Schedule

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

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

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

1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however improve/upgrade the Road Profile as indicated in Annexure-III based on site/design requirement.

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

Annex - I

(Schedule-A)

Site

1. The Site

The Site of the Project Highway comprises the section of National Highway -39 (New NH-2) from Daili (End of Kangpokpi Bypass) (Ex. Km276+578of NH-39) to Kuraopokpi (Ex Km288+815 of NH-39) in the state of Manipur. The contract package of the project comprises the rehabilitation and upgradation of existing two lanes to 4 lane divided carriageway configuration. The land, carriageway and structures comprising the Site are described below:

2. Land

The Site of the Project Highway comprises the land (existing right of way (ROW)) as described below:

S. No	Existing Chainage (Km)		Existing ROW (m)	Remarks
	From	To		
1	276+578	288+815	12	

3. Carriageway

The present carriageway of the Project Highway is generally Two Lane carriageway. The type of the existing pavement is flexible and road width details of are as below:

Ex. Chainage (Km)		Length (m)	Terrain		Carriageway	
From	To		LHS	RHS	Type	Width (m)
276+578	278+800	2222	Valley	Hilly	BT	6.3/6.8
278+800	279+000	200	Rolling	Rolling	BT	6.3
279+000	280+600	1600	Rolling	Rolling	BT	7
280+600	281+800	1200	Rolling	Rolling	BT	6.3
281+800	282+200	400	Hilly	Rolling	BT	6.2
282+200	283+600	1400	Rolling	Rolling	BT	6.2
283+600	283+800	200	Valley	Hilly	BT	6.6/6.8
283+800	287+600	3800	Valley	Hilly	BT	6.6
287+600	288+815	1215	Rolling	Rolling	BT	6.8/6.5
Total Length (km)		12.237				

4. Major Bridges

The Site includes the following Major Bridges:

S No.	Ex. Chainage	Ex. Span arrangement (No. x Span)	Total Outer Width (m)	Type of Structure		
				Superstructure	Substructure	Foundation
NIL						

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

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

S. No.	Existing Chainage (KM)	Type of Structure		No. of Spans with span length(m)	Width (m)	ROB /RUB	Remarks
		Found-ation	Super-structure				
NIL							

6. Grade separators

The Site includes the following grade separators:

S.No.	Existing Chainage (KM)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Super structure		
NIL					

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Ex. Chainage (Km)	Ex. Span arrangement (No. x Span)	Total Outer Width of Deck (m)	Type of Structure		
				Superstructure	Substructure	Foundation
1	279+357	1 x 20.5	8.5	RCC-T Beam	RCC wall type Abutment	Open
2	281+333	1 x 17.0	10.5	RCC-T Beam	RCC wall type Abutment	Open
3	283+525	1 x 26.5	8.3	PSC I Beam with RCC Deck	RCC wall type Abutment	Open

S. No.	Ex. Chainage (Km)	Ex. Span arrangement (No. x Span)	Total Outer Width of Deck (m)	Type of Structure		
				Superstructure	Substructure	Foundation
4	286+411	1 x 6.5	12.0	Solid slab	RCC wall type Abutment	Open
5	287+381	1 x 14.5	12.0	RCC-T Beam	RCC wall type Abutment	Open
6	288+621	1 x 10.0	10.3	Solid slab	RCC wall type Abutment	Open

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location/ Existing Chainage (KM)	Remarks
NIL		

9. Underpasses (Vehicular, Non Vehicular)

The Site includes the following underpasses:

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

10. Culverts

10.1 Pipe Culverts:

The Site has the following existing pipe culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	No. of Pipe	Pipe Dia (m)	Carriageway Width (m)	Remarks
1	276+583	Pipe	1	1	7.5	Blocked-R
2	276+768	Pipe	1	1	7	
3	279+848	Pipe	1	1		
4	280+099	Pipe	1	1		
5	280+474	Pipe	1	1	6	
6	281+018	Pipe	1	1	6	
7	281+895	Pipe	1	1	7.2	Blocked
8	282+867	Pipe	1	1	6.2	
9	283+288	Pipe	1	1	6.2	

S. No.	Ex. Chainages (Km)	Type of Culvert	No. of Pipe	Pipe Dia (m)	Carriageway Width (m)	Remarks
10	284+748	Pipe	1	1	6.8	
11	285+468	Pipe	1	1	7.2	
12	285+560	Pipe	1	1		
13	286+024	Pipe	1	1		
14	286+097	Pipe	1	1		
15	286+254	Pipe	-	-	-	Blocked
16	286+387	Pipe	1	1	6.6	
17	286+794	Pipe	1	1	7	
18	287+090	Pipe	1	1		
19	287+137	Pipe	1	1	6.6	
20	287+479	Pipe	1	1	6.8	
21	287+576	Pipe	1	1	6.8	
22	287+770	Pipe	1	1	9	

10.2 Slab Culverts

The Site has the following existing slab culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	Span Arrangement	Clear Span (m)	Carriageway Width (m)	Remarks
1	276+906	Slab	0.15	1	1	6.8	
2	277+787	Slab	0.5	1	2.6	9.7	
3	277+980	Slab	0.3	1	1	6.8	
4	278+234	Slab	0.3	1	3.1	6.2	
5	278+350	Slab	0.2	1	1	6.5	
6	278+466	Slab	0.2	1	1	6.4	
7	278+791	Slab		1	1.2		
8	280+022	Slab		1	3		
9	280+299	Slab	0.3	1	1.2	6.2	
10	281+093	Slab	0.2	1	1	6.5	
11	281+225	Slab		1	3		
12	281+524	Slab	0.3	1	2	6.8	
13	281+843	Slab	0.4	1	3.5	7.2	
14	282+055	Slab	0.4	1	5.1	7	
15	282+192	Slab	0.3	1	1.1	7	
16	282+269	Slab	0.2	1	1	7	
17	282+445	slab	0.5	1	2	9	
18	282+736	slab	0.5	1	2.5	9.6	
19	283+082	Slab	0.4	1	4.3	6.2	
20	283+825	Slab	0.5	1	2.5	9.5	
21	283+928	Slab	0.2	1	3.2	6	
22	284+210	Slab	0.3	1	1.8	6.8	
23	284+558	Slab	0.2	1	1.6	6.8	

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	Span Arrangement	Clear Span (m)	Carriageway Width (m)	Remarks
24	284+625	Slab	0.2	1	1	6.3	
25	284+680	Slab		1	1.6		
26	284+837	Slab	0.4	1	2	6.8	
27	284+900	Slab	0.3	1	2.8	6.8	
28	285+036	Slab	-	-	Blocked	-	Blocked
29	285+114	Slab	0.3	1	3	6	
30	285+373	Slab		1	2		
31	285+435	Slab	0.3	1	1.3	7.2	
32	285+502	Slab	0.3	1	2.1	7	
33	285+607	Slab	0.3	1	2.1	6.8	
34	285+682	Slab	0.3	1	2.1	7	
35	285+709	Slab	0.1	1	1.2	7	
36	285+783	Slab	0.2	1	1	7	
37	285+847	Slab	0.2	1	2	7	
38	286+147	Slab	0.5	1	2.7	9.2	
39	286+347	Slab	0.2	1	1	7	
40	286+597	Slab	0.2	1	1.2	7	
41	286+865	Slab	0.5	1	2.5	10	
42	287+065	Slab	0.2	1	1	6.5	
43	287+161	Slab	0.3	1	2.2	6.5	
44	287+260	Slab	0.3	1	3.5	6.5	
45	287+526	Slab	0.25	1	1	6.8	
46	287+641	Slab	-	-	-	-	Blocked
47	287+705	Slab	0.3	1	1.6	7.2	
48	287+863	Slab		-	-	-	Blocked
49	287+989	Slab		1	2		
50	288+124	Slab	0.3	1	2	7.2	
51	288+310	Slab	0.2	1	1.6	7	

10.3Other Culverts

11. Bus bays & Bus Shelters

The details of bus stops on the site are as follows:

S.No	Ex. Chainage (Km)	Ex. Bus Stop	Side	Remarks
1	278+731	Bus Stop	LHS	Tumnoupokpi
2	279+183	Bus Stop	LHS	Tumnoupokpi
3	280+710	Bus Stop	RHS	Keithelmanbi
4	280+940	Bus Stop	RHS	Keithelmanbi

S.No	Ex. Chainage (Km)	Ex. Bus Stop	Side	Remarks
5	281+880	Bus Stop	RHS	Keithelmanbi
6	282+485	Bus Stop	RHS	Keithelmanbi
7	283+488	Bus Stop	RHS	Bongmoul
8	283+947	Bus Stop	LHS	Bongmoul
9	287+577	Bus Stop	LHS	Saparmeina
10	288+600	Bus Stop	LHS	Saparmeina

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Road side drains

S. No.	Existing Chainage(Km)		Type	
	From	To	Masonry/cc (Pukka)	Earthen (Kutcha)
Nil				

14. Major junctions

The details of Major junctions are as follows:

SN	Ex. Chainage (Km)	At Grade/ Grade Separated	Details of Cross Road		Starts From
			Direction (LHS/RHS)	Road Type (NH/SH/MDR)	
1	274+120	At Grade	RHS	SH	Kangpokpi

15. Minor junctions

The details of the minor junctions are as follows:

S. No	Existing Chainage (Km)	Type of Junction	Side	Width of Cross Road	Village/Town Name
1	278+700	T	RHS	2.2	Tumnoupokpi
2	281+700	+	BOTH	2.1/ 2.6	Keithelmanbi
3	281+850	+	BOTH	6.0/ 4.2	Keithelmanbi

S. No	Existing Chainage (Km)	Type of Junction	Side	Width of Cross Road	Village/Town Name
4	281+900	T	RHS	2	Keithelmanbi
5	283+950	T	RHS	3.9	Keithelmanbi
6	286+680	T	RHS	6.6	Keithelmanbi
7	286+760	T	RHS	3.1	Keithelmanbi
8	287+575	T	RHS	3.5	Phoibih
9	288+060	T	RHS	2.7	Phoibih
10	288+125	T	LHS	2.4	Saparmeina
11	288+150	T	RHS	5.7	Saparmeina
12	288+255	T	LHS	3.8	Saparmeina
13	288+265	T	RHS	6	Saparmeina
14	288+575	T	LHS	5.3	Saparmeina
15	288+640	T	RHS	6.5	Saparmeina

16. Bypasses

The details of the bypasses are as follows:

S. No.	Name of bypass (town)	Chainage (km)	Length	Carriageway	
		From ----to	(in Km)	Width (m)	Type
NIL					

17. Other structures

- Nil –

18. Referencing

The relationship between the "Existing Chainage" as per field survey and "Design Chainage" is given below:

S.No.	Existing Chainage (Km)	Design Chainage (Km)	Remarks
1	276+578	274+610	Start of Package-4b
2	277+000	275+312	
3	278+000	276+311	
4	279+000	277+299	
5	280+000	278+297	
6	281+000	279+308	
7	282+000	280+300	

S.No.	Existing Chainage (Km)	Design Chainage (Km)	Remarks
8	283+000	281+295	
9	284+000	282+292	
10	285+000	283+239	
11	286+000	284+198	
12	287+000	285+189	
13	288+000	286+185	
14	288+815	287+000	End of Package-4b

Annex - II

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

S.No	Ex Chainage (m)		Design Chainage(m)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
1	276+578	276+593	274+610	274+620	10	55.2	90% land will be available at the time of appointed date and balance 10% land after 150 (one hundred and fifty) days from Appointed date.
2	276+593	276+331	274+620	274+650	30	53.5	
3	276+331	276+387	274+650	274+700	50	55.5	
4	276+387	276+487	274+700	274+800	100	58	
5	276+487	276+537	274+800	274+850	50	52.5	
6	276+537	276+637	274+850	274+950	100	45	
7	276+637	276+786	274+950	275+100	150	47.5	
8	276+786	276+987	275+100	275+300	200	45	
9	276+987	277+088	275+300	275+400	100	47.5	
10	277+088	277+138	275+400	275+450	50	49	
11	277+138	277+189	275+450	275+500	50	54	
12	277+189	277+344	275+500	275+650	150	57.5	
13	277+344	277+395	275+650	275+700	50	52.5	
14	277+395	277+495	275+700	275+800	100	45	
15	277+495	277+584	275+800	275+890	90	46.5	
16	277+584	277+697	275+890	276+000	110	45	
17	277+697	277+849	276+000	276+150	150	47.5	
18	277+849	278+187	276+150	276+500	350	52.5	
19	278+187	278+239	276+500	276+550	50	49	
20	278+239	278+330	276+550	276+640	90	46.5	
21	278+330	278+690	276+640	277+000	360	45	
22	278+690	278+740	277+000	277+050	50	47.5	
23	278+740	278+840	277+050	277+150	100	50	
24	278+840	278+890	277+150	277+200	50	47.5	
25	278+890	279+598	277+200	277+900	700	45	
26	279+598	279+698	277+900	278+000	100	57	
27	279+698	279+748	278+000	278+050	50	47.5	
28	279+748	279+848	278+050	278+150	100	45	
29	279+848	279+898	278+150	278+200	50	47.5	
30	279+898	280+001	278+200	278+300	100	49	
31	280+001	280+051	278+300	278+350	50	47.5	
32	280+051	280+201	278+350	278+500	150	45	
33	280+201	280+451	278+500	278+750	250	37.5	
34	280+451	280+601	278+750	278+900	150	43.8	
35	280+601	280+651	278+900	278+950	50	41.3	
36	280+651	281+293	278+950	279+600	650	37.5	
37	281+293	281+393	279+600	279+700	100	39.8	

S.No	Ex Chainage (m)		Design Chainage(m)		Length (m)	PROW width (m)	Date of Providing ROW*
	From	To	From	To			
38	281+393	281+543	279+700	279+850	150	37.5	
39	281+543	281+693	279+850	280+000	150	43.8	
40	281+693	281+743	280+000	280+050	50	37.5	
41	281+743	281+893	280+050	280+200	150	39.8	
42	281+893	281+943	280+200	280+250	50	43.5	
43	281+943	282+349	280+250	280+650	400	45	
44	282+349	282+449	280+650	280+750	100	46.5	
45	282+449	283+406	280+750	281+700	950	45	
46	283+406	283+555	281+700	281+850	150	47.5	
47	283+555	283+757	281+850	282+050	200	45	
48	283+757	283+858	282+050	282+150	100	46.5	
49	283+858	283+911	282+150	282+200	50	49	
50	283+911	283+966	282+200	282+250	50	52.5	
51	283+966	284+134	282+250	282+400	150	57.5	
52	284+134	284+189	282+400	282+450	50	52.5	
53	284+189	284+293	282+450	282+550	100	54	
54	284+293	284+433	282+550	282+690	140	46.5	
55	284+433	284+636	282+690	282+890	200	49	
56	284+636	284+746	282+890	283+000	110	47.5	
57	284+746	284+954	283+000	283+200	200	52.5	
58	284+954	285+011	283+200	283+250	50	45	
59	285+011	285+111	283+250	283+350	100	46.5	
60	285+111	285+211	283+350	283+450	100	45	
61	285+211	285+312	283+450	283+550	100	46.5	
62	285+312	285+404	283+550	283+640	90	45	
63	285+404	285+617	283+640	283+840	200	47.5	
64	285+617	285+682	283+840	283+900	60	52.5	
65	285+682	285+945	283+900	284+150	250	57.5	
66	285+945	286+001	284+150	284+200	50	59	
67	286+001	286+202	284+200	284+400	200	46.5	
68	286+202	286+353	284+400	284+550	150	47.5	
69	286+353	286+553	284+550	284+750	200	45	
70	286+553	286+858	284+750	285+050	300	46.5	
71	286+858	286+909	285+050	285+100	50	52.5	
72	286+909	287+099	285+100	285+290	190	57.5	
73	287+099	287+159	285+290	285+350	60	52.5	
74	287+159	287+458	285+350	285+650	300	45	
75	287+458	287+710	285+650	285+900	250	46.5	
76	287+710	288+015	285+900	286+200	300	45	
77	288+015	288+566	286+200	286+750	550	41.3	
78	288+566	288+606	286+750	286+790	40	45	
79	288+606	288+656	286+790	286+840	50	53.5	
80	288+656	288+706	286+840	286+890	50	41.3	
81	288+706	288+815	286+890	287+000	110	45	

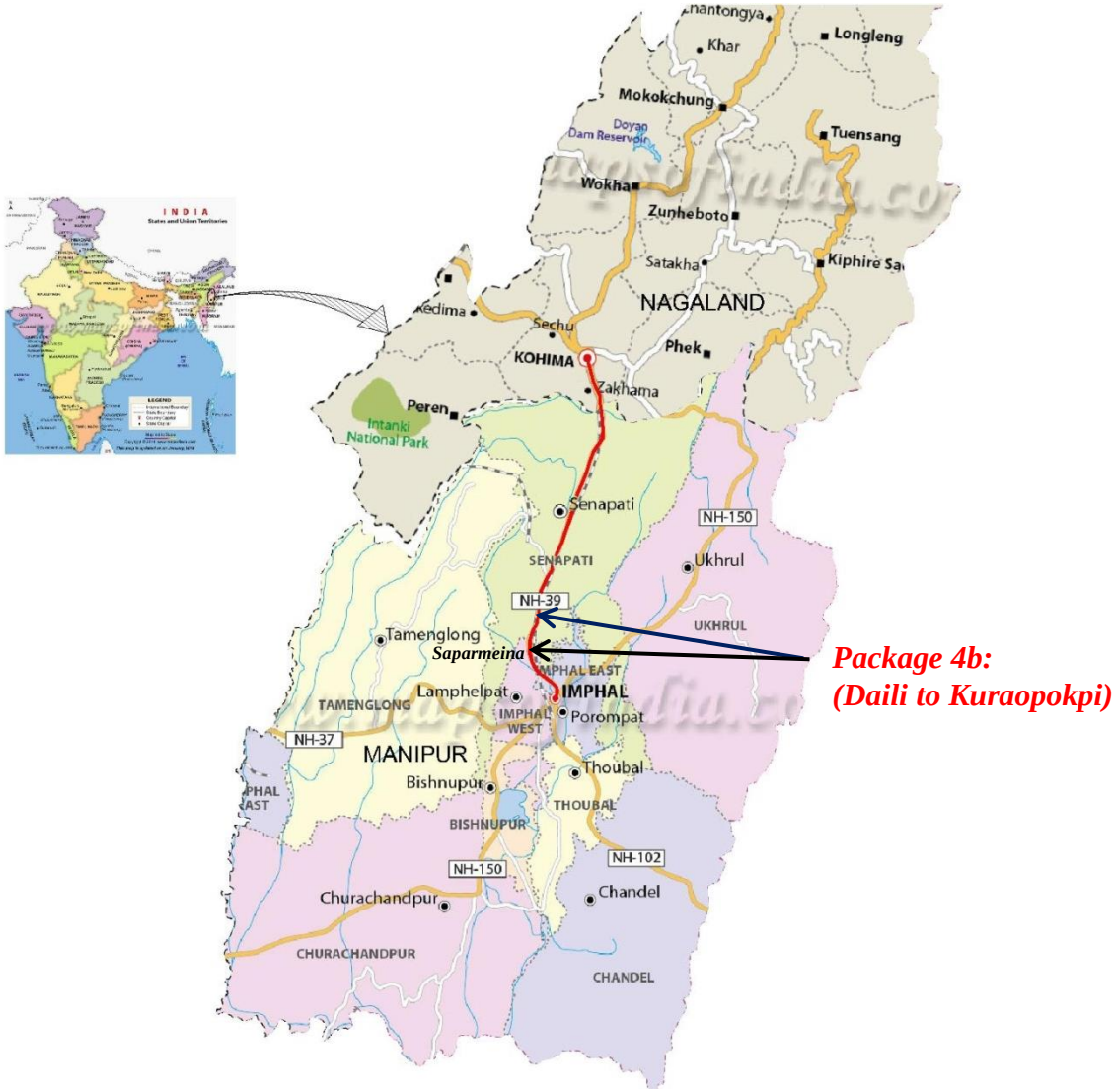
- The dates specified herein, shall in no case be beyond 150 (one hundred and fifty) days after the Appointed Date.

Annex - III

(Schedule-A)

Alignment Plans

The existing alignment of the Package-4B i.e. Daili (End of Kangpokpi Bypass) to Kuraopokpi section of Project Highway shall be modified as per the Alignment plan.



The proposed Alignment Plan and Profile of the Project Highway is available on e-Portal. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL.

Annex - IV

(Schedule-A)

Environment Clearances

As per GoI, MoEF notification No. 21-270/2008-IA, III dated 22nd August 2013, proposed project involves expansion of 12.390 km existing National Highway (less than 100 Km). As a result Environmental clearances will not be required from MoEF.

However, forest clearance is required for Tree cutting.

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SCHEDULE - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the Project Highway

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

2. Rehabilitation and Augmentation as Four lane divided carriageway

Rehabilitation and Upgradation shall include Four lane divided carriageway of project highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex - I

(Schedule-B)

Description of Four-Laning

1.1. Widening of the Existing Highway

The Project Highway shall follow the existing alignment unless otherwise specified by the Authority or shown in the alignment plan 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 plain/rolling terrain to the extent land is available.

1.2. Width of Carriageway

1.2.1 Four laning with paved shoulder from Daili (end of Kongpokpi bypass) (Km274+610) to Kuraopokpi (Km287+000) shall be undertaken. The width of paved carriageway shall be 2x9m wide in accordance with the Typical Cross Section (TCS) drawings presented in ***Appendix B1- Typical Cross Sections or Manual referred to in the Schedule-D*** (herein after called the "Manual") unless otherwise specified in this Schedule-B and Schedule-D.

The total roadway width of project highway shall be 18 m wide.

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

Built-up stretch (Township)	**Design Chainage (Km)**		**Roadway (m)**	**Paved Width (m)**	**(Typical cross section) (Ref. to Schedule B Appendix B-1)**
	From	**To**			
NIL					

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

2. Geometric Design and General Features

2.1. General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual (IRC:SP:84-2014).

2.2. Design speed

The design Speed for the project highway adopted for plain/rolling terrain is 100km/hr. However due to certain site constraints, the minimum design speed adopted for plain/rolling terrain is 80km/hr. at locations mentioned in Schedule - D.

2.3. Improvement of the existing road geometrics

The alignment of existing road has been improved at many locations along the route either by eliminating sharp curves and/or increasing the radii of horizontal curves. Also, at few locations the existing steep gradients have been improved through cutting/filling so as to conform the requirement of IRC:SP:84-2014 and achieving ruling gradient for plain/rolling terrain. So the reconstruction of road shall follow the improved alignment as enclosed in the bid document.

Sl. No.	Design Chainage (Km)		Type of deficiency	Remarks
	From Km	To Km		
As per Alignment Plan (Annex-III, Schedule A)				

2.3.1 Details of proposed Realignments:

S. No	Design Chainage(Km)		Side	Design Length (Km)	Remarks
	From	To			
As per Alignment Plan (Annex-III, Schedule A)					

2.3.2 Details of Proposed Bypasses:

S. No	Design Chainage(Km)		Side	Design Length (km)	Remarks
	From	To			
Nil					

2.4. Right of Way

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

2.5. Type of shoulders

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

Design Chainage (Km)		Fully paved shoulders/ footpaths	(Typical cross section) (Ref. to Schedule B Appendix B-1)
From	To		
NIL			

(b) In open country, paved shoulders of 1.5 m width shall be provided with same pavement layers of carriageway and balance 2.0m wide earthen shoulder shall be covered with 150mm thick compacted layer of granular/hard material. The granular sub-base (GSB) layer to be extended till side slope.

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

2.6. Lateral and vertical clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provisions of guard rails/ crash barriers shall be as per the paragraph 2.10 of the Manual.

2.6.2 Lateral Clearance: The width of the openings at underpasses shall be as follows:

S. No.	Design Chainage(Km)	Span/opening (m)	Remarks
Nil			

2.7. Lateral and vertical clearances at overpasses

2.7.1 Lateral and vertical clearances at overpasses and provision of guard rails/crash barriers shall be as per the paragraph 2.11 of the Manual.

2.7.2 Lateral Clearance: The size of the openings at overpasses shall be as follows:

S. No.	Location (Chainage) (from km to km)	Span/opening (m)	Remarks
NIL			

2.8. Service roads / Slip roads

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

S. No.	Design Chainage	RHS / LHS/ or Both sides	Length (km)
NIL			

2.9. Grade separated structures:

2.9.1 Grade separated structures shall be provided as per the paragraph 2.13 of the Manual. The requisite particulars are given below:

S. No.	Location of Structure	Deck Width (m)	Number and length of spans	Approach gradient
NIL				

2.10. Cattle and Pedestrian under pass / over pass

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

S.No.	Location	Type of crossing
NIL		

2.11. Typical Cross Section of the Project Highway

Typical Cross Sections (TCS) have been developed as TCS-1 to TCS-10& TCS-13

showing configuration along with a schedule of their applicability is presented in Appendix B-1 to this Schedule-B.

3. Intersections and Grade Separators

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

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

(a) At-grade intersections

Major Junctions: -

S. No	Existing Chainage (Km)	Design Chainage (Km)	Type of Junction	Side	Remarks
Nil					

Minor Junctions: -

S. No	Existing Chainage (Km)	Design Chainage (Km)	Type of Junction	Side	Proposed Width	Village/Town Name
1	278+366	276+675	T	RHS	3.5	Tumnoupokpi
2	278+747	277+056	Y	LHS	3.5	Tumnoupokpi
3	278+833	277+142	Y	RHS	3.5	Tumnoupokpi
4	280+404	278+700	T	RHS	5.5	Keithelmanbi
5	280+530	278+826	T	RHS	3.5	Keithelmanbi
6	280+600	278+896	T	RHS	3.5	Keithelmanbi
7	280+707	279+003	T	RHS	3.5	Keithelmanbi
8	281+377	279+685	Y	LHS	3.5	Keithelmanbi
9	281+385	279+693	Y	RHS	3.5	Keithelmanbi
10	281+493	279+801	Y	RHS	3.5	Keithelmanbi
11	281+515	279+823	T	LHS	3.5	Keithelmanbi
12	281+574	279+882	T	RHS	3.5	Keithelmanbi
13	282+152	280+452	T	RHS	3.5	Keithelmanbi
14	283+195	281+490	T	RHS	3.5	Keithelmanbi
15	283+719	282+013	Y	RHS	5.5	Bongmoul
16	286+385	284+581	Y	RHS	3.5	Phoibih
17	286+463	284+659	Y	RHS	3.5	Phoibih
18	287+275	285+465	T	RHS	3.5	Phoibih
19	287+763	285+952	T	RHS	3.5	Phoibih

S. No	Existing Chainage (Km)	Design Chainage (Km)	Type of Junction	Side	Proposed Width	Village/Town Name
20	287+833	286+022	Y	LHS	3.5	Saparmeina
21	287+869	286+058	Y	RHS	3.5	Saparmeina
22	287+956	286+146	T	LHS	3.5	Saparmeina
23	287+972	286+162	T	RHS	5.5	Saparmeina
24	288+581	286+765	Y	LHS	5.5	Saparmeina
25	288+636	286+820	Y	RHS	5.5	Saparmeina

For the proper drainage, additional Pipe Culvert (NP4 class) shall be provided on cross roads as per site condition.

(b) Grade separated intersection with/without ramps

S. No.	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
NIL				

4. Road Embankment and Cut Section

4.1 The reconstruction of the existing road and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of the Manual and the specified cross sectional details. Deficiencies in the Plan and Profile of the existing road shall be corrected.

4.2 Raising of the Existing Road

The profile of the existing road at the following locations shall be raised:

S. No.	Chainage		Length	Extent of raising
	From	To		
As per Alignment Plan & Profile (Annex-III, Schedule A)				

5. Pavement Design

5.1. Pavement design

Pavement design shall be carried out in accordance with Section 5 of the Manual and IRC:37-2018.

5.2. Type of pavement

Flexible pavement should be provided on entire project length.

5.3. Design requirements

Pavement design shall be as per section 5 of the Manual and IRC: 37: 2018.

5.3.1 Design Period and Strategy

Flexible pavement for new pavement or for widening and strengthening of the existing pavement shall be designed for a minimum design period of ***15*** years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for minimum design traffic of ***30*** Million Standard Axles (MSA).

5.4. Reconstruction stretches

The entire length of the Project road requires 'reconstruction' following the Alignment Plan (Annex III-Schedule A). The entire road shall be designed as new flexible pavement.

6. Roadside Drainage

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

7. Design of Structures

7.1. General

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

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

S. No.	Bridge (Km)	Carriageway width and Cross section Features
As per GAD		

7.1.3 The following structures shall be provided with footpaths:

S. No.	Bridge (Km)	Carriageway width and Cross section Features
As per GAD		

7.1.4 All bridges shall be high-level bridges.

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

Sl. No.	Bridge at km	Utility service to be carried	Remarks
To be finalized as per the site condition, during the execution, in consultation with the Authority Engineer.			

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

7.2. Culverts

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

7.2.2 Reconstruction of Existing Culverts:

(i) **Reconstruction of Pipe Culvert to Pipe Culvert**

The following pipe culverts are proposed for reconstruction to pipe culverts:

S. No.	Location		Proposed Span (m)	Type	Remarks
	Existing	Proposed			
NIL					

(ii) **Reconstruction of Pipe/Slab Culvert to Box Culvert**

The following pipe/slab culverts are proposed for reconstruction to box culverts:

S. No.	Location		Type	Proposed Span (m)	Remarks
	Existing	Proposed			
1	276+732	274+764	Box Culvert	1X2X2m	
2	276+906	275+221	Box Culvert	1X2X2m	
3	277+980	276+279	Box Culvert	1X2X2m	
4	278+233	276+542	Box Culvert	1X2X2m	
5	278+350	276+659	Box Culvert	1X2X2m	
6	278+465	276+774	Box Culvert	1X2X2m	
7	278+791	277+100	Box Culvert	1X4X4m	Cushion 4.0m
8	279+848	278+147	Box Culvert	1X2X2m	
9	280+021	278+318	Box Culvert	1X2X2m	Cushion 3.0m
10	280+299	278+596	Box Culvert	1X2X2m	
11	280+475	278+771	Box Culvert	1X2X2m	
12	281+018	279+326	Box Culvert	1X2X2m	
13	281+225	279+533	Box Culvert	1X3X2m	
14	282+269	280+569	Box Culvert	1X2X2m	
15	282+446	280+746	Box Culvert	1X3X3m	
16	282+736	281+034	Box Culvert	1x3x3m	
17	282+860	281+157	Box Culvert	1X2X2m	
18	283+288	281+583	Box Culvert	1X2X2m	
19	284+558	282+814	Box Culvert	1X2X2m	
20	285+113	283+352	Box Culvert	1X3X3m	
21	285+373	283+613	Box Culvert	1X2X2m	
22	286+024	284+222	Box Culvert	1X2X2m	
23	286+147	284+345	Box Culvert	1X2X2m	
24	286+348	284+543	Box Culvert	1X2X2m	
25	286+597	284+793	Box Culvert	1X3X3m	
26	287+161	285+350	Box Culvert	1X2X2m	
27	287+381	285+571	Box Culvert	1X2X2m	
28	287+554	285+746	Box Culvert	1X2X2m	
29	287+641	285+830	Box Culvert	1X2X2m	
30	287+771	285+960	Box Culvert	1X2X2m	
31	287+989	286+179	Box Culvert	1X2X2m	
32	288+123	286+308	Box Culvert	1X2X2m	
33	288+310	286+495	Box Culvert	1X2X2m	

7.2.3 Widening of Existing Culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in Appendix B-1 to this Schedule-B. Repairs and strengthening of existing structures where required shall be carried out.

(a) Retaining / widening of Pipe Culverts

S. No.	Ex. Chainage (Km)	Design Chainage (Km)	Type	Size (Nos x dia in m)	Remark
Nil					

(b) Retaining / widening of Slab Culverts

S.No.	Ex. Chainage (Km)	Design Chainage (Km)	Type	Span	Remark
1	278+425	276+087	Slab Culvert	1X2.6m	Widened Left side
2	281+550	279+832	Slab Culvert	1X2m	Widened Both side
3	281+850	280+151	Slab Culvert	1X3.5m	Widened Both side
4	282+075	280+356	Slab Culvert	1X5.1m	Widened Both side
5	283+095	281+377	Slab Culvert	1X4.3m	Widened Both side
6	283+850	282+119	Slab Culvert	1X2.5m	Widened Left side

7.2.4 Additional **New culverts** shall be constructed as per particulars given in the table below:

S.No.	Design Chainage (Km)	Type	Size (No x span)	Cushion (m)
1	274+629	Box Culvert	1X3X3m	3.0
2	274+925	Box Culvert	1X2X2m	
3	275+415	Box Culvert	1X2X2m	
4	275+800	Box Culvert	1X2X2m	
5	277+385	Box Culvert	1X3X3m	
6	278+920	Box Culvert	1X3X3m	
7	282+510	Box Culvert	1X2X2m	
8	283+001	Box Culvert	1X2X2m	

One additional culvert shall also be provided at each 'T' or 'Y' shape junction and two additional pipe culvers at each cross roads as per site condition for drainage requirement.

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

Sl. No.	Location		Type	Size	Type of repair required
	Existing	Proposed			
Necessary repair and rehabilitation / strengthening works are to be carried out for all widening and retained culverts as per site condition and as directed by Authority's Engineer.					

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

7.3. Bridges

7.3.1 Existing bridges to be re-constructed

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

a) Major Bridges:

S.No.	Location		Type of Existing structure	Span Arrangement		Deck width
	Existing	Proposed		Existing	Proposed	
NIL						

b) Minor Bridges:

S. No.	Location		Type of Existing structure	Span Arrangement		Deck width
	Existing	Proposed		Existing	Proposed	
NIL						

(ii)The following bridges shall be retained / widened:

a) Major Bridges:

S. No	Chainage (km)		Span Arrangement (m)	Outer Width (m)	Super Struc. Type	Remarks
	Design	Existing				
NIL						

b) Minor Bridges:

S. No	Chainage (km)		Span Arrangement (m)	Outer Width (m)	Super Structure Type	Remarks
	Design	Existing				
1	277+655	279+357	1X20.5	8.5	RCC T-Beam	Retained with general upkeep and maintenance.
2	279+642	281+333	1X17.0	10.5	RCC T-Beam	Retained with general upkeep and maintenance
3	281+824	283+525	1X26.5	8.3	PSC I Beam with RCC Deck	Retained with general upkeep and maintenance
4	284+607	286+411	1X6.7	12.3	RCC Solid Slab	Retained with general upkeep and maintenance

Note: Necessary repair and rehabilitation/ strengthening works are to be carried out for all widening and retained bridges as per site condition and as directed by the Authority's Engineer

7.3.2 Additional New bridges:

New bridges at the following locations on the Project Highway shall be constructed. The GADs of new bridges are attached in Volume II: Drawings folder.

S. No.	Design Chainage	Type of Structure	Proposed Span	Remarks
1	277+655	MNBR	1 x 20.8	New 2 Lane bridge + Existing bridge retained
2	279+642	MNBR	1 x 17.2	New 2 Lane bridge + Existing bridge retained
3	281+824	MNBR	1 x 26.6	New 2 Lane bridge + Existing bridge retained
4	284+607	MNBR	1 x 6.0 (Clear span) x 3.0	New 2 Lane bridge + Existing bridge retained
5	285+450	MNBR	1 x 14.8	New 4 Lane bridge
6	286+805	MNBR	2 x 6.0 (Clear Span) x 3	New 4 Lane bridge

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

S. No.	Location at km	Remarks
NIL		

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

S. No.	Location		Type of Existing structure	Span Arrangement	Remarks
	Existing	Proposed			
As per Note given under clause 7.3.1					

7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual.

7.3.6 Structures in marine environment

Sl. No.	Location at km	Remarks
NIL		

7.4. Rail-road bridges- NIL

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

7.4.2 *Road over-bridges- NIL*

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

S. No.	Chainage	Proposed Span	Type of Superstructure	Deck Width	Remarks
NIL					

7.4.3 *Road under-bridges*

Road under-bridges (road under railway line) shall be provided at the

following level crossings, as per GAD drawings attached:

S.No.	Location of Level crossing	Proposed Span arrangement
NIL		

7.5. Grade separated structures

S. No.	Design Chainage	Type of Structure	Proposed Span (m)	Deck width (M)
NIL				

7.6. 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
Repair of wearing course and partially damaged railing most of existing bridge location. Vegetation growth needs to be removed from existing structure.		

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		

7.7. W- Beam Metal Crash Barrier

The W beam crash Barriers are proposed where the embankment height is more than 3m height. The locations are as below:

Sl. No.	Design Chainage (Km)		TCS Type	Length (m)
	From	To		
Left Hand Side (LHS)				
1	275+170	275+220	TCS - 5	50
2	275+400	275+500	TCS - 4	100
3	275+800	275+900	TCS - 8	100
4	275+900	275+930	TCS - 1	30
5	276+510	276+630	TCS - 5	120
6	276+630	276+640	TCS - 1	10
7	277+050	277+160	TCS - 7	110
8	278+220	278+270	TCS - 2	50
9	278+270	278+300	TCS - 1	30
10	278+760	278+790	TCS - 13	30
11	278+790	278+900	TCS - 9	110
12	280+090	280+150	TCS - 9	60
13	280+150	280+200	TCS - 10	50
14	280+200	280+230	TCS-10 to TCS-1	30
15	280+620	280+780	TCS - 1	160
16	282+070	282+090	TCS - 6	20
17	282+090	282+150	TCS - 1	60
18	282+150	282+190	TCS - 6	40
19	282+470	282+630	TCS - 5	160
20	282+630	282+880	TCS - 8	250
21	282+880	282+910	TCS - 5	30
22	282+910	282+920	TCS - 6	10
23	283+240	283+260	TCS - 1	20
24	283+260	283+320	TCS - 8	60
25	283+320	283+360	TCS - 1	40
26	283+470	283+520	TCS - 8	50
27	283+520	283+580	TCS - 6	60
28	283+580	283+730	TCS - 5	150
29	283+730	283+800	TCS - 6	70
30	284+170	284+180	TCS - 6	10
31	284+180	284+390	TCS - 4	210
32	284+780	284+790	TCS - 1	10
33	284+790	285+010	TCS - 8	220
34	285+010	285+040	TCS - 5	30
35	285+040	285+050	TCS - 6	10
36	285+670	285+760	TCS - 4	90
37	285+760	285+770	TCS-4 to TCS-9	10
38	285+840	285+910	TCS - 10	70
39	286+890	286+900	TCS - 9	10
40	286+900	286+940	TCS-9 to TCS-1	40
41	286+940	287+000	TCS-10 to TCS-8	60

Sl. No.	Design Chainage (Km)		TCS Type	Length (m)
	From	To		
Right Hand Side (RHS)				
1	274+610	274+630	TCS - 7	20
2	274+630	274+640	TCS - 8	10
3	276+990	277+010	TCS - 1	20
4	277+010	277+160	TCS - 7	150
5	278+150	278+170	TCS - 1	20
6	278+170	278+220	TCS - 8	50
7	278+220	278+290	TCS - 7	70
8	278+290	278+330	TCS - 8	40
9	278+330	278+340	TCS - 1	10
10	281+350	281+410	TCS - 1	60
11	281+550	281+610	TCS - 1	60
12	281+610	281+720	TCS - 1	110
13	281+680	281+808	TCS - 8	128
14	282+720	282+830	TCS - 8	110

The W beam crash Barriers are proposed in both sides, where the radius of the curve upto 450m as given below:

S No	Design Chanage		Length	Remark (Curve Radius)
	Start	End		
Inner edge				
16	276+216	276+410	194	-360
17	276+423	276+655	232	400
18	283+606	283+997	391	360
19	284+029	284+421	392	-360

LEFT Side Outer Edge				RIGHT Side Outer Edge			
S No	CHAINAGE		Length	S No	CHAINAGE		Length
	Start	End			Start	End	
1	276+423	276+510	87	1	276+216	276+410	194
2	276+640	276+655	15	2	284+029	284+421	392
3	283+800	283+997	197				

7.8. Protection Work

The Stone Masonry Breast wall have been proposed on hill side section along the roadway edge where cutting is required or cutting is more than available ROW.

Retaining walls are proposed to restrict the earth along the filling section where normal side slope crosses the available ROW. The PCC toe walls are adopted upto the height of

2m from GL and RCC retaining wall where the required height of wall at site is more than 2m.

The project section where the hill cut heights of side slope is more than 25m, Surficial protection and Erosion Control measures have been considered and details of Typical measures for soil and Rocky surface are presented in Appendix B-1 of this Schedule B.

Breast wall and Retaining wall shall be provided in accordance with section 13 of the Manual.

1. Breast wall

The Stone masonry Breast Wall shall be provided at the following locations:

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	274+800	274+810	6		1.5		10
2	274+810	274+820	6		1.5		10
3	274+820	274+830	6		3		10
4	274+830	274+840	6		3		10
5	274+840	274+850	6		3		10
6	274+850	274+860	6		1.5		10
7	274+860	274+870	6		1.5		10
8	274+870	274+880	6		1.5		10
9	274+880	274+890	6		3		10
10	274+890	274+900	6		3		10
11	274+900	274+910	6		1.5		10
12	274+910	274+920	6		1.5		10
13	274+920	274+930	6		1.5		10
14	274+930	274+940	6		1.5		10
15	274+940	274+950	6		1.5		10
16	274+950	274+960	6		1.5		10
17	274+960	274+970	6		3		10
18	274+970	274+980	6		3		10
19	274+980	274+990	6		3		10
20	274+990	275+000	6		3		10
21	275+000	275+010	6		3		10
22	275+010	275+020	6		3		10
23	275+020	275+030	6		3		10
24	275+030	275+040	6		3		10
25	275+040	275+050	6		3		10
26	275+050	275+060	6		3		10
27	275+060	275+070	6		3		10
28	275+070	275+080	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
29	275+080	275+090	6		3		10
30	275+090	275+100	6		3		10
31	275+100	275+110	6		3		10
32	275+110	275+120	6		3		10
33	275+120	275+130	6		3		10
34	275+130	275+140	6		3		10
35	275+140	275+150	6		3		10
36	275+150	275+160	6		3		10
37	275+160	275+170	6		3		10
38	275+170	275+180	6		3		10
39	275+180	275+190	5		3		10
40	275+190	275+200	5		3		10
41	275+200	275+210	5		3		10
42	275+210	275+220	5		3		10
43	275+220	275+230	6		3		10
44	275+230	275+240	6		3		10
45	275+240	275+250	6		3		10
46	275+250	275+260	6		1.5		10
47	275+270	275+280	6		0		
48	275+280	275+290	6		1.5		10
49	275+290	275+300	6		3		10
50	275+300	275+310	3		3		10
51	275+310	275+320	3		3		10
52	275+320	275+330	3		3		10
53	275+330	275+340	3		3		10
54	275+340	275+350	3		3		10
55	275+350	275+360	3		3		10
56	275+360	275+370	3		3		10
57	275+370	275+380	3		3		10
58	275+380	275+390	3		3		10
59	275+390	275+400	3		3		10
60	275+400	275+410	4		3		10
61	275+410	275+420	4		3		10
62	275+420	275+430	4		3		10
63	275+430	275+440	4		3		10
64	275+440	275+450	4		3		10
65	275+450	275+460	4		3		10
66	275+460	275+470	4		3		10
67	275+470	275+480	4		3		10
68	275+480	275+490	4		3		10
69	275+490	275+500	4		3		10
70	275+500	275+510	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
71	275+510	275+520	6		3		10
72	275+520	275+530	6		3		10
73	275+530	275+540	6		3		10
74	275+540	275+550	6		3		10
75	275+550	275+560	6		3		10
76	275+560	275+570	6		3		10
77	275+570	275+580	6		3		10
78	275+580	275+590	6		3		10
79	275+590	275+600	6		3		10
80	275+600	275+610	6		3		10
81	275+610	275+620	6		3		10
82	275+620	275+630	6		3		10
83	275+630	275+640	6		3		10
84	275+640	275+650	6		3		10
85	275+650	275+660	6		3		10
86	275+660	275+670	6		3		10
87	275+670	275+680	6		3		10
88	275+680	275+690	6		3		10
89	275+690	275+700	6		3		10
90	275+700	275+710	6		3		10
91	275+710	275+720	6		3		10
92	275+720	275+730	6		1.5		10
93	275+730	275+740	6		1.5		10
94	275+740	275+750	6		1.5		10
95	275+960	275+970	6		1.5		10
96	275+970	275+980	6		1.5		10
97	275+980	275+990	6		3		10
98	275+990	276+000	6		3		10
99	276+000	276+010	6		3		10
100	276+010	276+020	6		3		10
101	276+020	276+030	6		3		10
102	276+030	276+040	6		3		10
103	276+040	276+050	6		3		10
104	276+050	276+060	6		3		10
105	276+060	276+070	6		3		10
106	276+070	276+080	6		3		10
107	276+080	276+090	6		3		10
108	276+090	276+100	6		3		10
109	276+100	276+110	6		3		10
110	276+110	276+120	6		3		10
111	276+120	276+130	6		3		10
112	276+130	276+140	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
113	276+140	276+150	6		3		10
114	276+150	276+160	6		3		10
115	276+160	276+170	6		3		10
116	276+170	276+180	6		3		10
117	276+180	276+190	6		3		10
118	276+190	276+200	6		3		10
119	276+200	276+210	6		3		10
120	276+210	276+220	6		3		10
121	276+220	276+230	6		3		10
122	276+230	276+240	6		3		10
123	276+240	276+250	6		3		10
124	276+250	276+260	6		3		10
125	276+260	276+270	6		3		10
126	276+270	276+280	6		3		10
127	276+280	276+290	6		3		10
128	276+290	276+300	6		3		10
129	276+300	276+310	6		3		10
130	276+310	276+320	6		3		10
131	276+320	276+330	6		3		10
132	276+330	276+340	6		3		10
133	276+340	276+350	6		3		10
134	276+350	276+360	6		3		10
135	276+360	276+370	6		3		10
136	276+370	276+380	6		3		10
137	276+380	276+390	6		3		10
138	276+390	276+400	6		3		10
139	276+400	276+410	6		3		10
140	276+410	276+420	6		3		10
141	276+420	276+430	6		3		10
142	276+430	276+440	6		3		10
143	276+440	276+450	6		3		10
144	276+450	276+460	6		3		10
145	276+460	276+470	6		3		10
146	276+470	276+480	6		3		10
147	276+480	276+490	6		3		10
148	276+490	276+500	6		3		10
149	276+500	276+510	6		3		10
150	276+510	276+520	5		3		10
151	276+520	276+530	5		3		10
152	276+530	276+540	5		3		10
153	276+540	276+550	5		3		10
154	276+550	276+560	5		1.5		10
155	276+560	276+570	5		1.5		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
156	276+570	276+580	5		1.5		10
157	276+580	276+590	5		1.5		10
158	276+590	276+600	5		1.5		10
159	276+600	276+610	5		1.5		10
160	276+610	276+620	5		1.5		10
161	276+620	276+630	5		1.5		10
162	277+210	277+220	2	1.5	1.5	10	10
163	277+220	277+230	2	1.5	1.5	10	10
164	277+230	277+240	2	3	1.5	10	10
165	277+240	277+250	2	1.5	1.5	10	10
166	277+250	277+260	2	1.5	1.5	10	10
167	277+260	277+270	2	1.5	1.5	10	10
168	277+880	277+890	2	1.5	0	10	
169	277+890	277+900	2	1.5	1.5	10	10
170	277+900	277+910	2	1.5	1.5	10	10
171	277+910	277+920	2	3	3	10	10
172	277+920	277+930	2	3	3	10	10
173	277+930	277+940	2	3	3	10	10
174	277+940	277+950	2	3	3	10	10
175	277+950	277+960	2	3	3	10	10
176	277+960	277+970	2	3	3	10	10
177	277+970	277+980	2	3	3	10	10
178	277+980	277+990	2	3	3	10	10
179	277+990	278+000	2	3	3	10	10
180	278+000	278+010	2	3	3	10	10
181	278+010	278+020	2	3	3	10	10
182	278+020	278+030	2	3	3	10	10
183	278+030	278+040	2	3	3	10	10
184	278+040	278+050	2	3	3	10	10
185	278+050	278+060	2	3	3	10	10
186	278+060	278+070	2	3	3	10	10
187	278+070	278+080	2	3	3	10	10
188	278+080	278+090	2	1.5	3	10	10
189	278+090	278+100	2	1.5	3	10	10
190	278+100	278+110	2	1.5	3	10	10
191	278+110	278+120	2	1.5	1.5	10	10
192	278+120	278+130	2	1.5	1.5	10	10
193							
194	279+730	279+740	13		1.5		10
195	279+740	279+750	13	1.5	3	10	10
196	279+750	279+760	13	1.5	1.5	10	10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
197	279+760	279+770	13	1.5	1.5	10	10
198	279+770	279+780	13	1.5	3	10	10
199	279+780	279+790	13		3		10
200	281+880	281+890	6		1.5		10
201	281+890	281+900	6		1.5		10
202	281+900	281+910	6		3		10
203	281+910	281+920	6		3		10
204	281+920	281+930	6		3		10
205	281+930	281+940	6		1.5		10
206	281+940	281+950	6		1.5		10
207	281+950	281+960	6		1.5		10
208	281+960	281+970	6		1.5		10
209	281+970	281+980	6		1.5		10
210	281+980	281+990	6		1.5		10
211	281+990	282+000	6		1.5		10
212	282+000	282+010	6		1.5		10
213	282+010	282+020	6		1.5		10
214	282+020	282+030	6		1.5		10
215	282+030	282+040	6		1.5		10
216	282+040	282+050	6		1.5		10
217	282+160	282+170	6		1.5		10
218	282+170	282+180	6		3		10
219	282+180	282+190	6		3		10
220	282+190	282+200	6		3		10
221	282+200	282+210	6		3		10
222	282+210	282+220	6		3		10
223	282+220	282+230	6		3		10
224	282+230	282+240	6	1.5	3	10	10
225	282+240	282+250	2	1.5	3	10	10
226	282+250	282+260	2	3	3	10	10
227	282+260	282+270	2	3	3	10	10
228	282+270	282+280	2	3	3	10	10
229	282+280	282+290	2	3	3	10	10
230	282+290	282+300	2	3	3	10	10
231	282+300	282+310	2	3	3	10	10
232	282+310	282+320	2	3	3	10	10
233	282+320	282+330	2	3	3	10	10
234	282+330	282+340	2	3	3	10	10
235	282+340	282+350	2	3	3	10	10
236	282+350	282+360	2	3	3	10	10
237	282+360	282+370	2	3	3	10	10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
238	282+370	282+380	2	3	3	10	10
239	282+380	282+390	2	3	3	10	10
240	282+390	282+400	2	3	3	10	10
241	282+400	282+410	2	3	3	10	10
242	282+410	282+420	2	3	3	10	10
243	282+420	282+430	2	1.5	3	10	10
244	282+430	282+440	2	1.5	3	10	10
245	282+440	282+450	6	0	3	0	10
246	282+450	282+460	6	0	3	0	10
247	282+460	282+470	6		3		10
248	282+470	282+480	5		3		10
249	282+480	282+490	5		3		10
250	282+490	282+500	5		3		10
251	282+500	282+510	5		3		10
252	282+510	282+520	5		3		10
253	282+520	282+530	5		3		10
254	282+530	282+540	5		3		10
255	282+540	282+550	5		3		10
256	282+550	282+560	5		3		10
257	282+560	282+570	5		3		10
258	282+570	282+580	5		3		10
259	282+580	282+590	5		3		10
260	282+590	282+600	5		1.5		10
261	282+600	282+610	5		1.5		10
262	282+610	282+620	5		1.5		10
263	282+880	282+890	5		1.5		10
264	282+890	282+900	5		1.5		10
265	282+900	282+910	5		3		10
266	282+910	282+920	6		3		10
267	282+920	282+930	6		3		10
268	282+930	282+940	6		3		10
269	282+940	282+950	6		3		10
270	282+950	282+960	6		3		10
271	282+960	282+970	6		3		10
272	282+970	282+980	6		3		10
273	282+980	282+990	6		3		10
274	282+990	283+000	6		3		10
275	283+000	283+010	6		3		10
276	283+010	283+020	6		3		10
277	283+020	283+030	6		3		10
278	283+030	283+040	6		3		10
279	283+040	283+050	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
280	283+050	283+060	6		3		10
281	283+060	283+070	6		3		10
282	283+070	283+080	6		3		10
283	283+080	283+090	6		3		10
284	283+090	283+100	6		3		10
285	283+100	283+110	6		3		10
286	283+110	283+120	6		3		10
287	283+120	283+130	6		3		10
288	283+130	283+140	6		3		10
289	283+140	283+150	6		3		10
290	283+150	283+160	6		3		10
291	283+160	283+170	6		3		10
292	283+170	283+180	6		3		10
293	283+180	283+190	6		3		10
294	283+190	283+200	6		3		10
295	283+200	283+210	6		3		10
296	283+210	283+220	6		3		10
297	283+560	283+570	6		1.5		10
298	283+570	283+580	6		1.5		10
299	283+580	283+590	5		1.5		10
300	283+590	283+600	5		1.5		10
301	283+600	283+610	5		1.5		10
302	283+610	283+620	5		1.5		10
303	283+620	283+630	5		3		10
304	283+630	283+640	5		3		10
305	283+640	283+650	5		3		10
306	283+650	283+660	5		3		10
307	283+660	283+670	5		3		10
308	283+670	283+680	5		3		10
309	283+680	283+690	5		3		10
310	283+690	283+700	5		3		10
311	283+700	283+710	5		3		10
312	283+710	283+720	5		3		10
313	283+720	283+730	5		3		10
314	283+730	283+740	6		3		10
315	283+740	283+750	6		3		10
316	283+750	283+760	6		3		10
317	283+760	283+770	6		3		10
318	283+770	283+780	6		3		10
319	283+780	283+790	6		3		10
320	283+790	283+800	6		3		10
321	283+800	283+810	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
322	283+810	283+820	6		3		10
323	283+820	283+830	6		3		10
324	283+830	283+840	6		3		10
325	283+840	283+850	6		3		10
326	283+850	283+860	6		3		10
327	283+860	283+870	6		3		10
328	283+870	283+880	6		3		10
329	283+880	283+890	6		3		10
330	283+890	283+900	6		3		10
331	283+900	283+910	6		3		10
332	283+910	283+920	6		3		10
333	283+920	283+930	2	1.5	3	10	10
334	283+930	283+940	2	1.5	3	10	10
335	283+940	283+950	2	3	3	10	10
336	283+950	283+960	2	3	3	10	10
337	283+960	283+970	2	3	3	10	10
338	283+970	283+980	2	3	3	10	10
339	283+980	283+990	2	3	3	10	10
340	283+990	284+000	2	3	3	10	10
341	284+000	284+010	2	3	3	10	10
342	284+010	284+020	2	3	3	10	10
343	284+020	284+030	2	3	3	10	10
344	284+030	284+040	2	3	3	10	10
345	284+040	284+050	2	3	3	10	10
346	284+050	284+060	2	3	3	10	10
347	284+060	284+070	2	3	3	10	10
348	284+070	284+080	2	1.5	3	10	10
349	284+080	284+090	6		3		10
350	284+090	284+100	6		3		10
351	284+100	284+110	6		3		10
352	284+110	284+120	6		3		10
353	284+120	284+130	6		3		10
354	284+130	284+140	6		3		10
355	284+140	284+150	6		3		10
356	284+150	284+160	6		3		10
357	284+160	284+170	6		3		10
358	284+170	284+180	6		3		10
359	284+180	284+190	4		3		10
360	284+190	284+200	4		1.5		10
361	284+320	284+330	4		1.5		10
362	284+330	284+340	4		1.5		10
363	284+340	284+350	4		1.5		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
364	284+350	284+360	4		1.5		10
365	284+360	284+370	4		3		10
366	284+370	284+380	4		3		10
367	284+380	284+390	4		3		10
368	284+390	284+400	6		3		10
369	284+400	284+410	6		3		10
370	284+410	284+420	6		3		10
371	284+420	284+430	6		3		10
372	284+430	284+440	6		3		10
373	284+440	284+450	6		3		10
374	284+450	284+460	6		3		10
375	284+460	284+470	6		3		10
376	284+470	284+480	6		3		10
377	284+480	284+490	6		3		10
378	284+490	284+500	6		3		10
379	284+500	284+510	6		3		10
380	284+510	284+520	6		3		10
381	284+520	284+530	6		3		10
382	284+530	284+540	6		3		10
383	284+540	284+550	5		3		10
384	284+550	284+560	5		1.5		10
385	284+560	284+570	5		1.5		10
386	285+010	285+020	5		1.5		10
387	285+020	285+030	5		1.5		10
388	285+030	285+040	5		1.5		10
389	285+040	285+050	6		3		10
390	285+050	285+060	6		3		10
391	285+060	285+070	6		3		10
392	285+070	285+080	6		3		10
393	285+080	285+090	6		3		10
394	285+090	285+100	6		3		10
395	285+100	285+110	6		3		10
396	285+110	285+120	6		3		10
397	285+120	285+130	6		3		10
398	285+130	285+140	6		3		10
399	285+140	285+150	6		3		10
400	285+150	285+160	6		3		10
401	285+160	285+170	6		3		10
402	285+170	285+180	6		3		10
403	285+180	285+190	6		3		10
404	285+190	285+200	6		3		10
405	285+200	285+210	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
406	285+210	285+220	6		3		10
407	285+220	285+230	6		3		10
408	285+230	285+240	6		3		10
409	285+240	285+250	6		3		10
410	285+250	285+260	6		3		10
411	285+260	285+270	6		3		10
412	285+270	285+280	6		3		10
413	285+280	285+290	6		3		10
414	285+290	285+300	6		3		10
415	285+300	285+310	6		3		10
416	285+310	285+320	6		3		10
417	285+320	285+330	6		3		10
418	285+330	285+340	6		3		10
419	285+340	285+350	6		3		10
420	285+350	285+360	6		3		10
421	285+360	285+370	6		3		10
422	285+370	285+380	6		1.5		10
423	285+380	285+390	6		1.5		10
424	285+390	285+400	6		3		10
425	285+400	285+410	6		3		10
426	285+410	285+420	6		3		10
427	285+420	285+430	6		3		10
428	285+430	285+440	6		3		10
429	285+440	285+450	6		1.5		10
430	285+450	285+460	6		0		
431	285+460	285+470	6		0		
432	285+470	285+480	6		1.5		10
433	285+480	285+490	6		3		10
434	285+490	285+500	6		3		10
435	285+500	285+510	6		3		10
436	285+510	285+520	6		3		10
437	285+520	285+530	6		3		10
438	285+530	285+540	6		1.5		10
439	285+540	285+550	6		1.5		10
440	285+550	285+560	6		1.5		10
441	285+590	285+600	6		1.5		10
442	285+600	285+610	6		1.5		10
443	285+610	285+620	6		3		10
444	285+620	285+630	6		3		10
445	285+630	285+640	6		3		10
446	285+640	285+650	6		3		10
447	285+650	285+660	6		3		10

S No	Design Chainage (Km)		TCS	Breast Wall Height above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
448	285+660	285+670	4		3		10
449	285+670	285+680	4		3		10
450	285+680	285+690	4		3		10
451	285+690	285+700	4		3		10
452	285+700	285+710	4		3		10
453	285+710	285+720	4		3		10
454	285+720	285+730	4		3		10
455	285+730	285+740	4		3		10
456	285+740	285+750	4		3		10
457	285+750	285+760	4		3		10
458	285+760	285+770	4 to 9		3		10
459	285+770	285+780	4 to 9		1.5		10
460	285+780	285+790	4 to 9		1.5		10
461	285+790	285+800	4 to 9		1.5		10
462	285+800	285+810	4 to 9		1.5		10

2. Toe/Retaining wall:

Retaining walls shall be designed considering appropriate height as per site condition. The PCC walls have been adopted upto the height of 2m from the ground level and RCC retaining walls for height more than 2m. The proposal shall be got approved from the Authority Engineer. The minimum length and height details of Toe Wall are as below:

The details of Toe Wall are as below:

S No	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	274+610	274+620	7	1.229	0.733	10	10
2	274+620	274+630	7	1.622	0.949	10	10
3	274+630	274+640	8	1.528		10	
4	274+640	274+650	8	1.448		10	
5	274+650	274+660	8	1.663		10	
6	274+660	274+670	8	1.563		10	
7	274+670	274+680	8	1.49		10	
8	274+680	274+690	8	1.311		10	
9	274+690	274+700	8	1.66		10	
10	274+700	274+710	8	1.304		10	
11	274+710	274+720	8	1.567		10	

S No	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
12	274+720	274+730	8	1.71		10	
13	274+730	274+740	8	1.496		10	
14	274+740	274+750	8	1.093		10	
15	274+750	274+760	8	1.371		10	
16	274+760	274+770	8	1.261		10	
17	274+770	274+780	8	1.126		10	
18	274+780	274+790	8	1.148		10	
19	274+790	274+800	8	1.197		10	
20	275+180	275+190	5	0.562		10	
21	275+190	275+200	5	0.847		10	
22	275+200	275+210	5	0.839		10	
23	275+210	275+220	5	1.744		10	
24	275+400	275+410	4	0.633		10	
25	275+490	275+500	4	1.068		10	
26	275+800	275+810	8	1.661		10	
27	275+870	275+880	8	1.777		10	
28	275+880	275+890	8	1.254		10	
29	275+890	275+900	8	0.69		10	
30	276+520	276+530	5	1.573		10	
31	276+530	276+540	5	0.885		10	
32	276+540	276+550	5	1.754		10	
33	276+590	276+600	5	1.777		10	
34	276+600	276+610	5	1.663		10	
35	276+610	276+620	5	1.035		10	
36	276+620	276+630	5	0.597		10	
37	278+170	278+180	8		0.223		10
38	278+180	278+190	8		0.51		10
39	278+190	278+200	8		0.797		10
40	278+200	278+210	8		1.174		10
41	278+210	278+220	8		1.618		10
42	278+220	278+230	7	0.222		10	
43	278+260	278+270	7	1.895		10	
44	278+270	278+280	7	1.387		10	
45	278+280	278+290	7	0.893		10	
46	278+320	278+330	8		0.945		10

S No	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
47	280+150	280+160	10	0.276		10	
48	280+160	280+170	10	1.251		10	
49	280+170	280+180	10	0.472		10	
50	280+180	280+190	10	0.824		10	
51	280+190	280+200	10	0.498		10	
52	281+720	281+730	8		0.39		10
53	281+730	281+740	8		0.785		10
54	281+740	281+750	8		0.968		10
55	281+750	281+760	8		1.098		10
56	281+760	281+770	8		1.09		10
57	281+770	281+780	8		1.23		10
58	281+780	281+790	8		1.901		10
59	282+470	282+480	5	1.647		10	
60	282+480	282+490	5	1.757		10	
61	282+490	282+500	5	1.953		10	
62	283+260	283+270	8	0.506		10	
63	283+270	283+280	8	0.578		10	
64	283+280	283+290	8	0.643		10	
65	283+290	283+300	8	0.702		10	
66	283+300	283+310	8	0.406		10	
67	283+310	283+320	8	0.185		10	
68	283+470	283+480	8	0.807		10	
69	283+480	283+490	8	1.598		10	
70	283+490	283+500	8	1.382		10	
71	283+500	283+510	8	0.892		10	
72	283+510	283+520	8	0.401		10	
73	283+580	283+590	5	0.386		10	
74	283+590	283+600	5	1.228		10	
75	283+600	283+610	5	1.105		10	
76	283+610	283+620	5	0.509		10	
77	283+620	283+630	5	0.296		10	
78	283+630	283+640	5	0.358		10	
79	283+640	283+650	5	0.517		10	
80	283+650	283+660	5	0.733		10	
81	283+660	283+670	5	0.872		10	
82	283+670	283+680	5	0.952		10	
83	283+680	283+690	5	0.922		10	

S No	Design Chainage (Km)		TCS Type	Toe wall height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
84	283+690	283+700	5	0.831		10	
85	283+700	283+710	5	0.669		10	
86	283+710	283+720	5	0.434		10	
87	283+720	283+730	5	0.194		10	
88	284+190	284+200	4	0.308		10	
89	284+200	284+210	4	0.463		10	
90	284+210	284+220	4	0.672		10	
91	284+220	284+230	4	1.699		10	
92	284+370	284+380	4	1.795		10	
93	284+380	284+390	4	0.926		10	
94	284+540	284+550	5	0.65		10	
95	284+550	284+560	5	1.03		10	
96	284+560	284+570	5	0.347		10	
97	284+790	284+800	8	0.767		10	
98	284+800	284+810	8	1.673		10	
99	285+030	285+040	5	1.047		10	
100	285+670	285+680	4	0.432		10	
101	285+680	285+690	4	1.152		10	
102	285+750	285+760	4	1.766		10	
103	285+820	285+830	10	0.5		10	
104	285+830	285+840	10	0.5		10	
105	285+840	285+850	10	0.637		10	
106	285+850	285+860	10	1.511		10	
107	285+900	285+910	10	0.801		10	
108	286+940	286+950	10 to 8	0.328		10	
109	286+950	286+960	10 to 8	0.442		10	
110	286+960	286+970	10 to 8	0.556		10	
111	286+970	286+980	10 to 8	0.569		10	
112	286+980	286+990	10 to 8	0.761		10	
113	286+990	287+000	10 to 8	0.959		10	

The details of Retaining Walls are as below:

S No	Design Chainage (Km)		TCS Type	Retaining Wall (m) above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	275+410	275+420	4	2.025		10	
2	275+420	275+430	4	2.964		10	
3	275+430	275+440	4	3.421		10	
4	275+440	275+450	4	4.035		10	
5	275+450	275+460	4	3.707		10	
6	275+460	275+470	4	3.462		10	
7	275+470	275+480	4	3.86		10	
8	275+480	275+490	4	2.525		10	
9	275+810	275+820	8	2.197		10	
10	275+820	275+830	8	2.616		10	
11	275+830	275+840	8	2.501		10	
12	275+840	275+850	8	2.512		10	
13	275+850	275+860	8	2.569		10	
14	275+860	275+870	8	2.654		10	
15	276+510	276+520	5	2.323		10	
16	276+550	276+560	5	2.514		10	
17	276+560	276+570	5	3.438		10	
18	276+570	276+580	5	3.046		10	
19	276+580	276+590	5	2.404		10	
20	278+220	278+230	7		2.065		10
21	278+230	278+240	7	2.226	2.497	10	10
22	278+240	278+250	7	2.925	2.427	10	10
23	278+250	278+260	7	2.415	2.384	10	10
24	278+260	278+270	7		2.46		10
25	278+270	278+280	7		3.375		10
26	278+280	278+290	7		3.079		10
27	278+290	278+300	8		2.885		10
28	278+300	278+310	8		2.704		10
29	278+310	278+320	8		2.144		10
30	281+790	281+800	8		2.77		10
31	281+800	281+808	8		2.198		8
32	282+500	282+510	5	2.125		10	
33	282+510	282+520	5	2.242		10	
34	282+520	282+530	5	2.353		10	
35	282+530	282+540	5	2.458		10	
36	282+540	282+550	5	2.714		10	

S No	Design Chainage (Km)		TCS Type	Retaining Wall (m) above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
37	282+550	282+560	5	2.938		10	
38	282+560	282+570	5	3.089		10	
39	282+570	282+580	5	3.395		10	
40	282+580	282+590	5	4.206		10	
41	282+590	282+600	5	4.942		10	
42	282+600	282+610	5	5.672		10	
43	282+610	282+620	5	5.745		10	
44	282+620	282+630	5	5.894		10	
45	282+630	282+640	8	5.898		10	
46	282+640	282+650	8	6.563		10	
47	282+650	282+660	8	6.576		10	
48	282+660	282+670	8	6.561		10	
49	282+670	282+680	8	7.002		10	
50	282+680	282+690	8	7.421		10	
51	282+690	282+700	8	8.175		10	
52	282+700	282+710	8	8.686		10	
53	282+710	282+720	8	8.555		10	
54	282+720	282+730	8	8.55		10	
55	282+730	282+740	8	8.683		10	
56	282+740	282+750	8	8.877		10	
57	282+750	282+760	8	8.86		10	
58	282+760	282+770	8	8.712		10	
59	282+770	282+780	8	8.682		10	
60	282+780	282+790	8	8.724		10	
61	282+790	282+800	8	8.834		10	
62	282+800	282+810	8	9.012		10	
63	282+810	282+820	8	10.11		10	
64	282+820	282+830	8	9.561		10	
65	282+830	282+840	8	8.369		10	
66	282+840	282+850	8	6.749		10	
67	282+850	282+860	8	4.838		10	
68	282+860	282+870	8	4.182		10	
69	282+870	282+880	8	3.62		10	
70	282+880	282+890	5	3.273		10	
71	282+890	282+900	5	3.051		10	
72	282+900	282+910	5	2.274		10	
73	284+230	284+240	4	2.791		10	
74	284+240	284+250	4	2.756		10	
75	284+250	284+260	4	2.867		10	
76	284+260	284+270	4	2.987		10	
77	284+270	284+280	4	3.527		10	
78	284+280	284+290	4	3.417		10	

S No	Design Chainage (Km)		TCS Type	Retaining Wall (m) above GL		Length (m)	
	From	To		LHS	RHS	LHS	RHS
79	284+290	284+300	4	2.846		10	
80	284+300	284+310	4	3.269		10	
81	284+310	284+320	4	3.781		10	
82	284+320	284+330	4	3.935		10	
83	284+330	284+340	4	3.928		10	
84	284+340	284+350	4	3.997		10	
85	284+350	284+360	4	3.252		10	
86	284+360	284+370	4	2.591		10	
87	284+810	284+820	8	2.107		10	
88	284+820	284+830	8	2.095		10	
89	284+830	284+840	8	2.069		10	
90	284+840	284+850	8	2.359		10	
91	284+850	284+860	8	2.616		10	
92	284+860	284+870	8	2.738		10	
93	284+870	284+880	8	2.785		10	
94	284+880	284+890	8	2.866		10	
95	284+890	284+900	8	2.93		10	
96	284+900	284+910	8	3.03		10	
97	284+910	284+920	8	3.21		10	
98	284+920	284+930	8	3.402		10	
99	284+930	284+940	8	3.568		10	
100	284+940	284+950	8	3.732		10	
101	284+950	284+960	8	3.824		10	
102	284+960	284+970	8	3.882		10	
103	284+970	284+980	8	3.759		10	
104	284+980	284+990	8	3.71		10	
105	284+990	285+000	8	3.863		10	
106	285+000	285+010	8	3.984		10	
107	285+010	285+020	5	3.488		10	
108	285+020	285+030	5	2.599		10	
109	285+690	285+700	4	2.001		10	
110	285+700	285+710	4	2.89		10	
111	285+710	285+720	4	3.463		10	
112	285+720	285+730	4	3.045		10	
113	285+730	285+740	4	2.74		10	
114	285+740	285+750	4	2.186		10	
115	285+860	285+870	10	2.303		10	
116	285+870	285+880	10	2.877		10	
117	285+880	285+890	10	2.74		10	
118	285+890	285+900	10	2.46		10	

Note: The above mentioned retaining wall locations are tentative and total length given is minimum. Additional length if required shall be provided as per site conditions. Also, Toe/Retaining walls at toe to be provided to accommodate the cross section within the available RoW whenever required.

3. Stone Pitching

The Stone pitching has been adopted to protect the erosion of embankment side slope where the river stream are very close and may damage the side slope. The minimum locations on the project highway are as below:

Sl. No.	Design Chainage (Km)		Side	Length (m)	Avg. Height (m)
	From	To			
1	275+300	275+400	LHS	100	1.52
2	275+400	275+500	LHS	100	4.00
3	284+180	284+390	LHS	210	4.00
4	285+660	285+760	LHS	100	4.00

4. Surficial Protection and Erosion Control Measures (Cut Height of Side Slope >25m)

The Hill side surficial protection and erosion control measures is proposed at locations where the cut height of side slope is more than 25m.

The minimum details of locations with length and average height are as below and may be finalized in consultation with the Authority Engineer.

S No	Design Chainage (Km)		Length (m)	Average Height (m)
	From	To		
Nil				

Hill side Typical Surficial Protection and Erosion Control Measures for cut height of side slope more than 25m are presented in Appendix-1 of this Schedule B and described below:

(a) Hill side Toe Gabion wall for Isolated Soil Strata - Mechanically woven Zn+10%Al with PVC coated steel wire mesh gabion toe wall with minimum height of wall 3.0 m shall be constructed for the locations wherever soil strata is encountered after cutting at the toe of hill side slope. Gabion toe wall shall be constructed along with non-woven geotextile behind the gabion for filtration & separation and road edge drain.

(b) Surficial Protection for Rocky Strata -Continuously threaded anchors shall be installed wherever rocky strata are encountered on the slope. Surficial protection with secured drapery system shall be done for full length and height of cut slope surface developed by cutting the rock with slope angle of 80 degree with horizontal after excavation, wherever rocky strata is encountered. Surface protection for rocky strata shall be done by high resistance double twisted hexagonal Zn+5%Al coated wire mesh with top, bottom and surface continuously threaded anchors. Top, bottom and surface anchors shall have minimum length and minimum diameter as 3.0 m and 25 mm respectively. Top and bottom anchors shall be provided at a maximum spacing of 1.5 m and 3.0 m c/c in longitudinal direction respectively. Surface anchors shall be provided with maximum spacing of 3 m c/c in longitudinal and vertical directions for total area. All rock anchors shall be fully grouted. Minimum yield strength of anchorages shall be 500 MPa.

(c) Erosion Control Measures for Soil Surface - Self drilling anchors shall be installed wherever collapsible strata is encountered on the slope. Erosion control measures shall be adopted for cut slope wherever soil strata is encountered at the surface and slope angle shall be limited to 45 degrees or flatter with horizontal after the excavation upto proposed right of way. Three dimensional reinforced synthetic geomat shall be used for erosion control measures along with hydraulically applied erosion control measures. Self Drilling Anchors shall be used for supporting geomat along with u-pins. Minimum length and outer diameter of self drilling anchors shall be 1 m and 32 mm respectively. Self drilling anchors shall be provided with maximum spacing of 3 m c/c in longitudinal and vertical directions.

(d) Drainage Measures for Cut Slopes - Drainage measures for internal seepage in the cut slope shall be adopted by installing PVC pipes inside the slope. PVC pipes for internal seepage shall be half perforated and lined with geotextile. PVC pipes shall be installed for minimum 4 m length at spacing of 4 m c/c in longitudinal direction in minimum 4 layers at the bottom of the cut slope. Top drain shall also be constructed at the toe wherever soil strata is encountered after rocky strata. In addition to the above mentioned drainage measures, suitable surface drainage measures shall be adopted as per the site condition.

8. Traffic Control Devices and Road Safety Works

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

8.1. Traffic signs, Pavement marking and Safety barriers

a) **Traffic Signs:**

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway as per section 9 of Manual.

b) **Pavement marking:**

Pavement markings shall cover road marking for the entire Project Highway as per section 9 of Manual

c) **Safety Barrier:**

Provide W-beam crash barrier, and parapet walls along the project highway as suggested in the section 9 of Manual.

8.2. Specifications of the Reflective Sheeting

The prismatic Reflective sheeting shall be provided in accordance with the para 9.2.3 of the Manual.

9. Roadside Furniture

a. Roadside furniture shall be provided in accordance with the provisions of Section 9and 12 of the Manual and as given in Schedule-C.

b. Overhead traffic signs: location and size

Overhead traffic signs are provided as per site requirement according to paragraph 9.2.5 of the Manual and as given in Schedule-C.
Major Road Junctions

a) Delineators: Delineators for the entire Project Highway

10. Compulsory Afforestation

NIL

11. Hazardous Locations

The hazardous locations those require safety barriers are the locations such as Road Side obstacles, Sharp Curves, Bridge approaches and any other locations identified in consultation with Authority Engineer during the execution of project highway.

(a) The safety barriers shall be provided on both side of curves with radius upto 450m as per clause 9.7.1 of Manual at the following hazardous location on:

S No	Design Chanage		Length	Remark (Curve Radius)
	Start	End		
Inner edge				
16	276+216	276+410	194	-360
17	276+423	276+655	232	400
18	283+606	283+997	391	360
19	284+029	284+421	392	-360

LEFT Side Outer Edge				RIGHT Side Outer Edge			
S No	CHAINAGE		Length	S No	CHAINAGE		Length
	Start	End			Start	End	
1	276+423	276+510	87	1	276+216	276+410	194
2	276+640	276+655	15	2	284+029	284+421	392
3	283+800	283+997	197				

12. Special Requirement for Hill Roads

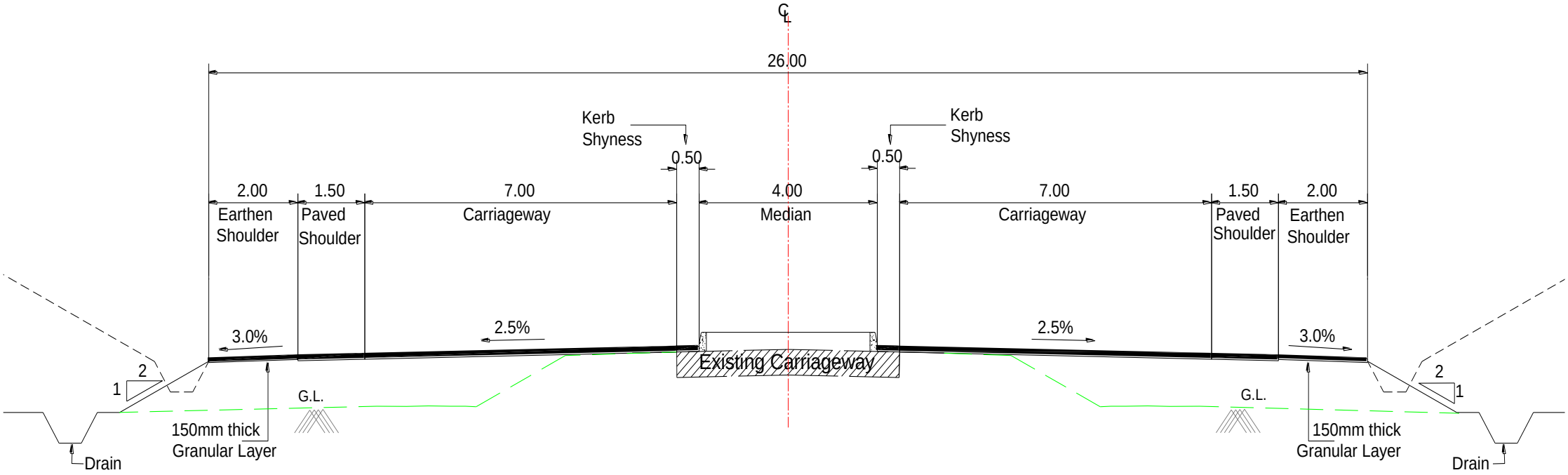
In accordance with the Section 13 of the Manual and recommended practices for treatment of Embankment and road side slope erosion control.

13. Change of Scope

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths 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

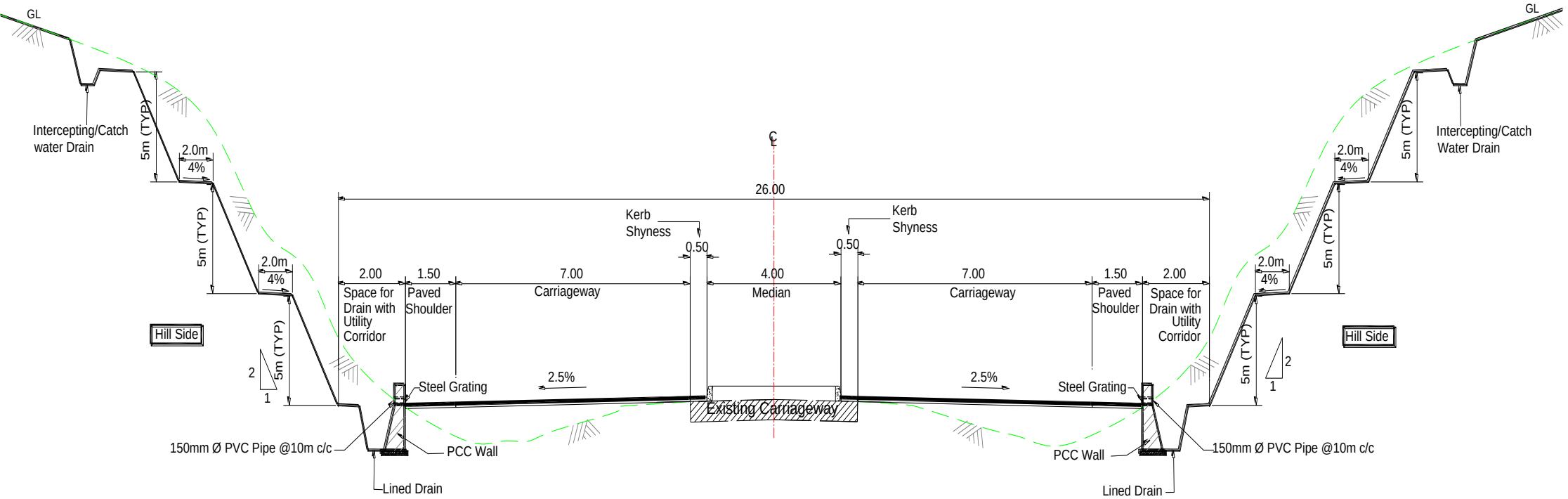
13. Change of Scope

Appendix B1 - Typical Cross Sections

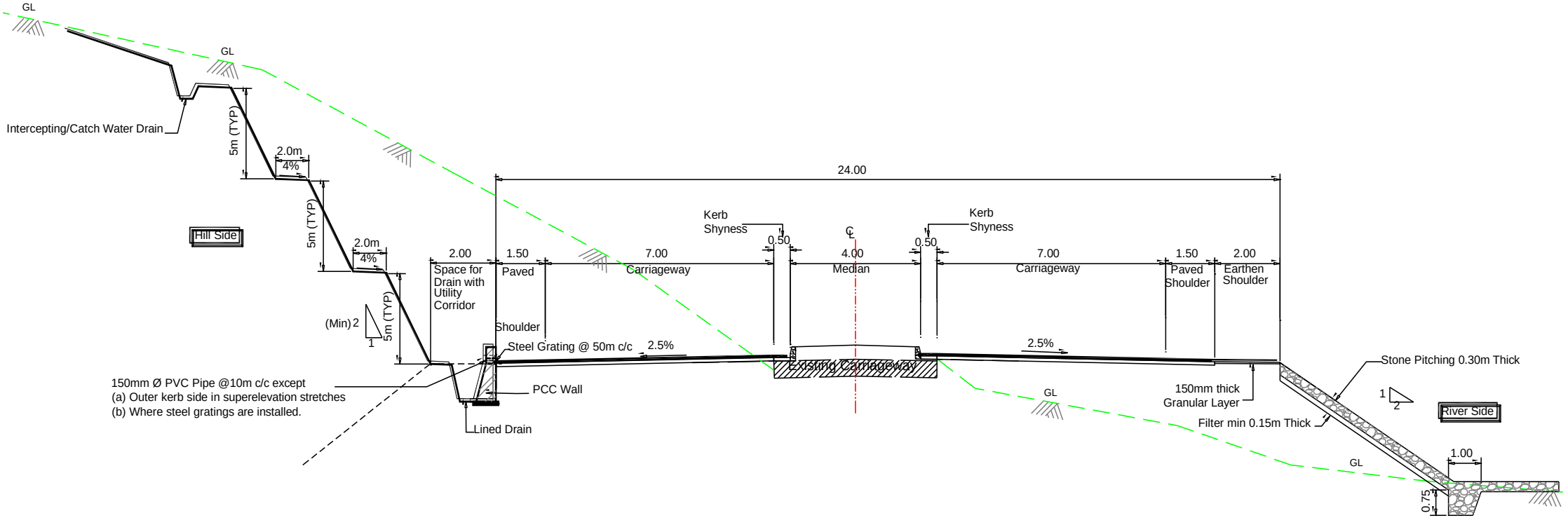


TCS-1 : 4-Lane Divided Carriageway With Raised Media

(Normal Fill/Cut Section– Rural Section)

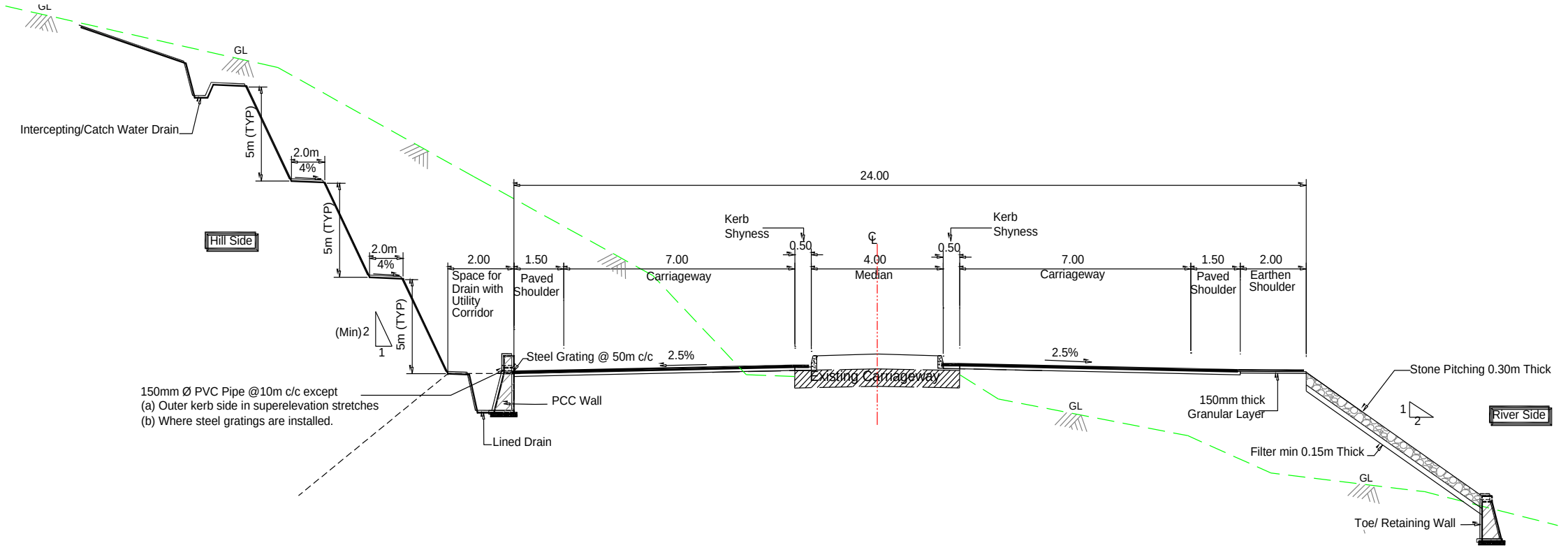


TCS-2 : 4-Lane Divided Carriageway with Both-side Hill Cutting



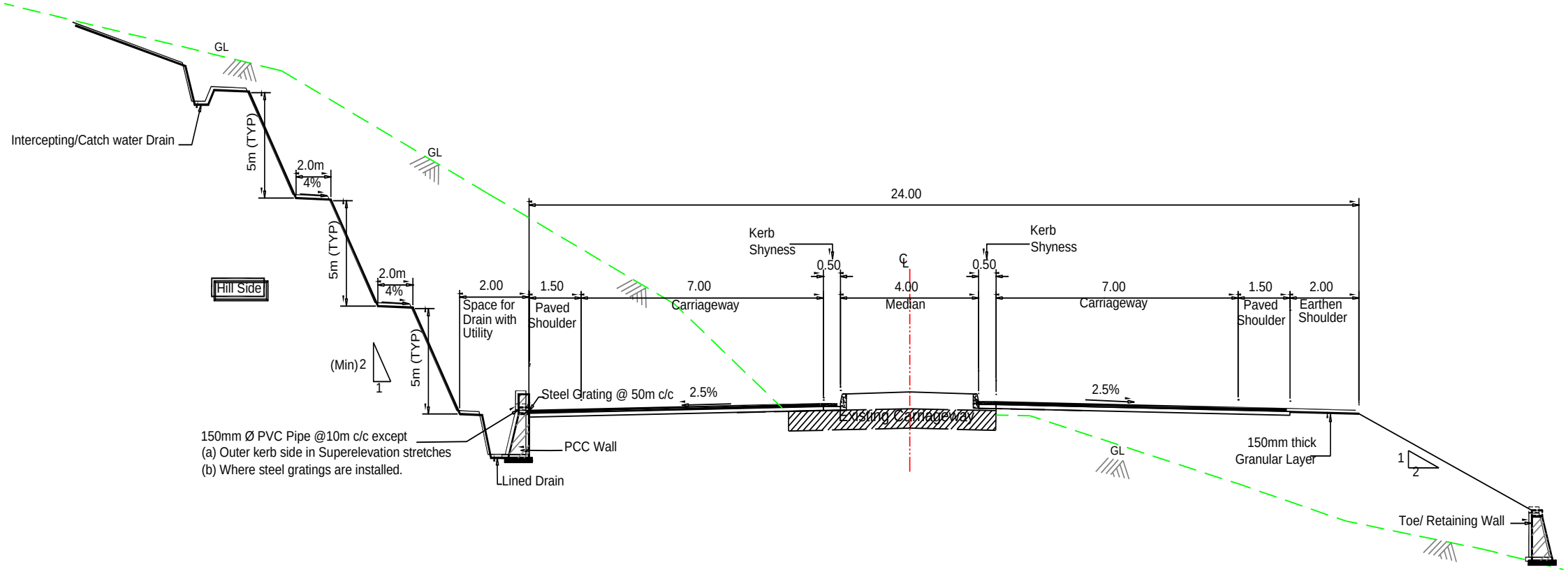
TCS-3 :4-Lane Divided Carriageway

(Hill Side Cutting / Fill and River Side Stone Pitching)



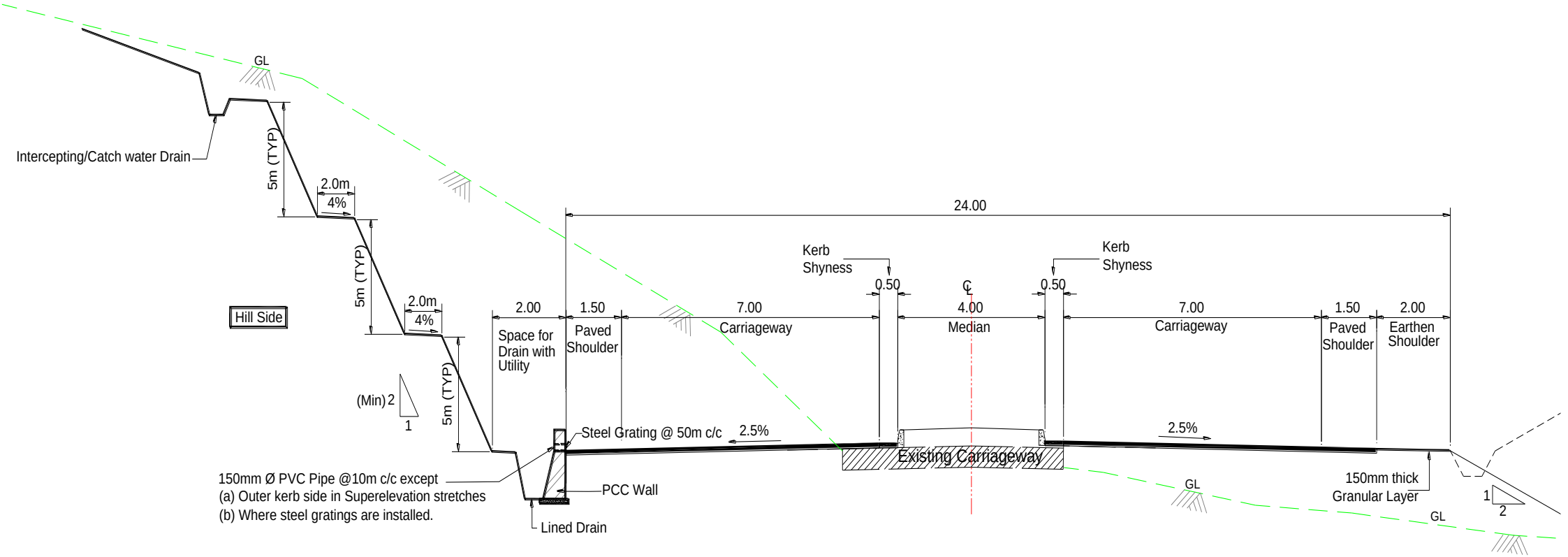
TCS-4 : 4-Lane Divided Carriageway

(Hill Side Cutting / Fill and River Side Stone Pitching with Toe/Retaining Wall)



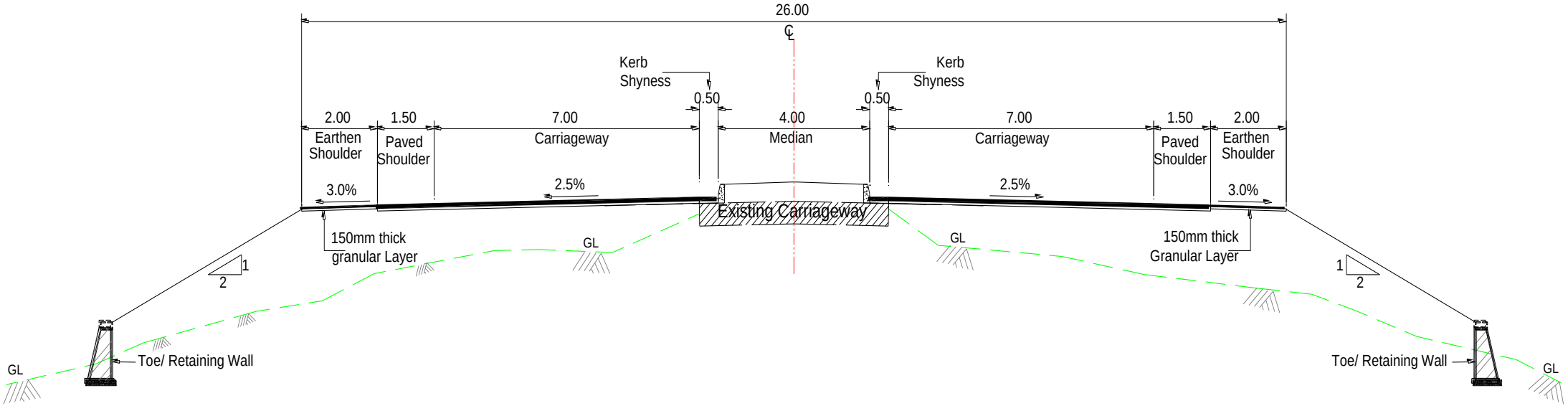
TCS-5 : 4-Lane Divided Carriageway

(One Side Hill Cutting and Other Side Toe/Retaining Wall)

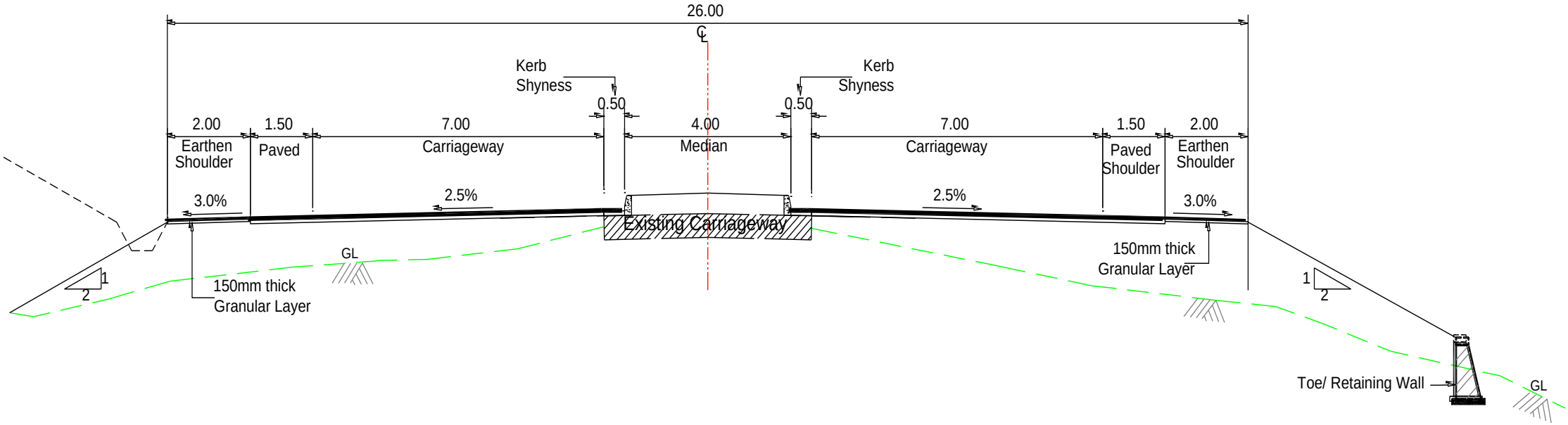


TCS-6 : 4-Lane Divided Carriageway

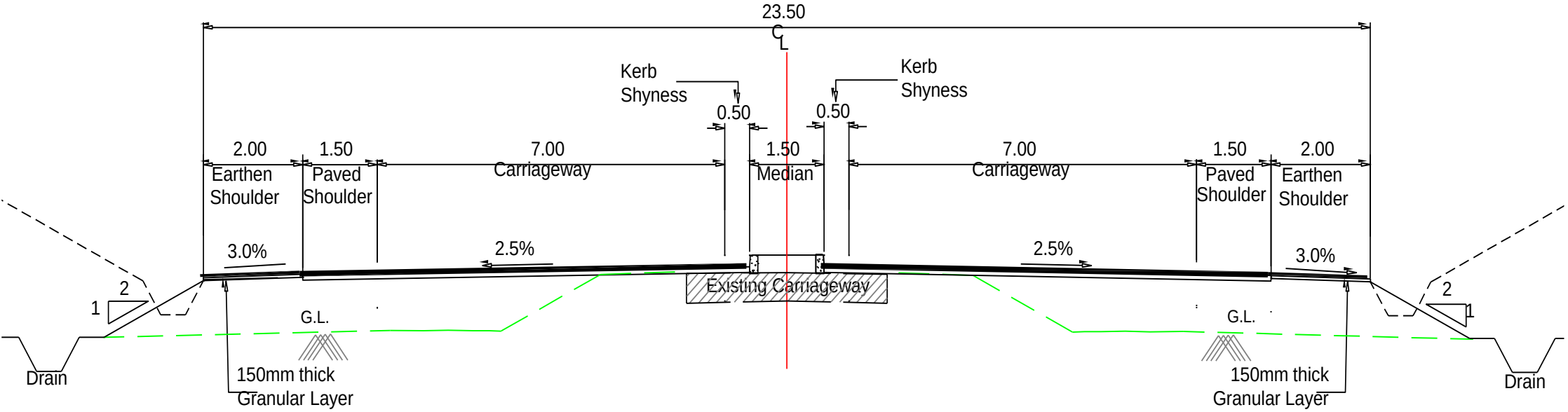
(One Side Hill Cutting and Other Side normal Cut/Fill Section)



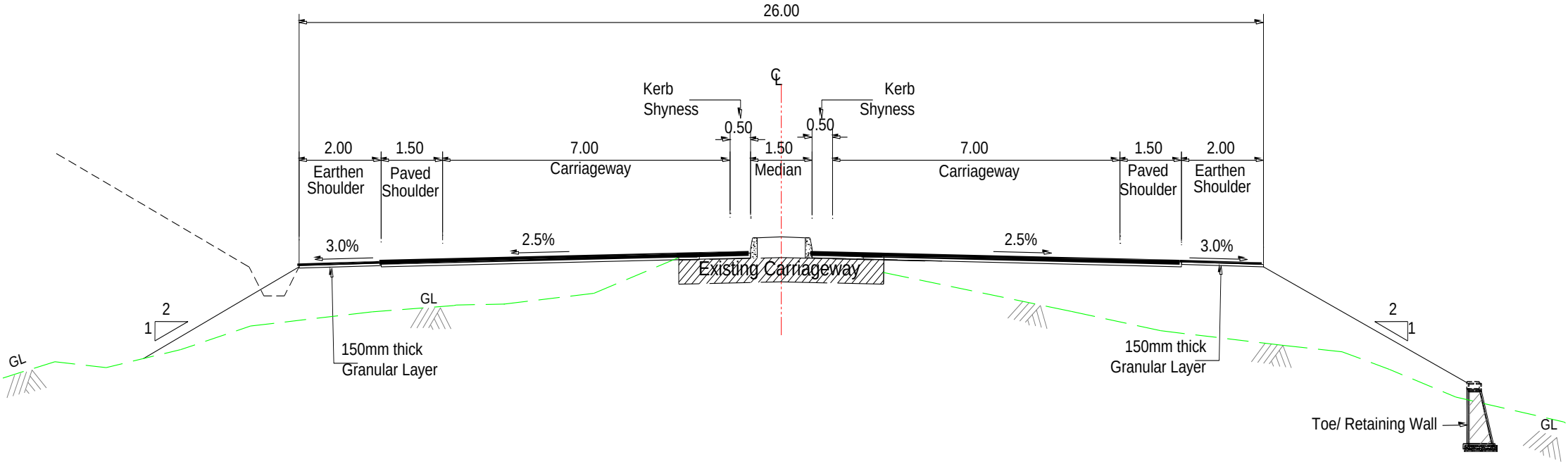
TCS-7 : 4-Lane Divided Carriageway with Bothside Toe/Retaining Walls



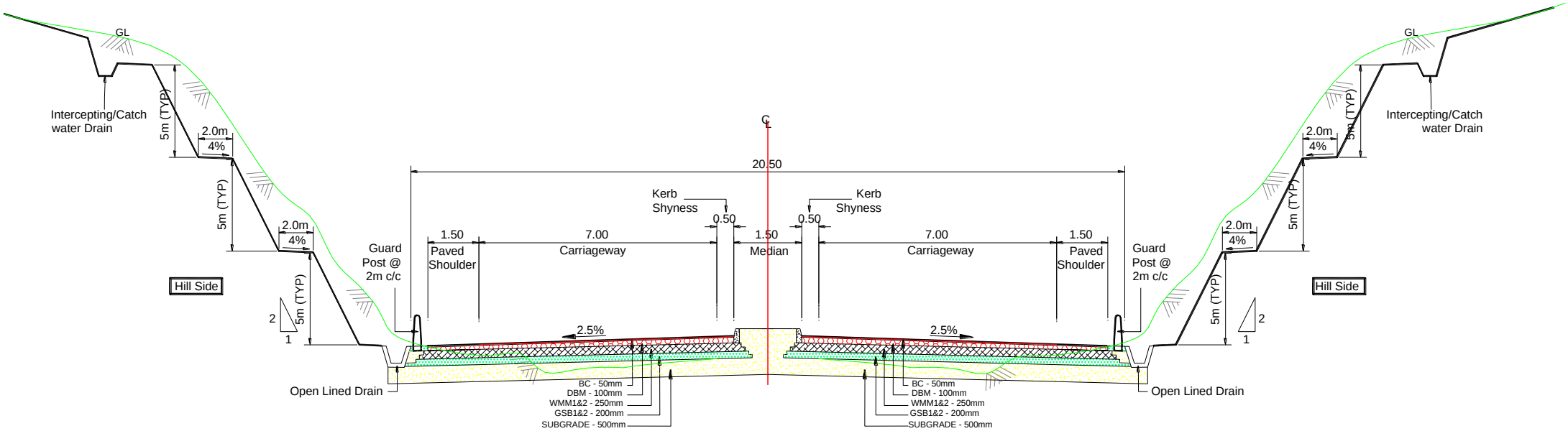
TCS-8 : 4-Lane Divided Carriageway
(One Side Retaining Wall and Other Side normal Cut/Fill Section)



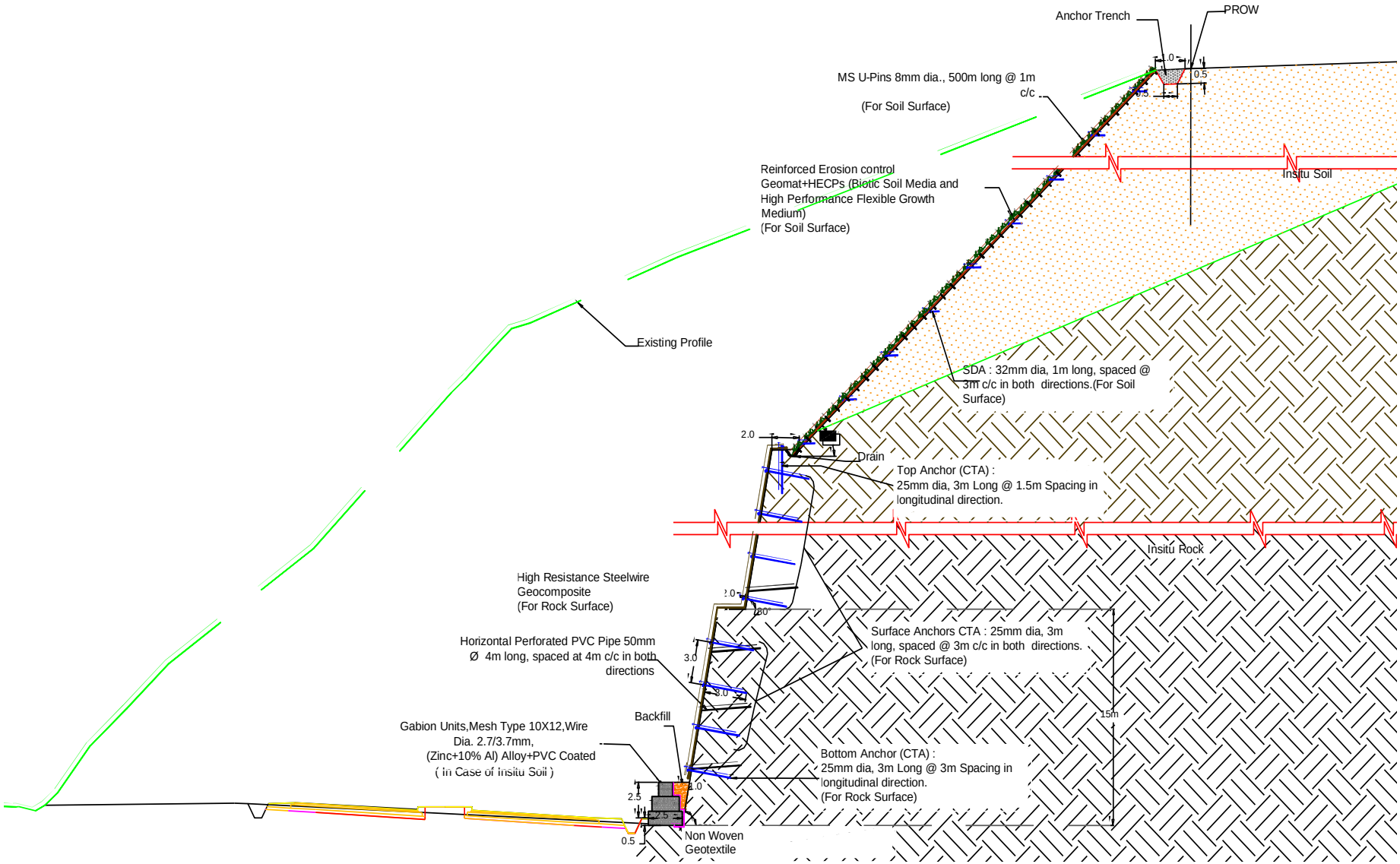
TCS-9 : 4-Lane Divided Carriageway With Cut/Fill
(Semi Built up Area)



TCS-10 : 4-Lane Divided Carriageway
(One Side Retaining Wall and Other Side normal Cut/Fill Section)



TCS-13 : 4-Lane Divided Carriageway **<u>with Both-side Hill Cutting</u>**
(1.50m median width)



Typical Surficial Protection and Erosion Control Measures (Cut Height of Side Slope > 25m)

Applicable Stretches of Typical Cross-section

S No	DESIGN CHAINAGE (Km)		Length	TCS Type
	From	To	(m)	
1	274+610	274+630	20	7
2	274+630	274+800	170	8
3	274+800	275+180	380	6
4	275+180	275+220	40	5
5	275+220	275+300	80	6
6	275+300	275+400	100	3
7	275+400	275+500	100	4
8	275+500	275+760	260	6
9	275+760	275+800	40	1
10	275+800	275+900	100	8
11	275+900	275+960	60	1
12	275+960	276+510	550	6
13	276+510	276+630	120	5
14	276+630	277+010	380	1
15	277+010	277+050	40	8
16	277+050	277+160	110	7
17	277+160	277+210	50	1
18	277+210	277+270	60	2
19	277+270	277+645	375	1
20	277+645	277+665	20	BRG
21	277+665	277+880	215	1
22	277+880	278+130	250	2
23	278+130	278+170	40	1
24	278+170	278+220	50	8
25	278+220	278+290	70	7
26	278+290	278+330	40	8
27	278+330	278+400	70	1
28	278+400	278+500	100	1 to 9
29	278+500	279+635	1135	9
30	279+635	279+652	17	BRG
31	279+652	279+730	78	9
32	279+730	279+790	60	13
33	279+790	280+150	360	9
34	280+150	280+200	50	10
35	280+200	280+230	30	10 to 1
36	280+230	280+300	70	9 to 1
37	280+300	281+720	1420	1
38	281+720	281+808	88	8
39	281+808	281+835	27	BRG
40	281+835	281+880	45	1
41	281+880	282+090	210	6
42	282+090	282+150	60	1

S No	DESIGN CHAINAGE (Km)		Length	TCS Type
	From	To	(m)	
43	282+150	282+240	90	6
44	282+240	282+440	200	2
45	282+440	282+470	30	6
46	282+470	282+630	160	5
47	282+630	282+880	250	8
48	282+880	282+910	30	5
49	282+910	283+220	310	6
50	283+220	283+260	40	1
51	283+260	283+320	60	8
52	283+320	283+470	150	1
53	283+470	283+520	50	8
54	283+520	283+580	60	6
55	283+580	283+730	150	5
56	283+730	283+920	190	6
57	283+920	284+080	160	2
58	284+080	284+180	100	6
59	284+180	284+390	210	4
60	284+390	284+540	150	6
61	284+540	284+570	30	5
62	284+570	284+604	34	1
63	284+604	284+610	6	BRG
64	284+610	284+790	180	1
65	284+790	285+010	220	8
66	285+010	285+040	30	5
67	285+040	285+443	403	6
68	285+443	285+458	15	BRG
69	285+458	285+560	102	6
70	285+560	285+590	30	1
71	285+590	285+660	70	6
72	285+660	285+760	100	4
73	285+760	285+820	60	4 to 9
74	285+820	285+910	90	10
75	285+910	286+798	888	9
76	286+798	286+810	12	BRG
77	286+810	286+900	90	9
78	286+900	286+940	40	9 to 1
79	286+940	287+000	60	10 to 8

Total Length (m) of each TCS:		
TCS-1	3189	4 Lane Divided Carriageway with 4m Raised Median- Normal Cut/Fill section in Rural Section
TCS-2	670	4 Lane Divided Carriageway with 4m Raised Median- Both side Hill Cutting with PCC Toe wall cum lined drain
TCS-3	100	4 Lane Divided Carriageway with 4m Raised Median- Hill side Cutting/Normal Filling and River side Stone Pitching on Embankment
TCS-4	410	4 Lane Divided Carriageway with 4m Raised Median- Hill side Cutting/Normal Filling and River side Stone Pitching on Embankment with Toe/Retaining wall
TCS-5	560	4 Lane Divided Carriageway with 4m Raised Median- One side Hill Cutting with PCC Toe wall cum lined drain and other side Toe/ Retaining wall
TCS-6	2985	4 Lane Divided Carriageway with 4m Raised Median- One side Hill Cutting with PCC Toe wall cum lined drain and other side Normal Cut/Fill
TCS-7	200	4 Lane Divided Carriageway with 4m Raised Median- Both side Toe/Retaining walls
TCS-8	1068	4 Lane Divided Carriageway with 4m Raised Median- One side Normal Cut/Fill and other side Toe/Retaining wall
TCS-9	2551	4 Lane Divided Carriageway with 1.5m Raised Median- Normal Cut/Fill section in Semi Built up Area
TCS-10	140	4 Lane Divided Carriageway with 1.5m Raised Median- One side Normal Cut/Fill section and other side Toe/Retaining wall in Semi Built up Area
TCS-13	60	4 Lane Divided Carriageway with 1.5m Raised Median- with Both-side Hill Cutting
Varies	360	
Bridges	97	Bridge Section as per GAD

(Schedule B-1)

The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Authority.

Annex – I

SCHEDULE - C

PROJECT FACILITIES

1. Project Facilities

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

(a) Toll Plaza

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Tree plantation;

(e) Truck lay-byes;

(f) Bus-bays and bus shelters;

(g) Median Opening

(h) Utility duct

(i) Others to be specified

1. Operational and maintenance base camp
2. Utilities

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Roadside furniture

The roadside furniture shall include the provision of the;

i. Traffic Signs

Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway as per manual recommended in Schedule D. locations of the sign boards shall be finalized with the consultation of Authority Engineer.

ii. Pavement Markings

Pavement markings shall cover road marking for the entire Project Highway as per the manual recommended in Schedule D. locations of the sign boards shall be finalized with the consultation of Authority Engineer.

iii. LED Traffic Blinkers

For all **Pedestrian** cross walks along the alignment, at all Major Junction locations and at Curve locations where curve radius not confirming to minimum radius as per design standards and any other locations specified in relevant manual recommended in Schedule D.

iv. Crash barrier

Provide W-beam Steel crash barrier along the Project Highway at the locations as suggested in the manual recommended in Schedule D.

No W-Beam Steel crash barrier is required where already masonry/ concrete parapet wall is provisioned.

v. Delineators

Delineators for the entire project highway at the locations as recommend in relevant IRC Manual (mentioned in Schedule D) or as directed by Authority's Engineer shall be provided.

vi. Boundary stones

For the entire project highway as recommend in relevant IRC Manual (mentioned in Schedule D) shall be provided.

vii. Hectometer/Kilometer stones

For the entire project highway as recommend in relevant IRC Manual (mentioned in Schedule D) shall be provided

b) Pedestrian Facilities

i. Pedestrian Guard Rail: Provide pedestrian guard rail at each bus stop location, shall be provided.

ii. Additional Pedestrian facilities shall be provided at vulnerable locations as per specifications and standards specified in Schedule D.

c) Landscaping and Tree Plantation

Landscaping: At major intersections, interchange etc.

Landscaping within ROW of the project highway shall be done as per specifications and standards specified in Schedule D.

d) Truck Lay-Byes:

Two 100m length and 7m width Truck lay byes with both side taper of 70m length as per Figure 12.1 of IRC:SP:84-2014 have been proposed are given below.

S No	Design Chainage	Side	Existing/Proposed	Village Name
NIL				

e) Bus Bays/Bus Shelters

Bus Bays (15m length and 3.5m width) with ghost island (width=1.5m) and taper of 100m length on both side as per Figure 12.2 of IRC:SP:84-2014 are proposed at following locations. The design of bus shelters should be aesthetically pleased with surrounding. However, locations shall be decided with Authority & Authority's Engineer at site. The minimum number of bus bays/ shelters is given below.

S No	Design Chainage (Km)	Side	Existing/Proposed	Village Name
1	274+750	Both Side	Proposed	Daili
2	276+750	Both Side	Proposed	Tumnoupokpi
3	277+950	Both Side	Proposed	Kalapahar
4	278+850	Both Side	Proposed	Keithelmanbi
5	286+100	Both Side	Proposed	Saparmeina

f) Median Opening

The median opening of 20m length are proposed at following locations with both side storage lanes of 3.5m for 55m length (minimum) where the proposed median width is 4m:

S. No.	Design Chainage (Km)	Name of Place
1	274+620	Kangpokpi bypass End Junction
2	276+800	Tumnoupokpi
3	277+750	Kalapahar
4	278+950	Keithelmanbi
5	279+900	Keithelmanbi (School Building)
6	281+700	Bethel Veng

S. No.	Design Chainage (Km)	Name of Place
7	284+750	Phoibih
8	285+900	Saparmeina
9	286+400	Saparmeina

g) Utility Duct

A 600mm diameter NP-4 Pipe with inspection box/chamber as per clause 2.16 of IRC:SP:84-2014 are proposed.

h) Others: NIL

1. **Operational and maintenance base camp-** NIL
2. **Utilities-** NIL
3. **Rainwater Harvesting-** NIL

SCHEDULE – D

(Refer Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (IRC: SP: 84-2014), referred to herein as the Manual.

Annex - I

(Schedule-D)

Specifications and Standards for Construction of Project Highway

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four Laning of Highways through Public Private Partnership (IRC: SP: 84-2014), referred to as the Manual and MoRT&H Specifications for Road and Bridge Work (Fifth Revision 2013). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2. Deviations from the Specifications and Standards

2.1 The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority Engineer" and "Agreement" respectively.

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

S. No	Clause No	Description	Deviation to Clause
1	**2.5.1**	Median width in Open country with isolated built up area	The median width of 2.5 including Kerb Shyness of 0.5m on either side has been adopted in TCS-9, TCS-10 and TCS-13.

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 Paragraph2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

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

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

The obligations of the Contractor in respect of Maintenance Requirementsshall include repair and rectification of the Defects and deficiencies specified in Annex - Iof 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)

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

Table -1: Maintenance Criteria for Pavements:

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approache	Potholes	Nil	< 0.1% of area and subjectto limit of 10 mmin depth	Daily	Length Measurement Unitlike Scale,Tape, odometer etc.	IRC 82: 2015 and DistressIdentification Manual for Long TermPavement Performance Program, FHWA 2003(http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48hours	MORT&H Specification 3004.2

AssetTypes	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
ofGrade structure, approachesof connecting roads,slip roads,lay byes etc. as applicable)	Cracking	Nil	< 5% subjectto limitof 0.5sqm forany 50 m length	Daily			7-15 days	MORT&H Specification3004.3
	Rutting	Nil	< 5mm	Daily	Straight Edge		15 -30days	MORT&H Specification3004.2
	Corrugations and Shoving	Nil	< 0.1% ofarea	Daily	Length Measurement Unitlike		2-7days	IRC:82-2015

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
	Bleeding	Nil	< 1 %of area	Daily	Scale,Tape, odometer etc.		3-7days	MORT&H Specification3004.4
	Ravelling / Stripping	Nil	< 1 %of area	Daily			7-15 days	IRC:82-2015read with IRCSP 81
	Edge Deformation/ Breaking	Nil	< 1 mfor any100 msection and width < 0.1 mat any location,restricte	Daily			7- 15days	IRC:82-2015

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			d to30 cmfrom theedge					
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machineor equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring 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	180days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180days	BS:7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180days	IRC:82-2015

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
	Other PavementDistresses			Bi-Annually			2-7days	IRC:82-2015
	Deflection/RemainingLife			Annually	Falling Weight Deflectometer	IRC 115: 2014	180days	IRC:115-2014
Rigid Pavement (PavementofMCW, ServiceRoad,Grade structure,	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656-94:2000	180days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2008	180days	IRC:SP:83-2008

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
approaches of connecting roads, slip roads,lay byes etc. as applicable)		**Minimum SN**	**Traffic Speed(Km/h)**		Coefficient Routine Investigation Machineor equivalent)			
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Embankment/ Slope	Edgedrop at shoulders	Nil	40mm	Daily	Length Measurement Unitlike Scale,Tape, odometer	IRC	7-15 days	MORT&H Specification408.4
	Slopeof camber/crossfall	Nil	<2% variation in prescribedslope of camber /cross fall	Daily			7-15 days	MORT&H Specification408.4
	EmbankmentSlopes	Nil	<15% variation in prescribe	Daily			7-15 days	MORT&H Specification408.4

AssetType	Performance Parameter	Level ofService (LOS)		Frequency of Inspection	Tools/Equipment	Standards and Referencesfor Inspection and DataAnalysis	Time limitfor Rectification/ Repair	Maintenance Specifications
		Desirable	**Acceptable**					
			side slope					
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	RainCuts/ Gulliesin 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 followingtable

Table -2: **Maintenance Criteria for RigidPavements:**

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	**For the case d > D/2**
CRACKING						
1	**Single Discrete Cracks Not intersecting withany joint**	w = width ofcrack L = length ofcrack d = depth of crack D = depth ofslab	0	Nil, notdiscernible	NoAction	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discerniblefrom slow-movingcar	Seal withoutdelay	Seal, and stitch if L> lm.
			3	w = 0.5 - 1.5 mm, discerniblefrom fast-movingcar		Within7days

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			4	w = 1.5 - 3.0mm	Seal, and stitch if L > l m. Within 7days	Staple or DowelBar Retrofit, FDRfor affectedportion. Within 15days
			5	w > 3mm.		
2	**Single Transverse (or Diagonal)Crack intersecting withone or morejoints**	w = width ofcrack L = length ofcrack d = depth of crack D = depth ofslab	0	Nil, notdiscernible	NoAction	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7days	Staple or DowelBar Retrofit. Within 15days
			2	w = 0.2 - 0.5 mm, discerniblefrom slowvehicle		
			3	w = 0.5 - 3.0 mm, discerniblefrom fastvehicle	Route, seal and stitch,if L > 1m. Within 7days	

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			4	w = 3.0 - 6.0mm	Dowel BarRetrofit. Within 15days	Full DepthRepair Dismantle and reconstructaffected. Portion withnorms and specifications-See Para 5.5 &9.2 Within 15days
			5	w > 6 mm, usually associatedwith spalling, and/or slab rockingunder traffic	Not Applicable, as it may befull depth	
3	**SingleLongitudinal Crackintersecting with one ormore joints**	w = width ofcrack L = length ofcrack d = depth ofcrack D = depth ofslab	0	Nil, notdiscernible	NoAction	
			1	w < 0.5 mm, discernable fromslow movingvehicle	Seal with epoxy, if L >1 m. Within 7days	Staple or dowelbar retrofit. Within 15days

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			2	w = 0.5 - 3.0 mm, discerniblefrom fastvehicle	Route seal and stitch, ifL > lm. Within 15days	-
			3	w = 3.0 - 6.0mm	Staple, if L > 1m. Within 15days	Partial DepthRepair withstapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may befull depth	
			5	w > 12 mm, usually associatedwith spalling, and/or slab rockingunder traffic		Full DepthRepair Dismantle and reconstructaffected portion as pernorms and specifications -

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	**For the case d > D/2**
						See Para5.6.4 Within 15days
4	**Multiple Cracks intersecting withone or morejoints**	**w = width ofcrack**	0	Nil, notdiscernible	NoAction	-
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15days	
			2	w = 0.2 - 0.5 mm. discerniblefrom slowvehicle		
			3	w = 0.5 - 3.0 mm, discerniblefrom fastvehicle	Full depth repairwithin 15days	Dismantle,Reinstate subbase, Reconstructwhole slab as per specificationswithin 30days
			4	w = 3.0 - 6.0 mm panel brokeninto 2 or 3 pieces		
			5	w > 6 mm and/or panel broken		

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
				into more than 4 pieces		
5	**CornerBreak**	w = width of crack L = length ofcrack	0	Nil, notdiscernible	NoAction	-
			1	w < 0.5 mm; only 1 cornerbroken	Seal with lowviscosity epoxyto secure broken parts Within 7days	Seal with epoxyseal withepoxy Within 7days
			2	w < 1.5 mm; L < 0.6 m, onlyone cornerbroken		
			3	w < 1.5 mm; L < 0.6 m, twocorners broken	Partial Depth (ReferFigure 8.3of IRC:SP:83-2008) Within 15days	Full depth repair
			4	w > 1.5 mm; L > 0.6 m orthree cornersbroken		
			5	ree or four cornersbroken		Reinstate sub-base, and reconstruct the

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	**For the case d > D/2**
						slab as pernorms andspecifications within30days
6	**Punchout (Applicable to ContinuousReinforced Concrete Pavement (CRCP) only)**	w = width ofcrack L = length(m/m2)	0	Nil, notdiscernible		NoAction
			1	w < 0.5 mm; L < 3m/m^2	Not Applicable, as itmay be fulldepth	Seal withlow viscosity epoxyto secure broken parts. Within 15days
			2	either w > 0.5 mm or L < 3m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^{2}and deformation		Full depth repair-Cut out andreplace damaged areataking care not todamage reinforcement. Within 30days
			5	w>3mm,L>3m/m^{2}and deformation		

<table>
<tr><th rowspan="2">S.No.</th><th rowspan="2">Type ofDistress</th><th rowspan="2">Measured Parameter</th><th rowspan="2">Degreeof Severity</th><th rowspan="2">AssessmentRating</th><th colspan="2">RepairAction</th></tr>
<tr><th>For the case d < D/2</th><th>For the case d > D/2</th></tr>
<tr><td colspan="7">Surface Defects</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Ravelling or Honeycomb type surface</td><td rowspan="5">r = areadamaged surface/totalsurface of slab (%) h = maximumdepth ofdamage</td><td rowspan="2">0</td><td rowspan="2">Nil, notdiscernible</td><td>ShortTerm</td><td>LongTerm</td></tr>
<tr><td>Noaction.</td><td rowspan="4">NotApplicable</td></tr>
<tr><td>1</td><td>r < 2%</td><td rowspan="2">Local repair of areas damaged and liable to be damaged.
Within 15days</td></tr>
<tr><td>2</td><td>r = 2 - 10%</td></tr>
<tr><td>3</td><td>r =10-25%</td><td rowspan="2">Bonded Inlay, 2 or 3 slabs if affecting.</td></tr>
<tr><td>4</td><td>r = 25 - 50%</td></tr>
</table>

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
					Within 30days	
			5	r > 50% and h > 25mm	Reconstruct slabs, 4or more slabs if affecting. Within 30days	
8	**Scaling**	r = damagedsurface/totalsurface of slab (%) h = maximumdepth ofdamage	0	Nil, notdiscernible	**ShortTerm**	**LongTerm**
					Noaction.	NotApplicable
			1	r <**2 %**	Local repair of areas damaged and liable to be damaged. Within 7days	
			2	r = 2 - 10%		

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			3	r = 10 - 20%	Bonded Inlay within15 days	
			4	r = 20 - 30%		
			5	r > 30 % and h > 25mm	Reconstruct slabwithin 30days	
9	**Polished Surface/Glazing**	t = texturedepth, sand patchtest	0		Noaction.	NotApplicable
			1	t > 1mm		
			2'	t = 1 - 0.6mm	Monitor rate of deterioration	
			3	t = 0.6 - 0.3mm		
			4	t = 0.3 - 0.1mm		

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5km. Within 30days	
10	**Popout (SmallHole), Pothole ReferPara 8.4**	n = number/m^2d = diameter h = maximumdepth	0	d < 50 mm; h < 25 mm; n < 1 per5 m^2	Noaction.	NotApplicable
			1	d = 50 - 100 mm; h < 50 mm; n <1 per 5 m^2	Partial depth repair65 mmdeep. Within 15days	
			2	d = 50 - 100 mm; h > 50 mm; n <1 per 5 m^2		

S.No.	Type ofDistress	Measured Parameter	Degreeof Severity	AssessmentRating	RepairAction	
					For the case d < D/2	For the case d > D/2
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5m^2	Partial depth repair110mm i.e.10 mm more than the depth of the hole. Within 30days	
			4	d = 100 - 300 mm; h > 100 mm; n< 1 per 5m^2		
			5	d > 300 mm; h > 100 mm: n > 1per 5 m^2	Full depthrepair. Within 30days	

JointDefects						
11	**Joint SealDefects**	loss or damage L = Length as %total joint length	0	Difficult todiscern.	**ShortTerm** Noaction.	**LongTerm** NotApplicable
			1	Discernible, L< 25% but of littleimmediate consequence withregard to ingress of wateror trappingincompressible material.	Clean joint, inspectlater.	
			3	Notable.L>25% insufficientprotection against ingress ofwater and trapping incompressiblematerial.	Clean and reapply sealantin selected locations. Within 7days	
			5	Severe; w > 3mm negligible protection against ingress ofwater	Clean, widen and reseal thejoint. Within 7days	

				and trapping incompressiblematerial.		
12	**Spalling ofJoints**	w = width oneither side of the joint L= lengthofspalled portion (as %joint length)	0	Nil, notdiscernible	Noaction.	NotApplicable
			1	w < 10mm	Apply low viscosity epoxyresin/ mortar in crackedportion.	
			2	w = 10 - 20 mm, L <25%	Within 7days	
			3	w = 20 - 40 mm, L >25%	Partial Depth Repair. Within 15days	
			4	w = 40 - 80 mm, L >25%	30 - 50 mm deep, h = w + 20%of w, within 30days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deeprepair. H = w + 20% ofw. Within 30days	
13	**Faulting (or Stepping)**	f = difference oflevel	0	not discernible, < 1 mm	Noaction.	Noaction.

	in Cracks or Joints		1	f < 3mm		
			2	f = 3 - 6mm	Determine cause and observe,take action for diamondgrinding	Replace the slabas appropriate. Within 30days
			3	f = 6 - 12mm	DiamondGrinding	
			4	f= 12 - 18 mm	Raise sunkenslab.	Replace the slabas appropriate. Within 30days
			5	f> 18mm	Strengthen subgrade andsub-base by groutingand raising sunkenslab	
14	**Blowup or Buckling**	h = vertical displacementfrom normalprofile	0	Nil, notdiscernible	**ShortTerm**	**LongTerm**
			1	h < 6mm	NoAction	
			2	h = 6 - 12mm	Install Signs to WarnTraffic	

			3	h = 12 - 25 mm	within 7days	
			4	h > 25mm	Full DepthRepair. Within 30days	
			5	shattered slabs, ie 4or more pieces	Replace broken slabs. Within 30days	
15	**Depression**	h = negativevertical displacementfrom normal profile L =length	0	Not discernible, h < 5mm	Noaction.	NotApplicable
			1	h = 5 - 15mm		
			2	h = 15-30 mm, Nos<20% joints	Install Signs to WarnTraffic within 7days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or >20% joints	Strengthensubgrade. Reinstate pavement at normallevel	

			5	h > 100mm	if L < 20m. Within 30days	
16	**Heave**	h = positivevertical displacementfrom normalprofile. L = length	0	Not discernible. h <5 mm	**ShortTerm**	**LongTerm**
					Noaction.	scrabble
			1	h = 5 - 15mm	Followup.	
			2	h = 15 - 30 mm, Nos <20%joints	Install Signs toWarn Traffic within 7days	
			3	h = 30 - 50 mm		
			4	h > 50 mm or >20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30days	
			5	h > 100mm		
17	**Bump**	h = vertical	0	h < 4mm	Noaction	

		displacement from normalprofile	1	h = 4 - 7mm	Grind, in case of new construction within 7days	ConstructionLimit for New Construction.
			3	h = 7 - 15mm	Grind, in case of ongoingMaintenance within 15days	Replace in caseof newconstruction. Within 30days
			5	h > 15mm	Full DepthRepair. Within 30days	Full DepthRepair. Within 30days
18	**Lane to Shoulder Drop-off**	f = differenceof level	0	Nil, not discernible <3mm	**ShortTerm** Noaction.	**LongTerm**
			1	f = 3 - 10mm	Spot repair ofshoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill upshoulder	

			4	f = 50 - 75 mm	within 7days	For any 100m stretchReconstruct shoulder, if affecting 25%or more ofstretch. Within 30days
			5	f > 75mm		
Drainage						
19	**Pumping**	quantity offines and waterexpelled through open joints andcracks Nos	0	not discernible	NoAction	
			1 to2	slight/ occasional Nos< 10%	Repair cracks and jointsWithout delay.	Inspect andrepair sub-drainageat distressedsections andupstream.
			3 to4	appreciable/ Frequent 10 -25%	Lift or jack slab within 30 days.	
		Nos/100 m stretch	5	abundant, crack development > 25%	Repair distressedpavement sections. Strengthensubgrade and subbase. Replaceslab. Within 30days	

20	**Ponding**	Ponding onslabs due to blockage of drains	0-2	No discernible problem	Noaction.	
			3 to4	Blockages observedin drains,butwater flowing	Clean drains etc. within 7days, Followup	Action requiredto stop waterdamaging foundation within30 days.
			5	Ponding,accumulation of waterobserved	-do-	

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

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service(LOS)</th><th>Frequencyof Measurement</th><th>TestingMethod</th><th>Recommended Remedial measures</th><th>Time limitfor Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of SafeSight Distance</td><td>As per IRC SP :84-2014, aminimum of safe stopping sight distanceshall be availablethroughout.
<table><tr><th>Design Speed, kmph</th><th>Desirable MinimumSight 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>ManualMeasurements with Odometeralong with video/image backup</td><td colspan="2">Removal of obstruction within24 hours, in case of sight lineaffected by temporary objects such astrees, temporaryencroachments.

In case of permanent structureor designdeficiency:
Removal of obstruction/improvement of deficiency at the earliest
Speed Restrictionboards and suitable trafficcalming measures such as transversebar marking, blinkers, etc. shallbe applied during the periodof rectification.</td><td>IRC:SP84-2014</td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="2"><70% of markingremaining</td><td>Bi-Annually</td><td>VisualAssessmentas per Annexure-F ofIRC:35-2015</td><td>Re - painting</td><td>Cat-1Defect– within 24 hours
Cat-2 Defect - within 2months</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>Frequencyof Measurement</th><th>TestingMethod</th><th>Recommended Remedial measures</th><th>Time limitfor Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td>Day time Visibility</td><td>During expected life ServiceTime
Cement Road-130mcd/m²/lux
Bituminous Road -100mcd/m²/lux</td><td>Monthly</td><td>As per Annexure-Dof IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect–within 24 hours
Cat-2 Defect–within 2months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Night Time Visibility</td><td>Initial and MinimumPerformancefor Dry Retro reflectivityduringnight time:
<table><tr><th>Design Speed</th><th colspan="2">(RL) Retro Reflectivity(mcd/m²/lux)</th></tr><tr><td></td><td>Initial (7days)</td><td>Minimum Thresholdlevel (TL) &warranty periodrequired up to 2years</td></tr><tr><td>Up to65</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 PerformanceforNight Visibility under wetcondition(Retroreflectivity):</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 2months</td><td>IRC:35-2015</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service(LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limitfor Rectification	Specifications and Standards
		Initial 7 days Retro reflectivity:100 mcd/m^2/lux Minimum Threshold Level:50 mcd/m^2/lux					
	Skid Resistance	Initial and Minimumperformance for SkidResistance: Initial (7days):55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city trafficcondition encompassing the locationslike pedestrian crossings, bus bay,bus stop, cycle trackintersection delineation, transverse barmarkings etc	Bi-Annually	As per Annexure-Gof IRC:35-2015		Within 24hours	IRC:35-2015
Road Signs	Shape and Position	Shape and Position as perIRC:67-2012. Signboard should be clearly visiblefor the design speed of thesection.	Daily	Visual with video/image backup	Improvement of shape, in caseif shape is damaged. Relocation as perrequirement	48 hours incase of Mandatory Signs,Cautionary and Informatory Signs (Singleand Dual post signs) 15 Days in case of Gantry/Cantilever Signboards	IRC:67-2012
	Retro reflectivity	As per specifications inIRC:67-2012	Bi-Annually	Testing of each	hange of ignboard	48 hours incase of Mandatory	RC:67-2012

Asset Type	Performance Parameter	Level of Service(LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limitfor Rectification	Specifications and Standards
				signboardusing Retro ReflectivityMeasuringDevice. In accordance with ASTMD 4956-09.		Signs, Cautionary and InformatorySigns (Singleand Dual post signs) 1 Month incase of Gantry/Cantilever Signboards	
Kerb	KerbHeight	As per IRC 86:1983 dependingupon type ofKerb	Bi-Annually	Use ofdistance measuringtape	Raising Kerb Height	Within 1 Month	RC 86:1983
	KerbPainting	Functionality: Functioning ofKerb painting asintended	Daily	Visualwith video/image backup	KerbRepainting	Within7-days	RC 35:2015
OtherRoad Furniture	ReflectivePavementMarkers(Road Studs)	Numbers and Functionality asper specifications in IRC:SP:84-2014and IRC:35-2015, unless specifiedin Schedule-B.	Daily	Counting	NewInstallation	Within 2months	IRC:SP:84-2014,IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail asintended	Daily	Visual with video/image backup	Rectification	Within 15days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning ofSafety Barriers asintended	Daily	Visual with video/image backup	Rectification	Within 7days	IRC:SP:84-2014, IRC:119-2015
	End Treatment of	Functionality: Functioning of End Treatment asintended	Daily	Visual with video/image	Rectification	Within 7days	IRC:SP:84-2014,

Asset Type	Performance Parameter	Level of Service(LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limitfor Rectification	Specifications and Standards
	Traffic Safety Barriers			backup			IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators asintended	Daily	Visual with video/imageb ackup	Rectification	Within 7days	IRC:SP-2014,IRC:119- 2015
	Guard Posts and Delineators	Functionality: Functioning ofGuard Posts and Delineators as intended	Daily	Visual with video/image backup	Rectificatio n	Within 15days	IRC: 79 - 1981
	OverheadSign Structure	Overhead signstructure shall be structurallyadequate	Daily	Visual with video/image backup	Rectification	Within 15days	IRC:67-2012
	TrafficB linkers	Functionality: Functioning ofTraffic Blinkers asintended	Daily	Visual with video/image backup	Rectification	Within 7days	IRC:SP:84-2014
Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illumination onthe road surface	Daily	Theillumination level shallbe measuredwith luxmeter	Improvement in Lighting System	24hours	IRC:SP:84-2014
		Nomajor failure in the lighting system	Daily	-	Rectification of failure	24hours	IRC:SP:84-2014
		Nominor failure in the lighting system	Monthly	-	Rectification of failure	8hours	IRC:SP:84-2014
	Toll Plaza Canopy Lights	Minimum 40 Lux illumination onthe road surface	Daily	The illuminationlev el shallbe measuredwith luxmeter	Improvementin LightingSystem	24hours	IRC:SP:84-2014
		No major/minor failure in thelighting system	Daily	-	Rectification of failure	8hours	IRC:SP:84-2014

Asset Type	Performance Parameter	Level of Service(LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limitfor Rectification	Specifications and Standards
Treesand Plantation including medianplantation	Obstruction in aminimum head-room of 5.5 mabove carriagewayor obstruction in visibilityof road signs	No obstruction due totrees	Monthly	Visual with video/image backup	Removal oftrees	Immediate	IRC:SP:84-2014
	Deterioration in healthof treesand bushes	Health of plantation shall be asper requirement of specifications& instructions issued by Authorityfrom time to time	Daily	Visual with video/image backup	Timelywatering andtreatment. OrReplacement of Treesand Bushes.	Within 90days	IRC:SP:84-2014
	Vegetationaffectingsight line androad structures	Sight line shall be free from obstruction byvegetation	Daily	Visual with video/image backup	Removal ofTrees	Immediate	IRC:SP 84 - 2014
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4hours	
	Defects in electrical,water and sanitaryinstallations	-	Daily	-	Rectification	24hours	

Asset Type	Performance Parameter	Level of Service(LOS)	Frequencyof Measurement	TestingMethod	Recommended Remedial measures	Time limitfor Rectification	Specifications and Standards
OtherProject Facilities and Approachroads	Damage or deterioration in ApproachRoads, pedestrian facilities, truck lay-bys, bus-bays,bus-shelters, cattle crossings, Traffic Aid Posts,Medical Aid Posts and otherworks		Daily	-	Rectification	15days	IRC:SP 84 - 2014

AssetType	PerformanceParameter	Level ofService (LOS)	FrequencyofMeasurement	TestingMethod	RecommendedRemedial measures	Timelimit for Rectification	SpecificationsandStandards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% ofculvert normal flowarea to available.	2 times ina year(before andafter rainyseason)	Inspection byBridge Engineer as perIRC SP: 35-1990 and recording of depthof silting and areaof vegetation.	Cleaning silt up soilsand debris in culvert barrel after rainy season,removal of bushes andvegetation, U/s of barrel, underbarrel and D/s of barrelbefore rainyseason.	15 days beforeonset ofmonsoon andwithin 30 daysafter end ofrainy season.	IRC5-2015, IRC SP:40-1993 and IRC SP:13-2004
	Leak-proof expansionjoints if any	No leakage throughexpansionjoints	Bi-Annually	Physicalinspection of expansionjoints as per IRC SP:35-1990 if any,for leakage strainson walls at joints.	Fixing with sealant suitably	30 days or beforeonset of rains whicheverc omesearlier	IRCSP:40-1993 andIRC SP:69-2011
	Structurallysound	Spalling of concrete not more than0.25 sqm	Bi-Annually	Detailedinspection of all componentsof culvert as perIRC SP:35-1990 and recording the defects	Repairs tospalling, cracking,delamination, rusting shall befollowed as perIRC:SP:40-1993.	15days	IRC SP 40-1993 and MORTH Specifications clause 2800
		Delaminationof concrete notmore than 0.25 sq.m.					
		Crackswider than 0.3 mmnot more than1m aggregatelength					

	Protection works in good condition	Damaged ofrough stone apronor bankrevetment not more than 3 sqm, damageto solid apron (concreteapron) not more than 1	2 times ina year(before andafter rainy season)	Condition surveyas per IRCSP:35-1990	Repairs to damaged aprons andpitching	30 days afterdefect observation or 2weeks beforeonset of rainy seasonwhic hever isearlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridgesincludin gROBs Flyover etc.as applicable	Ridingquali ty or user comfort	No potholein wearing coaton bridgedeck	Daily	Visual inspectionas per IRCSP:35-1990	Repairs to BC orwearing coat	15days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansionjoint	Daily	Visual inspection as per IRCSP:35-1990	Repairs to BC oneither side of expansionjoints, profile correctioncourse on approach slab incase of settlement toapproach embankment	15days	MORT&H Specification 3004.2 & 2811.
	User safety(con ditionof crash barrier and guard rail)	No damagedor missingstretch of crashbarrier orpedestrian handrailing	Daily	Visualinspection and detailed condition surveyas per IRC SP:35- 1990.	Repairs andreplacement of safety barriers asthe case maybe	3days	IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993.

	Rustedreinforcem ent	Not more than 0.25sq.m	Bi-Annually	Detailedcondition survey as per IRC SP: 35-1990using Mobile Bridge InspectionUnit	All the corroded reinforcement shallneed to be thoroughlycleaned from rusting andapplied with anti-corrosive coating before carrying out the repairs toaffected concrete portionwith epoxy mortar /concrete.	15days	IRC SP:40-1993 and MORTH Specification1600.
	Spallingof concrete	Not more than 0.50sq.m					
	Delaminatio n	Not more than0.50 sq.m					
	Crackswid er than 0.30mm	Not morethan 1m totallength	Bi-Annually	Detailedcondition survey as per IRC SP: 35-1990using Mobile Bridge InspectionUnit	Groutingwithepoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation.	48 Hours	IRC SP: 40-1993 and MORTH Specification 2800.
	Rainwater seepageth roughdec kslab	Leakage - nil	Quarterly	Detailedcondition survey as per IRC SP: 35-1990using Mobile Bridge InspectionUnit	Grouting of deck slabat leakage areas, waterproofing, repairsto drainagespouts	1months	MORTH specifications 2600 & 2700.
	Deflectiond ue to permanent loads and	Within design limits.	Once in every 10 years for spans more	Load testmethod	Carry out majorrehabilitation workson bridge to retainoriginal design loads capacity	6months	IRC SP: 51-1999.

	liveloads		than 40m				
	Vibrations in bridge deck dueto movingtrucks	Frequency of vibrationsshall not be morethan 5Hz	Once in every 5years for spans more than 30m and every 10 years for spans between 15 to 30m	Laserdisplacement sensors orlaser vibro-meters	Strengthening of super structure	4months	AASHTO LRFD specifications
	Leakagein Expansionjoints	No damage to elastomeric sealant compound in strip seal expansionjoint, no leakage ofrain waterthrough expansion jointin case of buriedand asphalt plugand copper stripjoint.	Bi-Annually	Detailedcondition survey as perIRC SP:35-1990using Mobile Bridge InspectionUnit	Replace of seal in expansionjoint	15days	MORTH specifications 2600 and IRC SP:40-1993.
	Debrisand dust in strip seal	No dust or debrisexpa in nsion joint	Monthly	Detailedcondition survey as perIRC SP:35-1990 using	Cleaning of expansion joint gapsthoroughly	3days	MORTH specifications 2600 and

	expansion joint	gap.		Mobile Bridge InspectionUnit			IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffitof the deck slab.No silt, debris,clogging of drainage spout collectionchamb	Monthly	Detailedcondition survey as perIRC SP: 35-1990 using Mobile Bridge InspectionUnit	Cleaningofdrainage spouts thoroughly. Replacement of missing/brokendown takepipeswitha minimum pipeextension of 500mm below soffitof slab. Providingsealant around the drainagespout if any leakagesobserved.	3days	MORTH specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rustedsteel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailedcondition survey as perIRC SP: 35-1990using Mobile Bridge InspectionUnit	All the corrodedreinforcement shallneed to be thoroughlycleaned from rusting andapplied with anti-corrosive coating beforecarrying out repairs to substructure by grouting/gunitingand micro concreting depending on typeof	30days	IRC SP: 40-1993 and MORTH specification 2800.

	Bearings	Delamination of bearingreinforcement not more than 5%, crackingor tearing ofrubber not more than2 locations per side, norupture ofreinforcement orrubber	Bi-Annually	Detailedcondition survey as perIRC SP: 35-1990using Mobile Bridge InspectionUnit	In case of failure ofeven one bearing onany pier/abutment, allthe bearings on that pier/abutment shallbe replaced, in order togetuniform load transferon tobearings.	3months	MORTH specification 2810 and IRC SP: 40-199.
BridgeFoundations	Scouring aroundfoundations	Scouringshall not belower thanmaximum scour levelfor thebridge	Bi-Annually	Conditionsurvey and visual inspection asper IRC SP:35-1990 using Mobile BridgeInspection Unit. In case ofdoubt, useUnderwater camera for inspection ofdeep wells inmajor	Suitable protection works aroundpier/abutment	1month	IRC SP: 40-1993, IRC 83-2014,MORTH specification2500
	Protection works in good condition	Damagedof roughstone apron or bank revetmentnot more than 3	2 times in a year (beforeand afterrainy season)	Condition survey as per IRCSP:35-1990	Repairs to damaged aprons andpitching.	30 days after defectobservatio n or 2	IRC: SP 40-1993 and IRC:SP:13-2004.

		sq.m, damageto solid apron(concreteapron) not more than 1 sq.m				weeksbefore onset of rainy seasonwhicheverisearlier.	
Note: AnyStructureduringtheentirecontractperiodwhichisfoundthatdoesnotcomplieswithallrequirementsofthisTablewillbeprepared, rehabilitated or even reconstructed under the scope of thecontractor.							

Table 4: Maintenance Criteria for Structures andCulverts:

Table 5: Maintenance Criteria for HillRoads

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

HillRoads		
(i)	Damage to Retaining wall/ Breastwall	7 (Seven)days
(ii)	Landslides requiringclearance	12 (Twelve)hours
(iii)	Snow requiringclearance	24 (Twenty Four) hours

<u>Note:</u>Foralltables1to5above,latestBIS&IRCstandards(eventhosenotindicated herewith) along with MoRTH specifications shall be binding for allmaintenance activities.

A. FlexiblePavement

Nature of Defect or deficiency		Time limit forrepair/ rectification
(b)	**Granular earth shoulders, side slopes, drains andculverts**	
(i)	Variation by more than 1 % in the prescribedslope of camber/cross fall (shall not be less thanthe camber on the maincarriageway)	7 (seven)days
(ii)	Edge drop at shoulders exceeding 40mm	7 (seven)days
(iii)	Variation by more than 15% in the prescribedside (embankment)slopes	30 (thirty) days
(iv)	Rain cuts/gullies inslope	7 (seven)days
(v)	Damage to or silting of culverts and sidedrains	7 (seven)days
(vi)	Desilting of drains in urban/semi- urbanareas	24 (twenty four)hours
(vii)	Railing, parapets, crashbarriers	7 (seven) days(Restore immediately if causingsafety hazard)
(c)	**Road side furniture including road sign and pavementmarking**	
(i)	Damage to shape or position, poor visibility orloss of retro-reflectivity	48 (forty eight)hours
(ii)	Painting of km stone, railing, parapets,crash barriers	As and when required/Once everyyear
(iii)	Damaged/missing signs road requiring replacement	7 (seven)days
(iv)	Damage to road markups	7 (seven)days
(d)	**Roadlighting**	
(i)	Any major failure of thesystem	24 (twenty four)hours
(ii)	Faults and minorfailures	8 (eight) hours
(e)	**Trees andplantation**	

Nature of Defect or deficiency		Time limit forrepair/ rectification
(i)	Obstruction in a minimum head- room of 5m above carriageway or obstruction in visibilityof road signs	24 (twenty four)hours
(ii)	Removal of fallen trees fromcarriageway	4 (four)hours
(iii)	Deterioration in health of trees andbushes	Timely watering andtreatment
(iv)	Trees and bushes requiringreplacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line androad structures	15 (fifteen)days
(f) Restarea		
(i)	Cleaning oftoilets	Every 4 (four)hours
(ii)	Defects in electrical, water and sanitaryinstallations	24 (twenty four)hours
(g) [Toll Plaza]		
(h)	**Other Project Facilities and Approachroads**	
(i)	Damage in approach roads, pedestrianfacilities, truck lay- byes, bus-bays, bus-shelters,cattle crossings, [Traffic Aid Posts, Medical Aid Posts]and serviceroads	15 (fifteen)days
(ii)	Damaged vehicles or debris on the road	4 (four)hours
(iii)	Malfunctioning of the mobilecrane	4 (four)hours
Bridges		
(a) Superstructure		
(i)	Any damage, cracks, spalling/scaling Temporarymeasures Permanentmeasures	within 48 (forty eight)hours within 15 (fifteen) days oras specified by theAuthority's Engineer
(b) Foundations		

Nature of Defect or deficiency		Time limit forrepair/ rectification
(i)	Scouring and/or cavitation	15 (fifteen)days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlementand tilting, spalling,scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) daysGreasing of metallic bearings oncein ayear
(e)	**Joints**	
(i)	Malfunctioning ofjoints	15 (fifteen)days
(f)	**Otheritems**	
(i)	Deforming of pads in elastomericbearings	7 (seven)days
(ii)	Gathering of dirt in bearings and joints; orclogging of spouts, weep holes andvent-holes	3 (three)days
(iii)	Damage or deterioration in kerbs,parapets, handrails and crashbarriers	3 (three) days(immediately within 24 hours ifposing danger tosafety)
(iv)	Rain-cuts or erosion of banks of the side slopesof approaches	7 (seven)days
(v)	Damage to wearingcoat	15 (fifteen)days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guidebunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structureor obstructing thewaterway	15 (fifteen)days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breastwall	7 (seven)days
(ii)	Landslides requiringclearance	12 (twelve)hours

Nature of Defect or deficiency		Time limit forrepair/ rectification
(iii)	Snow requiringclearance	24 (twenty four)hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification,or add to the nature of Defect or deficiency beforeissuing the bidding document, withthe approvalofthecompetentauthority.]

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) LicencefrominspectoroffactoriesorothercompetentAuthorityforsetting 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

(See Clause 7.1)

Annex-I : Form of Bank Guarantee
[Performance Security/Additional Performance Security]

To,
Managing Director, NHIDCL,
National Highways & Infrastructure Development Corporation Ltd.

(A) _____[name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "**Agreement**") for the **"Name of Work"** (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

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

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

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

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

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

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

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

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

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

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

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

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

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

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

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

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

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

13. 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:

Sl. No	Particulars	Details
1	Name of the Beneficiary	lational Highways and Infrastructure Development Corporation Limited
2	Beneficiary Bank Account No.	90621010002659
3	Beneficiary Bank Branch	IFSC SYNB0009062
4	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5	Beneficiary Bank Address	yndicate 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,
Managing Director, NHIDCL,
National Highways & Infrastructure Development Corporation Ltd.
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 "**Name of Work"** (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")**[$]**.**

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

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

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

A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways & Infrastructure Development Corporation Ltd., that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in

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

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

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has

[$] 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).

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

12. 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:

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

Signed and sealed this ……. day of ……., 20…… at …….
SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)
NOTES:

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

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

SCHEDULE - H

(See Clauses10.1(iv) and 19.3)

Contract Price Weightages

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

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 of for Payment	Percentage Weightage
1	**2**	**3**	**4**
Road works including New Culverts, Widening and Repair of Culverts	70.34%	**A-Widening and Strengthening of Existing Road**	
		(1) Earthwork up to top of the sub-grade	
		(2) Sub Base Course	
		(3) Non Bituminous Base Course	
		(4) Bituminous Base Course	
		(5) Bituminous Concrete	
		(6) Widening and repair of culverts	3.90%
		B.1- Reconstruction/ New 4 Lane/Realignment/ Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the sub-grade	22.27%
		(2) Sub Base Course (Granular work sub-base, shoulders)	13.14%
		(3) Non Bituminous Base Course (WMM)	15.25%
		(4) Bituminous Base Course (DBM)	18.16%
		(5) Wearing Coat (Bituminous Concrete)	8.57%
		C.1- Reconstruction/ New Service road (Flexible pavement)	
		(1) Earthwork up to top of the sub-grade	
		(2) Sub Base Course (Granular work sub-base, shoulders)	
		(3) Non Bituminous Base Course (WMM)	
		(4) Bituminous Base Course (DBM)	
		(5) Wearing Coat (Bituminous Concrete)	
		D-Reconstruction and New Culverts on existing road, realignment and Bypasses,	
		(1) Culverts(length <6m)	18.71%

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	**2**	**3**	**4**
Minor Bridges / Underpasses/ Overpasses	3.62%	**A.1- Widening and Repair of Minor bridges (length>6m and <60m)**	
		Minor Bridges	
		A.2-New Minor bridges (length>6m and <60m)	
		1. Foundation + Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap	48.59%
		2. Super-structure: On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects	50.07%
		3. Approaches: On completion of approaches including Retaining walls, stone pitching, protection works, filter media. etc., complete in all respects & fit for use.	1.34%
		4. Guide Bunds and river Training Works: On completion of Guide Bund and River Training Works complete in all respects	
		B.2-New Underpass	
		1. Foundation + Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
		1. **Super-structure:** On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified	
		2. Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls,, stone pitching, protection works, etc., complete in all respects & fit for use.	
Major Bridge (length>60m) works and ROB/UB/Elevated sections/ Flyovers including viaducts, if any		**A.1- Widening and Repair of Major Bridges**	
		1. Foundation	
		2. Sub-structure	
		3. Super-structure (including bearings)	
		4. Wearing Coat including expansion joints	
		5. Miscellaneous Items like hand rails, crash barriers, road marking etc.)	
		6. Wing walls/Return walls	
		7. Guide Bunds, River Training works etc.	
		8. Approaches (Including Retaining walls, stone pitching and protection works)	
		A.2- New Major Bridges	
		1. Foundation	
		2. Sub-structure	
		3. Super-structure (including bearings)	
		4. Wearing Coat including expansion joints	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
		5. Miscellaneous Items like hand rails, crash barriers, road marking etc.)	
		6. Wing walls/Return walls	
		7. Guide Bunds, River Training works etc.	
		8. Approaches (Including Retaining walls, stone pitching and protection works)	
Other Works	26.04%	(ii) . Road Side Drain	15.16%
		(iii).Road signs, markings, km stones, safety devices… a) W beam crash barrier b) Utility Duct c) Misc	 5.00% 8.25%
		(iv).Project Facilities a) Bus Shelter b) Truck lay byes	 10.46%
		(v) Road side Plantation	
		(vi) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs	0.78%
		(vii) Protection works a) Retaining wall b) Breast wall c) Toe Wall d) Surficial protection and Erosion Control Measures (Cut Height of Side slope >25m)	 19.19 % 36.96 % 4.20 %

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
		(viii) Safety and Traffic Management during Construction	-

1.3 Procedure of estimating the value of work done

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	Percentage Weightage	Payment Procedure
A-Widening and Strengthening of Existing Road		
(6) Widening and repair of culverts	3.90%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of atleast 1 (one) Culverts.
B.1- Reconstruction/ New 4 Lane/Realignment/ Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade	22.27%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in full length or 5 (five) km length, whichever is less.
(2) Sub Base Course	13.14%	
(3) Non Bituminous Base Course (WMM)	15.25%	
(4) Bituminous Base Course (DBM)	18.16%	
(5) Wearing Coat (Bituminous Concrete)	8.57%	
D -Reconstruction and New Culverts on existing road, realignment and Bypasses, Culvert (length<6m)	18.71%	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 atleast 1(one) Culverts.

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

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

Where P= Contract Price

L = Total length in km

Similarly, the rates per km for 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 Bridge and Underpasses/Overpasses

Procedure for estimating the value of Minor Bridge and Underpass/overpasses shall be as stated in Table 1.3.2:

Table 1.3.2

Stage of Payment	Percentage Weightage	Payment Procedure
A.1- Widening and repairs of Minor Bridges (length >6m and <60m)	-	Cost of each Minor Bridge shall be determined on pro rata basis with respect to the total linear length of the Minor Bridge. Payment shall be made on the completion of widening and repair work of Minor Bridge.
A.2- New Minor Bridges		
1. Foundation +Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap	48.59%	**1. Foundation +Sub-Structure:** Cost of each Minor Bridge shall be determined on pro rata basis with respect to the total linear length (m) of the Minor Bridges. Payment against foundation+ substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation + substructure of each bridge subject to completion of at least two foundations along

Stage of Payment	Percentage Weightage	Payment Procedure
		with sub structure upto abutment/pier cap level of each bridge.
2. Super-structure: On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects	50.07%	**2. Super-structure:** 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 respect as specified in the column of "Stage of Payment" in this sub-clause.
3. Approaches: On completion of approaches including Retaining walls, stone pitching, protection works, filter media. etc., complete in all respects & fit for use.	1.34%	**3. Approaches** : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "Stage of Payment" in this sub-clause.
4. Guide Bunds and River Training Works: On completion of Guide Bunds and River Training Works complete in all respects		**4. Guide Bunds and River Training Works:** Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training works in all respects as specified.
B.2- New Underpass/Overpasses		
1. Foundation +Sub-Structure: On completion of foundation work including foundations for wing and return walls, abutments, piers up to the abutment/pier cap		**1. Foundation +Sub-Structure:** Cost of each Underpass shall be determined on pro rata basis with respect to the total linear length (m) of the Underpass. Payment against foundation+ substructure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation + substructure of each Underpass subject to completion of at least two foundations along with sub-structure upto

Stage of Payment	Percentage Weightage	Payment Procedure
		abutment/pier cap level of each Underpass.
3. **Super-structure:** On completion of super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs and markings, tests on completion etc., complete in all respects Wearing Coat (a) in case of Overpass- wearing coat including expansion joints complete in all respects as specified and (b) in case of underpass-rigid pavement including drainage facility complete in all respects as specified.		**2. Super-structure:** 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 respect as specified in the column of "Stage of Payment" in this sub-clause.
3. Approaches: On completion of approaches including Retaining walls/Reinforced Earth walls, stone pitching, protection works,. etc., complete in all respects & fit for use.		**3. Approaches** : Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches in all respect as specified.

1.3.3 **Major Bridge works, ROB/RUB and Structures**

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

Table 1.3.3

Stage of Payment	Percentage Weightage	Payment Procedure
A.2- New Major Bridges		
1. Foundation:		**1. Foundation:** Cost of each Major Bridge shall be determined on pro rata basis with respect to the total linear

Stage of Payment	Percentage Weightage	Payment Procedure
		length (m) of the Major Bridges. Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of foundation of Major bridge subject to completion of at least two foundations of the Major Bridge. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
2. Sub-Structure		**2. Sub-Structure:** Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. not less than 25% of the scope of sub-structure of the major bridge subject to completion of at least two sub-structures of abutments/piers upto abutment/pier cap level of the major bridge.
3.Super-structure (including bearings)		**3. Super-structure:** 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 respect as specified.
4.Wearing coat including expansion joints		**4. Wearing Coat:** Payment shall be made on completion of wearing coat including expansion joints complete in all respect as specified.
5.Miscellaneous Items like hand rails, crash barriers, road marking etc.		**5. Miscellaneous:** Payment shall be made on completion of all miscellaneous works like

Stage of Payment	Percentage Weightage	Payment Procedure
		hand rails, crash barrier, road marking etc. complete in all respect as specified.
6.Wing walls/ Return walls		**6. Wing walls/ Return walls:** Payment shall be made on completion of all wing walls/return walls complete in all respect as specified.
7.Guide bunds, River Training works etc.		**7. Guide bunds, River Training works:** Payment shall be made on completion of all Guide bunds/ River Training works etc. complete in all respect as specified
8.Approaches (including Retaining walls, stone pitching and protection works)		**8. Approaches:** Payment shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respect as specified

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Percentage Weightage	Payment Procedure
(ii) Road side drains	15.16%	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) percent of the total length.
(iii)Road signs, markings, km stones, safety devices…		
d) W beam crash barrier	5.00%	
e) Utility Duct		
f) Misc.	8.25%	

Stage of Payment	Percentage Weightage	Payment Procedure
(iv) Project facilities		
a) Bus Shelter	10.46%	Payment shall be made on pro rata basis for completed facilities.
b) Truck lay-byes	-	
(v) Roadside plantation		Unit of measurement is linear length.
(vii) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs	0.78%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 (five) percent of the total length.
(viii) Protection works a) Retaining wall b) Breast wall c) Toe wall d) Surficial protection and Erosion Control Measures (Cut Height of Side slope >25m)	19.19 % 36.96 % 4.20 %	
(ix) Safety and traffic management during construction	--	Payment shall be made on pro rata basis every six months.

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

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Annex - I

(Schedule - I)

List of Drawings

a) Working Drawings of all the components/elements of the project Highway as determined by Authority Engineer/ Authority, and

b) As-built drawings for the Project Highway components/elements as determined by Authority Engineer/ Authority. As-built drawings shall be duly certified by Authority Engineer.

a) A broad list of the drawings of the various components/elements of the project Highway and project facilities required to be submitted by the Contractor is given below:

a) Horizontal and Vertical Alignment (Plan & Profile) with:

- Details of Reference Pillars,
- Horizontal Intersection Point
- Vertical Intersection Point
- Elements of Curves, Details of Structures, etc.

b) Detailed Designed Cross Sections with Pavement layers at 20 m interval

c) Detailed Drawings of individual Cross Drainage Structures

d) Detailed drawing of Individual Minor & Major Bridges

e) Detailed Drawing of Breast wall, PPC wall, Retaining walls and Slope Protection work

f) Detailed Drawing of Drainage including lined drain and other drains.

g) Drawings of Major and Minor junctions,

h) Detailed Drawing of Light Vehicular Underpass

i) Drawings of a Truck lay bye and Bus bay with furniture and drainage system

j) Drawings of road furniture items including traffic signage, markings, safety barriers, etc.

k) Drawings of traffic diversion plans and traffic control measures

l) Drawings of landscaping and horticulture

m) Drawings of pedestrian crossings

n) General arrangement of Base camp and Administrative Block

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. *Project Completion Schedule*

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

2. *Project Milestone-I*

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

(i) 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 **[60% of the Scheduled Construction Period]** 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 **[85% of the Scheduled Construction Period]** 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 [Scheduled Construction Period] day from the Appointed Date.

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

6. ***Extension of time***

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

Schedule - K

(See Clause 12.1 (ii))

Tests on Completion

1. ***Schedule for Tests***

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

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

2. ***Tests***

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

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

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

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

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

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

3. ***Agency for conducting Tests***

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

4. ***Completion Certificate***

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

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

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

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

Schedule -L

(See Clause12.2)

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 **"…….Name of Work……"**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 there of.

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%

S. No.	Item/Defect/Deficiency	Percentage
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

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

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: Rs. [*****]

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

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

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