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

SCHEDULES

For

"Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode.

JANUARY, 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. The Site

(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
TO LUMDING
NH-54
TO HEJAICHAK
KM-176+581
END POINT
End Point
Mahur
P. Lonkai
Ashalu
Impohoi
Hekaukang
P. Leikul
KM-156+489
START POINT
TO JATINGA
Google Earth
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5 km
N

Annex-I
(Schedule-A)

Site

1. Site

The Site of the two-lane (proposed 2-lanewith paved shoulder carriageway)Project Highway starts near P.Leikul and ends near Mahur (Borowapu)(Package-10) from Existing Chainagekm160+875 of NH-137 to km182+169 of NH 137 (Design Chainage 156+489 to 176+581) 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	160875	161100	225	7	Agricultrure
2	161100	161800	700	7	Builtup
3	161800	164550	2750	7	Agricultrure
4	164550	165200	650	7	Builtup
5	165200	165800	600	7	Agricultrure
6	165800	166700	900	7	Builtup
7	166700	166850	150	7	Agricultrure
8	166850	167850	1000	7	Builtup
9	167850	171000	3150	7	Agricultrure
10	171000	172050	1050	7	Builtup
11	172050	172700	650	7	Agricultrure
12	172700	173350	650	7	Builtup
13	173350	174550	1200	7	Agricultrure
14	174550	175600	1050	7	Builtup
15	175600	177700	2100	10	Builtup
16	177700	182169	4469	10	Agricultrure

3. Carriageway

The present carriageway of the Project Highway is 7.0m wide. 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	160+875	182+169	21294	3.00	

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	175+700	_	_	Bailey Bridge	1X20	5.4

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)	TypeofStructure	No. of Spans withspanlength(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	160895	HPC	1ROW900	
2	161100	HPC	1ROW900	

S. No.	Chainage(km)	Type of Culvert	Span /Opening with span length (m)	Remarks
3	161510	HPC	1ROW900	
4	162015	HPC	1ROW900	
5	162495	HPC	1ROW900	
6	162650	HPC	1ROW900	
7	162975	HPC	1ROW900	
8	163310	FCW	_	
9	163625	HPC	1ROW900	
10	163770	HPC	1ROW900	
11	163900	HPC	1ROW900	
12	164010	HPC	1ROW900	
13	164130	HPC	1ROW900	
14	164245	HPC	1ROW900	
15	164455	HPC	1ROW900	
16	164500	HPC	1ROW900	
17	164720	HPC	1ROW900	
18	164845	HPC	1ROW900	
19	164900	HPC	1ROW900	
20	165040	FCW	_	
21	165100	HPC	1ROW900	
22	165275	HPC	1ROW900	
23	165475	HPC	1ROW900	
24	165550	HPC	1ROW900	
25	165630	HPC	1ROW900	
26	165740	HPC	1ROW900	
27	165795	HPC	1ROW900	
28	165920	HPC	1ROW900	
29	166170	HPC	1ROW900	
30	166250	HPC	1ROW900	
31	166360	HPC	1ROW900	
32	166395	HPC	1ROW900	
33	166500	RCC SLAB	1X1	
34	166715	HPC	1ROW900	
35	166810	HPC	1ROW900	
36	166925	HPC	1ROW900	
37	167330	HPC	1ROW900	
38	167375	HPC	1ROW900	
39	167825	HPC	1ROW900	
40	167895	HPC	1ROW900	
41	167990	RCC SLAB	1X2	
42	168035	HPC	1ROW900	
43	168265	HPC	1ROW900	
44	168390	HPC	1ROW900	
45	168550	HPC	1ROW900	
46	168625	HPC	1ROW900	
47	168690	HPC	1ROW900	
48	168840	RCC SLAB	1X2	

S. No.	Chainage(km)	Type of Culvert	Span /Opening with span length (m)	Remarks
49	168925	HPC	1ROW900	
50	168950	HPC	1ROW900	
51	169150	HPC	1ROW900	
52	169290	HPC	1ROW900	
53	164425	HPC	1ROW900	
54	169710	HPC	1ROW900	
55	170040	HPC	1ROW900	
56	170090	HPC	1ROW900	
57	170190	HPC	1ROW900	
58	170420	HPC	1ROW900	
59	171000	HPC	1ROW900	
60	171070	HPC	1ROW900	
61	171180	HPC	1ROW900	
62	171425	HPC	1ROW900	
63	171890	HPC	1ROW900	
64	172025	HPC	1ROW900	
65	172355	HPC	1ROW900	
66	173855	HPC	1ROW900	
67	174110	HPC	1ROW900	
68	174175	HPC	1ROW900	
69	174245	HPC	1ROW900	
70	174370	HPC	1ROW900	
71	174475	HPC	1ROW900	
72	174490	HPC	1ROW900	
73	174785	HPC	1ROW900	
74	174930	HPC	1ROW900	
75	175260	HPC	1ROW900	
76	175465	HPC	1ROW900	
77	175980	RCC SLAB	1X3	
78	176220	RCC SLAB	1X1	
79	176505	RCC SLAB	1X3	
80	176550	RCC SLAB	1X3	
81	176615	HPC	1ROW900	
82	176990	RCC SLAB	1X1	
83	177045	HPC	1ROW900	
84	177090	RCC SLAB	1X1	
85	177130	RCC SLAB	1X1	
86	177265	RCC SLAB	1X1	
87	177415	RCC SLAB	1X1	
88	177510	HPC	1ROW900	
89	177725	RCC SLAB	1X1.5	
90	177975	RCC SLAB	1X1	
91	178220	FCW	_	
92	178890	RCC SLAB	1X1.5	
93	179050	FCW	_	
94	179250	RCC SLAB	1X1.5	

S. No.	Chainage(km)	Type of Culvert	Span /Opening with span length (m)	Remarks
95	179350	HPC	1ROW900	
96	179635	HPC	1ROW900	
97	179695	RCC SLAB	1X1.5	
98	180190	FCW	_	
99	180695	RCC SLAB	1X1.5	
100	180820	HPC	1ROW900	
101	181070	HPC	1ROW900	
102	181185	HPC	1ROW900	
103	181340	HPC	1ROW900	
104	182170	HPC	1ROW900	

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			
	KM			NH	SH	MDR	Others
1	182+169	Y	-	Y	-	-	-

(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	Type of Road (BT, CC, Gr.)	Type of Junctions (T,Y,+)	Side	Type of Road (SH/ MDR/ PMGSY/ VR)

S. No.	Existing Chainage	Type of Road (BT, CC, Gr.)	Type of Junctions (T,Y,+)	Side	Type of Road (SH/ MDR/ PMGSY/ VR)
1	161+150	ER	T	RHS	To P. Leikul Village
2	161+250	ER	X	BS	To P. Leikul Village
3	161+325	ER	X	BS	To P. Leikul Village
4	161+400	ER	Y	RHS	To P. Leikul Village
5	161+500	ER	Y	LHS	To P. Leikul Village
6	161+740	ER	Y	RHS	To P. Leikul Village
7	163+305	BT	Y	LHS	To Gamvom Village
8	164+880	ER	Y	LHS	To Impoi(H) Village
9	164+900	ER	Y	RHS	To Impoi(CH) Village
10	165+010	ER	Y	RHS	To Impoi(CH) Village
11	166+080	ER	X	BS	To Asalu Village
12	166+230	ER	Y	RHS	To Asalu Village
13	166+460	ER	Y	LHS	To Asalu Village
14	166+640	ER	Y	RHS	To Asalu Village
15	167+100	ER	Y	LHS	To Asalu Village
16	167+200	ER	Y	RHS	To Hekaukang Village
17	167+230	ER	Y	LHS	To Hekaukang Village
18	167+540	ER	Y	LHS	To Hekaukang Village
19	168+340	ER	Y	LHS	To Nakhojau Village
20	168+480	ER	Y	LHS	To Nakhojau Village
21	169+750	ER	Y	RHS	To Pangmol Village
22	171+175	ER	X	BS	To N. Lonkai Village
23	171+215	ER	Y	LHS	To N. Lonkai Village
24	171+345	ER	Y	RHS	To N. Lonkai Village
25	171+500	ER	Y	LHS	To N. Lonkai Village
26	171+775	ER	Y	LHS	To P. Lonkai Village
27	171+880	BT	Y	LHS	To P. Lonkai Village

S. No.	Existing Chainage	Type of Road (BT, CC, Gr.)	Type of Junctions (T,Y,+)	Side	Type of Road (SH/ MDR/ PMGSY/ VR)
28	172+080	BT	Y	RHS	To P. Lonkai Village
29	172+295	ER	Y	RHS	To Nirianam Village
30	172+740	ER	Y	RHS	To Nirianam Village
31	172+825	ER	Y	RHS	To Chudining Village
32	173+135	ER	Y	RHS	To Chudining Village
33	173+200	ER	Y	RHS	To Chudining Village
34	173+540	ER	X	BS	To NchureloaVillage
35	175+010	ER	Y	RHS	To Assam Rifles Camp
36	175+600	BT	Y	RHS	To NH-54(Old NH)
37	175+750	ER	T	RHS	To Mahur Town
38	175+815	ER	Y	LHS	To Mahur Town
39	175+875	ER	Y	RHS	To Mahur Town
40	175+910	ER	Y	LHS	To Mahur Town
41	176+010	ER	Y	RHS	To Mahur Town
42	176+245	ER	Y	LHS	To Mahur Town
43	167+515	ER	Y	LHS	To Daodung Village
44	176+675	ER	Y	RHS	To Daodung Village
45	176+800	ER	Y	LHS	To Daodung Village
46	176+845	ER	Y	RHS	To Daodung Village
47	177+595	ER	Y	LHS	To Daodung Village
48	177+800	ER	Y	RHS	To Daodung Village
49	178+325	ER	Y	RHS	To Daodung Village
50	178+735	ER	Y	LHS	To Daodung 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)		Nos. of Crossings		Remarks
			Maintained by PGCIL Department		Maintained by PGCIL Department		
	From	To	400KV	132KV	400KV	132KV	
NIL							

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

S.No	Chainage		Length of Line(in m)				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	160875	182169	200	12000	3900			28	24		4/3	25/63KVA

9 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
			Water Supply Line		Sewage Line		Water Supply Line		Sewage Line		
	From	To	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	With Pumping	With Gravity Flow	
1	160875	182169	-	14.525	-	-	-	1200	-	-	-

(b) Bore well/Hand Pump within RoW

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

(c) RCC INTAKE WIER- 1 NO.

d) **Any Other Lines: NIL**

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)	156.489	156.689	0.200	40.000	Within180 days after Appointed Date
	156.689	157.389	0.700	30.000	
	157.389	157.689	0.300	60.000	
	157.689	157.989	0.300	30.000	
	157.989	158.189	0.200	45.000	
	158.189	158.489	0.300	30.000	
	158.489	158.689	0.200	75.000	
	158.689	159.089	0.400	45.000	
	159.089	159.689	0.600	75.000	
	159.689	160.289	0.600	55.000	
	160.289	160.489	0.200	30.000	
	160.489	160.789	0.300	65.000	
	160.789	161.339	0.550	60.000	
	161.339	162.089	0.750	30.000	
	162.089	162.289	0.200	40.000	
	162.289	162.489	0.200	30.000	
	162.489	162.789	0.300	45.000	
	162.789	163.089	0.300	30.000	
	163.089	163.389	0.300	35.000	
	163.389	163.689	0.300	45.000	
	163.689	163.889	0.200	35.000	
	163.889	164.889	1.000	60.000	
	164.889	165.289	0.400	75.000	
	165.289	165.689	0.400	60.000	
	165.689	167.089	1.400	45.000	
Full Right of Way (full width)	167.089	167.189	0.100	55.000	Within180 days after Appointed Date
	167.189	167.789	0.600	115.000	
	167.789	167.889	0.100	65.000	
	167.889	168.089	0.200	45.000	

Description	Design Chainage (km)		Length (km)	Width (m)	Date of Providing ROW
	From	To			
	168.089	169.600	1.511	40.000	
	169.600	170.600	1.000	30.000	
	170.600	171.449	0.849	20.000	
	171.449	172.749	1.300	30.000	
	172.749	172.949	0.200	45.000	
	172.949	174.734	1.785	30.000	
	174.734	175.434	0.700	45.000	
	175.434	176.581	1.147	30.000	

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	156+489	2786669.474	521924.636
2	156+500	2786668.636	521913.93
3	156+525	2786666.686	521889.007
4	156+550	2786664.735	521864.083
5	156+575	2786661.797	521839.275
6	156+600	2786652.695	521816.127
7	156+625	2786637.77	521796.098
8	156+650	2786621.931	521776.756
9	156+675	2786606.163	521757.357
10	156+700	2786593.288	521736.027
11	156+725	2786590.087	521711.492
12	156+750	2786597.219	521687.628
13	156+775	2786607.84	521664.997
14	156+800	2786618.566	521642.415
15	156+825	2786629.715	521620.046
16	156+850	2786643.935	521599.507
17	156+875	2786658.945	521579.515
18	156+900	2786671.297	521557.868
19	156+925	2786674.631	521533.283
20	156+950	2786671.041	521508.56
21	156+975	2786665.645	521484.176
22	157+000	2786650.335	521465.176
23	157+025	2786626.059	521463.063
24	157+050	2786603.157	521472.992
25	157+075	2786580.706	521483.988
26	157+100	2786557.83	521494.024
27	157+125	2786533.25	521497.901
28	157+150	2786508.306	521496.353
29	157+175	2786483.395	521494.252
30	157+200	2786458.51	521491.883
31	157+225	2786434.539	521485.152
32	157+250	2786414.285	521470.718
33	157+275	2786398.261	521451.552
34	157+300	2786382.979	521431.766
35	157+325	2786367.697	521411.981
36	157+350	2786352.411	521392.199
37	157+375	2786335.68	521373.676
38	157+400	2786315.423	521359.074
39	157+425	2786294.361	521345.606
40	157+450	2786273.298	521332.139
41	157+475	2786252.24	521318.665
42	157+500	2786232.311	521303.634
43	157+525	2786216.808	521284.125

S.N.	CHAINAGE	NORTHING	EASTING
44	157+550	2786207.248	521261.111
45	157+575	2786204.366	521236.359
46	157+600	2786207.303	521211.555
47	157+625	2786211.447	521186.901
48	157+650	2786215.591	521162.247
49	157+675	2786219.707	521137.588
50	157+700	2786221.258	521112.695
51	157+725	2786214.256	521088.883
52	157+750	2786199.096	521069.101
53	157+775	2786181.425	521051.418
54	157+800	2786163.694	521033.793
55	157+825	2786145.964	521016.168
56	157+850	2786128.234	520998.542
57	157+875	2786110.504	520980.917
58	157+900	2786092.774	520963.292
59	157+925	2786075.044	520945.667
60	157+950	2786057.314	520928.042
61	157+975	2786038.54	520911.584
62	158+000	2786016.473	520899.92
63	158+025	2785993.591	520889.851
64	158+050	2785970.707	520879.784
65	158+075	2785948.218	520868.902
66	158+100	2785929.219	520852.85
67	158+125	2785917.004	520831.189
68	158+150	2785911.537	520806.831
69	158+175	2785907.717	520782.124
70	158+200	2785903.898	520757.418
71	158+225	2785900.08	520732.711
72	158+250	2785895.711	520708.104
73	158+275	2785885.982	520685.227
74	158+300	2785868.56	520667.438
75	158+325	2785848.359	520652.713
76	158+350	2785828.04	520638.147
77	158+375	2785807.697	520623.618
78	158+400	2785784.292	520615.597
79	158+425	2785759.596	520618.685
80	158+450	2785734.926	520622.567
81	158+475	2785710.414	520618.871
82	158+500	2785690.525	520604.151
83	158+525	2785677.918	520582.653
84	158+550	2785668.114	520559.655
85	158+575	2785658.368	520536.633
86	158+600	2785649.762	520513.185

S.N.	CHAINAGE	NORTHING	EASTING
87	158+625	2785646.367	520488.463
88	158+650	2785645.224	520463.49
89	158+675	2785643.618	520438.548
90	158+700	2785636.723	520414.657
91	158+725	2785621.173	520395.282
92	158+750	2785601.055	520380.467
93	158+775	2785580.489	520366.255
94	158+800	2785562.292	520349.241
95	158+825	2785550.387	520327.337
96	158+850	2785541.172	520304.098
97	158+875	2785532.012	520280.837
98	158+900	2785522.84	520257.58
99	158+925	2785511.801	520235.197
100	158+950	2785495.224	520216.577
101	158+975	2785476.321	520200.217
102	159+000	2785457.353	520183.932
103	159+025	2785438.385	520167.647
104	159+050	2785419.416	520151.362
105	159+075	2785400.448	520135.076
106	159+100	2785381.492	520118.777
107	159+125	2785365.134	520100.031
108	159+150	2785357.328	520076.471
109	159+175	2785358.441	520051.558
110	159+200	2785361.466	520026.742
111	159+225	2785364.491	520001.925
112	159+250	2785367.932	519977.184
113	159+275	2785383.685	519958.704
114	159+300	2785406.888	519949.973
115	159+325	2785412.369	519927.22
116	159+350	2785393.298	519912.155
117	159+375	2785377.247	519894.622
118	159+400	2785385.735	519871.802
119	159+425	2785397.029	519849.618
120	159+450	2785397.498	519824.882
121	159+475	2785386.351	519802.721
122	159+500	2785372.07	519782.201
123	159+525	2785353.951	519765.343
124	159+550	2785329.993	519759.04
125	159+575	2785305.879	519753.653
126	159+600	2785297.81	519731.673
127	159+625	2785310.203	519710.098
128	159+650	2785324.217	519689.394
129	159+675	2785338.23	519668.691
130	159+700	2785352.244	519647.988

S.N.	CHAINAGE	NORTHING	EASTING
131	159+725	2785366.257	519627.285
132	159+750	2785380.173	519606.517
133	159+775	2785390.946	519584.052
134	159+800	2785393.989	519559.314
135	159+825	2785393.825	519534.315
136	159+850	2785393.817	519509.317
137	159+875	2785398.121	519484.798
138	159+900	2785410.085	519462.92
139	159+925	2785424.445	519442.456
140	159+950	2785438.839	519422.015
141	159+975	2785453.233	519401.575
142	160+000	2785467.627	519381.134
143	160+025	2785482.021	519360.694
144	160+050	2785496.405	519340.246
145	160+075	2785508.833	519318.616
146	160+100	2785512.829	519294.155
147	160+125	2785508.628	519269.547
148	160+150	2785502.78	519245.241
149	160+175	2785496.982	519220.923
150	160+200	2785494.197	519196.153
151	160+225	2785501.19	519172.417
152	160+250	2785518.674	519154.906
153	160+275	2785541.726	519145.416
154	160+300	2785565.81	519138.712
155	160+325	2785589.577	519131.021
156	160+350	2785610.538	519117.643
157	160+375	2785625.233	519097.597
158	160+400	2785631.61	519073.574
159	160+425	2785628.79	519048.879
160	160+450	2785617.208	519026.878
161	160+475	2785600.223	519008.564
162	160+500	2785583.132	518990.347
163	160+525	2785571.386	518968.423
164	160+550	2785565.933	518944.05
165	160+575	2785561.692	518919.413
166	160+600	2785555.763	518895.155
167	160+625	2785547.71	518871.487
168	160+650	2785539.633	518847.828
169	160+675	2785531.582	518824.16
170	160+700	2785525.984	518799.853
171	160+725	2785527.775	518775.001
172	160+750	2785533.126	518750.581
173	160+775	2785538.423	518726.151
174	160+800	2785540.259	518701.265

S.N.	CHAINAGE	NORTHING	EASTING
175	160+825	2785539.598	518676.274
176	160+850	2785538.909	518651.284
177	160+875	2785538.219	518626.293
178	160+900	2785537.529	518601.303
179	160+925	2785536.84	518576.312
180	160+950	2785535.868	518551.334
181	160+975	2785531.31	518526.786
182	161+000	2785525.215	518502.54
183	161+025	2785521.494	518477.873
184	161+050	2785525.648	518453.333
185	161+075	2785534.197	518429.844
186	161+100	2785542.973	518406.435
187	161+125	2785540.547	518382.274
188	161+150	2785526.121	518361.862
189	161+175	2785511.768	518341.396
190	161+200	2785500.9	518318.953
191	161+225	2785495.909	518294.523
192	161+250	2785497.118	518269.617
193	161+275	2785504.451	518245.785
194	161+300	2785516.567	518223.934
195	161+325	2785529.424	518202.494
196	161+350	2785542.281	518181.053
197	161+375	2785555.138	518159.613
198	161+400	2785567.993	518138.171
199	161+425	2785579.43	518115.976
200	161+450	2785585.108	518091.712
201	161+475	2785583.915	518066.821
202	161+500	2785575.942	518043.211
203	161+525	2785561.801	518022.692
204	161+550	2785542.575	518006.838
205	161+575	2785519.738	517996.864
206	161+600	2785495.044	517993.468
207	161+625	2785470.055	517994.116
208	161+650	2785445.072	517995.032
209	161+675	2785420.089	517995.949
210	161+700	2785395.105	517996.865
211	161+725	2785370.122	517997.781
212	161+750	2785345.138	517998.666
213	161+775	2785320.236	517997.102
214	161+800	2785296.617	517989.156
215	161+825	2785275.103	517976.446
216	161+850	2785253.959	517963.107
217	161+875	2785232.814	517949.769
218	161+900	2785211.67	517936.43

S.N.	CHAINAGE	NORTHING	EASTING
219	161+925	2785190.525	517923.092
220	161+950	2785169.381	517909.753
221	161+975	2785147.854	517897.066
222	162+000	2785124.212	517889.188
223	162+025	2785099.316	517888.092
224	162+050	2785074.912	517893.325
225	162+075	2785050.975	517900.537
226	162+100	2785026.893	517907.218
227	162+125	2785002.044	517908.477
228	162+150	2784978.281	517901.122
229	162+175	2784956.81	517888.34
230	162+200	2784935.711	517874.93
231	162+225	2784914.658	517861.448
232	162+250	2784895.45	517845.54
233	162+275	2784881.162	517825.123
234	162+300	2784871.326	517802.151
235	162+325	2784862.066	517778.929
236	162+350	2784848.26	517758.377
237	162+375	2784825.537	517748.964
238	162+400	2784801.181	517753.539
239	162+425	2784777.941	517762.752
240	162+450	2784754.251	517770.652
241	162+475	2784729.414	517772.956
242	162+500	2784704.419	517772.448
243	162+525	2784679.426	517771.879
244	162+550	2784655.88	517766.075
245	162+575	2784651.682	517743.051
246	162+600	2784657.851	517719.386
247	162+625	2784645.054	517698.749
248	162+650	2784621.174	517694.344
249	162+675	2784600.945	517708.303
250	162+700	2784583.286	517726
251	162+725	2784563.99	517741.571
252	162+750	2784541.436	517735.32
253	162+775	2784538.633	517711.481
254	162+800	2784545.351	517687.401
255	162+825	2784546.372	517662.726
256	162+850	2784530.748	517644.137
257	162+875	2784506.327	517639.965
258	162+900	2784481.328	517640.203
259	162+925	2784456.33	517640.437
260	162+950	2784431.835	517636.497
261	162+975	2784413.459	517620.149
262	163+000	2784405.187	517596.653

S.N.	CHAINAGE	NORTHING	EASTING
263	163+025	2784397.795	517572.818
264	163+050	2784380.101	517556.082
265	163+075	2784355.827	517557.589
266	163+100	2784335.601	517572.16
267	163+125	2784316.432	517588.207
268	163+150	2784297.217	517604.2
269	163+175	2784276.144	517617.502
270	163+200	2784251.704	517621.36
271	163+225	2784228.122	517613.601
272	163+250	2784207.122	517600.059
273	163+275	2784186.504	517585.921
274	163+300	2784165.886	517571.783
275	163+325	2784145.268	517557.644
276	163+350	2784124.65	517543.506
277	163+375	2784104.032	517529.367
278	163+400	2784086.669	517511.987
279	163+425	2784091.399	517488.404
280	163+450	2784104.847	517467.329
281	163+475	2784118.142	517446.159
282	163+500	2784128.417	517423.414
283	163+525	2784133.968	517399.081
284	163+550	2784134.575	517374.13
285	163+575	2784130.274	517349.54
286	163+600	2784123.766	517325.402
287	163+625	2784117.24	517301.269
288	163+650	2784110.713	517277.136
289	163+675	2784104.187	517253.003
290	163+700	2784097.66	517228.87
291	163+725	2784090.546	517204.914
292	163+750	2784079.535	517182.516
293	163+775	2784065.182	517162.052
294	163+800	2784050.517	517141.805
295	163+825	2784035.852	517121.558
296	163+850	2784020.222	517102.077
297	163+875	2784000.212	517087.282
298	163+900	2783976.466	517079.843
299	163+925	2783951.508	517079.067
300	163+950	2783926.52	517079.847
301	163+975	2783901.53	517080.038
302	164+000	2783877.284	517074.557
303	164+025	2783857.188	517059.99
304	164+050	2783843.372	517039.233
305	164+075	2783831.968	517016.986
306	164+100	2783820.603	516994.718

S.N.	CHAINAGE	NORTHING	EASTING
307	164+125	2783809.239	516972.451
308	164+150	2783797.88	516950.18
309	164+175	2783788.34	516927.119
310	164+200	2783786.697	516902.351
311	164+225	2783793.62	516878.389
312	164+250	2783802.99	516855.211
313	164+275	2783812.553	516832.115
314	164+300	2783828.253	516813.181
315	164+325	2783852.485	516810.141
316	164+350	2783876.286	516817.731
317	164+375	2783900.372	516815.619
318	164+400	2783912.021	516794.668
319	164+425	2783905.418	516770.714
320	164+450	2783896.503	516747.358
321	164+475	2783888.887	516723.575
322	164+500	2783888.517	516698.749
323	164+525	2783897.108	516675.355
324	164+550	2783908.77	516653.242
325	164+575	2783920.511	516631.171
326	164+600	2783932.304	516609.127
327	164+625	2783946.496	516588.621
328	164+650	2783966.036	516573.168
329	164+675	2783987.907	516561.062
330	164+700	2784009.893	516549.161
331	164+725	2784031.878	516537.259
332	164+750	2784053.863	516525.357
333	164+775	2784074.929	516511.967
334	164+800	2784090.237	516492.495
335	164+825	2784094.485	516468.122
336	164+850	2784086.901	516444.507
337	164+875	2784072.903	516423.816
338	164+900	2784058.08	516403.684
339	164+925	2784043.258	516383.552
340	164+950	2784028.435	516363.42
341	164+975	2784014.233	516342.871
342	165+000	2784010.178	516318.787
343	165+025	2784023.358	516297.935
344	165+050	2784041.478	516280.712
345	165+075	2784054.598	516259.827
346	165+100	2784049.981	516235.987
347	165+125	2784029.543	516222.45
348	165+150	2784005.18	516216.874
349	165+175	2783983.767	516205.421
350	165+200	2783982.565	516181.237

S.N.	CHAINAGE	NORTHING	EASTING
351	165+225	2783988.914	516157.057
352	165+250	2783998.016	516133.908
353	165+275	2784015.936	516116.63
354	165+300	2784035.631	516101.233
355	165+325	2784055.552	516086.133
356	165+350	2784076.567	516072.605
357	165+375	2784098.632	516060.867
358	165+400	2784121.104	516049.913
359	165+425	2784143.577	516038.959
360	165+450	2784166.046	516027.999
361	165+475	2784187.696	516015.547
362	165+500	2784207.027	515999.739
363	165+525	2784223.469	515980.945
364	165+550	2784237.754	515960.429
365	165+575	2784251.922	515939.831
366	165+600	2784266.09	515919.234
367	165+625	2784280.258	515898.636
368	165+650	2784294.609	515878.168
369	165+675	2784310.839	515859.173
370	165+700	2784329.31	515842.351
371	165+725	2784349.734	515827.962
372	165+750	2784371.773	515816.188
373	165+775	2784394.425	515805.612
374	165+800	2784417.082	515795.044
375	165+825	2784439.717	515784.432
376	165+850	2784460.854	515771.219
377	165+875	2784475.138	515751.012
378	165+900	2784478.008	515726.438
379	165+925	2784468.843	515703.434
380	165+950	2784452.193	515684.846
381	165+975	2784434.089	515667.606
382	166+000	2784415.981	515650.368
383	166+025	2784397.874	515633.131
384	166+050	2784379.767	515615.894
385	166+075	2784361.659	515598.656
386	166+100	2784343.552	515581.419
387	166+125	2784325.445	515564.182
388	166+150	2784307.337	515546.944
389	166+175	2784289.23	515529.707
390	166+200	2784271.123	515512.47
391	166+225	2784253.161	515495.084
392	166+250	2784238.554	515474.933
393	166+275	2784233.891	515450.631
394	166+300	2784239.066	515426.249

S.N.	CHAINAGE	NORTHING	EASTING
395	166+325	2784247.203	515402.61
396	166+350	2784255.39	515378.989
397	166+375	2784263.578	515355.367
398	166+400	2784271.549	515331.675
399	166+425	2784275.367	515307.067
400	166+450	2784271.708	515282.389
401	166+475	2784265.744	515258.111
402	166+500	2784262.922	515233.533
403	166+525	2784280.374	515217.22
404	166+550	2784303.927	515208.929
405	166+575	2784315.725	515188.531
406	166+600	2784310.349	515164.16
407	166+625	2784304.049	515139.967
408	166+650	2784297.928	515115.733
409	166+675	2784299.924	515091.073
410	166+700	2784313.499	515070.389
411	166+725	2784333.95	515056.151
412	166+750	2784345.799	515034.598
413	166+775	2784342.797	515010.187
414	166+800	2784330.083	514988.67
415	166+825	2784320.006	514965.844
416	166+850	2784312.5	514941.997
417	166+875	2784305.044	514918.135
418	166+900	2784297.587	514894.273
419	166+925	2784290.131	514870.411
420	166+950	2784282.748	514846.526
421	166+975	2784278.626	514821.952
422	167+000	2784284.567	514797.933
423	167+025	2784301.286	514779.696
424	167+050	2784324.635	514771.35
425	167+075	2784349.582	514770.106
426	167+100	2784374.582	514769.963
427	167+125	2784399.582	514769.82
428	167+150	2784424.568	514770.424
429	167+175	2784449.419	514773.081
430	167+200	2784473.978	514777.731
431	167+225	2784498.43	514782.934
432	167+250	2784522.823	514779.792
433	167+275	2784540.768	514762.972
434	167+300	2784545.478	514738.832
435	167+325	2784537.796	514715.11
436	167+350	2784530.587	514691.219
437	167+375	2784527.697	514666.391
438	167+400	2784522.274	514642.089

S.N.	CHAINAGE	NORTHING	EASTING
439	167+425	2784510.4	514620.118
440	167+450	2784497.816	514598.516
441	167+475	2784485.231	514576.915
442	167+500	2784472.646	514555.313
443	167+525	2784460.061	514533.712
444	167+550	2784448.571	514511.577
445	167+575	2784447.168	514486.876
446	167+600	2784454.178	514462.886
447	167+625	2784459.873	514438.571
448	167+650	2784461.485	514413.652
449	167+675	2784458.941	514388.811
450	167+700	2784452.366	514364.717
451	167+725	2784444.404	514341.019
452	167+750	2784436.442	514317.321
453	167+775	2784429.283	514293.382
454	167+800	2784427.869	514268.534
455	167+825	2784433.912	514244.333
456	167+850	2784442.489	514220.851
457	167+875	2784450.817	514197.281
458	167+900	2784457.365	514173.162
459	167+925	2784462.261	514148.647
460	167+950	2784466.998	514124.1
461	167+975	2784471.815	514099.569
462	168+000	2784479.931	514075.989
463	168+025	2784493.607	514055.139
464	168+050	2784510.658	514036.86
465	168+075	2784527.888	514018.746
466	168+100	2784545.118	514000.631
467	168+125	2784562.347	513982.517
468	168+150	2784579.577	513964.402
469	168+175	2784596.807	513946.288
470	168+200	2784614.032	513928.169
471	168+225	2784630.358	513909.245
472	168+250	2784645.052	513889.028
473	168+275	2784658.012	513867.658
474	168+300	2784669.148	513845.284
475	168+325	2784678.384	513822.06
476	168+350	2784686.612	513798.453
477	168+375	2784694.84	513774.846
478	168+400	2784703.068	513751.238
479	168+425	2784711.296	513727.631
480	168+450	2784719.524	513704.024
481	168+475	2784726.626	513680.073
482	168+500	2784729.865	513655.313

S.N.	CHAINAGE	NORTHING	EASTING
483	168+525	2784728.952	513630.358
484	168+550	2784723.985	513605.882
485	168+575	2784717.336	513581.782
486	168+600	2784710.679	513557.685
487	168+625	2784704.021	513533.587
488	168+650	2784697.364	513509.49
489	168+675	2784690.707	513485.393
490	168+700	2784684.351	513461.216
491	168+725	2784679.099	513436.776
492	168+750	2784675.005	513412.116
493	168+775	2784672.078	513387.29
494	168+800	2784670.326	513362.354
495	168+825	2784669.751	513337.363
496	168+850	2784670.355	513312.373
497	168+875	2784672.137	513287.439
498	168+900	2784675.092	513262.616
499	168+925	2784679.215	513237.961
500	168+950	2784684.496	513213.527
501	168+975	2784690.923	513189.37
502	169+000	2784698.395	513165.514
503	169+025	2784706.074	513141.723
504	169+050	2784713.796	513117.945
505	169+075	2784721.995	513094.328
506	169+100	2784730.781	513070.924
507	169+125	2784740.117	513047.733
508	169+150	2784749.581	513024.593
509	169+175	2784759.044	513001.454
510	169+200	2784768.459	512978.295
511	169+225	2784776.51	512954.634
512	169+250	2784782.562	512930.385
513	169+275	2784786.7	512905.734
514	169+300	2784790.401	512881.01
515	169+325	2784794.101	512856.285
516	169+350	2784796.344	512831.416
517	169+375	2784792.934	512806.714
518	169+400	2784785.575	512782.825
519	169+425	2784777.964	512759.011
520	169+450	2784770.352	512735.198
521	169+475	2784762.741	512711.385
522	169+500	2784755.129	512687.572
523	169+525	2784747.518	512663.759
524	169+550	2784736.591	512641.449
525	169+575	2784717.674	512625.381
526	169+600	2784693.985	512617.717

S.N.	CHAINAGE	NORTHING	EASTING
527	169+625	2784669.848	512611.27
528	169+650	2784647.631	512599.949
529	169+675	2784628.905	512583.484
530	169+700	2784613.993	512563.439
531	169+725	2784599.8	512542.859
532	169+750	2784585.606	512522.279
533	169+775	2784571.413	512501.698
534	169+800	2784557.22	512481.118
535	169+825	2784543.027	512460.537
536	169+850	2784529.348	512439.62
537	169+875	2784518.124	512417.3
538	169+900	2784509.77	512393.754
539	169+925	2784503.912	512369.454
540	169+950	2784498.409	512345.067
541	169+975	2784492.906	512320.68
542	170+000	2784487.403	512296.293
543	170+025	2784480.966	512272.148
544	170+050	2784471.693	512248.949
545	170+075	2784460.291	512226.702
546	170+100	2784448.714	512204.544
547	170+125	2784437.136	512182.386
548	170+150	2784425.559	512160.228
549	170+175	2784413.982	512138.071
550	170+200	2784402.405	512115.913
551	170+225	2784390.83	512093.754
552	170+250	2784380.894	512070.853
553	170+275	2784376.543	512046.301
554	170+300	2784378.402	512021.435
555	170+325	2784385.792	511997.583
556	170+350	2784394.507	511974.151
557	170+375	2784403.222	511950.719
558	170+400	2784411.938	511927.287
559	170+425	2784420.653	511903.856
560	170+450	2784429.368	511880.424
561	170+475	2784438.059	511856.983
562	170+500	2784446.063	511833.301
563	170+525	2784453.257	511809.359
564	170+550	2784460.372	511785.393
565	170+575	2784467.488	511761.427
566	170+600	2784474.603	511737.461
567	170+625	2784481.718	511713.495
568	170+650	2784488.833	511689.529
569	170+675	2784495.949	511665.563
570	170+700	2784503.917	511641.884

S.N.	CHAINAGE	NORTHING	EASTING
571	170+725	2784516.624	511620.43
572	170+750	2784534.244	511602.787
573	170+775	2784555.661	511590.008
574	170+800	2784578.651	511580.189
575	170+825	2784600.319	511567.802
576	170+850	2784619.099	511551.362
577	170+875	2784634.238	511531.52
578	170+900	2784645.48	511509.214
579	170+925	2784655.703	511486.4
580	170+950	2784665.926	511463.586
581	170+975	2784676.149	511440.771
582	171+000	2784686.066	511417.827
583	171+025	2784692.917	511393.814
584	171+050	2784696.879	511369.132
585	171+075	2784700.64	511344.416
586	171+100	2784704.401	511319.701
587	171+125	2784708.161	511294.985
588	171+150	2784711.922	511270.269
589	171+175	2784715.683	511245.554
590	171+200	2784719.444	511220.838
591	171+225	2784723.08	511196.105
592	171+250	2784723.075	511171.193
593	171+275	2784713.951	511148.111
594	171+300	2784696.336	511130.6
595	171+325	2784674.538	511118.399
596	171+350	2784652.237	511107.1
597	171+375	2784629.936	511095.802
598	171+400	2784607.635	511084.503
599	171+425	2784585.334	511073.204
600	171+450	2784563.427	511061.253
601	171+475	2784552.652	511039.492
602	171+500	2784561.514	511016.884
603	171+525	2784583.557	511005.531
604	171+550	2784606.596	510995.843
605	171+575	2784626.801	510981.376
606	171+600	2784638.391	510959.51
607	171+625	2784640.873	510934.7
608	171+650	2784640.594	510909.702
609	171+675	2784640.529	510884.705
610	171+700	2784645.016	510860.232
611	171+725	2784659.502	510840.176
612	171+750	2784681.442	510828.478
613	171+775	2784705.434	510821.466
614	171+800	2784728.813	510812.837

S.N.	CHAINAGE	NORTHING	EASTING
615	171+825	2784744.509	510794.046
616	171+850	2784744.099	510769.577
617	171+875	2784727.76	510751.358
618	171+900	2784703.665	510745.286
619	171+925	2784678.913	510741.88
620	171+950	2784656.08	510732.157
621	171+975	2784638.977	510714.067
622	172+000	2784625.02	510693.327
623	172+025	2784611.205	510672.491
624	172+050	2784597.391	510651.655
625	172+075	2784584.177	510630.446
626	172+100	2784576.782	510606.748
627	172+125	2784580.329	510582.168
628	172+150	2784589.73	510559.013
629	172+175	2784599.693	510536.084
630	172+200	2784609.656	510513.155
631	172+225	2784619.619	510490.226
632	172+250	2784630.265	510467.621
633	172+275	2784646.264	510448.644
634	172+300	2784669.112	510439.154
635	172+325	2784693.713	510441.779
636	172+350	2784715.101	510454.521
637	172+375	2784734.218	510470.63
638	172+400	2784753.229	510486.864
639	172+425	2784772.241	510503.099
640	172+450	2784791.411	510519.142
641	172+475	2784813.089	510531.353
642	172+500	2784837.771	510533.056
643	172+525	2784860.247	510522.717
644	172+550	2784875.07	510502.894
645	172+575	2784881.675	510478.841
646	172+600	2784885.904	510454.202
647	172+625	2784890.115	510429.559
648	172+650	2784894.325	510404.916
649	172+675	2784898.536	510380.273
650	172+700	2784901.476	510355.474
651	172+725	2784896.807	510331.13
652	172+750	2784882.536	510310.732
653	172+775	2784865.032	510292.884
654	172+800	2784847.405	510275.156
655	172+825	2784829.781	510257.424
656	172+850	2784813.627	510238.403
657	172+875	2784804.986	510215.185
658	172+900	2784805.37	510190.247

S.N.	CHAINAGE	NORTHING	EASTING
659	172+925	2784808.259	510165.414
660	172+950	2784813.059	510140.92
661	172+975	2784822.424	510117.755
662	173+000	2784832.517	510094.883
663	173+025	2784842.61	510072.011
664	173+050	2784852.16	510048.917
665	173+075	2784855.923	510024.367
666	173+100	2784848.191	510000.866
667	173+125	2784830.139	509983.949
668	173+150	2784806.185	509977.757
669	173+175	2784782.196	509983.808
670	173+200	2784763.877	510000.489
671	173+225	2784751.738	510022.307
672	173+250	2784740.921	510044.845
673	173+275	2784727.98	510066.168
674	173+300	2784708.431	510081.425
675	173+325	2784685.03	510090.146
676	173+350	2784661.184	510097.655
677	173+375	2784637.633	510105.995
678	173+400	2784617.119	510120.012
679	173+425	2784601.968	510139.844
680	173+450	2784588.402	510160.843
681	173+475	2784574.841	510181.846
682	173+500	2784559.44	510201.168
683	173+525	2784536.229	510198.171
684	173+550	2784530.284	510174.94
685	173+575	2784533.497	510150.191
686	173+600	2784542.456	510126.921
687	173+625	2784556.801	510106.513
688	173+650	2784573.428	510087.843
689	173+675	2784590.096	510069.211
690	173+700	2784606.764	510050.578
691	173+725	2784623.415	510031.93
692	173+750	2784638.055	510011.737
693	173+775	2784646.261	509988.229
694	173+800	2784646.842	509963.338
695	173+825	2784639.742	509939.473
696	173+850	2784625.649	509918.947
697	173+875	2784606.217	509903.309
698	173+900	2784585.252	509889.692
699	173+925	2784564.273	509876.094
700	173+950	2784543.295	509862.496
701	173+975	2784522.316	509848.899
702	174+000	2784501.338	509835.301

S.N.	CHAINAGE	NORTHING	EASTING
703	174+025	2784480.359	509821.703
704	174+050	2784459.381	509808.105
705	174+075	2784438.402	509794.507
706	174+100	2784417.424	509780.909
707	174+125	2784396.966	509766.57
708	174+150	2784379.986	509748.309
709	174+175	2784367.914	509726.476
710	174+200	2784358.236	509703.426
711	174+225	2784348.595	509680.36
712	174+250	2784338.954	509657.293
713	174+275	2784329.312	509634.227
714	174+300	2784319.671	509611.161
715	174+325	2784310.03	509588.095
716	174+350	2784299.226	509565.58
717	174+375	2784282.234	509547.534
718	174+400	2784259.169	509538.197
719	174+425	2784234.689	509533.133
720	174+450	2784210.391	509527.333
721	174+475	2784188.843	509515.05
722	174+500	2784175.502	509494.215
723	174+525	2784173.784	509469.534
724	174+550	2784183.707	509446.795
725	174+575	2784199.542	509427.472
726	174+600	2784216.074	509408.718
727	174+625	2784232.606	509389.964
728	174+650	2784248.978	509371.073
729	174+675	2784262.111	509349.901
730	174+700	2784267.871	509325.692
731	174+725	2784265.393	509300.932
732	174+750	2784255.395	509278.094
733	174+775	2784242.498	509256.678
734	174+800	2784229.518	509235.312
735	174+825	2784217.829	509213.248
736	174+850	2784213.726	509188.812
737	174+875	2784221.618	509165.363
738	174+900	2784239.704	509148.443
739	174+925	2784262.584	509138.467
740	174+950	2784285.85	509129.361
741	174+975	2784305.718	509114.496
742	175+000	2784316.486	509092.215
743	175+025	2784317.875	509067.325
744	175+050	2784316.328	509042.373
745	175+075	2784314.735	509017.424
746	175+100	2784313.142	508992.474

S.N.	CHAINAGE	NORTHING	EASTING
747	175+125	2784311.55	508967.525
748	175+150	2784309.957	508942.576
749	175+175	2784309.175	508917.602
750	175+200	2784312.692	508892.887
751	175+225	2784318.268	508868.516
752	175+250	2784323.856	508844.149
753	175+275	2784329.977	508819.918
754	175+300	2784340.934	508797.564
755	175+325	2784358.435	508779.848
756	175+350	2784378.989	508765.624
757	175+375	2784399.34	508751.125
758	175+400	2784416.881	508733.37
759	175+425	2784430.544	508712.483
760	175+450	2784439.785	508689.299
761	175+475	2784444.25	508664.742
762	175+500	2784445.905	508639.797
763	175+525	2784447.484	508614.847
764	175+550	2784449.113	508589.9
765	175+575	2784453.349	508565.301
766	175+600	2784460.576	508541.37
767	175+625	2784467.917	508517.472
768	175+650	2784475.258	508493.574
769	175+675	2784482.6	508469.676
770	175+700	2784489.931	508445.775
771	175+725	2784495.286	508421.398
772	175+750	2784494.314	508396.497
773	175+775	2784486.552	508372.817
774	175+800	2784473.046	508351.828
775	175+825	2784460.255	508330.527
776	175+850	2784458.562	508305.845
777	175+875	2784468.909	508283.372
778	175+900	2784488.721	508268.519
779	175+925	2784511.198	508257.574
780	175+950	2784533.675	508246.629
781	175+975	2784554.764	508233.476
782	176+000	2784567.574	508212.31
783	176+025	2784568.667	508187.594
784	176+050	2784560.287	508164.069
785	176+075	2784555.922	508139.696
786	176+100	2784563.679	508116.203
787	176+125	2784578.673	508096.204
788	176+150	2784593.787	508076.289
789	176+175	2784606.877	508055.057
790	176+200	2784611.504	508030.706

S.N.	CHAINAGE	NORTHING	EASTING
791	176+225	2784608.085	508005.975
792	176+250	2784603.111	507981.475
793	176+275	2784598.136	507956.975
794	176+300	2784593.161	507932.475
795	176+325	2784587.735	507908.077
796	176+350	2784577.645	507885.315
797	176+375	2784560.993	507866.776
798	176+400	2784541.705	507850.873
799	176+425	2784522.309	507835.1

S.N.	CHAINAGE	NORTHING	EASTING
800	176+450	2784502.914	507819.326
801	176+475	2784483.677	507803.363
802	176+500	2784467.401	507784.504
803	176+525	2784457.969	507761.476
804	176+550	2784456.59	507736.63
805	176+575	2784462.193	507712.304
806	176+575	2784462.193	507712.304
807	176+581	2784464.251	507705.612

Schedule-B

Schedule-B

(SeeClause2.1)

DevelopmentoftheProjectHighway

1. DevelopmentoftheProjectHighway

Development of the Project Highwayshallinclude designandconstructionof the Project Highway as described in this Schedule-B and inSchedule-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 clearlyand 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 theprescribed standardsfor [plain/rolling] terrain to the extent land isavailable.

(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.	-	156489	156900	7+1.5x2+1x1=11 m	**0.411**	2.9
2.	-	157100	158500	7+1.5x2+1x1=11 m	**1.400**	2.9
3.	-	159900	160600	7+1.5x2+1x1=11 m	**0.700**	2.9
4.	-	161400	162300	7+1.5x2+1x1=11 m	**0.900**	2.9
5.	-	162400	162500	7+1.5x2+1x1=11 m	**0.100**	2.9
6.	-	162800	163100	7+1.5x2+1x1=11 m	**0.300**	2.9
7.	-	163300	163850	7+1.5x2+1x1=11 m	**0.550**	2.9
8.	-	163950	164150	7+1.5x2+1x1=11 m	**0.200**	2.9
9.	-	164700	165100	7+1.5x2+1x1=11 m	**0.400**	2.9
10.	-	165400	165600	7+1.5x2+1x1=11 m	**0.200**	2.9
11.	-	166600	166700	7+1.5x2+1x1=11 m	**0.100**	2.9
12.	-	171500	172000	7+1.5x2+1x1=11 m	**0.500**	2.9
13.	-	172200	172500	7+1.5x2+1x1=11 m	**0.300**	2.9

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
14.	-	172800	172900	7+1.5x2+1x1=11 m	**0.100**	2.9
15.	-	173200	173400	7+1.5x2+1x1=11 m	**0.200**	2.9
16.	-	173700	174400	7+1.5x2+1x1=11 m	**0.700**	2.9
17.	-	175400	175900	7+1.5x2+1x1=11 m	**0.500**	2.9
18.	-	176100	176300	7+1.5x2+1x1=11 m	**0.200**	2.9
		Total Length			**7.761km**	

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.	-	156900	157100	7+1.5x2=10 m	0.200	2.11(new)
2.	-	158500	159900	7+1.5x2=10 m	1.400	2.11(new)
3.	-	160600	161400	7+1.5x2=10 m	0.800	2.11(new)
4.	-	164250	164300	7+1.5x2=10 m	0.050	2.11(new)
5.	-	164450	164700	7+1.5x2=10 m	0.250	2.11(new)
6.	-	165100	165400	7+1.5x2=10 m	0.300	2.11(new)
7.	-	165600	166200	7+1.5x2=10 m	0.600	2.11(new)
8.	-	166300	166600	7+1.5x2=10 m	0.300	2.11(new)
9.	-	166700	167000	7+1.5x2=10 m	0.300	2.11(new)
10.	-	167200	168100	7+1.5x2=10 m	0.900	2.11(new)
11.	-	172900	173200	7+1.5x2=10 m	0.300	2.11(new)
12.	-	174500	175100	7+1.5x2=10 m	0.600	2.11(new)
13.	-	175200	175400	7+1.5x2=10 m	0.200	2.11(new)
		Total Length			**6.200km**	

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.	-	162300	162400	7+1.5x2+1x1=11 m	**0.100**	2.8
2.	-	162500	162800	7+1.5x2+1x1=11 m	**0.300**	2.8
3.	-	163100	163300	7+1.5x2+1x1=11 m	**0.200**	2.8

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
4.	-	163850	163950	7+1.5x2+1x1=11 m	**0.100**	2.8
5.	-	164150	164250	7+1.5x2+1x1=11 m	**0.100**	2.8
6.	-	164300	164450	7+1.5x2+1x1=11 m	**0.150**	2.8
7.	-	166200	166300	7+1.5x2+1x1=11 m	**0.100**	2.8
8.	-	167000	167200	7+1.5x2+1x1=11 m	**0.200**	2.8
9.	-	168100	169600	7+1.5x2+1x1=11 m	**1.500**	2.8
10.	-	172000	172200	7+1.5x2+1x1=11 m	**0.200**	2.8
11.	-	170600	171500	7+1.5x2+1x1=11 m	**0.900**	2.8
12.	-	172000	172200	7+1.5x2+1x1=11 m	**0.200**	2.8
13.	-	173400	173700	7+1.5x2+1x1=11 m	**0.300**	2.8
14.	-	174400	174500	7+1.5x2+1x1=11 m	**0.100**	2.8
15.	-	175100	175200	7+1.5x2+1x1=11 m	**0.100**	2.8
16.	-	175900	176100	7+1.5x2+1x1=11 m	**0.200**	2.8
17.	-	176300	176581	7+1.5x2+1x1=11 m	**0.281**	2.8
		Total Length			**5.131km**	

d) **Two-Lane Carriageway with Paved Shoulder in Hilly Terrain with both side Retaining Wall on Valley side:** The Carriageway shall be 7.0 m wide with 1.5 m paved shoulder both side and 1.0m Earthen Shoulder both side shall be provided. The Stretch specified following table.

S.No.	Built-up stretch (Township)	Design Chainage		Width (m)	Length (km)	Typical cross section (Ref. to Manual)
1.	-	169600	170600	7+1.5x2+ 1.0X2=12 m	1.000	Fig 2.12 (new)
		Total Length			**1.000km**	

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

e) 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:

Sl. No.	Stretch		Radius (m)	Speed(km/h)
	From	To		
1.	156958.107	157043.431	30	30
2.	159244.962	159280.775	30	30
3.	159290.927	159339.369	20	20
4.	159335.833	159408.964	20	20
5.	159554.743	159616.424	20	20
6.	161098.704	161128.154	30	30
7.	162317.963	162405.860	40	30
8.	162535.146	162576.138	20	20
9.	162580.802	162666.567	30	30
10.	162706.364	162779.017	20	20
11.	162793.270	162878.955	30	30
12.	162920.520	162998.804	40	30
13.	163005.839	163096.413	30	30
14.	163377.658	163428.425	20	20
15.	164265.079	164340.997	30	30
16.	164342.288	164419.302	25	30
17.	164959.075	165032.641	30	30
18.	165042.235	165137.576	30	30
19.	165149.225	165201.572	20	20
20.	165223.947	165274.963	40	30
21.	166480.285	166530.433	20	20
22.	166537.713	166588.125	20	20
23.	166713.629	166779.545	40	30
24.	167223.968	167309.558	40	30
25.	171443.237	171512.035	30	30
26.	171776.384	171903.245	35	30
27.	173489.982	173542.232	20	20

(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 ofshoulders

[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.	156489	156900	411	2x1.5=3.0m	1x1=1.0m	Fig 2.9
2.	156900	157100	200	2x1.5=3.0m	-	Fig 2.11(new)
3.	157100	158500	1400	2x1.5=3.0m	1x1=1.0m	Fig 2.9
4.	158500	159900	1400	2x1.5=3.0m	-	Fig 2.11(new)
5.	159900	160600	700	2x1.5=3.0m	1x1=1.0m	Fig 2.9
6.	160600	161400	800	2x1.5=3.0m	-	Fig 2.11(new)
7.	161400	162300	900	2x1.5=3.0m	1x1=1.0m	Fig 2.9
8.	162300	162400	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
9.	162400	162500	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
10.	162500	162800	300	2x1.5=3.0m	1x1=1.0m	Fig 2.8
11.	162800	163100	300	2x1.5=3.0m	1x1=1.0m	Fig 2.9
12.	163100	163300	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
13.	163300	163850	550	2x1.5=3.0m	1x1=1.0m	Fig 2.9
14.	163850	163950	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
15.	163950	164150	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
16.	164150	164250	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
17.	164250	164300	50	2x1.5=3.0m	-	Fig 2.11(new)
18.	164300	164450	150	2x1.5=3.0m	1x1=1.0m	Fig 2.8
19.	164450	164700	250	2x1.5=3.0m	-	Fig 2.11(new)
20.	164700	165100	400	2x1.5=3.0m	1x1=1.0m	Fig 2.9
21.	165100	165400	300	2x1.5=3.0m	-	Fig 2.11(new)
22.	165400	165600	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
23.	165600	166200	600	2x1.5=3.0m	-	Fig 2.11(new)
24.	166200	166300	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
25.	166300	166600	300	2x1.5=3.0m	-	Fig 2.11(new)
26.	166600	166700	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
27.	166700	167000	300	2x1.5=3.0m	-	Fig 2.11(new)
28.	167000	167200	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
29.	167200	168100	900	2x1.5=3.0m	-	Fig 2.11(new)
30.	168100	169600	1500	2x1.5=3.0m	1x1=1.0m	Fig 2.8
31.	169600	170600	1000	2x1.5=3.0m	2x1=2.0m	Fig 2.12 (new)

S.No.	Design Chainage		Length (in m)	Paved Shoulder	Earthen Shoulder	Reference to cross section
	From	To				
32.	170600	171500	900	2x1.5=3.0m	1x1=1.0m	Fig 2.8
33.	171500	172000	500	2x1.5=3.0m	1x1=1.0m	Fig 2.9
34.	172000	172200	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
35.	172200	172500	300	2x1.5=3.0m	1x1=1.0m	Fig 2.9
36.	172500	172800	300	2x1.5=3.0m	1x1=1.0m	Fig 2.8
37.	172800	172900	100	2x1.5=3.0m	1x1=1.0m	Fig 2.9
38.	172900	173200	300	2x1.5=3.0m	-	Fig 2.11(new)
39.	173200	173400	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
40.	173400	173700	300	2x1.5=3.0m	1x1=1.0m	Fig 2.8
41.	173700	174400	700	2x1.5=3.0m	1x1=1.0m	Fig 2.9
42.	174400	174500	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
43.	174500	175100	600	-	-	Fig 2.11(new)
44.	175100	175200	100	2x1.5=3.0m	1x1=1.0m	Fig 2.8
45.	175200	175400	200	-	-	Fig 2.11(new)
46.	175400	175900	500	2x1.5=3.0m	1x1=1.0m	Fig 2.9
47.	175900	176100	200	2x1.5=3.0m	1x1=1.0m	Fig 2.8
48.	176100	176300	200	2x1.5=3.0m	1x1=1.0m	Fig 2.9
49.	176300	176581	281	2x1.5=3.0m	1x1=1.0m	Fig 2.8
	Total		**=20092m**			

(vi) Lateral and vertical clearances at underpasses

(a) Lateraland 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) (fromkmtokm)	Span/opening (m)	Remarks
Nil			

(vii) Lateral and verticalclearances 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 separatedstructures

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

[Refer to the provision of relevant Manual and providedetails]

S. No.	Location of structure	Length (m)	Number andlengthofspans (m)	Approach gradient	Remarks, ifany
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)	Crossroadat			Remarks, if any
			Existing Level	Raised Level	Lowered Level	
Nil						

(x) Cattle and pedestrian underpass /overpass

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

S.No.	Location	Typeofcrossing
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 Retaining Wall on Valley side	1.000	TCS-2.12(new)
2	Reconstruction in Two-Lane Carriageway with Paved Shoulder in Hilly Terrain with both side drain on hill side	6.100	TCS-2.11(new)
3	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	5.131	TCS-2.8
4	Reconstruction in Two-Lane Carriageway with Paved Shoulder in Hilly Terrain without retaining wall	7.761	TCS-2.9
	Total	**20.092km**	

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
1.	156489	156900	0.411	Fig 2.9	Open Country
2.	156900	157100	0.200	Fig 2.11(new)	Open Country
3.	157100	158500	1.400	Fig 2.9	Open Country
4.	158500	159900	1.400	Fig 2.11(new)	Open Country
5.	159900	160600	0.700	Fig 2.9	Open Country
6.	160600	161400	0.800	Fig 2.11(new)	Open Country
7.	161400	162300	0.900	Fig 2.9	Open Country
8.	162300	162400	0.100	Fig 2.8	Open Country
9.	162400	162500	0.100	Fig 2.9	Open Country
10.	162500	162800	0.300	Fig 2.8	Open Country
11.	162800	163100	0.300	Fig 2.9	Open Country
12.	163100	163300	0.200	Fig 2.8	Open Country
13.	163300	163850	0.550	Fig 2.9	Open Country
14.	163850	163950	0.100	Fig 2.8	Open Country

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
15.	163950	164150	0.200	Fig 2.9	Open Country
16.	164150	164250	0.100	Fig 2.8	Open Country
17.	164250	164300	0.050	Fig 2.11(new)	Open Country
18.	164300	164450	0.150	Fig 2.8	Open Country
19.	164450	164700	0.250	Fig 2.11(new)	Open Country
20.	164700	165100	0.400	Fig 2.9	Open Country
21.	165100	165400	0.300	Fig 2.11(new)	Open Country
22.	165400	165600	0.200	Fig 2.9	Open Country
23.	165600	166200	0.600	Fig 2.11(new)	Open Country
24.	166200	166300	0.100	Fig 2.8	Open Country
25.	166300	166600	0.300	Fig 2.11(new)	Open Country
26.	166600	166700	0.100	Fig 2.9	Open Country
27.	166700	167000	0.300	Fig 2.11(new)	Open Country
28.	167000	167200	0.200	Fig 2.8	Open Country
29.	167200	168100	0.900	Fig 2.11(new)	Open Country
30.	168100	169600	1.500	Fig 2.8	Open Country
31.	169600	170600	1.000	Fig 2.10	Built-up Area
32.	170600	171500	0.900	Fig 2.10A	Built-up Area
33.	171500	172000	0.500	Fig 2.10	Built-up Area
34.	172000	172200	0.200	Fig 2.9	Open Country
35.	172200	172500	0.300	Fig 2.8	Open Country
36.	172500	172800	0.300	Fig 2.9	Open Country
37.	172800	172900	0.100	Fig 2.8	Open Country
38.	172900	173200	0.300	Fig 2.9	Open Country
39.	173200	173400	0.200	Fig 2.11(new)	Open Country
40.	173400	173700	0.300	Fig 2.9	Open Country
41.	173700	174400	0.700	Fig 2.8	Open Country
42.	174400	174500	0.100	Fig 2.9	Open Country
43.	174500	175100	0.600	Fig 2.8	Open Country
44.	175100	175200	0.100	Fig 2.11(new)	Open Country
45.	175200	175400	0.200	Fig 2.8	Open Country

S.no.	Des Ch from (m)	Des Ch to (m)	Length (km)	TCS type	Remarks
46.	175400	175900	0.500	Fig 2.11(new)	Open Country
47.	175900	176100	0.200	Fig 2.9	Open Country
48.	176100	176300	0.200	Fig 2.8	Open Country
49.	176300	176581	0.281	Fig 2.9	Open Country
	Total Design Length		**20.092km**		

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 ofintersection	Otherfeatures
1	176+581	3 legged	(L/s Jatinga R/s Maibong)

b. Minor Intersections

S.No.	Intersection at km	Type ofintersection	Otherfeatures
1.	156+770	3 legged	To P. Leikul Village
2.	165+870	4 legged	To P. Leikul Village
3.	156+950	4 legged	To P. Leikul Village
4.	157+010	3 legged	To P. Leikul Village
5.	157+100	3 legged	To P. Leikul Village
6.	157+330	3 legged	To P. Leikul Village
7.	158+815	3 legged	To Gamvom Village
8.	160+330	3 legged	To Impoi(H) Village
9.	160+350	3 legged	To Impoi(CH) Village
10.	160+450	3 legged	To Impoi(CH) Village
11.	161+500	4 legged	To Asalu Village

S.No.	Intersection at km	Type ofintersection	Otherfeatures
12.	161+640	3 legged	To Asalu Village
13.	161+870	3 legged	To Asalu Village
14.	162+050	3 legged	To Asalu Village
15.	162+510	3 legged	To Asalu Village
16.	162+615	3 legged	To Hekaukang Village
17.	162+650	3 legged	To Hekaukang Village
18.	162+950	3 legged	To Hekaukang Village
19.	163+710	3 legged	To Nakhojau Village
20.	163+840	3 legged	To Nakhojau Village
21.	165+070	3 legged	To Pangmol Village
22.	166+455	4 legged	To N. Lonkai Village
23.	166+500	3 legged	To N. Lonkai Village
24.	166+620	3 legged	To N. Lonkai Village
25.	166+770	3 legged	To N. Lonkai Village
26.	167+000	3 legged	To P. Lonkai Village
27.	167+085	3 legged	To P. Lonkai Village
28.	167+285	3 legged	To P. Lonkai Village
29.	167+500	3 legged	To Nirianam Village
30.	167+925	3 legged	To Nirianam Village
31.	168+020	3 legged	To Chudining Village
32.	168+300	3 legged	To Chudining Village
33.	168+370	3 legged	To Chudining Village
34.	168+690	4 legged	To NchureloaVillage
35.	170+000	3 legged	To Assam Rifles Camp
36.	170+800	3 legged	To Mahur Town
37.	170+890	3 legged	To Mahur Town
38.	170+975	3 legged	To Mahur Town
39.	171+200	3 legged	To Mahur Town
40.	171+470	3 legged	To Daodung Village
41.	171+530	3 legged	To Daodung Village
42.	171+750	3 legged	To Daodung Village

S.No.	Intersection at km	Type ofintersection	Otherfeatures
43.	171+800	3 legged	To Daodung Village
44.	172+515	3 legged	To Daodung Village
45.	172+690	3 legged	To Daodung Village
46.	173+200	3 legged	To Daodung Village
47.	173+500	3 legged	To Daodung Village

(ii) Grade separated intersection with/without ramps

S. No.	Location (km)	Salient features	Minimum length of viaduct to be provided	Roadtobecarriedover /underthestructures
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 theplan 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 beraised in the followingsections:

S. No.	Section (Fromkm tokm)	Length	Extentofraising [Top offinishedroadlevel]
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	GSB
156+489	176+581	20.092	8	20	30	50	150	200

Note:- Subgrade of 500mm shall be provided using Soil Stabilization.

(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)	
156+489	176+581	20.092	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 shallbe 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 tothe provision of relevant Manual and specifythestretches, ifany, 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.	156+489	176+581	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: 39442 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	156489	156700	211	1.000	0.000	211

S. No.	Chainage		Length (in m)	Catch Water Drain at no.of	Catch Water Drain at no.of bench (RHS)	Total Length (in m)
2	156700	156900	200	1.000	0.000	200
3	156900	157100	400	1.000	1.000	400
4	157100	157400	300	1.000	0.000	300
5	157400	157500	300	3.000	0.000	300
6	157500	157700	800	4.000	0.000	800
7	157700	158100	400	1.000	0.000	400
8	158100	158200	200	2.000	0.000	200
9	158200	158500	300	1.000	0.000	300
10	158500	158700	1000	4.000	1.000	1000
11	158700	158900	400	1.000	1.000	400
12	158900	159200	900	2.000	1.000	900
13	159200	159700	2500	4.000	1.000	2500
14	159700	159800	200	1.000	1.000	200
15	159800	159900	400	3.000	1.000	400
16	159900	160100	200	1.000	0.000	200
17	160100	160300	600	3.000	0.000	600
18	160300	160500	200	1.000	0.000	200
19	160500	160600	200	2.000	0.000	200
20	160600	161400	3200	3.000	1.000	3200
21	161400	162100	700	1.000	0.000	700
22	162100	162300	200	1.000	0.000	200
23	162300	162500	200	1.000	0.000	200
24	162500	162600	200	2.000	0.000	200
25	162600	162700	100	1.000	0.000	100
26	162700	162800	200	2.000	0.000	200
27	162800	163400	1200	2.000	0.000	1200
28	163400	163900	1000	2.000	0.000	1000
29	163900	164250	1050	3.000	0.000	1050
30	164250	164300	200	3.000	1.000	200
31	164300	164450	300	2.000	0.000	300
32	164450	164700	1000	3.000	1.000	1000
33	164700	164900	400	2.000	0.000	400
34	164900	165100	800	4.000	0.000	800
35	165100	165400	1200	3.000	1.000	1200
36	165400	165600	600	3.000	0.000	600
37	165600	165800	600	2.000	1.000	600
38	165800	166000	400	1.000	1.000	400
39	166000	166200	400	1.000	1.000	400
40	166200	166300	200	2.000	0.000	200
41	166300	166400	300	2.000	1.000	300
42	166400	166500	200	1.000	1.000	200
43	166500	166600	200	1.000	1.000	200
44	166600	166700	200	2.000	0.000	200
45	166700	167000	600	1.000	1.000	600
46	167000	167100	200	1.000	1.000	200
47	167100	167200	400	3.000	1.000	400
48	167200	167500	2100	4.000	3.000	2100
49	167500	167700	1400	5.000	2.000	1400
50	167700	167900	1000	3.000	2.000	1000
51	167900	168100	400	1.000	1.000	400
52	168100	169600	1500	1.000	0.000	1500
53	170600	171500	900	1.000	0.000	900

S. No.	Chainage		Length (in m)	Catch Water Drain at no.of	Catch Water Drain at no.of bench (RHS)	Total Length (in m)
54	171500	172900	1400	1.000	0.000	1400
55	172900	173200	600	1.000	1.000	600
56	173200	174500	1300	1.000	0.000	1300
57	174500	175100	1200	1.000	1.000	1200
58	175100	175200	100	1.000	0.000	100
59	175200	175400	400	1.000	1.000	400
60	175400	176581	1181	1.000	0.000	1181
Total Length (in m)						**39442**

b) Hill Side Drain: 25292m

S.No.	TCS Type	Chainage prop.		Side	Length in (m)
		From	To		
1	Fig 2.9	156489	156900	One Side	411
2	Fig 2.11(new)	156900	157100	Both Side	400
3	Fig 2.9	157100	158500	One Side	1400
4	Fig 2.11(new)	158500	159900	Both Side	2800
5	Fig 2.9	159900	160600	One Side	700
6	Fig 2.11(new)	160600	161400	Both Side	1600
7	Fig 2.9	161400	162300	One Side	900
8	Fig 2.8	162300	162400	One Side	100
9	Fig 2.9	162400	162500	One Side	100
10	Fig 2.8	162500	162800	One Side	300
11	Fig 2.9	162800	163100	One Side	300
12	Fig 2.8	163100	163300	One Side	200
13	Fig 2.9	163300	163850	One Side	550
14	Fig 2.8	163850	163950	One Side	100
15	Fig 2.9	163950	164150	One Side	200
16	Fig 2.8	164150	164250	One Side	100
17	Fig 2.11(new)	164250	164300	Both Side	100
18	Fig 2.8	164300	164450	One Side	150
19	Fig 2.11(new)	164450	164700	Both Side	500
20	Fig 2.9	164700	165100	One Side	400
21	Fig 2.11(new)	165100	165400	Both Side	600
22	Fig 2.9	165400	165600	One Side	200
23	Fig 2.11(new)	165600	166200	Both Side	1200
24	Fig 2.8	166200	166300	One Side	100
25	Fig 2.11(new)	166300	166600	Both Side	600
26	Fig 2.9	166600	166700	One Side	100
27	Fig 2.11(new)	166700	167000	Both Side	600
28	Fig 2.8	167000	167200	One Side	200
29	Fig 2.11(new)	167200	168100	Both Side	1800
30	Fig 2.8	168100	169600	One Side	1500
31	Fig 2.8	170600	171500	One Side	900
32	Fig 2.9	171500	172000	One Side	500
33	Fig 2.8	172000	172200	One Side	200

	TCS Type	Chainage prop.		Side	Length in (m)
34	Fig 2.9	172200	172500	One Side	300
35	Fig 2.8	172500	172800	One Side	300
36	Fig 2.9	172800	172900	One Side	100
37	Fig 2.11(new)	172900	173200	Both Side	600
38	Fig 2.9	173200	173400	One Side	200
39	Fig 2.8	173400	173700	Both Side	300
40	Fig 2.9	173700	174400	One Side	700
41	Fig 2.8	174400	174500	One Side	100
42	Fig 2.11(new)	174500	175100	Both Side	1200
43	Fig 2.8	175100	175200	One Side	100
44	Fig 2.11(new)	175200	175400	Both Side	400
45	Fig 2.9	175400	175900	One Side	500
46	Fig 2.8	175900	176100	One Side	200
47	Fig 2.9	176100	176300	One Side	200
48	Fig 2.8	176300	176581	One Side	281
			Total		**25292m**

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 atkm	Widthofcarriagewayand cross-sectionalfeatures*
NIL		

(c) The following structuresshall be providedwith footpaths:

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

S. No.	Bridge atkm	Widthofcarriagewayand cross-sectionalfeatures*
1.	157+490	**Carriageway Width = 11.0 m** Footpath width= 3.0m (2x1.5m) Width of Crash Barrier = 2.0m (2x1m)
2.	165+255	

S. No.	Bridge atkm	Widthofcarriagewayand cross-sectionalfeatures*
3.	170+210	Width of Railings = 2.0m (2x1m) Overall width = 18 m
4.	170+435	
5.	174+710	

(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.	Bridgeatkm	Utilityservice tobe 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 widthofallculvertsshould not be less than theroadwaywidthofthe approaches.

(b) Reconstruction of existingculverts:

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,ifany*
1.	156510	1X3X3	Box Culvert
2.	156705	1X3X3	Box Culvert
3.	157100	1X3X3	Box Culvert
4.	157960	1X2X2	Box Culvert
5.	158075	1X3X3	Box Culvert
6.	158490	1X3X3	Box Culvert
7.	158810	1X3X3	Box Culvert
8.	159115	1X3X3	Box Culvert
9.	159260	1X3X3	Box Culvert
10.	159385	1X3X3	Box Culvert
11.	159590	1X3X3	Box Culvert
12.	159695	1X2X2	Box Culvert

Sl.No.	Culvert location (km)	Span/Opening(m)	Remarks,ifany*
13.	159890	1X3X3	Box Culvert
14.	160145	1X3X3	Box Culvert
15.	160285	1X3X3	Box Culvert
16.	160525	1X3X3	Box Culvert
17.	160700	1X3X3	Box Culvert
18.	160890	1X3X3	Box Culvert
19.	161025	1X3X3	Box Culvert
20.	161135	1X3X3	Box Culvert
21.	161190	1X3X3	Box Culvert
22.	161320	1X3X3	Box Culvert
23.	161655	1X3X3	Box Culvert
24.	161760	1X3X3	Box Culvert
25.	161905	1X3X3	Box Culvert
26.	162115	1X3X3	Box Culvert
27.	162265	1X2X2	Box Culvert
28.	162335	1X2X2	Box Culvert
29.	162550	1X3X3	Box Culvert
30.	162730	1X3X3	Box Culvert
31.	163200	1X3X3	Box Culvert
32.	163405	1X3X3	Box Culvert
33.	163630	1X2X2	Box Culvert
34.	163740	1X2X2	Box Culvert
35.	163900	1X3X3	Box Culvert
36.	163975	1X2X2	Box Culvert
37.	164115	1X3X3	Box Culvert
38.	164195	1X3X3	Box Culvert
39.	164270	1X3X3	Box Culvert
40.	164290	1X3X3	Box Culvert
41.	164490	1X3X3	Box Culvert
42.	164620	1X3X3	Box Culvert
43.	164750	1X2X2	Box Culvert
44.	165025	1X3X3	Box Culvert
45.	165410	1X3X3	Box Culvert
46.	165505	1X3X3	Box Culvert
47.	165725	1X3X3	Box Culvert
48.	165805	1X2X2	Box Culvert
49.	166285	1X3X3	Box Culvert
50.	166450	1X3X3	Box Culvert
51.	166490	1X3X3	Box Culvert
52.	166690	1X2X2	Box Culvert

Sl.No.	Culvert location (km)	Span/Opening(m)	Remarks,ifany*
53.	166835	1X3X3	Box Culvert
54.	166910	1X3X3	Box Culvert
55.	166995	1X3X3	Box Culvert
56.	167085	1X3X3	Box Culvert
57.	167550	1X3X3	Box Culvert
58.	167990	1X3X3	Box Culvert
59.	168990	1X2X2	Box Culvert
60.	169235	1X2X2	Box Culvert
61.	169290	1X2X2	Box Culvert
62.	169360	1X3X3	Box Culvert
63.	169470	1X3X3	Box Culvert
64.	169560	1X3X3	Box Culvert
65.	169985	1X3X3	Box Culvert
66.	170945	1X3X3	Box Culvert
67.	171180	1X3X3	Box Culvert
68.	171460	1X3X3	Box Culvert
69.	171510	1X3X3	Box Culvert
70.	171610	1X2X2	Box Culvert
71.	171980	1X3X3	Box Culvert
72.	172080	1X3X3	Box Culvert
73.	172210	1X3X3	Box Culvert
74.	172370	1X3X3	Box Culvert
75.	172460	1X2X2	Box Culvert
76.	172620	1X3X3	Box Culvert
77.	172860	1X3X3	Box Culvert
78.	173040	1X2X2	Box Culvert
79.	173640	1X3X3	Box Culvert
80.	173730	1X3X3	Box Culvert
81.	173960	1X3X3	Box Culvert
82.	174380	1X3X3	Box Culvert
83.	174800	1X3X3	Box Culvert
84.	175115	1X3X3	Box Culvert
85.	175265	1X3X3	Box Culvert
86.	175475	1X2X2	Box Culvert
87.	175585	1X2X2	Box Culvert
88.	175750	1X2X2	Box Culvert
89.	176570	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) Wideningof existingculverts:

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 carriedout.

Sl. No.	Culvert location	Type,span,heightand widthofexistingculvert (m)	Repairstobe carriedout [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,ifany*
1.	138615	1X3X3	Box Culvert
2.	138800	1X3X3	Box Culvert
1.	165990	1X2X2	Box Culvert
2.	168190	1X2X2	Box Culvert
3.	168390	1X2X2	Box Culvert
4.	168590	1X2X2	Box Culvert
5.	168785	1X2X2	Box Culvert
6.	169830	1X3X3	Box Culvert
7.	170210	1X3X3	Box Culvert
8.	170600	1X3X3	Box Culvert
9.	173300	1X2X2	Box Culvert
10.	173410	1X2X2	Box Culvert
11.	174150	1X2X2	Box Culvert
12.	174580	1X3X3	Box Culvert
13.	175025	1X2X2	Box Culvert
14.	175850	1X2X2	Box Culvert
15.	176190	1X2X2	Box Culvert
16.	176360	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	Typeofrepair 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]

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					

Minor Bridge – 2no.

Sl. No.	Bridge location (km)	Salient detailsofexistingbridge		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	157490	BOX	1X3X3	-	3x16
2	165255	BOX	2X3X4	-	2X4X4

*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. Any increase in the length/span/height shall not be treated as change of scope of**

work.

3. **Contractor has the liberty to use alternate bridge construction technologies such as UHPC girders or modular bridge in order to reduce the time required for bridge construction. Any increase in length/span/height/quantities due to use of alternate bridge construction technologies in the project shall not account of change of scope.**

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 newbridgesif 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 – 3 Nos.

S.No.	Location (km)	Span Arrangements	Remarks,ifany
1	170+210	3X16	T -Beam Girder
2	170+435	1X25	T -Beam Girder
3	174+710	1X25	T -Beam Girder

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**

Major Bridge – NIL

S.No.	Location (km)	Span Arrangements	Remarks,ifany
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 atkm	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) Drainagesystem forbridge 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 ofLevelcrossing (Chainagekm)	Lengthofbridge (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 ofLevelcrossing (Chainage km)	Number andlengthof span(m)
Nil		

(v) Grade separatedstructures

[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 Manualand 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)	Natureandextent ofrepairs/ strengthening tobecarriedout
NIL		

(b) ROB / RUB

S. No.	Location of ROB/RUB (km)	Natureandextent ofrepairs/ strengtheningtobe carriedout
Nil		

(c) Overpasses/Underpasses and otherstructures

S. No.	Location of Structure(km)	Natureandextent ofrepairs/ Strengtheningtobe carriedout
Nil		

(vii) List of Major Bridges

The following is the list ofthe 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 Manualand specify]

9. Roadside Furniture

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

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

[Refer to the provision of relevant Manualand 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 2.9	156489	156900	One Side	**411**
2.	Fig 2.9	157100	158500	One Side	**1400**
3.	Fig 2.9	159900	160600	One Side	**700**
4.	Fig 2.9	161400	162300	One Side	**900**
5.	Fig 2.8	162300	162400	One Side	**100**
6.	Fig 2.9	162400	162500	One Side	**100**
7.	Fig 2.8	162500	162800	One Side	**300**
8.	Fig 2.9	162800	163100	One Side	**300**
9.	Fig 2.8	163100	163300	One Side	**200**
10.	Fig 2.9	163300	163850	One Side	**550**
11.	Fig 2.8	163850	163950	One Side	**100**
12.	Fig 2.9	163950	164150	One Side	**200**
13.	Fig 2.8	164150	164250	One Side	**100**
14.	Fig 2.8	164300	164450	One Side	**150**
15.	Fig 2.9	164700	165100	One Side	**400**
16.	Fig 2.9	165400	165600	One Side	**200**
17.	Fig 2.8	166200	166300	One Side	**100**
18.	Fig 2.9	166600	166700	One Side	**100**
19.	Fig 2.8	167000	167200	One Side	**200**
20.	Fig 2.8	168100	169600	One Side	**1500**
21.	Fig 2.12(new)	169600	170600	Both Side	**2000**
22.	Fig 2.8	170600	171500	One Side	**900**
23.	Fig 2.9	171500	172000	One Side	**500**
24.	Fig 2.8	172000	172200	One Side	**200**
25.	Fig 2.9	172200	172500	One Side	**300**
26.	Fig 2.8	172500	172800	One Side	**300**
27.	Fig 2.9	172800	172900	One Side	**100**
28.	Fig 2.9	173200	173400	One Side	**200**
29.	Fig 2.8	173400	173700	One Side	**300**
30.	Fig 2.9	173700	174400	One Side	**700**
31.	Fig 2.8	174400	174500	One Side	**100**
32.	Fig 2.8	175100	175200	One Side	**100**
33.	Fig 2.9	175400	175900	One Side	**500**
34.	Fig 2.8	175900	176100	One Side	**200**
35.	Fig 2.9	176100	176300	One Side	**200**
36.	Fig 2.8	176300	176581	One Side	**281**
37.	Fig 2.9	156489	156900	One Side	**411**
38.	Fig 2.9	157100	158500	One Side	**1400**
39.	Fig 2.9	159900	160600	One Side	**700**
40.	Fig 2.9	161400	162300	One Side	**900**
41.	Fig 2.8	162300	162400	One Side	**100**
42.	Fig 2.9	162400	162500	One Side	**100**
43.	Fig 2.8	162500	162800	One Side	**300**
44.	Fig 2.9	162800	163100	One Side	**300**
45.	Fig 2.8	163100	163300	One Side	**200**
46.	Fig 2.9	163300	163850	One Side	**550**
47.	Fig 2.8	163850	163950	One Side	**100**

S. No.	Type of TCS	Location stretch		Side	Total Length (m)
		From (m)	To (m)		
48.	Fig 2.9	163950	164150	One Side	**200**
49.	Fig 2.8	164150	164250	One Side	**100**
50.	Fig 2.8	164300	164450	One Side	**150**
Total Length					**14892m**

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)		
1.	162300	162400	One side	100
2.	162500	162800	One side	300
3.	163100	163300	One side	200
4.	163850	163950	One side	100
5.	164150	164250	One side	100
6.	164300	164450	One side	150
7.	166200	166300	One side	100
8.	167000	167200	One side	200
9.	168100	169600	One side	1500
10.	169600	170600	Both side	2000
11.	170600	171500	One side	900
12.	172000	172200	One side	200
13.	172500	172800	One side	300
14.	173400	173700	One side	300
15.	174400	174500	One side	100
16.	175100	175200	One side	100
17.	175900	176100	One side	200
18.	176300	176581	One side	281
	Total			**7131m**

Note: - Retaining wall shall be designed and provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 7131 meter. Increase in length of Retaining wall will not be treated as change of Scope.

b) PCC Breast wall

Sl. No.	Location stretch		Side	Total Length (m)
	From (m)	To (m)		
1	156489	167100	One side	10611
2	167100	168100	Both side	2000
3	168100	169600	One side	1500
4	170600	176400	One side	5800
		Total		**19911 m**

Note: - 1. Breast wallshall be designed and provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 19911 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		Side	Total Length (m)
	From (m)	To (m)		
1	156489	167100	One side	10611
2	167100	168100	Both side	2000
3	168100	169600	One side	1500
4	170600	176400	One side	4900
		Total		**19011 m**

Note: - Hydroseeding & Mulching are provided as per the technical requirement in consultation with the Authority Engineer subject to minimum length of 19011 meter. Increase in length of Hydroseeding & Mulching shall not be treated as change of Scope.

d) Special Protection for Sinking Zone

S. No.	Location stretch		Length (in m)	Area in Sq.m.	Detail of Special Protection
	From (m)	To (m)			
1	156600	156700	100	1000	At Sinking locations, the hill surface/ slope to be protected / treated with Soil/ Rock nailing & High Strength Wire Mesh having of minimum diameter 3 mm twisted or straight of high tensile steel wire as per IRC & BS specifications. The System should be tailor made according to the site conditions and requirements with accessories like Connection Clips / Press Claws / Shackles/ Boundary Ropes / Wire Rope Anchors etc. 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.
2	159100	159600	500	20000	
3	160100	160300	200	4000	
4	162750	162800	50	1000	
5	163950	164300	350	10500	
6	165300	165700	400	10000	
7	166200	166400	200	3000	
8	166900	167100	200	2000	
9	167100	167300	200	4000	
10	167300	167800	500	25000	
11	168000	168500	500	5000	
12	173300	173550	250	2500	
13	174600	175100	500	7500	
Total				**95500**	

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 95500Sq.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**			
	Items for 33KV Line			
1.	GI Steel SP 66 tubular pole	Nos	6	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.
2.	GI Channel cross arm (100x50x6x3200)mm	Nos	12	
3.	GI angle (50x50x6)mm	Nos	18	
4.	Hot Dip GI Wire Stay Wire 7/10 SWG for HT	KG	18	
5.	Polymeric Pin insulator - FRP 34mm	Nos	9	
6.	Polymeric Disc insulator - 90kN (T&C Type)	Nos	18	
7.	Jointing Sleeve for Raccon	Nos	18	
8.	ACSR Raccoon conductor	Km	0.6	
9.	HT stay set	Nos	6	
10.	HT Guy Insulator	Nos	6	
11.	Tension Clamp for ASCR Raccon	no	18	
12.	pole clamp for GI flat, 50x6mm	Nos	24	
13.	Hot Dip GI wire , 6 SWG	Kg	5	
14.	CI earth pipe 1.8 mm inner dia 100mm	Nos	6	
15.	GI nuts-bolts & GI washer(assorted)	Kg	30	
16.	PG clamp for ACSR Racoon	No.	18	
17.	GI Barbered Wire Type A	Kg	5	
18.	33KVA Danger Plate	No.	6	
19.	Stay grouting	No.	6	
20.	Grouting and steel Tubular Poles	No.	6	
A2	**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
1.	GI Steel SP 66 tubular pole	Nos	332	
2.	11KV GI Channel cross arm (100x50x6x2200)mm	Nos	618	
3.	GI 11 kv T cross arm (50x50x6)mm	Nos	67	
4.	GI Channel (150x75x6)mm	Nos	308	
5.	11 kv Pin insulator-polymeric	Nos	617	
6.	11KV Polymeric Disc insulator - 70kN	Nos	764	

7.	H/W fitting for 11 KV DISC 70 KN	Nos	764	detailed estimate of utility owning department, without any additional claim/COS.
8.	ACSR Raccoon conductor	Km	36	
9.	HT stay set	Nos	220	
10.	HT Guy Insulator	Nos	220	
11.	GI Stay Wire 7/10 SWG	Kg	450	
12.	pole clamp for GI flat, 50x6mm	Nos	1010	
13.	GI wire for earthing, 6 SWG	Kg	970	
14.	GI pipe 50 mm dia 3 mtr length	Nos	130	
15.	GI nuts-bolts & GI washer(assorted)	Kg	1150	
16.	PG clamp for ACSR Racoon	No.	764	
17.	GI Barbered Wire Type A	Kg	420	
18.	GI Channel (75x40x6) mm	Mtr	50	
19.	Stay grouting	No.	332	
20.	Grouting and steel Tubular Poles	No.	220	
A3	**Items for LT Line**			
1.	GI Steel SP 30 tubular pole	Nos	126	
2.	GI Pole round clamp pf GI Flate 50x6mm	Nos	252	
3.	LT stay set	Nos	126	
4.	GI Stay Wire 7/14 SWG	Kg	252	
5.	LT Guy Insulator (Porcelain)	Nos	126	
6.	LT XLPE 1 core 120mm sq (Al) armoured	Mtr	7800	
7.	MS LT Angle Cross Arm (40x40x5x500)mm	Nos	252	
8.	I hook GI	Nos	252	
9.	GI Shackle Streps with bolts	Nos	504	
10.	MS Nuts & Bolts with washers (assorted)	Kg	150	
11.	LT Pin Insulater(Porcelain)	Nos	252	
12.	Shackle Insulater(Porcelain)	Nos	252	
13.	LT Danger Plate	Set	126	
14.	Stay grouting	Nos	60	
15.	Grouting and mufflering of steel Tubular Poles	Nos	60	

Sr. No	Type of Utility	Unit	Quantity	Remarks
A4	**Items for 25KVA Sub station**			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.	11/0.4 KV 25KVA DTR (4 star) BIS level-2	Nos	4	
2.	GI Steel Tubular Pole SP 60	Nos	8	
3.	GI Channel Crossing arm 10x50x6x2200 mm	Nos	16	
4.	PG Clamp for AAAC "Recon"	Nos	24	
5.	GI ground Pole clamp 50x50x6 mm	Nos	24	
6.	ACSR recon conductor	KM	0.12	
7.	HT stay set complete	Set	8	
8.	HT Guy Insulator	Nos	8	
9.	GI Stay Wire 7/10 SWG	Kg	50	
10.	11 kv Pin insulator-polymeric	Nos	24	
11.	GI pipe 50 mm dia 3 mtr length	Nos	24	
12.	GI nuts-bolts & GI washer(assorted)	Kg	35	
13.	11KV Polymeric Disc insulator - 70kN (tension clamp)	Nos	24	
14.	H/W fitting for DISC insulator B&S 70 KN tension	Nos	24	
15.	11 KV DEO fuse- 150A	Set	4	
16.	11KV GOAB Switch- 150A	Set	4	
17.	11KV Lightening arrester 9KA line type	Set	4	
18.	LT XLPE single core cable 50 Sq.mm.	mtr	240	
19.	Aluminum lug (assorted)	Nos	65	
20.	DTR cubical for 25KVA DTR (comprising MCCB static TVM, CT, volt metre, ammeter,etc.)	Nos	4	
21.	11kV Danger Plate	Nos	8	
22.	GI Barbered Wire for Anticlimbing device	Kg	25	
23.	Stay grouting	Nos	8	
24.	Grouting and mufflering of steel Tubular Poles as per Specification	Job	8	
25.	DTR fencing as per REC standard specification complete with material &labour	Job	4	

Sr. No	Type of Utility	Unit	Quantity	Remarks
A5	**Items for 63KVA Sub station**			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.	11/0.4 KV 63KVA DTR (4 star) BIS level-2	Nos	3	
2.	GI Steel Tubular Pole SP 60	Nos	6	
3.	GI Channel Crossing arm 10x50x6x2200 mm	Nos	12	
4.	PG Clamp for AAAC "Recon"	Nos	18	
5.	GI ground Pole clamp 50x50x6 mm	Nos	21	
6.	ACSR recon conductor	KM	0.12	
7.	HT stay set complete	Set	6	
8.	HT Guy Insulator	Nos	6	
9.	GI Stay Wire 7/10 SWG	Kg	65	
10.	11 kv Pin insulator-polymeric	Nos	18	
11.	GI pipe 50 mm dia 3 mtr length	Nos	18	
12.	GI nuts-bolts & GI washer(assorted)	Kg	20	
13.	11KV Polymeric Disc insulator - 70kN (tension clamp)	Nos	18	
14.	H/W fitting for DISC insulator B&S 70 KN tension	Nos	18	
15.	11 KV DEO fuse- 150A	Set	3	
16.	11KV GOAB Switch- 150A	Set	3	
17.	11KV Lightening arrester 9KA line type	Set	3	
18.	LT XLPE single core cable 50 Sq.mm.	mtr	180	
19.	Aluminum lug (assorted)	Nos	50	
20.	DTR cubical for 63KVA DTR (comprising MCCB static TVM, CT, volt metre, ammeter,etc.)	Nos	3	
21.	11kV Danger Plate	Nos	12	
22.	GI Barbered Wire for Anticlimbing device	Kg	18	
23.	Stay grouting	Nos	6	
24.	Grouting and mufflering of steel Tubular Poles as per Specification	Job	6	
25.	DTR fencing as per REC standard specification complete with material &labour	Job	3	

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

1.	GI Pipes 40mm(RWGM)	m	5145	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.
2.	GI Pipes 50mm (RWGM)	m	3110	
3.	GI Pipes 80mm (RWGM)	m	3050	
4.	GI Pipes 100mm (RWGM)	m	2070	
5.	HDPE Pipes 50mm Dia(CWGM)	m	1200	
6.	RCC Intake weir	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:4994 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	157+800-157+900	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: 6no(Both Side).

S. No.	Project Facility	Location (km)	Design Requirements	Other Essential Details
1	Bus Bay & Shelter	157+600-157+700 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
2	Bus Bay & Shelter	159+950-160+050 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
3	Bus Bay & Shelter	161+600-161+700 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
4	Bus Bay & Shelter	163+250-163+350 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
5	Bus Bay & Shelter	166+100-166+200 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
6	Bus Bay & Shelter	166+850-166+950 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
7	Bus Bay & Shelter	169+400-169+500 (LHS & RHS)	Separation from main carriageway	Start Taper-100 m, Straight-30 m, End Taper-100 m
8	Bus Bay & Shelter	172+200-172+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	157+800-157+900	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)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for [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 to the extent set forth below:]

(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)
2	TCS-2.12 (New)	New Typical Cross Section	Two-Lane Carriageway with Paved Shoulder in Hilly Terrain with both side Retaining Wall on Valley side

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

Sl. No.	Stretch		Radius (m)	Speed(km/h)
	From	To		
1.	156958.107	157043.431	30	30
2.	159244.962	159280.775	30	30
3.	159290.927	159339.369	20	20
4.	159335.833	159408.964	20	20
5.	159554.743	159616.424	20	20
6.	161098.704	161128.154	30	30
7.	162317.963	162405.860	40	30
8.	162535.146	162576.138	20	20
9.	162580.802	162666.567	30	30
10.	162706.364	162779.017	20	20

Sl. No.	Stretch		Radius (m)	Speed(km/h)
11.	162793.270	162878.955	30	30
12.	162920.520	162998.804	40	30
13.	163005.839	163096.413	30	30
14.	163377.658	163428.425	20	20
15.	164265.079	164340.997	30	30
16.	164342.288	164419.302	25	30
17.	164959.075	165032.641	30	30
18.	165042.235	165137.576	30	30
19.	165149.225	165201.572	20	20
20.	165223.947	165274.963	40	30
21.	166480.285	166530.433	20	20
22.	166537.713	166588.125	20	20
23.	166713.629	166779.545	40	30
24.	167223.968	167309.558	40	30
25.	171443.237	171512.035	30	30
26.	171776.384	171903.245	35	30
27.	173489.982	173542.232	20	20

Typical Cross Sections

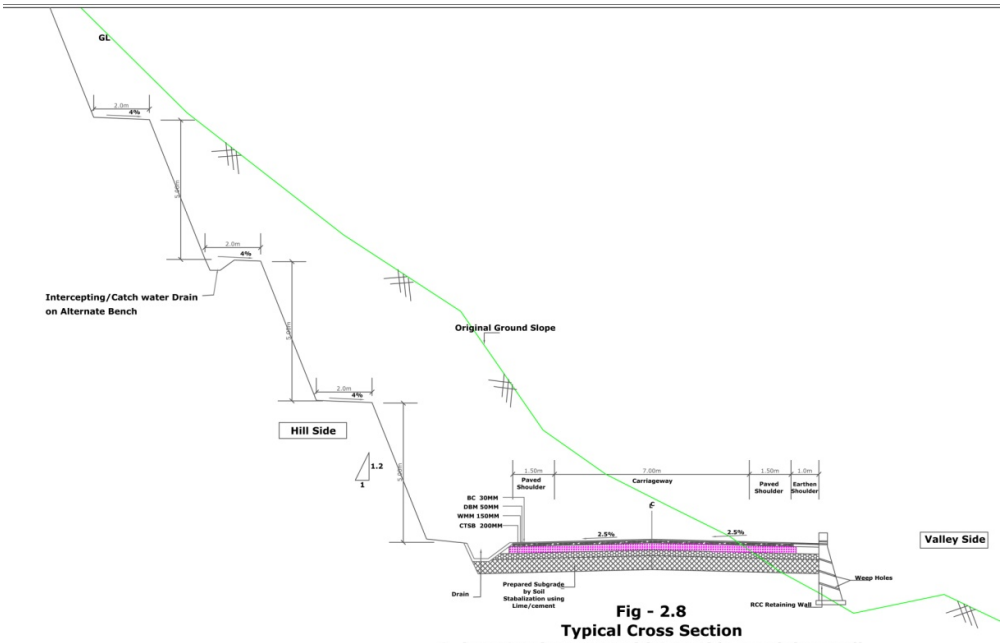


Fig - 2.8
Typical Cross Section
2- lane Carriageway WithOne Side Retaining Wall
(Open Country - Mountainous Terrain)

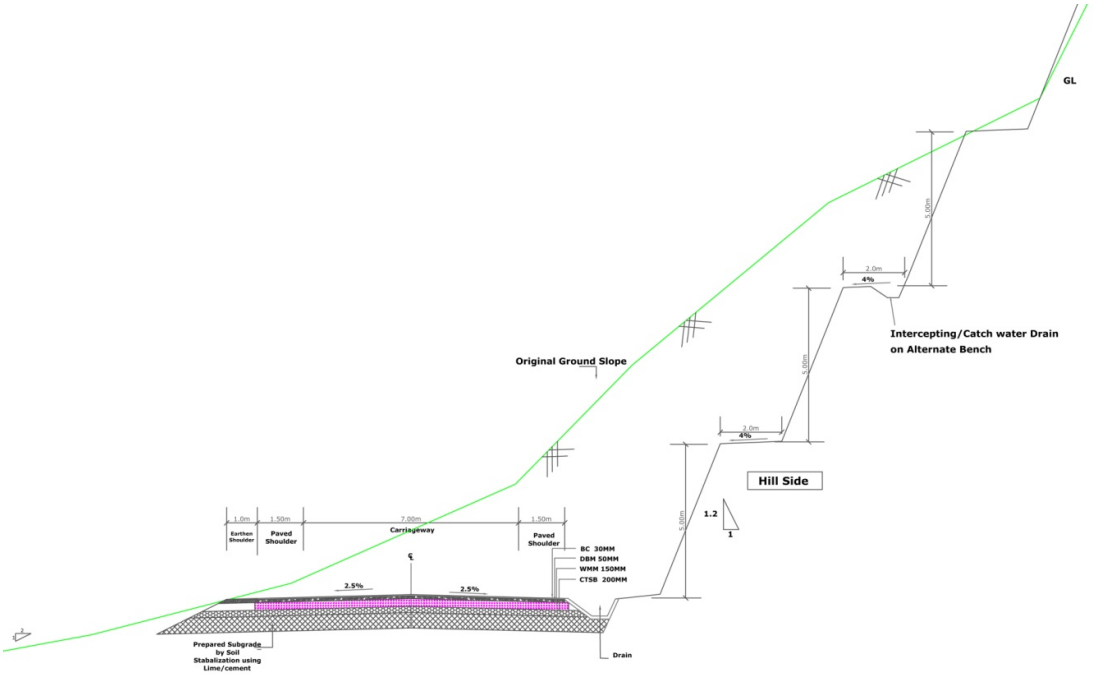


Fig - 2.9
Typical Cross Section
2- lane Carriageway Without Retaining Wall
(Open Country - Mountainous Terrain)

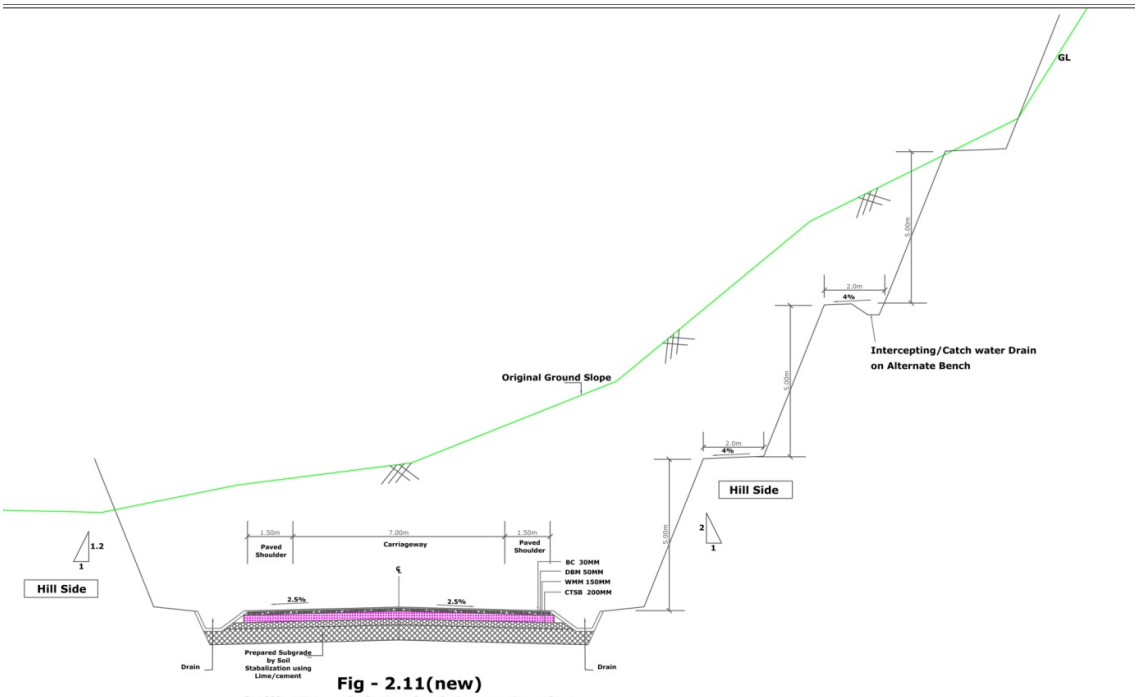


Fig - 2.11(new)
(Hilly Terrain) Typical Cross Section
2- lane Carriageway With Paved Shoulders
(Through Cut) Hill Section

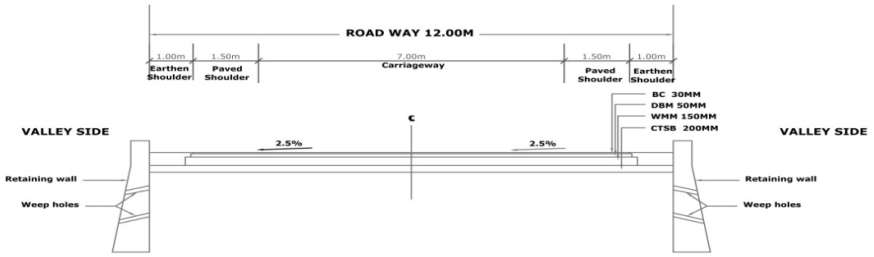


Fig - 2.12 (new)
Typical Cross Section (Hilly Terrain)
2- lane carriageway (With Paved Shoulder)
(With Retaining Wall on both Side)

Annexure D-II

Specification & Methodology for Special Protection of Sinking Zone

1. INTRODUCTION:

SELFDRILLING ANCHOR BARS:

Self-drilling hollow injection anchor bolt is an advanced anchor system, which is composed by hollowanchor bar, nut, plate, coupler, drill bit, centralizer and anchor bars can be cut & lengthened bycoupling according to the demands. This anchor system can be integrated with the functions of drilling, grouting and anchoring. It also can ensure the anchoring for complex ground conditions.

For projects facing such ground conditions, self-drilling anchors should be considered as the mainproductivity solution. Self-Drilling Anchors from are designed for optimized installation, tailored to theproject'sneeds.

By drilling a hole in collapsing soil or loose rock, with a sacrificial drill bit and a hollow rod, and afterthe drilling operation injecting cementitious grout or resin into the hollow rod and surrounding cavity, self-drilling anchors area top productivity solution.

Self-drilling anchor boltsfromconsistsof:

- Ahexagonalnut
- Abearingplate
- Extension couplings, ifthe anchorconsistsofseveral anchorrodsections
- Hollowanchorrod(s)
- Asacrificialdrillbit

2. Applications of Self-Drilling Anchors Slope stabilization

Self-Drilling Anchors are used to stabilize unstable rock/soil formations. The unconsolidated orweathered ground conditions favor the SDA technique for a fast and simple method of installation compared to the traditional methods.

3. SDA Anchor Components

i).Hollow anchor rods

The anchor rod features a hollow bore for flushing, or simultaneous drilling and grouting, and has aleft-hand thread for connection to standard drill tooling. It is manufactured from API

standard thickwall steel tubing, cold rolled to a standard ISO rope thread profile. The rolling process refines the crystalline structure of the steel, increasing the yield strength, and producing a durable drill rod suitable for a wide range of applications. The standard rope thread of the anchor rod produces an excellent bond between the rod and grout, as well as enabling connection to the drilling rigs and a wide range of drill steel accessories.

ii). Extension couplings

The coupling features a patented design that enables direct end to-end energy transmission between each bar, reducing losses and ensuring maximum percussive energy at the drill bit. To enable the correct seating of each bar within the coupler, all bars are chamfered with precision toenablethebarendstohaveface-to-facecontact.

iii). Bearing plates

The bearing plates are forged steel plates with a center hole, allowing articulation of seven degreesinalldirections.

iv). Hexagonal nuts

The hexagonal nuts are manufactured from high precision steel with chamfered edges on both endsfrom high precision steel, and tempered to meet the stringent demands on anchor specifications and the daily operations of underground work. All nuts exceed the ultimate strength of the bar.

v). Shanks

Rotary percussion is the preferred method of installation. Either a hydraulic or air hammer is suitable. To transfer the rotation and percussion from the hammer to the bar‘s system, there is aneedfora shankadapter.

vi). Grout coupling

After using standard flushing media (water or air), grouting must be done. For connecting the grouting hose from the pump with the anchor bar, the grout coupling is used. The grout coupling will be removed and reused after the grouting process is done.

vii) Sacrificial drill bits

The sacrificial drill bit is the most crucial part of the anchoring system and is responsible for the productivity of the installation. Intech Anchoring offers a large range of drill bits to suit the changing geology encountered during projects. In order to improve on performance and cost efficiency, data iscollected from projects around the world and incorporated into the design with the goal to improve penetration rate and bit quality and to reduce manufacturing and application costs.

viii) The selection of drill bits

A successful installation of the SDA system depends on the selection of the most suitable drill bit. Compared to conventional drill bit types offered globally for maximum standing performance for rock or soil, the criteria for SDA drill bits are defined by consideration of the following factors:

- Geology
- Geometry

4) BRIEF INSTALLATION METHODOLOGY OF SDA

The following steps are involved in the installation of nails:

i). Scaling works:

All the loose debris & unwanted materials are to be properly removed from the surface of slope and in the location of SDA applications.

ii). Identifications:

Identification and marking the nail locations on the slope surface based on the spacing specified in drawing (Refer Fig-1)

Figure 1: Marking of drill locations on the slope

Sacrificial drill bit of required size, shall be attached at the front of nail (Refer Fig-2)

Figure 2: Drill bit for self-drilling anchors (typical cross bit)

iii) Drilling shall be done for the specified length and diameter as mentioned in the drawing. Grouting operation shall be carried out simultaneously with the drilling and installation of self-drilling anchor (refer fig 3-4). The usual water-cement ratio ranges from 0.40 to 0.50.

Figure3:Drillingoperationontheslope

Figure 4: Grouting operation

iv. If required, coupler joint can be provided to match the required nail length. The coupler joint shall be firmly fixed to its full thread centralizers shall be installed at the outer end after full penetration of nail in to the surface as per the requirement (Fig -5)

Figure 5: Centralizers at the outer end of nail

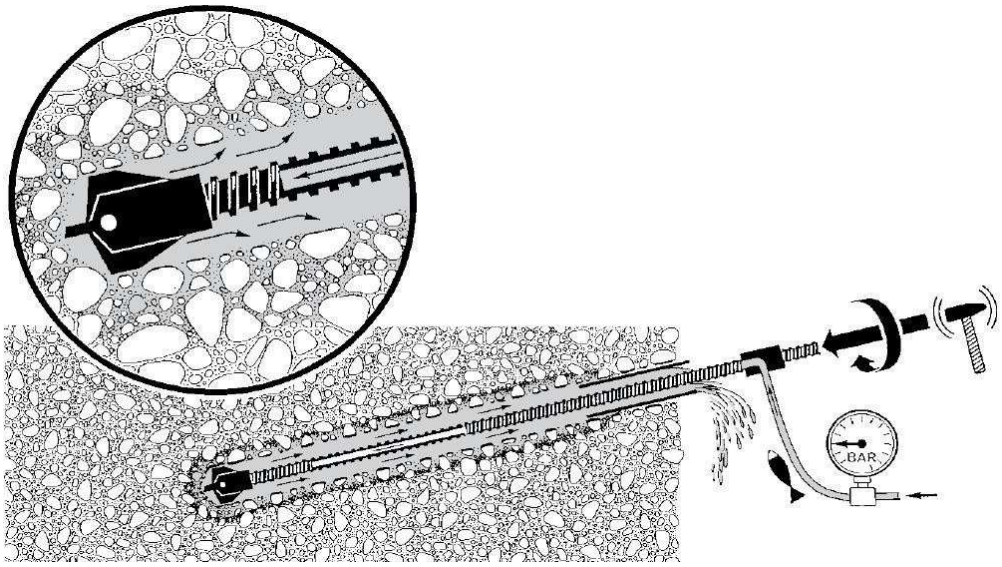


Figure 6: Drilling of SDA

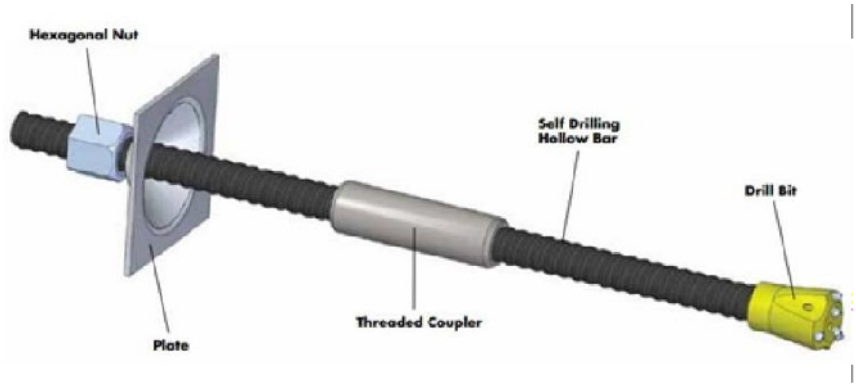


Figure 7: Components of SDA

vii) Bearing plate with sufficient thickness of steel plates are installed having a central hole required at the face of SDA. The main function of this plate is to transfer the tension load of SDA to the ground.

viii) After this the hexagonal nuts made of high strength steel with properly made by all edges to satisfy the demands of anchor specifications is to be installed.

SDA installation, rotary percussion processes the rotation, and percussion transfer from the hammer to hollow bar system using the shank connector.

HYDROSEEDINGONSLOPEAFTERNAILING:

Soil Reinforcement Geo-composite is a Hydro-seeding method that was widely accepted by, manyagency and landscape engineers due to its high performance. Hydro-seeding is a complementary application used together with other kinds of geosynthetic products such as the 3D Geo-composite mat. The slurry consists of fertilizer, signal grass seeds, mulching material. It outperform sand is more cost-effective than conventional erosion control methods.

As compared to conventional turfing, hydro-seeding is more effective, installation friendly and it has deeper root zone with better coverage. Employing the most superior erosion control blanket and the quality service; 3D Geo-composite mat is able to provide the outstanding Slope Protection solution.

Steps of Hydroseeding

Step 1: Prepare site: Fill any rillsor gullies caused by previous erosion.

Step 2: Hydroseed Mix: Fill the hydro-seeder tank with water, and add the normal mix of seed,fertilizer,fibermulch,etc.

Step 3: Add Silt Stop: Slowly add the Silt Stop polymer as the final additive to the hydroseed mix while the agitator is running to ensure mixing. Allow 5 minutes of mixing before beginning to apply.

Step 4: Apply Hydroseed: Apply the hydroseed mixture over the top of the dressed slope. Proper application should result incomplete coverage with no bare soil visible.

The matting and polymer will help hold the seed and fertilizer in place and prevent the soil from eroding until the vegetation can germinate and establish root structure.

REINFORCED GEOMATS

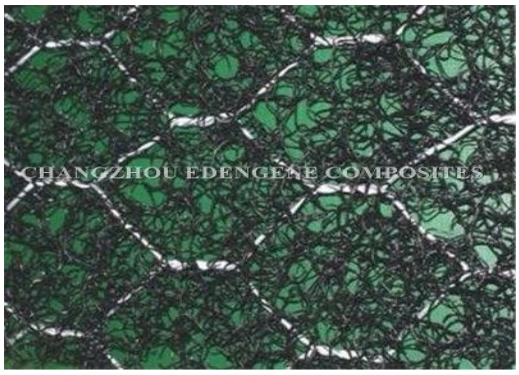
(3D Geocomposite mat)

i). General

All the natural slopes and surfaces are subject to continuous erosion forces of water and winds.

Protection of slopes by growing locally grown vegetation, in the form of turfing, is the best method to protect the slopes against the erosion because once the roots of this vegetation penetrate into the slope by 75-100mm, they provide root reinforcement against the slope erosion. The 3D Geo-composite mats are installed after hydroseeding process is completed over slope.

Geo-mats



In many areas, growing of vegetation/ turfing on the slope is difficult or not possible due to in fertile nature of the soil on the slopes and/or due to scanty or very heavy rainfall in that area. In such cases, the three-dimensional erosion control mats, called as Geomats, are useful as they increase the soil's resistance to erosion and some fertile soil layer can also be placed in these mats to promote growth of vegetation. By reinforcing soil during vegetation growth, they significantly improve development of a strong and deeper root system.

Geomat is a light flexible material, an alternative to massive and ecologically-unfriendly concrete, stone or asphalt constructions. Due to open surface and strip hardness geomat can be easily filled with soil all over its area and depth and it encourages root germination, quick vegetation of slopes and thus guarantees erosion control. With right choice of the material and observation of assembling technique erosion damages can be eliminated evenondifficultareasandsteepslopes.

ii). <u>Installation Methodology</u>

3D Geo-composite mat must be installed starting from the highest point.

- In order to attach the mesh, a 20 cm wide and20 cm deep trench must be dug at least 1m away from the slope's edge.
- Insert the 3D Geo-composite mat inside the trench with ground pegs. Next, the trench should be covered and compacted to increase its resistance.
- Please ensure to leave no more than 1m either side of each ground peg when attaching the 3D mesh.
- Once installed and secured to the trench, the 3D Geo-composite mat can be unrolled on top of the slope following its downward direction.
- Please ensure to leave between 10 and 20cm overlap between rolls. Likewise,we must also place ground pegs along the joints leaving no more than 1m on either side. When joining the ends of two separate rolls, please ensure to leave at least a 10cm overlap as well as to provide further strengthening by installing additional ground pegs no further apart than 50cm on either side.
- Once finished installing the 3DGeocomposite mat, we must proceed to assess the ground pegs installed in between the ends of two separate rolls.

3 HighTensile SteelWire Mesh

Wire meshes have a composition of different percentages of high carbon steel, which is comprised of different diameters of wire and different geometries. Nowadays, high tensile steel wire meshes are used world wide in different applications like security fences, architecture, natural hazard protection, blast protection during tunneling and road widening activities in hilly terrain, slope protection works.

In most conditions, high tensile wire meshes are used to protect the surface of the soil/ rockslope stabilization. Where the slope of soil/rock profile required cutting to meet the degree of road expansion, their surface is required to protect using nail/ SDA/ rock bolt system withhigh tensile wire mesh system to secure the region between the soil nail/SDA/ rock bolt reinforced system.
Slope surface protection using the high tensile wire mesh system is very economical compared to traditional protection systems. This wire mesh system has freedom of arrangement for installation due to its flexible nature.

The high tensile wire mesh has considerable tensile strength of approximately 100kN/m, mesh punching strength 160kN. The high tensile wire mesh with their special properties provided for the slope surface stabilization is substantially more economical than wire ropes net systems.

The high tensile wire mesh system is commonly used in geotechnical engineering solutions. These are typically used in the rockfall protection kits, rock/soil slope surface protections, attenuator, secure drapery systems, debris flows, and prevention of avalanche, mud flow, and land slide

protection applications.

After 3D Geo-composite mat are installed then high tensile wire mesh system are laid over theslope. This is fixed with bearing plates. Nut & plates are applied over the anchor to tighten the mesh&3DGeocomposite mat.

Drain pipes or weep hole pipes (50mm dia.) PVC perforated pipes wrapped with non-woven geotextile are also installed parallelly with SDA bars along the slope as per GFC drawings.

For all the above-mentioned items refer: MORT&H (Section 3200) – Soil Nailing MORT&H (Section700)–Geosynthetics

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 with IRC SP 81
	Edge Deformation/ Breaking	Nil	< 1 m for any 100 m section and width < 0.1 m at	Daily	Scale, Tape, odometer etc.			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
			any location, restricted to 30 cm from the edge					
	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 Distresses			Bi-Annually			2-7 days	IRC:82- 2015
	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	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

Asset Type	Performance	Level of Service (LOS)		Frequency of	Tools/Equipment	Standards and References for Inspection and Data Analysis	Time limit for	Maintenance
roads, slip roads, lay byes etc. as applicable)								
	Skid	Skid Resistance no. at different speed of vehicles		Bi-Annually	SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)	RC:SP:83-2008	180 days	IRC:SP:83-2008
		Minimum SN	**Traffic Speed (Km/h)**					
		36	50					
		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	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
			fall					
	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	Nil, not discernible	No Action	Not applicable
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car		Seal, and stitch if L > lm.
			3	w = 0.5 - 1.5 mm, discernible from fast-	Seal without delay	Within 7days

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
				moving car		
			4	w = 1.5 - 3.0 mm	Seal, and stitch if L > l m.	Staple or Dowel Bar Retrofit, FDR for affected portion.
			5	w > 3 mm.	Within 7 days	Within 15days
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.	Staple or Dowel Bar Retrofit.
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle	Within 7 days	Within 15 days
			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.	Full Depth Repair Dismantle and reconstruct affected.
					Within 15 days	
			5	w > 6 mm, usually associated with spelling, and/or slab rocking under traffic	Not Applicable, as it may be full depth	Portion with norms 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.	Staple or dowel bar retrofit.

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	w = 0.5 - 3.0 mm, discernible from fast vehicle	Within 7 days Route seal and stitch, if L > l m. Within 15 days	Within 15days
			3	w = 3.0 – 6.0 mm	Staple, if L > 1 m. Within 15 days	Partial Depth Repair with stapling. Within 15days
			4	w = 6.0 - 12.0 mm, usually associated with spalling	Not Applicable, as it may be full depth	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic		Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4 Within 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		

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	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 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

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
						and specifications within 30days
6	Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)	w = width of crack L = length (m/m2)	0	Nil, not discernible	**Not Applicable, as it may be full depth**	No Action
			1	w < 0.5 mm; L < 3 m/m2		Seal with low viscosity epoxy to secure broken parts. Within 15 days
			2	either w > 0.5 mm or L < 3 m/m2		
			3	w > 1.5 mm and L < 3 m/m2		
			4	w > 3 mm, L < 3 m/m2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage Reinforcement. Within 30days
			5	w > 3 mm, L > 3 m/m2 and deformation		
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	
			2	r = 2 - 10 %	and liable to be	

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
					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	
			2	r = 2 - 10 %	and liable to be damaged. Within 7days	
			3	r = 10 - 20%	Bonded Inlay within 15	

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	r = 10 - 30%	Days	
			5	r>30 % and h> 25mm	Reconstruct slab within 30 days	
9	Polished Surface/Glazing	t = texture depth, sand patch test	0		No action	Not Applicable
			1	t > 1 mm		
			2	t = 1 – 0.6 mm		
			3	t = 0.6 – 0.3 mm	Monitor rate of deterioration	
			4	t = 0.3 – 0.1 mm	Diamond Grinding if Affecting	
			5	t < 0.1 mm	50% or more slabs in a Continuous stretch of minimum 5 km. Within 30 days	
10	Popout (Small Hole),	n = number/m2	0	d < 50 mm; h < 25 mm; n <	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
	Pothole Refer Para 8.4	d = diameter h = maximum depth	1	1 per 5 m2 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	Within 30 days	
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m2	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	Clean and reapply sealant in	

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
				against ingress of water and trapping incompressible material.	Selected locations. Within 7 days	
			4	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint. Within 7 days	
12	Spalling of Joints	w = width on either side of the joint L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion.	
			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	

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
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0	not discernible, < 1 mm	No action.	No action.
			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 Traffic	
			3	h = 12 - 25 mm	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
			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		
			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	

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
16	Heave	h = positive vertical displacement from normal profile. L = length	0	Not discernible. h < 5 mm	No action.	
			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	scrabble
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m.	
			5	h > 100 mm	Within 30 days	
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

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 > 15 mm	Full Depth Repair. Within 30 days	Full Depth Repair. Within 30days
18	**Lane to Shoulder Dropoff**	f = difference of level			**Short Term**	**Long Term**
			0	Nil, not discernible < 3mm	No Action	
			1	f = 3 - 10 mm	Spot repair of shoulder within 7 days	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder within 7 dayss	For any 100 m Stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days
			4	f = 50 - 75 mm		
			5	f > 75 mm		
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

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 to 4	appreciable/ Frequent 10 - 25%	Lift or jack slab within 30 days.	and upstream.
			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	As per IRC SP :84-2014, a	Monthly	Manual	Removal of obstruction within 24		IRC:SP

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th colspan="4">Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th colspan="2">Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="4"></td><td rowspan="4">of Safe Sight Distance</td><td colspan="4">minimum of safe stopping sight distance shall be available throughout.</td><td rowspan="4"></td><td rowspan="4">Measurements with O dometer along with video/ image backup</td><td colspan="3" rowspan="4">hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.
In case of permanent structure or design deficiency: Removal of obstruction/improvement of deficiency at the earliest Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="4">84-2014</td></tr>
<tr><td>Design Speed, kmph</td><td>Desirable Minimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td colspan="4"><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Day time Visibility</td><td colspan="4">During expected life Service Time
Cement Road - 130mcd/m2/lux
Bituminous Road - 100mcd/m2/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td rowspan="3"></td><td rowspan="3">Night Time Visibility</td><td colspan="4"><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u></td><td rowspan="3">Bi-Annually</td><td rowspan="3">As per Annexure-E of IRC:35-2015</td><td rowspan="3">Re - painting</td><td rowspan="3">Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td rowspan="3">IRC:35-2015</td></tr>
<tr><td>Design Speed</td><td colspan="3">(RL) Retro Reflectivity (mcd/m2/lux)</td></tr>
<tr><td>Up to 65</td><td>200</td><td>80</td></tr>
</table>

Asset Type	Performance Parameter	Level of Service (LOS)			Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		65-100	250	120					
		Above 100	350	150					
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):							
Road Signs	Shape and Position	Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section.			Daily	Visual with video/image backup	Improvement of shape, in case if shape is damaged. Relocation as Per requirement	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 15 Days in case of Gantry/Cantilever Sign boards	IRC:67-2012
	Retro reflectivity	As per specifications in IRC:67-2012			Bi-Annually	Testing of Each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09.	Change of signboard	48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs) 1 Month in case of Gantry/ Cantilever Sign boards	IRC:67-2012
Kerb	Kerb Height	As per IRC 86:1983 depending upon type of Kerb			Bi-Annually	Use of distance measuring tape	Raising Kerb Height	Within 1 Month	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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
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
	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

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 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
		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

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every 4 hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other Project Facilities and Approac h 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
	Leak-proof expansion joints if any	No leakage through expansion joints	Bi-Annually	Physical inspection of expansion joints as per	Fixing with sealant suitably	30 days or before onset of rains whichever	IRC SP:40-1993 and IRC SP:69-2011

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				IRC SP: 35-1990 if any, for leakage strains on walls at joints.		comes earlier	
	Structurally sound	Spalling of concrete not more than 0.25 sqm	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
		Delamination of concrete not more than 0.25 sq.m.					
		Cracks wider than 0.3 mm not more than 1m aggregatelength					
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concreteapron) not more than 1 sqm	2 times in a year (before and after rainy season)	Condition survey as per IRC SP:35-1990	Repairs to damaged aprons and pitching	30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier.	IRC: SP 40-1993 and IRC:SP:13-2004.
Bridges including ROBs Flyover etc. as applicable	Riding quality or user comfort	No pothole in wearing coat on bridge deck	Daily	Visual inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	15 days	MORT&H Specification 2811
Bridge -Super Structure	Bumps	No bump at expansion joint	Daily	Visual inspection as	Repairs to BC on either side of	15 days	MORT&H Specification

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
				per IRC SP:35-1990	expansion joints, profile correction course on approach slab in case of settlement to approach embankment		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 IRC SP: 35-1990 using Mobile Bridge Inspection Unit	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete.	15 days	IRC SP: 40-1993 and MORTH Specification 1600.
	Spalling of concrete	Not more than 0.50 sq.m					
	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	Grouting with epoxy mortar, investigating causes for cracks development and	48 Hours	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
				Bridge Inspection Unit	carry out necessary rehabilitation		
	Rainwater seepage through deck slab	Leakage - nil	Quarterly	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	1 months	MORTH specifications 2600 & 2700
	Deflection due to permanent loads and live loads	Within design limits.	Once in every 10 years for spans more than 40 m	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	6 months	IRC SP: 51-1999.
	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	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.

Asset Type	Performance Parameter	Level of Service (LOS)	Frequency of Measurement	Testing Method	Recommended Remedial measures	Time limit for Rectification	Specifications and Standards
		buried and asphalt plug and copper strip joint					
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit	Cleaning of expansion joint gaps thoroughly	3 days	MORTH specification 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 Mobile Bridge Inspection Unit. In case of oubt, use Underwater camera for	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
				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	15 (fifteen) days

	facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads	
(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]
[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

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 **"Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode under NH(O)-NE."** 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 operatable at our.....Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [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	CNRB0019062
4.	Beneficiary Bank Branch Name	Transport Bhawan, New Delhi
5.	Beneficiary Bank Address	Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001

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

SIGNED, SEALED AND DELIVERED

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

NOTES:

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

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

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

Form for Guarantee for Withdrawal of Retention Money

[DG(RD)&SS,

Ministry of Road Transport & Highways Transport Bhawan, New Delhi]

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 **"Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode under NH(O)-NE."**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 authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

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

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

12. This Guarantee shall be operatable at our ……Branch at Guwahat, 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 claim, 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 the SFMS(Structural Finance Messaging System) platform & shall invariable send an advice of the Bank Guarantee to the designated bank of [MoRT&H/NHAI/NHIDCL/State PWD/BRO], the details of which are as under:-

Sr. No.	Particulars	Details
1.	Name of Beneficiary	RO NHIDCL, Projects
2.	Beneficiary Bank Account No.	73653210000013
3.	Beneficiary Bank Branch	CNRB0017365
4.	Beneficiary Bank Branch Name	Dispur, Guwahati
5.	Beneficiary Bank Address	Canara Bank, Upasana Commplex, 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. ……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.	41.03%	**A - Widening and strengthening of existing road**	
		(1) Earthwork upto Subgrade top	
		(2) Sub base course (GSB)	
		(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	56.39%
		(2) Subbase course (GSB)	8.06%
		(3) Non bituminous base course (WMM)	5.30%
		(4) Bituminous base (Prime and DBM)	6.17%
		(5) Wearing coat (Tack coat, BC)	2.74%
		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	
		(2) Subbase course (GSB)	
		(3) Non bituminous base course (WMM)	
		(4) Bituminous base (Prime and DBM)	
		(5) wearing coat (Tack coat, BC)	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		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	21.34%
Minor Bridges/ Underpasses/ Overpasses	3.54%	**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.	38.97%
		(2) Sub-structure: (on completion of abutments, piers upto abutment/pier cap.)	18.25%
		(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)	39.92%
		(4) Approaches (on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	2.86%
		(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	
		(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.	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(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	
		(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	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(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	
		(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	

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(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.	
		(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	54.19%	(i) Toll plaza including it's approach	
		(ii) Road side drains	
		a) Hill Side Trapezoidal/V Type Drain	1.37%
		b) Catch Water Drain	1.13%
		(iii) Road signs, markings, km stones, safety devices etc.	4.20%
		(iv) Project facilities	
		(a) Bus Bay with Bus Shelter	0.85%
		(b) Truck laybyes	0.09%
		(c) Rest area with Toilet Block	0.10%
		(d) others to specified	
		(v) Road side plantation	0.30%
		(vi) Repair of Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	
		(vii) Retaining Wall	18.03%

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(viii) Breast Wall	30.96%
		(ix) Hydro-seeding& Mulching	5.82%
		(x) Special Protection of Sinking Zone	33.73%
		(xi) Junction Improvement	3.42%
Electrical utilities and public Health Utilities (Water pipe lines and sewage lines)	1.24%	(i) EHT line / (ii) EHT crossings	
		(iii) HT/ LT line / (iv) HT/ LT crossings over ground	86.2%
		(iv) HT/ LT line / (vi) HT/ LT crossings Under ground	
		(vii) Water pipeline / (viii) Water pipeline crossings	13.8%
		(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)		

Stage of Payment	Percentage -weightage	Payment Procedure
(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.
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.	56.39%	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)	8.06%	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)	5.30%	
(4) Bituminous base (Prime and DBM)	6.17%	
(5) wearing coat (Tack coat, BC)	2.74%	
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:	21.34%	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.	38.97%	(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.	18.25%	(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.	39.92%	(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.	2.86%	(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.
(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		

Stage of Payment	Weightage	Payment Procedure
(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		
(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

Stage of payment	Weightage	Payment procedure
		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 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.

Stage of payment	Weightage	Payment procedure
(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 upto abutment/piers cap level of a bridge.
(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

Stage of payment	Weightage	Payment procedure
		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, 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 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

Stage of payment	Weightage	Payment procedure
		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 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.

Stage of payment	Weightage	Payment procedure
(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.
(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

Stage of payment	Weightage	Payment procedure
		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)		
(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.

Stage of payment	Weightage	Payment procedure
(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.
(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

Stage of payment	Weightage	Payment procedure
		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.
(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.

Stage of payment	Weightage	Payment procedure
(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.
(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

Stage of payment	Weightage	Payment procedure
		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 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

Stage of payment	Weightage	Payment procedure
		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.
(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/

Stage of payment	Weightage	Payment procedure
		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	1.37%	
b) Catch Water Drain	1.13%	
(iii) Road signs, markings, km stones, safety devices	4.20%	
(iv) Project Facilities		Payment shall be made on pro rata basis for completed facilities.
a) Bus bays& shelter	0.85%	
b) Truck lay-byes	0.09%	
c) Rest areas with toilet Block	0.10%	
d) Others		
(v) Roadside Plantation	0.30%	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	18.03%	
(vii) Breast Wall	30.96%	
(ix) Hydro-seeding& Mulching	5.82%	
(x) Special Protection for Sinking Zone	33.73%	

Stage of Payment	Weightage	Payment Procedure
(x) Junction Improvement	3.42%	

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.
(iii) HTI LT line (including transformers if any)	86.20%	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	13.80%	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

Stage of Payment	Weightage	Payment Procedure
		work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)
(vi) water pipeline 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 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-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 256rd 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 "Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode under NH(O)-NE."** (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")# **"Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode under NH(O)-NE."**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"), for **"Widening & Upgradation to two lanes with paved shoulders road from Tamenglong to Mahur (NH-137) in the State of Assam starting from km 156.489 near P. Leikul to km 176.581 near Borowapu (Package-10) on EPC mode under NH(O)-NE."** (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)