Schedules

Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode

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 Kohima (Ex. Km185+540 of NH-39) to Mao (Nagaland /Manipur Border) (Ex Km212+334 of NH-39) in the state of Nagaland. 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	185+540	212+334	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)
184+540	185+000	460	Valley	Hilly	BT	7.7
185+000	185+200	200	Plain	Plain	BT	7.7
185+200	185+400	200	Plain	Hilly	BT	7.7
185+400	186+800	1400	Valley	Hilly	BT	7.7
186+800	192+000	5200	Valley	Hilly	BT	6.0
192+000	194+800	2800	Valley	Hilly	BT	7.2
194+800	195+000	200	Valley	Hilly	BT	6.5
195+000	195+200	200	Plain	Hilly	BT	6.5
195+200	196+400	1200	Valley	Hilly	BT	6.5
196+400	198+000	1600	Plain	Hilly	BT	6.5
198+000	199+800	1800	Valley	Hilly	BT	6.5
199+800	203+200	3400	Plain	Plain	BT	6.5
203+200	203+400	200	Plain	Hilly	BT	6.5

Ex. Chainage (Km)		Length (m)	Terrain		Carriageway	
From	To		LHS	RHS	Type	Width (m)
203+400	209+400	6000	Valley	Hilly	BT	6.5
209+400	209+800	400	Plain	Plain	BT	6.5
209+800	212+334	2534	Valley	Hilly	BT	6.5

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	194+603	1 x 9.0	7.65	RCC & Steel	CRM wall type	Open
2	199+157	1 x 9.1	7.8	RCC & Steel	CRM wall type	Open

3	201+410	1 x 9.1	7.9	RCC & Steel	CRM wall type	Open
4	207+498	1 x 24.75	8.5	RCC	RCC wall type	Open
5	210+376	1 x 7.5	7.9	RCC & Steel	CRM wall type	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 Pipes	Pipe Dia (m)	Carriageway Width (m)	Remarks
1	192+170	Pipe	2	1.2	8	
2	209+429	Pipe	2	1	6.6	
3	212+200	Pipe	2	1	6.7	
4	212+307	Pipe	2	1	6.7	

10.2 Slab Culverts

The Site has the following existing slab culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
1	185+910	Slab	0.9	6.2	
2	185+992	Slab	1	6	

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
3	186+081	Slab	0.9	6.9	
4	186+138	Slab	0.9	6.7	
5	186+204	Slab	1.8	9.6	
6	186+344	Slab	1	7.5	
7	186+409	Slab	2.3	7.8	
8	186+469	Slab	2	7.2	
9	186+644	Slab	2	6.9	
10	186+779	Slab	0.9	7.8	
11	186+839	Slab	0.8	7.8	
12	186+960	Slab	1.5	7	
13	187+355	Slab	0.9	6.6	
14	187+524	Slab	1	6.4	
15	187+659	Slab	1	7.7	
16	187+847	Slab	0.9	6.5	
17	187+950	Slab	0.9	6.5	Blocked
18	188+107	Slab	0.9	6.5	
19	188+153	Slab	0.9	7	
20	188+476	Slab	0.9	7.5	
21	188+597	Slab	1.5	7.5	
22	188+687	Slab	3.5	7.7	
23	189+112	Slab	1	6.5	
24	189+258	Slab	1	7	
25	189+389	Slab	1.5	7	
26	189+497	Slab	1	6	
27	189+577	Slab	5	6	
28	190+096	Slab	1	7.15	
29	190+211	Slab	0.9	6.5	Blocked
30	190+389	Slab	0.9	6.5	
31	190+513	Slab	1	7	Blocked
32	190+590	Slab	0.9	7	
33	190+682	Slab	-	-	Blocked
34	190+876	Slab	0.9	7.2	
35	191+249	Slab	1	7.2	
36	191+853	Slab	1	7.2	
37	191+910	Slab	1	7.2	
38	191+978	Slab	2	7	
39	192+159	Slab	1.5	6	
40	192+337	Slab	0.9	6.7	
41	192+539	Slab	0.9	6	
42	192+595	Slab	1	7	
43	192+661	Slab	0.9	6.2	
44	192+755	Slab	0.9	7	Blocked

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
45	192+881	Slab	1.5	6.6	
46	192+994	Slab	0.9	7	
47	193+135	Slab	1	7	
48	193+234	Slab	0.9	6.8	
49	193+334	Slab	0.9	7	Blocked
50	193+812	Slab	2.0	7	
51	193+1026	Slab	0.9	7	Blocked
52	194+107	Slab	1.2	6.8	Blocked
53	194+174	Slab	1.5	7.1	
54	194+201	Slab	-	-	Blocked
55	194+348	Slab	0.9	7	
57	194+812	Slab	1	7.3	
58	194+984	Slab	0.9	7	
59	195+051	Slab	1.2	7.4	
60	195+181	Slab	1.5	7	
61	195+238	Slab	3	7.5	
62	195+338	Slab	1	7.5	
63	195+621	Slab	1.2	7.2	
64	195+744	Slab	1.2	7.4	
65	196+129	Slab	1.5	7.5	
66	196+393	Slab	1	7.5	
67	196+643	Slab	1	7.5	
68	196+816	Slab	1	8	
69	197+032	Slab	1	7.3	
70	197+131	Slab	1	6.8	
71	197+410	Slab	1	6.3	
72	197+436	Slab	0.9	6.5	
73	197+480	Slab	1.5	7.5	
74	197+531	Slab	0.9	7.5	
75	197+681	Slab	1.5	8	
76	197+779	Slab	0.9	7	
77	198+150	Slab	1	7.3	
78	198+289	Slab	1.5	7.3	
79	198+500	Slab	1	7.1	
80	198+615	Slab	1	7.1	
81	198+752	Slab	1.5	7	
82	198+836	Slab	0.9	6.2	
83	198+883	Slab	0.9	6.2	
84	198+989	Slab	0.9	7	
85	199+048	Slab	0.9	7	
86	199+120	Slab	1.2	7	Blocked
87	199+177	Slab	1	6.8	Blocked

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
88	199+213	Slab	1.2	6.2	Blocked
89	199+369	Slab	1	7.2	
90	199+750	Slab	0.9	7.2	
91	199+817	Slab	1	7.2	
92	199+930	Slab	0.9	7.2	
93	200+271	Slab	1	6.7	
94	200+446	Slab	0.9	6.6	
95	201+059	Slab	0.9	6.7	
96	201+209	Slab	0.9	-	
97	201+295	Slab	1.6	6.3	
98	201+508	Slab	0.9	6.6	
99	201+634	Slab	1.5	6.6	
100	201+738	Slab	0.9	6.7	
101	201+781	Slab	1.1	6.1	
102	202+076	Slab	0.9	6.2	
103	202+303	Slab	0.9	7	
104	202+493	Slab	3	6	Blocked
105	202+637	Slab	0.9	7.2	
106	202+705	Slab	1	7.4	
107	202+887	Slab	1	7.2	
108	203+466	Slab	1	7.05	
109	203+539	Slab	1	7.5	
110	203+599	Slab	0.56	7.5	
111	203+659	Slab	0.9	7.5	
112	203+835	Slab	1	6.9	
113	203+914	Slab	1.6	7.2	
114	203+1038	Slab	1	6.3	
115	203+1249	Slab	2	7	Blocked, Sinking Zone
116	203+1302	Slab	0.9	6.8	
117	204+084	Slab	1.2	7	
118	204+225	Slab	1.2	9	
119	204+303	Slab	1	7	
120	204+474	Slab	0.8	8.7	Blocked
121	204+661	Slab	0.9	8.3	
122	204+862	Slab	1	7.2	
123	204+946	Slab	3.8	7	
124	205+041	Slab	0.9	7	
125	205+310	Slab	1	6.8	
126	205+457	Slab	1	6.2	
127	205+559	Slab	1	7	
128	205+613	Slab	0.9	6.8	
129	205+649	Slab	0.9	6.6	

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
130	205+828	Slab	1	6.7	
131	205+962	Slab	0.9	7.7	
132	206+000	Slab	0.9	7	
133	206+184	Slab	0.9	6.7	
134	206+372	Slab	0.9	7.8	
135	206+421	Slab	1	6.7	
136	206+609	Slab	1	7	
137	206+785	Slab	0.9	6.6	
138	206+896	Slab	1	7	
139	207+047	Slab	0.9	8.2	
140	207+098	Slab	1	7.6	
141	207+140	Slab	0.9	7.6	
142	207+223	Slab	1.5	7.6	
143	207+950	Slab	0.9	7.6	
144	208+004	Slab	1	8.3	Blocked
145	208+012	Slab	1	8.3	Blocked
146	208+015	Slab	1	8.3	
147	208+296	Slab	0.9	6.7	
148	208+496	Slab	0.9	7.3	Blocked
149	208+739	Slab	0.9	7	
150	208+778	Slab	1	6.5	
151	208+967	Slab	1	7.45	
152	209+054	Slab	0.9	6.9	
153	209+186	Slab	0.9	6.7	Blocked
154	209+322	Slab	0.9	6.3	Blocked
155	209+548	Slab	1	6.6	Blocked
156	209+846	Slab	1	7.2	
157	210+160	Slab	0.95	6.8	
158	210+390	Slab	0.9	7	
159	210+531	Slab	0.9	6.8	
160	210+790	Slab	1.5	7	
161	210+863	Slab	1	7	Blocked
162	210+966	Slab	1	6.8	
163	211+052	Slab	0.9	7.7	
164	211+181	Slab	0.9	6.9	
165	211+276	Slab	0.8	6.7	
166	211+328	Slab	0.9	6.5	
167	211+481	Slab	0.9	7	
168	211+568	Slab	0.9	6.9	
169	211+696	Slab	-	-	Blocked
170	211+763	Slab	1	7.25	
171	211+904	Slab	0.9	7.2	

S. No.	Ex. Chainages (Km)	Type of Culvert	Clear Span (m)	Carriageway Width (m)	Remarks
172	211+968	Slab	0.9	7.2	
173	212+089	Slab	1	6.7	
174	212+140	Slab	1	6.7	
175	212+263	Slab	-	-	Blocked

10.1 Box Culverts

The Site has the following existing box culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	Span Arrangement	Clear Span (m)	Carriageway Width (m)	Remarks
1	185+602	Box	0.5	1	2	7.6	
2	185+707	Box	0.5	1	2.2	8.4	
3	185+840	Box	0.5	1	2.7	7.6	
4	187+034	Box	0.5	1	2	7.6	
5	187+202	Box	0.4	2	2	7	
6	187+270	Box	0.4	2	2	8	
7	187+442	Box	0.5	1	2.2	9	
8	187+582	Box	0.5	1	2.5	9	

10.2 Other Culverts

The Site has the following existing other culverts:

S. No.	Ex. Chainages (Km)	Type of Culvert	Thickness of Slab (m)	Span Arrangement	Clear Span (m)	Carriageway Width (m)	Remarks
1	190+465	Slab+Steel	0.6	1	4.5	6.5	
2	190+740	Slab+Pipe	0.25	1	1.2+.6	7.5	
3	204+782	Slab+Steel	.5+.5	1	5	6.8	
4	212+054	Slab+Pipe	0.15	1+2	0.95+1	7.1	

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	186+862	Ex.bus stop	LHS	Kohima
2	200+025	Ex.bus stop	LHS	Jakhama
3	201+346	Ex.bus stop	RHS	Jakhama
4	202+331	Ex.bus stop	LHS	Jakhama
5	212+324	Ex.bus stop	LHS	Khuzama

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

Existing Drains – unserviceable, broken/ blocked.

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	185+540	At Grade	LHS	City road	

15. Minor junctions

The details of the minor junctions are as follows:

S. No.	Existing Chainage (Km)	Direction	Surface Type	Wide of Road	Type of Junction	Leading To
1	191+082	LHS	BT.Road	1.4	Y-Jn.	Kohima
2	191+658	LHS	BT.Road	4.1	T-Jn.	Kohima
3	192+172	RHS	BT.Road	4.6	Y-Jn.	Naga Heritage Village
4	192+562	RHS	BT.Road	7	Y-Jn.	Naga Heritage Village
5	196+141	RHS	BT.Road	2.6	Y-Jn.	Kigwema

6	197+266	RHS	BT.Road	5	T-Jn.	Kigwema
7	197+550	LHS	BT.Road	3.7	Y-Jn.	Jakhama
8	199+178	RHS	BT.Road	5.8	Y-Jn.	Jakhama
9	199+179	LHS	BT.Road	2.3	Y-Jn.	Jakhama
10	201+304	LHS	BT.Road	2.7	Y-Jn.	Jakhama
11	201+348	RHS	BT.Road	3.7	Y-Jn.	Jakhama
12	202+652	LHS	BT.Road	5.1	Y-Jn.	Jakhama
13	203+086	LHS	BT.Road	2.8	Y-Jn.	Jakhama
14	204+545	RHS	BT.Road	3.4	Y-Jn.	Jakhama
15	205+442	LHS	BT.Road	4.8	Y-Jn.	Jakhama
16	209+739	RHS	BT.Road	3.6	Y-Jn.	Khuzama
17	209+740	LHS	BT.Road	2.6	T-Jn.	Khuzama
18	209+835	RHS	BT.Road	4	Y-Jn.	Khuzama
19	210+058	LHS	BT.Road	2.9	Y-Jn.	Khuzama
20	210+080	RHS	BT.Road	3.2	Y-Jn.	Khuzama

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	185+540		Start of Package-1
2	193+240	193+160	
3	194+000	193+950	
4	195+000	195+009	
5	196+000	195+793	

S. No.	Existing Chainage (Km)	Design Chainage (Km)	Remarks
6	197+000	196+703	
7	198+000	197+547	
8	199+000	198+526	
9	200+000	199+483	
10	201+000	200+480	
11	202+000	201+396	
12	203+000	202+289	
13	204+000	203+599	
14	205+000	204+515	
15	206+000	205+500	
16	207+000	206+450	
17	208+000	207+450	
18	209+000	208+399	
19	210+000	209+413	
20	211+000	210+410	
21	212+000	211+381	
22	212+334	211+709	End of Package-1 (Nagaland /Manipur Border)

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:

Sl. No	Design Chainage		Length (Km)	Proposed ROW Width (m)	Date of Providing proposed ROW
	From	To			
i) 90% of ROW (full width)	185.540	211.709	26.249	Varying ROW from minimum 18 m to maximum 36 m at different locations	At Appointment Date
ii) Balance Right of way (width)	185.540	211.709	26.249	Varying ROW from minimum 18m to maximum 36 m at different locations	Within 150 days after the Appointed Date

The Construction of Project Highway will be implemented as per Manual, details of which are already given in Article-2 of Annexure – I of Schedule –A.

Annex - III

(Schedule-A)

Alignment Plans

The existing alignment of the Package-1 i.e. Kohima to Mao (Nagaland/Manipur Border) 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 26.249 km existing National Highway (less than 100 Km). As a result Environmental clearances will not be required from MoEF.

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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 two lane carriageway with paved shoulder

NA.

3. Specifications and Standards

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

Annex - I

(Schedule-B)

Description of Two-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 Mountainous/Steep terrain to the extent land is available.

1.2. Width of Carriageway

1.2.1 Two laning with paved shoulder from proposed Kohima bypass (Km 193+240) to Mao-Nagaland/Manipur Border (Km211+709).The width of paved carriageway shall be 10m (7.0m + 2x1.5m) 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.

At sharp horizontal curves, extra widening of carriageway should be provided as per Table 6.9 of IRC: SP: 48-1998.
Provided that in the built-up areas the width of the carriageway shall be as specified in the following table:

S. No.	Built-up stretch (Township)	Design Chainage (Km)		Paved Width (m)	(Typical cross section) (Ref. to Schedule B Appendix B-1)
		From	To		
1	Army Camp Area	195+050	197+600	7+2x1.5m	18, 20
2	Near St Joseph's college Jakhama	199+150	199+880	7+2x1.5m	18, 22, 26
3	Khuzama	208+800	209+470	7+2x1.5m	17, 18, 20, 26

There will be bituminous overlay only on existing carriageway from Kohima (Ex. Km185+540) to proposed Kohima Bypass (@ Ex Km193+240).

40mm BC and 90mm DBM with profile correction with WMM has to be done for Overlay provided.

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:48-1998/ IRC:SP:73-2018).

2.2. Design speed

The design speed shall be as per IRC 73: 2018.

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 Manual and achieving ruling gradient for Mountainous/Steepterrain. 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:

S. No.	Design Chainage (Km)		Fully paved shoulders/ footpaths	(Typical cross section) (Ref. to Schedule B Appendix B-1)
	From	To		
1	*Appendix B1- Typical Cross Sections or Manual*			

(b) The paved shoulders (1.5 m width) shall be provided with same pavement layers of carriageway. The earthen shoulder and 0.5 m wide space between the drain and paved shoulder as shown in Appendix B1- Typical Cross section 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 IRC: SP: 73-2018.

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 (Km)	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.	Design Chainage 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.	Design Chainage	Type of crossing
NIL		

2.11. Typical Cross Section of the Project Highway

Typical Cross Sections (TCS) have been developed as TCS-14 to TCS-18, TCS-20

to TCS-22 and TCS-24 to TCS-27showing 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 shall be as per Section3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category of VRs. The Contractor has to construct the following:

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)	Side	Width	Type	Village/Town Name	T-Junction
1	196+141	195+939	RHS	2.6	BT.Road	Kigwema	Y-Jn.
2	197+266	196+961	RHS	5	BT.Road	Kigwema	T-Jn.
3	197+550	197+218	LHS	3.7	BT.Road	Jakhama	Y-Jn.
4	199+178	198+718	RHS	5.8	BT.Road	Jakhama	Y-Jn.
5	199+179	198+727	LHS	2.3	BT.Road	Jakhama	Y-Jn.
6	201+304	200+794	LHS	2.7	BT.Road	Jakhama	Y-Jn.
7	201+348	200+851	RHS	3.7	BT.Road	Jakhama	Y-Jn.
8	202+652	201+894	LHS	5.1	BT.Road	Jakhama	Y-Jn.
9	203+086	202+358	LHS	2.8	BT.Road	Jakhama	Y-Jn.
10	204+545	202+687	RHS	3.4	BT.Road	Jakhama	Y-Jn.
11	205+442	204+148	LHS	4.8	BT.Road	Jakhama	Y-Jn.

S.No	Existing Chainage (Km)	Design Chainage (Km)	Side	Width	Type	Village/Town Name	T-Junction
12	209+739	204+958	RHS	3.6	BT.Road	Khuzama	Y-Jn.
13	209+740	209+150	LHS	2.6	BT.Road	Khuzama	T-Jn.
14	209+835	209+245	RHS	4	BT.Road	Khuzama	Y-Jn.
15	210+058	209+469	LHS	2.9	BT.Road	Khuzama	Y-Jn.
16	210+080	209+502	RHS	3.2	BT.Road	Khuzama	Y-Jn.

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

Sl. 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 IRC: SP: 73-2018 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

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 of main carriageway for design traffic of 20 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be taken for design if less than 10%. Maximum value of CBR to be taken for design shall not exceed 10%.

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

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 (IRC: SP: 73-2018).
Drain of following length and type shall be provided:

Sr. No.	Type of drain	Length (except CD structures) (m)	Side of construction Hill side/Both
1	RCC Covered Drain	6900	Hill side
2	Lined Drain	14160	One /Both side
3	Unlined Drain	980	Hill side
4	Catch water drain	4180	Hill side

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 Existing Pipe/Slab Culvert to New Box Culvert**

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

S. No.	Chainage (km)		Type		Proposed span/Size (m)	Remarks
	Existing	Design	Existing	Proposed		
1	193+350	193+253	Slab	Box	1x2x2	
2	193+900	193+936	Slab	Box	1x2x2	
3	193+970	194+056	Slab	Box	1x2x2	
4	194+090	194+124	Slab	Box	1x2x2	
5	194+350	194+298	Slab	Box	1x2x2	
6	194+710	194+825	Slab	Box	1x2x3	
7	195+150	195+190	Slab	Box	1x2x2	
8	201+320	201+219	Slab	Box	1x3x3	Cushion 3.0m
9	202+200	201+870	Slab	Box	1x3x4	
10	202+450	202+071	Slab	Box	1x2x3	
11	204+420	204+057	Slab	Box	1x2x2	
12	204+960	204+475	Slab	Box	1x4x3	
13	205+250	204+968	Slab	Box	1x3x4	
14	207+950	207+393	Slab	Box	1x2x2	
15	209+400	208+925	Slab	Box	1x2x2	
16	209+429	208+809	Pipe Culvert	Box	1x2x2	
17	210+500	210+193	Slab	Box	1x2x2	Cushion 3.0m
18	210+520	210+261	Slab	Box	1x2x3	
19	210+700	210+357	Slab	Box	1x2x2	
20	210+870	210+462	Slab	Box	1x2x2	
21	210+950	210+590	Slab	Box	1x2x3	
22	211+130	210+685	Slab	Box	1x3x3	Cushion 4.0m
23	211+250	210+876	Slab	Box	1x2x2	
24	211+520	211+077	Slab	Box	1x2x2	
25	211+600	211+143	Slab	Box	1x2x2	
26	212+200	211+564	Pipe Culvert	Box	1x2x2	

S. No.	Chainage (km)		Type		Proposed span/Size (m)	Remarks
	Existing	Design	Existing	Proposed		
27	212+320	211+627	Slab	Box	1x2x2	

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.	Chainage (Km)		Type	No of Pipes	Dia. (m)	Widening Side	Remarks
	Existing	Design					
1	209+429	208+809	Pipe Culvert	2	1	Right Side	
2	212+200	211+564	Pipe Culvert	2	1	Right Side	

(b) Retaining / widening of Box culvert

S. No.	Chainage (Km)		Type	No of Span	Span (m)	Remarks
	Existing	Design				
1	185+840	185+846	Box Culvert	1	2.7	Retained
2	187+034	187+087	Box Culvert	1	2	Retained
3	187+202	187+245	Box Culvert	2	2	Retained
4	187+270	187+313	Box Culvert	2	2	Retained
5	187+582	187+593	Box Culvert	1	2.5	Retained

(c) Retaining / widening of Slab Culverts

(i) Chainage Km 185.540 to Km 193.240

S. No.	Chainage (km)		Type	No of Span	Span	Widening Side	Remarks
	Existing	Design			(m)		
1	185+800	185+800	Slab Culvert	1	0.9		Retained
2	185+870	185+870	Slab Culvert	1	1		Retained
3	186+000	186+000	Slab Culvert	1	0.9		Retained
4	186+050	186+050	Slab Culvert	1	0.9		Retained
5	186+100	186+100	Slab Culvert	1	1.8		Retained
6	186+200	186+200	Slab Culvert	1	1		Retained
7	186+400	186+400	Slab Culvert	1	2.3		Retained
8	186+500	186+500	Slab Culvert	1	2		Retained
9	186+800	186+800	Slab Culvert	1	2		Retained
10	186+900	186+900	Slab Culvert	1	0.9		Retained
11	186+920	186+920	Slab Culvert	1	0.8		Retained

S. No.	Chainage (km)		Type	No of Span	Span (m)	Widening Side	Remarks
	Existing	Design					
12	186+950	186+950	Slab Culvert	1	1.5		Retained
13	187+350	187+350	Slab Culvert	1	0.9		Retained
14	187+500	187+500	Slab Culvert	1	1		Retained
15	187+660	187+660	Slab Culvert	1	1		Retained
16	187+800	187+800	Slab Culvert	1	0.9		Retained
17	187+870	187+870	Slab Culvert	1	0.9		Retained
18	187+910	187+910	Slab Culvert	1	0.9		Retained
19	187+950	187+950	Slab Culvert	1	0.9		Retained
20	188+050	188+050	Slab Culvert	1	0.9		Retained
21	188+150	188+150	Slab Culvert	1	1.5		Retained
22	188+210	188+210	Slab Culvert	1	3.5		Retained
23	189+070	189+070	Slab Culvert	1	1		Retained
24	189+170	189+170	Slab Culvert	1	1		Retained
25	189+300	189+300	Slab Culvert	1	1.5		Retained
26	189+380	189+380	Slab Culvert	1	1		Retained
27	189+420	189+420	Slab Culvert	1	5		Retained
28	190+050	190+050	Slab Culvert	1	1		Retained
29	190+120	190+120	Slab Culvert	1	0.9		Retained
30	190+400	190+400	Slab Culvert	1	0.9		Retained
31	190+440	190+440	Slab+Steel	1	4.5		Retained
32	190+465	190+465	Slab Culvert	1	1		Retained
33	190+520	190+520	Slab Culvert	1	0.9		Retained
34	190+750	190+750	Slab+Pipe	1	1.2+0.6		Retained
35	190+820	190+820	Slab Culvert	1	0.9		Retained
36	191+015	191+015	Slab Culvert	1	1		Retained
37	191+100	191+100	Slab Culvert	1	1		Retained
38	191+200	191+200	Slab Culvert	1	1		Retained
39	191+300	191+300	Slab Culvert	1	2		Retained
40	192+100	192+100	Slab Culvert	1	1.5		Retained
41	192+190	192+190	Slab Culvert	1	0.9		Retained
42	192+350	192+350	Slab Culvert	1	0.9		Retained
43	192+420	192+420	Slab Culvert	1	1		Retained
44	192+530	192+530	Slab Culvert	1	0.9		Retained
45	192+570	192+570	Slab Culvert	1	0.9		Retained
46	192+840	192+840	Slab Culvert	1	1.5		Retained
47	192+997	192+997	Slab Culvert	1	0.9		Retained
48	193+150	193+150	Slab Culvert	1	1		Retained
49	193+250	193+250	Slab Culvert	1	0.9		Retained
(ii) Chainage Km 193.240 to Km 211.709							
50	193+812	193+722	Slab Culvert	1	2	Left Side	

S. No.	Chainage (km)		Type	No of Span	Span (m)	Widening Side	Remarks
	Existing	Design					
51	194+984	194+997	Slab Culvert	1	0.9	Bothside	
52	195+051	195+060	Slab Culvert	1	1.2	Bothside	
53	195+238	195+247	Slab Culvert	1	3		Retained
54	195+338	195+345	Slab Culvert	1	1		Retained
55	195+621	195+624	Slab Culvert	1	1.2	Left Side	
56	195+744	195+743	Slab Culvert	1	1.2	Left Side	
57	196+129	195+921	Slab Culvert	1	1.5	Left Side	
58	196+393	196+176	Slab Culvert	1	1	Bothside	
59	196+643	196+423	Slab Culvert	1	1	Right Side	
60	196+816	196+595	Slab Culvert	1	1	Left Side	
61	197+032	196+734	Slab Culvert	1	1	Right Side	
62	197+131	196+832	Slab Culvert	1	1		Retained
63	197+410	197+111	Slab Culvert	1	1	Bothside	
64	197+480	197+179	Slab Culvert	1	1.5	Left Side	
65	197+531	197+227	Slab Culvert	1	0.9		Retained
66	197+681	197+376	Slab Culvert	1	1.5		Retained
67	197+779	197+475	Slab Culvert	1	0.9	Bothside	
68	198+150	197+697	Slab Culvert	1	1		Retained
69	198+289	197+831	Slab Culvert	1	1.5	Left Side	
70	198+500	198+037	Slab Culvert	1	1		Retained
71	198+615	198+142	Slab Culvert	1	1		Retained
72	198+752	198+277	Slab Culvert	1	1.5		Retained
73	198+836	198+361	Slab Culvert	1	0.9	Bothside	
74	198+883	198+408	Slab Culvert	1	0.9	Bothside	
75	198+989	198+515	Slab Culvert	1	0.9	Bothside	
76	199+048	198+574	Slab Culvert	1	0.9	Bothside	
77	199+120	198+645	Slab Culvert	1	1.2	Right Side	
78	199+213	198+743	Slab Culvert	1	1.2		Retained
79	199+369	198+896	Slab Culvert	1	1	Right Side	
80	199+750	199+274	Slab Culvert	1	0.9	Left Side	
81	199+817	199+340	Slab Culvert	1	1	Bothside	
82	199+930	199+452	Slab Culvert	1	0.9	Bothside	
83	200+271	199+754	Slab Culvert	1	1	Bothside	
84	201+059	200+540	Slab Culvert	1	0.9	Right Side	
85	201+209	200+690	Slab Culvert	1	0.9	Bothside	
86	201+295	200+775	Slab Culvert	1	1.6	Right Side	
87	201+508	201+001	Slab Culvert	1	0.9	Right Side	
88	201+634	201+124	Slab Culvert	1	1.5	Right Side	
89	201+781	201+256	Slab Culvert	1	1.1	Right Side	
90	202+076	201+468	Slab Culvert	1	0.9	Right Side	
91	202+303	201+695	Slab Culvert	1	0.9	Right Side	
92	202+887	202+250	Slab Culvert	1	1	Left Side	

S. No.	Chainage (km)		Type	No of Span	Span (m)	Widening Side	Remarks
	Existing	Design					
93	203+466	202+743	Slab Culvert	1	1		Retained
94	203+539	202+816	Slab Culvert	1	1	Bothside	
95	203+659	202+938	Slab Culvert	1	0.9	Right Side	
96	203+835	203+112	Slab Culvert	1	1	Bothside	
97	203+914	203+191	Slab Culvert	1	1.6	Bothside	
98	203+1038	203+310	Slab Culvert	1	1	Right Side	
99	203+1302	203+562	Slab Culvert	1	0.9	Right Side	
100	204+084	203+680	Slab Culvert	1	1.2		Retained
101	204+303	203+887	Slab Culvert	1	1	Left Side	
102	204+782	204+323	Slab Culvert	1	5	Bothside	
103	204+862	204+394	Slab Culvert	1	1	Bothside	
104	205+041	204+555	Slab Culvert	1	0.9	Bothside	
105	205+310	204+822	Slab Culvert	1	1	Bothside	
106	205+649	205+164	Slab Culvert	1	0.9	Right Side	
107	205+828	205+338	Slab Culvert	1	1	Bothside	
108	206+184	205+686	Slab Culvert	1	0.9	Left Side	
109	206+421	205+911	Slab Culvert	1	1	Bothside	
110	206+609	206+094	Slab Culvert	1	1	Bothside	
111	206+785	206+264	Slab Culvert	1	0.9	Bothside	
112	207+047	206+490	Slab Culvert	1	0.9	Right Side	
113	207+140	206+586	Slab Culvert	1	0.9	Right Side	
114	207+223	206+669	Slab Culvert	1	1.5	Right Side	
115	208+296	207+727	Slab Culvert	1	0.9	Bothside	
116	208+496	207+916	Slab Culvert	1	0.9	Right Side	
117	208+739	208+153	Slab Culvert	1	0.9	Right Side	
118	209+186	208+571	Slab Culvert	1	0.9	Right Side	
119	209+322	208+703	Slab Culvert	1	0.9	Left Side	
120	209+846	209+222	Slab Culvert	1	1		Retained
121	211+904	211+284	Slab Culvert	1	0.9	Right Side	
122	211+968	211+347	Slab Culvert	1	0.9	Right Side	
123	212+089	211+451	Slab Culvert	1	1	Right Side	
124	212+140	211+499	Slab Culvert	1	1	Right Side	

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

S. No.	Design Chainage (Km)	Type	Span Arrangement (m)	Remarks
1	193+520	Box Culvert	1x3.0x3.0	
2	194+410	Box Culvert	1x2.0x2.0	
3	195+520	Box Culvert	1x2.0x2.0	

S. No.	Design Chainage (Km)	Type	Span Arrangement (m)	Remarks
4	196+010	Box Culvert	1x2.0x2.0	
5	196+970	Box Culvert	1x2.0x2.0	
6	199+900	Box Culvert	1x2.0x2.0	
7	200+020	Box Culvert	1x2.0x3.0	
8	200+260	Box Culvert	1x2.0x2.0	
9	202+480	Box Culvert	1x2.0x2.0	
10	204+680	Box Culvert	1x2.0x2.0	
11	205+050	Box Culvert	1x2.0x2.0	
12	205+440	Box Culvert	1x2.0x2.0	
13	205+550	Box Culvert	1x2.0x2.0	
14	205+820	Box Culvert	1x2.0x2.0	
15	206+385	Box Culvert	1x2.0x2.0	
16	206+810	Box Culvert	1x2.0x2.0	
17	207+060	Box Culvert	1x2.0x2.0	
18	207+200	Box Culvert	1x2.0x2.0	
19	207+457	Box Culvert	1x4.0x4.0	Cushion 3.0m
20	207+840	Box Culvert	1x2.0x3.0	
21	209+577	Box Culvert	1x2.0x3.0	

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:

S. No.	Chainage		Type	Size	Type of repair required
	Existing	Design			
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.

The numbers of culvert above are minimum, to be provided and it may increase as per site condition. In case of increase in numbers of culvert, no positive change of scope will be payable

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.	Chainage (Km)		Type of Existing structure	Span Arrangement		Deck width
	Existing	Design		Existing	Proposed	
NIL						

b) Minor Bridges:

S.No.	Chainage (Km)		Type of Existing structure	Span Arrangement		Deck width
	Existing	Design		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
	Existing	Design				
NIL						

b) Minor Bridges:

S. No	Chainage (Km)		Span Arrangement	Outer Width	Super Structure Type	Remarks
	Design	Existing	(m)	(m)		
1	200+897	201+410	1 X9.1	12	RCC T-Beam	Existing Bridge is to be widened.
2	206+944	207+498	1 X 24	12	RCC T-Beam	Ex. Bridge is to be widened.

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 2 Lane 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 (Km)	Span (m)	Remark
1	194+590	40	2 Lane New Bridge as per section 7 of IRC SP 73:2018
2	198+684	14	
3	208+333	40	
4	209+748	40	

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 damaged railing of all the existing bridge. Vegetation growth 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. Protection Work

The Stone Masonry Breast wall are to be constructed on hill side section along the roadway edge where cutting is required or cutting is more than available ROW.

Retaining walls are to be constructed to restrict the earth along the filling section where normal side slope crosses the available ROW. The PCC toe walls to be adopted upto the height of 2.0m from GL and RCC retaining wall where the required height of wall at site is more than 2.0m.

The project section where the hill cut heights of side slope is more than 25m, surficial protection and Erosion Control measures are to be provided and details of typical measures for soil and Rocky surface are given in Appendix B-1 of this Schedule B.

S. No.	Description of Work	Length (m)
1	Breast Wall in Stone Masonary	
	(a) For 1.0 m height	130
	(b) For 1.5 m height	5220
	(c) For 2.0 m height	140
	(d) For 2.5 m height	160
	(e)For 3.0 m height	1150
2	Breast Wall in RCC (3 to 6 m height)	460
3	Toe Wall	6315
4	Retaining Wall in Stone Masonary	0
5	Retaining Wall in RCC	2332

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

1. **Breast wall**

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

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1.0m height Breast Wall							
1	195800	195810	18		1		10
2	196490	196500	18		1		10
3	197100	197110	18		1		10
4	197230	197240	18		1		10
5	197240	197250	18		1		10
6	197420	197430	18		1		10
7	199220	199230	18		1		10
8	199240	199250	18		1		10
9	199260	199270	18		1		10
10	199290	199300	18		1		10
11	199730	199740	18		1		10
12	208800	208810	18		1		10
13	208880	208890	18		1		10
1.5m height Breast Wall							
1	193340	193350	15		1.5		10
2	193350	193360	15		1.5		10
3	193360	193370	15		1.5		10
4	193370	193380	15		1.5		10
5	193380	193390	15		1.5		10
6	193390	193400	15		1.5		10
7	193440	193450	15		1.5		10
8	193570	193580	15		1.5		10
9	193580	193590	15		1.5		10
10	193590	193600	15		1.5		10
11	193670	193680	14		1.5		10
12	193890	193900	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
13	193900	193910	15		1.5		10
14	193910	193920	15		1.5		10
15	194260	194270	15		1.5		10
16	194270	194280	15		1.5		10
17	194280	194290	15		1.5		10
18	194290	194300	15		1.5		10
19	194300	194310	15		1.5		10
20	194320	194330	15		1.5		10
21	194330	194340	15		1.5		10
22	194340	194350	15		1.5		10
23	194350	194360	15		1.5		10
24	194360	194370	15		1.5		10
25	194370	194380	15		1.5		10
26	194380	194390	15		1.5		10
27	194390	194400	15		1.5		10
28	196500	196510	18		1.5		10
29	196510	196520	18		1.5		10
30	196520	196530	18		1.5		10
31	196530	196540	18		1.5		10
32	197430	197440	18		1.5		10
33	197780	197790	15		1.5		10
34	197790	197800	15		1.5		10
35	197800	197810	15		1.5		10
36	197860	197870	15		1.5		10
37	197880	197890	15		1.5		10
38	197890	197900	15		1.5		10
39	197900	197910	15		1.5		10
40	197910	197920	15		1.5		10
41	197920	197930	15		1.5		10
42	198070	198080	15		1.5		10
43	198080	198090	15		1.5		10
44	198090	198100	15		1.5		10
45	198100	198110	15		1.5		10
46	198110	198120	15		1.5		10
47	198120	198130	15		1.5		10
48	198170	198180	15		1.5		10
49	198180	198190	15		1.5		10
50	198190	198200	15		1.5		10
51	198200	198210	15		1.5		10
52	198220	198230	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
53	198230	198240	15		1.5		10
54	198240	198250	15		1.5		10
55	198250	198260	15		1.5		10
56	198260	198270	15		1.5		10
57	198270	198280	15		1.5		10
58	198340	198350	15		1.5		10
59	198350	198360	15		1.5		10
60	198360	198370	15		1.5		10
61	198420	198430	15		1.5		10
62	198430	198440	15		1.5		10
63	198440	198450	15		1.5		10
64	198450	198460	15		1.5		10
65	198460	198470	15		1.5		10
66	198470	198480	15		1.5		10
67	198630	198640	15		1.5		10
68	198640	198650	15		1.5		10
69	198800	198810	15		1.5		10
70	198860	198870	15		1.5		10
71	198890	198900	15		1.5		10
72	198900	198910	15		1.5		10
73	198910	198920	15		1.5		10
74	198920	198930	15		1.5		10
75	198930	198940	15		1.5		10
76	198940	198950	15		1.5		10
77	198950	198960	15		1.5		10
78	198980	198990	15		1.5		10
79	198990	199000	15		1.5		10
80	199000	199010	15		1.5		10
81	199010	199020	15		1.5		10
82	199020	199030	15		1.5		10
83	199030	199040	15		1.5		10
84	199040	199050	15		1.5		10
85	199050	199060	15		1.5		10
86	199060	199070	15		1.5		10
87	199090	199100	15		1.5		10
88	199100	199110	15		1.5		10
89	199110	199120	15		1.5		10
90	199120	199130	15		1.5		10
91	199230	199240	18		1.5		10
92	199910	199920	15		1.5		10
93	199920	199930	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
94	200050	200060	15		1.5		10
95	200060	200070	15		1.5		10
96	200140	200150	15		1.5		10
97	200150	200160	15		1.5		10
98	200160	200170	15		1.5		10
99	200170	200180	15		1.5		10
100	200180	200190	15		1.5		10
101	200290	200300	15		1.5		10
102	200390	200400	15		1.5		10
103	200970	200980	15		1.5		10
104	200980	200990	15		1.5		10
105	200990	201000	15		1.5		10
106	201000	201010	15		1.5		10
107	201010	201020	15		1.5		10
108	201020	201030	15		1.5		10
109	201030	201040	15		1.5		10
110	201040	201050	15		1.5		10
111	201050	201060	15		1.5		10
112	201900	201910	15		1.5		10
113	201910	201920	15		1.5		10
114	201920	201930	15		1.5		10
115	202130	202140	15		1.5		10
116	202380	202390	15		1.5		10
117	202390	202400	15		1.5		10
118	202400	202410	15		1.5		10
119	202410	202420	15		1.5		10
120	202420	202430	15		1.5		10
121	202430	202440	15		1.5		10
122	202440	202450	15		1.5		10
123	202470	202480	15		1.5		10
124	202480	202490	15		1.5		10
125	202490	202500	15		1.5		10
126	202500	202510	15		1.5		10
127	202510	202520	15		1.5		10
128	202520	202530	15		1.5		10
129	202530	202540	15		1.5		10
130	202540	202550	15		1.5		10
131	202550	202560	14		1.5		10
132	202560	202570	14		1.5		10
133	202570	202580	14		1.5		10
134	202580	202590	14		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
135	202590	202600	14		1.5		10
136	202600	202610	15		1.5		10
137	202610	202620	15		1.5		10
138	202620	202630	15		1.5		10
139	202630	202640	15		1.5		10
140	202640	202650	15		1.5		10
141	202650	202660	15		1.5		10
142	202660	202670	15		1.5		10
143	202750	202760	15		1.5		10
144	202760	202770	15		1.5		10
145	202770	202780	15		1.5		10
146	202780	202790	15		1.5		10
147	202830	202840	16		1.5		10
148	202840	202850	16	1.5	1.5	10	10
149	202910	202920	16		1.5		10
150	202920	202930	15		1.5		10
151	202930	202940	15		1.5		10
152	202940	202950	15		1.5		10
153	202950	202960	15		1.5		10
154	202960	202970	15		1.5		10
155	202970	202980	15		1.5		10
156	202980	202990	15		1.5		10
157	202990	203000	15		1.5		10
158	203000	203010	15		1.5		10
159	203010	203020	15		1.5		10
160	203020	203030	15		1.5		10
161	203030	203040	15		1.5		10
162	203040	203050	15		1.5		10
163	203050	203060	15		1.5		10
164	203060	203070	15		1.5		10
165	203070	203080	15		1.5		10
166	203080	203090	15		1.5		10
167	203130	203140	14		1.5		10
168	203140	203150	14		1.5		10
169	203150	203160	14		1.5		10
170	203160	203170	14		1.5		10
171	203170	203180	14		1.5		10
172	203180	203190	14		1.5		10
173	203190	203200	14		1.5		10
174	203200	203210	14		1.5		10
175	203210	203220	14		1.5		10
176	203220	203230	14		1.5		10
177	203280	203290	15		1.5		10
178	203290	203300	15		1.5		10
179	203300	203310	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
180	203310	203320	15		1.5		10
181	203320	203330	15		1.5		10
182	203420	203430	15		1.5		10
183	203430	203440	15		1.5		10
184	203440	203450	15		1.5		10
185	203560	203570	15		1.5		10
186	203570	203580	15		1.5		10
187	203580	203590	15		1.5		10
188	203590	203600	15		1.5		10
189	203600	203610	15		1.5		10
190	203690	203700	15		1.5		10
191	203700	203710	15		1.5		10
192	203710	203720	15		1.5		10
193	203750	203760	15		1.5		10
194	203760	203770	15		1.5		10
195	203950	203960	15		1.5		10
196	203960	203970	15		1.5		10
197	203970	203980	15		1.5		10
198	203980	203990	15		1.5		10
199	203990	204000	15		1.5		10
200	204000	204010	15		1.5		10
201	204040	204050	15		1.5		10
202	204050	204060	15		1.5		10
203	204060	204070	15		1.5		10
204	204070	204080	15		1.5		10
205	204110	204120	15		1.5		10
206	204120	204130	15		1.5		10
207	204130	204140	15		1.5		10
208	204140	204150	15		1.5		10
209	204150	204160	15		1.5		10
210	204160	204170	16		1.5		10
211	204170	204180	16	1.5	1.5	10	10
212	204310	204320	15		1.5		10
213	204320	204330	15		1.5		10
214	204440	204450	15		1.5		10
215	204490	204500	15		1.5		10
216	204500	204510	15		1.5		10
217	204510	204520	15		1.5		10
218	204620	204630	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
219	204630	204640	15		1.5		10
220	204640	204650	15		1.5		10
221	204650	204660	15		1.5		10
222	204660	204670	15		1.5		10
223	204700	204710	15		1.5		10
224	204710	204720	15		1.5		10
225	204720	204730	15		1.5		10
226	204730	204740	15		1.5		10
227	204740	204750	15		1.5		10
228	204750	204760	15		1.5		10
229	204760	204770	15		1.5		10
230	204830	204840	15		1.5		10
231	204840	204850	15		1.5		10
232	204850	204860	15		1.5		10
233	204860	204870	15		1.5		10
234	204870	204880	15		1.5		10
235	204880	204890	15		1.5		10
236	204890	204900	15		1.5		10
237	204900	204910	15		1.5		10
238	204910	204920	15		1.5		10
239	205080	205090	15		1.5		10
240	205090	205100	15		1.5		10
241	205100	205110	15		1.5		10
242	205110	205120	15		1.5		10
243	205120	205130	15		1.5		10
244	205130	205140	15		1.5		10
245	205210	205220	15		1.5		10
246	205220	205230	15		1.5		10
247	205240	205250	15		1.5		10
248	205250	205260	15		1.5		10
249	205260	205270	15		1.5		10
250	205270	205280	15		1.5		10
251	205280	205290	15		1.5		10
252	205290	205300	15		1.5		10
253	205300	205310	15		1.5		10
254	205310	205320	15		1.5		10
255	205320	205330	15		1.5		10
256	205330	205340	15		1.5		10
257	205340	205350	15		1.5		10
258	205350	205360	15		1.5		10
259	205360	205370	15		1.5		10
260	205370	205380	15		1.5		10
261	205380	205390	15		1.5		10
262	205390	205400	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
263	205450	205460	15		1.5		10
264	205470	205480	14		1.5		10
265	205510	205520	14		1.5		10
266	205520	205530	14		1.5		10
267	205530	205540	14		1.5		10
268	205540	205550	15		1.5		10
269	205580	205590	15		1.5		10
270	205590	205600	15		1.5		10
271	205600	205610	15		1.5		10
272	205610	205620	15		1.5		10
273	205620	205630	15		1.5		10
274	205630	205640	15		1.5		10
275	205710	205720	15		1.5		10
276	205720	205730	15		1.5		10
277	205730	205740	15		1.5		10
278	205770	205780	15		1.5		10
279	205780	205790	15		1.5		10
280	205790	205800	15		1.5		10
281	205800	205810	15		1.5		10
282	205840	205850	15		1.5		10
283	205850	205860	15		1.5		10
284	205860	205870	15		1.5		10
285	205870	205880	15		1.5		10
286	205880	205890	15		1.5		10
287	205890	205900	15		1.5		10
288	206050	206060	15		1.5		10
289	206110	206120	14		1.5		10
290	206170	206180	15		1.5		10
291	206180	206190	15		1.5		10
292	206190	206200	15		1.5		10
293	206200	206210	15		1.5		10
294	206220	206230	15		1.5		10
295	206230	206240	15		1.5		10
296	206240	206250	15		1.5		10
297	206270	206280	15		1.5		10
298	206280	206290	15		1.5		10
299	206290	206300	15		1.5		10
300	206300	206310	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
301	206330	206340	15		1.5		10
302	206340	206350	15		1.5		10
303	206350	206360	15		1.5		10
304	206360	206370	15		1.5		10
305	206370	206380	15		1.5		10
306	206380	206390	15		1.5		10
307	206390	206400	15		1.5		10
308	206400	206410	15		1.5		10
309	206410	206420	15		1.5		10
310	206420	206430	15		1.5		10
311	206430	206440	15		1.5		10
312	206440	206450	14		1.5		10
313	206450	206460	14		1.5		10
314	206460	206470	14		1.5		10
315	206470	206480	14		1.5		10
316	206480	206490	14		1.5		10
317	206490	206500	14		1.5		10
318	206500	206510	14		1.5		10
319	206510	206520	14		1.5		10
320	206520	206530	14		1.5		10
321	206540	206550	14		1.5		10
322	206550	206560	14		1.5		10
323	206560	206570	14		1.5		10
324	206570	206580	14		1.5		10
325	206590	206600	14		1.5		10
326	206600	206610	14		1.5		10
327	206610	206620	14		1.5		10
328	206620	206630	14		1.5		10
329	206630	206640	14		1.5		10
330	206640	206650	14		1.5		10
331	207100	207110	15		1.5		10
332	207110	207120	15		1.5		10
333	207120	207130	15		1.5		10
334	207130	207140	15		1.5		10
335	207140	207150	15		1.5		10
336	207240	207250	15		1.5		10
337	207270	207280	15		1.5		10
338	207280	207290	15		1.5		10
339	207290	207300	15		1.5		10
340	207340	207350	15		1.5		10
341	207350	207360	15		1.5		10
342	207360	207370	15		1.5		10
343	207370	207380	15		1.5		10
344	207380	207390	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
345	207490	207500	15		1.5		10
346	207500	207510	15		1.5		10
347	207510	207520	15		1.5		10
348	207520	207530	15		1.5		10
349	207550	207560	15		1.5		10
350	207580	207590	15		1.5		10
351	207590	207600	15		1.5		10
352	207770	207780	15		1.5		10
353	207780	207790	15		1.5		10
354	207820	207830	15		1.5		10
355	207860	207870	15		1.5		10
356	207870	207880	15		1.5		10
357	207880	207890	15		1.5		10
358	207890	207900	15		1.5		10
359	207900	207910	15		1.5		10
360	207910	207920	15		1.5		10
361	207920	207930	15		1.5		10
362	207930	207940	15		1.5		10
363	207940	207950	15		1.5		10
364	208150	208160	15		1.5		10
365	208160	208170	15		1.5		10
366	208170	208180	15		1.5		10
367	208180	208190	15		1.5		10
368	208190	208200	15		1.5		10
369	208390	208400	15		1.5		10
370	208400	208410	15		1.5		10
371	208480	208490	14		1.5		10
372	208490	208500	14		1.5		10
373	208500	208510	14		1.5		10
374	208510	208520	14		1.5		10
375	208520	208530	15		1.5		10
376	208530	208540	15		1.5		10
377	208540	208550	15		1.5		10
378	208560	208570	14		1.5		10
379	208570	208580	14		1.5		10
380	208620	208630	14		1.5		10
381	208630	208640	14		1.5		10
382	208640	208650	14		1.5		10
383	208650	208660	14		1.5		10
384	208910	208920	18		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
385	209100	209110	20		1.5		10
386	209110	209120	20		1.5		10
387	209330	209340	18		1.5		10
388	209360	209370	18		1.5		10
389	209370	209380	18		1.5		10
390	209530	209540	15		1.5		10
391	209540	209550	15		1.5		10
392	209550	209560	15		1.5		10
393	209560	209570	15		1.5		10
394	209570	209580	15		1.5		10
395	209580	209590	15		1.5		10
396	209590	209600	15		1.5		10
397	209830	209840	15		1.5		10
398	209840	209850	15		1.5		10
399	209850	209860	15		1.5		10
400	209860	209870	15		1.5		10
401	209870	209880	15		1.5		10
402	209880	209890	15		1.5		10
403	209890	209900	15		1.5		10
404	209900	209910	15		1.5		10
405	209910	209920	15		1.5		10
406	209920	209930	15		1.5		10
407	209930	209940	15		1.5		10
408	209940	209950	14		1.5		10
409	209950	209960	14		1.5		10
410	209960	209970	14		1.5		10
411	209970	209980	14		1.5		10
412	209980	209990	14		1.5		10
413	209990	210000	14		1.5		10
414	210000	210010	14		1.5		10
415	210010	210020	14		1.5		10
416	210020	210030	14		1.5		10
417	210030	210040	14		1.5		10
418	210040	210050	14		1.5		10
419	210050	210060	14		1.5		10
420	210060	210070	14		1.5		10
421	210070	210080	14		1.5		10
422	210080	210090	14		1.5		10
423	210090	210100	14		1.5		10
424	210100	210110	14		1.5		10
425	210110	210120	14		1.5		10
426	210450	210460	15		1.5		10
427	210460	210470	15		1.5		10
428	210470	210480	15		1.5		10
429	210480	210490	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
430	210490	210500	15		1.5		10
431	210500	210510	15		1.5		10
432	210510	210520	15		1.5		10
433	210520	210530	15		1.5		10
434	210530	210540	15		1.5		10
435	210540	210550	15		1.5		10
436	210550	210560	15		1.5		10
437	210560	210570	15		1.5		10
438	210740	210750	15		1.5		10
439	210750	210760	15		1.5		10
440	210760	210770	15		1.5		10
441	210770	210780	15		1.5		10
442	210780	210790	15		1.5		10
443	210840	210850	15		1.5		10
444	210850	210860	15		1.5		10
445	210860	210870	15		1.5		10
446	210970	210980	15		1.5		10
447	210980	210990	15		1.5		10
448	210990	211000	15		1.5		10
449	211000	211010	15		1.5		10
450	211010	211020	15		1.5		10
451	211020	211030	15		1.5		10
452	211030	211040	15		1.5		10
453	211040	211050	15		1.5		10
454	211050	211060	15		1.5		10
455	211060	211070	15		1.5		10
456	211070	211080	15		1.5		10
457	211080	211090	15		1.5		10
458	211090	211100	15		1.5		10
459	211100	211110	15		1.5		10
460	211110	211120	15		1.5		10
461	211120	211130	15		1.5		10
462	211130	211140	15		1.5		10
463	211140	211150	15		1.5		10
464	211150	211160	15		1.5		10
465	211160	211170	15		1.5		10
466	211210	211220	15		1.5		10
467	211220	211230	15		1.5		10
468	211230	211240	15		1.5		10
469	211240	211250	15		1.5		10
470	211250	211260	15		1.5		10
471	211260	211270	15		1.5		10
472	211270	211280	15		1.5		10
473	211280	211290	15		1.5		10
474	211290	211300	15		1.5		10
475	211300	211310	15		1.5		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
476	211310	211320	15		1.5		10
477	211320	211330	15		1.5		10
478	211330	211340	15		1.5		10
479	211340	211350	15		1.5		10
480	211350	211360	15		1.5		10
481	211360	211370	15		1.5		10
482	211370	211380	15		1.5		10
483	211390	211400	15		1.5		10
484	211400	211410	15		1.5		10
485	211410	211420	15		1.5		10
486	211430	211440	15		1.5		10
487	211440	211450	15		1.5		10
488	211450	211460	15		1.5		10
489	211460	211470	15		1.5		10
490	211470	211480	15		1.5		10
491	211480	211490	15		1.5		10
492	211510	211520	15		1.5		10
493	211520	211530	15		1.5		10
494	211530	211540	15		1.5		10
495	211540	211550	15		1.5		10
496	211550	211560	15		1.5		10
497	211560	211570	15		1.5		10
498	211570	211580	15		1.5		10
499	211580	211590	15		1.5		10
500	211590	211600	15		1.5		10
501	211600	211610	15		1.5		10
502	211610	211620	15		1.5		10
503	211620	211630	15		1.5		10
504	211630	211640	15		1.5		10
505	211690	211700	15		1.5		10
2.0m height Breast Wall							
1	195430	195440	18		2		10
2	195670	195680	18		2		10
3	195820	195830	18		2		10
4	196390	196400	18		2		10
5	197350	197360	18		2		10
6	197370	197380	18		2		10
7	199740	199750	18		2		10
8	208860	208870	18		2		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
9	208960	208970	18		2		10
10	209120	209130	20		2		10
11	209340	209350	18		2		10
12	209350	209360	18		2		10
13	209380	209390	18		2		10
14	209390	209400	18		2		10
2.5m height Breast Wall							
1	195150	195160	18		2.5		10
2	195160	195170	18		2.5		10
3	195440	195450	18		2.5		10
4	195470	195480	18		2.5		10
5	195540	195550	18		2.5		10
6	195810	195820	18		2.5		10
7							
8	196220	196230	18		2.5		10
9	196330	196340	18		2.5		10
10	197020	197030	18		2.5		10
11	197270	197280	18		2.5		10
12	197320	197330	18		2.5		10
13	197360	197370	18		2.5		10
14	208810	208820	18		2.5		10
15	208850	208860	18		2.5		10
16	208930	208940	18		2.5		10
17	209400	209410	18		2.5		10
3.0m height Breast Wall							
18	193400	193410	15		3		10
19	193410	193420	15		3		10
20	193420	193430	15		3		10
21	193430	193440	15		3		10
22	193600	193610	15		3		10
23	193610	193620	15		3		10
24	193620	193630	15		3		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
25	193630	193640	14		3		10
26	193640	193650	14		3		10
27	193650	193660	14		3		10
28	193660	193670	14		3		10
29	198810	198820	15		3		10
30	200070	200080	15		3		10
31	200080	200090	15		3		10
32	200090	200100	15		3		10
33	200120	200130	15		3		10
34	200300	200310	15		3		10
35	200310	200320	15		3		10
36	200340	200350	15		3		10
37	200350	200360	15		3		10
38	200360	200370	15		3		10
39	200370	200380	15		3		10
40	200380	200390	15		3		10
41	201930	201940	15		3		10
42	201940	201950	15		3		10
43	201950	201960	15		3		10
44	201960	201970	15		3		10
45	201970	201980	15		3		10
46	201990	202000	15		3		10
47	202000	202010	15		3		10
48	202030	202040	15		3		10
49	202040	202050	15		3		10
50	202140	202150	15		3		10
51	202150	202160	15		3		10
52	202160	202170	15		3		10
53	202850	202860	16	1.5	3	10	10
54	202860	202870	16	1.5	3	10	10
55	202870	202880	16	1.5	3	10	10
56	202880	202890	16	1.5	3	10	10
57	202890	202900	16	1.5	3	10	10
58	202900	202910	16	1.5	3	10	10
59	203550	203560	15		3		10
60	203730	203740	15		3		10
61	203740	203750	15		3		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
62	203910	203920	15		3		10
63	203920	203930	15		3		10
64	203930	203940	15		3		10
65	203940	203950	15		3		10
66	204080	204090	15		3		10
67	204090	204100	15		3		10
68	204100	204110	15		3		10
69	204180	204190	16	1.5	3	10	10
70	204190	204200	16	1.5	3	10	10
71	204200	204210	16	1.5	3	10	10
72	204210	204220	16	1.5	3	10	10
73	204220	204230	16	1.5	3	10	10
74	204230	204240	16	1.5	3	10	10
75	204240	204250	16	1.5	3	10	10
76	204250	204260	16	1.5	3	10	10
77	204260	204270	16	1.5	3	10	10
78	204330	204340	15		3		10
79	204340	204350	15		3		10
80	204350	204360	15		3		10
81	204360	204370	15		3		10
82	204370	204380	15		3		10
83	204380	204390	15		3		10
84	204390	204400	15		3		10
85	204400	204410	15		3		10
86	204410	204420	15		3		10
87	204420	204430	15		3		10
88	204430	204440	15		3		10
89	204690	204700	15		3		10
90	205460	205470	15		3		10
91	205490	205500	14		3		10
92	205500	205510	14		3		10
93	206060	206070	15		3		10
94	206120	206130	14		3		10
95	206150	206160	14		3		10
96	206160	206170	15		3		10
97	206210	206220	15		3		10
98	207300	207310	15		3		10
99	207310	207320	15		3		10
100	207320	207330	15		3		10

S. No.	Design Chainage (Km)		TCS Type	Height of Breast Wall (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
101	207330	207340	15		3		10
102	207600	207610	15		3		10
103	207610	207620	15		3		10
104	207620	207630	15		3		10
105	207640	207650	15		3		10
106	207650	207660	15		3		10
107	207790	207800	15		3		10
108	207800	207810	15		3		10
109	207810	207820	15		3		10
110	208200	208210	15		3		10
111	208210	208220	15		3		10
112	208220	208230	15		3		10
113	208230	208240	14		3		10
114	208240	208250	14		3		10
115	208250	208260	14		3		10
116	208410	208420	15		3		10
117	208420	208430	14		3		10
118	208430	208440	14		3		10
119	208440	208450	14		3		10
120	208450	208460	14		3		10
121	208460	208470	14		3		10
122	208470	208480	14		3		10
123	208580	208590	14		3		10
124	208590	208600	14		3		10
125	208600	208610	14		3		10
126	208610	208620	14		3		10
127	211420	211430	15		3		10
128	211640	211650	15		3		10
129	211650	211660	15		3		10
130	211660	211670	15		3		10
131	211670	211680	15		3		10
132	211680	211690	15		3		10

b) The RCC Breast Wall shall be provided towards hill side in urban area/ built up locations at the following locations:

S. No	CHAINAGE		TCS	Height (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	195140	195150	18	0	5		10
2	195450	195460	18	0	3		10

S. No	CHAINAGE		TCS	Height (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
3	195460	195470	18	0	3		10
4	195550	195560	18	0	3		10
5	195560	195570	18	0	4		10
6	195570	195580	18	0	4.5		10
7	195660	195670	18	0	3.5		10
8	195690	195700	18	0	3		10
9	195830	195840	18	0	6		10
10	196150	196160	18	0	3.5		10
11	196320	196330	18	0	4		10
12	196340	196350	18	0	4		10
13	196350	196360	18	0	5.5		10
14	196360	196370	18	0	5.5		10
15	196370	196380	18	0	3.5		10
16	196380	196390	18	0	3.5		10
17	196400	196410	18	0	3		10
18	196410	196420	18	0	3.5		10
19	196420	196430	18	0	3		10
20	197010	197020	18	0	3		10
21	197070	197080	18	0	4		10
22	197080	197090	18	0	5.5		10
23	197090	197100	18	0	3.5		10
24	197200	197210	18	0	3		10
25	197210	197220	18	0	4		10
26	197220	197230	18	0	3		10
27	197280	197290	18	0	4.5		10
28	197290	197300	18	0	6		10
29	197300	197310	18	0	5		10
30	197310	197320	18	0	5		10
31	199750	199760	18	0	4.5		10
32	199760	199770	18	0	6		10
33	199770	199780	18	0	6		10
34	199780	199790	18	0	6		10
35	199790	199800	18	0	6		10
36	208820	208830	18	0	3.5		10
37	208830	208840	18	0	4		10
38	208840	208850	18	0	3		10

S. No	CHAINAGE		TCS	Height (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
39	208920	208930	18	0	3.5		10
40	208940	208950	18	0	3		10
41	208950	208960	18	0	3		10
42	209410	209420	18	0	4		10
43	209420	209430	18	0	5		10
44	209430	209440	18	0	6		10
45	209440	209450	18	0	5		10
46	209450	209460	18	0	4		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 of Toe walls and their height are as below:

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	193+285	193+290	TCS - 22	1		5	
2	193+290	193+300	TCS - 22	1.2		10	
3	193+300	193+310	TCS - 15	2		10	
4	193+310	193+320	TCS - 15	2		10	
5	193+320	193+330	TCS - 15	1.4		10	
6	193+330	193+340	TCS - 15	1.3		10	
7	193+340	193+350	TCS - 15	1.1		10	
8	193+350	193+360	TCS - 15	0.9		10	
9	193+425	193+430	TCS - 15	1		5	
10	193+430	193+440	TCS - 15	1.1		10	
11	193+570	193+580	TCS - 15	1		10	
12	193+580	193+590	TCS - 15	0.7		10	
13	193+590	193+600	TCS - 15	0.7		10	
14	193+840	193+850	TCS - 22	1		10	
15	193+850	193+860	TCS - 22	0.9		10	
16	193+860	193+870	TCS - 22	1.2		10	
17	193+870	193+880	TCS - 15	1.1		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
18	193+880	193+890	TCS - 15	0.7		10	
19	193+890	193+900	TCS - 15	0.8		10	
20	194+220	194+230	TCS - 15	0.9		10	
21	194+230	194+240	TCS - 15	0.8		10	
22	194+240	194+250	TCS - 15	0.6		10	
23	194+250	194+260	TCS - 15	2		10	
24	194+260	194+270	TCS - 15	1.7		10	
25	194+270	194+280	TCS - 15	2		10	
26	194+280	194+290	TCS - 15	0.8		10	
27	194+290	194+300	TCS - 15	0.6		10	
28	194+300	194+310	TCS - 15	0.5		10	
29	194+310	194+320	TCS - 15	0.8		10	
30	195+170	195+180	TCS - 26	0.5		10	
31	195+180	195+190	TCS - 26	0.5		10	
32	195+190	195+200	TCS - 26	1.3		10	
33	195+200	195+210	TCS - 26	0.7		10	
34	195+210	195+220	TCS - 26	1		10	
35	195+220	195+230	TCS - 26	1.3		10	
36	195+230	195+240	TCS - 26	1.1		10	
37	195+240	195+250	TCS - 26	0.9		10	
38	195+250	195+260	TCS - 26	0.6		10	
39	195+260	195+270	TCS - 26	1.3		10	
40	195+270	195+280	TCS - 26	1.9		10	
41	195+280	195+290	TCS - 26	1.7		10	
42	195+290	195+300	TCS - 26	1.6		10	
43	195+300	195+310	TCS - 26	1.1		10	
44	195+310	195+320	TCS - 26	0.6		10	
45	195+320	195+330	TCS - 26	0.6		10	
46	195+330	195+340	TCS - 26	0.6		10	
47	195+340	195+350	TCS - 26	0.5		10	
48	195+350	195+360	TCS - 26	0.9		10	
49	195+360	195+370	TCS - 26	1.3		10	
50	195+410	195+420	TCS - 26	1.6		10	
51	195+420	195+430	TCS - 26	1		10	
52	195+430	195+440	TCS - 18	0.6		10	
53	195+440	195+450	TCS - 18	0.8		10	
54	195+450	195+460	TCS - 18	0.8		10	
55	195+460	195+470	TCS - 18	1.5		10	
56	195+470	195+480	TCS - 18	1.2		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
57	195+480	195+490	TCS - 18	1		10	
58	195+490	195+500	TCS - 26	0.7		10	
59	195+500	195+510	TCS - 26	0.8		10	
60	195+510	195+520	TCS - 26	0.6		10	
61	195+520	195+530	TCS - 26	1.4		10	
62	195+530	195+540	TCS - 26	0.8		10	
63	195+605	195+610	TCS - 26	0.5		5	
64	195+610	195+620	TCS - 26	0.5		10	
65	195+650	195+660	TCS - 26	2		10	
66	195+660	195+670	TCS - 18	1.4		10	
67	195+670	195+680	TCS - 18	0.8		10	
68	195+680	195+690	TCS - 18	1.2		10	
69	195+690	195+700	TCS - 18	1.3		10	
70	195+700	195+710	TCS - 26	0.5		10	
71	195+710	195+720	TCS - 26	0.5		10	
72	195+720	195+730	TCS - 26	0.5		10	
73	195+760	195+770	TCS - 26	1.3		10	
74	195+770	195+780	TCS - 26	0.5		10	
75	195+780	195+790	TCS - 26	0.5		10	
76	195+790	195+800	TCS - 26	0.5		10	
77	195+800	195+810	TCS - 18	0.5		10	
78	195+810	195+820	TCS - 18	0.5		10	
79	195+820	195+830	TCS - 18	0.5		10	
80	195+830	195+840	TCS - 18	0.5		10	
81	195+840	195+850	TCS - 26	0.5		10	
82	195+850	195+860	TCS - 26	0.5		10	
83	195+860	195+870	TCS - 26	0.6		10	
84	195+870	195+880	TCS - 26	0.5		10	
85	195+880	195+890	TCS - 26	0.5		10	
86	195+890	195+900	TCS - 26	0.5		10	
87	195+900	195+910	TCS - 26	0.5		10	
88	195+910	195+920	TCS - 26	0.5		10	
89	195+920	195+930	TCS - 26	0.5		10	
90	195+930	195+940	TCS - 26	0.8		10	
91	195+940	195+950	TCS - 26	0.9		10	
92	195+950	195+960	TCS - 26	1.1		10	
93	195+960	195+970	TCS - 26	1		10	
94	195+970	195+980	TCS - 26	0.9		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
95	196+040	196+050	TCS - 26	1.1		10	
96	196+050	196+060	TCS - 26	1.3		10	
97	196+060	196+070	TCS - 26	1.1		10	
98	196+070	196+080	TCS - 26	0.6		10	
99	196+080	196+090	TCS - 26	1.3		10	
100	196+090	196+100	TCS - 26	1.6		10	
101	196+100	196+110	TCS - 26	1.3		10	
102	196+110	196+120	TCS - 26	1.2		10	
103	196+120	196+130	TCS - 18	1.2		10	
104	196+130	196+140	TCS - 18	0.9		10	
105	196+140	196+150	TCS - 18	0.5		10	
106	196+150	196+160	TCS - 18	1.2		10	
107	196+160	196+170	TCS - 18	0.9		10	
108	196+170	196+180	TCS - 18	1.8		10	
109	196+180	196+190	TCS - 18	1.6		10	
110	196+190	196+200	TCS - 18	1.6		10	
111	196+200	196+210	TCS - 18	1.3		10	
112	196+210	196+220	TCS - 18	0.6		10	
113	196+220	196+230	TCS - 18	0.7		10	
114	196+230	196+240	TCS - 18	0.6		10	
115	196+240	196+250	TCS - 26	0.8		10	
116	196+250	196+260	TCS - 26	0.6		10	
117	196+260	196+270	TCS - 26	0.6		10	
118	196+270	196+280	TCS - 26	0.5		10	
119	196+280	196+290	TCS - 26	0.5		10	
120	196+290	196+300	TCS - 26	0.5		10	
121	196+300	196+310	TCS - 26	0.5		10	
122	196+310	196+320	TCS - 18	0.5		10	
123	196+320	196+330	TCS - 18	0.5		10	
124	196+330	196+340	TCS - 18	0.5		10	
125	196+340	196+350	TCS - 18	1.9		10	
126	196+380	196+390	TCS - 18	1.8		10	
127	196+390	196+400	TCS - 18	0.9		10	
128	196+400	196+410	TCS - 18	1		10	
129	196+410	196+420	TCS - 18	0.6		10	
130	196+420	196+430	TCS - 18	0.6		10	
131	196+430	196+440	TCS - 26	0.6		10	
132	196+440	196+450	TCS - 26	0.6		10	
133	196+480	196+490	TCS - 26	1.2		10	
134	196+490	196+500	TCS - 18	0.6		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
135	196+500	196+510	TCS - 18	0.7		10	
136	196+510	196+520	TCS - 18	0.6		10	
137	196+520	196+530	TCS - 18	0.8		10	
138	196+530	196+540	TCS - 18	0.7		10	
139	196+540	196+550	TCS - 26	0.6		10	
140	196+550	196+560	TCS - 26	0.5		10	
141	196+560	196+570	TCS - 26	1		10	
142	196+570	196+580	TCS - 26	1.5		10	
143	196+580	196+590	TCS - 26	1.7		10	
144	196+590	196+600	TCS - 26	1.7		10	
145	196+600	196+610	TCS - 26	1.2		10	
146	196+610	196+620	TCS - 26	0.7		10	
147	196+620	196+630	TCS - 26	0.6		10	
148	196+630	196+640	TCS - 26	0.8		10	
149	196+640	196+650	TCS - 26	0.9		10	
150	196+650	196+660	TCS - 26	1.6		10	
151	196+660	196+670	TCS - 26	1.1		10	
152	196+670	196+680	TCS - 26	0.7		10	
153	196+680	196+690	TCS - 26	0.5		10	
154	196+690	196+700	TCS - 26	0.5		10	
155	196+700	196+710	TCS - 26	0.7		10	
156	196+710	196+720	TCS - 26	0.9		10	
157	196+720	196+730	TCS - 26	1.8		10	
158	196+730	196+740	TCS - 26	1.7		10	
159	196+740	196+750	TCS - 26	0.9		10	
160	196+750	196+760	TCS - 26	0.6		10	
161	196+760	196+770	TCS - 26	0.7		10	
162	196+770	196+780	TCS - 26	0.8		10	
163	196+780	196+790	TCS - 26	0.6		10	
164	196+790	196+800	TCS - 26	0.9		10	
165	196+800	196+810	TCS - 26	2		10	
166	196+810	196+820	TCS - 26	2		10	
167	196+960	196+970	TCS - 26	0.6		10	
168	196+970	196+980	TCS - 26	0.5		10	
169	196+980	196+990	TCS - 26	1.5		10	
170	196+990	197+000	TCS - 26	1.1		10	
171	197+000	197+010	TCS - 18	1.2		10	
172	197+010	197+020	TCS - 18	1.2		10	
173	197+020	197+030	TCS - 18	1.1		10	
174	197+030	197+040	TCS - 18	1.1		10	
175	197+040	197+050	TCS - 18	1.1		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
176	197+050	197+060	TCS - 18	1.1		10	
177	197+060	197+070	TCS - 18	0.9		10	
178	197+070	197+080	TCS - 18	0.6		10	
179	197+080	197+090	TCS - 18	0.6		10	
180	197+090	197+100	TCS - 18	0.7		10	
181	197+100	197+110	TCS - 18	0.7		10	
182	197+110	197+120	TCS - 26	1.9		10	
183	197+120	197+130	TCS - 26	0.6		10	
184	197+130	197+140	TCS - 26	0.6		10	
185	197+140	197+150	TCS - 26	0.9		10	
186	197+150	197+160	TCS - 26	1.1		10	
187	197+190	197+200	TCS - 18	0.6		10	
188	197+200	197+210	TCS - 18	0.6		10	
189	197+210	197+220	TCS - 18	0.6		10	
190	197+220	197+230	TCS - 18	1.6		10	
191	197+230	197+240	TCS - 18	2		10	
192	197+240	197+250	TCS - 18	2		10	
193	197+250	197+260	TCS - 18	0.9		10	
194	197+260	197+270	TCS - 18	0.7		10	
195	197+270	197+280	TCS - 18	0.5		10	
196	197+280	197+290	TCS - 18	0.6		10	
197	197+290	197+300	TCS - 18	0.5		10	
198	197+300	197+310	TCS - 18	0.5		10	
199	197+310	197+320	TCS - 18	0.5		10	
200	197+320	197+330	TCS - 18	0.5		10	
201	197+330	197+345	TCS - 18	0.7		15	
202	197+440	197+450	TCS - 26	0.5		10	
203	197+450	197+460	TCS - 26	0.5		10	
204	197+460	197+470	TCS - 26	0.5		10	
205	197+470	197+480	TCS - 26	0.5		10	
206	197+480	197+490	TCS - 26	0.5		10	
207	197+490	197+500	TCS - 26	0.5		10	
208	197+500	197+510	TCS - 26	0.5		10	
209	197+510	197+520	TCS - 26	0.6		10	
210	197+520	197+530	TCS - 26	0.6		10	
211	197+530	197+540	TCS - 26	0.9		10	
212	197+540	197+550	TCS - 26	1.3		10	
213	197+550	197+560	TCS - 26	1.9		10	
214	197+590	197+600	TCS - 26	1.1		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
215	197+600	197+610	TCS - 22	0.5		10	
216	197+610	197+620	TCS - 22	0.5		10	
217	197+790	197+800	TCS - 15	0.5		10	
218	197+800	197+810	TCS - 15	0.5		10	
219	197+930	197+940	TCS - 15	0.9		10	
220	197+940	197+950	TCS - 15	0.7		10	
221	197+950	197+960	TCS - 15	1		10	
222	197+960	197+970	TCS - 22	2		10	
223	197+970	197+980	TCS - 22	1.3		10	
224	197+980	197+990	TCS - 22	2		10	
225	197+990	198+000	TCS - 22	2		10	
226	198+000	198+010	TCS - 22	0.7		10	
227	198+010	198+020	TCS - 22	0.6		10	
228	198+020	198+030	TCS - 22	0.5		10	
229	198+030	198+040	TCS - 22	0.5		10	
230	198+040	198+050	TCS - 22	0.5		10	
231	198+050	198+060	TCS - 22	0.5		10	
232	198+135	198+150	TCS - 15	0.5		15	
233	198+150	198+160	TCS - 15	1.3		10	
234	198+205	198+210	TCS - 15	0.5		5	
235	198+210	198+225	TCS - 15	0.5		15	
236	198+265	198+270	TCS - 15	0.5		5	
237	198+300	198+310	TCS - 15	1.4		10	
238	198+310	198+320	TCS - 15	1.1		10	
239	198+320	198+330	TCS - 15	0.9		10	
240	198+330	198+340	TCS - 15	0.9		10	
241	198+340	198+350	TCS - 15	0.8		10	
242	198+350	198+360	TCS - 15	0.5		10	
243	198+360	198+370	TCS - 15	0.5		10	
244	198+370	198+380	TCS - 22	0.8		10	
245	198+380	198+390	TCS - 22	1		10	
246	198+390	198+400	TCS - 22	1.6		10	
247	198+400	198+410	TCS - 22	2		10	
248	198+410	198+420	TCS - 15	2		10	
249	198+420	198+430	TCS - 15	0.5		10	
250	198+430	198+440	TCS - 15	0.5		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
251	198+440	198+450	TCS - 15	0.5		10	
252	198+450	198+460	TCS - 15	0.5		10	
253	198+525	198+530	TCS - 22	0.5		5	
254	198+530	198+540	TCS - 22	0.9		10	
255	198+540	198+550	TCS - 22	0.6		10	
256	198+550	198+560	TCS - 22	1.5		10	
257	198+640	198+650	TCS - 15	0.5		10	
258	198+650	198+660	TCS - 15	0.5		10	
259	198+740	198+750	TCS - 21	0.5		10	
260	198+750	198+760	TCS - 21	0.5		10	
261	198+760	198+770	TCS - 21	0.9		10	
262	198+770	198+780	TCS - 21	0.6		10	
263	198+780	198+790	TCS - 21	0.6		10	
264	198+790	198+800	TCS - 21	0.7		10	
265	198+800	198+810	TCS - 15	1.1		10	
266	198+810	198+820	TCS - 15	1.5		10	
267	198+860	198+870	TCS - 15	0.9		10	
268	198+870	198+880	TCS - 15	0.6		10	
269	198+940	198+950	TCS - 15	0.7		10	
270	198+950	198+960	TCS - 15	1.8		10	
271	198+960	198+970	TCS - 15	1.5		10	
272	198+970	198+980	TCS - 15	2		10	
273	199+140	199+150	TCS - 15	0.8		10	
274	199+150	199+160	TCS - 26	2		10	
275	199+160	199+170	TCS - 26	2		10	
276	199+170	199+180	TCS - 26	1.9		10	
277	199+180	199+190	TCS - 26	1.7		10	
278	199+190	199+200	TCS - 26	2		10	
279	199+200	199+210	TCS - 26	1.6		10	
280	199+210	199+220	TCS - 18	2		10	
281	199+220	199+230	TCS - 18	2		10	
282	199+300	199+310	TCS - 26	0.5		10	
283	199+310	199+320	TCS - 26	0.5		10	
284	199+320	199+330	TCS - 26	0.5		10	
285	199+330	199+340	TCS - 26	0.5		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
286	199+340	199+350	TCS - 26	1.3		10	
287	199+350	199+360	TCS - 26	2		10	
288	199+360	199+370	TCS - 26	1.7		10	
289	199+370	199+380	TCS - 26	0.9		10	
290	199+380	199+390	TCS - 26	1.5		10	
291	199+450	199+460	TCS - 26	1.9		10	
292	199+460	199+470	TCS - 26	1.8		10	
293	199+470	199+480	TCS - 26	2		10	
294	199+480	199+490	TCS - 26	1.3		10	
295	199+490	199+500	TCS - 26	1		10	
296	199+580	199+590	TCS - 26	1.4		10	
297	199+590	199+600	TCS - 26	1		10	
298	199+600	199+610	TCS - 26	0.7		10	
299	199+610	199+620	TCS - 26	0.6		10	
300	199+620	199+630	TCS - 26	0.8		10	
301	199+630	199+640	TCS - 26	1.3		10	
302	199+640	199+650	TCS - 26	0.7		10	
303	199+650	199+660	TCS - 26	0.8		10	
304	199+660	199+670	TCS - 26	0.9		10	
305	199+670	199+680	TCS - 26	1.7		10	
306	199+680	199+690	TCS - 26	1.9		10	
307	199+690	199+700	TCS - 26	1.5		10	
308	199+700	199+710	TCS - 26	2		10	
309	199+710	199+720	TCS - 26	0.5		10	
310	199+720	199+730	TCS - 26	0.8		10	
311	199+730	199+740	TCS - 18	0.9		10	
312	199+740	199+750	TCS - 18	0.5		10	
313	199+750	199+760	TCS - 18	0.5		10	
314	199+760	199+770	TCS - 18	0.6		10	
315	199+770	199+780	TCS - 18	1.3		10	
316	199+780	199+790	TCS - 18	1.6		10	
317	199+890	199+900	TCS - 22	1		10	
318	199+900	199+910	TCS - 22	`		10	
319	199+910	199+920	TCS - 15	0.6		10	
320	199+920	199+930	TCS - 15	0.9		10	
321	199+930	199+940	TCS - 22	0.6		10	
322	199+940	199+950	TCS - 22	1.8		10	
323	200+040	200+050	TCS - 15	0.8		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
324	200+050	200+060	TCS - 15	0.8		10	
325	200+060	200+070	TCS - 15	0.7		10	
326	200+070	200+080	TCS - 15	0.6		10	
327	200+080	200+090	TCS - 15	0.6		10	
328	200+090	200+100	TCS - 15	0.6		10	
329	200+100	200+110	TCS - 15	0.6		10	
330	200+110	200+120	TCS - 15	1.3		10	
331	200+120	200+130	TCS - 15	1		10	
332	200+130	200+140	TCS - 15	2		10	
333	200+140	200+150	TCS - 15	2		10	
334	200+150	200+160	TCS - 15	1.2		10	
335	200+160	200+170	TCS - 15	1.5		10	
336	200+170	200+180	TCS - 15	1		10	
337	200+180	200+190	TCS - 15	0.5		10	
338	200+190	200+200	TCS - 22	0.9		10	
339	200+200	200+210	TCS - 22	1.3		10	
340	200+210	200+220	TCS - 22	1.8		10	
341	200+260	200+270	TCS - 22	0.9		10	
342	200+270	200+280	TCS - 22	0.5		10	
343	200+280	200+290	TCS - 15	0.5		10	
344	200+290	200+300	TCS - 15	0.5		10	
345	200+300	200+310	TCS - 15	0.5		10	
346	200+310	200+320	TCS - 15	0.5		10	
347	200+320	200+330	TCS - 15	0.5		10	
348	200+330	200+340	TCS - 15	0.5		10	
349	200+340	200+350	TCS - 15	0.5		10	
350	200+350	200+360	TCS - 15	0.5		10	
351	200+360	200+370	TCS - 15	0.6		10	
352	200+370	200+380	TCS - 15	0.7		10	
353	200+380	200+390	TCS - 15	0.8		10	
354	200+390	200+400	TCS - 15	0.6		10	
355	200+400	200+410	TCS - 22	0.5		10	
356	200+460	200+470	TCS - 24	1		10	
357	200+580	200+590	TCS - 24	1		10	
358	200+590	200+600	TCS - 24	1		10	
359	200+600	200+610	TCS - 24	2		10	
360	200+610	200+620	TCS - 24	1.7		10	
361	200+620	200+630	TCS - 24	1		10	
362	200+630	200+640	TCS - 24	0.6		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
363	200+640	200+650	TCS - 24	0.5		10	
364	200+650	200+660	TCS - 24	1		10	
365	200+660	200+670	TCS - 24	1		10	
366	200+670	200+680	TCS - 24	1		10	
367	200+680	200+690	TCS - 24	1		10	
368	200+690	200+700	TCS - 24	1.2		10	
369	200+700	200+710	TCS - 24	0.9		10	
370	200+710	200+725	TCS - 24	0.8		15	
371	200+850	200+860	TCS - 22	0.6		10	
372	200+860	200+870	TCS - 22	2		10	
373	200+870	200+880	TCS - 22	2		10	
374	200+880	200+890	TCS - 22	1.2		10	
375	200+890	200+892	TCS - 22	1.7		2	
376	200+902	200+910	TCS - 22	1.8		8	
377	200+910	200+920	TCS - 22	1.6		10	
378	201+200	201+210	TCS - 22	0.6		10	
379	201+240	201+250	TCS - 22	0.6		10	
380	201+310	201+320	TCS - 22	0.6		10	
381	201+590	201+600	TCS - 24	1.1		10	
382	201+600	201+610	TCS - 24	1.3		10	
383	201+610	201+620	TCS - 24	0.9		10	
384	201+620	201+630	TCS - 24	1.5		10	
385	201+630	201+640	TCS - 24	1.5		10	
386	201+640	201+650	TCS - 24	1.7		10	
387	201+825	201+830	TCS - 24	1.1		5	
388	201+830	201+840	TCS - 24	0.9		10	
389	201+840	201+850	TCS - 24	1.7		10	
390	201+950	201+960	TCS - 15	0.6		10	
391	201+960	201+970	TCS - 15	1		10	
392	201+970	201+980	TCS - 15	1.3		10	
393	201+980	201+985	TCS - 15	1.4		5	
394	202+050	202+060	TCS - 22	1.8		10	
395	202+060	202+070	TCS - 22	0.6		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
396	202+120	202+130	TCS - 15	1.8		10	
397	202+130	202+140	TCS - 15	0.7		10	
398	202+230	202+240	TCS - 22	0.5		10	
399	202+240	202+250	TCS - 22	0.8		10	
400	202+250	202+260	TCS - 22	1.5		10	
401	202+260	202+270	TCS - 22	0.6		10	
402	202+270	202+280	TCS - 22	0.6		10	
403	202+280	202+290	TCS - 22	0.5		10	
404	202+290	202+300	TCS - 22	0.5		10	
405	202+300	202+310	TCS - 22	0.5		10	
406	202+310	202+320	TCS - 22	0.9		10	
407	202+320	202+330	TCS - 22	1.4		10	
408	202+330	202+340	TCS - 22	2		10	
409	202+340	202+345	TCS - 22	1.1		5	
410	202+505	202+510	TCS - 15	1.1		5	
411	202+510	202+520	TCS - 15	0.8		10	
412	202+520	202+530	TCS - 15	2		10	
413	202+600	202+610	TCS - 15	0.6		10	
414	202+610	202+620	TCS - 15	0.8		10	
415	202+790	202+800	TCS - 15	0.5		10	
416	202+800	202+810	TCS - 15	0.5		10	
417	202+810	202+820	TCS - 15	0.5		10	
418	202+820	202+830	TCS - 15	0.5		10	
419	202+920	202+930	TCS - 15	0.5		10	
420	202+930	202+940	TCS - 15	0.5		10	
421	202+940	202+950	TCS - 15	0.5		10	
422	202+950	202+960	TCS - 15	0.6		10	
423	202+960	202+970	TCS - 15	0.8		10	
424	202+970	202+980	TCS - 15	0.8		10	
425	202+980	202+990	TCS - 15	0.9		10	
426	202+990	203+000	TCS - 15	1.5		10	
427	203+000	203+010	TCS - 15	1.1		10	
428	203+010	203+020	TCS - 15	0.7		10	
429	203+020	203+030	TCS - 15	1		10	
430	203+030	203+040	TCS - 15	0.5		10	
431	203+040	203+050	TCS - 15	0.5		10	
432	203+050	203+060	TCS - 15	0.5		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
433	203+060	203+070	TCS - 15	0.5		10	
434	203+070	203+080	TCS - 15	0.5		10	
435	203+080	203+090	TCS - 15	0.8		10	
436	203+090	203+100	TCS - 22	1.4		10	
437	203+100	203+110	TCS - 22	1.9		10	
438	203+110	203+120	TCS - 22	1.6		10	
439	203+120	203+130	TCS - 22	0.5		10	
440	203+280	203+290	TCS - 15	0.6		10	
441	203+290	203+300	TCS - 15	0.6		10	
442	203+300	203+310	TCS - 15	0.5		10	
443	203+310	203+320	TCS - 15	0.5		10	
444	203+320	203+330	TCS - 15	0.6		10	
445	203+330	203+340	TCS - 22	1.5		10	
446	203+410	203+420	TCS - 15	1.2		10	
447	203+420	203+430	TCS - 15	1		10	
448	203+430	203+440	TCS - 15	0.7		10	
449	203+440	203+450	TCS - 15	1		10	
450	203+550	203+560	TCS - 15	0.5		10	
451	203+560	203+570	TCS - 15	0.5		10	
452	203+570	203+580	TCS - 15	0.5		10	
453	203+580	203+590	TCS - 15	0.5		10	
454	203+590	203+600	TCS - 15	0.5		10	
455	203+600	203+610	TCS - 15	0.5		10	
456	203+785	203+790	TCS - 22	0.8		5	
457	203+790	203+800	TCS - 22	1.4		10	
458	203+890	203+900	TCS - 15	1.8		10	
459	203+900	203+910	TCS - 15	1.1		10	
460	203+910	203+920	TCS - 15	0.6		10	
461	203+920	203+930	TCS - 15	0.7		10	
462	203+930	203+940	TCS - 15	0.6		10	
463	203+940	203+950	TCS - 15	1.7		10	
464	203+950	203+960	TCS - 15	0.8		10	
465	203+960	203+970	TCS - 15	1.6		10	
466	203+970	203+980	TCS - 15	0.9		10	
467	203+980	203+990	TCS - 15	0.8		10	
468	203+990	204+000	TCS - 15	0.9		10	
469	204+000	204+010	TCS - 15	1.2		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
470	204+040	204+050	TCS - 15	0.7		10	
471	204+270	204+280	TCS - 22	0.9		10	
472	204+280	204+290	TCS - 22	1.2		10	
473	204+290	204+300	TCS - 22	5		10	
474	204+300	204+310	TCS - 22	2		10	
475	204+385	204+390	TCS - 15	0.7		5	
476	204+390	204+400	TCS - 15	0.7		10	
477	204+400	204+410	TCS - 15	2		10	
478	204+410	204+420	TCS - 15	2		10	
479	204+420	204+430	TCS - 15	0.6		10	
480	204+430	204+440	TCS - 15	0.5		10	
481	204+440	204+450	TCS - 15	0.5		10	
482	204+570	204+580	TCS - 22	1.7		10	
483	204+580	204+590	TCS - 22	1.8		10	
484	204+590	204+600	TCS - 22	2		10	
485	204+600	204+610	TCS - 22	1.4		10	
486	204+610	204+620	TCS - 15	0.9		10	
487	204+620	204+630	TCS - 15	0.6		10	
488	204+630	204+640	TCS - 15	0.6		10	
489	204+640	204+650	TCS - 15	0.6		10	
490	204+650	204+660	TCS - 15	0.6		10	
491	204+660	204+670	TCS - 15	0.6		10	
492	204+670	204+680	TCS - 15	0.9		10	
493	204+680	204+690	TCS - 15	1.7		10	
494	204+740	204+750	TCS - 15	1.8		10	
495	204+750	204+760	TCS - 15	2		10	
496	204+760	204+770	TCS - 15	1.9		10	
497	204+770	204+780	TCS - 22	1.8		10	
498	204+840	204+850	TCS - 15	0.8		10	
499	204+850	204+860	TCS - 15	0.6		10	
500	204+860	204+870	TCS - 15	0.7		10	
501	204+870	204+880	TCS - 15	0.9		10	
502	204+880	204+890	TCS - 15	1.3		10	
503	204+890	204+900	TCS - 15	1.6		10	
504	204+900	204+910	TCS - 15	2		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
505	204+980	204+990	TCS - 22	1.1		10	
506	204+990	205+000	TCS - 22	1		10	
507	205+000	205+010	TCS - 22	0.8		10	
508	205+010	205+020	TCS - 22	0.7		10	
509	205+020	205+030	TCS - 22	1.2		10	
510	205+030	205+040	TCS - 22	1.6		10	
511	205+040	205+050	TCS - 22	2		10	
512	205+050	205+060	TCS - 22	2		10	
513	205+060	205+070	TCS - 22	1.2		10	
514	205+150	205+160	TCS - 22	0.5		10	
515	205+160	205+170	TCS - 22	0.8		10	
516	205+200	205+210	TCS - 15	0.5		10	
517	205+210	205+220	TCS - 15	0.5		10	
518	205+220	205+230	TCS - 15	0.5		10	
519	205+230	205+240	TCS - 15	0.5		10	
520	205+240	205+250	TCS - 15	0.5		10	
521	205+250	205+260	TCS - 15	0.8		10	
522	205+260	205+270	TCS - 15	0.8		10	
523	205+270	205+280	TCS - 15	0.9		10	
524	205+280	205+290	TCS - 15	0.5		10	
525	205+405	205+410	TCS - 15	0.8		5	
526	205+410	205+420	TCS - 15	0.8		10	
527	205+420	205+430	TCS - 15	0.6		10	
528	205+540	205+550	TCS - 15	0.5		10	
529	205+550	205+560	TCS - 15	0.9		10	
530	205+560	205+570	TCS - 15	0.7		10	
531	205+570	205+580	TCS - 15	0.7		10	
532	205+580	205+590	TCS - 15	0.8		10	
533	205+590	205+600	TCS - 15	0.7		10	
534	205+600	205+610	TCS - 15	0.6		10	
535	205+610	205+620	TCS - 15	1		10	
536	205+620	205+630	TCS - 15	0.9		10	
537	205+630	205+640	TCS - 15	0.5		10	
538	205+640	205+650	TCS - 22	0.5		10	
539	205+650	205+660	TCS - 22	0.5		10	
540	205+660	205+670	TCS - 22	1.8		10	
541	205+710	205+720	TCS - 15	0.5		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
542	205+720	205+730	TCS - 15	0.5		10	
543	205+730	205+740	TCS - 15	0.5		10	
544	205+740	205+750	TCS - 15	0.6		10	
545	205+750	205+760	TCS - 15	0.6		10	
546	205+800	205+810	TCS - 15	0.7		10	
547	205+810	205+820	TCS - 15	1.8		10	
548	205+820	205+830	TCS - 15	2		10	
549	205+830	205+840	TCS - 15	1.3		10	
550	205+920	205+930	TCS - 22	0.9		10	
551	206+070	206+080	TCS - 22	0.5		10	
552	206+080	206+090	TCS - 22	1.1		10	
553	206+090	206+100	TCS - 22	2		10	
554	206+240	206+250	TCS - 15	0.6		10	
555	206+250	206+260	TCS - 15	0.6		10	
556	206+260	206+270	TCS - 15	0.6		10	
557	207+420	207+430	TCS - 22	1		10	
558	207+470	207+480	TCS - 22	1.9		10	
559	207+620	207+630	TCS - 15	0.8		10	
560	207+630	207+640	TCS - 15	1		10	
561	207+640	207+650	TCS - 15	0.9		10	
562	207+650	207+660	TCS - 15	1.2		10	
563	207+660	207+670	TCS - 15	1.6		10	
564	207+670	207+680	TCS - 15	1.8		10	
565	207+680	207+690	TCS - 15	1.5		10	
566	207+690	207+700	TCS - 15	1.1		10	
567	207+700	207+710	TCS - 15	1		10	
568	207+710	207+720	TCS - 15	1.7		10	
569	207+720	207+730	TCS - 15	1.2		10	
570	207+730	207+740	TCS - 22	1.4		10	
571	207+740	207+750	TCS - 22	1.7		10	
572	207+820	207+830	TCS - 15	0.5		10	
573	207+830	207+840	TCS - 15	1.8		10	
574	207+840	207+850	TCS - 15	2		10	
575	207+850	207+860	TCS - 15	2		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
576	207+860	207+870	TCS - 15	0.5		10	
577	207+950	207+960	TCS - 22	1		10	
578	207+960	207+970	TCS - 22	1.9		10	
579	208+020	208+030	TCS - 22	1.8		10	
580	208+030	208+040	TCS - 22	1.6		10	
581	208+040	208+050	TCS - 22	1.2		10	
582	208+050	208+060	TCS - 22	1.2		10	
583	208+060	208+070	TCS - 22	1.7		10	
584	208+070	208+080	TCS - 22	2		10	
585	208+080	208+090	TCS - 22	0.6		10	
586	208+090	208+100	TCS - 22	0.9		10	
587	208+100	208+110	TCS - 22	1.3		10	
588	208+110	208+120	TCS - 22	1.6		10	
589	208+120	208+130	TCS - 22	2		10	
590	208+130	208+140	TCS - 22	2		10	
591	208+140	208+150	TCS - 22	1.1		10	
592	208+750	208+755	TCS - 22	0.9		5	
593	208+845	208+850	TCS - 18	1.3		5	
594	208+850	208+860	TCS - 18	1.2		10	
595	208+860	208+870	TCS - 18	1.2		10	
596	208+870	208+880	TCS - 18	1.8		10	
597	208+880	208+890	TCS - 18	2		10	
598	208+890	208+900	TCS - 18	1.1		10	
599	208+900	208+910	TCS - 18	0.5		10	
600	209+395	209+400	TCS - 18	0.9		5	
601	209+400	209+410	TCS - 18	1.1		10	
602	209+410	209+420	TCS - 18	1.4		10	
603	209+420	209+430	TCS - 18	1.1		10	
604	209+430	209+440	TCS - 18	1		10	
605	209+440	209+450	TCS - 18	1		10	
606	209+450	209+460	TCS - 18	1		10	
607	209+460	209+470	TCS - 18	1.2		10	
608	209+470	209+480	TCS - 22	1.5		10	
609	209+480	209+490	TCS - 22	2		10	
610	209+490	209+500	TCS - 22	2		10	
611	209+500	209+510	TCS - 22	1.7		10	

No.	Design Chainage (Km)		TCS Type	Height of Toe Wall above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
612	209+600	209+610	TCS - 22	0.6		10	
613	209+610	209+620	TCS - 22	2		10	
614	209+620	209+625	TCS - 22	0.6		5	
615	209+790	209+800	TCS - 22	1.6		10	
616	209+890	209+900	TCS - 15	0.5		10	
617	209+900	209+910	TCS - 15	0.5		10	
618	209+910	209+920	TCS - 15	0.5		10	
619	209+920	209+930	TCS - 15	0.5		10	
620	209+930	209+940	TCS - 15	0.5		10	
621	210+155	210+160	TCS - 22	0.6		5	
622	210+160	210+170	TCS - 22	1.8		10	
623	210+485	210+490	TCS - 15	0.5		5	
624	210+490	210+500	TCS - 15	0.5		10	
625	210+500	210+510	TCS - 15	0.5		10	
626	210+510	210+520	TCS - 15	0.5		10	
627	210+570	210+580	TCS - 22	1.4		10	
628	210+580	210+590	TCS - 22	1.8		10	
629	210+870	210+880	TCS - 22	1.6		10	
630	210+880	210+890	TCS - 22	1.6		10	
631	211+055	211+060	TCS - 15	0.5		5	
632	211+060	211+070	TCS - 15	0.7		10	
633	211+070	211+080	TCS - 15	0.9		10	
634	211+250	211+260	TCS - 15	0.6		10	
635	211+260	211+270	TCS - 15	0.9		10	
636	211+270	211+280	TCS - 15	0.7		10	
637	211+280	211+290	TCS - 15	0.9		10	
638	211+290	211+300	TCS - 15	0.7		10	
639	211+365	211+370	TCS - 15	0.8		5	
640	211+370	211+380	TCS - 15	0.9		10	
641	211+380	211+390	TCS - 15	1.3		10	

The details of RCC Retaining Walls along the project road are as below:

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
1	193+440	193+450	TCS - 15	2.42		10	
2	193+450	193+460	TCS - 22	3.93		10	
3	193+460	193+470	TCS - 22	6.27		10	
4	193+470	193+480	TCS - 22	4.61		10	
5	193+480	193+490	TCS - 22	3.65		10	
6	193+490	193+500	TCS - 22	2.14		10	
7	193+500	193+510	TCS - 22	2.04		10	
8	193+510	193+520	TCS - 22	2.9		10	
9	193+520	193+530	TCS - 22	2.79		10	
10	193+530	193+540	TCS - 22	4.36		10	
11	193+540	193+550	TCS - 22	3.7		10	
12	193+550	193+560	TCS - 22	3		10	
13	193+560	193+570	TCS - 22	2.35		10	
14	194+740	194+750	TCS - 22	3.1		10	
15	194+750	194+760	TCS - 22	2.98		10	
16	194+760	194+770	TCS - 22	2.7		10	
17	194+770	194+780	TCS - 22	3.34		10	
18	194+780	194+790	TCS - 22	3.84		10	
19	194+790	194+800	TCS - 22	2.9		10	
20	194+800	194+810	TCS - 22	3.79		10	
21	194+810	194+820	TCS - 22	2.67		10	
22	194+820	194+830	TCS - 22	2.02		10	
23	194+830	194+840	TCS - 22	2.14		10	
24	194+840	194+850	TCS - 22	3.53		10	
25	195+370	195+380	TCS - 26	2.5		10	
26	195+380	195+390	TCS - 26	2.71		10	
27	195+390	195+400	TCS - 26	2.69		10	
28	195+400	195+410	TCS - 26	2.67		10	
29	195+620	195+630	TCS - 26	2.88		10	
30	195+630	195+640	TCS - 26	8.31		10	
31	195+640	195+650	TCS - 26	3.94		10	
32	195+730	195+740	TCS - 26	2		10	
33	195+740	195+750	TCS - 26	3.28		10	
34	195+750	195+760	TCS - 26	2.96		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
35	195+980	195+990	TCS - 26	2.35		10	
36	195+990	196+000	TCS - 26	2.36		10	
37	196+000	196+010	TCS - 26	3.95		10	
38	196+010	196+020	TCS - 26	6.03		10	
39	196+020	196+030	TCS - 26	5.97		10	
40	196+030	196+040	TCS - 26	4.19		10	
41	196+350	196+360	TCS - 18	2.72		10	
42	196+360	196+370	TCS - 18	2.87		10	
43	196+370	196+380	TCS - 18	2.5		10	
44	196+450	196+460	TCS - 26	2.07		10	
45	196+460	196+470	TCS - 26	2.33		10	
46	196+470	196+480	TCS - 26	2.16		10	
47	197+160	197+170	TCS - 26	4.54		10	
48	197+170	197+180	TCS - 26	4.67		10	
49	197+180	197+190	TCS - 26	2.14		10	
50	197+560	197+570	TCS - 26	2.44		10	
51	197+570	197+580	TCS - 26	3.05		10	
52	197+580	197+590	TCS - 26	2.4		10	
53	198+270	198+280	TCS - 15	2.46		10	
54	198+280	198+290	TCS - 15	3.9		10	
55	198+290	198+300	TCS - 15	2.91		10	
56	198+820	198+830	TCS - 21	2.85		10	
57	198+830	198+840	TCS - 21	3.3		10	
58	198+840	198+850	TCS - 21	2.48		10	
59	198+850	198+860	TCS - 15	2.19		10	
60	199+390	199+400	TCS - 26	2.58		10	
61	199+400	199+410	TCS - 26	2.43		10	
62	199+410	199+420	TCS - 26	2.78		10	
63	199+420	199+430	TCS - 26	3.08		10	
64	199+430	199+440	TCS - 26	2.81		10	
65	199+440	199+450	TCS - 26	2.11		10	
66	199+550	199+560	TCS - 26	3.08		10	
67	199+560	199+570	TCS - 26	2.61		10	
68	199+570	199+580	TCS - 26	2.76		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
69	199+790	199+800	TCS - 18	2.85		10	
70	199+800	199+810	TCS - 22	3.99		10	
71	199+810	199+820	TCS - 22	5.03		10	
72	199+820	199+830	TCS - 22	6.49		10	
73	199+830	199+840	TCS - 22	9.78		10	
74	199+840	199+850	TCS - 22	12.78		10	
75	199+850	199+860	TCS - 22	12.01		10	
76	199+860	199+870	TCS - 22	11.48		10	
77	199+870	199+880	TCS - 22	9.9		10	
78	199+880	199+890	TCS - 22	4.18		10	
79	199+950	199+960	TCS - 22	4.21		10	
80	199+960	199+970	TCS - 22	5.07		10	
81	199+970	199+980	TCS - 22	6.55		10	
82	199+980	199+990	TCS - 22	6.69		10	
83	199+990	200+000	TCS - 22	6.79		10	
84	200+000	200+010	TCS - 22	6.35		10	
85	200+010	200+020	TCS - 22	4.77		10	
86	200+020	200+030	TCS - 22	2.49		10	
87	200+220	200+230	TCS - 22	2.86		10	
88	200+230	200+240	TCS - 22	2.55		10	
89	200+240	200+250	TCS - 22	3.53		10	
90	200+250	200+260	TCS - 22	3.29		10	
91	200+410	200+420	TCS - 22	4.17		10	
92	200+420	200+430	TCS - 22	7.27		10	
93	200+430	200+440	TCS - 22	7.53		10	
94	200+440	200+450	TCS - 22	7.64		10	
95	200+450	200+460	TCS - 22	5.28		10	
96	201+210	201+220	TCS - 22	3.14		10	
97	201+220	201+230	TCS - 22	6.41		10	
98	201+230	201+240	TCS - 22	4.13		10	
99	201+320	201+330	TCS - 22	3.56		10	
100	201+330	201+340	TCS - 22	5.14		10	
101	201+340	201+350	TCS - 22	6.06		10	
102	201+350	201+360	TCS - 22	6.44		10	
103	201+360	201+370	TCS - 22	5.47		10	
104	201+850	201+860	TCS - 24	2.95		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
105	201+860	201+870	TCS - 22	5.39		10	
106	201+870	201+880	TCS - 22	4.12		10	
107	202+070	202+080	TCS - 22	2.1		10	
108	202+080	202+090	TCS - 22	5.54		10	
109	202+090	202+100	TCS - 22	5.83		10	
110	202+100	202+110	TCS - 22	4.55		10	
111	202+110	202+120	TCS - 22	3.27		10	
112	203+230	203+240	TCS - 22	3.42		10	
113	203+240	203+250	TCS - 22	5.08		10	
114	203+250	203+260	TCS - 22	6.82		10	
115	203+260	203+270	TCS - 22	5.74		10	
116	203+270	203+280	TCS - 22	3.3		10	
117	203+340	203+350	TCS - 22	4.81		10	
118	203+350	203+360	TCS - 22	9.34		10	
119	203+360	203+370	TCS - 22	11.99		10	
120	203+370	203+380	TCS - 22	11.56		10	
121	203+380	203+390	TCS - 22	8.51		10	
122	203+390	203+400	TCS - 22	5.48		10	
123	203+400	203+410	TCS - 22	3.38		10	
124	203+450	203+460	TCS - 22	2.04		10	
125	203+460	203+470	TCS - 22	2.99		10	
126	203+470	203+480	TCS - 22	3.77		10	
127	203+480	203+490	TCS - 22	4.25		10	
128	203+490	203+500	TCS - 22	4.33		10	
129	203+500	203+510	TCS - 22	6.45		10	
130	203+510	203+520	TCS - 22	7.24		10	
131	203+520	203+530	TCS - 22	6.81		10	
132	203+530	203+540	TCS - 22	3.88		10	
133	203+540	203+550	TCS - 15	2.23		10	
134	203+610	203+620	TCS - 22	2.01		10	
135	203+620	203+630	TCS - 22	5.64		10	
136	203+630	203+640	TCS - 22	6.69		10	
137	203+640	203+650	TCS - 22	6.81		10	
138	203+650	203+660	TCS - 22	5.37		10	
139	203+660	203+670	TCS - 22	3.95		10	
140	203+800	203+810	TCS - 22	10.24		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
141	203+810	203+820	TCS - 22	10.56		10	
142	203+820	203+830	TCS - 22	10.38		10	
143	203+830	203+840	TCS - 22	9.63		10	
144	203+840	203+850	TCS - 22	6.02		10	
145	203+850	203+860	TCS - 22	4.13		10	
146	203+860	203+870	TCS - 22	2.23		10	
147	203+870	203+880	TCS - 22	2.25		10	
148	203+880	203+890	TCS - 22	2.27		10	
149	204+010	204+020	TCS - 15	3.29		10	
150	204+020	204+030	TCS - 15	4.04		10	
151	204+030	204+040	TCS - 15	2.74		10	
152	204+450	204+460	TCS - 22	2.06		10	
153	204+460	204+470	TCS - 22	6.63		10	
154	204+470	204+480	TCS - 22	3.53		10	
155	204+780	204+790	TCS - 22	2.21		10	
156	204+790	204+800	TCS - 22	2.65		10	
157	204+800	204+810	TCS - 22	2.75		10	
158	204+810	204+820	TCS - 22	3.19		10	
159	204+820	204+830	TCS - 22	2.48		10	
160	204+830	204+840	TCS - 15	2.06		10	
161	204+910	204+920	TCS - 15	2.16		10	
162	204+920	204+930	TCS - 22	2.36		10	
163	204+930	204+940	TCS - 22	2.36		10	
164	204+940	204+950	TCS - 22	2.95		10	
165	204+950	204+960	TCS - 22	3.7		10	
166	204+960	204+970	TCS - 22	3.78		10	
167	204+970	204+980	TCS - 22	3.05		10	
168	205+170	205+180	TCS - 22	2.73		10	
169	205+180	205+190	TCS - 22	3.46		10	
170	205+190	205+200	TCS - 22	3.67		10	
171	205+670	205+680	TCS - 22	3.81		10	
172	205+680	205+690	TCS - 22	4.81		10	
173	205+690	205+700	TCS - 22	4.03		10	
174	205+700	205+710	TCS - 15	2.21		10	
175	205+930	205+940	TCS - 22	2.56		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
176	205+940	205+950	TCS - 22	3.7		10	
177	205+950	205+960	TCS - 22	5.44		10	
178	205+960	205+970	TCS - 22	4.98		10	
179	205+970	205+980	TCS - 22	2.56		10	
180	207+430	207+440	TCS - 22	2.17		10	
181	207+440	207+450	TCS - 22	5.57		10	
182	207+450	207+460	TCS - 22	9.32		10	
183	207+460	207+470	TCS - 22	7.2		10	
184	207+970	207+980	TCS - 22	3.76		10	
185	207+980	207+990	TCS - 22	6.87		10	
186	207+990	208+000	TCS - 22	4.82		10	
187	208+000	208+010	TCS - 22	3.68		10	
188	208+010	208+020	TCS - 22	2.36		10	
189	208+300	208+310	TCS - 22	2.68		10	
190	208+310	208+313	TCS - 22	8.44		3	
191	208+353	208+360	TCS - 22	8.05		7	
192	208+360	208+370	TCS - 22	4.7		10	
193	208+670	208+680	TCS - 22	2.82		10	
194	208+680	208+690	TCS - 22	3.28		10	
195	208+690	208+700	TCS - 22	2.81		10	
196	208+700	208+710	TCS - 22	2.48		10	
197	208+710	208+720	TCS - 22	3.23		10	
198	208+720	208+730	TCS - 22	3.31		10	
199	208+730	208+740	TCS - 22	3.39		10	
200	208+740	208+750	TCS - 22	2.73		10	
201	209+768	209+770	TCS - 22	6.44		2	
202	209+770	209+780	TCS - 22	4.29		10	
203	209+780	209+790	TCS - 22	4.48		10	
204	210+170	210+180	TCS - 22	2.37		10	
205	210+180	210+190	TCS - 22	4.49		10	
206	210+190	210+200	TCS - 22	5.18		10	
207	210+200	210+210	TCS - 22	3.79		10	
208	210+360	210+370	TCS - 22	2.43		10	
209	210+370	210+380	TCS - 22	3.36		10	

S. No.	Design Chainage (Km)		TCS Type	Wall Height above GL (m)		Length (m)	
	From	To		LHS	RHS	LHS	RHS
210	210+380	210+390	TCS - 22	4.04		10	
211	210+390	210+400	TCS - 22	4.74		10	
212	210+400	210+410	TCS - 22	4.45		10	
213	210+590	210+600	TCS - 22	2.53		10	
214	210+600	210+610	TCS - 22	3.33		10	
215	210+610	210+620	TCS - 22	2.76		10	
216	210+620	210+630	TCS - 22	2.66		10	
217	210+630	210+640	TCS - 22	2.8		10	
218	210+640	210+650	TCS - 22	2.98		10	
219	210+650	210+660	TCS - 27	2.5		10	
220	210+660	210+670	TCS - 27	2.5		10	
221	210+670	210+680	TCS - 27	2.5		10	
222	210+680	210+690	TCS - 27	2.5		10	
223	210+690	210+700	TCS - 27	2.5		10	
224	210+700	210+710	TCS - 27	2.5		10	
225	210+710	210+720	TCS - 27	2.5		10	
226	210+775	210+780	TCS - 15	2.68		10	
227	210+780	210+790	TCS - 15	3.29		10	
228	210+790	210+800	TCS - 22	3.09		10	
229	210+800	210+805	TCS - 22	2.62		10	
230	210+890	210+900	TCS - 22	2.46		10	
231	210+900	210+910	TCS - 22	2.66		10	
232	210+910	210+920	TCS - 22	3.79		10	
233	210+920	210+930	TCS - 22	3.64		10	
234	210+930	210+940	TCS - 22	3.5		10	
235	210+940	210+950	TCS - 22	3.22		10	

Note: The above mentioned retaining wall locations are tentative and 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.

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

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

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

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/ parapet walls all along the valley side of project highway.

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

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

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

(b) Pedestrian: The pedestrian facilities shall include the provision of the;

(i) Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location.

(ii) Pedestrian Crossings: Provide pedestrian crossing facilities on Junctions.

ii. Overhead traffic signs: location and size

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

Sl. No.	Location (Km)	Size
1	At km 185.540	16 m X 1.2 m (Double Pole)
2	At km 211.709	16 m X 1.2 m (Double Pole)

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

Sl. No.	Design Chainage	Remarks
1	197.352	
2	205.390	

10. Compulsory Afforestation

Minimum 3000 nos. trees are required to be planted as compensatory afforestation

11. Hazardous Locations

Metal Beam crash barrier of minimum length of 2800 m (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides on the project by the Contractor at the locations finalized in consultation with AE. Typical details of metal crash barrier are given in as per manual. Increase in length if any as per site requirement will not constitute change of scope.

12. Special Requirement for Hill Roads

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

The following minimum length shall be provided:

Sr. No.	Items	Length (m)
1	Hydroseeding and Seeding & mulching	50800 sqm
2	Surfacial Protection and Erosion Control	200 m

	measures	
3	Vertical cut off drains	2260 m

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

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

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

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

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

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		Length (m)	Reason	Side
	From	To			
Hill Side Protection					
1	200090	200120	30	Deep Cut	RHS
2	200300	200380	80	Deep Cut	RHS
3	202170	202200	30	Deep Cut	RHS
4	206120	206160	40	Deep Cut	RHS
5	208260	208300	40	Deep Cut	RHS

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

(a) **Hill side Toe Gabion wall for Localised Soil Strata-** Mechanically woven Double Twisted hexagonal shaped steel wire mesh gabion toe wall with minimum height 3.0 m are proposed for the locations wherever erodible strata is encountered after cutting. Gabion units (as per IRC SP 116:2018, IS 16014:2012 and MoRT&H rev 5 clause 2500) shall be of 1 m height with mesh type 10x12 and mesh opening tolerances -2% to +2%, mesh wire dia 2.7/3.7mm(ID/OD), (Zn + 10%Al + Polymer coated), mechanically edged/selvedged, with partition at 1 m interval and shall have minimum 10 numbers of mesh openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter 2.2/3.2 mm (ID/OD) Zn+10%Al with polymer coated to ensure longer lifespan. Gabion toe wall shall be constructed having non-woven geotextile at the back side for filtration & separation.

(b) **Surficial Protection and Erosion Control Measures for Soil Strata –** For the existing sliding locations and for the cut slopes wherever total cut height is more than 25 m (and soil strata is encountered after the cutting), surficial protection measures are adopted along with erosion control measures. Slope shall be cut in a pattern with 5m height and 2m berm and so on at an angle of 50 degrees or flatter with horizontal. Three dimensional reinforced synthetic geomat shall be used for erosion control measures along with hydraulically applied erosion control measures. Self Drilling Anchors are used for supporting geomat along with u-pins. Minimum length and outer diameter of self drilling anchors are 4 m and 32 mm respectively. Self drilling anchors are provided with maximum spacing of 1.5 m c/c in longitudinal and vertical directions.Self drilling anchors shall also be installed wherever collapsible strata are encountered on the slope.

(c) **Surficial Protection for Rocky Strata -** Surficial protection with secured drapery system are done for full length and height wherever rocky strata is encountered on the slope after cutting and total cut height is more than 25 m. Surface protection are done by using high resistance double twisted hexagonal shaped wire mesh/grid geocomposite (Zn+5%Al coated) with top, bottom and surface anchors. Continuously threaded anchors are installed on the slope wherever rocky strata is encountered. Anchors shall have minimum length and minimum diameter of 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 are provided with maximum spacing of 3 m c/c in longitudinal and vertical directions for total area with rocky strata. All rock anchors shall be fully grouted. Minimum yield strength of anchors shall be 500 MPa.

(d) **Drainage Measures for Cut Slopes -** Drainage measures for internal seepage in the cut slope is proposed by installing PVC pipes inside the slope. PVC pipes for internal seepage shall be half perforated of minimum 50 mm internal diameter and shall be lined with geotextile. PVC pipes are installed for minimum 3 m length at spacing of 4 m c/c in longitudinal direction in minimum 3 layers at the toe of slope. Open surface drains shall also be

constructed on the berms wherever soil strata is encountered. Road side drain along the road and catch water drains on the slope at regular intervals shall also be constructed. In addition to the above-mentioned drainage measures, suitable surface drainage measures are adopted as per the site condition.

(ii) **Sinking Measures**

Typical Vertical cut off drain details are presented in TCS of this Schedule B.

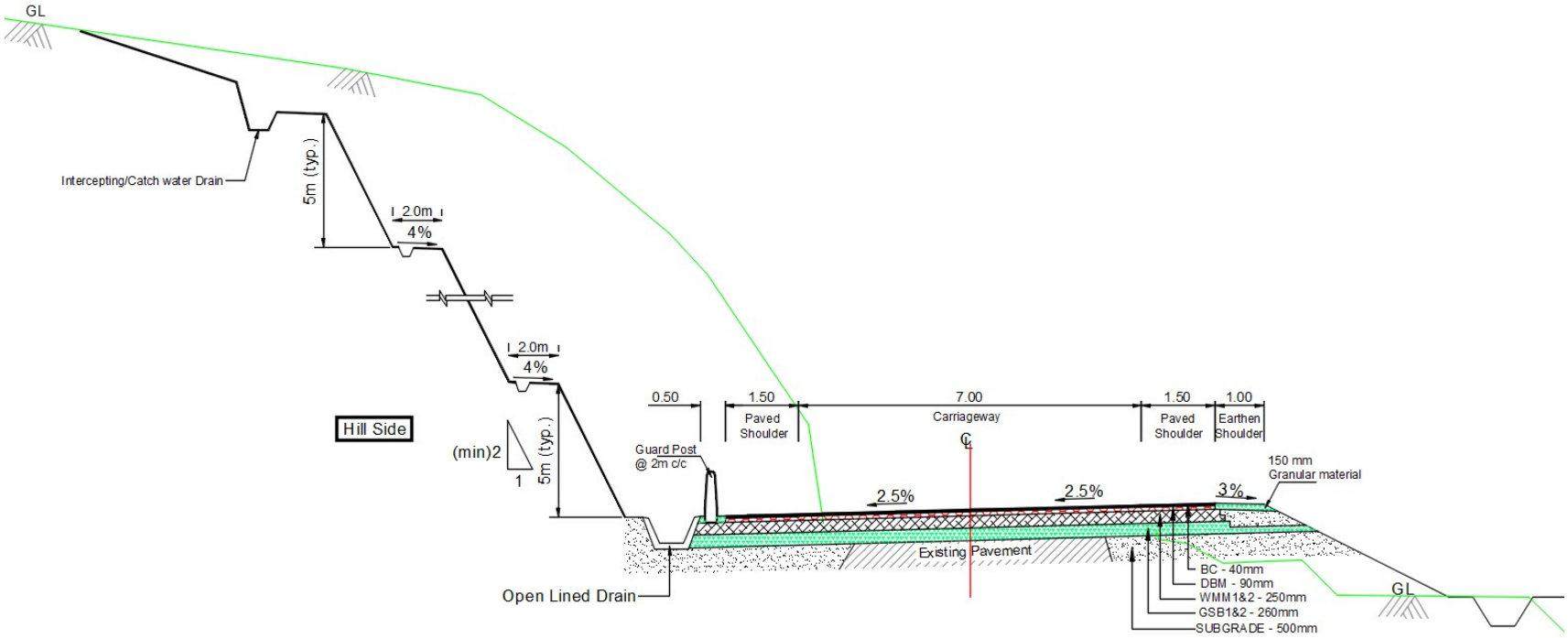
The vertical cut off drain shall be provided at following locations.

S.No.	Existing Chainage (km)		Design Chainage (Km)		Length (m)
	Start	End	Start	End	
1	203+768	204+315	203+035	203+920	885
2	204+787	205+730	204+390	205+255	865
3	206+832	207+381	206+335	206+845	510

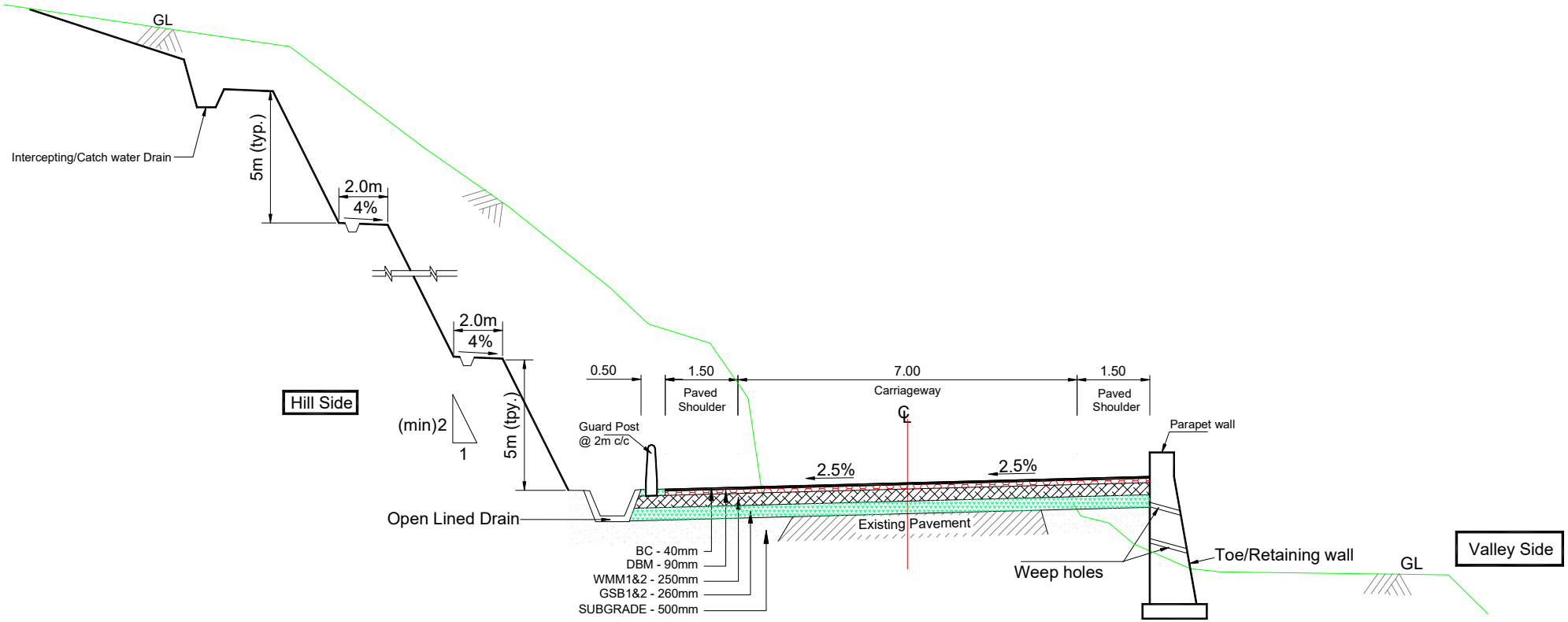
13. Change of Scope

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

Appendix B1 - Typical Cross Sections

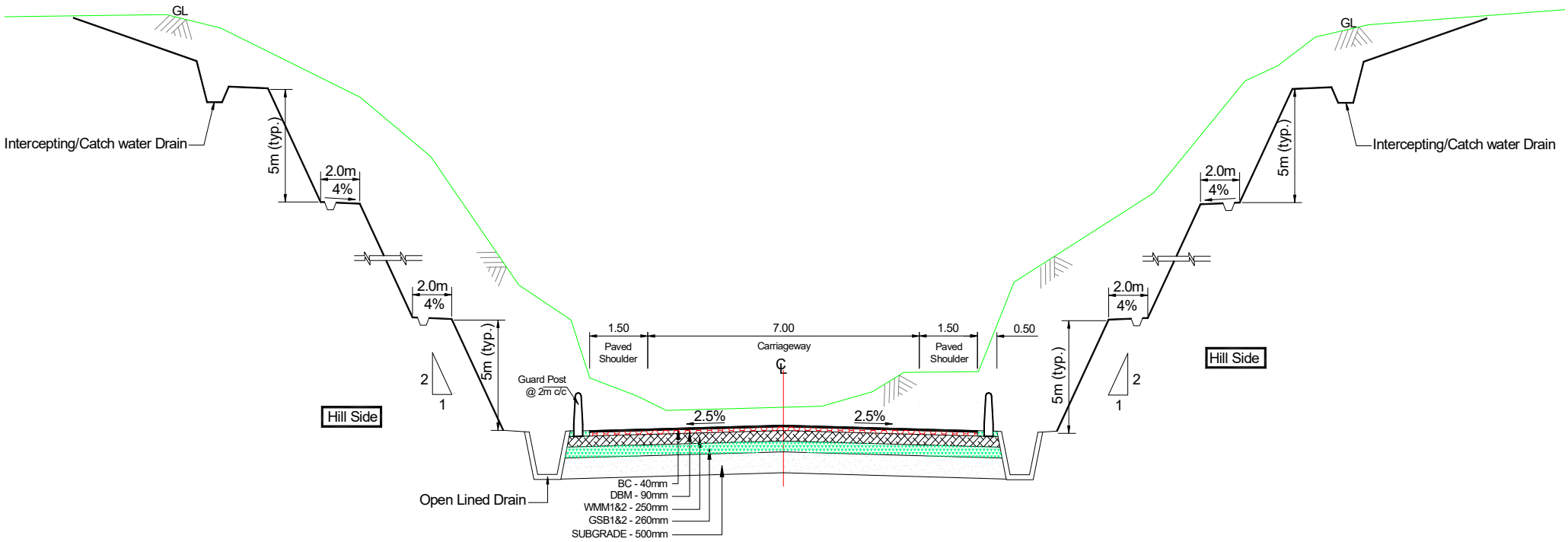


TCS-14 :2-Lane Carriageway with one side Hill Cutting and another side Normal Cut/Fill (Open Country - Mountainous Terrain)



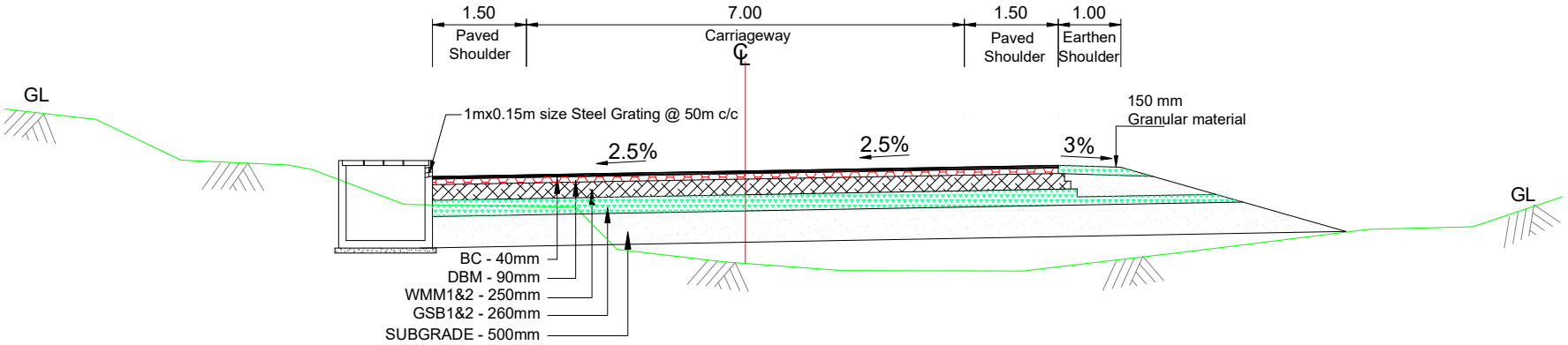
TCS - 15 : 2-Lane Carriageway with one side Hill Cutting and another side Toe/Retaining Wall

(Open Country - Mountainous Terrain)

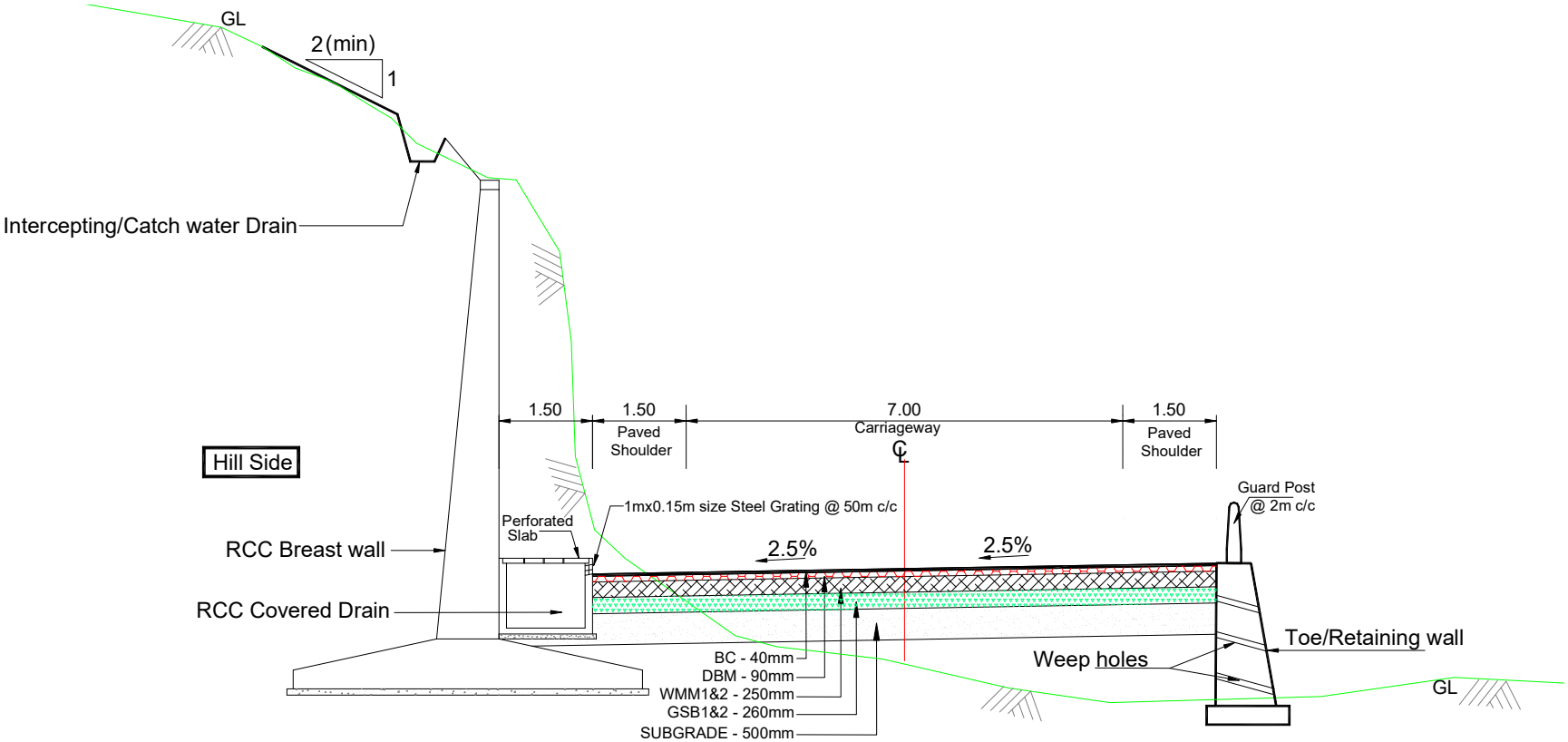


TCS - 16 : 2-Lane Carriageway with both sides Hill Cutting & Open Lined Drains (Through Cutting)

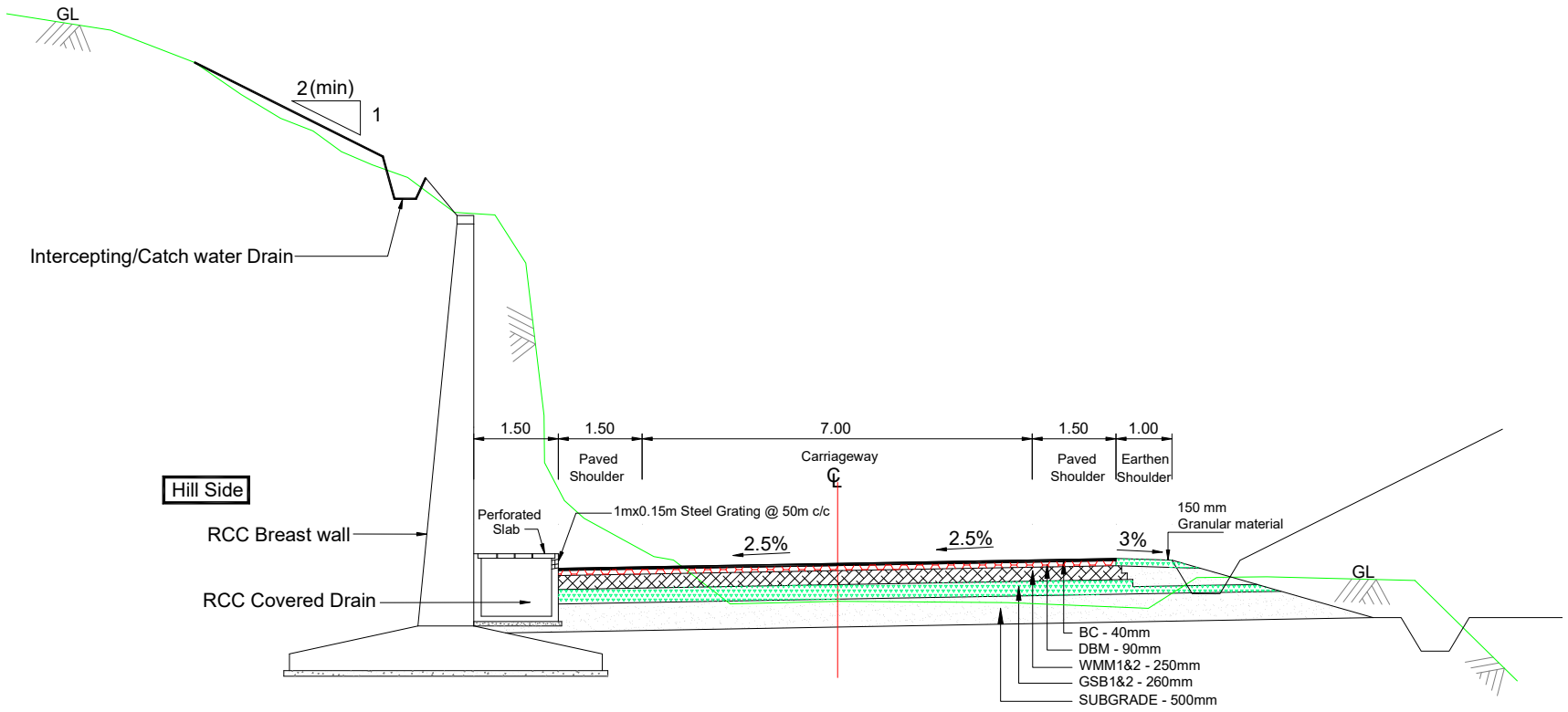
(Open Country - Mountainous Terrain)



TCS - 17 : 2-Lane Carriageway with one side Covered Drain and another side Normal Cut/Fill (Hill Side Cutting / Fill and River (Built-up Section-Mountainous Terrain)

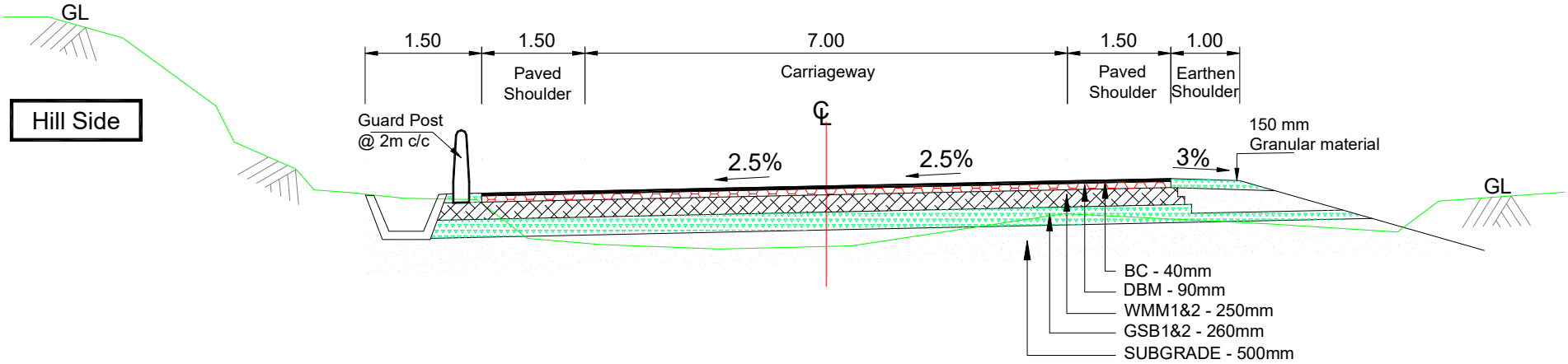


TCS - 18 : 2-Lane Carriageway with one side RCC Breast wall and another side Toe/ Retaining Wall (Built-up Section-Mountainous Terrain)



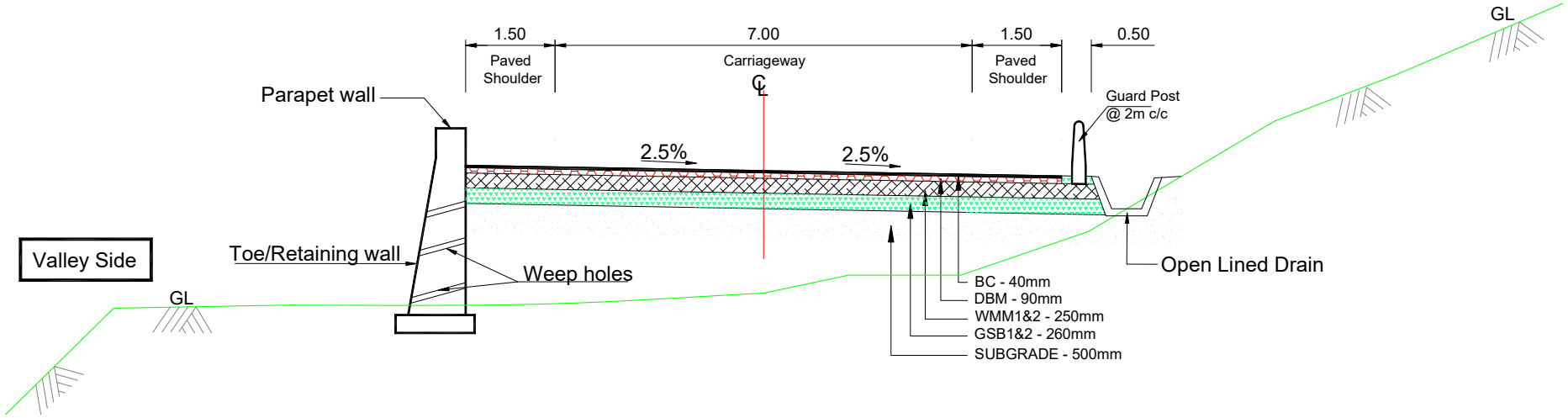
TCS - 20 : 2-Lane Carriageway with one side RCC Breast wall with Cover drain and another side Normal Cut/Fill

(Built-up Section-Mountainous Terrain)



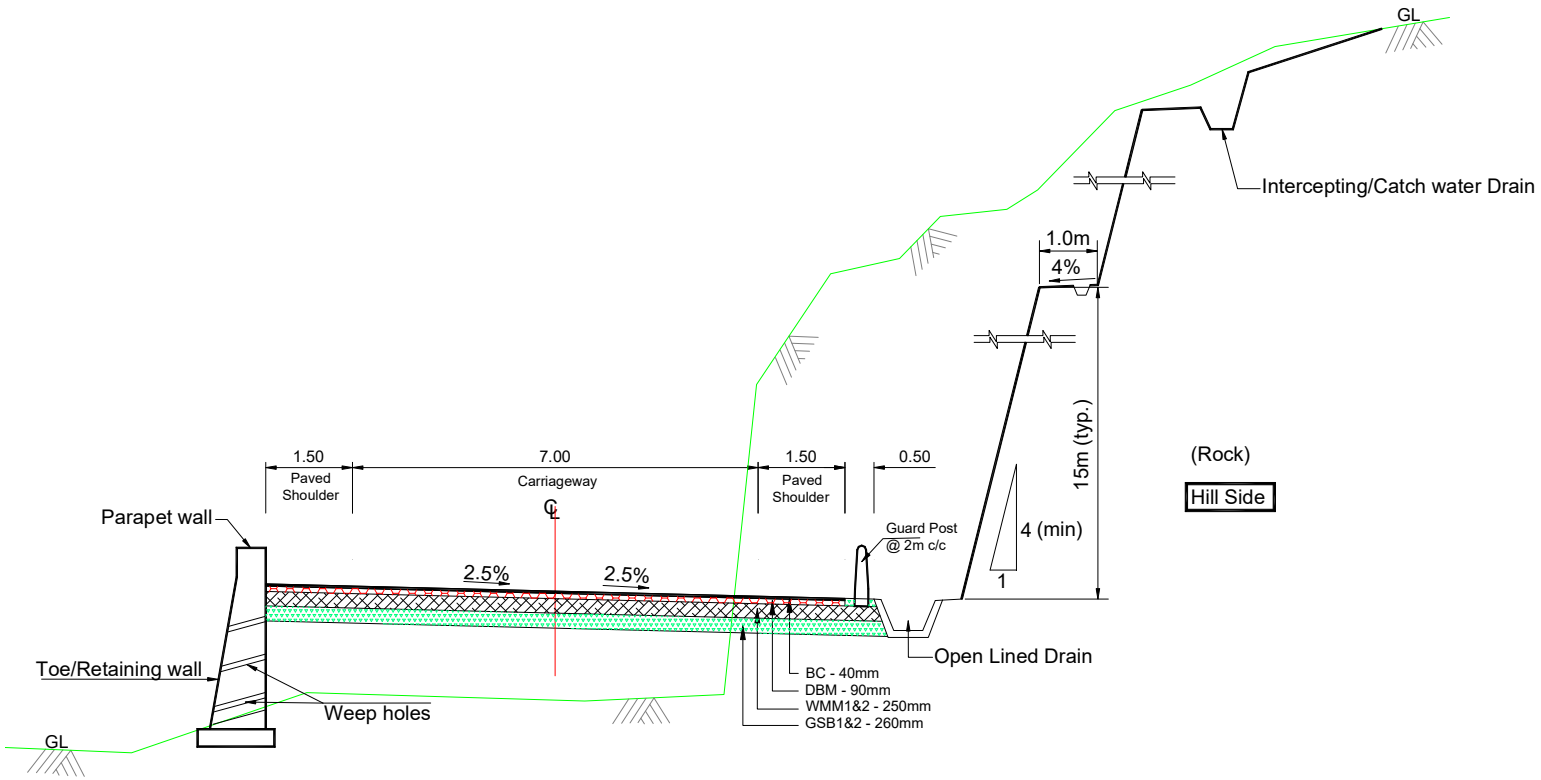
TCS - 21 : 2-Lane Carriageway with one side Open Lined Drain and another side Normal Cut/Fill

(Open Country - Mountainous Terrain)



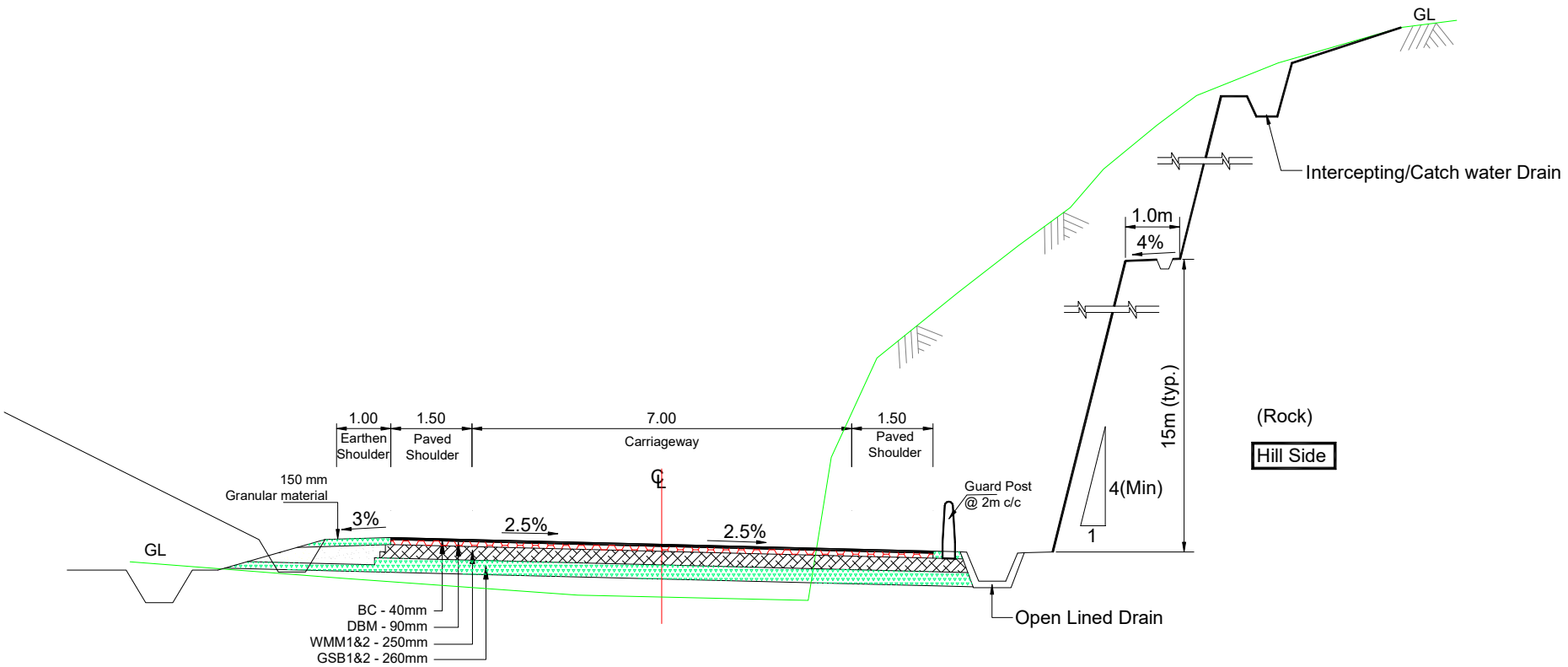
TCS - 22 : 2-Lane Carriageway with one side Toe/Retaining Wall and another side Open Lined Drain

(Open Country - Mountainous Terrain)



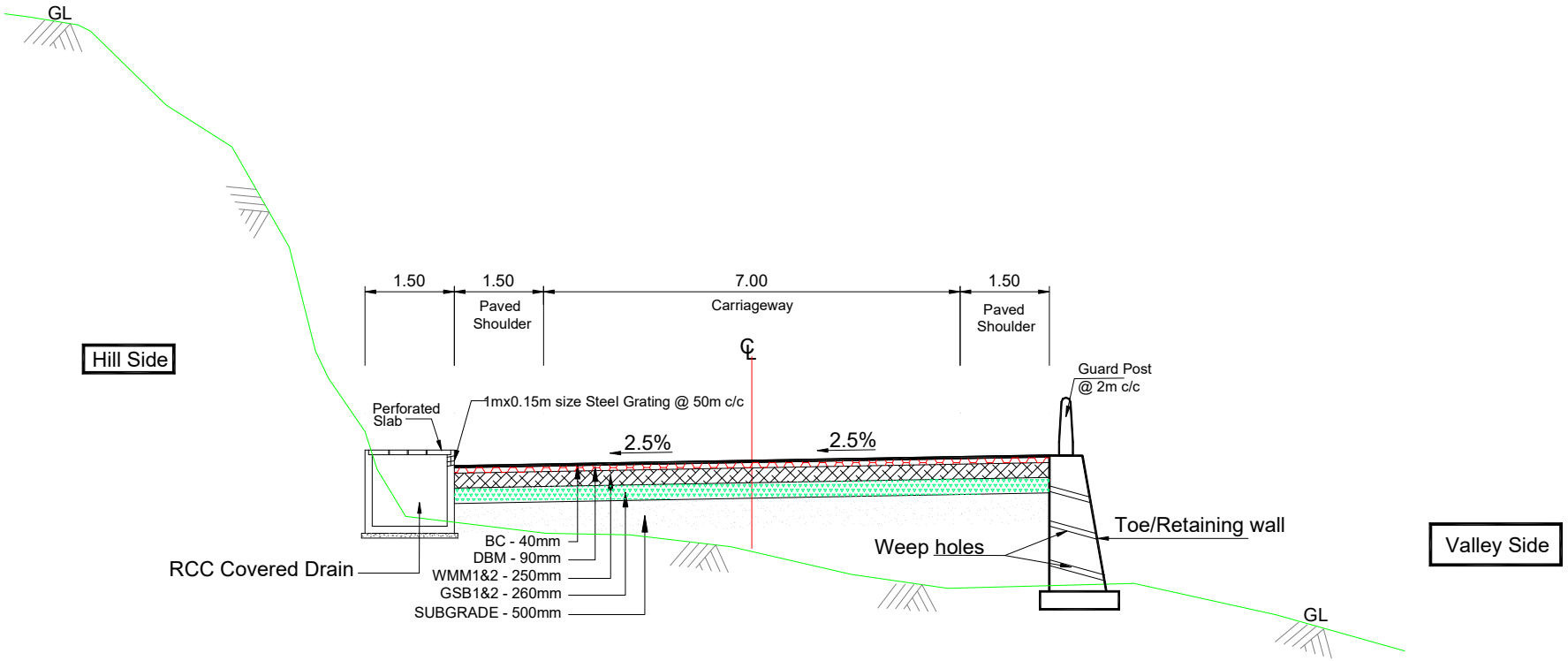
TCS - 24 : 2-Lane Carriageway with one side Rock Cutting and another side Toe/ Retaining wall)

(Open Country - Mountainous Terrain)



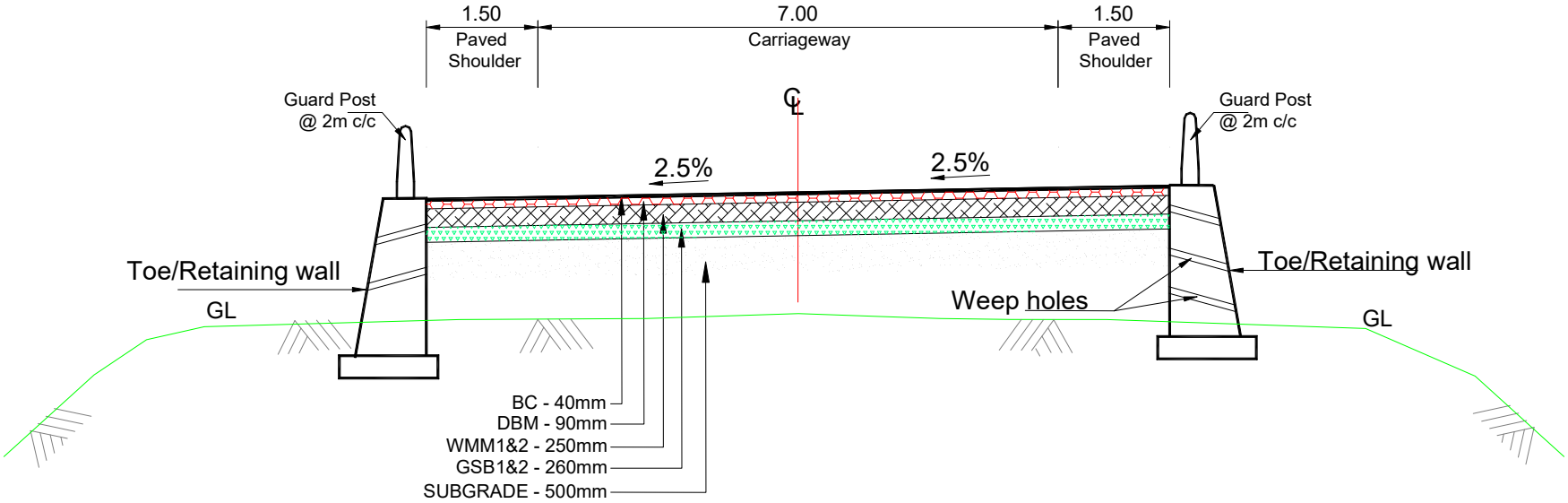
TCS - 25 : 2-Lane Carriageway with one side normal cut/Fill and another side Rock Cutting

(Open Country - Mountainous Terrain)



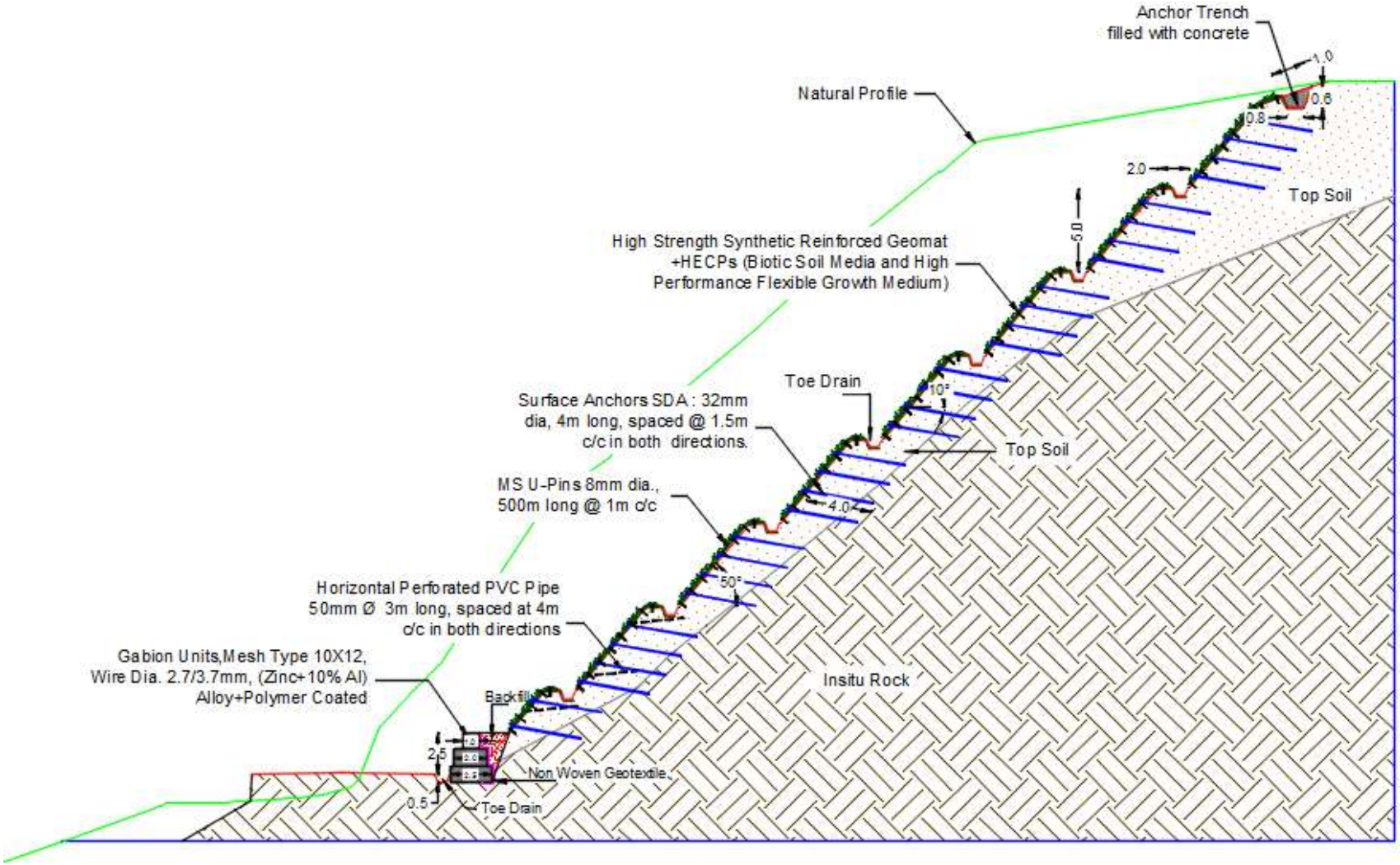
TCS - 26: 2-Lane Carriageway with one side Covered Drain and another side Toe/ Retaining Wall

(Built-up Section-Mountainous Terrain)

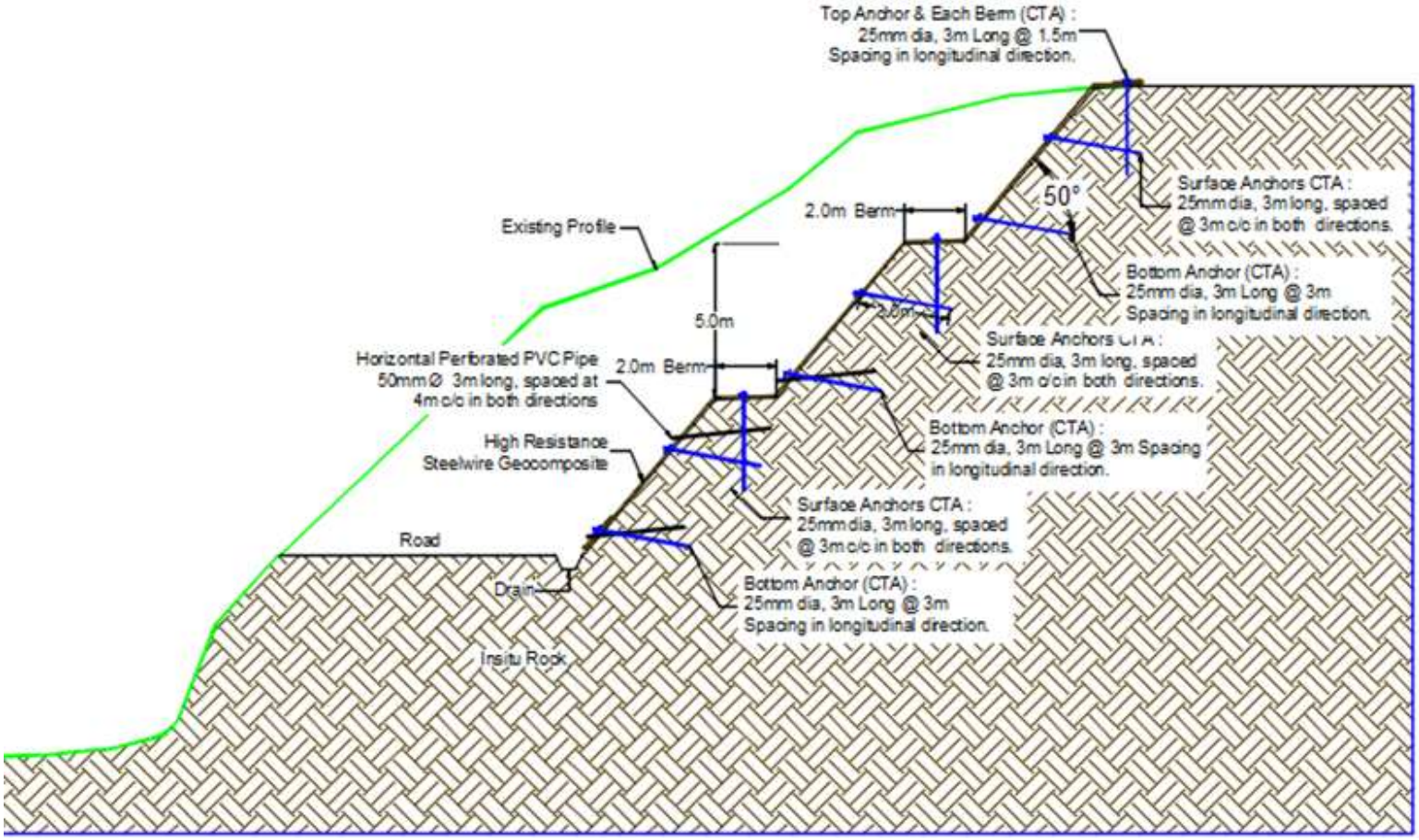


TCS - 27 : 2-Lane Carriageway with Both Sides Toe/Retaining Walls

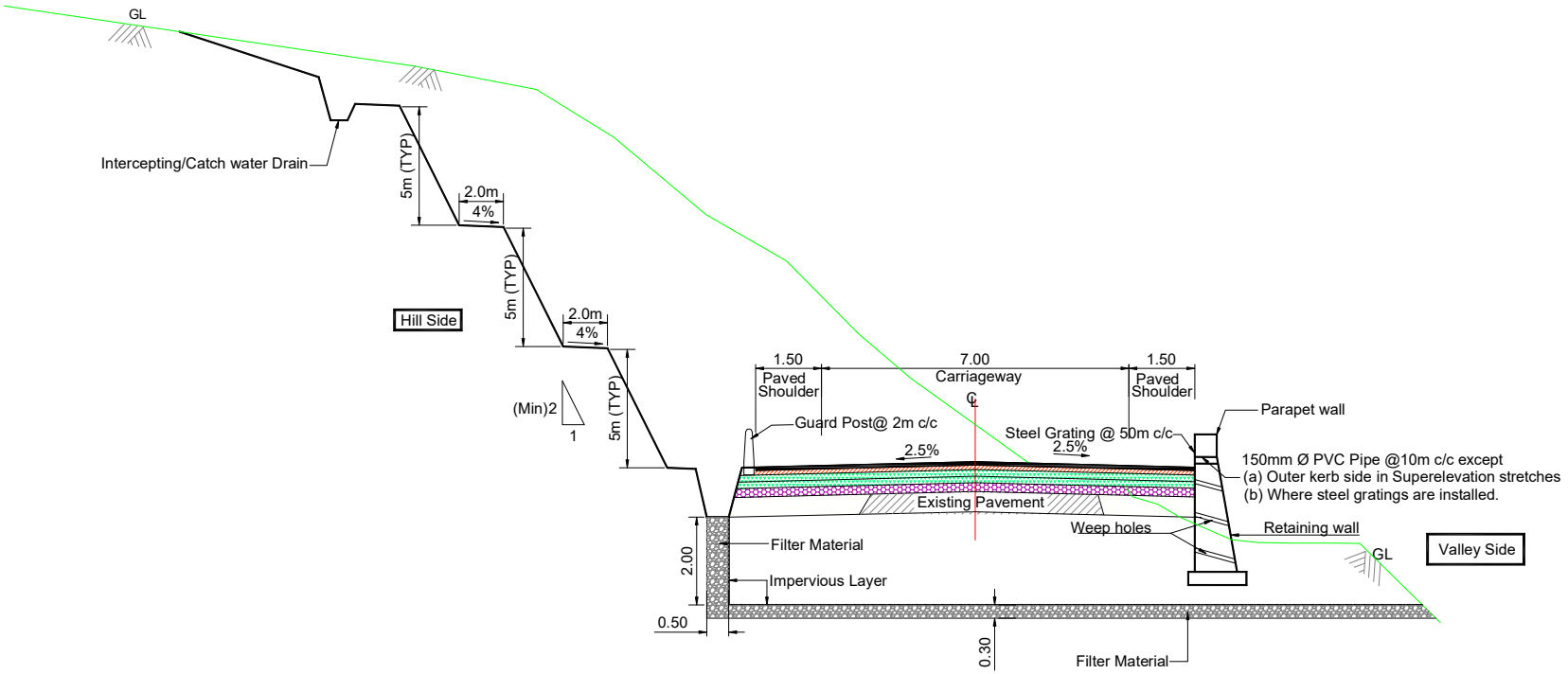
(Open Country - Mountainous Terrain)



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



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



Typical Sinking Measures using Vertical Cut-off drain

Applicable Stretches of Typical Cross-section

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
	185+540	193+240	7700	**Bituminous Overlay only on Ex. CW**
Match Equation Ex Km 193+240 of Nh-39 = Design Chainage Km193+160				
1	193+160	193+285	125	TCS – 21
2	193+285	193+300	15	TCS – 22
3	193+300	193+360	60	TCS – 15
4	193+360	193+425	65	TCS – 14
5	193+425	193+450	25	TCS – 15
6	193+450	193+570	120	TCS – 22
7	193+570	193+600	30	TCS – 15
8	193+600	193+680	80	TCS – 14
9	193+680	193+825	145	TCS – 21
10	193+825	193+870	45	TCS – 22
11	193+870	193+900	30	TCS – 15
12	193+900	193+930	30	TCS – 14
13	193+930	194+220	290	TCS – 21
14	194+220	194+320	100	TCS – 15
15	194+320	194+400	80	TCS – 14
16	194+400	194+570	170	TCS – 25
17	194+570	194+610	40	**Bridge**
18	194+610	194+740	130	TCS – 25
19	194+740	194+855	115	TCS – 22
20	194+855	195+050	195	TCS – 21
21	195+050	195+130	80	TCS – 17
22	195+130	195+170	40	TCS – 20
23	195+170	195+430	260	TCS – 26
24	195+430	195+490	60	TCS – 18
25	195+490	195+540	50	TCS – 26
26	195+540	195+590	50	TCS – 20
27	195+590	195+605	15	TCS – 17
28	195+605	195+660	55	TCS – 26
29	195+660	195+700	40	TCS – 18
30	195+700	195+800	100	TCS – 26
31	195+800	195+840	40	TCS – 18
32	195+840	196+120	280	TCS – 26
33	196+120	196+240	120	TCS – 18
34	196+240	196+310	70	TCS – 26
35	196+310	196+430	120	TCS – 18
36	196+430	196+490	60	TCS – 26
37	196+490	196+540	50	TCS – 18

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
38	196+540	196+820	280	TCS – 26
39	196+820	196+960	140	TCS – 17
40	196+960	197+000	40	TCS – 26
41	197+000	197+110	110	TCS – 18
42	197+110	197+190	80	TCS – 26
43	197+190	197+345	155	TCS – 18
44	197+345	197+440	95	TCS – 20
45	197+440	197+600	160	TCS – 26
46	197+600	197+620	20	TCS – 22
47	197+620	197+760	140	TCS – 21
48	197+760	197+790	30	TCS – 14
49	197+790	197+810	20	TCS – 15
50	197+810	197+840	30	TCS – 22
51	197+840	197+860	20	TCS – 21
52	197+860	197+930	70	TCS – 14
53	197+930	197+960	30	TCS – 15
54	197+960	198+060	100	TCS – 22
55	198+060	198+135	75	TCS – 14
56	198+135	198+160	25	TCS – 15
57	198+160	198+205	45	TCS – 14
58	198+205	198+225	20	TCS – 15
59	198+225	198+265	40	TCS – 14
60	198+265	198+370	105	TCS – 15
61	198+370	198+410	40	TCS – 22
62	198+410	198+460	50	TCS – 15
63	198+460	198+480	20	TCS – 14
64	198+480	198+525	45	TCS – 21
65	198+525	198+560	35	TCS – 22
66	198+560	198+620	60	TCS – 21
67	198+620	198+640	20	TCS – 14
68	198+640	198+660	20	TCS – 15
69	198+660	198+677	17	TCS – 21
70	198+677	198+691	14	**Bridge**
71	198+691	198+800	109	TCS – 21
72	198+800	198+820	20	TCS – 15
73	198+820	198+850	30	TCS – 21
74	198+850	198+880	30	TCS – 15
75	198+880	198+940	60	TCS – 14
76	198+940	198+980	40	TCS – 15
77	198+980	199+140	160	TCS – 14
78	199+140	199+150	10	TCS – 15
79	199+150	199+210	60	TCS – 26

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
80	199+210	199+230	20	TCS – 18
81	199+230	199+300	70	TCS – 20
82	199+300	199+500	200	TCS – 26
83	199+500	199+550	50	TCS – 17
84	199+550	199+730	180	TCS – 26
85	199+730	199+800	70	TCS – 18
86	199+800	199+910	110	TCS – 22
87	199+910	199+930	20	TCS – 15
88	199+930	200+030	100	TCS – 22
89	200+030	200+190	160	TCS – 15
90	200+190	200+280	90	TCS – 22
91	200+280	200+400	120	TCS – 15
92	200+400	200+460	60	TCS – 22
93	200+460	200+470	10	TCS – 24
94	200+470	200+580	110	TCS – 25
95	200+580	200+725	145	TCS – 24
96	200+725	200+850	125	TCS – 25
97	200+850	200+892	42	TCS – 22
98	200+892	200+902	10	**Bridge**
99	200+902	200+920	18	TCS – 22
100	200+920	200+960	40	TCS – 21
101	200+960	201+060	100	TCS – 14
102	201+060	201+120	60	TCS – 21
103	201+120	201+190	70	TCS – 25
104	201+190	201+200	10	TCS – 21
105	201+200	201+250	50	TCS – 22
106	201+250	201+310	60	TCS – 25
107	201+310	201+370	60	TCS – 22
108	201+370	201+590	220	TCS – 25
109	201+590	201+650	60	TCS – 24
110	201+650	201+825	175	TCS – 25
111	201+825	201+860	35	TCS – 24
112	201+860	201+880	20	TCS – 22
113	201+880	201+890	10	TCS – 21
114	201+890	201+950	60	TCS – 14
115	201+950	201+985	35	TCS – 15
116	201+985	202+050	65	TCS – 14
117	202+050	202+120	70	TCS – 22
118	202+120	202+140	20	TCS – 15
119	202+140	202+200	60	TCS – 14
120	202+200	202+230	30	TCS – 21
121	202+230	202+345	115	TCS – 22

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
122	202+345	202+370	25	TCS – 21
123	202+370	202+505	135	TCS – 14
124	202+505	202+530	25	TCS – 15
125	202+530	202+600	70	TCS – 14
126	202+600	202+620	20	TCS – 15
127	202+620	202+670	50	TCS – 14
128	202+670	202+740	70	TCS – 21
129	202+740	202+790	50	TCS – 14
130	202+790	202+830	40	TCS – 15
131	202+830	202+920	90	TCS – 16
132	202+920	203+090	170	TCS – 15
133	203+090	203+130	40	TCS – 22
134	203+130	203+230	100	TCS – 14
135	203+230	203+280	50	TCS – 22
136	203+280	203+330	50	TCS – 15
137	203+330	203+410	80	TCS – 22
138	203+410	203+450	40	TCS – 15
139	203+450	203+540	90	TCS – 22
140	203+540	203+610	70	TCS – 15
141	203+610	203+675	65	TCS – 22
142	203+675	203+690	15	TCS – 21
143	203+690	203+770	80	TCS – 14
144	203+770	203+785	15	TCS – 21
145	203+785	203+890	105	TCS – 22
146	203+890	204+050	160	TCS – 15
147	204+050	204+160	110	TCS – 14
148	204+160	204+270	110	TCS – 16
149	204+270	204+310	40	TCS – 22
150	204+310	204+385	75	TCS – 14
151	204+385	204+450	65	TCS – 15
152	204+450	204+480	30	TCS – 22
153	204+480	204+490	10	TCS – 21
154	204+490	204+530	40	TCS – 14
155	204+530	204+570	40	TCS – 21
156	204+570	204+610	40	TCS – 22
157	204+610	204+690	80	TCS – 15
158	204+690	204+740	50	TCS – 14
159	204+740	204+770	30	TCS – 15
160	204+770	204+830	60	TCS – 22
161	204+830	204+920	90	TCS – 15
162	204+920	205+070	150	TCS – 22
163	205+070	205+150	80	TCS – 14

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
164	205+150	205+200	50	TCS – 22
165	205+200	205+290	90	TCS – 15
166	205+290	205+405	115	TCS – 14
167	205+405	205+430	25	TCS – 15
168	205+430	205+540	110	TCS – 14
169	205+540	205+640	100	TCS – 15
170	205+640	205+700	60	TCS – 22
171	205+700	205+840	140	TCS – 15
172	205+840	205+900	60	TCS – 14
173	205+900	205+920	20	TCS – 21
174	205+920	205+980	60	TCS – 22
175	205+980	206+030	50	TCS – 21
176	206+030	206+070	40	TCS – 14
177	206+070	206+100	30	TCS – 22
178	206+100	206+110	10	TCS – 21
179	206+110	206+240	130	TCS – 14
180	206+240	206+270	30	TCS – 15
181	206+270	206+650	380	TCS – 14
182	206+650	206+910	260	TCS – 25
183	206+910	206+932	22	TCS – 21
184	206+932	206+956	24	**Bridge**
185	206+956	206+970	14	TCS – 21
186	206+970	207+100	130	TCS – 25
187	207+100	207+160	60	TCS – 14
188	207+160	207+230	70	TCS – 21
189	207+230	207+390	160	TCS – 14
190	207+390	207+420	30	TCS – 21
191	207+420	207+480	60	TCS – 22
192	207+480	207+490	10	TCS – 21
193	207+490	207+620	130	TCS – 14
194	207+620	207+730	110	TCS – 15
195	207+730	207+750	20	TCS – 22
196	207+750	207+770	20	TCS – 21
197	207+770	207+820	50	TCS – 14
198	207+820	207+870	50	TCS – 15
199	207+870	207+950	80	TCS – 14
200	207+950	208+150	200	TCS – 22
201	208+150	208+300	150	TCS – 14
202	208+300	208+313	13	TCS – 22
203	208+313	208+353	40	**Bridge**
204	208+353	208+370	17	TCS – 22
205	208+370	208+390	20	TCS – 21

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
206	208+390	208+670	280	TCS – 14
207	208+670	208+755	85	TCS – 22
208	208+755	208+770	15	TCS – 21
209	208+770	208+800	30	TCS – 14
210	208+800	208+845	45	TCS – 20
211	208+845	208+910	65	TCS – 18
212	208+910	208+970	60	TCS – 20
213	208+970	209+100	130	TCS – 17
214	209+100	209+130	30	TCS – 20
215	209+130	209+320	190	TCS – 17
216	209+320	209+395	75	TCS – 20
217	209+395	209+470	75	TCS – 18
218	209+470	209+510	40	TCS – 22
219	209+510	209+600	90	TCS – 14
220	209+600	209+625	25	TCS – 22
221	209+625	209+728	103	TCS – 21
222	209+728	209+768	40	**Bridge**
223	209+768	209+800	32	TCS – 22
224	209+800	209+830	30	TCS – 21
225	209+830	209+890	60	TCS – 14
226	209+890	209+940	50	TCS – 15
227	209+940	210+120	180	TCS – 14
228	210+120	210+155	35	TCS – 21
229	210+155	210+210	55	TCS – 22
230	210+210	210+360	150	TCS – 21
231	210+360	210+410	50	TCS – 22
232	210+410	210+440	30	TCS – 21
233	210+440	210+485	45	TCS – 14
234	210+485	210+520	35	TCS – 15
235	210+520	210+570	50	TCS – 14
236	210+570	210+650	80	TCS – 22
237	210+650	210+720	70	TCS – 27
238	210+720	210+775	55	TCS – 14
239	210+775	210+790	15	TCS – 15
240	210+790	210+805	15	TCS – 22
241	210+805	210+830	25	TCS – 21
242	210+830	210+870	40	TCS – 14
243	210+870	210+955	85	TCS – 22
244	210+955	210+970	15	TCS – 21
245	210+970	211+055	85	TCS – 14
246	211+055	211+080	25	TCS – 15
247	211+080	211+250	170	TCS – 14

S. No.	Design Chainage (Km)		Length (m)	TCS Type
	From	To		
248	211+250	211+300	50	TCS – 15
249	211+300	211+365	65	TCS – 14
250	211+365	211+390	25	TCS – 15
251	211+390	211+709	319	TCS – 14

Total Length (m) of each TCS:		
TCS-14	990	2-Lane Carriageway with one side Hill Cutting and another side Normal Cut/Fill in Open Country - Mountainous Terrain
TCS-15	6399	2-Lane Carriageway with one side Hill Cutting and another side Toe/Retaining Wall in Open Country - Mountainous Terrain
TCS-16	200	2-Lane Carriageway with both sides Hill Cutting & Open Lined Drains (Through Cutting) in Open Country - Mountainous terrain
TCS-17	180	2-Lane Carriageway with one side Covered Drain and another side Normal Cut/Fill in Built-up Section-Mountainous Terrain.
TCS-18	1360	2-Lane Carriageway with one side RCC Breast wall and another side Toe/ Retaining Wall in Built-up Section-Mountainous Terrain)
TCS-20	30	2-Lane Carriageway with one side RCC Breast wall with Cover drain and another side Normal Cut/Fill in Built-up Section-Mountainous Terrain.
TCS-21	516	2-Lane Carriageway with oneside Open Lined Drain and another side Normal Cut/Fillin Open Country - Mountainous Terrain
TCS-22	4636	2-Lane Carriageway with one side Toe/Retaining Wall and another side Open Lined Drain in Open Country - Mountainous Terrain
TCS-24	1130	2-Lane Carriageway with one side Rock Cutting and another side Toe/Retaining wall in Open Country - Mountainous Terrain
TCS-25	570	2-Lane Carriageway with one side normal cut/Fill and another side Rock Cutting in Open Country - Mountainous Terrain
TCS-26	2300	2-Lane Carriageway with one side Covered Drain and another side Toe/ Retaining Wall in Built-up Section-Mountainous Terrain.
TCS-27	70	2-Lane Carriageway with Both Sides Toe/Retaining Walls
Bridges	168	Bridge Section as per GAD

SCHEDULE – C
(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

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

(a) Roadside furniture

(b) Pedestrian facilities

(c) Tree plantation

(d) Bus shelters

(e) Passing Places

(f) Truck lay byes and

(g) Others to be specified

2 Description of Project Facilities

Toll Plaza

NIL

Bus Shelters

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

Bus shelters shall be provided on the Project Highway at 12 locations as mentioned herein under. Bus shelters shall be constructed as per Manual on both sides of the Project Highway. These bus shelters will also have passenger shelter.

Details of Bus shelters

S No	Design Chainage (Km)	Side	Village Name
1	194+043	Both	Kohima
2	196+353	Both	Kigwema
3	197+223	LHS	Zakhama
4	197+303	RHS	Zakhama
5	201+658	RHS	Khuzama
6	201+733	LHS	Khuzama
7	203+603	Both	Vishama
8	208+643	RHS	Khuzama
9	208+723	LHS	Khuzama
10	209+658	LHS	Khuzama
11	209+713	RHS	Khuzama
12	212+473	Both	Mao

Truck lay byes

It shall be provided at the following locations for a capacity of minimum 10 trucks at each location.

Sl. No.	Truck lay bye Chainage(Both Side)	Name of the Place
Nil		

Pedestrian Facilities

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

Landscaping

Landscape treatment of the Project Highway shall be undertaken through planting of trees and ground cover of appropriate varieties and landscaping on surplus land in the ROW. The Construction Contractor should plant at least 3000 nos. of trees of minimum 6 ft. height with tree guard made up of MS sections.

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

Environment

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

SCHEDULE – D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1. Construction

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

2. Design Standards

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

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

Annex – I
(Schedule – D)

Specifications and Standards for Construction

1 Specifications and Standards

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

2 Deviations from the Specifications and Standards

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

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

S. No.	Clause	Provision as per Manual (IRC:SP:73-2018)	Modified Provision
1	2.2	**Design Speed:** Ruling or minimum Design speed shall be followed	Design speed shall be 30 km/h for project highway excepting hair pin bend locations wherein design speed shall be 20 km/h. The same is mentioned in the Plan &Profile drawings given in **Annexure-III** of **Schedule A.**
2	2.7.2	**Roadway Width:** On horizontal curves with radius up to 300 m width of pavement and roadway shall be increased as per Table 2.4	On horizontal Curves with radius up to 300 m width of pavement and roadway shall be increased as per Plan & Profile drawings given in Annexure – III of Schedule A
3	2.9.4	**Radius of Horizontal Curves:**	Radius of Horizontal curves shall be as per the alignment plan shown in

S. No.	Clause	Provision as per Manual (IRC:SP:73-2018)	Modified Provision
			Plan & Profile drawings given in **Annexure-III** of **Schedule A.**

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1. Maintenance Requirements

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

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

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

2.Repair/Rectification of Defects and Deficiencies

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

3. Other Defects and Deficiencies

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

4. Extension of Time Limit

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

5. Emergency Repairs/Restoration

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

6. Daily inspection by the Contractor

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

7. Pre-monsoon Inspection / Post-monsoon Inspection

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

8. Repairs on account of natural calamities

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

Annex - I

(Schedule-E)

Repair/rectification of Defects and Deficiencies

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

Nature of Defect or deficiency		Time limit for repair/rectification
ROADS		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
(ii)	Roughness value exceeding 2,200 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	120 (one hundred and twenty) days
(iii)	Pot holes	24 hours
(iv)	Any cracks in road surface	15 (fifteen) days
(v)	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
(vi)	Bleeding/skidding	7 (seven) days
(vii)	Any other defect/distress on the road	15 (fifteen) days
(viii)	Damage to pavement edges	15 (fifteen) days
(ix)	Removal of debris, dead animals	6 hours
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	Desilting of drains in urban/semi-urban areas	24 hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days

Nature of Defect or deficiency		Time limit for repair/rectification
(d)	**Road Lighting**	
(i)	Any major failure of the system	24 hours
(ii)	Faults and minor failures	8 hours
(e)	**Trees and Plantation**	
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
(ii)	Removal of fallen trees from carriageway	4 hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30 (thirty) days
(v)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(f)	**Rest Area**	
(i)	Cleaning of toilets	Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	24 hours
(g)	**Toll Plazas**	
(h)	**Other Project Facilities and Approach Roads**	
(i)	Damage in approach roads, pedestrian facilities, truck lay-byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	15 (fifteen) days
(ii)	Damaged vehicles or debris on the road	4 (four) hours
(iii)	Malfunctioning of the mobile crane	4 (four) hours
	Bridges	
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 hours within 15 (fifteen) days or as specified by the Authority's Engineer
(b)	**Foundations**	
(i)	Scouring and/or cavitation	15 (fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
(d)	**Bearings (metallic) of bridges**	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric bearings	7 (seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3 (three) days

Nature of Defect or deficiency		Time limit for repair/rectification
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7 (seven) days
(v)	Damage to wearing coat	15 (fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Damage to retaining wall/breast wall	7 (seven) days
(ii)	Landslides requiring clearance	12 (twelve) hours
(iii)	Snow requiring clearance	24 (twenty four) hours

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

SCHEDULE - F
(See Clause 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

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

a) Permission of the State Government for extraction of boulders from quarry;
b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
c) License for use of explosives;
d) Permission of the State Government for drawing water from river/reservoir;
e) License from inspector of factories or other competent Authority for setting up batching plant;
f) Clearance of Pollution Control Board for setting up batching plant;
g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
h) Permission of Village Panchayats and State Government for borrow earth; and
i) Any other permits or clearances required under Applicable Laws.

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

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

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

SCHEDULE - G
(See Clauses 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I
(See Clause 7.1.1)
Performance Security

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

WHEREAS:

_____ [name and address of contractor] (hereinafter called the "**Contractor**") and Managing Director, NHIDCL, PTI Building, 3rd Floor, 4, Parliament Street, New Delhi-110001(hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") for the **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode**

, subject to and in accordance with the provisions of the Agreement

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

B. We, …….. through our branch at …….. (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") 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 & Infrastructural 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, fulfilment 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 fulfilment, 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.

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

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

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

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

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 7.5.3)

Form for Guarantee for Withdrawal of Retention Money

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

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the and The Managing Director , NHIDCL, PTI Building, New Delhi (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") for the **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode**

, subject to and in accordance with the provisions of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)
(Name)
(Designation)
(Code Number)
(Address)
NOTES:

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

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

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

Form for Guarantee for Advance Payment

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

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "Contractor") has executed an agreement (hereinafter called the "Agreement") with the Managing Director, Head Office New Delhi (hereinafter called the "Authority") have entered into an agreement (hereinafter called the "Agreement") for the **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode**

, subject to and in accordance with the provisions of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

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

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

[$] 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).

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

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

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

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

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

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(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	57%	**A-Widening and Strengthening of Existing Road**	
		(1) Earthwork up to top of the sub-grade	14.37%
		(2) Sub Base Course	15.17%
		(3) Non Bituminous Base Course	16.65%
		(4) Bituminous Base Course	19.49%
		(5) Bituminous Concrete	9.04%
		(6) Widening and repair of culverts	10.38%
		B.1- Reconstruction/ New 2Lane+PS/Realignment/ Bypass (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)	
		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)	14.90%

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
Minor Bridges / Underpasses/ Overpasses	3.77%	**A.1- Widening and Repair of Minor bridges (length>6m and <60m)**	
		Minor Bridges	8.47%
		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	28.96%
		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	59.64%
		3. Approaches: On completion of approaches including Retaining walls, stone pitching, protection works, filter media. etc., complete in all respects & fit for use.	2.93%
		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)	

Item	Weightage in Percentage to the Contract Price	Stage of for Payment	Percentage Weightage
1	2	3	4
		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)	
Other Works	39.23%	(ii) . Road Side Drain	21.15%
		(iii).Road signs, markings, km stones, safety devices…	4.11%
		(iv).Project Facilities a) Bus Shelter b) Truck lay byes	1.08%
		(v) Road side Plantation	0.1%
		(vi) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs	
		(vii) Protection works a) Retaining wall b) Breast wall c) Surfacial protection and Erosion Control Measures (Cut Height of Side slope >25m) d) Hydroseeding and seeding and mulching	31.78% 18.00% 11.10% 4.57
		(viii) Safety and Traffic Management during Construction	8.11%

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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		
(1) Earthwork up to top of the sub-grade	14.37%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5(five) percent of the total length.
(2) Sub Base Course	15.17%	
(3) Non Bituminous Base Course (WMM)	16.65%	
(4) Bituminous Base Course (DBM)	19.49%	
(5) Wearing Coat (Bituminous Concrete)	9.04%	
(6) Widening and repair of culverts	10.38%	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 3(three) Culverts.
B.1- Reconstruction/ New 2Lane+PS/Realignment/ Bypass (Flexible Pavement)		
(1) Earthwork up to top of the sub-grade		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 5(five) percent of the total length.
(2) Sub Base Course		
(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, Culvert (length<6m)	14.90%	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 3(three) Culverts.

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@. 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)	8.47%	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	28.96%	**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

Stage of Payment	Percentage Weightage	Payment Procedure
		least two foundations along 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	59.64%	**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.	2.93%	**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

Stage of Payment	Percentage Weightage	Payment Procedure
		with sub-structure upto 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

Stage of Payment	Percentage Weightage	Payment Procedure
		with respect to the total linear 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

Stage of Payment	Percentage Weightage	Payment Procedure
		all miscellaneous works like 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	21.15%	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…	4.11%	
(iv) Project facilities		

Stage of Payment	Percentage Weightage	Payment Procedure
a) Bus Shelter	1.08%	Payment shall be made on pro rata basis for completed facilities.
b) Truck lay-byes		
(v) Roadside plantation	0.1%	Unit of measurement is linear length.
(vii) Protection works other than approaches to the bridges, elevated section/flyover/grade separator and ROBs/ RUBs		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 per cent) of the total length or 10% of the area for seeding and mulching
(viii) Protection works a) Retaining b) Breast wall c) Surficial protection and Erosion Control Measures (Cut Height of Side slope >25m) d) Hydroseeding and seeding and mulching	 52.17% 20.39% 13.28% 4.57%	
(ix) Safety and traffic management during construction	8.11%	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 10.2.4)

DRAWINGS

1 Drawings

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

2 Additional Drawings

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

Annex - I
(Schedule - I)

List of Drawings

[Note: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

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

   (a) Drawing of plan, profile and cross sections

   (b) Drawings of cross drainage works

   (c) Drawings of junctions

   (d) Drawing of typical cross sections

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

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

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

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

   (i) Drawings of road drainage measures

   (j) Drawings of typical details slope protection measures

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 **[192th]** day from the Appointed Date (the "**Project Milestone- I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for anamount 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 **[329th]** 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 anamount 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 **[467 st]** day from the Appointed Date (the "**Project Milestone- III**").

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

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the [549th] day from the Appointed Date.

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

6. Extension of time

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

SCHEDULE - K

(See Clause 12.1.2)

TESTS ON COMPLETION

1 Schedule for Tests

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

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

2 Tests

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

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

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

2.4 Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

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

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

3 Agency for conducting Tests

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

4 Completion Certificate

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

SCHEDULE - L
(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …….. (the "Agreement"), for **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode"**

1

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

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

In view of the foregoing, I am satisfied that the Project Road *of* **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode"**

4 can be safely and reliably placed in service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the …… day of …….. 20…..

ACCEPTED, SIGNED, SEALED	SIGNED, SEALED AND
AND DELIVERED	DELIVERED
For and on behalf of	for and on behalf of
CONTRACTOR by:	AUTHORITY's ENGINEER by:

(Signature) (Signature)

COMPLETION CERTIFICATE

1 I, …….. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …….. (the "Agreement"), for **Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode**

(the "Project Highway") on Engineering, Procurement and Construction (EPC) basis through …….. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safely and reliably placed in service of the Users thereof.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of

The Authority's Engineer by:

(Signature)

(Name)

(Designation)

(Address)

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

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

(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidental vehicles, fallen trees, road blockades or malfunctioning of mobile crane	10%
(ii)	Any other Defects in accordance with paragraph 1.	5%
(g)	**Defects in Other Project Facilities**	5%

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

R=P/IOO x M x L1/L

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

M = Monthly lump-sum payment in accordance with the Bid

L1 = Non-complying length

L = Total length of the road,

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

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

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

SCHEDULE - N
(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

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

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

2 Terms of Reference

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

3 Appointment of Government entity as Authority's Engineer

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

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1 Scope

1.1 These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "Agreement), which has been entered into between the National Highways and Infrastructure Development Corporation Ltd, 3rd Floor, PTI Building, 4, Parliament Street, New Delhi – 110001the "Authority") and ..... (the "Contractor") **Construction of two lane with paved shoulder of Kohima-Bypass Road connecting NH-39 (New NH-02), NH-150(New NH-02), NH-61(New NH-29) and NH-39 (New NH-02) from Design Km 32.00 to design Km 43.454 [Design Length – 11.454 Km] in the state of Nagaland Under SARDP-NE on EPC Mode (Package IV)"**

and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

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

2 Definitions and interpretation

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

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

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

3. General

3.1 The Authority'sEngineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

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

(a) any Time Extension;

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

(c) the Termination Payment; or

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

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

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

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

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

4 Construction Period

4.1 During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended up to 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

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

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

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

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

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

4.7 The Authority'sEngineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In

particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

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

4.9 For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

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

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

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

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

4.14 In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the

Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

4.15 The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

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

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

4.18 The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

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

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

5.3 The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in

conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

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

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

6 Determination of costs and time

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

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

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

7. Payments

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

7.2 Authority's Engineer shall -

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

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

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

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

8. Other duties and functions

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

9 Miscellaneous

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

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

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

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

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

SCHEDULE - O

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

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

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

(b) the deductions for maintenance work not done;

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

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

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

SCHEDULE - P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

3.1 The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less

than the amount stated below with no limit on the number of occurrences.

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

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

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

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 **" Upgradation of existing road to 2-Lane with Paved Shoulder from Kohima to Mao from Km 185.540 to Km 211.709 (Design length – 26.249) of NH -39 (New NH – 02) under Bharatmala NH(O) – TSP in the state of Nagaland in EPC mode "**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)