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

SCHEDULES

For

"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"

March, 2023

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

New Delhi – 110001

Schedule-A

Schedule- A

(See Clauses 2.1 and 8.1)

Site of the Project

1. TheSite

(i) Site of the Two-Lane (proposed 4-lane divided carriageway)Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this **Schedule-A**

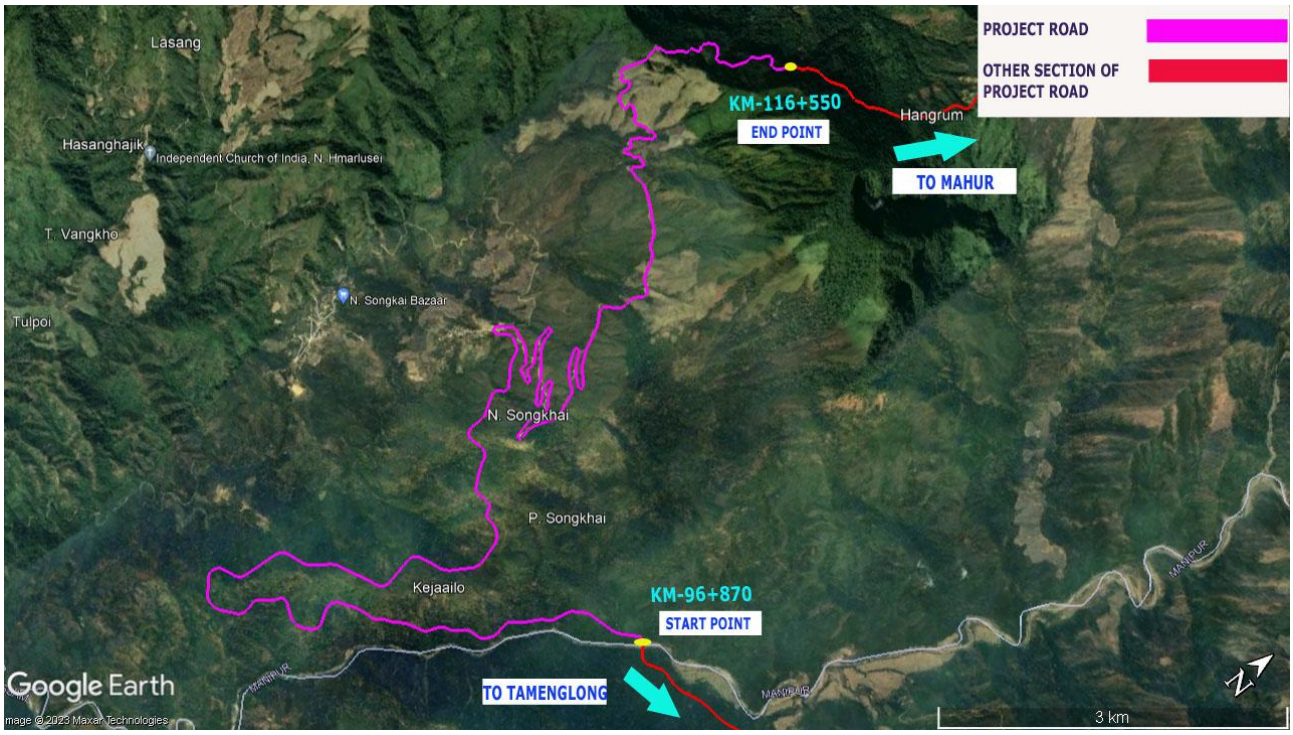
(ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

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

(iv) The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. 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 Annex-III based on site/design requirement.

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

KEY PLAN


PROJECT ROAD
OTHER SECTION OF PROJECT ROAD
Lasang
Hasanghajik
Independent Church of India, N. Hmarlusei
T. Vangkhe
N. Songkai Bazaar
Tulpoi
N. Songkhai
P. Songkhai
Kejaailo
KM-116+550
END POINT
Hangrum
TO MAHUR
KM-96+870
START POINT
TO TAMENGLONG
MANIPUR
Google Earth
3 km

Annex-I
(Schedule-A)

Site

1. Site

The Site of the two-lane (proposed 2-lanewith paved shoulder carriageway) Project Highway starts near Jiri River (Assam/ Manipur Border) ends near Hangrum (Package-7) from Existing Chainage km 99+287 of NH-137 to km 117+920 of NH 137 (Design Chainage km 96+870 to km 116+550) on Tamenglong - Mahur road in the state of Assam.The land, carriageway and structures comprising the Site are described below.

2. Land

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

S No.	Existing Chainage (km)		Length (m)	Right of Way (m)	Remarks
	From	To			
1	99+287	109+240	9953	0	Green Field
2	109+240	117+920	8680	7	Existing Road

3. Carriageway

The present carriageway of the Project Highway is 3.75m wide& some green field Stretch. The type of the existing pavement is flexible. The detail is given below.

S No.	Existing Chainage (km)		Length (m)	Carriageway Width (m)	Remarks
	From	To			
1	99+287	109+240	9953	-	Green Field
2	109+240	117+920	8680	3.75	-
Total			18633		

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Chainage(km)	Type of super structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Superstructure		
NIL						

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

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

S. No.	Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/RUB
		Foundation	Superstructure			
NIL						

6. Grade separators

The Site includes the following grade separators:

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

7. Minor bridges

The Site includes the following minor bridges:

S. No.	Chainage (km)	Type of super structures			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-structure	Superstructure		
1	114+525	_	_	Bailey Bridge	1x19.8	4.1

8. Railway level crossings

The Site includes the following railway level crossings:

S. No.	Location (km)	Remarks
NIL		

9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

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

10. Culverts

The Site has the following culverts:

S. No.	Chainage(km)	Type of Culvert	Span /Opening with span length (m)	Remarks
1	109570	Slab	1X2	
2	109695	Slab	1X2	
3	109740	Slab	1X1	
4	110020	Slab	1X1	
5	110155	Slab	1X1	
6	110490	Slab	1X1	
7	110885	SLAB	1X3	
8	110985	Slab	1X1	
9	111085	Slab	1X1	
10	111410	HPC	1ROW900	
11	111955	Slab	1X2	
12	112245	Slab	1X1	

S. No.	Chainage(km)	Type of Culvert	Span /Opening with span length (m)	Remarks
13	112100	Slab	1X1	
14	112545	Slab	1X1	
15	113015	SLAB	1X3	
16	113210	SLAB	1X3	
17	113300	SLAB	1X3	
18	113565	Slab	1X2	
19	113835	Slab	1X2	
20	113990	Slab	1X2	
21	114100	Slab	1X1	
22	114610	Slab	1X1	
23	114840	SLAB	1X3	
24	115050	Slab	1X1	
25	115175	SLAB	1X3	
26	115250	Slab	1X1	
27	115420	Slab	1X1	
28	115510	Slab	1X1	
29	115775	Slab	1X1	
30	115860	Slab	1X1	
31	115975	Slab	1X1	
32	116270	SLAB	1X3	
33	116500	HPC	1ROW900	
34	116680	Slab	1X1	
35	116840	SLAB	1X3	
36	117460	Slab	1X2	
37	117550	HPC	1ROW900	
38	117805	SLAB	1X3	

11. Bus bays

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

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

12. Truck Lay byes

The details of truck lay byes are as follows:

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

13. Roadside drains

The details of the roadside drains are as follows:

S. No.	Location	Type

	From km	to km	Masonry/cc (Pucca)	Earthen (Kutcha)
NIL				

14. Major Junctions

The details of major junctions are as follow.

S. No.	Location		At grade	Separated	Category of Cross Road			
	From km	To km			NH	SH	MDR	Others
NIL								

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

15. Minor Junctions

The details of the minor junctions are as follows:

S. No.	Existing Chainage	Design Chainage	Type of Road (BT, CC, Gr.)	Type of Junctions (T,Y,+)	Side	Type of Road (SH/ MDR/ PMGSY/ VR)
1	109+240	-	BT	Y	LHS	To N. Sonkhai Village

16. Bypasses

The details of the bypasses are as follows:

S.No.	Name of bypass (town)	Chainage (km) From km to km	Length
NIL			

17. Details of Existing Utilities Schedule

The existing utilities schedules as below,

17.1 Electrical Utilities

The Site includes the following Electrical Utilities: -

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

S. No	Chainage		Length of line(km) Maintained by PGCIL Department		Nos. of Crossings Maintained by PGCIL Department		Remarks
	From	To	400KV	132KV	400KV	132KV	
NIL							

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

S.No	Chainage		Length of Line(in km)				Nos. of Crossings				Transformer	
	From	To	HT 33KV	HT 11KV	LT 230V	LT 440V	HT 33KV	HT 11KV	LT 230V	LT 440V	No	Capacity
1	99287	117920	-	8670	-			1	-		-	-

0 nos. of Distribution Transformer

c) **Public Health Utilities (Water/Sewage Pipelines)**

(a) The Site includes the following Public Health Utilities: -

S.No	Chainage		Length (in m)				Crossings (in m)				Remarks
	From	To	Water Supply Line		Sewage Line		Water Supply Line		Sewage Line		
			With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	
1	99287	117920	-	160	-	-	-	-	-	-	-

(b) Bore well/Hand Pump within RoW

Sl. No.	Bore Well**		Hand Pump	
	Chainage	Nos	Chainage	Nos
NIL				

(c) Water Tank within RoW

Sl. No.	Water Tank		
	Chainage	Nos	Capacity
NIL			

d) **Any Other Items: 2no.**

Sl. No.	Other Items	
	Items	Nos
1	TP of RSF 2.00m² with internal connection, Back wash with Solar Panels	1
2	CWR 15KL Cap. With Chemical dosing pump	1

18. Other Structures: NIL

Annex-II

(As per Clause 8.3 (i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

(i) Full Right of Way (full width)

Description	Design Chainage (km)		Length (km)	Width (m)	Date of Providing ROW
	From	To			
Full Right of Way (full width)	96.870	97.100	0.230	80.000	Within180 days after Appointed Date
	97.100	98.100	1.000	50.000	
	98.100	98.400	0.300	95.000	
	98.400	99.500	1.100	75.000	
	99.500	100.200	0.700	50.000	
	100.200	105.100	4.900	55.000	
	105.100	106.500	1.400	45.000	
	106.500	106.700	0.200	50.000	
	106.700	107.100	0.400	65.000	
	107.100	107.500	0.400	45.000	
	107.500	108.000	0.500	45.000	
	108.000	108.370	0.370	60.000	
	108.370	109.000	0.630	45.000	
	109.000	109.240	0.240	60.000	
	109.240	109.280	0.040	45.000	
	109.280	109.500	0.220	65.000	
	109.500	109.900	0.400	50.000	
	109.900	111.100	1.200	45.000	
	111.100	111.320	0.220	75.000	
	111.320	114.200	2.880	45.000	
	114.200	116.200	2.000	35.000	
	116.200	116.550	0.350	45.000	

Annex - III

(Schedule-A)

Alignment Plans

The alignment plan of the Project Highway is available on E - Tendering portal of NHIDCL

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

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

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

Annex - IV

(Schedule-A)

Environment Clearances

As per MOEF notification F. No. 21-270/2008-1A.III (dated 22 August 2013), Environmental Clearance is not required for Assam state.

Annexure -V

(Schedule -A)

Centre Line Coordinates of the Project Road

S.N.	Chainage	Northing	Easting
1	96+870	532318.742	2774964.558
2	96+880	532308.799	2774965.445
3	96+890	532298.877	2774964.339
4	96+900	532289.372	2774961.283
5	96+910	532280.665	2774956.4
6	96+920	532273.097	2774949.888
7	96+930	532266.104	2774942.739
8	96+940	532259.112	2774935.591
9	96+950	532252.119	2774928.442
10	96+960	532245.127	2774921.293
11	96+970	532238.134	2774914.144
12	96+980	532231.142	2774906.996
13	96+990	532224.149	2774899.847
14	97+000	532217.157	2774892.698
15	97+010	532210.164	2774885.549
16	97+020	532203.172	2774878.401
17	97+030	532196.179	2774871.252
18	97+040	532189.186	2774864.103
19	97+050	532182.194	2774856.955
20	97+060	532175.201	2774849.806
21	97+070	532168.208	2774842.658
22	97+080	532161.127	2774835.597
23	97+090	532153.764	2774828.832
24	97+100	532146.073	2774822.442
25	97+110	532138.072	2774816.445
26	97+120	532129.782	2774810.855
27	97+130	532121.222	2774805.687
28	97+140	532112.415	2774800.953
29	97+150	532103.382	2774796.665
30	97+160	532094.146	2774792.834
31	97+170	532084.73	2774789.469
32	97+180	532075.159	2774786.578
33	97+190	532065.482	2774784.055
34	97+200	532055.781	2774781.628
35	97+210	532046.08	2774779.201
36	97+220	532036.379	2774776.773
37	97+230	532026.678	2774774.346
38	97+240	532016.977	2774771.919

S.N.	Chainage	Northing	Easting
39	97+250	532007.276	2774769.492
40	97+260	531997.575	2774767.065
41	97+270	531987.874	2774764.637
42	97+280	531978.174	2774762.21
43	97+290	531968.473	2774759.783
44	97+300	531958.772	2774757.356
45	97+310	531949.071	2774754.929
46	97+320	531939.37	2774752.501
47	97+330	531929.669	2774750.074
48	97+340	531919.968	2774747.647
49	97+350	531910.267	2774745.22
50	97+360	531900.566	2774742.793
51	97+370	531890.865	2774740.366
52	97+380	531881.164	2774737.938
53	97+390	531871.48	2774735.444
54	97+400	531861.913	2774732.539
55	97+410	531852.557	2774729.014
56	97+420	531843.457	2774724.873
57	97+430	531834.653	2774720.134
58	97+440	531826.184	2774714.82
59	97+450	531818.088	2774708.954
60	97+460	531810.4	2774702.561
61	97+470	531803.152	2774695.675
62	97+480	531796.227	2774688.461
63	97+490	531789.367	2774681.185
64	97+500	531782.507	2774673.909
65	97+510	531775.647	2774666.633
66	97+520	531768.787	2774659.357
67	97+530	531761.927	2774652.081
68	97+540	531755.067	2774644.805
69	97+550	531748.207	2774637.529
70	97+560	531741.347	2774630.252
71	97+570	531734.575	2774622.895
72	97+580	531728.197	2774615.196
73	97+590	531722.593	2774606.921
74	97+600	531718.103	2774597.994
75	97+610	531714.786	2774588.566
76	97+620	531712.359	2774578.867

S.N.	Chainage	Northing	Easting
77	97+630	531710.406	2774569.06
78	97+640	531708.548	2774559.234
79	97+650	531706.689	2774549.408
80	97+660	531704.831	2774539.582
81	97+670	531702.973	2774529.757
82	97+680	531701.115	2774519.931
83	97+690	531699.257	2774510.105
84	97+700	531697.399	2774500.279
85	97+710	531695.541	2774490.453
86	97+720	531693.682	2774480.627
87	97+730	531691.824	2774470.802
88	97+740	531689.855	2774460.998
89	97+750	531687.387	2774451.309
90	97+760	531684.006	2774441.904
91	97+770	531679.446	2774433.013
92	97+780	531673.773	2774424.785
93	97+790	531667.321	2774417.148
94	97+800	531660.466	2774409.868
95	97+810	531653.518	2774402.675
96	97+820	531646.57	2774395.484
97	97+830	531639.622	2774388.292
98	97+840	531632.673	2774381.101
99	97+850	531625.796	2774373.841
100	97+860	531619.27	2774366.267
101	97+870	531613.259	2774358.277
102	97+880	531607.794	2774349.905
103	97+890	531602.821	2774341.23
104	97+900	531598.03	2774332.452
105	97+910	531593.243	2774323.672
106	97+920	531588.457	2774314.892
107	97+930	531583.671	2774306.112
108	97+940	531578.884	2774297.332
109	97+950	531574.098	2774288.552
110	97+960	531569.311	2774279.772
111	97+970	531564.525	2774270.991
112	97+980	531559.739	2774262.211
113	97+990	531554.952	2774253.431
114	98+000	531550.166	2774244.651
115	98+010	531545.38	2774235.871
116	98+020	531540.578	2774227.099
117	98+030	531535.576	2774218.441
118	98+040	531530.173	2774210.027
119	98+050	531524.357	2774201.894
120	98+060	531518.141	2774194.062

S.N.	Chainage	Northing	Easting
121	98+070	531511.543	2774186.549
122	98+080	531504.669	2774179.286
123	98+090	531497.731	2774172.084
124	98+100	531490.793	2774164.882
125	98+110	531483.855	2774157.681
126	98+120	531476.931	2774150.466
127	98+130	531470.213	2774143.06
128	98+140	531464.049	2774135.19
129	98+150	531458.831	2774126.668
130	98+160	531454.788	2774117.53
131	98+170	531451.995	2774107.936
132	98+180	531450.503	2774098.055
133	98+190	531450.335	2774088.064
134	98+200	531451.326	2774078.117
135	98+210	531453.048	2774068.268
136	98+220	531455.062	2774058.473
137	98+230	531457.097	2774048.682
138	98+240	531459.132	2774038.891
139	98+250	531461.167	2774029.1
140	98+260	531463.202	2774019.309
141	98+270	531465.237	2774009.519
142	98+280	531467.272	2773999.728
143	98+290	531469.272	2773989.93
144	98+300	531470.901	2773980.065
145	98+310	531471.696	2773970.101
146	98+320	531471.493	2773960.107
147	98+330	531470.294	2773950.184
148	98+340	531468.11	2773940.429
149	98+350	531464.968	2773930.94
150	98+360	531461.091	2773921.723
151	98+370	531456.934	2773912.628
152	98+380	531452.76	2773903.541
153	98+390	531448.585	2773894.454
154	98+400	531444.411	2773885.367
155	98+410	531440.191	2773876.301
156	98+420	531435.619	2773867.409
157	98+430	531430.322	2773858.933
158	98+440	531424.027	2773851.172
159	98+450	531416.757	2773844.318
160	98+460	531408.639	2773838.49
161	98+470	531399.819	2773833.794
162	98+480	531390.492	2773830.199
163	98+490	531380.902	2773827.372
164	98+500	531371.212	2773824.9

S.N.	Chainage	Northing	Easting
165	98+510	531361.512	2773822.469
166	98+520	531351.812	2773820.038
167	98+530	531342.112	2773817.607
168	98+540	531332.412	2773815.175
169	98+550	531322.712	2773812.744
170	98+560	531313.03	2773810.244
171	98+570	531303.469	2773807.321
172	98+580	531294.206	2773803.566
173	98+590	531285.488	2773798.682
174	98+600	531277.498	2773792.682
175	98+610	531270.376	2773785.673
176	98+620	531264.163	2773777.842
177	98+630	531258.622	2773769.52
178	98+640	531253.407	2773760.988
179	98+650	531248.233	2773752.43
180	98+660	531243.06	2773743.872
181	98+670	531237.887	2773735.314
182	98+680	531232.713	2773726.756
183	98+690	531227.516	2773718.213
184	98+700	531222.022	2773709.86
185	98+710	531215.863	2773701.986
186	98+720	531208.95	2773694.766
187	98+730	531201.351	2773688.272
188	98+740	531193.142	2773682.569
189	98+750	531184.456	2773677.618
190	98+760	531175.553	2773673.065
191	98+770	531166.621	2773668.567
192	98+780	531157.69	2773664.07
193	98+790	531148.797	2773659.497
194	98+800	531140.147	2773654.484
195	98+810	531131.994	2773648.701
196	98+820	531124.46	2773642.132
197	98+830	531117.619	2773634.844
198	98+840	531111.539	2773626.909
199	98+850	531106.282	2773618.407
200	98+860	531101.9	2773609.423
201	98+870	531098.313	2773600.091
202	98+880	531095.117	2773590.615
203	98+890	531091.967	2773581.125
204	98+900	531088.816	2773571.634
205	98+910	531085.666	2773562.143
206	98+920	531082.515	2773552.652
207	98+930	531079.365	2773543.161
208	98+940	531076.203	2773533.675

S.N.	Chainage	Northing	Easting
209	98+950	531072.805	2773524.271
210	98+960	531068.769	2773515.125
211	98+970	531063.738	2773506.491
212	98+980	531057.61	2773498.598
213	98+990	531050.486	2773491.59
214	99+000	531042.506	2773485.574
215	99+010	531033.943	2773480.415
216	99+020	531025.086	2773475.775
217	99+030	531016.149	2773471.288
218	99+040	531007.211	2773466.803
219	99+050	530998.273	2773462.319
220	99+060	530989.335	2773457.834
221	99+070	530980.397	2773453.35
222	99+080	530971.458	2773448.866
223	99+090	530962.52	2773444.381
224	99+100	530953.582	2773439.897
225	99+110	530944.644	2773435.412
226	99+120	530935.706	2773430.928
227	99+130	530926.796	2773426.388
228	99+140	530918.045	2773421.551
229	99+150	530909.543	2773416.288
230	99+160	530901.315	2773410.606
231	99+170	530893.382	2773404.52
232	99+180	530885.762	2773398.045
233	99+190	530878.476	2773391.198
234	99+200	530871.502	2773384.032
235	99+210	530864.655	2773376.744
236	99+220	530857.813	2773369.45
237	99+230	530850.972	2773362.157
238	99+240	530844.13	2773354.864
239	99+250	530837.288	2773347.57
240	99+260	530830.447	2773340.277
241	99+270	530823.605	2773332.984
242	99+280	530816.696	2773325.755
243	99+290	530809.423	2773318.895
244	99+300	530801.548	2773312.739
245	99+310	530793.116	2773307.369
246	99+320	530784.363	2773302.535
247	99+330	530775.532	2773297.843
248	99+340	530766.701	2773293.151
249	99+350	530757.869	2773288.46
250	99+360	530749.073	2773283.706
251	99+370	530741.075	2773277.731
252	99+380	530734.424	2773270.285

S.N.	Chainage	Northing	Easting
253	99+390	530729.194	2773261.77
254	99+400	530724.205	2773253.103
255	99+410	530719.216	2773244.436
256	99+420	530714.228	2773235.769
257	99+430	530709.089	2773227.194
258	99+440	530702.611	2773219.599
259	99+450	530694.752	2773213.441
260	99+460	530685.827	2773208.968
261	99+470	530676.225	2773206.205
262	99+480	530666.52	2773203.793
263	99+490	530656.815	2773201.382
264	99+500	530647.11	2773198.97
265	99+510	530637.405	2773196.558
266	99+520	530627.701	2773194.147
267	99+530	530617.996	2773191.735
268	99+540	530608.291	2773189.323
269	99+550	530598.586	2773186.912
270	99+560	530588.881	2773184.5
271	99+570	530579.186	2773182.051
272	99+580	530569.585	2773179.258
273	99+590	530560.184	2773175.855
274	99+600	530551.03	2773171.834
275	99+610	530542.165	2773167.211
276	99+620	530533.609	2773162.037
277	99+630	530525.224	2773156.588
278	99+640	530516.855	2773151.115
279	99+650	530508.486	2773145.641
280	99+660	530500.117	2773140.168
281	99+670	530491.748	2773134.695
282	99+680	530483.378	2773129.221
283	99+690	530475.009	2773123.748
284	99+700	530466.64	2773118.275
285	99+710	530458.271	2773112.801
286	99+720	530449.902	2773107.328
287	99+730	530441.533	2773101.855
288	99+740	530433.164	2773096.381
289	99+750	530424.794	2773090.908
290	99+760	530416.425	2773085.435
291	99+770	530408.056	2773079.961
292	99+780	530399.724	2773074.432
293	99+790	530391.66	2773068.522
294	99+800	530384.159	2773061.915
295	99+810	530377.356	2773054.592
296	99+820	530371.318	2773046.626

S.N.	Chainage	Northing	Easting
297	99+830	530366.105	2773038.097
298	99+840	530361.769	2773029.09
299	99+850	530358.355	2773019.695
300	99+860	530355.895	2773010.007
301	99+870	530354.415	2773000.121
302	99+880	530353.93	2772990.137
303	99+890	530354.443	2772980.155
304	99+900	530355.951	2772970.273
305	99+910	530358.437	2772960.591
306	99+920	530361.878	2772951.206
307	99+930	530366.238	2772942.212
308	99+940	530371.374	2772933.633
309	99+950	530376.879	2772925.285
310	99+960	530382.43	2772916.968
311	99+970	530387.982	2772908.65
312	99+980	530393.533	2772900.333
313	99+990	530399.084	2772892.015
314	100+000	530404.636	2772883.697
315	100+010	530410.187	2772875.38
316	100+020	530415.739	2772867.062
317	100+030	530421.29	2772858.745
318	100+040	530426.841	2772850.427
319	100+050	530432.364	2772842.091
320	100+060	530437.597	2772833.571
321	100+070	530442.142	2772824.668
322	100+080	530445.59	2772815.289
323	100+090	530447.761	2772805.535
324	100+100	530448.616	2772795.579
325	100+110	530448.14	2772785.598
326	100+120	530446.342	2772775.768
327	100+130	530443.252	2772766.265
328	100+140	530438.927	2772757.257
329	100+150	530433.443	2772748.904
330	100+160	530426.956	2772741.3
331	100+170	530419.826	2772734.291
332	100+180	530412.399	2772727.596
333	100+190	530404.926	2772720.951
334	100+200	530397.453	2772714.306
335	100+210	530389.98	2772707.661
336	100+220	530382.507	2772701.016
337	100+230	530375.02	2772694.387
338	100+240	530367.339	2772687.985
339	100+250	530359.275	2772682.074
340	100+260	530350.835	2772676.714

S.N.	Chainage	Northing	Easting
341	100+270	530342.057	2772671.928
342	100+280	530332.98	2772667.738
343	100+290	530323.643	2772664.161
344	100+300	530314.089	2772661.214
345	100+310	530304.36	2772658.911
346	100+320	530294.499	2772657.26
347	100+330	530284.55	2772656.27
348	100+340	530274.557	2772655.946
349	100+350	530264.565	2772656.287
350	100+360	530254.617	2772657.294
351	100+370	530244.759	2772658.961
352	100+380	530235.034	2772661.281
353	100+390	530225.485	2772664.243
354	100+400	530216.152	2772667.831
355	100+410	530206.999	2772671.858
356	100+420	530197.887	2772675.977
357	100+430	530188.774	2772680.095
358	100+440	530179.662	2772684.214
359	100+450	530170.549	2772688.332
360	100+460	530161.437	2772692.45
361	100+470	530152.324	2772696.569
362	100+480	530143.212	2772700.687
363	100+490	530134.099	2772704.806
364	100+500	530124.986	2772708.924
365	100+510	530115.832	2772712.947
366	100+520	530106.475	2772716.469
367	100+530	530096.808	2772718.999
368	100+540	530086.873	2772720.017
369	100+550	530076.932	2772719.105
370	100+560	530067.369	2772716.237
371	100+570	530058.567	2772711.526
372	100+580	530050.877	2772705.16
373	100+590	530044.525	2772697.452
374	100+600	530039.366	2772688.893
375	100+610	530035.058	2772679.871
376	100+620	530031.177	2772670.655
377	100+630	530027.36	2772661.412
378	100+640	530023.523	2772652.177
379	100+650	530019.463	2772643.039
380	100+660	530014.975	2772634.105
381	100+670	530010.045	2772625.405
382	100+680	530004.687	2772616.963
383	100+690	529998.913	2772608.799
384	100+700	529992.739	2772600.934

S.N.	Chainage	Northing	Easting
385	100+710	529986.18	2772593.388
386	100+720	529979.309	2772586.123
387	100+730	529972.338	2772578.952
388	100+740	529965.366	2772571.784
389	100+750	529958.393	2772564.616
390	100+760	529951.421	2772557.447
391	100+770	529944.464	2772550.264
392	100+780	529937.742	2772542.862
393	100+790	529931.65	2772534.938
394	100+800	529926.654	2772526.287
395	100+810	529923.286	2772516.889
396	100+820	529921.845	2772507.01
397	100+830	529922.195	2772497.026
398	100+840	529923.857	2772487.17
399	100+850	529926.323	2772477.48
400	100+860	529929.102	2772467.874
401	100+870	529931.903	2772458.275
402	100+880	529934.704	2772448.675
403	100+890	529937.504	2772439.075
404	100+900	529940.301	2772429.474
405	100+910	529942.906	2772419.82
406	100+920	529944.855	2772410.015
407	100+930	529945.837	2772400.068
408	100+940	529945.822	2772390.072
409	100+950	529944.808	2772380.128
410	100+960	529942.807	2772370.334
411	100+970	529939.839	2772360.789
412	100+980	529935.932	2772351.589
413	100+990	529931.126	2772342.824
414	101+000	529925.469	2772334.583
415	101+010	529919.018	2772326.948
416	101+020	529911.895	2772319.931
417	101+030	529904.435	2772313.273
418	101+040	529896.921	2772306.675
419	101+050	529889.406	2772300.076
420	101+060	529881.892	2772293.478
421	101+070	529874.378	2772286.88
422	101+080	529866.864	2772280.281
423	101+090	529859.35	2772273.683
424	101+100	529851.836	2772267.085
425	101+110	529844.322	2772260.486
426	101+120	529836.808	2772253.888
427	101+130	529829.294	2772247.29
428	101+140	529821.78	2772240.691

S.N.	Chainage	Northing	Easting
429	101+150	529814.258	2772234.101
430	101+160	529806.578	2772227.699
431	101+170	529798.528	2772221.769
432	101+180	529790.101	2772216.389
433	101+190	529781.334	2772211.582
434	101+200	529772.266	2772207.369
435	101+210	529762.938	2772203.771
436	101+220	529753.391	2772200.801
437	101+230	529743.668	2772198.474
438	101+240	529733.811	2772196.8
439	101+250	529723.864	2772195.787
440	101+260	529713.872	2772195.438
441	101+270	529703.879	2772195.756
442	101+280	529693.929	2772196.738
443	101+290	529684.067	2772198.382
444	101+300	529674.336	2772200.679
445	101+310	529664.78	2772203.618
446	101+320	529655.441	2772207.188
447	101+330	529646.36	2772211.372
448	101+340	529637.579	2772216.152
449	101+350	529629.135	2772221.506
450	101+360	529621.067	2772227.411
451	101+370	529613.392	2772233.82
452	101+380	529605.943	2772240.491
453	101+390	529598.517	2772247.189
454	101+400	529591.092	2772253.887
455	101+410	529583.667	2772260.585
456	101+420	529576.241	2772267.283
457	101+430	529568.816	2772273.981
458	101+440	529561.39	2772280.679
459	101+450	529553.965	2772287.377
460	101+460	529546.539	2772294.075
461	101+470	529539.114	2772300.773
462	101+480	529531.688	2772307.471
463	101+490	529524.263	2772314.169
464	101+500	529516.881	2772320.915
465	101+510	529509.759	2772327.932
466	101+520	529503.182	2772335.46
467	101+530	529497.433	2772343.636
468	101+540	529492.625	2772352.399
469	101+550	529488.82	2772361.641
470	101+560	529486.062	2772371.248
471	101+570	529484.386	2772381.101
472	101+580	529483.814	2772391.079

S.N.	Chainage	Northing	Easting
473	101+590	529484.351	2772401.06
474	101+600	529485.992	2772410.919
475	101+610	529488.716	2772420.536
476	101+620	529492.489	2772429.791
477	101+630	529497.265	2772438.571
478	101+640	529502.986	2772446.767
479	101+650	529509.58	2772454.278
480	101+660	529516.966	2772461.011
481	101+670	529525.053	2772466.885
482	101+680	529533.701	2772471.899
483	101+690	529542.681	2772476.296
484	101+700	529551.803	2772480.395
485	101+710	529560.942	2772484.453
486	101+720	529570.081	2772488.512
487	101+730	529579.221	2772492.571
488	101+740	529588.36	2772496.63
489	101+750	529597.499	2772500.688
490	101+760	529606.638	2772504.747
491	101+770	529615.778	2772508.806
492	101+780	529624.917	2772512.865
493	101+790	529634.045	2772516.948
494	101+800	529643.025	2772521.345
495	101+810	529651.614	2772526.459
496	101+820	529659.651	2772532.402
497	101+830	529667.054	2772539.118
498	101+840	529673.75	2772546.54
499	101+850	529679.672	2772554.593
500	101+860	529684.76	2772563.197
501	101+870	529688.964	2772572.266
502	101+880	529692.241	2772581.709
503	101+890	529694.559	2772591.432
504	101+900	529695.937	2772601.334
505	101+910	529696.718	2772611.303
506	101+920	529697.356	2772621.282
507	101+930	529697.993	2772631.262
508	101+940	529698.631	2772641.242
509	101+950	529699.268	2772651.221
510	101+960	529699.905	2772661.201
511	101+970	529700.542	2772671.181
512	101+980	529701.179	2772681.16
513	101+990	529701.817	2772691.14
514	102+000	529702.454	2772701.12
515	102+010	529703.091	2772711.1
516	102+020	529703.728	2772721.079

S.N.	Chainage	Northing	Easting
517	102+030	529704.365	2772731.059
518	102+040	529705.003	2772741.039
519	102+050	529705.64	2772751.018
520	102+060	529706.277	2772760.998
521	102+070	529706.914	2772770.978
522	102+080	529707.551	2772780.957
523	102+090	529708.189	2772790.937
524	102+100	529708.826	2772800.917
525	102+110	529709.463	2772810.896
526	102+120	529710.1	2772820.876
527	102+130	529710.737	2772830.856
528	102+140	529711.375	2772840.835
529	102+150	529712.012	2772850.815
530	102+160	529712.649	2772860.795
531	102+170	529713.286	2772870.774
532	102+180	529713.923	2772880.754
533	102+190	529714.561	2772890.734
534	102+200	529715.198	2772900.713
535	102+210	529715.835	2772910.693
536	102+220	529716.503	2772920.671
537	102+230	529717.528	2772930.616
538	102+240	529719.371	2772940.441
539	102+250	529722.184	2772950.033
540	102+260	529725.941	2772959.296
541	102+270	529730.603	2772968.138
542	102+280	529736.125	2772976.47
543	102+290	529742.451	2772984.209
544	102+300	529749.518	2772991.278
545	102+310	529757.256	2772997.607
546	102+320	529765.587	2773003.131
547	102+330	529774.418	2773007.814
548	102+340	529783.551	2773011.886
549	102+350	529792.766	2773015.768
550	102+360	529801.984	2773019.646
551	102+370	529811.201	2773023.524
552	102+380	529820.418	2773027.403
553	102+390	529829.636	2773031.281
554	102+400	529838.853	2773035.159
555	102+410	529848.07	2773039.037
556	102+420	529857.288	2773042.916
557	102+430	529866.505	2773046.794
558	102+440	529875.722	2773050.672
559	102+450	529884.94	2773054.55
560	102+460	529894.157	2773058.429

S.N.	Chainage	Northing	Easting
561	102+470	529903.373	2773062.31
562	102+480	529912.532	2773066.324
563	102+490	529921.511	2773070.723
564	102+500	529930.259	2773075.565
565	102+510	529938.754	2773080.839
566	102+520	529946.975	2773086.531
567	102+530	529954.902	2773092.626
568	102+540	529962.513	2773099.11
569	102+550	529969.791	2773105.966
570	102+560	529976.718	2773113.178
571	102+570	529983.275	2773120.726
572	102+580	529989.447	2773128.593
573	102+590	529995.267	2773136.724
574	102+600	530000.953	2773144.951
575	102+610	530006.634	2773153.18
576	102+620	530012.314	2773161.41
577	102+630	530017.995	2773169.64
578	102+640	530023.676	2773177.87
579	102+650	530029.357	2773186.1
580	102+660	530035.037	2773194.329
581	102+670	530040.718	2773202.559
582	102+680	530046.399	2773210.789
583	102+690	530052.079	2773219.019
584	102+700	530057.76	2773227.248
585	102+710	530063.441	2773235.478
586	102+720	530069.127	2773243.705
587	102+730	530074.948	2773251.835
588	102+740	530081.121	2773259.701
589	102+750	530087.68	2773267.248
590	102+760	530094.607	2773274.458
591	102+770	530101.887	2773281.313
592	102+780	530109.5	2773287.796
593	102+790	530117.427	2773293.89
594	102+800	530125.649	2773299.58
595	102+810	530134.145	2773304.852
596	102+820	530142.893	2773309.696
597	102+830	530151.813	2773314.215
598	102+840	530160.77	2773318.661
599	102+850	530169.727	2773323.107
600	102+860	530178.685	2773327.553
601	102+870	530187.642	2773331.999
602	102+880	530196.6	2773336.445
603	102+890	530205.557	2773340.89
604	102+900	530214.514	2773345.336

S.N.	Chainage	Northing	Easting
605	102+910	530223.472	2773349.782
606	102+920	530232.429	2773354.228
607	102+930	530241.386	2773358.674
608	102+940	530250.344	2773363.119
609	102+950	530259.301	2773367.565
610	102+960	530268.259	2773372.011
611	102+970	530277.216	2773376.457
612	102+980	530286.173	2773380.903
613	102+990	530295.131	2773385.349
614	103+000	530304.088	2773389.794
615	103+010	530313.046	2773394.24
616	103+020	530322.003	2773398.686
617	103+030	530330.96	2773403.132
618	103+040	530339.918	2773407.578
619	103+050	530348.875	2773412.023
620	103+060	530357.832	2773416.469
621	103+070	530366.79	2773420.915
622	103+080	530375.747	2773425.361
623	103+090	530384.705	2773429.807
624	103+100	530393.662	2773434.253
625	103+110	530402.619	2773438.698
626	103+120	530411.577	2773443.144
627	103+130	530420.534	2773447.59
628	103+140	530429.492	2773452.036
629	103+150	530438.449	2773456.482
630	103+160	530447.406	2773460.927
631	103+170	530456.364	2773465.373
632	103+180	530465.274	2773469.912
633	103+190	530473.926	2773474.922
634	103+200	530482.071	2773480.716
635	103+210	530489.596	2773487.295
636	103+220	530496.428	2773494.592
637	103+230	530502.497	2773502.534
638	103+240	530507.743	2773511.043
639	103+250	530512.113	2773520.033
640	103+260	530515.563	2773529.415
641	103+270	530518.06	2773539.093
642	103+280	530519.578	2773548.973
643	103+290	530520.102	2773558.955
644	103+300	530519.627	2773568.94
645	103+310	530518.19	2773578.833
646	103+320	530516.132	2773588.618
647	103+330	530513.911	2773598.369
648	103+340	530511.689	2773608.119

S.N.	Chainage	Northing	Easting
649	103+350	530509.467	2773617.869
650	103+360	530507.245	2773627.618
651	103+370	530505.023	2773637.368
652	103+380	530502.801	2773647.118
653	103+390	530500.579	2773656.868
654	103+400	530498.357	2773666.618
655	103+410	530496.135	2773676.368
656	103+420	530493.913	2773686.118
657	103+430	530491.69	2773695.868
658	103+440	530489.468	2773705.618
659	103+450	530487.246	2773715.368
660	103+460	530485.024	2773725.118
661	103+470	530482.802	2773734.868
662	103+480	530480.58	2773744.618
663	103+490	530478.358	2773754.368
664	103+500	530476.136	2773764.118
665	103+510	530473.914	2773773.868
666	103+520	530471.692	2773783.618
667	103+530	530469.47	2773793.368
668	103+540	530467.248	2773803.118
669	103+550	530465.046	2773812.873
670	103+560	530463.159	2773822.692
671	103+570	530462.058	2773832.627
672	103+580	530461.95	2773842.622
673	103+590	530462.84	2773852.578
674	103+600	530464.72	2773862.396
675	103+610	530467.571	2773871.977
676	103+620	530471.364	2773881.225
677	103+630	530476.061	2773890.048
678	103+640	530481.616	2773898.359
679	103+650	530487.972	2773906.073
680	103+660	530495.067	2773913.114
681	103+670	530502.829	2773919.412
682	103+680	530511.182	2773924.903
683	103+690	530520.021	2773929.573
684	103+700	530529.124	2773933.711
685	103+710	530538.285	2773937.722
686	103+720	530547.445	2773941.732
687	103+730	530556.606	2773945.743
688	103+740	530565.767	2773949.753
689	103+750	530574.927	2773953.763
690	103+760	530584.088	2773957.774
691	103+770	530593.248	2773961.784
692	103+780	530602.409	2773965.795

S.N.	Chainage	Northing	Easting
693	103+790	530611.569	2773969.805
694	103+800	530620.73	2773973.816
695	103+810	530629.891	2773977.826
696	103+820	530639.051	2773981.836
697	103+830	530648.212	2773985.847
698	103+840	530657.372	2773989.857
699	103+850	530666.533	2773993.868
700	103+860	530675.681	2773997.906
701	103+870	530684.717	2774002.189
702	103+880	530693.535	2774006.903
703	103+890	530702.106	2774012.052
704	103+900	530710.41	2774017.622
705	103+910	530718.424	2774023.601
706	103+920	530726.13	2774029.973
707	103+930	530733.508	2774036.722
708	103+940	530740.539	2774043.831
709	103+950	530747.206	2774051.283
710	103+960	530753.493	2774059.058
711	103+970	530759.383	2774067.139
712	103+980	530764.865	2774075.5
713	103+990	530770.059	2774084.045
714	104+000	530775.198	2774092.624
715	104+010	530780.336	2774101.203
716	104+020	530785.474	2774109.782
717	104+030	530790.612	2774118.361
718	104+040	530795.751	2774126.94
719	104+050	530800.889	2774135.519
720	104+060	530806.027	2774144.098
721	104+070	530811.165	2774152.677
722	104+080	530816.304	2774161.256
723	104+090	530821.442	2774169.835
724	104+100	530826.58	2774178.414
725	104+110	530831.718	2774186.993
726	104+120	530836.857	2774195.572
727	104+130	530841.995	2774204.151
728	104+140	530847.133	2774212.73
729	104+150	530852.232	2774221.332
730	104+160	530857.001	2774230.12
731	104+170	530861.193	2774239.197
732	104+180	530864.77	2774248.533
733	104+190	530867.718	2774258.087
734	104+200	530870.022	2774267.816
735	104+210	530871.673	2774277.677
736	104+220	530872.664	2774287.626

S.N.	Chainage	Northing	Easting
737	104+230	530872.99	2774297.619
738	104+240	530872.649	2774307.611
739	104+250	530871.644	2774317.558
740	104+260	530869.978	2774327.417
741	104+270	530867.661	2774337.143
742	104+280	530864.861	2774346.742
743	104+290	530861.947	2774356.308
744	104+300	530859.032	2774365.874
745	104+310	530856.117	2774375.44
746	104+320	530853.202	2774385.005
747	104+330	530850.287	2774394.571
748	104+340	530847.372	2774404.137
749	104+350	530844.457	2774413.703
750	104+360	530841.542	2774423.268
751	104+370	530838.627	2774432.834
752	104+380	530835.712	2774442.4
753	104+390	530832.797	2774451.966
754	104+400	530829.882	2774461.531
755	104+410	530826.967	2774471.097
756	104+420	530824.052	2774480.663
757	104+430	530821.088	2774490.213
758	104+440	530817.785	2774499.651
759	104+450	530813.944	2774508.882
760	104+460	530809.568	2774517.872
761	104+470	530804.67	2774526.589
762	104+480	530799.268	2774535.003
763	104+490	530793.382	2774543.084
764	104+500	530787.03	2774550.806
765	104+510	530780.235	2774558.141
766	104+520	530773.021	2774565.064
767	104+530	530765.412	2774571.551
768	104+540	530757.435	2774577.579
769	104+550	530749.117	2774583.128
770	104+560	530740.488	2774588.178
771	104+570	530731.576	2774592.712
772	104+580	530722.414	2774596.714
773	104+590	530713.032	2774600.171
774	104+600	530703.463	2774603.07
775	104+610	530693.74	2774605.402
776	104+620	530683.897	2774607.158
777	104+630	530673.968	2774608.332
778	104+640	530663.986	2774608.921
779	104+650	530653.988	2774608.922
780	104+660	530644.006	2774608.336

S.N.	Chainage	Northing	Easting
781	104+670	530634.06	2774607.3
782	104+680	530624.127	2774606.148
783	104+690	530614.194	2774604.996
784	104+700	530604.251	2774603.94
785	104+710	530594.279	2774604.406
786	104+720	530584.597	2774606.843
787	104+730	530575.593	2774611.155
788	104+740	530567.626	2774617.171
789	104+750	530561.012	2774624.649
790	104+760	530555.832	2774633.195
791	104+770	530550.906	2774641.898
792	104+780	530545.979	2774650.6
793	104+790	530541.052	2774659.302
794	104+800	530535.936	2774667.888
795	104+810	530529.432	2774675.463
796	104+820	530521.553	2774681.594
797	104+830	530512.613	2774686.038
798	104+840	530502.969	2774688.617
799	104+850	530493.004	2774689.228
800	104+860	530483.098	2774687.94
801	104+870	530473.255	2774686.174
802	104+880	530463.412	2774684.409
803	104+890	530453.569	2774682.644
804	104+900	530443.726	2774680.879
805	104+910	530433.883	2774679.113
806	104+920	530424.04	2774677.348
807	104+930	530414.198	2774675.583
808	104+940	530404.355	2774673.817
809	104+950	530394.511	2774672.053
810	104+960	530384.644	2774670.434
811	104+970	530374.699	2774669.418
812	104+980	530364.707	2774669.508
813	104+990	530354.865	2774671.194
814	105+000	530345.541	2774674.763
815	105+010	530337.064	2774680.044
816	105+020	530329.465	2774686.534
817	105+030	530322.546	2774693.751
818	105+040	530315.993	2774701.304
819	105+050	530309.502	2774708.911
820	105+060	530303.01	2774716.518
821	105+070	530296.519	2774724.124
822	105+080	530290.028	2774731.731
823	105+090	530283.536	2774739.338
824	105+100	530277.045	2774746.945

S.N.	Chainage	Northing	Easting
825	105+110	530270.554	2774754.551
826	105+120	530264.062	2774762.158
827	105+130	530257.571	2774769.765
828	105+140	530251.08	2774777.372
829	105+150	530244.588	2774784.978
830	105+160	530238.097	2774792.585
831	105+170	530231.628	2774800.211
832	105+180	530225.373	2774808.012
833	105+190	530219.381	2774816.018
834	105+200	530213.66	2774824.219
835	105+210	530208.215	2774832.606
836	105+220	530203.053	2774841.17
837	105+230	530198.179	2774849.901
838	105+240	530193.598	2774858.79
839	105+250	530189.317	2774867.827
840	105+260	530185.246	2774876.961
841	105+270	530180.91	2774885.97
842	105+280	530175.885	2774894.611
843	105+290	530170.026	2774902.71
844	105+300	530163.388	2774910.184
845	105+310	530156.037	2774916.957
846	105+320	530148.046	2774922.963
847	105+330	530139.496	2774928.141
848	105+340	530130.472	2774932.439
849	105+350	530121.063	2774935.815
850	105+360	530111.365	2774938.235
851	105+370	530101.473	2774939.675
852	105+380	530091.487	2774940.12
853	105+390	530081.507	2774939.566
854	105+400	530071.632	2774938.018
855	105+410	530061.952	2774935.521
856	105+420	530052.449	2774932.408
857	105+430	530043.002	2774929.131
858	105+440	530033.555	2774925.851
859	105+450	530024.108	2774922.572
860	105+460	530014.661	2774919.293
861	105+470	530005.21	2774916.022
862	105+480	529995.687	2774912.976
863	105+490	529985.982	2774910.576
864	105+500	529976.076	2774909.261
865	105+510	529966.084	2774909.267
866	105+520	529956.18	2774910.601
867	105+530	529946.542	2774913.24
868	105+540	529937.341	2774917.136

S.N.	Chainage	Northing	Easting
869	105+550	529928.739	2774922.221
870	105+560	529920.889	2774928.405
871	105+570	529913.932	2774935.577
872	105+580	529907.989	2774943.611
873	105+590	529903.167	2774952.363
874	105+600	529899.551	2774961.678
875	105+610	529897.205	2774971.392
876	105+620	529896.035	2774981.319
877	105+630	529895.647	2774991.31
878	105+640	529895.602	2775001.31
879	105+650	529895.589	2775011.31
880	105+660	529895.577	2775021.31
881	105+670	529895.565	2775031.31
882	105+680	529895.552	2775041.31
883	105+690	529895.54	2775051.31
884	105+700	529895.528	2775061.31
885	105+710	529895.515	2775071.31
886	105+720	529895.481	2775081.31
887	105+730	529895.122	2775091.302
888	105+740	529893.967	2775101.231
889	105+750	529891.83	2775110.996
890	105+760	529888.729	2775120.498
891	105+770	529884.695	2775129.644
892	105+780	529879.84	2775138.383
893	105+790	529874.552	2775146.871
894	105+800	529869.194	2775155.314
895	105+810	529863.836	2775163.758
896	105+820	529858.478	2775172.201
897	105+830	529853.12	2775180.644
898	105+840	529847.761	2775189.088
899	105+850	529842.403	2775197.531
900	105+860	529837.045	2775205.974
901	105+870	529831.687	2775214.418
902	105+880	529826.329	2775222.861
903	105+890	529820.971	2775231.305
904	105+900	529815.613	2775239.748
905	105+910	529810.255	2775248.191
906	105+920	529804.896	2775256.635
907	105+930	529799.538	2775265.078
908	105+940	529794.18	2775273.521
909	105+950	529788.822	2775281.965
910	105+960	529783.464	2775290.408
911	105+970	529778.605	2775299.134
912	105+980	529775.521	2775308.629

S.N.	Chainage	Northing	Easting
913	105+990	529774.386	2775318.548
914	106+000	529775.244	2775328.494
915	106+010	529778.06	2775338.072
916	106+020	529782.724	2775346.899
917	106+030	529789.048	2775354.624
918	106+040	529796.658	2775361.101
919	106+050	529804.465	2775367.351
920	106+060	529812.23	2775373.65
921	106+070	529818.997	2775380.99
922	106+080	529824.171	2775389.528
923	106+090	529827.546	2775398.923
924	106+100	529828.987	2775408.802
925	106+110	529828.437	2775418.77
926	106+120	529825.918	2775428.43
927	106+130	529821.529	2775437.397
928	106+140	529815.446	2775445.314
929	106+150	529808.114	2775452.108
930	106+160	529800.65	2775458.763
931	106+170	529793.186	2775465.418
932	106+180	529785.722	2775472.073
933	106+190	529778.258	2775478.728
934	106+200	529770.794	2775485.383
935	106+210	529763.33	2775492.038
936	106+220	529755.866	2775498.693
937	106+230	529748.402	2775505.348
938	106+240	529740.938	2775512.003
939	106+250	529733.474	2775518.658
940	106+260	529726.01	2775525.313
941	106+270	529718.546	2775531.968
942	106+280	529711.082	2775538.623
943	106+290	529703.62	2775545.28
944	106+300	529696.242	2775552.03
945	106+310	529689.149	2775559.078
946	106+320	529682.417	2775566.471
947	106+330	529676.063	2775574.191
948	106+340	529670.103	2775582.22
949	106+350	529664.552	2775590.536
950	106+360	529659.423	2775599.119
951	106+370	529654.729	2775607.948
952	106+380	529650.475	2775616.997
953	106+390	529646.507	2775626.176
954	106+400	529642.583	2775635.374
955	106+410	529638.66	2775644.573
956	106+420	529634.715	2775653.762

S.N.	Chainage	Northing	Easting
957	106+430	529630.49	2775662.824
958	106+440	529625.599	2775671.542
959	106+450	529619.726	2775679.626
960	106+460	529612.832	2775686.86
961	106+470	529605.038	2775693.113
962	106+480	529596.482	2775698.274
963	106+490	529587.347	2775702.332
964	106+500	529577.892	2775705.584
965	106+510	529568.307	2775708.434
966	106+520	529558.704	2775711.223
967	106+530	529549.101	2775714.012
968	106+540	529539.498	2775716.801
969	106+550	529529.894	2775719.588
970	106+560	529520.242	2775722.202
971	106+570	529510.444	2775724.181
972	106+580	529500.487	2775725.022
973	106+590	529490.535	2775724.217
974	106+600	529480.934	2775721.479
975	106+610	529472.058	2775716.906
976	106+620	529464.066	2775710.91
977	106+630	529456.833	2775704.009
978	106+640	529450.087	2775696.629
979	106+650	529443.493	2775689.111
980	106+660	529436.901	2775681.591
981	106+670	529430.31	2775674.071
982	106+680	529423.718	2775666.551
983	106+690	529417.127	2775659.031
984	106+700	529410.535	2775651.511
985	106+710	529403.925	2775644.008
986	106+720	529396.884	2775636.914
987	106+730	529388.766	2775631.111
988	106+740	529379.392	2775627.756
989	106+750	529369.439	2775627.633
990	106+760	529359.993	2775630.773
991	106+770	529352.095	2775636.831
992	106+780	529346.613	2775645.139
993	106+790	529344.152	2775654.784
994	106+800	529344.981	2775664.703
995	106+810	529348.726	2775673.946
996	106+820	529354.241	2775682.277
997	106+830	529360.481	2775690.091
998	106+840	529366.794	2775697.846
999	106+850	529373.108	2775705.601
1000	106+860	529379.421	2775713.356

S.N.	Chainage	Northing	Easting
1001	106+870	529385.735	2775721.111
1002	106+880	529392.048	2775728.866
1003	106+890	529398.361	2775736.621
1004	106+900	529404.675	2775744.376
1005	106+910	529410.988	2775752.131
1006	106+920	529417.306	2775759.883
1007	106+930	529423.796	2775767.489
1008	106+940	529430.806	2775774.616
1009	106+950	529438.619	2775780.843
1010	106+960	529447.369	2775785.653
1011	106+970	529456.893	2775788.646
1012	106+980	529466.809	2775789.852
1013	106+990	529476.803	2775789.694
1014	107+000	529486.749	2775788.671
1015	107+010	529496.651	2775787.281
1016	107+020	529506.55	2775785.858
1017	107+030	529516.448	2775784.435
1018	107+040	529526.346	2775783.013
1019	107+050	529536.245	2775781.59
1020	107+060	529546.143	2775780.167
1021	107+070	529556.041	2775778.744
1022	107+080	529565.939	2775777.322
1023	107+090	529575.838	2775775.899
1024	107+100	529585.736	2775774.476
1025	107+110	529595.634	2775773.053
1026	107+120	529605.523	2775771.566
1027	107+130	529615.354	2775769.742
1028	107+140	529625.083	2775767.434
1029	107+150	529634.684	2775764.642
1030	107+160	529644.134	2775761.374
1031	107+170	529653.409	2775757.638
1032	107+180	529662.485	2775753.443
1033	107+190	529671.341	2775748.8
1034	107+200	529679.953	2775743.719
1035	107+210	529688.3	2775738.215
1036	107+220	529696.365	2775732.303
1037	107+230	529704.216	2775726.11
1038	107+240	529712.023	2775719.861
1039	107+250	529719.829	2775713.611
1040	107+260	529727.636	2775707.361
1041	107+270	529735.442	2775701.112
1042	107+280	529743.249	2775694.862
1043	107+290	529751.052	2775688.609
1044	107+300	529757.555	2775681.073

S.N.	Chainage	Northing	Easting
1045	107+310	529761.235	2775671.825
1046	107+320	529761.709	2775661.879
1047	107+330	529760.893	2775651.912
1048	107+340	529760.078	2775641.945
1049	107+350	529760.469	2775631.994
1050	107+360	529764.06	2775622.711
1051	107+370	529770.49	2775615.113
1052	107+380	529779.053	2775610.037
1053	107+390	529788.774	2775607.791
1054	107+400	529798.638	2775606.146
1055	107+410	529808.501	2775604.502
1056	107+420	529818.365	2775602.857
1057	107+430	529828.229	2775601.213
1058	107+440	529838.093	2775599.568
1059	107+450	529847.957	2775597.924
1060	107+460	529857.821	2775596.279
1061	107+470	529867.687	2775594.647
1062	107+480	529877.643	2775593.923
1063	107+490	529887.241	2775596.415
1064	107+500	529894.547	2775603.091
1065	107+510	529897.757	2775612.452
1066	107+520	529896.086	2775622.206
1067	107+530	529889.946	2775629.968
1068	107+540	529881.087	2775634.512
1069	107+550	529871.467	2775637.23
1070	107+560	529861.789	2775639.748
1071	107+570	529852.111	2775642.265
1072	107+580	529842.433	2775644.783
1073	107+590	529832.879	2775647.706
1074	107+600	529824.046	2775652.358
1075	107+610	529816.313	2775658.672
1076	107+620	529809.989	2775666.397
1077	107+630	529805.326	2775675.224
1078	107+640	529802.509	2775684.802
1079	107+650	529801.651	2775694.748
1080	107+660	529802.343	2775704.722
1081	107+670	529802.934	2775714.701
1082	107+680	529801.822	2775724.622
1083	107+690	529798.761	2775734.124
1084	107+700	529793.873	2775742.829
1085	107+710	529787.359	2775750.395
1086	107+720	529780.233	2775757.411
1087	107+730	529773.107	2775764.426
1088	107+740	529765.98	2775771.442

S.N.	Chainage	Northing	Easting
1089	107+750	529758.854	2775778.457
1090	107+760	529751.728	2775785.473
1091	107+770	529744.602	2775792.488
1092	107+780	529737.476	2775799.504
1093	107+790	529730.349	2775806.519
1094	107+800	529723.223	2775813.535
1095	107+810	529716.097	2775820.55
1096	107+820	529708.971	2775827.566
1097	107+830	529701.844	2775834.581
1098	107+840	529694.718	2775841.597
1099	107+850	529687.628	2775848.648
1100	107+860	529680.844	2775855.993
1101	107+870	529674.728	2775863.899
1102	107+880	529669.431	2775872.376
1103	107+890	529665.007	2775881.339
1104	107+900	529661.5	2775890.7
1105	107+910	529658.849	2775900.34
1106	107+920	529656.652	2775910.095
1107	107+930	529654.522	2775919.866
1108	107+940	529652.393	2775929.637
1109	107+950	529650.264	2775939.407
1110	107+960	529648.134	2775949.178
1111	107+970	529646.005	2775958.949
1112	107+980	529643.876	2775968.719
1113	107+990	529641.746	2775978.49
1114	108+000	529639.617	2775988.261
1115	108+010	529637.487	2775998.031
1116	108+020	529635.697	2776007.864
1117	108+030	529636.24	2776017.795
1118	108+040	529641.027	2776026.456
1119	108+050	529649.381	2776031.762
1120	108+060	529659.256	2776032.414
1121	108+070	529668.234	2776028.251
1122	108+080	529674.273	2776020.379
1123	108+090	529677.633	2776010.977
1124	108+100	529680.238	2776001.322
1125	108+110	529682.838	2775991.666
1126	108+120	529685.438	2775982.01
1127	108+130	529688.037	2775972.354
1128	108+140	529690.637	2775962.697
1129	108+150	529693.27	2775953.05
1130	108+160	529696.175	2775943.482
1131	108+170	529699.539	2775934.066
1132	108+180	529703.371	2775924.831

S.N.	Chainage	Northing	Easting
1133	108+190	529707.659	2775915.798
1134	108+200	529712.393	2775906.991
1135	108+210	529717.562	2775898.431
1136	108+220	529723.151	2775890.141
1137	108+230	529729.149	2775882.14
1138	108+240	529735.538	2775874.449
1139	108+250	529742.304	2775867.087
1140	108+260	529749.429	2775860.072
1141	108+270	529756.897	2775853.422
1142	108+280	529764.639	2775847.094
1143	108+290	529772.472	2775840.877
1144	108+300	529780.306	2775834.662
1145	108+310	529788.141	2775828.448
1146	108+320	529795.975	2775822.233
1147	108+330	529803.81	2775816.018
1148	108+340	529811.644	2775809.804
1149	108+350	529819.478	2775803.589
1150	108+360	529827.313	2775797.375
1151	108+370	529835.147	2775791.16
1152	108+380	529842.982	2775784.945
1153	108+390	529850.816	2775778.731
1154	108+400	529858.651	2775772.516
1155	108+410	529866.485	2775766.301
1156	108+420	529874.32	2775760.087
1157	108+430	529882.154	2775753.872
1158	108+440	529889.989	2775747.658
1159	108+450	529897.823	2775741.443
1160	108+460	529905.657	2775735.228
1161	108+470	529913.492	2775729.014
1162	108+480	529921.293	2775722.758
1163	108+490	529928.889	2775716.255
1164	108+500	529936.155	2775709.386
1165	108+510	529943.069	2775702.162
1166	108+520	529949.613	2775694.602
1167	108+530	529955.771	2775686.724
1168	108+540	529961.527	2775678.549
1169	108+550	529966.913	2775670.124
1170	108+560	529972.148	2775661.603
1171	108+570	529977.41	2775653.1
1172	108+580	529982.922	2775644.757
1173	108+590	529988.835	2775636.694
1174	108+600	529995.143	2775628.935
1175	108+610	530001.83	2775621.502
1176	108+620	530008.879	2775614.411

S.N.	Chainage	Northing	Easting
1177	108+630	530016.184	2775607.582
1178	108+640	530023.545	2775600.813
1179	108+650	530030.906	2775594.044
1180	108+660	530038.268	2775587.276
1181	108+670	530045.629	2775580.507
1182	108+680	530052.99	2775573.739
1183	108+690	530060.351	2775566.97
1184	108+700	530067.712	2775560.202
1185	108+710	530075.187	2775553.562
1186	108+720	530083.733	2775548.447
1187	108+730	530093.559	2775547.259
1188	108+740	530102.753	2775550.92
1189	108+750	530109.066	2775558.541
1190	108+760	530110.953	2775568.255
1191	108+770	530108.044	2775577.732
1192	108+780	530102.098	2775585.747
1193	108+790	530095.345	2775593.122
1194	108+800	530088.577	2775600.484
1195	108+810	530081.809	2775607.845
1196	108+820	530075.04	2775615.207
1197	108+830	530068.272	2775622.568
1198	108+840	530061.504	2775629.93
1199	108+850	530054.739	2775637.294
1200	108+860	530048.086	2775644.759
1201	108+870	530041.76	2775652.503
1202	108+880	530035.83	2775660.553
1203	108+890	530030.309	2775668.89
1204	108+900	530025.212	2775677.492
1205	108+910	530020.551	2775686.338
1206	108+920	530016.332	2775695.404
1207	108+930	530012.416	2775704.605
1208	108+940	530008.555	2775713.829
1209	108+950	530004.693	2775723.054
1210	108+960	530000.86	2775732.29
1211	108+970	529998.108	2775741.88
1212	108+980	529998.834	2775751.763
1213	108+990	530004.135	2775760.12
1214	109+000	530012.794	2775764.912
1215	109+010	530022.69	2775764.966
1216	109+020	530031.454	2775760.339
1217	109+030	530038.161	2775752.95
1218	109+040	530044.031	2775744.855
1219	109+050	530049.88	2775736.744
1220	109+060	530055.729	2775728.632

S.N.	Chainage	Northing	Easting
1221	109+070	530061.577	2775720.521
1222	109+080	530067.426	2775712.409
1223	109+090	530073.274	2775704.298
1224	109+100	530079.123	2775696.187
1225	109+110	530085.035	2775688.121
1226	109+120	530091.233	2775680.275
1227	109+130	530097.813	2775672.746
1228	109+140	530104.761	2775665.556
1229	109+150	530112.046	2775658.707
1230	109+160	530119.507	2775652.049
1231	109+170	530126.986	2775645.411
1232	109+180	530134.465	2775638.773
1233	109+190	530141.944	2775632.135
1234	109+200	530149.423	2775625.497
1235	109+210	530156.891	2775618.846
1236	109+220	530164.173	2775611.993
1237	109+230	530170.944	2775604.639
1238	109+240	530176.83	2775596.564
1239	109+250	530181.594	2775587.78
1240	109+260	530185.148	2775578.441
1241	109+270	530187.429	2775568.712
1242	109+280	530188.396	2775558.767
1243	109+290	530188.047	2775548.78
1244	109+300	530186.627	2775538.884
1245	109+310	530184.58	2775529.096
1246	109+320	530182.333	2775519.352
1247	109+330	530180.08	2775509.609
1248	109+340	530177.827	2775499.866
1249	109+350	530175.574	2775490.123
1250	109+360	530173.321	2775480.381
1251	109+370	530171.084	2775470.634
1252	109+380	530169.07	2775460.84
1253	109+390	530167.517	2775450.962
1254	109+400	530166.459	2775441.019
1255	109+410	530165.9	2775431.036
1256	109+420	530165.84	2775421.037
1257	109+430	530166.28	2775411.048
1258	109+440	530167.219	2775401.093
1259	109+450	530168.654	2775391.198
1260	109+460	530170.581	2775381.386
1261	109+470	530172.886	2775371.655
1262	109+480	530175.288	2775361.948
1263	109+490	530177.69	2775352.241
1264	109+500	530180.093	2775342.534

S.N.	Chainage	Northing	Easting
1265	109+510	530182.495	2775332.827
1266	109+520	530184.898	2775323.12
1267	109+530	530187.301	2775313.413
1268	109+540	530189.703	2775303.706
1269	109+550	530192.106	2775293.998
1270	109+560	530194.508	2775284.291
1271	109+570	530197.414	2775274.732
1272	109+580	530202.732	2775266.341
1273	109+590	530211.228	2775261.267
1274	109+600	530221.117	2775260.888
1275	109+610	530229.977	2775265.296
1276	109+620	530235.64	2775273.412
1277	109+630	530237.038	2775283.247
1278	109+640	530235.75	2775293.155
1279	109+650	530233.94	2775302.989
1280	109+660	530232.129	2775312.824
1281	109+670	530230.318	2775322.659
1282	109+680	530228.507	2775332.493
1283	109+690	530226.696	2775342.328
1284	109+700	530224.885	2775352.163
1285	109+710	530223.08	2775361.998
1286	109+720	530221.44	2775371.863
1287	109+730	530220.236	2775381.789
1288	109+740	530219.53	2775391.763
1289	109+750	530219.324	2775401.76
1290	109+760	530219.617	2775411.754
1291	109+770	530220.41	2775421.722
1292	109+780	530221.699	2775431.637
1293	109+790	530223.483	2775441.476
1294	109+800	530225.756	2775451.213
1295	109+810	530228.513	2775460.824
1296	109+820	530231.734	2775470.291
1297	109+830	530235.228	2775479.66
1298	109+840	530238.756	2775489.017
1299	109+850	530242.285	2775498.374
1300	109+860	530245.814	2775507.731
1301	109+870	530249.342	2775517.087
1302	109+880	530252.871	2775526.444
1303	109+890	530256.4	2775535.801
1304	109+900	530259.928	2775545.157
1305	109+910	530263.457	2775554.514
1306	109+920	530266.986	2775563.871
1307	109+930	530270.515	2775573.228
1308	109+940	530274.023	2775582.592

S.N.	Chainage	Northing	Easting
1309	109+950	530277.228	2775592.063
1310	109+960	530279.668	2775601.757
1311	109+970	530281.132	2775611.645
1312	109+980	530281.601	2775621.63
1313	109+990	530281.071	2775631.611
1314	110+000	530279.548	2775641.49
1315	110+010	530277.048	2775651.169
1316	110+020	530273.759	2775660.611
1317	110+030	530270.138	2775669.932
1318	110+040	530266.49	2775679.243
1319	110+050	530262.842	2775688.554
1320	110+060	530259.194	2775697.865
1321	110+070	530255.546	2775707.176
1322	110+080	530251.898	2775716.486
1323	110+090	530248.25	2775725.797
1324	110+100	530244.602	2775735.108
1325	110+110	530240.954	2775744.419
1326	110+120	530237.306	2775753.73
1327	110+130	530233.658	2775763.04
1328	110+140	530230.009	2775772.351
1329	110+150	530226.361	2775781.662
1330	110+160	530222.713	2775790.973
1331	110+170	530219.065	2775800.284
1332	110+180	530215.417	2775809.595
1333	110+190	530211.769	2775818.905
1334	110+200	530208.121	2775828.216
1335	110+210	530204.473	2775837.527
1336	110+220	530200.733	2775846.8
1337	110+230	530195.632	2775855.382
1338	110+240	530188.928	2775862.779
1339	110+250	530180.888	2775868.697
1340	110+260	530171.832	2775872.899
1341	110+270	530162.224	2775875.666
1342	110+280	530152.587	2775878.334
1343	110+290	530142.95	2775881.006
1344	110+300	530133.373	2775883.881
1345	110+310	530124.019	2775887.405
1346	110+320	530115.054	2775891.828
1347	110+330	530106.533	2775897.056
1348	110+340	530098.286	2775902.712
1349	110+350	530090.089	2775908.439
1350	110+360	530081.891	2775914.166
1351	110+370	530073.694	2775919.893
1352	110+380	530065.496	2775925.621

S.N.	Chainage	Northing	Easting
1353	110+390	530057.299	2775931.348
1354	110+400	530049.101	2775937.075
1355	110+410	530040.904	2775942.802
1356	110+420	530032.725	2775948.556
1357	110+430	530024.71	2775954.534
1358	110+440	530016.993	2775960.893
1359	110+450	530009.604	2775967.629
1360	110+460	530002.56	2775974.726
1361	110+470	529995.881	2775982.167
1362	110+480	529989.581	2775989.932
1363	110+490	529983.662	2775997.991
1364	110+500	529977.957	2776006.204
1365	110+510	529972.276	2776014.433
1366	110+520	529966.594	2776022.663
1367	110+530	529960.913	2776030.892
1368	110+540	529955.232	2776039.121
1369	110+550	529949.55	2776047.351
1370	110+560	529943.869	2776055.58
1371	110+570	529938.187	2776063.809
1372	110+580	529932.506	2776072.039
1373	110+590	529926.85	2776080.285
1374	110+600	529922.164	2776089.094
1375	110+610	529920.804	2776098.91
1376	110+620	529924.234	2776108.193
1377	110+630	529931.696	2776114.694
1378	110+640	529941.36	2776116.822
1379	110+650	529950.871	2776114.074
1380	110+660	529958.624	2776107.811
1381	110+670	529965.294	2776100.363
1382	110+680	529971.885	2776092.842
1383	110+690	529978.476	2776085.322
1384	110+700	529985.067	2776077.801
1385	110+710	529991.659	2776070.281
1386	110+720	529998.25	2776062.76
1387	110+730	530004.841	2776055.24
1388	110+740	530011.432	2776047.719
1389	110+750	530018.023	2776040.199
1390	110+760	530024.614	2776032.678
1391	110+770	530031.206	2776025.158
1392	110+780	530037.88	2776017.712
1393	110+790	530044.843	2776010.536
1394	110+800	530052.156	2776003.717
1395	110+810	530059.801	2775997.272
1396	110+820	530067.758	2775991.217

S.N.	Chainage	Northing	Easting
1397	110+830	530076.008	2775985.568
1398	110+840	530084.53	2775980.337
1399	110+850	530093.26	2775975.461
1400	110+860	530102.051	2775970.695
1401	110+870	530110.843	2775965.93
1402	110+880	530119.635	2775961.166
1403	110+890	530128.427	2775956.402
1404	110+900	530137.219	2775951.637
1405	110+910	530146.011	2775946.873
1406	110+920	530154.804	2775942.108
1407	110+930	530163.596	2775937.344
1408	110+940	530172.39	2775932.583
1409	110+950	530181.376	2775928.205
1410	110+960	530190.928	2775925.318
1411	110+970	530200.878	2775925.233
1412	110+980	530210	2775929.1
1413	110+990	530216.204	2775936.81
1414	111+000	530217.954	2775946.551
1415	111+010	530215.124	2775956.067
1416	111+020	530209.152	2775964.044
1417	111+030	530201.51	2775970.475
1418	111+040	530193.234	2775976.087
1419	111+050	530184.891	2775981.601
1420	111+060	530176.549	2775987.115
1421	111+070	530168.206	2775992.629
1422	111+080	530159.864	2775998.143
1423	111+090	530151.521	2776003.656
1424	111+100	530143.179	2776009.17
1425	111+110	530134.836	2776014.684
1426	111+120	530126.494	2776020.198
1427	111+130	530118.151	2776025.712
1428	111+140	530109.809	2776031.226
1429	111+150	530101.475	2776036.752
1430	111+160	530093.264	2776042.459
1431	111+170	530085.328	2776048.542
1432	111+180	530077.705	2776055.013
1433	111+190	530070.416	2776061.858
1434	111+200	530063.478	2776069.058
1435	111+210	530056.908	2776076.595
1436	111+220	530050.65	2776084.394
1437	111+230	530044.485	2776092.268
1438	111+240	530038.322	2776100.144
1439	111+250	530032.159	2776108.019
1440	111+260	530025.996	2776115.894

S.N.	Chainage	Northing	Easting
1441	111+270	530019.833	2776123.769
1442	111+280	530013.67	2776131.644
1443	111+290	530007.507	2776139.519
1444	111+300	530001.344	2776147.394
1445	111+310	529995.189	2776155.275
1446	111+320	529989.187	2776163.273
1447	111+330	529983.556	2776171.536
1448	111+340	529978.344	2776180.069
1449	111+350	529973.565	2776188.852
1450	111+360	529969.133	2776197.816
1451	111+370	529964.796	2776206.826
1452	111+380	529960.46	2776215.837
1453	111+390	529956.124	2776224.848
1454	111+400	529951.787	2776233.859
1455	111+410	529947.451	2776242.87
1456	111+420	529943.115	2776251.881
1457	111+430	529938.779	2776260.892
1458	111+440	529934.443	2776269.903
1459	111+450	529930.107	2776278.914
1460	111+460	529925.77	2776287.925
1461	111+470	529921.434	2776296.936
1462	111+480	529917.098	2776305.947
1463	111+490	529912.762	2776314.958
1464	111+500	529908.401	2776323.957
1465	111+510	529903.806	2776332.838
1466	111+520	529898.79	2776341.488
1467	111+530	529893.348	2776349.876
1468	111+540	529887.493	2776357.982
1469	111+550	529881.241	2776365.785
1470	111+560	529874.627	2776373.285
1471	111+570	529867.841	2776380.629
1472	111+580	529861.04	2776387.961
1473	111+590	529854.24	2776395.293
1474	111+600	529847.44	2776402.625
1475	111+610	529840.639	2776409.956
1476	111+620	529833.839	2776417.288
1477	111+630	529827.038	2776424.62
1478	111+640	529820.238	2776431.952
1479	111+650	529813.482	2776439.324
1480	111+660	529807.063	2776446.989
1481	111+670	529801.401	2776455.224
1482	111+680	529796.988	2776464.185
1483	111+690	529794.336	2776473.809
1484	111+700	529793.65	2776483.769

S.N.	Chainage	Northing	Easting
1485	111+710	529794.955	2776493.667
1486	111+720	529798.201	2776503.108
1487	111+730	529803.219	2776511.741
1488	111+740	529809.543	2776519.478
1489	111+750	529816.673	2776526.486
1490	111+760	529824.203	2776533.065
1491	111+770	529831.822	2776539.542
1492	111+780	529839.441	2776546.018
1493	111+790	529847.061	2776552.495
1494	111+800	529854.68	2776558.972
1495	111+810	529862.236	2776565.522
1496	111+820	529869.436	2776572.458
1497	111+830	529875.961	2776580.03
1498	111+840	529881.697	2776588.217
1499	111+850	529886.587	2776596.935
1500	111+860	529890.582	2776606.097
1501	111+870	529893.643	2776615.613
1502	111+880	529895.738	2776625.387
1503	111+890	529896.847	2776635.321
1504	111+900	529896.959	2776645.316
1505	111+910	529896.073	2776655.273
1506	111+920	529894.228	2776665.098
1507	111+930	529891.766	2776674.789
1508	111+940	529889.169	2776684.446
1509	111+950	529886.884	2776694.18
1510	111+960	529885.35	2776704.058
1511	111+970	529884.993	2776714.044
1512	111+980	529885.966	2776723.989
1513	111+990	529888.251	2776733.717
1514	112+000	529891.809	2776743.054
1515	112+010	529896.487	2776751.888
1516	112+020	529901.885	2776760.304
1517	112+030	529907.608	2776768.504
1518	112+040	529913.371	2776776.676
1519	112+050	529919.088	2776784.881
1520	112+060	529924.435	2776793.329
1521	112+070	529928.963	2776802.239
1522	112+080	529932.161	2776811.701
1523	112+090	529933.529	2776821.59
1524	112+100	529932.906	2776831.554
1525	112+110	529930.316	2776841.195
1526	112+120	529925.862	2776850.13
1527	112+130	529919.721	2776858.001
1528	112+140	529912.144	2776864.502

S.N.	Chainage	Northing	Easting
1529	112+150	529903.541	2776869.581
1530	112+160	529894.358	2776873.53
1531	112+170	529884.895	2776876.76
1532	112+180	529875.345	2776879.725
1533	112+190	529865.791	2776882.676
1534	112+200	529856.249	2776885.668
1535	112+210	529846.835	2776889.038
1536	112+220	529837.747	2776893.198
1537	112+230	529829.118	2776898.245
1538	112+240	529821.037	2776904.128
1539	112+250	529813.583	2776910.788
1540	112+260	529806.832	2776918.16
1541	112+270	529800.85	2776926.168
1542	112+280	529795.588	2776934.669
1543	112+290	529790.691	2776943.388
1544	112+300	529785.839	2776952.132
1545	112+310	529780.987	2776960.876
1546	112+320	529776.135	2776969.62
1547	112+330	529771.283	2776978.364
1548	112+340	529766.431	2776987.108
1549	112+350	529761.578	2776995.852
1550	112+360	529756.726	2777004.596
1551	112+370	529751.874	2777013.34
1552	112+380	529747.022	2777022.084
1553	112+390	529742.17	2777030.828
1554	112+400	529737.31	2777039.567
1555	112+410	529732.25	2777048.192
1556	112+420	529726.628	2777056.458
1557	112+430	529720.135	2777064.054
1558	112+440	529712.696	2777070.726
1559	112+450	529704.437	2777076.351
1560	112+460	529695.564	2777080.954
1561	112+470	529686.356	2777084.851
1562	112+480	529677.02	2777088.434
1563	112+490	529667.685	2777092.018
1564	112+500	529658.478	2777095.917
1565	112+510	529649.606	2777100.523
1566	112+520	529641.35	2777106.151
1567	112+530	529633.914	2777112.827
1568	112+540	529627.374	2777120.385
1569	112+550	529621.53	2777128.497
1570	112+560	529616.051	2777136.863
1571	112+570	529610.634	2777145.269
1572	112+580	529605.218	2777153.675

S.N.	Chainage	Northing	Easting
1573	112+590	529599.801	2777162.08
1574	112+600	529594.343	2777170.46
1575	112+610	529588.541	2777178.602
1576	112+620	529582.056	2777186.208
1577	112+630	529574.844	2777193.129
1578	112+640	529566.976	2777199.296
1579	112+650	529558.569	2777204.706
1580	112+660	529549.886	2777209.665
1581	112+670	529541.154	2777214.538
1582	112+680	529532.421	2777219.411
1583	112+690	529523.689	2777224.285
1584	112+700	529514.957	2777229.158
1585	112+710	529506.225	2777234.032
1586	112+720	529497.493	2777238.905
1587	112+730	529488.761	2777243.778
1588	112+740	529480.029	2777248.652
1589	112+750	529471.296	2777253.525
1590	112+760	529462.564	2777258.398
1591	112+770	529453.832	2777263.272
1592	112+780	529445.1	2777268.145
1593	112+790	529436.368	2777273.018
1594	112+800	529427.636	2777277.892
1595	112+810	529418.904	2777282.765
1596	112+820	529410.171	2777287.639
1597	112+830	529401.439	2777292.512
1598	112+840	529392.707	2777297.385
1599	112+850	529383.956	2777302.223
1600	112+860	529375.065	2777306.8
1601	112+870	529365.963	2777310.938
1602	112+880	529356.682	2777314.66
1603	112+890	529347.331	2777318.206
1604	112+900	529337.978	2777321.743
1605	112+910	529328.624	2777325.28
1606	112+920	529319.271	2777328.818
1607	112+930	529309.917	2777332.355
1608	112+940	529300.564	2777335.892
1609	112+950	529291.21	2777339.429
1610	112+960	529281.857	2777342.966
1611	112+970	529272.503	2777346.504
1612	112+980	529263.15	2777350.041
1613	112+990	529253.796	2777353.578
1614	113+000	529244.443	2777357.115
1615	113+010	529235.051	2777360.548
1616	113+020	529225.487	2777363.459

S.N.	Chainage	Northing	Easting
1617	113+030	529215.693	2777365.458
1618	113+040	529205.749	2777366.471
1619	113+050	529195.753	2777366.485
1620	113+060	529185.805	2777365.501
1621	113+070	529176.006	2777363.531
1622	113+080	529166.401	2777360.751
1623	113+090	529156.904	2777357.621
1624	113+100	529147.417	2777354.459
1625	113+110	529137.759	2777351.921
1626	113+120	529127.794	2777351.313
1627	113+130	529117.901	2777352.669
1628	113+140	529108.109	2777354.701
1629	113+150	529098.318	2777356.733
1630	113+160	529088.46	2777358.355
1631	113+170	529078.478	2777358.126
1632	113+180	529068.529	2777357.116
1633	113+190	529058.575	2777356.17
1634	113+200	529048.937	2777358.414
1635	113+210	529041.555	2777365.005
1636	113+220	529038.236	2777374.328
1637	113+230	529039.793	2777384.101
1638	113+240	529045.799	2777391.984
1639	113+250	529053.136	2777398.779
1640	113+260	529060.473	2777405.573
1641	113+270	529067.811	2777412.368
1642	113+280	529075.148	2777419.162
1643	113+290	529082.485	2777425.956
1644	113+300	529089.597	2777432.967
1645	113+310	529093.421	2777442.095
1646	113+320	529092.402	2777451.938
1647	113+330	529086.788	2777460.088
1648	113+340	529077.954	2777464.548
1649	113+350	529068.079	2777466.124
1650	113+360	529058.198	2777467.661
1651	113+370	529048.317	2777469.198
1652	113+380	529038.436	2777470.734
1653	113+390	529028.554	2777472.271
1654	113+400	529018.629	2777472.513
1655	113+410	529009.745	2777468.152
1656	113+420	529004.038	2777460.067
1657	113+430	529000.366	2777450.766
1658	113+440	528995.007	2777442.439
1659	113+450	528986.332	2777437.676
1660	113+460	528976.473	2777436.018

S.N.	Chainage	Northing	Easting
1661	113+470	528966.597	2777434.449
1662	113+480	528956.914	2777432.073
1663	113+490	528948.479	2777426.789
1664	113+500	528941.126	2777420.011
1665	113+510	528933.778	2777413.229
1666	113+520	528926.429	2777406.447
1667	113+530	528918.224	2777400.872
1668	113+540	528908.387	2777399.787
1669	113+550	528899.235	2777403.551
1670	113+560	528893.007	2777411.242
1671	113+570	528891.229	2777420.977
1672	113+580	528894.336	2777430.373
1673	113+590	528900.753	2777438.031
1674	113+600	528907.154	2777445.701
1675	113+610	528910.204	2777455.115
1676	113+620	528908.367	2777464.84
1677	113+630	528902.093	2777472.492
1678	113+640	528893.004	2777476.528
1679	113+650	528883.505	2777479.656
1680	113+660	528874.475	2777483.855
1681	113+670	528867.289	2777490.744
1682	113+680	528862.753	2777499.604
1683	113+690	528861.366	2777509.46
1684	113+700	528863.28	2777519.228
1685	113+710	528868.28	2777527.837
1686	113+720	528874.511	2777535.657
1687	113+730	528880.743	2777543.478
1688	113+740	528886.975	2777551.299
1689	113+750	528893.206	2777559.12
1690	113+760	528899.458	2777566.925
1691	113+770	528905.918	2777574.558
1692	113+780	528912.629	2777581.971
1693	113+790	528919.583	2777589.156
1694	113+800	528926.773	2777596.106
1695	113+810	528934.132	2777602.876
1696	113+820	528941.5	2777609.638
1697	113+830	528948.868	2777616.399
1698	113+840	528956.236	2777623.16
1699	113+850	528963.603	2777629.922
1700	113+860	528969.662	2777637.819
1701	113+870	528972.803	2777647.265
1702	113+880	528972.68	2777657.218
1703	113+890	528969.308	2777666.583
1704	113+900	528963.058	2777674.329

S.N.	Chainage	Northing	Easting
1705	113+910	528954.616	2777679.604
1706	113+920	528944.914	2777681.826
1707	113+930	528935.018	2777680.752
1708	113+940	528926.013	2777676.507
1709	113+950	528917.657	2777671.014
1710	113+960	528909.301	2777665.52
1711	113+970	528900.906	2777660.09
1712	113+980	528891.535	2777656.732
1713	113+990	528881.57	2777656.494
1714	114+000	528871.589	2777657.113
1715	114+010	528861.605	2777657.369
1716	114+020	528851.987	2777654.805
1717	114+030	528843.328	2777649.814
1718	114+040	528834.767	2777644.645
1719	114+050	528826.206	2777639.477
1720	114+060	528817.645	2777634.309
1721	114+070	528809.084	2777629.141
1722	114+080	528800.523	2777623.972
1723	114+090	528791.963	2777618.804
1724	114+100	528783.176	2777614.066
1725	114+110	528773.413	2777612.124
1726	114+120	528763.553	2777613.483
1727	114+130	528754.68	2777617.994
1728	114+140	528747.757	2777625.149
1729	114+150	528741.829	2777633.203
1730	114+160	528735.902	2777641.257
1731	114+170	528729.513	2777648.933
1732	114+180	528721.762	2777655.225
1733	114+190	528712.916	2777659.852
1734	114+200	528703.484	2777663.173
1735	114+210	528694.032	2777666.437
1736	114+220	528684.579	2777669.701
1737	114+230	528675.127	2777672.965
1738	114+240	528665.675	2777676.229
1739	114+250	528656.046	2777678.777
1740	114+260	528646.326	2777676.914
1741	114+270	528638.69	2777670.62
1742	114+280	528635.005	2777661.436
1743	114+290	528635.882	2777651.533
1744	114+300	528637.812	2777641.721
1745	114+310	528639.662	2777631.896
1746	114+320	528638.224	2777622.105
1747	114+330	528632.267	2777614.202
1748	114+340	528623.251	2777610.122

S.N.	Chainage	Northing	Easting
1749	114+350	528613.321	2777610.573
1750	114+360	528603.437	2777612.093
1751	114+370	528593.553	2777613.612
1752	114+380	528583.669	2777615.132
1753	114+390	528573.785	2777616.651
1754	114+400	528563.901	2777618.17
1755	114+410	528554.122	2777620.202
1756	114+420	528544.916	2777624.065
1757	114+430	528536.661	2777629.679
1758	114+440	528529.685	2777636.821
1759	114+450	528524.268	2777645.207
1760	114+460	528520.624	2777654.501
1761	114+470	528518.9	2777664.335
1762	114+480	528519.164	2777674.315
1763	114+490	528521.216	2777684.095
1764	114+500	528523.57	2777693.814
1765	114+510	528525.925	2777703.533
1766	114+520	528527.328	2777713.417
1767	114+530	528526.74	2777723.383
1768	114+540	528524.184	2777733.033
1769	114+550	528519.882	2777742.051
1770	114+560	528515.224	2777750.9
1771	114+570	528510.566	2777759.749
1772	114+580	528504.871	2777767.884
1773	114+590	528496.096	2777772.46
1774	114+600	528486.202	2777772.269
1775	114+610	528477.61	2777767.358
1776	114+620	528471.323	2777759.592
1777	114+630	528465.185	2777751.697
1778	114+640	528459.048	2777743.802
1779	114+650	528452.562	2777736.22
1780	114+660	528443.623	2777731.975
1781	114+670	528433.742	2777732.535
1782	114+680	528425.34	2777737.764
1783	114+690	528420.157	2777746.251
1784	114+700	528415.763	2777755.232
1785	114+710	528408.821	2777762.286
1786	114+720	528399.348	2777765.148
1787	114+730	528389.385	2777764.611
1788	114+740	528380.042	2777767.874
1789	114+750	528373.407	2777775.216
1790	114+760	528371.104	2777784.84
1791	114+770	528373.368	2777794.526
1792	114+780	528376.576	2777803.997

S.N.	Chainage	Northing	Easting
1793	114+790	528379.784	2777813.469
1794	114+800	528382.992	2777822.94
1795	114+810	528386.199	2777832.412
1796	114+820	528389.407	2777841.884
1797	114+830	528392.615	2777851.355
1798	114+840	528395.822	2777860.827
1799	114+850	528399.03	2777870.298
1800	114+860	528402.238	2777879.77
1801	114+870	528405.445	2777889.241
1802	114+880	528408.653	2777898.713
1803	114+890	528411.861	2777908.184
1804	114+900	528415.069	2777917.656
1805	114+910	528418.276	2777927.128
1806	114+920	528421.484	2777936.599
1807	114+930	528424.691	2777946.071
1808	114+940	528427.778	2777955.582
1809	114+950	528430.31	2777965.253
1810	114+960	528431.913	2777975.12
1811	114+970	528432.523	2777985.097
1812	114+980	528432.134	2777995.085
1813	114+990	528430.753	2778004.985
1814	115+000	528428.566	2778014.742
1815	115+010	528426.04	2778024.417
1816	115+020	528423.487	2778034.086
1817	115+030	528420.934	2778043.755
1818	115+040	528418.382	2778053.424
1819	115+050	528415.829	2778063.092
1820	115+060	528413.277	2778072.761
1821	115+070	528410.734	2778082.432
1822	115+080	528408.646	2778092.208
1823	115+090	528408.078	2778102.173
1824	115+100	528410.12	2778111.92
1825	115+110	528415.199	2778120.481
1826	115+120	528422.771	2778126.951
1827	115+130	528431.77	2778131.27
1828	115+140	528441.326	2778134.205
1829	115+150	528451.004	2778136.723
1830	115+160	528460.683	2778139.234
1831	115+170	528470.363	2778141.745
1832	115+180	528479.983	2778144.46
1833	115+190	528488.989	2778148.767
1834	115+200	528496.96	2778154.778
1835	115+210	528503.578	2778162.253
1836	115+220	528508.67	2778170.847

S.N.	Chainage	Northing	Easting
1837	115+230	528513.363	2778179.678
1838	115+240	528518.055	2778188.509
1839	115+250	528522.786	2778197.319
1840	115+260	528527.773	2778205.986
1841	115+270	528533.046	2778214.482
1842	115+280	528538.599	2778222.798
1843	115+290	528544.426	2778230.924
1844	115+300	528550.521	2778238.851
1845	115+310	528556.877	2778246.571
1846	115+320	528563.398	2778254.153
1847	115+330	528569.921	2778261.732
1848	115+340	528576.445	2778269.311
1849	115+350	528582.969	2778276.89
1850	115+360	528589.344	2778284.585
1851	115+370	528592.49	2778293.968
1852	115+380	528590.751	2778303.71
1853	115+390	528585.664	2778312.314
1854	115+400	528582.412	2778321.664
1855	115+410	528584.027	2778331.427
1856	115+420	528590.126	2778339.221
1857	115+430	528599.196	2778343.218
1858	115+440	528608.89	2778345.672
1859	115+450	528618.585	2778348.125
1860	115+460	528628.279	2778350.578
1861	115+470	528637.421	2778354.427
1862	115+480	528643.68	2778362.092
1863	115+490	528645.498	2778371.82
1864	115+500	528642.43	2778381.228
1865	115+510	528635.689	2778388.579
1866	115+520	528628.72	2778395.744
1867	115+530	528623.097	2778403.993
1868	115+540	528619.224	2778413.195
1869	115+550	528617.257	2778422.983
1870	115+560	528617.274	2778432.966
1871	115+570	528619.274	2778442.747
1872	115+580	528623.177	2778451.936
1873	115+590	528628.767	2778460.213
1874	115+600	528634.788	2778468.197
1875	115+610	528640.81	2778476.181
1876	115+620	528646.831	2778484.165
1877	115+630	528652.852	2778492.149
1878	115+640	528658.874	2778500.133
1879	115+650	528665.273	2778507.794
1880	115+660	528673.622	2778513.214

S.N.	Chainage	Northing	Easting
1881	115+670	528683.285	2778515.604
1882	115+680	528693.197	2778514.701
1883	115+690	528702.269	2778510.604
1884	115+700	528710.597	2778505.068
1885	115+710	528718.925	2778499.533
1886	115+720	528727.253	2778493.997
1887	115+730	528735.581	2778488.462
1888	115+740	528743.657	2778482.574
1889	115+750	528750.894	2778475.683
1890	115+760	528757.15	2778467.892
1891	115+770	528762.32	2778459.34
1892	115+780	528767.002	2778450.504
1893	115+790	528771.895	2778441.791
1894	115+800	528778.904	2778434.723
1895	115+810	528787.84	2778430.339
1896	115+820	528797.718	2778429.119
1897	115+830	528807.453	2778431.198
1898	115+840	528815.97	2778436.348
1899	115+850	528823.161	2778443.296
1900	115+860	528830.309	2778450.289
1901	115+870	528837.458	2778457.282
1902	115+880	528844.607	2778464.274
1903	115+890	528852.207	2778470.751
1904	115+900	528860.926	2778475.613
1905	115+910	528870.341	2778478.973
1906	115+920	528879.817	2778482.17
1907	115+930	528889.158	2778485.715
1908	115+940	528897.681	2778490.914
1909	115+950	528905.002	2778497.702
1910	115+960	528910.828	2778505.809
1911	115+970	528914.93	2778514.911
1912	115+980	528918.218	2778524.355
1913	115+990	528921.505	2778533.799
1914	116+000	528924.793	2778543.243
1915	116+010	528928.08	2778552.688
1916	116+020	528931.368	2778562.132
1917	116+030	528934.656	2778571.576
1918	116+040	528937.943	2778581.02
1919	116+050	528941.231	2778590.464
1920	116+060	528944.518	2778599.908
1921	116+070	528947.644	2778609.404
1922	116+080	528949.161	2778619.271
1923	116+090	528948.687	2778629.243
1924	116+100	528946.266	2778638.931

S.N.	Chainage	Northing	Easting
1925	116+110	528943.169	2778648.439
1926	116+120	528940.688	2778658.102
1927	116+130	528941.261	2778668.04
1928	116+140	528945.053	2778677.242
1929	116+150	528951.649	2778684.698
1930	116+160	528960.218	2778689.805
1931	116+170	528969.116	2778694.37
1932	116+180	528977.443	2778699.876
1933	116+190	528984.511	2778706.927
1934	116+200	528990.038	2778715.241
1935	116+210	528993.802	2778724.488
1936	116+220	528996.087	2778734.221
1937	116+230	528998.262	2778743.982
1938	116+240	529000.437	2778753.742
1939	116+250	529002.612	2778763.503
1940	116+260	529004.79	2778773.263
1941	116+270	529007.318	2778782.935
1942	116+280	529011.162	2778792.149
1943	116+290	529017.157	2778800.105
1944	116+300	529025.376	2778805.72
1945	116+310	529034.98	2778808.336
1946	116+320	529044.911	2778807.667
1947	116+330	529054.078	2778803.788

S.N.	Chainage	Northing	Easting
1948	116+340	529061.735	2778797.395
1949	116+350	529068.048	2778789.649
1950	116+360	529073.721	2778781.415
1951	116+370	529079.337	2778773.141
1952	116+380	529084.969	2778764.878
1953	116+390	529091.044	2778756.941
1954	116+400	529098.318	2778750.108
1955	116+410	529107.142	2778745.495
1956	116+420	529116.982	2778743.997
1957	116+430	529126.771	2778745.801
1958	116+440	529135.458	2778750.672
1959	116+450	529142.596	2778757.648
1960	116+460	529148.6	2778765.641
1961	116+470	529154.207	2778773.921
1962	116+480	529159.576	2778782.356
1963	116+490	529164.662	2778790.966
1964	116+500	529169.457	2778799.741
1965	116+510	529173.958	2778808.67
1966	116+520	529178.158	2778817.745
1967	116+530	529182.054	2778826.954
1968	116+540	529185.767	2778836.24
1969	116+550	529189.478	2778845.525

Schedule-B

Schedule-B

(SeeClause2.1)

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]

[Rehabilitation and augmentation] shall include [Two-Laning and Strengthening] of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex- I

(Schedule-B)

Description of [Two-Laning]

[Note: Description of the Project Highway shall be given by the Authority in detail together with explanatory drawings (where necessary) to explain the Authority's requirements precisely in order to avoid subsequent changes in the Scope of the Project. The particulars that must be specified in this Schedule-B are listed below as per the requirements of the Manual of Specifications and Standards for [Two Laning of Highways (IRC: SP:73-2018)], referred to as the Manual. If any standards, specifications or details are not given in the Manual, the minimum design/construction requirements shall be specified in this Schedule. In addition to these particulars, all other essential project specific details, as required, should be provided in order to define the Scope of the Project clearly and precisely.]

1. Widening of the Existing Highway

(i) The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for [plain/rolling] terrain to the extent land is available.

(ii) Width of Carriageway

a) **Two Lane Road with Paved shoulders in Hilly Terrain with Hill side drain & without Retaining Wall: -** The Carriageway shall be 7.0 m wide with 1.5 m paved shoulder both side and 1.0 m earthen shoulder valley side shall be provided. The width of carriageway specified following table-

S. No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
1.	-	97500	97700	7+1.5x2+1x1=11 m	0.200	2.9
2.	-	97900	98000	7+1.5x2+1x1=11 m	0.100	2.9
3.	-	99000	99100	7+1.5x2+1x1=11 m	0.100	2.9
4.	-	99200	99300	7+1.5x2+1x1=11 m	0.100	2.9
5.	-	99700	99800	7+1.5x2+1x1=11 m	0.100	2.9
6.	-	101300	101400	7+1.5x2+1x1=11 m	0.100	2.9
7.	-	101700	101900	7+1.5x2+1x1=11 m	0.200	2.9

S. No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
8.	-	102100	102200	7+1.5x2+1x1=11 m	0.100	2.9
9.	-	103700	103900	7+1.5x2+1x1=11 m	0.200	2.9
10.	-	104000	104500	7+1.5x2+1x1=11 m	0.500	2.9
11.	-	104900	105100	7+1.5x2+1x1=11 m	0.200	2.9
12.	-	106000	106200	7+1.5x2+1x1=11 m	0.200	2.9
13.	-	106400	106600	7+1.5x2+1x1=11 m	0.200	2.9
14.	-	111700	113200	7+1.5x2+1x1=11 m	1.500	2.9
15.	-	114000	114100	7+1.5x2+1x1=11 m	0.100	2.9
16.	-	114150	114350	7+1.5x2+1x1=11 m	0.200	2.9
17.	-	114400	114650	7+1.5x2+1x1=11 m	0.250	2.9
18.	-	114800	115100	7+1.5x2+1x1=11 m	0.300	2.9
19.	-	115150	115350	7+1.5x2+1x1=11 m	0.200	2.9
20.	-	115750	116000	7+1.5x2+1x1=11 m	0.250	2.9
21.	-	116350	116550	7+1.5x2+1x1=11 m	0.200	2.9
		Total Length			**5.300 km**	

b) **Two-Lane with paved shoulder in Hilly Terrain with Hill side Drain on Both sides in open Country area (Box cut): -** The Carriageway shall be 7.0 m wide with 1.5 m. paved shoulder both sides shall be provided. The width of carriage way shall be specified in following table:

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
1.	-	96870	97100	7+1.5x2=10 m	0.230	2.11(new)
2.	-	97300	97500	7+1.5x2=10 m	0.200	2.11(new)
3.	-	97800	97900	7+1.5x2=10 m	0.100	2.11(new)
4.	-	98100	98250	7+1.5x2=10 m	0.150	2.11(new)
5.	-	98500	98650	7+1.5x2=10 m	0.150	2.11(new)
6.	-	98750	98900	7+1.5x2=10 m	0.150	2.11(new)
7.	-	99100	99200	7+1.5x2=10 m	0.100	2.11(new)
8.	-	99300	99700	7+1.5x2=10 m	0.400	2.11(new)
9.	-	99800	100100	7+1.5x2=10 m	0.300	2.11(new)
10.	-	100200	100300	7+1.5x2=10 m	0.100	2.11(new)
11.	-	100800	101100	7+1.5x2=10 m	0.300	2.11(new)

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
12.	-	102400	102600	7+1.5x2=10 m	0.200	2.11(new)
13.	-	102800	102950	7+1.5x2=10 m	0.150	2.11(new)
14.	-	103150	103500	7+1.5x2=10 m	0.350	2.11(new)
15.	-	103600	103700	7+1.5x2=10 m	0.100	2.11(new)
16.	-	103900	104000	7+1.5x2=10 m	0.100	2.11(new)
17.	-	104500	104900	7+1.5x2=10 m	0.400	2.11(new)
18.	-	105200	105500	7+1.5x2=10 m	0.300	2.11(new)
19.	-	105600	106000	7+1.5x2=10 m	0.400	2.11(new)
20.	-	109900	110300	7+1.5x2=10 m	0.400	2.11(new)
21.	-	113200	114000	7+1.5x2=10 m	0.800	2.11(new)
		Total Length			**5.380km**	

c) **Two Lane Road with Paved shoulders in Hilly Terrain with Hill side drain& Retaining Wall: -** The Carriageway shall be 7.0 m wide with 1.5 m paved shoulder both side and 1.0 m earthen shoulder valley side shall be provided. The width of carriageway specified following table-

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
1.	-	97100	97300	7+1.5x2+1x1=11 m	0.200	2.8
2.	-	97700	97800	7+1.5x2+1x1=11 m	0.100	2.8
3.	-	98000	98100	7+1.5x2+1x1=11 m	0.100	2.8
4.	-	98250	98500	7+1.5x2+1x1=11 m	0.250	2.8
5.	-	98650	98750	7+1.5x2+1x1=11 m	0.100	2.8
6.	-	98900	99000	7+1.5x2+1x1=11 m	0.100	2.8
7.	-	100100	100200	7+1.5x2+1x1=11 m	0.100	2.8
8.	-	100300	100800	7+1.5x2+1x1=11 m	0.500	2.8
9.	-	101100	101300	7+1.5x2+1x1=11 m	0.200	2.8
10.	-	101400	101700	7+1.5x2+1x1=11 m	0.300	2.8
11.	-	101900	102100	7+1.5x2+1x1=11 m	0.200	2.8
12.	-	102200	102400	7+1.5x2+1x1=11 m	0.200	2.8
13.	-	102600	102800	7+1.5x2+1x1=11 m	0.200	2.8
14.	-	102950	103150	7+1.5x2+1x1=11 m	0.200	2.8
15.	-	103500	103600	7+1.5x2+1x1=11 m	0.100	2.8
16.	-	105100	105200	7+1.5x2+1x1=11 m	0.100	2.8

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
17.	-	105500	105600	7+1.5x2+1x1=11 m	0.100	2.8
18.	-	106200	106400	7+1.5x2+1x1=11 m	0.200	2.8
19.	-	106600	109900	7+1.5x2+1x1=11 m	3.300	2.8
20.	-	110300	111700	7+1.5x2+1x1=11 m	1.400	2.8
21.	-	114100	114150	7+1.5x2+1x1=11 m	0.050	2.8
22.	-	114350	114400	7+1.5x2+1x1=11 m	0.050	2.8
23.	-	114650	114800	7+1.5x2+1x1=11 m	0.150	2.8
24.	-	115100	115150	7+1.5x2+1x1=11 m	0.050	2.8
25.	-	115350	115750	7+1.5x2+1x1=11 m	0.400	2.8
26.	-	116000	116350	7+1.5x2+1x1=11 m	0.350	2.8
		Total Length			**9.000 km**	

$ The contents of this Annex-I may be modified in accordance with the structure of the Project.

d) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.1 above.

2. Geometric Design and General Features

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of [40 km per hr for Mountainous terrain] with some restrictions mentioned in Clause 2(iii).

(iii) Improvement of the existing road geometrics

[Refer to paragraph 2.1 (v) of the Manual and provide details]

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

S. No.	Stretch		Radius (m)	Speed(km/h)
	From	To		
1.	106704.838	106827.994	30	30

S. No.	Stretch		Radius (m)	Speed(km/h)
2.	107289.488	107318.810	30	30
3.	107341.478	107386.096	30	30
4.	107466.887	107547.933	20	20
5.	108010.610	108092.474	20	20
6.	108702.551	108783.705	20	20
7.	108955.764	109034.032	20	20
8.	109559.204	109640.825	20	20
9.	110585.834	110666.358	20	20
10.	110957.204	111018.287	20	20
11.	113188.401	113238.316	20	20
12.	113296.460	113341.267	20	20
13.	113392.789	113419.771	20	20
14.	113431.146	113451.890	20	20
15.	113472.940	113490.571	30	30
16.	113522.291	113583.015	20	20
17.	113596.863	113636.319	20	20
18.	113651.615	113709.379	30	30
19.	113849.782	113939.204	30	30
20.	113967.874	113987.182	30	30
21.	114005.326	114023.480	30	30
22.	114094.597	114138.981	30	30
23.	114244.564	114286.514	20	20
24.	114308.198	114346.549	20	20
25.	114572.889	114612.814	20	20
26.	114645.667	114686.305	20	20
27.	114698.431	114723.519	20	20
28.	114725.630	114766.228	20	20
29.	115066.191	115143.445	30	30
30.	115357.254	115382.447	20	20

Note:- At above locations Safety features like Traffic Sign boards, Crash Barrier, Road Delineators, etc. as per IRC 67: 2022 shall be provided.

(iv) Right of Way

[Refer to paragraph 2.3 of the Manual].Details of the Right of Way are given in Annex II of Schedule-A.

(v) Type of shoulders

[Refer to paragraph 2.5.2of the Manual and specify]

(a) In open country paved shoulder of 1.5m both side & earthen shoulder of 1.0m width on valley side shall be provided (Hilly terrain).

S. No.	Design Chainage		Length (in m)	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From	To				
1.	96870	97100	230	2x1.5=3.0m	-	Fig 2.11(new)
2.	97100	97300	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
3.	97300	97500	200	2x1.5=3.0m	-	Fig 2.11(new)
4.	97500	97700	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
5.	97700	97800	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
6.	97800	97900	100	2x1.5=3.0m	-	Fig 2.11(new)
7.	97900	98000	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
8.	98000	98100	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
9.	98100	98250	150	2x1.5=3.0m	-	Fig 2.11(new)
10.	98250	98500	250	2x1.5=3.0m	1x1=1.0m	Fig 2.8
11.	98500	98650	150	2x1.5=3.0m	-	Fig 2.11(new)
12.	98650	98750	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
13.	98750	98900	150	2x1.5=3.0m	-	Fig 2.11(new)
14.	98900	99000	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
15.	99000	99100	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
16.	99100	99200	100	2x1.5=3.0m	-	Fig 2.11(new)
17.	99200	99300	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
18.	99300	99700	400	2x1.5=3.0m	-	Fig 2.11(new)
19.	99700	99800	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
20.	99800	100100	300	2x1.5=3.0m	-	Fig 2.11(new)
21.	100100	100200	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
22.	100200	100300	100	2x1.5=3.0m	-	Fig 2.11(new)
23.	100300	100800	500	2x1.5=3.0m	1x1=1.0m	Fig 2.8
24.	100800	101100	300	2x1.5=3.0m	-	Fig 2.11(new)
25.	101100	101300	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
26.	101300	101400	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
27.	101400	101700	300	2x1.5=3.0m	1x1=1.0m	Fig 2.8

S. No.	Design Chainage		Length (in m)	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From	To				
28.	101700	101900	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
29.	101900	102100	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
30.	102100	102200	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
31.	102200	102400	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
32.	102400	102600	200	2x1.5=3.0m	-	Fig 2.11(new)
33.	102600	102800	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
34.	102800	102950	150	2x1.5=3.0m	-	Fig 2.11(new)
35.	102950	103150	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
36.	103150	103500	350	2x1.5=3.0m	-	Fig 2.11(new)
37.	103500	103600	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
38.	103600	103700	100	2x1.5=3.0m	-	Fig 2.11(new)
39.	103700	103900	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
40.	103900	104000	100	2x1.5=3.0m	-	Fig 2.11(new)
41.	104000	104500	500	2x1.5=3.0m	1x1=1.0m	Fig 2.9
42.	104500	104900	400	2x1.5=3.0m	-	Fig 2.11(new)
43.	104900	105100	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
44.	105100	105200	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
45.	105200	105500	300	2x1.5=3.0m	-	Fig 2.11(new)
46.	105500	105600	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
47.	105600	106000	400	2x1.5=3.0m	-	Fig 2.11(new)
48.	106000	106200	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
49.	106200	106400	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
50.	106400	106600	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
51.	106600	109900	3300	2x1.5=3.0m	1x1=1.0m	Fig 2.8
52.	109900	110300	400	2x1.5=3.0m	-	Fig 2.11(new)
53.	110300	111700	1400	2x1.5=3.0m	1x1=1.0m	Fig 2.8
54.	111700	113200	1500	2x1.5=3.0m	1x1=1.0m	Fig 2.9

S. No.	Design Chainage		Length (in m)	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From	To				
55.	113200	114000	800	2x1.5=3.0m	-	Fig 2.11(new)
56.	114000	114100	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
57.	114100	114150	50	2x1.5=3.0m	1x1=1.0m	Fig 2.8
58.	114150	114350	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
59.	114350	114400	50	2x1.5=3.0m	1x1=1.0m	Fig 2.8
60.	114400	114650	250	2x1.5=3.0m	1x1=1.0m	Fig 2.9
61.	114650	114800	150	2x1.5=3.0m	1x1=1.0m	Fig 2.8
62.	114800	115100	300	2x1.5=3.0m	1x1=1.0m	Fig 2.9
63.	115100	115150	50	2x1.5=3.0m	1x1=1.0m	Fig 2.8
64.	115150	115350	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
65.	115350	115750	400	2x1.5=3.0m	1x1=1.0m	Fig 2.8
66.	115750	116000	250	2x1.5=3.0m	1x1=1.0m	Fig 2.9
67.	116000	116350	350	2x1.5=3.0m	1x1=1.0m	Fig 2.8
68.	116350	116550	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
	Total		**=19680m**			

(vi) Lateral and vertical clearances at underpasses

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

(b) Lateral clearance: The width of the opening at the under passes shall be as follows:

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

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as the provision of relevant Manual.

(b) Lateral clearance: The width of the opening at the overpasses shall be as

follows:

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

(viii) Service roads

Service roads shall be constructed at the locations and for the lengths indicated below: [Refer to the provision of relevant Manual and provided details]

S. No.	Location of service road (From km to km)	Right hand side(RHS)/Left hand side(LHS)/or Both sides	Length(km)of service road
Nil			

(ix) Grade separated structures

(a) Grade separated structures shall be provided as per provision of the relevant Manual. The requisite particulars are given below:

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

S. No.	Location of structure	Length (m)	Number and length of spans (m)	Approach gradient	Remarks, if any
Nil					

(b) In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows: [Refer to the provision of relevant Manual and specify the type of vehicular underpass/ overpass structure and whether the cross road is to be carried at the existing level, raised or lowered]

Sl. No.	Location	Type of structure Length(m)	Cross road at			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

(x) Cattle and pedestrian underpass /overpass

Cattle and pedestrian underpass/overpass shall be constructed as follows: [Refer to provision of relevant Manual and specify the requirements of cattle and pedestrian underpass/overpass]

S. No.	Location	Type of crossing
Nil		

(xi) Typical cross-sections of the Project Highway

[GivetypicalcrossSectionsoftheProjectHighwaybyreferencetotheManual]

As per attached Drawings

Sr. No.	Description	Design Length (Km.)	Proposed TCS Type
1	Reconstruction in Two-Lane Carriageway with Paved Shoulder in Hilly Terrain with both side drain on hill side	5.380	TCS-2.11(new)
2	Two Lane Road with Paved shoulders in Hilly Terrain with Trapezoidal Drains on Hill side and Retaining wall on Valley Side in open country area	9.000	TCS-2.8
3	Reconstruction in Two-Lane Carriageway with Paved Shoulder in Hilly Terrain without retaining wall	5.300	TCS-2.9
	Total	**19.680km**	

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
1.	96870	97100	0.230	Fig 2.11(new)	Open Country
2.	97100	97300	0.200	Fig 2.8	Open Country
3.	97300	97500	0.200	Fig 2.11(new)	Open Country
4.	97500	97700	0.200	Fig 2.9	Open Country
5.	97700	97800	0.100	Fig 2.8	Open Country
6.	97800	97900	0.100	Fig 2.11(new)	Open Country
7.	97900	98000	0.100	Fig 2.9	Open Country
8.	98000	98100	0.100	Fig 2.8	Open Country
9.	98100	98250	0.150	Fig 2.11(new)	Open Country
10.	98250	98500	0.250	Fig 2.8	Open Country

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
11.	98500	98650	0.150	Fig 2.11(new)	Open Country
12.	98650	98750	0.100	Fig 2.8	Open Country
13.	98750	98900	0.150	Fig 2.11(new)	Open Country
14.	98900	99000	0.100	Fig 2.8	Open Country
15.	99000	99100	0.100	Fig 2.9	Open Country
16.	99100	99200	0.100	Fig 2.11(new)	Open Country
17.	99200	99300	0.100	Fig 2.9	Open Country
18.	99300	99700	0.400	Fig 2.11(new)	Open Country
19.	99700	99800	0.100	Fig 2.9	Open Country
20.	99800	100100	0.300	Fig 2.11(new)	Open Country
21.	100100	100200	0.100	Fig 2.8	Open Country
22.	100200	100300	0.100	Fig 2.11(new)	Open Country
23.	100300	100800	0.500	Fig 2.8	Open Country
24.	100800	101100	0.300	Fig 2.11(new)	Open Country
25.	101100	101300	0.200	Fig 2.8	Open Country
26.	101300	101400	0.100	Fig 2.9	Open Country
27.	101400	101700	0.300	Fig 2.8	Open Country
28.	101700	101900	0.200	Fig 2.9	Open Country
29.	101900	102100	0.200	Fig 2.8	Open Country
30.	102100	102200	0.100	Fig 2.9	Open Country
31.	102200	102400	0.200	Fig 2.8	Open Country
32.	102400	102600	0.200	Fig 2.11(new)	Open Country
33.	102600	102800	0.200	Fig 2.8	Open Country
34.	102800	102950	0.150	Fig 2.11(new)	Open Country
35.	102950	103150	0.200	Fig 2.8	Open Country
36.	103150	103500	0.350	Fig 2.11(new)	Open Country
37.	103500	103600	0.100	Fig 2.8	Open Country

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
38.	103600	103700	0.100	Fig 2.11(new)	Open Country
39.	103700	103900	0.200	Fig 2.9	Open Country
40.	103900	104000	0.100	Fig 2.11(new)	Open Country
41.	104000	104500	0.500	Fig 2.9	Open Country
42.	104500	104900	0.400	Fig 2.11(new)	Open Country
43.	104900	105100	0.200	Fig 2.9	Open Country
44.	105100	105200	0.100	Fig 2.8	Open Country
45.	105200	105500	0.300	Fig 2.11(new)	Open Country
46.	105500	105600	0.100	Fig 2.8	Open Country
47.	105600	106000	0.400	Fig 2.11(new)	Open Country
48.	106000	106200	0.200	Fig 2.9	Open Country
49.	106200	106400	0.200	Fig 2.8	Open Country
50.	106400	106600	0.200	Fig 2.9	Open Country
51.	106600	109900	3.300	Fig 2.8	Open Country
52.	109900	110300	0.400	Fig 2.11(new)	Open Country
53.	110300	111700	1.400	Fig 2.8	Open Country
54.	111700	113200	1.500	Fig 2.9	Open Country
55.	113200	114000	0.800	Fig 2.11(new)	Open Country
56.	114000	114100	0.100	Fig 2.9	Open Country
57.	114100	114150	0.050	Fig 2.8	Open Country
58.	114150	114350	0.200	Fig 2.9	Open Country
59.	114350	114400	0.050	Fig 2.8	Open Country
60.	114400	114650	0.250	Fig 2.9	Open Country
61.	114650	114800	0.150	Fig 2.8	Open Country
62.	114800	115100	0.300	Fig 2.9	Open Country
63.	115100	115150	0.050	Fig 2.8	Open Country
64.	115150	115350	0.200	Fig 2.9	Open Country

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
65.	115350	115750	0.400	Fig 2.8	Open Country
66.	115750	116000	0.250	Fig 2.9	Open Country
67.	116000	116350	0.350	Fig 2.8	Open Country
68.	116350	116550	0.200	Fig 2.9	Open Country
	Total Design Length		**19.680 km**		

3. Intersections and Grade Separators

All intersections and grade separators shall be as per the provision of relevant Manual. Existing intersections which are deficient shall be improved to the prescribed standards. [Refer to the provision of relevant Manual and specify the requirements. Explain where necessary with drawings/sketches/general arrangement]
Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

(i) At-grade intersections

a. Major Intersections

S. No.	Intersection at km	Type of intersection	Other features
NIL			

b. Minor Intersections

S.No.	Intersection at km	Type of intersection	Other features
1	106+830	3 legged	To N. Sonkhai Village

(ii) Grade separated intersection with/without ramps

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

4. Road Embankment and Cut Section

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in Section4 of the Manual and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

Note: -

1. Disposal of extra earth (Muck) obtained by cutting is sole responsibility of contractor.

2. Identification & finalization of muck disposal site is sole responsibility of contractor in consultation with Authority Engineer & without violating Guidelines of MoEFCC.

3. Any financial implication related to the muck disposal & muck disposal site will not be considered as Change of Scope.

(ii) Raising of the existing road [Refer to the provision of relevant Manual and specify sections to be raised]

The existing road shall be raised in the following sections:

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

5. Pavement Design

(i) Pavement design shall be carried out in accordance with Section 5 of the Manual.

Homogenous Section (Km)			CBR (%)	MSA	Adopted Pavement Composition In Widening Position (mm)			
From	To	Length (in Km)		Adopted	BC	DBM	WMM	CTSB
96+870	116+550	19.68	10	20	30	50	150	200

(ii) Type of pavement

[Refer to paragraph 5.1 of the Manual and state specific requirement, if any, of providing cement concrete pavement.]

Homogenous Section (Km)			Type of Pavement
From	To	Length (in Km)	
96+870	116+550	19.68	Flexible Pavement

(i) Design requirements

[Refer to the provision of relevant Manual and specify design requirements and strategy]

a) 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 20 years. Stage construction shall not be permitted.

b) Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 million standard axles.

(ii) Reconstruction of stretches

[Refer to the provision of relevant Manual and specify the stretches, if any, tobe reconstructed.]

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

S. No.	Stretch		Remark
	From km	To km	
1.	96+870	116+550	Reconstruction

6. Roadside Drainage

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

a) PCC Catch water drain: 45480 m

S. No.	Chainage		Length (in m)	Catch Water Drain at no. of bench (LHS)	Catch Water Drain at no. of bench (RHS)	Total Length (in m)
	From	To				
1.	96870	97100	230	2.000	4.000	**1380**
2.	97100	97300	200	0.000	1.000	**200**
3.	97300	97500	200	1.000	2.000	**600**
4.	97500	97700	200	0.000	2.000	**400**
5.	97700	97800	100	0.000	1.000	**100**
6.	97800	97900	100	1.000	3.000	**400**
7.	97900	98000	100	0.000	2.000	**200**
8.	98000	98100	100	0.000	1.000	**100**
9.	98100	98250	150	1.000	8.000	**1350**
10.	98250	98500	250	0.000	3.000	**750**
11.	98500	98650	150	1.000	3.000	**600**
12.	98650	98750	100	0.000	3.000	**300**
13.	98750	98900	150	1.000	6.000	**1050**

S. No.	Chainage		Length (in m)	Catch Water Drain at no. of	Catch Water Drain at no. of bench (RHS)	Total Length (in m)
14.	98900	99000	100	0.000	3.000	**300**
15.	99000	99100	100	0.000	3.000	**300**
16.	99100	99200	100	1.000	3.000	**400**
17.	99200	99300	100	0.000	3.000	**300**
18.	99300	99700	400	1.000	4.000	**2000**
19.	99700	99800	100	0.000	2.000	**200**
20.	99800	100100	300	1.000	3.000	**1200**
21.	100100	100200	100	0.000	3.000	**300**
22.	100200	100300	100	1.000	3.000	**400**
23.	100300	100800	500	0.000	2.000	**1000**
24.	100800	101100	300	0.000	1.000	**300**
25.	101100	101300	200	0.000	1.000	**200**
26.	101300	101400	100	0.000	1.000	**100**
27.	101400	101700	300	0.000	1.000	**300**
28.	101700	101900	200	0.000	2.000	**400**
29.	101900	102100	200	0.000	2.000	**400**
30.	102100	102200	100	0.000	3.000	**300**
31.	102200	102400	200	0.000	1.000	**200**
32.	102400	102600	200	1.000	2.000	**600**
33.	102600	102800	200	0.000	1.000	**200**
34.	102800	102950	150	1.000	1.000	**300**
35.	102950	103150	200	0.000	1.000	**200**
36.	103150	103500	350	1.000	1.000	**700**
37.	103500	103600	100	0.000	1.000	**100**
38.	103600	103700	100	1.000	1.000	**200**
39.	103700	103900	200	0.000	1.000	**200**
40.	103900	104000	100	1.000	3.000	**400**
41.	104000	104500	500	0.000	2.000	**1000**
42.	104500	104900	400	1.000	3.000	**1600**
43.	104900	105100	200	0.000	2.000	**400**
44.	105100	105200	100	0.000	1.000	**100**
45.	105200	105500	300	1.000	3.000	**1200**
46.	105500	105600	100	0.000	1.000	**100**
47.	105600	106000	400	1.000	2.000	**1200**
48.	106000	106200	200	0.000	1.000	**200**
49.	106200	106400	200	0.000	1.000	**200**
50.	106400	106600	200	0.000	1.000	**200**
51.	106600	109900	3300	0.000	2.000	**6600**
52.	109900	110300	400	1.000	3.000	**1600**
53.	110300	111700	1400	0.000	2.000	**2800**
54.	111700	113200	1500	0.000	2.000	**3000**
55.	113200	114000	800	1.000	3.000	**3200**
56.	114000	114100	100	0.000	1.000	**100**
57.	114100	114150	50	0.000	1.000	**50**
58.	114150	114350	200	0.000	2.000	**400**
59.	114350	114400	50	0.000	1.000	**50**

S. No.	Chainage		Length (in m)	Catch Water Drain at no. of	Catch Water Drain at no. of bench (RHS)	Total Length (in m)
60.	114400	114650	250	0.000	1.000	**250**
61.	114650	114800	150	0.000	1.000	**150**
62.	114800	115100	300	0.000	1.000	**300**
63.	115100	115150	50	0.000	1.000	**50**
64.	115150	115350	200	0.000	1.000	**200**
65.	115350	115750	400	0.000	1.000	**400**
66.	115750	116000	250	0.000	1.000	**250**
67.	116000	116350	350	0.000	1.000	**350**
68.	116350	116550	200	0.000	3.000	**600**
Total Length (in m)						**45480**

b) Hill Side Drain: 25060m

Sl. No.	Type of TCS	Location stretches		Side	Total Length (m)
		From (km)	To (km)		
1.	Fig 2.11(new)	96870	97100	Both Side	460
2.	Fig 2.8	97100	97300	One side	200
3.	Fig 2.11(new)	97300	97500	Both Side	400
4.	Fig 2.9	97500	97700	One side	200
5.	Fig 2.8	97700	97800	One side	100
6.	Fig 2.11(new)	97800	97900	Both Side	200
7.	Fig 2.9	97900	98000	One side	100
8.	Fig 2.8	98000	98100	One side	100
9.	Fig 2.11(new)	98100	98250	Both Side	300
10.	Fig 2.8	98250	98500	One side	250
11.	Fig 2.11(new)	98500	98650	Both Side	300
12.	Fig 2.8	98650	98750	One side	100
13.	Fig 2.11(new)	98750	98900	Both Side	300
14.	Fig 2.8	98900	99000	One side	100
15.	Fig 2.9	99000	99100	One side	100
16.	Fig 2.11(new)	99100	99200	Both Side	200
17.	Fig 2.9	99200	99300	One side	100
18.	Fig 2.11(new)	99300	99700	Both Side	800
19.	Fig 2.9	99700	99800	One side	100
20.	Fig 2.11(new)	99800	100100	Both Side	600
21.	Fig 2.8	100100	100200	One side	100
22.	Fig 2.11(new)	100200	100300	Both Side	200
23.	Fig 2.8	100300	100800	One side	500
24.	Fig 2.11(new)	100800	101100	Both Side	600
25.	Fig 2.8	101100	101300	One side	200
26.	Fig 2.9	101300	101400	One side	100
27.	Fig 2.8	101400	101700	One side	300
28.	Fig 2.9	101700	101900	One side	200
29.	Fig 2.8	101900	102100	One side	200
30.	Fig 2.9	102100	102200	One side	100
31.	Fig 2.8	102200	102400	One side	200

Sl. No.	Type of TCS	Location stretches		Side	Total Length (m)
		From (km)	To (km)		
32.	Fig 2.11(new)	102400	102600	Both Side	400
33.	Fig 2.8	102600	102800	One side	200
34.	Fig 2.11(new)	102800	102950	Both Side	300
35.	Fig 2.8	102950	103150	One side	200
36.	Fig 2.11(new)	103150	103500	Both Side	700
37.	Fig 2.8	103500	103600	One side	100
38.	Fig 2.11(new)	103600	103700	Both Side	200
39.	Fig 2.9	103700	103900	One side	200
40.	Fig 2.11(new)	103900	104000	Both Side	200
41.	Fig 2.9	104000	104500	One side	500
42.	Fig 2.11(new)	104500	104900	Both Side	800
43.	Fig 2.9	104900	105100	One side	200
44.	Fig 2.8	105100	105200	One side	100
45.	Fig 2.11(new)	105200	105500	Both Side	600
46.	Fig 2.8	105500	105600	One side	100
47.	Fig 2.11(new)	105600	106000	Both Side	800
48.	Fig 2.9	106000	106200	One side	200
49.	Fig 2.8	106200	106400	One side	200
50.	Fig 2.9	106400	106600	One side	200
51.	Fig 2.8	106600	109900	One side	3300
52.	Fig 2.11(new)	109900	110300	Both Side	800
53.	Fig 2.8	110300	111700	One side	1400
54.	Fig 2.9	111700	113200	One side	1500
55.	Fig 2.11(new)	113200	114000	Both Side	1600
56.	Fig 2.9	114000	114100	One side	100
57.	Fig 2.8	114100	114150	One side	50
58.	Fig 2.9	114150	114350	One side	200
59.	Fig 2.8	114350	114400	One side	50
60.	Fig 2.9	114400	114650	One side	250
61.	Fig 2.8	114650	114800	One side	150
62.	Fig 2.9	114800	115100	One side	300
63.	Fig 2.8	115100	115150	One side	50
64.	Fig 2.9	115150	115350	One side	200
65.	Fig 2.8	115350	115750	One side	400
66.	Fig 2.9	115750	116000	One side	250
67.	Fig 2.8	116000	116350	One side	350
68.	Fig 2.9	116350	116550	One side	200
Total Length					**= 25060 m**

7. Design of Structures

(i) General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross-

sectional features and other details specified therein.

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

[Referto the provision of relevant Manual and specify the width of carriageway of new bridges and structures of more than 60(sixty) metre length, if the carriageway width is different from 7.5(seven point five) metres in the table below.]

Sl. No.	Bridge at km	Width of carriageway and cross-sectional features*
NIL		

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

[Refer to the provision of relevant Manual and provide details of new Structures with footpath.]

S. No.	Bridge at km	Width of carriageway and cross-sectional features*
1.	97+220	**Carriageway Width = 11.0 m** Footpath width= 3.0m (2x1.5m) Width of Crash Barrier = 2.0m (2x1m) Width of Railings = 2.0m (2x1m) Overall width = 18 m
2.	113+315	
3.	116+435	

(d) All bridges shall be high-level bridges.
[Refer to the provision of relevant Manual and state if there is any exception]

(e) The following structures shall be designed to carry utility services specified in table below:

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

S.No.	Bridge at km	Utility service to be carried	Remarks
Nil			

(f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall confirm to the typical cross-sections given in the provision of relevant Manual.

(ii) Culverts

(a) Overall width of all culverts should not be less than the roadway width of

the approaches.

(b) Reconstruction of existing culverts:

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

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

Sl.No.	Culvert location (km)	Span/Opening(m)	Remarks, if any*
1.	107115	1X2X2	Box Culvert
2.	107240	1X2X2	Box Culvert
3.	107300	1X2X2	Box Culvert
4.	107665	1X2X2	Box Culvert
5.	107785	1X2X2	Box Culvert
6.	108345	1X2X2	Box Culvert
7.	109275	1X2X2	Box Culvert
8.	109750	1X2X2	Box Culvert
9.	110250	1X3X3	Box Culvert
10.	110715	1X2X2	Box Culvert
11.	110855	1X2X2	Box Culvert
12.	111520	1X2X2	Box Culvert
13.	111925	1X3X3	Box Culvert
14.	112090	1X3X3	Box Culvert
15.	112170	1X3X3	Box Culvert
16.	112420	1X3X3	Box Culvert
17.	112680	1X3X3	Box Culvert
18.	112820	1X2X2	Box Culvert
19.	112935	1X3X3	Box Culvert
20.	113405	1X2X2	Box Culvert
21.	113615	1X3X3	Box Culvert
22.	113800	1X2X2	Box Culvert
23.	113935	1X3X3	Box Culvert
24.	114010	1X2X2	Box Culvert
25.	114180	1X2X2	Box Culvert
26.	114265	1X2X2	Box Culvert
27.	114600	1X2X2	Box Culvert
28.	114700	1X2X2	Box Culvert
29.	114970	1X3X3	Box Culvert
30.	115155	1X2X2	Box Culvert

Sl.No.	Culvert location (km)	Span/Opening(m)	Remarks, if any*
31.	115320	1X2X2	Box Culvert
32.	115480	1X3X3	Box Culvert
33.	116100	1X3X3	Box Culvert
34.	116180	1X2X2	Box Culvert

Note:-

1. The cushion over the culverts should be aligned symmetrically on both sides of road along the road way width.

2. Minimum Width of Culvert should be 12.0m & Maximum Width should be calculated as per applicable TCS, Earth Cushion & Site conditions.

3. Proposed Span Arrangement of Culverts mentioned above may vary as per site conditions. All Culverts shall be designed and provided as per the technical requirement in consultation with the Authority Engineer.

(c) Widening of existing culverts:

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

Sl. No.	Culvert location	Type, span, height and width of existing culvert (m)	Repairs to be carried out [specify]
Nil			

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

Sl. No.	Culvert location (km)	Span/Opening(m)	Remarks, if any*
1.	97530	1X2X2	Box Culvert
2.	97650	1X2X2	Box Culvert
3.	97850	1X2X2	Box Culvert
4.	98060	1X2X2	Box Culvert
5.	98170	1X3X3	Box Culvert
6.	98650	1X2X2	Box Culvert
7.	98800	1X2X2	Box Culvert
8.	99050	1X2X2	Box Culvert
9.	99300	1X3X3	Box Culvert
10.	99650	1X2X2	Box Culvert

Sl. No.	Culvert location (km)	Span/Opening(m)	Remarks, if any*
11.	99750	1X2X2	Box Culvert
12.	99900	1X2X2	Box Culvert
13.	100040	1X2X2	Box Culvert
14.	100250	1X2X2	Box Culvert
15.	100465	1X2X2	Box Culvert
16.	100570	1X3X3	Box Culvert
17.	100750	1X2X2	Box Culvert
18.	101080	1X2X2	Box Culvert
19.	101270	1X2X2	Box Culvert
20.	101390	1X2X2	Box Culvert
21.	101520	1X2X2	Box Culvert
22.	101680	1X2X2	Box Culvert
23.	101850	1X2X2	Box Culvert
24.	102010	1X2X2	Box Culvert
25.	102420	1X2X2	Box Culvert
26.	102680	1X2X2	Box Culvert
27.	102850	1X2X2	Box Culvert
28.	103100	1X2X2	Box Culvert
29.	103300	1X2X2	Box Culvert
30.	103550	1X2X2	Box Culvert
31.	103750	1X2X2	Box Culvert
32.	103950	1X2X2	Box Culvert
33.	104150	1X2X2	Box Culvert
34.	104380	1X2X2	Box Culvert
35.	104600	1X2X2	Box Culvert
36.	104830	1X2X2	Box Culvert
37.	105050	1X2X2	Box Culvert
38.	105350	1X3X3	Box Culvert
39.	105550	1X2X2	Box Culvert
40.	105750	1X2X2	Box Culvert
41.	105810	1X2X2	Box Culvert
42.	106080	1X3X3	Box Culvert
43.	106320	1X2X2	Box Culvert
44.	106500	1X2X2	Box Culvert
45.	106650	1X2X2	Box Culvert
46.	107975	1X2X2	Box Culvert

Sl. No.	Culvert location (km)	Span/Opening(m)	Remarks, if any*
47.	108130	1X2X2	Box Culvert
48.	108660	1X2X2	Box Culvert
49.	108825	1X2X2	Box Culvert
50.	109130	1X2X2	Box Culvert
51.	109455	1X2X2	Box Culvert
52.	109900	1X2X2	Box Culvert
53.	110400	1X2X2	Box Culvert
54.	110510	1X2X2	Box Culvert
55.	111115	1X2X2	Box Culvert
56.	111220	1X2X2	Box Culvert
57.	115815	1X2X2	Box Culvert

Note:-

1. The cushion over the culverts should be aligned symmetrically on both sides of road along the road way width.

2. Minimum Width of Culvert should be 12.0m & Maximum Width should be calculated as per applicable TCS, Earth Cushion & Site conditions.

3. Proposed Span Arrangement of Culverts mentioned above may vary as per site conditions. All Culverts shall be designed and provided as per the technical requirement in consultation with the Authority Engineer.

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

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

S.No.	Location at km	Type of repair required
NIL		

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

(iii) Bridges

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

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

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

a. Major Bridge – NIL

Sl. No.	Bridge location (km)	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Proposed Span Arrangement (m)
		Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
NIL					

b. Minor Bridges – 2nos.

Sl. No.	Bridge location (km)	Salient details of existing bridge		Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Proposed Span Arrangement (m)
		Type of Structures	Span Arrangement and Total Vent way (No. x Length) (m)		
1	113315	Bailey Bridge	1x19	-	1x16
2	116435	Slab	1x3	-	2X3X3

*Attach GAD

Note: -

1. **During reconstruction of existing bridges, traffic movement should not be obstructed. Hence for movement of traffic, diversions shall be constructed as per site conditions.**
2. **Proposed Span Arrangement of Bridges mentioned above may vary as per site conditions. All Minor Bridges shall be designed and provided as per the technical requirement in consultation with the Authority Engineer.**

The following narrow bridges shall be widened:

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

@ Attach cross-section

(b) Additional new bridges

[Specify additional new bridges if required, and attach GAD]

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

Minor Bridge – 1 Nos.

S.No.	Location (km)	Span Arrangements	Remarks, if any
1.	97+220	3x16m	T- Beam Girder

Major Bridge – 0 Nos.

S.No.	Location (km)	Span Arrangements	Remarks, if any
NIL			

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

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

Sl. No.	Location at km	Remarks
NIL		

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

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

Sl. No.	Location at km	Remarks
NIL		

(e) Drainage system for bridge decks

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

(f) Structures in marine environment

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

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB/RUB shall be as specified in the provision of relevant Manual. [Refer to the provision of relevant Manual and specify modification, if any]

(b) **Road over-bridges**

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

crossings, as per GAD drawings attached:

S. No.	Location of Level crossing (Chainage km)	Length of bridge (m)
NIL		

(c) Road under-bridges

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

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

(v) Grade separated structures

[Refer to the provision of relevant Manual]
The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (ix) and3 of this Annex-I.

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

S. No.	Location ofbridge (km)	Nature and extent of repairs/ strengthening to be carried out
NIL		

(b) ROB / RUB

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

(c) Overpasses/Underpasses and others structures

S. No.	Location of Structure(km)	Nature and extent of repairs/ Strengthening to be carried out

Nil

(vii) List of Major Bridges

The following is the list of the Major Bridges:

S.No.	Location (Km)
NIL	

8. Traffic Control Devices and Road Safety Works

i. Traffic control devices and road safety works shall be provided in accordance with the provision of relevant Manual.

ii. Specifications of the reflective sheeting. [Refer to the provision of relevant Manual and specify]

9. Roadside Furniture

(i) Road side furniture shall be provided in accordance with the provisions of the relevant Manual.

(ii) Overhead traffic signs: at each village start and end border, etc.

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

10. Compulsory Afforestation

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

11. Hazardous Locations

THRIE- Beam crash barriers shall also be provided at the following hazardous locations:

S. No.	Type of TCS	Location stretch		Side	Total Length (m)
		From (m)	To (m)		
1.	Fig 2.8	97100	97300	One Side	200
2.	Fig 2.9	97500	97700	One Side	200
3.	Fig 2.8	97700	97800	One Side	100
4.	Fig 2.9	97900	98000	One Side	100
5.	Fig 2.8	98000	98100	One Side	100
6.	Fig 2.8	98250	98500	One Side	250
7.	Fig 2.8	98650	98750	One Side	100
8.	Fig 2.8	98900	99000	One Side	100
9.	Fig 2.9	99000	99100	One Side	100
10.	Fig 2.9	99200	99300	One Side	100
11.	Fig 2.9	99700	99800	One Side	100
12.	Fig 2.8	100100	100200	One Side	100

S. No.	Type of TCS	Location stretch		Side	Total Length (m)
		From (m)	To (m)		
13.	Fig 2.8	100300	100800	One Side	500
14.	Fig 2.8	101100	101300	One Side	200
15.	Fig 2.9	101300	101400	One Side	100
16.	Fig 2.8	101400	101700	One Side	300
17.	Fig 2.9	101700	101900	One Side	200
18.	Fig 2.8	101900	102100	One Side	200
19.	Fig 2.9	102100	102200	One Side	100
20.	Fig 2.8	102200	102400	One Side	200
21.	Fig 2.8	102600	102800	One Side	200
22.	Fig 2.8	102950	103150	One Side	200
23.	Fig 2.8	103500	103600	One Side	100
24.	Fig 2.9	103700	103900	One Side	200
25.	Fig 2.9	104000	104500	One Side	500
26.	Fig 2.9	104900	105100	One Side	200
27.	Fig 2.8	105100	105200	One Side	100
28.	Fig 2.8	105500	105600	One Side	100
29.	Fig 2.9	106000	106200	One Side	200
30.	Fig 2.8	106200	106400	One Side	200
31.	Fig 2.9	106400	106600	One Side	200
32.	Fig 2.8	106600	109900	One Side	3300
33.	Fig 2.8	110300	111700	One Side	1400
34.	Fig 2.9	111700	113200	One Side	1500
35.	Fig 2.9	114000	114100	One Side	100
36.	Fig 2.8	114100	114150	One Side	50
37.	Fig 2.9	114150	114350	One Side	200
38.	Fig 2.8	114350	114400	One Side	50
39.	Fig 2.9	114400	114650	One Side	250
40.	Fig 2.8	114650	114800	One Side	150
41.	Fig 2.9	114800	115100	One Side	300
42.	Fig 2.8	115100	115150	One Side	50
43.	Fig 2.9	115150	115350	One Side	200
44.	Fig 2.8	115350	115750	One Side	400
45.	Fig 2.9	115750	116000	One Side	250
46.	Fig 2.8	116000	116350	One Side	350
47.	Fig 2.9	116350	116550	One Side	200
Total Length					**= 14300 m**

12. SPECIAL REQUIREMENT FOR HILL ROADS

[Refer to paragraphs 14.5 and 14.8 of the Manual and provide details where relevant and required.]

Special requirement for hill roads in accordance with the provisions of section 14 of the manual shall be provided in the following locations: -

a) RCC Retaining Wall

Sl. No.	Location stretch		Side	Total Length (m)
	From (m)	To (m)		

Sl. No.	Location stretch		Side	Total Length (m)
	From (m)	To (m)		
1.	97100	97300	One side	200
2.	97700	97800	One side	100
3.	98000	98100	One side	100
4.	98250	98500	One side	250
5.	98650	98750	One side	100
6.	98900	99000	One side	100
7.	100100	100200	One side	100
8.	100300	100800	One side	500
9.	101100	101300	One side	200
10.	101400	101700	One side	300
11.	101900	102100	One side	200
12.	102200	102400	One side	200
13.	102600	102800	One side	200
14.	102950	103150	One side	200
15.	103500	103600	One side	100
16.	105100	105200	One side	100
17.	105500	105600	One side	100
18.	106200	106400	One side	200
19.	106600	109900	One side	3300
20.	110300	111700	One side	1400
21.	114100	114150	One side	50
22.	114350	114400	One side	50
23.	114650	114800	One side	150
24.	115100	115150	One side	50
25.	115350	115750	One side	400
26.	116000	116350	One side	350
	Total			=9000 m

Note: - Retaining wall shall be designed and provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 9000 meter. Increase in length of Retaining wall will not be treated as change of Scope.

b) PCC/RCC Breast wall

S. No.	Location stretch		Side	Total Length (m)
	From (m)	To (m)		
1	96870	97100	One Side	230
2	97300	101100	One Side	3800
3	101600	102600	One Side	1000
4	103200	104100	One Side	900
5	104300	105000	One Side	700
6	105200	105500	One Side	300
7	105700	106000	One Side	300
8	106300	111300	One Side	5000
9	111700	114000	One Side	2300
			Total	=14530m

Note: - 1. Breast wallshall be designed and provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 14530 meter. Increase in length of Breast wall will not be treated as change of Scope.

2. For Height of Breast Wall following parameters shall be adopted: -
(a) For cutting height of hill side slopes till 10m – minimum height of breast wall should be 2.0m above GL.
(b) For cutting height of hill side slopes 10-20m – minimum height of breast wall should be 3.0m above GL.
(c) For cutting height of hill side slopes 20-30m – minimum height of breast wall should be 4.0mabove GL.
(d) For cutting height of hill side slopes above 30m – minimum height of breast wall should be 5.0m above GL.

c) Hydroseeding & Mulching

S. No.	Location stretch		Total Length (m)
	From (m)	To (m)	
1	96870	97100	230
2	97300	97600	300
3	97800	98000	200
4	98100	100300	2200
5	100500	100700	200
6	100800	101100	300
7	101700	101900	200
8	102100	102600	500
9	103200	103500	300
10	103900	104100	200
11	104300	105000	700
12	105200	105500	300
13	105700	106000	300
14	106300	111300	5000
			= 10930m

Note: - Hydroseeding & Mulching are provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 10930 meter. Increase in length of Hydroseeding & Mulching shall not be treated as change of Scope.

d) Special Protection for Sinking Zone

S. No.	Tentative stretch		Length (in m)	Area in Sq.m.	Detail of Special Protection
	From (m)	To (m)			
1	114450	116550	2100	126000	Supply and installation of rock fall mitigation system comprising of steel wire grid/mesh Geo-composite made of mechanically woven Double twisted Hexagonal shaped steel wire mesh (wire dia. 2.7mm, Class A Zn-Al5% coated , Type 8 x 10, D=80mm) interlaced during manufacturing with 8mm (construction type-6x7+WSC and of rope grade 1770MPa) in longitudinal direction at 0.3m spacing, with longitudinal tensile strength of 165KN/m and punch resistance of 140 KN and rhomboidal shaped Cable Panel/Net of 10mm diameter of steel wire rope of size 300 mm x 300 mm with suitable connection at each intermediate and end junctions having minimum tear resistance of 15kN with tensile strength of 230kN/m and punch strength of 370kN, wherever applicable along with top anchoring using anchor trench filled with concrete or top nails, bottom nails and surface nails of CTA 32mm dia. and suitable corrosion protection coating of lengths and spacing, including top and bottom support rope, lacing wire or rope required to connect the nets and all accessories such as U-clamps, turn buckles, thimbles, including safety, all other ancillary works, material, machinery, labour etc. complete including preparatory works of loose scaling, vegetation removal etc. as per technical specifications attached and as directed by Engineer-in -charge. The System should be tailor made according to the site conditions and requirements with accessories. Equivalent / Higher Protection system will be Technically Evaluated by Approving Authority. The Final Type of product to be used shall be decided upon approval of final design / drawing as per IRC & BS specification.
Total				**126000**	

Note: - Special Protection for Sinking Zone shall be provided as per the technical requirement in consultation with the Authority Engineer subject to minimum area of 126000 Sq.m. Increase in Area will not be treated as change of Scope. The specification and methodology adopted for special protection works on sinking zone should be as per Annexure D2 of Schedule D.

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 undertaken in accordance with the provisions of Article 13.

14. Utility Shifting

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

Notes:

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

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

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

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

Schedule B-1

Sr. No	Type of Utility	Unit	Quantity	Remarks
A	**Electrical Utilities**			
A1	**Items for 11KV Line**			The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/COS.
1.	GI Steel SP 66 tubular pole	Nos	44	
2.	11KV GI Channel cross arm (100x50x6x2200)mm	Nos	104	
3.	GI 11 kv T cross arm (50x50x6)mm	Nos	7	
4.	GI Channel (150x75x6)mm	Nos	55	
5.	11 kv Pin insulator-polymeric	Nos	75	
6.	11KV Polymeric Disc insulator - 70kN	Nos	90	
7.	H/W fitting for 11 KV DISC 70 KN	Nos	90	
8.	ACSR Raccoon conductor	Km	6	
9.	HT stay set	Nos	40	
10.	HT Guy Insulator	Nos	40	
11.	GI Stay Wire 7/10 SWG	Kg	120	
12.	pole clamp for GI flat, 50x6mm	Nos	230	
13.	GI wire for earthing, 6 SWG	Kg	25	
14.	GI pipe 50 mm dia 3 mtr length	Nos	22	
15.	GI nuts-bolts & GI washer(assorted)	Kg	25	
16.	PG clamp for ACSR Racoon	No.	90	
17.	GI Barbered Wire Type A	Kg	44	
18.	GI Channel (75x40x6) mm	Mtr	5	
19.	Stay grouting	No.	44	
20.	Grouting and steel Tubular Poles	No.	40	

Sr. No	Type of Utility	Unit	Quantity	Remarks
B	**Water/Sewage pipeline**			
B1	**Water supply pipeline (Drinking & Water Supply Dept., PHED)**			The details of items/quantities/works to be executed for shifting of utilities is tentative. All works/quantities/ miscellaneous items to be executed at site as per detailed estimate of utility owning department, without any additional claim/COS.
1.	GI Pipes (CWGM) 40mm	m	100	
2.	HDPE Pipes 50mm Dia	m	160	
B2	Other Items			
1.	TP of RSF 2.00m² with internal connection, Back wash with Solar Pannels	No.	1	
2.	CWR 15KL Cap. With Chemical dosing pump	No.	1	

Schedule-C

Schedule-C

(SeeClause2.1)

Project Facilities

1. Project Facilities

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

(a) Toll plaza[s];

(b) Roadsidefurniture;

(c) Pedestrianfacilities;

(d) Treeplantation;

(e) Truck lay-byes;

(f) Bus-bays and bus shelters;

(g) Rest areas; and

(h) Others to be specified

2. Description of Project Facilities

Each of theProject Facilities is described below:

(a) Toll Plaza: Nil

(b) Roadside Furniture:

S. No.	ProjectFacility	Location	Design Requirements	Otheressential details
1	Traffic Sign & Pavement marking	Entire Length	As per Schedule D	
2	Km stone, Hectometer Stone, 5thkilometre stone	Entire Length	As per Schedule D	
3	Boundary Stone	Entire Length	As per Schedule D	
4	Roadside Delineator, marker & Road Stud	As per manual	As per Schedule D	

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project- specific requirements and the provisions of

the Manual.

(c) Pedestrian Facilities:

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

(d) Tree Plantation:4922 nos. of trees should be planted & maintained by EPC Contractor @4mc/c in Single ROW within Proposed ROW as per IRC :SP:21-2009

(e) Truck Lay Byes:1no.

S. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
1	Truck Lay Bye	104+300-104+400	One side	-

Note:- The Design & Specifications of Truck Lay-bye shall follow IRC :SP-73:2018 & finalized in consultation with Authority Engineer.

(f) Bus Bay & Shelter: 1no(Both Side).

S. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
1	Bus Bay & Shelter	106+200-106+300 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m

Note:- The Design & Specifications of Bus Bay & Shelter shall follow IRC :SP-73:2018 & finalized in consultation with Authority Engineer.

(g) Rest areas: 1no.

S. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
1	Rest Area with Public Toilet	104+300-104+400	One side	-

Note:- The Design & Specifications of Rest Area with Public Toilet shall follow IRC :SP-73:2018 & finalized in consultation with Authority Engineer.

(h) Others:

(i) Street Lighting

Street lighting shall be provided in the built-up area, bus bay, truck lay bye and

major junction location.

(j) 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

Schedule-D

(SeeClause2.1)

Specifications and Standards

1. Construction

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

2. Design Standards

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

[Manual of Specifications and Standards for Two Laning of Highways (IRC: SP: 73-2018), referred to herein as the Manual]

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

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Annex- I

(Schedule-D)

SpecificationsandStandardsforConstruction

1. SpecificationsandStandards

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

2. Deviations from the Specifications and Standards

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

(ii) [Not withstanding anything to the contrary contained in Paragraph-1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended tothe extentset forthbelow:]

(iii) [Note1: Deviations fromtheaforesaidSpecificationsand Standards shallbe listedout here. Suchdeviations shall bespecified only ifthey are considered essential in viewof project-specific requirements.]

Sr. No.	Cl. No.	Provisions in Clause	Deviation from Manual
1	TCS-2.11 (New)	New Typical Cross Section	Two-Lane with paved shoulder in Hilly Terrain with Hill side Drain on Both sides in open Country area (Box cut)

(iv) Locations where Speed is less than 40km/hr.

S. No.	Stretch		Radius (m)	Speed(km/h)
	From	To		
1.	106704.838	106827.994	30	30
2.	107289.488	107318.810	30	30
3.	107341.478	107386.096	30	30
4.	107466.887	107547.933	20	20
5.	108010.610	108092.474	20	20
6.	108702.551	108783.705	20	20
7.	108955.764	109034.032	20	20

S. No.	Stretch		Radius (m)	Speed(km/h)
8.	109559.204	109640.825	20	20
9.	110585.834	110666.358	20	20
10.	110957.204	111018.287	20	20
11.	113188.401	113238.316	20	20
12.	113296.460	113341.267	20	20
13.	113392.789	113419.771	20	20
14.	113431.146	113451.890	20	20
15.	113472.940	113490.571	30	30
16.	113522.291	113583.015	20	20
17.	113596.863	113636.319	20	20
18.	113651.615	113709.379	30	30
19.	113849.782	113939.204	30	30
20.	113967.874	113987.182	30	30
21.	114005.326	114023.480	30	30
22.	114094.597	114138.981	30	30
23.	114244.564	114286.514	20	20
24.	114308.198	114346.549	20	20
25.	114572.889	114612.814	20	20
26.	114645.667	114686.305	20	20
27.	114698.431	114723.519	20	20
28.	114725.630	114766.228	20	20
29.	115066.191	115143.445	30	30
30.	115357.254	115382.447	20	20

Note:- At above locations Safety features like Traffic Sign boards, Crash Barrier, Road Delineators, etc. as per IRC 67: 2022 shall be provided.

Annexure- D-I

Typical Cross Sections

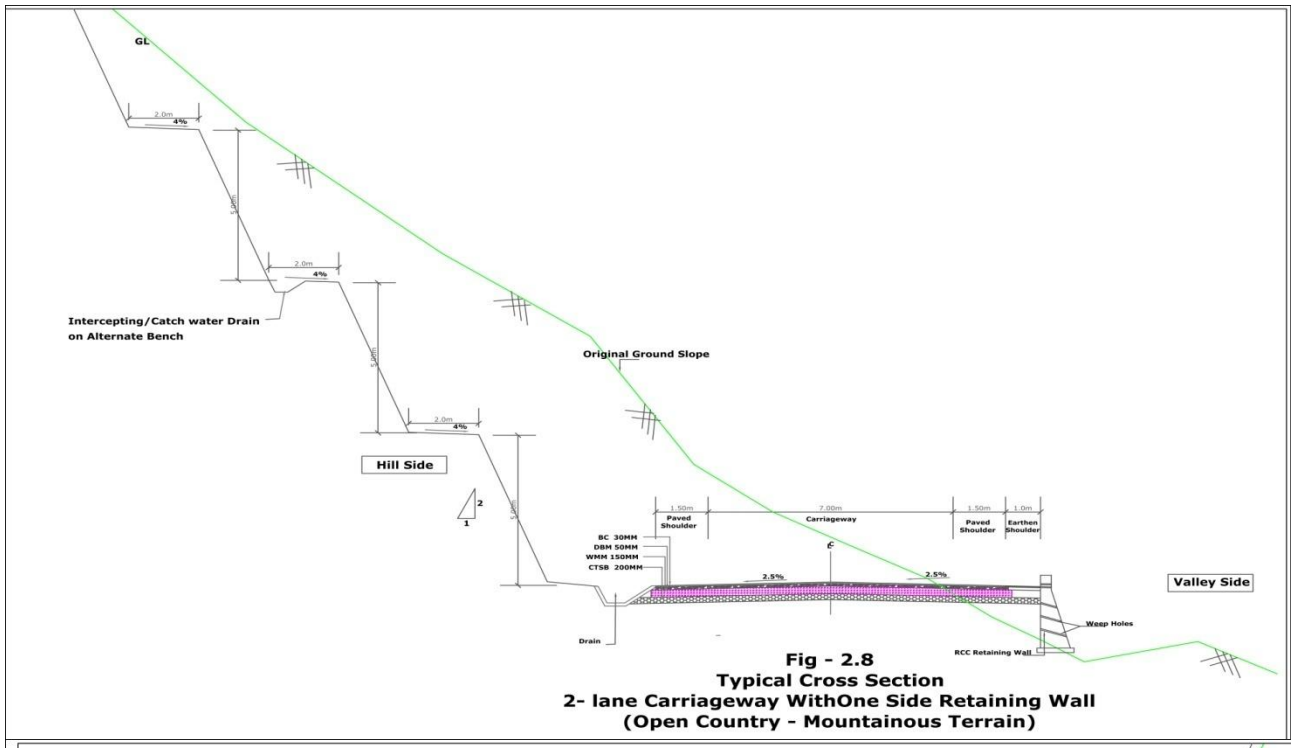

Fig - 2.8
Typical Cross Section
2- lane Carriageway WithOne Side Retaining Wall
(Open Country - Mountainous Terrain)

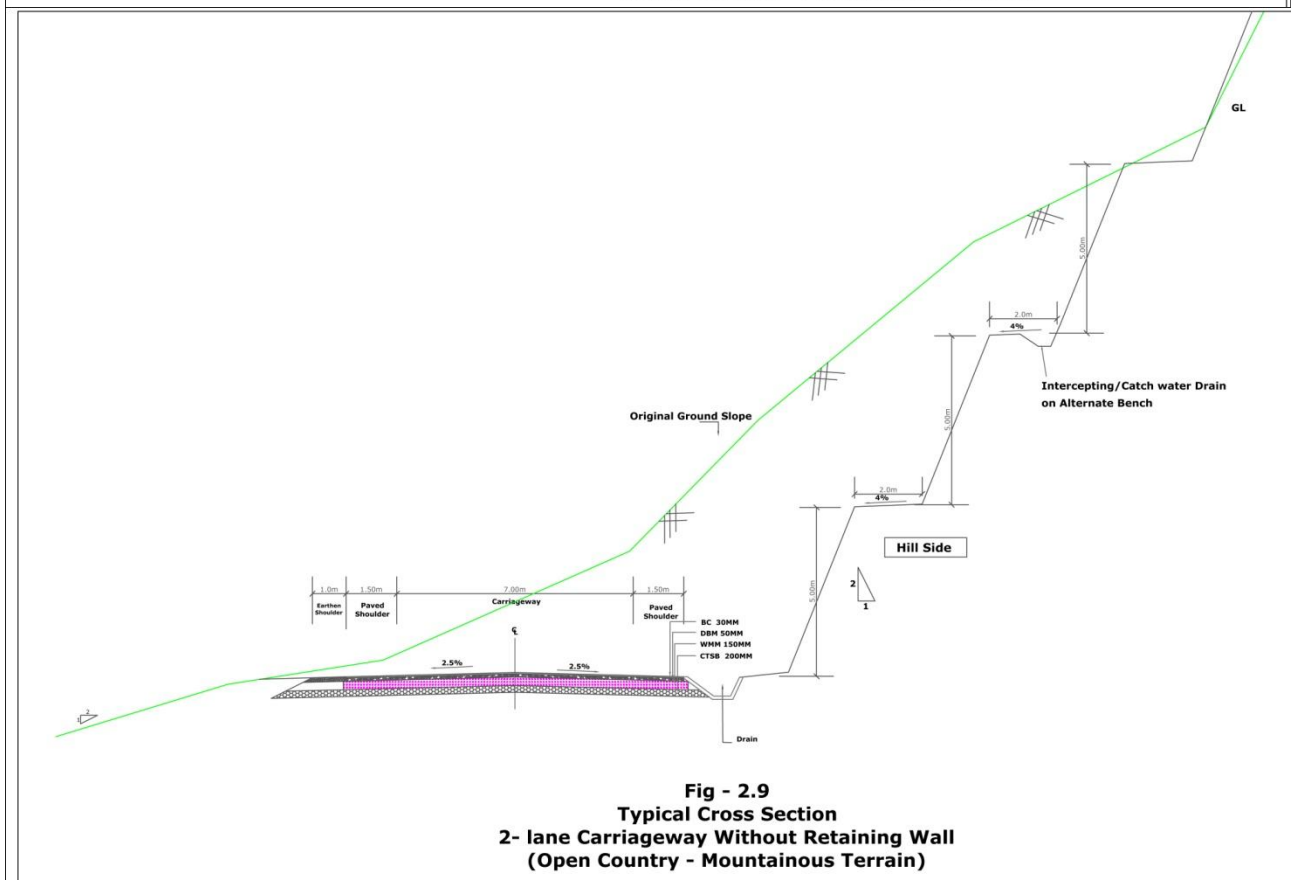

Fig - 2.9
Typical Cross Section
2- lane Carriageway Without Retaining Wall
(Open Country - Mountainous Terrain)

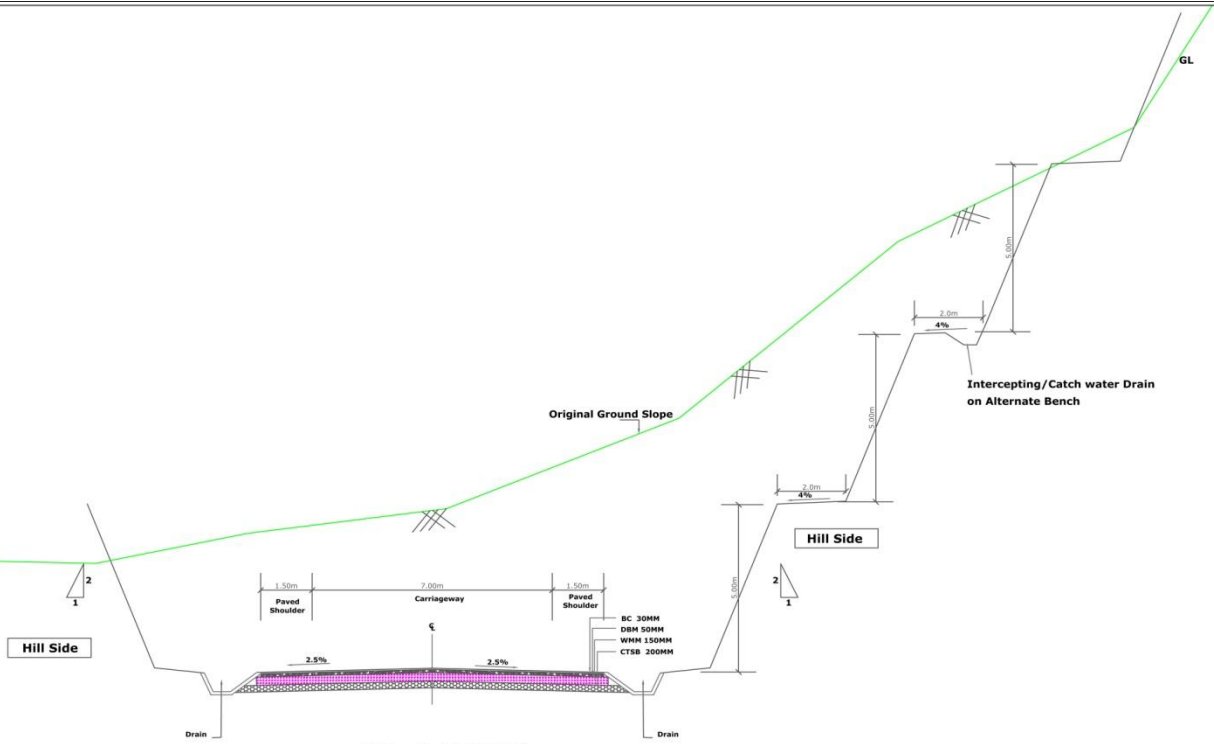

Fig - 2.11(new)
(Hilly Terrain) Typical Cross Section
2- lane Carriageway With Paved Shoulders
(Through Cut) Hill Section

Annexure D-II

Specification & Methodology for Special Protection
(Rock fall Mitigation)

Providing and spreading steel wire grid/mesh consisting of hexagonal double twisted wire mesh type 8x10 woven with steel wire with a diameter of 2.70 mm (EN 10223-3; EN 10218), Zn-5%Al coated (EN 10244 - class A), interlaced during manufacturing with 8mm (construction type-6x7+WSC and of rope grade 1770MPa) in longitudinal direction at 0.3m spacing Zl-5%Al coated (EN 10244 - class A)(specifications as per clause 5.3.3 of IRC HRB Special Report 23), meeting the minimum requirements: Longitudinal Tensile Strength of High Resistance Steel Wire mesh /Grid Geo-composite : 165 kN/m (minimum) ; Puncture Resistance of High Resistance steel wire mesh/grid Geo-composite : 140kN minimum at maximum displacement of 46cm as per UNI 11437; including top and bottom support rope, lateral wire rope cable anchors at top and bottom, lacing wire rope or links required to connect the nets and all accessories such as U-clamps, thimbles, including safety, all other ancillary works, material, machinery, labour, etc., with all leads and lifts and as per technical specifications attached and as directed by Engineer - In - Charge.

The Steel wire grid/mesh geo-composite shall be time tested proven CE certified system as per IRC Highway Research Board Special Report-23 and should meet the minimum requirements of Mechanically woven double twisted (DT) hexagonal shaped Class AZn+Al5% Coated wire interlaced with 8 mm steel wire rope during manufacturing in longitudinally and transversal direction as per IRC Highway Research Board Special Report-23.

Material Specifications:

The Steel wire mesh geo composite shall be mechanically prefabricated to become a uniform hexagonal woven wire mesh wherein joints are formed by twisting each pair of wires through two half turns commonly known as Double Twisted, in such a manner that unravelling is prevented. The longitudinal selvedge steel ropes and the intermediate steel ropes of 8mm are inserted during the process of manufacture to form a cohesive and monolithic geocomposite product.

All steel wires used in the manufacturing of Steel wire mesh geocomposite and in the lacing operation during construction shall confirm to EN 10223 – 3. The wire used for the manufacture of double twisted wire mesh shall have a tensile strength in the range of 380-500N/mm2 and elongation shall not be less than 10%. Test must be carried out on a sample of at least 25 cm length. DT mesh shall confirm properties indicated in table. All tests on the mesh and lacing wire must be performed prior to manufacturing the mesh

Required Properties of Mechanically Woven DT shaped mesh

Property	Value
Mesh Type	8x10
Mesh Opening "D"(mm)(maximum)	80
Tolerance – Mesh Opening(%)	+16 to - 4
Mesh Wire Diameter (mm)	2.7mm

Property	Value
Tolerance – Mesh Wire Diameter(+/)(mm)	0.07
Mesh Wire Zinc- Al alloyCoating (gm/sqm)	240min

High Resistance Steel wire mesh Geo-composite should meet the following minimum strength requirements:

The longitudinal steel rope should meet the requirement as per IS 2266 / ISO 2408/ EN 12385-22008 / EN 12385-4 2008 and have a nominal diameter of 8.00 mm. They shall be made from galvanized (Zn-Al alloy) steel in accordance with 10244-2. The rope shall be of grade 1770 N/sq mm and with a minimum breaking load of the rope as 40 KN. The longitudinal steel ropes are spaced at 1m. Tensile test & zinc mass test on steel ropes must be performed prior to manufacturing the High Resistance steel wire mesh geo-composite.

The diameter of the lacing wire rope shall be of required diameter as suggested by the supplier but shall not be less than 8 mm and shall have same characteristics as the mesh wire rope. Typically, lacing wire rope is supplied at 3% of the total weight of High Resistance Steel wire mesh geo-composite to enable the lacing to be undertaken in an adequate manner. Alternatively, if required as per site conditions and suggested by the Manufacturer, lacing wire ropes or lap links could be used for joining of adjacent nets.

The Strength Properties of Geo-composite shall be as below:

S/No	Property	Value (Minimum)
(a)	Longitudinal Tensile strength	165 kN/m
(b)	Punch Resistance	140 kN(min) at maximum displacement of 46cm tested inaccordance with UNI 11437

Lacing wire ropes or links shall be used for joining of adjacent nets.

Installation Method: The rolls of Steel wire mesh geocomposite should be rolled down the surface from Top anchoring system as per the contract drawings. New Roll shall be placed side by side of adjacent roll in the same manner such that longitudinal ropes of both the rolls can be laced together by hand. Lacing shall commence by twisting end of the lacing wire tightly the two selvedges. It shall then pass round the two edges being joined using alternate single and double loops at approximately 100 mm intervals. The lacing wire shall be securely tied off at the bottom of the roll. The Bottom anchoring and surficial anchoring shall be done as per the contract drawings or as per standard system.

Testing and acceptance criteria for Quality Control: Material shall be approved by engineer–in-charge before supply. Testing on mesh wire & rope shall be performed prior to manufacturing the Steel wire mesh Geocomposite as mentioned in Table 5. Table 5 showing Testing Plans:

Sr. No.	Type of Test	Frequency of testing & minimum number of samples	Test Location	Reference Code	Remarks, if any
1	Tensile test on Wire Rope	01 sample per 8000 sqm	Supplier of Wire ropes factory/Independent laboratory	IS 2266/ISO 2408	Can be certified through supplier MTC, else the testing can be done at Supplier location
2	Zinc Mass of Wires used for Rope	01 sample per 8000 sqm	Supplier of Wire ropes factory/ Independent laboratory	IS 1835	
3	Properties of GI Wire				
	b. Zinc Mass &Zinc Adhesion	01 sample per 800 sqm	Manufacturers Lab/ Independent laboratory	EN 10244	

TECHNICAL SPECIFICATION FOR FULLY THREADED ANCHOR BARS

Scope:

The fully threaded anchor bars shall be designed and arranged in order to stabilize the fractured or jointed rock mass to induce homogeneity in the behavior. The anchor bars shall have the required grip length in rock. The grout shall have characteristic strength of 200kg/cm2. The fully threaded anchor bars, nuts, washer plates shall be provided.

Drilling shall be carried out by DTH machine or Top Hammer or any other suitable equipment. Size of the hole shall be minimum 51 mm and 76mm for nail diameters of 32mm. The Anchor Bar shall be high strength continuously threaded bar of tensile strength more than 400 KN with hexagonal nut and plate. If there are difficult ground and rock conditions resulting into unstable drill holes which can collapse, the Anchor Bar shall be replaced with Self-drilling anchor of tensile strength >400 KN with attached sacrificial drill bit with hexagonal nut and plate For convenience of installation, appropriate arrangement (coupler) shall be made to connect two smaller lengths of anchor bars to achieve the required length. However, the strength of the bar with coupler should be same as that of single bar.

Installation Guideline:

i. Anchor bars of 32mm diameter and required length along with washer plate, nut shall be installed along with drilling activity.

ii. Grouting Drilled Holes: Grouting of the drilled holes shall be done by using OPC Grade 43 along with Suitable admixture. Mixing shall be done along with potable water

so as to form the Cementous paste.

iii. The grouting material should not shrink after final setting.

iv. The grouting pressure shall be kept such that the drill hole shall be 100% filled after installation of anchor bar. The bidder shall maintain record of grout material consumed for each hole and submit to Engineer.

Material Technical Performance Requirements:

1. The EPC Contractor should provide past performance for successful completion of similar works using "Protection/Mitigation works using Rhomboidal shape steel cable panels having suitable connection at each intermediate and end junctions of the cable panel and/or High Resistance Steel wire mesh Geocomposite system" along with the bid.

2. The EPC Contractor shall provide the Test certificates from independent Laboratories / agencies of repute have established system performance meeting the requirements for Rhomboidal cable panels with suitable connection at each intermediate and end junction and High Resistance Steel wire Mesh Geo-composite with the bid as below:

(A) For Rhomboidal Cable Panels with suitable connection at each intermediate and end junction:

a. The established system should able to increase the bearing capacity during punch test / any accepted method of testing material. Under punch test with the standard / established procedure the system of Rhomboidal Cable Panel with suitable connection at each intermediate and end junction should be able to bear minimum resistance of 370 KN with maximum displacement up to 33cm as per the test procedures defined in ISO 17746.
b. The Rhomboidal Cable Panel with suitable connection at each intermediate and end junction should have minimum tensile strength of 230kN/m as per the test procedures defined in ISO 17746.
c. The connection at each intermediate and end junction of Rhomboidal cable Panels should have static tear minimum 15kN as per the test procedures defined in ISO 17746.

(B) For High Resistance steel wire Mesh Geo-composite:

a. The High Resistance steel wire Mesh Geo-composite should have minimum tensile strength of 170kN/m in longitudinal direction.
b. Under punch test with the standard / established procedure the system of High

Resistance Steel wire mesh Geo-composite should be able to bear minimum resistance of 140 KN with maximum displacement up to 45cm.

SPECIFICATION OF THE MATERIALS TO BE USED:

SPECIFICATION FOR RHOMBOIDAL CABLE PANEL FOR ROCK FALL PROTECTION:

The rockfall protection system shall be as per IRC Highway Research Board Special Report-23 to be used for high hazard locations and shall be Rhomboidal in shape and should have corrosion protection coating, to prevent corrosion effect at rockfall protection system (Square /rectangular/diamond shape cable panel will not be preferred as per technical requirement of the site condition). Each Rhomboidal Cable panel should be made of one single cable having all the intermediate and end junctions of the Rhomboidal cable panel should have suitable connection as defined in IRC Highway Research Board Special Report-23 having minimum tear capacity of 15 kN and should have minimum pull apart of 9kN. The diameter of the cable should be 10mm and must have tensile strength of 1770N/mm^2. The loose end of cable knotted using similar / equivalent material for suage/sleeve having fastening resistance, should not be less than 90% of breaking load of the cable.

The Edge / Perimetral rope of diameter same or higher than the wrapping rope shall be used to secure the Mesh panel /cable net and should have sleeves of suitable material.

Table 1 showing specification for Wrapping Rope and Edge / Perimetral rope

Diameter(mm)	10mm
Rope grade of cable net	1770N/mm2
Zinc coating(IS 1835)	Class A minimum and above

Table – 2: The Rhomboidal Cable Panel should meet the following minimum strength requirements:

Sr. No.	Strength Parameter	Value (minimum)
1	Tensile Strength of cable Panel	230kN/m
2	Puncture Strength of Cable Panel	370kN at maximum displacement of 33cm
3	Tear Resistance at Junctions of cable intersections	15kN
4	Pull Apart Resistance at Junctions of cable intersections	9kN

*** The Above parameters shall meet the requirements as per the test procedures defined in ISO 17746.

Installation Procedure and Safety:

The rhomboidal shaped Cable panels should be used in combination with appropriate rock bolting. The rhomboidal shaped cable panels shall carefully be unrolled over the slope and the rock bolts shall be installed, keeping the rock bolt under the mesh intersection. Wherever this is not possible, the rock bolt shall be enclosed within an additional steel cable provided. Care should be taken to tighten the rhomboidal shaped cable panels around the rock bolt by pulling manually. Adjacent panel junction connection strength with cable net should not be less than 35-40KN.

Note: Self Drilling Anchors can be used in place of continuously threaded anchor bars depending on the strata at installation location and as directed by Engineer. In case of use of Self Drilling anchors, the contractor shall execute the job at the same rate as defined in the schedule for continuously threaded anchor bars.

After completion of rhomboidal shaped cable panel installation, base plate of a suitable size shall be tightened on the rock/soil nail, taking care that the base plate maintains a tight contact with as much with the Rhomboidal cable panel, as possible.

Testing and Acceptance criteria for Quality control:

Testing shall be done on raw material as per testing plan indicated in Table 3. The material should get approved from the client before the actual start of supply. The manufacturer of the rhomboidal shaped cable panels shall provide Manufacturers Test Certificate for the material with every lot/shipment. The Manufacturers Test Certificate shall be provided for certifying that rhomboidal shaped cable panel rock fall protection system conforms to all the technical and special requirements.

Table 3 showing Testing Plan:

Sr. No	Test	Specification	Number of Testing	Lot size	Comments
		ROPE			
1	Tensile test on wire rope	IS 2266/ISO 2048	01	Minimum 8000 Sq.m	At wire rope manufacturer lab/independent laboratory
2	Zinc mass of wire used inrope	IS 1835	01	Minimum 8000 Sq.m	At wire rope manufacturer lab/independent

Sr. No	Test	Specification	Number of Testing	Lot size	Comments
					laboratory
	CONNECTION AT JUNCTION				
3	Tear resistance	Manufacturer procedure	01	Minimum 8000 Sq.m	At cable panel manufacturer lab/independent laboratory
4	Pull Apart resistance	Manufacturer procedure	01	Minimum 8000 Sq.m	At cable panel manufacturer lab/independent laboratory
NoTe:	Testing of rope shall be carried out on the sample collected after receipt of material on work site.				

Special requirements:

1. The Manufacturer / Supplier should have production facility for manufacturing wire rope net panel in India. Manufacturing facility shall be certified for ISO 9001: 2015 Quality Management System certification
2. The wire rope net panel rock fall protection system shall have demonstrated satisfactory performance in similar applications and capacities in India or abroad. Valid documentary proof showing the supply of wire rope net panel to at least one project in India / abroad in the form of case study / Certificate from client shall be submitted.
3. The Manufacturer / supplier shall have a demonstrated capability of providing technical support and design assistance for rock fall protection works.
4. The Manufacturer / Supplier should have in-house testing facility to conduct the key testing on wire rope net panels.
5. The Manufacturer / Supplier should have supplied Rhomboidal wire rope panels with double knot connection at junctions not less than 18000 Sq.m for a single project in India.
6. The Manufacturer / Supplier shall submit documentary proof of adoption of the proposed technology on at least one project in India along with proposal.
7. The Manufacturer / Supplier should not have a history of poor performance such as abandoning the works, financial failures, blacklisting. If it is observed, Manufacturer / Supplier will be automatically disqualified

*****The EPC Contractor shall provide sample of rhomboidal steel cable panel with suitable connection at each intermediate and end junction and as per technical specifications of size 3m X 3m of along with the bid during physical submission.

Mode of Measurements: The mode of measurement shall be based on Sq.m of Area of Rhomboidal Steel Cable Panels supplied.

Schedule-E

SCHEDULE - E

(See Clauses 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

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

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

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

[Specify all the relevant documents]

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.

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	< 0.1 % of area and subject to limit of 10 mm indepth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	< 5 % subject to limit of 0.5 sqm for any 50 m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	< 5 mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	< 0.1 % of area	Daily	Length Measurement Unit like		2-7 days	IRC:82-2015
	Bleeding	Nil	< 0.1 % of area	Daily	Scale, Tape, odometer etc.		3-7 days	MORT&H Specification 3004.4
	Raveling / Stripping	Nil	< 0.1 % of area	Daily			7-15 days	IRC:82-2015 read

Asset Type	Performance	Level of Service (LOS)		Frequency of	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for	Maintenance
								with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge	Daily	Scale, Tape, odometer etc.			IRC:82-2015
	Roughness BI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS: 7941-1: 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82-2015
	Other Pavement			Bi-Annually			2-7 days	IRC:82-2015

Asset Type	Performance	Level of Service (LOS)		Frequency of	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for	Maintenance
	Distresses							
	Deflection/ Remaining Life			Annually	Falling Weight Deflect meter	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade Structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	Class I Profilometer	ASTM E950 (98) :2004 and ASTM E1656 - 94: 2000	180 days	IRC:SP:83-2008
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or	RC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**					

Asset Type	Performance	Level of Service (LOS)		Frequency of	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for	Maintenance
		36	50		equivalent)			
		33	65					
		32	80					
		31	95					
		31	110					
Embankment/ Slope	Edge drop at shoulders	Nil	40 mm	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC	7-15 days	MORT&H Specification 408.4
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification 408.4

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

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

Table -2: Maintenance Criteria for Rigid Pavements:

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
CRACKING						
1.	Single Discrete Cracks Not intersecting with any joint	w = width of crack L = length of crack d = depth of crack D = depth of slab	0 1 2	Nil, not discernible w < 0.2 mm. hair cracks	No Action	Not applicable

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
				w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay Seal, and stitch if L > l m. Within 7 days	Seal, and stitch if L > lm. Within 7days Staple or Dowel Bar Retrofit, FDR for affected portion. Within 15days
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm		
			5	w > 3 mm.		
2.	**Single Transverse (or Diagonal) Crack intersecting with one or more joints**	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal with epoxy. Within 7 days	Staple or Dowel Bar Retrofit. Within 15 days
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route, seal and stitch, if L > 1 m. Within 7 days	
			4	w = 3.0 - 6.0 mm	Dowel Bar Retrofit. Within 15 days	Full Depth Repair Dismantle and reconstruct affected. Portion with norms

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	and specifications - See Para 5.5 & 9.2 Within 15days
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack L = length of crack d = depth of crack D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernable from slow moving vehicle	Seal with epoxy, if L > 1 m. Within 7 days	Staple or dowel bar retrofit. Within 15days
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle	Route seal and stitch, if L > l m. Within 15 days	
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling.
			4	w = 6.0 - 12.0 mm, usually associated with spalling		Within 15days
			5	w > 12 mm, usually	Not Applicable, as it may be full	Full Depth Repair

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
				associated with spalling, and/or slab rocking under traffic	depth	Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 15days
4	Multiple Cracks intersecting with one or more joints	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal, and stitch if L > l m. Within 15 days	
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair within 15 days	Dismantle, Reinstate Sub-base, Reconstruct whole slab as per specifications within 30 days
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
				pieces		
5	**Corner Break**	w = width of crack L = length of crack	0	Nil, not discernible	No Action	
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts Within 7 days	Seal with epoxy seal with epoxy Within 7 days
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		
			3	w < 1.5 mm; L < 0.6 m, two corners broken		
			4	w > 1.5 mm; L > 0.6 m or three corners broken	Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008) Within 15 days	Full depth repair
			5	three or four corners broken		Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced	w = width of crack L = length (m/m2)	0	Nil, not discernible		No Action

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
	Concrete Pavement (CRCP) only)		1	w < 0.5 mm; L < 3 m/m2	**Not Applicable, as it may be full depth**	Seal with low viscosity epoxy to secure broken parts. Within 15 days Full depth repair - Cut out and replace damaged area taking care not to damage Reinforcement. Within 30days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		
			5	w > 3 mm, L > 3 m/m2 and deformation		
7	Raveling or Honeycomb type surface	r = area damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No Action	
			1	r < 2 %	Local repair of areas Damaged	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			2	r = 2 - 10 %	and liable to be damaged. Within 15 days	
			3	r = 10-25%	Bonded Inlay, 2 or 3 slabs if	
			4	r = 25 - 50 %	Affecting Within 30 days	
			5	r > 50% and h > 25 mm	Reconstruct slabs, 4 or more slabs if affecting. Within 30 days	
8	Scaling	r = damaged surface/total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	Short Term No Action	Long Term
			1	r < 2 %	Local repair of areas Damaged	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			2	r = 2 - 10 %	and liable to be damaged. Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15 Days	
			4	r = 10 - 30%		
			5	r>30 % and h> 25mm	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	t = texture depth, sand patch test	0 1	t > 1 mm	No action	Not Applicable
			2	t = 1 – 0.6 mm		
			3	t = 0.6 – 0.3 mm	Monitor rate of deterioration	
			4	t = 0.3 – 0.1 mm	Diamond Grinding if Affecting	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			5	t < 0.1 mm	50% or more slabs in a Continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole), Pothole Refer Para 8.4	n = number/m2 d = diameter h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m2	No action.	Not Applicable
			1	d = 50 - 100 mm; h < 50 mm; n < 1 per 5 m2	Partial depth repair 65 mm deep. Within 15 days	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m2	Partial depth repair 110mm	
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m2	i.e.10 mm more than the depth of the hole.	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m2		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m2	Within 30 days Full depth repair. Within 30 days	
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	
			2	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in Selected locations. Within 7 days	
			4	Severe; w > 3 mm negligible protection against ingress of water and trapping	Clean, widen and reseal the joint. Within 7 days	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
				incompressible material.		
12	Spalling of Joints	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion.	
			2	w = 10 - 20 mm, L < 25%	Within 7 days Partial Depth Repair.	
			3	w = 20 - 40 mm, L > 25%	Within 15 days	
			4	w = 40 - 80 mm, L > 25%	30 - 50 mm deep, h = w + 20% of w, within 30 days	
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w. Within 30 days	
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0	not discernible, < 1 mm	No action.	No action.

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			1	f < 3 mm		
			2	f = 3 - 6 mm	Determine cause and observe, take action for diamond grinding	Replace the slab as appropriate.
			3	f = 6 - 12 mm	Diamond Grinding	Within 30days
			4	f= 12 - 18 mm	Raise sunken slab.	Replace the slab as appropriate.
			5	f> 18 mm	Strengthen sub-grade and sub-base by grouting and raising sunken slab	Within 30days
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No Action	
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			3	h = 12 - 25 mm	Traffic within 7 days	
			4	h > 25 mm	Full Depth Repair. Within 30 days	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs. Within 30 days	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm	Install Signs to Warn Traffic within 7 days	
			2	h = 15-30 mm, Nos <20% joints		
			3	h = 30 - 50 mm		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			4	h > 50 mm or > 20% joints	Strengthen subgrade.	
			5	h > 100 mm	Reinstate pavement at normal level if L < 20 m. Within 30 days	
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic	
			3	h = 30 - 50 mm	within 7 days	
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days	
			5	h > 100 mm		

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
17	Bump	h = vertical displacement from normal profile	0	h < 4 mm	No action	
			1	h = 4 - 7 mm	Grind, in case of new construction within 7 days	Construction Limit for New Construction.
			3	h = 7 - 15 mm	Grind, in case of ongoing Maintenance within 15 days	Replace in case of new construction. Within 30days
			4	h > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level	0	Nil, not discernible < 3mm	**Short Term** No Action	**Long Term**
			1	f = 3 - 10 mm	Spot repair of shoulder	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			2	f = 10 - 25 mm	within 7 days	
			3	f = 25 - 50 mm	Fill up shoulder	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch.
			4	f = 50 - 75 mm	within 7 dayss	
			5	f > 75 mm		Within 30days
Drainage						
19	Pumping	quantity of fines and water expelled through open joints and cracks Nos	0	not discernible	No Action	
			1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints Without delay.	Inspect and repair sub-drainage at distressed sections and upstream.
			3 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	

S.No.	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2 Short Term	For the case d > D/2 Long Term
			5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. Within 30 days	
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc within 7 days, Follow up	Action required to stop water damaging foundation within 30 days.
			5	Ponding, accumulation of water observed	-do	

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Highway	Availability of Safe Sight	As per IRC SP :84-2014, a minimum of safe stopping sight	Monthly	Manual Measurements	Removal of obstruction within 24 hours, in case of sight line		IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Distance	distance shall be available throughout.				with O dometer along with video/ image backup	affected by temporary objects such as trees, temporary encroachments. In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.		
		Design Speed, kmph	**Desirable Minimum Sight Distance (m)**	**Safe Stopping Sight Distance (m)**					
		100	360	180					
		80	260	130					
Pavement Marking	Wear	<70% of marking remaining			Bi-Annually	**Visual Assessment as per Annexure-F of IRC:35-2015**	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect - within 2 months	IRC:35-2015
	Day time Visibility	During expected life Service Time Cement Road - 130mcd/m2/lux Bituminous Road - 100mcd/m2/lux			Monthly	As per Annexure-D of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect – within 2 months	IRC:35-2015
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time:			Bi-Annually	As per Annexure-E of IRC:35-2015	Re - painting	Cat-1 Defect – within 24 hours Cat-2 Defect –	IRC:35-2015

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		Design Speed	(RL) Retro Reflectivity (mcd/m2/lux)					within 2 months	
		Up to 65	200	80					
		65-100	250	120					
		Above 100	350	150					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):							
Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.			Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as Per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012			Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1	IRC:67-2012

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Device. In accordance with ASTM D 4956-09.		Month in case of Gantry/ Cantilever Sign boards	
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb	Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	IRC 86:1983
	Kerb Painting	Functionality: Functioning of Kerb painting as intended	Daily	Visual with video/image backup	Kerb Repainting	Within 7-days	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B.	Daily	Counting	New Installation	Within 2 months	IRC:SP:84-2014, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended	Daily	Visual with video/image backup	Rectification	Within 15 days	IRC:SP:84-2014
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End Treatment as intended	Daily	Visual with video/image backup	Rectification	Within 7 days	IRC:SP:84-2014, IRC:119- 2015

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

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, busshelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works		Daily	-	Rectification	15 days	IRC:SP 84-2014

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	2 times in a year (before and after rainy season)	Inspection by Bridge Engineer as per IRC SP: 35-1990 and recording of depth of silting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	15 days before onset of monsoon and within 30 days after end of rainy season.	IRC 5-2015, IRC SP:40-1993 and IRC SP:13-2004

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	30 days or before onset of rains whichever comes earlier	IRC SP:40-1993 and IRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm Delamination of concrete not more than 0.25 sq.m. Cracks wider than 0.3 mm not more than 1m aggregatelength	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC:SP:40-1993.	15 days	IRC SP 40-1993 and MORTH Specifications clause 2800
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season	IRC: SP 40-1993 and IRC:SP:13-2004.

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

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

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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
	strip seal expansion joint	expansion joint gap.		survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	joint gaps thoroughly		s 2600 and IRC SP: 40-1993.
	Drainage spouts	No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed	3 days	MORTH specification 2700.
Bridge-substructure	Cracks/ spalling of concrete/ Rusted steel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating	30 days	IRC SP: 40-1993 and MORTH specification 2800.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
					before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type of defect noticed		
	Bearings	Delaminating of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/ abutment shall be replaced, in order to get uniform load transfer on to bearings.	3 months	MORTH specification 2810 and IRC SP: 40-199.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visual Inspection as per IRC SP:35-1990 using	suitable protection works around pier/abutment	1 months	IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				Mobile Bridge Inspection Unit. In case of oubt, use Underwater camera for inspection of deep wells in major Rivers.			
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching.	30 days After defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Note: Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Structures and Culverts:

Table 5: Maintenance Criteria for Hill Roads

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

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

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

A. Flexible Pavement

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

(i)	Cleaning of toilets	Every 4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24 (twenty four) hours
(g) [Toll Plaza]		
(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 (forty eight) 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
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(vi)	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

SCHEDULE - F

(See Clause 3.1.7(a))

APPLICABLE PERMITS

1 Applicable Permits

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

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

Schedule-G

SCHEDULE – G

(See Clauses 7.1 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1)

[Performance Security/Additional Performance Security]

To
National Highway & Highway Development Corporation Ltd.
PTI Building, 3rd Floor, 4, Parliament Street,
New Delhi- 110001

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called the "**Contractor**") and [name and address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") for the construction of the **"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"** subject to and in accordance with the provisions of the Agreement

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

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

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

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

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

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

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

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

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

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

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

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

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 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 there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

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

Sr. No.	Particulars	Details
1.	Name of Beneficiary	National Highways & Infrastructure Development Corporation Limited
2.	Beneficiary Bank Account No.	90621010002659
3.	Beneficiary Bank Branch Name and Address	Canara Bank (erstwhile Syndicate Bank), Transport Bhawan, 1st Parliament Street, New Delhi-110001
4.	Beneficiary Bank Branch IFSC	CNRB0019062
5.	Swift Code (For Foreign Bidders)	SYNBINBB126

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

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

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

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

Form for Guarantee for Withdrawal of Retention Money

To
National Highway & Highway 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 NHIDCL, (hereinafter called the "Authority") for the construction of the **"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"** subject to and in accordance with the provisions of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

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

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly 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.

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

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

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

Sr. No.	Particulars	Details
1.	Name of Beneficiary	RO NHIDCL PROJECTS
2.	Beneficiary Bank Account No.	73653210000013
3.	Beneficiary Bank Branch IFSC	CNRB0019062
4.	Beneficiary Bank Branch Name	Canara Bank, Dispur, Guwahati
5.	Beneficiary Bank Branch Address	Upasana Complex, Dr. R. P. Road, Ganeshguri, Dispur, Guwahati

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

Schedule-H

(See Clauses10.1 (iv) and 19.3)

1 Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs. 465.84 Cr.

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road works including culverts, widening and repair of culverts.	45.15%	**A - Widening and strengthening of existing road**	
		(1) Earthwork up to Subgrade top	
		(2) Sub base course (GSB/CTSB)	
		(3) Non bituminous base course (WMM)	
		(4) Bituminous base (Prime and DBM)	
		(5) Wearing coat (Tack coat, BC)	
		(6) widening and repair of culverts	
		B.1 - Reconstruction/ New 2/4-lane realignment/bypass (Flexible pavement)	
		(1) Earthwork upto Subgrade top	60.50%
		(2) Subbase course (GSB)	8.36%
		(3) Non bituminous base course (WMM)	5.52%
		(4) Bituminous base (Prime and DBM)	6.42%
		(5) Wearing coat (Tack coat, BC)	2.86%
		B.2 - Reconstruction/ New 2/4-lane realignment/bypass (Rigid Pavement)	
		(1) Earthwork upto Subgrade top	
		(2) Subbase course (GSB)	
		(3) Dry lean concrete (DLC)	
		(4) Pavement quality concrete (PQC) course	
		C.1 - Reconstruction/ New Service road (flexible Pavement)	
		(1) Earthwork upto Subgrade top	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(2) Subbase course (GSB)	
		(3) Non bituminous base course (WMM)	
		(4) Bituminous base (Prime and DBM)	
		(5) wearing coat (Tack coat, BC)	
		C.2 - Reconstruction/ New Service road (Rigid Pavement)	
		(1) Earthwork upto Subgrade top	
		(2) Subbase course (GSB)	
		(3) Dry lean concrete (DLC)	
		(4) Pavement quality concrete (PQC) course	
		D. - Reconstruction/ New culverts on existing road and realignments, bypasses	16.34%
Minor Bridges/ Underpasses/ Overpasses	1.98%	**A.1 - Widening and repairs of Minor Bridges**	
		Widening of existing bridges	
		Rehabilitation of existing bridges	
		A.2 - New of Minor Bridges	
		(1) Foundation: (on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	41.41%
		(2) Sub-structure: (on completion of abutments, piers upto abutment/pier cap.)	18.48%
		(3) Super-structure (on completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect)	17.28%
		(4) Approaches (on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	22.83%
		(5) Guide Bunds and River Training works: (On completion of Guide Bunds and river training works complete in all respects.)	
		B.1 - Widening and repairs of Underpasses/Overpasses	
		B.2 - New Underpasses/Overpasses	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	
		(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap	
		(3) Super-structure: on completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect.	
		(4) Approaches: on completion of approaches including RE wall, retaining walls stone pitching, protection works complete in all respect and fit for use.	
Major Bridge works and ROB/RUB/elevated sections/flyovers including viaducts, if any		**A.1 - Widening and repairs of existing major bridges**	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure (including bearing)	
		(4) wearing coat (including expansion joint)	
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	
		(6) wing walls/return walls	
		(7) Guide bunds, river training works etc.	
		(8) Approaches (including retaining walls, stone pitching, protection works).	
		A.2 - New/ Reconstruction major bridges	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure (including bearing)	
		(a) casting of girder	
		(b) casting of segments	
		(c) erection of girder	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(4) Other ancillary works: wearing coat, including expansion joint, hand rails, crash barriers, tests on completion in all respect.	
		(5) Miscellaneous works: stone pitching, protection works excluding retaining/ reinforced earth wall etc.	
		(6) wing walls/return walls upto full height	
		(7) Guide bunds, river training works etc.	
		(8) Retaining wall/ Reinforced earth wall etc.	
		(8.a) Panel casting	
		(8.b) Erection of panel/ construction of retaining wall	
		B.1 - Widening and repairs of (a) ROB and (b) RUB	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure (including bearing)	
		(4) wearing coat: (a) in case of ROB - wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB - rigid pavement under RUB including drainage facility complete in all respect as specified.	
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	
		(6) wing walls/return walls	
		(7) Approaches (including retaining walls, stone pitching, protection works).	
		B.2 - New ROB / RUB	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure (including bearing)	
		(a) casting of girder	
		(b) casting of segments	
		(C)erection of girder	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	
		(6) wing walls/return walls upto full height	
		(7) Retaining wall/ Reinforced earth wall etc.	
		(7.a) RE wall Panel casting	
		(7.b) Erection of RE wall panel/ construction of retaining wall	
		C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure (including bearing)	
		(4) wearing coat including expansion joint	
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	
		(6) wing walls/return walls	
		(7) Approaches (including retaining walls/ Reinforced earth walls, stone pitching, protection works).	
		C.2 - New Elevated section/Flyover/Grade Separators	
		(1) Foundation	
		(2) Sub structure	
		(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)	
		(a) casting of girder	
		(b) casting of segments	
		(c) erection of girder	
		(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	
		(6) wing walls/return walls upto full height	
		(7) Retaining wall/ Reinforced earth wall etc.	
		(7.a) Panel casting	
		(7.b) Erection of panel/ construction of retaining wall	
Other works	52.71%	(i) Toll plaza including it's approach	
		(ii) Road side drains	
		a) Hill Side Trapezoidal/V Type Drain	1.61%
		b) Catch Water Drain	1.55%
		(iii) Road signs, markings, km stones, safety devices etc.	3.70%
		(iv) Project facilities	
		(a) Bus Bay with Bus Shelter	0.13%
		(b) Truck laybyes	0.10%
		(c) Rest area with Toilet Block	0.12%
		(d) others to specified	
		(v) Road side plantation	0.35%
		(vi) Repair of Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	
		(vii) Retaining Wall	27.14%
		(viii) Breast Wall	26.94%
		(ix) Hydro-seeding& Mulching	4.00%
		(x) Special Protection of Sinking Zone	34.29%
		(xi) Junction Improvement	0.07%
Electrical utilities and public Health Utilities (Water	0.16%	(i) EHT line / (ii) EHT crossings	
		(iii) HT/ LT line / (iv) HT/ LT crossings over ground	86.59%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
pipe lines and sewage lines)		(iv) HT/ LT line / (vi) HT/ LT crossings Under ground	
		(vii) Water pipeline / (viii) Water pipeline crossings	13.41%
		(ix) Sewage lines / (x) Sewage line crossings	

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:

Table1.3.1

Stage of Payment	Percentage -weightage	Payment Procedure
A - Widening and strengthening of existing road		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.		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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)		
(4) Bituminous base (Prime and DBM)		
(5) wearing coat (Tack coat, BC)		
(6) widening and repair of culverts		Cost of ten completed culverts shall be determined pro rata with respect to the total number of culverts. Payment shall be made on the completion of at least five culverts.

Stage of Payment	Percentage -weightage	Payment Procedure
B.1 - Reconstruction/ New 2/4-lane realignment/bypass (Flexible pavement)		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.	60.50%	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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)	8.36%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)	5.52%	
(4) Bituminous base (Prime and DBM)	6.42%	
(5) wearing coat (Tack coat, BC)	2.86%	
B.2 - Reconstruction/ New 2/4-lane realignment/bypass (Rigid Pavement)		
(1) Earthwork upto top of the Subgrade including excavation in Soil, soft rock and hard rock, removal of unserviceable soil etc.		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 500m.In case of Hill cutting, the payment procedure will be as under:Hill Cutting : 40% of weightage of A(1)Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry lean concrete (DLC)		
(4) Pavement quality concrete (PQC) course		
C.1 - Reconstruction/ New Service road/ Slip Road (flexible Pavement)		

Stage of Payment	Percentage -weightage	Payment Procedure
(1) Earthwork upto top of the Subgrade including Shoulder		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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Non bituminous base course (WMM)		
(4) Bituminous base (Prime and DBM)		
(5) wearing coat (Tack coat, BC)		
C.2 - Reconstruction/ New Service road/ Slip road (Rigid Pavement)		
(1) Earthwork upto top of the Subgrade		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 500m. In case of Hill cutting, the payment procedure will be as under: Hill Cutting : 40% of weightage of A(1) Preparation of Sub-Grade: 60% of weightage of A(1)
(2) Subbase course (GSB)		Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 500 m.
(3) Dry lean concrete (DLC)		
(4) Pavement quality concrete (PQC) course		
D. - Reconstruction/ New culverts on existing road, Realignments, bypasses:	16.34%	Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least one culvert.

@. 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. And L = Total length in km.

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

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

1.3.2 Minor Bridges and Underpasses/Overpasses.

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

Table1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1 - Widening and repairs of Minor Bridges		Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length of the minor bridges. Payment shall be made on the completion of widening & repair works of a minor bridge.
Widening of existing bridges		
rehabilitation of existing bridges		
A.2 - New of Minor Bridges		
(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.	41.41%	(1) Foundation: Payment against foundation shall be made on prorata basis on completion of at least two foundations. In case where load testing is required for foundation, trigger of first payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto abutment/pier cap.	18.48%	(2) Substructure: Payment against substructure shall be made on prorata basis on completion of at least two substructures upto abutment/pier cap level of each bridges.
(3) Super-structure: on completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect.	17.28%	(3) Super structure: Payment shall be made on prorata basis on completion of a stage i.e., completion of super structure of at least one span in all respects as specified in the column of Stage payment in this sub clause.
(4) Approaches: on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	22.83%	(4) Approaches: Payment shall be made on prorata basis on completion of a stage i.e., completion of approaches in all respect as specified in the column of "stage Payment" in this sub clause.

Stage of Payment	Weightage	Payment Procedure
(5) Guide Bunds and River Training works: On completion of Guide Bunds and river training works complete in all respects.		(5) Guide bunds and river training works: Payment shall be made on proratabasison completion of a stage i.e., completion of guide bunds and river training works in all respect as specified.
B.1 - Widening and repairs of Underpasses/Overpasses		Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpass/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpasses.
B.2 - New Underpasses/Overpasses		
(1) Foundation: on completion of the foundation work including foundation for wing wall, return wall, abutments, piers.		(1) Foundation: Payment against foundation shall be made on prorata basis on comletion of at least two foundations. In case where load testing is required for foundation, trigger of fisrt payment shall include load testing also where specified.
(2) Sub-structure: on completion of abutments, piers upto the abutment/pier cap		(2) Substructure: Payment against substructure shall be made on prorata basis on comletion of at least two substructures upto abutment/pier cap level of each underpass/overpass.
(3) Super-structure: on completion of the ssuper structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. completion in all respect)		(3) Super structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure of at least one span in all respects as specified in the column of Stage payment in this sub clause.
(4) Approaches: on completion of approaches including RE wall, retaining walls/ Reinforced earth wall, stone pitching, protection works complete in all respect and fit for use.		(4) Approaches: Payment shall be made on prorata basis on completion of a stage i.e. completion of approaches in all respect as specified in the column of "stage Payment" in this sub clause.

1.3.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of major Bridge works, ROB/RUB and structure work shall be as stated in table 1.3.3

Table 1.3.3

Stage of payment	Weightage	Payment procedure
A.1 - Widening and repairs of existing major bridges		

Stage of payment	Weightage	Payment procedure
(1) Foundation	-	(1) Foundation: Cost of each major bridge shall be determined on pro rata basis with respect to the total linear length (m) of the major bridges. Payment against foundation shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the 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 the first payment shall include load testing also where specified.
(2) Sub structure	-	(2) Sub structure: Payment against sub-structure shall be made on prorata 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 substructures of abutment/piers upto abutment/piers cap level of the major bridge.
(3) Superstructure (including bearing)	-	(3) Suer structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings of at least one span in all respects as specified.
(4) wearing coat (including expansion joint)	-	(4) wearing coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)	-	(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto top		(6) wing wall/ return wall: Payment shall be made on completion of wing wall/return

Stage of payment	Weightage	Payment procedure
		wall complete in all respects as specified.
(7) Guide bunds, river training works etc.		(7) Guide bund, 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, protection works).	-	(8) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
A.2 - New/ Reconstruction major bridges		Cost of each structure shall be determined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given in this table.
(1) Foundation: foundation of abutment/piers		(1) Foundation: 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 a bridge as per weightage given in this table, subject to completion of at least two foundations in all respect. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.		(2) Substructure: Payment against sub structure shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of sub-structure of a bridge as per weightage given in this table,subject to completion of at least two substructure of abutment/piers uptoabutment/piers cap level of a bridge.

Stage of payment	Weightage	Payment procedure
(3) Superstructure: including girder, deck slab, bearings (excluding wearing coat and expansion joints)		
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)		(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e., not less than completion of casting of at least five girders of the structure.
(3.b) Super structure: casting of segments		(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e., not less than completion of casting of at least 10 (ten) segments of the structure.
(3.c) Super structure: erection of girder, deck slab and bearings		(c) Super structure (erection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e., completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, including expansion joint, hand rails, carsh barriers, tests on completion in all respect.		(4) Other ancillary work: Payment shall be made on prorata basis on completion of the stage in all respect as specified, for each structure.
(5) Miscellaneous works: stone pitching, protection works excluding retaining/ reinforced earth wall etc.		(5) Miscellaneous works: Payment shall be made on prorata basis on completion of the stage in all respects as specified, for each structure.
(6) wing walls/return walls upto full height		(6) Wing wall/ return wall: Payment shall be made on completion of wing wall/return walls for a bridge as per weightage given in this table

Stage of payment	Weightage	Payment procedure
		complete in all respects as specified.
(7) Guide bunds, river training works etc.		(7) Guid bund, river training works: Payment shall be made on onprorata basis on completion of the stages in all respect as specified.
(8) Retaining wall/ Reinforced earth wall etc.		Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
(8.a) Panel casting		(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e., not less than completion of casting of 25% of the scope of RE wall panel of each bridge.
(8.b) Erection of panel/ construction of retaining wall		(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e. completion of erection of panels/ construction of retainning wall complete in all respect for at least 25% scope of work for each structure.
B.1 - Widening and repairs of (a) ROB and (b) RUB		
(1) Foundation		(1) Foundation: Cost of each ROB/RUB shall be determined on pro rata basis with respect to the total linear length (m) of the ROB/RUBs. Payment against foundation shall be made on prorata basis on completion of a stage i.e. not less than 25% of the scope of foundation of the ROB/RUB subject to completion of at least two foundations of

Stage of payment	Weightage	Payment procedure
		the ROB/RUB. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure		(2) Substructure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of sub-structure of the ROB/RUB subject to completion of at least two substructure of abutment/piers upto abutment/piers cap level of the ROB/RUB.
(3) Superstructure (including bearing)		(3) Super structure: Payment shall be made on prorata basis on completion of a stage i.e., completion of super structure including bearings of at least one span in all respects as specified.
(4) wearing coat : (a) in case of ROB - wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB - rigid pavement under RUB including drainage facility complete in all respect as specified.		(4) wearing coat: Payment shall be made on completion of (a) in case of ROB - wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB - rigid pavement under RUB including drainage facility complete in all respect as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)		(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls		(6) Wing wall/return wall: Payment shall be made on completion of wing wall/return wall complete in all respects as specified.

Stage of payment	Weightage	Payment procedure
(7) Approaches (including retaining walls, stone pitching, protection works).		(7) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
B.2 - New ROB / RUB		Cost of each structure shall be determined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given in this table.
(1) Foundation: foundation of abutment/piers		(1) Foundation: Payment against foundation shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the ROB/RUB as per weightage given in this table,subject to completion of at least two foundations of the ROB/RUB in all respect. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.		(2) Substructure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of sub-structure of the ROB/RUB as per weightage given in tis table, subject to completion of at least two substructures of abutment/piers upto abutment/piers cap level of the ROB/RUB.
(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)		

Stage of payment	Weightage	Payment procedure
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)		(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e., not less than completion of casting of at least five girders of the structure.
(3.b) Super structure: casting of segments		(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e., not less than completion of casting of at least 10 (ten) segments of the structure.
(3.c) Super structure: erection of girder, deck dlab and bearings		(c) Super structure (erection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e. completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.		(4) Other ancillary works: Payment shall be made on prorata basis on completion of a stage in all respect as specified, for each structure.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)		(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto full height		(6) wing walls/return walls upto full height: Payment shall be made on completion of wing wall/return wall complete for rach ROB/RUB asper weightage given in the table, completion in all respects as specified.

Stage of payment	Weightage	Payment procedure
(7) Retaining wall/ Reinforced earth wall etc.		Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
(7.a) Panel casting		(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e., not less than completion of casting of 25% of the scope of RE wall panel of each ROB/RUB.
(7.b) Erection of panel/ construction of retaining wall		(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e., completion of erection of panels/ construction of retaining wall complete in all respect for at least 25% scope of work for each ROB/RUB.
C.1 - Widening and repairs of Elevated section/Flyover/Grade Separators		
(1) Foundation		(1) Foundation: Cost of each structure shall be determined on pro rata basis with respect to the total linear length (m) of the structures. Payment against foundation shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of the structure subject to completion of at least two foundations of the structure. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.

Stage of payment	Weightage	Payment procedure
(2) Sub structure		(2) Sub structure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of sub-structure of the structure subject to completion of at least two substructure of abutment/piers upto abutment/piers cap level of the structure.
(3) Superstructure (including bearing)		(3) Super Structure: Payment shall be made on prorata basis oncompletion of a stage i.e., completion of super structure including bearings of at least one span in all respects as specified.
(4) wearing coat including expansion joint		(4) wearing coat including expansion joint: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)		(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls		(6) wing walls/return walls: Payment shall be made on completion of wing wall/return wall complete in all respects as specified.
(7) Approaches (including retaining walls, stone pitching, protection works).		(7) Approaches: Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
C.2 - New Elevated section/Flyover/Grade Separators		Cost of each structure shall be determined on prorata basis with respect to the total linear length (m) of all the structures. Payments shall be made on completion of each stage of structures as per weightage given in this table.

Stage of payment	Weightage	Payment procedure
(1) Foundation: foundation of abutment/piers		(1) Foundation: Payment against foundation shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of foundation of each structure as per weightage given in this table,subject to completion of at least two foundations in allrespect. In case where load testing is required for foundation, the trigger of the first payment shall include load testing also where specified.
(2) Sub structure: Substructure for abutment, piers upto the abutment/pier cap level.		(2) Substructure: Payment against sub-structure shall be made on prorata basis on completion of a stage i.e., not less than 25% of the scope of sub-structure of each structure as per weightage given in tis table, subject to completion of at least two substructures of abutment/piers upto abutment/piers cap level.
(3) Superstructure: including girder, deck slab, bearing (excluding wearing coat and expansion joints)		
(3.a) Super Structure: Casting of girder/ fabrication of girders (steel)		(a) Super structure (casting of girder): Unit of measurement is number. Payment against casting of girder shall be made on prorata basis with respect to total number of girders required in the structure on completion of a stage i.e., not less than completion of casting of at least five girders of the structure.
(3.b) Super structure: casting of segments		(b) Super structure (casting of segment): Unit of measurement is number. Payment against casting of segments shall be made on prorata basis with respect to total number of segments required in the structure on completion of a stage i.e., not less than completion of casting of at least 10 (ten) segments of the

Stage of payment	Weightage	Payment procedure
		structure.
(3.c) Super structure: erection of girder, deck Slab and bearings		(c) Super structure (erection of girders, deck slab and bearing): Payment shall be made on prorata basis on completion of a stage i.e., completion of super structure including bearings at least one span in all respect as specified.
(4) Other ancillary works: wearing coat, expansion joint, hand railing, crash barriers tests on completion etc. completion in all respect.		(4) Other ancillary works: Payment shall be made on prorata basis on completion of a stage in all respect as specified, for each structure.
(5) Miscellaneous items (like hand rails, crash barriers, road markings etc.)		(5) Miscellaneous: Payment shall be made on completion of all miscellaneous works like hand rail, crash barrier, road markings, etc. complete in all respects as specified.
(6) wing walls/return walls upto full height		(6) wing walls/return walls upto full height: Payment shall be made on completion of wing wall/return wall complete for rach ROB/RUB asper weightage given in the table, completion in all respects as specified.
(7) Retaining wall/ Reinforced earth wall etc.		Payment shall be made on prorata basis on completion of both approaches including stone pitching, protection works, etc. complete in all respect as specified.
(7.a) Panel casting		(a) Panel casting: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis with respect to total area panels required for the structure on completion of a stage i.e., not less than completion of casting of 25% of the scope of RE wall panel of each ROB/RUB.

Stage of payment	Weightage	Payment procedure
(7.b) Erection of panel/ construction of retaining wall		(b) Erection of panel/ Construction of retaining wall: Unit of measurement is area in Sqm. Payment against casting of panels shall be made on prorata basis on completion of a stage i.e., completion of erection of panels/ construction of retaining wall complete in all respect for at least 25% scope of work for each ROB/RUB.

1.3.4 Other works.

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

Table 1.3.4

Stage of Payment	Weightage	Payment Procedure
(i) Toll plaza		Unit of measurement is each completed toll plaza. Payment of each toll plaza shall be made on pro rata basis as per following completed stages: (i) Rigid pavement upto DLC (LHS) - 12.5% (ii) Rigid pavement upto DLC (RHS) - 12.5% (iii)PQC (LHS) - 25% (iv) PQC (RHS) - 25% (v) Admin Building, Maintenance Building &Misc - 10% (vi) Canopy, Toll Booth, Safety Items & Miscellaneous works - 12.5% (vii) Toll plaza Tunnel/over head bridge - 2.5%
(ii) Road side drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length.
a) Hill Side Trapezoidal/V Type Drain	1.61%	
b) Catch Water Drain	1.55%	
(iii) Road signs, markings, km stones, safety devices	3.70%	
(iv) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus bays& shelter	0.13%	
b) Truck lay-byes	0.10%	
c) Rest areas with toilet Block	0.12%	
d) Others		

Stage of Payment	Weightage	Payment Procedure
(v) Roadside Plantation	0.35%	Unit of measurement is linear length. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length.
(vi) Repair of Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.		
(a) Retaining wall	27.14%	
(vii) Breast Wall	26.94%	
(ix) Hydro-seeding& Mulching	4.00%	
(x) Special Protection for Sinking Zone	34.29%	
(x) Junction Improvement	0.07%	

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

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

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) EHT line	0.00%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i)Erection of Poles-20%, (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) EHT crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 4.

Stage of Payment	Weightage	Payment Procedure
(iii) HTl LT line (including transformers if any)	86.59%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of LT/ HT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20% (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR)
(iv) HT/ LT crossings/ Under Ground Cable Crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to completion of minimum of 1 crossings.
(v) Water pipeline	13.41%	Unit of measurementis as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) water pipeline crossings & other Items as per Schedule B		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings.
(vii) Sewage lines	0.00%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(viii) Sewage line crossings		Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe-

Stage of Payment	Weightage	Payment Procedure
		50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

2 Procedure for payment for Maintenance.

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

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

Schedule-I

SCHEDULE - I

(See Clause 10.2 (iv))

DRAWINGS

1 Drawings

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

2 Additional Drawings

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

Annex - I

(Schedule - I)

List of Drawings

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 horizontal alignment & vertical profile and detailed cross sections

(b) Drawings of cross drainage works i.e. Bridges/Culverts/Flyovers and Other Structures.

(c) Drawings for River Training works

(d) Drawings of interchanges, major intersections and underpasses

(e) Drawing of control centre

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

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

(h) Drawings of road drainage measures

(i) Drawings of typical details slope protection measures

(j) Drawings of landscaping and horticulture

(k) Drawings of pedestrian crossing

(l) Drawings of street lighting

(m) Any other drawings as per instruction of Authority Engineer

(m) General Arrangement showing Base Camp and Administrative Block

Schedule-J

Schedule - J

(See Clause 10.3 (ii))

Project Completion Schedule

1. Project Completion Schedule

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

2. Project Milestone-I

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

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

3. Project Milestone-II

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

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

4. Project Milestone-III

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

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

5. Scheduled Completion Date

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

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

6. Extension of time

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

Schedule-K

SCHEDULE - K

(See Clause 12.1 (ii))

Tests on Completion

1 Schedule for Tests

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

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

2 Tests

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

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

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

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

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

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

3 Agency for conducting Tests

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

4 Completion Certificate

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

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

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

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

Schedule-L

Schedule – L
(See Clause 12.2)
Completion Certificate

1 I, …… (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "Agreement"), for **"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"** (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

SCHEDULE - M

(See Clauses 14.6, 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

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

2. Percentage reductions in lump sum payments

- 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%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	5%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	

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

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

$$R=P/100 \times (M_1 \text{ or } M_2) \times L1/L$$

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

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

(i) These Terms of Reference (the "TOR") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "Agreement), which has been entered into between the NHIDCL(the "Authority") and ..... (the "Contractor")# **"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"** and a copy of which is annexed hereto and marked as Annex-A to formpart of this TOR. # - In case the bid of Authority's Engineer is invited simultaneously with the bid of EP project, then the status of bidding of EPC project only to be indicated

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

2 Definitions and interpretation

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

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

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

3. General

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

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

(a) any Time Extension;
(b) any additional cost to be paid by the Authority to the Contractor;
(c) the Termination Payment; or
(d) 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).

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

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

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

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

4 **Construction Period**

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

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

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

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

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

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

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

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

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, 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.

(x) 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.

(xi) 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.

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

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

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days

the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

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

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

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

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate 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

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

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

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

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule-E,

the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

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

6 Determination of costs and time

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

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

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

7. Payments

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

(ii) Authority's Engineer shall –

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

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

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

(iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the

receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

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

9 Miscellaneous

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

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

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

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

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

Schedule-O

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(i) subsequent to the last claim;
(b) amounts reflecting adjustments in price for the aforesaid claim;
(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;
(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2(iii) (a);
(e) total of (a), (b), (c) and (d) above;
(f) Deductions:
  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;
  (ii) Any amount towards deduction of taxes; and
  (iii) Total of (i) and (ii) above.
(g) Net claim: (e) – (f) (iii);
(h) The amounts received by the Contractor upto the last claim:
  (i) For the Works executed (excluding Change of Scope orders);
  (ii) For Change of Scope Orders, and
  (iii) Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

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

3. Contractor's claim for Damages

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

Schedule-P

SCHEDULE - P
(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

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

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

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

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

2. Insurance for Contractor's Defects Liability

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

3. Insurance against injury to persons and damage to property

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

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

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

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

4. **Insurance to be in joint names**

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

Schedule-Q

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 kilometer.

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

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"), **"Upgradation & Improvement of Tamenglong- Mahur Road (NH-137) to two lane with paved shoulders in the state of Assam on Engineering, Procurement & Construction (EPC) mode - Package-7 starting near Jiri River(Assam/Manipur Border) at km 96.870 and ending near Hangrum at km 116.550 (Length-19.68km)"** (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)