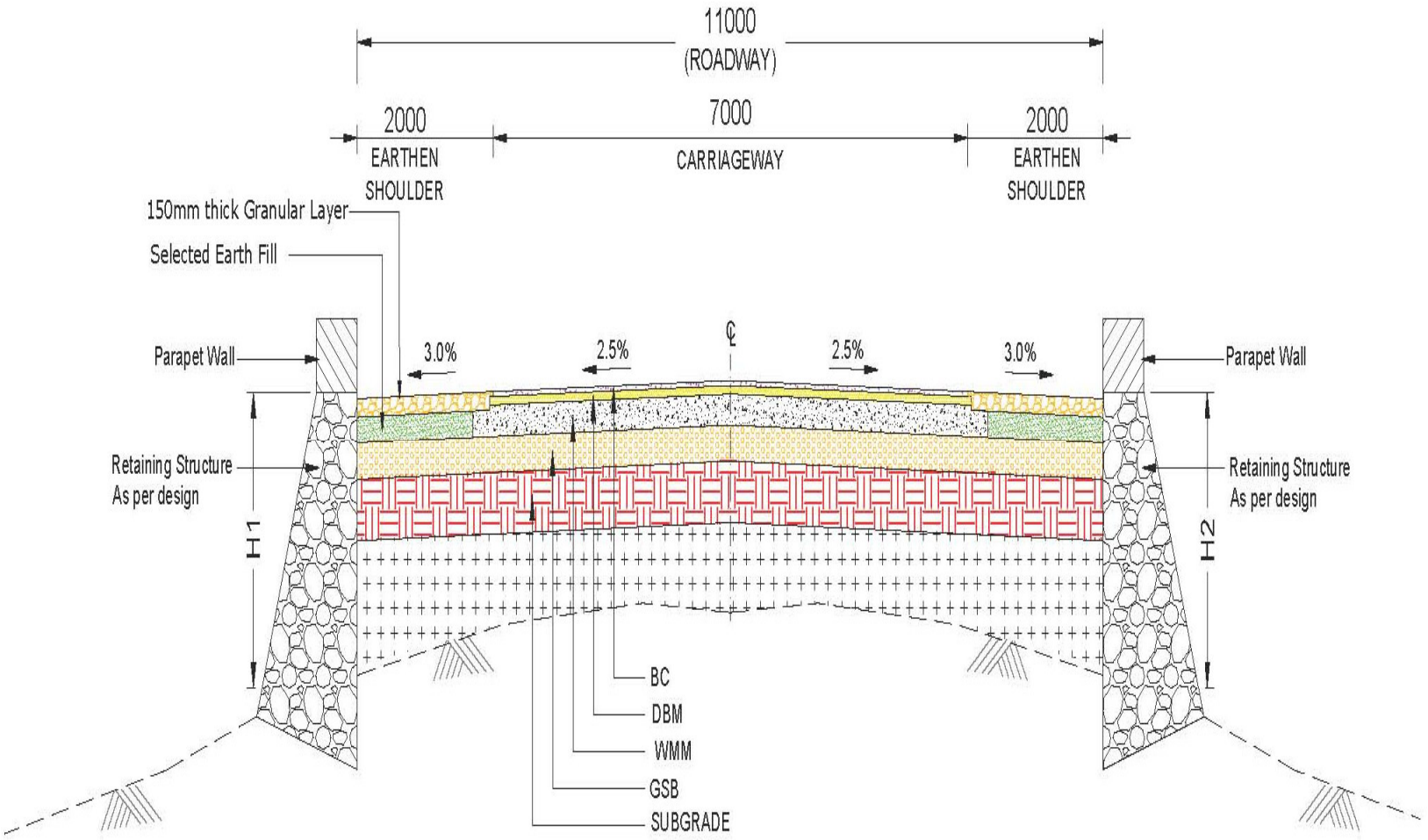
TCS-5: 2-Lane Carriageway with Both Side Breast Wall



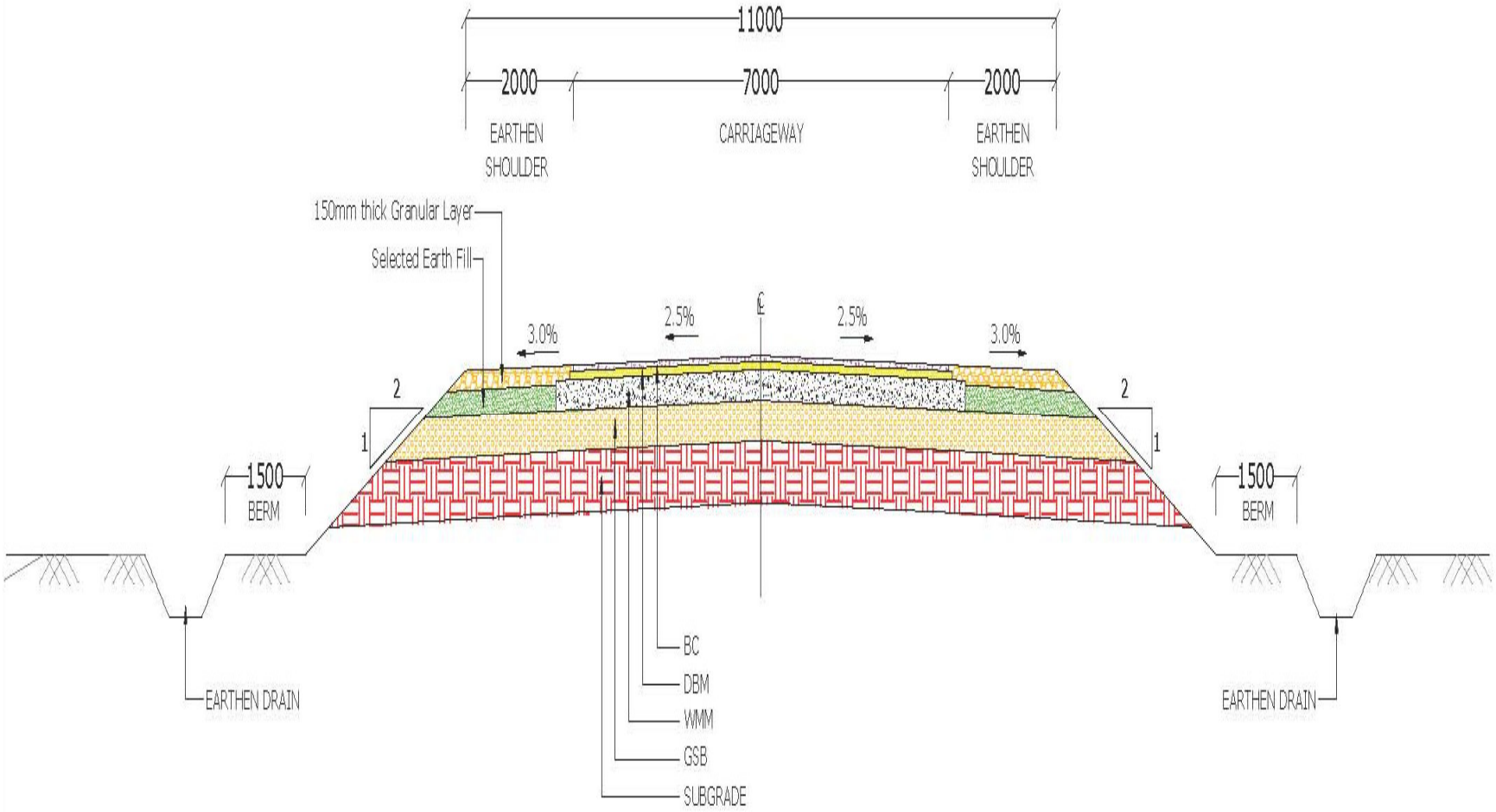
TCS-6: 2-Lane Carriageway with One Side Breast Wall & Other Side Trapezoidal Open Drain



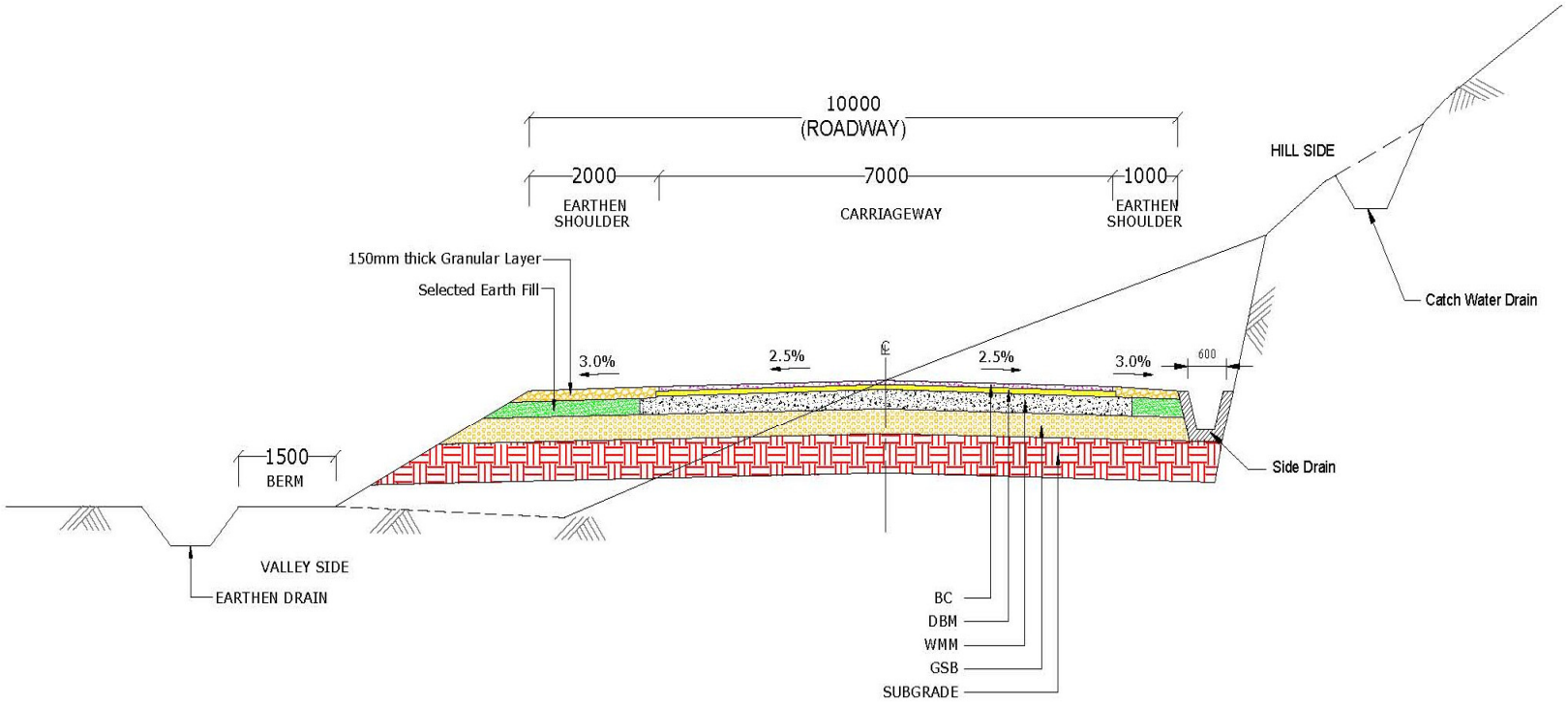
TCS-7: 2-Lane Carriageway with One Side Retaining Wall



TCS-8: 2-Lane Carriageway with Both Side Retaining Wall



TCS-9: For 2-Lane Carriageway with Earthen Shoulder



TCS-10: For 2-Lane Carriageway with Earthen Shoulder Valley Side and Other Side Trapezoidal Open Drain

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

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

(a) Toll plazas.

(b) Traffic Control Device/Road Safety Device/Roadside furniture.

(c) Pedestrian facilities.

(d) Landscaping and Tree plantation

(e) Truck lay-byes.

(f) Bus-bays and Passenger shelters

(g) Rest areas

(h) Others

2. Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza: Nil

(b) Roadside Furniture:

The roadside furniture shall be provided in accordance with section 9.0 of the Manual of the standards and Specifications.

Sl. No.	Project Facility	Location	Design Standard	Other essential details
1	Traffic Sign & Pavement marking	Entire Length (As per Schedule B)	As per manual	
2	Km stone, Hectometer Stone, 5th kilometer stone, boundary stone	Entire Length	As per manual	
3	Roadside Delineator, marker & Road Studs	As per Schedule B	As per manual	
4	Metal beam crash barrier	As per Schedule B	As per manual	
5	Traffic safety devices	Where ever required	As per manual	

(c) Location of Pedestrian Facilities:

Pedestrian facilities in the form of footpath cum drain shall be provided in the built up area (refer typical cross-section drawing). Pedestrian facilities shall be provided at the locations of urban sections in order to ensure safety of pedestrians while crossing in consultation with Authority.

(d) Landscaping & Tree plantation:

Landscaping and Tree plantation shall be done at Major intersection, Muck disposal sites and in van panchayat/ nap land of the adjoining villages.

(e) Location of Truck Lay Byes:

Sl. No.	Proposed Chainage (km)
Nil	

(f) Bus –bays and Bus shelters:

As stipulated in section 12.5 of the Manual, Bus shelters shall be provided at below indicative locations.

Sl. No.	Proposed Chainage (km)	Remarks
1	10.800	Hmawngbu Village
2	20.200	Kakichhuah village
3	28.200	Longmasu Village

Note: Above shown number of locations are minimum, however, the location of passenger shelters shall be finalized as per suitability of location and site requirement in consultation with Authority. Any change in location or increase in numbers shall not be treated as change of scope**.**

(g) Rest areas: Nil

(h) Others:

Street Lighting

Street lighting shall be provides in the built up area.

Rainwater Harvesting

As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rainwater, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board. Minimum 1 number per 5 km has to be provided throughout the project length.

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 Manual of Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC SP 73-2018 referred to as the Manual, and MORTH Specifications for Road and Bridge Works 5th Revision 2013 or latest version. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

THE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH, NEW DELHI on 01th Nov, 2018

Following recommendations and suggestions have been made for dumping muck & dumping yard:-

a. Before dumping muck at the dumping yard first of all retaining/ gabion walls of specified capacity and suitable design should be constructed.

b. All the dumping sites should be properly designed with retaining wall/gabion structures and should be maintained regularly in order to check the spillage of the muck down the slope and into the rivers and other places.

c. Wherever boulders are rolling down along with muck, gabion structures/retaining wall should have sufficient foundation and bottom width should be 4-5 m. Length of one gabion structure should not be more than 6-8 m. Wherever more length of gabion structure is required one gabion structure should be bound with another.

d. If any new dumping sites are identified in future, then the retaining / gabion structures should be constructed at suitable vertical interval of 5-6 m so that entire disposed muck may not exert pressure only at one wall/ toe wall rather the load of muck should be distributed on different walls.

e. Angle of repose of muck should be maintained between $30^{o.}$ to $45^{o.}$ Long slopes should be intercepted to several short ones with the help of 1.5 to 2.0 m wide berms / terraces/ benches in between in order to maintain less than critical velocity for runoff water and simultaneously mass erosion with be controlled.

f. The capacity/ volume of muck disposal site should be more than volume of muck to be disposed.

g. Proper sign boards indicating the name, number, location, dumping capacity, etc. should be installed at all the dumping sites.

h. Dumping sites which are full of their capacity they should be rehabilitated with local grass or shrubs. Jute geo textile (JGT) may also be used for establishment of vegetation at vulnerable sites.

i. Gabion walls should be constructed above HFL of River. If slope is very high to construct a gabion wall then a RCC/stone masonry retaining wall should be given at bank of River after proper design including foundation. Height of this wall should be well above the HFL of River.

j. All construction sites should follow and comply with the provisions of the Construction and Demolition Waste Management Rules, 2016".

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for [Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC SP 73-2018], referred to as the Manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

(i) The terms "Contractor", "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.

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

(iii) [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.]

Item	Provision as per Manual	Modified Provision
Applicable cross sections	Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC SP 73-2018	Two lane with earthen shoulders. As per TCS in Schedule B (with carriageway width of 7m, 1m shoulder on hillside and 2m shoulder on valley side)
Cross section of bridge	Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC SP 73-2018	7.5m carriageway including shyness, 1.5m footpath on both sides, 0.45m crash barriers and 0.30m Railings.
Design Speed	**Mountainous or Steep Terrain:**	**Mountainous or Steep Terrain:**
	Guidelines for Alignment survey and Geometric design of Hill roads – IRC: 52-2019 and Hill road manual IRC: SP 48 -1998 and IRC SP 73-2018	20 km/hr at hair pin bend

Table: Locations where Design Speed is less than 30 kmph

HIP No.	HIP Easting	HIP Northing	Radius	HIP Chainage	SPEED (V) in KMPH
5	477361.8	2449606	20	629.55	20
23	477705.5	2449234	21	2018.79	20
30	477521.4	2449878	21	2541.699	20
104	480004.6	2449652	20	8787.348	20
115	479830.5	2450225	20	9715.362	20
140	480471.2	2448560	20	11789.21	20
246	483288.9	2446314	20	22113.18	20
256	483536.1	2447020	20	22764.78	20
285	483950.4	2445125	20	25957.92	20
298	484197.7	2444088	20	26994.35	20

Schedule - E

(See Clauses 2.1 and 14.2)

Maintenance Requirements

1. Maintenance Requirements

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

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

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

2. Repair/rectification of Defects and deficiencies

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

3. Other Defects and deficiencies

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

4. Extension of time limit

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

5. Emergency repairs/restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

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

8. Repairs on account of natural calamities

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

Annex -I

(Schedule-E)

Annex –I Repair/rectification of Defects and deficiencies

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

Table -1: Maintenance Criteria for Pavements:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		2-7 days	IRC:82-2015
	Bleeding	Nil	< 1 % of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	< 1 % of area	Daily			7-15 days	IRC:82-2015 read with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily			7- 15 days	IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th>Frequency of Inspection</th><th>Tools/ Equipment</th><th>Standards and References for Inspection and Data Analysis</th><th>Time limit for Rectification/Repair</th><th>Maintenance Specifications</th></tr>
<tr><td></td><td></td><td>Desirable</td><td>Acceptable</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3"></td><td>Pavement Condition Index</td><td>3</td><td>2.1</td><td>Bi-Annually</td><td rowspan="2">(Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td rowspan="2">Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment</td><td>180 days</td><td>IRC:82-2015</td></tr>
<tr><td>Other Pavement Distresses</td><td></td><td></td><td>Bi-Annually</td><td>2-7 days</td><td>IRC:82-2015</td></tr>
<tr><td>Deflection/ Remaining Life</td><td></td><td></td><td>Annually</td><td>Falling Weight Deflectometer</td><td>IRC 115: 2014</td><td>180 days</td><td>IRC:115-2014</td></tr>
<tr><td rowspan="2">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td>Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles
<table><tr><th>Minimum SN</th><th>Traffic Speed (Km/h)</th></tr><tr><td>36</td><td>50</td></tr><tr><td>33</td><td>65</td></tr><tr><td>32</td><td>80</td></tr><tr><td>31</td><td>95</td></tr><tr><td>31</td><td>110</td></tr></table></td><td>Bi-Annually</td><td>SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>IRC:SP:83-2008</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td rowspan="2">Embankment / Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="2">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="2">IRC</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/Repair	Maintenance Specifications
		Desirable	Acceptable					
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification 408.4
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/ Gullies in slope	Nil	Nil	Daily Specially During Rainy Season	NA		7-15 days	MORT&H Specification

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

Table -2: Maintenance Criteria for Rigid Pavements:

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

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
	more joints	D = depth of slab	3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms and specifications - See Para 5.5 & 9.2 Within 15days
			5	w > 6 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	
3	**Single Longitudinal Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > 1 m. Within 15 days	-
			3	w = 3.0 - 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15 days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15 days
4	**Multiple Cracks intersecting with one or more joints**	**w = width of crack**	0	Nil, not discernible	No Action	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > 1 m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate subbase, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	-
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	**Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)**	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action
			1	w < 0.5 mm; L < 3 m/m²	Not Applicable, as it may be full depth	Seal with low viscosity epoxy to secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3 m/m²		
			3	w > 1.5 mm and L < 3 m/m²		
			4	w > 3 mm, L < 3 m/m² and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m² and deformation		
Surface Defects						
7	Ravelling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to be damaged. Within 15 days	
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if affecting. Within 30 days	
			4	r = 25 - 50 %		

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	**Scaling**	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	r < **2** %	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10 %		
			3	r = 10 - 20%	Bonded Inlay within 15 days	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab within 30 days	
9	**Polished Surface/Glazing**	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2 '	t = 1 - 0.6 mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days	
10	**Popout (Small Hole), Pothole Refer Para 8.4**	n = number/m² d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m²	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m²	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m²		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m²	Partial depth repair 110mm	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m²	i.e.10 mm more than the depth of the hole. Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m²	Full depth repair. Within 30 days	
Joint Defects						
11	**Joint Seal Defects**	loss or damage L = Length as % total joint length	0	Difficult to discern.	**Short Term**	**Long Term**
					No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations. Within 7 days	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	**Spalling of Joints**	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion. Within 7 days	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair. Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	**Faulting (or Stepping) in**	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
	Cracks or Joints		1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate. Within 30days
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate. Within 30days
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting and raising sunken slab	
14	**Blowup or Buckling**	h = vertical displacement from normal profile	0	Nil, not discernible	**Short Term**	**Long Term**
					No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic within 7 days	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	**Depression**	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen sub-grade. Reinstate pavement at normal level if L < 20 m. Within 30 days	
			5	h > 100 mm		
16	**Heave**	h = positive vertical displacement from	0	Not discernible. h < 5 mm	**Short Term**	**Long Term**
					No action.	scrabble

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		normal profile. L = length	1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic within 7 days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		
17	**Bump**	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			5	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term**	**Long Term**
					No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm		
			4	f = 50 - 75 mm		For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			5	f > 75 mm	Fill up shoulder within 7 days	
Drainage						
19	**Pumping**	quantity of fines	0	not discernible	No Action	

Sr. No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
		and water expelled through open joints and cracks Nos	1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	**Ponding**	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do-	

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC:SP 84-2014</td></tr>
<tr><td rowspan="2">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Day time Visibility</td><td>During expected life Service Time
Cement Road - 130mcd/m²/lux
Bituminous Road - 100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Night Time Visibility</td><td>Initial and Minimum Performance for Dry Retro reflectivity during night time:
<table><tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m²/lux)</td></tr><tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr><tr><td>Up to 65</td><td>200</td><td>80</td></tr><tr><td>65 - 100</td><td>250</td><td>120</td></tr><tr><td>Above 100</td><td>350</td><td>150</td></tr></table>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):
Initial 7 days Retro reflectivity: 100 mcd/m²/lux
Minimum Threshold Level: 50 mcd/m²/lux</td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Skid Resistance</td><td>Initial and Minimum performance for Skid Resistance:
Initial (7days): 55BPN
Min. Threshold: 44BPN
*Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc</td><td>Bi-Annually</td><td>As per Annexure-G of IRC:35-2015</td><td></td><td>Within 24 hours</td><td>IRC:35-2015</td></tr>
</table>

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

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination on the road surface	Daily	The illumination level shall be measured with luxmeter	Improvement in Lighting System	24 hours	IRC:SP:84-2014
		No major/minor failure in the lighting system	Daily	-	Rectification of failure	8 hours	IRC:SP:84-2014
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs	No obstruction due to trees	Monthly	Visual with video/image backup	Removal of trees	Immediate	IRC:SP:84-2014
	Deterioration in health of trees and bushes	Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time	Daily	Visual with video/image backup	Timely watering and treatment. Or Replacement of Trees and Bushes.	Within 90 days	IRC:SP:84-2014
	Vegetation affecting sight line and road structures	Sight line shall be free from obstruction by vegetation	Daily	Visual with video/image backup	Removal of Trees	Immediate	IRC:SP 84-2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Table 4: Maintenance Criteria for Structures and Culverts:

Pipe/box/ slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregate length	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge - Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment	15 days	MORT&H Specification 3004.2 & 2811.
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection and detailed condition survey as per IRC SP: 35-1990.	Repairs and replacement of safety barriers as the case may be	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.
	Rusted reinforcement	Not more than 0.25 sqm	Bi-Annually	Detailed condition survey as per IRC	All the corroded reinforcement shall	15 days	IRC SP: 40-1993 and MORTH

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Spalling of concrete	Not more than 0.50 sqm		SP: 35-1990 using Mobile Bridge Inspection Unit	need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.		Specification 1600.
	Delamination	Not more than 0.50 sq.m					
	Cracks wider than 0.30 mm	Not more than 1m total length	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to 30 m	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	4 months	AASHTO LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint.	Bi-Annually	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Replace of seal in expansion joint	15 days	MORTH specifications 2600 and IRC SP: 40-1993.
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specifications 2600 and IRC SP: 40-1993.

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers.	Suitable protection works around pier/abutment	1 month	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

Nature of Defect or deficiency		Time limit for repair/ rectification
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures	within 48 (forty eight) hours
	Permanent measures	within15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours

Schedule - F

(See Clause 4.1 (vii)(a))

Applicable Permits

1. Applicable Permits

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

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

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

(c) Licence for use of explosives;

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

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

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

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

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

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

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

Schedule - G

(See Clauses 7.1 and 19.2)

Annex-I : Form of Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____[name of Authority]

_____ [address of Authority]

WHEREAS_____[name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _Dated__ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS 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 Contract, 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.

[1] Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract 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 Contract 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 Contract 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 Contract 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 Contract 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 Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

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

Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

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

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

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

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (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. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

[$]Insert date atleast 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 2.21 of the RFP). The Contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire DLP.

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

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

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

Annex - II

(Schedule - G)
(See Clause 19.2)

Annex – II: Form for Guarantee for Advance Payment

To

_____[name of Authority]
_____ [address of Authority]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the ***** section of [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs._____cr. (Rupees_____crore) and the amount of this Guarantee is Rs._____cr. (Rupees_____crore) (the "**Guarantee Amount**")[2].

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

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

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

   A letter from the Authority, under the hand of an officer not below the rank of [General

2 The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment

Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever

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

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

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

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

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

7. The Guarantee shall cease to be in force and effect on ****[3] Unless a demand or

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

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

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

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

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

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

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. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

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

(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 Clauses 10.1(iv) and 19.3)

Contract Price Weightages

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

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts.	40.47%	**A- Widening and strengthening of existing road**	[Nil]
		B.1- Reconstruction/New 2-Lane Realignment /Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	27.99
		(2) Sub Base Course	13.40
		(3) Non Bituminous Base course	16.60
		(4) Bituminous Base course	13.31
		(5) Wearing Coat	8.42
		(6) Earthen Shoulder	0.26
		B.2- Reconstruction/New 2-Lane Realignment/ Bypass (Rigid Pavement)	[Nil]
		C.1- Reconstruction/ New Service Road (Flexible Pavement)	[Nil]
		C.2- Reconstruction/New Service Road (Rigid Pavement)	[Nil]
		D- Reconstruction and New culverts on existing road, realignments, bypasses: Culverts (length <6m)	20.02
Minor Bridges works (length >6 m and <60 m)	1.58%	**A.1- Widening and Repair of Minor bridges (length >6 m and<60m).**	
		Minor Bridges	[Nil]
		A.2- New Minor bridges (length >6 m and <60 m)	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(i) Foundation	14.24
		(ii) Sub Structure	40.72
		(iii) Super-structure	45.04
		(iv) Approaches	included in road works
		(v) Guide Bunds & River Training Works	[Nil]
Major Bridges works (length>60 m)	12.53%	**A.1- Widening and repairs of Major Bridges**	[Nil]
		A.2- New Major Bridges	
		(i) Foundation	3.73
		(ii) Sub-structure	16.03
		(iii) Super-structure (including bearings)	77.25
		(iv) Wearing Coat including expansion joints	0.91
		(v) Miscellaneous Items like hand rails, crash barriers, road markings etc.	2.08
		(vi) Wing walls/return walls	[Nil]
		(vii) Guide Bunds, River Training works etc.	[Nil]
		(viii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]
Other Works	45.35%	(i) Toll Plaza	[Nil]
		(ii) Road side covered drains	[Nil]
		(iii) Road side open drains	2.47
		(iv) Road signs, markings, km stones, safety Devices,... etc.	4.04
		(v) Project facilities	
		a) Bus Bays	0.03
		b)Truck Lay-Byes	[Nil]
		c) Junctions (Major & Minor)	0.16
		d) Rest areas	[Nil]
		e) Diversion work	[Nil]
		f) Others	[Nil]

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(v) Road side plantation	[Nil]
		(vi) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/ grade separators and ROBs/ RUBs	[Nil]
		(vii) Safety and traffic management during construction	0.06
		(viii) Protection Works	
		(a) Retaining wall with parapet	57.69
		(b) Breast wall	30.41
		(c) Parapet	0.04
		(d) Seeding Mulching with jute net	5.10
Electrical utilities and Public Health Utilities (Water pipe lines and Sewage lines)	0.07%	i) Electrical lines	63.79
		ii) Water and sewage pipelines	36.21

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage weightage	Payment Procedure
A- Widening & strengthening of existing road	[Nil]	
B.1- Reconstruction/New 2-lane realignment/ bypass (Flexible pavement)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m. In case of Hill cutting, the payment procedure will be as under:
(1) Earthwork up to top of the sub- grade	27.99	
(2) Sub Base Course	13.40	

Stage of Payment	Percentage weightage	Payment Procedure
(3) Non Bituminous Base course	16.60	Hill cutting: 40% of weightage of B.1 (1). Preparation of Sub-grade: 60% of weightage of B.1 (1).
(4) Bituminous Base course	13.31	
(5) Wearing Coat	8.42	
(6) Earthen Shoulder	0.26	
B.2- Reconstruction/New 2-Lane realignment/ bypass (Rigid pavement)	[Nil]	
C.1- Reconstruction/ New service road (Flexible pavement)	[Nil]	
C.2- Reconstruction/ New service road (Rigid pavement)	[Nil]	
D- Re-Construction and New culverts on existing road, realignments, bypasses		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 at least 01 (One) culvert.
Culverts (length <6m)	20.02	

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

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

Where,

P = Contract Price

L = Total length in km

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

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

1.3.2 Minor Bridges

Procedure for estimating the value of Minor Bridge shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1-Widening and repair of minor bridges (length>6mand<60m)	[Nil]	
A.2-New minor bridges		
(i) Foundation: On completion of the foundation work including foundations for wing and return walls, abutments, piers.	14.24	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against foundation shall be made on pro-rata basis on completion of at least two foundations. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub- Structure: On completion of the abutments, piers upto the abutment/pier cap level.	40.72	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges. Payment against sub-structure shall be made on pro-rata basis on completion of at least two sub-structures upto abutment/ pier cap level of each bridge.
(iii) Super-structure: On completion of the super-structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	45.04	Payment shall be made on pro-rata basis on completion of a stage i.e. Completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(iv) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect and fit for use.	Included in road estimate	Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.

(v) Guide Bunds and River Training Works: On completion of Guide Bunds and river Training Works complete in all respects	[Nil]	

1.3.3 Major Bridge works

Procedure for estimating the value of Major Bridge works shall be as stated in table 1.3.3:

Table 1.3.3

Stage of Payment	Weightage	Payment Procedure
1	2	3
A.1- Widening and repairs of Major Bridges	[Nil]	
A.2- New Major Bridges		
(i) Foundation: Foundation for abutment, piers.	3.73	Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Major Bridge. Payment against foundation shall be made on pro- rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the major Bridge as per weighatge given in this table, subject to completion of at least two foundations in all respect. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
(ii) Sub-structure: Sub structures of abutment, piers upto abutment/pier cap level.	16.03	Payment against Sub- structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub- structure of the major bridge subject to completion of at least two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
(iii)Super-structure including girder, deck slab, bearings (excluding wearing Coat and expansion joints)		
(a) Super-structure: casting of girders/ fabrication of girders (steel)	30.90	Unit of measurement is numbers. Payment against casting of girders/ fabrication of girders shall be made on pro-rata basis with respect to total numbers of girders required in the structure on completion of a

Stage of Payment	Weightage	Payment Procedure
1	2	3
		stage i.e. not less than completion of casting/ fabrication of at least five girders of a structure.
(b) Super-structure: erection of girders, deck slab and bearings	46.35	Payment shall be made on pro-rata basis on completion of a stage i.e. Completion of super-structure including bearing of at least one span in all respects as specified.
(iv) Wearing Coat including expansion joints	0.91	Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(v) Miscellaneous Items like hand rails, crash barriers, road markings etc	2.08	Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified.
(vi) Wing walls/return walls	[Nil]	Payments shall be made on completion of all wing walls/return walls complete in all respects as specified.
(vii) Guide Bunds, River Training works etc.	[Nil]	Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified.
(viii) Approaches (including Retaining walls, stone pitching and protection works)	[Nil]	Payments shall be made on completion of both approaches including stone pitching, protection works, etc. complete in all respects as specified.

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

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

1.3.4 Other works

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza	[Nil]	
(ii) Road side Covered drains	[Nil]	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 5% (five per cent) of the total length.
(iii) Road side open drains	2.47	
(iv) Road signs, markings, km stones, safety devices, etc.	4.04	
(v) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus Bays	0.03	
b)Truck Lay-Byes	[Nil]	
c) Junctions (Major & Minor)	0.16	
d) Rest areas	[Nil]	
e) Diversion work	[Nil]	
f) Others	[Nil]	
(vi) Road side plantation	[Nil]	
(vii) Repair of protection works other than approaches to the bridges, elevated sections/ flyovers/grade separators and ROBs/RUBs.	[Nil]	
(viii) Safety and traffic management during construction	0.06	Payment shall be made on pro rata basis every six months.
(viii) Protection Works		Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five per cent) of the total length.
(a) Retaining wall with parapet	57.69	
(b) Breast wall	30.41	
(c) Parapet	0.04	
(d) Seeding Mulching with jute net	5.10	

1.3.5 Electrical utilities and Public Health Utilities (Water pipelines and sewage lines)

Procedure for estimating the value of other works done shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) Electrical lines including crossings, transformers if any.	63.79	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of Electrical lines. Payment shall be made for completed activity. The average weightage of major activities (only for payment purpose) in shifting work is :- (i) Erection of Poles- 20%, (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)- 15% and (iv) Charging of line including dismantling and site clearance- 35%
(ii) Water and sewage pipelines including crossing if any.	36.21	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. The average weightage of major activities (only for payment purpose) in shifting work is:- (i) Laying of pipe- 50%, (ii) Charging of line including all miscellaneous works and dismantling and site clearance- 50%.

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 (iv))

Drawings

1. Drawings

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

2. Additional Drawings

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

Annex -I

(Schedule -I)

Annex –I: List of Drawings

A minimum list of the drawings of the various components / elements of the Project Highway and project facilities required to be submitted by the Contractors given below:

a) Drawings of horizontal alignment, vertical profile and detailed cross sections.

b) Drawings of all Major and Minor Bridges.

c) Drawings of cross-drainage works.

d) Drawings of Major intersections, Grade Separated Structures, Viaduct.

e) Drawing of Toll Plaza layout and building.

f) Drawing of bus-bay and bus shelters.

g) Drawing of road furniture including traffic signage, marking, safety barriers etc.

h) Drawing of traffic diversion plan.

i) General arrangement showing area of base camp and administrative block.

j) Any other Drawing as per instruction of Authority's Engineer.

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the **256th** day from the Appointed Date (the **"Project Milestone-**I").

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

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the **438th** day from the Appointed Date (the **"Project Milestone- II").**

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

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **621th** day from the Appointed Date (the **"Project Milestone- III").**

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

5. Scheduled Completion Date

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

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

6. Extension of time

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

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

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

2. Tests

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

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

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

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

(lux) of lighting using requisite testing equipment.

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

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

3. Agency for conducting Tests

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

4. Completion Certificate

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

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

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

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

Schedule - L

(See Clause 12.2)

Completion Certificate

1. I,…….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated (the **"Agreement"),** for [construction of the ****section (km ** to km **) of National Highway No. ***] (the **"Project Highway")** on Engineering, Procurement and Construction (EPC) basis through…… (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

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

(Signature)

(Name)

(Designation) (Address)

Schedule - M

(See Clauses 14.6, 15.2 and 19.7)

Payment Reduction for Non-Compliance

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

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

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

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

2. Percentage reductions in lump sum payments on monthly basis

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

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/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%

S. No.	Item/Defect/Deficiency	Percentage
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

Where,

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

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

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

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

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

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

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

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

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

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

2. Terms of Reference

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

3. Appointment of Government entity as Authority's Engineer

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

Annex -I

(Schedule - N)

Annex –I: Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the **"TOR")** for the Authority's Engineer are being specified pursuant to the EPC Agreement dated (the **"Agreement),** which has been entered into between the [name and address of the Authority] (the **"Authority")** and…… (the **"Contractor")#** for [Two-Laning] of the **** section (km ** to km **) of National Highway No. ** in the State of *** 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.

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

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

2. Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;

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

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

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

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

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

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

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

4. Construction Period

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

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

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

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

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

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

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

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

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

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

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance

with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

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

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

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

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

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

5. Maintenance Period

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

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

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

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

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

6. Determination of costs and time

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

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

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

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in

accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9. Miscellaneous

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

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

(iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project

Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

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

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

Schedule - O

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

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

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

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

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

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

(f) Deductions:

i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
ii. Any amount towards deduction of taxes; and
iii. Total of (i) and (ii) above.

(g) Net claim: (e) - (f) (iii);

(h) The amounts received by the Contractor upto the last claim:
i. For the Works executed (excluding Change of Scope orders);
ii. For Change of Scope Orders, and
iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(a) the monthly payment admissible in accordance with the provisions of the Agreement;
(b) the deductions for maintenance work not done;
(c) net payment for maintenance due, (a) minus (b);
(d) amounts reflecting adjustments in price under Clause 19.12; and
(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule - P

(See Clause 20.1)

Insurance

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

The insurance cover shall be not less than the value of the contract price.

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

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

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

4. Insurance to be in joint names

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

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Riding Quality test:

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

2. Visual and physical test:

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

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I,…….. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated……. (the **"Agreement**"), for [construction of the****section (km ** to km **) of ****] (the "**Project Highway**") on Engineering, Procurement and Construction (EPC) basis

Through …….. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day

SIGNED, SEALED AND DELIVERED

(Signature)
(Name and designation of Authority's Representative)
(Address)

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