National Highways Authority of India

(Ministry of Shipping, Road Transport & Highways)
Government of India

DESIGN, ENGINEERING, FINANCE, CONSTRUCTION, OPERATION AND MAINTENANCE OF 4 LANING OF PUNE – SOLAPUR SECTION OF NH – 9 FROM KM 40.000 TO KM 144.400 IN THE STATE OF MAHARASHTRA UNDER NHDP PHASE III ON DESIGN, BUILD, FINANCE, OPERATE AND TRANSFER (DBFOT) BASIS

CONCESSION AGREEMENT

between

National Highways Authority of India,
G – 5& 6, Sector-10, Dwarka, New Delhi – 110 075

and

M/s Pune Solapur Expressways Private Limited,
C/o TATA Services Limited, Jeevan Bharati Tower I, 10th Floor, 124 Connaught Circus, New Delhi – 110 001

VOLUME – II

(SCHEDULES)

May 2009

Pune Solapur Expressways Private Limited Delhi

National Highways Authority of India

(Ministry of Shipping, Road Transport & Highways)
Government of India

DESIGN, ENGINEERING, FINANCE, CONSTRUCTION, OPERATION AND MAINTENANCE OF 4 LANING OF PUNE - SOLAPUR SECTION OF NH - 9 FROM KM 40.000 TO KM 144.400 IN THE STATE OF MAHARASHTRA UNDER NHDP PHASE III ON DESIGN, BUILD, FINANCE, OPERATE AND TRANSFER (DBFOT) BASIS

CONCESSION AGREEMENT

between

National Highways Authority of India,
G - 5& 6, Sector-10, Dwarka, New Delhi - 110 075

and

M/s Pune Solapur Expressways Private Limited,
C/o TATA Services Limited, Jeevan Bharati Tower I, 10th Floor, 124 Connaught Circus, New Delhi - 110 001

VOLUME - II

(SCHEDULES)

May 2009

VOLUME – III : SCHEDULES

CONTENTS

SCHEDULE – A

(See Clause 10.1)

SITE OF THE FOUR LANE PROJECT HIGHWAY

1. THE SITE

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

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 Concessionaire and such inventory shall form part of the memorandum referred to in Clause 10.3.1 of the Agreement.

Additional land required for Toll Plazas, Traffic Aid Posts, Medical Aid Posts and vehicle rescue posts or for construction of works specified in Change of Scope Order shall be acquired in accordance with the provisions of this Agreement. Upon acquisition, such land shall form part of the Site and vest in the Authority.

Annex – I

(Schedule-A)

Site for Four Laning

1.1 The Site

The project highway aims at developing the existing two lanes to four lanes from km 40.000 to km 144.400 of NH-9 in the State of Maharashtra.

Thus the construction package for the project includes developing the existing two lane carriageway to Four lane dual carriageway configurations including strengthening of existing two lanes between Km 40.000 to Km 144.400 defined as "**Project Highway**".

1.2 Description of the Project Highway

The project highway is generally 2-lane and the road is passing through the built up areas of towns and villages enroute. Important towns along the alignment are Yawat, Kurkumbh, Bhigwan and Indapur. An index map and location plan of the Project Highway is given at **Appendix A-I.**

1.2.1 Referencing System

Kilometer stones are existing in entire length of the project highway. It is called the "Existing Chainage". During topography survey with Total Station, observations made are referred to "Design Chainage". The relationship between the "Existing Chainage" and the "Design Chainage" as per field surveys of the location of existing km stones using the Total Station for the "Project Highway" is **given at Appendix A-II.**

1.3 Latitudes & Longitudes

Latitude and longitude of the project corridor lies between 18^0-18'N to 17^0-18'N and 73^0-33'E to 76^0-30'E respectively.

1.4 Terrain

The project road passes through plain terrain except for small stretches of rolling terrain.

1.5 Traffic

Traffic count details as per the survey conducted by design consultant during the month of October and November 2005 on the project highway are given at **Appendix A-III.**

1.6 Abutting Land Use

Agriculture is predominant land use along the project highway. Settlements and ribbon developments are observed intermittently along the project highway. The land use in these sections is commercial or residential. The Urban/Built up Settlements along the project highway are given at **Appendix A-IV.**

1.8 Land

The Details of existing ROW are at Appendix A-V.

1.9 Road Works

An inventory of road works and their condition is at **Appendix A-VI**.

2.0 Structures

An inventory of the existing structures is at **Appendix A-VII**.

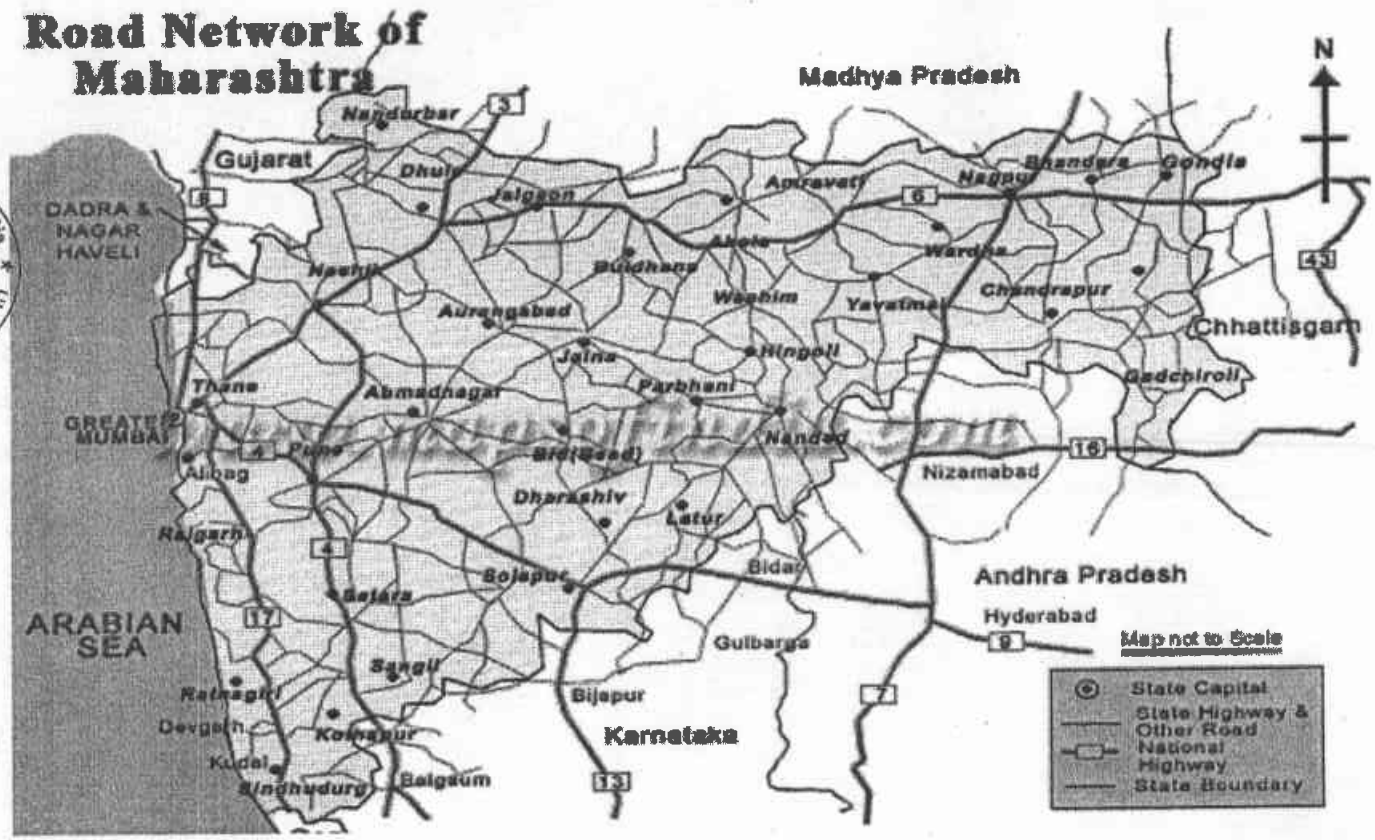
2.1 Facilities

An inventory of the existing facilities is at **Appendix A-VIII**.

***

Appendix A-I

Index map of Project Highway



Appendix A-II

Design Chainage corresponding to existing chainage

Existing Chainage (i.e. Km stone)	Design Chainage(Km)
40+000	40+000
41+000	41+120
42+000	42+155
43+000	43+160
44+000	44+160
45+000	45+170
46+000	46+160
47+000	47+170
48+000	48+180
49+000	49+180
50+000	50+180
51+000	51+190
52+000	52+180
53+000	53+190
54+000	54+180
55+000	55+190
56+000	56+195
57+000	57+210
58+000	58+210
59+000	59+210
60+000	60+200
61+000	61+200
62+000	62+200
63+000	63+200
64+000	64+225
65+000	65+230
66+000	66+230
67+000	67+230
68+000	68+240
69+000	69+240
70+000	70+240
71+000	71+240

Existing Chainage (i.e. Km stone)	Design Chainage(Km)
93+000	93+220
94+000	94+240
95+000	95+030
96+000	96+220
97+000	97+210
98+000	98+360
99+000	99+525
100+000	100+680
101+000	101+930
102+000	103+010
103+000	104+150
104+000	105+150
105+000	106+485
106+000	107+575
107+000	108+590
108+000	109+980
109+000	111+140
110+000	112+290
111+000	113+450
112+000	114+600
113+000	115+775
114+000	116+780
115+000	118+030
116+000	119+230
117+000	120+380
118+000	121+520
119+000	122+540
120+000	123+540
121+000	124+550
122+000	125+550
123+000	126+560
124+000	127+565

Existing Chainage (i.e. Km stone)	Design Chainage(Km)
72+000	72+120
73+000	73+240
74+000	74+240
75+000	75+240
76+000	76+240
77+000	77+240
78+000	78+240
79+000	79+245
80+000	80+250
81+000	81+245
82+000	82+240
83+000	83+240
84+000	84+230
85+000	85+230
86+000	86+230
87+000	87+225
88+000	88+225
89+000	89+220
90+000	90+220
91+000	91+220
92+000	92+225

Existing Chainage (i.e. Km stone)	Design Chainage(Km)
125+000	128+560
126+000	129+565
127+000	130+570
128+000	131+540
129+000	132+570
130+000	133+575
131+000	134+575
BYPASS	135+580
BYPASS	136+580
BYPASS	137+590
BYPASS	138+620
BYPASS	139+600
BYPASS	140+610
138+000	143+390
139+000	144+400
140+000	145+425
141+000	146+380
142+000	147+420
143+000	148+420
144+000	150+420
144+400	150+050

Appendix A-III

Traffic Table

Location	Year of Survey	Two wheelers	Three wheelers	Cars	Buses	LCV	HGV **	Slow Moving Vehicles	Total	PCU
54+500	2005	2885	346	2341	621	1014	5364	255	12826	26836
97+800	2005	1556	152	1183	533	678	3500	102	7716	12956
130+600	2005	1637	199	1367	621	699	3848	124	8499	18826

** HGV

Location	Truck M-axle	Truck 2-axle
54+500	1924	3440
97+800	824	2676
130+600	1225	2623

Appendix A-IV

Urban/Built up Settlements along the Project Highway

Existing Chainage From	Existing Chainage To	Land Use Type (Left / Right)	Name of Town and Village
42+700	45+600	Builtup	Yawat
47+700	48+600	Builtup,Agricultural	Bhandgaon
54+600	56+500	Builtup,Barren	Choufulla
58+000	59+000	Residential, Agricultural	Warwand
63+500	64+400	Builtup,Agricultural	Patas
65+000	65+200	Residential, Agricultural	Khedgaon
70+000	72+000	Residential, Agricultural	Mukandwadi
72+100	75+600	Builtup,Agricultural	Kurkumbh
79+600	81+100	Builtup,Agricultural	Malad
84+000	84+300	Residential, Agricultural	Ravangaon
88+000	88+900	Residential, Agricultural	Deshmukhwadi
90+000	90+500	Residential, Agricultural	Khadki
98+000	100+200	Builtup,Barren	Bhigwan
108+000	108+200	Residential, Agricultural	Walchandnagar
110+300	110+400	Residential, Agricultural	Dalaj No.2
113+300	113+700	Residential, Agricultural	Kalewadi No.2
116+000	116+500	Residential, Agricultural	Palasdeo Village
120+000	120+400	Residential, Agricultural	Loni Deokar
123+200	124+000	Residential, Agricultural	Balpudi
134+000	136+500	Builtup	Indapur
139+650	139+850	Residential, Agricultural	Sardewadi

Appendix A-V

Existing Right of Way

Sr.No	Chainage		Average Row (m)	Sr.No	Chainage		Average Row (m)
	To	From			To	From	
1	40+000	40+400	25	184	92+200	92+400	30
2	40+400	40+600	26	185	92+400	92+600	30
3	40+600	40+800	28	186	92+600	92+800	33
4	40+800	41+000	38	187	92+800	93+000	40
5	41+000	41+200	49	188	93+000	93+200	38
6	41+200	41+400	53	189	93+200	93+400	28
7	41+400	41+600	55	190	93+400	93+600	28
8	41+600	41+800	55	191	93+600	93+800	28
9	41+800	42+000	53	192	93+800	94+000	20
10	42+000	42+200	48	193	94+000	94+200	23
11	42+200	42+400	43	194	94+200	94+400	30
12	42+400	42+800	41	195	93+400	93+600	30
13	42+800	43+000	40	196	93+600	93+800	30
14	43+000	43+200	41	197	93+800	94+000	33
15	43+200	43+400	42	198	94+000	94+200	23
16	43+400	43+600	41	199	94+200	94+800	30
17	43+600	43+800	39	200	94+800	95+000	33
18	43+800	44+000	36	201	95+000	95+200	35
19	44+000	44+400	35	202	95+200	95+400	28
20	44+400	44+600	33	203	95+400	95+600	25
21	44+600	44+800	30	204	95+600	96+800	30
22	44+800	45+000	31	205	96+800	97+000	25
23	45+000	46+200	33	206	97+000	97+200	23
24	46+200	46+400	28	207	97+200	97+400	28
25	46+400	46+600	21	208	97+400	97+600	30
26	46+600	48+200	20	209	97+600	97+800	30
27	48+200	48+400	23	210	97+800	98+000	38
28	48+400	49+000	25	211	98+000	99+000	45
29	49+000	49+400	20	212	99+000	99+200	50
30	49+400	49+600	23	213	99+200	99+400	55
31	49+600	50+000	28	214	99+400	99+600	50
32	50+000	50+200	25	215	99+600	100+800	45
33	50+200	50+400	28	216	100+800	101+000	46
34	50+400	50+800	30	217	101+000	105+200	45
35	50+800	51+000	34	218	105+200	105+400	58
36	51+000	51+400	30	219	105+400	105+600	70
37	51+400	51+800	35	220	105+600	107+000	68
38	51+800	52+200	43	221	107+000	107+200	71
39	52+200	52+600	35	222	107+200	108+800	75
40	52+600	52+800	44	223	108+800	110+000	58
41	52+800	53+000	40	224	110+000	110+200	62
42	53+000	53+400	30	225	110+200	110+400	70
43	53+400	53+800	31	226	110+400	110+600	78
44	53+800	54+000	28	227	110+600	110+800	80
45	54+000	54+200	27	228	110+800	111+000	75
46	54+200	54+400	31	229	111+000	111+200	73

Sr.No	Chainage		Average Row (m)	Sr.No	Chainage		Average Row (m)
	To	From			To	From	
47	54+400	54+600	32	230	111+200	111+400	73
48	54+600	54+800	29	231	111+400	111+600	70
49	54+800	55+000	25	232	111+600	111+800	68
50	55+000	55+200	29	233	111+800	112+000	61
51	55+200	55+600	30	234	112+000	112+200	59
52	55+600	56+000	28	235	112+200	112+400	60
53	56+000	56+400	30	236	112+400	112+600	60
54	56+400	56+600	28	237	112+600	112+800	63
55	56+600	56+800	33	238	112+800	113+000	62
56	56+800	57+000	25	239	113+000	113+200	57
57	57+000	57+200	28	240	113+200	113+400	58
58	57+200	57+400	33	241	113+400	113+600	63
59	57+400	57+800	35	242	113+600	113+800	65
60	57+800	58+000	25	243	113+800	114+000	61
61	58+000	58+200	20	244	114+000	114+200	61
62	58+200	58+400	30	245	114+200	114+400	65
63	58+400	58+600	28	246	114+400	114+600	65
64	58+600	58+800	25	247	114+600	114+800	63
65	58+800	59+200	38	248	114+800	115+000	53
66	59+200	59+400	45	249	115+000	115+200	58
67	59+400	59+600	45	250	115+200	115+400	70
68	59+600	59+800	40	251	115+400	115+600	65
69	59+800	60+000	35	252	115+600	115+800	60
70	60+000	60+600	30	253	115+800	116+000	58
71	60+600	60+800	28	254	116+000	116+200	60
72	60+800	61+200	25	255	116+200	116+400	65
73	61+200	61+600	30	256	116+400	116+600	55
74	61+600	61+800	28	257	116+600	116+800	53
75	61+800	62+000	25	258	116+800	117+000	65
76	62+200	62+400	28	259	117+000	117+200	70
77	62+400	62+600	25	260	117+200	117+400	70
78	62+600	62+800	35	261	117+400	117+600	70
79	62+800	63+600	28	262	117+600	117+800	45
80	63+600	63+800	35	263	117+800	118+000	45
81	63+800	64+200	40	264	118+000	118+200	25
82	64+200	64+400	35	265	118+200	118+400	28
83	64+400	64+800	30	266	118+400	118+600	28
84	64+800	65+000	31	267	118+600	118+800	30
85	65+000	65+200	36	268	118+800	119+000	24
86	65+200	65+600	40	269	119+000	119+200	19
87	65+600	65+800	35	270	119+200	119+400	25
88	65+800	66+000	33	271	119+400	119+800	30
89	66+000	66+800	30	272	119+600	119+800	30
90	66+800	67+200	25	273	119+800	120+000	22
91	67+200	67+800	30	274	120+000	120+200	15
92	67+800	68+200	25	275	120+200	120+400	18
93	68+200	68+400	30	276	120+400	120+600	23
94	68+400	68+600	25	277	120+600	120+800	30
95	68+600	68+800	20	278	120+800	121+000	33
96	68+800	69+000	30	279	121+000	121+200	25

Sr.No	Chainage		Average Row (m)	Sr.No	Chainage		Average Row (m)
	To	From			To	From	
97	69+000	69+200	40	280	121+200	121+400	23
98	69+200	69+400	35	281	121+400	121+600	23
99	69+400	69+600	35	282	121+600	121+800	20
100	69+600	69+800	45	283	121+800	122+000	19
101	69+800	70+000	43	284	122+000	122+200	19
102	70+000	70+200	38	285	122+200	122+400	23
103	70+200	70+600	40	286	122+400	122+600	35
104	70+600	70+800	40	287	122+600	122+800	50
105	70+800	71+000	43	288	122+800	123+000	50
106	71+000	71+600	53	289	123+000	123+200	53
107	71+600	71+800	58	290	123+200	123+400	60
108	71+800	72+000	53	291	123+400	123+600	58
109	72+000	72+200	78	292	123+600	123+800	50
110	72+200	72+400	73	293	123+800	126+800	45
111	72+400	72+600	70	294	126+800	127+000	32
112	72+600	72+800	60	295	127+000	127+200	24
113	72+800	73+200	50	296	127+200	127+400	30
114	73+200	73+400	53	297	127+400	127+600	30
115	73+400	73+600	58	298	127+600	127+800	28
116	73+600	73+800	45	299	127+800	128+000	30
117	73+800	74+000	40	300	128+000	128+200	40
118	74+000	74+200	50	301	128+200	129+600	45
119	74+200	74+400	53	302	129+600	129+800	35
120	74+400	74+600	50	303	129+800	130+000	28
121	74+600	74+800	48	304	130+000	130+200	25
122	74+800	75+000	45	305	130+200	130+400	25
123	75+000	75+600	40	306	130+400	130+600	25
124	75+600	75+800	38	307	130+600	130+800	28
125	75+800	76+000	35	308	130+800	131+000	28
126	76+000	76+200	38	309	131+000	131+200	30
127	76+200	74+800	40	310	131+200	131+400	35
128	74+800	75+000	45	311	131+400	131+600	35
129	75+000	75+600	40	312	131+600	132+000	40
130	75+600	76+000	35	313	132+000	132+200	29
131	76+000	76+200	38	314	132+200	132+400	30
132	76+200	77+000	40	315	132+400	132+600	33
133	77+000	77+200	38	316	132+600	132+800	38
134	77+200	78+000	35	317	132+800	133+000	38
135	78+000	78+200	30	318	133+000	133+200	35
136	78+200	78+400	25	319	133+200	133+400	35
137	78+400	78+600	28	320	133+400	133+600	30
138	78+600	78+800	33	321	133+600	133+800	28
139	78+800	79+000	30	322	133+800	134+000	29
140	79+000	79+200	28	323	134+000	134+200	37
141	79+200	79+400	38	324	134+200	134+400	40
142	79+400	80+000	45	325	134+400	134+600	38
143	80+000	80+200	35	326	134+600	134+800	33
144	80+200	80+400	25	327	134+800	135+600	30
145	80+400	80+600	28	328	135+600	135+800	33
146	80+600	82+600	30	329	135+800	136+000	25

Sr.No	Chainage		Average Row (m)	Sr.No	Chainage		Average Row (m)
	To	From			To	From	
147	82+600	82+800	33	330	136+000	136+200	20
148	82+800	83+000	38	331	136+200	136+400	25
149	83+000	83+200	40	332	136+400	136+600	28
150	83+200	83+400	45	333	136+600	136+800	30
151	83+400	83+600	60	334	136+800	137+000	28
152	83+600	83+800	70	335	137+000	137+200	23
153	83+800	84+000	50	336	137+200	137+400	20
154	84+000	84+200	53	337	137+400	137+600	23
155	84+200	84+400	45	338	137+600	137+800	30
156	84+400	84+600	48	339	137+800	138+000	31
157	84+600	85+800	50	340	138+000	138+200	28
158	85+800	86+800	45	341	138+200	138+400	30
159	86+800	87+000	40	342	138+400	138+600	33
160	87+000	87+200	35	343	138+600	138+800	33
161	87+200	87+400	33	344	138+800	139+000	28
162	87+400	87+600	28	345	139+000	139+200	23
163	87+600	87+800	25	346	139+200	139+400	20
164	87+800	88+000	30	347	139+400	139+600	25
165	88+000	88+200	33	348	139+600	139+800	30
166	88+200	88+400	30	349	139+800	140+000	27
167	88+400	88+600	33	350	140+000	140+200	30
168	88+600	88+800	38	351	140+200	140+400	30
169	88+800	89+000	43	352	140+400	140+600	33
170	89+000	89+200	40	353	140+600	140+800	38
171	89+200	89+400	33	354	140+800	141+000	40
172	89+400	89+600	33	355	141+000	141+200	35
173	89+600	89+800	35	356	141+200	141+400	30
174	89+800	90+000	38	357	141+400	141+600	35
175	90+000	90+200	38	358	141+600	141+800	35
176	90+200	90+400	33	359	141+800	142+800	30
177	90+400	91+000	30	360	142+800	143+000	28
178	91+000	91+200	33	361	143+000	143+200	35
179	91+200	91+400	35	362	143+200	143+400	43
180	91+400	91+600	33	363	143+400	143+800	40
181	91+600	91+800	30	364	143+800	144+000	35
182	91+800	92+000	28	365	144+000	144+200	28
183	92+000	92+200	28	366	144+200	144+400	35

Appendix A-VI

Inventory of Road works

a.	Existing Carriageway Width	Appendix A-VI(a)
b.	Existing Crust	Appendix A-VI(b)
c.	Pavement Roughness	Appendix A-VI(c)
d.	Pavement deflection	Appendix A-VI(d)
e.	Existing Major Junctions	Appendix A-VI(e)
f.	Existing Minor Junctions	Appendix A-VI(f)
g.	Existing Truck Laybyes	Appendix A-VI(g)
h.	Existing Bus bays	Appendix A-VI(h)

Appendix A-VI(a)

Existing Carriageway Width

Existing chainage		Carriageway Width	Paved shoulder	Earthen Shoulders
From	To			
40.000	43.000	10.00	-	2 x 1.0
43.000	44.000	12.000	-	2 x 1.0
44.000	50.000	10.000	-	2 x 1.0
50.000	52.000	10.000	-	2 x 1.5
52.000	55.000	10.000	-	2 x 1.0
55.000	57.000	8.000	2 x1.5	-
57.000	58.000	7.000	2 x1.2	-
58.000	60.000	6.600	2 x1.5	-
60.000	62.000	7.400	2 x1.3	2 x 1.6
62.000	65.000	7.500	2 x1.3	2 x 1.0
65.000	66.500	7.100	-	2 x 2.5
66.500	68.500	7.100	-	2 x 2.0
68.500	69.000	7.000	-	2 x 3.0
69.000	75.000	7.100	-	2 x 2.5
75.000	77.000	7.200	-	2 x 2.5
77.000	86.000	7.100	-	2 x 2.5
86.000	88.000	7.200	-	2 x 2.5
88.000	91.000	7.100	-	2 x 2.5
91.000	94.000	7.000	-	2 x 2.5
94.000	96.000	7.100	-	2 x 3.0
96.000	97.000	7.100	-	2 x 2.5
97.000	100.500	7.000	-	2 x 2.5
100.500	112.500	7.000	-	2 x 2.0
112.500	121.000	7.100	-	2 x 1.5
121.000	135.000	7.000	-	2 x 2.5
135.000	136.000	8.000	2 x 1.0	-
136.000	137.000	7.000	2 x 1.0	-
137.000	144.400	7.000	-	2 x 2.5

Appendix A-VI (b)

Existing Crust

Location (km)	Main Carriageway			
	BT (mm)	WBM (mm)	Granular layer	Total (mm)
40	200	120	200	520
41	200	120	200	520
42	160	120	200	480
43	160	120	200	480
44	240	180	200	620
45	204	168	200	572
46	208	180	200	588
47	212	192	200	604
48	216	204	200	620
49	80	150	200	430
50	80	150	200	430
51	80	200	200	480
52	80	200	200	480
53	80	200	200	480
54	80	200	200	480
55	80	320	200	600
56	80	320	200	600
57	80	200	200	480
58	80	200	200	480
59	80	280	200	560
60	80	280	200	560
61	140	240	200	580
62	140	240	200	580
63	100	180	200	480
64	100	180	200	480
65	120	180	200	500
66	120	180	200	500
67	120	200	200	520
68	120	200	200	520
69	150	200	200	550
70	150	200	200	550
71	140	180	200	520
72	140	180	200	520
73	170	180	200	550
74	170	180	200	550
75	100	75	200	375
76	100	75	200	375
77	200	120	200	520
78	200	120	200	520
79	160	120	200	480
80	160	120	200	480

Location (km)	Main Carriageway			
	BT (mm)	WBM (mm)	Granular layer	Total (mm)
81	240	180	200	620
82	240	180	200	620
83	240	180	200	620
84	240	180	200	620
85	100	150	200	450
86	100	150	200	450
87	170	170	200	540
88	170	170	200	540
89	110	170	200	480
90	110	170	200	480
91	120	150	200	470
92	120	150	200	470
93	240	280	200	720
94	240	280	200	720
95	180	100	200	480
96	180	100	200	480
97	150	80	200	430
98	150	80	200	430
99	160	100	200	460
100	160	100	200	460
101	130	170	200	500
102	130	170	200	500
103/100	150	180	200	530
105/500	150	150	200	500
107	230	180	200	610
108	230	180	200	610
109	220	200	200	620
110	220	200	200	620
111	110	200	200	510
112	110	200	200	510
113	170	200	200	570
114	170	200	200	570
115	260	200	200	660
116	260	200	200	660
117	200	150	200	550
118	200	150	200	550
119	230	200	200	630
120	230	200	200	630
121	160	150	200	510
122	160	150	200	510
123	150	130	200	480
124	150	130	200	480
125	150	150	200	500
126	150	150	200	500
127	270	210	200	680

Location (km)	Main Carriageway			
	BT (mm)	WBM (mm)	Granular layer	Total (mm)
128	270	210	200	680
129	260	130	200	590
130	260	130	200	590
131	220	150	200	570
132	220	150	200	570
133	280	200	200	680
134	280	200	200	680
135	280	200	200	680
136	280	200	200	680
137	220	170	200	590
138	220	170	200	590
139	130	150	200	480
140	130	150	200	480
141	100	70	200	370
142	100	70	200	370
143	130	170	200	500
144	130	170	200	500

Appendix A - VI(c)

Pavement roughness

Stretch	Roughness (BI mm/km)
40+000 – 61+000	2720
61+000 – 101+000	3610
101+000 144+400	2410

Appendix A - VI(d)

Pavement Deflection

Sl. No.	Chainage (Km)		Characteristic Deflection (mm)
	From	To	
1	40+000	41+000	0.98
2	41+000	42+000	0.57
3	42+000	43+000	1.13
4	43+000	44+000	1.19
5	44+000	45+000	0.80
6	45+000	46+000	1.30
7	46+000	47+000	1.54
8	47+000	48+000	1.81
9	48+000	49+000	1.18
10	49+000	50+000	1.11
11	50+000	51+000	1.67
12	52+000	53+000	1.35
13	53+000	54+000	1.23
14	54+000	55+000	0.74
15	55+000	56+000	0.86
16	56+000	57+000	0.71
17	57+000	58+000	0.92
18	58+000	59+000	0.96
19	59+000	60+000	0.94
20	60+000	61+000	1.00
21	61+000	62+000	1.29
22	62+000	63+000	1.30
23	63+000	64+150	1.43
24	64+150	65+000	1.27
25	65+000	66+000	1.28
26	66+000	67+000	1.47
27	67+000	68+000	1.05
28	68+000	69+000	0.64
29	69+000	70+000	0.72
30	70+000	71+000	1.04
31	71+000	72+000	0.49
32	72+000	73+000	1.01
33	73+000	74+000	1.47
34	74+000	75+000	1.27

Sl. No.	Chainage (Km)		Characteristic Deflection (mm)
	From	To	
35	75+000	76+000	1.46
36	76+000	77+000	1.50
37	77+000	78+000	1.52
38	78+000	79+000	0.84
39	79+000	80+000	1.06
40	80+000	81+000	0.91
41	81+000	82+000	1.49
42	82+000	83+000	1.48
43	83+000	84+000	1.42
44	84+000	85+000	1.18
45	85+000	86+000	1.24
46	86+000	87+000	1.36
47	87+000	88+000	1.81
48	88+000	89+000	1.80
49	89+000	90+000	1.75
50	90+000	91+000	1.07
51	91+000	92+000	2.20
52	92+000	93+000	1.33
53	93+000	94+000	1.65
54	94+000	95+000	1.73
55	95+000	96+000	1.80
56	96+000	97+000	1.02
57	97+000	98+000	1.46
58	98+000	99+000	1.34
59	99+000	100+000	1.15
60	100+000	101+000	1.23
61	101+000	102+000	1.14
62	102+000	103+000	1.23
63	103+000	104+000	0.89
64	104+000	105+000	0.69
65	105+000	106+000	1.21
66	106+000	107+000	1.36
67	107+000	108+000	1.16
68	108+000	109+000	0.79
69	109+000	110+000	0.98
70	110+000	111+000	0.68
71	111+000	112+000	1.31
72	112+000	113+000	1.35

Pune Solapur Expressways Private Limited Delhi

Sl. No.	Chainage (Km)		Characteristic Deflection (mm)
	From	To	
73	113+000	114+000	1.36
74	114+000	115+150	0.59
75	115+150	116+000	0.83
76	116+000	117+000	0.48
77	117+000	117+000	1.00
78	117+000	119+000	0.71
79	119+000	120+000	0.75
80	120+000	121+000	1.38
81	121+000	122+000	1.18
82	122+000	123+000	1.24
83	123+000	124+000	1.16
84	124+000	125+000	1.22
85	125+000	126+000	0.91
86	126+000	127+000	0.74
87	127+000	128+000	0.86
88	128+000	129+000	0.71
89	129+000	130+000	1.33
90	130+000	131+000	1.72
91	131+000	132+000	0.95
92	132+000	133+000	0.82
93	133+000	134+000	1.29
94	134+000	135+000	1.21
95	135+000	136+000	1.36
96	136+000	137+000	1.36
97	137+000	138+000	1.19
98	138+000	139+000	1.09
99	139+000	140+000	0.94
100	140+000	141+000	0.92
101	141+000	142+000	0.85
102	142+000	143+000	0.74
103	143+000	144+000	0.84

Appendix A - VI(e)

Existing Major Junctions

S. No	Existing Chainage	Side (Left/Right)	Destination
1	55+000	Cross	To Satara SH-62 R/S, Ahmednagar
2	64+800	Y	To Daund SH67 & Ahmednagar
3	73+800	Cross	To Daund RHS, Baramati L/S
4	99+800	Cross	To Baramati SH 63R/S, Ahmednagar L/S
5	132+800	Y	To Akluj R/S

Appendix A- V (f)

Existing Minor Junction junctions

S. No	Existing Chainage	Side (Left/Right)	Destination
1	58+300	Cross	To Kaden L/S, Farmhouse R/S
2	63+700	R/S	To Baramati R/S
3	65+700	R/S	To Baramati R/S
4	69+200	L/S	To MIDC
5	90+100	R/S	To Baramati
6	103+500	R/S	To Ballarpur Industries Ltd.
7	108+000	Cross	To Walchand Nagar R/S, Dalaj L/S
8	116+500	L/S	To Padasdeo
9	120+100	Cross	To Nimgaon R/S, Loni L/S
10	121+500	R/S	To MIDC
11	123+200	Cross	To Balpudi R/S, Warkute L/S
12	127+400	Staggered	To Bijwadi R/S, Kalthan No.1 L/S

Appendix A-VI(g)

Existing truck laybyes

- Nil -

Appendix A-VI (h)

Existing Bus Bays

- Nil -

Appendix A-VII

Inventory of structures

(i)	Major & Minor Bridges	Appendix A-VII (a)
(ii)	Minor Bridges	Appendix A-VII (b)
(iii)	Culverts	Appendix A-VII (c)
(iv)	Grade separated junctions	Appendix A-VII (d)
(v)	ROB / RUBs	Appendix A-VII (e)
(vi)	Railway level crossings	Appendix A-VII (g)

Appendix A-VII (a)

Existing Major Bridges

S. No.	Name of Bridge	Bridge No.	Chainage (km)	Width	Span arrangement & total length	General Condition
1	Sonar Nallah/ Roti nallah crossing	93/129	93+135	7.1	8 x 7.7	Fair

Appendix A-VII (b)

Existing Minor Bridges

Sr. No.	Name of Bridge	Bridge No.	Chainage (km)	Width	Span arrangement & total length	General Condition
1	Shiva Nallah Crossing	41/2	40+775	11.00	3 x 2.6	Fair
2	Irrigation Canal Crossing	42/2	41+317	10.00	3 x 7.6	Good
3		43/1	42+200		2 x 7.2	Fair
4	Irrigation Canal Crossing	43/3	42+655	10.00	6.9 + 7.5 + 5 + 7.9	Fair
5	Nallah Crossing	44/2	43+512	12.00	5 x 6.5	Fair
6	Irrigation Canal Crossing	45/2	44+247	21.00	3 x 7	Good
7	Nallah Crossing	46/6	45+900	11.10	3.2 + 3.8 + 3.2	Good
8	Nallah Crossing	48/2	47+400	10.20	4.2 + 4 + 4.2	Fair
9	Nallah Crossing	49/1	48+450	11.00	3.5 + 4.1 + 3.9 + 3.6	Good
10	Nallah Crossing	52/1	51+892	13.70	1 x 15.6	Fair
11	Canal Crossing	53/2	52+600	10.9	7.1 + 7.4 + 7.9	Fair
12	Nallah Crossing	53/4	52+950	10.9	2 x 7.1	Good
13	Nallah Crossing	55/1	54+000	11.10	2 x 4.1	Good
14	Varvand Nallah	60/05	60+050	7.30	9.7 + 10 + 10 + 10 + 10 + 9.7	Fair
15	Nallah Crossing	61/950	61+950	11.10	9.7 + 10 + 4 +10.4 + 10.4 + 9	Good
16	Patas Nallah Crossing	64/05	64+050	11.95	3.4 + 3.6 + 3.6 + 3.6 + 3.4	Good
17	Irrigation Canal Crossing	65/300	65+300	11.05	6.1 + 5.0 + 6.1	Fair
18	Mallad Nallah Crossing	81/465	81+645	7.80	1 x 6.8	Fair
19	Khadaki Nallah Crossing	89/543	89+545	7.60	1 x 6.5	Fair
20	Khadaki Nallah	89/724	89+730	7.00	1 x 6.5	Fair
21	Nallah Crossing)	95/07	95+270	8.60	1 x 7.9	Good
22	Karanji Nallah & Back Water of Uini Dam	100/500	100+500	47.40	2 x 21.5	Poor
23	Aamir Hamaal Nallah Crossing	102/300	102+300	7.50	16 + 16.2 + 16.6	Poor
24	Badalwadi Nallah No. 1	106/650	106+650	11.00	8.25 + 9.25 + 4.15 + 9.1 + 8.5	Fair
25	Bindalwadi Nallah	107/050	107+050	7.80	2 x 16.4	Fair

Sr. No.	Name of Bridge	Bridge No.	Chainage (km)	Width	Span arrangement & total length	General Condition
	No. 2					
26	Nallah Crossing		108+895		1 x 7	
27	Dalaj Nallah 1	109/00	109+000	7.20	1 x 8.5	
28	Nallah Crossing Dalaj Nallah No. 2	110/400	110+400	7.00	10.2 + 10.7 + 9.9	Poor
29	Dalaj Nallah No. 3	112/080	112+080	6.80	9.3 + 9.3 + 9.5	Poor
30	Palasdev Nallah	115/050	115+050	6.00	16.6 + 16.4 + 16.6	Poor
31	Lonidevkal Nallah	119/600	119+600	11.00	2 x 6	Good
32	Lonidevkal Nallah	119/700	119+700	10.40	1 x 6	Fair
33	Gagargaon Nallah No. 1	126/600	126+600	7.50	9.75 + 9.7 + 9.6	Fair
34	Varangalli Nallah	126/900	126+900	7.50	8.7 + 8.8 + 5 + 8.8 + 8.9 + 8.8	Fair
35	Nallah Crossing	128/200	128+050	7.40	5 x 3.65	Poor
36	Babhulgaon Nallah	142/600	142+600	7.50	6.6 + 7.0 + 6.6	Poor

Appendix A-VII (c)

Culverts

1. List of Pipe Culverts

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
1.	41+070	41+185	Pipe	1X1.0	
2.	41+450	41+514	Pipe	1X1.0	
3.	41+750	41+800	Pipe	1X1.2	
4.	43+150	43+319	Pipe	1X1.2	
5.	44+600	44+679	Pipe	1X1.0	
6.	45+135	45+300	Pipe	1X1.0	
7.	45+665	45+837	Pipe	2X1.2	
8.	45+715	45+893	Pipe	1X1.2	
9.	46+440	46+600	Pipe	3X1.2	
10.	46+940	47+037	Pipe	1X1.2	
11.	47+050	47+219	Pipe	1X1.2	
12.	47+450	47+625	Pipe	2X1.2	
13.	47+960	48+091	Pipe	1X1.2	
14.	48+070	48+255	Pipe	1X0.9	
15.	48+720	48+899	Pipe	2X1.2	
16.	49+790	49+918	Pipe	3X1.0	
17.	50+270	50+459	Pipe	1X1.0	
18.	50+390	50+579	Pipe	4X1.0	
19.	52+530	52+700	Pipe	1X1.0	
20.	52+815	53+003	Pipe	1X0.75	
21.	53+165	53+349	Pipe	1X0.9	
22.	54+600	54+126	Pipe	1X1.0	
23.	55+235	55+429	Pipe	1X0.75	
24.	55+410	55+590	Pipe	1X1.0	
25.	56+210	56+391	Pipe	1X1.0	
26.	56+255	56+436	Pipe	3X0.75	
27.	56+730	56+917	Pipe	3X1.2	
28.	56+990	57+197	Pipe	1X1.0	
29.	57+650	57+256	Pipe	3X1.2	
30.	57+230	57+528	Pipe	1X1.0	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
31.	57+520	57+712	Pipe	2X0.75	
32.	57+850	58+038	Pipe	1X1.0	
33.	58+410	58+624	Pipe	1X1.0	
34.	59+800	59+293	Pipe	1X1.2	
35.	59+625	59+832	Pipe	1X1.2	
36.	60+490	60+685	Pipe	1X1.0	
37.	61+950	61+600	Pipe	1X0.75	
38.	61+720	61+918	Pipe	1X1.0	
39.	62+130	62+280	Pipe	1X1.0	
40.	62+510	62+707	Pipe	1X1.0	
41.	63+180	63+000	Pipe	1X0.75	
42.	63+100	63+200	Pipe	3X0.75	
43.	63+475	63+720	Pipe	1X1.0	
44.	64+560	64+759	Pipe	1X0.75	
45.	64+710	64+908	Pipe	1X0.75	
46.	65+040	65+300	Pipe	1X2.0	
47.	65+900	65+335	Pipe	1X1.0	
48.	65+550	65+800	Pipe	1X2.0	
49.	67+240	67+463	Pipe	1X1.0	
50.	67+370	67+599	Pipe	1X1.0	
51.	68+600	68+350	Pipe	1X1.0	
52.	69+370	69+594	Pipe	1X1.0	
53.	70+270	70+523	Pipe	1X1.0	
54.	70+510	70+696	Pipe	2X1.0	
55.	71+300	71+520	Pipe	1X0.75	
56.	71+670	71+858	Pipe	2X1.0	
57.	72+330	72+450	Pipe	2X0.75	
58.	72+430	72+550	Pipe	1X1.0	
59.	72+590	72+725	Pipe	1X1.0	
60.	72+830	72+958	Pipe	2X0.75	
61.	73+000	73+237	Pipe	1X1.0	
62.	73+170	73+410	Pipe	1X1.0	
63.	73+425	73+670	Pipe	2X0.75	
64.	74+200	74+265	Pipe	2X1.0	
65.	74+410	74+650	Pipe	1X1.0	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
66.	76+170	76+048	Pipe	1X1.0	
67.	76+670	76+872	Pipe	2X1.0	
68.	77+300	77+193	Pipe	1X1.0	
69.	77+600	77+295	Pipe	1X1.0	
70.	77+440	77+678	Pipe	2X1.0	
71.	77+640	77+841	Pipe	1X1.0	
72.	78+220	78+470	Pipe	1X1.0	
73.	79+510	79+800	Pipe	1X0.75	
74.	80+240	80+482	Pipe	1X0.75	
75.	81+160	81+063	Pipe	1X1.0	
76.	81+260	81+502	Pipe	1X0.75	
77.	82+700	82+323	Pipe	2X1.0	
78.	82+130	82+380	Pipe	2X1.0	
79.	82+520	82+764	Pipe	2X1.0	
80.	82+530	82+913	Pipe	1X0.60	
81.	83+230	83+460	Pipe	2X1.0	
82.	83+330	83+551	Pipe	2X1.0	
83.	84+800	84+100	Pipe		
84.	84+340	84+583	Pipe	1X1.0	
85.	84+530	84+802	Pipe	2X1.0	
86.	84+665	84+877	Pipe	2X1.0	
87.	84+640	84+983	Pipe	1X1.0	
88.	85+295	85+539	Pipe	1X1.0	
89.	85+555	85+760	Pipe	1X1.0	
90.	86+180	86+017	Pipe	1X1.0	
91.	86+270	86+522	Pipe	1X1.0	
92.	86+460	86+684	Pipe	2X1.0	
93.	87+070	87+335	Pipe	1X0.75	
94.	88+390	88+634	Pipe	2X0.90	
95.	88+600	88+840	Pipe	2X0.90	
96.	89+070	89+110	Pipe	1X0.75	
97.	90+240	90+483	Pipe	1X0.60	
98.	90+580	90+800	Pipe	1X1.0	
99.	90+720	90+970	Pipe	1X0.75	
100.	91+240	91+495	Pipe	2X1.0	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
101.	91+560	91+800	Pipe	1X1.0	
102.	92+600	92+291	Pipe	1X1.0	
103.	92+260	92+500	Pipe	1X1.0	
104.	92+440	92+691	Pipe	1X0.75	
105.	92+560	92+785	Pipe	1X1.0	
106.	93-120	93+078	Pipe	1X1.0	
107.	93+460	93+677	Pipe	1X1.0	
108.	93+460	93+715	Pipe	1X0.75	
109.	93+660	93+891	Pipe	1X1.0	
110.	94+190	94+436	Pipe	1X1.0	
111.	94+510	94+750	Pipe	1X0.5	
112.	95+350	95+385	Pipe	2X1.0	
113.	95+720	95+761	Pipe	2X1.0	
114.	95+825	95+855	Pipe	2X1.0	
115.	96+070	96+121	Pipe	1X0.60	
116.	96+080	96+330	Pipe	2X1.0	
117.	96+610	96+845	Pipe	2X1.0	
118.	96+815	96+950	Pipe	1X1.0	
119.	97+120	97+079	Pipe	2X1.2	
120.	97+425	97+726	Pipe	2X1.2	
121.	98+010	98+350	Pipe	1X1.0	
122.	98+450	98+850	Pipe	1X1.0	
123.	99+430	99+145	Pipe	2X1.0	
124.	99+130	99+394	Pipe	1X1.0	
125.	99+120	99+649	Pipe	1X1.0	
126.	99+270	99+820	Pipe	1X1.0	
127.	100+130	100+495	Pipe	1X1.0	
128.	101+390	102+477	Pipe	1X0.75	
129.	101+420	102+497	Pipe	1X0.75	
130.	101+720	102+767	Pipe	1X0.75	
131.	102+220	103+250	Pipe	1X0.75	
132.	102+850	103+900	Pipe	1X1.0	
133.	103+180	104+350	Pipe	1X0.75	
134.	103+560	104+700	Pipe	1X0.75	
135.	103+710	104+873	Pipe	1X0.75	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
136.	104+130	105+011	Pipe	1X0.75	
137.	104+090	105+267	Pipe	1X0.75	
138.	104+210	105+402	Pipe	1X0.75	
139.	104+580	105+546	Pipe	1X0.75	
140.	104+610	105+737	Pipe	1X0.75	
141.	104+710	105+882	Pipe	1X0.75	
142.	104+800	105+957	Pipe	1X0.75	
143.	105+280	106+172	Pipe	1X1.0	
144.	105+015	106+466	Pipe	2X0.75	
145.	105+160	106+649	Pipe	1X0.75	
146.	106+350	107+217	Pipe	1X0.75	
147.	106+140	107+429	Pipe	1X1.0	
148.	107+560	109+276	Pipe	1X0.75	
149.	107+850	109+705	Pipe	1X1.0	
150.	107+990	109+954	Pipe	1X0.75	
151.	108+130	110+105	Pipe	1X1.0	
152.	108+470	110+475	Pipe	1X1.0	
153.	108+760	110+650	Pipe	1X1.0	
154.	109+390	111+518	Pipe	1X1.0	
155.	110+210	112+039	Pipe	1X1.0	
156.	110+800	112+165	Pipe	1X1.0	
157.	110+130	112+450	Pipe	1X0.75	
158.	111+350	113+027	Pipe	1X1.0	
159.	111+170	113+633	Pipe	1X1.0	
160.	111+320	113+701	Pipe	3X1.0	
161.	111+650	114+150	Pipe	1X0.75	
162.	111+850	114+340	Pipe	1X1.0	
163.	112+410	115+014	Pipe	1X0.75	
164.	112+610	115+247	Pipe	1X1.0	
165.	112+720	115+382	Pipe	2X1.0	
166.	112+890	115+704	Pipe	1X1.0	
167.	113+300	115+816	Pipe	1X1.0	
168.	113+340	116+127	Pipe	1X1.0	
169.	113+510	116+219	Pipe	2X1.0	
170.	113+720	116+413	Pipe	2X1.0	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
171.	114+560	117+250	Pipe	2X1.0	
172.	114+660	117+350	Pipe	1X1.0	
173.	114+820	117+470	Pipe	1X1.0	
174.	115+010	118+057	Pipe	1X1.0	
175.	115+820	118+870	Pipe	2X1.0	
176.	115+850	118+892	Pipe	3X1.0	
177.	116+440	119+710	Pipe	2X0.75	
178.	116+640	119+917	Pipe	2X0.75	
179.	116+940	120+280	Pipe	2X1.0	
180.	117+270	120+656	Pipe	3X1.0	
181.	117+440	120+873	Pipe	1X0.75	
182.	117+760	121+205	Pipe	1X0.75	
183.	118+170	121+310	Pipe	1X0.75	
184.	118+330	121+818	Pipe	3X0.75	
185.	119+310	122+182	Pipe	2X0.75	
186.	119+670	123+196	Pipe	1X1.0	
187.	120+510	124+037	Pipe	1X0.75	
188.	120+590	124+193	Pipe	3X1.0	
189.	121+070	124+462	Pipe	2X1.0	
190.	121+060	124+596	Pipe	2X1.0	
191.	121+310	124+855	Pipe	2X1.0	
192.	122+400	125+510	Pipe	1X0.75	
193.	122+520	126+246	Pipe	3X1.0	
194.	123+200	126+527	Pipe	1X0.75	
195.	123+370	126+950	Pipe	1X1.0	
196.	124+240	127+817	Pipe	1X0.75	
197.	124+530	128+050	Pipe	2X0.75	
198.	124+730	128+250	Pipe	1X0.75	
199.	124+840	128+376	Pipe	1X0.75	
200.	125+750	128+662	Pipe	1X0.75	
201.	125+190	128+754	Pipe	1X0.75	
202.	125+460	129+062	Pipe	1X0.75	
203.	125+710	129+292	Pipe	1X0.75	
204.	126+550	129+525	Pipe	2X1.0	
205.	128+270	131+276	Pipe	3X0.75	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
206.	136+170	139+778	Pipe	1X1.2	
207.	138+710	144+050	Pipe	1X1.0	
208.	139+140	144+226	Pipe	1X0.60	
209.	140+110	145+534	Pipe	1X1.0	
210.	142+220	147+198	Pipe	2X1.0	
211.	142+800	147+326	Pipe	2X1.0	
212.	142+800	147+523	Pipe	2X0.75	
213.	143+320	148+094	Pipe	1X1.0	
214.	143+110	148+330	Pipe	2X0.75	
215.	143+200	148+425	Pipe	1X0.75	
216.	143+340	148+750	Pipe	2X0.75	
217.	144+230	149+190	Pipe	1X1.0	
218.	144+800	149+314	Pipe	2X0.90	
219.	144+150	149+407	Pipe	1X1.0	
220.	144+170	149+583	Pipe	1X0.75	
221.	144+340	149+752	Pipe	1x1.0	

2. Slab Culverts / Box Culverts

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
1.	40+350	40+349	Slab/Box	1X5.5	
2.	54+705	54+885	Slab/Box	1X3.2	
3.	56+490	56+686	Slab/Box	1X5.2	
4.	58+165	58+372	Slab	1X0.75	
5.	61+950	61+288	Slab/Box	1X1.3	
6.	61+515	61+750	Slab/Box	1X1.3	
7.	62+290	62+500	Slab/Box	1X1.0	
8.	66+545	66+800	Slab/Box	1X0.60	
9.	67+130	67+089	Slab/Box	1X0.60	
10.	67+470	67+700	Slab/Box	1X0.70	
11.	68+180	68+023	Slab/Box	1X2.1	
12.	68+460	68+650	Slab/Box	1X2.1	
13.	69+465	69+697	Slab/Box	1X0.60	
14.	69+740	69+965	Slab/Box	1X2.1	
15.	70+570	70+745	Slab/Box	1X1.1	
16.	71+100	71+217	Slab/Box	1X2.3	
17.	73+115	73+353	Slab/Box	1X2.0	
18.	73+730	73+930	Slab/Box	1X3.9	
19.	75+900	75+121	Slab/Box	1X3.0	
20.	75+300	75+539	Slab/Box	1X4.0	
21.	76+320	76+565	Slab/Box	1X1.8	
22.	78+710	78+959	Slab/Box	1X4.5	
23.	79+125	79+094	Slab/Box	1X1.6	
24.	80+430	80+723	Slab	1X3.3	
25.	81+400	81+283	Slab/Box	1X3.3	
26.	84+200	84+201	Slab/Box	1X2.3	
27.	85+500	85+211	Slab/Box	1X2.5	
28.	86+140	86+380	Slab/Box	1X2.4	
29.	88+120	88+363	Slab/Box	1X3.2	
30.	90+560	90+758	Stone/Box	1X0.60	
31.	95+230	95+031	Slab/Box	1X2.1	
32.	97+180	97+400	Slab/Box	1X2.1	
33.	98+170	98+170	Slab/Box	1X1.6	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
34.	101+100	102+055	Slab/Box	1X4.1	
35.	102+130	103+150	Slab/Box	1X4.1	
36.	106+240	107+825	Slab/Box	1X4.1	
37.	118+400	121+462	Slab/Box	1X3.0	
38.	118+280	121+720	Slab/Box	1X3.3	
39.	119+600	122+432	Slab/Box	1X1.7	
40.	120+065	123+602	Slab/Box	1X4.0	
41.	122+240	125+824	Slab/Box	1X2.6	
42.	128+240	131+818	Slab/Box	1X1.0	
43.	129+160	132+730	Slab/Box	1X2.0	
44.	130+410	133+205	Slab/Box	1X3.0	
45.	130+200	133+562	Slab/Box	3X1.0	
46.	130+650	134+310	Slab/Box	1X1.0	
47.	131+750	134+674	Slab/Box	1X1.2	
48.	131+260	134+843	Slab/Box	3X0.80	
49.	131+370	134+971	Slab/Box	1X2.7	
50.	131+750	135+293	Slab/Box	1X2.1	
51.	132+520	136+092	Slab/Box	1X2.0	
52.	132+710	136+320	Slab/Box	1X1.8	
53.	133+270	136+952	Slab/Box	2X0.80	
54.	134+260	137+326	Slab/Box	2X1.0	
55.	134+100	137+573	Slab/Box	1X1.0	
56.	134+415	137+948	Slab/Box	2X1.3	
57.	135+440	138+221	Slab/Box	2X1.5	
58.	135+130	138+477	Slab/Box	2X1.0	
59.	135+300	138+650	Slab/Box	2X1.0	
60.	135+460	138+030	Slab/Box	2X0.75	
61.	135+620	139+210	Slab/Box	1X0.45	
62.	135+890	139+434	Slab/Box	1X1.0	
63.	136+450	140+150	Slab/Box	1X1.0	
64.	136+540	140+245	Slab/Box	1X2.3	
65.	136+730	140+360	Slab/Box	1X2.3	
66.	136+810	140+513	Slab/Box	1X3.8	
67.	137+020	140+618	Slab/Box	1X0.75	
68.	137+290	142+712	Slab/Box	1X0.60	

Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Span Arrangement	Remarks/ Condition
69.	138+700	143+321	Slab/Box	1X1.0	
70.	138+400	143+380	Slab/Box	1X0.40	
71.	138+340	143+781	Slab/Box	1X3.2	
72.	139+190	144+562	Slab/Box	1X5.3	
73.	139+630	144+941	Slab/Box	1X2.3	
74.	140+120	145+296	Slab/Box	1X2.5	
75.	140+360	145+817	Slab/Box	1X3.5	
76.	141+800	146+261	Slab/Box	1X3.3	
77.	141+180	146+550	Slab/Box	1X1.0	
78.	141+270	146+686	Slab/Box	1X3.2	
79.	142+422	146+994	Slab/Box	2X1.2	
80.	143+690	148+962	Slab/Box	1X3.6	

Appendix A-VII (d)

Grade separated junctions

- Nil -

Appendix A-VII (e)

ROBs / RUBs

- Nil -

Appendix A-VII (f)

Railway level crossings

There exists only one at grade railway crossing at 79+600 (existing Chainage).

SCHEDULE – B

(See Clause 2.1)

DEVELOPMENT OF THE PROJECT HIGHWAY

1. **DEVELOPMENT OF THE PROJECT HIGHWAY**

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

2. **FOUR-LANING**

2.1. Four-Laning shall include construction of the Four-Lane Project Highway as described in **Annex-I** of this **Schedule-B** and **Annex-I** of **Schedule-C**.

2.2. Four-Laning shall be undertaken and completed by the Concessionaire in conformity with the Specifications and standards set forth in **Annex-I** of **Schedule-D**.

Annex – 1

(Schedule - B)

Description of Four-Laning

1. Width of Carriageway

1.1 The paved carriageway shall be 17.5 meters wide excluding the median:

Provided that in the following urban stretches, the width of carriageway shall be:

Total Length of the project corridor is 110.050 Km. Notwithstanding the base alignment plans enclosed with this document, the Concessionaire shall himself carryout and be responsible for the Design, Engineering, Finance, Construction, Operation and Maintenance for all the components relevant for the improvement and up-gradation of the Project Highway to fulfill the scope of the project as envisaged herein under. These shall comply with design specifications and standards given in Schedule D. The designs for different project facilities shall follow the locations and indicative designs given in Schedule C and shall comply with design specifications and standards outlined in Schedule D. The maintenance of the different elements of Project Highway and facilities thereon shall follow the minimum maintenance requirements as described in Schedule K. All the designs and drawings shall be reviewed by the Independent Consultant prior to execution.

1.2 Except as otherwise provided in this Agreement, the width of the paved carriageway shall conform to clause 1.1 above.

2. Project Facilities

Project facilities shall be constructed in conformity with Annex-I of Schedule-C.

3. Specifications and Standards

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

4. Other Features of four laning

4.1. Cross Sections

The Project Highway shall be widened to Four lane dual configuration with paved shoulder with or without Service Roads. A typical cross section alongwith different types of cross section required to be developed in different segments of the project highway are indicated in **Appendix BI**.

4.2. Alignment Plan and Longitudinal Section

The alignment and vertical profile of Project Highway is given at Appendix BII in soft copy. The FRL, gradients etc. Shall be as per the Manual of Specifications and Standards for 4 lane Highways.

4.3. Bypasses & Realignment

There is one bypass in the project highway. The details of bypass to be provided are given at **Appendix BIII.**

4.4. Service Road

Service Roads shall be provided in lengths indicated in **Appendix – BIV.**

4.5. Proposed Right of Way

The details of the Proposed ROW are given in **Appendix - BV.**

4.6. At Grade Intersection

At grade intersections shall be provided at the intersection of service roads and all intersecting roads at locations specified in **Appendix – B VI** for major intersections and in **Appendix BVII** for minor intersections.

4.7. Grade Separated Intersections

The grade separated intersections shall be as provided as given at **Appendix B VIII.**

4.8. Underpasses

Vehicular underpass shall be provided at location given at **Appendix – BIX.**

Pedestrian/cattle underpass shall be provided at location given at **Appendix – BX.**

4.9. Major bridges

Major bridges as listed in **Appendix BXI** shall be provided, widened, reconstructed, or extended.

4.10. **Minor bridges**

Minor bridges as listed in **Appendix BXII** shall be provided, widened, reconstructed, or extended.

4.11. **Culverts**

Culverts shall be provided, widened, reconstructed, or extended as listed in **Appendix BXIII.**

4.12. **ROB/RUB**

Details of ROB/RUBs to be provided are given at **Appendix BXIV**. Following points shall be taken care of:

i) The proposed span arrangements of the ROBs are tentative and subject to change as per availability of railway boundaries/requirement of the railways.

ii) ROB shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authority.

iii) The ROB's shall be constructed and maintained by the concessionaire under supervision of the Railways.

iv) All expenditure related to construction, maintenance and supervision of ROB (except P&E charges) shall be borne by the Concessionaire.

v) During construction, the existing level crossings shall be widened to 12 metres or two separate level crossings of 7 metres each shall be provided

4.13. **Entry/Exist ramps**

Entry/exit ramps for entering into or exiting from the project highway shall be provided wherever necessary.

4.14. **Slope protection**

The side slope shall be protected by using suitable slope protection measure wherever required along the present highway.

4.15. **Utilities**

Provision of accommodating utilities shall be made both over as well as underground wherever required.

4.16. **Rainwater Harvesting**

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

Appendix BI

1. Typical Cross Sections (please refer page B-30 to B-36)

2. Cross Section Type along the Project Corridor

S. No.	Design Chainage From	Design Chainage To	Length (km)	C/s Type
1	40+000	42+300	2.300	**001A**
2	42+300	46+000	3.700	002 / 004
3	46+000	54+400	8.400	001A
4	54+400	56+200	1.800	002 / 004
5	56+200	58+200	2.000	001A
6	58+200	59+600	1.400	001A / 003
7	59+600	63+200	3.600	001A
8	63+200	65+300	2.100	001B / 003
9	65+300	69+200	3.900	001A
10	69+200	72+950	3.750	001A / 003
11	72+950	73+200	0.250	001A
12	73+200	74+500	1.300	002 / 004
13	74+500	90+200	15.700	001A
14	90+200	90+700	0.500	001A / 003
15	90+700	98+350	7.650	001A
16	98+350	100+450	2.100	002 / 004
17	100+450	119+200	18.750	001A
18	119+200	120+000	0.800	001A / 003
19	120+000	123+300	3.300	001 A
20	123+300	123+900	0.600	001A / 003
21	123+900	135+580	11.700	001A
22	135+580	142+800	7.22	5
23	142+800	150+050	7.25	001A

Appendix BII

Alignment Plan and longitudinal Section are enclosed in digital form in CD marked as **Appendix BII.**

Appendix BIII

Details of Bypasses

1. **Bypasses**

Name of Bypass	Existing Chainage		Length (km)
	From	To	
Indapur Bypass	132+200	137+200	6.800 (As per topographic survey)

Appendix BIV

Details of Service Roads

LHS

S. No.	Location	Design Chainage From	Design Chainage To	Length (km)	Width (m)	Remarks
1	Yavat	43+000	44+000	1.000	7.00	
2	Bhand Gaon	47+160	47+450	0.300	7.00	
3	Choufulla Town	54+400	56+200	1.800	7.00	
4	Warvand Village	58+200	59+600	1.400	7.00	
5	Patas & Kedgaon Village	63+200	65+300	2.100	7.00	
6	MIDC Kurkumbh	69+200	72+950	3.750	7.00	
7	Kurkumbh Town	73+200	74+500	1.300	7.00	
8	Malad	79+750	80+750	1.000	7.00	
9	Ravangaon	84+550	84+950	0.400	7.00	
10	Khadki Village	90+200	90+700	0.500	7.00	
11	Bhigwan Town	98+350	100+450	2.100	7.00	
12	Palasdeo Village	119+200	120+000	0.800	7.00	
13	Loni Deokar Village	123+300	123+900	0.600	7.00	
Total (LHS)				17.05		

RHS

S. No.	Location	Design Chainage From	Design Chainage To	Length (km) (RHS)	Width (m)	Remarks
1	Starting from Yavat town up to end of Package-I	43+000	150+050	107.05	7.00	Service roads for slow moving (sugarcane produce) vehicles
Total (RHS)				107.05		

Total LHS (km)	17.05
Total RHS (km)	107.05
Total (km)	**124.10**

The Total length of Service road is **124.10 Kms**

Appendix BV

Details of Proposed ROW

The proposed ROW for the project highway shall be 60m all along the corridor.

Appendix BVI

Major Intersection

S. No	Existing Chainage	Side (Left/Right)	Destination
1	55+000	Cross	To Satara SH-62 R/S, Ahmednagar
2	64+800	Y	To Daund SH67 & Ahmednagar
3	73+800	Cross	To Daund RHS, Baramati L/S
4	99+800	Cross	To Baramati SH 63R/S, Ahmednagar L/S
5	132+800	Y	To Akluj R/S

Appendix BVII

Minor Intersection

S. No	Existing Chainage	Side (Left/Right)	Destination
1	58+300	Cross	To Kaden L/S, Farmhouse R/S
2	63+700	R/S	To Baramati R/S
3	65+700	R/S	To Baramati R/S
4	69+200	L/S	To MIDC
5	90+100	R/S	To Baramati
6	103+500	R/S	To Ballarpur Industries Ltd.
7	108+000	Cross	To Walchand Nagar R/S, Dalaj L/S
8	116+500	L/S	To Padasdeo
9	120+100	Cross	To Nimgaon R/S, Loni L/S
10	121+500	R/S	To MIDC
11	123+200	Cross	To Balpudi R/S, Warkute L/S
12	127+400	Staggered	To Bijwadi R/S, Kalthan No.1 L/S

Appendix BVIII

Details of Proposed Grade Separated Intersections

S No.	Location	Existing Chainage	Design Chainage	Name of Intersecting Roads	Proposed structural configuration	Proposed Structure type	Proposed span arrangement
1	Choufulla	55+000	55+250	SH	New 6-Lane Grade Separator	Flyover	2x15.0x6.5
2	Bhigwan Bus Stand	98+700	99+000	City Road	New 6-Lane Grade Separator	Single Arm Left Hand Side Flyover	2x15.0x5.0
3	L/S Ahmed Nagar, R/S Baramati	99+800	100+450	SH	New 6-Lane Grade Separator	Flyover	2x15.0x5.0

Appendix BIX

Details of Proposed Vehicular Underpasses

S. No.	Design Chainage (km)	Location	Size	Type
1	63+900	R/S Baramati	2x15x5.5	VUP
2	70+750	MIDC CIPLA	2x15x5.5	VUP
3	74+000	Kurkumbh Village	2x15x5.5	VUP
4	138+740	Bypass	2x15x5.5	VUP
5	140+050	Bypass	2x15x5.5	VUP
6	Location shall be decided in consultation with IC.		2x15x5.5	VUP
7	Location shall be decided in consultation with IC.		2x15x5.5	VUP

Appendix BX

Details of Proposed Pedestrian/Cattle Underpasses

S. No.	Design Chainage (km)	Location	Size	Type
1.	43+370	Yawat Town	6x3.5	P&C
2.	47+650	Bhandgaon	6x3.5	P&C
3.	58+300	Warwand Town	6x3.5	P&C
4.	63+000	Bhaskarwadi	4x2.5	PUP
5.	64+130	L/S Patas Village	6x3.5	PUP
6.	80+850	Malad Village	6x3.5	P&C
7.	84+250	Ravangaon	6x3.5	P&C
8.	94+340	Village	6x3.5	P&C
9.	99+700	Bhigwan Town	6x3.5	P&C
10.	102+250		4x3.5	P&C
11.	119+540	L/S Palasdeo	6x3.5	P&C
12.	123+600	L/S Loni	6x3.5	P&C
13.	129+160	Cattle Crossing	4x3.5	Cattle Crossing
14.	129+750	Cattle Crossing	4.0x3.5	Cattle Crossing
15.	144+000	Sardewadi School	6x3.5	P&C

Appendix BXI

Details of new Minor Bridges and Rehabilitation/Repair/widening Scheme for Existing Major Bridges.

A. Construction of new Major Bridges

S. No	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing span arrangement	Proposed span arrangement
1	93+135	93+343	Nallah	Replacement of existing bridge with new 6 lane bridge	PSC Girder Bridge	8 x 7.7	2 x 30.80

B Rehabilitation/Repair/Widening of Existing Major Bridges

- NIL -

Appendix BXII

Details of new Minor Bridges and Rehabilitation/Repair/widening Scheme for Existing Minor Bridges.

A. Construction of new Minor Bridges**

S No.	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing Span arrangement	Proposed span arrangement
1	128+050	131+589	Nallah	Replacement of existing bridge with new 6 lane bridge	RCC T-Beam Bridge	5 x 3.65	1x18.25
2	142+600	148+199	Nallah	Replacement of existing bridge with new 6 lane bridge	RCC T-Beam Bridge	6.6+7.0+6.6	1x20.20

B Rehabilitation/Repair/Widening of Existing Minor Bridges**

S No.	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing Span arrangement	Proposed span arrangement
1	40+775	40+765	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	3 x 2.6	1x 7.80
2	41+317	41+315	Canal	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	PSC Girder Bridge	3 x 7.6	1x23.40
3	42+200	42+185	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	2 x7.2	1x14.40
4	42+655	42+822	Canal	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	PSC Girder Bridge	6.9+7.55+7.9	1x22.50
5	43+512	43+659	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-ans Solid Slab Beam Bridge	5 x 6.5	1x18.0+2x6.60
6	44+247	44+406	Canal	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam Bridge	3 x 7.0	1x21.00

S No.	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing Span arrangement	Proposed span arrangement
7	45+900	46+043	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	3.2+3.8+3.2	1x10.00
8	47+400	47+563	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	4.2+4.0+4.2	1x12.40
9	48+450	48+624	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	3.5+4.1+3.9+3.6	1x15.10
10	51+892	52+097	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	1x15.6 (Arch)	1x15.60
11	52+600	52+827	Canal	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	PSC Girder Bridge	7.1+7.4+7.9	1x22.20
12	52+950	53+166	Canal	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	2 x 7.1	1x14.20
13	54+000	54+199	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	2 x 4.5	1x9.00
14	60+050	60+338	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	9.7+10+10+10+10+9.7	3x20.00
15	61+950	62+147	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	PSC Girder Bridge	9.7+10.4+10.4+10.4+9.7	2x25.30
16	64+050	64+286	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	3.4+3.6+3.6+3.6+3.4	1x17.60
17	65+300	65+556	Canal	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	6.1+5.0+6.10	1x18.00
18	81+465	81+698	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane	RCC Solid Slab Bridge	1 x 6.8	1x7.10

S No.	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing Span arrangement	Proposed span arrangement
				configuration			
19	89+545	89+762	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 6.5	1x7.10
20	89+730	89+943	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 6.5	1x7.10
21	95+270	95+275	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 7.9	1x9.00
22	100+500	101+247	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam Bridge	2 x 21.5	2x21.50
23	102+300	103+352	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam Bridge	16+16.2+16.6	3x16.40
24	106+650	108+392	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	8.25+9.25+4.15+9.1+8.5	1x17.50+1x21.76
25	107+050	108+846	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam Bridge	2 x 16.4	2x16.40
26	108+895	110+879	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 7.0	1x8.50
27	109+000	111+105	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 8.5	1x8.50
28	110+400	112+721	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	10.2+10.7+9.9	3x10.00
29	112+080	114+700	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	9.3+9.3+9.5	3x9.40

S No.	Existing Chainage	Design Chainage	Type of crossing	Proposed structural configuration	Proposed Structure type	Existing Span arrangement	Proposed span arrangement
30	115+050	118+101	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam Bridge	16.6+16.4+16.6	3x16.50
31	119+600	123+093	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC T-Beam Bridge	2 x 6.0	1x12.00
32	119+700	123+207	Nallah	Rehabilitation and Widening of existing 3 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	1 x 6.0	1x6.10
33	126+600	130+114	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC Solid Slab Bridge	9.75+9.7+9.6	1x9.75+1x9.7+1x9.6
34	126+900	130+486	Nallah	Rehabilitation and Widening of existing 2 lane bridge to 6 lane configuration	RCC T-Beam and Solid Slab Bridge	8.7+8.85+8.8+8.9+8.8	1x8.7+2x17.55+1x8.80

*** The proposed span arrangement is tentative and the same shall be finalized in consultation with Irrigation Authority & IC. Any change in span arrangement shall not be treated as change in scope of work.**

****For slow moving traffic (such as sugar cane produce, carts, tractors etc.), extra service lane have been proposed after accommodating 3-lanes formation. The minor bridges and culverts (minimum 2-lane) also have been proposed to be constructed wherever cross-drainage structures are falling.**

Appendix BXIII

Table B3: Reconstruction/Widening Scheme for Culverts**

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
1.	40+350	40+349	Slab/Box	Widening	1X5.5	
2.	41+070	41+185	Pipe	Widening	1X1.0	
3.	41+450	41+514	Pipe	Widening	1X1.0	
4.	41+750	41+800	Pipe	Widening	1X1.2	
5.	43+150	43+319	Pipe	Widening	1X1.2	
6.	44+600	44+679	Pipe	Widening	1X1.0	
7.	45+135	45+300	Pipe	Widening	1X1.0	
8.	45+665	45+837	Pipe	Reconstruction	1x2.0 (Box)	
9.	45+715	45+893	Pipe	Widening	1X1.2	
10.	46+440	46+600	Pipe	Reconstruction	1x3.0 (Box)	
11.	46+940	47+037	Pipe	Widening	1X1.2	
12.	47+050	47+219	Pipe	Widening	1X1.2	
13.	47+450	47+625	Pipe	Reconstruction	1x2.0 (Box)	
14.	47+960	48+091	Pipe	Widening	1X1.2	
15.	48+070	48+255	Pipe	Reconstruction	1x1.0 (HP)	
16.	48+720	48+899	Pipe	Reconstruction	1x2.0 (Utility)	
17.	49+790	49+918	Pipe	Reconstruction	1x2.0 (Box)	
18.	50+270	50+459	Pipe	Widening	1X1.0	
19.	50+390	50+579	Pipe	Reconstruction	1x3.0 (Box)	
20.	52+530	52+700	Pipe	Widening	1X1.0	
21.	52+815	53+003	Pipe	Reconstruction	1x1.0 (HP)	
22.	53+165	53+349	Pipe	Reconstruction	1x1.0 (HP)	
23.	54+600	54+126	Pipe	Reconstruction	1x1.0 (HP)	
24.	54+705	54+885	Slab/Box	Widening	1X3.2	
25.	55+235	55+429	Pipe	Reconstruction	1x1.0 (HP)	
26.	55+410	55+590	Pipe	Widening	1X1.0	
27.	56+210	56+391	Pipe	Reconstruction	1x1.0 (HP)	
28.	56+255	56+436	Pipe	Reconstruction	1x3.0 (Box)	
29.	56+490	56+686	Slab/Box	Widening	1X5.2	
30.	56+730	56+917	Pipe	Reconstruction	1x3.0 (Box)	
31.	56+990	57+197	Pipe	Widening	1X1.0	
32.	57+650	57+256	Pipe	Widening	3X1.2	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
33.	57+230	57+528	Pipe	Widening	1X1.0	
34.	57+520	57+712	Pipe	Reconstruction	1x2.0 (Box)	
35.	57+850	58+038	Pipe	Reconstruction	1x1.0 (HP)	
36.	58+165	58+372	Slab	Reconstruction	1x1.0 (HP)	
37.	58+410	58+624	Pipe	Widening	1X1.0	
38.	59+800	59+293	Pipe	Widening	1X1.2	
39.	59+625	59+832	Pipe	Widening	1X1.2	
40.	60+490	60+685	Pipe	Widening	1X1.0	
41.	61+950	61+288	Slab/Box	Reconstruction	1x1.3 (Slab)	
42.	61+950	61+600	Pipe	Reconstruction	1x1.0 (HP)	
43.	61+515	61+750	Slab/Box	Widening	1X1.3	
44.	61+720	61+918	Pipe	Widening	1X1.0	
45.	62+130	62+280	Pipe	Widening	1X1.0	
46.	62+290	62+500	Slab/Box	Widening	1X1.0	
47.	62+510	62+707	Pipe	Widening	1X1.0	
48.	63+180	63+000	Pipe	Reconstruction	1x1.0 (HP)	
49.	63+100	63+200	Pipe	Widening	3X0.75	
50.	63+475	63+720	Pipe	Reconstruction	3x1.0 (HP)	
51.	64+560	64+759	Pipe	Reconstruction	1x1.0 (HP)	
52.	64+710	64+908	Pipe	Reconstruction	1x1.0 (HP)	
53.	65+040	65+300	Pipe	Widening	1X2.0	
54.	65+900	65+335	Pipe	Widening	1X1.0	
55.	65+550	65+800	Pipe	Reconstruction	2x1.0 (HP)	
56.	66+545	66+800	Slab/Box	Reconstruction	1x1.0 (HP)	
57.	67+130	67+089	Slab/Box	Reconstruction	1x1.0 (HP)	
58.	67+240	67+463	Pipe	Widening	1X1.0	
59.	67+370	67+599	Pipe	Widening	1X1.0	
60.	67+470	67+700	Slab/Box	Reconstruction	1x1.0 (HP)	
61.	68+180	68+023	Slab/Box	Reconstruction	1x2.5 (Slab)	
62.	68+600	68+350	Pipe	Widening	1X1.0	
63.	68+460	68+650	Slab/Box	Reconstruction	1x2.5 (Slab)	
64.	69+370	69+594	Pipe	Widening	1X1.0	
65.	69+465	69+697	Slab/Box	Reconstruction	1x1.0	
66.	69+740	69+965	Slab/Box	Widening	1X2.1	
67.	70+270	70+523	Pipe	Widening	1X1.0	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
68.	70+510	70+696	Pipe	Reconstruction	1x2.0 (Box)	
69.	70+570	70+745	Slab/Box	Widening	1X1.1	
70.	71+100	71+217	Slab/Box	Widening	1X2.3	
71.	71+300	71+520	Pipe	Reconstruction	1x1.0 (HP)	
72.	71+670	71+858	Pipe	Widening	2X1.0	
73.	72+330	72+450	Pipe	Reconstruction	2x1.0 (HP)	
74.	72+430	72+550	Pipe	Widening	1X1.0	
75.	72+590	72+725	Pipe	Reconstruction	1x1.0 (HP)	
76.	72+830	72+958	Pipe	Reconstruction	2x1.0 (HP)	
77.	73+000	73+237	Pipe	Reconstruction	1x1.0 (HP)	
78.	73+115	73+353	Slab/Box	Widening	1X2.0	
79.	73+170	73+410	Pipe	Widening	1X1.0	
80.	73+425	73+670	Pipe	Reconstruction	2x1.0 (HP)	
81.	73+730	73+930	Slab/Box	Widening	1X3.9	
82.	74+200	74+265	Pipe	Widening	2X1.0	
83.	74+410	74+650	Pipe	Widening	1X1.0	
84.	75+900	75+121	Slab/Box	Widening	1X3.0	
85.	75+300	75+539	Slab/Box	Widening	1X4.0	
86.	76+170	76+048	Pipe	Widening	1X1.0	
87.	76+320	76+565	Slab/Box	Reconstruction	1x2.0 (Box)	
88.	76+670	76+872	Pipe	Reconstruction	1x2.0 (Box)	
89.	77+300	77+193	Pipe	Widening	1X1.0	
90.	77+600	77+295	Pipe	Widening	1X1.0	
91.	77+440	77+678	Pipe	Widening	2X1.0	
92.	77+640	77+841	Pipe	Widening	1X1.0	
93.	78+220	78+470	Pipe	Widening	1X1.0	
94.	78+710	78+959	Slab/Box	Widening	1X4.5	
95.	79+125	79+094	Slab/Box	Reconstruction	1x3.0 (Box)	
96.	79+510	79+800	Pipe	Reconstruction	1x1.0 (HP)	
97.	80+240	80+482	Pipe	Reconstruction	1x1.0 (HP)	
98.	80+430	80+723	Slab	Reconstruction	1x6.0 (Utility)	
99.	81+160	81+063	Pipe	Widening	1X1.0	
100.	81+400	81+283	Slab/Box	Widening	1X3.3	
101.	81+260	81+502	Pipe	Reconstruction	1x1.0 (HP)	
102.	82+700	82+32	Pipe	Widening	2X1.0	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
103.	82+130	82+380	Pipe	Widening	2X1.0	
104.	82+520	82+764	Pipe	Widening	2X1.0	
105.	82+530	82+913	Pipe	Reconstruction	1x1.0 (HP)	
106.	83+230	83+460	Pipe	Widening	2X1.0	
107.	83+330	83+551	Pipe	Widening	2X1.0	
108.	84+200	84+201	Slab/Box	Reconstruction	1x6.0 (Utility)	
109.	84+340	84+583	Pipe	Widening	1X1.0	
110.	84+530	84+802	Pipe	Widening	2X1.0	
111.	84+665	84+877	Pipe	Widening	2X1.0	
112.	84+640	84+983	Pipe	Widening	1X1.0	
113.	85+500	85+211	Slab/Box	Widening	1X2.5	
114.	85+295	85+539	Pipe	Widening	1X1.0	
115.	85+555	85+760	Pipe	Widening	1X1.0	
116.	86+180	86+017	Pipe	Widening	1X1.0	
117.	86+140	86+380	Slab/Box	Widening	1X2.4	
118.	86+270	86+522	Pipe	Widening	1X1.0	
119.	86+460	86+684	Pipe	Reconstruction	1x2.0 (Box)	
120.	87+070	87+335	Pipe	Reconstruction	1x1.0 (HP)	
121.	88+120	88+363	Slab/Box	Reconstruction	1x6.0 (Utility)	
122.	88+390	88+634	Pipe	Reconstruction	2x1.0 (HP)	
123.	88+600	88+840	Pipe	Reconstruction	2x1.0 (HP)	
124.	89+070	89+110	Pipe	Reconstruction	1x1.0 (HP)	
125.	90+240	90+483	Pipe	Reconstruction	1x4.0 (Utility)	
126.	90+560	90+758	Stone/Box	Reconstruction	1x6.0 (Utility)	
127.	90+580	90+800	Pipe	Reconstruction	1x1.0 (HP)	
128.	90+720	90+970	Pipe	Reconstruction	1x1.0 (HP)	
129.	91+240	91+495	Pipe	Reconstruction	1x6.0 (Utility)	
130.	91+560	91+800	Pipe	Widening	1X1.0	
131.	92+600	92+291	Pipe	Widening	1X1.0	
132.	92+260	92+500	Pipe	Widening	1X1.0	
133.	92+440	92+691	Pipe	Reconstruction	1x1.0 (HP)	
134.	92+560	92+785	Pipe	Reconstruction	1x1.0 (HP)	
135.	93-120	93+078	Pipe	Reconstruction	1x1.0 (HP)	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
136.	93+460	93+677	Pipe	Reconstruction	1x1.0 (HP)	
137.	93+460	93+715	Pipe	Reconstruction	1x1.0 (HP)	
138.	93+660	93+891	Pipe	Reconstruction	1x1.0 (HP)	
139.	94+190	94+436	Pipe	Widening	1X1.0	
140.	94+510	94+750	Pipe	Reconstruction	1x1.0 (HP)	
141.	95+230	95+031	Slab/Box	Reconstruction	1x2.1 (Slab)	
142.	95+350	95+385	Pipe	Widening	2X1.0	
143.	95+720	95+761	Pipe	Reconstruction	1x3.0 (Box)	
144.	95+825	95+855	Pipe	Widening	2X1.0	
145.	96+070	96+121	Pipe	Reconstruction	1x1.0 (HP)	
146.	96+080	96+330	Pipe	Widening	2X1.0	
147.	96+610	96+845	Pipe	Widening	2X1.0	
148.	96+815	96+950	Pipe	Widening	1X1.0	
149.	97+120	97+079	Pipe	Widening	2X1.2	
150.	97+180	97+400	Slab/Box	Reconstruction	1x2.1 (Slab)	
151.	97+425	97+726	Pipe	Widening	2X1.2	
152.	98+170	98+170	Slab/Box	Widening	1X1.6	
153.	98+010	98+350	Pipe	Widening	1X1.0	
154.	98+450	98+850	Pipe	Widening	1X1.0	
155.	99+430	99+145	Pipe	Widening	2X1.0	
156.	99+130	99+394	Pipe	Widening	1X1.0	
157.	99+120	99+649	Pipe	Widening	1X1.0	
158.	99+270	99+820	Pipe	Widening	1X1.0	
159.	100+130	100+495	Pipe	Widening	1X1.0	
160.	101+100	102+055	Slab/Box	Widening	1X4.1	
161.	101+390	102+477	Pipe	Reconstruction	1x1.0 (HP)	
162.	101+420	102+497	Pipe	Reconstruction	1x1.0 (HP)	
163.	101+720	102+767	Pipe	Reconstruction	1x1.0 (HP)	
164.	102+130	103+150	Slab/Box	Widening	1X4.1	
165.	102+220	103+250	Pipe	Widening	1X0.75	
166.	102+850	103+900	Pipe	Widening	1X1.0	
167.	103+180	104+350	Pipe	Widening	1X0.75	
168.	103+560	104+700	Pipe	Widening	1X0.75	
169.	103+710	104+873	Pipe	Widening	1X0.75	
170.	104+130	105+011	Pipe	Reconstruction	1x1.0 (HP)	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
171.	104+090	105+267	Pipe	Reconstruction	1x1.0 (HP)	
172.	104+210	105+402	Pipe	Reconstruction	1x1.0 (HP)	
173.	104+580	105+546	Pipe	Reconstruction	1x1.0 (HP)	
174.	104+610	105+737	Pipe	Reconstruction	1x1.0 (HP)	
175.	104+710	105+882	Pipe	Reconstruction	1x1.0 (HP)	
176.	104+800	105+957	Pipe	Reconstruction	1x1.0 (HP)	
177.	105+280	106+172	Pipe	Widening	1X1.0	
178.	105+015	106+466	Pipe	Reconstruction	2x1.0 (HP)	
179.	105+160	106+649	Pipe	Reconstruction	1x1.0 (HP)	
180.	106+350	107+217	Pipe	Reconstruction	1x1.0 (HP)	
181.	106+140	107+429	Pipe	Widening	1X1.0	
182.	106+240	107+825	Slab/Box	Widening	1X4.1	
183.	107+560	109+276	Pipe	Reconstruction	1x1.0 (HP)	
184.	107+850	109+705	Pipe	Widening	1X1.0	
185.	107+990	109+954	Pipe	Reconstruction	1x1.0 (HP)	
186.	108+130	110+105	Pipe	Widening	1X1.0	
187.	108+470	110+475	Pipe	Widening	1X1.0	
188.	108+760	110+650	Pipe	Widening	1X1.0	
189.	109+390	111+518	Pipe	Widening	1X1.0	
190.	110+210	112+039	Pipe	Widening	1X1.0	
191.	110+800	112+165	Pipe	Widening	1X1.0	
192.	110+130	112+450	Pipe	Reconstruction	1x1.0 (HP)	
193.	111+350	113+027	Pipe	Widening	1X1.0	
194.	111+170	113+633	Pipe	Widening	1X1.0	
195.	111+320	113+701	Pipe	Widening	3X1.0	
196.	111+650	114+150	Pipe	Reconstruction	1x1.0 (HP)	
197.	111+850	114+340	Pipe	Widening	1X1.0	
198.	112+410	115+014	Pipe	Reconstruction	1x1.0 (HP)	
199.	112+610	115+247	Pipe	Widening	1X1.0	
200.	112+720	115+382	Pipe	Reconstruction	2X1.0 (HP)	
201.	112+890	115+704	Pipe	Widening	1X1.0	
202.	113+300	115+816	Pipe	Widening	1X1.0	
203.	113+340	116+127	Pipe	Widening	1X1.0	
204.	113+510	116+219	Pipe	Widening	2X1.0	
205.	113+720	116+413	Pipe	Widening	2X1.0	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
206.	114+560	117+250	Pipe	Widening	2X1.0	
207.	114+660	117+350	Pipe	Widening	1X1.0	
208.	114+820	117+470	Pipe	Widening	1X1.0	
209.	115+010	118+057	Pipe	Widening	1X1.0	
210.	115+820	118+870	Pipe	Widening	2X1.0	
211.	115+850	118+892	Pipe	Reconstruction	1x3.0 (Box)	
212.	116+440	119+710	Pipe	Reconstruction	2x1.0 (HP)	
213.	116+640	119+917	Pipe	Reconstruction	2x1.0 (HP)	
214.	116+940	120+280	Pipe	Widening	2X1.0	
215.	117+270	120+656	Pipe	Widening	3X1.0	
216.	117+440	120+873	Pipe	Reconstruction	1x1.0 (HP)	
217.	117+760	121+205	Pipe	Reconstruction	1x1.0 (HP)	
218.	118+170	121+310	Pipe	Reconstruction	1x1.0 (HP)	
219.	118+400	121+462	Slab/Box	Reconstruction	1x3.0 (Slab)	
220.	118+280	121+720	Slab/Box	Reconstruction	1x3.0 (Slab)	
221.	118+330	121+818	Pipe	Reconstruction	3x1.0 (HP)	
222.	119+310	122+182	Pipe	Reconstruction	2x1.0 (HP)	
223.	119+600	122+432	Slab/Box	Widening	1X1.7	
224.	119+670	123+196	Pipe	Widening	1X1.0	
225.	120+065	123+602	Slab/Box	Reconstruction	1x4.0 (Utility)	
226.	120+510	124+037	Pipe	Reconstruction	1x1.0 (HP)	
227.	120+590	124+193	Pipe	Widening	3X1.0	
228.	121+070	124+462	Pipe	Widening	2X1.0	
229.	121+060	124+596	Pipe	Widening	2X1.0	
230.	121+310	124+855	Pipe	Widening	2X1.0	
231.	122+400	125+510	Pipe	Reconstruction	1x1.0 (HP)	
232.	122+240	125+824	Slab/Box	Widening	1X2.6	
233.	122+520	126+246	Pipe	Reconstruction	1x3.0 (Box)	
234.	123+200	126+527	Pipe	Reconstruction	1x1.0 (HP)	
235.	123+370	126+950	Pipe	Widening	1X1.0	
236.	124+240	127+817	Pipe	Reconstruction	1x1.0 (HP)	
237.	124+530	128+050	Pipe	Reconstruction	2x1.0 (HP)	
238.	124+730	128+250	Pipe	Reconstruction	1x1.0 (HP)	
239.	124+840	128+376	Pipe	Reconstruction	1x1.0 (HP)	
240.	125+750	128+662	Pipe	Reconstruction	1x1.0 (HP)	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
241.	125+190	128+754	Pipe	Reconstruction	1x1.0 (HP)	
242.	125+460	129+062	Pipe	Reconstruction	1x1.0 (HP)	
243.	125+710	129+292	Pipe	Reconstruction	1x1.0 (HP)	
244.	126+550	129+525	Pipe	Widening	2X1.0	
245.	128+270	131+276	Pipe	Reconstruction	1x3.0 (Box)	
246.	128+240	131+818	Slab/Box	Reconstruction	1x1.0 (Slab)	
247.	129+160	132+730	Slab/Box	Reconstruction	1x2.0 (Slab)	
248.	130+410	133+205	Slab/Box	Widening	1X3.0	
249.	130+200	133+562	Slab/Box	Widening	3X1.0	
250.	130+650	134+310	Slab/Box	Reconstruction	1x1.0 (HP)	
251.	131+750	134+674	Slab/Box	Reconstruction	1x2.0 (Slab)	
252.	131+260	134+843	Slab/Box	Reconstruction	3x0.8 (Slab)	
253.	131+370	134+971	Slab/Box	Reconstruction	1x2.0 (Slab)	
254.	137+290	142+712	Slab/Box	Reconstruction	1x1.0 (HP)	
255.	138+700	143+321	Slab/Box	Reconstruction	1x1.0 (HP)	
256.	138+400	143+380	Slab/Box	Reconstruction	1x1.0 (HP)	
257.	138+340	143+781	Slab/Box	Widening	1X3.2	
258.	138+710	144+050	Pipe	Widening	1X1.0	
259.	139+140	144+226	Pipe	Reconstruction	1x1.0 (HP)	
260.	139+190	144+562	Slab/Box	Reconstruction	1x5.3 (Slab)	
261.	139+630	144+941	Slab/Box	Reconstruction	1x2.3 (Slab)	
262.	140+120	145+296	Slab/Box	Reconstruction	1x2.5 (Slab)	
263.	140+110	145+534	Pipe	Widening	1X1.0	
264.	140+360	145+817	Slab/Box	Reconstruction	1x3.5 (Slab)	
265.	141+800	146+261	Slab/Box	Reconstruction	1x3.3 (Slab)	
266.	141+180	146+550	Slab/Box	Widening	1X1.0	
267.	141+270	146+686	Slab/Box	Reconstruction	1x3.2 (Slab)	
268.	142+422	146+994	Slab/Box	Reconstruction	1x3.3 (Slab)	
269.	142+220	147+198	Pipe	Widening	2X1.0	
270.	142+800	147+326	Pipe	Widening	2X1.0	
271.	142+800	147+523	Pipe	Reconstruction	2X0.75	
272.	143+320	148+094	Pipe	Widening	1X1.0	
273.	143+110	148+330	Pipe	Reconstruction	2x1.0 (HP)	
274.	143+200	148+425	Pipe	Reconstruction	1x1.0 (HP)	
275.	143+340	148+750	Pipe	Reconstruction	2x1.0 (HP)	

Sr. No	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
276.	143+690	148+962	Slab/Box	Reconstruction	1x3.6 (Slab)	
277.	144+230	149+190	Pipe	Widening	1X1.0	
278.	144+800	149+314	Pipe	Reconstruction	2x1.0 (HP)	
279.	144+150	149+407	Pipe	Widening	1X1.0	
280.	144+170	149+583	Pipe	Reconstruction	1x1.0 (HP)	
281.	144+340	149+752	Pipe	Widening	1x1.0	

SLC-Slab Culverts, HPC – Hume Pipe Culvert

Proposed New Culverts**

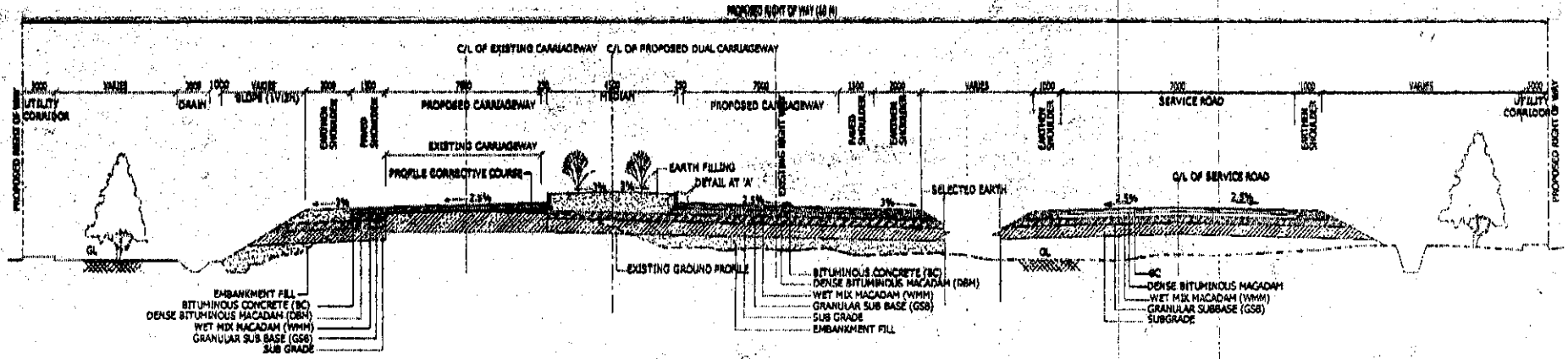
Sr. No.	Existing Chainage (km)	Design Chainage (km)	Type of Structure	Recommendation	Proposed Span Arrangement	Remarks/ Condition
1	84+800	84+900	Pipe	New	1x1.0 (HP)	
2	131+750	135+293	Box	Bypass		New
3	132+520	136+092	Box	Bypass		New
4	132+710	136+320	Box	Bypass		New
5	133+270	136+952	Box	Bypass		New
6	134+260	137+326	Box	Bypass		New
7	134+100	137+573	Box	Bypass		New
8	134+415	137+948	Box	Bypass		New
9	135+440	138+221	Box	Bypass		New
10	135+130	138+477	Box	Bypass		New
11	135+300	138+650	Box	Bypass		New
12	135+460	138+810	Box	Bypass		New
13	135+620	139+210	Box	Bypass		New
14	135+890	139+434	Box	Bypass		New
15	136+170	139+778	Pipe	Bypass		New
16	136+450	140+150	Slab/Box	Bypass		New
17	136+540	140+245	Slab/Box	Bypass		New
18	136+730	140+360	Slab/Box	Bypass		New
19	136+810	140+513	Slab/Box	Bypass		New
20	137+020	140+618	Slab/Box	Bypass		New

HPC – Hume Pipe Culvert

Appendix BXIV

Details of Proposed ROB/RUB

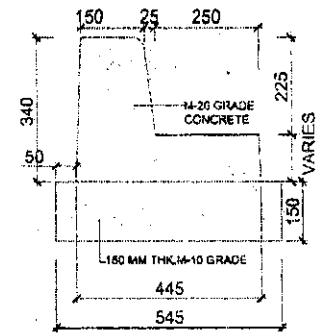
S. No.	Existing Chainage	Design Chainage	Type of crossing	Existing structure	Proposed structural configuration	Proposed Structure type	Proposed span arrangement
1	79+600	79+861	Railway Line	-	New 6-lane ROB	PSC Girder	2x21.00+ 1x23.00



NOTES:

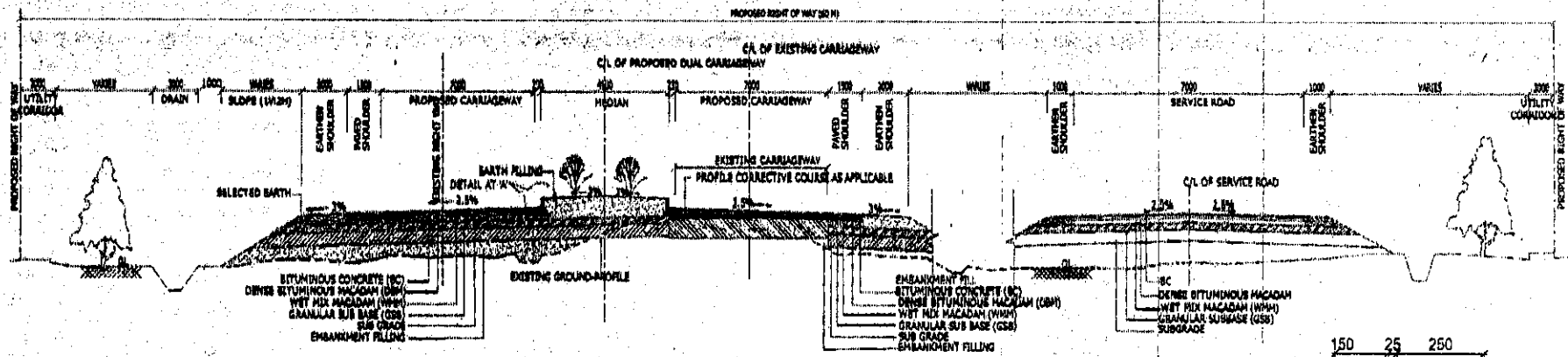
1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK. WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING . DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) CHUTES (WITH TOE CHAMBER) WILL BE PROVIDED FOR EMBANKMENT IS > 3 MTR
7) TREE PLANTING SHOULD BE DONE BESIDE THE TOELINE OF PROPOSED SIX LANE CARRIAGEWAY

TYPICAL CROSS SECTION FOR RIGHT SIDE WIDENING (RURAL SECTION) - 001(A)



DETAIL AT 'A' OF KERB STONE

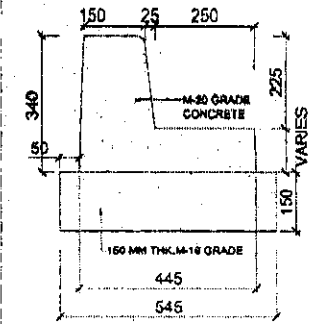
B-30



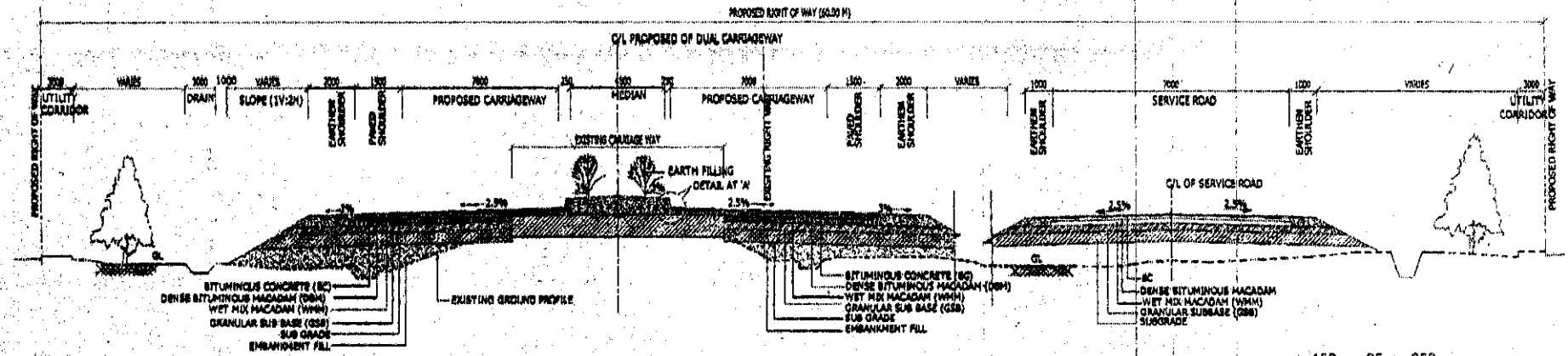
NOTES:

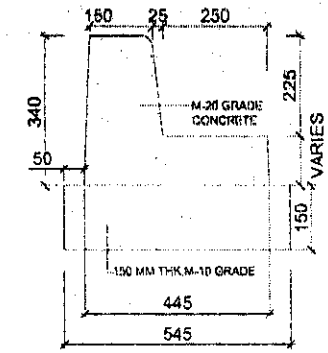
1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK. WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING . DRAIN SHOULD BE SUITABLY CONNECTED NEARLIST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) CHUTES (WITH TOE CHAMBER) WILL BE PROVIDED FOR EMBANKMENT IS > 3 MTR

TYPICAL CROSS SECTION FOR LEFT SIDE WIDENING (RURAL SECTION) - 001(B)



DETAIL AT 'A' OF KERB STONE





DETAIL AT 'A' OF KERB STONE

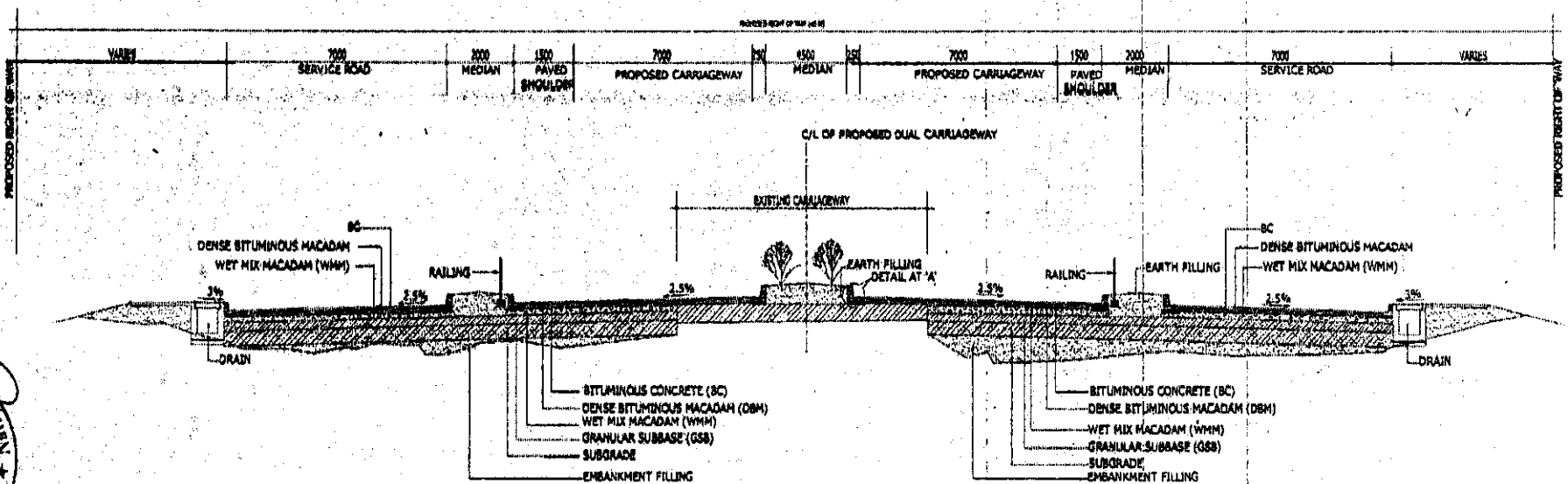
NOTES:

1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING , DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) CHUTES (WITH TOE CHAMBER) WILL BE PROVIDED FOR EMBANKMENT IS > 3 MTR.

TYPICAL CROSS SECTION FOR CONCENTRIC WIDENING AND TRANSITION ZONES - 002

Pune Solapur Expressways Private Limited

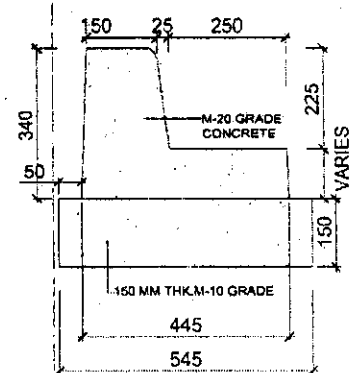
B-32



NOTES:

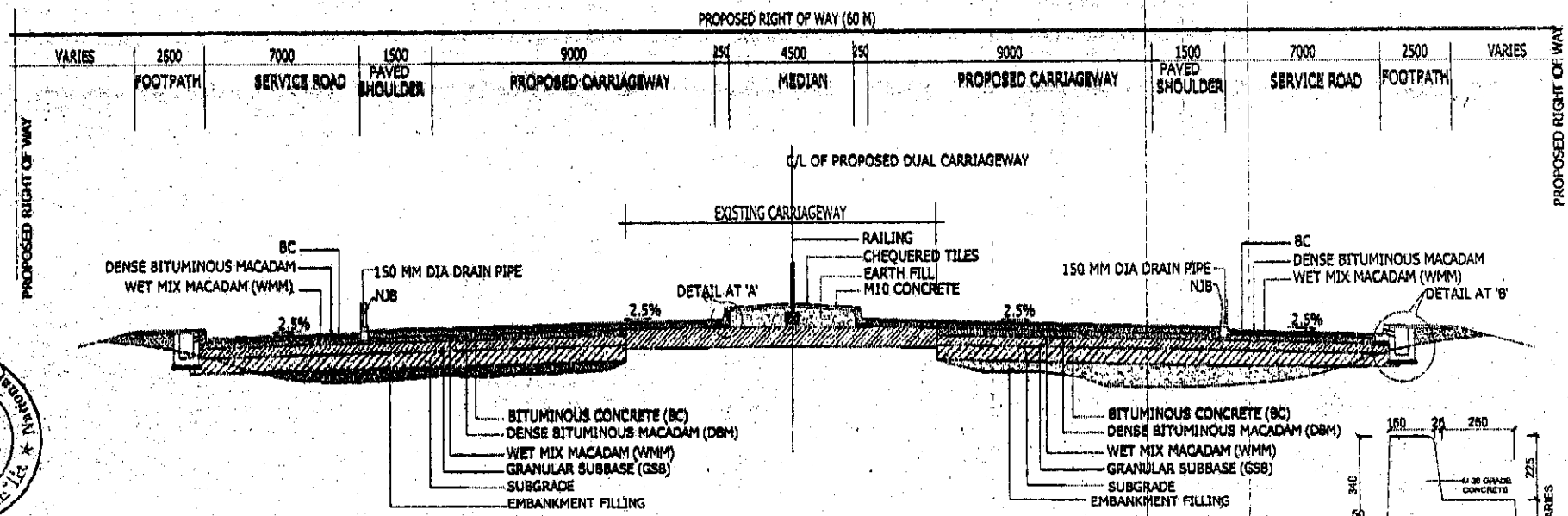
1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK. WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING., DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) TREE PLANTING SHOULD BE DONE BESIDE THE TOELINE OF PROPOSED SIX LANE CARRIAGEWAY
7) TREE PLANTING SHOULD BE DONE BESIDE THE TOELINE OF PROPOSED SIX LANE CARRIAGEWAY

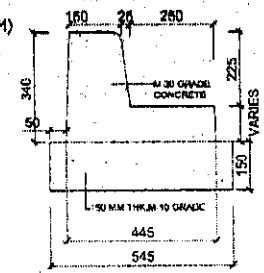
TYPICAL CROSS SECTION TYPE FOR 4 LANE CARRIAGEWAY WITH SERVICE ROAD ON LHS/ RHS AT VILLAGE (RURAL SECTION) - 003



DETAIL AT 'A' OF KERB STONE

B-33

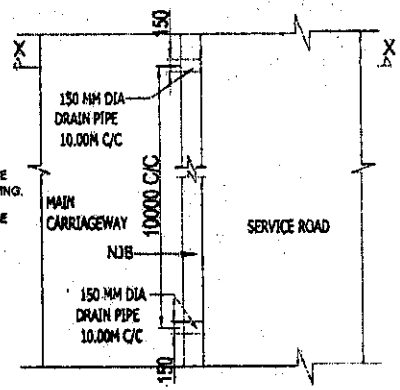




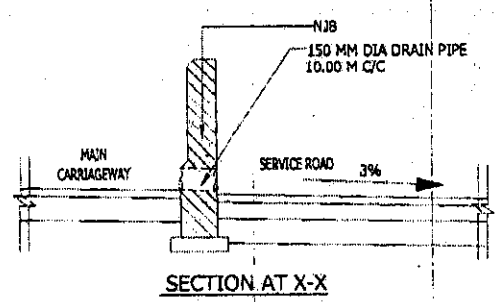
DETAIL AT 'A' OF KERB STONE

NOTES:

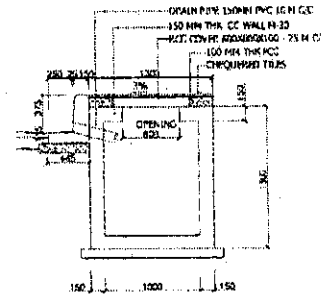
1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK. WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING . DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ESTABLISHING GRAVITY FLOW.
4) TO DRAIN OFF THE CARRIAGEWAY WATER OPENING SHALL BE PROVIDED IN MEDIAN / FOOTPATH 10 MTR. C/C AS PER DRAWING.
5) TO DRAIN OFF THE CARRIAGEWAY WATER OPENING SHALL BE PROVIDED IN NJB 10 MTR. C/C AS PER DRAWING.



DRAIN PIPE PLAN IN NJB



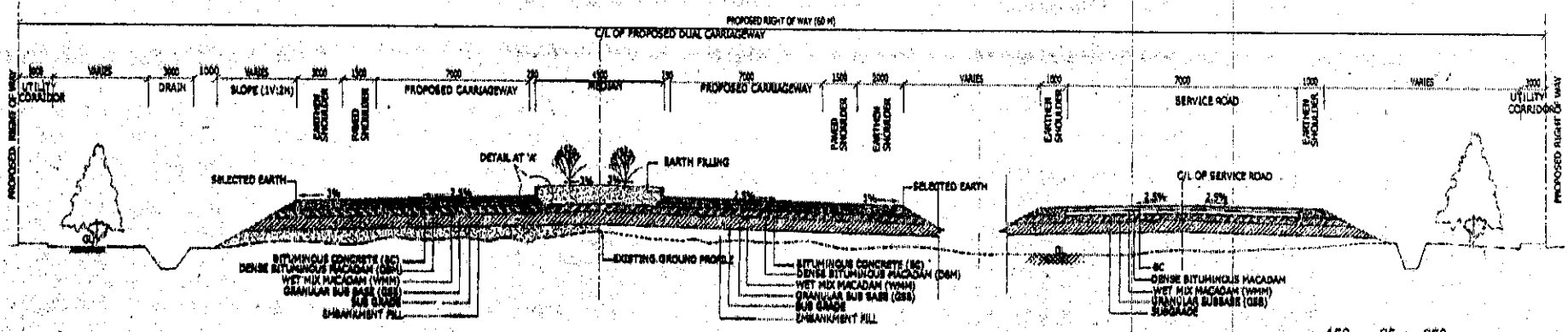
SECTION AT X-X

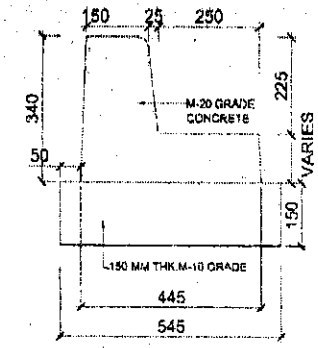


DETAILS AT 'B'

TYPICAL CROSS SECTION TYPE FOR 4 LANE CARRIAGEWAY WITH SERVICE ROAD ON BOTH SIDE (URBAN SECTION) - 004(

B-34



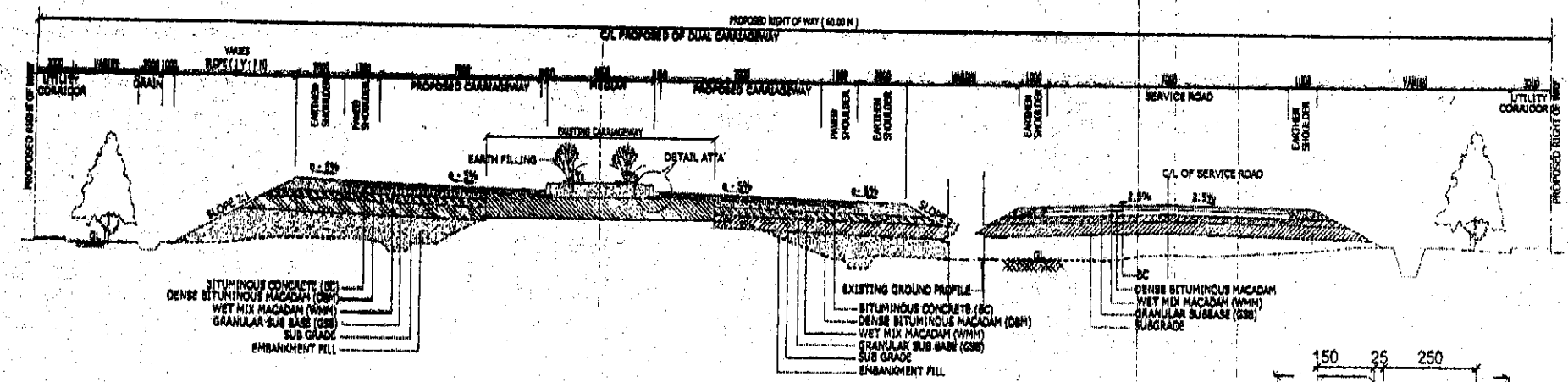


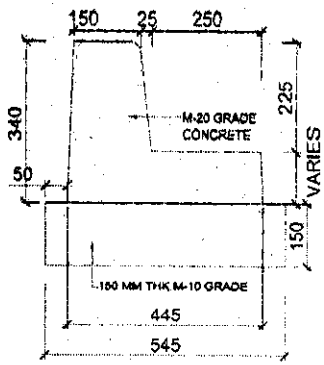
DETAIL AT 'A' OF KERB STONE

NOTES:

1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING . DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) CHUTES (WITH TOE CHAMBER) WILL BE PROVIDED FOR EMBANKMENT IS > 3 MTR

TYPICAL CROSS SECTION FOR NEW FORMATION (RURAL SECTION) - 005





DETAIL AT 'A' OF KERB STONE

NOTES:

1) ALL DIMENSION ARE IN MILIMETER
2) SUBGRADE 500 MM THK. WITH MINIMUM CBR 10 %
3) FOR DRAIN DETAIL REFER DRAINAGE DRAWING . DRAIN SHOULD BE SUITABLY CONNECTED NEAREST EXISTING NALLAH (NATURAL DRAIN) ASTABLISHING GRAVITY FLOW.
4) EMBANKMENT SLOPE SHALL BE 1 V : 2 H IN CUTTING SECTION 1 V : 2 H
5) CRASH BARRIER TO BE PROVIDED OUT SIDE SHOULDER WHERE HEIGHT OF EMBANKMENT IS > 3 MTR.
6) CHUTES (WITH TOE CHAMBER) WILL BE PROVIDED FOR EMBANKMENT IS > 3 MTR

TYPICAL CROSS SECTION FOR CONCENTRIC WIDENING AND SUPERELEVATED SECTION - 006

SCHEDULE – C
(See Clause 2.1)

PROJECT FACILITIES

1. Project Facilities

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

(a) toll plaza;
(b) roadside furniture;
(c) street lighting;
(d) pedestrian facilities;
(e) landscaping and tree plantation;
(f) rest areas;
(g) truck lay-bys;
(h) bus-bays and shelters;
(i) cattle crossings;
(j) development of site for wayside amenities;
(k) traffic aid posts;
(l) medical aid posts;
(m) vehicle rescue posts;
(n) telecom system; and
(o) highway traffic management system,

2. Project Facilities for Four-Laning

Project Facilities forming part of Four-Laning and to be completed on or before the Project Completion Date have been described in Annex-I of this Schedule-C.

Annex – I

(Schedule – C)

Project Facilities for Four-Laning

1. Project Facilities

The Concessionaire shall construct the Project Facilities described in this Annex-I to form part of the Four-Lane Project Highway. The Project Facilities shall include:

a) toll plaza
b) roadside furniture
c) pedestrian facilities
d) tree plantation
e) truck lay-bys
f) bus-bays and bus shelters; and
g) others
   1. Highway Lighting
   2. Highway Patrol
   3. Ambulances
   4. Cranes
   5. development of site for wayside amenities
   6. traffic aid posts
   7. medical aid posts
   8. vehicle rescue posts
   9. telecom system
   10. others to be specified

2. Description of Project Facilities

Each of the Project Facilities is briefly described below:

(a) Toll Plaza

1) At Km 65+000
2) At Km 140+000

Specifications and other requirements of the toll plaza's shall be strictly as per schedule 'D".

(b) Road Side Furniture

i) Traffic signs and Pavement Markings

Traffic signs and pavement markings shall include road side signs, overhead signs, curve mounted signs and road marking along the project highway. The location for these provisions shall be finalized in consultation with Independent Engineer.

ii) Concrete Crash Barrier, Metal beam crash barrier, Separators (MS railings)

The minimum length of Concrete Crash Barrier shall be 9477m. Metal beam crash Barrier shall be 10600,m Separator (M.S. railings) shall be 23400m..

iii) Traffic Safety Devices wherever required

iv) Boundary stones

v) Hectometer/kilometer stones

vi) Traffic blinker signal (L.E.D) at intersections.

(c) Pedestrian Facilities

The additional pedestrians facilities in the form of guard rails, footpath, lighting etc. shall be provided wherever required.

(d) Landscaping and Tree Plantation

Landscaping of the highway shall be done on within ROW, but not limited to, the following:

Median
Grade Separated intersections
Entry and Exit ramp
At grade islands of intersection locations
Toll Plaza Area

(e) Truck lay-byes

Truck Laybyes shall be provided at locations given at Appendix C-1.

(f) Bus-byes and Bus Shelter

Bus Laybyes shall be provided at locations given at Appendix C-II.

(g) Others

1. Highway Lighting

High Mast Lighting shall be provided at all the required locations as per manual except for Minor Junctions where Solar lighting shall be provided.

2. Highway Patrol

Highway Patrol units as per the prescribed Manual

3. Ambulances

Ambulance units as per the prescribed Manual

4. Cranes

Cranes as per the prescribed Manual

5. Development of site for wayside amenities

Development of site for wayside amenities

6. Traffic aid posts

Traffic aid posts as per the prescribed Manual

7. Medical aid posts

Medical aid posts as per the prescribed Manual

8. Vehicle rescue posts

Vehicle rescue posts as per the prescribed Manual

9. Telecom system

Emergency Call Boxes (ECBs) at every 2 km shall be provided along the Project Highways in accordance with the clause 4.18.4 of the Manual.

Note: In case of any discrepancy in the location of any of the project facilities mentioned in this Annex-I, the independent Engineer shall finalise the same as per site requirement.

Provisions of other facilities, if required may be made in similar manner.

Note: In case of any discrepancy in number or location of any of the project facilities mentioned in this Annex-I, the Independent Engineer shall finalise the number/location of these facilities as per site requirement.

Appendix C - I

Truck lay-byes

The concessionaire shall provide four nos of Truck lay byes at existing chainages 40+500 (L/S), 71+000 (R/S), 97+500 (L/S) and 144+000(L/S). The locations of these truck lay bays are tentative and shall be finalized by the concessionaire in consultation with the IE.

Appendix C -II

Bus-byes and Bus Shelter

Pick Up Bus Stops Locations

Pick Up Bus Stops (Left Side)			**Pick Up Bus Stops (Right Side)**	
S. No.	Existing Chainage		S. No.	Existing Chainage
1	43+100		1	56+000
2	44+406		2	61+000
3	64+000		3	113+200
4	90+300		4	143+200
5	100+300			
6	106+400			
7	110+000			
8	119+500			

Bus Bays Locations

Bus Bays (Left Side)			**Bus Bays (Right Side)**	
S. No.	Existing Chainage		S. No.	Existing Chainage
1	40+100		1	51+300
2	43+500		2	54+100
3	45+000		3	55+200
4	48+400		4	58+500
5	49+800		5	60+800
6	51+000		6	63+100
7	55+000		7	64+800
8	58+500		8	69+050
9	63+100		9	70+050
10	65+600		10	73+200
11	69+050		11	97+600
12	69+400		12	98+600
13	73+200		13	99+100
14	73+800		14	99+800
15	80+800		15	110+800
16	84+000		16	114+050
17	90+800		17	129+400
18	92+100		18	130+200
19	97+100		19	130+800
20	98+600		20	131+700
21	99+100		21	132+500
22	103+500		22	133+600
23	104+100		23	144+100
24	108+100			
25	110+800			
26	111+200			
27	114+050			

Bus Bays (Left Side)			Bus Bays (Right Side)	
28	115+800			
29	117+900			
30	119+800			
31	120+100			
32	121+800			
33	127+400			

SCHEDULE -D

(See clause 2.1 a)

SPECIFICATIONS & STANDARDS

1.Four Lanning

The concessionaire shall comply with the manual of specifications & standards for four lanning of National highways through Public Private Partnership Govt, of India, Department of Road transport & highways, setforth in Annex-1 of schedule D for construction of the four/six lane project highway.

Annexure-I
(Schedule-D)

Specifications & Standards for Four-Laning

1. Manual of Specification and Standards to apply

Subject to the provisions of Paragraph 2 of this Annex-I, Four-Laning of the Project Highway shall conform to the Manual of Specification and Standards for BOT Road Projects published by Ministry of Shipping, Road Transport and Highways (MoSRTH). An authenticated copy of the Manual has been provided to the Concessionaire as Volume-IV of the bid document.

2. **There is no deviation** from the "Manual of Specifications & Standards for Four laning of National highways through Public Private Partnership" published by Government of India, Department of Road transport & Highways, Ministry of Shipping, Road Transport and Highways (MoSRTH).

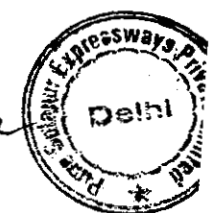
Manual
of
Specifications and Standards
for
Four Laning
of
National Highways
through
Public Private Partnership

Government of India

Department of Road Transport & Highways

Ministry of Shipping, Road Transport & Highways

D-3



FOREWORD

Government of India has taken a mission for improvement of road infrastructure in the country. An ambitious National Highway Development Project (NHDP) has been taken up into seven phases whereby around 26,000 km. length of National Highways is to be upgraded to 4-lane divided carriageway facility, 6,500 km of National Highways to be upgraded to six lane facilities, 20,000 of existing deficient stretches to be improved to two-lane with paved shoulder facility, construction of 1,000 km. of expressways and construction of bypasses, ring roads, flyovers, etc. at major locations. The implementation of these phases now would be mainly through Public Private Partnership (PPP) for attracting private capital, improving efficiencies and optimising the cost. Several states are also pursuing programmes for development of state highways and roads through Public Private Partnership.

The Model Concession Agreement (MCA) for awarding PPP projects on National Highways has been revised and approved by the Committee on Infrastructure (COI) headed by the Prime Minister. MCA follows the design, build, finance and operate (DBFO) approach that requires the private investor (Concessionaire) to bear the responsibility for detailed design, construction, operation & maintenance of the project highway during the period of concession. The Model Concession Agreement envisages a Manual of Specifications & Standards in one of its technical schedules.

Government is committed for providing road infrastructure comparable to the world standards. Accountability for providing safe and reliable road network ultimately rests with the Government. It is, therefore, essential that the specifications and standards laid down for development of National Highways particularly through Public Private Partnership should cover sound engineering practices and safety features. More attention also needs to be given to amenities to the users so that they get the value for their money on these developed National Highways.

A draft of the Manual was prepared by Indian Roads Congress (IRC) as a consultancy assignment given by the Planning Commission. Planning Commission had forwarded this draft to the Ministry for application with or without modification.

D-4

Ministry constituted a Technical Committee comprising the following officers for examining this draft and finalisation of the Manual for adoption of National highway works to be taken up through the Model Concession Agreement for PPP projects:

1.	Sh. G. Sharan, Director General (Road Development), Deptt. of Road Transport & Highways, (DoRT&H)	-	Chairman
2.	Sh. A. P. Bahadur, Chief Engineer, DoRT&H	-	Member
3.	Sh. S. B. Basu, Chief Engineer, DoRT&H	-	Member
4.	Sh. R. D. Dohare, Chief Engineer, DoRT&H	-	Member
5.	Sh. A. N. Dhodapkar, Chief Engineer, DoRT&H	-	Member
6.	Sh. A. V. Sinha, Member (Tech.), National Highways Authority of India (NHAI)	-	Member

Sh. V. L. Patankar, Director, National Institute for Training of Highway Engineers NITHE was co-opted and contributed significantly in redrafting the Manual so as to address safety requirements in planning and designing of the 4-lane highway. Sh. R. K. Singh and Sh. Sudip Choudhary, Superintending Engineers in the Ministry helped in finalization of the Manual.

DoRT&H expresses its gratitude to the various members of the technical committee whose names have been mentioned above and other officers who took great pains and contributed immensely in finalization of this Manual. The efforts made by the experts and staff of IRC and Planning Commission are also acknowledged.

I am confident that this Manual will serve its intended purpose as part of the Model Concession Agreement for Public Private Partnership in Highways.

(G. Sharan)
Director General (Road Development)
Deptt. of Road Transport & Highways
Ministry of Shipping, Road Transport & Highways

11th March, 2008

National Highway Authority of India ★ New Delhi ★

Pune Solapur Expressways Private Limited Delhi

D-5

Introduction

This Manual has been prepared for 4 laning of National Highways on PPP mode.

The concept of developing a "forgiving" highway has been the main consideration in developing this Manual, besides amenities to the users who would be paying the fee for the use of the facilities and, therefore, expect higher level of facilities than available traditionally until now. The standards and specifications already available in Ministry's book of specifications and technical circulars and various codes of practices and guidelines of IRC have formed the basis for evolving this Manual. Wherever suitable standards were not available in some of the new areas, the same have been developed and suggestive layouts provided. The Manual has also recognized the need for adoption of new technologies and materials.

This Manual would eventually form an integral part of the MCA and binding on the concessionaire. It may be possible that some of the provisions of this Manual may not be feasible due to site constraints or other reasons. Such project specific deviations would need to be stated precisely by the road authorities while inviting the bids so that bidders are fully aware and able to assess their project cost.

The technical standards prepared by IRC and accepted by Ministry as well as by State Governments are same both for National Highways and for State Highways. This Manual, therefore, can be used for State Highways as well, however, some of the provisions contained in this Manual such as for Advance Traffic Management Systems (ATMS) may not be feasible for State Highways and State governments can take a view on this without compromising on the overall safe operation of the Highway. The term "Authority" used in the Manual could be replaced by the term "State Government of _____" or any other suitable terminology,

This Manual has been finalised for the projects to be taken up through Public Private Partnership. The concessionaire(s) shall undertake detailed planning and design of the project highway in accordance with provisions contained in this Manual. The Manual shall also be used by consultants for preparation of feasibility studies for project development.

The Manual should also be used for development of four lane highways to be implemented through budgetary sources. This Manual should also form the basis for preparation of Detailed Project Report for four laning projects to be taken up other than PPP mode.

The Manual is generic in nature. However, for the projects to be taken up through Public Private Partnership (PPP), consideration to the viability of the project may need to be given. Keeping this in view, following deviations can be permitted on case to case basis where the project may require viability gap funding (in accordance with the financial analysis undertaken by the implementing agency) of more than the prescribed limit.

(i) Wherever the traffic projections indicate that it would not reach the trigger traffic level for six lane highway during the period of concession, the width of new bridges would be such that the requirement for four lane highway configuration is met with.

(ii) Provision of ATMS as prescribed in Section 2.3.3 and detailed in Section 4.18 shall be deferred for the next phase of development of the project highway.

The provision of restaurant, fuel facility and garage for minor repair as prescribed in Section 4.13.3 would be optional based on concessionaire assessment of their commercial viability.

(iii) Construction of separate bridge structure to maintain the continuity of the service road across the stream/dip in the ground may be dispensed with and the service road may be connected to the existing bridge structure for the highway traffic.

(iv) Pavement of the main highway shall be designed for the cumulative number of standard axles of 8.16 tones over the design life of 20 years for the concession period of 15 years and above and the design life of 15 years for the concession period of less than 15 years.

Contents

MANUAL OF SPECIFICATIONS AND STANDARDS FOR FOUR LANING OF NATIONAL HIGHWAYS

[See Clause 2.1(a) of Concession Agreement]

SECTION – 1: GENERAL

1.1 This Manual, forming part of Annex-I to Schedule D of the Concession Agreement (refer Clause 2.1(a) of the Concession Agreement), sets forth the Specifications and Standards to be followed for development of the Project Highway as described in Schedule B and construction of project facilities as described in Schedule C on the project site as described in Schedule A. The concessionaire shall make himself fully aware of the Project Site with regard to the existing features of the site (such as location, layout, geometry, right of way, intersecting roads, existing accesses , etc) including the constraints at the site (such as limitation of right of way, existence of adjoining property, existing structures, plantation, utilities, etc), plan, design and construct the Project Highway comprising its various features (such as four-laning, service roads, underpasses, overpasses, grade separators, widening/reconstruction of bridges, etc) and the project facilities(such as toll plazas, rest areas, lighting, landscaping, wayside amenities, etc) meeting the standards, specifications and quality specified in this Manual.

1.2 Any project report and other information provided by the Authority shall be used by the concessionaire only for reference purpose and for carrying out further investigations. The concessionaire shall be solely responsible for undertaking all the activities, that are necessary for the delivery of the project, such as planning, surveys, investigations, design, construction planning, management traffic operation, safety to the users/abutting property holders etc. and shall have no claim against Authority for any loss, damage, risk, costs, liabilities or obligations

D-9

arising out of or in relation to the project report and other information provided by the Authority.

1.3 General consideration of planning, design and construction

The Project Highway shall be planned as a "partially access controlled highway" where access to the highway shall be provided only at pre-determined locations. In doing so, the concessionaire shall take measures to overcome the physical and operational constraints and plan, design and construct the Project Highway using appropriate methods, management techniques and technologies. General consideration shall, without being limited to, be as follows:-

(a) **The constraints**

The physical constraints in the existing highway are in the form of limitation of right of way, un-regulated access, inadequate service roads and underpasses, numerous at-grade junctions, lack of physical separation between local and through traffic etc. The operational constraints arise out of the necessity or possibility of closing a portion of the road for construction and/or diverting the traffic to temporary diversions, thereby reducing the capacity and safety of the existing highway. The solutions evolved by the concessionaire shall be such that these operational constraints are overcome through appropriate planning, design and construction method, techniques and technologies and by adopting suitable traffic management measures.

(b) **Safety of design**

All designs shall be safe to ensure that the Project Highway or any part thereof (for example embankment, pavement, retaining structures, bridges, culverts, etc) does not collapse (global stability) nor its serviceability/performance (for example settlement, roughness, undulations, deflections, etc) deteriorates below acceptable level as prescribed in Schedule K of the Concession Agreement.

(c) **Durability**

The Project Highway shall not only be safe but also durable. This would mean that the deteriorating effects of climate and environment (for example wetting and drying, freezing and thawing, if applicable, temperature differences, aggressive environment leading to corrosion etc) in addition to the traffic shall be duly considered in design and construction to make the Project Highway durable.

(d) **Mitigating disruptive effects of construction**

The planning, design and construction of the highway shall be such that the construction of Project Highway does not have adverse impact on the environment and does not disrupt the lives and business activities of the people living close to the highway.

1.4 Acceptable Standards

1.4.1 The concessionaire shall follow latest version, issued prior to a date 60 days before the last date of bid submission, of following Indian Standards, Specifications, Codes of Practice, Guidelines, etc in the following order of priority:

i) Technical circulars issued by MOSRTH which are either published by Indian Roads Congress or are available on the website of MOSRTH in so far as they relate to matter covered in this Manual.

ii) Specifications for Road and Bridge Works issued by the Ministry of Shipping, Road Transport & Highways hereinafter referred as 'MOSRTH' or 'Ministry's Specifications'.

iii) Indian Roads Congress (IRC) Codes and Standards; as per **Appendix D-1**.

iv) Bureau of Indian Standards (BIS) in the absence of any specific provision/issue in the aforesaid Codes and Specifications as per **Appendix D-1**.

1.4.2 Wherer Indian standards are either not available or if available, are not adequate, the concessionaire shall be permitted to adopt international standards and specifications as followed in United States of America, United Kingdom, European Union, Japan, Germany or Australia. The concessionaire shall submit proposal in this regard to the Independent Engineer (IE - see Clause 23 of Concession Agreement) for review and comments.

1.4.3 All building works shall conform to the specifications of Central Public Works Department (CPWD) and norms stipulated in the National Building Code (NBC). In case of conflict between CPWD and NBC norms, NBC norms shall prevail. To the extent specific provisions for building works are provided in IRC/MOSRTH specifications, the same shall prevail over the CPWD and NBC provisions. For this purpose, building works shall also deemed to include roadside facilities, landscape elements and/or any other works incidental to the building works. All items of lighting works of the building shall conform to CPWD Specifications for Electric Works (Part I and II).

1.4.4 The concessionaire shall also be permitted to use proprietary or patented designs subject to the condition that the concessionaire shall be solely responsible for their performance and durability.

1.5 Overall Scheme

The concessionaire shall prepare and submit, in accordance with provisions of this Manual and in compliance with Clause 12.1 of the Concession Agreement, the detailed design, construction methodology, quality assurance procedure and operation of the Project Highway and project facilities to the IE for his review. If, on review, the scheme is not found to conform to the provisions of this Manual, the concessionaire shall modify the scheme to make it conform to the provisions of the Manual. Increase in cost due to any modification suggested by the IE shall not be a reason for the concessionaire objecting to or contesting these modifications. The concessionaire shall

proceed with the implementation of the project as per the scheme so modified.

1.6 Clarificatory role of Manual

Where the provisions of the Concession Agreement are general in nature, the provisions of this Manual shall be deemed to clarify or amplify these provisions.

1.7 Drawings to have comprehensive meaning

"Drawings" referred to in Clause 12.3 of the Concession Agreement shall not have a restrictive meaning but shall include charts, sketches, explanatory notes and documents explaining the design assumptions, designs, construction methodologies, etc which can demonstrate that "Drawings" conform to the provisions of this Manual. All drawings specifically referred to in this Manual shall form part of Schedule H of the Concession Agreement.

1.8 Interpretation of the Manual

(1) In case of any conflict between provisions of this Manual and IRC codes or Ministry's specifications, provisions of this Manual shall prevail.

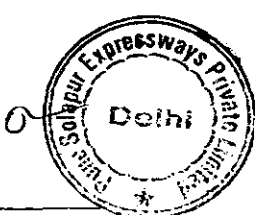
(2) The IE would ensure that the project highway is planned, designed and constructed in accordance with the provisions contained in this Manual. In case any non-conformity is found, the issue would be pointed out to the Concessionaire and reported to the executing agency (such as NHAI). If the issues do not get resolved at the level of executing agency so that the provisions of Manual are complied with, the matter would be referred to the DORTH for a final decision before any step is taken by either party for arbitration..

1.9 The concessionaire shall keep all the existing utilities in continuous satisfactory use as per Clause 11 of the Concession Agreement. Wherever existing utilities are to be shifted and/or new utilities are to be provided during the concession period, the same shall be accommodated within the utility corridor of 2.0 m width identified at the edges of the ROW subject to approval by the Authority.

1.10 This Manual is applicable for four laning of the Project Highway. However, some sections of the Project Highway, as specified in schedule B, are required to be widened to six lanes, which should not be construed to six laning of the Project Highway. For six laning of such sections, design shall be finalized based on review & comments of IE.

1.11 The terms 'Ministry of Surface Transport', 'Ministry of Road Transport and Highways' and 'Ministry of Shipping, Road Transport & Highways' or any successor or substitute thereof shall be considered as synonymous.

1.12 The terms 'Inspector' and 'Engineer' used in MOSRTH Specification shall be deemed to be substituted by the term 'Independent Engineer'; to the extent its duties and functions are consistent with the provisions under 'CLAUSE 23' of the Concession Agreement and this Manual. For avoidance of doubt, it is clarified that the role of 'Independent Engineer' is to 'review and comment', whereas approval will be accorded by the 'Concessionaire'/ 'Engineer' appointed by the 'Concessionaire' taking into account comments of 'Independent Engineer'.



D-149

SECTION – 2: PLANNING THE PROJECT HIGHWAY

2.1 GENERAL

The concessionaire shall plan for capacity augmentation and design the Project Highway in a manner that will ensure safe operation of the Project Highway as a "partially access controlled highway". The concept of providing forgiving highway to the road users shall be kept in mind while planning and designing the Project Highway. For safe operation, high speed traffic and slow traffic/local traffic shall be separated by constructing parallel service roads wherever required as specified under Schedule B.

2.2 Operational Objectives of the Project Highway

The Project Highway will be operated as a partially controlled access highway so as to substantially improve the safety and operational efficiency of the existing highway. The partial control on access for the Project Highway shall be achieved through measures such as service road with physical separation for local traffic, intersections, acceleration/deceleration lanes, vehicular and pedestrian underpasses, median openings with shelter lane as described in succeeding paragraphs.

2.2.1 Service road for separation of local traffic:

Local traffic in built up area shall be separated with provision of service roads. The requirement and the length of the service roads in such built up areas shall be identified for the design period of the project highway and specified in the Schedule B. Built up area shall mean all sections of the Project Highway, which are situated within the limits of municipal town(s) and shall also include those sections having continuous length of 200 m or more in non-municipal areas where dwellings / shops have been built on one or both sides of the Project Highway on at least 50 percent of the total length of each such section.

The service roads shall be connected to the main highway through properly designed entry/exit ramps at locations given in schedule B. The service roads, the ramps and the underpasses/flyovers shall take care of the local/access traffic and ensure that no right or U turn is required to be provided on the main highway. At the ends, the service roads shall be provided with end treatment so that the local traffic is able to merge the highway in a safe and efficient manner. Some suggestive layouts for commonly occurring situations are given in fig. 2.1(A), 2.1 (B), 2.1(C), 2.1 (D), 2.2, 2.3 and 2.4. The spacing as indicated in figure 2.3 between two consecutive entry and exit ramps for service road would not be kept less than 500 m.

2.2.2 **Intersection:**

(i) Grade separated intersections:

Grade separated intersections shall be provided at all intersections of Project Highway with National Highways and State Highways. Grade separated intersections shall also be provided at all other intersections of Project Highway with other category roads as per warrants specified in IRC 92 and at locations specified in schedule B.

(ii) At grade intersection;

All intersections other than those covered in (i) above shall be designed as at-grade intersections in following manner:

a) All merging and diverging movements to / from the Project Highway shall be either through service road with end treatment or acceleration and deceleration lanes except for the traffic allowed to cross Project Highway at predetermined locations.

b) If the road is crossing the Project Highway, the four arm at-grade intersection shall be designed in accordance with MOSRTH standard drawings. In case the standard drawing has not provided the right turning lane, the same would be

provided to accommodate the peak hour right turning traffic.

c) If the road meets the Project Highway at T- intersection, this would be designed as "left in left out". The right turnings from such cross roads shall be permissible at the next intersection or median opening.

2.2.3 **Access from private property:**

Ingress/egress to/from commercial and industrial properties including retail outlets shall be provided through acceleration/deceleration lane in accordance with MOSRTH guidelines at the cost of property owners.

2.2.4 **Vehicular Underpasses:** Vehicular underpass shall be provided as specified in Schedule B and to connect service roads on both sides of the Project Highway in such a manner that no vehicle is required to travel more than 2 km on service road to approach an underpass for crossing over to the other side.

2.2.5 **Facilities for pedestrians and cyclists:**

Facilities for safe and unhindered movement of pedestrians and cyclists shall be provided on the project highway wherever it passes through urban/built-up areas and at grade separators. These facilities shall be planned in accordance with the relevant provisions contained in IRC-11, IRC-17 and IRC-103. Facilities shall also be planned and provided for crossing of pedestrians and cyclists. The crossing facilities can be either in conjunction with at grade intersections or through underpasses. The crossing facilities shall be so planned that pedestrians do not have to walk for more than 0.5 km. to reach the crossing point. The existing slab culverts and minor bridges with span length equal to or more than 5m, a vertical clearance of more than 2.5m and not catering to perennial flow, can also be used for pedestrians and cycle crossings by providing necessary flooring. In rural stretches, pedestrian/cycle underpasses shall be provided at the locations of existing crossing points.

2.2.6 **Cattle crossings:**

Facilities for crossing of cattle through underpasses shall be provided at locations specified in Schedule 'B'.

2.2.7 **Median openings:**

Median openings shall be provided at four or more arm intersection and at other locations to facilitate the U-turn for vehicles and not for leading directly to any cross road. The average spacing of median openings shall be around 2 kms. If a number of roads are meeting the Project Highway, then they would be joined together through a service road and an at-grade 'T' intersection would be provided such that the spacing of 2 kms for median openings is maintained.

2.2.8 **Traffic signs and road markings for guidance to user:**

(i) The Project Highway shall be provided with elaborate system of traffic signs and markings. The traffic signs for various situations/location would be in accordance with IRC 67 in terms of location, configuration and colour scheme.

(ii) Pavement marking shall also be carefully planned depending upon the requirement for each location and shall conform to IRC-35. The Project Highway shall incorporate all such safety features such as elaborate system of signs and markings, cat's eyes, delineators, hazard markers, safety barriers at hazardous locations, pedestrian guardrails so that the Project Highway operates as a "Forgiving Highway".

2.3 **User Facilities:**

2.3.1 **Rest Areas:**

The Project Highway shall have rest areas as specified in Schedule C and be provided with facilities for the users so as to provide safe and comfortable journey. For this purpose, rest areas shall be planned with composite facilities for long distance travelers through personal cars, buses and goods vehicles. Due consideration shall be given to the requirements of different class of road users including truck drivers.

Wherever some eateries or informal rest areas exits along the highway, they would be separated from the main highway with separation-island along with safe entry and exit with signs and markings and parking spaces for expected peak hour vehicles.

2.3.2 **Bus-Bays:**

If the Project Highway has regular movement of buses either through Government or through private sector, bus bays shall be planned, designed and provided for the convenience of bus commuters and safe and unimpeded travel on Project Highway. The location of Bus Bays shall be in accordance with the section 4.14 of the Manual and as given in Schedule 'C'.

2.3.3 **Advanced Traffic Management Systems (ATMS):**

The Project Highway shall be provided with ATMS so as to have enhanced safety for the users / travellers, collect information for the traffic operations, provide information to the users on real time basis for the traffic flow conditions and incidents ahead. For this purpose, there would be a control centre and outdoor equipment connected through a transmission medium.

2.3.4 **Highway Patrol:**

The Project Highway shall be provided with highway patrol unit(s) for round the clock patrolling so as to provide assistance to the users in case of any need, monitor the travel conditions to provide information to the control section and to undertake immediate measures for managing the traffic flow in case of any incident.

2.3.5 **Ambulance(s):**

The Project Highway shall be provided with ambulance services so that the response time is not more than 10 minutes of the call.

2.3.6 **Crane(s):**

The Project Highway shall be provided with crane(s) with capacity to tow-away the disabled vehicles.

2.4 **Avenue/median plantation:**

The Project Highway shall have plantation of trees along the highway and low height shrubs on the medians. Plantation scheme shall be reviewed by IE so that it does not affect the road safety.

2.5 **Drainage:**

The Project Highway shall be provided with an elaborate drainage system to drain the storm water from the roadway and embankment and to ensure minimum disturbance to natural drainage of surface and subsurface water of the area.

2.6 **Toll Plaza:**

The Project Highway shall have toll plaza(s) as per the requirements and stipulations contained in Schedule C of the Concession Agreement.

2.7 **Lighting System:**

The Project Highway shall be provided with lighting system in urban stretches/ built up areas, grade separators, underpasses, toll plaza and its approaches, rest areas and bus stops.

2.8 **Operation and maintenance centre:**

The Project Highway shall have operation and maintenance centre(s) for carrying out operation and maintenance activities of the Project Highway.

2.9 **New concepts, technologies and materials:**

The Concessionaire would be permitted to adopt new technologies and materials as per the requirements of either the design or as a result of Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) (such as noise barriers) or for providing cost effective solutions. These shall be subject to the review by I E for their design and adoption.

D-2

2.10 Planning drawings:

The concessionaire shall plan the Project Highway conforming to the requirements spelt out above and submit Kilometre-wise strip plan for the entire project length schematically depicting therein the location of all features specified in Schedule B as well as the project facilities specified in Schedule C clearly indicating the existing features and proposed improvement plan to the IE for review and comments. The submissions shall also include a 3-D animated perspective (To give a drive through vision) of the Project Highway showing the proposed improvements and main features.

SECTION -3: SURVEY AND INVESTIGATIONS

All detailed survey and investigation that are required for planning, design and construction of the project highway such as detailed topographic survey, traffic survey, hydraulic and drainage survey, road and bridge inventory and condition survey, subsurface investigation, material survey and pavement investigation, shall be carried out in accordance with IRC: SP:19, IRC: SP: 35 & IRC: SP:54 and best industry practices.

Technologies and equipments used for undertaking these surveys and investigations shall be such which will ensure the degree of details and accuracy of investigation results required for proper planning, design and construction of the project highway.

All the data generated from these surveys and investigations shall be properly referenced, compiled, validated and presented in easily comprehensible forms, such as those prescribed in the publication referred to above. The data in electronic as well as hard copy formats shall along with the detailed drawings prepared in accordance with section 4 of this Manual form part of Schedule H to the Concession Agreement and shall be used for detailed design in accordance with section 4 of this Manual.

D-22

SECTION - 4: DESIGN

4.1 General

The designs shall be based on the detailed survey and investigation data collected by the concessionaire in accordance with Section 3 of this Manual. The drawings prepared on the basis of these designs along with the drawings required as per Section 3 of the Manual shall form part of Schedule H of the Concession Agreement.

All the designs and drawings shall be submitted to the I E for review and comments. The work shall be carried out in accordance with these drawings and such other additional drawings prepared or modified as per comments of the I E.

4.2 Geometric Design:

Geometric design of the highway, except for cross sectional requirements, shall be in accordance with IRC: 73, IRC: 86, IRC: 38 and IRC SP: 23. Uniformity of design standards shall be maintained throughout the length of Project Highway. All deficiencies in the existing highway geometry shall be rectified to meet the minimum standards specified in this Manual. The detailed plans, L-sections, cross-sections, strip plans and plans of other facilities of the existing highway to be prepared by the concessionaire shall be used for developing the layout of various features of the Project Highway.

4.2.1 General cross-sectional requirements:

The design of cross section of the four lane highway shall take into account the following general requirements:

(i) The developed cross sections for both the highway as well as the service road shall have operational safety in focus such as segregation, separation, turning radii, gradients, etc and provisions for various types of movements and maneuvers like merge, diverge, weave, etc shall be comprehensively considered and provided for.

(ii) Provisions shall be made in the cross-section for accommodating utilities both over as well as underground as the case may be. A 2.0 m wide strip of land at the extreme edge of ROW may be kept for accommodating utility services. Provisions contained in IRC 98 shall be followed to accommodate utility services for Project Highway in built up areas.

4.2.2 Specific cross sectional requirements

The cross section shall provide for the following:

4.2.2.1 Rural Sections

(i) Minimum width of median

(a) Raised median with mountable kerb (as per IRC: 86) 4.5 m

(b) Depressed median with crash barriers on both sides 7.0 m

(ii) Width of paved carriageway on both sides of median

(a) 2-lane carriageway with each lane of 3.5 m width 7.0 m

(b) Median side paved strip adjacent to carriageway having same specification as main carriageway in case of

(i) Raised median 0.25 m

(ii) Depressed median 0.50 m

(c) Paved shoulder on left side of the pavement having same specification as main carriageway in Plain and rolling terrain 1.50 m

(iii) Width of earthen shoulder

(a) Plain and rolling terrain 2.00 m

(b) Mountainous and steep terrain

- Both carriageways side by side 2.5 m
  (i/c drain of hill side and crash barrier on valley side)
- Two carriageways with separate alignments– 2.5 m
  on valley side
  (i/c drain of hill side and crash barrier on valley side)

(iv) Side drain

Cross section shall be designed to cater for effective drainage of estimated peak hour run off.

(v) Width of utility corridor on both sides — 2.0 m

4.2.2.2 **Urban/ Built up Sections**

(i) Minimum width of median

(a) Flush median with central crash barrier — 2.0 m

(b) Raised median with central crash barrier — 1.2 m

(ii) Width of paved carriageway on both sides of median

(a) 2-lane carriageway with each lane of 3.5 m width — 7.0 m

(b) Median side paved strip adjacent to carriageway of same specification as main carriageway in case of

(i) Raised median — 0.50 m

(ii) Flush median — full width (excluding crash barrier)

(c) Paved shoulder with same specifications as the main carriageway

(i) Plain and rolling terrain — 1.5 m

(ii) Mountainous and steep terrain (since no service road is provided)

Both carriageways side by side at same level and two carriageways at separate alignments and at different levels:

Habitation on hill and valley side -	2.5m (on each side including drains on hill side)
Habitation on valley side -	2.5m (on valley side)
Habitation on hill side -	2.5m (on hill side including drain)

(iii) Width of earthen shoulder

(a) Plain and rolling terrain — -1.5 m (when no service road is provided) the

portion be included in the separation island (when service road is provided)

(b) Mountainous and steep terrain (since no service is provided)

Both carriageways side by side at same level and two carriageways at separate alignments and at different levels:

Habitation on hill and valley side - --------

Habitation on valley side - 2.5m (on hill side including drain)

Habitation on hill side - 2.5m (valley side including crash barrier)

(iv) Width of service roads Normal 7.0 m (Minimum 5.5m)

(v) Minimum width of separation island between main carriageway and service road 1.5 m

(vi) Minimum width of footpath 1.5 m

(vii) Side drain

Cross section shall be designed to cater for effective drainage of estimated peak hour run off.

(viii) Width of utility corridor on both sides 1.5 m

The footpath shall be designed for use of pedestrians and cyclists as per site requirements. Side drain and utility corridor can be accommodated either under footpath or separation island depending upon local situation.

4.2.3 **Design Speed:**

The design speeds given in following table shall be adopted for various terrain conditions.

D-26

Nature of Terrain	Cross slope of the country (per cent)	Design speed (km/hr)	
		Ruling	Minimum
Plain	0 - 10	100	80
Rolling	> 10 - 25	80	65
Mountainous	> 25 - 60	50	40
Steep	> 60	40	30

Short stretches (say less than 1 km) of varying terrain in the project stretch shall not be taken into consideration while deciding the terrain classification for a given section of Project Highway.

In general, the ruling design speed shall be adopted for geometric design of the highway. Only in exceptional circumstances minimum design speed may be adopted where site conditions are extremely restrictive and adequate land width is not available. Abrupt changes in design speed shall be avoided.

4.2.4 **Horizontal Alignment:**

(a) While designing the horizontal alignment, the following general principles shall be kept in view.

i. Alignment should be fluent and blend well with the surrounding topography.

ii. On new roads, the curves should be designed to have largest practical radius but in no case less than ruling value corresponding to ruling design speed.

iii. As a normal rule, sharp curves shall not be introduced at the end of long tangent since these can be extremely hazardous.

iv. The curves shall be sufficiently long and have suitable transitions to provide pleasing appearance.

v. Reverse curves may be needed in difficult terrain. Sufficient length between two curves shall be provided for

D-27

introduction of requisite transition curves, and required superelevation.

vi. The curves in the same direction separated by short tangents known as broken back curves should be avoided as far as possible. Wherever possible, such portion may be designed with longer single curve.

vii. To avoid distortion in appearance, the horizontal alignment should be coordinated carefully with the longitudinal profile.

(b) All horizontal curves shall consist of circular portion flanked by spiral transitions at both ends.

(c) **Radii of Horizontal Curves**

The radius of horizontal curves for various terrain conditions shall not be less than the ruling minimum values as per IRC: 73 for the National Highways and the terrain of the project area except where site conditions are restrictive and adequate land is not available. Where such restrictions exist, the radius of curve shall not be less than the specified absolute minimum values in IRC: 73.

(d) **Transition curves**

Minimum length of transition curve shall be as per IRC: 73 for the specified design speed.

4.2.5 **Camber/Cross fall**

Camber / unidirectional cross fall shall be provided for each carriageway including paved shoulders in accordance with stipulations of IRC: 73. The cross fall for earthen shoulder shall be 0.5% steeper than that of the carriageway subject to a minimum of 3.0%. On curves, the shoulder on the high side of superelevated portion shall be provided with reverse slope from the superelevated carriageway portion. At the same time, it should not be too great to give break in the cross slope. The rate of change between pavement cross slope and outside shoulder should not exceed 5%.

D-28

4.2.6 **Super elevation**

Super elevation shall be provided on curves as per details given in IRC: 73 corresponding to the design speed and radius of horizontal curve adopted.

4.2.7 **Sight Distance**

The design shall provide for values of intermediate sight distance as per details given in IRC: 73 corresponding to the design speed adopted unless there are site constraints, where a minimum of stopping sight distance shall definitely be available. The requisite site distance shall be available across the inside of horizontal curves. Where horizontal and summit curves overlap, the design shall provide for the required sight distance both in the vertical direction along the pavement and in the horizontal direction on the inside of curve.

4.2.8 **Vertical Alignment:**

(i) The vertical alignment shall provide for a smooth longitudinal profile. Grade changes shall not be too frequent as to cause kinks and visual discontinuities in the profile. In this regard, directions given in IRC: 73 shall be kept in view.

(ii) There shall be coordination between horizontal alignment and vertical profile of the Project Highway and guidelines given in IRC: 73 in this regard shall be followed.

(iii) Gradients up to the value corresponding to ruling gradient as per IRC: 73 shall be adopted as far as possible. Value corresponding to limiting gradient shall be adopted only in very difficult situations and for short lengths.

(iv) Long sweeping vertical curves shall be provided at all grade changes. These shall be designed as square parabolas.

(v) The vertical profile of the two carriageways shall be designed in such a manner that difference in road level between the two carriageways at the locations of median openings would not be more than 0.25m.

D-29

(vi) The aspect of efficient drainage shall also be kept into consideration while designing vertical profile and cross-sections of the highway as stipulated in IRC: SP: 42 and IRC: SP: 50.

4.2.9 **Geometric design requirement of additional features:**

a. Acceleration Lane:

(i) Length: Designed for a speed differential of 60 kph

(ii) Width: 5.5 m

(iii) Taper at merge: 1 in 15 beyond design length.

b. Deceleration lane:

Same as 'acceleration lane'

c. Median Openings:

Length of median opening: Not less than 20 m

Shelter lane: Width 3.5 m; Length based on maximum number of right turning vehicles in peak hour

d. Service Roads:

Design Speed:	40 km/hr (minimum)
Width: Carriageway	Normal 7.0 m (minimum 5.5 m)
Paved shoulder	0.5 m on both sides (may be dispensed with in exceptional circumstances)
Camber/ Super elevation:	As per IRC (Unidirectional camber towards drain shall be provided)
Extra widening:	To be provided at flares for underpass approaches, adequate turning radius, U-turn facility etc as per requirement.
Gradient:	1 in 30 (ruling min) underpass approaches – 1 in 50 generally, max 1 in 30.

e. Bridges for service road:

(i) If total length of bridge required to be constructed is less than 60 m, on a straight, the service road shall continue

D-31

across the stream through separate bridge structures, which may be vented causeway structure with vents designed to cater for ordinary flood discharge.

(ii) In cases involving bridges of length 60 m or more, separate bridge structures shall not be provided and service roads on both side of the stream shall be merged with the Project Highway. In such cases, width of bridge to be constructed for main highway shall be increased by one traffic lane (i.e. 3.5 m) on both sides of carriageway to accommodate merging traffic of service road. For this purpose, service roads shall be merged by tapering of the road (1 in 20) with detailed system of signs and markings.

(iii) In cases of ROBs, the service roads on both the sides shall be joined through one of the viaducts of ROB. This arrangement shall be on either side of the railway crossing if the situation demands. For some proportion of service road traffic, safe entry and exit shall be provided from service roads to the ROB.

(iv) Bridges in built up area will invariably accommodate footpath unless specified otherwise in Schedule-B.

f. Junctions at Service Roads:

(i) With minor merging roads: Flaring at the junction like a 'left-in left-out' configuration but with provision for right turning through painted channelising island.

(ii) At underpasses: Flaring at the junction with provision of painted channelising island to guide traffic movement to / from the underpass.

g. Vehicular Underpasses:

Width	:	7.5 m minimum 10.5 m (with footpath of 1.5 m on both sides) desirable
Vertical Clearance	:	5.0 m

h. Pedestrian / Cattle Underpass:

Width	:	4.0 m minimum
Vertical Clearance	:	2.5 m minimum; to be increased to 4.5m, in case certain categories of animals such as elephant/camel are expected to cross the Project Highway.

i. At Grade Intersection : At-grade intersections shall be designed as per IRC SP: 41 and layout as per MOST Type Design for intersections on National Highways. However, these typed designs shall be modified to provide for right turning lanes in the median, dropped kerbs and gap in channelisers to facilitate pedestrian crossing.

j. Grade Separated Intersection: The location of grade separated interchanges shall be as given in Schedule 'B'. Their layout and design shall be as per IRC: 92, keeping in view the site requirements. The crossing of side road to project highway shall depend upon the topography at the site.

4.3 Embankment

4.3.1 General

The height of the embankment shall be based on the final road levels. The following principles shall be followed for fixing the road level:

i) The top of sub-grade is at least 1.0 m above the high flood level/high water table/pond level. However, in exceptional circumstances not covered in the scope of work specified in Schedule-B, where it is found difficult to fulfill this criterion without needing reconstruction or raising in substantial length, the criteria may be relaxed depending on site conditions, ensuring a minimum difference of 0.6 m between the top of sub-grade and HFL/high water table/pond level.

D-3

ii) The road level of the new two-lane carriageway is not lower than the existing carriageway unless it improves vertical profile and also satisfies all other requirements set out in this Manual.

iii) To fulfill the minimum free board requirement and provide smooth vertical profile for portions forming approaches to structures.

iv) To raise the level of stretches of the existing road from drainage considerations as indicated in Schedule B of the Concession Agreement.

4.3.2 **Structural features and design of embankment**

i) Embankment shall be designed to ensure the stability of the roadway and shall incorporate only those materials, which are suitable for embankment construction as per Section 5 of this Manual.

ii) Side slopes shall not be steeper than 2H:1V in accordance with clause 4.6. and where necessary, the embankment shall be retained by a retaining structure.

iii) Where the embankment is to be supported on a weak stratum it shall be necessary to specially design the embankment and also adopt appropriate remedial / ground improvement measures.

iv) High embankments (height 6 m or above) in all soils shall be designed from stability considerations. For design of high embankments IRC: 75 and MOSRTH – Guidelines for Design of High Embankments may be referred to.

v) The side slopes shall be protected against erosion by providing turfing / vegetative cover, stone/C.C. block pitching, geo-synthetics, gabion walls or any other measures depending on the height of the embankment, type of soil involved and susceptibility of soil to erosion as per IRC: 56. Pitching works on slopes shall be as per MOST Specifications.

4.3.3 **Use of Fly Ash for Embankment Construction**

(i) Fly ash shall be used for construction of embankment in accordance with guidelines of MOSRT&H. The embankment shall be designed and constructed in accordance with IRC: SP-58. The thickness of soil cover shall not be less than 1 m for embankments up to 3 m height. For high embankments the thickness of soil cover shall be increased as per design.

(ii) The side slopes of the embankment shall be protected against erosion as stated in section 4.3.2 (v) above.

(iii) The stability analysis of the embankment shall be carried out as per IRC: 75.

4.4 Pavement Design

4.4.1 Type of Pavement.

(i) Unless otherwise specified in Schedule-B, the concessionaire may adopt any type (flexible/rigid) pavement structure for new construction.

(ii) The concessionaire shall submit proposal with regard to the type of pavement proposed for strengthening of the existing pavement to IE for review and comments and finalize the proposal taking into account comments of IE.

4.4.2 Design traffic

Pavement of the main highway shall be designed for the cumulative number of standard axles of 8.16 tones over the design life of 20 years for the concession period of 15 years and above and the design life of 15 years for the concession period of less than 15 years. Base year traffic, axle load distribution, and vehicle damage factor for design shall be determined on the basis of survey and investigation to be carried out by the concessionaire in accordance with section 3 of this Manual. The cumulative axle load for the purpose of design shall not be less than the number of standard axles obtained if the

D-34

base year traffic is cumulated at a rate of growth, which is the highest of the following in the initial 5 years:

(a) 5 % per annum for all vehicles

(b) Trend growth of various vehicle categories

(c) Projected Growth rate of revenue assumed in the concessionaire's cash flow

(d) Growth determined from secondary socio economic data and elasticity factors.

and then reduces by 2 (two) percentage points for every 5 year subject to a minimum rate of growth of 5 % at any point of time.

4.4.3 **Design procedures**

(i) For widening of the existing flexible pavement to meet the geometric design requirements specified in this Manual, the thickness and composition of layers for widening shall be same as that of existing pavement and further deficiencies in thickness shall be made up by overlay on the entire width of the pavement including paved shoulders. If the condition of existing pavement is so deficient that it cannot be improved by overlays, it will be scarified and the pavement shall be designed afresh.

(ii) In case the existing cement concrete pavement is to be widened, the widened pavement shall be of the same thickness and specification not inferior to that of the existing pavement. The widened pavement shall be joined with the exiting pavement by providing longitudinal joints of the same design and specification as that of the existing pavement. Similarly, the transverse joints with dowel bars of the same design as provided in the existing pavement shall be provided.

(iii) Flexible Pavement

The new flexible pavement shall be designed in accordance with IRC: 37 and strengthening of the existing flexible pavement in accordance with IRC: 81.

D-35

(iv) Rigid Pavement

The new rigid pavement shall be designed in accordance with IRC: 58. The existing rigid pavement may be rehabilitated / strengthened either by rigid or flexible overlays in accordance with good industry practice subject to review by the IE.

4.4.4 **Pavement Performance Indicators and Requirements**

i) The pavement performance and structural capacity shall be measured in terms of objective measurable performance and strength indicators, i.e., roughness, rutting, cracking and deflection.

ii) The new or strengthened flexible pavement surface on completion shall satisfy the following standards:

a. **Roughness**

In each lane measured by Bump Integrator (BI) : Not more than 2000 mm/km for each lane in a km length

b. **Rutting**

In wheel path measured by 3 m. Straight Edge. : No Rutting

c. **Cracking** : No Cracking

d. **Deflection** : Not more than 0.5mm characteristic deflection to be determined as per IRC: 81

e. **Other** : Nil

(iii) The new or strengthened rigid pavement surface on completion shall satisfy the following standards:

a. **Roughness**

In each lane measured by BI : Not more than 2000 mm/km for each lane in a km length

D-36

b. **Cracking** : No Cracks other than shrinkage cracks

c. **Other distresses such as scaling, raveling, spalling at edges** : Nil

4.5 Design of structures

4.5.1 General

i) The complete structure shall be designed to be safe against collapse and to maintain at all times an acceptable serviceability level. These shall be also designed to be durable to withstand the deteriorating effects of climate and environment.

ii) All bridges shall have independent superstructure for each direction of travel. Culverts may have single or independent structure. Width of median in structural portion shall be kept same as that in the approaches.

iii) In cases where median is kept open to sky, suitable provision shall be made for retaining the earth likely to spill from median portion of immediate embankment behind abutment either by extending the abutment wall or constructing a new retaining wall. Care shall also be taken to merge the wing wall /return wall and flooring of the old bridge with that of the new bridge.

iv) All bridges shall provide for carriageway width as per section 4.5.5 below. Wherever specified in Schedule B, the superstructure shall also provide for pedestrian footpath.

v) Utility service, if any, to be taken on the structures shall be as specified in Schedule B of the Concession Agreement.

vi) Concessionaire is encouraged to adopt innovative/latest techniques in design, construction and use of new materials. However, in all such cases, Concessionaire shall submit all

relevant details along-with guidelines and propriety literature proposed to be followed to IE for review and comments.

4.5.2 **Type of Structure**

i) The concessionaire may choose any type of structure and structural system. Design and layout of structures shall be aesthetically pleasing to local environment.

ii) Bridge superstructure, substructure and foundation may be of plain or reinforced concrete, pre-stressed concrete or steel-concrete composite construction.

iii) The following types of structures shall not be accepted
   a) Drop in spans with halved joints (articulations)
   b) Trestle type frames for substructures

4.5.3 **Pipe Culverts**

(i) Minimum diameter of pipes for new pipe culverts shall be 1200 mm.

(ii) Existing culverts of diameter 900 mm and above, which are in sound condition and functioning satisfactorily, may be retained and extended.

(iii) All existing culverts of diameter less than 900 mm shall be dismantled and reconstructed.

(iv) Minimum depth of earth cushion over pipe including road crust shall not be less than 1000 mm for new / reconstructed culverts. In case of existing sound and safe culverts a minimum cushion of 600 mm may be acceptable.

4.5.4 **Design Period**

The design discharge shall be evaluated for flood of 50-year return period for calculation of waterway and design of foundations.

4.5.5 **Width of structures**

The width of the culverts and bridges shall be adopted as below:

i) New culverts and bridges

D-38

(a) The pipe / slab / box bridges / culverts shall have the same overall width as of the approach road. Overall width of these structures shall be such that the outer face of railing/parapet shall be in line with the outer edge of the shoulder. The median side inner edge of the safety barrier/kerb shall be at a minimum distance of 500 mm from the edge of the carriageway.

(b) All other new bridges shall be constructed to accommodate for six lane carriageway. In case existing bridge is retained, as mentioned below, for traffic in one direction, a new three lane bridge shall be constructed for plying of traffic in other direction. Width of bridge shall be increased to provide for additional lane in urban/built up areas in accordance with section 4.2.9 e (ii) above. Width of immediate approaches shall be adjusted to provide smooth transition from approaches to bridge.

ii) Existing culverts and bridges:

The pipe / slab / box bridges / culverts shall be widened preferably on the outer side so as to make the deck width same as specified in sub-section 4.5.5 (i) above. The bridges having 2-lane carriageway and deep foundations, T-beam or box type superstructure, which are difficult to widen may be retained and proper transition between approach and bridge shall be provided with the help of crash barriers. The wearing coat, damaged bearings and rubberized component of expansion joints older than 15 years shall be replaced before commissioning of the Project Highway.

(iii) In cases where bridges are constructed with footpath as per requirement specified in Schedule B, cross section of immediate approaches shall have extra width and provide for footpath.

D-3C

4.5.6 **Design loading and stresses**

(i) The design loads shall be as per IRC: 6 appropriate for the width of carriageway, type and properties of stream, location, altitude, etc.

(ii) In Seismic Zones IV & V, necessary precautions against dislodgement of superstructure shall be taken by provision of reaction blocks or other type of seismic arresters and increased width of pier/abutment cap.

4.5.7 **Analysis and design of structures**

All structures and their individual components shall be analysed and designed as per IRC:5, IRC:18, IRC:21, IRC:22, IRC:24, IRC:40, IRC:78 and IRC:83 (all parts) depending upon the type of structure / individual component proposed to be provided. The minimum cross sectional dimensions of each component shall be provided so as to satisfy the requirements specified in relevant IRC Code. The design shall take into account long term durability, serviceability, constructability, construction methodology and environmental factors. All river training and protection works shall be designed in accordance with IRC: 89.

4.6 Earth Retaining Structures

4.6.1 The concessionaire may adopt any type of earth retaining structure keeping in view the site conditions. The type of earth retaining structure shall be aesthetically pleasing and compatible with the adjoining structures. Earth retaining structures shall be designed for lateral earth pressure including inclined surcharge and hydrostatic pressure, if any.

4.6.2 If the retaining structure is a reinforced earth system, the basic design shall be provided by the system provider and the design shall conform to BS: 8006 in respect of limit state of collapse and serviceability. Complete design calculations and drawings showing ground

improvement, foundation, facia, reinforcement, drainage, friction slabs, crash barriers etc.

4.7 Drainage System

The design of drainage system such as surface and sub-surface drainage for pavement, median, shoulder, high embankment shall be carried out in accordance with IRC: SP: 42 and IRC: SP: 50. Surface runoff from the main highway, embankment slopes and the service roads shall be discharged through longitudinal drains, which shall be designed for adequate cross section, bed slopes, invert levels and the outfalls. If necessary, the walls of the drains shall be designed to retain the adjoining earth. Where drains are required to be the covered, the cover of the drain shall be designed for carrying the maximum expected wheel load. The covered drains shall be provided with iron gratings, strong enough to withstand expected loading.

4.8 Safety Barrier

Safety barrier of rigid, flexible or semi rigid type, in accordance with MOSRTH guidelines/circular shall be provided at following locations:

(i) Where height of embankment is 3 m or more,

(ii) Where embankment is retained by a retaining structure,

(iii) Where median is depressed, flushed or having the width less than 4.5 m. The barriers shall be for both directions of travel,

(iv) On valley side of highway in mountainous and steep terrain.

(v) Between main carriageway and footpath in bridges.

(vi) At hazardous locations identified in schedule B or through safety audit.

4.9 Toll Plazas

4.9.1 Toll plazas shall be designed for projected peak hour traffic of 20 years. The total number of toll booths and lanes shall be such as to ensure the

D-41

service time of not more than 10 seconds per vehicle at peak flow regardless of methodology adopted for fee collection. For purpose of guidance following parameters are suggested as a capacity of individual toll lane for design purpose:

(i)	Semi-automatic toll lane (Automatic vehicle identification but manual money transanction)	240 veh/hour
(ii)	Automatic toll lanes (Automatic vehicle identification and money transanction – smart card)	360 veh/hour
(iii)	Electronic toll collection (ETC lanes) (Toll collection through on board unit and no stoppage of vehicles)	1200 veh/hour

4.9.2 Two toll lanes in each direction of travel shall be provided with the system of payment through smart card and their configuration would be such that one lane in each direction could be upgraded in future to the system of Electronic Toll Collection (ETC). The implementation of ETC will be treated as change of scope when concessionaire would be asked to provide for the same. Not less than 2 middle toll lanes shall be capable of being used as reversible lane to meet the demand of tidal flow.

4.9.3 The width of each toll lane shall be 3.2 meters, except for the lane for over dimensional vehicles, where it shall be 4.5 m.

4.9.4 Between each toll lane of the toll plaza, traffic islands are required to accommodate toll booth. These islands shall be of minimum 25 m length and 1.8 m width. Protective barriers of reinforced concrete shall be placed at the front of each island to prevent out of control approaching vehicles crashing into the toll booth. They would be painted with reflective chevron markings.

4.9.5 Toll booth shall be placed at the centre of each traffic island with dimensions to accommodate toll collector's desk for toll equipment such as key board and console, video screen, card reader, note and coin

D-42

storage, telephone and environmental control system. The toll booth shall have large glass window to provide the toll collector with good visibility of approaching vehicles. The bottom of the toll window should be placed at such a height (0.9 m) above ground level so as to provide convenience of operation. The Toll booths shall be ergonomically designed and vandal proof. There shall be CCTV camera installed at each booth.

4.9.6 For the movement between toll office and toll booth of each toll lane, an underground tunnel across all toll lanes shall be provided. Its dimension would be sufficient to accommodate the required wiring/cable system and for convenient movement of personnel. It should also be provided with lighting and ventilation system so that the movement is convenient.

4.9.7 The area of toll plaza covering the flared portion shall be provided with concrete pavement. All the toll lanes and toll booths shall be covered with a canopy. The canopy shall be wide enough to provide weather protection to toll operators, drivers and facilities. The canopy shall be of aesthetically pleasing design with cylindrical support columns located at traffic island so that there is no restriction on visibility and traffic movement. The vertical clearance shall be as prescribed in this Manual.

4.9.8 The toll plaza shall have lighting system to provide visibility to drivers for the use of facility especially to access the correct service lane and also to the toll collector. Indian Standard IS: 1944 shall be followed. The minimum requirement of illumination on the road surface of 30 lux shall be ensured. This would be done by providing high-mast lighting (minimum 25 m height), lighting at canopy, and lighting inside toll booths. Street lighting shall also be provided on both side approaches of toll plaza for a minimum length of 500 metres on each side. Power supply shall be from public power supply system but stand by generating set of the capacity to supply the required power shall be provided at toll plaza.

D-43

4.9.9 The toll plaza shall be provided with surface and sub surface drainage system so that all the storm water is drained off efficiently and no ponding or stagnation of water takes place at any area of the toll plaza.

4.9.10 Toll Plaza shall have fire fighting equipment including smoke detectors and auto visual alarm system as per section 4.17.1 of National Building Code so that the personnel working in the complex and the office are not subjected to hazardous situation due to fire.

4.9.11 The semi automatic toll collection system shall be equipped in each entry lane with a vehicle detector for counting the number of vehicles and their axle number and for identification of the category of vehicle. The system shall also have a ticket issuing machine for issue of the tickets for user fee at the press of a button on a touch panel and entry lane controller for controlling the equipment of the entry lane and for sending the data to the data processing equipment at toll plaza office. Each toll lane shall have electronically operated boom barrier along with synchronised system for traffic lights.

4.9.12 The smart card system would comprise the system for vehicle identification, barrier and synchronize traffic light and payment through smart card. The smart card would comprise reader/writer conforming to ISO Standards: 1443-A sealed to a National Electrical Manufacturers Association (NEMA) for Ingress Protection (IP) - 65 having transmission frequency of 13.56 MHz.

4.9.13 The Electronic Toll Collection system shall consist of an on board unit fitted on a vehicle and an antenna to receive communication for identification of its code and other stored data and a system for transmitting the data from the on board unit to the reader and from reader to the customer information management system.

4.9.14 Toll plaza location shall also be provided with system for checking and preventing overloading of vehicles at toll plaza. For this purpose, weigh in motion systems at approaches to each toll lane are to be installed. Separate space for static weigh bridge and accommodation to store off-

D-44

loaded goods from overloaded vehicles shall be provided after the toll barriers for each direction of travel.

4.9.15 Toll plaza shall have a separate office building so as to provide comfortable office space for manager, cashier & other staff. There shall be separate rooms for T.V. monitors, meetings, toilets, and for the sale of passes, smart cards, on board units and public interaction. The building shall have a strong room for keeping the money and a garage to accommodate the security van (during operation of loading the collected revenue). There shall be parking space in the same campus for vehicles for the staff and workers and other vehicles engaged in the operation of the Project Highway.

4.9.16 The toll plaza shall have toll audit system and fraud protection measures. The operations for toll collection, supervision, auditing and money handling shall be done through the qualified personnel with numbers so that each operation is efficiently handled.

4.9.17 Suggestive lay out of toll plaza showing the service lanes, office space, parking space, weigh bridges is given in fig. 4.1A and that for toll booth in fig. 4.1B.

4.10 Operation and Maintenance Centre

4.10.1 There shall be operation and maintenance centre(s) either at the toll plaza (s) or at any other location along the highway as identified by the concessionaire. The land for the same shall be acquired by the concessionaire at his cost and risk. The operation and maintenance centre would have following minimum facilities:

(i) Main control centre and Administrative block

(ii) Equipment for operation and maintenance and storage space for them.

(iii) Storage space for equipment and material for traffic signs and markings

(iv) Workshop

(v) General garage and repair shop

D-45

(vi) Testing laboratory

(vii) Parking space for minimum 4 no. of large vehicles and for other expected vehicle during peak hours including those for working staff and visitors

4.10.2 All building works shall be designed to meet the functional requirements and shall be compatible with regional architecture and micro climate. Locally available materials shall be given preference but not at the cost of construction quality.

4.10.3 The circulation roads and parking spaces in the O&M centre shall be paved to withstand vehicle loads and forces due to frequent acceleration and deceleration of vehicles. Parking bays / lots shall have proper cross slope and drainage. The marking of the parking bays shall be as per IRC: 35 to demarcate parking and circulation space. Parking lots shall have illumination as provided in IS: 1944 (Parts I and II).

4.10.4 The whole campus of operation and maintenance centre shall have system for security with safe entry and exit.

4.11 Traffic Signs

Unless otherwise provided in this Manual, road signs shall be provided in accordance with IRC: 67.

4.11.1 There shall be corresponding road markings with stop signs, give way signs, merging or diverging traffic signs, lane closed signs, road narrowing signs, slip roads/ diversion signs, compulsory keep left/right signs, or any other signs as per IRC-67 and/or as reviewed by IE.

4.11.2 Wherever Project Highway alignment is on a curve, there shall be an advance cautionary signs for sharp curves (depending whether it is on left or right) and chevron signs (rectangular in dimension with traffic yellow background and black arrow) at the outer edge of the curve. The sign for the curve ahead particularly in mountainous and steep terrain shall always be accompanied with chevron signs at the outer edge of the curve and appropriate delineation.

D-4

4.11.3 Roads signs such as chevron, overhead etc. not covered by IRC-67 will be as given in this document would be as per BIS/British Standard/AASHTO/ASTM.

4.11.4 All road signs shall be with retro-reflective sheeting of high intensity grade with encapsulated lens fixed over aluminum sub-strata as per clause 801 of MOSRTH specification.

4.11.5 Kerb mounted signs shall be supported on GI pipes. Overhead signs shall be placed on a structurally sound gantry or cantilever structure made of GI pipes. Its height, lateral clearance and installation shall be as per MOST specifications. The pedestal supporting the gantry or cantilever structure of the overhead signs shall be flushed at the ground level and in no case shall protrude more than 15 cm above ground level.

4.11.6 It shall be ensured that any sign, signal or any other device erected for traffic control, traffic guidance and/or traffic information shall not obscure any other traffic sign and shall not carry any advertisement.

4.11.7 Each exit ramp shall have signs mounted on posts indicating the name of the place and the important roads it would lead to.

4.11.8 For toll plaza(s) advance direction signs shall be provided at 1 km and 500 m ahead of toll plaza. These signs are rectangular in shape, bilingual, gantry, cantilever mounted as illustrated in fig. 4.2 A and fig. 4.2 B. Wherever the local language is other than Hindi, local language instead of Hindi shall be used for sign at 500 m.

4.11.9 It is necessary that user be informed before using the road that a section of National Highway is a Toll Road. Similarly the user be also informed of the end of the Toll Road. Over head sign panels indicating that the toll road is ahead and that the toll road ends is illustrated in fig. 4.2 C and fig. 4.2 D.

4.11.10 At the start of flare of the toll plaza, a sign displaying the fee rates shall be erected. Suggestive configuration is given in fig. 4.3. The colour of words and panels shall follow IRC: 67.

4.11.11 It shall be ensured that any sign, signal or any other device erected for traffic control, traffic guidance and/or traffic information shall not obscure any other traffic sign.

4.12 Pavement Marking

4.12.1 Pavement markings on the Project Highway shall be in accordance with IRC: 35. These markings shall be applied to road centre line, edge line, continuity line, stop line, give way lines, diagonal/chevron markings, zebra crossing and at parking areas by mean of an approved self propelled machine which has a satisfactory cut off value capable of applying broken line automatically.

4.12.2 Road markings shall be of hot applied thermoplastic paints with reflectorising glass beads as per relevant clauses of Section 803 of MOST specifications.

4.12.3 At toll plaza, transverse bar lines be used across the flared approach to toll gate to reduce the speed of approaching traffic. The width of these lines shall be 300 mm and details as given in fig.

4.12.4 Concessionaire shall ensure that a detailed plan scheme and plan for traffic signs and pavement markings covering all length and features of Project Highway shall be prepared and submitted to IE for review and comment.

4.13 Rest Areas

4.13.1 Project Highway shall have Rest Area(s) planned such that they are spaced at the intervals of 90 minutes to one hour of driving time between two important cities/towns. They would not be located between 5 km of a town or city or near interchange where entrance and exit ramps could cause weaving conflict.

4.13.2 Rest areas shall be planned to cater for traffic moving in both directions such that there is no need for the vehicles on one carriageway to cross over to the other carriageway. The entry to Rest Areas would

D-48

be through deceleration lane and exit through acceleration lane. The minimum width of these lanes shall be 5.5 m.

4.13.3 Rest Area(s) shall be designed for the expected peak hour long term clientage and shall provide facilities for parking, restaurant, cafeteria, toilets, telephone and shops for selling items normally required for traveling, fuel and garage for minor repair, telephone, first aid. The parking should include parking for expected peak hour truck traffic and cafeteria suitable for fulfilling the need for Indian truck drivers and shall be paved by CC blocks strong enough to withstand expected loadings. The whole area shall be elaborately landscaped to provide a pleasing environment. A suggestive lay out is given in fig. 4.5. This can be modified to accommodate location specific requirements.

4.13.4 At locations along the Project Highway where some existing eateries (Dhaba) or other informal rest areas are located, they shall be separated from the main highway with separation island and safe entry and exit to these establishment and parking spaces for expected peak hour vehicles shall be provided with proper signs and markings.

4.14 Pick Up Bus Stops

4.14.1 Pick up Bus Stops shall be designed as defined in schedule C or as per the actual peak hour demand at identified location(s). However, the actual location shall be decided based on the general principles of location given in IRC: 80. Bus stops shall be provided on both sides of the Project Highway for either direction of travel so as to minimize the need for the crossing by commuters. The bus stop lay out shall provide safe entry and exit of buses from the Project Highway and safe movement of passengers. The shelter structure shall be aesthetically pleasing, structurally safe and functional so as to protect the waiting passengers adequately from sun, rains etc.

4.14.2 The bus bay and shelter shall be designed to provide for safe and convenient use by physically challenged passenger as well.

4.14.3 In rural areas the bus shelter shall be located at least 1.0 m away from the edge of the bus bay which shall be typically 30 m long. The plinth height of the bus stop shall be 0.3 m from the bus bay level and shall be 2 risers high. The minimum ceiling height of the structure shall be 2.1 m and the height of seating shall be 0.4 m from floor level.

4.14.4 The bus bay shall have length to accommodate the expected no. of buses in the peak time. The length and lay out shall be based on those given in IRC: 80 considered suitably modified for four lane dual carriageway highway. It shall be paved with pre-cast cement concrete (M-40) Blocks. The area of the bus stop used by pedestrians shall also be paved with pre-cast concrete blocks.

4.14.5 The barrier fences /pedestrian safety guard rails shall be erected between the bus loading area and the through lanes to prevent pedestrian crossings.

4.14.6 Pick up Bus Stop would be provided with litter bins. These would be simple in shape and their colour and finish shall make them conspicuous. Litter bin shall be post-mounted and/or swivel type. The mounting and fixing components shall be robust. The bin shall have drainage holes for periodic flushing. It shall also be theft, vandal-and fire-proof. It shall be resistant to wear and tear, and the material and design shall be such as to require minimal maintenance.

4.15 Pedestrian crossing facility

The Project Highway shall be provided with safe crossing facilities for the pedestrians. These shall be only at identified locations such as part of at–grade intersections, pedestrian /vehicular underpasses (in accordance with section 2.2.4). Pedestrian safety guardrail shall be provided to guide the pedestrian to the selected crossing /identified locations. For this purpose some of the common locations could be bus stops or other such locations with a possibility of peoples congregation from where the pedestrian safety guardrail be provided up to the nearest at-grade intersection or sub-way. The design of these facilities

D-5

shall be in accordance with IRC:103. At the crossing points drop in the curve shall be provided to facilitate crossing of physically challenge users. Similarly, the gaps in the channeliser shall be provided so as to avoid the need for frequent climbing and getting down from the channelisers.

4.16 Highway Landscaping

4.16.1 Trees shall be planted in rows and on either side of the Project Highway with a staggered pitch as per IRC: SP: 21. A range of 10-15 m c/c is recommended for spacing of trees (parallel to the road). Setback distance of trees in different situations shall be as per IRC: SP: 21 and IRC: 66. The distance between the kerb, if any, and the nearest edge of tree trunk shall be at least 2 m. The plantation in median shall comprise shrubs whose height would normally not exceed 1-1.5 m and shall be as per IRC SP: 21.

4.16.2 The scheme for landscaping shall be part of the overall Environmental Mitigation Plan (EMP) as spelt out in Schedule C. In case of a discrepancy between the spacing for trees to be planted parallel to the road as specified in the IRC standards and the EIA Report, the lesser of the two distances shall be adopted.

4.16.3 For safe traffic operation, vertical clearance between the crown of the carriageway and lowest part of the overhang of the tree available across the roadway shall conform to the standards laid down in IRC: SP: 21. The pit size, fencing, watering and manuring requirements shall also conform to the above standard. Planting shall be such that it does not obstruct the visibility of traffic from any side and shall be pleasing in appearance.

4.17 Advertisement/ Hoarding:

No advertisement/ hoarding shall be allowed to be erected on the Project Highway.

D-51

4.18 Advanced Traffic Management Systems (ATMS):

4.18.1 A real time system working round the clock shall be established for informing the road users of the road, traffic, and weather conditions on the Project Highway; for making interventions as required for smooth, safe and efficient traffic operation; and for providing rescue and relief to the users in distress. The system shall be capable of (i) acquisition of data from various sources such as the road, the users, the maintenance and operation patrol, the ambulance, and the intervention team (ii) three way communication between the data source and a Central Control Room, the Control Room and the data sources and display units, and between the maintenance and operation teams, through a transmission system, and (iii) A Central Control Room to process all data and control the highway operation.

4.18.2 The systems and equipment of ATMS shall meet the following main climatic and environmental requirement as specified in IS-9000

(i) Temperature Range of Operation – Low of 0° Celsius (± 3° C) to high of 60° Celsius (± 2° C)

(ii) Relative Humidity of 95%

(iii) Vibration Frequency Range of 10 Hz – 55 Hz

4.18.3 Data acquisition system: This shall consist of (a) Automatic Traffic Counter and Classifier (ATCC), with an in-road loop detectors and treadles. (b) Video cameras installed on road with such pan and tilts that a length of 2 km road is captured for video monitoring of traffic, (c) Emergency Call Boxes installed at every 2 km to enable any user to be instantly in contact with the Control Room, (d) Meteorological sensors for capturing data on temperature, weather, wind, (e) Mobile radios for patrol vehicles and ambulances to be in communication with Central Control Room and among themselves.

4.18.4 Emergency call boxes (ECBs) with loud speaker, micro phone, activation button with LED indicating conversation, shall be housed in a vandal proof casing and operate in full to play mode in noise level of up to 95 decibels with in built diagnostic features for automatic

detection in case of damage by any object. Mobile communication system shall comprise the mobile radio base stations and control centre equipments. It shall have provision for mounted mobile set on ambulances, trains & patrolling vehicles. The system shall have the facility to connect mobile to mobile, mobile to controller, and controller to mobile along with the systems for waiting, holding, and transfer of calls. The system shall use a pair of frequencies to be allotted to the concessionaire with the approval of wireless planning & coordination (WPC), Deptt. of Telecommunications and shall operate for full duplex mode.

4.18.5 The design for the Variable Message Signs (VMS) will be modular with sign panels using LEDs / High-Gain Trans-Reflective LCDs for outdoor ambient lights. The sign panel should be such that a display is legible from a distance of about 200 m. For this purpose, panels shall have minimum dimensions of 3m length x 1.8 m depth. The minimum height of the characters shall be 300 mm. The contrast ratio shall be more than 30 perpendicular to the bold face and more than 10 at an angle of ± 70 degrees to the perpendicular. The equipment shall be capable of storing minimum 10 frames that can be triggered on receiving the tele-command. The sign panels shall be installed on the structure in such a manner that they are aesthetically pleasing and can withstand wind pressures. The equipment shall be capable of storing minimum semi-duplex mode and other known forces. The minimum vertical clearance available at VMSs shall be 5.5 m from the road surface. Power supply shall be fed from the integrator locations.

4.18.6 The meteorological sensors shall comprise thermocouple /pyrometer, humidity meter, anemometer , visibility meter and sensor for measuring pavement surface temperature. They shall be installed on a single pole with a specific attachment and power supply fed from the integrator. They shall have the facility to communicate on Polythene Insulated Jelly Filled copper cables (PIJF) /Optical Fibre Cable.

D-5

4.18.7 The Automatic Traffic Counter-cum-Classifier (ATCC) shall be capable of detecting and recording all categories of vehicles plying on the Project Highway based on their length and no. of axles. The system shall be robust and capable of operating with minimum maintenance and may be either piezo-electric or infrared. It should have minimum accuracy level of 99%. The logic units shall be microprocessor based. The system should be able to record and store vehicle data for a period of at least two weeks with a Daily Traffic Volume of up to 1,00,000 vehicles. The system shall have compatibility to transfer the data on PIJF/Optical Fibre Cable/by using any of the available communication mode like GSM (Global System for Mobile Communications) / GPRS (General Packet Radio Service), landline modem, CDMA (Code Division Multiple Access) depending upon the effective and economic operation of the particular mode available at the site. The system shall be electric/solar power operated depending upon the availability of source.

4.18.8 The Closed Circuit Television (CCTV) Surveillance shall comprise video camera, its housing and pan, and Tilt Heads. The video camera shall be mounted at a height so as to cover the target length of highway and the housing shall be able to withstand adverse weather conditions. It shall have a 360 degree angular travel in the horizontal plane and a tilt of 90 degrees down from 0 degrees horizontal. It shall have zoom lens with minimum power of 30 X, auto iris and infrared filter, infrared compatibility for night operation and remotely selectable operating modes. It shall have compatibility with co-axial cable/optical fibre cable.

4.18.9 The main control centre shall be designed for round-the-clock operations of monitoring, on-line information acquisition and processing the same for decision making. The Main Control Centre shall have equipment of central computer, call centre, terminal junction box, uninterrupted power supply (UPS) , counsel operator with monitors and joy sticks, rack accommodation, large display board, line printer and general purpose office computer with monitor, printer, fax and

D-54

telephone. The system shall also have Network Management system (NMS) or real-time monitoring of Emergency Call Boxes (ECBs) and network diagnostics.

4.18.10 Transmission System: This shall consist of a backbone Optical Fiber Transmission system, cable system, interface system, network management system, repeater/ amplification system, and power supply system. There shall be 3 or 4 sub-centres (as appropriate) housing all the interface equipment apart from the Control Centre, provided with, as appropriate, cables, interface, terminals (such as optical line terminals and interface, network management system equipment, optical fiber cable interface equipment and control centre interface equipment, data acquisition system interface, etc). The cables from ECBs, VMS, meteorological data systems, ATCC shall be Polythene Insulated Jelly filled (PIJF) copper cables and those from CCTV cameras shall be coaxial cables. Repeaters/ amplifiers shall be used to maintain the quality of signals. All the cables shall have at least 20 % spare capacity to allow for expansion. The interface system shall be capable of handling the composite audio, video and data signals at various interface levels and process them.

4.18.11 Central Control Room (Control Centre): The Central Control Room (CCR) shall be the repository of all the data acquired from the field and their processing, storing, and archiving. All the information for real time monitoring of the Project Highway shall be generated at the CCR and the relevant information shall be disseminated to the users through Variable message signs, and to the operation and management teams through mobile radio communication system for appropriate intervention. Another important function to be performed at the Control centre shall be the operation and management of the ATMS itself along with its various sub systems.

CCR shall have the following minimum equipment, hardware and software:

D5

(1) A Central Computer Server with integrated ATMS and ATMS software

(2) A Traffic Manager's Terminal for operation of the integrated traffic management system

(3) Call system equipment comprising Operator PC along with sub-systems and digital voice recorder.

(4) Mobile radio terminal comprising Operator PC and engineering terminal

(5) Computers for Network Management System (NMS) for Fiber Optic Communication System.

(6) CCTV Console Equipment

(7) Computers for VMS, AVCC, MET, Traffic Control

(8) A large size screen

(9) A line Printer

(10) An Office Computer

(11) A Power Supply and back up system

4.18.12 Dissemination of information: Information generated at the Control Centre shall be disseminated in the following manner:

(a) To the users: By displays on the Variable Message signs, via internet web pages, and by creating a node at the way side amenities to display the relevant information.

(b) To the Operation and maintenance teams: By mobile phones

(c) To the ambulances: By mobile phones

(d) To the Trauma centres: Via ambulances

4.19 Highway patrol

Highway patrol unit(s) manned by at least two persons apart from the driver for every unit shall continuously patrol the highway in a stretch not exceeding 50 km and shall remain in contact with the Control Room on a real time basis. The patrol shall render assistance to users in distress and disabled vehicles through own intervention or by calling from assistance from Control Room, Crane operators or ambulance as

D-56

required. The patrol shall promptly clear the road of any obstruction. Where the obstructions take time to be cleared, the section shall be cordoned off by placing traffic cones, which shall be illuminated during night. The patrol vehicle shall be large enough for seating at least four personnel besides the driver and space to carry essential traffic management and safety tools. It shall also have a light on its top and a siren on board. It shall be equipped with traffic cones and other accessories for traffic control which are fully visible during night time.

4.20 Ambulance(s)

Ambulance(s) manned by at least two trained paramedics shall be available on the Project Highway so that the response time is not more than 10 minutes of call. Each ambulance shall be equipped with first aid, life saving medical services and support system implements for transporting the victims to the nearest trauma hospitals, and providing emergency medical aid during transportation of victims from accident site to the nearest trauma hospital.

4.21 Crane(s)

Crane(s) shall be available within an hour of an incident to clear the disabled vehicle off the carriageway.

4.22 All intervention teams comprising patrol, ambulances and cranes shall be in communication with each other and the Control Room all the time and shall intervene within the stipulated time.

4.23 Lighting system

All light posts erected on the railings of bridges, structures shall have adequate height such that a uniform illumination of 40 lux is available. All high mast lights in the interchange area shall illuminate the interchange with intensity of 40 lux.

D-57

All entry and exit ramp areas shall be uniformly illuminated with 40 lux intensity

All underpasses shall be illuminated with minimum intensity of 30 lux.

4.24 Design Report and Drawings

The concessionaire shall furnish the detailed report including designs and drawings for each component of the Project Highway such as geometry, pavement, structures, drainage, barriers, protective works, traffic control devices and other user facilities etc. as per the requirements specified above to the IE for his review and comments, if any. The drawings to be submitted shall satisfy the requirements (including scale and the size) specified in IRC: SP: 19 and IRC: SP: 54.

D-5

SECTION -5: MATERIALS

5.1 General:

Sourcing of all materials as well as compliance with environmental requirements under the applicable laws in respect of all works to be executed under the Concession Agreement shall be the sole responsibility of the concessionaire. All materials, whether natural (such as earth, gravel, sand, aggregates, etc), processed (such as bituminous and concrete mixes), or manufactured (such as cement, steel, bitumen, etc) shall be incorporated in the work only if they are tested and found to meet the requirements of this Manual or, in the absence of any provision in this Manual, conform to the best industry practice.

5.2 Natural materials

5.2.1 Physical requirements of earth, gravel, sand, and aggregates shall conform to the requirements of the provisions of those clauses of MOST specifications as are relevant to the intended use of the materials.

5.2.2 Natural aggregates when crushed and blended for various uses, different size fractions shall be proportioned to form grading conforming to those clauses of the MOST specifications as are relevant to the intended use of the material. Where clauses of the specifications provide more than one option, the option which provides the closest grading shall be provided.

5.3 Processed materials

5.3.1 Fly ash: Fly ash to be used in embankment construction shall meet the requirements specified in IRC: SP: 58.

5.3.2 Cement Concrete mixes: Concrete mixes, plain or reinforced, shall be design mixes, designed in accordance with the provisions of IS: 456. Concrete of M20 grade or higher shall be used for the project except for leveling course in foundation and dry lean concrete for Cement concrete

pavement where M15 grade concrete shall be used. Specific requirements of the mixes (such as workability, water cement ratio, use of admixtures, grades of cement and steel, minimum and maximum cement content, ratios of 7 and 28 days strengths, etc) shall be as per those provisions of MOST specifications as are relevant to the intended use of the concrete mix.

5.3.3 Bituminous mixes: Bituminous mixes shall be hot mix type and shall be designed in accordance with Asphalt Institute Manual series MS 2 with the ingredients of the mix (such as aggregates, fillers, bitumen, etc) conforming to the provisions of MOST specifications as relevant to the type of mix intended to be used.

5.4 Manufactured materials

5.4.1 Cement: Ordinary Portland cement grades 33, 43 and 53 conforming to IS: 269, IS: 8112, and IS: 12269 respectively shall be used subject to the condition that the design cement content does not exceed 540 kg per cum and the minimum requirement of cement from durability considerations are provided. Use of Portland slag cement or Portland pozzolana cement shall not be permissible for any structural concrete. Other grades of cement such as Rapid hardening cement conforming to IS: 8041 and Sulphate resistant cement conforming to IS: 12330 shall be permissible in specific situations subject to the provisions of clause 1000 of MOST specifications.

5.4.2 Bitumen: Paving grade bitumen conforming to IS: 73 shall be used. Crumb rubber modified bitumen (CRMB) and Polymer modified bitumen (PMB) conforming to IRC: SP: 53 shall be used.

5.4.3 Steel: High Yield Strength Deformed (HYSD) reinforcing bars of S 415 grade conforming to IS: 1786 and High Tensile Strength pre-stressing tendons conforming to IS: 6006 shall be used.

5.4.4 Sheathing, anchorages, void formers, bearings, expansion joints, geo-textile and geo-grid, metallic strips, bars, grids for reinforced earth, metal beam crash barriers, prefabricated vertical drains, retro-

reflective sheetings and road marking paints: These shall meet the relevant provisions of the MOST specifications, recommendations of the system providers, manufacturers' testing and certification, and the designers' design assumptions

5.5 Concessionaire may use other construction materials for example stabilized soil for which a detailed design procedure to be adopted shall be furnished to IE for review and comments.

D-61

SECTION -6: CONSTRUCTION

6.1 General

Construction planning, techniques, technologies and equipment shall be planned in a manner not to compromise on the efficiency and safety of the existing highway. Efficient and safe operation of the existing highway without reducing its capacity and safety shall be ensured during construction of the Project Highway. Construction shall meet the environmental safety norms, and ensure safety of temporary and permanent works, safety of traffic, pedestrian (if any) and workman during construction, meet the access needs of the population living close by and shall not cause any damage to their property.

6.2 Construction specifications

Unless not specifically provided for in the MOST specifications, construction of various components of the Project Highway shall be carried out in accordance with these provisions of specifications to the extent they are relevant. For avoidance of doubt, such provisions of the specification as relate to approval from Engineer, refer to contract drawings, provide for measurement for payment and unit rates, etc which are generally applicable to item rate contracts shall not be considered relevant to this agreement. However, provisions relating to material specifications, construction methods, equipment, processing of materials, laying, compaction, testing, quality control/assurance, etc shall be considered relevant to this agreement. The final decision with regard to which provisions are relevant and which are not, shall rest with DORTH keeping in view the comments of executing agency.

Where construction specification for any component of work is not provided for in MOST specifications, construction shall be carried out in accordance with international specification, or best industry practice, or the specifications provided by the manufacturer or provider of the system subject to review by IE. The concessionaire shall remain

D-62

responsible for construction with regard to its adequacy, safety, and durability regardless of any review and comments by the IE. In case, concessionaire chooses to adopt new material, technology and construction methodology, he shall first sample test the same to demonstrate that the proposed material/technology/methodology can be successfully implemented to achieve the specified performance levels of the Project Highway. These processes shall be subject to the review and comments of the IE.

All the construction equipment shall have the required capacity to meet the output requirements of works under the agreement and shall have mechanical, hydraulic, electronic and other controls, Manual or automatic, as required for meeting the construction requirements.

6.3 Construction planning

Prior to actual commencement of construction, a construction plan shall be drawn up and submitted to the IE for review and comments. The plan shall be prepared to meet the requirements of this section of the Manual and contain, inter alia, the following:

(1) Sequence of construction activities to be undertaken with time line on a PERT chart

(2) At each construction site, the areas to be cordoned off for construction and logistics of movement of construction equipment.

(3) Arrangement for movement of main line traffic near construction sites and assessment of capacity and safety of the alternative arrangement. If capacity augmentation is necessary as per the assessment, suggested measures to restore the original capacity of the main highway on the alternative arrangement.

(4) If construction activities affect the access to properties or movement of cross traffic, alternative arrangements during construction.

(5) A detailed plan for safe and efficient movement of existing traffic through the construction zones along with required signs and markings for cautions and guidance.

6.4 Base Camp for Construction

The concessionaire shall establish base camp(s) for the construction of Project Highway at the location from where construction sequences and processes can be efficiently performed. The land for the base camp shall be acquired by the concessionaire at his cost and risk and its size shall be such that it accommodates the plants, equipments, materials, laboratories, offices, residences and space for movement/circulation of construction vehicles/machinery. The space should also have space for recreation and sporting facilities for the staff and workers.

6.5 Traffic diversion

Where it is necessary to close the traffic on the existing highway for construction and divert the traffic on to an alternative route, such diversion shall have the width equal to the width of the road closed. The diversion road shall have fluent geometry and maintained in traffic worthy condition such that traffic can safely negotiate.

6.6 Access to private property

If existing access to private property is to be closed due to construction, alternative access shall be provided before construction is undertaken.

6.7 Cross road Traffic

If existing cross road is to be closed due to construction, alternative approach and crossing facility shall be provided before construction is undertaken.

6.8 Temporary work

Temporary work shall not be erected on the main highway if traffic is allowed to ply on it while construction is to progress. Similarly, erections

equipment for erection of temporary or permanent work shall not be allowed on the main highway if the portion of the highway remains under use of the main line traffic.

The concessionaire shall be responsible for safe, workable design and methodology for all temporary forms, staging and centering required for construction of structures in accordance with IRC: 87.

6.9 Traffic management during construction

In order to ensure that the construction activities do not disrupt the movement of the existing traffic, comprehensive traffic management plan shall be drawn up by the concessionaire. Wherever construction shall be undertaken, it shall be declared a construction zone. The length of the construction zone shall be reasonable, neither too short which will put the traffic to frequent inconvenience nor too long, which is difficult to manage.

Traffic in construction zones shall be managed in accordance with the provisions of IRC SP 55. All transitions, ingress/ egress to and from the main highway, shall have proper and smooth geometry and traffic shall be guided by road signs, markings, delineation and other appropriate means as required for safe and efficient operation.

After construction is completed in a particular zone, it shall be opened for normal operation. Prior to the beginning of normal operation, those parts of the diversions as will not eventually form part of the Project Highway shall be closed to prevent any movements not permitted under the normal operation of the Project Highway.

6.10 Improvement and maintenance of roads other than Project Highway

The concessionaire shall be responsible for the maintenance of the road/roads to be regularly used by him for carrying the construction material and /or machinery for construction of the project highway.

The level of improvement shall be commensurate to the requirements for carrying the expected traffic during construction period. These roads shall also to be maintained by the concessionaire up to the level of improvement carried out throughout the construction period and until commissioning of the Project Highway.

6.11 Social disruption

The concessionaire shall take all measures to mitigate any disruptive effects of construction such as noise and dust pollution, closure of local accesses, intrusion to the lives and business activities of the people, threat to their property, or any other disruption. These measures shall be taken after due consultation with the local people, local administration and authority's local establishment.

D-6

SECTION -7: QUALITY ASSURANCE

7.1 At least 2 weeks prior to commencement of the work, the Concessionaire shall draw up a Quality Assurance Manual (QAM) covering the Quality System (QS), Quality Assurance Plan (QAP) and documentation for all aspects of the bridge and road works as per IRC: SP 47 and IRC: SP: 57 respectively and furnish to the IE for review and comments. The quality assurance plan shall duly provide therein for conducting tests on the quality of materials, construction of temporary and permanent works, and the finished works. He shall enable the IE to inspect the Quality Assurance Plan, the test results, and witness the conduct of such tests. The IE shall, in his inspection report in compliance with the provisions of clause 13.2 of the Concession Agreement, bring out the non-conformities in the tests and quality procedures in his inspection report.

7.2 The quality of materials and work shall meet the requirement of Clause 900 of MOST specifications to the extent relevant and applicable. The decision with regard to the relevance and applicability of the Clause shall rest with the IE. The quality of materials and work that are not relevant to the MOST specifications shall meet the requirements of other relevant standards that are followed for the work. Always provided that manufacturer's testing and certification shall be essential for the manufactured materials.

7.3 Remedying the defects and deficiencies required as per Clause 13.2 of the Concession Agreement shall be carried out in the following manner:

(1) Improving, modifying, changing the Quality Assurance Plan and its implementation

(2) Replacing the non-conforming material by materials conforming to the standards by changing the material source, material processing, construction equipment or technique before incorporation of the material in work.

(3) In case a nonconforming material has been incorporated in the work, by removing the work to the extent of non-conformities and replacing it by a work meeting the requirements of the quality.

(4) In case a work or any of its component exceeds the limits of tolerances specified in the quality standards, by rectifying the work and bringing it within the limits of tolerance.

List of IRC Codes / Standards / Acts for Road/Bridge Works

IRC: 2 -1968 Route Marker Signs for National Highways (First Revision)

IRC: 3 -1983 Dimensions and weight of Road Design vehicles. (First Revision)

IRC: 5 -1998 Standard Specification & Code of Practice for Road Bridges, Section I – General Features of Design (7th Revision)

IRC: 6 -2000 Standard Specifications & Code of Practice for Road Bridges, Section II – Loads and Stresses (Fourth Revision)

IRC: 7 -1971 Recommended Practice for Numbering Bridges and Culverts (First Revision)

IRC: 8 -1980 Type Designs for Highway Kilometre Stones (Second Revision)

IRC: 9 -1972 Traffic Census on non urban roads (First Revision)

IRC: 10 -1961 Recommended Practice for Borrow pits for Road Embankments Constructed by Manual Operation

IRC: 15 -2002 Standard Specifications & Code of Practice for Construction of Concrete Roads (Third Revision)

IRC: 16 -1989 Specification for Priming of Base Course with Bituminous Primers (First Revision)

IRC: 18 -2000 Design Criteria for Prestressed Concrete Road Bridges (Post-Tensioned Concrete) (Third Revision)

IRC: 20 -1966 Recommended Practice for Bituminous Penetration Macadam (Full Grout)

IRC: 21 -2000 Standard Specifications and Code of Practice for Road Bridges. Section-III Cement Concrete (Plain and reinforced) (Third revision)

IRC: 22 -1986 Standard Specifications and Code of Practice for Road Bridges. Section-VI Composite Construction (First Revision).

IRC: 24 -2001 Standard Specifications and Code of Practice for Road Bridges. Section-V Steel Road Bridges (First Revision)

IRC: 26 -1967 Type Design for 200-Metre Stones

IRC: 30 -1968 Standard Letters and Numerals of Different Heights for Use on Highway Signs

IRC: 32 -1969 Standard for Vertical and Horizontal Clearances of Overhead Electric Power and Telecommunication Lines as Related to Roads

IRC: 33 -1969 Standard procedure for evaluation and condition surveys of stabilised soil roads.

IRC: 34 -1970 Recommendations for road construction in waterlogged area.

D-69

IRC: 35 -1997 Code of Practice for Road Markings (with Paints) (First Revision)

IRC: 36 -1970 Recommended Practice for Construction of Earth Embankments for Road Works

IRC: 37 -2001 Guidelines for the Design of Flexible Pavements (Second Revision)

IRC: 38 -1988 Guidelines for Design of Horizontal Curves for Highways and Design Tables (First Revision)

IRC: 40 -2002 Standard Specifications and Code of Practice for Road Bridges, Section IV - Brick, Stone and Block Masonry (Second Revision)

IRC: 41 -1997 Type designs for check barriers (First Revision)

IRC: 42 -1972 Proforma for record of test values of locally available pavement construction materials.

IRC: 45 -1972 Recommendations for Estimating the Resistance of Soil Below the Maximum Scour Level in the Design of Well Foundations of Bridges

IRC: 52 -2001 Recommendation about the alignment survey and geometric design of hill roads. (Second Revision)

IRC: 54 -1974 Vertical Clearances at Underpasses for Vehicular Traffic.

IRC: 56 -1974 Recommended Practice for Treatment of Embankment Slopes for Erosion Control

IRC: 57 -1974 Recommended Practice for Sealing of Joints in Concrete Pavements

IRC: 58 -2002 Guidelines for the design of plain jointed Rigid pavements for highways (Second Revision)

IRC: 59 -1976 Tentative Guidelines for the design of gap graded cement concrete mixes for road pavements.

IRC: 61 -1976 Tentative Guidelines for the construction of Cement Concrete Pavements in Hot Weather

IRC: 65 -1976 Recommended practice for traffic rotaries.

IRC: 67 -2001 Code of Practice for Road Signs (First Revision)

IRC: 69 -1977 Space Standards for Roads in Urban Areas

IRC: 70 -1977 Guidelines on regulations and control of mixed traffic in urban areas.

IRC: 71 -1977 Recommended practice for preparation of notations.

IRC: 73 -1980 Geometric Design Standards for Rural (Non-Urban) Highways

IRC: 75 -1979 Guidelines for the Design of High Embankments

IRC: 78 -2000 Standard Specifications and Code of Practice for Road Bridges. Section-VII Foundations & Sub-structure (Second Revision).

List of IRC Codes / Standards / Acts for Road/Bridge Works

IRC: 79 -1981 Recommended Practice for Road Delineators

IRC: 80 -1981 Type Designs for Pick-up Bus Stops on Rural (i.e., Non-Urban) Highways

IRC: 81 -1997 Tentative Guidelines for Strengthening of Flexible Road Pavement Using Benkelman Beam Deflection Technique (First Revision)

IRC: 83 -1999 Standard Specifications and Code of Practice for Road Bridges. Section-IX

Bearings, Part-I: Metallic Bearings.

IRC: 83 -1987 Standard Specifications and Code of Practice for Road Bridges, (Part-II) Section-IX Bearings, Part-II : Electrometric Bearings

IRC: 83 -2002 Standard Specifications and Code of Practice for Road Bridges, (Part-II) Section-IX Bearings, Part-III : POT POT-CUM-PTFE, PIN AND METALLIC GUIDE BEARINGS

IRC: 84 -1983 Code of Practice for Curing of Cement Concrete Pavement

IRC: 85 -1983 Recommended practice for accelerated strength testing and evaluation of concrete for Road and Airfield Constructions.

IRC: 86 -1983 Geometric Design Standards for Urban Roads in Plains

IRC: 87 -1984 Guidelines for the design and erection of false work for road bridges.

IRC: 88 -1984 Recommended practice for lime fly ash stabilised soil base/ sub base in pavement construction.

IRC: 89 -1997 Guidelines for Design & Construction of River Training & Control Works for Road Bridges (First Revision)

IRC: 91 -1985 Tentative guidelines for construction of cement concrete pavement in cold weather.

IRC: 92 -1985 Guidelines for the Design of Interchanges in Urban Areas

IRC: 93 -1985 Guidelines on Design and Installation of Road Traffic Signals

IRC: 98 -1997 Guidelines on Accommodation of Underground Utility Services Along and Across Roads in Urban Area (First Revision)

IRC: 101 -1988 Guidelines for design of continuously reinforced concrete pavement with elastic joints.

IRC: 102 -1988 Traffic studies for planning bypasses around towns.

IRC: 103 -1988 Guidelines for Pedestrian Facilities

IRC: 104 -1988 Guidelines for Environmental impact assessment of Highway projects.

National Highways Authority of India New Delhi

Pune Solapur Expressways Private Limited Delhi

IRC: SP: 11 -1988 Handbook of Quality Control for Construction of Roads and Runways (Second Revision)
IRC: SP: 13 -2004 Guidelines for the Design of Small Bridges and Culverts.
IRC: SP: 14 -1973 A Manual for the Application of the Critical Path Method to Highway Project in India
IRC: SP: 15 -1996 Ribbon Development Along Highways and its Prevention
IRC: SP: 16 -2004 Guidelines for surface evenness of Highways Pavements (First Revision)
IRC: SP: 17 -1977 Recommendations About Overlays on Cement Concrete Pavements
IRC: SP: 18 -1978 Manual for Highway Bridge Maintenance Inspection.

IRC: SP: 19 -2001 Manual for Survey, Investigation and Preparation of Road Projects (First Revision)
IRC: SP: 21 -1979 Landscaping of Road

IRC: SP: 22 -1980 Recommendations for the Sizes for each Type of Road Making Machinery to Cater to the General Demand of Road Works
IRC: SP: 23 -1983 Vertical Curves for Highways
IRC: SP: 25 -1984 Gopi and his Road Roller-Guidelines on Maintenance of Road Roller
IRC: SP: 27 -1984 Report Containing Recommendations of IRC Regional Workshops on Highway Safety
IRC: SP: 32 -1988 Road Safety for Children (5-12 Years Old)
IRC: SP: 33 -1989 Guidelines on Supplemental Measures for Design, Detailing & Durability of Important Bridge Structures.
IRC: SP: 34 -1989 General Guidelines About the Equipment for
IRC: SP: 35 -1990 Inspection and Maintenance of Bridge.
IRC: SP: 37 -1991 Guidelines for Evaluation of Load Carrying Capacity of Bridges
IRC: SP: 39 -1992 Guidelines on Bulk Bitumen Transportation & Storage Equipment
IRC: SP: 40 -1993 Guidelines on techniques for strengthening and rehabilitation of bridges.
IRC: SP: 41 -1994 Guidelines on Design of At-Grade Intersections in Rural & Urban Areas
IRC: SP: 42 -1994 Guidelines on Road Drainage
IRC: SP: 44 -1994 Highway Safety Code
IRC: SP: 46 -1997 Steel Fibre Reinforced Concrete For Pavements
IRC: SP: 47 -1998 Guidelines on Quality System for Road Bridges (Plain, Reinforced, Prestressed and Composite Concrete).
IRC: SP: 48 -1998 Hill Road Manual
IRC: SP: 50 -1999 Guidelines on Urban Drainage
IRC: SP: 51 -1999 Guidelines for Load Testing of Bridges
IRC: SP: 52 -1999 Bridge Inspector's Reference Manual

IRC: SP: 53 -2002 Guidelines on Use of Polymer and rubber Modified Bitumen in Road Construction (First Revision)
IRC: SP: 54 -1999 Project Preparation Manual for Bridges
IRC: SP: 55 -2001 Guidelines for Safety in Construction Zones
IRC: SP: 56 -2000 Guidelines for Steel Pedestrian Bridges
IRC: SP: 57 -2001 Guidelines for Quality Systems for Road Construction
IRC: SP: 58 -2001 Guidelines for Use of Fly ash in Road Embankments
IRC: SP: 59 -2002 Guidelines for Use of Geotextiles in Road Pavements and Associated Works
IRC: SP: 60 -2002 An Approach Document for Assessment of Remaining Life of Concrete Bridges

Ministry of Surface Transport Publications

MORT&H Pocketbook for Bridge Engineers, 2000 (First Revision)

MORT&H Pocketbook for Highway Engineers, 2002 (Second Revision)

MORT&H Specifications for Road and Bridge Works, 2001 (Fourth Revision)

MOST Standard Plans for 3.0 m Span Reinforced Cement Concrete Solid Slab Superstructure with and without Footpaths for Highways, 1991

MOST Standard Plans for Highways Bridges R.C.C. T-Beam & Slab Superstructure - Span from 10 m to 24 m with 12 m width, 1991

MOST Standard Plans for Highway Bridges PSC Girder and RC Slab Composite Superstructure for 30 m Span with and without Footpaths, 35 m Span with Footpaths and 40 m Span without Footpaths, 1991

MOST Standard Drawings for Road Bridges - R.C.C. Solid Slab Superstructure (15* & 30* SKEW Span 4.0 m to 10.0 m (with and without Footpaths), 1992

MOST Type Designs for Intersections on National Highways, 1992

MOST Computer Aided Design System for High Embankment Problems, 1993

MOST Addendum to Ministry's Technical Circulars and Directives on National Highways and Centrally Sponsored Road & Bridge Projects (Aug. 88 to Dec. 92), 1993

MOST Standard Drawing for Road Bridges R.C.C. Solid Slab Superstructure (22.5* SKEW) R.E. Span 4M to 10M (with and without Footpath), 1996

MOST Addendum to Ministry's Technical Circulars and Directives on National Highways and Centrally Sponsored Road & Bridge Projects (Jan. 93 to Dec. 94), 1996

Standard Plan for Highway Bridges - Prestressed Concrete Beam & RCC Slab Type Superstructure - Volume –II

MOST Addendum to Technical Circulars & Directives on National Highways & Centrally Sponsored Road & Bridge Works Projects (Jan. 1995 to Dec. 1997)

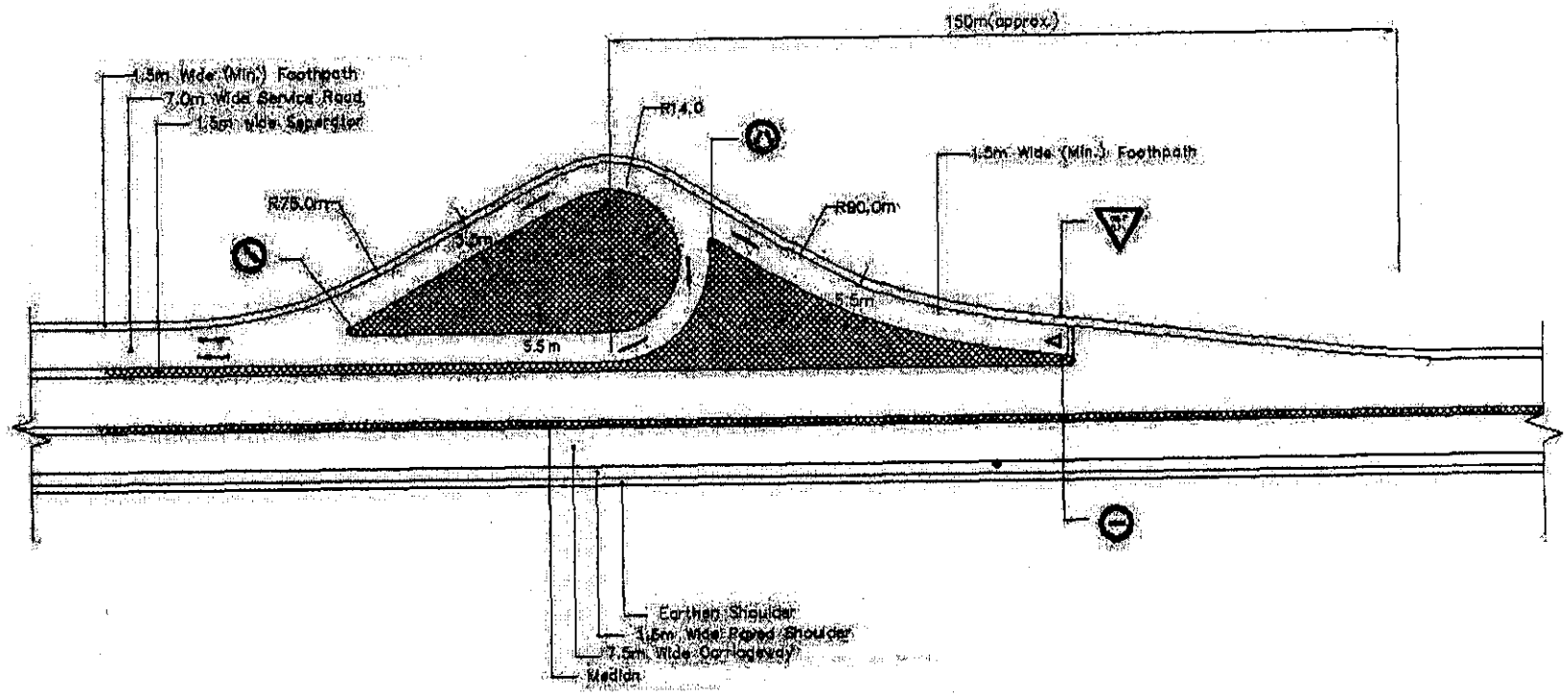
MOST Standard Plans for Single, Double and Triple Cell Box Culverts with and without Earth Cushion

Manual for Safety in Road Design

MORT&H Manual for Construction and Supervision of Bituminous Works, 2001

BIS PUBLICATIONS

IS: 1944 (Part-I & II) 1970	Code of Practice for lighting of Public thoroughfare: Parts Land 2 For Main and secondary roads (Group-A and B) (First revision) (Amendments No. 1 and 2) Parts – I and 2 in one volume) (Amendments-2).
IS: 1944 (Part-V) 1981	Code of Practice for Lighting of Public Thoroughfares: Parts 5 Lighting for Grade separated junctions, Bridges and Elevated roads (Group – D).
IS: 1944 (Part-VI) 1981	Code of Practice for lighting of Public thoroughfare: Part-6 Lighting for Towns and city centres and areas of civic Importance (Group-E).
IS/ISO: 9000	Standards for quality management systems.
IS: 10748 – 1995	Hot rolled steel for welded tubes and pipes (First Revision)
NBC	National Building Code
Part-III, NBC:	Development Control rules and general building requirements.
Part-IV, NBC:	Fire Protection
Part-VI, NBC:	Structural Design
Part-VIII, NBC:	Building Services
Part-IX, NBC:	Plumbing Services



Note:
1. Detailed system of Road Markings as per IRC35
2. Detailed system of Road Signs as per IRC 67

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

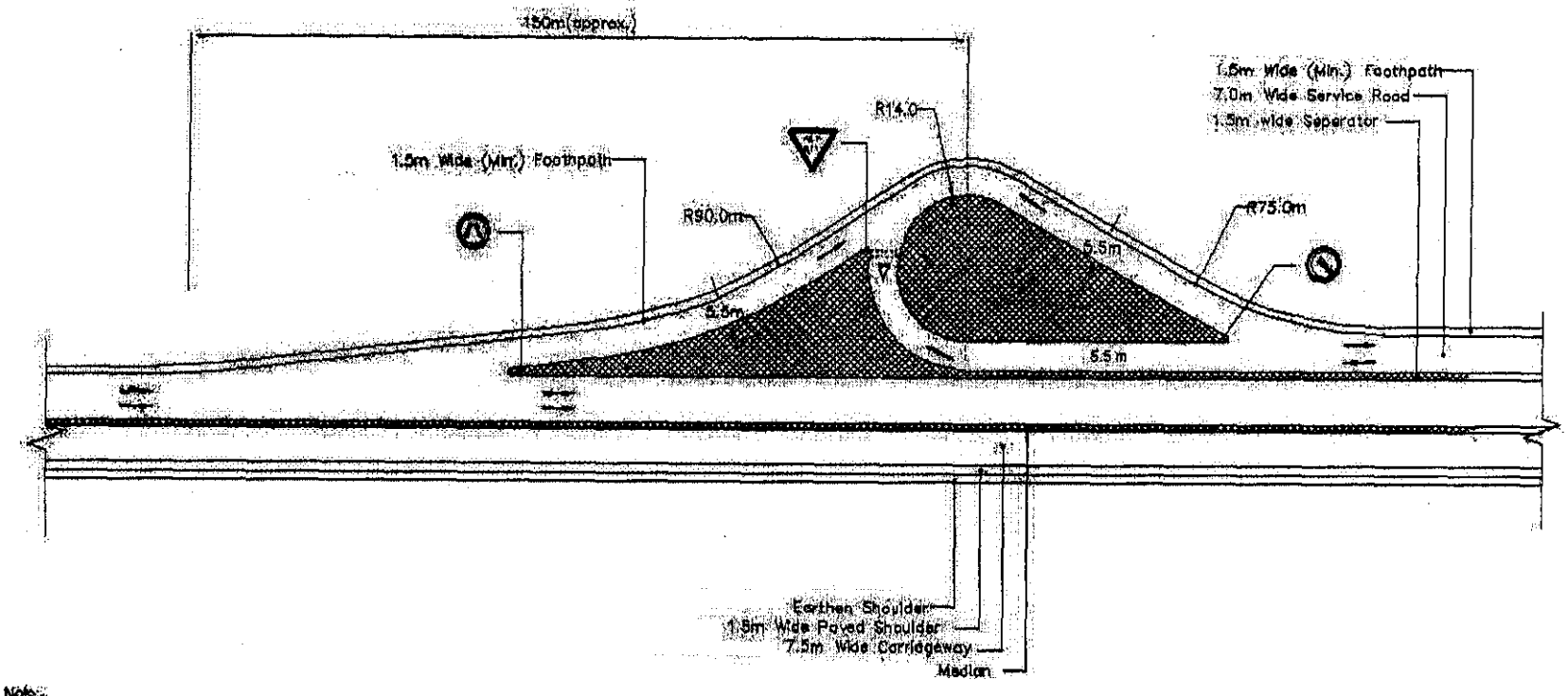
Suggestive Layout for Entry ramp to highway

Figure: 2.1A

SCALE:-Not to Scale

Pune Solapur Expressways Private Limited Delhi

National Highways Authority of India Delhi



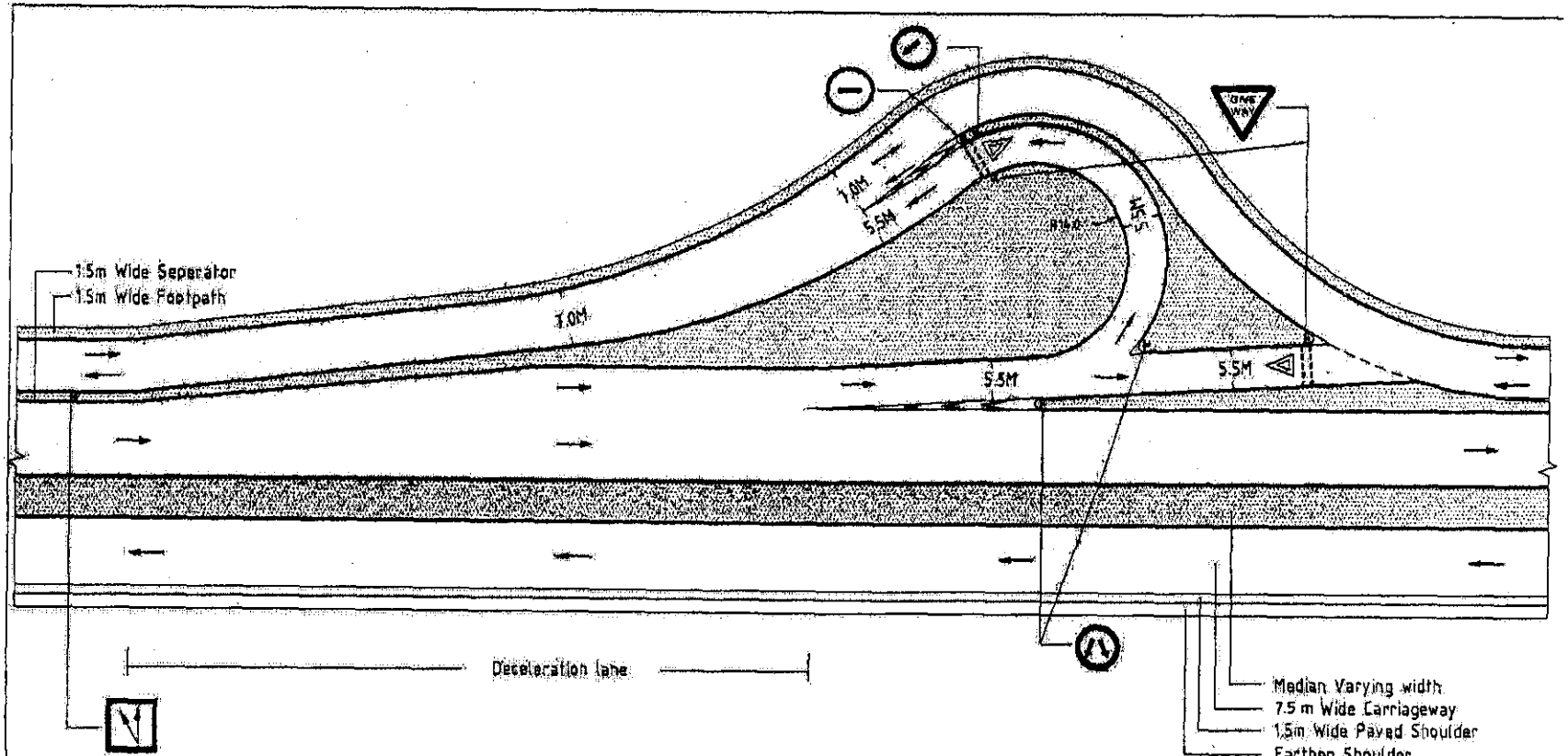
Note:-
1) Detailed system of Road Markings as per IRC:35
2) Detailed system of Road Signs as per IRC:67

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

Suggestive Layout for Exit ramp from highway

Figure: 2.1B

SCALE:-Not to Scale



Note:-

1. Detailed system of Road Markings as per IRC:35
2. Detailed system of Road Signs as per IRC:67

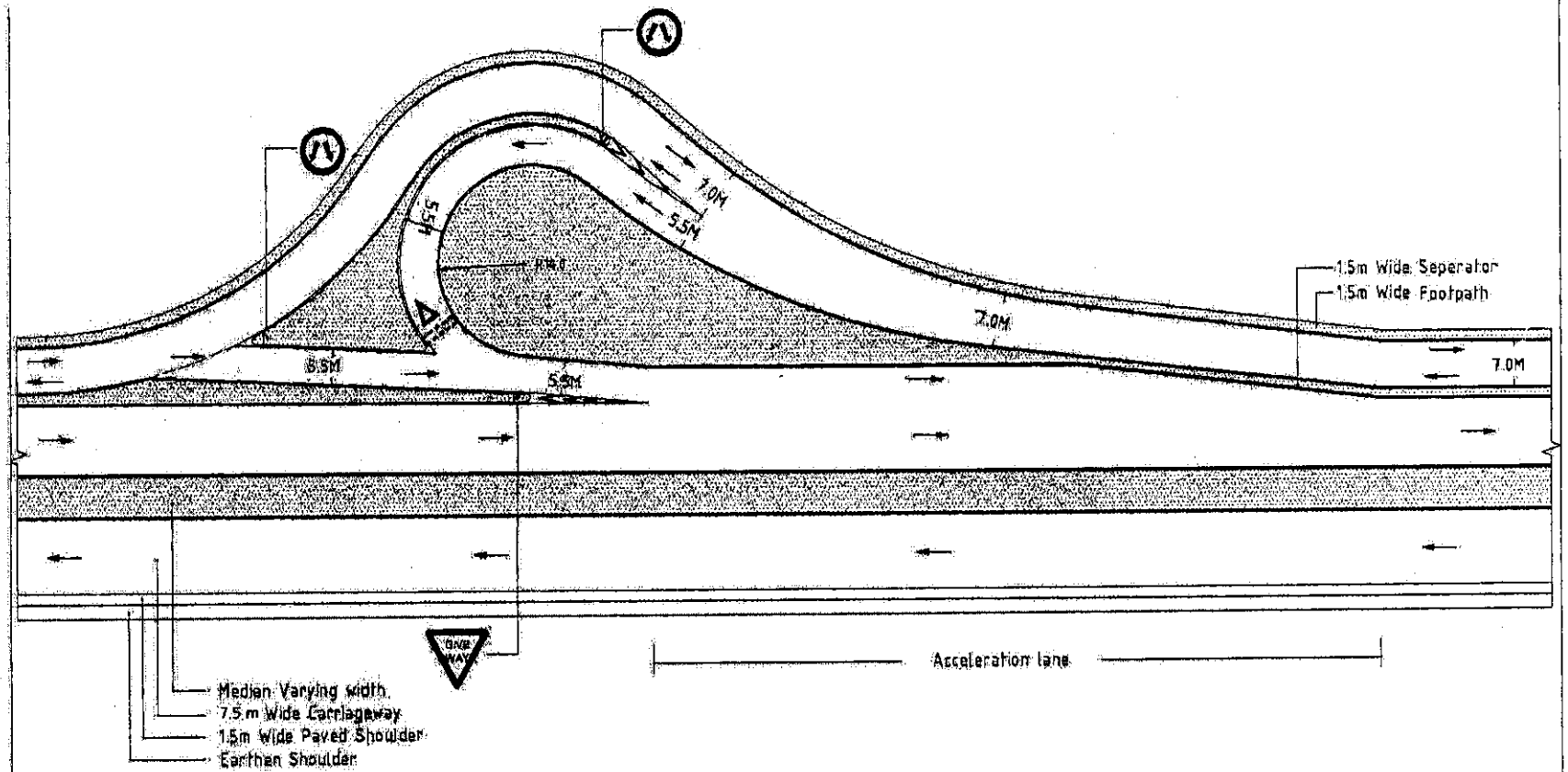
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE
Suggestive Layout for Exit Ramp from Highway

Figure: 2.10
SCALE:- Not to Scale

Pune Solapur Expressways Private Limited Delhi

National Highways Authority of India ★ New Delhi ★



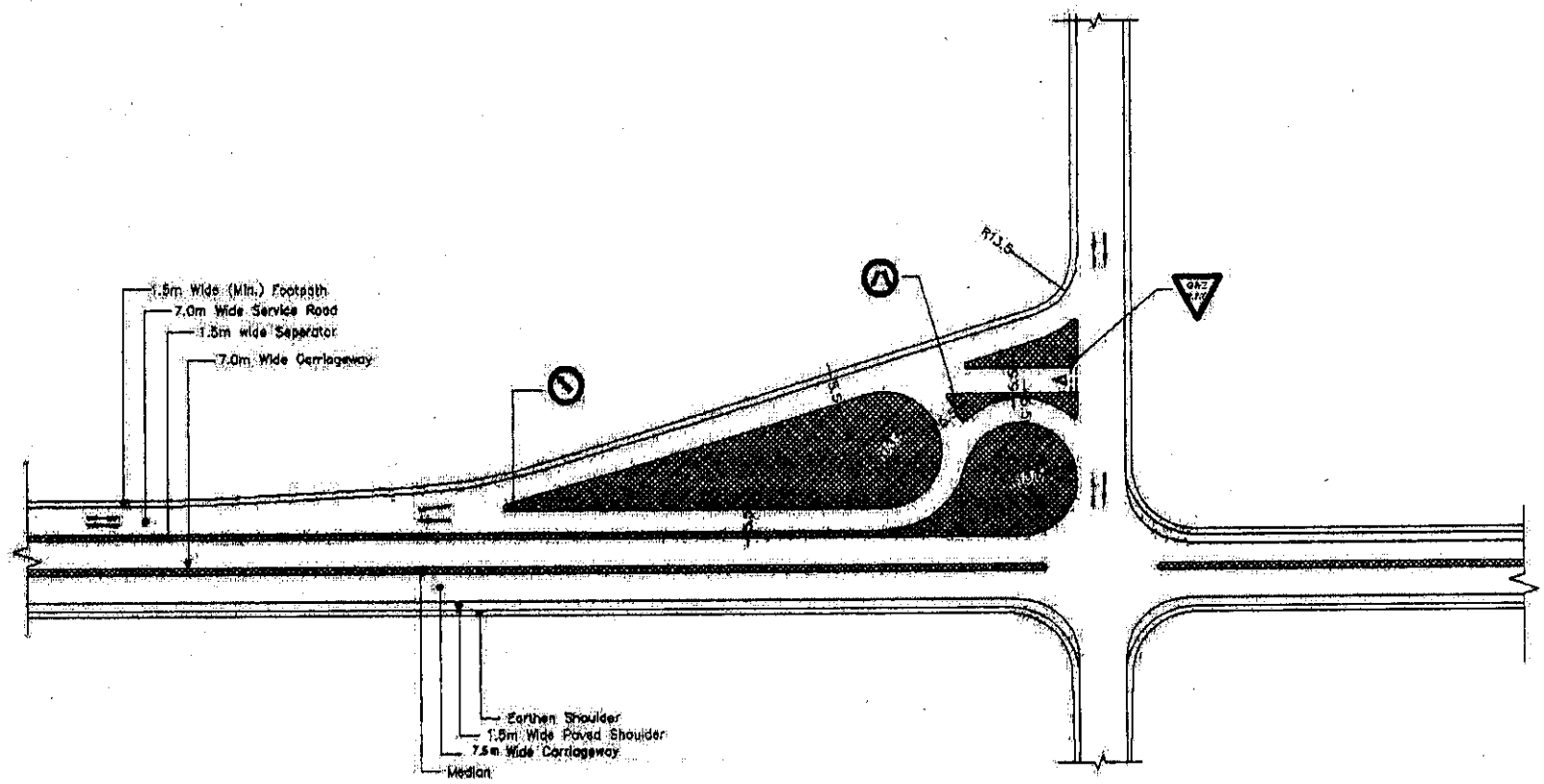
Note:-

1. Detailed system of Road Markings as per IRC:35
2. Detailed system of Road Signs as per IRC:67

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE
Suggestive Layout for Entry Ramp to Highway

Figure: 2.10
SCALE:- Not to Scale



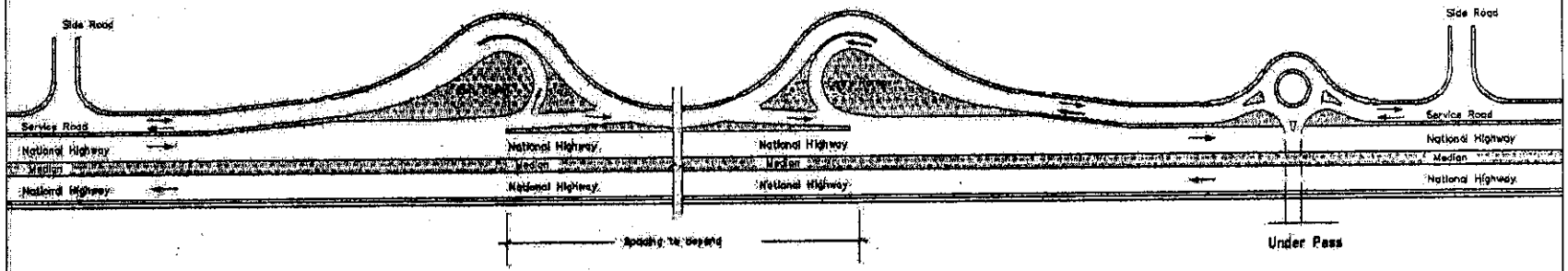
Note:-
Detailed system of Road Markings as per IRC:35

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE:-
Suggestive Layout of Service Road Ending at a junction with Cross Road

Figure: 2.2

SCALE:- Not to Scale



Note:-

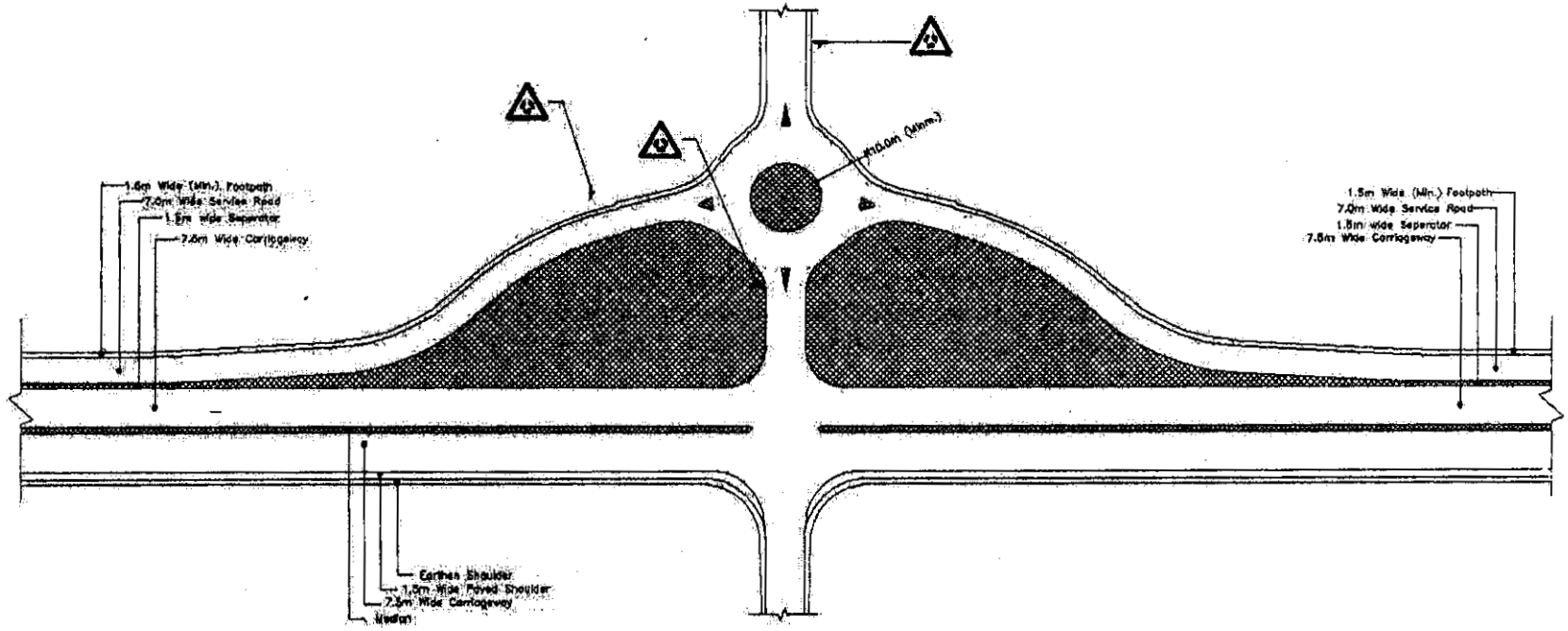
1. Detailed system of Road Markings as per IRC:35
2. Detailed system of Road Signs as per IRC:67

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE
Suggestive Layout showing configuration of service road, entry/exit ramps, side road and underpass

Figure: 2.3

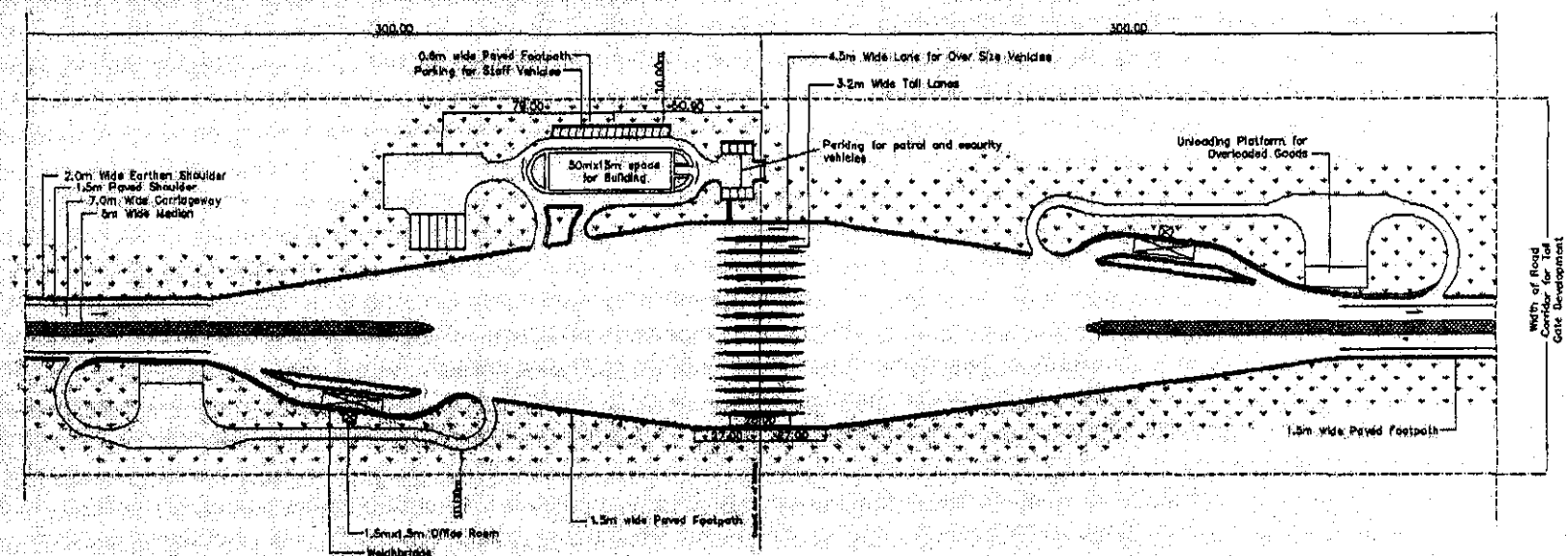
SCALE:- Not to Scale



Note:-

1. Detailed system of Road Markings as per IRC:35

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS	DRAWING TITLE:- Suggestive Layout of Service Road Continuing at Intersection
	Figure: 2.4
	SCALE:- Not to Scale

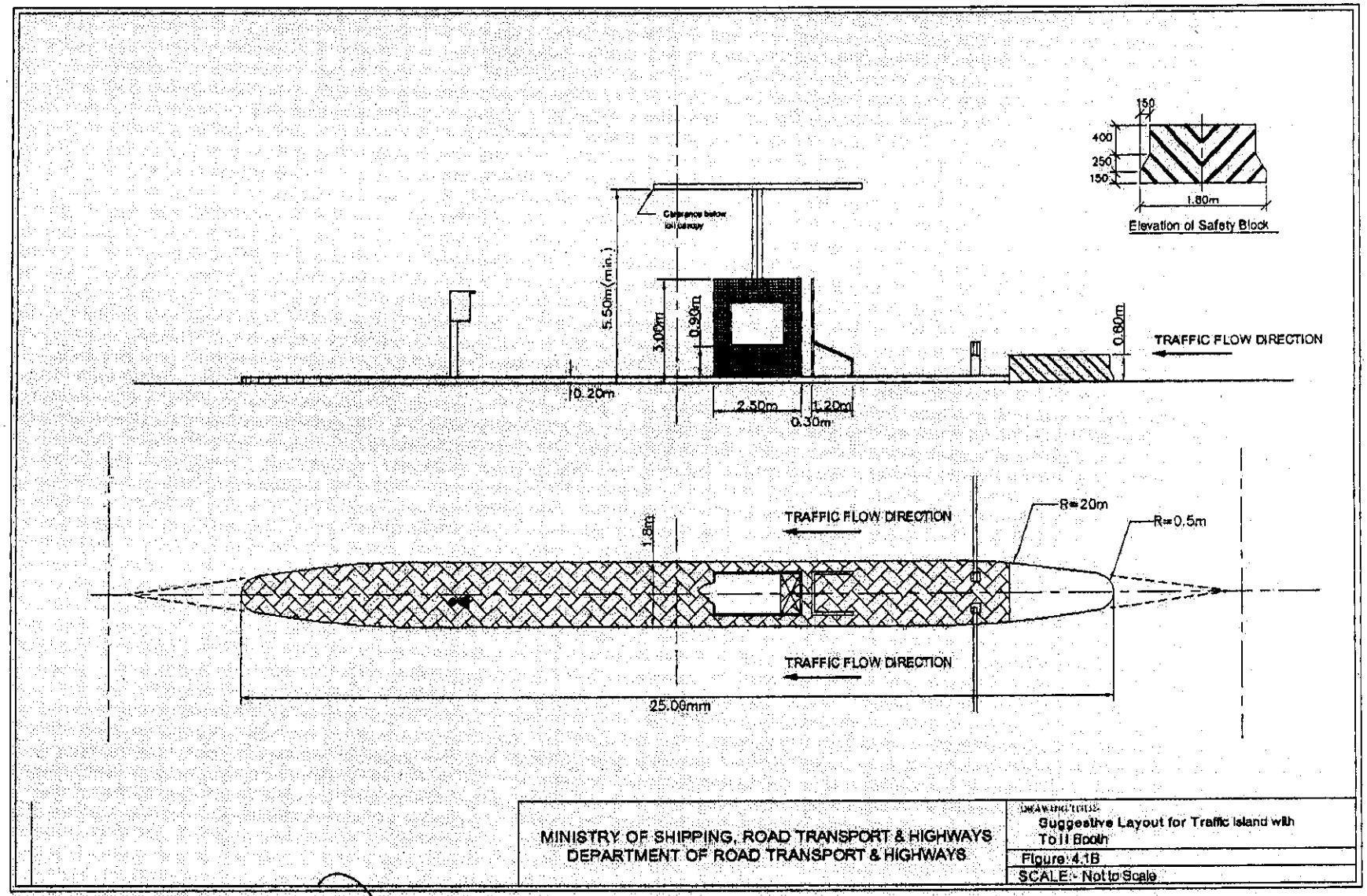


Note:-
Detailed system of Road Markings as per IRC:35

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE:-
Suggestive Layout for a Toll Plaza

Figure: 4.1A
SCALE:- Not to Scale



MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE:
Suggestive Layout for Traffic Island with Toll Booth

Figure: 4.1B

SCALE:- Not to Scale

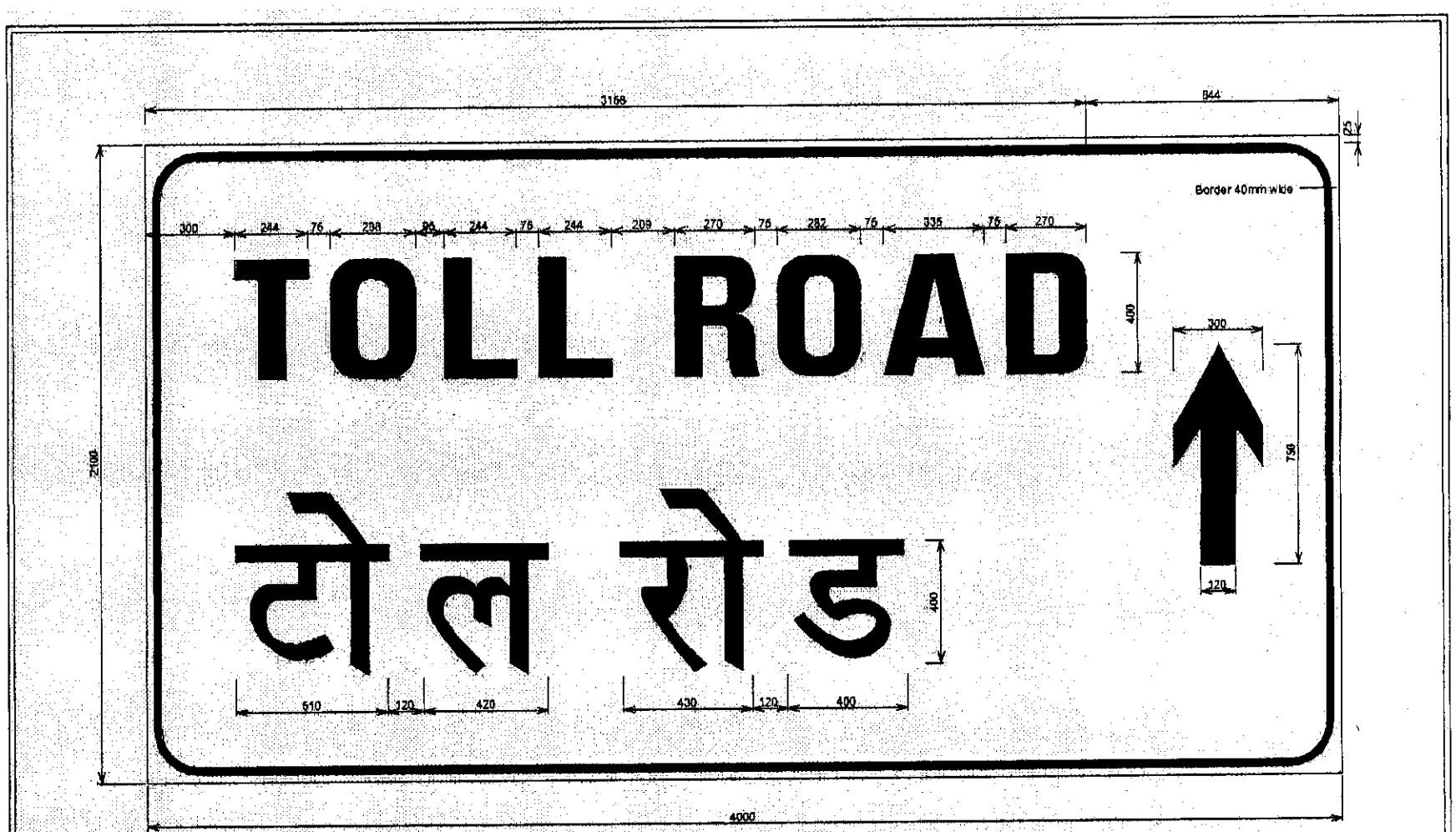
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS	DRAWING TITLE:- Sign Panel for Toll Gate at 1 Km
	Figure: 4.2A
	SCALE:- Not to Scale

Note:-
Local language instead of Hindi shall be used if the local language is other than Hindi.

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

DRAWING TITLE:
Sign Panel for Toll Gate at 500 m

Figure: 4.2B
SCALE:- Not to Scale



MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

Sign Panel for Start of Toll Road

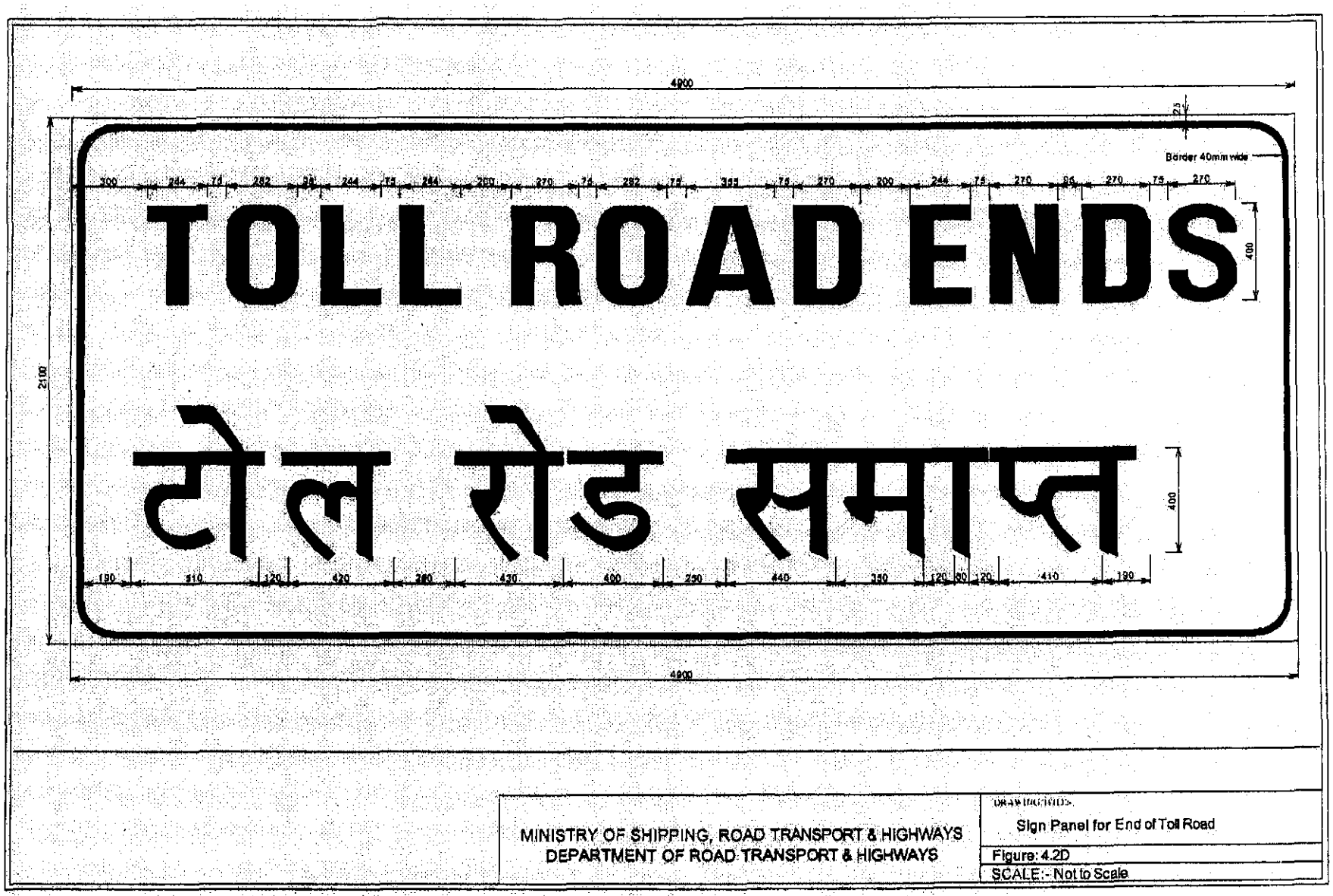
Figure: 4.2C

SCALE :- Not to Scale

Pune Solapur Expressways Private Limited

National Highways Authority of India

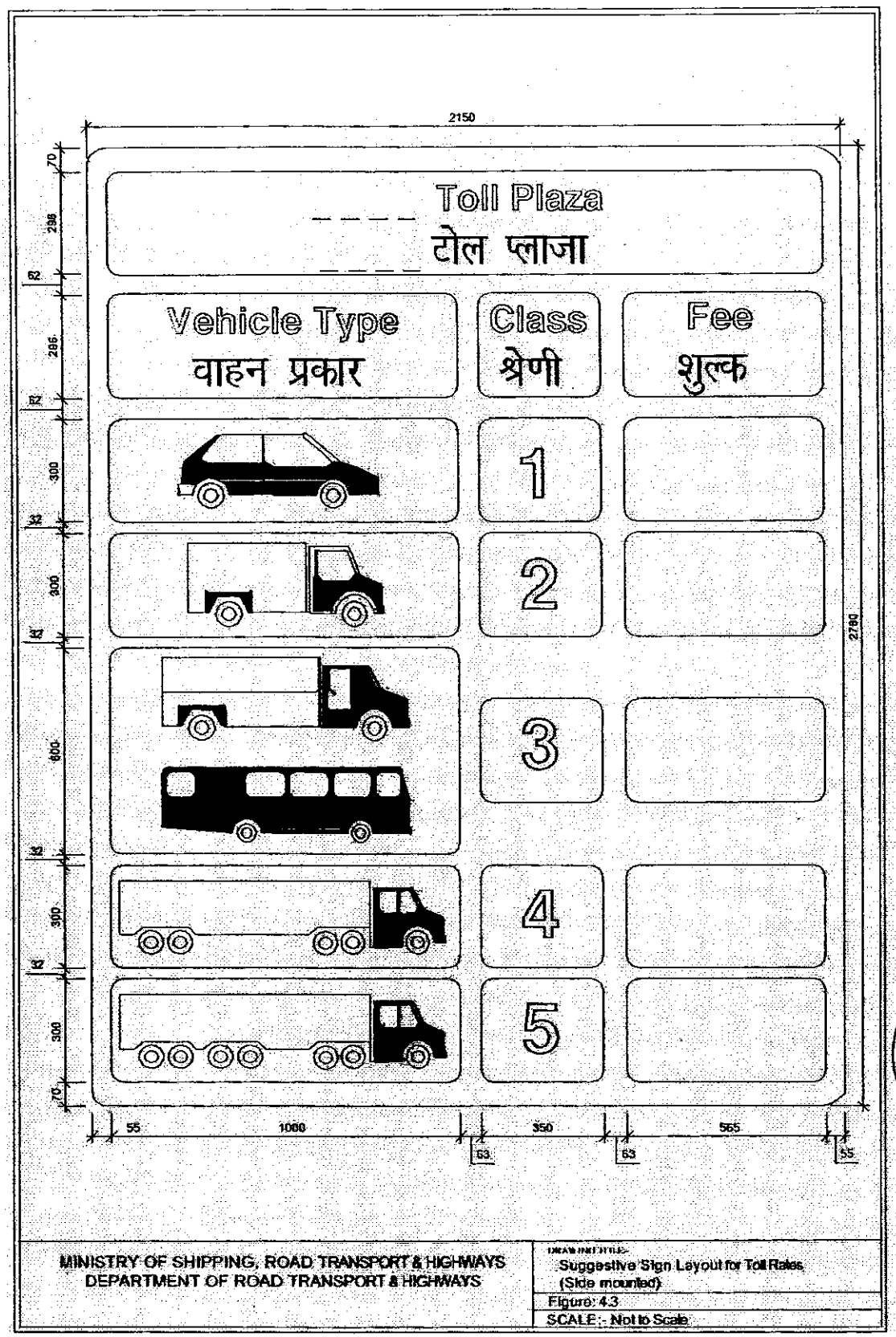
D-86



MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS	DRAWING TITLE: Sign Panel for End of Toll Road
	Figure: 4.2D
	SCALE:- Not to Scale

Pune Solapur Expressways Private Limited Delhi

National Highways Authority of India New Delhi



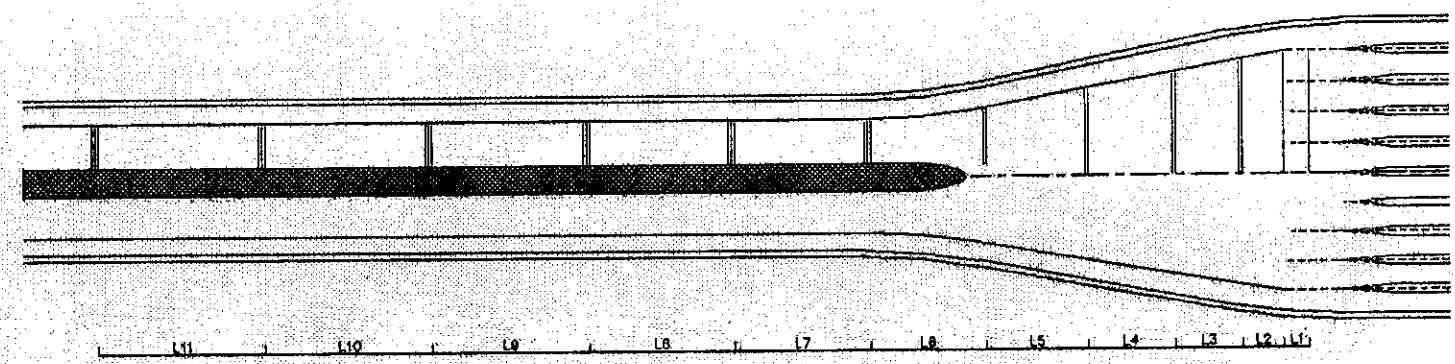
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS

Suggestive Sign Layout for Toll Rates (Side mounted)

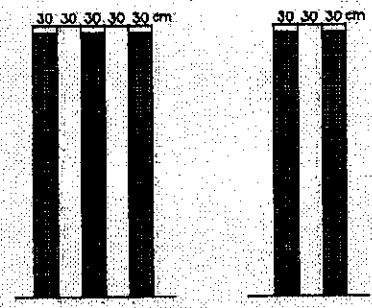
Figure: 4.3

SCALE:- Not to Scale

D-88



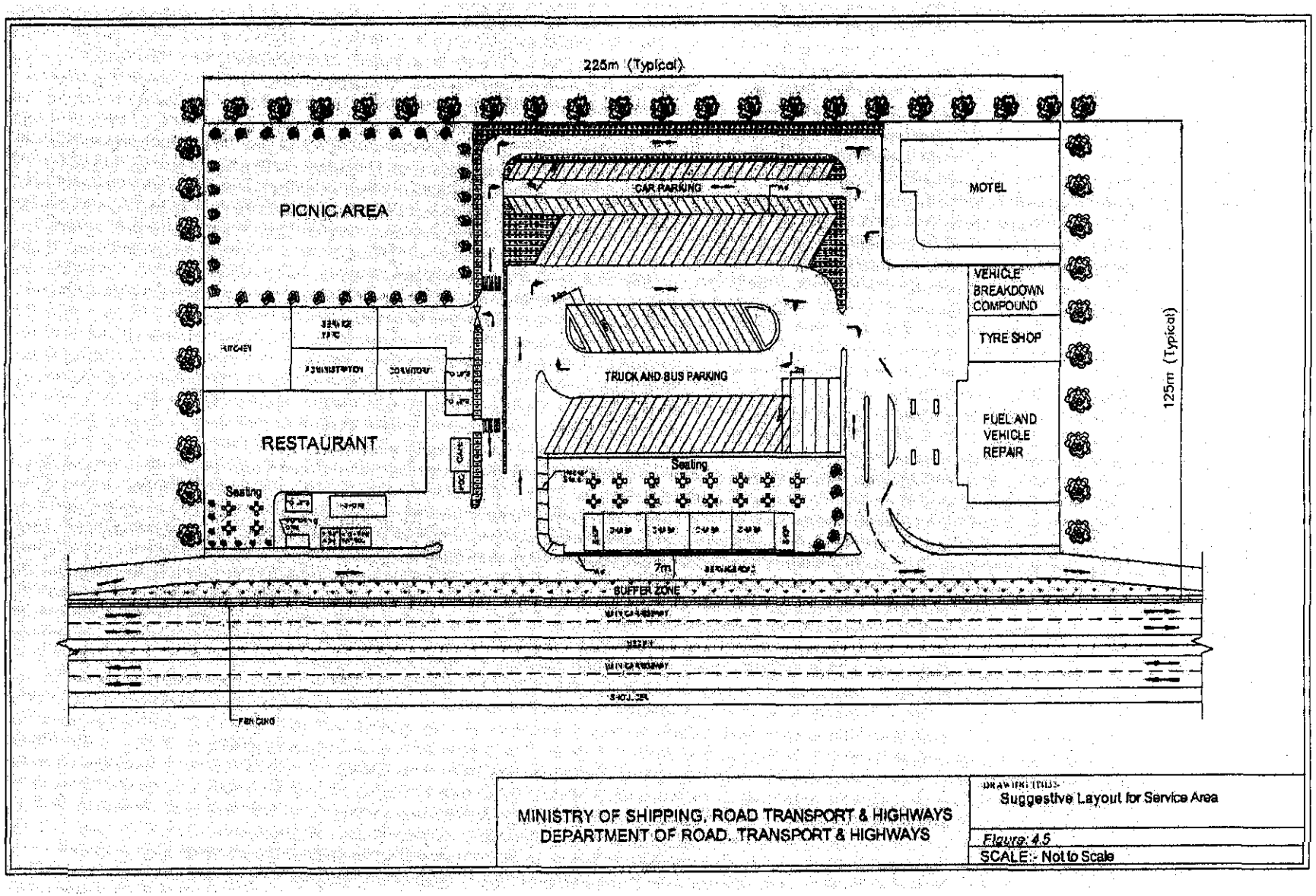
Distance from Previous Bar Marking (M)	No of Bar Markings
L1 = 5	1
L2 = 9	1
L3 = 13	2
L4 = 17	2
L5 = 20	2
L6 = 23	2
L7 = 26	3
L8 = 28	3
L9 = 30	3
L10 = 32	3
L11 = 32	3



WHITE TRANSVERSE BAR MARKING

Notes:-
Detailed system of Road Markings as per IRC:35

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS	DRAWING TITLE: Details of Suggestive Transverse Bar Markings for Speed Control at Toll Plaza Figure: 4.4 SCALE:- Not to Scale



SCHEDULE - E

(See Clause 4.1.3)

APPLICABLE PERMITS

1 Applicable Permits

1.1 The Concessionaire shall obtain, as required under the Applicable Laws, the following Applicable Permits on or before the Appointed Date, save and except to the extent of a waiver granted by the Authority in accordance with Clause 4.1.3 of the Agreement:

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

(b) Permission of Village Panchayat and Pollution Control Board for installation of crusher;

(c) Licence for use of explosives;

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

(e) Licence from Inspector of factories or other Competent Authority for setting up Batching Plant;

(f) Clearance of Pollution Control Board for setting up Batching Plant;

(g) Clearance of Village Panchayats and Pollution Control Board for Asphalt Plant;

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

(i) Permission of State Government for cutting of trees; and

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

1.2 Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority as a Condition Precedent.

SCHEDULE - F
(See Clause 9.1)

PERFORMANCE SECURITY

The Chairman,
National Highways Authority of India,
New Delhi.

WHEREAS:

(A) **** (the "**Concessionaire**") and the Chairman, National Highways Authority of India (the "**Authority**") have entered into a Concession Agreement dated _____ (the "Agreement") whereby the Authority has agreed to the Concessionaire undertaking Four Laning of Pune-Solapur Section of NH - 9 from km 40.000 to km 144.400 in the State of Maharashtra on Design,build,Finance, operate and transfer ("DBFOT") basis subject to and in accordance with the provisions of the Agreement.

(B) The Agreement requires the Concessionaire to furnish a Performance Security to the Authority in a sum of ***Rs. 55.50 crore (Rupees Fifty Five Crore Fifty Lacs only)*** (the "**Guarantee Amount**") as security for due and faithful performance of its obligations under and in accordance with the Agreement during the Construction Period (as defined in the Agreement).

(C) We, ***** through our Branch at ***** (the "**Bank**") have agreed to furnish this Bank 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 Concessionaire's obligations during the Construction 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 Concessionaire, such sum or sums upto 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 Concessionaire 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 Concessionaire is in default in due and faithful performance of its obligations during the Construction Period under the Agreement and its decision that the Concessionaire is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Concessionaire, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Concessionaire 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 Concessionaire 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 Concessionaire before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/or performance of all or any of the obligations of the Concessionaire 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 Concessionaire, 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 Concessionaire or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Concessionaire 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, not later than 6 (six) months from the date of expiry of 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 Performance Security shall cease to be in force and effect when the Concessionaire shall have expended on Project construction an aggregate sum not less than 20% (twenty per cent) of the Total Project Cost which is deemed to be Rs. 222.00 crores for the purpose of this Guarantee, and provided the Concessionaire is not in breach of this Agreement. Upon request made by the Concessionaire for release of the Performance Security alongwith the particulars required hereunder, duly certified by a statutory auditor of the Concessionaire, the Authority shall release the Performance Security forthwith.

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 that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

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

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for a period of one year or until it is released earlier by the Authority pursuant to the provisions of the Agreement

Signed and sealed this ** day of ***, 200* at ***.

SIGNED, SEALED AND DELIVERED For and on behalf of the BANK by:

(Signature)

(Name)

(Designation)

(Address)

SCHEDULE - G

(See Clause 12.1)

PROJECT COMPLETION SCHEDULE

1 Project Completion Schedule

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

2 Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 180th(One Hundred and Eightieth) days from the Appointed Date (the **"Project Milestone-I"**).

2.2 Prior to the occurrence of Project Milestone-I, the Concessionaire shall have commenced construction of the Project Highway and expended not less than 10% (ten per cent) of the total capital cost set forth in the Financial Package.

3 Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the 400th days from the Appointed Date (the **"Project Milestone-II"**).

3.2 Prior to the occurrence of Project Milestone-II, the Concessionaire shall have commenced construction of all bridges and expended not less than 35% (thirty five per cent) of the total capital cost set forth in the Financial Package.

4 Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 650th days from the Appointed Date (the **"Project Milestone-III"**).

4.2 Prior to the occurrence of Project Milestone-III, the Concessionaire shall have commenced construction of all Project Facilities and expended not less than 70% (Seventy per cent) of the total capital cost set forth in the Financial Package.

5 Scheduled Four-Laning Date

5.1 The Scheduled Four-Laning Date shall occur on the 910th (nine hundred and tenth) day from the Appointed Date.

5.2 On or before the Scheduled Project Completion Date, the Concessionaire shall have completed the Four-Lane Project Highway in accordance with this Agreement.

6 Extension of period

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Project 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 - H

(See Clause 12.3)

DRAWINGS

1 Drawings

In compliance of the obligations set forth in Clause 12.3 of this Agreement, the Concessionaire shall furnish to the Independent Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-H.

2 Additional drawings

2.1 If the Independent 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 Concessionaire to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Concessionaire shall promptly prepare and furnish such drawings to the Independent Engineer, as if such drawings formed part of Annex-I of this Schedule-H.

ANNEX-I

(Schedule-H)
List of Drawings

1. A broad list of the drawings of the various components/elements of the Project Highway and project facilities required to be submitted by the Concessionaire is given below:

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

   (b) Drawings of cross drainage works

   (c) Drawings of interchanges, major intersections, grade separators, underpasses and ROB's

   (d) Drawings of toll plaza layout, toll collection systems and roadway near toll plaza

   (e) Drawings of Control Centre

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

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

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

   (i) Drawings of traffic diversion plans and traffic control measures

   (j) Drawings of road drainage measures

   (k) Drawings of typical details slope protection measures

   (l) Drawings of landscaping and horticulture

   (m) Drawings of pedestrian crossings

   (n) Drawings of street lighting

   (o) Layout/Configuration of HTMS

   (p) General arrangement of Base camp and Administrative Block

SCHEDULE- I

(See Clause 14.1.2)

TESTS

1 Schedule for Tests

1.1 The Concessionaire shall, not later than 30 (thirty) days prior to the likely completion of Four-Laning, notify the Independent Engineer and the Authority of its intent to subject the Project Highway to Tests, and not later than 7 (seven) days prior to the actual date of Tests, furnish to the Independent Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Four-Laning.

1.2 The Concessionaire shall notify the Independent Engineer of its readiness to subject the Project Highway to Tests at any time after 7 (seven) days from the date of such notice, and upon receipt of such notice, the Independent Engineer shall, in consultation with the Concessionaire, 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 Independent Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 14 and this Schedule-I.

2 Tests

2.1 Visual and physical Test: The Independent Engineer shall conduct a visual and physical check of Four-Laning to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

2.2 Test drive: The Independent Engineer shall undertake a test drive of the Project Highway by a Car and by a fully loaded Truck to determine that the quality of service conforms to the provisions of the Agreement.

2.3 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 1,800 (one thousand and eight hundred) mm for each kilometre.

2.4 Pavement Composition Test: The thickness and composition of the pavement structure shall be checked on a sample basis by digging pits to determine conformity of such pavement structure with Specifications and Standards. The sample shall consist of one pit in each direction of travel to be chosen at random in each stretch of 5 (five) kilometres of the Project Highway. The first pit for the sample shall be selected by the Independent Engineer through an open draw of lots and every fifth kilometre from such first pit shall form part of the sample for this pavement quality Test.

2.5 Cross-section Test: The cross-sections of the Project Highway shall be checked on a sample basis through physical measurement of their dimensions for determining the conformity thereof with Specifications and Standards. For the road portion, the sample shall consist of one spot to be selected at random in each stretch of 1 (one) kilometre of the Project Highway. The first spot for the sample shall be selected by the Independent Engineer through an open draw of lots and the spots located at every one kilometre from such first spot shall form part of the sample. For the bridge portion, one spot shall be selected at random by the Independent Engineer in each

span of the bridge.

2.6 Structural Test for bridges: All major and minor bridges constructed by the Concessionaire shall be subjected to the Rebound Hammer and Ultrasonic Pulse Velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Non-destructive Testing Techniques, at two spots in every span, to be chosen at random by the Independent Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

2.7 Other Tests: The Independent Engineer may require the Concessionaire to carry out or cause to be carried additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

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

2.9 Safety review: Safety audit of the Project Highway shall have been undertaken by the Safety Consultant as set forth in Schedule-L, and on the basis of such audit, the Independent Engineer shall determine conformity of the Project Highway with the provisions of this Agreement.

3 Agency for conducting Tests

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

4 Completion/Provisional Certificate

Upon successful completion of Tests, the Independent Engineer shall issue the Completion Certificate or the Provisional Certificate, as the case may be, in accordance with the provisions of Article 14.

SCHEDULE - J

(See Clauses 14.2 & 14.3)

COMPLETION CERTIFICATE

1 I, **** (Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Concession Agreement dated *** (the "**Agreement**"), for Four Laning of Pune - Solapur Section of NH - 9 from km 40.00 to km 144.400*** in the State of Maharashtraon Design, build,Finance, operate and transfer (DBFOT) basis through Pune Solapur Expressways Private Limited, hereby certify that the Tests specified in Article 14 and Schedule-I 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 commercial service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Four-Laning have been completed, and the Project Highway is hereby declared fit for entry into commercial operation on this the *** day of *** 200*.

SIGNED, SEALED AND DELIVERED

For and on behalf of

INDEPENDENT ENGINEER by:

(Signature)

(Name)

(Designation)

(Address)

Provisional Certificate

1 I, **** (Name of the Independent Engineer), acting as Independent Engineer, under and in accordance with the Concession Agreement dated *** (the "**Agreement**"), for Four Laning of Pune-Solapur Section of NH - 9 from km 40.000 to km 144.400 in the State of Maharashtraon build, operate and transfer (BOT) basis through **** (Name of Concessionaire), hereby certify that the Tests specified in Article 14 and Schedule-I of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2 Construction Works that were found to be incomplete and/or deficient have been specified in the Punch List appended hereto, and the Concessionaire has agreed and accepted that it shall complete and/or rectify all such works in the time and manner set forth in the Agreement. (Some of the incomplete works have been delayed as a result of reasons attributable to the Authority or due to Force Majeure and the Provisional Certificate cannot be withheld on this account. Though the remaining incomplete works have been delayed as a result of reasons attributable to the Concessionaire), I am satisfied that having regard to the nature and extent of such incomplete works, it would not be prudent to withhold commercial operation of the Project Highway, pending completion thereof.

3 In view of the foregoing, I am satisfied that the Project Highway can be safely and reliably placed in commercial service of the Users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into commercial operation on this the *** day of *** 200*.

ACCEPTED, SIGNED, SEALED	SIGNED, SEALED AND
AND DELIVERED	DELIVERED
For and on behalf of	For and on behalf of
CONCESSIONAIRE by:	INDEPENDENT ENGINEER by:
(Signature)	(Signature)
(Name and Designation)	(Name and Designation)
(Address)	(Address)

SCHEDULE – K

(See Clause 17.2)

MAINTENANCE REQUIREMENTS

1 Maintenance Requirements

1.1 The Concessionaire shall, at all times, operate and maintain the Project Highway in accordance with the provisions of the Agreement, Applicable Laws and Applicable Permits. In particular, the Concessionaire shall, at all times during the Operation Period, conform to the maintenance requirements set forth in this Schedule-K (the "**Maintenance Requirements**").

1.2 The Concessionaire shall repair or rectify any defect or deficiency set forth in Paragraph 2 of this Schedule-K within the time limit specified therein and any failure in this behalf shall constitute a breach of the Agreement. Upon occurrence of any breach hereunder, the Authority shall be entitled to recover Damages as set forth in Clause 17.8 of the Agreement, without prejudice to the rights of the Authority under the Agreement, including Termination thereof.

2 Repair/rectification of defects and deficiencies

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

3 Other defects and deficiencies

3.1 In respect of any defect or deficiency not specified in Annex - I of this Schedule-K, the Concessionaire shall undertake repair or rectification in accordance with Good Industry Practice.

3.2 In respect of any defect or deficiency not specified in Annex - I of this Schedule-K, the Independent 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 Concessionaire within the time limit specified by the Independent Engineer.

4 Extension of time limit

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

5 Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-K, if any defect, deficiency or deterioration in the Project Highway poses danger to the life or property of the Users thereof, the Concessionaire shall promptly take all reasonable measures

for eliminating or minimizing such danger.

6 Daily Inspection by the Concessionaire

The Concessionaire 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 Independent Engineer may specify. Such record shall be kept in safe custody of the Concessionaire and shall be open to inspection by the Authority and the Independent Engineer at any time during office hours.

7 Divestment Requirements

All defects and deficiencies specified in this Schedule-K shall be repaired and rectified by the Concessionaire so that the Project Highway conforms to the Maintenance Requirements on the Transfer Date.

8 Display of Schedule - K

The Concessionaire shall display a copy of this Schedule - K at the Toll Plazas along with the Complaint Register stipulated in Article 46.

Annex – I

(Schedule-K)

Repair/Rectification of Defects and Deficiencies

The Concessionaire shall repair and rectify the defects and deficiencies specified in this Annex - I of Schedule - K within the time limit set forth herein.

Nature of defect or deficiency		**Time limit for repair/rectification**
ROADS		
(a) Carriageway and paved shoulders		
(i) Breach or blockade	-	Temporary restoration of traffic within 24 hours; permanent restoration within 15 days
(ii) Roughness value exceeding 2,500 mm in a stretch of 1 km (as measured by a standardised roughometer/ bump integrator)	-	180 days
(iii) Pot holes	-	48 hours
(iv) Cracking in more than 5% of road surface in a stretch of 1 km	-	30 days
(v) Rutting exceeding 10 mm in more than 2% of road surface in a stretch of 1 km (measured with 3 m straight edge)	-	30 days
(vi) Bleeding/skidding	-	7 days
(vii)Ravelling/Stripping of bitumen surface exceeding 10 sq m	-	15 days
(viii) Damage to pavement edges exceeding 10 cm	-	15 days

(ix)	Removal of debris	-	6 hours
(b)	**Hard/earth shoulders, side slopes, drains and culverts**		
(i)	Variation by more than 2% in the prescribed slope of camber/cross fall	-	30 days
(ii)	Edge drop at shoulders exceeding 40 mm	-	7 days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	-	30 days
(iv)	Rain cuts/gullies in slope	-	7 days
(v)	Damage to or silting of culverts and side drains during and immediately preceding the rainy season	-	7 days
(vi)	Desilting of drains in urban/semi-urban areas	-	48 hours
(c)	**Road side furniture including road signs and pavement marking**		
(i)	Damage to shape or position; poor visibility or loss of retro-reflectivity	-	48 hours
(d)	**Street lighting and telecom (ATMS)**		
(i)	Any major failure of the system	-	24 hours
(ii)	Faults and minor failures	-	8 hours
(e)	**Trees and plantation**		
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	-	24 hours

(ii) Deterioration in health of trees and bushes	-	Timely watering and treatment
(iii) Replacement of trees and bushes	-	90 days
(iv) Removal of vegetation affecting sight line and road structures	-	15 days

(f) Rest areas

(i) Cleaning of toilets	-	Every 4 hours
(ii) Defects in electrical, water and sanitary installations	-	24 hours

(g) Toll plaza

(i) Failure of toll collection equipment or lighting	-	8 hours
(ii) Damage to toll plaza	-	7 days

(h) Other Project Facilities and Approach roads

(i) Damage or deterioration in Approach Roads, [pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works]	-	15 days

BRIDGES

(a) Superstructure of bridges

(i) Cracks -	--	
Temporary measures		within 48 hours
Permanent measures		within 45 days
(ii) Spalling/scaling	-	15 days

(b)	**Foundations of bridges**		
(i)	Scouring and/or cavitation	-	15 days
(c)	**Piers, abutments, return walls and wing walls of bridges**		
(i)	Cracks and damages including settlement and tilting	-	30 days
(d)	**Bearings (metallic) of bridges**		
(i)	Deformation	-	15 days
(e)	**Joints in bridges**		
(i)	Loosening and malfunctioning of joints	-	15 days
(f)	**Other items relating to bridges**		
(i)	Deforming of pads in elastomeric bearings	-	7 days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	-	3 days
(iii)	Damage or deterioration in parapets and handrails	-	3 days
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	-	15 days
(v)	Damage to wearing coat	-	15 days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	-	30 days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	-	15 days

SCHEDULE - L

(See Clause 18.1.1)

SAFETY REQUIREMENTS

1 Guiding principles

1.1 Safety Requirements aim at reduction in injuries, loss of life and damage to property resulting from accidents on the Project Highway, irrespective of the person(s) at fault.

1.2 Users of the Project Highway include motorised and non-motorised vehicles as well as pedestrians and animals involved in, or associated with accidents. Vulnerable Road Users (VRU) include pedestrians as well as riders of motorised two-wheelers, bicycles and other vehicles which do not provide adequate occupant protection.

1.3 Safety Requirements apply to all phases of construction, operation and maintenance with emphasis on identification of factors associated with accidents, consideration of the same, and implementation of appropriate remedial measures.

1.4 Safety Requirements include measures associated with traffic management and regulation such as road signs, pavement marking, traffic control devices, roadside furniture, highway design elements, enforcement and emergency response.

2 Obligations of the Concessionaire

The Concessionaire shall abide by the following insofar as they relate to safety of the Users:

(a) Applicable Laws and Applicable Permits;

(b) Manual for Safety in Road Design, issued by MOSRTH;

(c) relevant Standards/Guidelines of IRC relating to safety road geometrics, bridges, culverts, road signs, pavement marking and roadside furniture;

(d) provisions of this Agreement; and

(e) Good Industry Practice.

3 Appointment of Safety Consultant

For carrying out safety audit of the Project Highway under and in accordance with this Schedule-L, the Authority shall appoint from time to time, one or more qualified firms or organisations as its consultants (the **"Safety Consultant"**). The Safety Consultant shall employ a team comprising, without limitation, one road safety expert and one traffic planner to undertake safety audit of the Project Highway.

4 Safety measures during Development Period

4.1 Not later than 90 (ninety) days from the date of this Agreement, the Authority shall appoint a Safety Consultant for carrying out safety audit at the design stage of the Project. The Safety Consultant shall collect data on all fatal crashes and other road accidents which occurred on the Project Highway in the preceding two years by

obtaining copies of the relevant First Information Reports (FIRs) from the police stations having jurisdiction. The information contained in such FIRs shall be summarised in the form prescribed by IRC/MOSRTH for this purpose and the data shall be analysed for the type of victims killed or injured, impacting vehicles, location of accidents and other relevant factors.

4.2 The Concessionaire shall provide to the Safety Consultant, in four copies, the relevant drawings containing the design details that have a bearing on safety of Users (the **"Safety Drawings"**). Such design details shall include horizontal and vertical alignments; sightlines; layouts of intersections; interchanges; road cross-section; bridges and culverts; side drains; provision for parked vehicles, slow moving vehicles (tractors, bullock carts, bicycles) and pedestrians; bus bays; truck lay-bys; and other incidental or consequential information. The Safety Consultant shall review the design details and forward three copies of the Safety Drawings with its recommendations, if any, to the Independent Engineer who shall record its comments, if any, and forward one copy each to the Authority and the Concessionaire.

4.3 The accident data and the design details shall be compiled, analysed and used by the Safety Consultant for evolving a package of recommendations consisting of safety related measures for the Project Highway. The safety audit shall be completed in a period of three months and a report thereof (the **"Safety Report"**) shall be submitted to the Authority, in five copies. One copy each of the Safety Report shall be forwarded by the Authority to the Concessionaire and the Independent Engineer forthwith.

4.4 The Concessionaire shall endeavour to incorporate the recommendations of the Safety Report in the design of the Project Highway, as may reasonably be required in accordance with Applicable Laws, Applicable Permits, Manuals and Guidelines of MOSRTH and IRC, Specifications and Standards, and Good Industry Practice. If the Concessionaire does not agree with any or all of such recommendations, it shall state the reasons thereof and convey them to the Authority forthwith. In the event that any or all of the works and services recommended in the Safety Report fall beyond the scope of Schedule-B, Schedule-C or Schedule-D, the Concessionaire shall make a report thereon and seek the instructions of the Authority for funding such works in accordance with the provisions of Article 18.

4.5 Without prejudice to the provisions of Paragraph 4.4, the Concessionaire and the Independent Engineer shall, within 15 (fifteen) days of receiving the Safety Report, send their respective comments thereon to the Authority, and not later than 15 (fifteen) days of receiving such comments, the Authority shall review the same alongwith the Safety Report and by notice direct the Concessionaire to carry out any or all of the recommendations contained therein with such modifications as the Authority may specify; provided that any works or services required to be undertaken hereunder shall be governed by the provisions of Article 18.

5 Safety measures during Construction Period

5.1 A Safety Consultant shall be appointed by the Authority, not later than 4 (four) months prior to the expected Project Completion Date, for carrying out a safety audit

of the completed Construction Works.

5.2 The Safety Consultant shall collect and analyse the accident data for the preceding two years in the manner specified in Paragraph 4.1 of this Schedule-L. It shall study the Safety Report for the Development Period and inspect the Project Highway to assess the adequacy of safety measures. The Safety Consultant shall complete the safety audit within a period of 4 (four) months and submit a Safety Report recommending a package of additional road safety measures, if any, that are considered essential for reducing accident hazards on the Project Highway. Such recommendations shall be processed, *mutatis mutandis,* and acted upon in the manner set forth in Paragraphs 4.3, 4.4 and 4.5 of this Schedule-L.

5.3 The Concessionaire shall make adequate arrangements during the Construction Period for the safety of workers and road Users in accordance with the guidelines of IRC for safety in construction zones, and notify the Authority and the Independent Engineer about such arrangements.

6 Safety measures during Operation Period

6.1 The Concessionaire shall develop, implement and administer a surveillance and safety programme for Users, including correction of safety violations and deficiencies and all other actions necessary to provide a safe environment in accordance with this Agreement.

6.2 The Concessionaire shall establish a Highway Safety Management Unit (the "**HSMU**") to be functional on and after COD, and designate one of its officers to be in-charge of the HSMU. Such officer shall have specialist knowledge and training in road safety and traffic engineering by having attended a course conducted by a reputed organisation on the subject.

6.3 The Concessionaire shall keep a copy of every FIR recorded by the Police with respect to any accident occurring on the Project Highway. In addition, the Concessionaire shall also collect data for all cases of accidents not recorded by the Police but where a vehicle rolled over or had to be towed away. The information so collected shall be summarised in the form prescribed by IRC/ MOSRTH for this purpose. The Concessionaire shall also record the exact location of each accident on a road map. The aforesaid data shall be submitted to the Authority at the conclusion of every quarter and to the Safety Consultant as and when appointed.

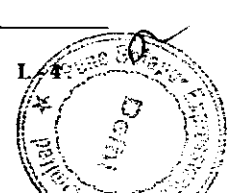
6.4 The Concessionaire shall submit to the Authority before the 31st (thirty first) May of each year, an annual report (in ten copies) containing, without limitation, a detailed listing and analysis of all accidents of the preceding Accounting Year and the measures taken by the Concessionaire pursuant to the provisions of Paragraph 6.1 of this Schedule-L for averting or minimising such accidents in future.

6.5 Once in every Accounting Year, a safety audit shall be carried out by the Safety Consultant to be appointed by the Authority. It shall review and analyse the annual report and accident data of the preceding year, and undertake an inspection of the Project Highway. The Safety Consultant shall complete the safety audit within a period of 1 (one) month and submit a Safety Report recommending specific improvements, if any, required to be made to the road, bridges, culverts, markings, signs, road furniture and Project Facilities, including cattle crossings and pedestrian

crossings. Such recommendations shall be processed, mutatis mutandis, and acted upon in the manner set forth in Paragraphs 4.3, 4.4 and 4.5 of this Schedule-L.

7 Costs and expenses

Costs and expenses incurred in connection with the Safety Requirements set forth herein, including the provisions of Paragraph 2 of this Schedule, shall be met in accordance with Article 18, and in particular, the remuneration of the Safety Consultant, safety audit, and costs incidental thereto, shall be met out of the Safety Fund.



SCHEDULE - M

(See Clause 19.5)

MONTHLY FEE STATEMENT

Project Highway: NH-9 Pune - Solapur (km 40.000 to km 144.400) **Month:**

Type of Vehicle	For Corresponding Month of Previous		For Preceding Month		For the Month Reported upon		
	No. of Vehicles	Fee Collected (in lakh Rs.)	No. of Vehicles	Fee Collected (in lakh Rs.)	Fee per Vehicle (in Rs.)	No. of Vehicles	Fee Collected (in lakh Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A Car							
B Mini Bus/ LCV							
C Bus							
D Mini Truck/ LCV							
E Truck							
F Heavy Truck							
G **Total**							

Note 1: The above statement does not include Local Traffic and vehicles travelling on Daily Passes or Monthly Passes

Note 2: Monthly Fee Statements for Monthly Passes and Daily Passes have been prepared separately in the above format and are enclosed.

Remarks, if any:

SCHEDULE - N

(See Clause 22.1)

WEEKLY TRAFFIC CENSUS

Project Highway:NH-9 Pune-Solapur (km 40.000 to km 144.400) Week ending:

Type of Vehicle	No. of vehicles using the Project Highway during		
	Corresponding week/last year	Preceding week	Week of report
(1)	(2)	(3)	(4)
A Fee paying Traffic A1 Car			
A2 Mini Bus/ LCV			
A3 Bus			
A4 Mini Truck/ LCV			
A5 Truck			
A6 Heavy Truck			
Total (A)			
B Local Traffic B1 Car			
Total (B)			
C Exempted Vehicles C1 Car			
C2 Mini Bus/ LCV			
C3 Bus			
C4 Mini Truck/ LCV			
C5 Truck			
C6 Tractor			
Total (C)			
D Total Traffic (A+B-C) D1 Car			
D2 Mini Bus/ LCV			
D3 Bus			
D4 Mini Truck/ LCV			
D5 Truck			
D6 Heavy Truck			
D7 Tractor			
Grand Total (E)			

Remarks, if any:

WEEKLY REPORT FOR WEIGH STATIONS

Project Highway: **Week ending:**

Type of Vehicle	Permitted Gross Vehicle Weight (Tonnes)	No. of Vehicles weighed (Sample size)	No. of Vehicles carrying load:			
			Within permissible limits	Up to 10% in excess	Over 10% and up to 20% in excess	Over 20% in excess
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A Mini Truck/ LCV						
B Truck						
C Heavy Truck						
D **Total**						

[**Note:** Sample size shall not be less than 200 trucks per week and 20 trucks per day, and should include a proportionate number of Heavy Trucks.

Remarks, if any:]

SCHEDULE - O

(See Clause 22.3.1)

TRAFFIC SAMPLING

1 Traffic sampling

The Authority may, in its discretion and at its own cost, undertake traffic sampling, pursuant to Clause 22.3, in order to determine the actual traffic on the Project Highway. Such traffic sampling shall be undertaken through the Independent Engineer in the manner set forth below.

2 Manual traffic count

The Independent Engineer shall employ the required number of enumerators who shall count, classify and record all the vehicles as they pass by, and divide the survey into fixed time periods. The count stations shall be located near the Toll Plaza on a straight section of the road with good visibility. The survey shall be conducted continuously for a minimum of 24 (twenty four) hours and maximum of 7 (seven) days at a time. The count period shall be 15 (fifteen) minutes with results summarised hourly.

3 Automatic traffic count

For automatic traffic count to be conducted on intermittent (non-continuous) basis, the Independent Engineer shall use suitable and standardised equipment to classify and record the range of vehicles passing through the Toll Plaza. For this purpose, the counter shall be checked with at least 100 (one hundred) vehicles, including all major vehicle types, over a range of speeds to ensure that all vehicles are being counted and classified correctly.

4 Variation between manual and automatic count

Average Daily Traffic (ADT) for each type of vehicle shall be determined separately by the aforesaid two methods and in the event that the number of vehicles in any category, as counted by the manual method, varies by more than 1% (one per cent) of the number of such vehicles as counted by the automatic method, the manual and automatic count of such category of vehicles shall be repeated, and in the event of any discrepancy between the two counts in the second enumeration, the average thereof shall be deemed to be the actual traffic. For the avoidance of doubt, it is expressly agreed that the Authority may, in consultation with the Concessionaire, adopt modified or alternative processes of traffic sampling for improving the reliability of such sampling.

SCHEDULE - P

(See Clause 23.1)

SELECTION OF INDEPENDENT ENGINEER

1 Selection of Independent Engineer

1.1 The provisions of Part II of the Standard Bidding Documents for Consultancy Assignments: Time Based (Volume V) issued by the Ministry of Finance, GOI in July, 1997 shall apply, *mutatis mutandis*, for invitation of bids and evaluation thereof save as otherwise provided herein.

1.2 The Authority shall invite expressions of interest from consulting engineering firms or bodies corporate to undertake and perform the duties and functions set forth in Schedule-Q and thereupon shortlist 10 (ten) qualified firms in accordance with pre-determined criteria. The Authority shall convey the aforesaid list of firms to the Concessionaire for scrutiny and comments, if any. The Concessionaire shall be entitled to scrutinise the relevant records of the Authority to ascertain whether the selection of firms has been undertaken in accordance with the prescribed procedure and it shall send its comments, if any, to the Authority within 15 (fifteen) days of receiving the aforesaid list of firms. Upon receipt of such comments, if any, the Authority shall, after considering all relevant factors, finalise and constitute a panel of 10 (ten) firms (the "**Panel of Firms**") and convey its decision to the Concessionaire.

1.3 The Authority shall invite the aforesaid firms in the Panel of Firms to submit their respective technical and financial offers, each in a separate sealed cover. All the technical bids so received shall be opened and pursuant to the evaluation thereof, the Authority shall shortlist 3 (three) eligible firms on the basis of their technical scores. The financial bids in respect of such 3 (three) firms shall be opened and the order of priority as among these firms shall be determined on the basis of a weighted evaluation where technical and financial scores shall be assigned respective weights of 80:20.

2 Fee and expenses

2.1 In determining the nature and quantum of duties and services to be performed by the Independent Engineer during the Development Period and Construction Period, the Authority shall endeavour that payments to the Independent Engineer on account of fee and expenses do not exceed 2% (two per cent) of the Total Project Cost. Payments not exceeding such 2% (two per cent) shall be borne equally by the Authority and the Concessionaire in accordance with the provisions of this Agreement and any payments in excess thereof shall be borne entirely by the Authority.

2.2 The nature and quantum of duties and services to be performed by the Independent Engineer during the Operation Period shall be determined by the Authority in conformity with the provisions of this Agreement and with due regard for economy in expenditure. All payments made to the Independent Engineer on account of fee and expenses during the Operation Period, shall be borne equally by the Authority and the Concessionaire.

3 Constitution of fresh panel

Not later than three years from the date of this Agreement, and every three years thereafter, the Authority shall prepare a fresh panel of firms in accordance with the criteria set forth in this Schedule-P; provided that the Authority may, at any time, prepare a fresh panel with prior written consent of the Concessionaire.

4 Appointment of government entity as Independent Engineer

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

SCHEDULE - Q

(See Clause 23.2.1)

TERMS OF REFERENCE FOR INDEPENDENT ENGINEER

1 Scope

1.1 These Terms of Reference for the Independent Engineer (**the "TOR"**) are being specified pursuant to the Concession Agreement dated *** (the **"Agreement"**), which has been entered into between the Authority and M/s Pune Solapur Expressways Private Limited (the **"Concessionaire"**) for Four Laning of **Pune - Solapur Section of NH - 9 from km 40.000 to km 144.400 in the State of Maharashtra** on build, operate and transfer (DBFOT) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 This TOR shall apply to construction, operation and maintenance of the Four-Lane Project Highway.

2 Definitions and interpretation

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

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

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

3 Role and functions of the Independent Engineer

3.1 The role and functions of the Independent Engineer shall include the following:

(i) review of the Drawings and Documents as set forth in Paragraph 4;

(ii) review, inspection and monitoring of Construction Works as set forth in Paragraph 5;

(iii) conducting Tests on completion of construction and issuing Completion/ Provisional Certificate as set forth in Paragraph 5;

(iv) review, inspection and monitoring of O&M as set forth in Paragraph 6;

(v) review, inspection and monitoring of Divestment Requirements as set forth in Paragraph 7;

(vi) determining, as required under the Agreement, the costs of any works or services and/or their reasonableness;

(vii) determining, as required under the Agreement, the period or any extension

thereof, for performing any duty or obligation;

(viii) assisting the Parties in resolution of disputes as set forth in Paragraph 9; and

(ix) undertaking all other duties and functions in accordance with the Agreement.

3.2 The Independent Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

4 Development Period

4.1 During the Development Period, the Independent Engineer shall undertake a detailed review of the Drawings to be furnished by the Concessionaire along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys and traffic surveys. The Independent Engineer shall complete such review and send its comments/observations to the Authority and the Concessionaire within 15 (fifteen) days of receipt of such Drawings. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

4.2 The Independent Engineer shall review any modified Drawings or supporting Documents sent to it by the Concessionaire and furnish its comments within 7 (seven) days of receiving such Drawings or Documents.

4.3 The Independent Engineer shall review the Drawings sent to it by the Safety Consultant in accordance with Schedule-L and furnish its comments thereon to the Authority and the Concessionaire within 7 (seven) days of receiving such Drawings. The Independent Engineer shall also review the Safety Report and furnish its comments thereon to the Authority within 15 (fifteen) days of receiving such report.

4.4 The Independent Engineer shall review the detailed design, construction methodology, quality assurance procedures and the procurement, engineering and construction time schedule sent to it by the Concessionaire and furnish its comments within 15 (fifteen) days of receipt thereof.

4.5 Upon reference by the Authority, the Independent Engineer shall review and comment on the EPC Contract or any other contract for construction, operation and maintenance of the Project Highway, and furnish its comments within 7 (seven) days from receipt of such reference from the Authority.

5 Construction Period

5.1 In respect of the Drawings, Documents and Safety Report received by the Independent Engineer for its review and comments during the Construction Period, the provisions of Paragraph 4 shall apply, *mutatis mutandis*.

5.2 The Independent Engineer shall review the monthly progress report furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 7 (seven) days of receipt of such report.

5.3 The Independent Engineer shall inspect the Construction Works and the Project Highway once every month, preferably after receipt of the monthly progress report from the Concessionaire, but before the 20th (twentieth) day of each month in any case, and make out a report of such inspection (the **"Inspection Report"**) setting forth an overview of the status, progress, quality and safety of construction, including the work methodology adopted, the materials used and their sources, and conformity of Construction Works with the Scope of the Project and the Specifications and Standards. In a separate section of the Inspection Report, the Independent Engineer shall describe in reasonable detail the lapses, defects or deficiencies observed by it in the construction of the Project Highway. The Inspection Report shall also contain a review of the maintenance of the existing lanes in conformity with the provisions of the Agreement. The Independent Engineer shall send a copy of its Inspection Report to the Authority and the Concessionaire within 7 (seven) days of the inspection.

5.4 The Independent Engineer may inspect the Project Highway more than once in a month if any lapses, defects or deficiencies require such inspections.

5.5 For determining that the Construction Works conform to Specifications and Standards, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests on a sample basis, to be specified by the Independent Engineer in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 5.5, 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 MOSRTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance. The Independent Engineer shall issue necessary directions to the Concessionaire for ensuring that the tests are conducted in a fair and efficient manner, and shall monitor and review the results thereof.

5.6 The sample size of the tests, to be specified by the Independent Engineer under Paragraph 5.5, shall comprise 10% (ten per cent) of the quantity or number of tests prescribed for each category or type of tests in the Quality Control Manuals; provided that the Independent Engineer may, for reasons to be recorded in writing, increase the aforesaid sample size by up to 10% (ten per cent) for certain categories or types of tests.

5.7 The timing of tests referred to in Paragraph 5.5, and the criteria for acceptance/ rejection of their results shall be determined by the Independent 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 Concessionaire for its own quality assurance in accordance with Good Industry Practice.

5.8 In the event that the Concessionaire carries out any remedial works for removal or rectification of any defects or deficiencies, the Independent Engineer shall require the Concessionaire to carry out, or cause to be carried out, tests to determine that such remedial works have brought the Construction Works into conformity with the Specifications and Standards, and the provisions of this Paragraph 5 shall apply to such tests.

5.9 In the event that the Concessionaire fails to achieve any of the Project Milestones, the

Independent Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Independent Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Concessionaire 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 Concessionaire, the Independent Engineer shall review the same and send its comments to the Authority and the Concessionaire forthwith.

5.10 If at any time during the Construction Period, the Independent Engineer determines that the Concessionaire has not made adequate arrangements for the safety of workers and Users in the zone of construction or that any work is being carried out in a manner that threatens the safety of the workers and the Users, it shall make a recommendation to the Authority forthwith, identifying the whole or part of the Construction Works that should be suspended for ensuring safety in respect thereof.

5.11 In the event that the Concessionaire carries out any remedial measures to secure the safety of suspended works and Users, it may, by notice in writing, require the Independent Engineer to inspect such works, and within 3 (three) days of receiving such notice, the Independent Engineer shall inspect the suspended works and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

5.12 If suspension of Construction Works is for reasons not attributable to the Concessionaire, the Independent Engineer shall determine the extension of dates set forth in the Project Completion Schedule, to which the Concessionaire is reasonably entitled, and shall notify the Authority and the Concessionaire of the same.

5.13 The Independent Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-I and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 5.13 and all matters incidental thereto, the Independent Engineer shall act under and in accordance with the provisions of Article 14 and Schedule-I.

5.14 Upon reference from the Authority, the Independent Engineer shall make a fair and reasonable assessment of the costs of providing information, works and services as set forth in Article 16 and certify the reasonableness of such costs for payment by the Authority to the Concessionaire.

5.15 The Independent Engineer shall aid and advise the Concessionaire in preparing the Maintenance Manual.

6 Operation Period

6.1 In respect of the Drawings, Documents and Safety Report received by the Independent Engineer for its review and comments during the Operation Period, the provisions of Paragraph 4 shall apply, *mutatis mutandis*.

6.2 The Independent Engineer shall review the annual Maintenance Programme furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 15 (fifteen) days of receipt of the Maintenance Programme.

6.3 The Independent Engineer shall review the monthly status report furnished by the Concessionaire and send its comments thereon to the Authority and the Concessionaire within 7 (seven) days of receipt of such report.

6.4 The Independent Engineer shall inspect the Project Highway once every month, preferably after receipt of the monthly status report from the Concessionaire, but before the 20th (twentieth) day of each month in any case, and make out an O&M Inspection Report setting forth an overview of the status, quality and safety of O&M including its conformity with the Maintenance Requirements and Safety Requirements. In a separate section of the O&M Inspection Report, the Independent Engineer shall describe in reasonable detail the lapses, defects or deficiencies observed by it in O&M of the Project Highway. The Independent Engineer shall send a copy of its O&M Inspection Report to the Authority and the Concessionaire within 7 (seven) days of the inspection.

6.5 The Independent Engineer may inspect the Project Highway more than once in a month, if any lapses, defects or deficiencies require such inspections.

6.6 The Independent Engineer shall in its O&M Inspection Report specify the tests, if any, that the Concessionaire 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 Concessionaire in this behalf.

6.7 In respect of any defect or deficiency referred to in Paragraph 3 of Schedule-K, the Independent 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.

6.8 The Independent Engineer shall determine if any delay has occurred in completion of repair or remedial works in accordance with the Agreement, and shall also determine the Damages, if any, payable by the Concessionaire to the Authority for such delay.

6.9 The Independent Engineer shall examine the request of the Concessionaire for closure of any lane(s) of the carriageway for undertaking maintenance/repair thereof, keeping in view the need to minimise disruption in traffic and the time required for completing such maintenance/repair in accordance with Good Industry Practice. It shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Concessionaire. Upon expiry of the permitted period of closure, the Independent Engineer shall monitor the re-opening of such lane(s), and in case of delay, determine the Damages payable by the Concessionaire to the Authority under Clause 17.7.

6.10 The Independent Engineer shall monitor and review the curing of defects and deficiencies by the Concessionaire as set forth in Clause 19.4.

6.11 In the event that the Concessionaire notifies the Independent Engineer of any modifications that it proposes to make to the Project Highway, the Independent Engineer shall review the same and send its comments to the Authority and the Concessionaire within 15 (fifteen) days of receiving the proposal.

6.12 The Independent Engineer shall undertake traffic sampling, as and when required by the Authority, under and in accordance with Article 22 and Schedule-O.

7 Termination

7.1 At any time, not earlier than 90 (ninety) days prior to Termination but not later than 10 (ten) days prior to such Termination, the Independent Engineer shall, in the presence of a representative of the Concessionaire, inspect the Project Highway for determining compliance by the Concessionaire with the Divestment Requirements set forth in Clause 38.1 and, if required, cause tests to be carried out at the Concessionaire's cost for determining such compliance. If the Independent Engineer determines that the status of the Project Highway is such that its repair and rectification would require a larger amount than the sum set forth in Clause 39.2, it shall recommend retention of the required amount in the Escrow Account and the period of retention thereof.

7.2 The Independent Engineer shall inspect the Project Highway once in every 15 (fifteen) days during a period of 90 (ninety) days after Termination for determining the liability of the Concessionaire under Article 39, in respect of the defects or deficiencies specified therein. If any such defect or deficiency is found by the Independent Engineer, it shall make a report in reasonable detail and send it forthwith to the Authority and the Concessionaire.

8 Determination of costs and time

8.1 The Independent Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

8.2 The Independent Engineer shall determine the period, or any extension thereof, that is required to be determined by it under the Agreement.

9 Assistance in Dispute resolution

9.1 When called upon by either Party in the event of any Dispute, the Independent Engineer shall mediate and assist the Parties in arriving at an amicable settlement.

9.2 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 Independent Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

10 Other duties and functions

The Independent Engineer shall perform all other duties and functions specified in the Agreement.

11 Miscellaneous

11.1 The Independent Engineer shall notify its programme of inspection to the Authority and to the Concessionaire, who may, in their discretion, depute their respective representatives to be present during the inspection.

11.2 A copy of all communications, comments, instructions, Drawings or Documents sent

by the Independent Engineer to the Concessionaire pursuant to this TOR, and a copy of all the test results with comments of the Independent Engineer thereon shall be furnished by the Independent Engineer to the Authority forthwith.

11.3 The Independent Engineer shall obtain, and the Concessionaire shall furnish in two copies thereof, all communications and reports required to be to submitted, under this Agreement, by the Concessionaire to the Independent Engineer, whereupon the Independent Engineer shall send one of the copies to the Authority along with its comments thereon.

11.4 The Independent 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.

11.5 Upon completion of its assignment hereunder, the Independent Engineer shall duly classify and list all Drawings, Documents, results of tests and other relevant records, and hand them over to the Authority or such other person as the Authority may specify, and obtain written receipt thereof. Two copies of the said documents shall also be furnished in micro film form or in such other medium as may be acceptable to the Autority.

SCHEDULE –R

(See Clause 27.1.1)

FEE NOTIFICATION

MINISTRY OF SHIPPING, ROAD TRANSPORT AND HIGHWAYS

(Department of Road Transport and Highways)

NOTIFICATION

New Delhi, the * 20****

S.O. *** Whereas, by the notification of the Government of India in the Ministry of Shipping, Road Transport and Highways, number ***** dated the *****, issued under section 11 of the National Highways Authority of India Act, 1988 (68 of 1988), the Central Government has entrusted the section of national highway from **km 40.000 to km 144.400 (Pune – Solapur Section) of National Highway No. 9 in the State of Maharashtra** to the National Highways Authority of India (hereinafter referred to as the "Authority");

And whereas, pursuant to the provisions of section 14 of the said Act, the Authority has entered into an agreement with M/s PUNE SOLAPUR EXPRESSWAYS PRIVATE LIMITED having its Registered Office at C/o TATA Services Limited, Jeevan Bharati Tower I, 10th Floor, 124 Connaught Circus, New Delhi-110001, (hereinafter referred to as "Concessionaire") for the development of the Four-Laning of **Pune – Solapur** Section of NH – 9 from **km 40.000 to km 144.400)** in the State of **Maharashtra** (hereinafter referred to as the said section) of the National Highway No. 9 on Design, Build, Finance, Operate and Transfer (DBFOT) basis;

Now, therefore, in exercise of the powers conferred by section 8A of the National Highways Act, 1956 (48 of 1956), read with Rule 3 of the National Highways Fee (Determination of Rates and Collection) Rules, 2008, the Central Government, having regard to the expenditure involved in building, maintenance, management and operation of the said section of the said national highway, interest on the capital invested, reasonable return, the volume of traffic and the period of said agreement between the Authority and the Concessionaire, hereby notifies that there shall be levied and collected fees on mechanical vehicles for the use of the stretch **km 40.000 to km 144.400 in the State of Maharashtra of Pune - Solapur Section of National Highway No. 9** at the rates specified in the aforesaid Rules and authorises the said Concessionaire to collect and retain the said fees on and from the date of commercial operation of the said section of national highway, subject to and in accordance with the said Rules and the provisions of the aforesaid agreement.

The fee levied and collected hereunder shall be due and payable at the following Toll Plazas for the distance specified for each such Toll Plaza:

S No.	Location of Toll Plaza	Length (in km) for which Fee payable.
1	At Km 65.000	62.50
2	At Km140.000	40.35 (excluding 7.2 Km Indapur Bypass)

In addition to above, the levied and collected hereunder for the permanent bridge/bypass/tunnel specified below shall be due and payable at the following Toll Plazas:

S No.	Location of Toll Plaza	Nature of Structure	Cost (in Rs. Crore)
1	At Km 140.000	Indapur Bypass	62.00

[F.No. RW/NH-*****]

(Name)

Deputy Secretary

Government of India

1. **Short title and commencement.** - (1) These rules may be called the National Highways Fee (Determination of Rates and Collection) Rules, 2008.

(2) They shall come into force on the date of their publication in the Official Gazette.

(3) They shall not apply to agreements and contracts executed and bids invited prior to the publication of these rules.

2. **Definitions.**– (1) In these rules, unless the context otherwise requires,-

(a) **"Act"** means the National Highways Act, 1956;

(b) **"base year"** means the period from 1st April 2007 to 31st March 2008;

(c) **"bypass"** means a section of the national highway bypassing a town or city;

(d) **"concessionaire"** means a person with whom an agreement has been entered into under section 8A of the Act;

(e) **"elevated highway"** means any section of national highway raised above ground level through support of peirs or columns;

(f) "**executing authority**" means an officer or authority notified by the Central Government under section 5 of the Act;

(g) "**expressway**" means a national highway having a divided carriageway suitable for high speed traffic and with control of access;

(h) **"financial year"** means the year commencing on the 1st day of April of a year and ending on 31st day of March of the succeeding year;

(i) "**gross vehicle weight**" in respect of any vehicle means the total weight of the vehicle and load certified and registered by the registering authority as permissible for that vehicle under the Motor Vehicles Act, 1988 (59 of 1988);

(j) "**lane**" means a lane forming part of the main carriageway and having a minimum width of three meters and fifty centimeters;

(k) "**mechanical vehicle**" means any vehicle driven under its own power including a motor vehicle as defined under the Motor Vehicles Act,1988;

(l) "**notification**" means a notification published in the Official Gazette;

(m) **"private investment project"** means a project relating to section of national highway, permanent bridge, bypass or tunnel, as the case may be, for which an agreement is entered into with a concessionaire ;

(n) **"public funded project"** means a project which is not a private investment project, as defined in clause (m) above and includes a private investment project in respect of which the agreement has expired;

(o) **"toll plaza"** means any building, structure or booth made for collection of fee.

(2) Words and expressions used herein and not defined but defined in the National Highways Authority of India Act, 1988 shall have the meanings respectively assigned to them in that Act.

3. **Levy of fee.**- (1) The Central Government may by notification, levy fee for use of any section of national highway, permanent bridge, bypass or tunnel forming part of the national highway, as the case may be, in accordance with the provisions of these rules:

Provided that the Central Government may, by notification, exempt any section of national highway, permanent bridge, bypass or tunnel constructed through a public funded project from levy of such fee or part thereof, and subject to such conditions as may be specified in that notification.

(2) The collection of fee levied under sub-rule (1) of Rule 3, shall commence within forty- five days from the date of completion of the section of national highway, permanent bridge, bypass or tunnel, as the case may be, constructed through a public funded project.

(3) In case of private investment project, the collection of fee levied under sub-rule (1) shall be made in accordance with the terms of the agreement entered into by the concessionaire.

(4) No fee shall be levied for the use of the section of national highway, permanent bridge, bypass or tunnel, as the case may be, by two wheelers, three wheelers, tractors and animal drawn vehicles:

Provided that three wheelers, tractors and animal-drawn vehicles shall not be allowed to use the section of national highway, permanent bridge, bypass or tunnel, as the case may be, where a service road or alternative road is available in lieu of the said national highway, permanent bridge, bypass or tunnel:

Provided further that where service road or alternative road is available and the owner, driver or the person in charge of a two wheeler is making use of the section of national

highway, permanent bridge, bypass or tunnel, as the case may be, he or she shall be charged fifty per cent. of the fee levied on a car.

Explanation1.- For the purposes of this rule,- (a) "alternative road" means such other road, the carriageway of which is more than ten meters wide and the length of which does not exceed the corresponding length of such section of national highway by twenty per cent. thereof;

(b) "service road" means a road running parallel to a section of the national highway which provides access to the land adjoining such section of the national highway.

(5) The fee notified by the Central Government under these rules shall be rounded off and levied in multiple of the nearest rupees five.

4. **Base rate of fee.** - (1) The rate of fee for use of the section of national highway, permanent bridge, bypass or tunnel constructed through public funded project or private investment project shall be identical.

(2) The rate of fee for use of a section of national highway of four or more lanes shall, for the base year 2007-08, be the product of the length of such section multiplied by the following rates, namely:-

Type of Vehicle	Base rate of fee per km (in rupees)
Car, Jeep, Van or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Mini Bus	1.05
Bus or Truck	2.20
Heavy Construction Machinery(HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (three to six axles)	3.45
Oversized Vehicles (seven or more axles)	4.20

Explanation.- For the purposes of this rule,-

(a) "car" or **"jeep"** or **"van"** or **"light motor vehicle"** means any mechanical vehicle the gross vehicle weight of which does not exceed seven thousand five hundred kilograms or the registered passenger carrying capability as specified in the certificate of registration issued under the Motor Vehicles Act, 1988 does not exceed twelve excluding the driver;

(b) **"light commercial vehicle"** or **"light goods vehicle"** or **"mini bus"** means any mechanical vehicle with a gross vehicle weight exceeding seven thousand five hundred kilograms but less than twelve thousand kilograms or the registered passenger carrying capability as specified in the certificate of registration issued under the Motor Vehicles Act, 1988, exceeds twelve but does not exceed thirty two excluding the driver;

(c) **"truck"** or **"bus"** means any mechanical vehicle with a gross vehicle weight exceeding twelve thousand kilograms but less than twenty thousand kilograms or the registered passenger carrying capability as specified in the certificate of registration issued under the Motor Vehicles Act, 1988, exceeds thirty two, excluding the driver;

(d) **"heavy construction machinery" or "earth moving equipment" or "multi axle vehicle "** means heavy construction machinery or earth moving equipment or mechanical vehicle including a multi axle vehicle with three to six axles or vehicle with a gross vehicle weight exceeding twenty thousand kilograms but less than sixty thousand kilogram; and

(e) **"oversized vehicle "** means any mechanical vehicle having seven or more axles or vehicle with a gross vehicle weight exceeding sixty thousand kilograms.

(3) The rate of fee for use of a section of national highway, having two lanes and on which the average investment for up gradation has exceeded rupees one crore per kilometer, shall be sixty per cent. of the rate of fee specified under sub-rule (2) of Rule 4.

(4) The rate of fee for use of permanent bridge, bypass or tunnel constructed with the cost exceeding rupees ten crore, shall, for the base year 2007-08, be as follows:-

Base rate of fee (rupees per vehicle per trip)					
Cost of permanent bridge, bypass or tunnel (rupees in crore)	Car, Jeep, Van or Light Motor Vehicle	Light Commercial Vehicle, Light Goods Vehicle or Mini Bus	Truck or Bus	HCM, EME or MAV	Oversized Vehicle
10 to 15	5	7.50	15	22	30
For every additional rupees five crore or part thereof, exceeding	1	1.50	3	4.50	6

rupees fifteen crore and up to rupees one hundred crore.					
For every additional rupees five crore or part thereof, exceeding rupees one hundred crore and upto rupees two hundred crore.	0.75	1.15	2.25	3.40	4.50
For every additional rupees five crore or part thereof, exceeding rupees two hundred crore.	0.50	0.75	1.50	2.25	3

Provided that while computing fee for the section of national highway on which a permanent bridge, bypass or tunnel costing rupees fifty crore or more is situated, the length of such permanent bridge, bypass or tunnel shall be excluded from the length of such section of national highway and fee shall be levied at the rates specified for such permanent bridge, bypass and tunnel:

Provided further that where the cost of such permanent bridge, bypass or tunnel, as the case may be, is less than rupees fifty crore, and the said permanent bridge, bypass or tunnel, form part of the section of national highway, then instead of above rate of fee, the rate of fee specified under sub-rule (2) of Rule 4 shall be applicable for such permanent bridge, bypass or tunnel.

Explanation.- For the purpose of this sub-rule,-

(a) the cost for private investment project, shall be the cost as assessed by the executing authority prior to invitation of bids from the concessionaire;

(b) the cost for public funded project shall be the cost as assessed by the executing authority six months prior to completion thereof.

5. Annual revision of rate of fee.-(1) The rates specified under rule 4 shall be increased without compounding, by three per cent. each year with effect from the 1st day of April, 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

(2) The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index between the week ending on January 6, 2007 (i.e. 208.7) and the week ending on or immediately after January 1 of the year in which such revision is undertaken but such revision shall be restricted to forty per cent of the increase in wholesale price index.

(3) The formula for determining the applicable rate of fee shall be as follows:-

$$\text{Applicable rate of fee} = \text{base rate} + \text{base rate} \times \left\{ \frac{\text{WPI A} - \text{WPI B}}{\text{WPI B}} \right\} \times 0.4$$

Explanation.- for the purposes of this sub-rule ,-

(a) applicable rate of fee shall be the rate payable by the user;

(b) base rate shall be the rate specified in rule 4 read with sub- rule (1);

(c) WPI A means the wholesale price index of the week ending on or subsequent to 1st January immediately preceding the date of revision under these rules; and

(d) WPI B means the wholesale price index of the week ending on 6th January, 2007 i.e. 208.7.

Illustration:

If the revision is to be made for the year 2008-09 by applying the wholesale price index of the week ending on 5th January 2008 (i.e. 216.6), then the rate for car, jeep or van will be 0.6796 as computed below:

$$\text{Applicable rate of fee: } 0.6695 + 0.6695 \times \left\{ \frac{216.6 - 208.7}{208.7} \right\} \times 0.4 = 0.6796$$

(4) Annual revision of rate of fee under this rule shall be effective from first of April every year.

6. **Collection of fee.-** (1) Fee levied under these rules shall be collected by the Central Government or the executing authority or the concessionaire, as the case may be, at the toll plaza.

(2) Every driver, owner or person in charge of a mechanical vehicle shall for the use of the section of national highway, permanent bridge, bypass or tunnel, before crossing the toll plaza, pay the fee specified under these rules.

(3) The fee collected under these rules shall be paid either in cash or through smart card or on board unit (transponder) or any other like device:

Provided that no additional charges shall be realised for making the payment of fee by use of a smart card or on board unit (transponder) or any other such device.

(4) Any driver, owner or person in charge of a mechanical vehicle who opts for the installation of on board unit (transponder) or any other such device for payment of fee, shall deposit a refundable security equivalent to the cost of the equipment with the Central Government, the executing authority or the concessionaire, as the case may be, for such installation and no interest shall accrue on such security deposit.

(5) The person receiving such fee under sub-rule (2) of Rule 6, shall issue to the driver, owner or person in charge of mechanical vehicle a receipt, specifying therein the date and time of such receipt of fee, total amount received, and the class of vehicle for which the fee has been received:

Provided that where the fee is paid through smart card or on board unit (transponder) or any other such device, a receipt shall be issued on demand only.

(6) The fee shall be collected in perpetuity by the Central Government or the executing authority, as the case may be, and for a specified period in accordance with the terms of the agreement entered into by the concessionaire.

(7) In respect of public funded projects the fee levied under these rules shall be collected by the Central Government, or the executing authority, as the case may be, through its own officials or through a contactor.

7. **Remittance and appropriation of fee.**- (1) In case of public funded projects, the fee collected under the provisions of these rules by every executing authority shall be remitted to the Central Government:

Provided that the Central Government may by notification allow any or all executing authorities to appropriate the whole or any part of the fee for such purposes and subject to such conditions as may be specified in the said notification:

Provided further that in case of private investment projects, the fee collected under the provisions of these rules shall be appropriated by the concessionaire in accordance with the provisions of and for the performance of its obligations under the agreement entered into by such concessionaire.

(2) Every executing authority shall remit to the Central Government, the amount of fee collected over and above the amount permitted to be appropriated by the executing authority under sub-rule (1) of Rule 7, within ninety days from the date of the closing of the financial year along with an annual return showing the amount collected and the expenditure incurred on collection of fee, including the administrative and management expenses.

(3) The Central Government shall by notification determine the administrative and management expenses which may be allowed to be deducted and retained by the executing authority.

8. **Location of toll plaza.**- (1) The executing authority or the concessionaire, as the case may be, shall establish a toll plaza beyond a distance of ten kilometers from a municipal or local town area limits:

Provided that the executing authority may, for reasons to be recorded in writing, locate or allow the concessionaire to locate a toll plaza within a distance of ten kilometers of such municipal or local town area limits, but in no case within five kilometers of such municipal or local town area limits:

Provided further that where a section of the national highway, permanent bridge, bypass or tunnel, as the case may be, is constructed within the municipal or town area limits or within five kilometers from such limits, primarily for use of the residents of such municipal or town

area, the toll plaza may be established within the municipal or town area limits or within a distance of five kilometers from such limits.

(2) Any other toll plaza on the same section of national highway and in the same direction shall not be established within a distance of sixty kilometers:

Provided that where the executing authority deems necessary, it may for reasons to be recorded in writing, establish or allow the concessionaire to establish another toll plaza within a distance of sixty kilometers:

Provided further that a toll plaza may be established within a distance of sixty kilometers from another toll plaza if such toll plaza is for collection of fee for a permanent bridge, bypass or tunnel.

9. **Discounts**.-(1) The executing authority or the concessionaire, as the case may be, shall upon request provide a pass for multiple journeys to cross a toll plaza within the specified period at the rates specified in sub-rule (2) of Rule 9.

(2) A driver, owner or person in charge of a mechanical vehicle who makes use of the section of national highway, permanent bridge, bypass or tunnel, may opt for such pass and he or she shall have to pay the fee in accordance with the following rates, namely:-

Amount payable	**Maximum number of one way journeys allowed**	**Period of validity**
One and half times of the fee for one way journey	Two	Twenty four hours from the time of payment
Two-third of amount of the fee payable for fifty single journeys.	Fifty	One month from date of payment

(3) A person who owns a mechanical vehicle registered for non-commercial purposes and uses it as such for commuting on a section of national highway, permanent bridge, bypass or tunnel, may obtain a pass, on payment of fee at the base rate for the year 2007-2008 of rupees one hundred and fifty per calendar month and revised annually in accordance with rule 5, authorising it to cross the toll plaza specified in such pass:

Provided that such pass shall be issued only if such driver, owner or person in charge of such mechanical vehicle resides within a distance of twenty kilometers from the toll plaza specified by such person and the use of such section of national highway, permanent bridge, bypass or tunnel, as the case may be, does not extend beyond the toll plaza next to the specified toll plaza.

Provided further that no such pass shall be issued if a service road or alternative road is available for use by such driver, owner or person in charge of a mechanical vehicle.

(4) No pass shall be issued or fee collected from a driver, owner or person in charge of a mechanical vehicle that uses part of the section of a national highway and does not cross a toll plaza.

10. Rate of fee for overloading.- (1) Without prejudice to the liability of the driver, owner or a person in charge of a mechanical vehicle under any law for the time being in force, a mechanical vehicle which is loaded in excess of the permissible load specified for its category under sub-rule (2) of rule 4, shall be liable to pay fee at such rate which is applicable for the next higher category of mechanical vehicles:

Provided that the payment of such fee for overloading shall not entitle a driver or owner or a person in charge of a mechanical vehicle to make use of such national highway and his or her vehicle shall be prevented from using the national highway or crossing the toll plaza until the excess load has been removed from such mechanical vehicle.

(2) The weight of a mechanical vehicle, as recorded at a weighbridge installed at the toll plaza, shall be the basis for levying the fee for overloading under this rule:

Provided that where no weighbridge has been installed at the toll plaza, no fee for overloading shall be levied and collected under this rule and the driver, owner or person incharge of the mechanical vehicle shall be liable to pay fee applicable for such vehicle only.

11. Exemption from payment of fee.- (1) No fee shall be levied and collected from a mechanical vehicle,-

(a) transporting and accompanying,-

(i) the President of India;

(ii) the Vice-President of India;

(iii) the Prime-Minister of India;

(iv) the Chief Justice of India;

(v) the Governor;

(vi) the Lieutenant Governor;

(vii) the Union Minister;

(viii) the Chief Minister;

(ix) the Judge of Supreme Court;

(x) the Chairman of the Council of State;

(xi) the Speaker of the House of People;

(xii) the Chairman of the Legislative Council of the State;

(xiii) the Speaker of the Legislative Assembly of the State;

(xiv) the Chief Justice of High Court;

(xv) the Judge of High Court;

(xvi) Ministers of States; and

(xvii) Foreign dignitaries on State visit.

(b) used for official purposes by,-

(i) the Ministry of Defence including those which are eligible for exemption in accordance with the provisions of the Indian Toll (Army and Air Force) Act, 1901 and rules made thereunder, as extended to Navy also;

(ii) the Central and State armed forces in uniform including para military forces and police;

(iii) an executive Magistrate;

(iv) a fire-fighting department or organisation;

(v) the National Highway Authority or any other organisation or person using such vehicle for inspection, survey, construction or operation and maintenance thereof; and

(c) used as ambulance.

12. Display of Information.- (1)The executing authority or the concessionaire, as the case may be, shall publish a notice specifying the amount of fee to be charged from the mechanical vehicle, in at least one Newspaper, each in English and vernacular language, having a wide circulation in such area.

(2) The executing authority shall prominently display in Hindi and English one thousand meters ahead of the toll plaza and in English and local language five hundred meters ahead of the toll plaza,-

(i) the amount of fee payable for each class of vehicles and the discounts available under rule 9;

(ii) the categories of vehicles exempted from payment of fee; and

(iii) the name, address and telephone or contact number of the executing authority or the concessionaire, as the case may be.

(3) The height of the display boards, their quality and size of lettering shall be clearly visible and legible to the users.

13. Unauthorised collection.- (1) An officer authorised by the Central Government or by the executing authority, as the case may be, may assess the excess fee collected, if any, by the executing authority or the concessionaire, as the case may be, and recover the same from such authority or concessionaire , along with an additional sum equal to twenty five per cent. of the excess fee collected:

Provided that no recovery of such excess fee shall be made unless an opportunity of hearing has been given to the executing authority or concessionaire, as the case may be.

(2) Any driver, owner or person incharge of a mechanical vehicle aggrieved by unauthorised collection of fee, may lodge a complaint with the officer authorised by the Central Government or the executing authority, as the case may be, in this behalf, who shall after hearing the parties pass an order on such complaint for refund of excess payment and damages for the inconvenience suffered by such user within thirty days.

14. Failure to pay fee.- (1) If any driver, owner or person in charge of a mechanical vehicle does not pay or refuses to pay the fee for use of national highway, permanent bridge, bypass or tunnel, his or her vehicle shall not be allowed to use such section of national highway, permanent bridge, bypass or tunnel and in case such vehicle obstructs the normal flow of traffic, the executing authority or the concessionaire, as the case may be, may get such obstructing vehicle removed from the national highway, permanent bridge, bypass or tunnel, as the case may be.

(2) Where the driver or the person in charge of a mechanical vehicle refuses or fails to pay the fee levied under these rules, the same shall be recovered from the registered owner of the mechanical vehicle.

(3) Where the Central Government, executing authority or the concessionaire, as the case may be, has reason to believe that a mechanical vehicle is plying on a section of the national highway, permanent bridge, bypass or tunnel without payment of fee due, it may stop such vehicle for the purpose of verifying the payment thereof and collect the fee due from such vehicle.

15. Power of Central Government to verify records.- An officer duly authorised by the Central Government or the executing authority, as the case may be shall have the power to verify the collection of fee, and inspect any document, records, other information, receipts or reports of the executing authority or the concessionaire, as the case may be.

16. Collection of fee in respect of Private Investment Project.- (1) The fee levied under the provisions of sub-rule (3) of rule 3 shall be collected by the concessionaire till its agreement is in force.

(2) On and from the date of expiry of the agreement specified under sub-rule (3) of rule 3, the fee levied shall be collected by the Central Government or the executing authority, as the case may be.

17. Bar for installation of additional barrier.- No barrier shall be installed at any place, other than at the toll plaza, except with the prior permission in writing of the Central Government or the executing authority, as the case may be, who after being satisfied that there is evasion of fee, may allow on such terms and conditions as it may impose, the installation of such additional barrier by the Central Government, the executing authority or the concessionaire, as the case may be, within ten kilometers from the toll plaza, to check the evasion of fee:

Provided that the Central Government or the executing authority, as the case may be, may, at any time, for reasons to be recorded in writing, withdraw such permission.

Provided further that where the Central Government or the executing authority, as the case may be, do not allow installation of an additional barrier by the concessionaire, the reasons for such refusal shall be communicated to such concessionaire within a reasonable period.

SCHEDULE - S
(See Clause 31.1.2)

ESCROW AGREEMENT

THIS ESCROW AGREEMENT is entered into on this the *** day of *** 200*.

AMONGST

1 [**** **LIMITED**], a company incorporated under the provisions of the Companies Act, 1956 and having its registered office at **** (hereinafter referred to as the **"Concessionaire"** which expression shall, unless repugnant to the context or meaning thereof, include its successors, permitted assigns and substitutes);

2 ****[name and particulars of Lenders' Representative] and having its registered office at *** acting for and on behalf of the Senior Lenders as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the **"Lenders' Representative"** which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes);

3 ****[name and particulars of the Escrow Bank] and having its registered office at ****(hereinafter referred to as the **"Escrow Bank"** which expression shall, unless repugnant to the context or meaning thereof, include its successors and substitutes); and

4 The National Highways Authority of India, established under the National Highways Authority of India Act 1988, represented by its Chairman and having its principal offices at G-5 & 6, Sector 10, Dwarka, New Delhi-110075 (hereinafter referred to as the "**Authority**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns).

WHEREAS:

(A) The Authority has entered into a Concession Agreement dated *** with the Concessionaire (the **"Concession Agreement"**) for Four Laning of Pune-Solapur****** Section of NH - 9 from km 40.000 to km 144.400in the State of Maharashtra on build, operate and transfer (DBFOT) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.

(B) Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Agreements.

(C) The Concession Agreement requires the Concessionaire to establish an Escrow Account, *inter alia,* on the terms and conditions stated therein.

NOW IT IS HEREBY AGREED as follows:

1 DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Agreement, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them:

"Agreement" means this Escrow Agreement and any amendment thereto made in accordance with the provisions contained herein;

"Concession Agreement" means the Concession Agreement referred to in Recital (A) above and annexed hereto as Annex-A, and shall include all of its Recitals and Schedules and any amendments made thereto in accordance with the provisions contained in this behalf therein;

"Cure Period" means the period specified in this Agreement for curing any breach or default of any provision of this Agreement by the Concessionaire, and shall commence from the date on which a notice is delivered by the Authority or the Lenders' Representative, as the case may be, to the Concessionaire asking the latter to cure the breach or default specified in such notice;

"Escrow Account" means an escrow account established in terms of and under this Agreement, and shall include the Sub-Accounts;

"Escrow Default" shall have the meaning ascribed thereto in Clause 6.1;

"Lenders' Representative" means the person referred to as the Lenders' Representative in the foregoing Recitals;

"Parties" means the parties to this Agreement collectively and "**Party**" shall mean any of the Parties to this Agreement individually;

"Payment Date" means, in relation to any payment specified in Clause 4.1, the date(s) specified for such payment; and

"Sub-Accounts" means the respective Sub-Accounts of the Escrow Account, into which the monies specified in Clause 4.1 would be credited every month and paid out if due, and if not due in a month then appropriated proportionately in such month and retained in the respective Sub Accounts and paid out therefrom on the Payment Date(s).

1.2 Interpretation

1.2.1 References to Lenders' Representative shall, unless repugnant to the context or meaning thereof, mean references to the Lenders' Representative, acting for and on behalf of Senior Lenders.

1.2.2 The words and expressions beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein, and the words and expressions used in this Agreement and not defined herein but defined in the Concession Agreement shall, unless repugnant to the context, have the meaning

ascribed thereto in the Concession Agreement.

1.2.3 References to Clauses are, unless stated otherwise, references to Clauses of this Agreement.

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

2 ESCROW ACCOUNT

2.1 Escrow Bank to act as trustee

2.1.1 The Concessionaire hereby appoints the Escrow Bank to act as trustee for the Authority, the Lenders' Representative and the Concessionaire in connection herewith and authorises the Escrow Bank to exercise such rights, powers, authorities and discretion as are specifically delegated to the Escrow Bank by the terms hereof together with all such rights, powers, authorities and discretion as are reasonably incidental hereto, and the Escrow Bank accepts such appointment pursuant to the terms hereof.

2.1.2 The Concessionaire hereby declares that all rights, title and interest in and to the Escrow Account shall be vested in the Escrow Bank and held in trust for the Authority, the Lenders' Representative and the Concessionaire, and applied in accordance with the terms of this Agreement. No person other than the Authority, the Lenders' Representative and the Concessionaire shall have any rights hereunder as the beneficiaries of or as third party beneficiaries under this Agreement.

2.2 Acceptance of Escrow Bank

The Escrow Bank hereby agrees to act as such and to accept all payments and other amounts to be delivered to and held by the Escrow Bank pursuant to the provisions of this Agreement. The Escrow Bank shall hold and safeguard the Escrow Account during the term of this Agreement and shall treat the amount in the Escrow Account as monies deposited by the Concessionaire, Senior Lenders or the Authority with the Escrow Bank. In performing its functions and duties under this Agreement, the Escrow Bank shall act in trust for the benefit of, and as agent for, the Authority, the Lenders' Representative and the Concessionaire or their nominees, successors or assigns, in accordance with the provisions of this Agreement.

2.3 Establishment and operation of Escrow Account

2.3.1 Within 30 (thirty) days from the date of this Agreement, and in any case prior to the Appointed Date, the Concessionaire shall open and establish the Escrow Account with the **** (name of Branch) Branch of the Escrow Bank. The Escrow Account shall be denominated in Rupees.

2.3.2 The Escrow Bank shall maintain the Escrow Account in accordance with the terms of this Agreement and its usual practices and applicable regulations, and pay the maximum rate of interest payable to similar customers on the balance in the said account from time to time.

2.3.3 The Escrow Bank and the Concessionaire shall, after consultation with the Lenders' Representative, agree on the detailed mandates, terms and conditions, and operating procedures for the Escrow Account, but in the event of any conflict or inconsistency between this Agreement and such mandates, terms and conditions, or procedures, this Agreement shall prevail.

2.4 Escrow Bank's fee

The Escrow Bank shall be entitled to receive its fee and expenses in an amount, and at such times, as may be agreed between the Escrow Bank and the Concessionaire. For the avoidance of doubt, such fee and expenses shall form part of the O&M Expenses and shall be appropriated from the Escrow Account in accordance with Clause 4.1.

2.5 Rights of the parties

The rights of the Authority, the Lenders' Representative and the Concessionaire in the monies held in the Escrow Account are set forth in their entirety in this Agreement and the Authority, the Lenders' Representative and the Concessionaire shall have no other rights against or to the monies in the Escrow Account.

2.6 Substitution of the Concessionaire

The Parties hereto acknowledge and agree that upon substitution of the Concessionaire with the Nominated Company, pursuant to the Substitution Agreement, it shall be deemed for the purposes of this Agreement that the Nominated Company is a Party hereto and the Nominated Company shall accordingly be deemed to have succeeded to the rights and obligations of the Concessionaire under this Agreement on and with effect from the date of substitution of the Concessionaire with the Nominated Company.

3 DEPOSITS INTO ESCROW ACCOUNT

3.1 Deposits by the Concessionaire

3.1.1 The Concessionaire agrees and undertakes that it shall deposit into and/or credit the Escrow Account with:

(a) all monies received in relation to the Project from any source, including the Senior Lenders, lenders of Subordinated Debt and the Authority;

(b) all funds received by the Concessionaire from its share-holders, in any manner or form;

(c) all Fee levied and collected by the Concessionaire;

(d) any other revenues from or in respect of the Project Highway; and

(d) all proceeds received pursuant to any insurance claims.

3.1.2 The Concessionaire may at any time make deposits of its other funds into the Escrow Account, provided that the provisions of this Agreement shall apply to such deposits.

3.2 Deposits by the Authority

The Authority agrees and undertakes that, as and when due and payable, it shall deposit into and/or credit the Escrow Account with:

(a) Grant and any other monies disbursed by the Authority to the Concessionaire;

(b) Revenue Shortfall Loan;

(c) all Fee collected by the Authority in exercise of its rights under the Concession Agreement; and

(d) Termination Payments:

Provided that the Authority shall be entitled to appropriate from the aforesaid amounts, any Concession Fee due and payable to it by the Concessionaire, and the balance remaining shall be deposited into the Escrow Account.

3.3 Deposits by Senior Lenders

The Lenders' Representative agrees, confirms and undertakes that the Senior Lenders shall deposit into and/or credit the Escrow Account with all disbursements made by them in relation to or in respect of the Project; provided that notwithstanding anything to the contrary contained in this Agreement, the Senior Lenders shall be entitled to make direct payments to the EPC Contractor under and in accordance with the express provisions contained in this behalf in the Financing Agreements.

3.4 Interest on deposits

The Escrow Bank agrees and undertakes that all interest accruing on the balances of the Escrow Account shall be credited to the Escrow Account; provided that the Escrow Bank shall be entitled to appropriate therefrom the fee and expenses due to it from the Concessionaire in relation to the Escrow Account and credit the balance remaining to the Escrow Account.

4 WITHDRAWALS FROM ESCROW ACCOUNT

4.1 Withdrawals during Concession Period

4.1.1 At the beginning of every month, or at such shorter intervals as the Lenders' Representative and the Concessionaire may by written instructions determine, the Escrow Bank shall withdraw amounts from the Escrow Account and appropriate them in the following order by depositing such amounts in the relevant Sub-Accounts for making due payments, and if such payments are not due in any month, then retain such monies in such Sub-Accounts and pay out therefrom on the Payment Date(s):

(a) all taxes due and payable by the Concessionaire;

(b) all payments relating to construction of the Project Highway, subject to and in accordance with the conditions, if any, set forth in the Financing Agreements;

(c) O&M Expenses, subject to the ceiling, if any, set forth in the Financing Agreements;

(d) O&M Expenses incurred by the Authority, provided it certifies to the Escrow Bank that it had incurred such expenses in accordance with the provisions of the Concession Agreement and that the amounts claimed are due to it from the Concessionaire;

(e) Concession Fee due and payable to the Authority;

(f) monthly proportionate provision of Debt Service due in an Accounting Year;

[(g) Premium due and payable to the Authority;]

(h) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire pursuant to the Concession Agreement, including repayment of Revenue Shortfall Loan;

(i) debt service payments in respect of Subordinated Debt;

(j) any reserve requirements set forth in the Financing Agreements; and

(k) balance, if any, in accordance with the instructions of the Concessionaire.

4.1.2 Not later than 60 (sixty) days prior to the commencement of each Accounting Year, the Concessionaire shall provide to the Escrow Bank, with prior written approval of the Lenders' Representative, details of the amounts likely to be required for each of the payment obligations set forth in this Clause 4.1; provided that such amounts may be subsequently modified, with prior written approval of the Lenders' Representative, if fresh information received during the course of the year makes such modification necessary.

4.2 Withdrawals upon Termination

Upon Termination of the Concession Agreement, all amounts standing to the credit of the Escrow Account shall, notwithstanding anything in this Agreement, be appropriated and dealt with in the following order:

(a) all taxes due and payable by the Concessionaire;

(b) 90% (ninety per cent) of Debt Due excluding Subordinated Debt;

(c) outstanding Concession Fee;

(d) all payments and Damages certified by the Authority as due and payable to it by the Concessionaire pursuant to the Concession Agreement, including [Premium,] repayment of Revenue Shortfall Loan and any claims in connection with or arising out of Termination;

(e) retention and payments arising out of, or in relation to, liability for defects and deficiencies set forth in Article 39 of the Concession Agreement;

(f) outstanding Debt Service including the balance of Debt Due;

(g) outstanding Subordinated Debt;

(h) incurred or accrued O&M Expenses;

(i) any other payments required to be made under the Concession Agreement; and

(j) balance, if any, in accordance with the instructions of the Concessionaire:

Provided that the disbursements specified in Sub-clause (j) of this Clause 4.2 shall be undertaken only after the Vesting Certificate has been issued by the Authority.

4.3 Application of insufficient funds

Funds in the Escrow Account shall be applied in the serial order of priority set forth in Clauses 4.1 and 4.2, as the case may be. If the funds available are not sufficient to meet all the requirements, the Escrow Bank shall apply such funds in the serial order of priority until exhaustion thereof.

4.4 Application of insurance proceeds

Notwithstanding anything in this Agreement, the proceeds from all insurance claims, except life and injury, shall be deposited into and/or credited to the Escrow Account and utilised for any necessary repair, reconstruction, reinstatement, replacement, improvement, delivery or installation of the Project Highway, and the balance remaining, if any, shall be applied in accordance with the provisions contained in this behalf in the Financing Agreements.

4.5 Withdrawals during Suspension

Notwithstanding anything to the contrary contained in this Agreement, the Authority may exercise all or any of the rights of the Concessionaire during the period of Suspension under Article 36 of the Concession Agreement. Any instructions given by the Authority to the Escrow Bank during such period shall be complied with as if such instructions were given by the Concessionaire under this Agreement and all actions of the Authority hereunder shall be deemed to have been taken for and on behalf of the Concessionaire.

5 OBLIGATIONS OF THE ESCROW BANK

5.1 Segregation of funds

Monies and other property received by the Escrow Bank under this Agreement shall, until used or applied in accordance with this Agreement, be held by the Escrow Bank in trust for the purposes for which they were received, and shall be segregated from other funds and property of the Escrow Bank.

5.2 Notification of balances

7 (seven) business days prior to each Payment Date (and for this purpose the Escrow Bank shall be entitled to rely on an affirmation by the Concessionaire and/or the Lenders' Representative as to the relevant Payment Dates), the Escrow Bank shall notify the Lenders' Representative of the balances in the Escrow Account and Sub-Accounts as at the close of business on the immediately preceding business day.

5.3 Communications and notices

In discharge of its duties and obligations hereunder, the Escrow Bank:

(a) may, in the absence of bad faith or gross negligence on its part, rely as to any matters of fact which might reasonably be expected to be within the knowledge of the Concessionaire upon a certificate signed by or on behalf of the Concessionaire;

(b) may, in the absence of bad faith or gross negligence on its part, rely upon the authenticity of any communication or document believed by it to be authentic;

(c) shall, within 5 (five) business days after receipt, deliver a copy to the Lenders' Representative of any notice or document received by it in its capacity as the Escrow Bank from the Concessionaire or any other person hereunder or in connection herewith; and

(d) shall, within 5 (five) business days after receipt, deliver a copy to the Concessionaire of any notice or document received by it from the Lenders' Representative in connection herewith.

5.4 No set off

The Escrow Bank agrees not to claim or exercise any right of set off, banker's lien or other right or remedy with respect to amounts standing to the credit of the Escrow Account. For the avoidance of doubt, it is hereby acknowledged and agreed by the Escrow Bank that the monies and properties held by the Escrow Bank in the Escrow Account shall not be considered as part of the assets of the Escrow Bank and being trust property, shall in the case of bankruptcy or liquidation of the Escrow Bank, be wholly excluded from the assets of the Escrow Bank in such bankruptcy or liquidation.

5.5 Regulatory approvals

The Escrow Bank shall use its best efforts to procure, and thereafter maintain and comply with, all regulatory approvals required for it to establish and operate the Escrow Account. The Escrow Bank represents and warrants that it is not aware of any reason why such regulatory approvals will not ordinarily be granted to the Escrow Bank.

6 ESCROW DEFAULT

6.1 Escrow Default

6.1.1 Following events shall constitute an event of default by the Concessionaire (an **"Escrow Default"**) unless such event of default has occurred as a result of Force

Majeure or any act or omission of the Authority or the Lenders' Representative:

(a) the Concessionaire commits breach of this Agreement by failing to deposit any receipts into the Escrow Account as provided herein and fails to cure such breach by depositing the same into the Escrow Account within a Cure Period of 5 (five) business days;

(b) the Concessionaire causes the Escrow Bank to transfer funds to any account of the Concessionaire in breach of the terms of this Agreement and fails to cure such breach by depositing the relevant funds into the Escrow Account or any Sub-Account in which such transfer should have been made, within a Cure Period of 5 (five) business days; or

(c) the Concessionaire commits or causes any other breach of the provisions of this Agreement and fails to cure the same within a Cure Period of 5 (five) business days.

6.1.2 Upon occurrence of an Escrow Default, the consequences thereof shall be dealt with under and in accordance with the provisions of the Concession Agreement.

7 TERMINATION OF ESCROW AGREEMENT

7.1 Duration of the Escrow Agreement

This Agreement shall remain in full force and effect so long as any sum remains to be advanced or is outstanding from the Concessionaire in respect of the debt, guarantee or financial assistance received by it from the Senior Lenders, or any of its obligations to the Authority remain to be discharged, unless terminated earlier by consent of all the Parties or otherwise in accordance with the provisions of this Agreement.

7.2 Substitution of Escrow Bank

The Concessionaire may, by not less than 45 (forty five) days prior notice to the Escrow Bank, the Authority and the Lenders' Representative, terminate this Agreement and appoint a new Escrow Bank, provided that the new Escrow Bank is acceptable to the Lenders' Representative and arrangements are made satisfactory to the Lenders' Representative for transfer of amounts deposited in the Escrow Account to a new Escrow Account established with the successor Escrow Bank. The termination of this Agreement shall take effect only upon coming into force of an Escrow Agreement with the substitute Escrow Bank.

7.3 Closure of Escrow Account

The Escrow Bank shall, at the request of the Concessionaire and the Lenders' Representative made on or after the payment by the Concessionaire of all outstanding amounts under the Concession Agreement and the Financing Agreements including the payments specified in Clause 4.2, and upon confirmation of receipt of such payments, close the Escrow Account and Sub-Accounts and pay any amount

standing to the credit thereof to the Concessionaire. Upon closure of the Escrow Account hereunder, the Escrow Agreement shall be deemed to be terminated.

8 SUPPLEMENTARY ESCROW AGREEMENT

8.1 Supplementary escrow agreement

The Lenders' Representative and the Concessionaire shall be entitled to enter into a supplementary escrow agreement with the Escrow Bank providing, *inter alia,* for detailed procedures and documentation for withdrawals from Sub-Accounts pursuant to Clause 4.1.1 and for matters not covered under this Agreement such as the rights and obligations of Senior Lenders and lenders of Subordinated Debt, investment of surplus funds, restrictions on withdrawals by the Concessionaire in the event of breach of this Agreement or upon occurrence of an Escrow Default, procedures relating to operation of the Escrow Account and withdrawal therefrom, reporting requirements and any matters incidental thereto; provided that such supplementary escrow agreement shall not contain any provision which is inconsistent with this Agreement and in the event of any conflict or inconsistency between provisions of this Agreement and such supplementary escrow agreement, the provisions of this Agreement shall prevail.

9 INDEMNITY

9.1 General indemnity

9.1.1 The Concessionaire will indemnify, defend and hold the Authority, Escrow Bank and the Senior Lenders, acting through the Lenders' Representative, harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.

9.1.2 The Authority will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Authority to fulfil any of its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement other than any loss, damage, cost and expense arising out of acts done in discharge of their lawful functions by the Authority, its officers, servants and agents.

9.1.3 The Escrow Bank will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Escrow Bank to fulfil its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Escrow Bank, its officers, servants and agents.

9.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 9.1 or in respect of

which it is entitled to reimbursement (the "**Indemnified Party**"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

10 DISPUTE RESOLUTION

10.1 Dispute resolution

10.1.1 Any dispute, difference or claim arising out of or in connection with this Agreement, which is not resolved amicably, shall be decided finally by reference to arbitration to a Board of Arbitrators comprising one nominee of each Party to the dispute, and where the number of such nominees is an even number, the nominees shall elect another person to such Board. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the "Rules") or such other rules as may be mutually agreed by the parties, and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996.

10.1.2 The Arbitrators shall issue a reasoned award and such award shall be final and binding on the parties. The venue of arbitration shall be Delhi and the language of arbitration shall be English.

11 MISCELLANEOUS PROVISIONS

11.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at Delhi shall have jurisdiction over all matters arising out of or relating to this Agreement.

11.2 Waiver of sovereign immunity

The Authority unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Authority with respect to its assets;

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

11.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

11.4 Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall be effectual and binding only if in writing and signed by the duly authorised representatives of the Parties.

11.5 Waiver

11.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and

(c) shall not affect the validity or enforceability of this Agreement in any manner.

11.5.2 Neither the failure by any Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by any Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

11.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

11.7 Survival

11.7.1 Termination of this Agreement:

(a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and

(b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any

obligations or liabilities for loss or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

11.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

11.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Clause 10.1 of this Agreement or otherwise.

11.9 Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

11.10 Notices

All notices or other communications to be given or made under this Agreement shall be in writing and shall either be delivered personally or sent by courier or registered post with an additional copy to be sent by facsimile. The address for service of each Party and its facsimile number are set out under its name on the signing pages hereto. A notice shall be effective upon actual receipt thereof, save that where it is received after 5.30 (five thirty) p.m. on a business day, or on a day that is not a business day, the notice shall be deemed to be received on the first business day following the date of actual receipt. Without prejudice to the foregoing, a Party giving or making a notice or communication by facsimile shall promptly deliver a copy thereof personally, or send it by courier or registered post to the addressee of such notice or communication. It is hereby agreed and acknowledged that any Party may by notice change the address to which such notices and communications to it are to be delivered or mailed. Such change shall be effective when all the Parties have notice of it.

11.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

11.12 Authorised representatives

Each of the Parties shall by notice in writing designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such

authorised representative by similar notice.

11.13 Original Document

This Agreement may be executed in four counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED
For and on behalf of
CONCESSIONAIRE by:

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)

SIGNED, SEALED AND DELIVERED
For and on behalf of SENIOR LENDERS by the Lenders' Representative:

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)

SIGNED, SEALED AND DELIVERED
For and on behalf of ESCROW BANK by

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)

SIGNED, SEALED AND DELIVERED
For and on behalf of NATIONAL HIGHWAY AUTHORITY OF INDIA by:

(Signature)
(Name)
(Designation)
(Address)
(Fax No.)

In the presence of;
1.

2.

SCHEDULE - T

(See Clause 33.2.1)

PANEL OF CHARTERED ACCOUNTANTS

1 Panel of Chartered Accountants

Pursuant to the provisions of Clause 33.2.1 of the Agreement, the Authority and the Concessionaire shall prepare a mutually agreed panel of 10 (ten) reputable firms of Chartered Accountants having their registered offices in India (the "**Panel of Chartered Accountants**"). The criteria for preparing such Panel and the procedure to be adopted in this behalf shall be as set forth in this Schedule-T.

2 Invitation for empanelment

2.1 The Authority shall invite offers from all reputable firms of Chartered Accountants who fulfil the following eligibility criteria, namely:

(a) the firm should have conducted statutory audit of the annual accounts of at least one hundred companies registered under the Companies Act, 1956, of which at least ten should have been public sector undertakings;

(b) the firm should have at least 5 (five) practising Chartered Accountants on its rolls, each with a minimum experience of ten years in the profession;

(c) the firm or any of its partners should not have been disqualified or black-listed by the Comptroller and Auditor General of India or the Authority; and

(d) the firm should have an office in the State or in an adjacent State with at least 2 (two) practising Chartered Accountants on its rolls in such State.

2.2 Interested firms meeting the eligibility criteria shall be required to submit a statement of their capability including the bio-data of all the practising Chartered Accountants on its rolls. In particular, each firm shall be required to furnish year-wise information relating to the names of all the companies with an annual turnover exceeding Rs. 100,00,00,000 (Rs. One hundred crore) whose annual accounts were audited by such firm in any of the preceding 5 (five) Accounting Years.

3 Evaluation and selection

3.1 The information furnished by each firm shall be scrutinised and evaluated by the Authority and 1 (one) point shall be awarded for each annual audit of the companies specified in Paragraph 2.2 above. (For the avoidance of doubt, a firm which has conducted audit of the annual accounts of any such company for five years shall be awarded five points).

3.2 The Authority shall prepare a list of all the eligible firms along with the points scored by each such firm and 10 (ten) firms scoring the highest points shall be identified and included in the draft Panel of Chartered Accountants.

4 Consultation with the Concessionaire

The Authority shall convey the aforesaid panel of firms to the Concessionaire for scrutiny and comments, if any. The Concessionaire shall be entitled to scrutinise the relevant records of the Authority to ascertain whether the selection of firms has been undertaken in accordance with the prescribed procedure and it shall send its comments, if any, to the Authority within 15 (fifteen) days of receiving the aforesaid panel.

5 Mutually agreed panel

5.1 The Authority shall, after considering all relevant factors including the comments, if any, of the Concessionaire, finalise and constitute a panel of 10 (ten) firms which shall be deemed to be the mutually agreed Panel of Chartered Accountants.

5.2 After completion of every five years from the date of preparing the mutually agreed Panel of Chartered Accountants, or such earlier period as may be agreed between the Authority and the Concessionaire, a new panel shall be prepared in accordance with the provisions of this Schedule - T.

Schedule-U

(See clause 38.3)

VESTING CERTIFICATE

1. The Chairman, National Highways Authority of India (the "Authority") refers to the Concession Agreement dated *** (the "Agreement") entered into between the Authority and M/s Pune Solapur Expressways Limited (the "Concessionaire") for Four Laning of Pune - Solapur Section of NH - 9 from km 40.000 to km 144.400 in the State of Maharashtra on Design build, Finance, operate and transfer ("DBFOT") basis.

2. The Authority hereby acknowledges compliance and fulfillment by the Concessionaire of the Divestment Requirements set forth in Clause 38.1 of the Agreement on the basis that upon issue of this Vesting Certificate, the Authority shall be deemed to have acquired, and all title and interest of the Concessionaire in or about the Project Highway shall be deemed to have vested unto the Authority, free from any encumbrances, charges and liens whatsoever.

3. Notwithstanding anything to the contrary contained hereinabove, it shall be a condition of this Vesting Certificate that nothing contained herein shall be construed or interpreted as waiving the obligation of the Concessionaire to rectify and remedy any defect or deficiency in any of the Divestment Requirements and/or relieving the Concessionaire in any manner of the same.

Signed this *** day of ***, 200* at Delhi.

AGREED, ACCEPTED AND SIGNED DELIVERED For and on behalf of CONCESSIONAIRE by:	SIGNED, SEALED AND For and on behalf of NATIONAL HIGHWAYS AUTHORITY OF INDIA by:
Signature	Signature
Name	Name
Designation	Designation
Address	Address
In the presence of	
1.	2.

SCHEDULE - V

(See Clause 40.3.1)

SUBSTITUTION AGREEMENT

THIS SUBSTITUTION AGREEMENT is entered into on this the *** day of *** 200*.

AMONGST

1 The National Highways Authority of India, established under the National Highways Authority of India Act 1988, represented by its Chairman and having its principal offices at G-5 & 6, Sector 10, Dwarka, New Delhi-110075 (hereinafter referred to as the "**Authority**" which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns);

2 [**** **LIMITED**], a company incorporated under the provisions of the Companies Act, 1956 and having its registered office at ****, (hereinafter referred to as the "**Concessionaire**" which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns and substitutes);

3 **** [name and particulars of Lenders' Representative] and having its registered office at ****, acting for and on behalf of the Senior Lenders as their duly authorised agent with regard to matters arising out of or in relation to this Agreement (hereinafter referred to as the **"Lenders' Representative"**, which expression shall unless repugnant to the context or meaning thereof include its successors and substitutes);

WHEREAS:

(A) The Authority has entered into a Concession Agreement dated *** with the Concessionaire (the **"Concession Agreement"**) for Four Laning of Pune - Solapur Section of NH - 9 from km 40.000 to km 144.400 in the State of Maharashtra on Design, build, Finance operate and transfer ("DBFOT") basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this Agreement.

(B) Senior Lenders have agreed to finance the Project in accordance with the terms and conditions set forth in the Financing Agreements.

(C) Senior Lenders have requested the Authority to enter into this Substitution Agreement for securing their interests through assignment, transfer and substitution of the Concession to a Nominated Company in accordance with the provisions of this Agreement and the Concession Agreement.

(D) In order to enable implementation of the Project including its financing, construction, operation and maintenance, the Authority has agreed and undertaken to transfer and assign the Concession to a Nominated Company in accordance with the terms and conditions set forth in this Agreement and the Concession Agreement.

NOW IT IS HEREBY AGREED as follows:

1 DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Substitution Agreement, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them:

"Agreement" means this Substitution Agreement and any amendment thereto made in accordance with the provisions contained in this Agreement;

"Financial Default" means occurrence of a material breach of the terms and conditions of the Financing Agreements or a continuous default in Debt Service by the Concessionaire for a minimum period of 3 (three) months;

"Lenders' Representative" means the person referred to as the Lenders' Representative in the foregoing Recitals;

"Nominated Company" means a company, incorporated under the provisions of the Companies Act, 1956, selected by the Lenders' Representative, on behalf of Senior Lenders, and proposed to the Authority for assignment/transfer of the Concession as provided in this Agreement;

"Notice of Financial Default" shall have the meaning ascribed thereto in Clause 3.2.1; and

"Parties" means the parties to this Agreement collectively and **"Party"** shall mean any of the Parties to this Agreement individually.

1.2 Interpretation

1.2.1 References to Lenders' Representative shall, unless repugnant to the context or meaning thereof, mean references to the Lenders' Representative, acting for and on behalf of Senior Lenders.

1.2.2 References to Clauses are, unless stated otherwise, references to Clauses of this Agreement.

1.2.3 The words and expressions beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein, and the words and expressions used in this Agreement and not defined herein but defined in the Concession Agreement shall, unless repugnant to the context, have the meaning ascribed thereto in the Concession Agreement.

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

2 ASSIGNMENT

2.1 Assignment of rights and title

The Concessionaire hereby assigns the rights, title and interest in the Concession to, and in favour of, the Lenders' Representative pursuant to and in accordance with the provisions of this Agreement and the Concession Agreement by way of security in respect of financing by the Senior Lenders under the Financing Agreements.

3 SUBSTITUTION OF THE CONCESSIONAIRE

3.1 Rights of substitution

3.1.1 Pursuant to the rights, title and interest assigned under Clause 2.1, the Lenders' Representative shall be entitled to substitute the Concessionaire by a Nominated Company under and in accordance with the provisions of this Agreement and the Concession Agreement.

3.1.2 The Authority hereby agrees to substitute the Concessionaire by endorsement on the Concession Agreement in favour of the Nominated Company selected by the Lenders' Representative in accordance with this Agreement. (For the avoidance of doubt, the Senior Lenders or the Lenders' Representative shall not be entitled to operate and maintain the Project Highway as Concessionaire either individually or collectively).

3.2 Substitution upon occurrence of Financial Default

3.2.1 Upon occurrence of a Financial Default, the Lenders' Representative may issue a notice to the Concessionaire (the **"Notice of Financial Default"**) along with particulars thereof, and send a copy to the Authority for its information and record. A Notice of Financial Default under this Clause 3 shall be conclusive evidence of such Financial Default and it shall be final and binding upon the Concessionaire for the purposes of this Agreement.

3.2.2 Upon issue of a Notice of Financial Default hereunder, the Lenders' Representative may, without prejudice to any of its rights or remedies under this Agreement or the Financing Agreements, substitute the Concessionaire by a Nominated Company in accordance with the provisions of this Agreement.

3.2.3 At any time after the Lenders' Representative has issued a Notice of Financial Default, it may by notice require the Authority to suspend all the rights of the Concessionaire and undertake the operation and maintenance of the Project Highway in accordance with the provisions of Article 36 of the Concession Agreement, and upon receipt of such notice, the Authority shall undertake Suspension under and in accordance with the provisions of the Concession Agreement. The aforesaid Suspension shall be revoked upon substitution of the Concessionaire by a Nominated Company, and in the event such substitution is not completed within 180 (one hundred and eighty) days from the date of such Suspension, the Authority may terminate the Concession Agreement forthwith by issuing a Termination Notice in accordance with the provisions of the Concession Agreement; provided that upon written request from the Lenders' Representative and the Concessionaire, the Authority may extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.3 Substitution upon occurrence of Concessionaire Default

3.3.1 Upon occurrence of a Concessionaire Default, the Authority shall by a notice inform the Lenders' Representative of its intention to issue a Termination Notice and grant 15 (fifteen) days time to the Lenders' Representative to make a representation, stating the intention to substitute the Concessionaire by a Nominated Company.

3.3.2 In the event that the Lenders' Representative makes a representation to the Authority within the period of 15 (fifteen) days specified in Clause 3.3.1, stating that it intends to substitute the Concessionaire by a Nominated Company, the Lenders' Representative shall be entitled to undertake and complete the substitution of the Concessionaire by a Nominated Company in accordance with the provisions of this Agreement within a period of 180 (one hundred and eighty) days from the date of such representation, and the Authority shall either withhold Termination or undertake Suspension for the aforesaid period of 180 (one hundred and eighty) days; provided that upon written request from the Lenders' Representative and the Concessionaire, the Authority shall extend the aforesaid period of 180 (one hundred and eighty) days by a period not exceeding 90 (ninety) days.

3.4 Procedure for substitution

3.4.1 The Authority and the Concessionaire hereby agree that on or after the date of Notice of Financial Default or the date of representation to the Authority under Clause 3.3.2, as the case may be, the Lenders' Representative may, without prejudice to any of the other rights or remedies of the Senior Lenders, invite, negotiate and procure offers, either by private negotiations or public auction or tenders for the take over and transfer of the Project Highway including the Concession to the Nominated Company upon such Nominated Company's assumption of the liabilities and obligations of the Concessionaire towards the Authority under the Concession Agreement and towards the Senior Lenders under the Financing Agreements.

3.4.2 To be eligible for substitution in place of the Concessionaire, the Nominated Company shall be required to fulfil the eligibility criteria that were laid down by the Authority for shortlisting the bidders for award of the Concession; provided that the Lenders' Representative may represent to the Authority that all or any of such criteria may be waived in the interest of the Project, and if the Authority determines that such waiver shall not have any material adverse effect on the Project, it may waive all or any of such eligibility criteria.

3.4.3 Upon selection of a Nominated Company, the Lenders' Representative shall request the Authority to:

(a) accede to transfer to the Nominated Company the right to construct, operate and maintain the Project Highway in accordance with the provisions of the Concession Agreement;

(b) endorse and transfer the Concession to the Nominated Company, on the same terms and conditions, for the residual Concession Period; and

(c) enter into a Substitution Agreement with the Lenders' Representative and the Nominated Company on the same terms as are contained in this Agreement.

3.4.4 If the Authority has any objection to the transfer of Concession in favour of the Nominated Company in accordance with this Agreement, it shall within 7 (seven) days from the date of proposal made by the Lenders' Representative, give a reasoned order after hearing the Lenders' Representative. If no such objection is raised by the Authority, the Nominated Company shall be deemed to have been accepted. The Authority thereupon shall transfer and endorse the Concession within 7 (seven) days of its acceptance/deemed acceptance of the Nominated Company; provided that in the event of such objection by the Authority, the Lenders' Representative may propose another Nominated Company whereupon the procedure set forth in this Clause 3.4 shall be followed for substitution of such Nominated Company in place of the Concessionaire.

3.5 Selection to be binding

The decision of the Lenders' Representative and the Authority in selection of the Nominated Company shall be final and binding on the Concessionaire. The Concessionaire irrevocably agrees and waives any right to challenge the actions of the Lenders' Representative or the Senior Lenders or the Authority taken pursuant to this Agreement including the transfer/assignment of the Concession in favour of the Nominated Company. The Concessionaire agrees and confirms that it shall not have any right to seek revaluation of assets of the Project or the Concessionaire's shares. It is hereby acknowledged by the Parties that the rights of the Lenders' Representative are irrevocable and shall not be contested in any proceedings before any court or Authority and the Concessionaire shall have no right or remedy to prevent, obstruct or restrain the Authority or the Lenders' Representative from effecting or causing the transfer by substitution and endorsement of the Concession as requested by the Lenders' Representative.

4 PROJECT AGREEMENTS

4.1 Substitution of Nominated Company in Project Agreements

The Concessionaire shall ensure and procure that each Project Agreement contains provisions that entitle the Nominated Company to step into such Project Agreement, in its discretion, in place and substitution of the Concessionaire in the event of such Nominated Company's assumption of the liabilities and obligations of the Concessionaire under the Concession Agreement.

5 TERMINATION OF CONCESSION AGREEMENT

5.1 Termination upon occurrence of Financial Default

At any time after issue of a Notice of Financial Default, the Lenders' Representative may by a notice in writing require the Authority to terminate the Concession Agreement forthwith, and upon receipt of such notice, the Authority shall undertake Termination under and in accordance with the provisions of Article 37 of the Concession Agreement.

5.2 Termination when no Nominated Company is selected

In the event that no Nominated Company acceptable to the Authority is selected and recommended by the Lenders' Representative within the period of 180 (one hundred

and eighty) days or any extension thereof as set forth in Clause 3.3.2, the Authority may terminate the Concession Agreement forthwith in accordance with the provisions thereof.

5.3 Realisation of Debt Due

The Authority and the Concessionaire hereby acknowledge and agree that, without prejudice to their any other right or remedy, the Lenders' Representative is entitled to receive from the Concessionaire, without any further reference to or consent of the Concessionaire, the Debt Due upon Termination of the Concession Agreement. For realisation of the Debt Due, the Lenders' Representative shall be entitled to make its claim from the Escrow Account in accordance with the provisions of the Concession Agreement and the Escrow Agreement.

6 DURATION OF THE AGREEMENT

6.1 Duration of the Agreement

6.1 This Agreement shall come into force from the date hereof and shall expire at the earliest to occur of the following events:

(a) Termination of the Agreement; or

(b) no sum remains to be advanced, or is outstanding to the Senior Lenders, under the Financing Agreements.

7 INDEMNITY

7.1 General indemnity

7.1.1 The Concessionaire will indemnify, defend and hold the Authority and the Lenders' Representative harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with Applicable Laws and Applicable Permits.

7.1.2 The Authority will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Authority to fulfil any of its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement or this Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Authority, its officers, servants and agents.

7.1.3 The Lenders' Representative will indemnify, defend and hold the Concessionaire harmless against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of the Lenders' Representative to fulfil its obligations under this Agreement, materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement, other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful

functions by the Lenders' Representative, its officers, servants and agents.

7.2 Notice and contest of claims

In the event that any Party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 7.1 or in respect of which it is entitled to reimbursement (the "**Indemnified Party**"), it shall notify the other Party responsible for indemnifying such claim hereunder (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the Indemnifying Party, such approval not to be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide all cooperation and assistance in contesting any claim and shall sign all such writings and documents as the Indemnifying Party may reasonably require.

8 DISPUTE RESOLUTION

8.1 Dispute resolution

8.1.1 Any dispute, difference or claim arising out of or in connection with this Agreement which is not resolved amicably shall be decided by reference to arbitration to a Board of Arbitrators comprising one nominee each of the Authority, Concessionaire and the Lenders' Representative. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the "Rules") or such other rules as may be mutually agreed by the parties, and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996.

8.1.2 The Arbitrators shall issue a reasoned award and such award shall be final and binding on the Parties. The venue of arbitration shall be Delhi and the language of arbitration shall be English.

9 MISCELLANEOUS PROVISIONS

9.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at Delhi shall have jurisdiction over all matters arising out of or relating to this Agreement.

9.2 Waiver of sovereign immunity

The Authority unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Authority with respect to its assets;

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

9.3 Priority of agreements

In the event of any conflict between the Concession Agreement and this Agreement, the provisions contained in the Concession Agreement shall prevail over this Agreement.

9.4 Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall be effectual and binding only if in writing and signed by the duly authorised representatives of the Parties.

9.5 Waiver

9.5.1 Waiver by any Party of a default by another Party in the observance and performance of any provision of or obligations under this Agreement:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and

(c) shall not affect the validity or enforceability of this Agreement in any manner.

9.5.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by a Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

9.6 No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

9.7 Survival

9.7.1 Termination of this Agreement:

(a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and

(b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

9.7.2 All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of 3 (three) years following the date of such termination or expiry of this Agreement.

9.8 Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under Clause 8 of this Agreement or otherwise.

9.9 Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

9.10 Notices

All notices or other communications to be given or made under this Agreement shall be in writing, shall either be delivered personally or sent by courier or registered post with an additional copy to be sent by facsimile. The address for service of each Party and its facsimile number are set out under its name on the signing pages hereto. A notice shall be effective upon actual receipt thereof, save that where it is received after 5.30 (five thirty) p.m. on any day, or on a day that is a public holiday, the notice shall be deemed to be received on the first working day following the date of actual receipt. It is hereby agreed and acknowledged that any Party may by notice change the address to which such notices and communications to it are to be delivered or mailed. Such change shall be effective when all the Parties have notice of it.

9.11 Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

9.12 Authorised representatives

Each of the Parties shall by notice in writing designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

9.13 Original Document

This Agreement may be executed in three counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WREREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED
For and on behalf of
CONCESSIONAIRE by:

(Signature)
(Name)
(Designation)
(Address)
(Fax)

SIGNED, SEALED AND DELIVERED
For and on behalf of
NATIONAL HIGHWAY AUTHORITY OF INDIA

by:

(Signature)
(Name)
(Designation)
(Address)
(Fax)

SIGNED, SEALED AND DELIVERED
For and on behalf of
SENIOR LENDERS by the Lenders' Representative:

(Signature)
(Name)
(Designation)
(Address)
(Fax)

In the presence of:
1. 2.

SCHEDULE W

(See Clause 47.3)

STATE SUPPORT AGREEMENT

THIS STATE SUPPORT AGREEMENT is made on this _____day of _____ 200_ AMONGST

1 THE GOVERNOR OF **THE STATE OF MAHARASHTRA** through the Secretary, Ministry of _____, **Government of Maharashtra,** (hereinafter referred to as "**GOMH**" which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns) of the One Part,

2 **National Highways Authority of India,** a statutory authority established under the provisions of the National Highways Authority of India Act, 1988, through its [.....] and having its principal office at G – 5 & 6, Sector – 10, Dwarka, New Delhi – 110 075 (hereinafter referred to as "NHAI" which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns), of the Second Part,

AND

3 ---------- **LIMITED,** a company incorporated and existing under the provisions of the Companies Act, 1956 and having its registered office at ---------- (hereinafter referred to as the "Concessionaire", which expression shall unless repugnant to the context or meaning thereof include its successors and substitutes) of the Third Part.

(Unless repugnant to the context or meaning thereof GOMH, NHAI and the Concessionaire are hereinafter collectively referred to as "Parties" and singly as "Party")

WHEREAS

A The Government of India in the Ministry of Shipping, Road Transport & Highways has mandated as on date hereof and may entrust at any time to NHAI specified sections of various National Highways situated within the State of Maharashtra for, inter alia, improvement (including four laning), operation and maintenance on Design,build,Finance, operate and transfer ("DBFOT") basis.

B The NHAI had decided to take up the improvement and strengthening of the existing carriageway from **km 40.000 to km 144.400, on the Pune - Solapur Section of National Highway No. 9 (NH-9) in the State of Maharashtra,** India and widening thereof to 4 lanes and its improvement, operation and maintenance on DBFOT basis (the "Project") through award of concession on certain terms and conditions as set forth in the Concession Agreement (as defined hereinafter).

C NHAI had accordingly, invited Request for Proposals dated [.....] (the "RFP") for selection of DBFOT Entrepreneurs for, inter alia, execution and implementation of the said Project on DBFOT basis.

D NHAI had after evaluation of bids received, in response to the RFP, accepted the bid of the Consortium and had issued its Letter of Acceptance vide Letter No. ———————— dated —— (the"LOA") to the Consortium requiring, inter alia, the execution of the Concession Agreement pursuant thereto.

E The Consortium had promoted and incorporated the Concessionaire as a limited liability company to enter into the Concession Agreement pursuant to the LOA for undertaking, inter alia, the design, engineering, financing, procurement, utility shifting , tree cutting, improvement, construction, operation and maintenance of the Project on DBFOT basis as referred to in Recital B and to fulfill its other obligations under the Concession Agreement and had requested NHAI to accept the Concessionaire as the entity which shall undertake and fulfill and perform the obligations and exercise the rights of the Consortium under the LOA, including under the Concession Agreement to be entered into pursuant to the LOA.

F NHAI agreed to the said request of the Consortium and had accordingly entered into the Concession Agreement with the Concessionaire pursuant to the LOA for, inter alia, the design, engineering, financing, procurement, utility shifting, tree cutting, improvement, construction, operation and maintenance of the said Project Highway including the widening thereof to 4/6 lanes on DBFOT basis subject to and on the terms and conditions setforth therein including schedules forming part thereof.

G **GOMH** recognizes that the implementation of the Project and its continued operation and maintenance under and in accordance with the Concession Agreement is necessary and required for the development of the State of **Maharashtra** in general and development of infrastructure for economic development and growth of the State in particular and acknowledges that to enable the implementation of the said Project, including to facilitate its financing and its operation and maintenance on DBFOT basis, in accordance with the Concession Agreement, it is necessary for the GOMH to agree and undertake to support and extend complete cooperation to the Concessionaire and NHAI with respect to the implementation of the Project.

H GOMH, NHAI and the Concessionaire have agreed that for the successful implementation of the Project, including performance of its obligations by the Concessionaire under and in accordance with the Concession Agreement requires extensive continued support and grant of certain rights and authorities as hereinafter set forth by **GOMH** and is an essential pre-condition for mobilization of resources therefore by the Concessionaire and therefore it is necessary and expedient to enter into this Agreement.

NOW THEREFORE THE PARTIES HERETO HEREBY AGREE AND THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATIONS

1.1 In this Agreement the following terms shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them.

1.1.1 "Agreement" means this State Support Agreement and all annexures hereto and amendments if any thereto made in accordance with the provisions contained herein in this behalf.

1.1.2 "Concession Agreement" means the Concession Agreement dated _____ entered into between NHAI and the Concessionaire for, inter alia, the implementation of the Project as more fully described therein and shall include all of its annexures and appendices and any amendments thereto made in accordance with the provisions contained in this behalf therein.

1.1.3 "Cure Period" means the period specified in this Agreement for curing any breach or default under this Agreement by a Party and shall commence from the date on which notice is delivered to the Party in such breach or default by any of the other Parties requiring it to cure such breach or default.

1.1.4 "GOMH Agency" means and department, body, authority, commission, instrumentality, agency, Municipality, Panchayat or other local authority or any statutory body or authority under the control of GOMH or which is subject to supervision, direction or control of GOMH in respect of any matter or which can be suspended, superseded or dissolved by GOMH.

1.1.5 "Local Taxes" means any state or local taxes, duties, levies, cess, fee or octoroi or any import or surcharge of like nature on the whole or any part of the traffic including any motorized vehicles or goods while in transit on the whole or any part of the Project Highway.

1.1.6 "MOSRTH" means Ministry of Shipping, Road Transport and Highways, earlier Ministry of Road Transport & highways.

1.1.7 "Municipality" shall have the meaning as assigned to it in Article 243Q of the Constitution of India.

1.1.8 "Panchayat" shall have the meaning as assigned to it in Article 243B of the Constitution of India.

1.1.9 "State Support" means the obligations assumed and the facilities agreed to the provided by GOMH to the Concessionaire hereunder or pursuant hereto and shall include the support obligations of the GOMH as setforth in the Concession Agreement.

1.1.10 "Substitution Agreement" means the Substitution Agreement dated _____ entered into between the Senior Lenders, NHAI and the Concessionaire in relation to the Project and providing for substitution of the Concessionaire by any other person selected by the Senior Lenders in the manner and subject to and on the terms and conditions set forth therein and a copy of which is annexed hereto and marked as "Annexure 'A'."

1.2 The words and expressions beginning with or in capital letters used in this Agreement and not defined herein but defined in the Concession Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Concession Agreement. Words and expressions used in this Agreement and neither defined herein nor in the Concession Agreement but defined in the Substitution Agreement shall have the meaning respectively assigned to them in the Substitution Agreement.

1.3 In this Agreement unless the context otherwise requires-

(a) any reference to a any statue or any statutory provision shall include any amendment or re-enactment or consolidation thereof so far as such modification or re-enactment or consolidation applies or is capable of applying to any transactions entered into hereunder;

(b) the words importing singular shall include plural and vice versa, and reference to a "person" and words denoting natural persons shall include partnerships, firms, companies, corporations, joint ventures, trusts, associations, organizations or other entities (whether or not having a separate legal entity) and shall include Government Instrumentalities and GOMH Agencies;

(c) the headings are for convenience of reference only and shall not be used in and shall not affect the construction or interpretation of this Agreement;

(d) terms beginning with capital letters and defined in this Agreement shall have the meaning ascribed thereto herein;

(e) the words "include" and "including" are to be construed without limitation.

(f) any reference to a "day" shall mean reference to a calendar day;

(g) any reference to "month" shall mean reference to a calendar month;

(h) the Annexures and appendices to this Agreement form an integral part of this Agreement and will be in full force and effect as though they were expressly set out in the body of this Agreement;

(i) any reference at any time to any agreement, deed, instrument, license or document of any description shall be construed as reference to that agreement, deed, instrument,, license or other document as amended, varied, supplemented, modified or suspended at the time of such reference provided that this clause shall not operate so as to increase liabilities or obligations of **GOMH** or NHAI hereunder or pursuant hereto in any manner whatsoever.

(j) References to Recitals, Clauses, Sub-clauses, Paragraphs, Annexures or Appendices in this Agreement shall, except where the context otherwise requires, be deemed to be references to Recitals, Clauses, Sub-clauses, Paragraphs, Annexures and Appendices of this Agreement.

(k) Any agreement, consent, approval, authorization, proposal, notice, communication, information or report required under or pursuant to this Agreement from or by any Party or Senior Lender(s) shall be valid and effectual only if it is in writing under the hands of duty authorized representative of such Party or the Senior Lender(s), as the case may be, in this behalf and not otherwise; and

(l) Any reference to any period commencing "from" a specified day or date and "till" or "until" a specified day or date shall include both days or dates.

(m) "Concessionaire" shall include Selectee under the Substitution Agreement.

2. TERM

2.1 This Agreement shall come into force on and from the date hereof and shall continue to be in full force and effect for (i) the period the Concession Agreement is in force and effect in accordance with the terms thereof including any extension thereof, or (ii) final determination and discharge by GOMH of all of its liabilities and claims hereunder against it, whichever is later.

3. SUPPORT OF GOMH

3.1 In Consideration of the Project being in the interests of the State of Maharashtra and its economic growth and development and the Concessionaire entering into the Concession Agreement and agreeing to comply with its obligations hereunder, GOMH agrees and undertakes to observe, comply with and perform the following with reference to the Concession Agreement and the Project:

(i) enable continued access to the Site to the Concessionaire for peaceful use of and operations at the Site by the Concessionaire under and in accordance with the provisions of the Concession Agreement without any let or hindrance from GOMH or persons claiming through or under it or any GOMH Agency;

(ii) subject to the Concessionaire complying with Applicable Laws, including payment of prescribed fee and charges, if any, provide to the Concessionaire Applicable Permits to the extent GOMH or any Governmental Instrumentality of GOMH is entitled to issue;

(iii) upon written request from the Concessionaire, assist the Concessionaire in obtaining access to all necessary infrastructure facilities from any Governmental Instrumentality of GOMH and to utilities, including water, electricity and telecommunication facilities at rates and on terms no less favorable to the Concessionaire than those generally available to commercial customers receiving substantially equivalent services;

(iv) ensure that no barriers are erected or placed on the Project Highway by GOMH or any GOMH Agency that interrupts free flow of traffic on the Project Highway except on account of any law and order situation calamities, disasters (natural, accidental or due to any act or omission

of any person or accident or otherwise) or upon national security considerations;

(v) provide the Concessionaire with assistance through a dedicated team against payment of prescribed fee and charges, if any, for regulation of traffic on the Project Highway;

(vi) provide the Concessionaire with police assistance in the form of dedicated highway patrol parties against payment of prescribed costs and charges, if any, for patrolling and provision of security on the Project Highway;

(vii) observe and comply with its obligations set forth in this Agreement;

(viii) support, cooperate with and facilitate NHAI and the Concessionaire in the implementation of the Project;

(ix) subject to and in accordance with the Applicable Laws including payment of prescribed fee and charges, if any, assist the Concessionaire in the procurement of all Applicable Permits required from any municipality and other local authorities and bodies including Panchayats in the State of Maharashtra for the implementation of the Project;

(x) ensure and procure, subject to and in accordance with the Applicable Laws, that all relevant municipality and other local authorities and bodies including Panchayats in the State of Maharashtra do not put any barriers or other obstructions on the Project Highway or accesses thereto that interrupt free flow of traffic on the Project Highway;

(xi) ensure and procure, subject to and in accordance with the Applicable Laws, that all relevant municipal and other local authorities and bodies including Panchayats in the State of Maharashtra do not levy or impose any Local Taxes on the Project Highway or on the traffic and or goods moving on the Project Highway without prior express written consent of the GOMH and after prior consultation with NHAI;

(xii) support, cooperate with and facilitate the NHAI and the Concessionaire in the implementation and operation of the Project Highway in accordance with the provisions of the Concession Agreement;

(xiii) not do or omit to do any act, deed or thing which may in any manner be violative of or cause the Concessionaire to violate any of the provisions of the Concession Agreement; and

(xiv) observe and comply with all of its obligations setforth in this Agreement.

3.2 Notwithstanding anything to the contrary contained in the Agreement, **GOMH** may construct and operate either itself or have the same, inter alia, built and operated on DBFOT basis or otherwise any Expressway or other toll road, not being a bye-pass, between inter alia, **from km 168.500 to km 265.000 of NH – 3** (the "Additional Tollway"), provided that such Additional Tollway shall not be opened to traffic before expiry of 15 (fifteen) years from the Appointed Date

3.3 GOMH agrees and undertakes that it shall not build and construct nor shall it cause to be built and constructed any Competing Road in breach of the Concession Agreement.

3.4 **GOMH** agrees and undertakes that it shall not levy, nor permit or authorize any Panchayat or Municipality to levy, any property taxes on or for the Site or Project Highway any additional toll, fee, charge or other tax on the use of whole or any part of the Project Highway.

3.5 **GOMH** acknowledges the rights of Senior Lenders and NHAI under the Substitution Agreement to undertake the substitution of the Concessionaire in accordance therewith and hereby covenants that upon substitution of the Concessionaire by the Selectee pursuant to and in accordance with the Substitution Agreement, it shall be deemed for the purposes of this Agreement that as if Selectee is a Party hereto and the Selectee shall accordingly be deemed to have succeeded to the rights and obligations of the Concessionaire under this Agreement on and with effect from the date of such substitution of the Concessionaire by the Selectee.

3.6 **GOMH** acknowledges and agrees that each of the Concessionaire and the NHAI shall have the right to seek specific performance of this Agreement.

4. CONCESSIONAIRE'S OBLIGATIONS

4.1 Concessionaire agrees and undertakes to perform, observe and comply with the following :

(i) All Applicable Laws and Applicable Permits;

(ii) The provisions of the Concession Agreement, the Substitution Agreement, and the Project Agreements; and

(iii) Its obligations under this Agreement.

5. REPRESENTATIONS AND WARRANTIES

5.1 The Concessionaire reiterates all of the Concessionaire's representations and warranties setforth in Article 7.1 of the Concession Agreement as if the same have been expressly incorporated herein by reference and makes the following further representations and warranties:

(i) It is duly organized, validly existing and in good standing under the laws of India.

(ii) It has power and authority to execute, deliver and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;

(iii) It has taken all necessary corporate and other action under Applicable Laws and its constitutional documents to authorize the execution, delivery and performance of this Agreement;

(iv) This Agreement constitutes its legal, valid and binding obligation enforceable against it in accordance with the terms hereof;

(v) It is subject to civil and commercial laws of India with respect to this Agreement and it hereby expressly and irrevocably waives any immunity in any jurisdiction in respect thereof;

(vi) All the information furnished to the GOMH pertaining to the Concessionaire including its constitution and existing and proposed shareholding structure is now and shall be true and correct as on the Appointed Date and COD;

(vii) The execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under or accelerate performance required by any of the terms of the Concessionaire's Memorandum and Articles of Association or any member of the Consortium or any Applicable Laws or Applicable Permits or any covenant, agreement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

(viii) There are no actions, suits, proceedings or investigations pending or, to the Concessionaire's knowledge, threatened against it at law or in equity before any court or before any judicial, quasi judicial or other authority, the outcome of which may result in the breach of or

constitute a default of the Concessionaire under this Agreement or which individually or in the aggregate may result in any material adverse effect on its business, properties or assets or its condition, financial or otherwise, or in any impairment of its ability to perform its obligations and duties under this Agreement;

(ix) The Concessionaire has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Governmental Instrumentality which may result in any material adverse effect or impairment of the Concessionaire's ability to perform its obligations and duties under this Agreement;

(x) The Concessionaire has complied with all Applicable Laws and Applicable Permits, and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have material adverse effect on its financial condition or its ability to perform its obligations and duties under this Agreement;

(xi) Each Consortium Member was and is duly organized and existing under the laws of the jurisdiction of its incorporation and has full power and authority to consent to and has validly consented to the Concessionaire entering into this Agreement with the GOMH;

(xii) No representation or warranty by the Concessionaire contained herein or in any other document furnished by it to GOMH, or to any GOMH Agency in relation to Applicable Permits contains or will contain any untrue statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;

(xiii) The Concessionaire warrants that no sums have been paid or will be paid, by or on behalf of the Concessionaire, to any Person by way of fees, commission or otherwise for entering into this Agreement or for influencing or attempting to influence any officer or employee of NHAI, or GOMH in connection herewith; and

(xiv) The Concessionaire is subject to civil and commercial laws of India with respect to this Agreement.

5.2 GOMH represents and warrants to the Concessionaire that :

(i) It has full power and authority to execute, deliver and perform this Agreement.

(ii) It has taken all necessary governmental action to authorize the execution, delivery and performance of this Agreement; and

(iii) This Agreement constitutes the legal, valid and binding obligation of GOMH enforceable against it in accordance with its terms.

6. SOVEREIGN IMMUNITY

6.1 GOMH hereby unconditionally and irrevocably:

(i) Agrees that the execution, delivery and performance by it of this Agreement do not constitute sovereign acts;

(ii) Agrees that should any proceedings be brought or any execution, attachment or any other legal process is made against it or its assets, property or revenues in any jurisdiction in relation to or arising out of this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings, execution, attachment or other legal process shall be claimed by or on behalf of GOMH or with respect to any of its assets, property or revenues;

(iii) waives any right of immunity, which it or its assets property or revenues now has or may acquire in the future or which may be attributed to it in any jurisdiction; and

(iv) consents generally to the enforcement of any judgment or award against it in any such proceedings including to the giving of any relief or the issue of any process in any jurisdiction in connection with any such proceedings including the making, enforcement or execution against it or any of its assets, property or revenues, of any order, judgment or decree that may be made or given in connection therewith.

6.2 Notwithstanding anything to the contrary herein contained such waiver of right of immunity shall not apply to

a) Property and assets of any consular or diplomatic mission or consulate or

b) Property belonging to the Defence services and such assets of the Union of India.

7. Breach and Compensation

7.1 In case **GOMH** or any GOMH Agency is in material breach of any of its obligations under this Agreement, and such breach is not cured within 30 days of receipt of a notice in writing in this behalf from the Concessionaire to **GOMH** with copy to NHAI and which has not occurred as a result of Concessionaire's breach of its obligations under this Agreement or the Concession Agreement or Force Majeure, **GOMH** shall pay to the Concessionaire, all direct additional costs suffered or incurred by the Concessionaire, determined by MOSRTH as arising out of such material default by **GOMH**.

7.2 In case of any dispute by **GOMH** on admissibility of the claim or extent of compensation determined by MOSRTH, the claim shall be settled in accordance with the Dispute Settlement mechanism provided in Clause 9 of this Agreement.

7.3 Any such compensation, as determined by MOSRTH or through the Dispute Settlement mechanism setforth in Clause 9 hereof as payable by GOMH, shall be paid to the Concessionaire by GOMH, in one lump sum within 90 (ninety) days of receipt of MOSRTH's determination of compensation or Award made in the arbitration pursuant to the Dispute Settlement mechanism setforth in Clause 9 of this Agreement.

7.4 In the event of the Concessionaire being in material breach of any of its obligations under this Agreement and such breach is not cured by the Concessionaire within 30 days of receipt of a notice in writing from GOMH or NHAI (the "Claiming Party"), as the case may be, with copy to the other of them and which has not occurred as a result of breach by Claiming Party of its obligations under this Agreement or the Concession Agreement or Force Majeure, the Concessionaire shall pay to the Claiming Party, all direct additional costs suffered or incurred by it determined by MOSRTH as arising out of such material breach by the Concessionaire. In case of any dispute by the Concessionaire on the admissibility of such claim or the extent of compensation by MOSRTH, the claim shall be settled in accordance with the

Dispute Resolution mechanism setforth in Clause 9 of this Agreement. Any such compensation, as determined by MOSRTH or by an Award in any arbitration pursuant to Clause 9, shall be paid within 90 (ninety) days of receipt of such MOSRTH determination or Award, as the case may be.

8. INDEMNITY

8.1. The Concessionaire will indemnify, defend and hold GOMH and NHAI harmless against any and all proceedings, actions and claims for any loss, damage, cost and expense of whatever kind and nature arising out of design, engineering, construction, development, finance, operation and maintenance of the Project Highway or arising out of any breach by the Concessionaire of any of its obligations under this Agreement or on account of failure of the Concessionaire to comply with, and observe Applicable Laws and Applicable Permits;

8.2. GOMH will, indemnify, defend and hold harmless the Concessionaire against any and all proceedings, actions and third party claims for any loss, damage, cost and expense arising out of failure of GOMH to fulfill any of its obligations under this Agreement materially and adversely affecting the performance of the Concessionaire's obligations under the Concession Agreement other than any loss, damage, cost and expense, arising out of acts done in good faith in discharge of their lawful functions by GOMH, its officers, servants and GOMH Agencies;

8.3. Without limiting the generality of Clause 8.2, the GOMH shall indemnify the Concessionaire and shall save it harmless from and against any payments required to be made by the Concessionaire with respect to levy of any Local Taxes [provided nothing contained herein shall be construed or interpreted as restricting in any way or manner the right of GOMH or any municipality, Panchayat or other local authorities to levy any taxes which they or any of them are lawfully entitled to levy, impose or collect (the "Expected Taxes"). The Concessionaire shall not be entitled to and GOMH shall be under no obligation to reimburse Expected Taxes to the Concessionaire or any person claiming through or under the Concessionaire;]

[Note : The portion in square brackets above negates and renders in effective the exemption from Local Taxes setforth in Clause 3.4 of this Agreement - suggest deletion of the portion in square brackets.]

8.4. In the event that any of the Parties receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under this Clause 8 or in respect of which it is entitled to reimbursement hereunder (the "Indemnified Party") it shall within 14 (fourteen) days of receipt of the claim or payment, as the case may be, communicate such claim to the Party obligated to indemnify the Indemnified Party hereunder (the "Indemnifying Party") and shall not settle or pay the claim without the prior approval of the Indemnifying Party. In the event that the Indemnifying Party wishes to contest or dispute the claim, it may conduct the proceedings in the name of the Indemnified Party and shall bear all costs involved in contesting the same. The Indemnified Party shall provide to the Indemnifying Party all cooperation and assistance in contesting any claim and shall sign all such writings and documents at the risk and cost of the Indemnifying Party as the Indemnifying Party may reasonably require.

9. GOVERNING LAW AND DISPUTE SETTLEMENT

9.1. This Agreement shall be governed by and construed and interpreted in accordance with the laws of India. The provisions contained in Clause 8 and 9 shall survive the termination of this Agreement.

9.2. Any dispute, difference or controversy of whatever nature howsoever arising out of or in connection with or in relation to this Agreement which is not resolved amicably within 90 (ninety) days of receipt of notice of such dispute, difference or controversy from a Party (the "Claimant") by the other remaining Parties (collectively the "Respondents"), the same shall be decided finally by reference to arbitration to a Board or Arbitrators comprising of one nominee each of the Claimant and of the Respondent against whom the claim has been made and if the claim is against both the Respondents than the two Respondents shall jointly select their nominee arbitrator and if the two Respondents are unable to agree upon such arbitrator than such arbitrator shall be appointed by the International Centre for Alternative Dispute Resolution, New Delhi in accordance with its Rules of Arbitration. Such arbitration shall be held in accordance with the Rules of Arbitration of the

International Centre for Alternative Dispute Resolution, New Delhi. The arbitration shall be subject to the provisions of the Arbitration and Conciliation Act, 1996 as amended from time to time. The Arbitrators shall issue a reasoned award. The venue of such arbitration shall be New Delhi, India. The Award made in any such arbitration shall be final and binding on the Parties.

9.3. Parties agree that they shall continue to perform their respective obligations under this Agreement during such arbitration, unless the performance or otherwise of such arbitration is itself the subject matter of arbitration.

9.4. The Courts of Delhi shall have exclusive jurisdiction over all matters arising out of or relating to this Agreement.

10. MISCELLANEOUS

10.1. Alteration of Terms

All additions, amendments, modifications and variations to this agreement shall be effectual and binding only if it is in writing and signed by the duly authorized representatives of GOMH and the Concessionaire.

10.2. Time or Indulgence Allowed

An indulgence by a Party to any of the other Party in respect of any obligation or matter hereunder including time for performance to such other party or to remedy any breach hereof shall not be construed as a waiver of any of its rights hereunder by the Parties and ay such indulgence may be on such terms and subject to such conditions as the Party giving it may specify and shall be without prejudice to the Parities then accrued respective rights under this Agreement except to the extent expressly varied in writing.

10.3. Severability of Terms

If any provisions of this Agreement are declared to be invalid, unenforceable or illegal by any competent arbitration tribunal or court, such invalidity, unenforceability or illegality shall not prejudice or affect the remaining provisions of this Agreement, which shall continue in full force and effect.

10.4. Language

All notices, certificates, correspondence or other communications under or in connection with the Agreement shall be in English

10.5. Notices

Any notice or communication hereunder shall be in writing and shall either be delivered personally or sent by registered or by electronic means. A copy of facsimile transmission or other means of telecommunication shall be sent in permanent written form. A copy of all the notices and communications will also be forwarded to the Lenders Representative. The service of notice shall unless otherwise notified by a notice hereunder to the parties at their following address:

IF to **GOMH:**
Attn :
Fax no :
Tel no.

IF to the NHAI:
Attn:
Fax no.
Tel no.

IF to the Concessionaire:
Attn :
Fax no.
Tel no.

The notice pursuant hereto will be deemed to have been received on the date when such notice is in fact received by the addressee.

10.6. Authorized Representatives

Each of the Parties shall by notice in writing designate their respective authorized representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of its such authorized representative by similar notice.

10.7. Original Document

This Agreement is made in three counterparts, each of which shall be deemed to be an original.

10.8. In case of any conflict between this Agreement and the Concession Agreement, the provisions contained in the Concession Agreement shall be binding on parties signing this State Support Agreement.

10.9. This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

10.10. Termination of this Agreement shall not relieve any Party of any accrued rights, obligations and liabilities arising out of or caused by any act or omission of a Party into the effective date of such termination or arising out of such termination.

10.11. This Agreement shall be binding on and shall inure to the benefit of successors and permitted assigns.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE PUT THEIR HANDS HEREUNTO ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

FOR CONCESSIONAIRE **FOR GOVT. OF _____**

BY :_____ BY : _____

Name :_____ Name:_____

Title:_____ Title:_____

FOR NATIONAL HIGHWAYS AUTHORITY OF INDIA

BY :_____

Name :_____

Title:_____

In the presence of:

1. 2.