NATIONAL HIGHWAYS AUTHORITY OF INDIA

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

Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km. 255.00 on Orai-Bhognipur Section on National Highway No. 25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur-Barah Section on National Highway No. 2 (NH-2) in the satte of Uttar Pradesh on BOT Basis.

CONCESSION AGREEMENT

BETWEEN

NATIONAL HIGHWAYS AUTHORITY OF INDIA
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

AND

M/S O B INFRASTRUCTURE LIMITED
41, Nagarjuna Hills, Punjagutta, Hyderabad - 500 082
Andra Pradesh

PACKAGE NO. : EW-II/BOT-UP

27th APRIL, 2006

VOLUME - II

CONTANTS

S.NO.	PARTICULARS	PAGE NO FROM	PAGE NO TO
	VOLUME - I		
1	CONCESSION AGREEMENT (CHAPTER I TO VIII)	1	107
	VOLUME - II		
1	SCHEDULE - A (SITE OF THE PROJECT)	108	168
2	SCHEDULE - B (SCOPE OF THE PROJECT)	169	244
3	SCHEDULE - C (PROJECT FACLITIES)	245	252
4	SCHEDULE - D (SSPECIFICATIONS & STANDARDS)	253	281
5	SCHEDULE - E (APPLICABLE PERMITES)	282	283
6	SCHEDULE - F (BANK GUARNTEE FOR PERFORMANCE SECURITY)	284	332
7	SCHEDULE - G (ANNUITY PAYMENT SCHEDULE)	333	-
8	SCHEDULE - H (PROJECT COMPLETION SCHEDULE)	334	336
9	SCHEDULE - I (DRAWINGS)	337	338
10	SCHEDULE - J (TESTS)	339	348
11	SCHEDULE - K1 (COMPLETION CERTIFICATE)	349	350
12	SCHEDULE - K1 (PROVISION COMPLETION CERTIFICATE)	351	-
13	SCHEDULE - L (OPERATIONS & MAINTENANCE REQUIRMENTS)	352	391
14	SCHEDULE - M (CASH FLOW PROJECTIONS)	392	396
15	SCHEDULE - N (SELECTION CRITERIA FOR INDEPENDENT CONSULTANTS)	397	400
16	SCHEDULE - O (INDEPENDENT CONSULTANT-TERM OF REFERANCE)	401	447
17	SCHEDULE - P (TRAFFIC SAMPLING)	448	449
18	SCHEDULE - Q (DRAFT ESCROW ACCOUNT AGREEMENT)	450	471
19	SCHEDULE - R (STATE SUPPORT AGREEMENT)	472	483
20	SCHEDULE - S (SAFETY REQUIRMENTS)	484	492
21	SCHEDULE - T (CRITERIA FOR LIST OF CHARTERED ACCOUNTS)	493	494
22	SCHEDULE - U (SUBSTITUTION AGREEMENT)	495	511

S.NO.	PARTICULARS	PAGE NO	
		FROM	TO
23	SCHEDULE - V (VESTING CERTIFICATE)	512	-
24	SCHEDULE - W (PASSANGER CAR UNIT FACTORS)	513	-
25	SCHEDULE - X (REPORTING AND RECORD REQUIREMENTS)	514	521
26	SPV FORMATION DETAILS	522	576
27	ADDENDUM / CORRIGENDUM	577	634
	VOLUME - III		
1	INSTRUCTION TO BIDDERS (PART-I)	635	691
2	LETTER OF ACCEPTANCE AND ACKNOWLEDGEMENT	692	693
3	CORRESPONDANCE BETWEEN NHAI AND CONTRACTOR	694	738
4	OTHER SUBMISSION	739	873
5	TECHNICAL SUBMISSION	874	1315

Four Laning of the Existing Orai -Bhognipur Section (Km 220.0 to Km 255.00) on NH-25 And Bhognipur – Barah Section (Km 421.20 To Km 449.00) on NH-2 on Build, Operate and Transfer (BOT) or BOT (Annuity) Basis in the State of Uttar Pradesh

Part IV: TECHNICAL SCHEDULES

SCHEDULE – A
SITE OF THE PROJECT

Schedule – A

SITE OF THE PROJECT

1. General

1.1 The Site

This project relates to the 2-Lane section of NH-25 from Orai (Km 220.000) to Bhognipur (Km 255.400) and from Bhognipur (422.000) to Barah (Km 449.000).

The section passes through urban& rural area like Atta, Kalpi town, Chaunk, Chauraha, Pipri, Bhognipur, Pukhrayan, Nabbipur, Matti Village and Barah etc.

In order to provide better level of service to vehicular traffic, it has been decided to augment the capacity of the project road by widening the existing 2-lane carriageway to 4-lane dual carriageway facility with Flyover/Grade Separator/ROB/Underpasses, Service Roads, Wayside amenities etc., on Build Operate and Transfer (BOT) or BOT (Annuity) basis.

This section of National Highway traverses through a flat terrain of mostly agricultural/built-up.

An Index Plan of the Project Highway is shown in **Fig. A.1**.

1.2 Disclaimer

The data presented in this schedule is for an initial understanding and guidance of the Concessionaire. NHAI will not be responsible for any inaccuracy in the information provided and shall not be liable for or be bound by the data used by the Concessionaire in evaluating the project viability. The Concessionaire will carry out his own Independent surveys for assessing actual position of the project corridor.

The Concessionaire acknowledges that prior to the execution of this Agreement, the Concessionaire has satisfied himself (based on his own Independent assessment) of the survey data, specifications and standards, site and all information provided by the NHAI. The concessionaire acknowledges and accepts the difficulties, risks and hazards likely to arise during the course of performance of his obligations hereunder.

AURAIYA

2

AKBARPUR

25

Lalpur

Rajpur

Malasa

Bhognipur

Pukhrayan

Lahar

JALAUN

PACKAGE V(C)

Km 255

Ghausganj

Kalpi

Jalaun

Barai

Aunta

Yamuna River

Khanuwan

Usargaon

ROB

ORAI

Itaura

Dabra

25

Betwa

Punchh

Kusmilla

Air Khas

BYPASS

Pirauna

Saidnagar

Bhander

Erich

BYPASS

HAMIRPUR

PACKAGE V(A)

Moth

DATIA

Amargarh

BYPASS

75

BYPASS

JHANSI

Km 104.100

Baghaira

Rath

Karari

Garhmau

Chirgaon

PACKAGE V(B)

Km 170.00 STARTS

PACKAGE V(B)

Km 220.00 ENDS

25

Jhansi

Bijauli

Bamgaon

MAHOBA

26

75

DESIGN CONSULTANT:

EMA Unihorn (India) Pvt. Ltd

3/31, Ratlam Extension, New Delhi-110015, India.

Tel.:-28219316, 28330672, 28439004

in association with

Carl Bro a/s of Denmark

and

Unihorn bv of The Netherlands

SCALE:

NATIONAL HIGHWAYS AUTHORITY OF INDIA

(Ministry of Road Transport & Highways)

REHAB. & UPGRADATION OF NH-25 TO FOUR LANE

(KM 170.000 TO 220.000)

CIVIL CONTRACT PACKAGE - EW - II (UP - V)

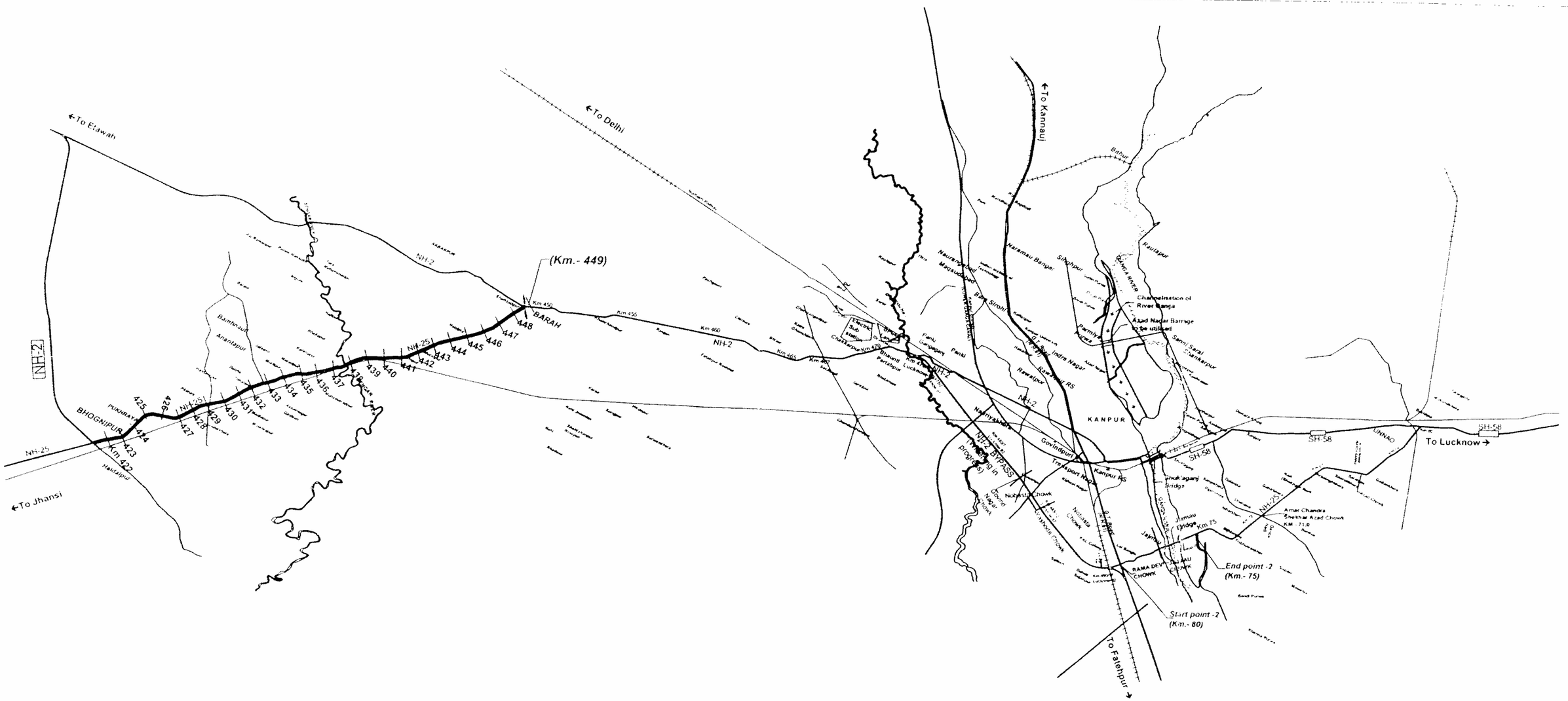
TITLE:

KEY PLAN 110

DRG. No. NHAI/JHANSI/NH-25/PAK-B/KP/01

DATE	Dec 2004	DRAWN	KAISER
DESIGNED	CHECKED	APPROVED	
MEHTA	F. CARLOS	BRIG. CHOWDHURY	

DATE	REV. NO.	REVISIONS


To Etawah
To Delhi
To Kannauj
To Jhansi
To Lucknow
To Fatehpur
NH-2
NH-25
(Km.- 449)
BARAH
BHOGNIPUR
Km 422
Km 449
Km 456
Km 466
Km 470
Km 475
Km 480
Km 485
Km 490
Km 495
Km 500
Km 505
Km 510
Km 515
Km 520
Km 525
Km 530
Km 535
Km 540
Km 545
Km 550
Km 555
Km 560
Km 565
Km

2. Description of Project Highway

An index map and location plan of the project highway is given as **Fig. A.1**. The Base Plans for the Project Highway showing the existing alignment, buildings utilities, etc., may be seen from the Detailed Project Report which is available in the office of General Manager (EW)-II, NHAI, New Delhi for reference.

2.1 a) Referencing System

Along the existing road, Kilometre stones are fixed in entire length of the project highway. Some existing kilometre stones may not be available, as the same may have been damaged. It is called as "Existing Chainage". During topography survey with Total Station, observations made are referred to "Proposed Chainage".

The details of Reference and Bench Mark Pillars along the Project Highway (km 220.000 to Km 255.000 and Km 422.000 to km449.000 of NH-25 (at Barah) are given in **Annexure A-1**.

2.1b) 'Start' and 'End' of The Project Highway

The Project Highway covers km 220.000(End of Orai) to Km 255.000 (Bhognipur) and Km 422.000 (Bhognipur) to km449.000 (Barah) of NH-25 (at Barah). Total length of the Project Highway along NH-25 is about 63.80 km.

2.2 Latitude & Longitude

The Project Highway is located at latitude N 80° 22'east and 26° 26' north respectively.

Terrain

The road traverses through plain/flat terrain. Some portion of the Project Highway also passes through undulating terrain. The entire alignment has easy gradients.

2.3 Traffic

Traffic count details as per the 7-days Classified Volume Count survey conducted during Feasibility Study/Preliminary Project Report by design consultants at the following location during 27th July to 3rd August 2003 on the Project Highway is given in the **Table A-2a** below:

Table A-2a: Details of Average Annual Daily Traffic

Count Station (Existing Chainage)	Total Vehicles (Nos.)	Total PCUs
Kalpi (Km 245.000)	6416	12090
Nabipur Petrol pump (Km 445.00)		16013

Peak Hour Turning Movement Traffic for three major junctions i.e. km 238.350, km 238.425, km 255.00 are given in **Table A-2c** below.

Table A-2c: Summary of Turning Movement Data

Existing Chainage (km)	Name of Intersection	Maximum Approach Volume (PCU/hr)	
		All Legs	Remarks
238.350	Madaripur crossing (start)	740	3 Legged
238.425	Hamirpur Junction	1179	3 Legged
255.000	Etawah Junction	2214	3 Legged
425.150	Pukhrayan Junction	1872	3 Legged

2.5 Abutting Land Use

Abutting land use on both sides is predominantly agricultural and the balance constitutes residential, commercial and industrial. Most of the land is agricultural. Predominant land use in various reaches is depicted at **Table A-3.**

Table A-3: Abutting Land Use

Existing Chainage (Km)			Landuse (Left & Right)
From		To	
220.000		241.000	Agricultural Land
241.000		245.000	Built-up Area
245.000		246.000	Yamuna River
246.000		248.000	Agricultural Land
248.000		250.000	Built-up Area
250.000		255.000	Agricultural Land
Km. 421.00	-	Km. 423.20	Bhognipur market, truck parking and other commercial establishments including brick Kilns.

Km. 423.20 - Km. 424..20	Semi – urban section of Pukhrayan
Km. 424.20 - Km. 427.00	Open agricultural land with scattered settlements.
Km. 427.00 - Km. 429.00	Open agricultural land with mixed / scattered small industrial establishments
Km. 429.00 - Km. 443.00	Open agricultural land
Km. 443.00 - Km. 444.00	Semi urban area of Matipur
Km. 444.00 - Km. 446.00	Open agricultural land with scattered industrial units
Km. 446.00 - Km. 447.00	Industrial with Semi urban area of Nabipur/Jainpur
Km. 447.00 - Km. 448.00	Predominantly industrial belt
Km. 448.00 - Km. 449.00	Open agricultural land

There are total 23 villages/towns/cities along the existing Project Highway, which are given in **Table A-4.**

Table A-4: Details of Villages/Towns/Cities

Road Sections		Name of Village
(From) Km	To (Km)	
226.000		Atta
235.000		Chaunk
237.000		Jaun pur
241.000	245.000	Kalpi
253.000		Pipri
421.40	422.00	Bhognipur
422.20	422.80	Shrirampur
423.00	428.80	Pukhrayan
429.00	430.40	Hansemau
430.60	432.40	Chhateni

432.60	434.20	Digh
434.40	435.00	Debipur
435.20	436.40	Muhammadpur
436.60	437.80	Mawar
438.00	438.40	Junedpur
438.60	439.00	Gauradand
439.20	441.20	Lalpur
441.40	442.80	Muridpur
443.00	444.40	Mati Kishanpur
444.60	445.40	Nabipur
445.60	447.60	Jainpur
447.80	448.40	Khalilpur
448.40	449.00	Barah

2.6 Right-of-Way

The existing right-of-way (ROW) of the Project Highway varies between 30.0 m to 60.0 m. **Table A-5** shows the currently available right-of-way (ROW) at various locations along the Project Highway. The additional land for Toll Plaza, Truck Park and other facilities shall be assessed by Concessionaire and agreed to by NHAI.

Table A-5: Details of Existing Right-of-Way (ROW)

From	To	Existing ROW
220.00	221.00	30.00
221.00	222.00	35.00
222.00	223.00	30.00
223.00	224.00	36.00
224.00	225.00	36.00
225.00	226.00	37.00
226.00	227.00	37.00
227.00	228.00	34.00
228.00	229.00	37.00
229.00	230.00	37.00
230.00	231.00	36.00
231.00	232.00	34.00
232.00	233.00	34.00

2.7 Road Crossings/Junctions

There are in total 65 major/ minor junctions. Out of total 65 junctions, 9 junctions have been categorized, as major junctions and remaining 56 are minor junctions. The details of Major junctions are given in **Table A-6**. Details of existing junctions are presented at **Annexure A-2.**

Table A-6: Details of Major junctions

S. No.	Existing Chainage (km)	Remarks
1	238.350	Madaripur crossing (start)
2	238.425	Hamirpur Junction
3	255.000	Etawah Junction
4	421.407	Bhognipur
5	425.000	Pukhrayan
6	434.759	Devipur
7	441.834	Murid pur
8	444.065	Matti
9	447.464	Barah

2.8 Road Condition Survey and Pavement Composition

As per the pavement condition data gathered in July/ August 2003 from test pit investigations, the average total thickness of existing pavement varies from 180 mm to 690 mm. The pavement mainly comprises of a WBM base course over sub grade, overlaid by mainly thin layers of bituminous macadam and mix seal surfacing/semi dense bituminous carpet or bituminous concrete over the years. The bituminous course layer's thickness varies between 40 mm to 320 mm, while that of WBM between 60 mm to 230 mm and Soling (brick / Talford base) between 40 mm to 260 mm. Bituminous overlay has been provided to improve the riding quality and also to increase the structural strength of the pavement to meet the requirements of increasing traffic load either fully or partially.

Details are shown in **Table A-8. Annexure A-3** shows the summary of road inventory and **Annexure A-4** shows the summary of condition

233.00	234.00	39.00
234.00	235.00	37.00
235.00	236.00	36.00
236.00	237.00	36.00
237.00	238.00	34.00
238.00	239.00	33.00
239.00	240.00	35.00
240.00	241.00	36.00
241.00	242.00	36.00
242.00	243.00	36.00
243.00	244.00	45.00
244.00	245.00	45.00
245.00	246.00	-
246.00	247.00	39.00
247.00	248.00	39.00
248.00	249.00	39.00
249.00	250.00	39.00
250.00	251.00	39.00
251.00	252.00	39.00
252.00	253.00	39.00
253.00	254.00	40.00
254.00	255.00	40.00
421.20	421.40	40.00
421.40	421.60	35.00
421.60	422.80	45.00
422.80	423.00	50.00
423.00	423.40	45.00
423.40	423.60	60.00
423.60	423.80	45.00
423.80	424.00	60.00
424.00	424.20	50.00
424.20	424.40	55.00
424.40	425.00	45.00
425.00	425.40	55.00
425.40	426.00	60.00
426.00	426.40	45.00
426.40	426.60	40.00
426.60	442.00	45.00
442.00	443.80	35.00
433.80	444.80	45.00
444.80	445.00	35.00
445.00	445.20	45.00
445.20	445.40	35.00
445.40	446.00	45.00
446.00	446.20	50.00
446.20	447.80	60.00
447.80	449.00	45.00

survey of existing road. Benkelman Beam Deflection survey results' summary is at **Annexure A-5.**

Table A-8: Details of Existing Pavement Composition

Chainage	Thickness Crust -Layers in mm					Remarks
	Bituminous Course	WBM	Base Course	Soling (Brick / Talford base)	Granular Material	
220.000	150	100			150	
225.000	150	75			160	
230.000	130	130			130	
235.000	150	155			150	
240.000	75	90			250	
248.000	240	140		200		
250.000	125	100		150		
255.000	125	120		150		
421.500	170	210		70		
422.000	125	80		150		
422.500	Bituminous		-	115		
	WBM		-	40		
	Bituminous		-	70		
	WBM		-	200		
	Brick Soling		-	120		
423.000	220	150		180		
423.500	Bituminous		-	100		
	Gravel with Bituminous		-	160		
	WBM		-	170		
	Brick Soling		-	140		
424.000	Bituminous		-	120		*Sub base 90-40 mm course aggregate
	WBM		-	30		
	Bituminous		-	50		
	Soling		-	140*		
424.500	210	220		180		

425.000	200	160		180		
425.500	200	230		260		
426.000	180	180		90		
426.500	160	150		160		
427.000	320	130		220		
427.500	300	120		100		
428.000	240	140		80		
428.500	280	135		85		
429.000	230	140		160		
429.500	260	55		165		
430.000	200	180		80		
430.500	280	100		140		
431.000	290	140		80		
431.500	280	180		80		
432.000	160	140		80		
432.500	150	100		160		
433.000	150	100		100		
433.500	160	--		--		
434.000	150	130		80		
434.500	210	170		--		
435.000	80	70		60		
435.500	90	120		60		
436.000	50	90		60		
436.500	50	100		60		
437.000	40	120		80		

437.500	40	70		80		
438.000	40	90		70		
438.500	35	90		70		
439.000	40	80		80		
439.500	50	90		70		
440.000	40	100		70		
440.500	50	100		80		
441.000	60	160		70		
441.500	40	120		70		
442.000	80	180		70		
442.500	60	110		70		
443.000	60	90		70		
443.500	55	100		70		
444.000	70	160		40	Soling	
444.500	60	65		--	(90-45) 120*	
445.000	60	60		--	100*	
445.500	60	160		--		
446.000	70	110		--		
446.500	70	170		--		
447.000	100	100		--	80*	
447.500	170	130		120		
448.000	180	60		240		
448.500	250			--	120	
449.000	170	230		60		

Annexure A-1 Details of Reference Bench Mark						
42	BM 230.750	609066.550	268447.960	133.902	RHS	
43	BM 231.000	609209.760	268526.360	133.731	RHS	
44	BM 231.250	609445.640	268642.680	134.490	RHS	
45	BM 231.500	609624.300	268753.020	134.346	LHS	
46	BM 231.750	609837.020	268853.400	134.397	RHS	
47	BM 232.000	610102.980	269000.280	134.314	RHS	
48	BM 232.250	610364.190	269138.700	133.931	RHS	
49	BM 232.500	610559.070	269255.990	133.852	RHS	
50	BM 232.750	610780.120	269378.610	133.979	RHS	
51	BM 233.000	610988.610	269472.090	133.585	RHS	
52	BM 233.250	611263.390	269614.160	133.620	RHS	
53	BM 233.500	611455.810	269715.370	133.821	RHS	
54	BM 233.750	611706.750	269844.950	133.855	RHS	
55	BM 234.000	611876.250	269946.070	133.874	LHS	
56	BM 234.250	612101.250	270061.420	134.141	RHS	
57	BM 234.500	612322.340	270161.420	134.138	RHS	
58	BM 235.000	612773.120	270399.710	132.927	RHS	
59	BM 235.250	612957.960	270479.730	132.447	RHS	
60	BM 235.500	613160.850	270579.910	133.836	RHS	
61	BM 235.750	613445.910	270734.390	132.676	RHS	
62	BM 236.000	613678.860	270839.790	133.146	RHS	
63	BM 236.250	613923.110	270974.160	133.006	RHS	
64	BM 236.500	614201.310	271111.420	132.277	RHS	
65	BM 236.750	614430.470	271211.930	132.815	RHS	
66	BM 237.000	614566.580	271293.170	133.049	RHS	
67	BM 237.250	614733.700	271372.850	133.283	RHS	
68	BM 237.500	614974.020	271528.910	133.090	RHS	
69	BM 237.750	615200.020	271687.480	131.939	RHS	
70	BM 238.000	615393.270	271846.750	130.932	RHS	
71	BM 238.250	615629.310	272006.620	130.968	RHS	
72	BM 239.000	616193.510	272449.140	131.979	RHS	
73	BM 239.250	616374.370	272592.850	132.342	RHS	
74	BM 240.750	616589.410	272772.810	132.272	RHS	
75	BM 240.000	616986.270	273054.320	130.768	RHS	
76	BM 240.250	617150.750	273143.490	123.231	RHS	
77	BM 240.500	617355.660	273324.400	126.624	LHS	
78	BM 240.750	617676.390	273540.250	122.981	RHS	
79	BM 241.000	617859.620	273689.530	125.905	RHS	
80	BM 241.250	618050.550	273768.580	128.832	RHS	
81	BM 241.500	618347.280	273795.080	129.514	RHS	
82	BM 241.750	618572.690	273821.500	127.194	RHS	
83	BM 242.000	618823.720	273809.650	124.481	RHS	
84	BM 242.250	619095.450	273755.280	124.635	RHS	

Annexure A-1 Details of Reference Bench Mark						
85	BM 242.500	619322.450	273860.600	122.453	RHS	
86	BM 242.750	619462.870	274070.920	121.143	RHS	
87	BM 243.000	619571.700	274271.530	119.318	RHS	
88	BM 243.250	619733.580	274481.340	118.720	RHS	
89	BM 243.500	620031.060	274631.490	118.374	RHS	
90	BM 243.750	620202.930	274770.670	118.243	RHS	
91	BM 244.000	620372.610	275000.270	118.405	RHS	
92	BM 244.250	620457.840	275273.040	120.425	RHS	
93	BM 244.500	620564.000	275481.610	120.603	RHS	
94	BM 244.750	620921.760	276227.360	119.318	RHS	
95	BM 245.000	621154.550	276694.480	118.720	RHS	
96	BM 245.250	621272.340	276929.920	118.374	RHS	
97	BM 245.500	621402.990	277184.380	118.243	RHS	
98	BM 245.750	621562.850	277368.410	118.405	RHS	
99	BM 246.500	621690.520	277530.620	121.481	RHS	
100	BM 247.000	621852.100	277716.010	120.231	RHS	
101	BM 247.250	622047.240	277938.280	116.438	RHS	
102	BM 247.500	622230.610	278148.610	116.350	RHS	
103	BM 247.750	622364.220	278298.690	116.677	RHS	
104	BM 248.000	622556.850	278500.370	116.055	RHS	
105	BM 248.250	622649.840	278629.410	116.059	RHS	
106	BM 248.500	622904.690	278894.530	116.778	RHS	
107	BM 248.750	623052.510	279082.060	121.069	RHS	
108	BM 249.000	623210.980	279259.830	123.531	RHS	
109	BM 249.250	623335.980	279497.430	123.865	RHS	
110	BM 249.500	623510.370	279748.790	129.438	RHS	
111	BM 249.750	623638.050	279950.720	130.742	RHS	
112	BM 250.000	623798.030	280158.010	131.311	RHS	
113	BM 250.250	623924.440	280337.280	130.842	RHS	
114	BM 250.500	624011.140	280478.240	131.039	RHS	
115	BM 250.750	624260.040	280816.010	130.815	RHS	
116	BM 251.000	624399.460	281032.390	130.776	RHS	
117	BM 251.250	624567.910	281254.500	130.838	RHS	
118	BM 251.500	624684.320	281437.700	130.483	RHS	
119	BM 251.750	624867.710	281684.840	131.100	RHS	
120	BM 252.000	625083.980	281939.510	132.054	RHS	
121	BM 252.225	624567.810	281254.495	130.806	RHS	
122	BM 252.500	624684.430	281437.650	130.508	RHS	
123	BM 252.750	624867.700	281684.835	130.460	RHS	
124	BM 253.000	625609.520	282446.800	130.684	RHS	
125	BM 253.500	626014.370	282827.451	131.060	RHS	
126	BM 253.750	625251.680	282118.940	131.014	RHS	
127	BM 254.000	625409.840	282269.280	130.940	RHS	

Annexure A-1 Details of Reference Bench Mark						
128	BM 254.500	626014.370	282827.460	130.389	RHS	
129	BM 254.750	626185.650	283016.510	130.327	RHS	
130	BM 255.0000	626362.230	283188.550	130.064	RHS	

Annexure A-2: Details of Existing Junctions

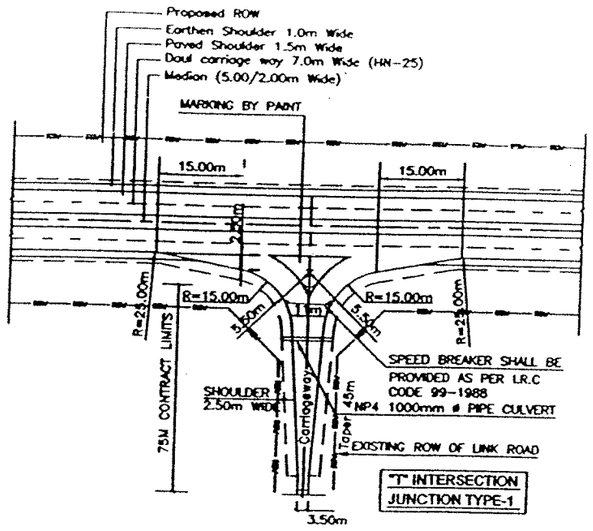
S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
1.	225.536		5		LHS	
2.	227.250		2		LHS	
3	232.350		5		RHS	
4	249.462		1		RHS	
5	249.478		5		LHS	
6	249.759		1		RHS	
7	249.918		1		RHS	
8	249.919		5		LHS	
9	252.016		5		RHS	
10	252.036		5		LHS	
11	255.460		1		RHS	
12	256.268		1		LHS	
13	256.559		1		LHS	
14	256.550		1		LHS	
15	421.407		BT	3.0	Right	To Ghatampur
16	422.555		BT	3.0	Left	To Khusrujapur
17	423.00		BT	3.0	Right	To Pukhrayan
18	423.100		BT	3.5	Right	To Pukhrayan
19	423.450		BT BT	3.0 3.0	Left Right	To Arauli To Pukhrayan
20	423.980		GR GR	4.0 3.0	Left Right	To Alapur To Kashwa

Annexure A-2: Details of Existing Junctions

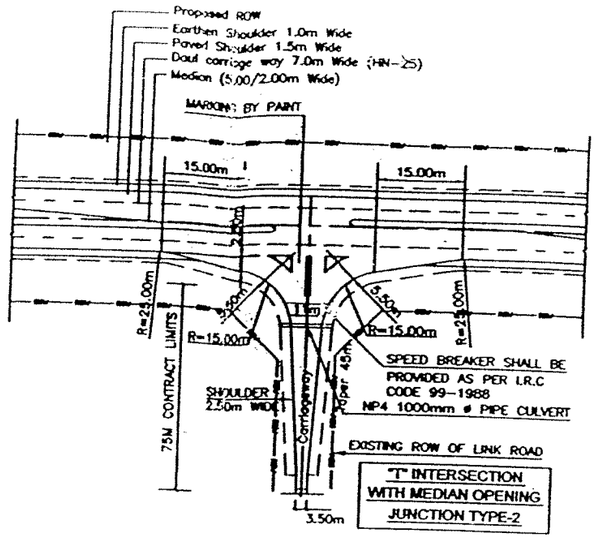
S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
21	424.168		GR	3.0	Right	To Pukhrayan
22	424.478		GR	3.0	Right	To Pukhrayan
23	424.837		BT BT	3.0 3.0	Left Right	To Harthawa To Pukhrayan
24	424.871		BT	3.0	Right	To Pukhrayan
25	425.00		BT	3.0	Right	To Pukhrayan
26	425.115		BT BT	3.0 3.0	Left Right	To Harthawa To Pukhrayan
27	425.388		BT BT	3.0 3.0	Left Right	To Chaura To Pukhrayan
28	425.662		BRICK ROAD	3.0	Right	To Pukhrayan
29	426.263		BT	3.0	Left	To Chora
30	426.863		GR	4.0	Right	To Pukhrayan
31	427.066		BT	3.0	Right	To Thalal Nagar
32	428.062		BT	3.0	Left	To Patoli
33	428.500		BT	3.0	Right	To Hatwa
34	428.710		BT	3.0	Left	To Hadarpur
35	429.672		GR	3.0	Right	To Harshmer
36	429.794		BT GR	3.0 3.0	Left Right	To Hadarpu To Harshmer
37	431.458		BT	3.0	Left	To Dhopa
38	431.633		BT	3.0	Right	To Mujeyapur
39	431.700		GR	2.0	Right	To Chhataine Village
40	432.177		GR	3.0	Left	To Blacl Malsa

Annexure A-2: Details of Existing Junctions

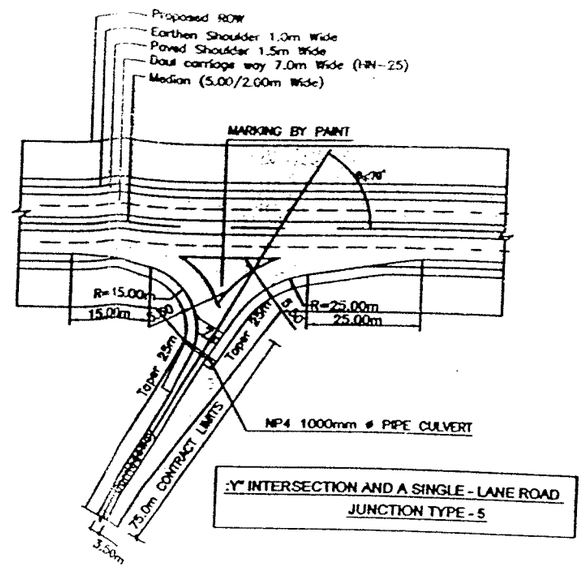
S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
41	432.551		BT	4.0	Left	To Jalalpur
42	433.482		BT BT	3.0 3.0	Left Right	To Baroor To Digh
43	433.780		GR	3.0	Right	To Digh
44	434.719		BT	3.0	Left	To Baroor
45	434.759		BT	3.0	Right	To Malasa
46	435.085		BT	3.0	Right	To Magamathpur
47	437.152		BT	3.0	Left	To Maapur
48	439.181		GR	3.0	Right	To Zeenatpur
49	439.389		BT	3.0	Left	To Goraw Village
50	440.724		BT	3.0	Right	To Musha Nagar
51	440.865		GR	4.0	Right	To Musha Nagar
52	441.00		BT	3.0	Left	To Karasa
53	441.834		BT GR	3.0 3.0	Left Right	To Akbarpur To Latupur
54	443.221		BT	3.50	Left	To Akbarpur
55	443.591		BT	3.0	Right	To Kantnya
56	444.065		BT	7.0	Left	To Akbarpur
57	445.415		GR GT	4.0 6.0	Left Right	To Nabipur To Mushapur
58	446.055		BT BT	5.0 7.0	Left Right	To Jainpur
59	446.659		BT BT	3.0 4.5	Left Right	To Surupur To Jainpur
60	447.079		BT	3.0	Left	To Surupur



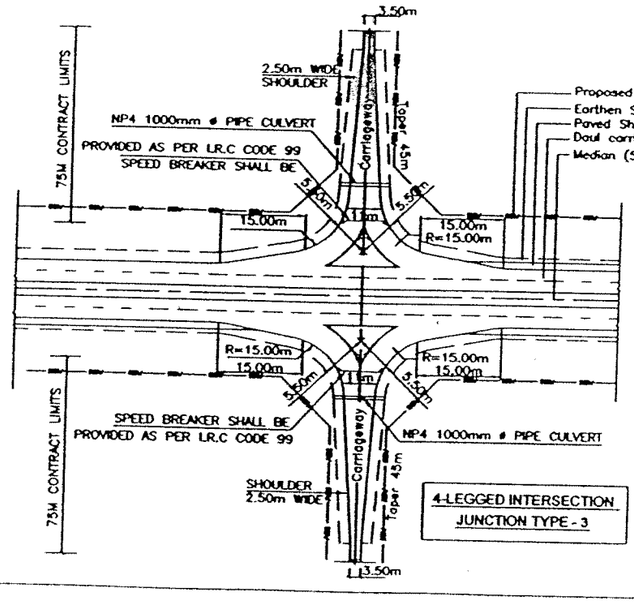
"T" INTERSECTION
JUNCTION TYPE-1



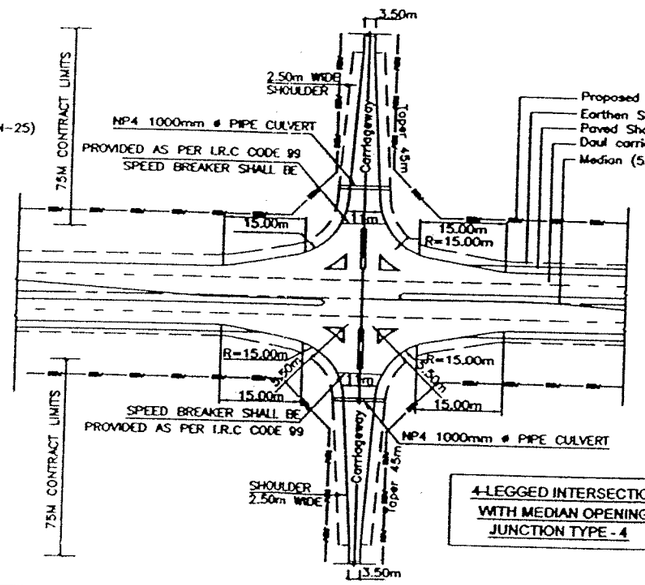
"T" INTERSECTION
WITH MEDIAN OPENING
JUNCTION TYPE-2



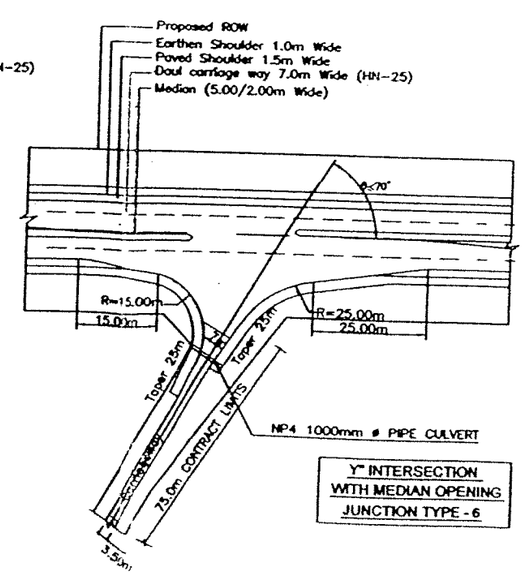
:Y" INTERSECTION AND A SINGLE - LANE ROAD
JUNCTION TYPE - 5



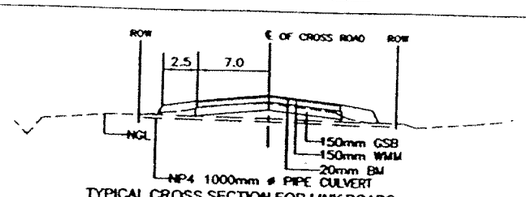
4-LEGGED INTERSECTION
JUNCTION TYPE - 3



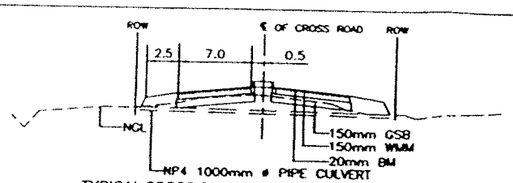
4-LEGGED INTERSECTION
WITH MEDIAN OPENING
JUNCTION TYPE - 4



Y" INTERSECTION
WITH MEDIAN OPENING
JUNCTION TYPE - 6



TYPICAL CROSS SECTION FOR LINK ROADS
CROSS SECTION WITH OUT MEDIAN



TYPICAL CROSS SECTION FOR LINK ROADS
CROSS SECTION WITH MEDIAN

NOTE:
1- TRAFFIC SIGNS AND ROAD SIGNS SHALL BE IN ACCORDANCE WITH RELEVANT I.R.C LATEST STANDARDS
2- LOCATION OF JUNCTION TYPES REFER TO PLAN AND PROFILE DRAWING
3- TYPICAL JUNCTIONS APPLICABLE FOR MINOR JUNCTIONS ONLY
4- REFER PIPE CULVERT TYPICAL DETAIL DRAWINGS No. NHAI/JHANSI/NH-25/MISC/PC/STD/07

DESIGN CONSULTANT:
EMA Unihorn (India) Pvt. Ltd.
Carl Bro a/s of Denmark
Unihorn bv of The Netherlands

SCALE: NOT T SCALE

ANNEXURE A-2

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

PROJECT:
REHAB. & UPGRADATION OF NH-25 TO FOUR LANE
(KM 220.000 TO 255.000)
CIVIL CONTRACT PACKAGE - EW - II (UP - V)

TITLE:
TYPICAL DETAIL OF JUNCTIONS

DRG. NO.: NHAI/JHANSI/NH-25/C/TYP JN-01
DATE: Jan 2005 | DRAWN: KAISER
DESIGNED: MEHTA | CHECKED: F. CARLOS | APPROVED: BRIG. CHOWDHURY

129

Annexure A-2: Details of Existing Junctions

S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
61	447.161		BT	3.0	Left	To Surupur
62	447.464		BT	5.0	Right	To Mangolpur

Note: NH=National Highway; SH=State Highway; MDR=Major District Road; ODR=Other District Road; VR=Village Road
BT= Bituminous Road; GR= Gravel Road; ER= Earthen Road

Anexure A-3: Road Inventory

No.	From	To	Remarks	Width	Width		Type	Width	Type	Width (m)		Type
										Left	Right	
117	220.00	221.00		30.00	7.00	0.35	Bituminous	7.00	Earthen			-
118	221.00	222.00		35.00	7.00	0.70	Bituminous	7.00	Earthen			-
119	222.00	223.00		30.00	7.00	3.25	Bituminous	7.00	Earthen			-
120	223.00	224.00		36.00	7.00	1.00	Bituminous	7.00	Earthen			-
121	224.00	225.00		36.00	7.00	0.40	Bituminous	7.00	Earthen			-
122	225.00	226.00		37.00	7.00	0.60	Bituminous	7.00	Earthen			-
123	226.00	227.00		37.00	7.00	0.90	Bituminous	7.00	Earthen			-
124	227.00	228.00		34.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
125	228.00	229.00		37.00	7.00	0.50	Bituminous	7.00	Earthen			-
126	229.00	230.00		37.00	7.00	0.90	Bituminous	7.00	Earthen			-
127	230.00	231.00		36.00	7.00	1.20	Bituminous	7.00	Earthen			-
128	231.00	232.00		34.00	7.00	0.20	Bituminous	7.00	Earthen			-
129	232.00	233.00		34.00	7.00	0.75	Bituminous	7.00	Earthen			-
130	233.00	234.00		39.00	7.00	0.60	Bituminous	7.00	Earthen			-
131	234.00	235.00		37.00	7.00	0.40	Bituminous	7.00	Earthen			-
132	235.00	236.00		36.00	7.00	0.80	Bituminous	7.00	Earthen			-

133	236.00	237.00		36.00	7.00	1.25	Bituminous	7.00	Earthen			-
134	237.00	238.00		34.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
135	238.00	239.00		33.00	7.00	0.50	Bituminous	7.00	Earthen			-
136	239.00	240.00		35.00	7.00	1.00	Bituminous	7.00	Earthen			-
137	240.00	241.00		36.00	7.00	0.60	Bituminous	7.00	Earthen			-
138	241.00	242.00	Sharp Horizontal Curves	36.00	7.00	0.50	Bituminous	7.00	Earthen			-
139	242.00	243.00	Sharp Horizontal Curves	36.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
140	243.00	244.00	Back-to Back Horizontal Curves	45.00	7.00	0.25	Bituminous	7.00	Earthen			-
141	244.00	245.00		45.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
142	245.00	246.00		Kalpi Bridge		-	Bituminous	7.00	Earthen			-
143	246.00	247.00		39.00	10.50	1.20	Bituminous	7.50	Paved	1.5	1.5	-
144	247.00	248.00		39.00	10.50	2.10	Bituminous	7.50	Paved	1.5	1.5	-
145	248.00	249.00		39.00	10.50	1.10	Bituminous	7.50	Paved	1.5	1.5	-
146	249.00	250.00		39.00	10.50	0.90	Bituminous	7.50	Paved	1.5	1.5	-
147	250.00	251.00		39.00	10.50	1.00	Bituminous	7.50	Paved	1.5	1.5	-
148	251.00	252.00		39.00	10.50	1.30	Bituminous	7.50	Paved	1.5	1.5	-
149	252.00	253.00		39.00	10.50	0.70	Bituminous	7.50	Paved	1.5	1.5	-
150	253.00	254.00		40.00	10.50	1.20	Bituminous	7.50	Paved	1.5	1.5	-
151	254.00	255.00		40.00	10.50	0.50	Bituminous	7.50	Paved	1.5	1.5	-

Annexure A-1 Details of Reference Bench Mark						
S.No	Reference Bench Mark	Easting	Northing	RL (m)	Side to Existing Road	Remark
1	BM 1	599556.750	263747.960	137.235	RHS	
2	BM 2	599762.770	263832.860	137.180	RHS	
3	BM 3	599986.340	263925.690	136.936	RHS	
4	BM 4	600214.660	264033.990	136.804	RHS	
5	BM 5	600469.990	264142.360	136.180	RHS	
6	BM 6	600724.500	264240.950	133.183	RHS	
7	BM 7	600944.490	264343.820	130.086	RHS	
8	BM 8	601159.000	264428.090	129.815	RHS	
9	BM 9	601352.600	264507.500	129.830	RHS	
10	BM 10	601691.300	264640.860	134.588	RHS	
11	BM 11	601905.020	264731.100	135.843	RHS	
12	BM 12	602073.460	264812.380	136.491	RHS	
13	BM 13	602269.880	264881.830	136.566	RHS	
14	BM 14	602451.390	264955.800	136.548	RHS	
15	BM 15	602585.430	265024.840	136.667	RHS	
16	BM 16	602995.420	265194.160	136.702	RHS	
17	BM 17	603167.290	265251.910	136.359	RHS	
18	BM 18	603299.960	265320.290	136.418	RHS	
19	BM 19	603543.830	265410.160	136.284	RHS	
20	BM 20	603920.900	265583.530	136.260	RHS	
21	BM 21	604175.640	265679.140	136.351	RHS	
22	BM 22	604392.160	265785.810	136.490	RHS	
23	BM 23	604586.870	265858.650	136.178	RHS	
24	BM 24	604849.170	265973.650	136.395	LHS	
25	BM 25	604999.130	266072.360	136.174	LHS	
26	BM 26	605227.140	266219.930	135.831	LHS	
27	BM 27	605438.280	266356.740	135.724	LHS	
28	BM 28	605690.950	266520.100	135.339	RHS	
29	BM 29	605839.960	266604.340	135.204	LHS	
30	BM 30	606047.200	266756.690	135.367	LHS	
31	BM 31	606254.660	266903.760	135.092	RHS	
32	BM 33	606723.050	267211.880	134.681	RHS	
33	BM 34	607066.480	267335.030	134.654	RHS	
34	BM 35	607313.130	267462.950	134.200	RHS	
35	BM 36	607447.240	267550.370	134.136	RHS	
36	BM 37	607616.450	267628.200	134.099	RHS	
37	BM 38	607852.200	267772.520	134.517	RHS	
38	BM 39	608113.890	267921.220	134.912	RHS	
39	BM 40	608326.840	268040.800	134.837	RHS	
40	BM 230.250	608519.620	268146.520	134.414	RHS	
41	BM 230.500	608796.520	268285.690	135.147	RHS	

2.9 Cross Drainage Structures

The Project Highway is predominantly aligned through rural areas with cultivated fields or barren lands on both sides. The surface flow during precipitation is generally drained to the adjoining areas on either side. The roadside drainage along the Project Highway needs some improvements, predominantly in urban stretches. The road is crossed by a number of rivers, streams, nallahs etc. The Project Highway has total 76 culverts, consisting of 6 Hume Pipe, 39 RCC slab & remaining 31box/arch/pipe+arch/slab+arch culverts.

The details of existing bridges/structures are presented in **Table A-9** below:

Table A-9: Details of Existing Bridges/Structures

Project Highway Section	Length (km)	No. of Bridges		No. of ROB	No. of RUB	No. of Under-passes	Total (Nos.)
		Major	Minor				
Orai to Bhognipur, and Bhognipur to Barah, NH-25	63.22	2	2	-	Nil	Nil	4

Annexure A-6, A-7 & A-8 shows the inventory and condition survey of bridges & structures and culverts respectively.

2.10 Existing Facilities

2.11 Land Acquisition/Utilities

The project highway would require Land Acquisition at certain places involving shifting of utilities etc. The details are mentioned in the Detailed Project Report which is available in the office of General Manager (EW)-II, NHAI, New Delhi for reference.

Anexure A-3 Contd. **Bhognipur to Barah (Km 421.200 to Km 449.000)**

Chainage		Terrain (Plain/ Rolling/ Hilly)	Land Used (Built Up/ Agri/ Forest/ Industrial/ Barren)	Name of Village/ Town	Formation Width (m)	CARRIAGEWAY			SHOULDER				Sub-mergence (cm)	Details of Cross Roads			Remarks
									Left		Right						
From (km)	To (km)					Type (BT/ CC/ GR/ ER)	Width (m)	Condition (G /F/ P/ VP)	Type	Width (m)	Type	Width (m)		Location (km)	Road Type	Carriage- way Width (m)	
421.20	421.40	PLAIN	L-UC R- UC	Bhognipur	12	BT	7	F	E	2.50	E	2.50					
421.40	421.60	PLAIN	L-UC R- UC	Bhognipur	12	BT	7	F	E	2.50	E	2.50	✓	421.407	BT	3.00	To Ghatampur
421.60	421.80	PLAIN	L-UC R- UC	Bhognipur	12.25	BT	7	F	E	2.75	E	2.50					
421.80	422.00	PLAIN	L-UC R- UC	Bhognipur	11	BT	7	F	E	2.00	E	2.00	✓				
422.00	422.20	PLAIN	L-UC R- UC	Shrirampur	12.5	BT	7	F	E	2.75	E	2.75					
422.20	422.40	PLAIN	L-UC R- UC	Shrirampur	11.1	BT	7	F	E	2.00	E	2.10					
422.40	422.60	PLAIN	L-UC R- UC	Shrirampur	12	BT	7	F	E	2.50	E	2.50		422.555	BT	3.00	To Khusrujapur
422.60	422.80	PLAIN	L – A R- UC	Shrirampur	10.9	BT	7	F	E	2.00	E	2.00	✓				
422.80	423.00	PLAIN	L-UC R- UC	Pukhrayan	11	BT	7	F	E	2.00	E	2.00		423.000	BT	3.00	To Pukhrayan
423.00	423.20	PLAIN	L-SU R- SU	Pukhrayan	11.75	BT	7	F	E	2.75	E	2.00		423.100	BT	3.50	To Pukhrayan
423.20	423.40	PLAIN	L-R R- R	Pukhrayan	11	BT	7	F	E	2.00	E	2.00	-				

423.40	423.60	PLAIN	L-SU R- SU	Pukhrayan	11.05	BT	7	F	E	2.00	E	2.05	-	423.450	BT BT	3.00 3.00	To Arauli To Pukhrayan
423.60	423.80	PLAIN	L-SU R- SU	Pukhrayan	11	BT	7	F	E	2.00	E	2.00	-				
423.80	424.00	PLAIN	L-SU R- SU	Pukhrayan	11	BT	7	F	E	2.00	E	2.00	-	423.980	GR GR	4.00 3.00	To Alapur To Kashwa
424.00	424.20	PLAIN	L-SU R- SU	Pukhrayan	11.2	BT	7	F	E	2.05	E	2.05	-	424.168	GR	3.00	To Pukhrayan
424.20	424.40	PLAIN	L-R R- R	Pukhrayan	11	BT	7	F	E	2.00	E	2.00	-				
424.40	424.60	PLAIN	L-R R- R	Pukhrayan	10	BT	7	F	E	1.50	E	1.50	-	424.478	GR	3.00	To Pukhrayan
424.60	424.80	PLAIN	L-A R-R	Pukhrayan	10.8	BT	7	F	E	2.00	E	1.80	-	424.837 424.871	BT BT BT	3.0 3.0 3.00	To Harthawa To Pukhrayan To Pukhrayan
424.80	425.00	PLAIN	L-R R- R	Pukhrayan	10.5	BT	7	F	E	2.00	E	1.80		425.000	BT	3.00	To Pukhrayan
425.00	425.20	PLAIN	L-SU R- SU	Pukhrayan	12	BT	7	F	E	2.50	E	2.50		425.115	BT BT	3.00 3.00	To Harthawa To Pukhrayan
425.20	425.40	PLAIN	L- A	Pukhrayan	12	BT	7	F	E	2.50	E	2.50		425.388	BT	3.00	To Chaura

			R- SU											BT	3.00	To Pukhrayan
425.40	425.60	PLAIN	L- A R- SU	Pukhrayan	12	BT	7	F	E	2.50	E	2.50				
425.60	425.80	PLAIN	L-SU R- SU	Pukhrayan	12.25	BT	7	F	E	2.50	E	2.75	425.662	BRICK ROAD	3.00	To Pukhrayan
425.80	426.00	PLAIN	L- A+1 R- SU	Pukhrayan	12.5	BT	7	F	E	2.50	E	3.00				
426.00	426.20	PLAIN	L- A+1 R- 1+SU	Pukhrayan	12	BT	7	F	E	2.50	E	2.50				
426.20	426.40	PLAIN	L- A+1 R- 1+SU	Pukhrayan	11.75	BT	7	F	E	2.50	E	2.25	426.263	BT	3.00	To Chora
426.40	426.60	PLAIN	L- A+1 R- SU	Pukhrayan	11.75	BT	7	F	E	2.50	E	2.25				
426.60	426.80	PLAIN	L- A+1 R- SU	Pukhrayan	11.75	BT	7	F	E	2.50	E	2.25				
426.80	427.00	PLAIN	L-A R- A	Pukhrayan	11	BT	7	F	E	2.00	E	2.00	426.863	GR	4.00	To Pukhrayan
427.00	427.20	PLAIN	L- A+SU R- A	Pukhrayan	13	BT	7.5	F	E	3.00	E	3.00	427.066	BT	3.00	To Thalal Nagar
427.20	427.40	PLAIN	L- 1+SU R- A+SU	Pukhrayan	13	BT	7	F	E	3.00	E	3.00				
427.40	427.60	PLAIN	L- 1+SU R- A	Pukhrayan	13	BT	7	F	E	3.00	E	3.00				
427.60	427.80	PLAIN	L-A R- A	Pukhrayan	13	BT	7	F	E	3.00	E	3.00				
427.80	428.00	PLAIN	L-A R- A	Pukhrayan	13	BT	7	F	E	3.00	E	3.00				

428.00	428.20	PLAIN	L-A+1 R- A+1	Pukhrayan	13	BT	7	F	E	3.00	E	3.00		428.062	BT	3.00	To Patoli
428.20	428.40	PLAIN	L- A+1 R- A	Pukhrayan	13	BT	7	F	E	3.00	E	3.00					
428.40	428.60	PLAIN	L-A R- A	Pukhrayan	13	BT	7	F	E	3.00	E	3.00		428.500	BT	3.00	To Hatwa
428.60	428.80	PLAIN	L-A+1 R- A+1	Pukhrayan	12	BT	7	F	E	2.50	E	2.50		428.710	BT	3.00	To Hadarpur
428.80	429.00	PLAIN	L- A+1 R- A	Hansemau	12	BT	7	F	E	2.50	E	2.50					
429.00	429.20	PLAIN	L-A+R R- A+R	Hansemau	13	BT	7	F	E	3.00	E	3.00					
429.20	429.40	PLAIN	L-A+R R- A+R	Hansemau	13	BT	7	F	E	3.00	E	3.00					
429.40	429.60	PLAIN	L-A+R R- A+R	Hansemau	12	BT	7	F	E	2.50	E	2.50	-				
429.60	429.80	PLAIN	L-A+R R- A+R	Hansemau	12	BT	7	F	E	2.50	E	2.50	-	429.672 429.794	GR BT GR	3.00 3.00 3.00	To Harshmer To Hadarpu To Harshmer
429.80	430.00	PLAIN	L-A+R R- A+R	Hansemau	12	BT	7	F	E	2.50	E	2.50	-				
430.00	430.20	PLAIN	L-A R- A	Hansemau	11.5	BT	7	F	E	2.00	E	2.50	-				
430.20	430.40	PLAIN	L-A R- A	Hansemau	13.5	BT	7	F	E	2.50	E	4.00	-				
430.40	430.60	PLAIN	L-A R- A	Hansemau	13.5	BT	7	F	E	2.50	E	4.00	-				

430.60	430.80	PLAIN	L-A R- A	Chhateni	14	BT	7	F	E	3.00	E	4.00	-					
430.80	431.00	PLAIN	L-A R- A	Chhateni	13	BT	7	F	E	2.50	E	3.50	-					
431.00	431.20	PLAIN	L- A R- A+R	Chhateni	13	BT	7	F	E	3.00	E	3.00	-					
431.20	431.40	PLAIN	L-A R- A	Chhateni	13	BT	7	F	E	3.00	E	3.00	-					
431.40	431.60	PLAIN	L-A+R R- A+R	Chhateni	13	BT	7	F	E	3.00	E	3.00	-	431.458	BT	3.00	To Dhopa	
431.60	431.80	PLAIN	L-A+R R- A+R	Chhateni	11	BT	7	F	E	1.50	E	2.50	-	431.633	BT	3.00	To Mujeya pur	
431.80	432.00	PLAIN	L- A R- A+1	Chhateni	11	BT	7	F	E	1.50	E	2.50	-	431.700	GR	2.00	To Chhatai ne Village	
432.00	432.20	PLAIN	L-A R- A	Chhateni	10.7	BT	7	F	E	0.50	E	0.50	-	432.177	GR	3.00	To Blacl Malsa	
432.20	432.40	PLAIN	L-A R- A	Chhateni	10.7	BT	7	F	E	0.50	E	0.50	-					
432.40	432.60	PLAIN	L-A R- A	Chhateni	10.7	BT	7	F	E	0.50	E	0.50	-	432.551	BT	4.00	To Jalalpur	
432.60	432.80	PLAIN	L-A R- A	Digh	10.7	BT	7	F	E	0.50	E	0.50	-					
432.80	433.00	PLAIN	L- A R- A+PP	Digh	10.7	BT	7	F	E	0.50	E	0.50						
433.00	433.20	PLAIN	L-A R- A	Digh	12	BT	7	F	E	1.00	E	1.00	-					
433.20	433.40	PLAIN	L- A R- A+R	Digh	12	BT	7	F	E	1.00	E	1.00	-					
433.40	433.60	PLAIN	L- A+R R- A	Digh	12	BT	7	F	E	1.00	E	1.00	-	433.482	BT BT	3.00 3.00	To Baroor To Digh	

433.60	433.80	PLAIN	L- A R- A+R	Digh	12	BT	7	F	E	1.00	E	1.00	-	433.780	GR	3.00	To Digh
433.80	434.00	PLAIN	L-A R- A	Digh	12	BT	7	F	E	1.00	E	1.00	-				
434.00	434.20	PLAIN	L-A R- A	Digh	12	BT	7	F	E	1.00	E	1.00					
434.20	434.40	PLAIN	L-A R- A	Digh	11.5	BT	7	F	E	1.00	E	0.50					
434.40	434.60	PLAIN	L- R R- A+R	Debipur	11.5	BT	7	F	E	1.00	E	0.50	-				
434.60	434.80	PLAIN	L- A+R R- R	Debipur	11.5	BT	7	F	E	1.00	E	0.50	-	434.719 434.759	BT BT	3.00 3.00	To Baroor To Malasa
434.80	435.00	PLAIN	L- A+R R- A+R	Debipur	11.5	BT	7	F	E	1.00	E	0.50	-				
435.00	435.20	PLAIN	L-A R- A	Debipur	11	BT	7	F	E	0.50	E	0.50		435.085	BT	3.00	To Magam athpur
435.20	435.40	PLAIN	L-A R- A	Muhammadpur	11	BT	7	F	E	0.50	E	0.50					
435.40	435.60	PLAIN	L-A+R R- A+R	Muhammadpur	13	BT	7	PLAIN	E	1.50	E	1.50	-				
435.60	435.80	PLAIN	L-A+R R- A+R	Muhammadpur	13	BT	7	F	E	1.50	E	1.50	-				
435.80	436.00	PLAIN	L-A R- A	Muhammadpur	13	BT	7	PLAIN	E	1.50	E	1.50	-				
436.00	436.20	PLAIN	L-A R- A	Muhammadpur	13	BT	7	F	E	1.50	E	1.50	-				
436.20	436.40	PLAIN	L-A R- A	Muhammadpur	13	BT	7	F	E	1.50	E	1.50	-				
436.40	436.60	PLAIN	L-A	Muhammadp	13	BT	7	PLAIN	E	1.50	E	1.50					

			R- A	ur													
436.60	436.80	PLAIN	L-A R- A	Mawar	13	BT	7	VPLAIN	E	1.50	E	1.50	✓ -				
436.80	437.00	PLAIN	L-A R- A	Mawar	13	BT	7	F	E	1.50	E	1.50	✓				
437.00	437.20	R	L- A R- A+R	Mawar	12	BT	7	PLAIN	E	1.50	E	1.50	-	437.152	BT	3.00	To Maapur
437.20	437.40	R	L- A+R R- A	Mawar	13	BT	7	F/PLAIN	E	1.50	E	1.50	-				
437.40	437.60	R	L-A R- A	Mawar	13	BT	7	F	E	1.50	E	1.50	-				
437.60	437.80	R	L-A R- A	Mawar	13	BT	7	PLAIN	E	1.50	E	1.50	✓ -				
437.80	438.00	PLAIN	L-A R- A	Mawar	13	BT	7	F	E	1.50	E	1.50	✓ -				
438.00	438.20	PLAIN	L-A R- A	Junedpur	11	BT	7	F	E	1.00	E	1.00	-				
438.20	438.40	PLAIN	L-A R- A	Junedpur	11	BT	7	F	E	1.00	E	1.00	-				
438.40	438.60	PLAIN	L-A R- A	Junedpur	11	BT	7	F	E	1.00	E	1.00	✓ -				
438.60	438.80	PLAIN	L-A R- A	Gauradand	11	BT	7	F/PLAIN	E	1.00	E	1.00	✓ -				
438.80	439.00	PLAIN	L-A R- A	Gauradand	11	BT	7	PLAIN	E	1.00	E	1.00	✓ -				
439.00	439.20	PLAIN	L-A	Gauradand	11	BT	7	F	E	1.00	E	1.00	✓	439.181	GR	3.00	To

			R- A										-				Zeenat pur
439.20	439.40	PLAIN	L-A R- A	Lalpur	11	BT	7	F	E	1.00	E	1.00	✓ -	439.389	BT	3.00	To Goraw Village
439.40	439.60	PLAIN	L-A R- A	Lalpur	11	BT	7	F	E	1.00	E	1.00	✓ -				
439.60	439.80	PLAIN	L-A R- A	Lalpur	11	BT	7	F	E	1.00	E	1.00	-				
439.80	440.00	PLAIN	L- A R- A+R	Lalpur	11	BT	7	F	E	1.00	E	1.00					
440.00	440.20	PLAIN	L-A+R R- A+R	Lalpur	11.5	BT	7	F	E	1.00	E	1.50	-				
440.20	440.40	PLAIN	L- A R- A+R	Lalpur	11.5	BT	7	F	E	1.00	E	1.50	✓ -				
440.40	440.60	PLAIN	L-A+R R- A+R	Lalpur	11.5	BT	7	F	E	1.00	E	1.50	✓ -				
440.60	440.80	PLAIN	L-A+R R- A+R	Lalpur	11.5	BT	7	F	E	1.00	E	1.50	-	440.724	BT	3.00	To Musha Nagar
440.80	441.00	PLAIN	L-A+R R- A+R	Lalpur	11.5	BT	7	F	E	1.00	E	1.50	-	440.865	GR	4.00	To Musha Nagar
441.00	441.20	PLAIN	L-A+R R- A+R	Lalpur	11	BT	7	F	E	1.00	E	1.00	-	441.000	BT	3.00	To Karasa
441.20	441.40	PLAIN	L- A R- A+R	Lalpur	11	BT	7	F	E	1.00	E	1.00	-				
441.40	441.60	PLAIN	L- A R-R+UC	Muridpur	11	BT	7	F	E	1.00	E	1.00	-				
441.60	441.80	PLAIN	L-A+R R- A+R	Muridpur	11	BT	7	PLAIN/F	E	1.00	E	1.00	-				

441.80	442.00	PLAIN	L-A+R R- A+R	Muridpur	11	BT	7	PLAIN/F	E	1.00	E	1.00		441.834	BT	3.00	To Akbarpur
															GR	3.00	To Latupur
442.00	442.20	PLAIN	L- R R- R	Muridpur	11	BT	7	PLAIN	E	1.00	E	1.00	-				
442.20	442.40	PLAIN	L- R R- R	Muridpur	11	BT	7	PLAIN/F	E	1.00	E	1.00	-				
442.40	442.60	PLAIN	L- R R- R	Muridpur	11	BT	7	F	E	1.00	E	1.00	-				
442.60	442.80	PLAIN	L- A+R R- R	Muridpur	11	BT	7	F	E	1.00	E	1.00	-				
442.80	443.00	PLAIN	L- A R- A	Muridpur	11	BT	7	F	E	1.00	E	1.00	-				
443.00	443.20	PLAIN	L-A+R R- A+R	Mati Kishanpur	12	BT	7	PLAIN	E	1.50	E	0.50	-				
443.20	443.40	PLAIN	L- A+R R- R	Mati Kishanpur	11	BT	7	PLAIN	E	1.50	E	0.50	-	443.221	BT	3.50	To Akbarpur
443.40	443.60	PLAIN	L-A+R R- A+R	Mati Kishanpur	11	BT	7	F/PLAIN	E	1.50	E	0.50	-	443.591	BT	3.00	To Kantnya
443.60	443.80	PLAIN	L- A+SU R- A	Mati Kishanpur	11	BT	7	PLAIN	E	1.50	E	0.50	-				
443.80	444.00	PLAIN	L- A+SU R- A	Mati Kishanpur	12	BT	7	F/PLAIN	E	1.00	E	1.00	-				
444.00	444.20	PLAIN	L-SU+A R- SU+A	Mati Kishanpur	11	BT	7	F/PLAIN	E	1.00	E	1.00	-	444.065	BT	7.00	To Akbarpur
444.20	444.40	PLAIN	L-A +SU R- A +SU	Mati Kishanpur	11	BT	7	F	E	1.00	E	1.00	-				
444.40	444.60	PLAIN	L-A R- A	Mati Kishanpur	11	BT	7	PLAIN	E	1.00	E	1.00	-				
444.60	444.80	PLAIN	L-A	Nabipur	11	BT	7	F	E	1.00	E	1.00	-				

			R- A														
444.80	445.00	PLAIN	L-R	Nabipur	13	BT	7	F	E	1.50	E	1.50	-				
			R- R														
445.00	445.20	PLAIN	L-R	Nabipur	11	BT	7	F	E	1.00	E	1.00	-				
			R- R														
445.20	445.40	PLAIN	L-R	Nabipur	11	BT	7	F	E	1.00	E	1.00	-				
			R- R														
445.40	445.60	PLAIN	L-R	Nabipur	11	BT	7	F	E	1.00	E	1.00		445.415	GR	4.00	To Nabipur
			R- R												GT	6.00	To Mushapur
445.60	445.80	PLAIN	L-R+1	Jainpur	11	BT	7	F	E	1.00	E	1.00					
			R- R+1														
445.80	446.00	PLAIN	BARN	Jainpur	11	BT	7	F	E	1.00	E	1.00	-				
446.00	446.20	PLAIN	L-1	Jainpur	11	BT	7	F	E	1.00	E	1.00	-	446.055	BT	5.00	To Jainpur
			R- 1												BT	7.00	
446.20	446.40	PLAIN	L-R+UC	Jainpur	12	BT	7	F	E	1.50	E	1.50	-				
			R- R+UC														
446.40	446.60	PLAIN	L-R+UC	Jainpur	12	BT	7	F	E	1.50	E	1.50	-				
			R- R+UC														
446.60	446.80	PLAIN	L-1	Jainpur	12	BT	7	F	E	1.50	E	1.50	-	446.659	BT	3.00	To Surupur
			R- 1												BT	4.50	To Jainpur
446.80	447.00	PLAIN	L-1	Jainpur	12	BT	7	F	E	1.50	E	1.50	-				
			R- 1														
447.00	447.20	PLAIN	L-1	Jainpur	11	BT	7	PLAIN/F	E	2.00	E	2.00	-	447.079	BT	3.00	To Surupur
			R- 1											447.161	BT	3.00	To Surupur
447.20	447.40	PLAIN	L-I	Jainpur	11	BT	7	F	E	2.00	E	2.00	-				
			R- I														
447.40	447.60	PLAIN	L-A	Jainpur	11	BT	7	F	E	2.00	E	2.00	-	447.464	BT	5.00	To Mangol

			R- I															
447.60	447.80	PLAIN	L-I	Jainpur	11	BT	7	F	E	2.00	E	2.00	-					pur
			R- A+R															
447.80	448.00	PLAIN	L- A	Khalilpur	10.5	BT	7	F	E	2.00	E	1.50	-					
			R- A+R															
448.00	448.20	PLAIN	L- I	Khalilpur	11	BT	7	F	E	2.00	E	2.00	-					
			R- A															
448.20	448.40	PLAIN	L-A	Khalilpur	10.5	BT	7	F	E	2.00	E	1.50	-					
			R- A															
448.40	448.60	PLAIN	L- A+R	Barah	10.5	BT	7	F	E	2.00	E	1.50	-					
			R- A															
448.60	448.80	PLAIN	L- UC+R	Barah	10	BT	7	F	E	1.50	E	1.50	-					
			R- A+R															
448.80	449.00	PLAIN	L- UC+R	Barah	10	BT	7	PLAIN	E	1.50	E	1.50	-					
			R- R															

Recording Interval : at every 200 meters

1. Terrain : P-Plain (0-10%), R-Rolling (10-25%), M-Mountainous (25-60%), S-Steep (>60%)
2. Land use : R-Rural, A-Agricultural, SU-Semi Urban, UC-Urban Commercial, I-Industrial
3. Earthwork in fill : I (0-*0.5m high), II (0.5m - 1.0m), III (> 1.0m)
4. Surface Type : BT-Bitumen, C-Concrete, G-Gravel
5. Shoulder Type : S-Sealed, G-Gravel, E-Earthen

Annexure A-4: Pavement Condition

Chainage (Km)		Carriage-way width (m)	Cracking				Ravelling		Pothol ing		Patching		Bleeding		Rut (Depth)	Edge failure	Shoulder					
																	Left			Right		
From	To		Type	Width	Area (Sqm)	%	Area (Sqm)	%	Area (Sqm)	%	Area (Sqm)	%	Area (Sqm)	%	Class	m	Type	Mode	Extent	Type	Mode	Extent
219/000	220/000	6.70	B	N	1072.0	16.0	-		-		-		-		2	100	E	D	M	E	D	M
220/000	221/000	6.80	B	N	2720.0	40.0	-		-		-		-		2	100	E	E	M	E	E	M
221/000	222/000	7.10	B	N	4260.0	60.0	-		-		-		-		2	-	E	E	M	E	E	M
222/000	223/000	7.10	B	N	4260.0	60.0	-		-		-		-		2	-	E	E	M	E	E	M
223/000	224/000	6.85	B	N	4932.0	72.0	-		-		-		-		3	-	E	E	M	E	E	M
224/000	225/000	6.70	B	N	4092.0	61.0	-		-		-		-		3	-	E	E	M	E	E	M
225/000	226/000	6.80	B	N	4080.0	60.00	-		-		-		-		3	-	E	E	M	E	E	M
226/000	227/000	7.00			-		-		-		-		-		1	-	E	-	-	E	-	-
227/000	228/000	6.90			-		-		-		-		-		1	-	E	-	-	E	-	-
228/000	229/000	6.90			-		-		-		-		-		1	-	E	-	-	E	-	-
229/000	230/000	7.00			-		-		-		-		-		1	-	E	-	-	E	-	-
230/000	232/000	6.90			-		-		-		-		-		1	-	E	-	-	E	-	-

232/000	233/000		B	N	2359.0														
			B	W	1219.0														
232/000	233/000	6.90			3576.0	51.8	-	-	-	-	2	-	E	-	-	E	-	-	
233/000	234/000		B	N	4170.0														
			B	W	37.5														
233/000	234/000	6.95			4207.5	60.5	-	-	-	-	3	300	E	E	M	E	E	M	
234/000	235/000	6.70	B	N	4020.0	60.00	-	-	-	-	2	200	E	E	M	E	E	M	
235/000	236/000	6.90	B	N	2553.0	37.0	-	-	-	-	2	300	E	-	-	E	-	-	
236/000	237/000	6.90	B	N	3105.0	45.0	-	-	-	-	2	200	E	D	M	E	D	M	
237/000	238/000	6.80	B	N	1224.0	18.0	-	-	-	-	2	-	P	-	-	P	-	-	
239/000	240/000	7.00	B	N	3500.0	50.0	-	-	-	-	2	-	E	D	M	B	D	M	
240/000	241/000	6.90	B	N	4140.0	60.0	-	-	-	-	2	-	E	D	M	B	D	M	
241/000	242/000	7.00	B	N	3710.0	53.0	-	-	-	-	2	100	E	-	-	E	-	-	
242/000	243/000	6.80			-		-	-	-	-	2	300	E	-	-	E	-	-	
243/000	247/000	-			-		-	-	-	-	-	-		-	-	-	-	-	
247/000	248/000	7.10	B	N	3550.0	50.0	-	-	-	-	2	-	H	-	-	H	-	-	
248/000	249/000	6.75	B	N	2058.7	30.5	-	-	-	-	2	-	H	-	-	H	-	-	
249/000	250/000	7.10	B	N	2875.5	40.5	-	-	-	-	2	200	H	-	-	H	-	-	

250/000	251/000	6.70	B	N	2410.0	36.0	-	-	-	-	2	250	E	D	M	E	D	M
251/000	252/000		A	N	552.0													
			B	N	3174.0													
251/000	252/000	6.90			3726.0	54.0	-	-	-	-	2	300	E	E	M	E	E	M
252/000	253/000	6.80	B	N	3128.0	46.0	-	-	-	-	2	150	E	-	-	E	-	-
253/000	254/000		A	N	1742.0													
			B	N	2546.0													
253/000	254/000	6.7			4288.0	64.0	-	-	-	-	2	400	E	D	M	E	D	M
254/000	255/000		B	N	2948.0													
			B	W	1206.0													
254/000	255/000	6.70			4154.0	62.0	-	-	-	-	2	600	E	E	F	E	E	F

Crack Type
- L. Longitudinal
- T. Transverse
- B. Block
- A. Alligator

Width
- N. Narrow < 3mm
- W. Wide > 3mm

Rut Class
1. < 10mm
2. 10-20mm
3. > 20mm

Shoulder Type
- P. Paved
- E. Earthern
- H. Hard

Distress Mode
- C. Cuts
- E. Eroded
- D. Drops
- F. Failed

Extent
- M. Modernate
- F. Frequini
- VF. Very Frequent

Annexure A-4 : Contd.

Bhognipur to Barah (Km 421.200 to Km 449.000)

Stretch (km)		Pavement Condition							Shoulder				Embankment Condition[4]
		Cracking			Revelling (%)	Edge Break (length in m)	Pot Holes (%)	Rut[2] Depth	Condition[3]		Edge Drop (in m)		
From	To	Type[1]	Fine (<3mm) (%)	Wide (>3mm) (%)					LHS	RHS	LHS	RHS	
421.20	421.40	AL	3	12	-	-	-	-	F	F	N	N	G
421.40	421.60	AL	3.5	10	-	-	-	-	F	F	N	N	G
421.60	421.80	AL	3	15	-	-	-	-	F	F	N	N	G
421.80	422.00	AL	2.5	12	-	-	-	-	F	F	N	N	G
422.00	422.20	AL	2	15	-	-	-	-	F	F	N	N	G
422.20	422.40	AL	2	20	-	-	1	-	F	F	N	N	G
422.40	422.60	AL	4	50	-	-	1	-	F	F	N	N	G
422.60	422.80	AL	1	30	-	-	-	-	F	F	N	N	G
422.80	423.00	AL	2	10	-	-	1	-	F	F	N	N	G
423.00	423.20	-	-	-	-	-	-	-	F	F	N	N	G
423.20	423.40	AL	2	-	-	-	-	-	F	F	N	N	G
423.40	423.60	AL	2	-	-	-	-	-	F	F	N	N	G
423.60	423.80	AL	4	-	-	-	-	-	F	F	N	N	G
423.80	424.00	AL	1	-	-	-	-	-	F	F	N	N	G
424.00	424.20	AL	4	-	-	-	-	-	F	F	N	N	G

424.20	424.40	AL	6	3	-	-	-	-	F	F	N	N	G
424.40	424.60	AL	3	10	-	-	-	-	F	F	N	N	G
424.60	424.80	AL	1	-	-	-	-	-	F	F	N	N	G
424.80	425.00	AL	1	-	-	-	-	-	F	F	N	N	G
425.00	425.20	AL	10	10	-	-	1	-	F	F	N	N	G
425.20	425.40	AL	5	7	-	-	-	-	F	F	N	N	G
425.40	425.60	AL	20	15	-	-	-	-	F	F	N	N	G
425.60	425.80	AL	15	20	-	-	1	-	F	F	N	N	G
425.80	426.00	AL	20	20	-	-	2	-	F	F	N	N	G
426.00	426.20	AL	30	30	-	-	-	-	F	F	N	N	G
426.20	426.40	AL	25	20	-	-	-	-	F	F	N	N	G
426.40	426.60	AL	15	15	-	-	2.5	-	F	F	N	N	G
426.60	426.80	AL	15	15	-	-	-	-	F	F	N	N	G
426.80	427.00	AL	20	15	-	-	1	-	F	F	N	N	G
427.00	427.20	AL	20	15	-	-	1	-	F	F	N	N	G
427.20	427.40	AL	20	15	-	-	1	-	F	F	N	N	G
427.40	427.60	AL	5	8	-	-	-	-	F	F	N		G
427.60	427.80	AL	10	4	-	-	-	-	F	F	N	N	G
427.80	428.00	AL	3	4	-	-	-	-	F	F	N	N	G
428.00	428.20	AL	10	12	-	-	-	-	G	G	N	N	G
428.20	428.40	AL	20	25	-	-	-	-	G	G	N	N	G
428.40	428.60	AL	10	15	-	-	-	-	G	G	N	N	G

428.60	428.80	AL	30	30	-	-	-	-	G	G	N	N	G
428.80	429.00	AL	10	15	-	-	1	-	G	G	N	N	G
429.00	429.20	AL	15	30	-	-	1	-	G	G	N	N	G
429.20	429.40	AL	10	30	-	-	-	-	F	F	N	N	G
429.40	429.60	AL	10	30	-	-	-	-	F	F	0.2	0.2	G
429.60	429.80	AL	15	30	-	-	-	-	F	F	0.2	0.2	G
429.80	430.00	AL	15	20	-	-	1	-	F	F	N	N	G
430.00	430.20	AL	5	5	-	-	-	-	G	G	N	N	G
430.20	430.40	AL	5	5	-	-	-	-	G	G	N	N	G
430.40	430.60	AL	5	5	-	-	2	-	G	G	N	N	G
430.60	430.80	AL	5	5	-	-	1	-	G	G	N	N	G
430.80	431.00	AL	5	5	-	-	1	-	G	G	N	N	G
431.00	431.20	AL	5	5	-	-	-	-	G	G	N	N	G
431.20	431.40	AL	8	8	-	-	-	-	G	G	N	N	G
431.40	431.60	AL	20	20	-	-	-	-	G	G	N	N	G
431.60	431.80	AL	10	10	-	-	1	-	F	F	N	N	G
431.80	432.00	AL	10	10	-	-	1	-	F	F	N	N	G
432.00	432.20	-	-	-	-	-	-	-	F	F	N	N	G
432.20	432.40	-	-	-	-	-	-	-	F	F	N	N	G
432.40	432.60	-	-	-	-	-	-	-	F	F	N	N	G
432.60	432.80	-	-	-	-	-	-	-	F	F	N	N	G
432.80	433.00	-	-	-	-	-	-	-	F	F	N	N	G

433.00	433.20	-	-	-	-	-	-	-	F	F	0.2	0.2	G
433.20	433.40	-	-	-	-	-	-	-	F	F	0.3	0.3	G
433.40	433.60	-	-	-	-	-	-	-	F	F	0.3	0.3	G
433.60	433.80	-	-	-	-	-	-	-	F	F	0.3	0.3	G
433.80	434.00	-	-	-	-	-	-	-	F	F	0.3	0.3	G
434.00	434.20	-	-	-	-	-	-	-	F	F	N	N	F
434.20	434.40	-	-	-	-	-	-	-	F	F	0.3	0.3	F
434.40	434.60	-	-	-	-	-	-	-	F	F	0.4	0.2	F
434.60	434.80	-	-	-	-	-	-	-	F	F	0.2	0.2	F
434.80	435.00	-	-	-	-	-	-	-	F	F	N	N	F
435.00	435.20	AL	-	40	-	-	4	-	F	F	N	N	G
435.20	435.40	AL	-	25	-	-	2	-	F	F	N	N	G
435.40	435.60	AL	-	25	-	-	-	-	F	F	N	N	G
435.60	435.80	AL	-	10	-	-	-	-	F	F	N	N	G
435.80	436.00	AL	-	10	-	-	1	-	F	F	N	N	G
436.00	436.20	AL	-	20	-	-	3	-	F	F	N	N	F
436.20	436.40	AL	-	25	-	-	2	-	F	F	N	N	F
436.40	436.60	AL	-	25	-	-	1	-	F	F	N	N	F
436.60	436.80	AL	-	20	-	-	1	-	F	F	N	N	F
436.80	437.00	AL	-	10	-	-	1	-	F	F	N	N	F
437.00	437.20	AL	-	10	-	-	2	-	F	F	N	N	F
437.20	437.40	AL	-	15	-	-	1	-	F	F	N	N	F

437.40	437.60	AL	-	15	-	-	1	-	F	F	N	N	F
437.60	437.80	-	-	-	-	-	-	-	F	F	N	N	F
437.80	438.00	AL	-	5	-	-	1	-	F	F	N	N	F
438.00	438.20	AL	-	5	-	-	2	-	F	F	N	N	F
438.20	438.40	-	-	-	-	-	-	-	F	F	N	N	F
438.40	438.60	AL	-	10	-	-	2	-	F	F	N	N	F
438.60	438.80	AL	-	5	-	-	-	-	F	F	N	N	F
438.80	439.00	AL	-	5	-	-	-	-	F	F	N	N	F
439.00	439.20	AL	-	5	-	-	2	-	F	P	N	N	G
439.20	439.40	-	-	-	-	-	-	-	F	P	N	N	G
439.40	439.60	AL	-	5	-	-	1	-	F	F	N	N	G
439.60	439.80	-	-	-	-	-	-	-	F	F	N	N	G
439.80	440.00	-	-	-	-	-	-	-	F	F	N	N	G
440.00	440.20	AL	5	-	-	-	1	-	G	G	N	N	F
440.20	440.40	AL	5	-	-	-	1	-	G	G	N	N	F
440.40	440.60	AL	-	5	-	-	-	-	F	F	N	N	F
440.60	440.80	-	-	-	-	-	-	-	F	F	N	N	F
440.80	441.00	-	-	-	-	-	1	-	F	F	N	N	F
441.00	441.20	AL	5	5	-	-	2	-	G	F	N	N	G
441.20	441.40	-	-	-	-	-	-	-	F	F	N	N	G
441.40	441.60	-	-	-	-	-	-	-	F	F	N	N	G
441.60	441.80	-	-	-	-	-	2	-	F	F	N	N	G

441.80	442.00	-	-	-	-	-	2	-	F	F	N	0.3	G
442.00	442.20	AL	5	5	-	-	2	-	G	F	N	N	G
442.20	442.40	AL	5	5	-	-	-	-	F	G	N	0.3	G
442.40	442.60	AL	5	-	-	-	-	-	F	G	N	N	G
442.60	442.80	AL	5	-	-	-	-	-	F	F	N	N	G
442.80	443.00	AL	5	-	-	-	-	-	F	F	N	N	G
443.00	443.20	AL	-	7	-	-	-	-	G	G	N	N	G
443.20	443.40	AL	-	7	-	-	-	-	G	G	N	N	G
443.40	443.60	AL	-	10	-	-	-	-	G	G	N	N	G
443.60	443.80	AL	-	5	-	-	-	-	G	G	N	N	G
443.80	444.00	AL	-	10	-	-	2	-	G	G	N	N	G
444.00	444.20	AL	-	6	-	-	-	-	G	F	N	N	F
444.20	444.40	AL	10	-	-	-	-	-	G	F	N	N	F
444.40	444.60	AL	10	-	-	-	-	-	G	G	F	0.2	F
444.60	444.80	AL	5	-	-	-	-	-	F	F	F	0.3	F
444.80	445.00	AL	5	5	-	-	-	-	F	F	F	0.3	F
445.00	445.20	AL	5	2	-	-	-	-	F	G	N	N	G
445.20	445.40	AL	5	2	-	-	-	-	F	G	N	N	G
445.40	445.60	AL	5	5	-	-	-	-	F	G	N	N	G
445.60	445.80	-	-	-	-	-	-	-	F	G	N	N	G
445.80	446.00	AL	5	8	-	-	-	-	F	G	N	N	G
446.00	446.20	AL	10	15	-	-	1	-	F	G	N	N	G

446.20	446.40	AL	10	15	-	-	1	-	F	G	N	N	G
446.40	446.60	AL	10	15	-	-	-	-	F	G	N	N	G
446.60	446.80	-	-	-	-	-	-	-	F	G	N	N	G
446.80	447.00	AL	10	10	-	-	-	-	F	G	N	N	G
447.00	447.20	AL	10	20	-	-	2	-	G	G	N	N	G
447.20	447.40	AL	10	20	-	-	2	-	G	G	N	N	G
447.40	447.60	AL	10	20	-	-	1	-	G	G	N	N	G
447.60	447.80	AL	10	20	-	-	1	-	G	G	N	N	G
447.80	448.00	AL	10	20	-	-	2	-	G	G	N	N	G
448.00	448.20	AL	30	40	-	-	2	-	G	G	N	N	G
448.20	448.40	AL	5	8	-	-	1	-	G	G	N	N	G
448.40	448.60	AL	8	15	-	-	1	-	G	G	N	N	G
448.60	448.80	AL	10	12	-	-	-	-	G	G	N	N	G
448.80	449.00	AL	4	6	-	-	-	-	G	G	N	N	G

N : Normal

153

Recording Interval : at every 200 meters

1. Crack Type : T - Transverse, L - Longitudinal, B - Block, A - Alligator
2. Rut Depth : I (<10mm), II (10-20mm), III (>20mm)
3. Shoulder Condition : G - Good, F - Fair, VP - Very Poor, P - Poor
4. Condition of Embankment : E - Eroded, F - Fair, G - Good Condition

Annexure A – 5 : Pavement Characteristics Deflection (Km 220.00o Km 255)

From	To	Initial (Do)	Interme diate (Di)	Final (Df)	Meas.D eflecion	Pav. Tempt.	Crrectn. (Tempt & Season)		Corrd. Def	Mean Def	S.D	Charac.D eflection
220.000	221.000	0.000	0.250	0.310	0.969	30	0.05	1.4	1.427	1.679	0.319	2.32
221.000	222.000	0.000	0.320	0.360	0.953	30	0.05	1.4	1.404	1.659		
222.000	223.000	0.000	0.290	0.340	0.971	30	0.05	1.4	1.429	1.663		
223.000	224.000	0.000	0.490	0.520	1.215	30	0.05	1.4	1.770	1.633		
224.000	225.000	0.000	0.300	0.360	1.069	30	0.05	1.4	1.567	1.643		
225.000	226.000	0.000	0.150	0.200	0.691	30	0.05	1.4	1.037	1.659		
226.000	227.000	0.000	0.350	0.390	1.013	30	0.05	1.4	1.488	1.701		
227.000	228.000	0.000	0.150	0.180	0.535	30	0.05	1.4	0.818	1.720		
228.000	229.000	0.000	0.330	0.420	1.364	30	0.05	1.4	1.979	1.773		
229.000	230.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.768		
230.000	231.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.746		
231.000	232.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.722		
232.000	233.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.699		
233.000	234.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.694		
234.000	235.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.679		
235.000	236.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.637		
236.000	237.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.543		
237.000	238.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.449		
238.000	239.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.355		
239.000	240.000	0.000	0.450	0.500	1.291	30	0.05	1.4	1.877	1.261		
240.000	241.000	0.000	0.300	0.340	1.291	30	0.05	1.4	1.0374	1.167		
241.000	242.000	0.000	0.150	0.520	1.291	30	0.05	1.4	1.4879	1.115		
242.000	243.000	0.000	0.350	0.360	1.291	30	0.05	1.4	0.8184	1.041		
243.000	244.000	0.000	0.150	0.200	1.291	30	0.05	1.4	1.9793	1.000		
244.000	245.000	0.000	0.330	0.390	1.291	30	0.05	1.4	1.8774	0.901		
245.000	246.000	0.000	0.450	0.180	1.291	30	0.05	1.4	1.8774	0.807		
246.000	247.000	0.000	0.450	0.420	1.291	30	0.05	1.4	1.8774	0.713		
247.000	248.000	0.000	0.450	0.500	0.953	30	0.05	1.4	1.8774	0 619		
248.000	249.000	0.000	0.450	0.500	0.971	30	0.05	1.4	1.8774	0.526		
249.000	250.000	0.000	0.450	0.500	1.215	30	0.05	1.4	1.4269	0.432		
250.000	251.000	0.000	0.450	0.500	1.069	30	0.05	1.4	1.4039	0.360		
251.000	252.000	0.000	0.450	0.500	0.691	30	0.05	1.4	1.4294	0.290		
252.000	253.000	0.000	0.350	0.500	1.013	30	0.05	1.4	1.7704	0.219		
253.000	254.000	0.000	0.150	0.340	0.535	30	0.05	1.4	1.5669	0.130		
254.000	255.000	0.000	0.330	0.520	1.364	30	0.05	1.4	1.0374	0.052		

Annexure A-5 Contd (Km 422.00 to Km 449.00)

Location	L/R	Do	Di	Df	PT	MC	AvgDef	Mean	STDV	Corr. Def
421.000	L	100	70	68	52.0	1.300	0.611	0.674	0.233	1.14
421.500	R	100	74	72	52.0	1.300	0.507			
422.000	L	100	72	70	52.0	1.300	0.559			
422.500	R	100	72	70	52.0	1.300	0.559			
423.000	L	100	66	63	52.3	1.300	0.964			
423.500	R	100	83	80	52.3	1.300	0.522			
424.000	L	100	82	80	55.0	1.340	0.268			
424.500	R	100	74	73	55.0	1.300	0.442			
425.000	L	100	63	60	48.9	1.300	1.086			
425.500	R	100	76	75	48.9	1.300	0.469			
426.000	L	100	61	59	48.9	1.300	0.885			
426.500	R	100	75	73	48.9	1.300	0.521			
427.000	L	100	77	75	48.9	1.300	0.469			
427.500	R	100	87	85	48.9	1.300	0.209			
428.000	L	100	78	76	43.5	1.300	0.514			
428.500	R	100	77	75	43.5	1.300	0.540			
429.000	L	100	69	67	43.5	1.300	0.748			
429.500	R	100	77	75	43.5	1.300	0.540			
430.000	L	100	88	86	37.8	1.300	0.328			
430.500	R	100	88	85	37.8	1.300	0.581			
431.000	L	100	79	77	43.0	1.520	0.578			
431.500	R	100	88	86	43.0	1.520	0.304			
432.000	L	100	68	66	35.8	1.120	0.753			
432.500	R	100	82	80	35.8	1.120	0.439			
433.000	L	100	87	85	40.2	1.120	0.278			
433.500	R	100	72	70	40.2	1.120	0.614			
434.000	L	100	72	70	37.8	1.520	0.869			
434.500	R	100	68	67	37.8	1.520	0.961			
435.000	L	100	78	77	37.8	1.120	0.484			
435.500	R	100	61	59	37.8	1.120	0.887			
436.000	L	100	61	59	40.1	1.150	0.884			
436.500	R	100	78	76	40.1	1.150	0.493			
437.000	L	100	62	60	34.0	1.010	0.818			
437.500	R	100	62	60	34.0	1.010	0.818			
438.000	L	100	75	73	36.0	1.150	0.610			
438.500	R	100	77	75	36.0	1.150	0.564			
439.000	L	100	76	75	33.0	1.150	0.598			
439.500	R	100	52	50	33.0	1.150	1.173			
440.000	L	100	72	70	43.0	1.010	0.525			
440.500	R	100	72	69	43.0	1.010	0.722			
441.000	L	100	58	55	41.0	1.150	1.167			
441.500	R	100	72	70	41.0	1.150	0.621			

442.000	L	100	62	61	40.0	1.150	0.840			
442.500	R	100	55	53	40.0	1.150	1.024			
443.000	L	100	62	59	41.0	1.010	0.944			
443.500	R	100	58	56	41.0	1.010	0.828			
444.000	L	100	77	74	36.0	1.150	0.787			
444.500	R	100	65	63	36.0	1.150	0.840			
445.000	L	100	70	68	33.0	1.010	0.667			
445.500	R	100	62	60	33.0	1.010	0.828			
446.000	L	100	67	65	35.0	1.500	1.050			
446.500	R	100	66	64	35.0	1.500	1.080			
447.000	L	100	79	77	34.0	1.080	0.508			
447.500	R	100	80	79	34.0	1.080	0.464			
448.000	L	100	72	70	32.0	1.080	0.680			
448.500	R	100	72	70	32.0	1.080	0.680			
449.000	L	100	70	68	32.0	1.080	0.724			

Legend:
Do = Initial dial gauge reading, Di = Intermediate dial gauge reading
Df = final dial gauge reading, L = Left Side
R= Right Side, PT= Pavement Temperature °C
MC = Moisture Correction as per IRC:81-1997 charts
Corr. Def = Corrected Characteristic Deflection , mm (mean + 2 X Std. Dev)

Annexure A-6: Inventory of Bridges & Structures

Sl. No.	Location km/m	Type of Structure	Thickness of Slab (m)	Carriage way Width (m)	Overall Width (m)	No. of Span X Span Length (m)	Height (m)	Structural Features		Others	
								Sub Structure	Super Structure	Parapet / Footpath	Wing / Return wall
1	222.00	RCC T-Girder slab Bridge over Chamari Nala	0.35	11.00	12.00	14.6m x 2 + 14.5m x 1	Top of Deck to BL is 10.m	RCC abutment (stem is 12.0m x 1.8m) and pier (stem is 1.5m two girder resting on one pier and other two resting on another pier)on RCC foundation. (0.75m thick pier cap)	1.8m depth of girder with cast insitu deck slab of 0.35m.	RCC railing of 1.0m height on 0.3m kerb.	1.5m thick PCC Steep wing walls wjth 5.5 m base.
2	245.00	PSC Balanced cantilever very heigh Bridge at Kalpi over Yammuna river	approx 5.5	7.60	12.00	8 x 85m + 2 x 42.5m	Top of Deck to BL is 10.m	RCC abut ment and Octagonal shape RCC piers on deep well foundations nearly 35mtrs deep.	Nearly 5.0m PSC Cantilever at supports and 2.5m to 3.0m in the middle	RCC railing with 1.7m footpath both the sides with inspection Chamber at every beraing location	RCC splayed wing walls

S. NO.	Bridge No.	Chainage(Km)	Existing Bridge				Remarks
			Span Arrangement			Total Length (m)	
Major Bridges Km. 441.20 to Km. 449.00 (Upward & Downward Direction)							
1	438/1	437.6	4	x	13.75	55.00m	
Minor Bridges Km 441.2 to Km. 449.00 (Upward & Downward Direction)							
1	446/2	421.2	6.3+6.0+6.2			18.5m	

Annexure A-7: Condition of Bridges as Determined by Visual Observation

Major Bridges					Minor Bridges						ROB's		
Super structure totally damaged	1.5m edge strip of Super structure damaged	Damaged to soffit of slabs, RCC pier/abutment cap, RCC pier	Bridges requiring minor repair	Good condition	Super structure totally damaged	1.5m edge strip of Super structure damaged	Damaged to soffit of slabs, RCC pier/abutment cap, RCC pier	Bridges requiring minor repairs	Good condition	Re-construction	Damaged to soffit of slabs, RCC pier/abutment cap, RCC pier	Bridges requiring minor repairs	Good condition
--	--	--	2	--	-	-	-	2	-	--	--	-	--

Annexure A-8: Inventory and Condition of Existing Culverts

Chainage : From Km. 220.000 - Km. 255.000

SL. No.	Existing Structure No.	Structure Type	Existing Structure Size	Proposed St. No.	Chainage	Remarks
1		RCC Box		**227/1**	226.150	**New RCC Box of Size 2.0m x 1.8m**
2		RCC Box		**228/2**	227.545	**New RCC Box of Size 2.0m x 1.8m**
3		RCC Box		**229/1**	228.350	**New RCC Box of Size 2.0m x 1.8m**
4	224/1	RCC Slab	5.0 x 1.8	**230/1**	229.350	**Extende by By 5.0m x 1.8m RCC Box**
RHS						**Extende by By 5.0m x 1.5m RCC Box**
5	225/1	RCC Box	1.37 x 1.7	**231/1**	230.290	**Replace by 1.5m x 1.8m RCC Box**
6		RCC Box		**232/1**	231.200	**New RCC Box of 3.0m x 2.9m**
RHS						**Extended by 3.0m x 1.9m**
7	227/1	Hume Pipe	1.22 m Dia	**233/1**	232.150	**Replace By 2.0m x 2.2m RCC Box**
RHS						**Extended by 2 m x 2.9m RCC Box**
8	228/1	RCC Slab	2.0 x 2.2	**233/2**	232.700	**Replace By 2.0m x 2.2m RCC Box.**
RHS						**Extended by 2m x 2.5m RCC Box**

160

9	228/2	RCC Slab	1.0 x 2.3	**234/1**	233.120	**Replace By 2.0m x 2.3m RCC Box**
10	228/3	RCC Slab	1.37 x 2.0	**234/2**	233.500	**Replace by 2.0m x 2.0m RCC Box**
11	229/1	RCC Slab	3.0 x 2.3	**235/1**	234.080	**Replace by 3.0 m x 2.3m RCC Box.**
12	230/1	RCC Slab	3.0 x 2.7	**235/2**	**234.685**	**Replace by 3.0 m x 2.7m RCC Box.**
13	230/2	RCC Slab	5.0 x 2.7	**235/3**	234.850	**Extended by 5.0 m x 2.7m RCC Box.**
14	230/3	RCC Slab	1.3 x 1.3	**236/1**	235.250	**Replace by 1.5m x 1.8m RCC Box**
15	231/1	RCC Slab	3.0 x 3.5	**237/1**	236.430	**Extended by 3.0 m x 3.5m RCC Box.**
RHS						**Extended by 3.0m x 2.9m RCC Box.**
16	232/1	RCC Slab	2.5 x 1.8	**238/1**	237.400	**Extende by by 2.5m x 1.8m RCC Box.**
RHS						**Extended by 2.5m x 1.5m RCC Box**
17		RCC Box		**239/2**	**238.850**	**New RCC Box of size 3.0 x 3.3m**
RHS						**Extended by 3.0 m x 2.0m RCC Box**
18	234/1	RCC Slab	1.5 x 1.9	**240/1**	239.550	**Extende by RCC Box Of Size 1.5 m x 1.9m.**
19	236/1	RCC Slab	1.5 x 2.3	**241/1**	240.950	**Replace by 2.0m x 2.3m RCC Box**
20		RCC Box		**242/1**	**241.500**	**New RCC Box of Size 1.5 m x 1.8m**
RHS						**Extended by 1.5m x 1.5m RCC Box**

21	237/1	RCC Slab	2.5 x 2.3	**243/1**	**242.250**	Extende by 2.5m x 2.3m RCC Box
RHS						Extende by 2.5m x 1.9m RCC Box
22	238/1	Hume Pipe	1.2m dia	**243/2**	242.810	Replace by 1.5m x1.8m RCC Box
RHS						Extended by 1.5m x 1.3m RCC Box
23	239/1	RCC Slab	1.2 x 1.8	**244/1**	243.650	Replace by 1.5m x1.8m RCC Box
RHS						Extended by 1.5m x 1.4m RCC Box
24	239/2	RCC Slab	3.0 x 3.0	**244/3**	243.950	Extended by 3.0m x 3.0m RCC Box
RHS						Extended by 3.0m x 2.0m RCC Box
25	239/3	Hume Pipe	1.2 m Dia	**245/1**	244.350	New RCC Box of size 2.0m x 2.0m
RHS						Extended by 2.0m x 1.5m RCC Box
26	240/1	Hume Pipe	1.3 m Dia	**246/1**	245.050	Replace by 1.5m x 1.8m RCC Box
RHS						Extended by 1.5m x 1.6m RCC Box
27	241/1	RCC Slab	3.0 x 3.0	**247/1**	246.030	Replace by 3.0m x 3.0m RCC Box
RHS						Extended by 3.0m x 4.0m RCC Box
28	241/2	Hume Pipe	1.3 m Dia	**247/2**	246.650	Replace by 1.5m x 1.8 m RCC Box
RHS						Extende by 1.5m x 2.5m RCC Box

29	242/1	Hume Pipe	1.0 m Dia	**247/3**	246.900	**Replace by 1.5m x 1.8m RCC Box**
RHS						**Extended by 1.5m x 2.5m RCC Box**
30	242/2	Brick Arch	1.3 x 2.4	**248/1**	247.150	**Replace by 1.5m x 1.8m RCC Box**
RHS						**Extended by 1.5m x 2.0m RCC Box**
31	243/1	RCC Slab	3.0 x 2.8	**248/3**	247.950	**Extended by by 3.0m x 2.8m RCC Box**
RHS						**Extended by 3.0m x 3.3m RCC Box**
32	243/2	RCC Slab	3.0 x 5.3	**249/1**	248.550	**Extended by 3.0m x 5.3 RCC Box**
RHS						**Extended by 3.0m x 5.8m RCC Box**
33	244/1	RCC Slab	3.0 x 3.4	**250/1**	249.150	**Extended by 3.0m x 3.4m RCC Box**
34	244/2	RCC Slab	3.0 x 4.3	**250/2**	249.360	**Replace by 3.0m x 4.3m RCC Box**
RHS						**Extended by 3.0m x 4.2m RCC Box**
35		RCC Box		**253/1**	252.550	**New RCC Box of 2.0m x 3.0m**
36		RCC Box		**254/1**	253.850	**New RCC Box of 3.0m x 3.6m**
37	251/1	RCC Slab	3.0 x 1.7	**256/1**	255.250	**Extende by 3.0m x 2.2m RCC Box**
38	252/1	RCC Slab	3.0 x 1.5	**257/1**	256.550	**Extended by 3.0m x 1.5m RCC Box**
39	253/1	RCC Slab	3.0 x 2.3	**258/1**	257.520	**Extended by 3.0m x 2.3m RCC Box**

40	254/1	RCC Slab	3.0 x 2.6	**259/1**	258.150	**Extended by 3.0m x 2.6m RCC Box**
41	255/1	RCC Slab	3.0 x 2.8	**260/1**	259.080	**Extended By 3.0m x 2.8m RCC Box.**
42	256/1	RCC Slab	2.0 x 2.8	**261/1**	260.100	**Extended By 2.0m x 2.8m RCC Box.**

Annexure A-8 (Contd.)

Highway Division	**Inventory and Condition Survey of Culverts**																	
Road Name	**Bhognipur – Barah (Kanpur Bypass)**												**Chainage**	**(Km117/0-Km185/0)**				
Road No.	**NH 25**												**Section**					
S. No.	Culvert No.	Location	Type of structures (Pipe, Slab,Box, Arch)	Thick-ness of Slab	Ventway (No.xVent size)	Carriage-way width	Width of culvert	Condition of various features of Culverts					Height above bed level		Presence of scour	Adequacy of Ventway	Remarks
								Pipe, Slab, Arch	Abutment, Headwall	Wing Wall	Return Wall	Parapet, Handrail	U/S	D/S			
		(km)		(m)	(m)	(m)	(m)						(m)	(m)			
Km 421.20 to Km 449.00 (Upward & Downward Direction)																		
1	423/1	422.1	HP		2 x 1.2	11.4	12.2											
2	424/1	423.23	RCC SLAB		1.5x 2.4	11.2	12											
3	424/2	423.63	RCC SLAB		1.5 x 1.9	11.3	12.1											
4	425/1	424.468	RCC SLAB		2x1.5	11.3	12.1											

Highway Division			Inventory and Condition Survey of Culverts															
Road Name			Bhognipur – Barah (Kanpur Bypass)										Chainage		(Km117/0-Km185/0)			
Road No.			NH 25										Section					
S. No.	Culvert No.	Location	Type of structures (Pipe, Slab,Box, Arch)	Thick-ness of Slab	Ventway (No.xVent size)	Carriage-way width	Width of culvert	Condition of various features of Culverts					Height above bed level		Presence of scour	Adequacy of Ventway	Remarks	
								Pipe, Slab, Arch	Abutment, Headwall	Wing Wall	Return Wall	Parapet, Handrail	U/S	D/S				
		(km)		(m)	(m)	(m)	(m)						(m)	(m)				
5	426/1	425.3	RCC SLAB		3.8x 2.2	11.3	12.1											
6	426/2	425.8	RCC SLAB		3.0x 2.0	11.3	12.1											
7	427/2	426.95	RCC SLAB		1.5x1.0	11.4	12.2											
8	428/1	427.85	RCC SLAB		3.0x1.0	11.4	12.2											
9	429/1	428.7	RCC SLAB		1.5x 1.0	11.2	12											
10	430/1	429.03	ARCH		2x0.9x 1.7	11.3	12.1											
11	430/2	429.39	RCC SLAB		1.5x1.5	11.3	12.1											
12	431/1	430.12	RCC SLAB		1.5x1.2	11.2	12											
13	432/1	431.27	RCC SLAB		1.5x1.4	11.3	12.1											

Highway Division			Inventory and Condition Survey of Culverts											Chainage		(Km117/0-Km185/0)		
Road Name			Bhognipur – Barah (Kanpur Bypass)											Section				
Road No.			NH 25															
S. No.	Culvert No.	Location	Type of structures (Pipe, Slab,Box, Arch)	Thick-ness of Slab	Ventway (No.xVent size)	Carriage-way width	Width of culvert	Condition of various features of Culverts					Height above bed level		Presence of scour	Adequacy of Ventway	Remarks
								Pipe, Slab, Arch	Abutment, Headwall	Wing Wall	Return Wall	Parapet, Handrail	U/S	D/S			
		(km)		(m)	(m)	(m)	(m)						(m)	(m)			
14	432/2	431.875	RCC SLAB		1.5x1.2	15.4	16.2										
15	433/1	432.57	HP		2x0.9	11.0	11.9										
16	433/2	432.65	RCC SLAB		2.1x1.75	11.7	12.5										
17	434/1	433.875	RCC SLAB		2x1.5x1.9	11.7	12.8										
18	435/1	434.72	RCC SLAB		1.5x1.7	11.3	12.1										
19	437/1	436.7	RCC SLAB		3.0x2.7	11.3	12.1										
20	439/1	438.3	RCC SLAB		3.0x2.1	11.3	12.1										
21	440/1	439.02	RCC SLAB		5.0x2.4	11.45	12.3										
22	441/1	440.1	RCC SLAB		0.9x1.5	11.45	12.3										

Highway Division			Inventory and Condition Survey of Culverts															
Road Name			Bhognipur – Barah (Kanpur Bypass)										Chainage		(Km117/0-Km185/0)			
Road No.			NH 25										Section					
S. No.	Culvert No.	Location	Type of structures (Pipe, Slab,Box, Arch)	Thick-ness of Slab	Ventway (No.xVent size)	Carriage-way width	Width of culvert	Condition of various features of Culverts					Height above bed level		Presence of scour	Adequacy of Ventway	Remarks	
								Pipe, Slab, Arch	Abutment, Headwall	Wing Wall	Return Wall	Parapet, Handrail	U/S	D/S				
		(km)		(m)	(m)	(m)	(m)						(m)	(m)				
23	442/1	441.01	RCC SLAB		1.5x2.6	11.3	12.1											
24	442/2	441.82	RCC SLAB		5.0x2.5	11.0	11.8											
25	443/1	442.21	RCC SLAB		1.5x1.8	11.2	12											
26	444/1	443.43	HP		4x1.0	11.7	12.5											
27	444/2	443.95	RCC SLAB		1.5x1.0	11.30	12.1											
28	446/1	445.05	RCC SLAB		1.5x1.2	10.1	10.9											
29	446/3	445.4	RCC SLAB		3.0x3.6	11.0	12											
30	446/4	445.5	RCC SLAB		1.5x1	11.7	12.5											
31	446/5	445.9	RCC SLAB		0.9 x 1.0	14.45	15.2											

Highway Division	Inventory and Condition Survey of Culverts												Chainage	(Km117/0-Km185/0)		
Road Name	Bhognipur – Barah (Kanpur Bypass)												Section			
Road No.	NH 25												Height above bed level		Presence of scour	Adequacy of Ventway	Remarks
S. No.	Culvert No.	Location	Type of structures (Pipe, Slab,Box, Arch)	Thick-ness of Slab	Ventway (No.xVent size)	Carriage-way width	Width of culvert	Condition of various features of Culverts					U/S	D/S			
								Pipe, Slab, Arch	Abutment, Headwall	Wing Wall	Return Wall	Parapet, Handrail					
		(km)		(m)	(m)	(m)	(m)						(m)	(m)			
32	447/1	446.99	HP		0.9x0.9	11.6	12.4										
33	449/1	448.25	RCC SLAB		6x1.5	11.10	12.1										

Four Laning of the Existing Orai -Bhognipur Section (Km 220.0 to Km 255.00) on NH-25 And Bhognipur – Barah Section (Km 421.20 To Km 449.00) on NH-2 on Build, Operate and Transfer (BOT) or BOT (Annuity) Basis in the State of Uttar Pradesh

Part IV: TECHNICAL SCHEDULES

SCHEDULE – B
SCOPE OF THE PROJECT

Schedule - B

SCOPE OF THE PROJECT

1. General

Following section of this schedule briefly highlights part of the scope of the work of the 'Project' relevant to the mainline. The description of the requirements for the various elements of the Project Highway given herein under are the bare minimum requirements for the 'Project'. The 'Project' has the same meaning as defined in Para 1.1 of concession agreement.

In the planning, design and execution of the works and other works in connection with the repair, maintenance or improvement of the Project Highway and functions associated with the construction of the Project Highway and roadside facilities, the Concessionaire shall take all such actions and do all such things (including, but not limiting to, organizing itself, adopting measure and standards, executing procedures including inspection procedures and highway patrols and engaging and managing contractors agents and employees) as will:

i) enable NHAI to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety) and,
ii) enable NHAI to fulfil its statutory and common law obligations and,
iii) enable NHAI to provide a congestion free uninterrupted flow of traffic on the Project Highway and,
iv) enable NHAI to provide a level of service to the public not inferior to that provided on the trunk road during construction or improvements works and,
v) enable the Police, local authorities, and others in performing statutory duties or functions in relation to the Project Highway or adjoining roads to fulfil those duties and functions and,
vi) minimize the risk of damage, destruction or disturbance to third party property and,
vii) ensure that members of the public are treated with all due courtesy and consideration and,
viii) provide a safe clear and informative system of road signs and,
ix) comply with any specified program requirements, including for the completion of the new road and,
x) enable standards of fitness for the purpose appropriate to a highway to the Character of the Project Highway to be achieved throughout the Contract Period and,
xi) ensure adequate off-street parking facilities for both passenger and goods vehicles and,
xii) provide adequate bus bays for stopping of buses and bus shelters for commuters to wait under protection and,
xiii) achieve a high standard in the appearance and aesthetic quality of the Project surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the existing road and,

xiv) undertake proper safety audit through an appropriate consultant (i.e. apart from the Independent Consultant) before C.O.D. and,

xv) carry out accident recording and reporting (to IC/NHAI) by classification on regular basis and,

xvi) ensure adequate safety of the Project Workers on the work site.

2 Project Highway

Notwithstanding the base alignment plans enclosed with this document, the Concessionaire shall himself carryout and be responsible for engineering surveys, investigations and detailed engineering designs and prepare the working drawings 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-L**. All the designs and drawings shall be reviewed by the Independent Consultant prior to execution.

2.1 (A) Cross Sections

The project highway (length = 63.22km) shall generally be widened (km 220.000 to 255.000 and 422.00 to km. 449.00 (Barah) have a minimum 2x2 lane dual carriageway with 1.5m wide paved shoulder facility. Remaining existing 2x2 lane portion of Project Highway would require improvement & strengthening and 1.5m wide paved shoulders, service roads on both sides etc., wherever required. The typical cross section of four lane divided highway (with varying median width) is applicable for all the rural sections, the typical cross section with narrow median and service road is applicable for the urban areas, which shall be followed along with the minimum design criterion, indicated in **Schedule-D** for the development of the Project Highway. These typical cross sections to be considered are given in **Fig. Attached**. **Table B-1** shows the proposed schedule of Typical Cross Sections along the Project Highway.

The alternative cross section of the Project Highway at the cross drainage structures shall follow the typical cross sections in consultation with the Independent Consultant at the time of construction. The utility services, including optical fibre cables, shall be provided in the utility corridor earmarked for this purpose on the side where it is convenient to the Concessionaire or the concerned Authority with the approval of Independent Consultant and NHAI. The existing optical fibre cable shall be relocated by the respective owner at a safe place as indicated by I/C / NHAI in such a way that it causes least hindrances to the execution of project. In urban sections the utility services shall be provided through underground ducts provided for this purpose. For cross connection, the utility services shall be carried through the nearest cross drainage structure/cattle crossing below its deck slab and above HFL. In absence of such a structure in the vicinity of

the proposed location, it shall pass through separate underground ducts. Location and design of the cross utility ducts shall be finalized at the detailed design stage in consultation with the Independent Consultant and NHAI.

Table B-1: Type of Road Cross Sections

Table B-1: Type of Road Cross Sections

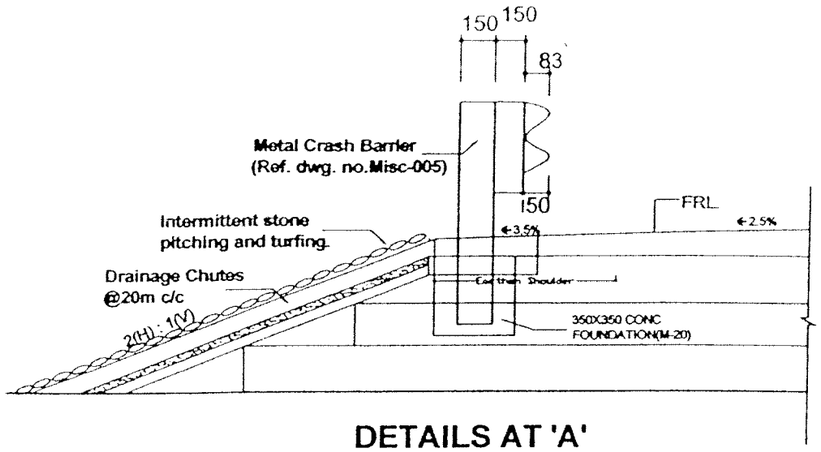
Proposed Chainage (km)		Length	Widening Type	Proposed Median Width	ROW (m)	Typical Cross Section ID	Service Road Width	Remarks
Start	End	(m)		(m)		(Type)	(m)	
255.000	421.740	**980**	SYM		45	5 & 6 C		Grade Separator
421.740	421.900	**160**	SYM	1.50	45	7 C	SYM - 5.5	
421.900	421.945	**45**	SYM	1.50	45	4 C	LHS - 5.5	
421.945	422.060	**115**	SYM	1.50	45	3C		
422.060	422.150	**90**	LHS	4.0 TO 4.5	45	1C		
422.150	422.450	**300**	LHS		45	2C	RHS - 5.5	
422.450	422.875	**425**	LHS	2.50	45	2C	SYM - 5.5	
422.875	422.940	**65**	SYM	Varying	45	3C	RHS - 5.5	
422.940	423.140	**200**	SYM	15.00	45	3C		
423.140	423.200	**60**	SYM	Varying	45	3C		
423.200	424.836	**1636**	SYM	2.50	45	4C	SYM - 5.5	
424.836	424.900	**64**	SYM	2.50	45	4C	LHS - 5.5	
424.900	425.361	461	SYM	1.20	45	9C		Grade Separator
425.361	425.670	**309**	SYM	2.50	45	3C		
425.670	425.914	**244**	SYM	2.50	45	4C	RHS - 5.50	
425.914	426.800	**886**	SYM	2.50	45	3C		
426.800	427.069	**269**	SYM	2.50	45	4C	LHS – 5.50	
427.069	427.700	**631**	SYM	2.50	45	4C	SYM – 5.50	
427.700	428.055	**355**	LHS	2.50	45	4C	LHS - 5.50	
428.055	428.200	**145**	SYM	2.50	45	4C	SYM – 5.50	
428.200	428.800	**600**	SYM	2.50	45	4C	RHS– 5.50	

428.800	429.358	**558**	SYM	2.50	45	4C	SYM - 5.50	
429.358	429.640	**282**	SYM	2.50	45	4C	LHS- 5.50	
429.640	429.800	**160**	SYM	2.50	45	4C	SYM - 5.50	
429.800	430.100	**300**	LHS	varying 3.5 - 4.5	45	1C		
430.100	433.200	**3100**	LHS	4.50	45	1C		
433.200	433.400	**200**	LHS	4.50	45	2C	RHS - 5.50	
433.400	433.480	**80**	LHS	4.50	45	4C	RHS - 5.50	
433.480	433.650	**170**	SYM	4.50	45	3C		
433.650	434.200	**550**		4.50	45	1C		
434.200	434.340	**140**	SYM	Varying 4.50 - 1.20	45	3C		
434.340	435.163	**823**	SYM	1.20	45	9C		**Grade Separator**
435.163	435.300	**137**	LHS	Varying 1.2 to 4.50	45	1C		
435.300	440.500	**5200**	LHS	4.50	45	1C		Sengur Bridge
440.500	440.900	**400**	RHS	1.50	45	2C	SYM - 5.5	
440.900	441.100	**200**	SYM	1.50	45	4C	SYM - 5.5	
441.100	441.400	**300**	RHS	1.50	45	2C	SYM - 5.5	
441.400	441.550	**150**	LHS	Varying 1.50 to 9.50	45	2C	RHS - 5.5	
441.550	441.800	**250**	LHS	4.50	45	2C	RHS - 5.5	
441.800	441.927	**127**	LHS	Varying	45	1C		
441.927	442.374	**447**	SYM	1.20	45	9C		**Grade Separator**

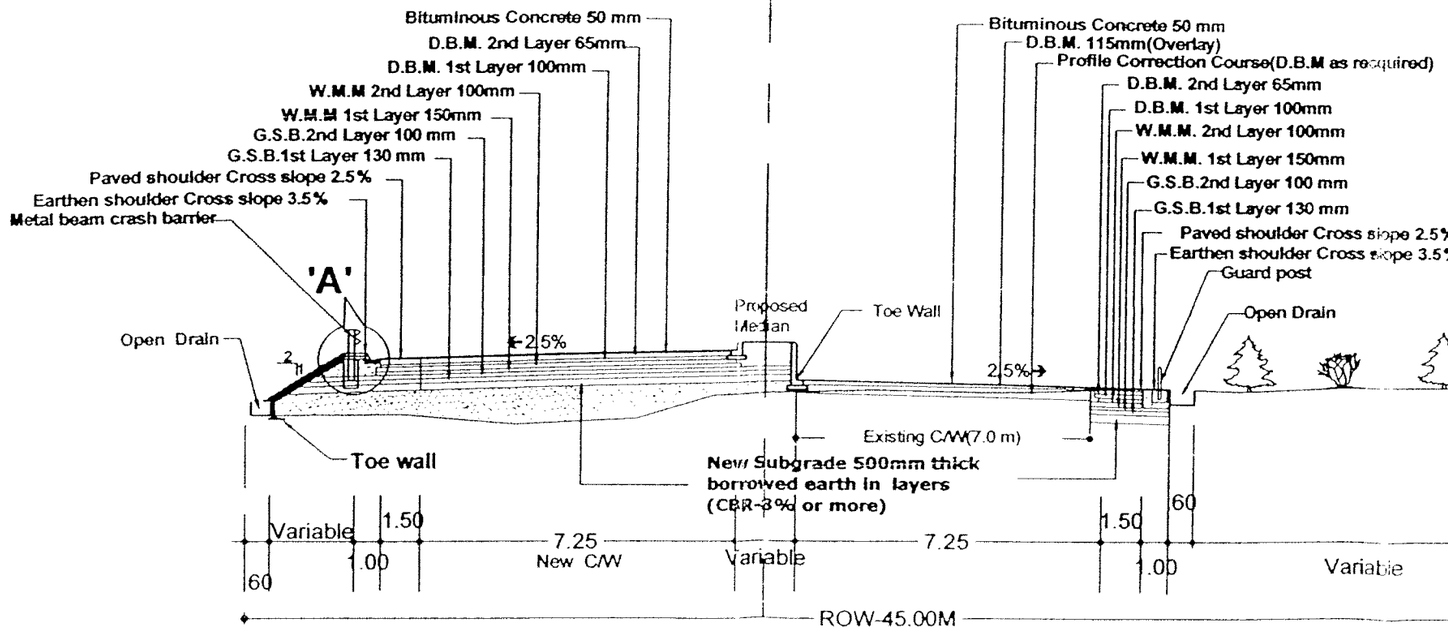
442.374	442.500	**126**	SYM	Varying 1.20 – 2.50	45	4C	SYM – 5.5	
442.500	442.615	**115**	SYM	2.50	45	4C	SYM – 5.5	
442.615	443.100	**485**	LHS	4.50	45	1C		
443.100	443.567	**467**	SYM	2.50	45	4C	SYM – 5.5	
443.567	443.676	**109**	SYM	2.50	45	3C		
443.676	444.438	**762**	SYM	1.20	45	9C		**Grade Separator**
444.438	444.474	**36**	SYM	Varying 1.20 – 4.50	45			
444.474	445.200	**726**	LHS	4.50	45	1C		
445.200	446.100	**900**	LHS	4.50	45	1C		Sengur Bridge
446.100	446.127	**27**	SYM	4.50	45	3C		
446.127	447.400	**1273**	SYM	4.50	45	4C	LHS – 5.5	
447.400	448.233	**833**	SYM	4.50	45	3C		
448.233	448.546	**313**	SYM	Varying 4.50 – 1.20	45	3C		
448.546	448.900	**354**	SYM	1.20	45	8C		**Grade Separator**
448.900	449.000	**100**			45			

Note: LHS = Left Side, RHS = Right, Sym. = Symmetrical, ROB = Rail Over Bridge, GS = Grade Separator, VP2 = Vehicular Underpass (2x2 Lane with 5m clearance), VP1 = Vehicular Underpass (2 Lane with 5m clearance), NVP = Non-Vehicular Underpass (2 Lane with

C : Stands for Crapht portion.



DETAILS AT 'A'

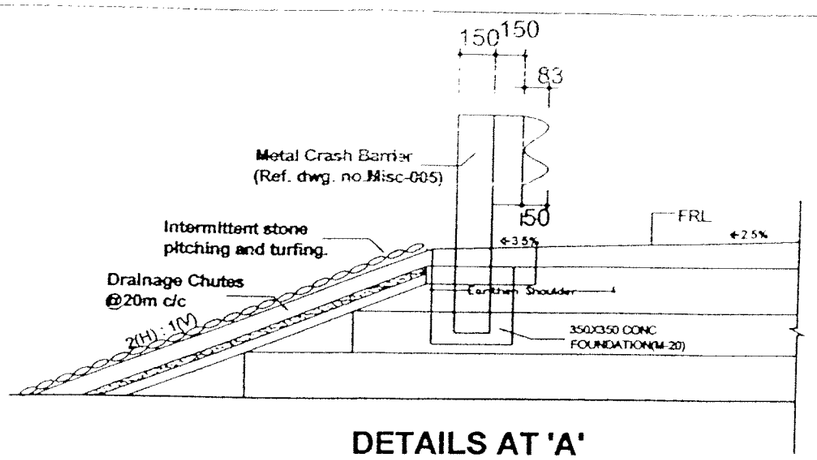


Type-1c: Typical X-section showing Eccentric widening along project road (without service road)

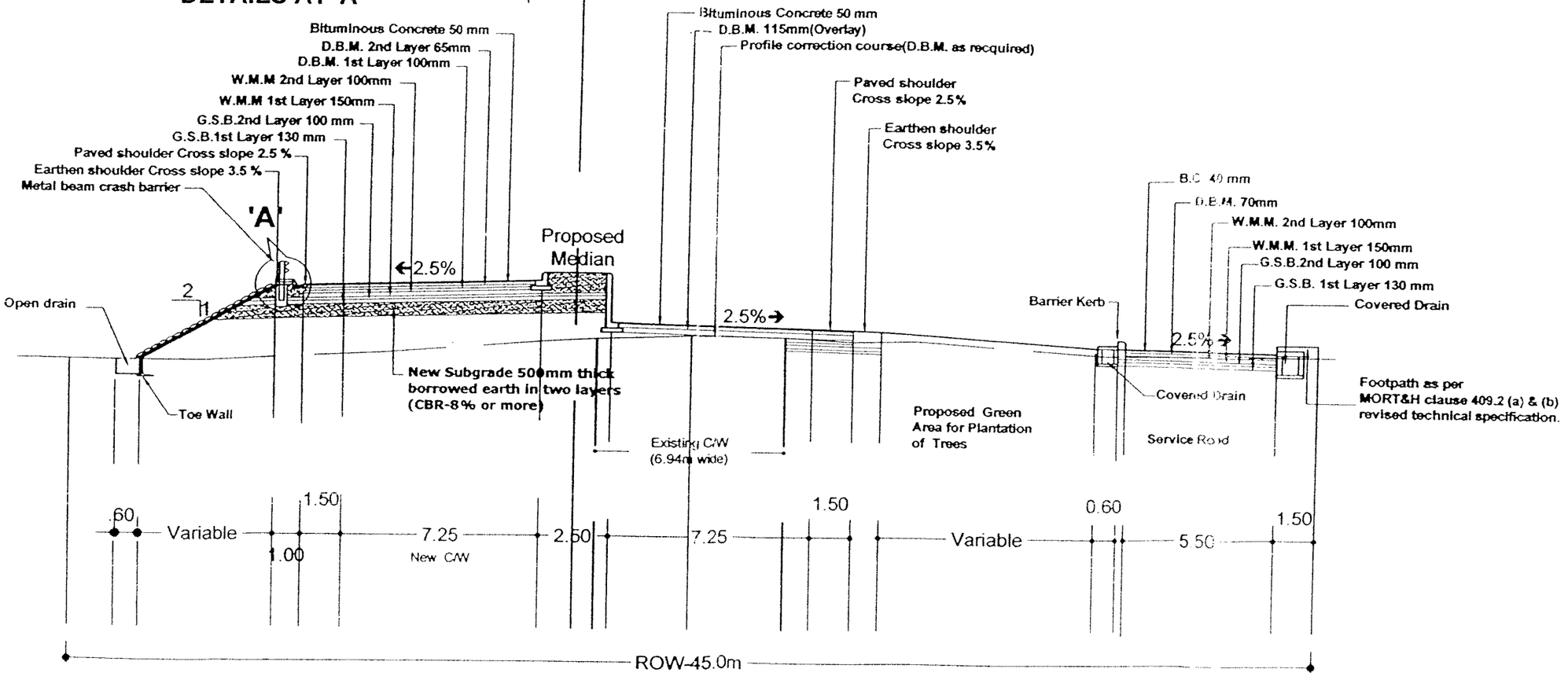
(Not to Scale)

1. All dimensions are in meter unless otherwise specified
2. The pavement composition shall be provided as per the details given

Fig -1



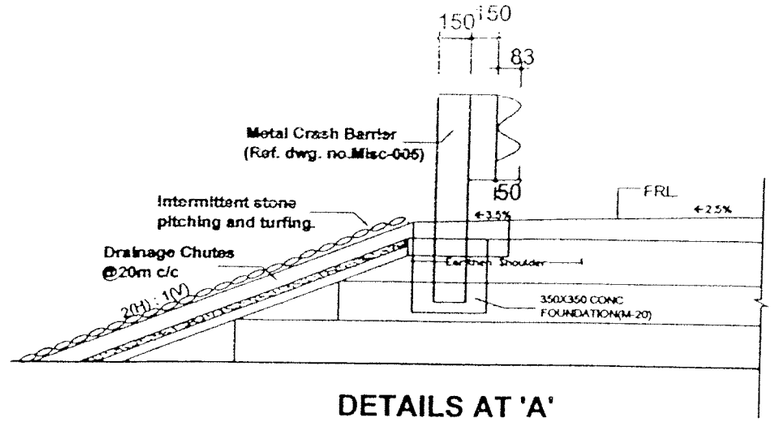
DETAILS AT 'A'



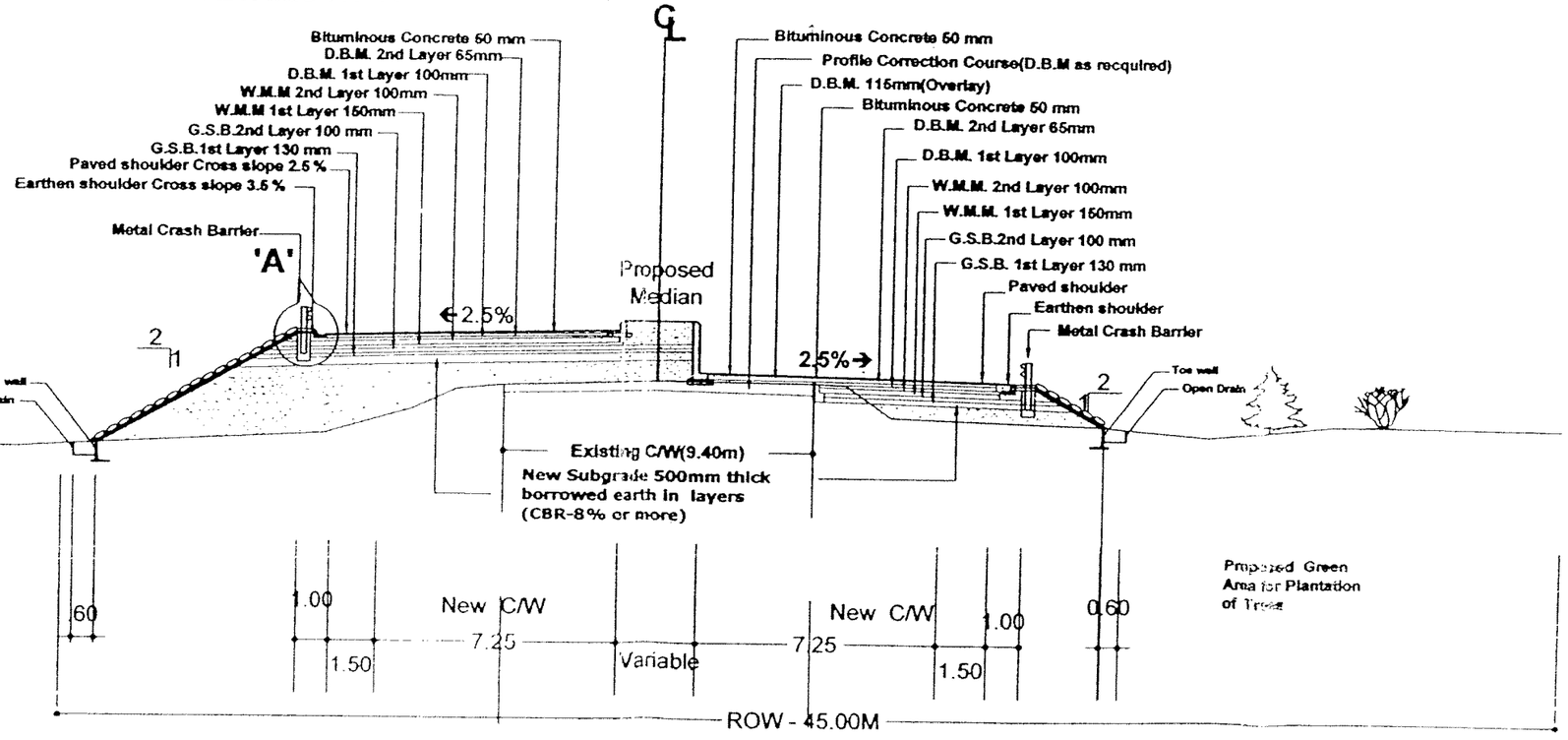
Type-2c: Typical X-section showing Eccentric widening along project road (with service road)
(Not to Scale)

1. All dimensions are in meter unless otherwise specified
2. The pavement composition shall be provided as per the details given

Fig. -2



DETAILS AT 'A'

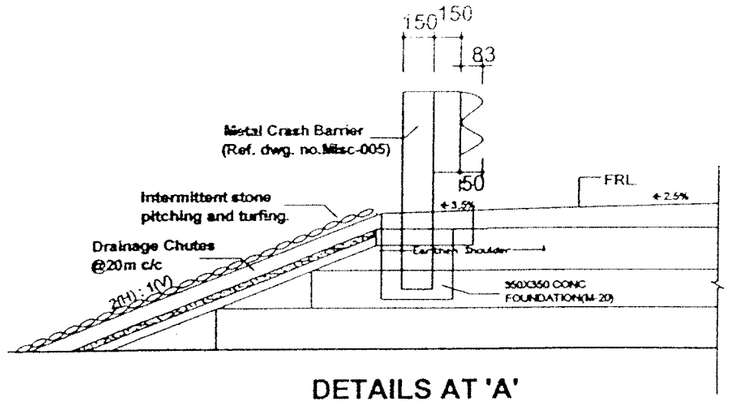


Type-3c: Typical X-section showing Concentric widening along project road (without service road)

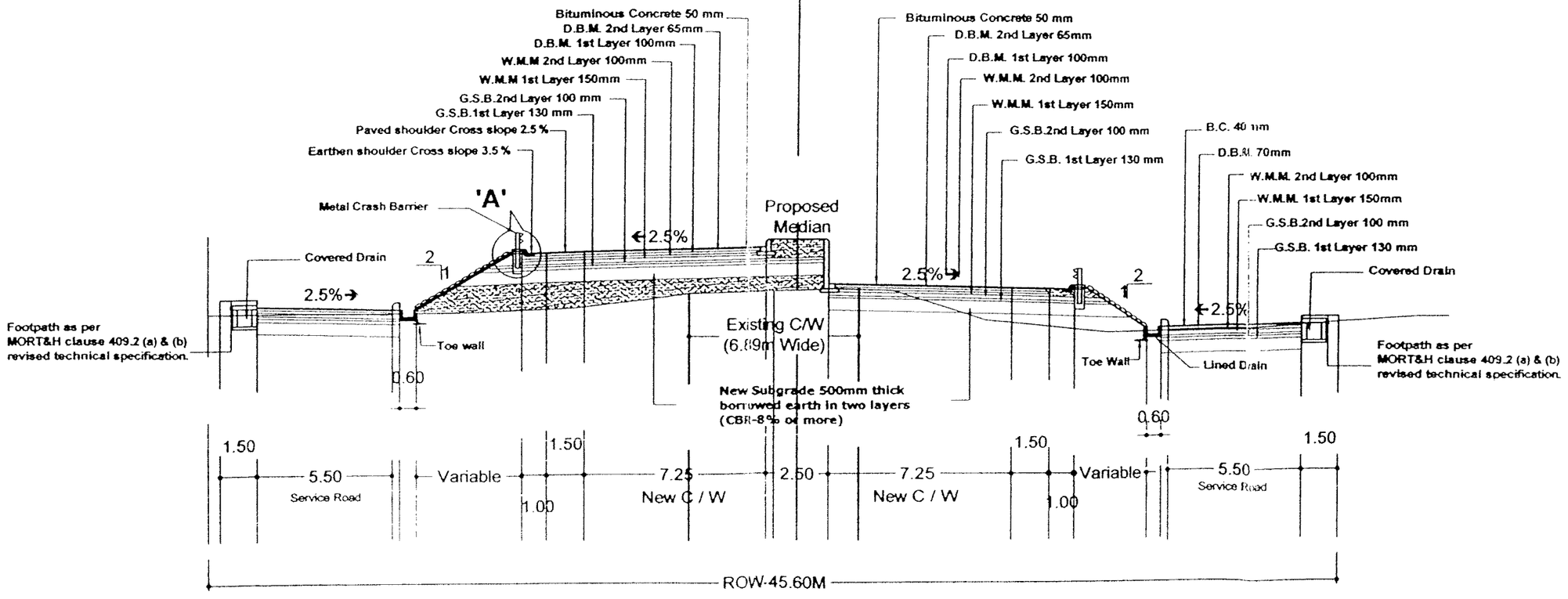
(Not to Scale)

1. All dimensions are in meter unless otherwise specified
2. The pavement composition shall be provided as per the details given

Fig -3

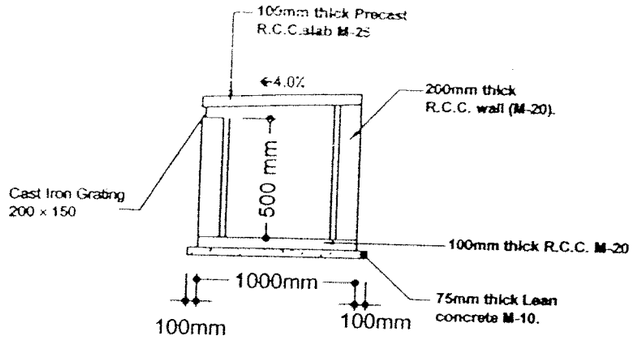


DETAILS AT 'A'

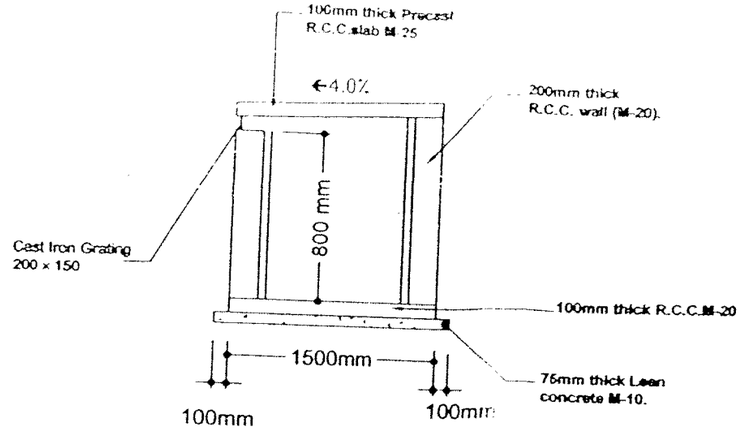


Type-4c: Typical X-section showing Concentric widening along project road (with service road)
(Not to Scale)

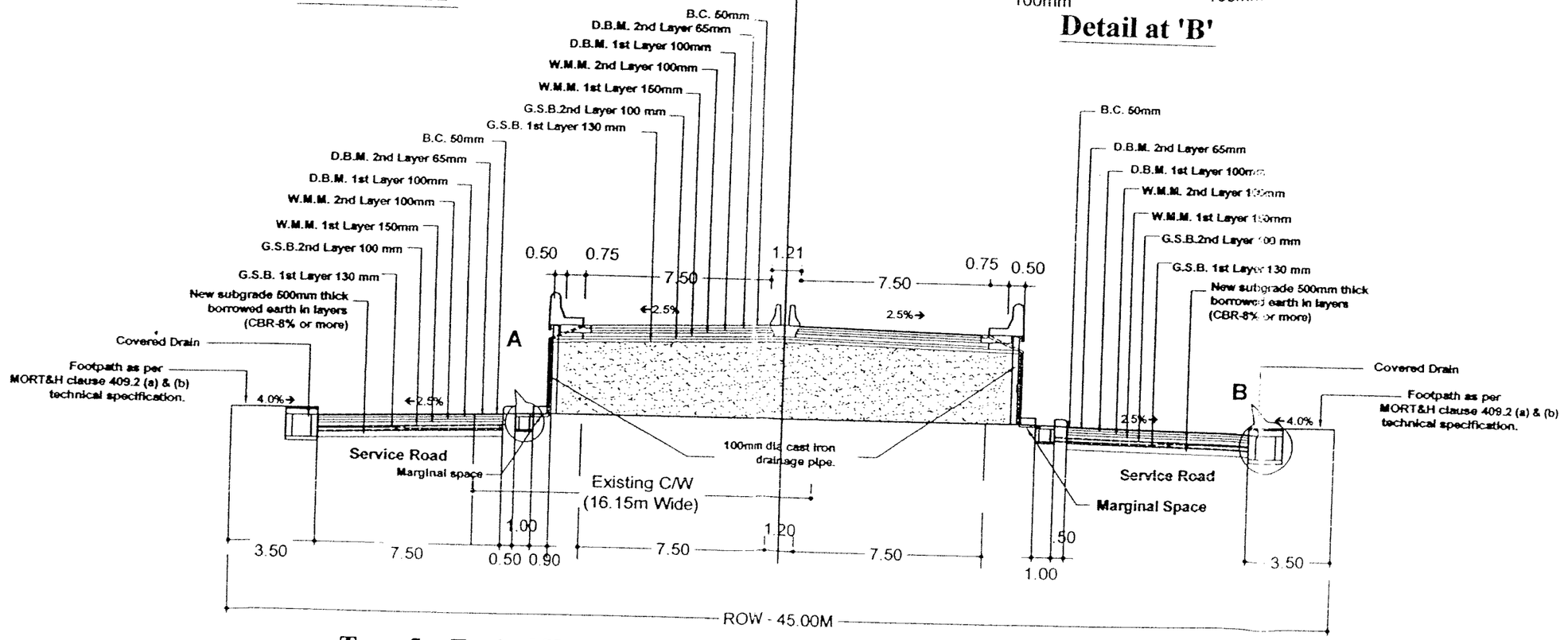
1. All dimensions are in meter unless otherwise specified.
2. The pavement composition shall be provided as per the details given



Detail at 'A'

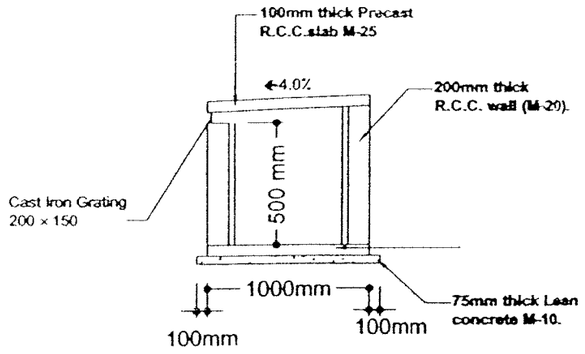


Detail at 'B'

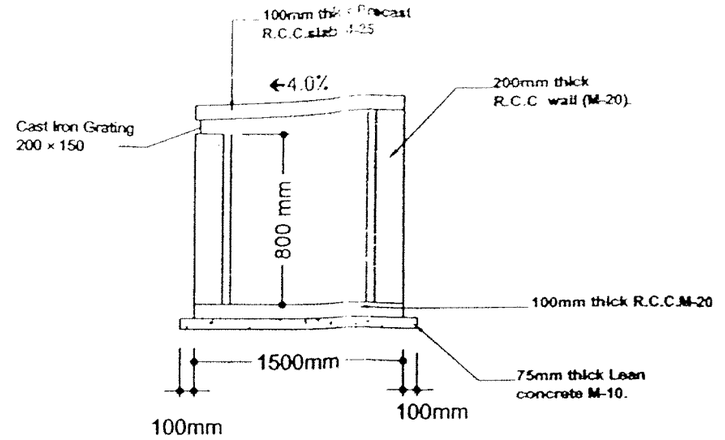


Type-5c: Typical X-section of Flyover on Embankment (R.E.S) at Bhognipur
(Not to Scale)

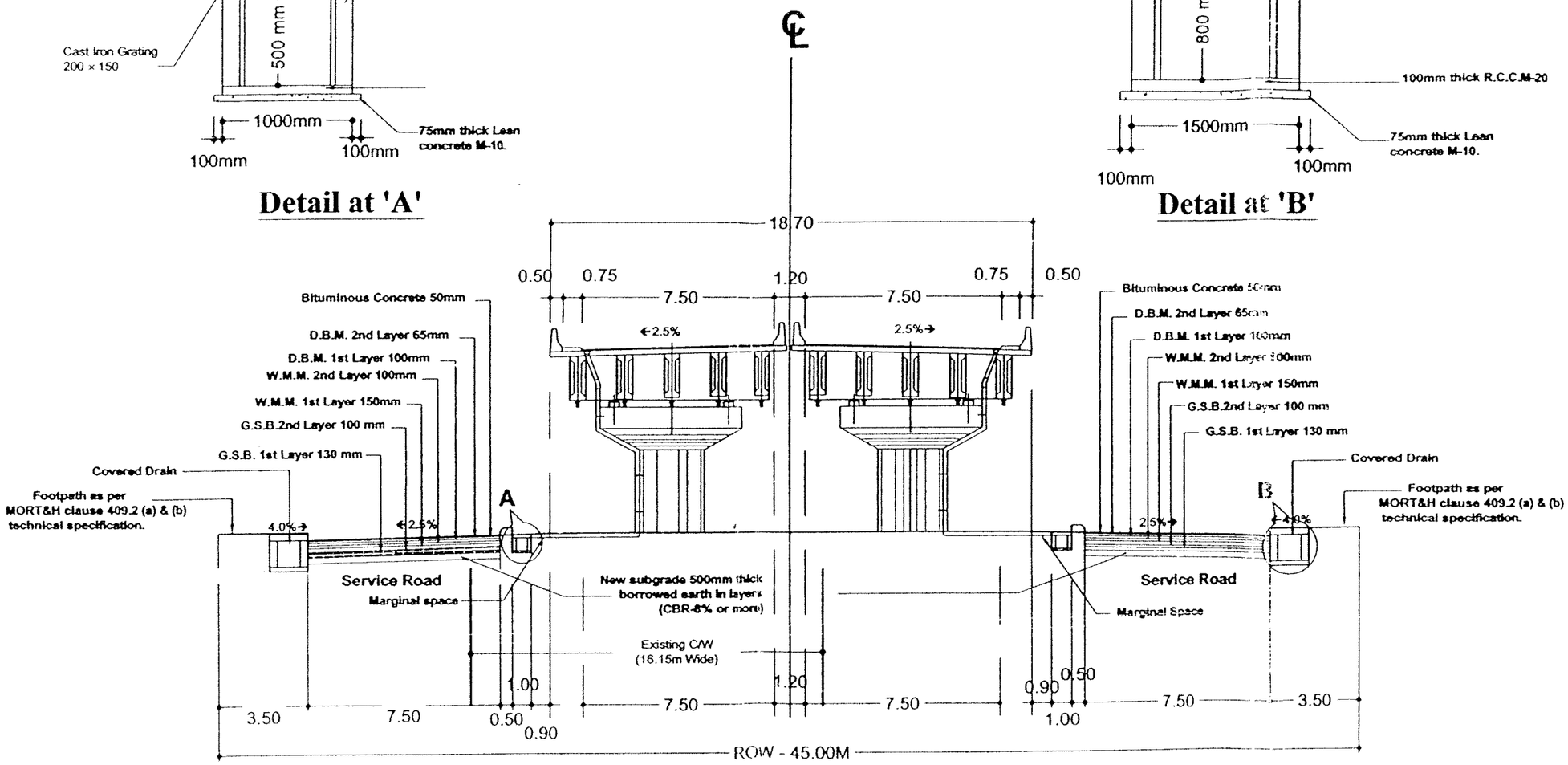
1. All dimensions are in meter unless otherwise specified.
2. The pavement composition shall be provided as per the details given.



Detail at 'A'

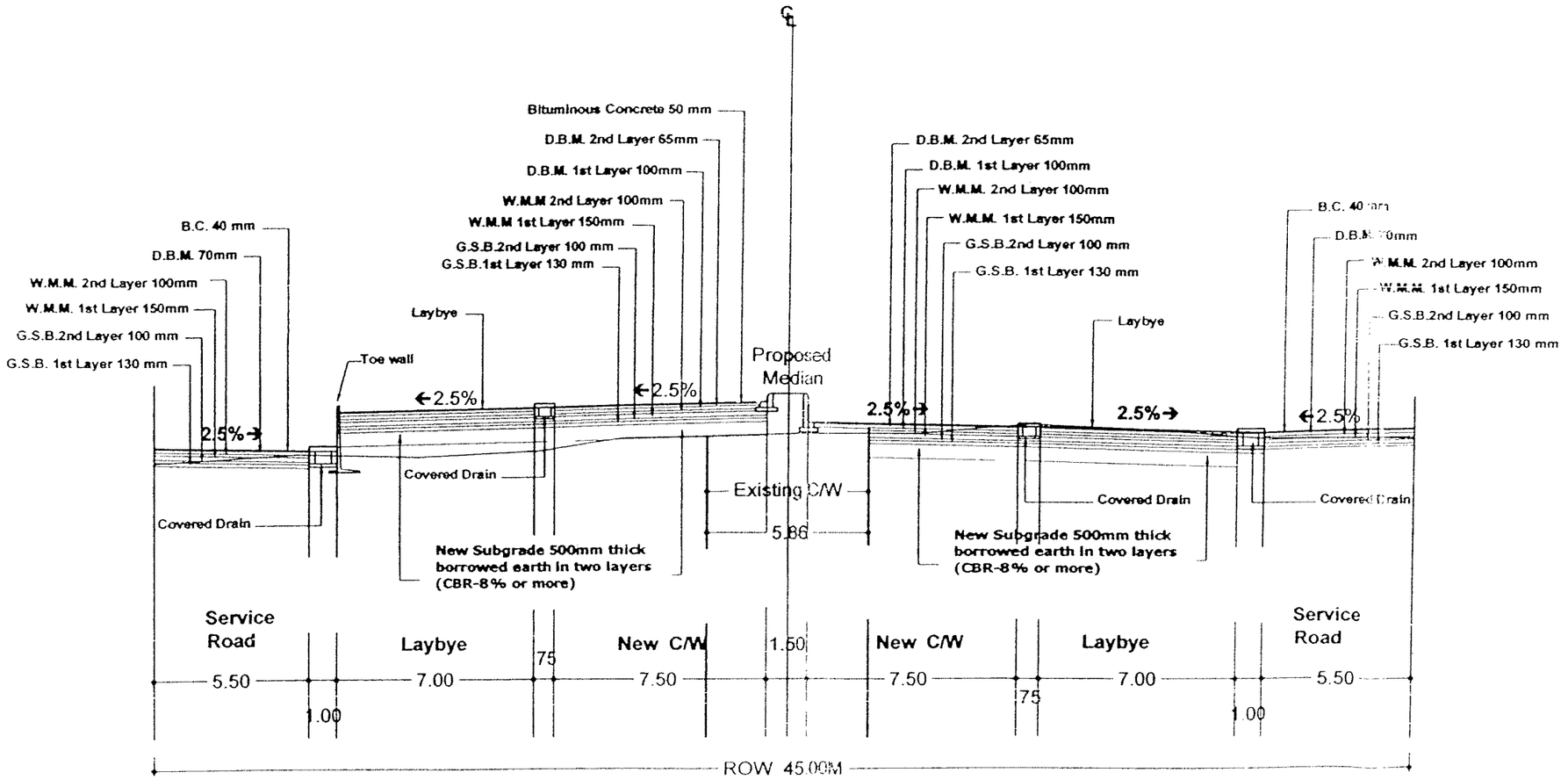


Detail at 'B'



Type-6c: Typical X-section of Flyover on Embankment (R.E.S) at Bhognipur
(Not to Scale)

1. All dimensions are in meter unless otherwise specified
2. The pavement composition shall be provided as per the details given

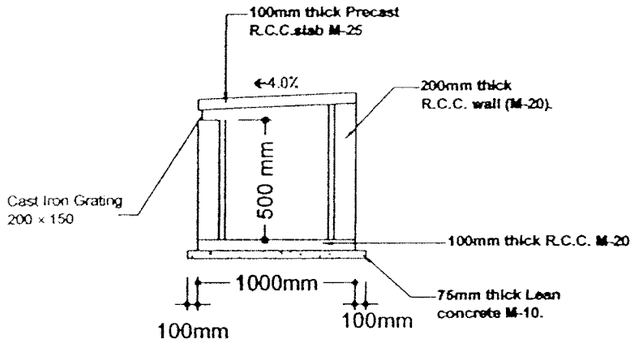


Type-7c: Typical X-section of Project Road (With Laybye)

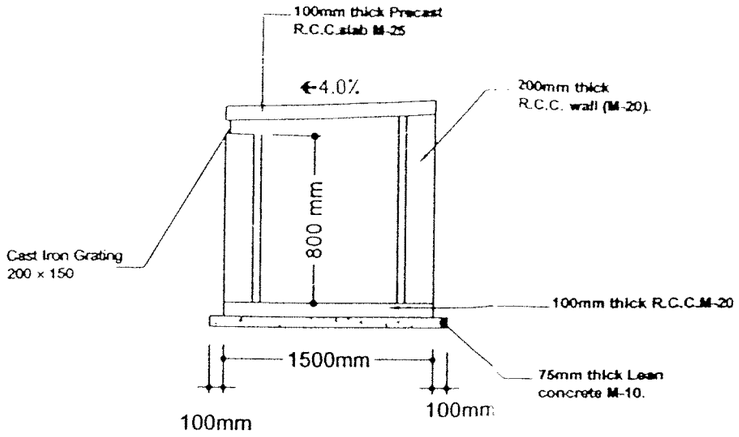
(Not to Scale)

1 All dimensions are in meter unless otherwise specified.
2 The pavement composition shall be provided as per the details given.

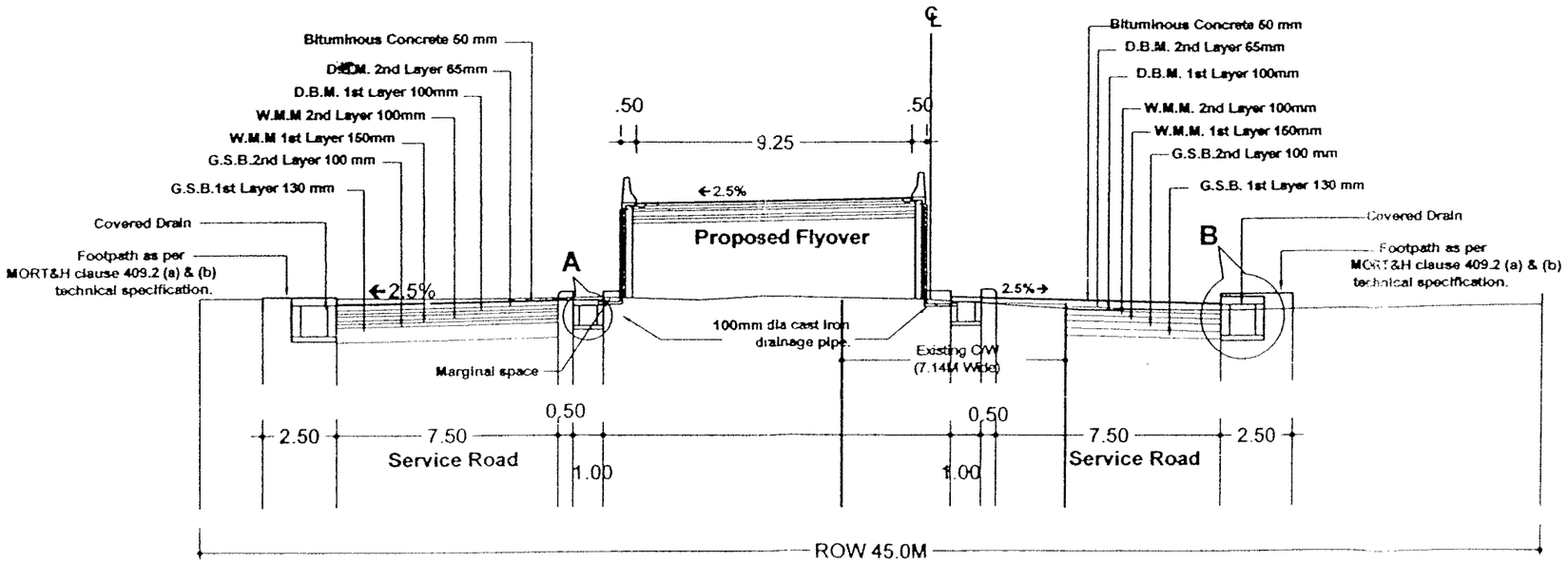
Fig -7



Detail at 'A'



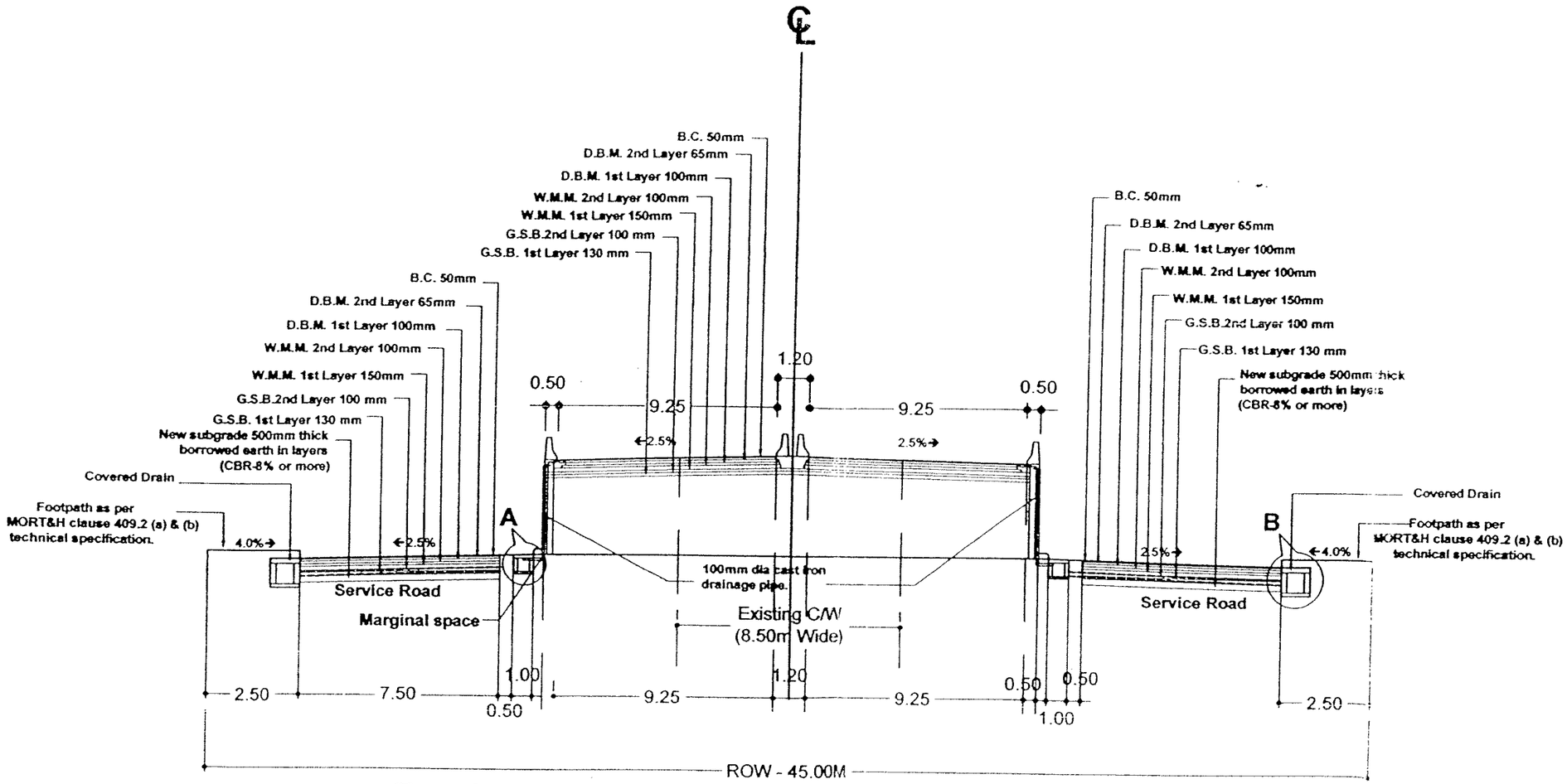
Detail at 'B'



Type-8c: Typical X-section of Flyover on Embankment (R.E.S) at Barah
(Not to Scale)

1 All dimensions are in meter unless otherwise specified
2 The pavement composition shall be provided as per the details given

Fig -8



Type-9c: Typical X-section of Flyover on Embankment (R.E.S) at CH: 425.15m, 434.763m, 442.144m, 444.066m.

(Not to Scale)

1. All dimensions are in meter unless otherwise specified.
2. The pavement composition shall be provided as per the details given

Fig. -9

2.1 (B) Longitudinal Section

As a minimum, the Concessionaire shall achieve the finished road level (FRL) as given in the Detailed Project Report, which is available in the office of General Manager (EW)-II, NHAI, New Delhi for reference

2.2 Service Road

The service road shall be provided as per details given in **Table B-2**.

Table B-2: Details of Proposed Service Road Locations

Table B-2: Details of Proposed Service Road Locations

S. No.	Proposed Chainage (km)		Length	Service Road Width	Side	Remarks
	Start	End	(m)	(m)		
1	247.640	250.200	2560		Both	
2	421.740	421.900	320	SYM - 5.5	SYM	
3	421.900	421.945	45	LHS - 5.5	SYM	
4	422.150	422.450	300	RHS - 5.5	LHS	
5	422.450	422.875	850	SYM - 5.5	LHS	
6	422.875	422.940	65	RHS - 5.5	SYM	
7	423.200	424.836	3272	SYM - 5.5	SYM	
8	424.836	424.900	64	LHS - 5.5	SYM	
9	425.670	425.914	244	RHS - 5.50	SYM	
10	426.800	427.069	269	LHS - 5.50	SYM	
11	427.069	427.700	1262	SYM - 5.50	SYM	
12	427.700	428.055	355	LHS - 5.50	LHS	
13	428.055	428.200	290	SYM - 5.50	SYM	
14	428.200	428.800	600	RHS- 5.50	SYM	
15	428.800	429.358	1116	SYM - 5.50	SYM	
16	429.358	429.640	282	LHS- 5.50	SYM	
17	429.640	429.800	320	SYM - 5.50	SYM	
18	433.200	433.400	200	RHS - 5.50	LHS	
19	433.400	433.480	80	RHS - 5.50	LHS	
20	440.500	440.900	800	SYM - 5.5	RHS	
21	440.900	441.100	400	SYM - 5.5	SYM	
22	441.100	441.400	600	SYM - 5.5	RHS	
23	441.400	441.550	150	RHS - 5.5	LHS	
24	441.550	441.800	250	RHS - 5.5	LHS	
25	442.374	442.500	252	SYM - 5.5	SYM	
26	442.500	442.615	230	SYM - 5.5	SYM	
27	443.100	443.567	934	SYM - 5.5	SYM	
28	446.127	447.400	1273	LHS - 5.5	SYM	
Total Length of Service Road (m)					17383.000	

2.3 Intersections/Junctions (At Grade)

Following aspects shall be considered for design of at-grade junctions:

i) Adequately designed intersections with Channelisations, all right turn and left turn (acceleration and deceleration) lanes (auxiliary) at all intersections for safe and smooth movement of traffic.

ii) Auxiliary acceleration and deceleration lanes for left turning traffic at entrances to major roadside facilities suCh as Wayside Amenities, Service Area and Truck Lay-byes and traffic merging/diverging locations.

iii) Typical intersection treatment to be applied as specified in Project Report.

iv) Improvement of existing intersections/junctions and provision of new intersections/junctions shall be as per **Table B-3.**

Table B-3: Details of Intersections/Junctions for Improvement

Km.	Village Name	Type of Intersection	Left /Right Side
238.350	Madaripur	3 – arms	Left
238.425	Hamirpur	3 – arms	Left
425.150	Etawah	3 – arms	Left
421.407	Bhognipur	3 – arms	Right
423.984	Pukhrayan	4 – arms	Cross
425.115	- do -	4 – arms	Cross
426.863	- do -	3 – arms	Right
429.794	Hansemau	4 – arms	Cross
432.551	Digh Village	3 – arms	Left
434.719	DebiPlainur	3 – arms	Left
434.759	- do -	3 – arms	Right
441.834	MuridPlainur	4 – arms	Cross
443.229	Matti Village	3 – arms	Left
444.065	- do -	3 – arms	Left
445.414	Nabipur	4 – arms	Cross
446.053	Jainpur	4 – arms	Cross
446.659	- do -	4 – arms	Cross
447.079	- do -	3 – arms	Right
447.161	- do -	3 – arms	Left
447.464	- do -	3 – arms	Right

IL&FS Infrastructure Ltd.

2.4 Structures

2.4.1 Cross-Drainage (Bridges & Culverts)

The details of existing bridges and culverts are given in **Annexure A-6, A-7 &A-8** of **SChedule-A** respectively. All the new cross drainage structures are given in **Annexure B-1 & B-2** and others required shall be designed & constructed in accordance with the design standards set in **SChedule-D.** Culverts given in **Annexure A-6** are to be widened/re-constructed as per alignment (to be decided in consultation with IC). Following guidelines shall be followed:

i) All the cross drainage structures for the new carriageway shall be designed in suCh way so that the inner edge of footpath matChes with the outer edge of paved shoulder.

ii) The existing structure shall be widened i.e. extended to matCh the new road cross sections. The widening shall be done so that inner edge of footpath matChes with the outer edge of paved shoulder.

iii) For major bridges in urban or rural areas open median shall be provided with minimum 8.0 m clear gap between two parapet walls of the bridges. However, for minor bridges uncovered median of the same width as of highway shall be provided.

iv) The adequacy of the vent size for all culverts/bridges shall be ascertained through detailed hydrological surveys and finalized in consultation with the IC/NHAI. The Highest Flood Level/Maximum Supply Level shall be properly assessed after collecting flood histories from local authorities/interviews with locals/Irrigation authorities.

v) Canal bridges shall be designed as per hydraulic requirements of Irrigation authorities. The construction plans shall be prepared as per closure sChedule of canals. Approval of GAD from Irrigation department may be required. It may be preferred to plan single span canal bridges with foundations not disturbing the canal bunds.

vi) The new bridge shall be so planned to not affect the foundations of the existing bridge.

vii) For drainage purpose the new/reconstruction of pipe culverts of minimum 1.2m dia shall be provided. The existing pipe culverts of 1m or more dia shall be extended to new carriageway with same diameter pipe. All pipe culverts of dia less than 1m shall be reconstructed.

viii) The culverts for irrigation Channels may be of smaller (not less than 300 mm) diameter with sump well and screen on both side to prevent entrapment of leaves, etc., inside.

There are total 67 existing culverts of whiCh 38 shall be extended/widened to accommodate the adjoining prescribed road cross sections. The 29 culverts would need reconstruction as per details given in **Annexure B-1**.

Further, the cross drainage plan of the highway shall be finalized in consultation with IC/NHAI and if required additional culverts shall be provided as part of the Concessionaire's obligation under this Contract Package.

O B Infrastructure Ltd.
National Highways Authority of India New Delhi

2.4.2 Bridges

Annexure B-2 gives the details of new 4/6 lane bridges that form part of the scope of 'Project'. At the location of major/minor river bridges, the necessary river training works also form part of the scope of the project. At the location of major bridges water pipeline is running along the existing bridge. The concessionaire shall take into account the shifting of this water pipeline to a suitable distance away from the ROW in consultation with NHAI/concerned state departments.

The existing bridges which are proposed to be retained, rehabilitation of substructure/superstructure of any kind including replacement of bearings, expansion joints, pitching piers and pier cap protection, provision of barrier and railings shall be done by the Concessionaire under the Contract.

The General Arrangement Drawings (GAD) for major and minor bridge is attached in the subsequent section.

2.4.3 Grade Separators

Grade separated intersections have been proposed at Chainages 421.20, 425.120, 442.143, 434.350, 444.064 and at 448.643. Amongst these, the last one has been proposed as a part of integration of NH 25 with the GQ corridor at Barah. This has been described separately in latter part of this Chapter.

The intersection at Ch. 425.120 caters to movement of cross-vehicular traffic, pedestrians and cattle. A head room of 3.5 m is considered adequate for this.

The next grade separator has been proposed at Ch. 434.350. This has been necessitated to cater to the cross movement of vehicular traffic (including tractor trailers) that ply across the NH corridor. The animal mandi draws some traffic at this location. Here the overpass has been proposed to offer a head room of 5.5m. A low-rise grade separator allowing a head room of 3.5m has been proposed at Ch. 442.143 to allow cross movements of pedestrians and cattle. This need was also projected by the local residents.

The settlement of Matti (KM. 444.064) is gaining in importance. Certain government offices are also being set up at this place. In view of its importance as a semi urban area and, towards avoiding conflicts with the through traffic, a grade separator along the NH corridor allowing a head room of 5.0m has been proposed at this location.

2.4.4 Underpasses

For safe cross movement of the pedestrians and cattle, 1 underpass using box culverts of size 10.5m x 5.5m shall be provided by the concessionaire at the location to be finalized with the independent consultant/NHAI. This DCGHwould require suitable raising of vertical profile and such works are included as part of the scope of the 'project'. The

General Arrangement Drawings (GAD) for the proposed Underpasses is shown in attached Drawings.

3. Geometric Improvement

i) The flat gradients shall be corrected in such a way so as to attain an appropriate longitudinal gradient in order to achieve longitudinal drainage. Also vertical curves shall be improvement/introduced so that the vertical curves meet IRC: SP-23/IRC: 73 standards.
ii) The horizontal alignment of the Project Highway shall be improved as per the standards set out in **Schedule-D.**
iii) The Improvement shall be done in consultation with the Independent Consultant ensuring that the proposed improvements are accommodated within the land width available.
iv) All deficient geometry needs to be improved to at least minimum design standards upto maximum extent.

4. Slope Protection and Drainage

The improvements in the drainage and the slope erosion shall be made as per the following norms:

4.1 Drainage Measures

Following measures shall be adopted:
i) Side ditches of required cross section for area Drainage on Both Sides of carriageway in rural section.
ii) Covered pucca drains underneath the sidewalk in the urban section.
iii) Open pucca drains underneath the median between main carriageway and service road with proper connection to the outfall location in the urban section.
iv) Chute drains along with shoulder drains in high embankment (3m and above).
v) Median drains at super elevated sections with proper outfall connections, and Covered pucca drains underneath the sidewalk of proposed facility (bus bays, truck lay-bys, etc.) in rural sections.

4.2 Slope Protection Measure

Following measures shall be adopted:

i) Side Slope of embankments 3m high or more shall be protected by pitching or geo-meshes or geo-nets or geo-grids in consultation with the Independent Consultant.

5. Traffic Signs and Pavement Markings

Traffic signs and pavement markings shall include roadside signs, overhead signs, curb mounted signs and road marking along the Project Highway. The design and marking for the Project Highway shall be as per the design standard indicated in **Schedule-D** and

the location for various treatment shall be finalized in consultation with the Independent Consultant.

The overhead sign shall be the reflectorised type with high intensity retro-reflective sheeting conforming to ASTM D 4956-01, Type VIII and/or Type IX of micro prismatic type. The retro-reflective sheet of Engineering Grade shall NOT be used. The height, lateral clearance, location and instillation shall be as per relevant clauses of MOST specifications. Overhead sign shall be installed ahead of major intersections, toll plazas and urban areas as per detailed design requirements.

The Concessionaire shall provide Aluminium Die Cast Matte Finish (Sand Blasted) conforming to IS 617:1994 Designation 4250 Sparkle Solar road studs powered by energy from the Sun, manufactured by 'TATA BP' Solar India or Equivalent having high intensity reflectivity on the curves, road junctions, zebra crossings, ramps etc. to provide the visibility. At least one thousand solar studs shall be provided on this project at the locations finalized in consultation with IC/NHAI.

6. Road Land Boundary

Road Land (ROW) Boundary shall be demarcated by putting RCC boundary pillars size 60 cm x 15 cm x 15 cm embedded in concrete (as per IRC) along the Project Highway at 50 m interval on both sides. All the components used in delineating road land boundary shall be aesthetically pleasing, sturdy and vandal proof. The road land boundary shall be demarcated in consultation with IC/NHAI. For future developments, additional land may be acquired so as to have 60m ROW all along.

7. Guard Rail and Traffic Safety Devices

i) For the safety of pedestrian at the intersections/Junctions, the guard rails shall be provided to enhance the safety in Urban/Semi-Urban locations.
ii) Barriers shall be provided at locations of bridge approaCches and high embankments (3m and more) and at curves having radius less than 1000 m at both sides.
iii) Delineators bollards and other safety devices shall be provided on curves and other locations as directed by IC/NHAI.
iv) At least the following provisions shall be made by the Concessionaire on this 'project' in respect of the metallic beam Guard Rails:

Metal beam Guard Rails including installation (crash barriers)	Of Steel, single runner, heavy duty (w-shape) as per drawing **Fig. B-15.**

8. Pre-Construction Activities

8.1 Land Acquisition (LA)

The additional land acquisition in few isolated stretCheS is foreseen on this project. The cost of LA as intimated by the concerned agencies shall be borne by NHAI.

8.2 Utility Shifting and Removal of Trees

The 'project' involves shifting of utilities of certain types. The cost towards utility sifting as per the demand note of the concerned Government/Semi-Government agencies shall be borne by NHAI.

8.3 Clearances to be obtained

The Concessionaire shall obtain all necessary clearances from all the concerned authorities required for implementing the project. NHAI shall provide support letters in this regard.

8.4 Encroachment Removal

Encroachments shall be removed by the NHAI at his own cost.

8.5 Compensatory Afforestation and Rehabilitation & Resettlement

NHAI shall bear cost in this regard. However, Concessionaire shall proactively be involved for all related activities.

9. Landscaping

The finished road facility shall exhibit adequate landscaping of aesthetically pleasing view. All the borrow areas shall be properly dressed maintaining drainability outward from the road facility. The side slopes shall be provided with Turfing.

10. Environment

i) In view of the statutory requirement of environmental clearance for Highway Project, the NHAI decided to carry out environmental impact assessment of the proposed widening and strengthening of the Project Highway.

ii) The environmental impact assessment study has accordingly been carried out and is presented in the Detailed Project Report, which is available in the office of General Manager (EW)-II, NHAI, New Delhi for reference.

iii) The said report brings out the baseline environmental conditions, envisaged impacts of the project, mitigation measures proposed and suitable management plan for monitoring and implementation of measures.

iv) The Project Highway during design, construction, operation and maintenance shall conform to the environmental rules and regulations in force. The Concessionaire shall be responsible for the same. As such the Detailed Project Report is available for guidance and should only be referred to. However this does not absolve Concessionaire from performance according to the laws on environment.

11. Distress in the form of heavy settlement and upheaval may have developed in patches in some kilometres of existing pavement. The cause of distress has to be thoroughly investigated and suitable remedial measures shall be provided as part of the Scope of work in consultation with IC before providing overlay.

ANNEXURE B-1 : Improvement of Cross Drainage Structure

Chainage : From Km. 220.000 - Km. 255.000

SL. No.	Existing Structure No.	Structure Type	Existing Structure Size	Proposed St. No.	Chainage	Remarks
1		RCC Box		**227/1**	226.150	New RCC Box of Size 2.0m x 1.8m
2		RCC Box		**228/2**	227.545	New RCC Box of Size 2.0m x 1.8m
3		RCC Box		**229/1**	228.350	New RCC Box of Size 2.0m x 1.8m
4	224/1	RCC Slab	5.0 x 1.8	**230/1**	229.350	Extende by By 5.0m x 1.8m RCC Box
RHS						Extende by By 5.0m x 1.5m RCC Box
5	225/1	RCC Box	1.37 x 1.7	**231/1**	230.290	Replace by 1.5m x 1.8m RCC Box
6		RCC Box		**232/1**	231.200	New RCC Box of 3.0m x 2.9m
RHS						Extended by 3.0m x 1.9m
7	227/1	Hume Pipe	1.22 m Dia	**233/1**	232.150	Replace By 2.0m x 2.2m RCC Box
RHS						Extended by 2 m x 2.9m RCC Box
8	228/1	RCC Slab	2.0 x 2.2	**233/2**	232.700	Replace By 2.0m x 2.2m RCC Box.
RHS						Extended by 2m x 2.5m RCC Box
9	228/2	RCC Slab	1.0 x 2.3	**234/1**	233.120	Replace By 2.0m x 2.3m RCC Box
10	228/3	RCC Slab	1.37 x 2.0	**234/2**	233.500	Replace by 2.0m x 2.0m RCC Box
11	229/1	RCC Slab	3.0 x 2.3	**235/1**	234.080	Replace by 3.0 m x 2.3m RCC Box.
12	230/1	RCC Slab	3.0 x 2.7	**235/2**	**234.685**	Replace by 3.0 m x 2.7m RCC Box.
13	230/2	RCC Slab	5.0 x 2.7	**235/3**	234.850	Extended by 5.0 m x 2.7m RCC Box.
14	230/3	RCC Slab	1.3 x 1.3	**236/1**	235.250	Replace by 1.5m x 1.8m RCC Box

15	231/1	RCC Slab	3.0 x 3.5	**237/1**	236.430	Extended by 3.0 m x 3.5m RCC Box.
RHS						Extended by 3.0m x 2.9m RCC Box.
16	232/1	RCC Slab	2.5 x 1.8	**238/1**	237.400	Extende by by 2.5m x 1.8m RCC Box.
RHS						Extended by 2.5m x 1.5m RCC Box
17		RCC Box		**239/2**	**238.850**	New RCC Box of size 3.0 x 3.3m
RHS						Extended by 3.0 m x 2.0m RCC Box
18	234/1	RCC Slab	1.5 x 1.9	**240/1**	239.550	Extende by RCC Box Of Size 1.5 m x 1.9m.
19	236/1	RCC Slab	1.5 x 2.3	**241/1**	240.950	Replace by 2.0m x 2.3m RCC Box
20		RCC Box		**242/1**	**241.500**	New RCC Box of Size 1.5 m x 1.8m
RHS						Extended by 1.5m x 1.5m RCC Box
21	237/1	RCC Slab	2.5 x 2.3	**243/1**	**242.250**	Extende by 2.5m x 2.3m RCC Box
RHS						Extende by 2.5m x 1.9m RCC Box
22	238/1	Hume Pipe	1.2m dia	**243/2**	242.810	Replace by 1.5m x1.8m RCC Box
RHS						Extended by 1.5m x 1.3m RCC Box
23	239/1	RCC Slab	1.2 x 1.8	**244/1**	243.650	Replace by 1.5m x1.8m RCC Box
RHS						Extended by 1.5m x 1.4m RCC Box
24	239/2	RCC Slab	3.0 x 3.0	**244/3**	243.950	Extended by 3.0m x 3.0m RCC Box
RHS						Extended by 3.0m x 2.0m RCC Box
25	239/3	Hume Pipe	1.2 m Dia	**245/1**	244.350	New RCC Box of size 2.0m x 2.0m
RHS						Extended by 2.0m x 1.5m RCC Box
26	240/1	Hume Pipe	1.3 m Dia	**246/1**	245.050	Replace by 1.5m x 1.8m RCC Box
RHS						Extended by 1.5m x 1.6m RCC Box
27	241/1	RCC Slab	3.0 x 3.0	**247/1**	246.030	Replace by 3.0m x 3.0m RCC Box
RHS						Extended by 3.0m x 4.0m RCC Box
28	241/2	Hume Pipe	1.3 m Dia	**247/2**	246.650	Replace by 1.5m x 1.8 m RCC Box

RHS						Extende by 1.5m x 2.5m RCC Box
29	242/1	Hume Pipe	1.0 m Dia	247/3	246.900	Replace by 1.5m x 1.8m RCC Box
RHS						Extended by 1.5m x 2.5m RCC Box
30	242/2	Brick Arch	1.3 x 2.4	248/1	247.150	Replace by 1.5m x 1.8m RCC Box
RHS						Extended by 1.5m x 2.0m RCC Box
31	243/1	RCC Slab	3.0 x 2.8	248/3	247.950	Extended by by 3.0m x 2.8m RCC Box
RHS						Extended by 3.0m x 3.3m RCC Box
32	243/2	RCC Slab	3.0 x 5.3	249/1	248.550	Extended by 3.0m x 5.3 RCC Box
RHS						Extended by 3.0m x 5.8m RCC Box
33	244/1	RCC Slab	3.0 x 3.4	250/1	249.150	Extended by 3.0m x 3.4m RCC Box
34	244/2	RCC Slab	3.0 x 4.3	250/2	249.360	Replace by 3.0m x 4.3m RCC Box
RHS						Extended by 3.0m x 4.2m RCC Box
35		RCC Box		253/1	252.550	New RCC Box of 2.0m x 3.0m
36		RCC Box		254/1	253.850	New RCC Box of 3.0m x 3.6m
37	251/1	RCC Slab	3.0 x 1.7	256/1	255.250	Extende by 3.0m x 2.2m RCC Box
38	252/1	RCC Slab	3.0 x 1.5	257/1	256.550	Extended by 3.0m x 1.5m RCC Box
39	253/1	RCC Slab	3.0 x 2.3	258/1	257.520	Extended by 3.0m x 2.3m RCC Box
40	254/1	RCC Slab	3.0 x 2.6	259/1	258.150	Extended by 3.0m x 2.6m RCC Box
41	255/1	RCC Slab	3.0 x 2.8	260/1	259.080	Extended By 3.0m x 2.8m RCC Box.
42	256/1	RCC Slab	2.0 x 2.8	261/1	260.100	Extended By 2.0m x 2.8m RCC Box.

ANNEXURE B-1 Contd : Improvement of Cross Drainage Structure

S. No	Culvert No	Ch. (KM)	Width of Structure (m)	Existing		Widening	Remarks
				Type	Opening Size		
1	423/1	422.10	12.20	RCC SLAB	2 X 1.2	ECCENTRIC	NCBL
2	424/1	423.20	12.00	Box Culvert	1.5 X 2.4	NEW	DEO & REFL
3	424/2	423.60	12.10	Box Culvert	1.5 X 1.9	NEW	DEO & REFL
4	425/1	424.70	12.10	Box Culvert	2 X 1.5	NEW	DEO & REFL
5	426/1	425.30	12.10	Box Culvert	3.8 X 2.2	NEW	DEO & REFL
6	426/2	425.80	12.10	Box Culvert	3.0 X 2.0	NEW	DEO & REFL
7	427/2	427.00	12.20	Box Culvert	1.5 X 1.0	NEW	DEO & REFL
8	428/1	427.90	12.20	Box Culvert	3.0 X 1.0	NEW	DEO & REFL
9	429/1	428.70	12.00	Box Culvert	1.5 X 1.0	NEW	DEO & REFL
10	430/1	429.00	12.10	Box Culvert	2X0.9X1.7	NEW	DEO & REFL
11	430/2	429.30	12.10	Box Culvert	1.5 X 1.5	NEW	DEO & REFL
12	431/1	430.10	12.00	RCC SLAB	1.5 X 1.2	ECCENTRIC	NCBL
13	432/1	431.30	12.10	RCC SLAB	1.5 X 1.4	ECCENTRIC	NCBL
14	432/2	431.90	16.20	RCC SLAB	1.5 X 1.2	ECCENTRIC	NCBL
15	433/1	432.60	11.90	Box Culvert	2.0 X 0.9	NEW	DEO & REFL
16	433/2	432.70	12.50	RCC SLAB	2.1 X 1.75	ECCENTRIC	NCBL
17	434/1	433.90	12.80	RCC SLAB	2X1.5X1.9	ECCENTRIC	NCBL
18	435/1	434.70	12.10	Box Culvert	1.5 X 1.7	NEW	DEO & REFL
19	437/1	436.70	12.10	RCC SLAB	3.0 X 2.7	ECCENTRIC	NCBL
20	439/1	438.30	12.10	RCC SLAB	3.0 X 2.1	ECCENTRIC	NCBL
21	440/1	439.00	12.30	RCC SLAB	5.0 X 2.4	ECCENTRIC	NCBL
22	441/1	440.10	12.30	Box Culvert	0.9 X 1.5	NEW	DEO & REFL
23	442/1	441.00	12.10	Box Culvert	1.5 X 2.6	NEW	DEO & REFL
24	442/2	441.80	11.80	RCC SLAB	5.0 X 2.6	ECCENTRIC	NCBL
25	443/1	442.20	12.00	Box Culvert	1.5 X 1.8	NEW	DEO & REFL
26	443/2	442.80	-	Box Culvert	-	CONCENTRIC	NCNA
27	444/1	443.40	12.50	Box Culvert	4.0 X 1.0	NEW	DEO & REFL
28	444/2	444.00	12.10	Box Culvert	1.5 X 1.0	NEW	DEO & REFL
29	446/1	445.10	10.90	RCC SLAB	1.5 X 1.2	ECCENTRIC	NCBL
30	446/3	445.40	12.00	RCC SLAB	3.0 X 3.6	ECCENTRIC	NCBL
31	446/4	445.50	12.50	RCC SLAB	1.5 X 1.0	-	DEO & REFL
32	446/5	445.90	15.20	RCC SLAB	0.9 X 1.0	ECCENTRIC	NCBL
33	447/1	447.00	12.40	Box Culvert	0.9 X 0.9	NEW	DEO & REFL
34	449/1	448.30	12.10	Box Culvert	6.0 X 1.5	NEW	DEO & REFL

Annexure B-2: Improvement Proposal for Bridges & Structures

S. No.	Bridge No.	Proposed Chainage (Km)	Proposed Scheme	Span Arrangement (Nos. x m)	Skew	Superstructure Type	Substructure		Foundation		Remarks
							Abutments	Pier	Abutments	Pier	
Minor Bridges											
1	222/1	222.0	2 Lane	3 x 14.57 c/c	-	RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
Major Bridges											
1	245/1	245.0	2 Lane	8x 85.0 + 2 x 43.7		PSC Guider & RCC Slab	Wall Type	Wall Type	Well foundation	Well foundation	

Annexure B-2: Improvement Proposal for Bridges & Structures

S. No.	Bridge No.	Proposed Chainage (Km)	Proposed Scheme	Span Arrangement (Nos. x m)	Skew	Superstructure Type	Substructure		Foundation		Remarks
							Abutments	Pier	Abutments	Pier	
Minor Bridges											
1	446/2	445.15	2 Lane	6.3+6.0+6.2		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
Major Bridges											
1	438/1	437.64	2 Lane	3 x 26.3		PSC Guider & RCC Slab	Wall Type	Wall Type	Well foundation	Well foundation	
Grade Separator											
1		421.200	2 x 2 Lane	11 x 26.25		PSC Guider & RCC Slab	Wall Type	Wall Type	Pile Foundation	Pile Foundation	
2		425.150	2 x 2 Lane	1 x 10.5		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
3		434.763	2 x 2 Lane	1 x 30.0		PSC Guider & RCC Slab	Circular		Pile Foundation		
4		442.144	2 x 2 Lane	1 x 10.5		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
5		444.066	2 x 2 Lane	1 x 30.0		PSC Guider & RCC Slab	Circular		Pile Foundation		
6		448.929	2 Lane	2 x 30.0		PSC Guider & RCC Slab	Circular	Circular	Pile Foundation	Pile Foundation	

197

Annexure B-3 Improvement Proposal For Proposed Underpass

Chainage	Design Chainage	Facility	Level of Service Road	Level of Main Carriageway	Size	Remarks
Km 244.200	Km 249.468	Vehicular Underpass	126.25	133.215	10.5 x 5.5	Kalpi - Nr Playground and College

LIST OF G.A. DRAWINGS OF CROSS DRAINAGE & OTHER STRUCTURES

BRIDGE NO.	SL. NO.	DRAWING TITLE	DRAWING NO.	
GENERAL NOTES	1.	GENERAL NOTES	NHAI/NH25JHANSI-BHOGNIPUR/GEN-01	
222/1	1.	GENERAL ARRANGEMENT DRAWING OF BRIDGE (NO. 222/1)	NHAI/NH25JHANSI-BHOGNIPUR/BR-222/1/S-01	(SHEET 1 OF 5)
	2.	GENERAL ARRANGEMENT DRAWING OF BRIDGE (NO. 222/1)	NHAI/NH25JHANSI-BHOGNIPUR/BR-222/1/S-01	(SHEET 2 OF 5)
	3.	GENERAL ARRANGEMENT DRAWING OF BRIDGE (NO. 222/1)	NHAI/NH25JHANSI-BHOGNIPUR/BR-222/1/S-01	(SHEET 3 OF 5)
	4.	GENERAL ARRANGEMENT DRAWING OF BRIDGE (NO. 222/1)	NHAI/NH25JHANSI-BHOGNIPUR/BR-222/1/S-01	(SHEET 4 OF 5)
	5.	GENERAL ARRANGEMENT DRAWING OF BRIDGE (NO. 222/1)	NHAI/NH25JHANSI-BHOGNIPUR/BR-222/1/S-01	(SHEET 5 OF 5)
246/1 KALPI BRIDGE	1.	GENERAL NOTES OF KALPI BRIDGE	NHAI/NH25/JHANSI - BHOGNIPUR/BR-246/1/S-01	
	2.	GENERAL ARRANGEMENT DRAWING OF KALPI BRIDGE	NHAI/NH25/JHANSI - BHOGNIPUR/BR-246/1/S-02	
CATTLE CROSSING (2.5x2.5M)	1.	GENERAL ARRANGEMENT DRAWING OF CATTLE CROOSING (2.5x2.5M)	NHAI/NH25/JHANSI - BHOGNIPUR/CATT-RCC/2.5m/S-01	
VEHICULAR CROSSING (10.5x5.0M)	1.	GENERAL ARRANGEMENT DRAWING OF VEHICULAR CROSSING (10.5x5.0M)	NHAI/NH25/JHANSI - BHOGNIPUR/VEH-RE/S-01	(SHEET 1 OF 2)
	2.	GENERAL ARRANGEMENT DRAWING OF VEHICULAR CROSSING (10.5x5.0M)	NHAI/NH25/JHANSI - BHOGNIPUR/VEH-RE/S-01	(SHEET 2 OF 2)
CULVERTS	1.	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-A)	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-101	
	2.	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-B)	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-102	
	3.	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-C)	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-103	
	4.	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-D)	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-104	
	5.	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-E)	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-105	
	6.	SCHEDULE FOR PROPOSED BOX CULVERT	NHAI/NH25/JHANSI-BHOGNIPUR/CULVERT/SC-106	

OB Infrastructure Pvt. Ltd.

ANNEXURE-B

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India
Tel.-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

CLIENT
NATIONAL HIGHWAYS AUTHORITY OF INDIA

NATIONAL HIGHWAYS AUTHORITY OF INDIA

PROJECT: FOUR LANING OF NH-25 (Km 220.500 TO Km 255.000) | BOT PACKAGE

TITLE: LIST OF DRAWINGS

DESIGN	CHECKED	APPROVED
PARDA	S.PANDEY	C.R. SURANA
DRAWN	SCALE	DATE
SAYYAD	N.T.S.	OCT.-2004

REVISION			
MARKED	DATE	DESCRIPTION	BY

DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/DRG. LIST/S-01

(A) GENERAL

1. THE DESIGN IS ACCORDING TO THE FOLLOWING CODES :-
   a) IRC:5 - 1998
   b) IRC:6 - 2000
   c) IRC:18 - 2000
   d) IRC:21 - 2000
   e) IRC:78 - 2000
2. ALL DIMENSIONS ARE IN MM & CHAINAGES AND LEVELS ARE IN METER UNLESS OTHERWISE STATED (UOS). ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED AND NO DRAWING SHALL BE SCALED.
3. WEARING COAT SHALL CONSIST OF THE FOLLOWING:-
   A. 40MM THICK BITUMINOUS/ASPHALTIC CONCRETE AFTER APPLYING TACK COAT AS PER SPECIFICATIONS.
   B. 25MM THICK BITUMINOUS MASTIC WEARING COURSE AS PER SPECIFICATIONS.
4. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:-
   A. ONE LANES OF IRC CLASS 70R (WHEELED/TRACKED/BOGIE + ONE LANE IRC CLASS-A WITH A REDUCTION FACTOR OF 0.9.
   B. TWO LANES OF CLASS A.
   C. ONE LANE OF IRC CLASS 70R (WHEELED/TRACKED/BOGIE.

(B) MATERIALS' SPECIFICATIONS

CONCRETE

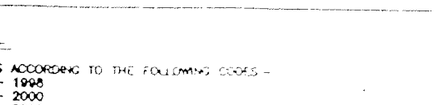
1. CONCRETE SHALL BE DESIGN MIX AND HAVE A MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150MM CUBES FOR VARIOUS ELEMENTS AS FOLLOWS (UOS):-

a)	PILE CAPS	= M35
b)	PILES	= M35
c)	PSC GIRDER	= M40
d)	KERB, CRASH BARRIER	= M40
e)	PEDESTALS FOR BEARINGS	= M35
f)	DECK SLAB ON PSC GIRDER	= M35
g)	BOX/RCC T-GIRDER	= M35
h)	OPEN FOUNDATION	= M35
i)	PIER/ABUTMENT	= M35

2. TO IMPROVE WORKABILITY OF CONCRETE AND CEMENT GROUT, ADMIXTURES CONFORMING TO IS:9103 COULD BE PERMITTED SUBJECT TO SATISFACTORY PROVEN USE. ADMIXTURES GENERATING HYDROGEN, NITROGEN, CHLORIDES ETC. SHOULD NOT BE USED. THE WORKABILITY OF CONCRETE SHOULD BE AS PER TENDER SPECIFICATIONS.
3. THE NOMINAL MAXIMUM SIZE OF AGGREGATE TO BE USED IN RCC AND PSC WORK SHALL BE 20MM.
4. ALL CONSTRUCTION JOINTS (C.J) ARE SHOWN THUS vvvvvv . AT C.J ALL LAITANCE SHALL BE REMOVED THOROUGHLY BEFORE CONCRETE HAS FULLY HARDENED. CARE TO BE TAKEN TO AVOID DISLODGMENT OF COARSE AGGREGATE. PREPARATION OF CONSTRUCTION JOINT SHALL STRICTLY CONFORM TO MOST SPECIFICATIONS.

REINFORCEMENT

1. REINFORCING STEEL SHALL BE GRADE DESIGNATION Fe 415 CONFORMING TO IS:1786.
2. NOTATION OF BAR REINFORCEMENT SHALL BE AS FOLLOWS:-



f REPRESENT GRADE - Fe : 415 BAR
f REPRESENT GRADE - Fe : 240 BAR
BAR SPACING INDICATED ON THE DRAWINGS SHALL BE PERPENDICULAR TO BARS UNLESS OTHER WISE INDICATED IN THE DRAWING.
FOR A CURVED ELEMENT THE LONGITUDINAL BARS ARE EXPECTED TO BE CURVED ALONG THE ELEMENT CENTRELINE AND TRANSVERSE BARS PLACED RADIALLY.

THE SPACING SPECIFIED FOR SUCH RADIALLY PLACED BAR IS APPLICABLE OF CENTRELINE OF ELEMENT (UOS).

3. STEEL SPACER BARS SHALL BE PROVIDED BETWEEN ADJACENT LAYERS OF PARALLEL REINFORCEMENT AND SPACED AT NOT MORE THAN 60 X SMALLER BAR DIA. THE DIAMETER OF THE SPACER BAR SHALL BE AT LEAST 25MM BUT NOT LESS THAN THE DIA OF THE PARALLEL REINFORCEMENTS.

PRESTRESSING STEEL AND ACCESSORIES

1. LONGITUDINAL PRESTRESSING TENDONS SHALL CONSIST OF 19 NOS. OF 13MM NOMINAL DIA 7-PLY CLASS 2 STRANDS AS PER IS:14268 -1995.
2. ONLY MULTI-STRAND JACKS SHALL BE USED FOR TENSIONING OF TENDONS. DIRECT AND INDIRECT FORCE MEASUREMENT DEVICE (PRESSURE GAUGE) TO BE ATTACHED IN CONSULTATION WITH SYSTEM SUPPLIER.
3. A METHOD STATEMENT SUPPORTED BY RELEVANT DRAWINGS/SKETCHES OF ALL PRESTRESSING OPERATIONS (SUCH AS SCHEME OF POST THREADING OF CABLES, COMPLETE PREPARATIONS AND ARRANGEMENTS FOR TENSIONING AND GROUTING, FILLING OF ANCHORAGE RECESSES ETC) PROPOSED BY THE CONTRACTOR AND HIS SPECIALIST PRESTRESSING AGENCY SHALL BE SUBMITTED FOR APPROVAL OF THE ENGINEER-IN-CHARGE.
4. ALL PRESTRESSING OPERATIONS SUCH AS SHEATHING PLACEMENT, THREADING, STRESSING, GROUTING AND SEALING ETC. TO BE CERTIFIED BY THE SPECIALIST PRESTRESSING AGENCY.

SHEATHING

1. SHEATHING FOR LONGITUDINAL PRESTRESSING SHALL BE OF 91 MM OG MANUFACTURED FROM MINIMUM 0.4MM THICK BRIGHT METAL AS PER SPECIFICATIONS. THE SHEATHING SHALL BE MANUFACTURED FRESH AT SITE UNLESS OTHERWISE PERMITTED BY THE ENGINEER-IN-CHARGE. IT SHALL BE TESTED AS PER IRC:18-2000 APPENDIX 1.
2. NO. OF JOINTS IN SHEATHING SHALL BE REDUCED TO MINIMUM. SHEATHING SHALL BE JOINED WITH THE HELP OF HEAT SHRINK TAPE IN ADDITION TO PVC TAPE AS PER THE SPECIFICATIONS.

WATER

WATER TO BE USED IN CONCRETING. GROUTING AND CURING SHALL CONFORM TO CLAUSE 302.4 OF IRC : 21-2000.

GROUT

THE TEMPERATURE OF THE GROUT SHALL NOT EXCEED 25° C AND MAY REQUIRE USE OF PRE-COOLED WATER. WATER CEMENT RATIO NOT TO EXCEED 0.4. SUITABLE ADMIXTURE SHALL BE USED FOR INCREASING WORKABILITY, REDUCING THE BLEEDING AND FOR EXPANDING THE GROUT.

EXPANSION JOINTS

EXPANSION JOINT SHALL BE AS PER SPECIFICATION STIPULATED IN NIT.
THE EXPANSION JOINT SHALL BE PROVIDED OVER THE FULL WIDTH OF THE DECK AND FOLLOW THE PROFILE INCLUDING KERB, FOOTPATH AND FACIA. SITE FABRICATION OF EXPANSION JOINT SHALL BE PROHIBITED. EXPANSION JOINTS SHALL BE INSTALLED AFTER LAYING THE WEARING COURSE. THE VOID LEFT FOR THIS PURPOSE TO BE TEMPORARILY BLOCKED WHILE LAYING THE WEARING COURSE.
FABRICATED STEEL PARTS SHALL BE POSITIONED ACCURATELY BEFORE CONCRETING THE VOID LEFT FOR THE PURPOSE.

PRESENCE OF MANUFACTURE'S REPRESENTATIVE AT THE TIME OF POSITIONING OF EMBEDDED PARTS AND INSTALLATION OF EXPANSION JOINTS IS MANDATORY. HE MUST CERTIFY ALL INSTALLATION OPERATIONS.

THE JOINTS SHALL BE GUARANTEED BY THE MANUFACTURERS PER THE REQUIREMENTS OF THE SPECIFICATIONS.

BEARINGS

THE BEARINGS AND THEIR CONNECTIONS TO THE PIER AND SUPERSTRUCTURE SHALL BE DESIGNED FOR THE FORCES STATED ON THE DRAWINGS. BEARING SHALL BE PROCURED ONLY FROM THE APPROVED MANUFACTURER.

EACH BEARING SHALL BE INDELIBLY MARKED WITH THE BEARING IDENTIFICATION MARK. DIRECTION OF MOVEMENT OF EACH BEARING SHALL BE IDENTIFIABLE ON THE TOP FACE OF BEARING.

A SCALE SHALL BE FIXED ON THE BEARING FOR ASSESSING MOVEMENTS.

(C) WORKMANSHIP/DETAILING

1. MINIMUM COVER CLEAR TO ANY REINFORCEMENT OF ALL ELEMENTS EXCEPT PILES, PILE CAPS AND FOUNDATIONS SHALL BE 40MM UNLESS SHOWN OTHERWISE IN THE DRAWING.
   MINIMUM COVER TO ANY REINFORCEMENT OF PILES, PILE CAPS, AND FOUNDATIONS SHALL BE 75MM (UOS).
2. WELDING OF REINFORCEMENT BARS SHALL NOT BE PERMITTED.
3. BENDING OF REINFORCEMENT BARS TO BE AS PER IS:2502-1963.
4. MINIMUM LAP LENGTH SHALL BE KEPT AS 63 D WHERE -D- IS THE DIAMETER OF SMALLER BAR & NOT MORE THAN 50% OF BARS TO BE LAPPED AT ANY ONE SECTION.
5. SUPPORTING CHAIRS OF MINIMUM 12MM DIA. SHALL BE PROVIDED AT SUITABLE INTERVALS AS PER IS:2502.
6. ALL SETTING OUT DIMENSIONS REDUCED LEVELS, CONCRETE DIMENSIONS & CABLE PROFILES TO BE VERIFIED BEFORE CONSTRUCTION COMMENCES. ANY DISCREPANCY TO BE BROUGHT TO THE NOTICE OF THE ENGINEER-IN-CHARGE IMMEDIATELY.
7. THE JACKING FORCE IN EACH LONGITUDINAL TENDON IS TO BE IMPARTED ON BOTH ENDS SIMULTANEOUSLY BY USING MULT-STRAND JACKS. UOS.
8. THE FOLLOWING BASIC PROPERTIES OF 13 MM NOMINAL DIA. PRESTRESS STRANDS HAVE BEEN CONSIDERED IN THE DESIGN:-

a)	AREA OF 1 STRAND	= 98.7 SQMM
b)	WOBBLE COEFFICIENT K	= 0.0046 PER METRE
c)	FRICTION COEFFICIENT μ	= 0.25 PER RADIAN
d)	MODULUS OF ELASTICITY OF STEEL ANCHORAGE SLIP/WEDGES	= 1.95 X 10^5 Mpa
e)	DRAW-IN/SEATING	= 6MM
f)	LOSS AT 70 % UTS AFTER 1000 HOURS AT 20 + 20C	= NOT MORE THAN 2.5 %
g)	UTS OF STRAND	= 1860 mpa

9. NO WELDING SHALL BE DONE IN THE VICINITY OF SHEATHING DUCTS.
10. GROUTING SHALL BE CARRIED OUT AS PER APPENDIX 5 OF IRC:18-2000 AFTER THE PRESTRESSING OPERATIONS ARE COMPLETED AND STRANDS HAVE BEEN CUT BY ACCEPTABLE TOOLS. REUSABLE METAL CAP WITH A CENTRAL HOLE SHALL BE FIXED BY FOUR BOLTS TO THE GUIDE PLATE OF ANCHOR TO PREVENT LEAKAGE DURING GROUTING UNDER PRESSURE. SUITABLE RUBBER GASKET SHALL BE PROVIDED AT THE INTERFACE OF METAL CAP AND GUIDE. EXTERNAL THREADED PIPE OF O.D=19MM SHALL BE USED AS NIPPLE FOR GROUTING AND SHALL PROTRUDE FROM METAL CAP. ALL STANDARD ACCESSORIES AND OTHER DETAILS SUCH AS VENT PIPES, FIXATION DETAILS OF VENT PIPE WITH SHEATHING, LOCATION OF VENT PIPE AND METHODOLOGY OF GROUTING SHALL BE SUBMITTED BY CONTRACTOR IN CONSULTATION WITH SPECIALIZED AGENCY FOR APPROVAL OF THE ENGINEER-IN-CHARGE. ADDITIONAL GROUT VENTS SHALL BE PROVIDED AS PER 2.8.2 OF APPENDIX 5 OF IRC-18-2000.
11. THE LOCATION OF JACKS FOR LIFTING UP THE SUPERSTRUCTURE TO REPLACE BEARING ETC. IS SHOWN THUS ▽. THIS SHALL BE DISTINCTLY ETCHED ON SOFFIT OF SUPERSTRUCTURE AND PIER/ABUTMENT CAPS.
12. ANCHORAGE RECESSES TO BE SEALED WITH EPOXY COATING AND FILLED WITH PREPACKAGED NON-SHRINK MORTAR. END FACE OF GIRDER, WITH ANCHORAGE SHALL BE COATED WITH TWO COATS OF EPOXY.
13. WHEREVER NECESSARY, REINFORCEMENT BARS MAY BE BENT OR SHIFTED LOCALLY TO AVOID CLASHING WITH PRESTRESS TENDONS. ANCHARAGES HOLES AND RECESSES WITH PRIOR APPROVAL OF ENGINEER-IN-CHARGE.
14. ALL ANCHORAGES PLATES ARE TO BE SET AT RIGHT ANGLES TO THE TENDON.
15. PRESTRESSING STEEL SHALL BE ACCURATELY LOCATED IN POSITION AS PER DRAWING, WITHIN A MAXIMUM TOLERANCE OF ± 5MM. THE SHEATHING BEING SUPPORTED AND FIXED AT INTERVAL NOT EXCEEDING 0.9M BY FIXING STEEL CHAIRS ON SPACER BARS TO SECONDARY REINFORCEMENT IN SUCH A MANNER THAT THE PROFILES OF THE CABLES IS IN NO WAY DISTURBED BY HEAVY VIBRATION AND / OR BY THE PRESSURE OF WET CONCRETE.
16. THE CRASH BARRIER SHALL HAVE A 10MM WIDE FULL DEPTH EXPANSION GAP AT EVERY 8 M MODE USING SHALITEX BOARD AND TREATED ON OUTSIDE USING POLYSULPHIDE SEALANT.

(D) SPECIAL NOTES FOR PRESTRESSING

1. IF THE CALCULATED ELONGATION IS REACHED BEFORE THE CALCULATED GAUGE PRESSURE IS OBTAINED, CONTINUE TENSIONING TILL THE CALCULATED GAUGE PRESSURE IS ATTAINED. PROVIDED THE ELONGATION DOES NOT EXCEED 1.05 TIMES THE CALCULATED ELONGATION. IF THIS ELONGATION IS ACHIEVED BEFORE THE CALCULATED GAUGE PRESSURE IS ATTAINED, STOP STRESSING AND INFORM THE ENGINEER-IN-CHARGE. IF THE CALCULATED ELONGATION HAS NOT BEEN REACHED CONTINUE TENSIONING BY INTERVELS OF 0.5MPO TILL THE CALCULATED GAUGE PRESSURE IS ATTAINED, PROVIDED THE GAUGE PRESSURE DOES NOT EXCEED 1.05 TIMES THE CALCULATED GAUGE PRESSURE.

   IF THE ELONGATION AT 1.05 TIMES THE CALCULATED GAUGE PRESSURE IS LESS THAN 0.95 TIMES THE CALCULATED ELONGATION, THE FOLLOWING MEASURES MUST BE TAKEN, IN SUCCESSION, TO IDENTIFY THE CAUSE OF THIS LACK OF ELONGATION:
   - RECALIBRATE THE PRESSURE GAUGE.
   - CHECK THE FUNCTIONING OF THE JACK, PUMP AND LOADS.
   - DE-TENSION THE CABLE, SHOE IT IN ITS DUCT TO CHECK THAT IT IS NOT BLOCKED BY MORTAR WHICH HAS ENTERED THROUGH THE HOLES IN THE SHEATH. RE-TENSION THE CABLE, IF FREE.

   IF THE REQUIRED ELONGATION IS NOT OBTAINED, FURTHER FINISHING OPERATIONS SUCH AS CUTTING OR SEALING SHOULD NOT BE UNDERTAKEN WITHOUT THE APPROVAL OF THE ENGINEER-IN-CHARGE.
2. WHERE THE PERMISSIBLE JACK STROKE IS LESS THAN 1.05 TIMES THE ELONGATION EXPECTED AT THE STRESSING END, CONTRACTOR IS TO SUBMIT METHOD STATEMENT FOR ACHIEVING THE DESIRED ELONGATION.
3. PROVISION SHALL BE MADE FOR 4% DUMMY CABLES FOR EMERGENCY PURPOSE
4. STRESSING SHALL BE COMMENSED ONLY AFTER THE CONCRETE HAS GAINED A MINIMUM CUBE STRENGTH OF 32Mpa

FOR COMPACTION OF SAND BETWEEN THE COUNTERFORT WALLS, IT MAY BE NECESSARY LAY SAND IN LAYERS NOT EXCEEDING 230 mm. AFTER THE LAYER IS LAID, A HAND OPERATED VIBRATORY ROLLER OR A NEEDLE VIBRATOR IS USED TO PROVIDE VIBRATIONS IN THE SAND LAYER LAID BETWEEN THE COUNTERFORT WALLS. AFTER THE INITIAL VIBRATORY COMPACTION IN DRY STATE OF SAND, THE SAND LAYER IS SOAKED WITH WATER SO THAT SAND PARTICLES COME CLOSER TO EACH OTHER DUE TO LUBRICATION OF SAND. AFTER THE SOAKING OF THE LAYER, LEAVE THE LAYER FOR ABOUT HALF AN HOUR. ONCE AGAIN A HAND ROLLER WITH VIBRATIONS OF 1800-2000 CPM AND AMPLITUDE OF 0.6-1.0 mm. BROUGHT AND GIVEN 4-5 PANES. THIS WILL COMPACT THE SAND LAYER TO THE MAXIMUM DENSITY. IN CASE THE HAND VIBRATORY ROLLER IS NOT AVAILABLE,THE COMPACTION CAN BE DONE BY A STATIC ROLLER OR FROG RAMMER TO PRODUCE SATISFACTORY RESULTS. THE DRY DENSITIES AFTER COMPACTION SHALL BE IN THE RANGE OF 1.85-2.00 gms/cc.

NOTES :-

1. REDUCED LEVELS SHOWN IN THE DRAWING ARE TEMPORARY AND SHALL BE CHANGED ACCORDING TO ROAD TOP LEVEL.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel:-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) BOT PACKAGE
TITLE: GENERAL NOTES

DESIGN	CHECKED	APPROVED	REVISION			
V.P. SINGH	R.P.GUPTA	Dr. C.R. SURANA	MARKED	DATE	DESCRIPTION	BY
DRAWN	SCALE	DATE				
R.GUPTA	R.Y.R.	OCT.-2004				

DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/GEN-01

200

SL NO	EXISTING ST. NO	PROPOSED ST. NO	CHAINAGE	PROPOSED ST. IL	EXISTING ST. IL	PROPOSED RTL	CLEAR SIZE OF BOX (Lxd)	WALL THICKNESS (t1)	DECK THICKNESS (t2)	BASE THICKNESS (t3)	(a)	TYPE	REQUIRED BEARING CAPACITY CATEGORY
1		221/1	220.497	136.212		138.427	2.0mx1.8m	0.300	0.350	0.380	.500		X
2		222/2	221.927	124.641		126.858	2.0mx1.8m	0.300	0.350	0.380	.500		X
3		223/1	222.720	134.219		136.434	2.0mx1.8m	0.300	0.350	0.380	.500		X
4	224/1	224/1	223.744		135.955	138.320	5.0mx1.8m	0.570	0.500	0.570	.300		X
		RHS				138.025	5.0mx1.5m	0.570	0.500	0.570	.300		X
5	225/1	225/1	224.864		135.848	137.863	1.5mx1.8m	0.300	0.350	0.380	.500		X
6		226/1	225.582	134.438		137.823	3.0mx2.9m	0.420	0.420	0.420	.900		X
		RHS				136.802	3.0mx1.9m	0.420	0.420	0.420	.900		X
7	227/1	227/1	226.532		133.951	136.586	2.0mx2.2m	0.350	0.370	0.420	1.300		X
		RHS				137.327	2.0mx2.9m	0.350	0.370	0.420	1.300		X
8	228/1	228/1	227.082		133.519	136.154	2.0mx2.2m	0.350	0.370	0.420	1.300		X
		RHS				136.493	2.0mx2.5m	0.350	0.370	0.420	1.100		X
9	228/2	228/2	227.501		133.476	136.211	2.0mx2.3m	0.350	0.370	0.420	1.000		X
10	228/3	228/3	227.895		133.548	135.963	2.0mx2.0m	0.300	0.350	0.380	.500		X
11	229/1	229/1	228.482		132.991	135.776	3.0mx2.3m	0.420	0.420	0.420	.900		X
12	230/1	230/1	229.065		132.187	135.372	3.0mx2.7m	0.420	0.420	0.420	.900		X
13	230/2	230/2	229.220		132.249	135.514	5.0mx2.7m	0.570	0.500	0.570	.300		Y
14	230/3	230/3	229.655		133.678	135.893	1.5mx1.8m	0.300	0.350	0.380	.500		X
15	231/1	231/1	230.810		132.676	136.691	3.0mx3.5m	0.460	0.450	0.480	1.700		X
		RHS				136.080	3.0mx2.9m	0.420	0.420	0.420	.900		X
16	232/1	232/1	231.785		133.657	135.912	2.5mx1.8m	0.420	0.420	0.420	.900		X
		RHS				134.879	2.5mx1.5m	0.420	0.420	0.420	.900		X
17		234/1	233.232	131.278		135.136	3.0mx3.3m	0.460	0.450	0.480	1.700		X
		RHS				133.706	3.0mx2.0m	0.420	0.420	0.420	.900		X
18	234/1	234/2	233.932		132.423	134.738	1.5mx1.9m	0.300	0.350	0.380	.500		X
19	236/1	236/1	235.232		131.379	134.114	2.0mx2.3m	0.350	0.370	0.420	1.300		X
20		236/2	235.875	131.663		133.878	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				132.748	1.5mx1.5m	0.300	0.350	0.380	.500		X
21	237/1	237/1	236.653	131.663	130.985	133.770	2.5mx2.3m	0.420	0.420	0.420	.900		X
		RHS				133.316	2.5mx1.9m	0.350	0.370	0.420	.500		X
22	238/1	238/1	237.194	131.663	131.679	133.894	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				133.224	1.5mx1.3m	0.300	0.350	0.380	.500		X
23	239/1	239/1	238.044		129.894	132.109	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				131.670	1.5mx1.4m	0.300	0.350	0.380	.500		X
24	239/2	239/2	238.350		128.638	132.123	3.0mx3.0m	0.420	0.420	0.420	.900		X
		RHS				131.174	3.0mx2.0m	0.420	0.420	0.420	.900		X
25	239/3	239/3	238.732		130.672	133.087	2.0mx2.0m	0.300	0.350	0.380	.500		X
		RHS				131.948	2.0mx1.5m	0.300	0.350	0.380	.500		X
26	240/1	240/1	239.432		132.198	134.413	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				134.138	1.5mx1.6m	0.300	0.350	0.380	.500		X
27	241/1	241/1	240.389		127.689	131.174	3.0mx3.0m	0.420	0.420	0.420	.900		X
		RHS				132.144	3.0mx4.0m	0.460	0.450	0.480	1.700		X

SL NO.	EXISTING ST. NO	PROPOSED ST. NO	CHAINAGE	PROPOSED ST. IL	EXISTING ST. IL	PROPOSED RTL	CLEAR SIZE OF BOX (Lxd)	WALL THICKNESS (t1)	DECK THICKNESS (t2)	BASE THICKNESS (t3)	(a)	TYPE	REQUIRED BEARING CAPACITY CATEGORY
28	241/2	242/1	241.027		131.674	133.889	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				136.531	1.5mx2.0m	0.350	0.370	0.420	1.300		X
29	242/1	242/2	241.286		134.660	136.893	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				138.618	1.5mx2.0m	0.350	0.370	0.420	1.300		X
30	242/2	242/3	241.539		134.636	136.851	1.5mx1.8m	0.300	0.350	0.380	.500		X
		RHS				137.155	1.5mx2.0m	0.300	0.350	0.380	.500		X
31	243/1	243/1	242.342		128.747	132.032	3.0mx2.8m	0.420	0.420	0.420	.900		X
		RHS				132.808	3.0mx3.3m	0.460	0.450	0.480	1.700		X
32	243/2	243/2	242.960		122.298	128.363	3.0mx5.2m	0.850	0.700	0.800	1.800		Y
		RHS				129.589	3.0mx6.2m	0.850	0.700	0.800	1.800		Y
33	244/1	244/1	243.515		127.786	128.701	3.0mx3.4m	0.460	0.450	0.480	1.700		Y
34	244/2	244/2	243.761		127.812	132.897	3.0mx4.3m	0.630	0.520	0.650	1.900		X
		RHS				132.536	3.0mx4.2m	0.630	0.520	0.650	1.900		X
35		247/1	246.938	121.695		125.130	2.0mx3.0m	0.350	0.370	0.420	1.300		X
36		248/1	248.233	130.746		134.861	3.0mx3.6m	0.460	0.450	0.480	1.700		X
37	251/1	250/2	249.640		137.302	139.987	3.0mx2.2m	0.420	0.420	0.420	.900		X
38	252/1	251/1	250.924		137.597	139.582	3.0mx1.5m	0.420	0.420	0.420	.900		X
39	253/1	252/1	251.909		137.057	139.842	3.0mx2.2m	0.420	0.420	0.420	.900		X
40	254/1	253/1	252.526		136.829	139.914	3.0mx2.6m	0.420	0.420	0.420	.900		X
41	255/1	254/1	253.461		136.155	139.440	3.0mx2.8m	0.420	0.420	0.420	.900		X

CAPACITY CATEGORY	SAFE BEARING CAPACITY REQUIRED FOR SOIL
X	15 T/M^2
Y	10 T/M^2

NOTES :

1. FOR STRUCTURAL NOTES REF. DRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. FOR GENERAL ARRANGEMENT/DETAIL REFER DRG. NO.
   - NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-101 (TYPE-A)
   - NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-102 (TYPE-B)
   - NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-103 (TYPE-C)
   - NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-104 (TYPE-D)
   - NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-105 (TYPE-E)

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India
Tel.-26519310, 26535872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

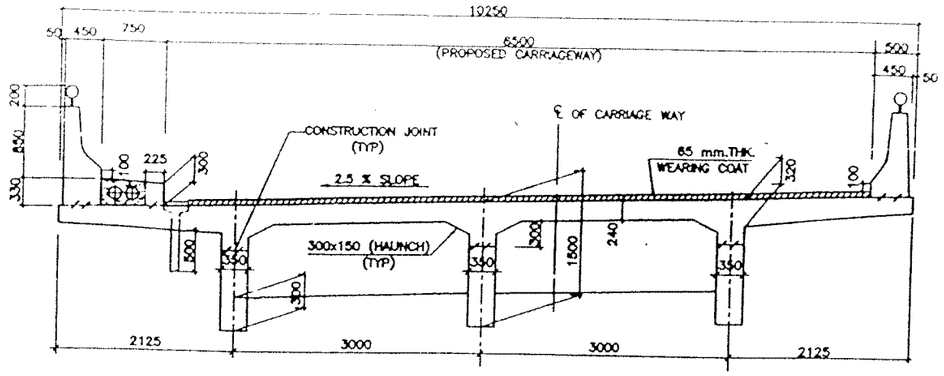
DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

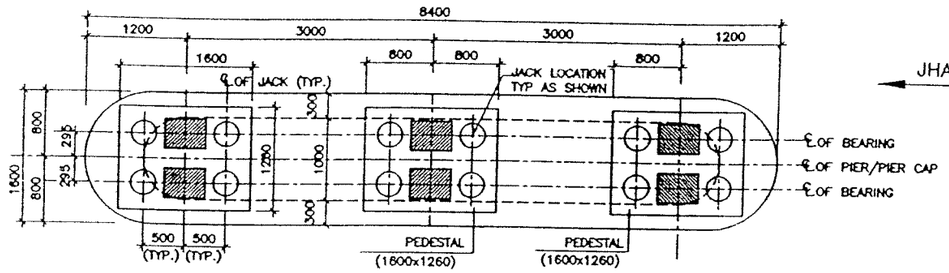
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.000 TO Km. 255.000) BOT PACKAGE
TITLE: SECHEDULE FOR BOX CULVERTS

DESIGN	CHECKED	APPROVED	REVISION MARKED	DATE	DESCRIPTION	BY
A. PANDA	R. PANDEY	Dr. C.S. SURANA				
DRAWN	SCALE	DATE				
MAP/LAY	N.T.S.	OCT.-2004				

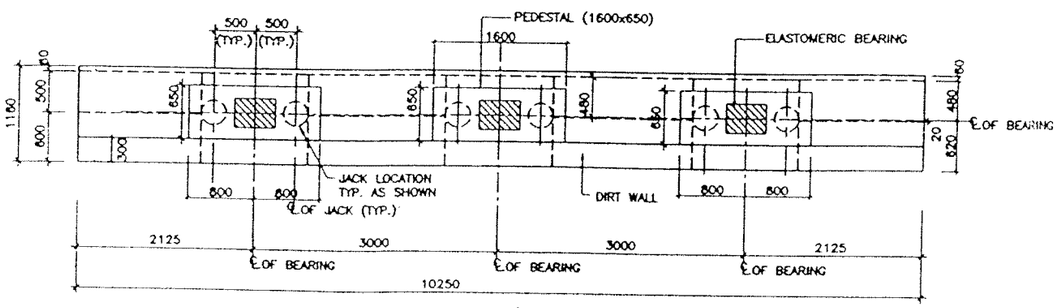
DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT SC-106



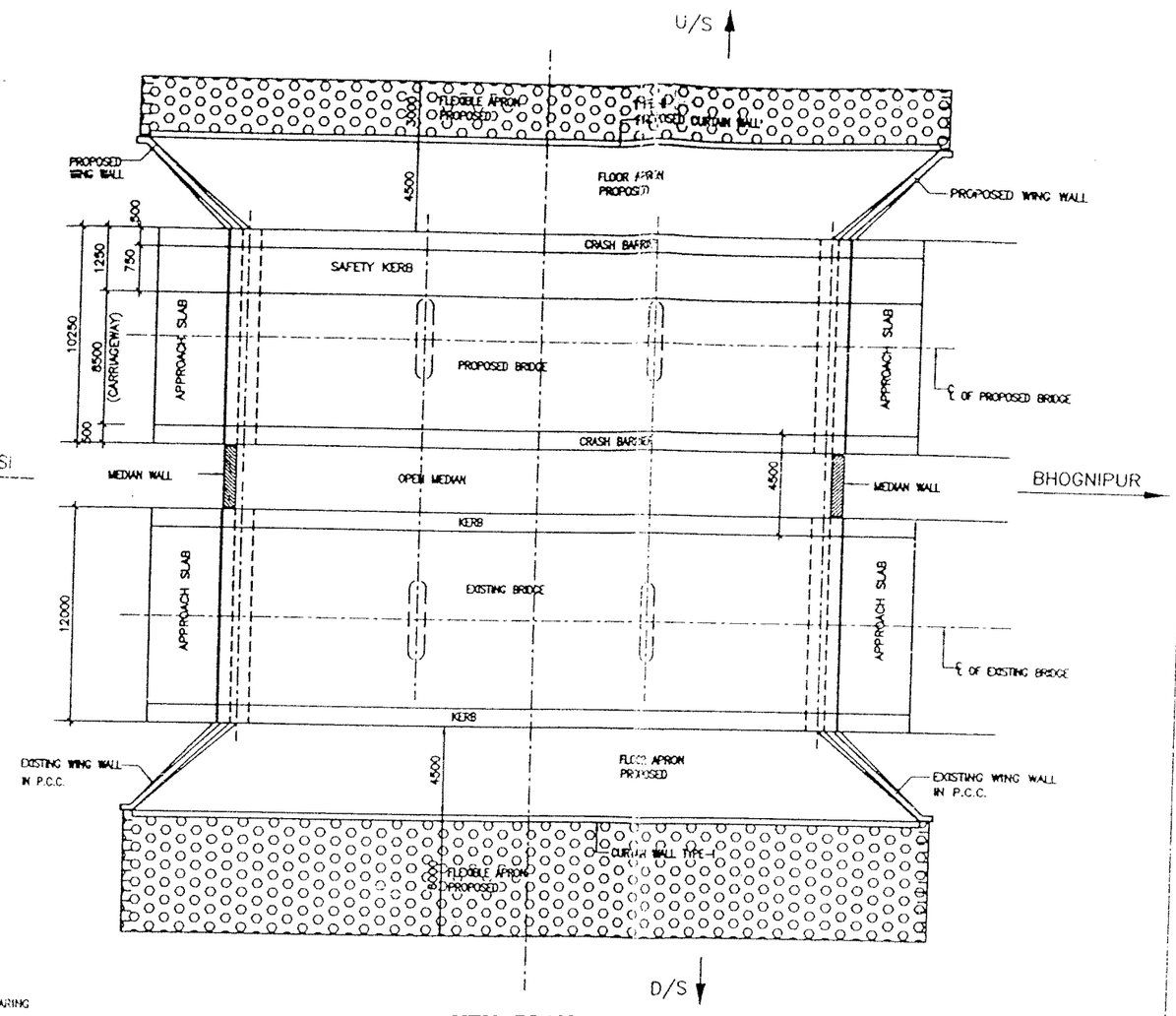
CROSS SECTION AT MID SPAN



PLAN AT PIER CAP TOP



PLAN AT ABUTMENT CAP TOP



KEY PLAN

SCALE N.T.S.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

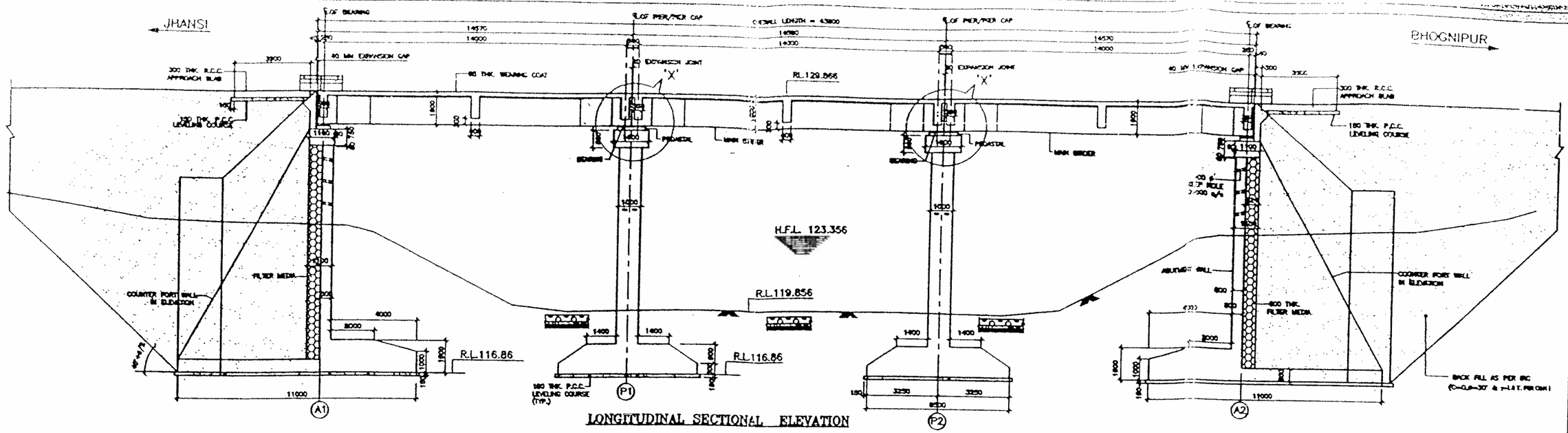
NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF BRG. NO.222/1 (AT Km 221.751)

DESIGN	CHECKED	APPROVED	REVISION			
			MARKED	DATE	DESCRIPTION	BY
T.P. SCALE	R. PANDEY	Dr. C.R. SURANA				
DRAWN	SCALE	DATE				
CHECKED	AS SHOWN	OCT.- 2004				
DRG. NO.						

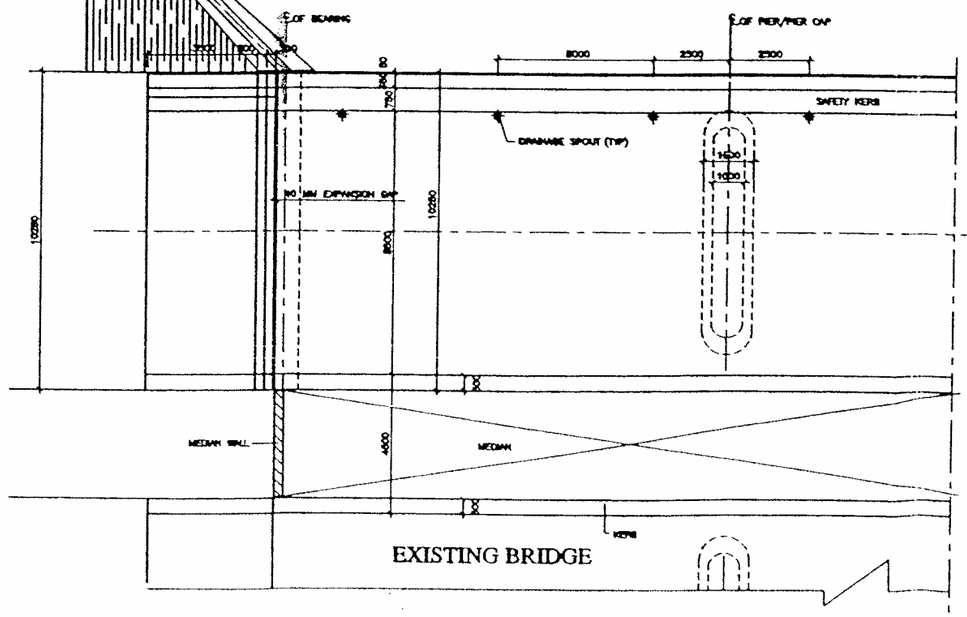
NHAI/NH25/JHANSI - BHOGNIPUR/BR-222/1/S-01 (SHEET 2 OF 6)

202

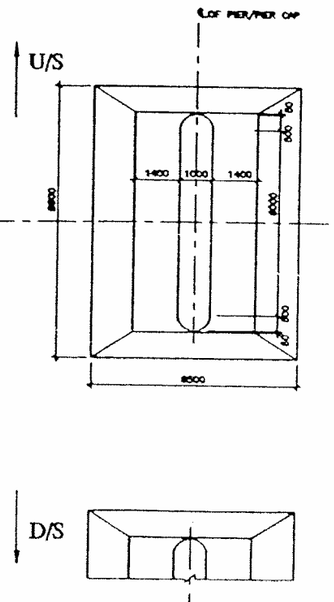


LONGITUDINAL SECTIONAL ELEVATION

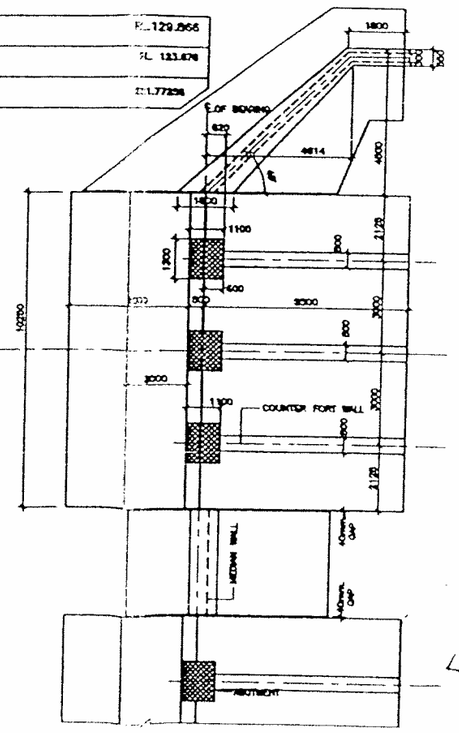
RTL.	RL.129.866	RL.129.866	RL.129.866	RL.129.866
GL.	RL.123.876	RL.119.856	RL.119.856	RL.123.876
CHAINAGE	221.72942	221.74371	221.76829	221.77256



HALF PLAN AT TOP LEVEL



HALF PLAN AT FOUNDATION LEVEL



PLAN

NOTES :

1. THE EXISTING OLD ARCH BRIDGE ON DOWN STREAM SIDE SHALL BE DISMANTLED.
2. THE BED ACCOUNT AND PROTECTION SHALL BE PROVIDED FOR EXISTING R.C.C. BRIDGE.
3. THE STONE PITCHING AND PROTECTION SHALL BE PROVIDED FOR WING WALL OF UP STREAM SIDE OF EXISTING R.C.C. BRIDGE.
4. THE STONE PITCHING AND EMBANKMENT PROTECTION SHALL BE PROVIDED FOR APPROACHES ON UP STREAM SIDE OF EXISTING R.C.C. BRIDGE FOR LENGTH OF 100M.

EMA Unihorn (India) Pvt. Ltd.
2/31, Hailaj Extension, New Delhi-110016, India.
Tel.:-26216310, 26523672, 26436004
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

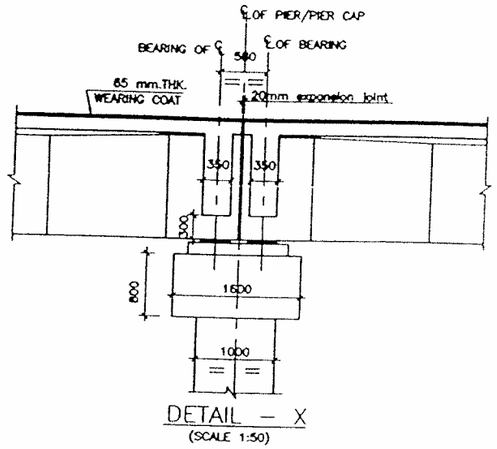
REFERENCE DRAWINGS

NATIONAL HIGHWAYS AUTHORITY OF INDIA

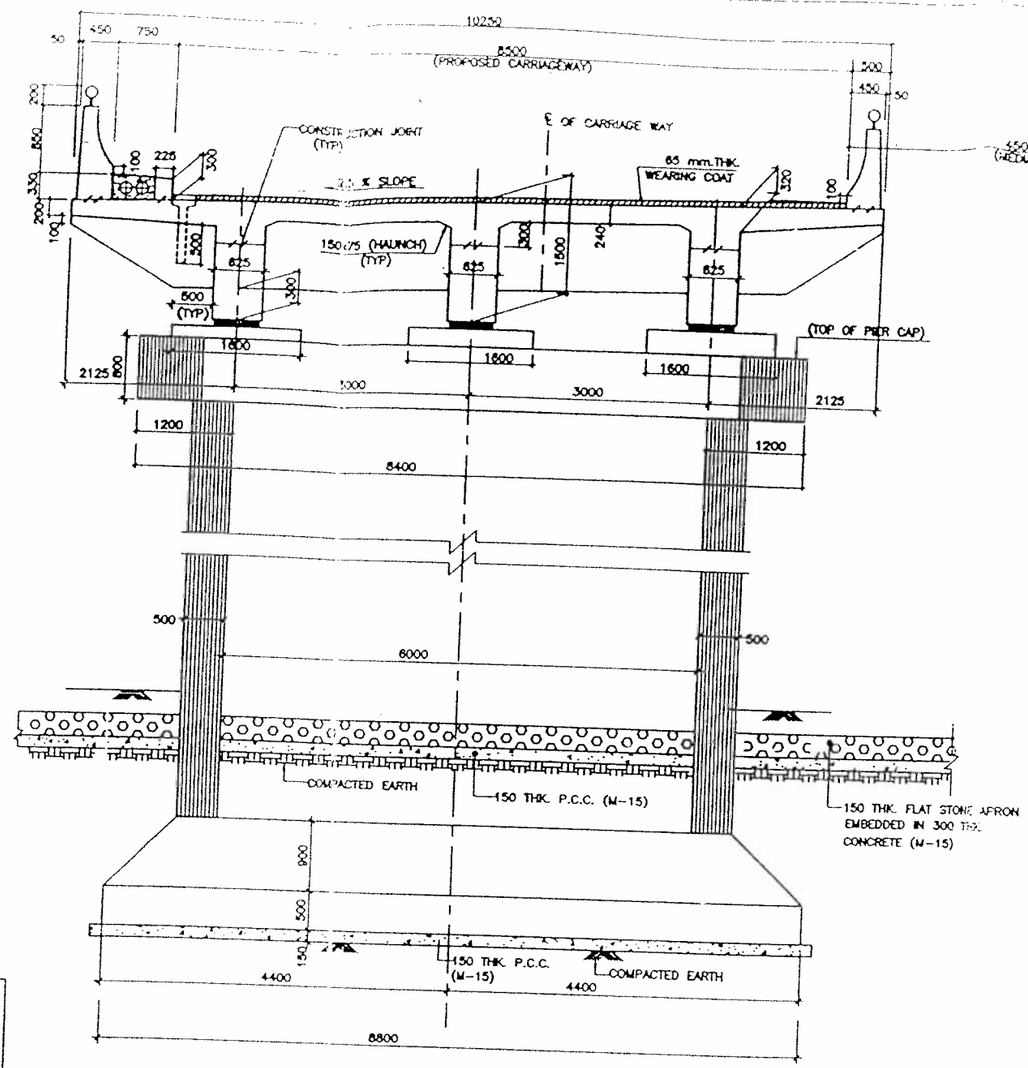
NATIONAL HIGHWAYS AUTHORITY OF INDIA
FOUR LANING OF NH-95 (Km. 220.00 TO Km. 255.00) BOT : ACHAGR
GENERAL ARRANGEMENT DRAWING OF BRG. NO.222/1 (AT Km 221.751)

213

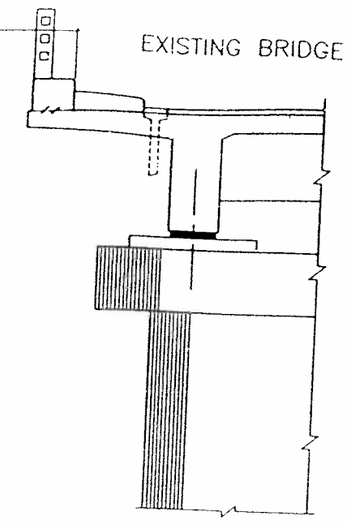
NHAI/BHOG/BRANCH - BHOGNIPUR/NH-95/222/1/3-01



DETAIL – X
(SCALE 1:50)



CROSS SECTION AT PIER SUPPORT



NOTES :–

1. FOR STRUCTURAL NOTES REF. DRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. DO NOT SCALE, FOLLOW WRITTEN DIMENSIONS ONLY.
4. BRIDGE LOCATION IS CHAINAGE AT CENTRE OF BRIDGE.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION, IF REQUIRED.
6. FOR ROAD TOP LEVEL REFERS TO LEVEL AT INNER MEDIAN EDGE.
7. ABUTMENT CAP TOP LEVEL MAY BE VARRIED MARGINALY TO SUIT BEARINGS/PEDESTAL HEIGHT SUBJECTED TO THE APPROVAL OF ENGINEER IN CHARGE.
8. FOR BEARING DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/ BE/M/S-201
9. FOR CRASH BARRIER DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/ CA/M/S-202
10. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/M/S-203
11. FOR WING WALL DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/W/M/S-204
12. CONC. GRADE SHALL BE M35 FOR SUPERSTRUCTURE, M35 FOR ABUTMENT FOUNDATION, RETURN WALL,M30 FOR APPROACH SLAB & M35 FOR PEDESTAL.
13. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.
14. REINF. DETAILS SHALL BE SHOWN IN CONSTRUCTION DRGS.
15. EXPANSION JOINTS SHALL BE AS PER MOST SPECIFICATION CLAUSE 2607.
16. SINGLE STRIP SEAL TYPE EXPANSION JOINT FOR TOTAL MOVEMENT OF 40 mm SHALL BE PROVIDED AS PER MOST SPECIFICATION
17. CROSS SLOPE OF 2.5 % SHALL BE PROVIDED BY RAISING PEDESTALS.
18. SAFE BEARING CAPACITY AT 4.0M. BELOW NATURAL GROUND LVL. = 30.0t/m2
19. DISCHARGE 'Q' = 61.87 Cu.m/s
20. BED PROTECTION IS PROVIDED .
21. MSLN = RL. 118.911m.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

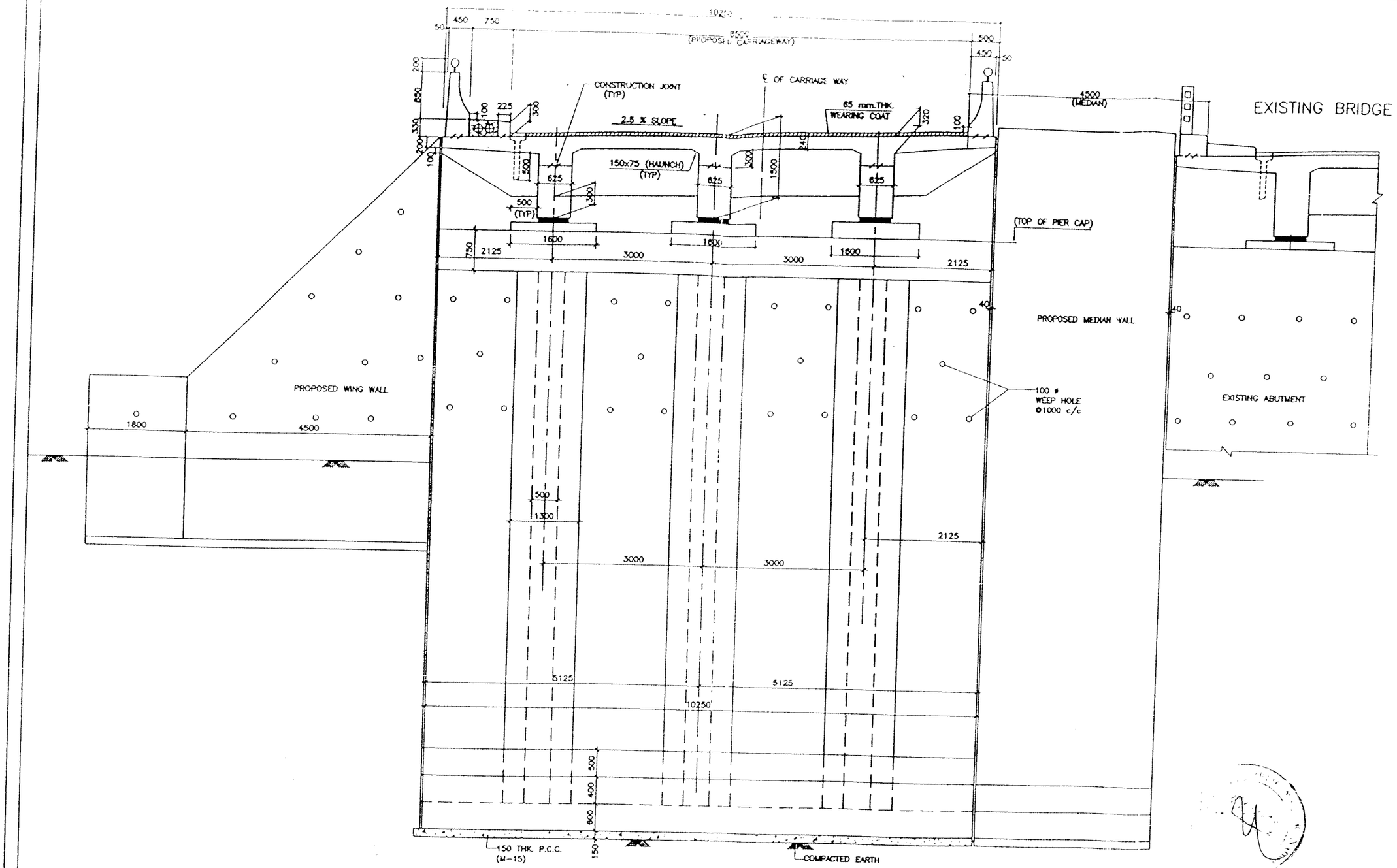
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF BRG. NO.222/1 (at Km 221.761)

DESIGNED	CHECKED	APPROVED
V.P. SINGH	R. PANDEY	Dr. C.R. MISHRA
DRAWN	SCALE	DATE
RAHUL	AS SHOWN	OCT.-2004
DRG. NO.		

REVISION

MARKED	DATE	DESCRIPTION	BY

NHAI/NH25/JHANSI – BHOGNIPUR/BR-222/1/S-01 (SHEET 6 OF 8)



CROSS SECTION AT ABUTMENT SUPPORT

EMA Unihorn (India) Pvt. Ltd.
2/31, Kailash Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF BRG. NO.222/1 (AT Km. 221.751)

DESIGN	CHECKED	APPROVED
V.P. SINGH	R. PANDEY	Dr. C.S. MURARKA
DRAWN	SCALE	DATE
SANJAY	N.T.S.	OCT.- 2004

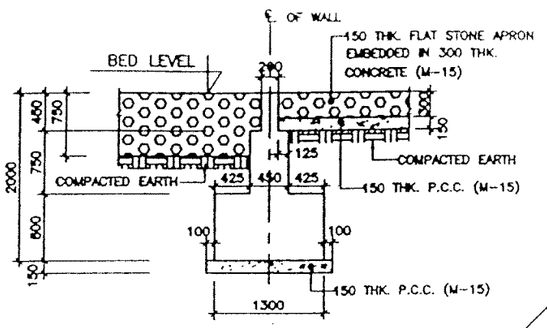
REVISION

MARKED	DATE	DESCRIPTION	BY

DRG NO: NHAI/NH25/JHANSI - BHOGNIPUR/BR-222/1/S-01 (SHEET 4 OF 6)

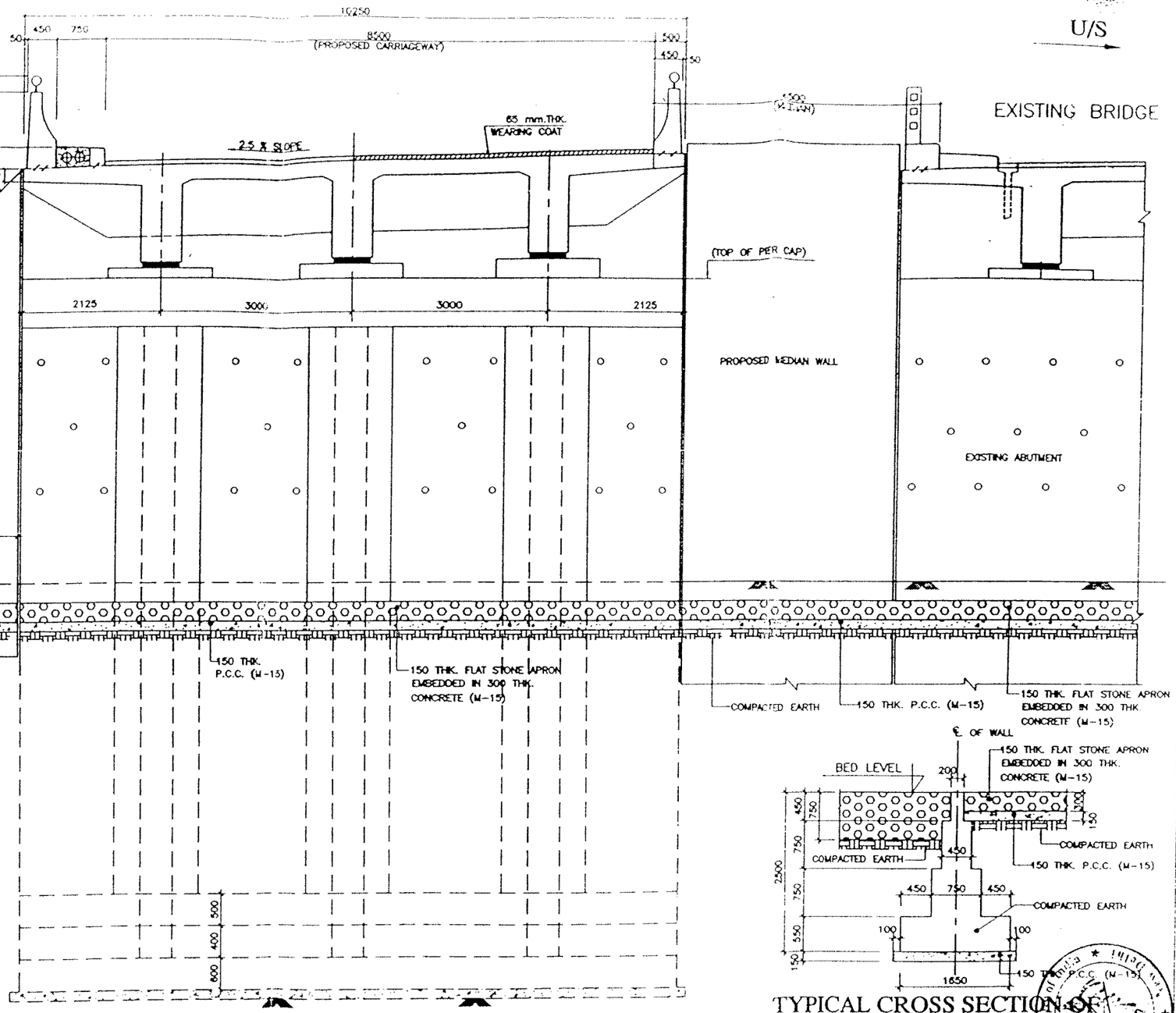
D/S

U/S



TYPICAL CROSS SECTION OF CURTAIN WALL TYPE-II

(UP STREAM SIDE)



TYPICAL CROSS SECTION OF FLOORING

EXISTING BRIDGE (NO.222/2)

TYPICAL CROSS SECTION OF CURTAIN WALL TYPE-I

(DOWN STREAM SIDE)

EMA Unihorn (India) Pvt. Ltd.
2/31, Kailash Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT	NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT	FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE	GENERAL ARRANGEMENT DRAWING OF BRG. NO.222/1 (AT K.m 221.751)

DESIGN	CHECKED	APPROVED
V.P. SINGH	R. PANDEY	Dr. C.R. SURANA
DRAWN	SCALE	DATE
SANJAY	N.T.S.	OCT.-2004

REVISION			
MARKED	DATE	DESCRIPTION	BY

DRG. NO. JHAI/NH26/JHANSI - BHOGNIPUR/BR-222/1/S-01 (SHEET 6 OF 6)

2117

(A) GENERAL

I. All dimensions are in mm, levels are in metres & chainages are in kilometer unless otherwise stated. Only written dimensions shall be followed. No dimensions shall be scaled.

II. The carriageway width is 7.5 m having 1.5m footpath on the down stream side. For design of bridge following live loads has been considered–

a) Carriageway live load
One lane of Class 70R or
One lane or 2 lane of Class A

b) Footpath live load : 400 kg/m^2

III. The designs are based on "moderate" conditions of exposure.

IV. Cement Concrete Wearing coat of thickness 75 mm conforming to clause 2702.2 of MORTH's Specification shall be provided

Hydrological Information

VI. The design of the structure is based on the following Hydraulic data –

i) H.F.L ——— RL 114.33
ii) L.W.L ——— RL 94.17
iii) Mean scour Level (at Pier location P4 to P6) ——— RL 89.61
iv) Mean scour Level (at Pier location P1 to P3 & P9) ——— RL 83.67
v) Mean scour Level (at Abutment location) ——— RL 94.86

Geotechnical Information

VII. The design of the well is based on the following SBC

i) Gross SBC at RL 84.0 for fixed pier well (P3) ——— 98.0 t/m^2
ii) Gross SBC at RL 70.5 for free Pier Well (P1 to P3 & P9) ——— 88.0 t/m^2
iii) Gross SBC at RL 48.75 for fixed Pier Well (P7) ——— 113.0 t/m^2
iv) Gross SBC at RL 65.0 for free Pier Well (P4 to P6 & P8) ——— 105.0 t/m^2
v.) Gross SBC at RL 88.0 abutment Well (A1 & A2) ——— 72.0 t/m^2

(B) MATERIALS SPECIFICATIONS

Concrete

I. Concrete shall be design mix and have a minimum 28 days characteristic strength on 150mm cube as specified elsewhere in the Tender Drawings.

II. Ordinary Portland cement conforming to IS: 269 or High Strength Ordinary Portland Cement conforming to IS: 8112 capable of achieving the required design concrete strength shall only be used.

III. To improve workability of concrete and cement grout, admixtures conforming to IS: 6925 and IS: 9103 could be permitted subject to satisfactory proven use. Admixtures generating hydrogen, nitrogen, chlorides etc. should not be used.

IV. Cement content in RCC members shall conform to Tender drawing / IRC codes / M.O.R.T.H's specification.

V. Water

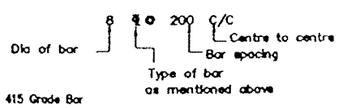
a. Water to be used in concreting, grouting and curing shall conform to clause 302.4 of IRC: 21–2000.

VI. Reinforcement

a. All reinforcing steel shall be of High Yield Strength Deformed (H.Y.S.D.) Bars or Thermo mechanically treated (TMT) (Grade designation S 415) conforming to IS: 1786. Mild steel bars grade designation S 240 shall conform to IS: 432 part–I. Structural steel will conform to IS: 226 with yield stress of 23.6Kg/cm^2.

b. Notation of bar reinforcement shall be as follows: –

Example: –



@ represent Grade – S : 415 Grade Bar
# represent Grade – S : 240 Grade Bar

Bar spacing indicated on the drawings shall be perpendicular to bars unless indicated in the drawing.

c. Steel spacer bars shall be provided between adjacent layers of parallel reinforcement and spaced at not more than 60 x smaller bar dia. The diameter of the spacer bar shall be at least 25mm but not less than the maximum dia of the parallel reinforcements.

d. Binding wires should be annealed 16 gauge PVC coated mild steel wires conforming to latest IS: code and MORTH's standard.

VII. Expansion Joints

a. The expansion joints must be robust, durable, water tight and replaceable. It must be provided over the full width of superstructure including kerb and footpath following the profile of the same (where relevant). Expansion joints shall be obtained only from approved manufacturers and should be of proven type. Details of the expansion joint shall be approved by the site engineer before commencement of construction. Site fabricated expansion joints shall be prohibited.

b. Fabricated steel parts shall be positioned accurately before concreting the portion of deck slab beyond the end faces of webs of Box girder

c. Presence of manufacturer's representative at the time of positioning of embedded parts and installation of expansion joints is mandatory.

d. Strip seal type expansion joint shall be provided in accordance with M.O.R.T.H's specification and shall be procured from the manufacturers as approved by NHAI.

VIII. Bearings

a. POT cum PTFE bearings, pin bearings and guided bearings shall be designed as per IRC: 5&00 part–9 along with relevant provisions of IRC: 78. and the tender specifications.

b. In the case of POT cum PTFE bearings dust seals of expanded polymer are to be provided to ensure protection of sliding contact surface from ingress of foreign materials.

c. The testing of raw materials, metallic components, elastomer & PTFE and acceptance test on bearing shall conform to IRC Codes/ MORTH's specifications/ Tender specifications.

d. Bearing shall be obtained from authorised manufacturer's only as per MORTH's latest circular in this regard and 15 years cost free maintainance guarantee shall be obtained.

(C) WORKMANSHIP/DETAILING

I. For ensuring proper cover to reinforcement, the mortar blocks of same grade as of parent concrete shall be provided & should be able to withstand the crushing during construction.

II. Bending of reinforcement bars to be as per IS: 2502–1963

III. Minimum lap length shall be as follows:

% Bar Lapped / Concrete Grade	Favourable zone		Unfavourable zone	
	25%	50%	25%	50%
M30 & above	56ø	72ø	70ø	101ø
M35 & above	49ø	63ø	70ø	89ø

IV. Supporting chairs of 12mm dia. shall be provided at suitable intervals as per IS: 2502.

V. Sharp edges of concrete shall be chamfered(10mmx10mm)

VI. Form work details shall be submitted by the contractor for the approval and that shall be load tested before use.

VII. Proper compaction of concrete shall be ensured by use of form and /or needle vibrators. Use of full width screed vibrators for compaction of concrete in deck slab shall be ensured.

VIII. Shuttering plates shall be suitably stiffened to enable the compaction by form vibrators.

IX. All setting out dimensions, reduced levels, concrete dimensions and cable profile to be verified on site before construction commences. Any discrepancy to be brought to the notice of Engineer–in–charge immediately

X. The location of jacks for lifting up the superstructure to replace bearing etc.is shown thus ↑ or thus ⊥ This shall be distinctly etched on soffit of superstructure and on pier/abutment caps.

XI. During jacking operation all jacks placed under one end of cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on the jacks is equal at all times.

XII. Welding of reinforcement is permitted only places where shown in the drawing and special cases with the approval of Engineer. Welding of reinforcement shall be done as per clause 304.6.6.5 of IRC : 21–2000.

XIII. Construction Joints

a. Construction joints shall be provided only at locations shown in the drawings or as directed by the Engineer. Concreting operation shall be carried out continuously up to the construction joints.

b. The concrete surface at the joint shall be brushed with a stiff brush after casting while the concrete is still fresh and it has only slightly hardened.

c. Before new concrete is poured, the surface of old concrete shall be prepared as under: –

a) For hardened concrete, the surface shall be thoroughly cleaned to remove debris and laitance and made rough so that 1/4 of the size of aggregate is exposed but without dislodging the aggregate or structurally damaging the concrete.

b) For partially hardened concrete, the surface shall be treated by wire brush followed by an air jet. The old surface shall be soaked with water, without leaving puddles, immediately before starting concreting to prevent absorption of water from new concrete.

d. New concrete shall be thoroughly compacted in the region of the joint.

(D) CONSTRUCTION SEQUENCE AND ERECTION SCHEDULE

a. The contractor shall submit detailed method statement for casting of varies segments of the bridge using cantilever construction equipment. Stress checks at all construction stages shall be produced by the contractor for approval of the engineer–in–charge.

b. The contractor shall submit detailed shop drawings for cantilever construction equipment proposed to be adopted, for approval of the engineer.

c. Design calculation shall be submitted by the contractor for temporary prestressing (if any), precambering, falsework, cantilever construction equipment, erection devices, temporary supporting systems etc.

d. The contractor shall also submit detailed calculation of stabilizing arrangement on each pier during cantilever construction, to cater for any unbalanced moments.

e. Any additional reinforcement which may be required in box girder segments for supporting, lifting, handling, placement etc. shall be assessed by the contractor and provided in addition to the reinforcements shown in drawings, at no extra cost

(E) SPECIAL NOTES FOR PRE–STRESSING

1. Prestressing Steel

a. All prestressing strands shall have 7 ply uncoated stress relieved high tensile strands of 12.7mm dia conforming to class 2 of is 14268–1995.

b. Bright metal sheathing shall be used.

c. The parameters adopted for design are as follows:

i) anchorage type ——— 19 K 13
ii) slip at each end ——— 6mm
iii) minimum sheath dia ——— 85mm
iv) sheath thickness ——— 0.5mm
v) co–efficient of friction ——— 0.25/ RADIAN
vi) wobble co–efficient ——— 0.0046/m
vii) nominal area of each strand ——— 98.7 mm^2
viii) nominal ultimate breaking load of each strand ——— 183.71KN
ix) modulus of elasticity of High tensile steel ——— 1.95×10^5 MPa

d. All the design parameters adopted shall be verified at site.

e. All prestressing accessories being patented items shall be obtained from authorised manufacturers only.

2. Prestressing operations

a. All cables shall be laid in smooth curves passing through the given ordinates. suitable spacers/ supports at all the important points and at a distance of 1000 c/c shall be provided to maintain tendon profile.

b. Stressing shall be carried out when the concrete attain a strength of 35Mpa

c. Stressing of cables shall be carried out simultaneously from both ends and all strands of cables shall be tensioned simultaneously. Only multipull jacks shall be used for stressing.

d. The emergency tendon marked Ⓓ will be used to compensate shortfall, if any in prestressing.

e. Grouting of cables shall be done in same sequence as stressing and shall conform to Irc 18–2000.

f. Anchorage pocket shall be filled with prepacked non–shrink mortar, end faces of girders to be coated with two coats of epoxy.

g. Extensions shall be rechecked at 24 hours after anchoring to observe slow slippage. The matter shall be reported for excessive slippage if any.

h. Initial slackness in cables shall be removed by applying small tension. The initial tension required to remove slackness shall be taken as the starting point for measuring elongation & correction shall be applied as per cl. 12.2.1.3 of Is:1343–1980.

i. In case the calculated elongation and the jack pressure are not achieved simultaneously during prestressing operation stressing shall be continued/ discontinued as per note no. 6 given below.

3. The extensions shall be modified at site in case actual value of area of 'a' & modulus of elasticity 'e' varies from those assumed in design, revised extension shall be calculated as under

$$\text{revised extension} = \frac{(195 \times 10^{\wedge}3) \times \text{original extension}}{(\text{new modulus})} \times \left(\frac{98.7}{\text{new area}}\right)$$

4. Elongation of cable shall be verified for a few cables at site. In case of value of μ and K are found to be different than those considered for design, extension shall be suitably modified after approval of design office.

5. The grip length from anchorage face upto gripping point in jack has not been considered in the extension calculations. the elongation at each end as given in table is to be corrected for grip length as under :

$$\text{new extension} = ex + 2x\left\{\frac{\text{jack force (in t)} \times 10000}{(\text{tension area (in mm}^2) \times e \text{ in mpa})}\right\} \times \boxed{\begin{matrix}\text{grip length}\\ \text{at each end}\\ \text{in mm}\end{matrix}}$$

6. If the calculated elongation is reached before the calculated gauge pressure is obtained, continue tensioning till obtaining the calculated guage pressure provided the elongation does not exceed 1.05 times the calculated elongation.

If the calculated elongation has not been reached continue tensioning in intervals of 5 kg/sqcm until the calculated elongation is reached provided the gauge pressure does not exceed 1.05 times the calculated gauge pressure.

If the elongation at 1.05 times the calculated guage pressure is less than 0.95 times the calculated elongation the following is less than 0.95 times the calculated elongation the following measures must be taken:

i) Recalibrate the pressure gauge

ii) Check the correct functioning of the jack pump & leads

iii) Retension the cable slide it in its duct to check that it is not blocked by mortar which has entered through holes in the sheath. retension the cable if free. If the required elongation is not obtained further finishing operation such as cutting or sealing should not be under taken without the approval of the design office

7. The gauge pressure for prestressing shall be worked out prior to any stressing operation duty taking in to account the ram area of the jack & the jack efficiency. The stressing equipments shall be well maintained and the calibration charts shall be available at site.

EMA Unihorn (India) Pvt. Ltd.
E/31, Kalkaji Extension, New Delhi–110019, India.
Tel.–26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

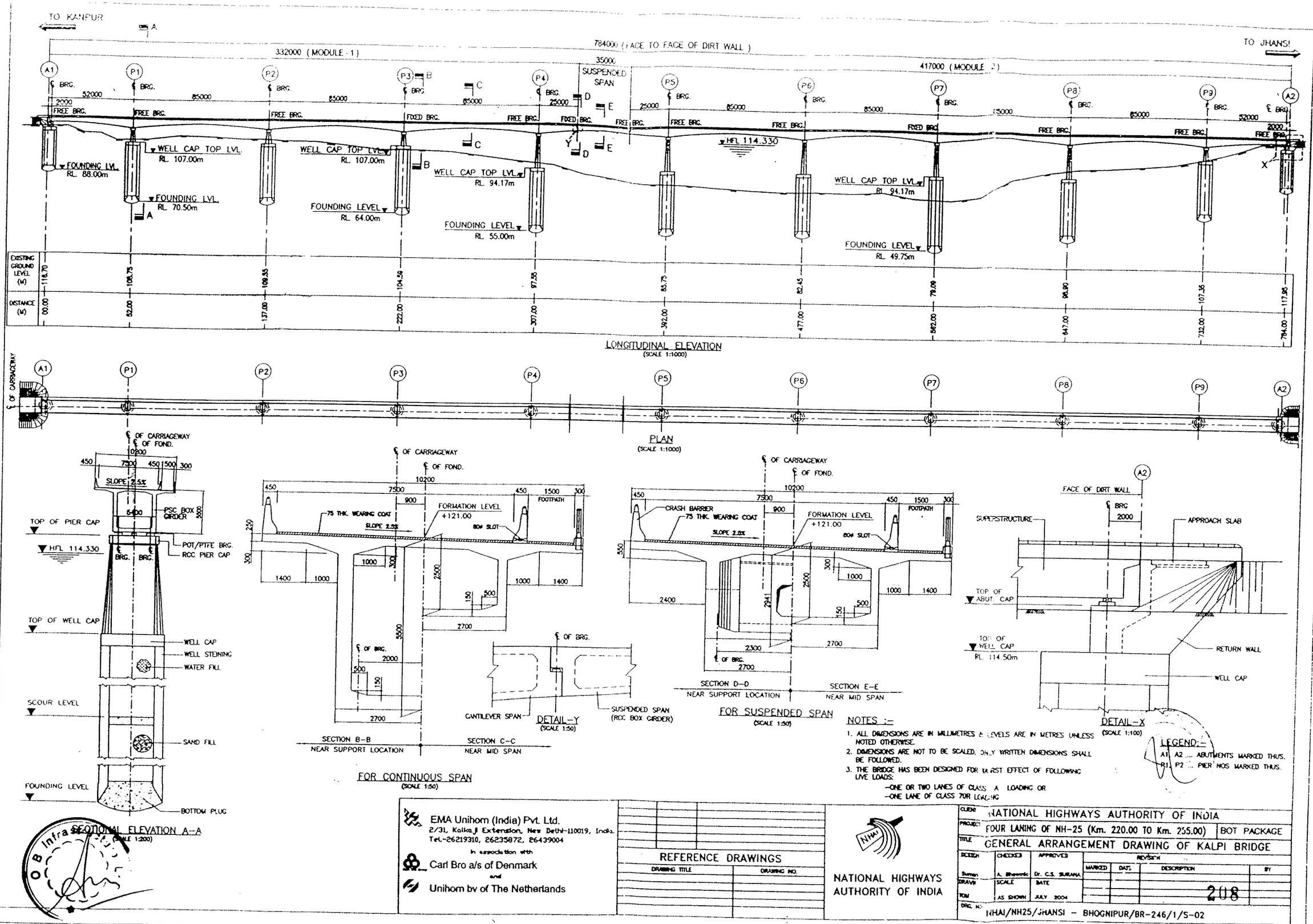
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH–25 (Km. 220.00 TO Km. 255.00) — BOT PACKAGE
TITLE: GENERAL NOTES OF KALPI BRIDGE

DESIGN	DRAWN	CHECKED	APPROVED
Suman	TON	A. Fioravanti	Dr. C.S. RUPWATE

REVISION

MARKED	DATE	DESCRIPTION	BY

SCALE: AS SHOWN
DATE: JULY 2004
DRG. NO: NHAI/NH25/JHANSI – BHOGNIPUR/BR–246/1/S–01



NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETRES & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THE BRIDGE HAS BEEN DESIGNED FOR WORST EFFECT OF FOLLOWING LIVE LOADS:
   - -ONE OR TWO LANES OF CLASS A LOADING OR
   - -ONE LANE OF CLASS 70R LOADING

LEGEND:-
A1, A2 ... ABUTMENTS MARKED THUS.
P1, P2 ... PIER NOS MARKED THUS.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel:-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

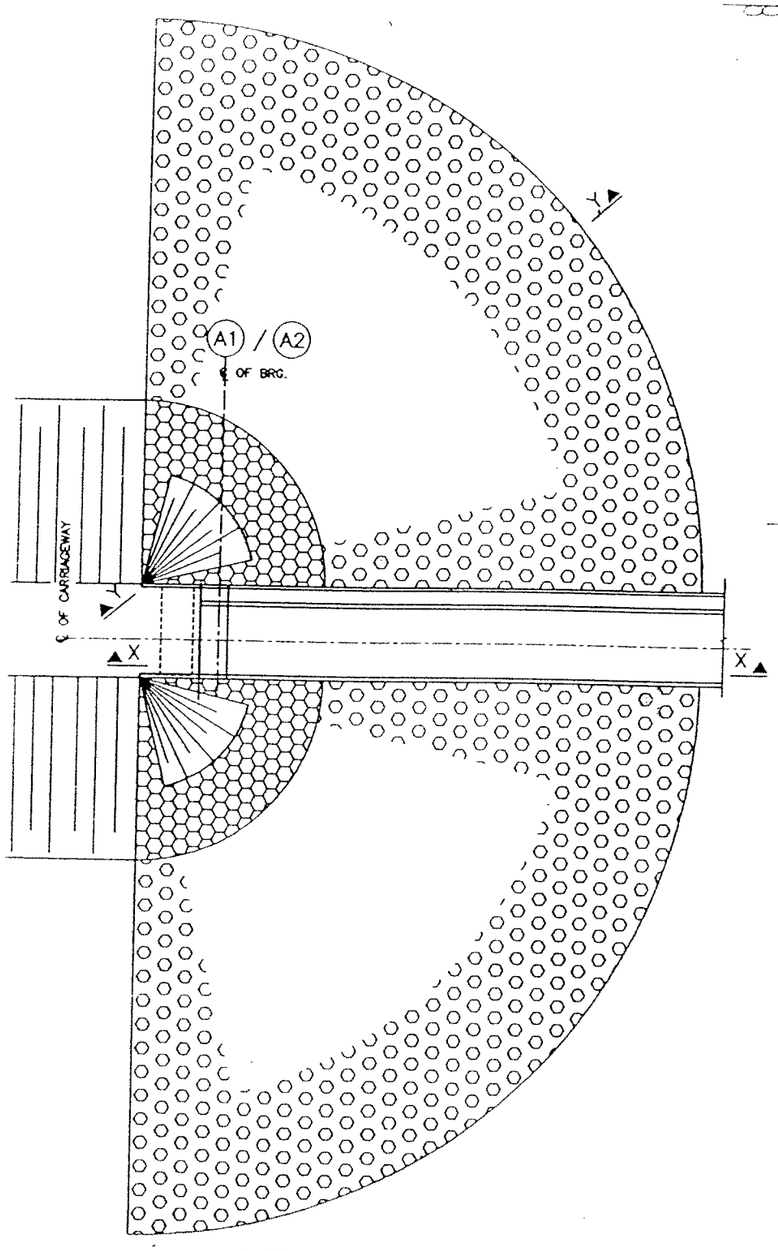
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF KALPI BRIDGE

DESIGN	CHECKED	APPROVED
Sharma	A. Bhowmik	Dr. C.S. SURANA
DRAWN	SCALE	DATE
TDM	AS SHOWN	JULY 2004

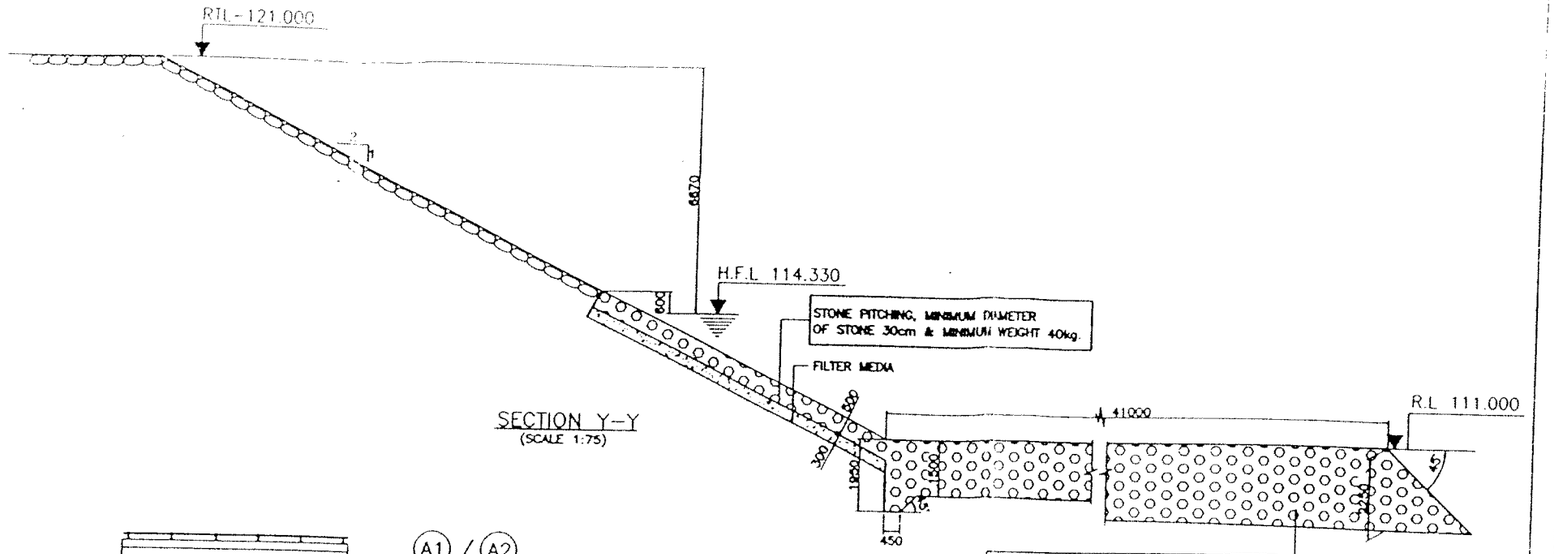
REVISION

MARKED	DATE	DESCRIPTION	BY

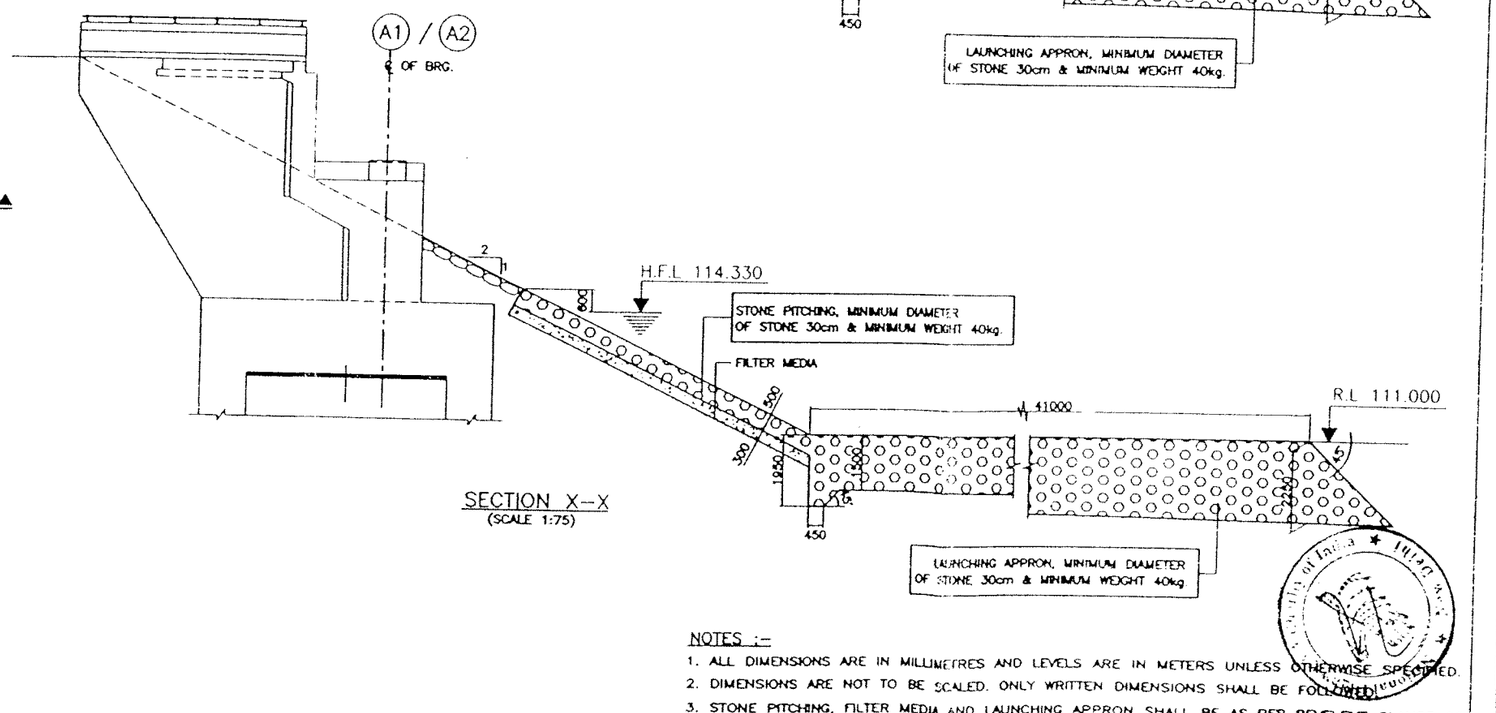
DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/BR-246/1/S-02



PART PLAN SHOWING PROTECTION WORK
(SCALE 1:300)



SECTION Y-Y
(SCALE 1:75)



SECTION X-X
(SCALE 1:75)

NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. STONE PITCHING, FILTER MEDIA AND LAUNCHING APPRON SHALL BE AS PER REVELENT CLAUSE OF IRC-89-1997.
4. ALL WORK SHALL BE CARRIED OUT AS PER M O S T S SPECIFICATIONS FOR ROADS AND BRIDGES WORKS (3rd REVISION)
5. IN CASE STONES OF REQUIRED SIZE AND WEIGHT ARE NOT AVAILABLE, CEMENT CONCRETE BLOCK IN M15 GRADE OR STONE IN WIRE CRATES MAY BE PERMITTED WITH THE ENGINEER'S APPROVAL.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26219318, 26235872, 26439904
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

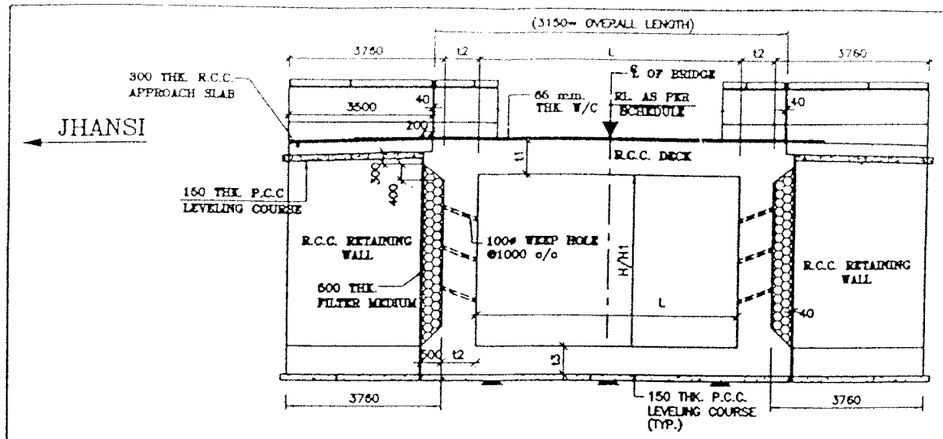
NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: DETAILS OF STONE PITCHING AND LAUNCHING APPRON AT KALPI BRIDGE

DESIGN	CHECKED	APPROVED
	A. Bhowmik	Dr. C.S. SURANA
SCALE		DATE
AS SHOWN		JULY 2004

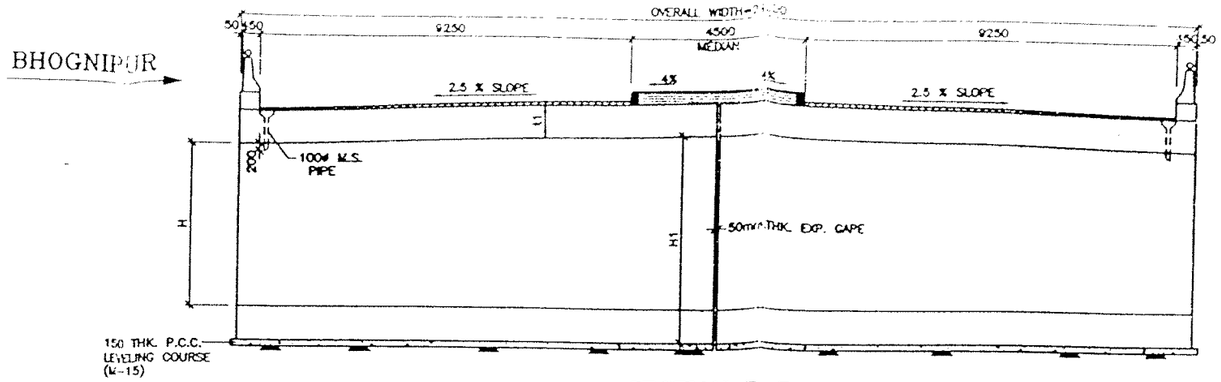
REVISION

MARKED	DATE	DESCRIPTION	BY

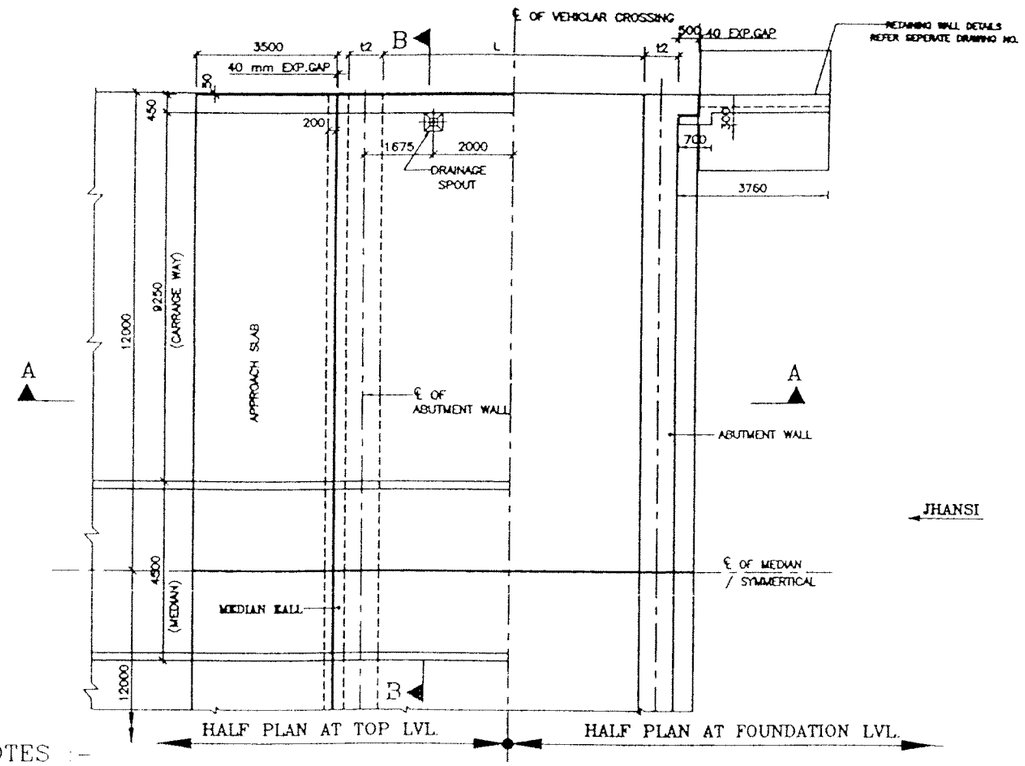
DWG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/BR-246/1/S-24



SECTION A–A



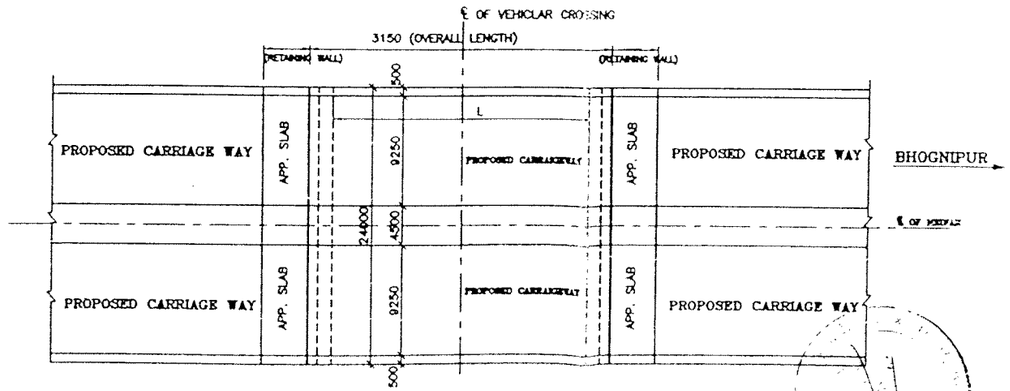
SECTION B–B



S. NO.	CHAINAGE	SPAN (L)	(H)	(H1)	(t1)	(t2)	(t3)
1.	249.032	2500	2500	2962.5	350	350	400

NOTES :–

1. FOR STRUCTURAL NOTES REF. DRG. NO. NHAI/NH25/JHANSI–BHOGNIPUR/GEN–01
2. NOT TO SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
3. CATTLE CROSSING LOCATION IS CHAINAGE AT CENTRE OF CATTLE CROSSING.
4. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION, IF REQUIRED.
5. FOR ROAD TOP LEVEL REFERS TO LEVEL AT INNER MEDIAN EDGE.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/ CA/M/S–202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/M/S–203
8. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO– NHAI/NH25/JHANSI – BHOGNIPUR/R/W/M/S–206
9. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.
10. RCDF DETAILS SHALL BE SHOWN IN CONSTRUCTION DRGS.
11. CROSS SLOPE OF 2.5 % SHALL BE PROVIDED BY RAISING PEDESTALS.
12. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB



KEY PLAN

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi–110019, India.
Tel.–26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

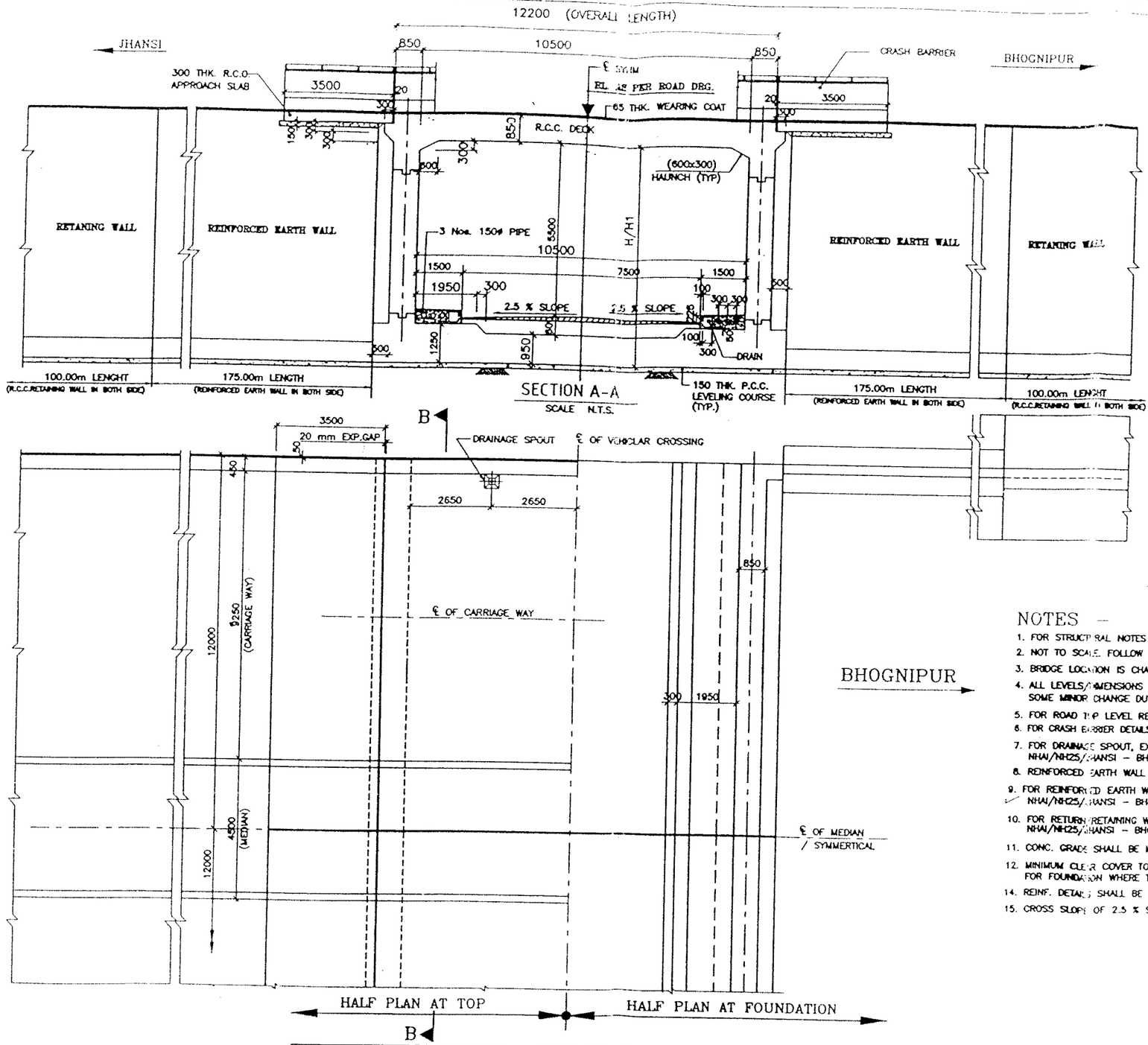
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH–25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF CATTLE CROSSING (2.5x2.5M)

DESIGN	CHECKED	APPROVED
A. PANDEY	R. PANDEY	Dr. C.S. SURANA
DRAWN	SCALE	DATE
A. PANDEY	(N.T.S.)	OCT.–2004

REVISION			
MARKED	DATE	DESCRIPTION	BY

DRG. NO.: NHAI/NH25/JHANSI – BHOGNIPUR/CATT–RCC/2.5m/S–01

210



NOTES –

1. FOR STRUCTURAL NOTES REF. DRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. NOT TO SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
3. BRIDGE LOCATION IS CHAINAGE AT CENTRE OF BRIDGE.
4. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION. IF REQUIRED.
5. FOR ROAD TOP LEVEL REFERS TO LEVEL AT INNER MEDIAN EDGE.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. REINFORCED EARTH WALL SHALL BE PROVIDED IN APPROACHES.
9. FOR REINFORCED EARTH WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/RE/M/S-205
10. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
11. CONC. GRADE SHALL BE M35 FOR BOX , M30 FOR APPROACH SLAB
12. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.
14. REINF. DETAILS SHALL BE SHOWN IN CONSTRUCTION DRGS.
15. CROSS SLOPE OF 2.5 % SHALL BE PROVIDED BY RAISING PEDESTALS

NOTES

1. FOR STRUCTURAL NOTES REF. DRG. NO. GEN-01.
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. REINFORCED EARTH RETAINING WALL OR R.C.C. RETAINING WALL SHALL BE USED TO RETAIN EARTH/ SOIL IN EMBANKEMENT PORTION.

EMA Unihorn (India) Pvt. Ltd
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

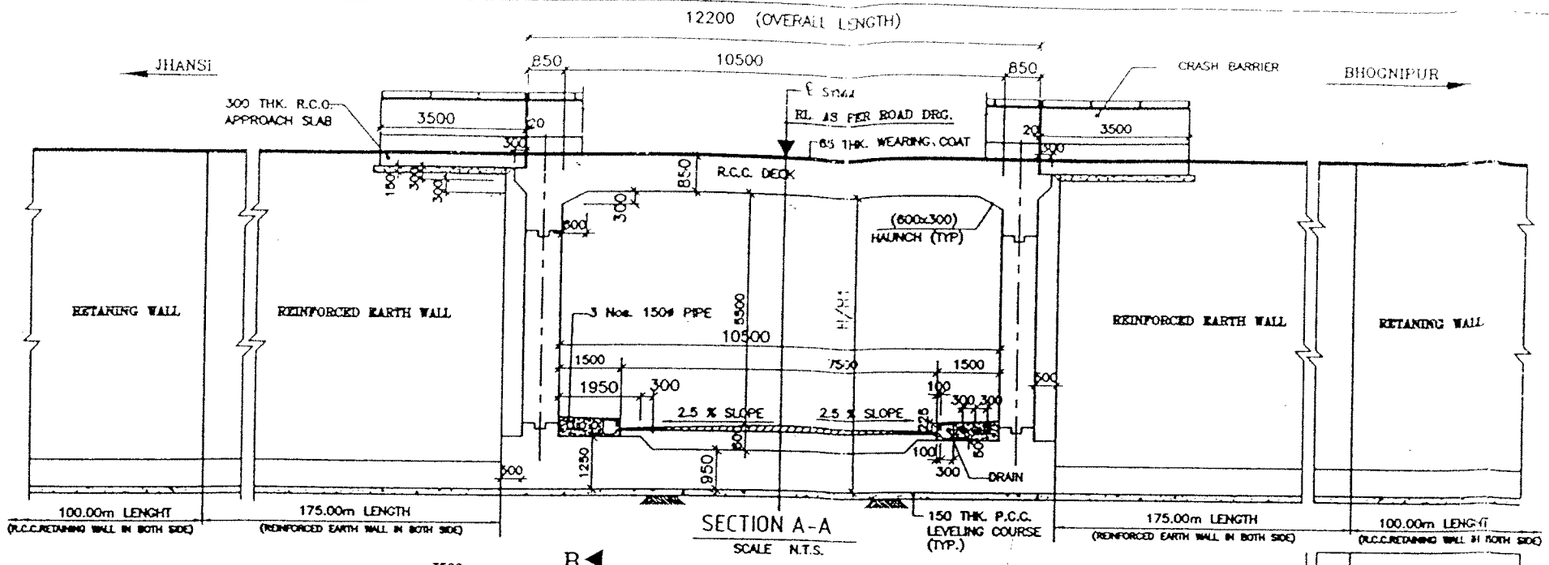
DRAWING TITLE	DRAWING NO.

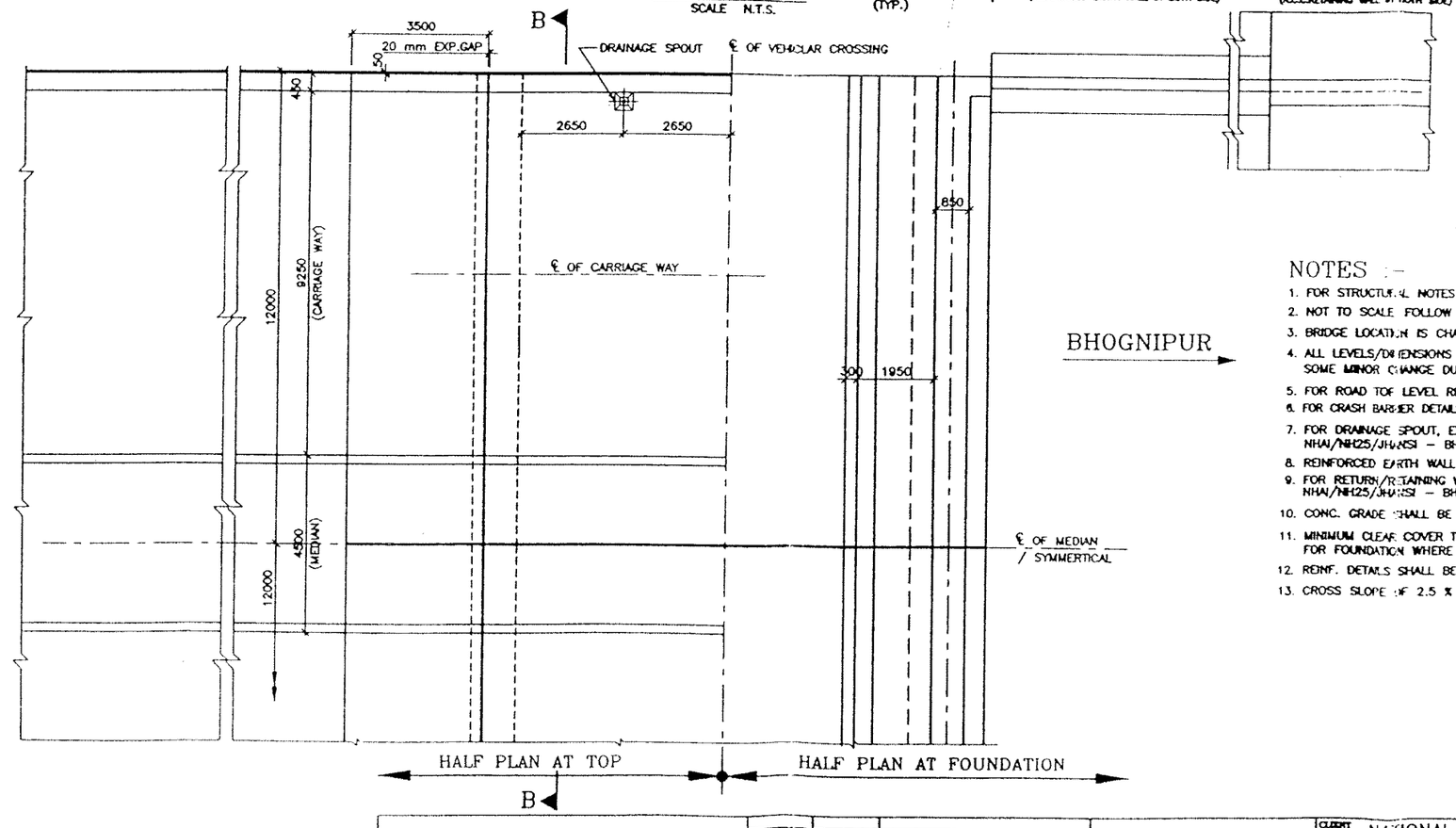
NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT	NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT	FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) BOT PACKAGE
TITLE	GENERAL ARRANGEMENT DRAWING OF VEHICULAR CROSSING (10.5x5.0M)
DESIGN & PLANDA	CHECKED: R.P.PANDEY; APPROVED: Dr.C.S. SURANA
DRAWN & TRACED	SCALE: (N.T.S.); DATE: OCT.-2004
DRG. NO	NHAI/NH25/JHANSI - BHOGNIPUR/VEH-RE/S-01 (SHEET 1 OF 1)

REVISION			
MARKED	DATE	DESCRIPTION	BY

211





NOTES :-

1. FOR STRUCTURAL NOTES REF. DRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. NOT TO SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
3. BRIDGE LOCATION IS CHAINAGE AT CENTRE OF BRIDGE.
4. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION, IF REQUIRED.
5. FOR ROAD TOP LEVEL REFERS TO LEVEL AT INNER MEDIAN EDGE.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. REINFORCED EARTH WALL SHALL BE PROVIDED IN APPROACHES.
9. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
10. CONC. GRADE SHALL BE M35 FOR BOX , M30 FOR APPROACH SLAB
11. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.
12. REINF. DETAILS SHALL BE SHOWN IN CONSTRUCTION DRGS.
13. CROSS SLOPE OF 2.5 % SHALL BE PROVIDED BY RAISING PEDESTALS.

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRG. NO. GEN-01.
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. REINFORCED EARTH RETAINING WALL OR R.C.C. RETAINING WALL SHALL BE USED TO RETAIN EARTH/ SOIL IN EMBANKEMENT PORTION.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

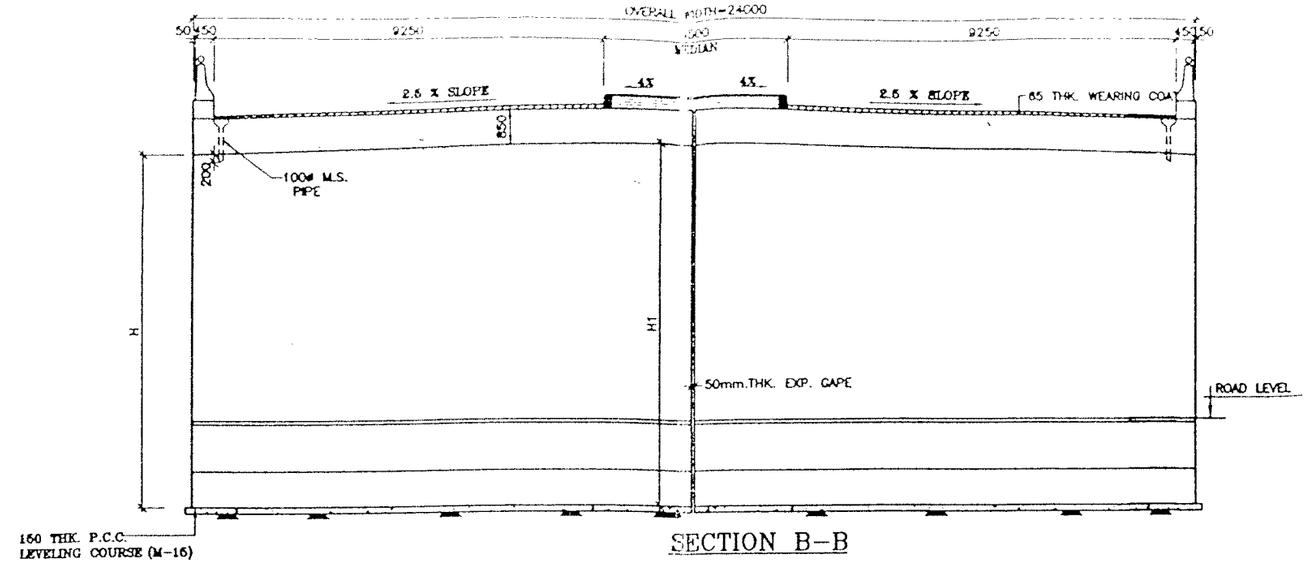
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.00 TO Km. 255.00) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF VEHICULAR CROSSING (10.5x5.0M)

DESIGN	CHECKED	APPROVED
A.PANDA	R.M.SHUKLA	Dr.C.S. PURANA
DRAWN	SCALE (AS SHOWN)	DATE OCT.-2004

REVISION			
MARKED	DATE	DESCRIPTION	BY

212

DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/VEH-RE/S-01 (SHEET 1 OF 1)

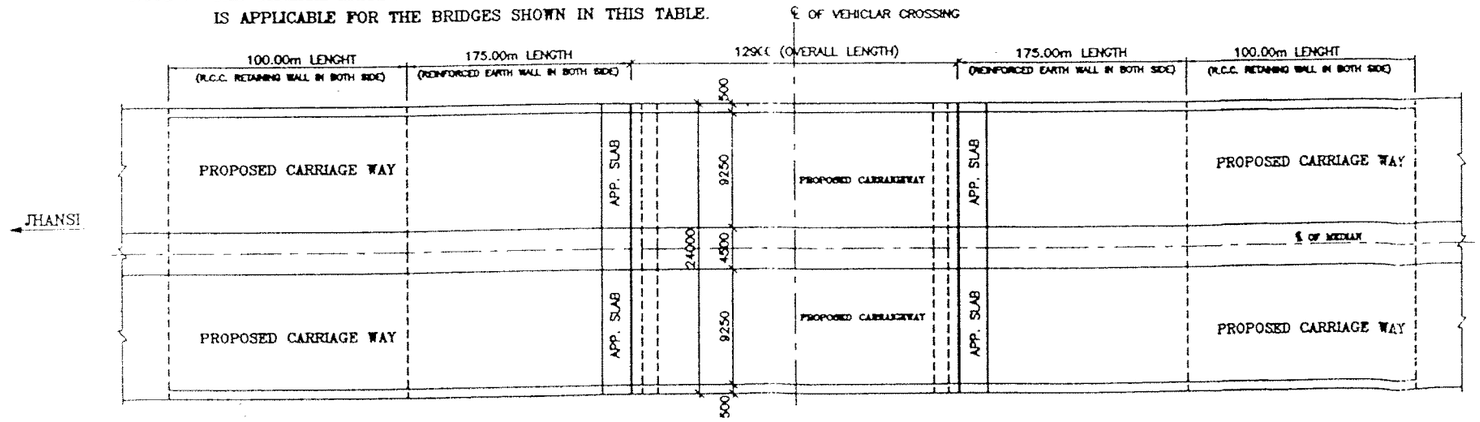


SECTION B–B

SCHEDULE FOR GRADE SEPETATOR

S. NO.	CHAINAGE	PROPOSED ROAD TOP LVL.	SERVICE ROAD TOP LVL.	N.G.L.	SPAN (L)	(H)	(H1)
1.	243.851				10500	7050	7350

NOTE :– THE GENERAL ARRANGEMENT DRAWING (SHEET 1 OF 2 & 2 OF 2) IS APPLICABLE FOR THE BRIDGES SHOWN IN THIS TABLE.



KEY PLAN

OB Infrastructure

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi–110019, India.
Tel.–26219310, 26235872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH–25 (Km. 220.00 TO Km. 255.00) BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING OF VEHICULAR CROSSING (10.5x5.0M)

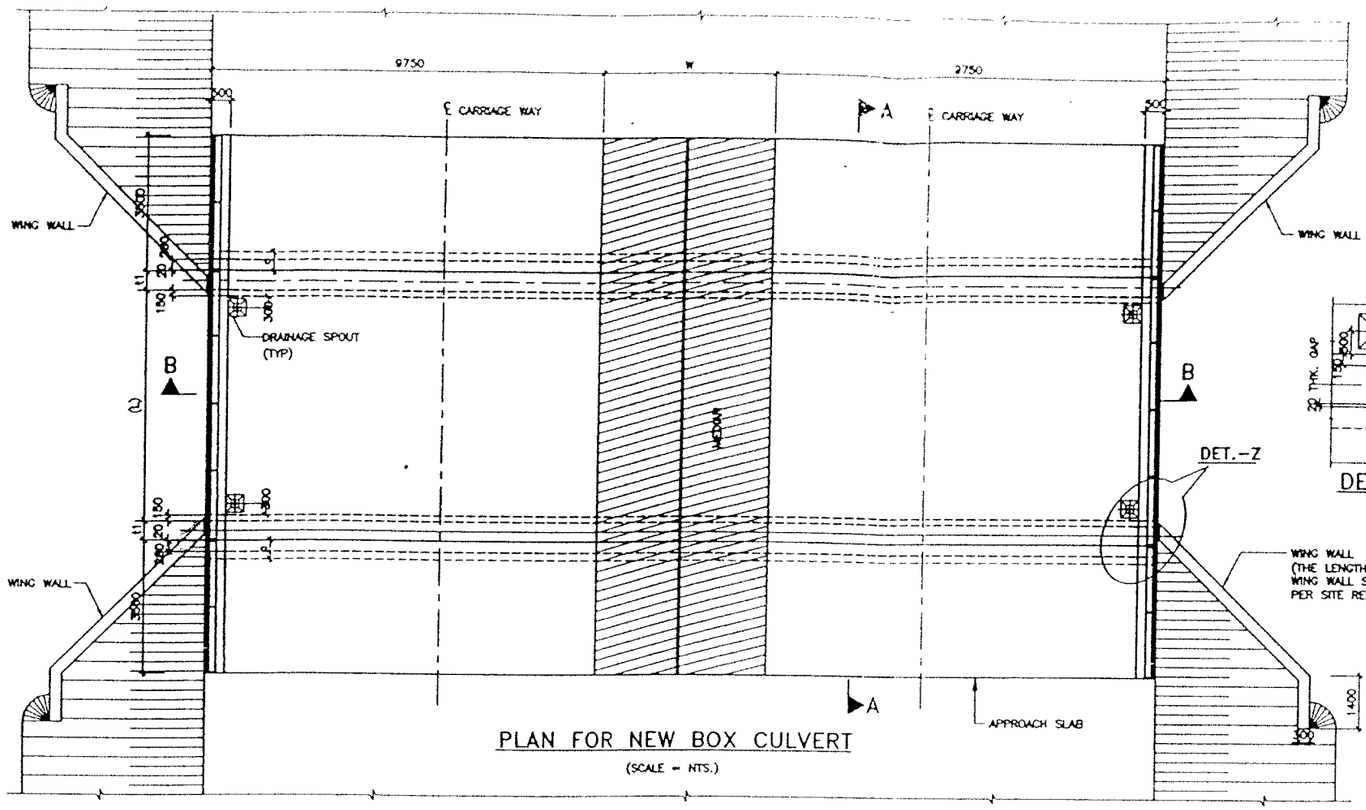
DESIGN	CHECKED	APPROVED
PANDA	R.P.SAXENA	Dr.C.S. SURANA
DRAWN	SCALE	DATE
SANTAN	(N.T.S.)	OCT.–2004

REVISION

MARKED	DATE	DESCRIPTION	BY

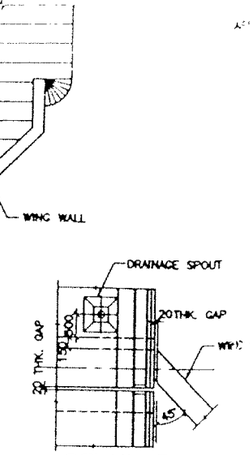
213

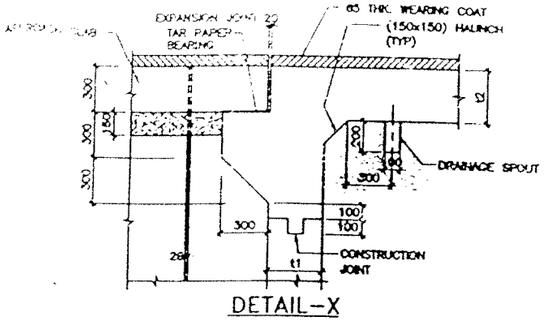
DRG. NO: NHAI/NH25/JHANSI – BHOGNIPUR/VEH-RE/S-01 (SHEET 2 OF 2)

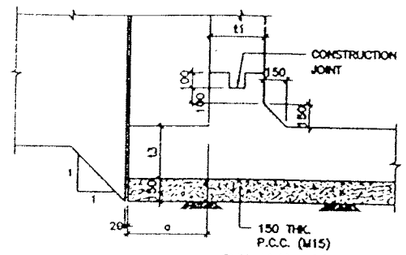


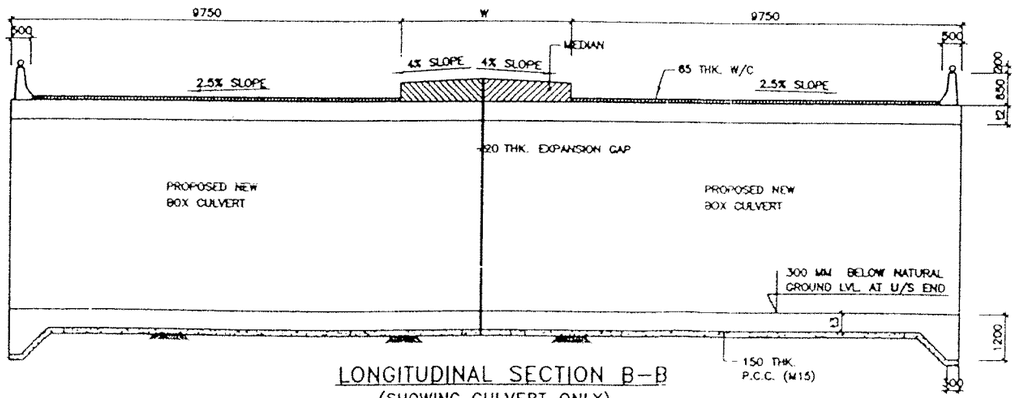
PLAN FOR NEW BOX CULVERT

(SCALE - NTS.)





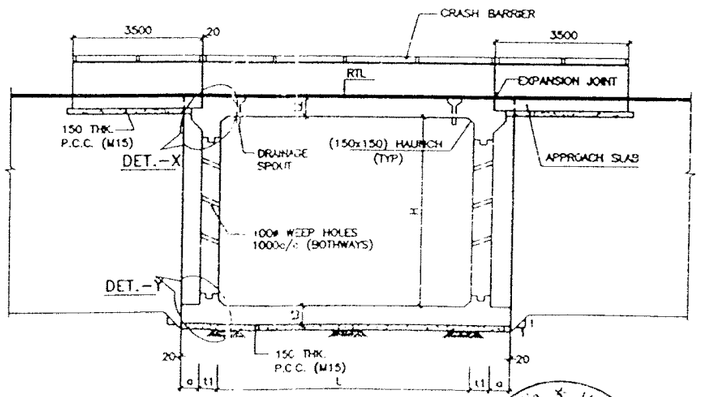




LONGITUDINAL SECTION B-B

(SHOWING CULVERT ONLY)

(SCALE - MTS.)



SECTION A-A

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. DRAWINGS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWS.
4. CULVERTS LOCATION IS CHAINAGE AT CENTRE OF CULVERTS.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION. IF REQUIRED.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. HEIGHT (H) OF EACH CULVERT SHALL BE CONFIRMED AS PER SITE CONDITIONS
9. RETURN WALLS SHALL BE PROVIDED AS PER SITE CONDITIONS
10. EXISTING CULVERTS SHALL BE DISMENTALED IN TWO STAGES
11. NEW CULVERTS SHALL BE CONSTRUCTED IN TWO STAGES TO PREVENT DISRUPTION OF TRAFFIC
12. 2.5 % CROSS SLOPE SHALL BE PROVIDED BY RAISING THE VERTICAL WALLS OF CULVERTS.
13. W & WIDTH OF THE CULVERT SHALL BE AS SHOWN IN ROAD DRAWING
14. FOR WING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/W/M/S-204
15. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
16. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB
17. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.

03 Jul 2006

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26519310, 26535872, 26439004
in association with
Carl Bro a/s of Denmark
and
Unihorn by of The Netherlands

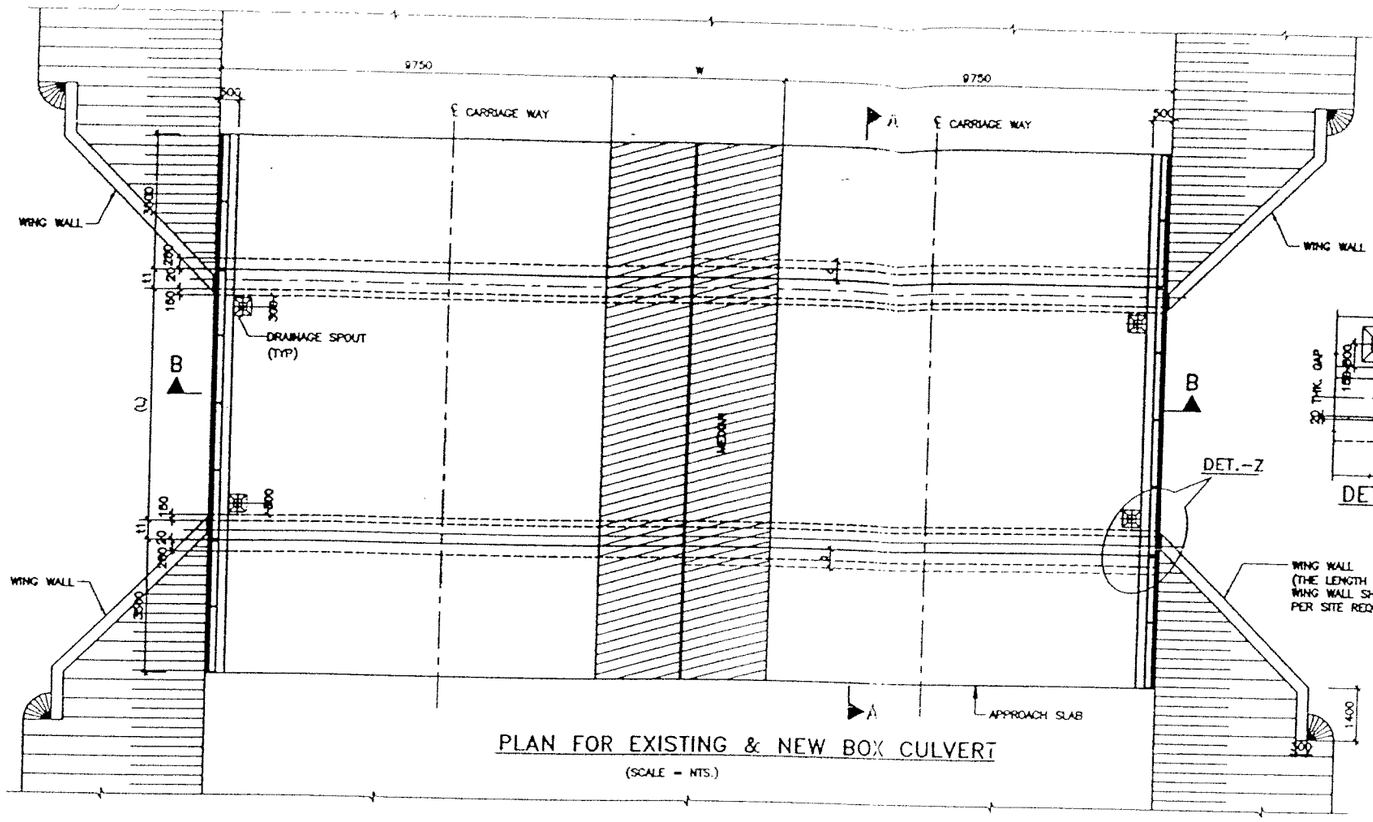
REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

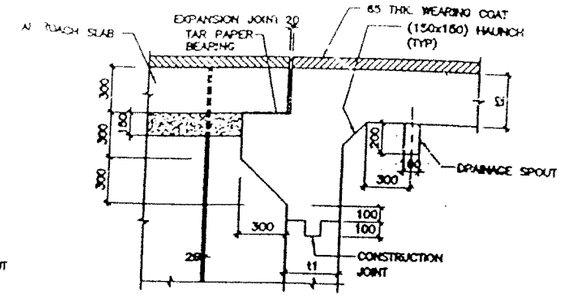
CLIENT	NATIONAL HIGHWAYS AUTHORITY OF INDIA					
PROJECT	FOUR LANING OF NH-25 (Km. 220.000 TO Km. 255.000)					BOT PACKAGE
TITLE	GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT					(TYPE-A)
DESIGN	CHECKED	APPROVED	REVISION			
			MARKED	DATE	DESCRIPTION	BY
S. PANDA	S. PANDEY	Dr. C.R. SURANA				
DRAWN	SCALE	DATE				
M. RAWAT	N.T.S.	OCT.-2004				
DRG. NO	NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-101					

214



PLAN FOR EXISTING & NEW BOX CULVERT

(SCALE - NTS.)

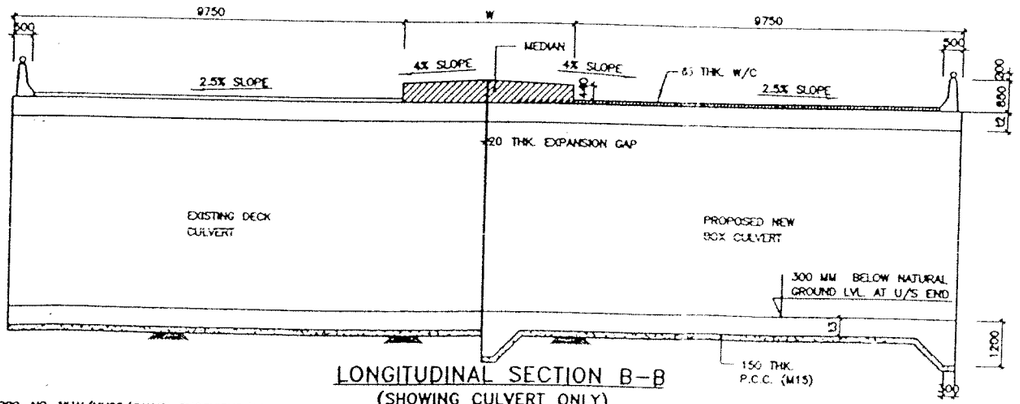


DETAIL-X

DETAIL-Z

DETAIL-Y

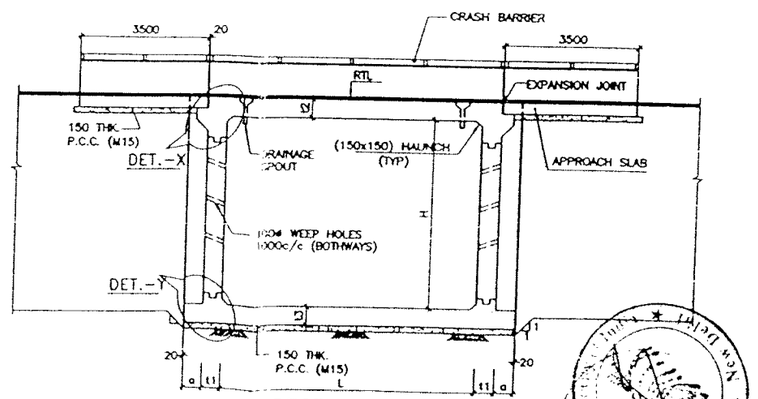
W= MEDIAN WIDTH



LONGITUDINAL SECTION B-B

(SHOWING CULVERT ONLY)

(SCALE - NTS.)



SECTION A-A

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. DRAWINGS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWS.
4. CULVERTS LOCATION IS CHAINAGE AT CENTRE OF CULVERTS.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION IF REQUIRED.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. HEIGHT (H) OF EACH CULVERT SHALL BE CONFIRMED AS PER SITE CONDITIONS
9. RETURN WALLS SHALL BE PROVIDED AS PER SITE CONDITIONS
10. EXISTING CULVERTS SHALL BE DISMENTALED IN TWO STAGES
11. NEW CULVERTS SHALL BE CONSTRUCTED IN TWO STAGES TO PREVENT DISRUPTION OF TRAFFIC
12. 2.5 % CROSS SLOPE SHALL BE PROVIDED BY RAISING THE VERTICAL WALLS OF CULVERTS.
13. RL. & WIDTH OF THE CULVERT SHALL BE AS SHOWN IN ROAD DRAWING
14. FOR WING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/W/M/S-204
15. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
16. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB
17. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26519310, 26535872, 26439004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA

PROJECT: FOUR LANING OF NH-25 (Km. 220.000 TO Km. 255.000) BOT PACKAGE

TITLE: GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT. (TYPE-B)

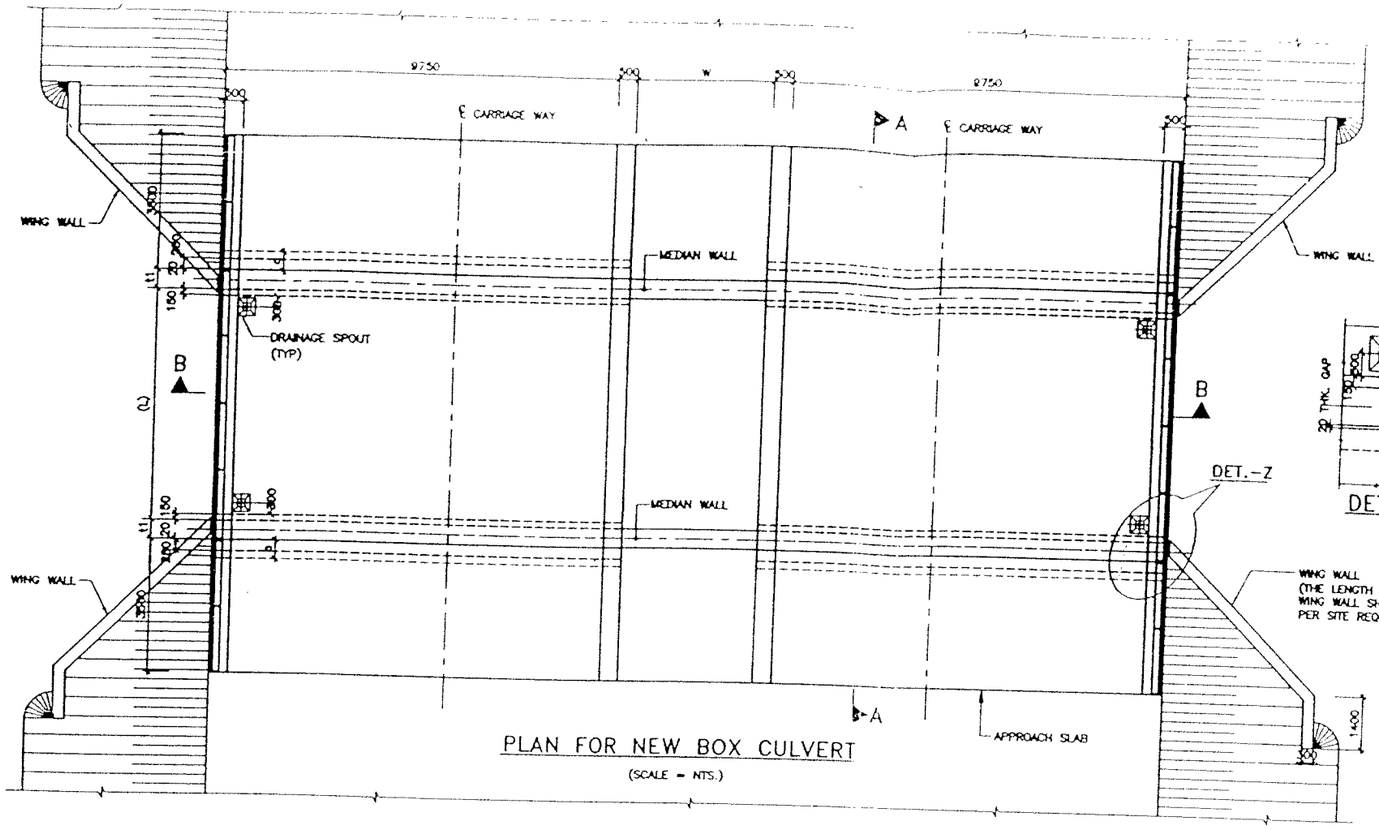
DESIGNED	CHECKED	APPROVED
A. PANDA	R. PANDEY	Dr. C.R. BUBBAL

DRAWN	SCALE	DATE
	N.T.S.	OCT.-2004

REVISION

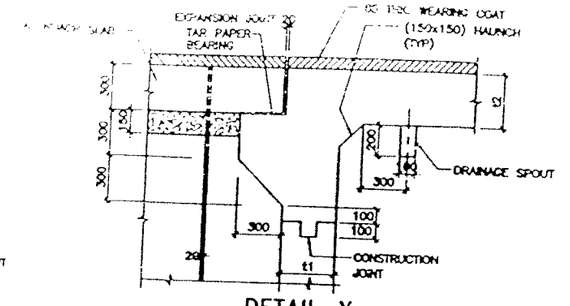
MARKED	DATE	DESCRIPTION	BY

DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-102

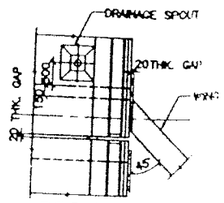


PLAN FOR NEW BOX CULVERT

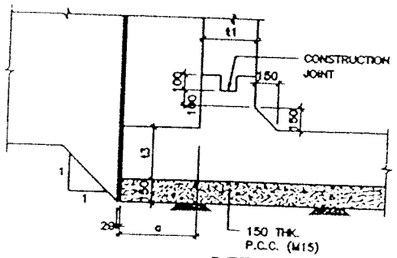
(SCALE = NTS.)



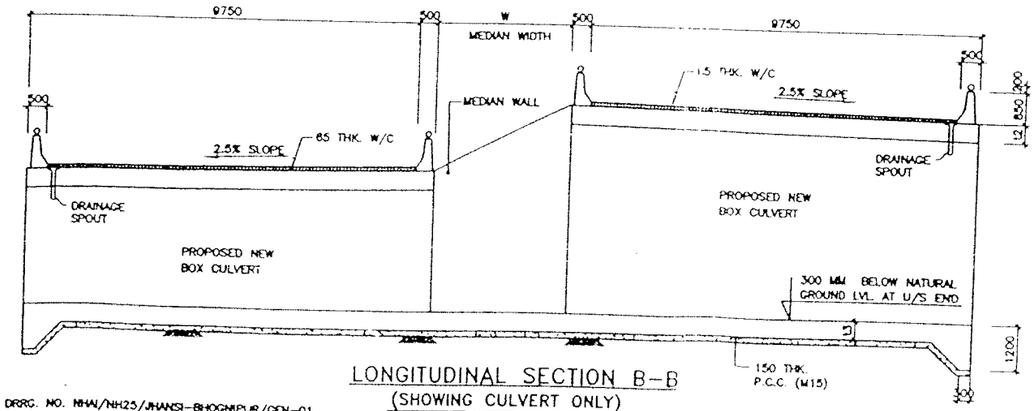
DETAIL-X



DETAIL-Z



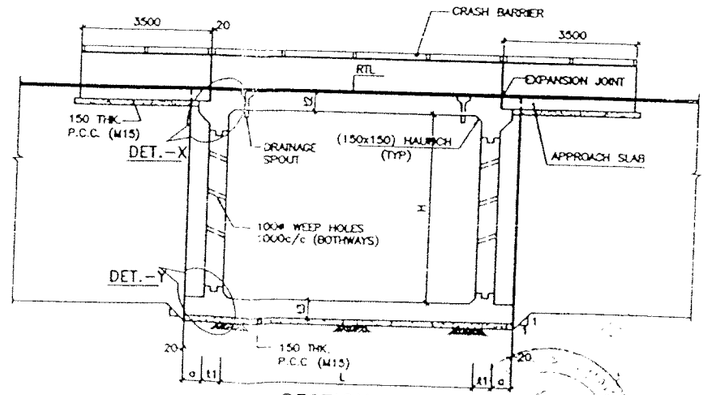
DETAIL-Y



LONGITUDINAL SECTION B-B

(SHOWING CULVERT ONLY)

(SCALE = NTS.)



SECTION A-A

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS.
3. DRAWINGS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWS.
4. CULVERTS LOCATION IS CHAINAGE AT CENTRE OF CULVERTS.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION, IF REQUIRED.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. HEIGHT (H) OF EACH CULVERT SHALL BE CONFIRMED AS PER SITE CONDITIONS
9. RETURN WALLS SHALL BE PROVIDED AS PER SITE CONDITIONS
10. EXISTING CULVERTS SHALL BE DISMENTALED IN TWO STAGES
11. NEW CULVERTS SHALL BE CONSTRUCTED IN TWO STAGES TO PREVENT DISRUPTION OF TRAFFIC
12. 2.5 % CROSS SLOPE SHALL BE PROVIDED BY RAISING THE VERTICAL WALLS OF CULVERTS.
13. RL & WIDTH OF THE CULVERT SHALL BE AS SHOWN IN ROAD DRAWING
14. FOR WING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/W/M/S-204
15. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
16. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB
17. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26519310, 26535872, 26439001
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA

PROJECT: FOUR LANING OF NH-25 (Km. 250.000 TO Km. 255.000) | BOT PACKAGE

TITLE: GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-C)

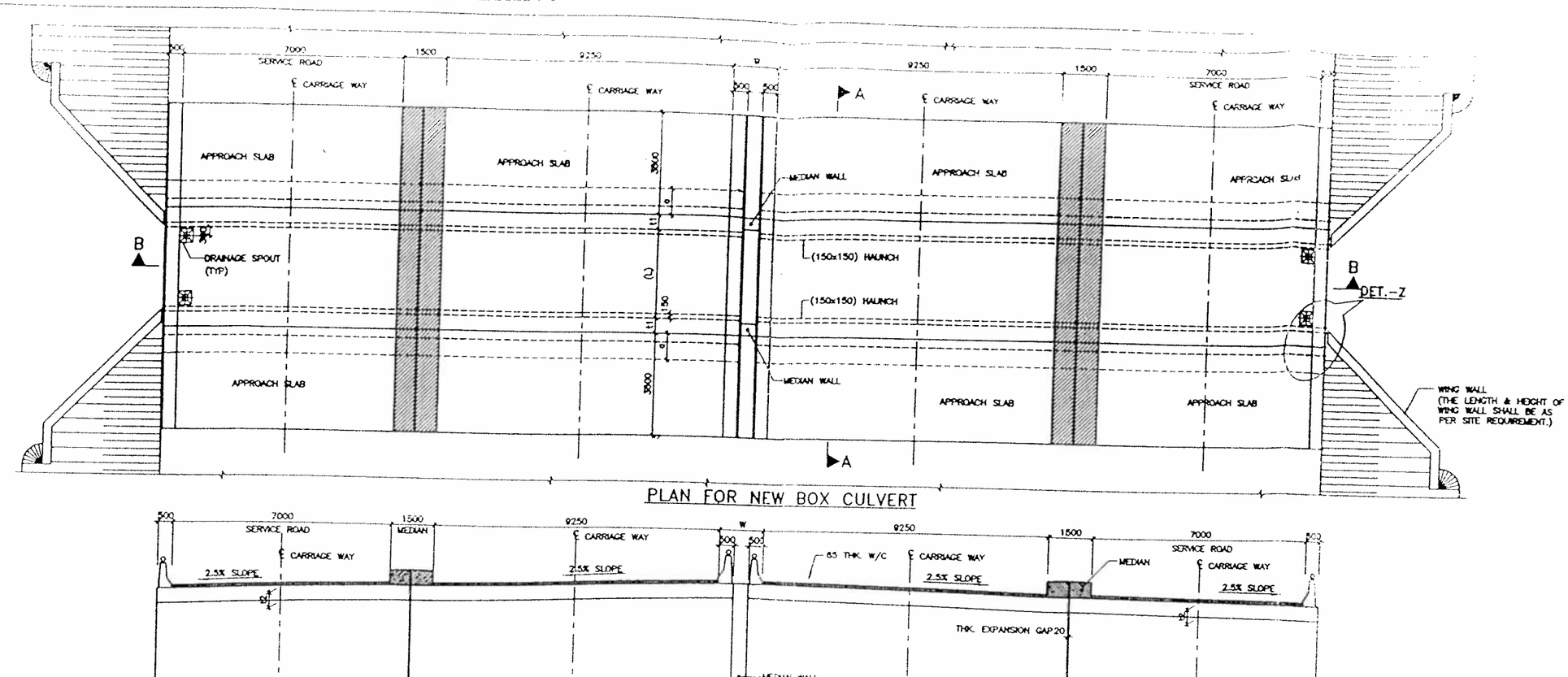
DESIGN	CHECKED	APPROVED
P. PARDA	R. PANDEY	Dr. C.S. SOMANI
SCALE	DATE	
N.T.S.	OCT.-2004	

REVISION

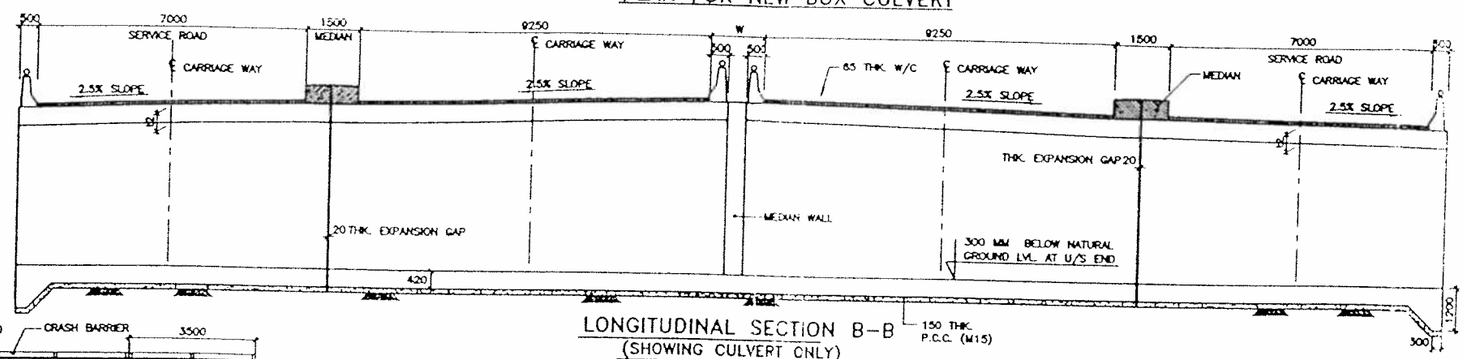
MARKED	DATE	DESCRIPTION	BY

216

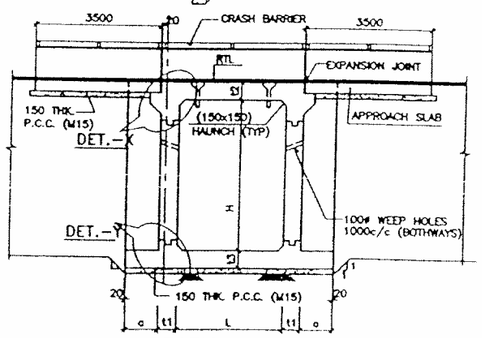
NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-103



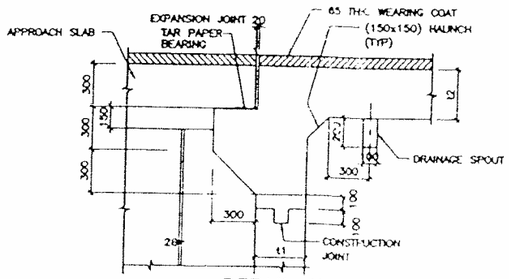
PLAN FOR NEW BOX CULVERT



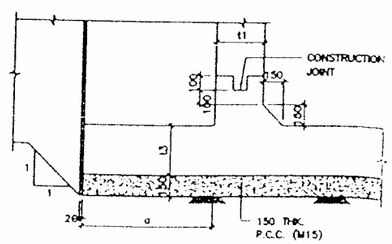
LONGITUDINAL SECTION B-B
(SHOWING CULVERT ONLY)



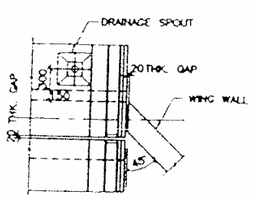
SECTION A-A



DETAIL-X



DETAIL-Y



DETAIL-Z

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRRQ. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
3. DRAWINGS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWS.
4. CULVERTS LOCATION IS CHAINAGE AT CENTRE OF CULVERTS.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION. IF REQUIRED.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. HEIGHT (H) OF EACH CULVERT SHALL BE CONFIRMED AS PER SITE CONDITIONS
9. RETURN WALLS SHALL BE PROVIDED AS PER SITE CONDITIONS
10. EXISTING CULVERTS SHALL BE DISMENTALED IN TWO STAGES
11. NEW CULVERTS SHALL BE CONSTRUCTED IN TWO STAGES TO PREVENT DISRUPTION OF TRAFFIC
12. 2.5 % CROSS SLOPE SHALL BE PROVIDED BY RAISING THE VERTICAL WALLS OF CULVERTS.
13. RL. & WIDTH OF THE CULVERT SHALL BE AS SHOWN IN ROAD DRAWING
14. FOR WING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/W/M/S-204
15. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/M/S-206
16. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB
17. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26519310, 26535872, 26436004
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

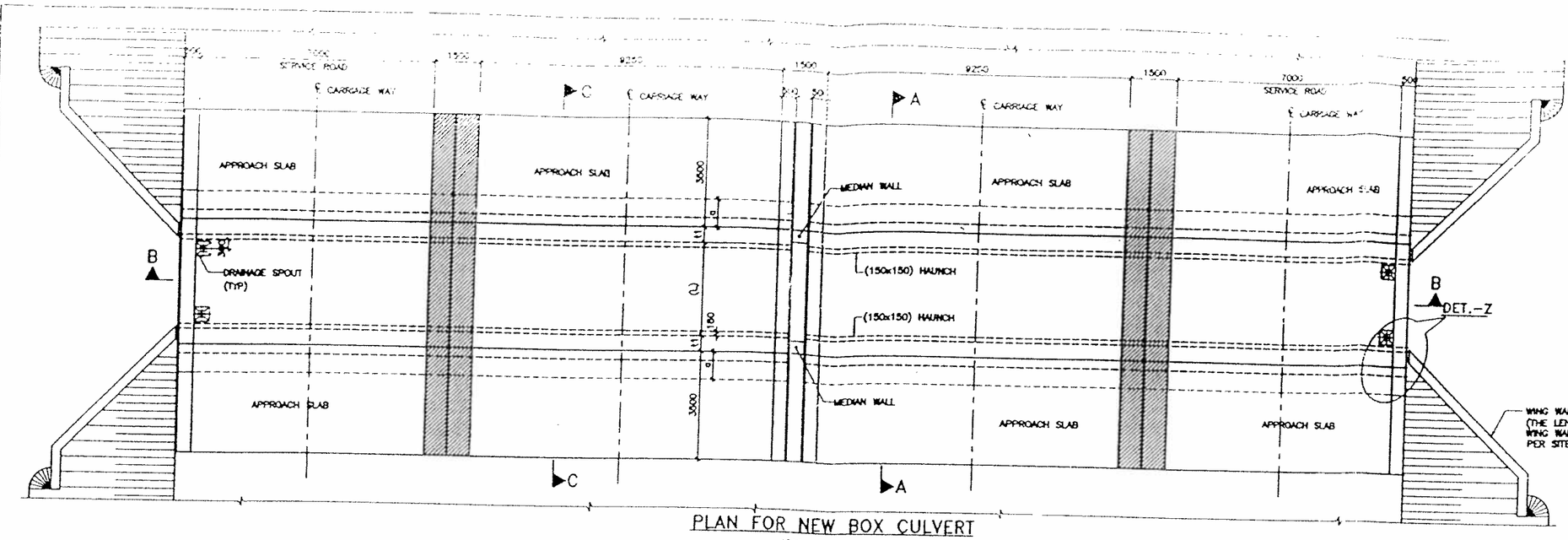
BUILDING TOOLS	DRAWING NO.

NATIONAL HIGHWAYS AUTHORITY OF INDIA

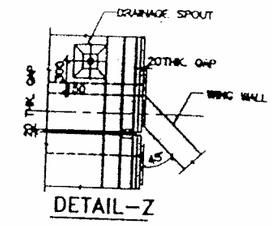
CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.000 TO Km. 255.000) BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-D)

LAYOUT	CHECKED	APPROVED	REVISION			
A. PANDA	R. PANDEY	Dr. G.R. SUBARAO	MARKED	DATE	DESCRIPTION	BY
DRAWN	SCALE	DATE				
G. RAWAT	N.T.S.	OCT.-2004				

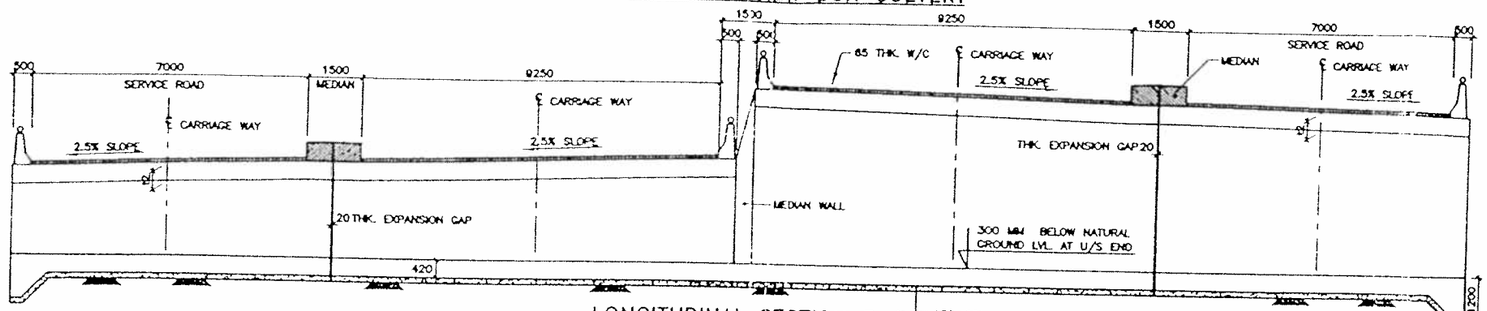
DRG. NO: NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-104



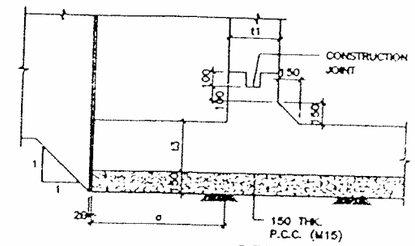
PLAN FOR NEW BOX CULVERT



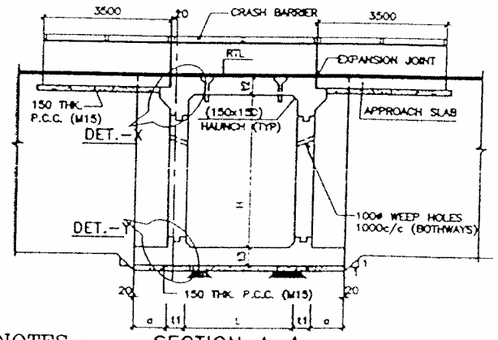
DETAIL-Z



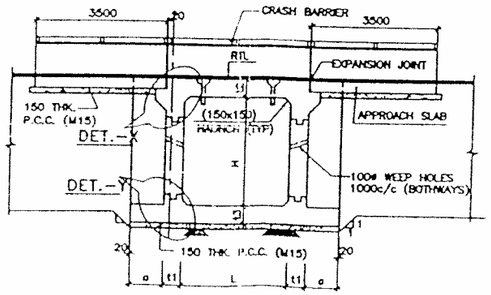
LONGITUDINAL SECTION B-B
(SHOWING CULVERT ONLY)



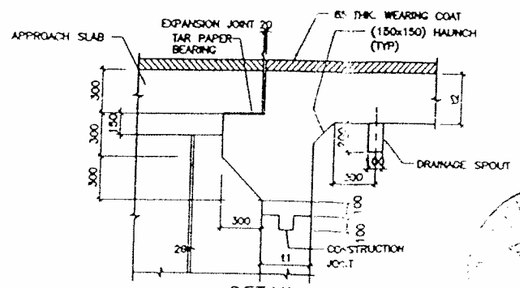
DETAIL-Y



SECTION A-A



SECTION C-C



DETAIL-X

NOTES :-

1. FOR STRUCTURAL NOTES REF. DRRG. NO. NHAI/NH25/JHANSI-BHOGNIPUR/GEN-01
2. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS.
3. DRAWINGS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWS.
4. CULVERTS LOCATION IS CHAINAGE AT CENTRE OF CULVERTS.
5. ALL LEVELS/DIMENSIONS ARE TENTATIVE AND MAY UNDERGO SOME MINOR CHANGE DURING EXECUTION, IF REQUIRED.
6. FOR CRASH BARRIER DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/ CA/M/S-202
7. FOR DRAINAGE SPOUT, EXPANSION JOINT DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/M/S-203
8. HEIGHT (H) OF EACH CULVERT SHALL BE CONFIRMED AS PER SITE CONDITIONS
9. RETURN WALLS SHALL BE PROVIDED AS PER SITE CONDITIONS
10. EXISTING CULVERTS SHALL BE DISMENTALED IN TWO STAGES
11. NEW CULVERTS SHALL BE CONSTRUCTED IN TWO STAGES TO PREVENT DISRUPTION OF TRAFFIC
12. 2.5 % CROSS SLOPE SHALL BE PROVIDED BY RAISING THE VERTICAL WALLS OF CULVERTS.
13. RL. & WIDTH OF THE CULVERT SHALL BE AS SHOWN IN ROAD DRAWING
14. FOR WING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/W/M/S-204
15. FOR RETURN/RETAINING WALL DETAILS REFER DRG. NO- NHAI/NH25/JHANSI - BHOGNIPUR/R/W/M/S-206
16. CONC. GRADE SHALL BE M25 FOR BOX , M30 FOR APPROACH SLAB
17. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR SHALL BE 40 mm EXCEPT FOR FOUNDATION WHERE THE MINIMUM CLEAR COVER SHALL BE 75 mm.

EMA Unihorn (India) Pvt. Ltd.
2/31, Kalkaji Extension, New Delhi-110019, India.
Tel.-26519310, 26536872, 26439004
in association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

REFERENCE DRAWINGS

EXISTING TITLE	DRAWING NO.

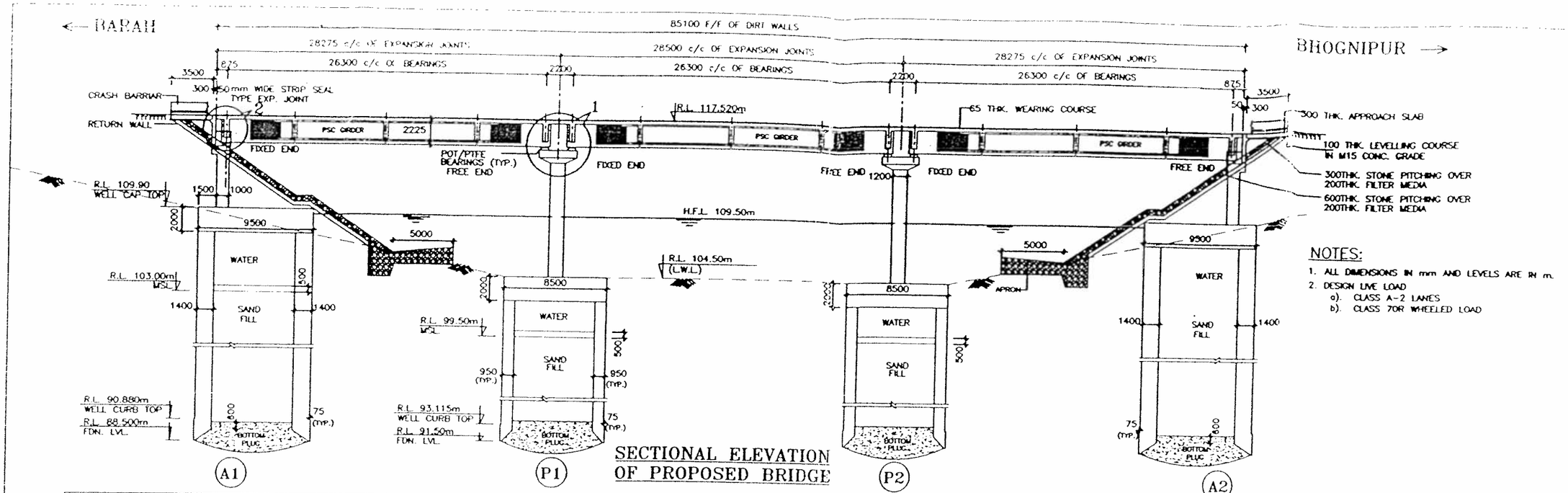
NATIONAL HIGHWAYS AUTHORITY OF INDIA

CLIENT: NATIONAL HIGHWAYS AUTHORITY OF INDIA
PROJECT: FOUR LANING OF NH-25 (Km. 220.000 TO Km. 255.000) | BOT PACKAGE
TITLE: GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT (TYPE-E)

DESIGN	CHECKED	APPROVED	REVISION			
A. PANDA	B. PANDEY	Dir. C.E. BORANA	MARKED	DATE	DESCRIPTION	BY
DRAWN	SCALE	DATE				
A. RAWAT	N.T.S.	OCT.-2004				

DWG. NO. NHAI/NH25/JHANSI - BHOGNIPUR/CULVERT/SC-105

21

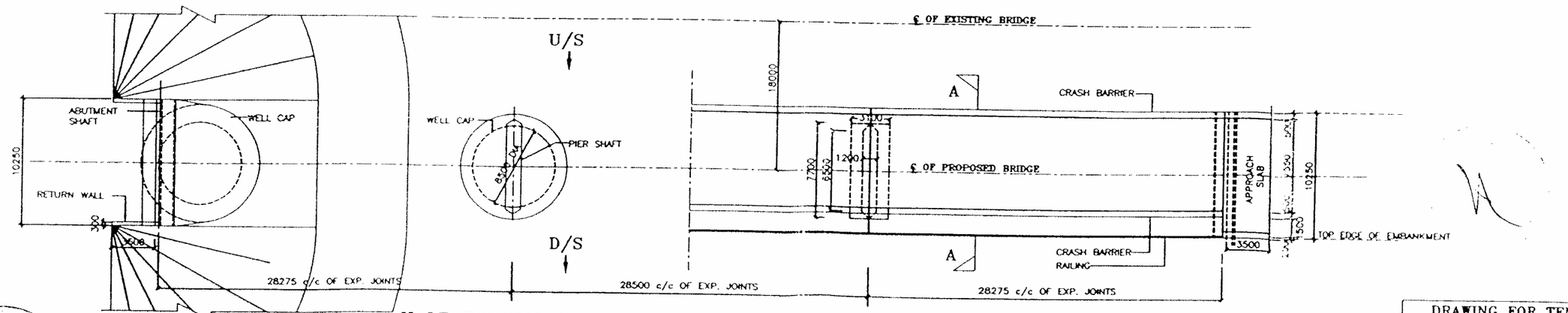


SECTIONAL ELEVATION OF PROPOSED BRIDGE

BED LEVEL (m)	110.10	109.42	108.07	107.08	106.05	105.03	104.50	104.50	104.50	104.50	104.50	104.50	104.50	105.03	106.05	107.08	108.07	109.42	110.10
CHAINAGE (m)	438+600	437+928.85	437+900	437+850	437+800	437+750	437+684.25	437+650	437+645	437+640	437+635	437+630	437+624.75	437+620	437+615	437+610	437+605	437+598.35	437+595

Note:
Measurement for sinking of well will be made from LWL-104.50

Include the clause for payment form LWL.



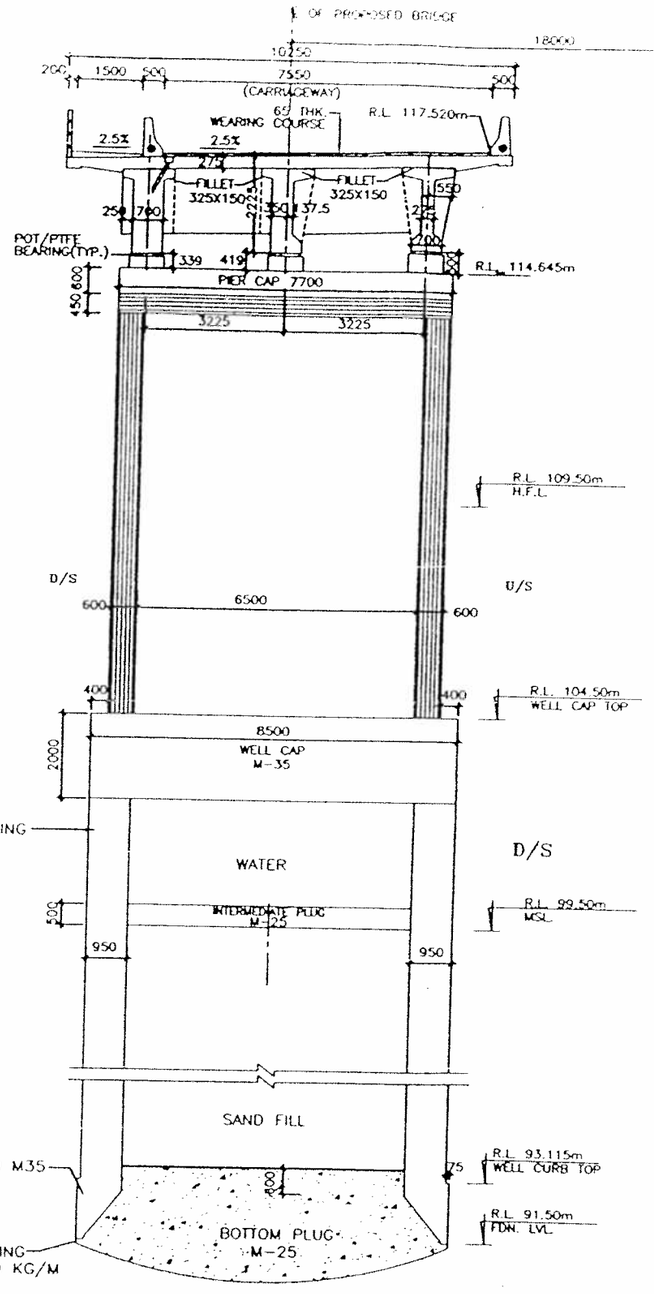
HALF BOTTOM PLAN

PLAN

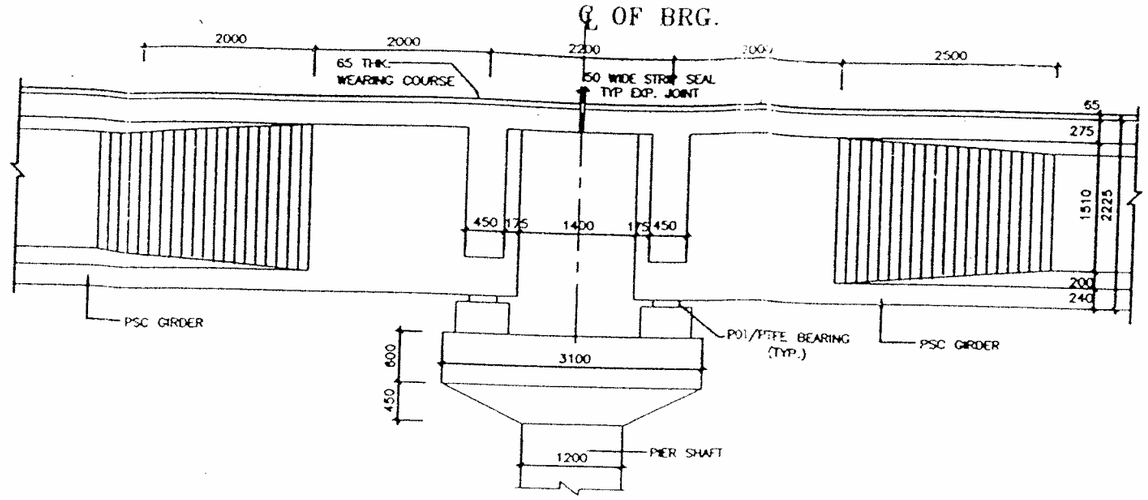
HALF TOP PLAN

DRAWING FOR TENDER PURPOSE ONLY

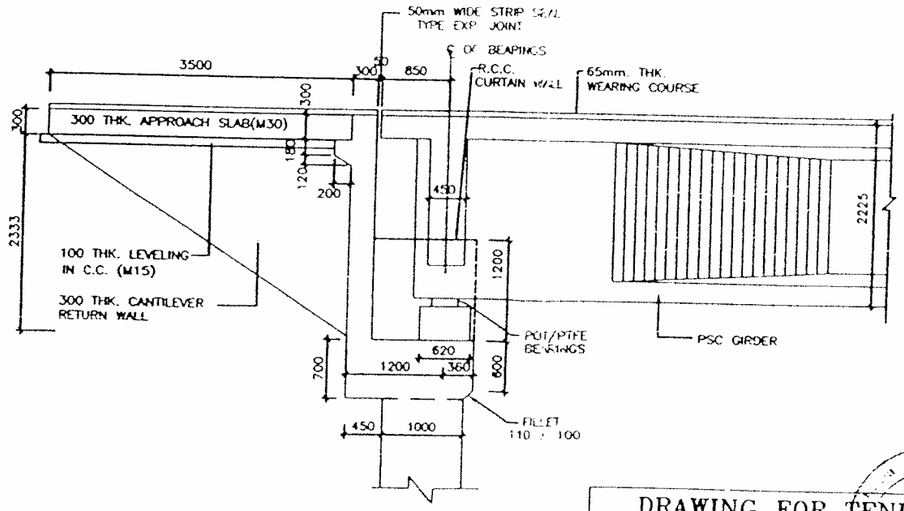
National Highways Authority of India	GENERAL ARRANGEMENT DRAWING BRIDGE NO. 438/1 (SENGUR RIVER)	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1:250	Prepared By: R.K. Murthy	Designed By: A.K.Garg	Team Leader: H.Talukdar	Drawing Number :- CRTS/NHAI/E-W/NH-25/C-III/31/BR/009 (SHEET 1 OF 2)



SECTION A–A
(SCALE 1:100)



DETAIL–1
(SCALE 1:50)

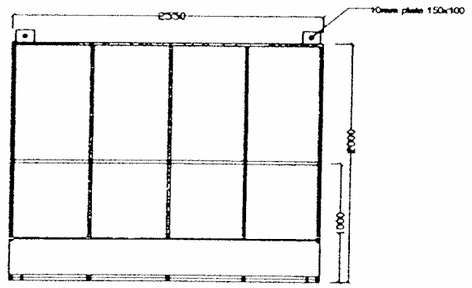


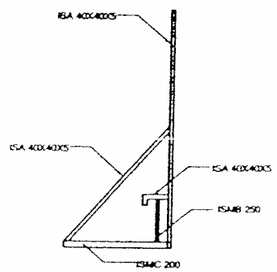
DETAIL–2
(SCALE 1:50)

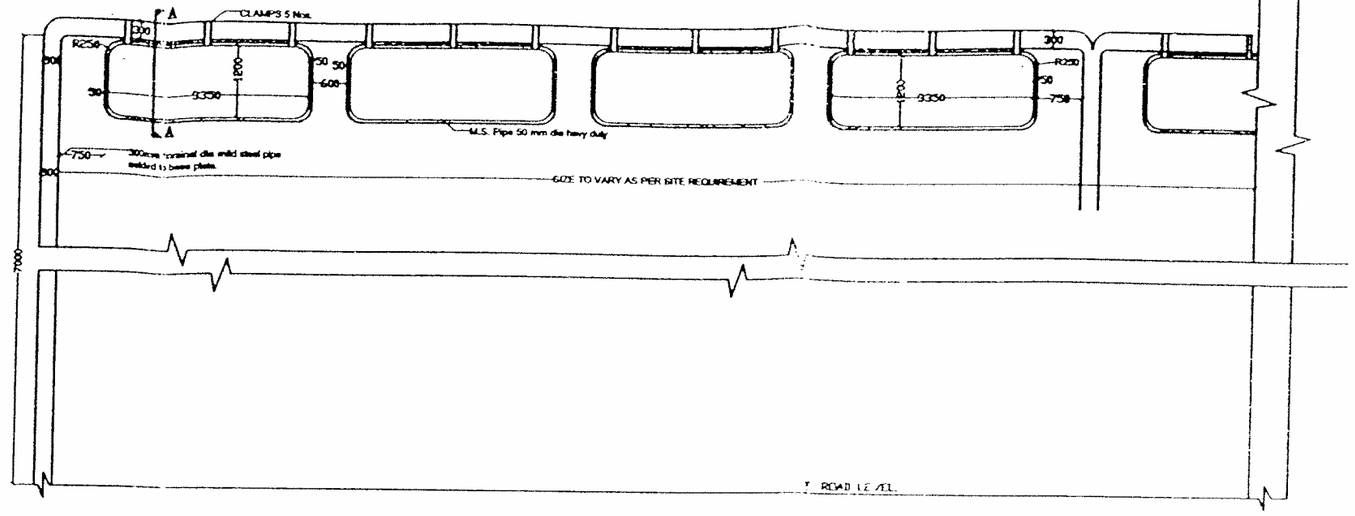
DRAWING FOR TENDER PURPOSE ONLY

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING BRIDGE NO. 438/1 (SENGUR RIVER)	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : AS SHOWN	Prepared By R.K. Murthy	Designed By A.K.Garg	Team Leader H.Talukdar	Drawing Number :- 220 CRTS/NHAI/E-W/NH-25/C-III/31/BR/010 (SHEET 2 OF 2)

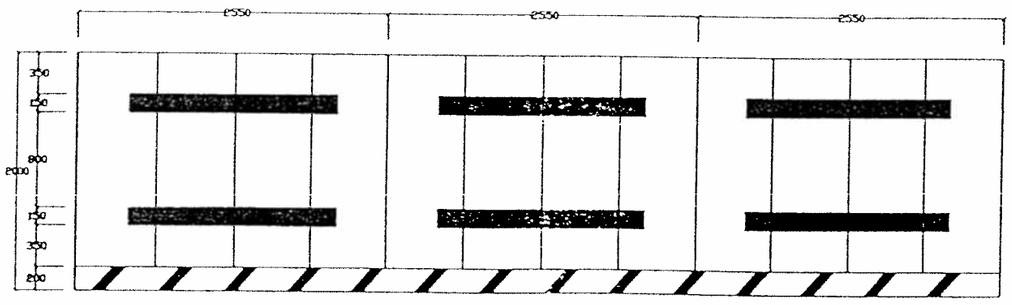
TYPICAL DETAILS FOR BARRICADING BOARD.



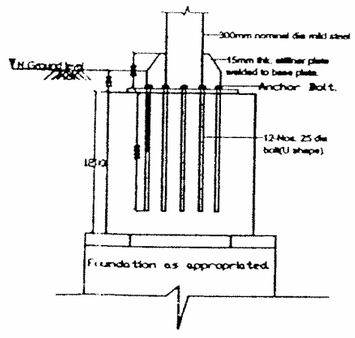




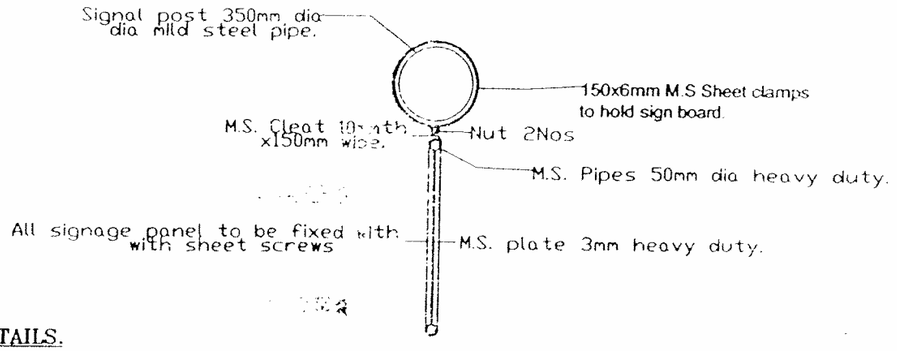
OVERHEAD GANTRY DETAILS.



ELEVATION OF ONE UNIT OF BARRICADING DURING CONSTRUCTION.



FOUNDATION AND ANCHORING DETAILS.

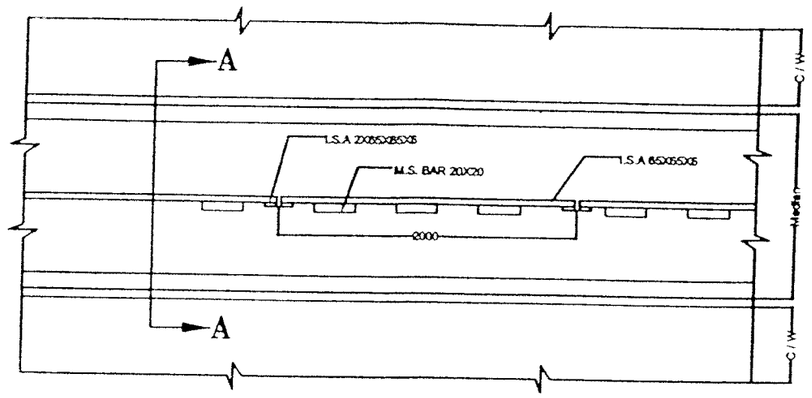


section A–A

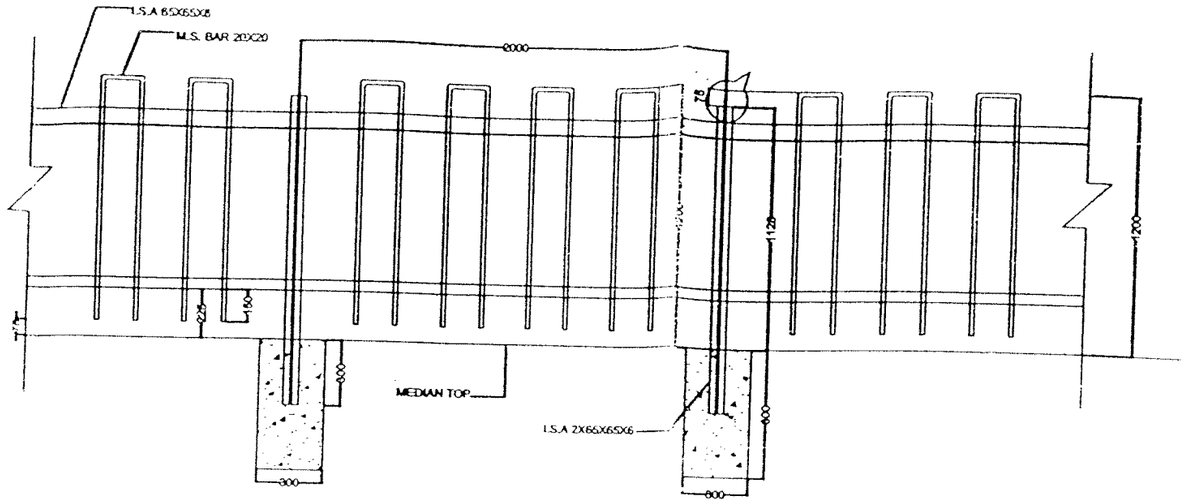
DRAWING FOR TENDER PURPOSE ONLY

221

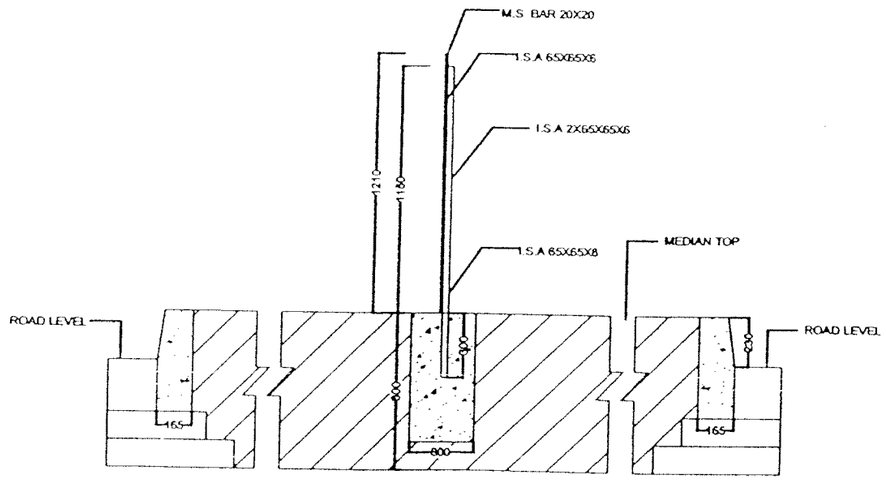
National Highways Authority of India	TYPICAL DETAILS OF BARRICADING BOARD&GANTRY	Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration. Contract package No. ———	CRAPHTS Consultants (I) Pvt. Ltd. 14/3, Mathura Road, Faridabad. Ph - 95129-2788 13, 27594 8	Date : Nov. - 2004	Prepared By : REJI	Team Leader H.Talukdar	Drawing Number CRTS/NHAI/E-W/NH-25/C-III/31/MISC/004



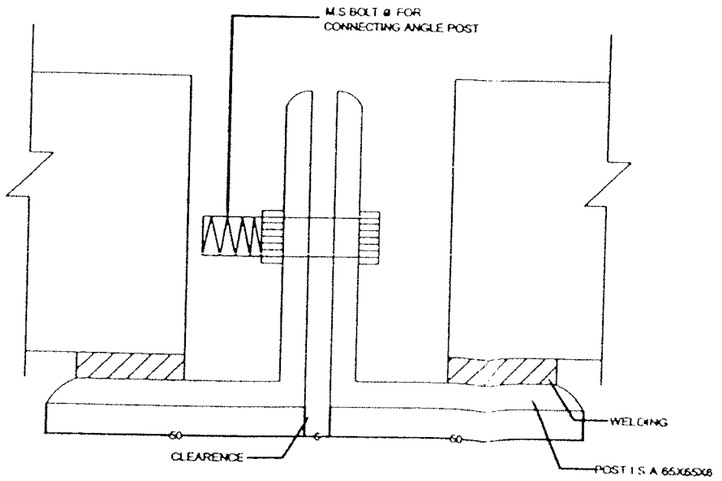
PLAN



ELEVATION



SECTION A-A

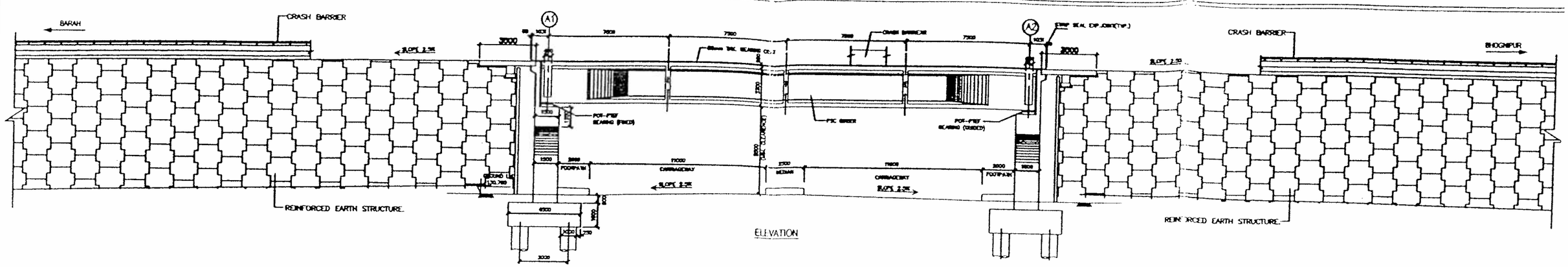


DETAIL AT - X

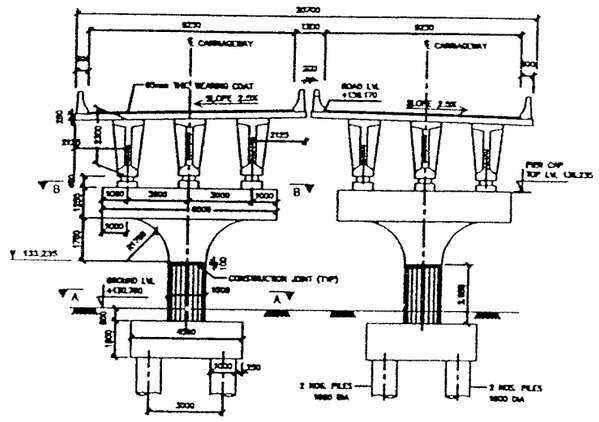
DRAWING FOR TENDER PURPOSE ONLY

222

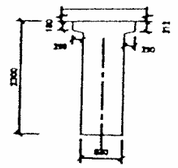
National Highways Authority of India	DETAILS OF PEDESTRIAN GUARD RAILING	Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration Contract package No. ————	CRAPHTS Consultants (I) Pvt. Ltd. 14/3, Mathura Road, Faridabad. Ph - 95129-278813, 275948	Date	Prepared By	Team Leader	Drawing Number
				Nov. - 2004	REJI	N.Tekchandani	CRTS/NHAI/E-W/NH-25/C-III/31/MISC/006



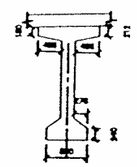
ELEVATION



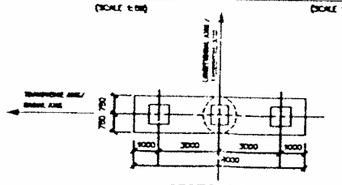
CROSS SECTION



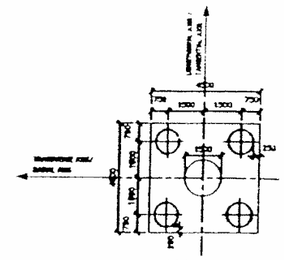
X-SECTION OF GIRDER NEAR SUPPORT
(SCALE 1:50)



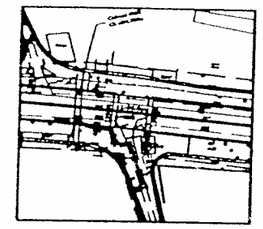
X-SECTION OF GIRDER AT MID SPAN
(SCALE 1:50)



SECTION B-B



SECTION A-A



KEY PLAN

NOTES:-

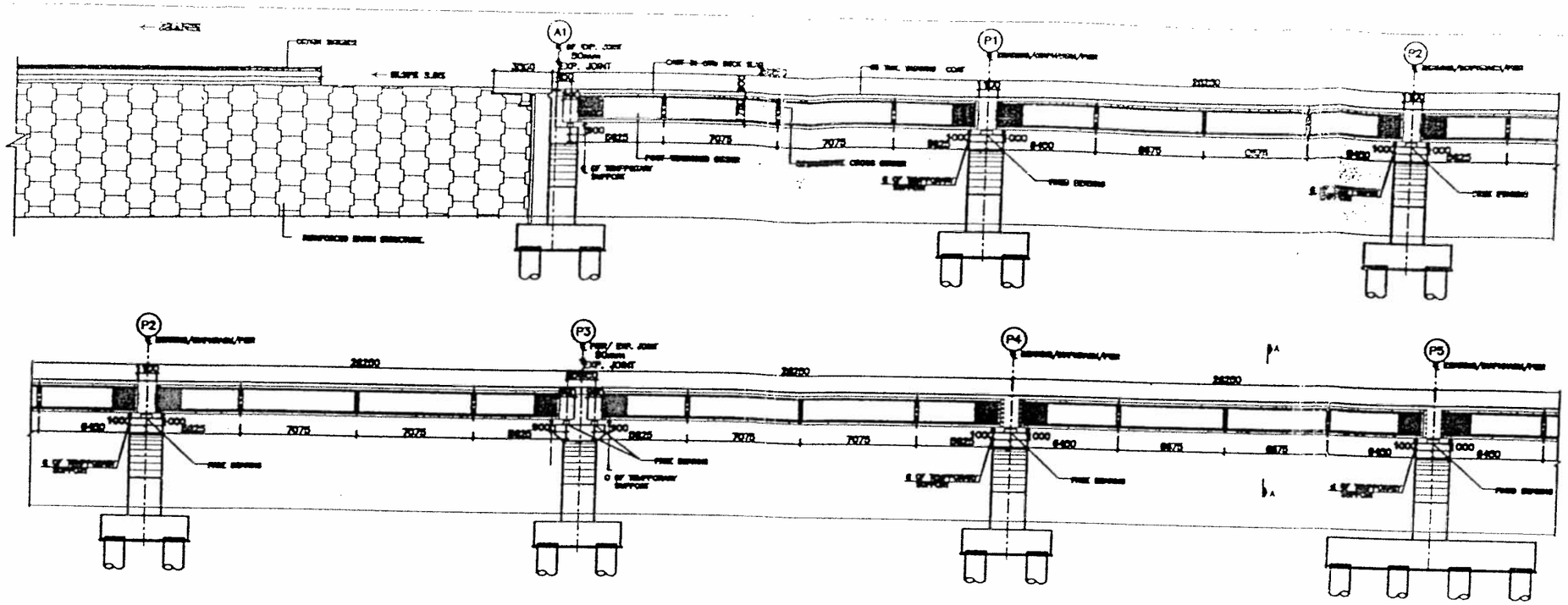
1. ALL DIMENSIONS IN MM AND LEVELS ARE IN M.
2. THE 2-LANE CARRIAGEWAY HAS BEEN DESIGNED FOR THE FOLLWING LOADING
   a). TWO LANES OF CLASS - A
   b). ONE LANE OF CLASS 70R.
3. SAFE LOAD CARRYING CAPACITY OF 1.0mDIA, 23.0m LONG PILE IS 230t TO BE VERIFIED BEFORE EXECUTION.

DESIGN DATA FOR POT CUM PTFE SLIDING

VERTICAL LOAD	HORIZONTAL FORCE			LONGITUDINAL MOVEMENT	ROTATION
	NON SEISMIC	SEISMIC			
	LONG.	LONG	TRANS.		
2250 KN	100 KN	200 KN	225 KN	± 25 mm	1%

THE GAD IS FOR TENDER PROPOSE ONLY
THE DIMENSIONS AND LEVELS ARE
TENTATIVE AND MAY UNDERGO SOME CHANGE

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km.434.763 (AT DEVIPUR) FLYOVER NO.3	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHITS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Pavelis crossing Faridabad - 121 003	Scale : 1: 50	Prepared By R.K. Murthy	Designed By A.K. Garg	Team Leader N.TALUKDAR	Drawing Number : CRTS/NHAI/E-W/NH25/C-III/31/FLY-3/005
				Date: 28--08--04				



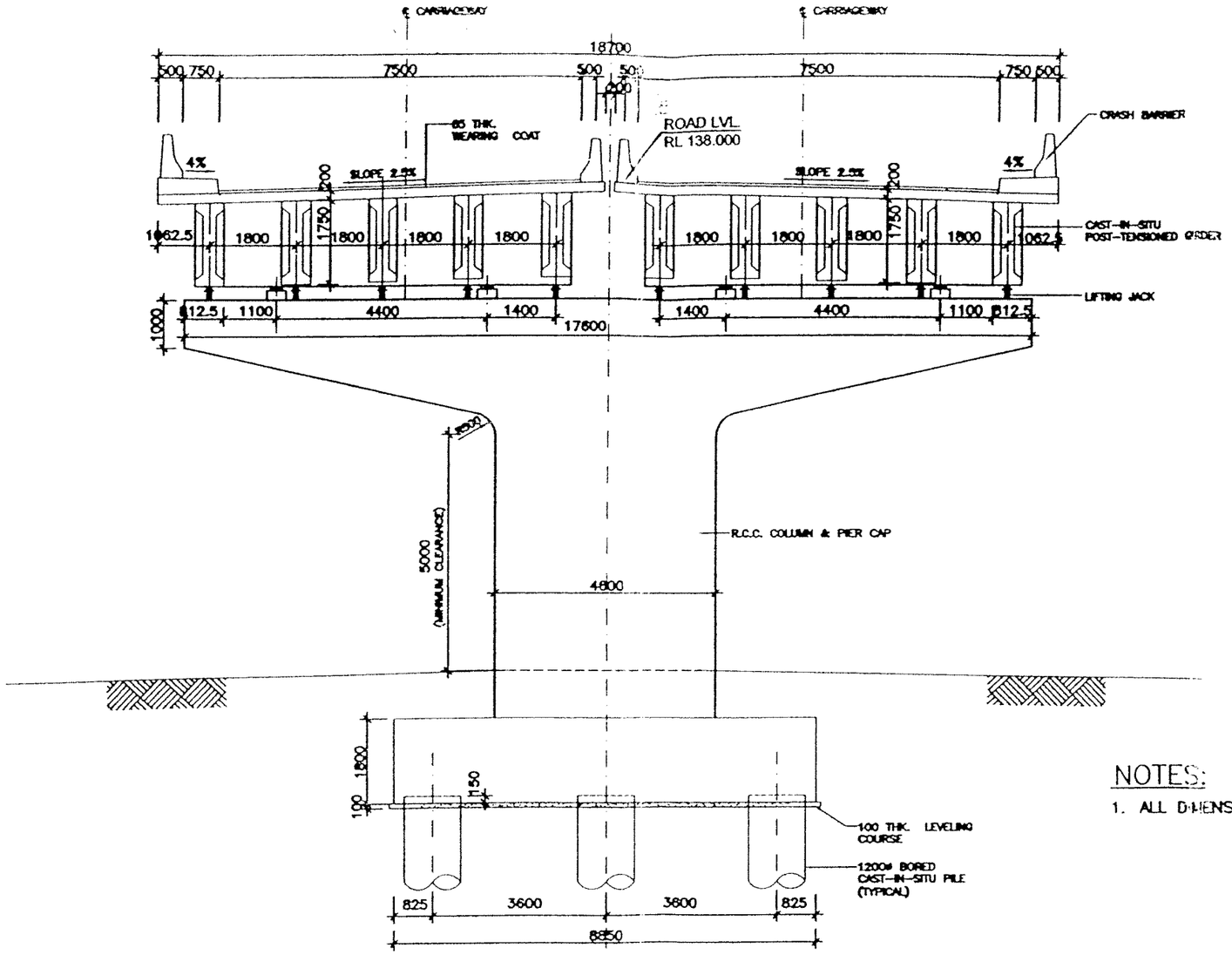
NOTES:

1. ALL DIMENSIONS IN mm AND LEVELS ARE IN m.
2. THE 2-LANE CARRIAGEWAY HAS BEEN DESIGNED FOR THE FOLLOWING LOADING:
   a). TWO LANE OF CLASS– A
   b). ONE LANE OF CLASS 70R.
3. SAFE LOAD CARRYING CAPACITY OF 1.20m DIA, 53.00m LONG PILE IS 230 t TO BE VERIFIED BEFORE EXECUTION.

22

DRAWING FOR TENDER PURPOSE ONLY

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km. 421.196 (AT BHOGNIPUR) FLYOVER NO. 1	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1:150	Prepared By R.K. Murthy	Designed By A.K.Garg	Team Leader H.Talukdar	Drawing Number :- CRTS/NHAI/E-W/C-III/31/FLY-1/001 (SHEET 1 OF 3)



SECTION A-A

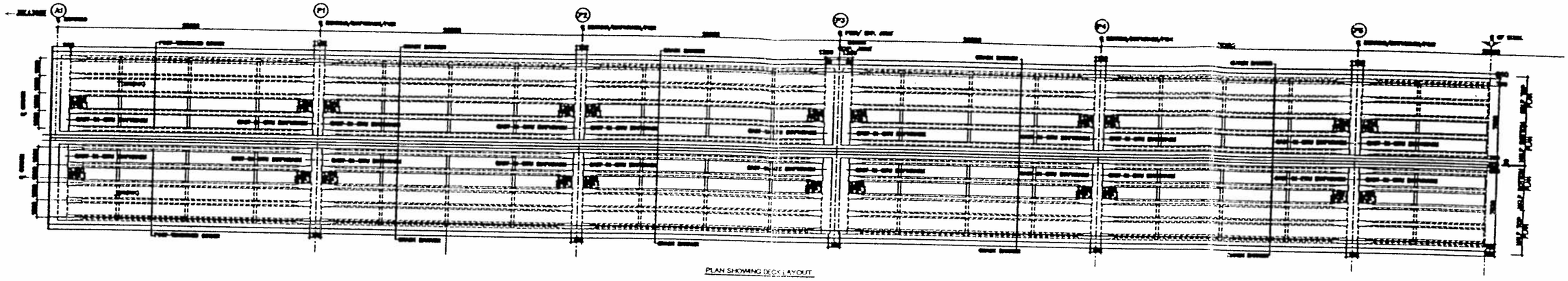
NOTES:

1. ALL DIMENSIONS IN mm.

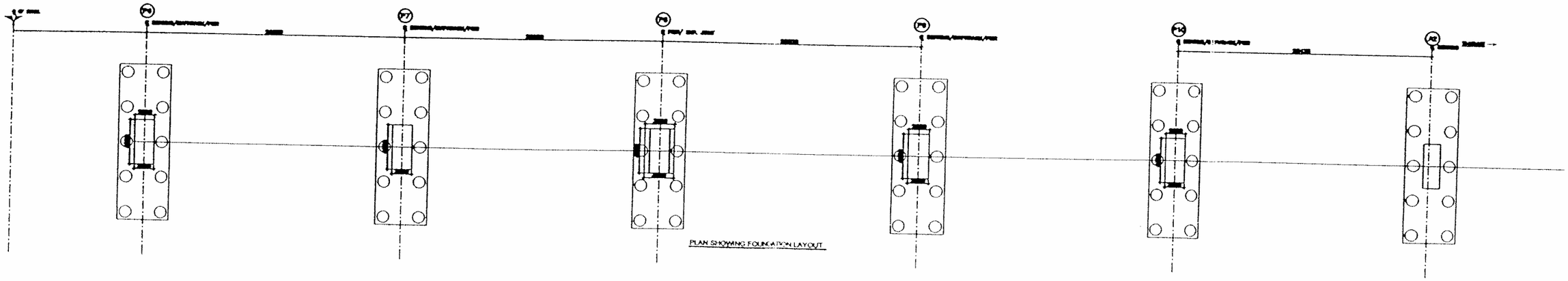
DRAWING FOR TENDER PURPOSE ONLY

225

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km. 421.196 (AT BHOGNIPUR) FLYOVER NO. 1	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1: 75	Prepared By R.K. Murthy	Designed By A.K.Garg	Team Leader P. Talukdar	Drawing Number :- CRTS/NHAI/E-W/C-III/31/FLY-1/003 (SHEET 3 OF 3)



PLAN SHOWING DECK LAYOUT



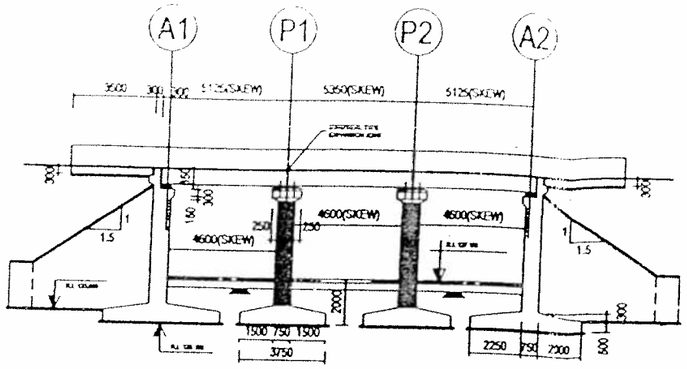
PLAN SHOWING FOUNDATION LAYOUT

DRAWING FOR TENDER PURPOSE ONLY

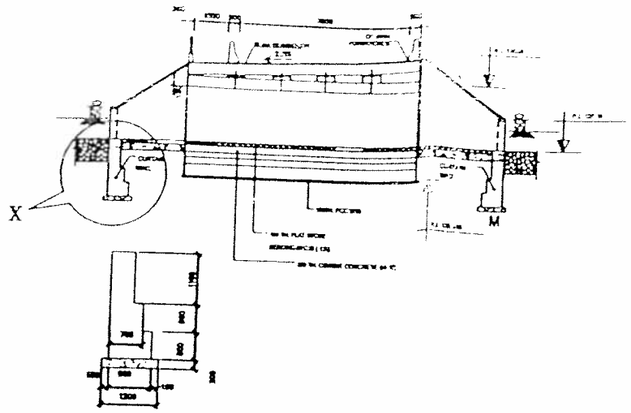
NOTES:

1. ALL DIMENSIONS IN mm.

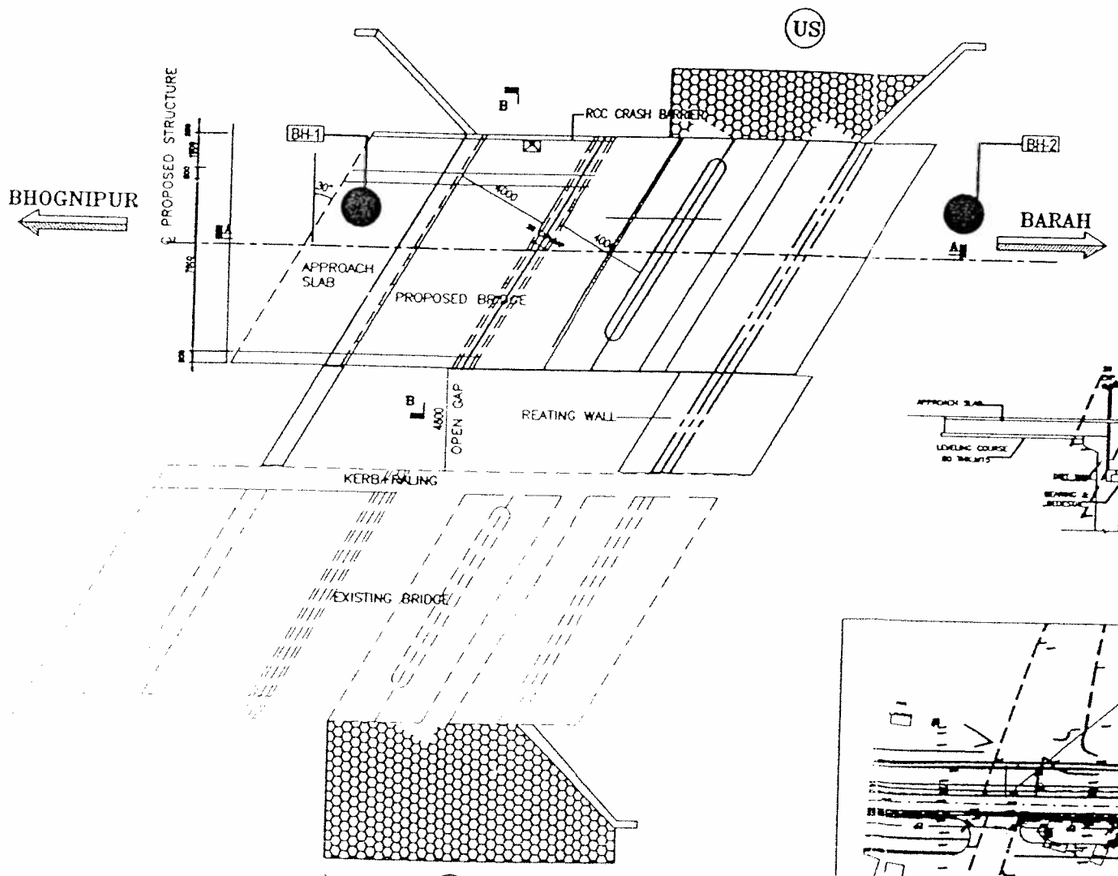
National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km. 421.196 (AT BHOGNIPUR) FLYOVER NO. 1	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1:150	Prepared By R.K. Murthy	Designed By A.K.Garg	Team Leader H.Talukdar	Drawing Number :- CRTS/NHAI/E-W/C-III/31/FLY-1/00: (SHEET 2 OF 3)



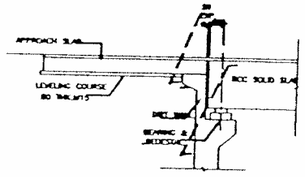
SECTION A-A

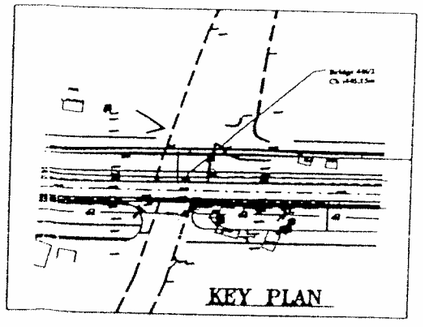


DETAIL X



PLAN HALF TOP PLAN HALF BOTTOM



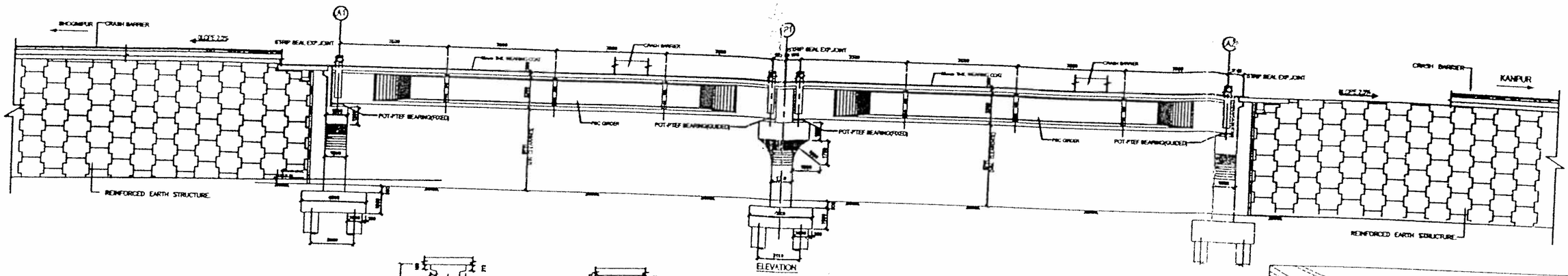


KEY PLAN

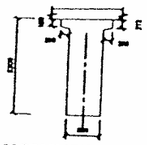
NOTES:

1. ALL DIMENSIONS IN MM AND LEVELS IN M.
2. DESIGN LIVE LOAD
3. CLASS A-A LANES
4. CLASS 70R WHEELED LOAD
5. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO. 305.3 OF LATEST SPECIFICATION OF ROADS AND BRIDGES SHALL OF MOST THE VALUE OF Φ & C CONSIDERED IN DESIGNING ARE 32.5 & 0 KN/M² & ZERO RESPECTIVELY.
4. THE FILTER MATERIAL SHALL BE WELL PACKED WITH SHINGLER SIZE TO PREVENTS THE SOIL AND BRIDGE WIRE TOWARDS THE WALL AND PROVIDE OVER ENTIRE SURFACE BEHIND ABUTMENT UPTO FULL HEIGHT.
5. 100 DIA WEEP HOLES ARE TO BE PROVIDED @ 1000 C/C IN STAGGERED MANNER (BOTH VERTICALLY AND HORIZONTALLY) @ 1:1.0 SLOPE (TYP.)
6. GRADE OF CONCRETE FOR STRUCTURAL ASPHALT
7. RCC MEMBER - M30 FOR SUPER STRUCTURE
8. FOR ALL OTHER MEMBER M-25
9. PCC MEMBER - M15
7. APPROACH SLAB SHALL BE CONSTRUCTED ONLY AFTER THE PASSAGE OF TWO RAINY SEASONS AFTER OPENING OF THE BRIDGE TO TRAFFIC.
8. ALLOWABLE SAFE BEARING CAPACITY OF STRATA - 14 T/M2 (NET)

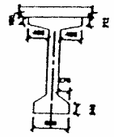
National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF BRIDGE NO 446/2	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Bara section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 143, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number : 227
				Date : 25-08-04	R.K. Murthy	A.K.Garg	H.TALUKDAR	CRTS/nHAUE-W/NH-25/C-III/31AM3/019



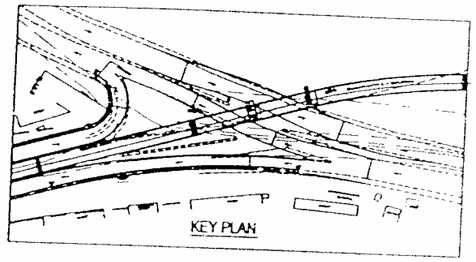
ELEVATION

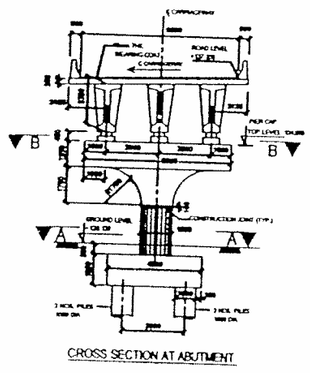


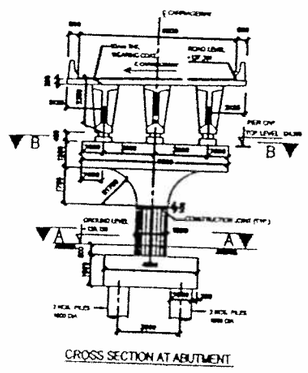
X-SEC OF GIRDER NEAR SUPPORT

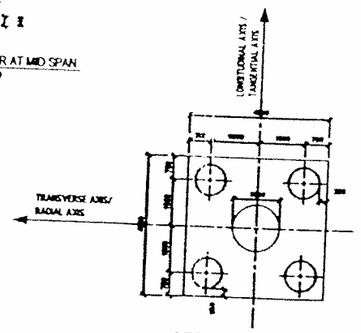


X-SEC OF GIRDER AT MID SPAN

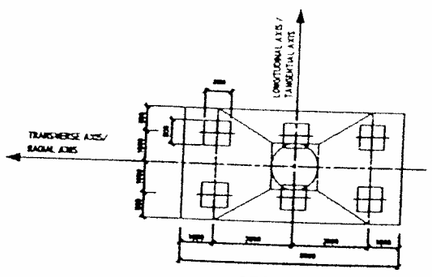




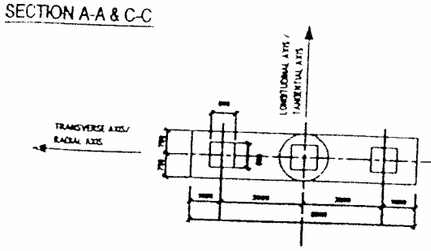




SECTION A-A & C-C



SECTION D-D



SECTION B-B

NOTES:-

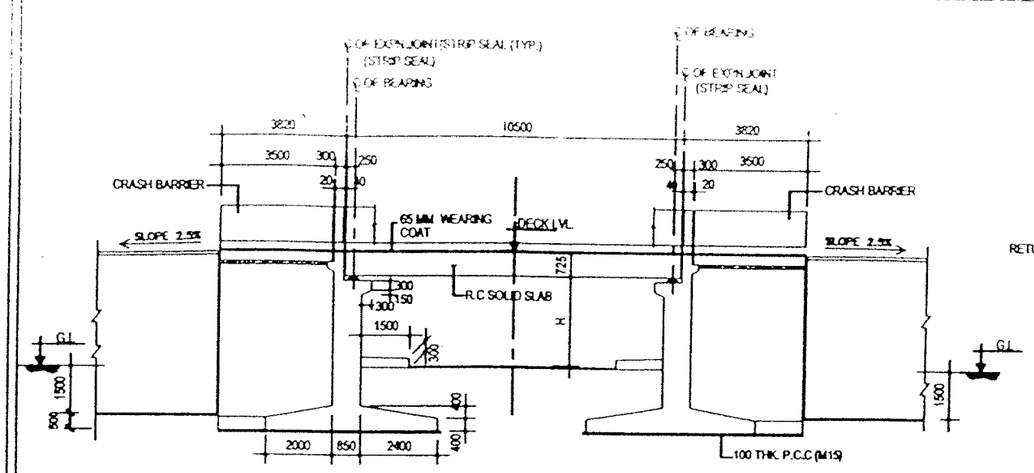
1. ALL DIMENSIONS IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGEWAY HAS BEEN DESIGNED FOR THE FOLLWING LOADING :
   a). TWO LANES OF CLASS - A
   b). ONE LANE OF CLASS 70R.
3. GRADE OF CONCRETE FOR STRUCTURAL MEMBER
   a) PILE & PILE CAP = M-35
   b) PIER & PIER CAP = M-35
   c) SUPERSTRUCTURE = M-40
   d) P.C.C = M-15
4. SAFE LOAD CARRYING CAPACITY OF 1.0mDIA, 23.0m LONG PILE IS 230t TO BE VERIFIED BEFORE EXECUTION.

DESIGN DATA FOR POT CUM PTFE BEARING

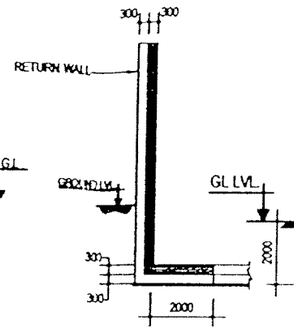
VERTICAL LOAD	HORIZONTAL FORCE			LONGITUDINAL MOMENT	ROTATION
	NON SEISMIC	SEISMIC			
	LONG.	LONG	TRANS.		
2250 KN	100 KN	200 KN	225 KN	± 25 mm	1%

THE GAD IS FOR TENDER PROPOSE ONLY
THE DIMENSIONS AND LEVELS ARE
TENTATIVE AND MAY UNDERGO SOME CHANGE

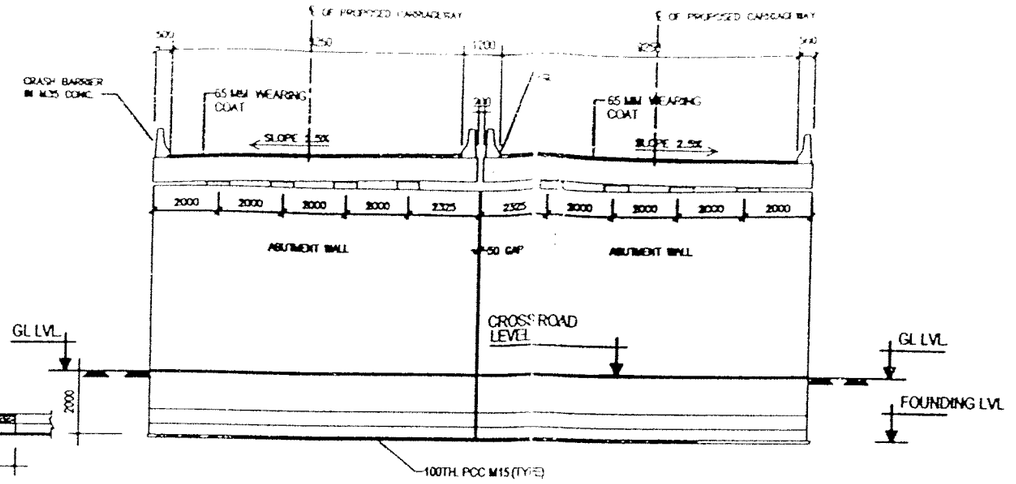
National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km.448.929 (AT BARAH) FLYOVER NO.6	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	GRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1:50	Prepared By	Designed By	Team Leader	Drawing Number :-
				Date: 26-08-04	R.K. Murthy	A.K. Garg	N. TALUKDAR	CRTS/NHAI/E-W/NH-25/C-III/31FLY-6/008



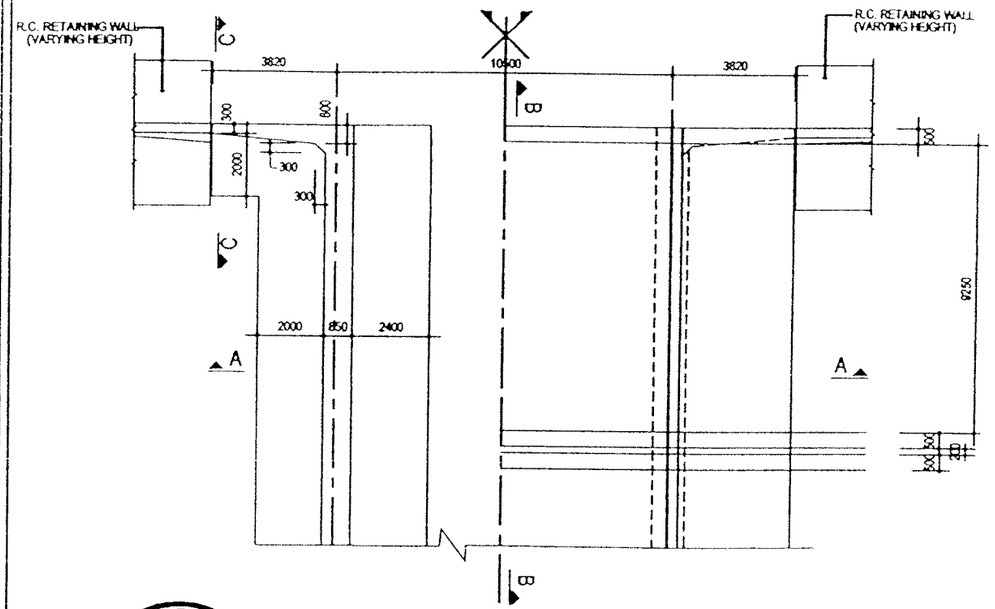
SECTION A-A



SECTION C-C



SECTION B-B



HALF PLAN AT FOUNDATION HALF PLAN AT TOP

PLAN

KEY PLAN

SCHEDULE FOR UNDERPASSES

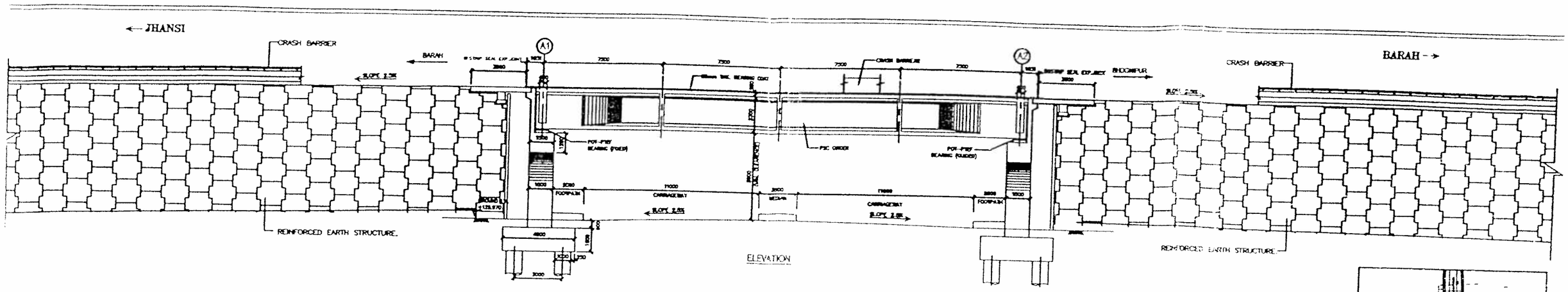
FLYOVER NO.	CHAINAGE	GROUND LEVEL	EXISTING CROSS ROAD LEVEL	F.G.L.	TOP OF ABUT. CAP LEVEL	FOUNDING LEVEL	MINIMUM CLEARANCE (M)
FLY.4	442.44	129.94	129.22	134.49	133.375	127.94	3.5 M

NOTES:

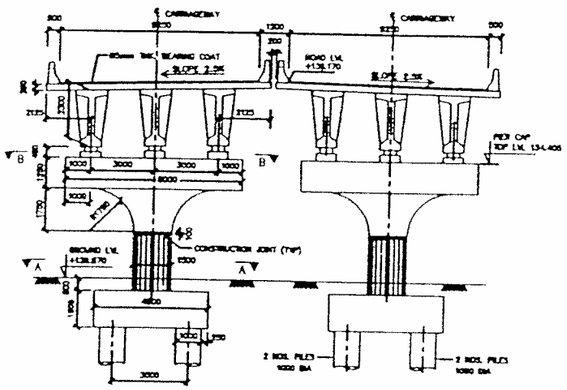
1. ALL DIMENSIONS IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGE WAY HAS BEEN DESIGNED FOR THE FOLLWING LOADING
   a) TWO LANES OF CLASS - A
   b) ONE LANE OF CLASS 70R.
3. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO. 305.2 OF LATEST SPECIFICATION OF ROADS AND BRIDGES WORK OF MOST. THE VALUE OF C=0,Ø>30&γ=1.8t/m³ ARE CONSIDERED IN DESIGNING
4. 600 THK. FILTER MATERIAL SHALL BE WELL PACKED WITH SMALLER SIZE TOWARDS THE SOIL AND BIGGER SITE TOWARDS THE WALL AND PROVIDE OVER ENTIRE SURFACE BEHIND RETURN WALL UPTO FULL HEIGHT.
5. 100 DIA WEEP HOLES ARE TO BE PROVIDED @ 1000 C/C IN STAGGERED MANNER (BOTH VERTICALLY AND HORIZONTALLY) IN 1:20 SLOPE (TYP.)
6. GRADE OF CONCRETE FOR STRUCTURAL MEMBER
   a) RCC MEMBER = M 30 FOR SOLID SLAB AND APPROACH SLAB.
7. ALLOWABLE SAFE BEARING CAPACITY OF SOIL = 18T/M2 TO BE VERIFIED BEFORE EXECUTION.

THE GAD IS FOR TENDER PROPOSE ONLY
THE DIMENSIONS AND LEVELS ARE
TENTATIVE AND MAY UNDERGO SOME CHANGE

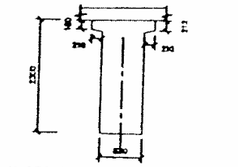
National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT KM.442.144 (AT MURIDPUR) FLYOVER NO.- 4	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : --	Prepared By	Designed By	Team Leader	Drawing Number :- 229
				Date: 26-08-04	R.K. Murthy	A.K.Garg	H.TALUKDAR	CRTS/NHAI/E-W/NH25/C-III/31FLY-4/006



ELEVATION

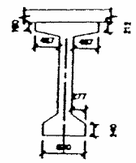


CROSS SECTION



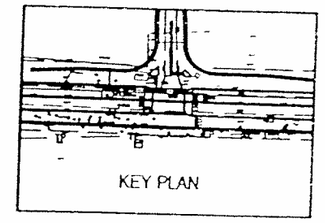
X- SEC. OF GIRDER NEAR SUPPORT

SCALE 1:50



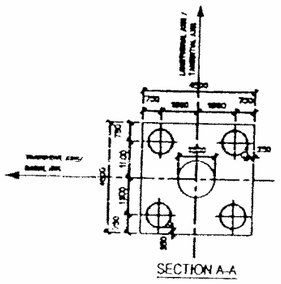
X- SEC. OF GIRDER AT MID SPAN

SCALE 1:50

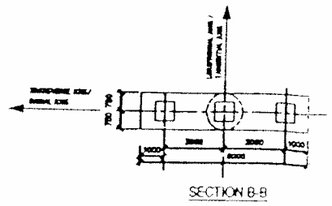


DESIGN DATA FOR POT CUM PTFE BEARING

VERTICAL LOAD	HORIZONTAL FORCE			LONGITUDINAL MOVEMENT	ROTATION
	NON SEISMIC	SEISMIC			
	LONG.	LONG	TRANS.		
2250 KN	100 KN	200 KN	225 KN	± 25 mm	1%



SECTION A-A



SECTION B-B

NOTES:-

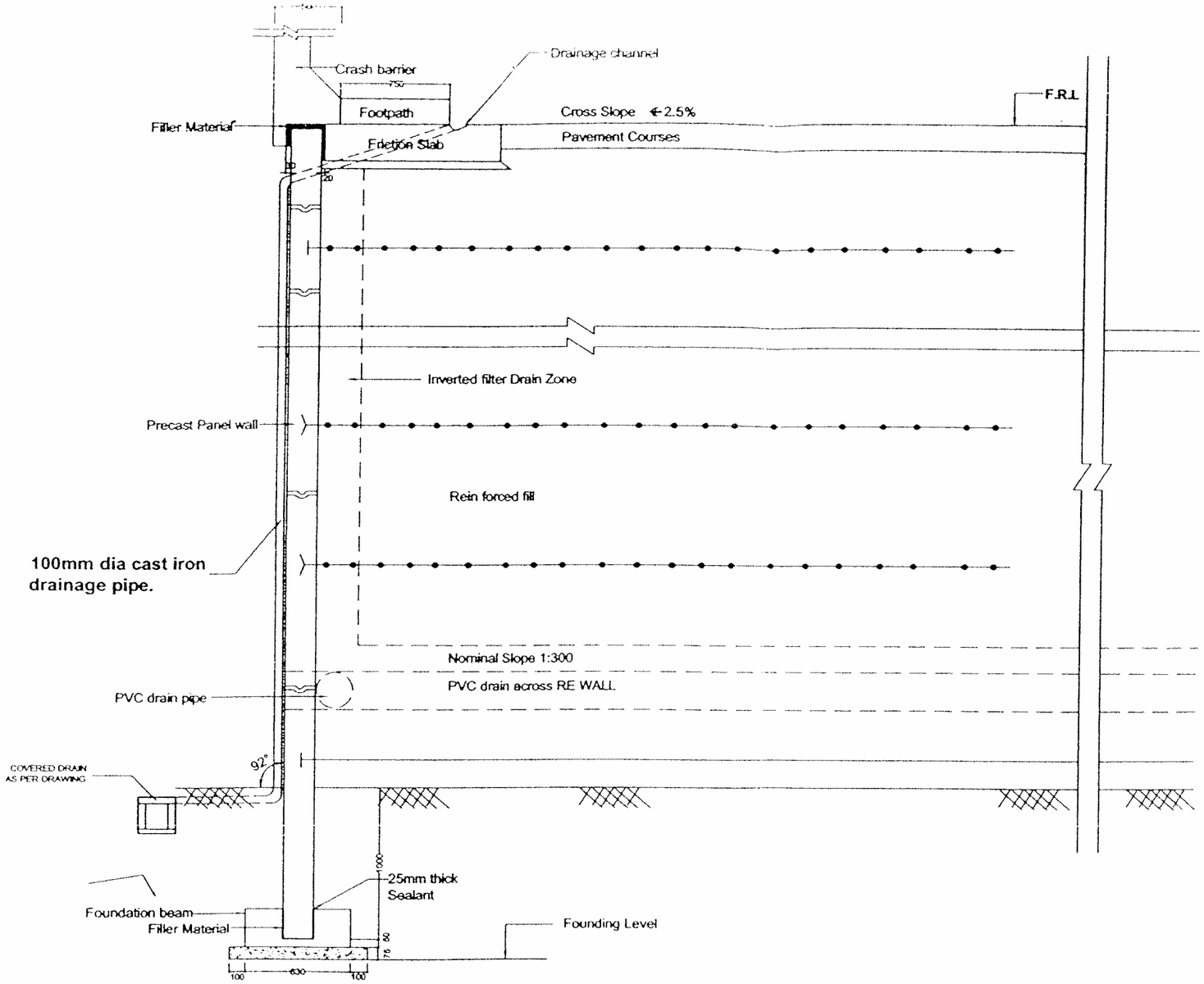
1. ALL DIMENSIONS IN MM AND LEVELS ARE IN M
2. THE 3-LANE CARRIAGEWAY HAS BEEN DESIGNED FOR THE FOLLOWING LOADING
   a) TWO LANES OF CLASS - A
   b) ONE LANE OF CLASS 70R.
3. GRADE OF CONCRETE FOR STRUCTURAL MEMBER
   a) PILE & PILE CAP = M-30
   b) PIER & PIER CAP = M-35
   c) SUPERSTRUCTURE = M-40
   d) P.C.C = M-15
4. SAFE LOAD CARRYING CAPACITY OF 1.0m DIA LONG PILE IS 22kN TO BE VERIFIED BEFORE EXECUTION.
5. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING DETAIL DRAWING
   a) PLAN & PROFILE OF FLYOVER NO.5 CRTS/MH/AUR/-WNH-25/FLY-5/001
   b) LAYOUT OF PILES, PILE CAP & PEDNE, DETAILS OF PILE & PILE CAP FOR ABUTMENT CRTS/MH/AUR/-WNH-25/FLY-5/011

THE GAD IS FOR TENDER PROPOSE ONLY
THE DIMENSIONS AND LEVELS ARE
TENTATIVE AND MAY UNDERGO SOME CHANGE

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT Km.444.066 (AT MATTI CHOWK) FLYOVER NO.5	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : 1:50	Prepared By	Designed By	Team Leader	Drawing Number :-
				Date: 26--05--04	R.K. Murthy	A.K.Garg	H.TALUKDAR	CRTS/MH/AUR/-WNH-25/C-II/31/FLY-5/007

O B Infrastructure Pvt. Ltd.

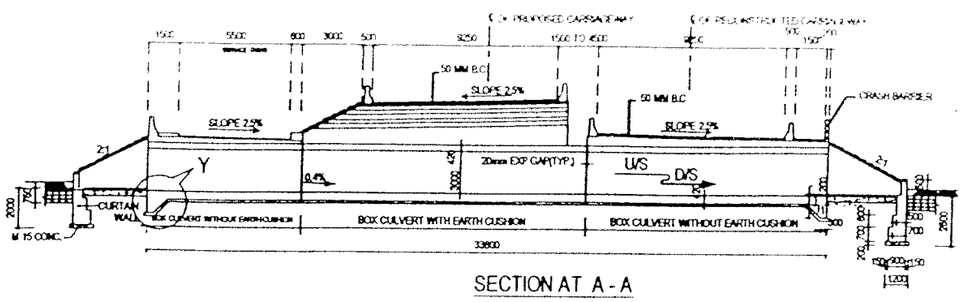
New Delhi



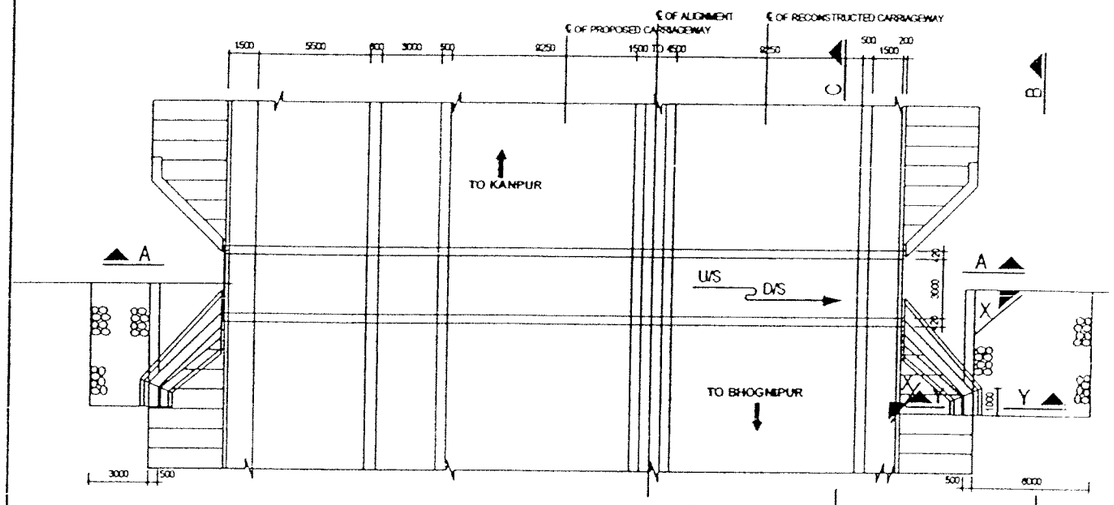
TYPICAL CROSS SECTION OF BHOGNIPUR FLYOVER ON EMBANKMENT WITH R E WALL

DRAWING FOR TENDER PURPOSE ONLY

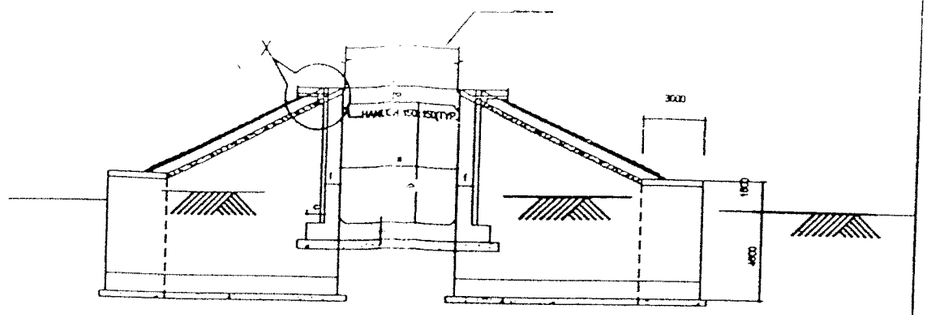
National Highways Authority of India	MISCELLANEOUS	**Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration** Contract package No. ————	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Prepared By	Designed By	Team Leader	Drawing Number :- 231
				REGI	A.K. Garg	H.Talukdar	CRTS/NHAI/E-W/NH-25/C-R/31/MISC/001



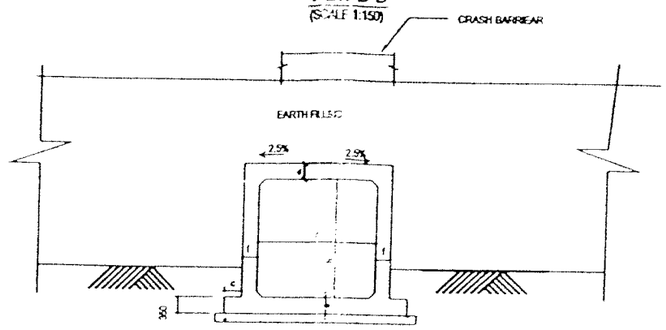
SECTION AT A - A



PLAN



VIEW B-B
(SCALE 1:150)



SECTION C-C
(SCALE 1:75)

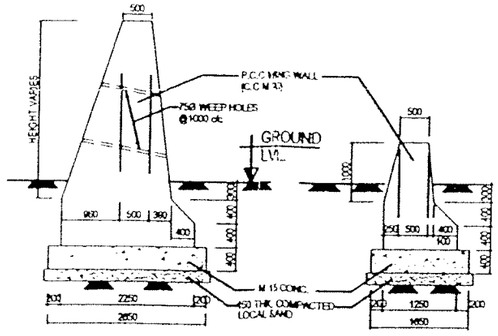
DIMENSION DETAIL FOR BOX CULVERT(WITHOUT EARTH CUSHION)

NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/0	2000	2000	500	350	380	300
1/23/0	2000	3000	1300	370	420	350
1/33/0	3000	3000	900	420	420	420

DIMENSION DETAIL FOR BOX CULVERT(WITH EARTH CUSHION)

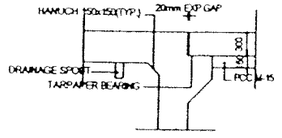
NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/3	2000	2000	500	250	300	250
1/22/4	2000	2000	500	280	350	280
1/22/5	2000	2000	500	300	350	300
1/23/3	2000	3000	1100	280	300	350
1/33/3	3000	3000	800	370	450	400

Nc / ab / Ec STANDS FOR NO. OF CELL / CLEAR WIDTH -CLEAR HIGHT/ HIGHT OF EARTH CUSHION

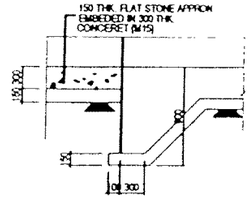


SECTION X-X
(AT HIGH END)
(SCALE 1:75)

SECTION Y-Y
(AT LOW END)
(SCALE 1:75)



DETAIL 'X'



DETAIL 'Y'

NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGE WAY HAS BEEN DESIGNED FOR FOLLOWING I.R.C. LOADING
   a. 2 LANES OF CLASS-A
   b. 1-LANE OF CLASS 70-R
3. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO 305.2 OF LATEST SPECIFICATION OF ROADS AND BRIDGES WORK OF MOST THE VALUE OF C, ϕ & γ CONSIDERED IN DESIGNING ARE 0.30° AND 1.8 t/M RESPECTIVELY

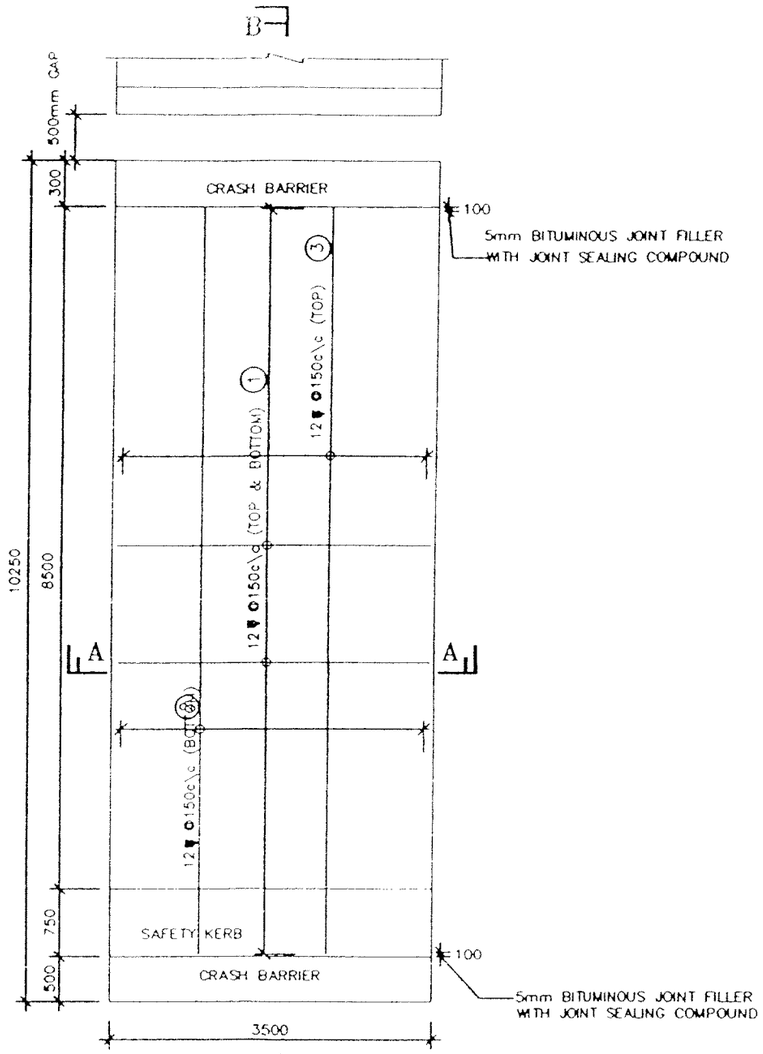
National Highways Authority Of India

GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (LEFTSIDE SERVICE ROAD)

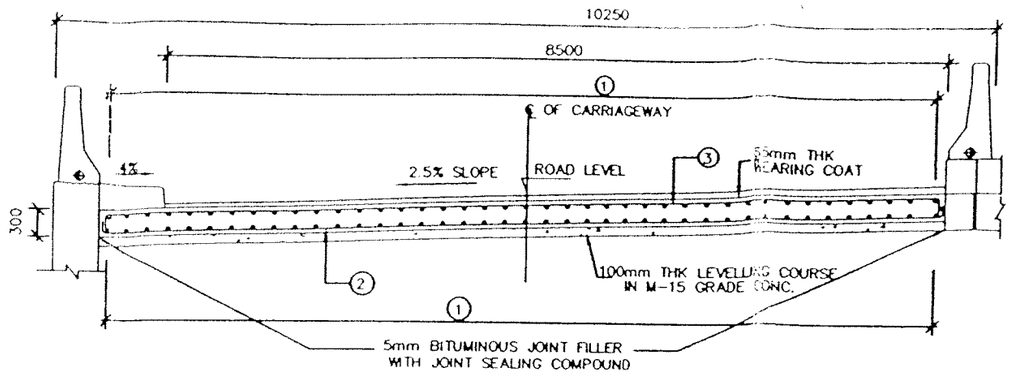
Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25

CRAPHTS Consultants (I) Pvt Ltd
14/3, Mathura Road,
Near Havells crossing
Faridabad - 121 003.

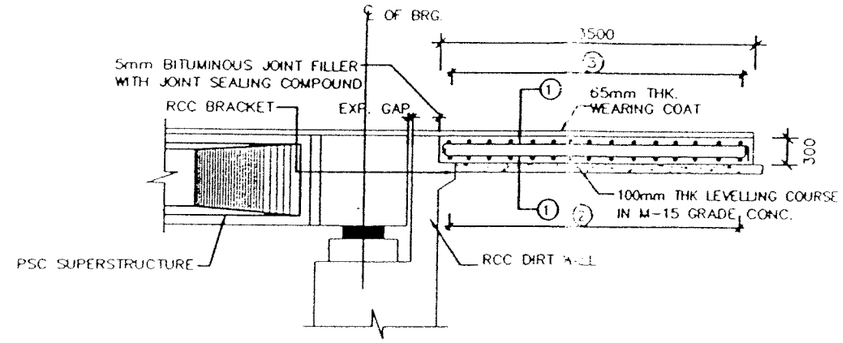
Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 232
Date : 25--08--04	R.K. Murthy	A.K.Garg	S.TALUKDAR	CRTS/NHAI/E-W/NH-25C-III/31/BC/012



PLAN



SECTION AT B–B

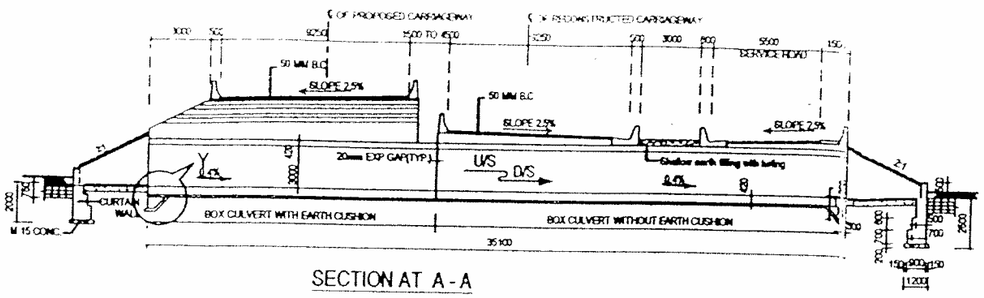


SECTION AT A–A

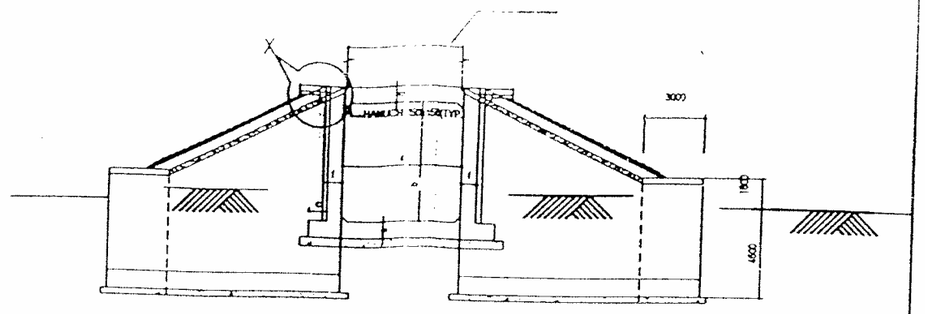
NOTES–

1. ALL DIMENSIONS ARE IN mm.UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED AND NO DIMENSION IS TO BE SCALED.
2. H.Y.S.D BARS GRADE (S–415)CONFORMING TO IS–1786 SHALL BE USED.
3. CONCRETE GRADE IS M–30.
4. CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE 50mm
5. FOR REINFORCEMENT DETAILS OF R.C. BRACKET SUPPORTING APPROACH SLAB REFER ABUTMENT DRAWING.
5. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE GENERAL ARRANGEMENT DRAWING.

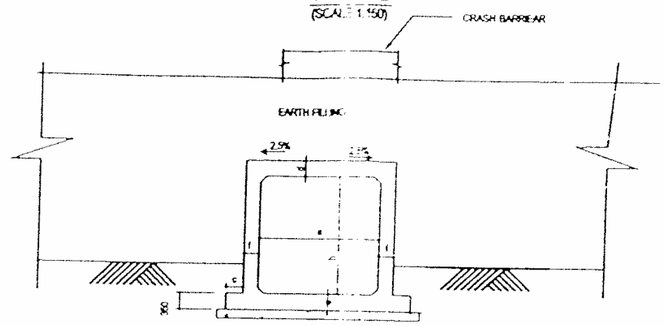
National Highways Authority of India	**DETAILS OF APPROACH SLAB.**	Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration Contract package No. ————	CRAPHTS Consultants (I) Pvt. Ltd. 14/3, Mathura Road, Faridabad. Ph - 95129-278813, 275948	Date : Nov. - 2004	Prepared By : REJI	Team Leader H.Talukdar	Drawing Number CRTS#NAME-JHAN-25/C-#31/MISC/007



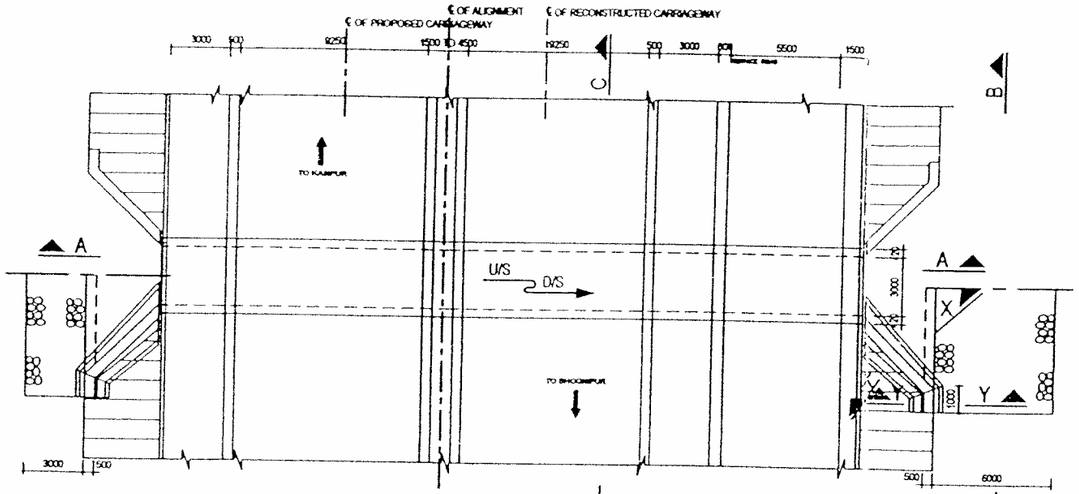
SECTION AT A - A



VIEW B-B
(SCALE 1:50)



SECTION C-C
(SCALE 1:75)



PLAN

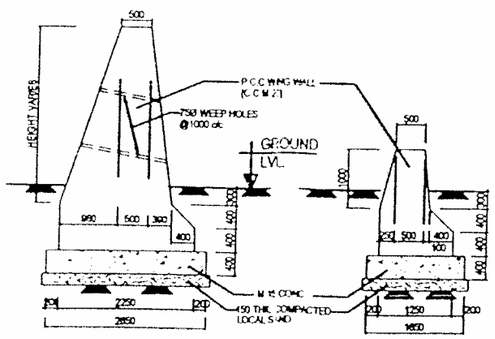
DIMENSION DETAIL FOR BOX CULVERT(WITHOUT EARTH CUSHION)

NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/0	2000	2000	500	350	380	300
1/23/0	2000	3000	1300	370	420	350
1/33/0	3000	3000	900	420	420	420

DIMENSION DETAIL FOR BOX CULVERT(WITH EARTH CUSHION)

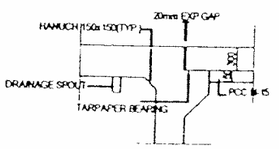
NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/3	2000	2000	500	250	300	250
1/22/4	2000	2000	500	280	350	280
1/22/5	2000	2000	500	300	350	300
1/23/3	2000	3000	1100	280	300	350
1/33/3	3000	3000	800	370	450	400

Nc / ab / Ec STANDS FOR NO. OF CELL / CLEAR WIDTH -CLEAR HIGHT/ HIGHT OF EARTH CUSHION

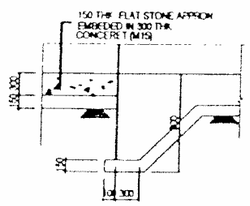


SECTION X-X
(AT HIGH END)
(SCALE 1:75)

SECTION Y-Y
(AT LOW END)
(SCALE 1:75)



DETAIL 'X'



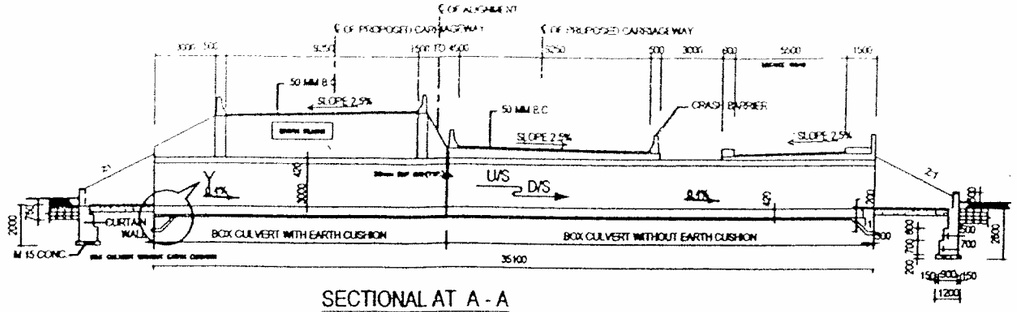
DETAIL 'Y'

NOTES:

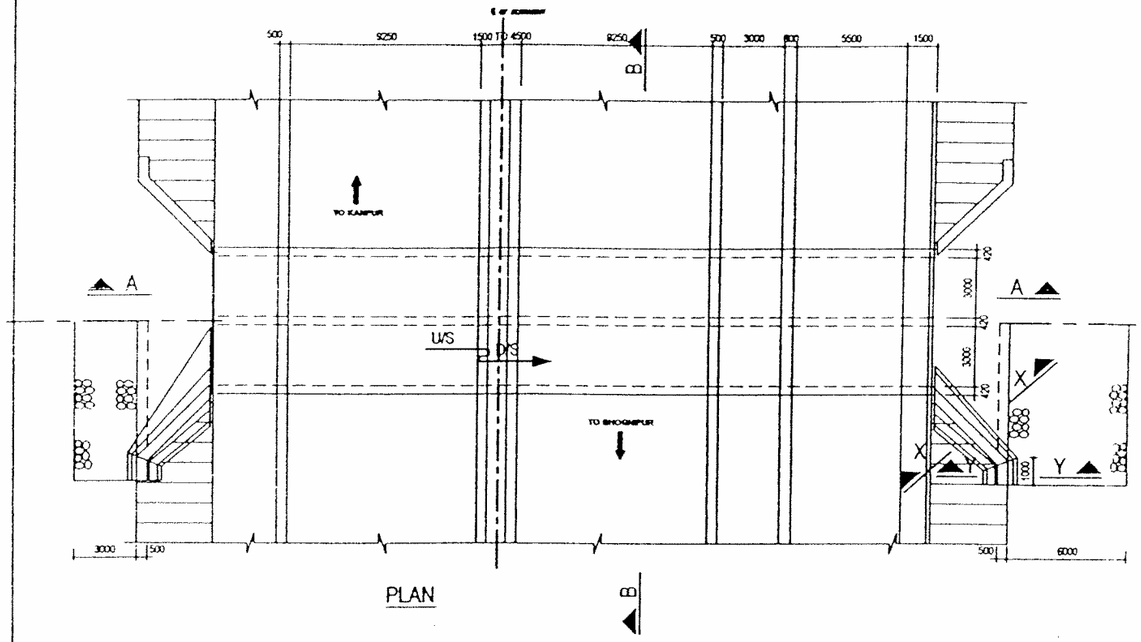
1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGE WAY HAS BEEN DESIGNED FOR FOLLOWING I.R.C. LOADING
   a. 2-LANES OF CLASS-A
   b. 1-LANE OF CLASS 70-R
3. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO. 305.2 OF LATEST SPECIFICATION OF ROADS AND BRIDGES WORK OF MOST. THE VALUE OF Ø, ϕ & γ CONSIDERED IN DESIGNING ARE 0.30° AND 1.8 T/M³ RESPECTIVELY

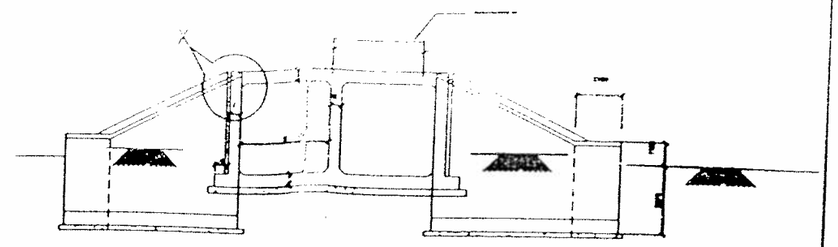
234

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (RIGHT SIDE SERVICE ROAD)	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- CRTS/NHAI/E-W/NH-25/C-III/31/BC/013
				Date : 25-08-04	R.K. Murthy	A.K.Gupta	H.TALUKDAR	

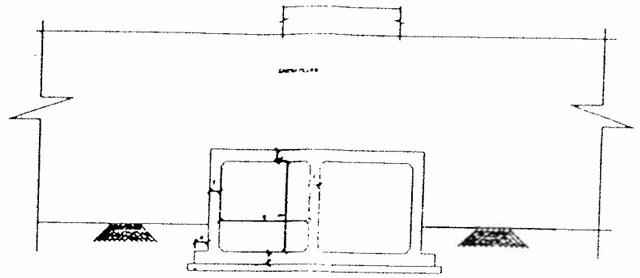


SECTIONAL AT A - A

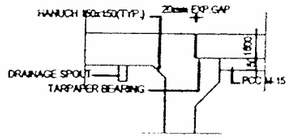




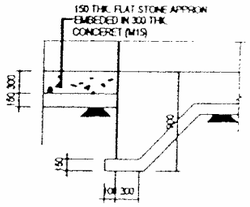
VIEW B-B
(SCALE 1:150)



VIEW B-B
(SCALE 1:150)



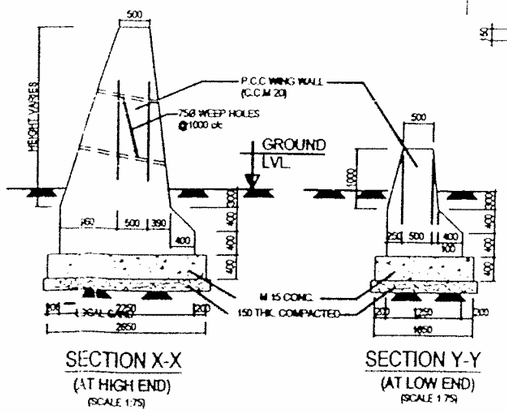
DETAIL 'X'



DETAIL 'Y'

NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGE WAY HAS BEEN DESIGNED FOR FOLLOWING I.R.C. LOADING
   a. 2-LANES OF CLASS-A
   b. 1-LANE OF CLASS 70-R
3. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO. 305.2 OF LATEST SPECIFICATION OF ROADS AND BRIDGES WORK OF MOST. THE VALUE OF C, Φ & 'γ' CONSIDERED IN DESIGNING ARE 0.30" AND 1.8 TM³ RESPECTIVELY
4. 100 DIA WEEP HOLES ARE TO BE PROVIDED @ 1000 C/C IN STAGGERED MANNER (BOTH VERTICALLY AND HORIZONTALLY) IN 1:20 SLOPE (TYP.)
5. ALLOWABLE SAFE BEARING CAPACITY OF SOIL = 11 T/M2 TO BE CONFIRMED BEFORE EXECUTION
6. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING DETAIL DRAWING



SECTION X-X
(AT HIGH END)
(SCALE 1:75)

SECTION Y-Y
(AT LOW END)
(SCALE 1:75)

DIMENSION DETAIL FOR BOX CULVERT(WITHOUT EARTH CUSHION)

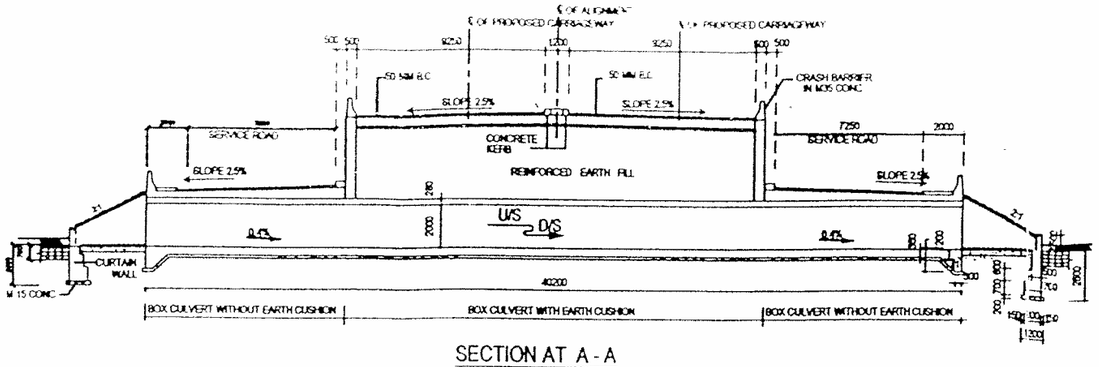
NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g(mm)
2/33/0	3000	3000	300	470	450	420	350

DIMENSION DETAIL FOR BOX CULVERT(WITH EARTH CUSHION)

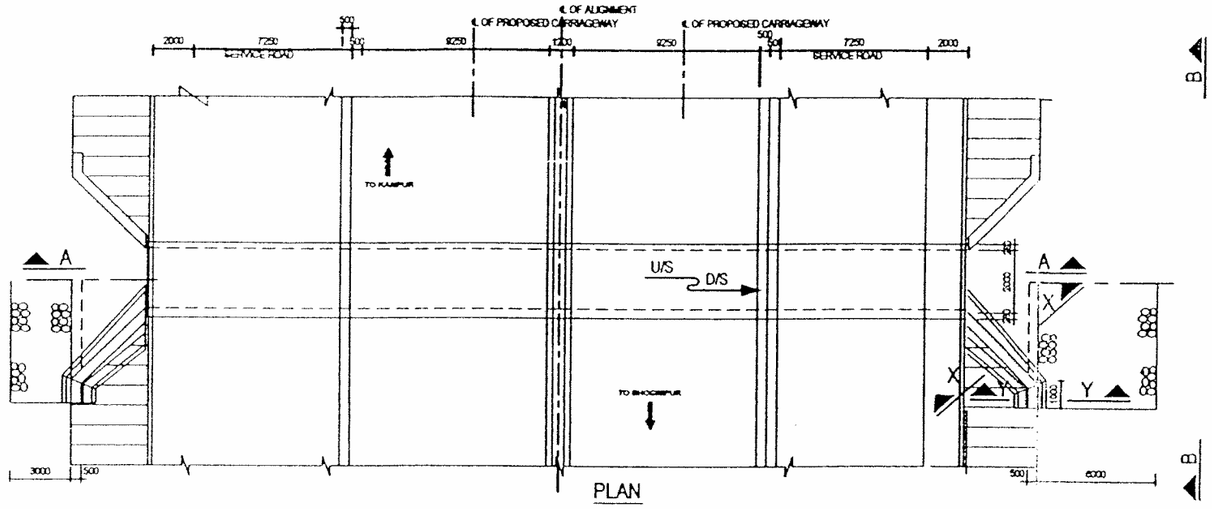
NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g(mm)
2/33/3	3000	3000	300	400	420	350	250

Nc / ab / Ec STANDS FOR NO. OF CELL / CLEAR WIDTH -CLEAR HIGHT/ HIGHT OF EARTH CUSHION

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF BOX CULVERT NO.449/1	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 235
				Date : 25-08-04	R.K. Murthy	A.K.Garg	H.Talukdar	CRTS/NHAI/E-W/NH-25/C:W/31/BC/14



SECTION AT A - A



PLAN

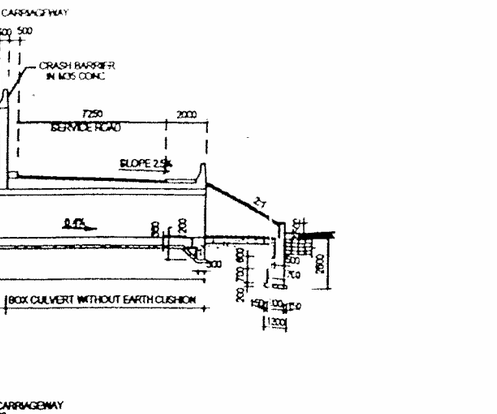
DIMENSION DETAIL FOR BOX CULVERT(WITHOUT EARTH CUSHION)

NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/0	2000	2000	500	350	380	300
1/23/0	2000	3000	1300	370	420	350
1/33/0	3000	3000	900	420	420	420

DIMENSION DETAIL FOR BOX CULVERT(WITH EARTH CUSHION)

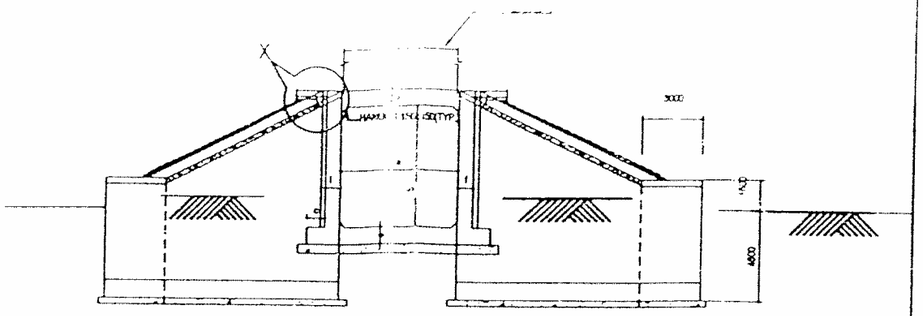
NC/ab/Ec	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
1/22/3	2000	2000	500	250	300	250
1/22/4	2000	2000	500	280	350	280
1/22/5	2000	2000	500	300	350	300
1/23/3	2000	3000	1100	280	300	350
1/33/3	3000	3000	800	370	450	400

Nc / ab / Ec STANDS FOR NO. OF CELL / CLEAR WIDTH -CLEAR HIGHT/ HIGHT OF EARTH CUSHION

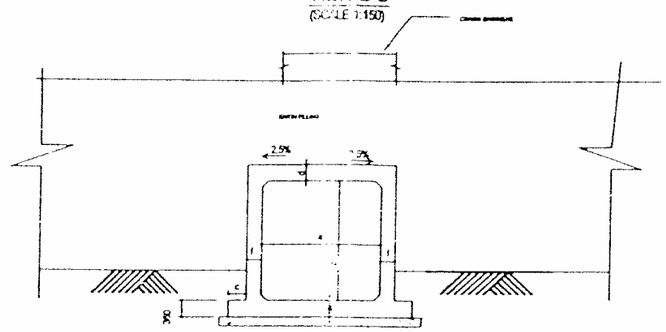


SECTION X-X
(AT HIGH END)
(SCALE 1:75)

SECTION Y-Y
(AT LOW END)
(SCALE 1:75)



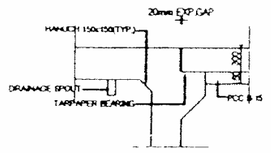
VIEW B-B
(SCALE 1:150)



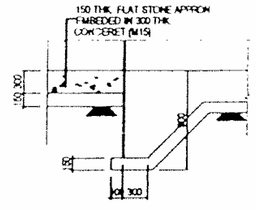
SECTION C-C
(SCALE 1:75)

NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M
2. THE 2-LANE CARRIAGE WAY HAS BEEN DESIGNED FOR FOLLOWING I.R.C. LOADING
   a. 2-LANES OF CLASS-A
   b. 1-LANE OF CLASS 70-R
3. BACK FILL MATERIAL SHALL BE AS PER CLAUSE NO. 305.2 OF LATEST SPECIFICATION OF ROADS AND BRIDGES WORK OF MOST. THE VALUE OF C, Φ & γ CONSIDERED IN DESIGNING ARE 0.30° AND 1.8 T/M³ RESPECTIVELY

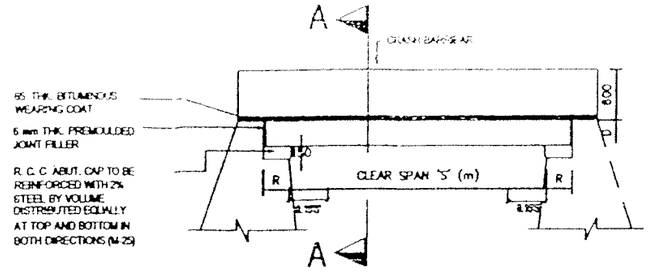


DETAIL 'X'



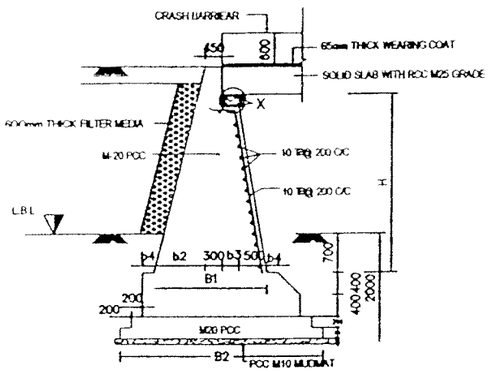
DETAIL 'Y'

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF BOX CULVERT NO.444/2	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003.	Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 236 CRTS/NHAI/NS-NH-25/BC/444-2/01
				Date : 25-08-04	R.K. Murthy	A.K.Garg	H.Talukdar	



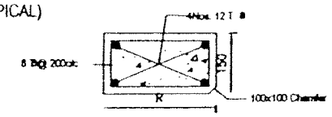
CROSS SECTION OF SLAB

Scale 1:50 (TYPICAL)

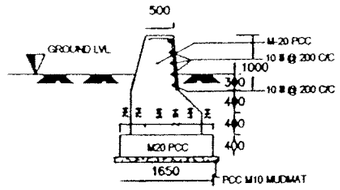


SECTION OF ABUTMENT

SCALE 1:75



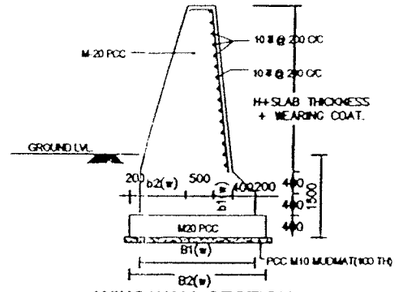
DETAIL AT X



WING WALL SECTION

(AT LOWER END FOR ALL SPAN)

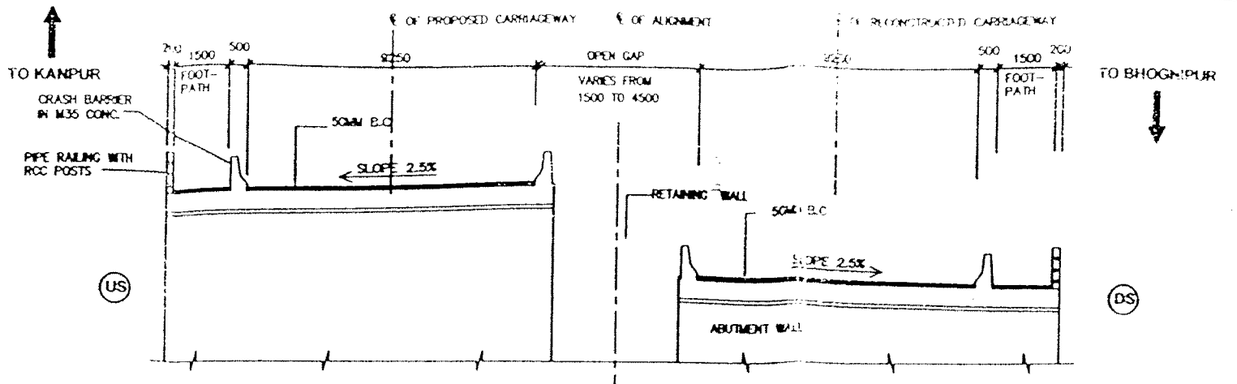
SCALE 1:75



WING WALL SECTION

(AT HIGH END)

SCALE 1:75



LONGITUDINAL SECTION ON A A

SCALE 1:100

GENERAL NOTES:

DESIGN SPECIFICATION:

01. IRC STANDARD SPECIFICATIONS AND CODE OF PRACTICE FOR ROAD AND BRIDGES SECTION I, II, III.

CONCRETE:

02. CONCRETE WITH A MINIMUM 28 DAYS WORKS STRENGTH OF 20N/MM2 (200 KG/CM2 CUBE FOR ABUTMENT 25N/MM2 (250 KG/CM2) FOR DECK SLAB.
03. REINFORCEMENT HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS: 1786

COVER:

04. MINIMUM CLEAR COVER TO ANY REINFORCEMENT SHALL BE IN ACCORDANCE WITH CLAUSE 304.3.3 OF IRC: 21-1987
05. TOP SURFACE OF THE ABUTMENT/PIER CAP SHALL BE GIVEN A SMOOTH FINISH BY CARBORANDUM STONE FOR EVEN SEATING OF DECK SLAB.
06. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED.
07. JOINTS AND LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 304.18.3 OF IRC:21-1987
08. DIMENSIONS OF BARS APPEARING IN SCHEDULE ARE FOR THE PURPOSE OF ESTIMATING STEEL QUANTITY.
09. PROVIDE P.C.C. M15 (1:2:4) MAT (100 MM THICK) AS LEVELLING COURSE UNDER FOUNDATION SLAB OR ABUTMENT WING WALL.
10. ABUTMENT AND WING WALL SECTIONS FOR INTERMEDIATE HEIGHTS TO BE ADOPTED SUITABLY. THE VARIOUS DIMENSIONS TO BE SUITABLY ADJUSTED TO SUIT THE SIZE OF SECTIONS WHERE NECESSARY.
11. THE SECTIONS ARE APPLICABLE FOR CULVERT DESIGNED FOR IRC: CLASS A X 2LANE OR CLASS 70 R WHEELED WHICHEVER PRODUCES WORST EFFECT WITHOUT PROVISION OF APPROACH SLAB.
12. THE SECTIONS SHALL BE IN CEMENT CONCRETE OF M-15 GRADE FOR FLOOR AND FOUNDATION BED
13. ABUTMENT AND WING WALL SECTIONS ARE PROVIDED ON THE BASIS OF PRESUMED BEARING CAPACITY OF SOIL AS 15.0 T/M2. THE ABUTMENT SECTIONS FOR 5M TO 5.9 M HEIGHT HAS BEEN PROVIDED FOR PRESUMED BEARING CAPACITY OF 22 T/M2. PRESUMED VALUE OF BEARING CAPACITY ARE TO BE ASCERTAINED AT SITE BY THE ENGINEER BEFORE CONSTRUCTION.
14. PCC ABUTMENTS AND WING WALLS SHALL BE PROVIDED WITH SURFACE REINFORCEMENT OF 10 MM @250 C/C BOTH WAYS ON ITS SURFACE SEEN IN ELEVATION.
15. 65 MM THICK BITUMINOUS WEARING COAT WILL COMPRISE OF 50 MM THICK ASPHALTIC CONCRETE IN TWO LAYERS OF 25 MM EACH OVER MASTIC ASPHALT 15 MM THICK WITH PRIME COAT.
16. FOR ABUTMENT AND WING WALL SECTIONS IRC SP-13 MAY BE REFERRED TO
17. DRAWING SHOULD NOT BE SCALED AND FIGURED DIMENSIONS ARE TO FOLLOW
18. FOR SPANS BETWEEN 2M TO 3M, 3M TO 4M & SO ON, VALUES FOR H, b1, b2 ETC ARE TO BE INTERPOLATED FROM THE CORRESPONDING TABLES

WING WALL SECTIONS FOR CULVERTS

ABUTMENT SECTIONS FOR CULVERTS

SPAN	6.0 m AND 5.0 m						4.0 m, 3.0 m, 2.0 m, 1.50 m, AND 1.0 m					
H	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1	0.20	0.25	0.30	0.35	0.40	0.50	0.25	0.20	0.25	0.30	0.35	0.40
b2	0.60	0.85	1.00	1.20	1.40	1.80	0.50	0.70	0.95	1.10	1.25	1.40
b3	0.40	0.40	0.40	0.40	0.40	0.50	0.30	0.30	0.30	0.30	0.30	0.30
b4	0.10	0.10	0.20	0.40	0.80	0.80	0.10	0.10	0.10	0.20	0.30	0.50
B1	1.70	2.00	2.20	2.45	2.70	3.30	1.55	1.70	2.00	2.20	2.40	2.80
B2	3.10	3.40	3.80	4.45	5.10	6.10	2.95	3.10	3.40	3.80	4.20	4.80

WING WALL SECTIONS FOR CULVERTS

SPAN	UP TO 2.00 m METRES						3.00 m METRES						4.00 m METRES						5.00 m METRES						6.00 m METRES				
H	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1(w)	0.18	0.23	0.28	0.33	0.38	0.43	0.19	0.24	0.29	0.34	0.39	0.44	0.19	0.24	0.29	0.34	0.39	0.44	0.25	0.30	0.35	0.40	0.45	0.55	0.25	0.30	0.35	0.40	0.45
b2(w)	0.45	0.58	0.70	0.82	0.95	1.07	0.46	0.59	0.71	0.84	0.98	1.09	0.46	0.48	0.73	0.85	0.98	1.10	0.62	0.75	0.87	1.00	1.13	1.75	0.63	0.75	0.88	1.00	1.13
B1(w)	1.53	1.72	1.88	2.05	2.23	2.40	1.55	1.73	1.90	2.08	2.25	2.43	1.55	1.62	1.82	2.09	2.27	2.44	1.77	1.95	2.12	2.30	2.48	3.20	1.78	1.95	2.13	2.30	2.48
B2(w)	1.93	2.12	2.28	2.45	2.63	2.80	1.95	2.13	2.30	2.48	2.65	2.83	1.95	2.02	2.32	2.49	2.67	2.84	2.17	2.35	2.52	2.70	2.88	3.60	2.18	2.35	2.53	2.70	2.88

National Highways Authority of India

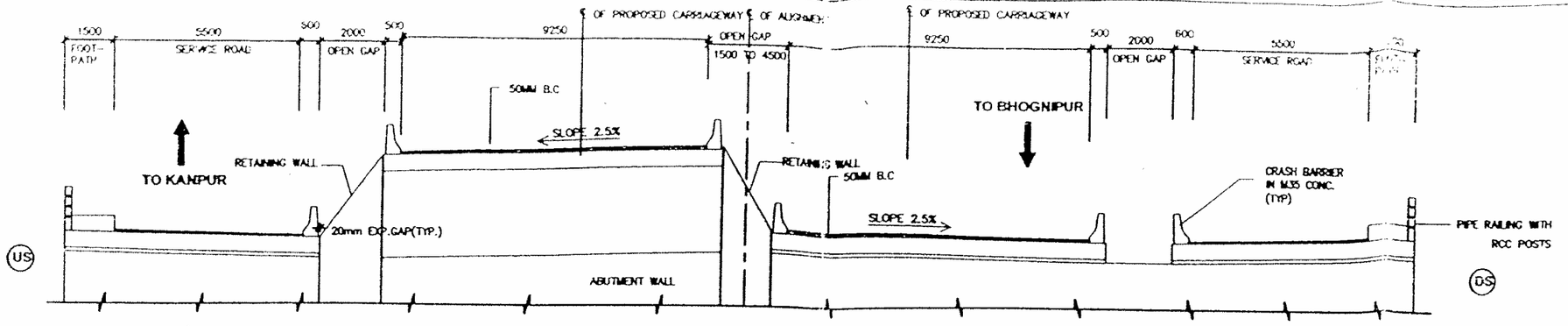
GENERAL ARRANGEMENT DRAWING

SOLID SLAB CULVERT

Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25

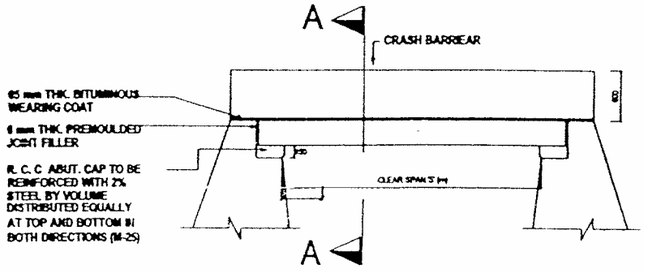
CRAPHTS Consultants (I) Pvt Ltd
14/3, Mathura Road,
Near Havells crossing
Faridabad - 121 003.

Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 237
Date: 27--08--04	R.K. Murthy	A.K.Garg	H.Talukdar	CRTS/NHAI/E-W/NH-25/C-III/31/SC/016



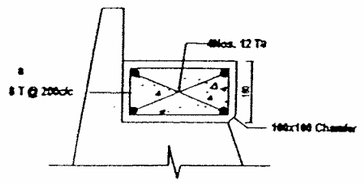
LONGITUDINAL SECTION ON A A

SCALE 1:125



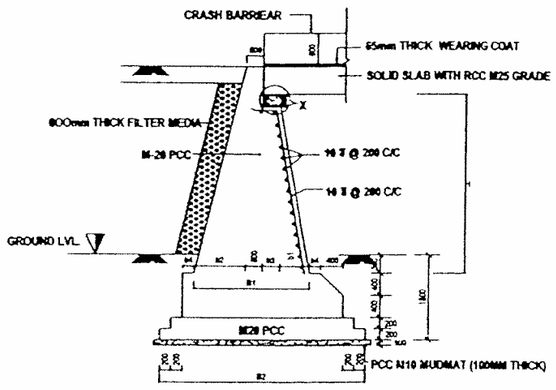
CROSS SECTION OF SLAB (TYPICAL)

SCALE 1:50



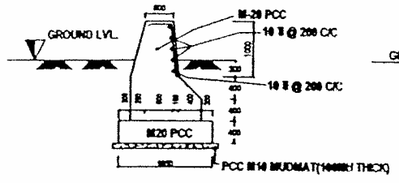
DETAIL AT X

SCALE 1:10



SECTION OF ABUTMENT

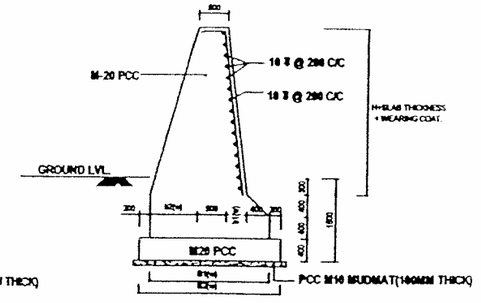
SCALE 1:50



WING WALL SECTION

(AT LOWER END FOR ALL SPANS)

SCALE 1:75



WING WALL SECTION

(AT HIGH END)

SCALE 1:75

GENERAL NOTES:

DESIGN SPECIFICATION:

01. IRC STANDARD SPECIFICATIONS AND CODE OF PRACTICE FOR ROAD AND BRIDGES SECTION I, II, III.

CONCRETE:

02. CONCRETE WITH A MINIMUM 28 DAYS WORKS STRENGTH OF 200 KG/CM2 CUBE FOR ABUTMENT 250KG/CM2 FOR DECK SLAB.
03. REINFORCEMENT HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS: 1786

COVER:

04. MINIMUM CLEAR COVER TO ANY REINFORCEMENT SHALL BE IN ACCORDANCE WITH CLAUSE 304.3.0 OF IRC: 21-1987
05. TOP SURFACE OF THE ABUTMENT/PIER CAP SHALL BE GIVEN A SMOOTH FINISH BY CARBORANDAM STONE FOR EVEN SEATING OF DECK SLAB.
06. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED.
07. JOINTS AND LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 304.18.3 OF IRC:21-1987
08. DIMENSIONS OF BARS REPEATING IN SCHEDULE ARE FOR THE PURPOSE OF ESTIMATING STEEL QUANTITY.
09. PROVIDE P.C.C. M10 MIX SEAT (100 MM THICK) AS LEVELLING COURSE UNDER FOUNDATION SLAB OR ABUTMENT WING WALL
10. ABUTMENT AND WING WALL SECTIONS FOR INTERMEDIATE HEIGHTS TO BE ADOPTED SUITABLY. THE VARIOUS DIMENSIONS TO BE SUITABLY ADJUSTED TO SUIT THE SIZE OF SECTIONS WHERE NECESSARY.
11. THE SECTIONS ARE APPLICABLE FOR CULVERT DESIGNED FOR IRC: CLASS A X 2LANE OR CLASS 70 R WHEELED WHICHEVER PRODUCES WORST EFFECT WITHOUT PROVISION OF APPROACH SLAB.
12. THE SECTIONS SHALL BE OF CEMENT CONCRETE OF M-15 GRADE FOR FLOOR AND FOUNDATION BED
13. ABUTMENT AND WING WALL SECTIONS ARE PROVIDED ON THE BASIS OF PRESUMED BEARING CAPACITY OF SOIL OF 15 T/M2. THE ABUTMENT SECTIONS FOR 5M TO 5.9 M HEIGHT HAS BEEN PROVIDED FOR PRESUMED BEARING CAPACITY OF 22 T/M2. PRESUMED VALUE OF BEARING CAPACITY ARE TO BE ASCERTAINED AT SITE BY THE ENGINEER BEFORE CONSTRUCTION COMMENCES.
14. PCC ABUTMENTS AND WING WALLS SHALL BE PROVIDED WITH SURFACE REINFORCEMENT OF 10 MM @200 C/C BOTH WAYS ON ITS SURFACE SEEN IN ELEVATION.
15. 65 MM THICK BITUMINOUS WEARING COAT WILL COMPRISE OF 50 MM THICK ASPHALTIC CONCRETE IN TWO LAYERS OF 25 EACH OVER MASTIC ASPHALT 15 MM THICK WITH PRIME COAT.
16. FOR ABUTMENT AND WING WALL SECTIONS IRC SP-13 MAY BE REFERRED TO
17. DRAWING SHOULD NOT BE SCALED AND FIGURED DIMENSIONS ARE TO FOLLOW
18. FOR SPANS BETWEEN 2m TO 3M, 3M TO 4M & 5O ON, VALUES FOR H, b1, b2 ETC ARE TO BE INTERPOLATED FROM THE CORRESPONDING TABLES

ABUTMENT SECTIONS FOR CULVERTS

SPAN	6.0 m AND 5.0 m						4.0 m, 3.0 m, 2.0 m, 1.50 m, AND 1.0 m					
H	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1	0.20	0.25	0.30	0.35	0.40	0.50	0.25	0.20	0.25	0.30	0.35	0.40
b2	0.60	0.85	1.00	1.20	1.40	1.80	0.50	0.70	0.95	1.10	1.25	1.40
b3	0.40	0.40	0.40	0.40	0.40	0.50	0.30	0.30	0.30	0.30	0.30	0.30
b4	0.10	0.10	0.20	0.40	0.60	0.80	0.10	0.10	0.10	0.20	0.30	0.50
B1	1.70	2.00	2.20	2.45	2.70	3.30	1.55	1.70	2.00	2.20	2.40	2.60
B2	3.10	3.40	3.80	4.45	5.10	6.10	2.95	3.10	3.40	3.80	4.20	4.80

WING WALL SECTIONS FOR CULVERTS

SPAN	UP TO 2.00 m METRES						3.00 m METRES						4.00 m METRES						5.00 m METRES						6.00 m METRES				
H	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1(w)	0.18	0.23	0.28	0.33	0.38	0.43	0.19	0.24	0.29	0.34	0.39	0.44	0.19	0.24	0.29	0.34	0.39	0.44	0.25	0.30	0.35	0.40	0.45	0.55	0.25	0.30	0.35	0.40	0.45
b2(w)	0.45	0.59	0.70	0.82	0.95	1.07	0.46	0.59	0.71	0.84	0.96	1.09	0.46	0.48	0.73	0.85	0.98	1.10	0.62	0.75	0.87	1.00	1.13	1.75	0.63	0.75	0.88	1.00	1.13
B1(w)	1.53	1.72	1.88	2.05	2.23	2.40	1.55	1.73	1.90	2.08	2.25	2.43	1.55	1.82	1.92	2.09	2.27	2.44	1.77	1.95	2.12	2.30	2.48	3.20	1.78	1.95	2.13	2.30	2.48
B2(w)	1.93	2.13	2.28	2.45	2.63	2.80	1.95	2.13	2.30	2.48	2.65	2.83	1.95	2.02	2.32	2.49	2.67	2.84	2.17	2.35	2.52	2.70	2.88	3.60	2.18	2.35	2.53	2.70	2.88

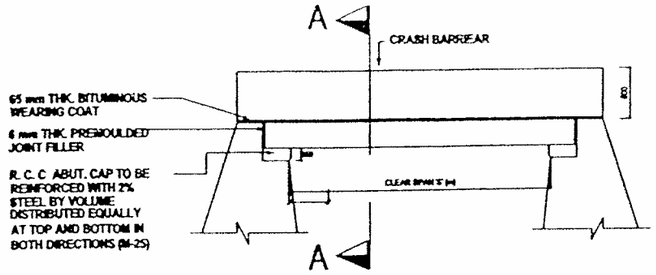
National Highways Authority of India

GENERAL ARRANGEMENT DRAWING OF SOLID SLAB CULVERT WITH SERVICE ROAD (BOTH SIDE)

Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25.

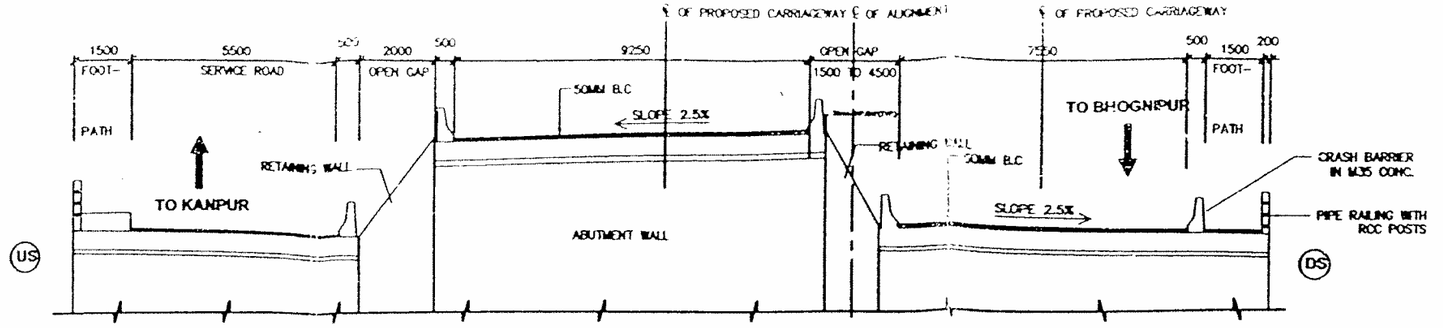
CRAPHTS Consultants (I) Pvt Ltd
14/3, Mathura Road,
Near Havells crossing
Faridabad - 121 003.

Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 238
Date: 27-08-04	R.K. Murthy	A.K.Garg	N.Talukdar	CRTS/NHAI/E-W/NH-25/C-III/31/SC/017



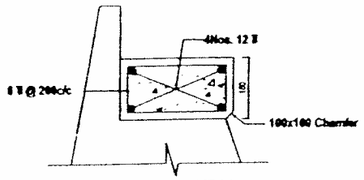
CROSS SECTION OF SLAB (TYPICAL)

SCALE 1:50



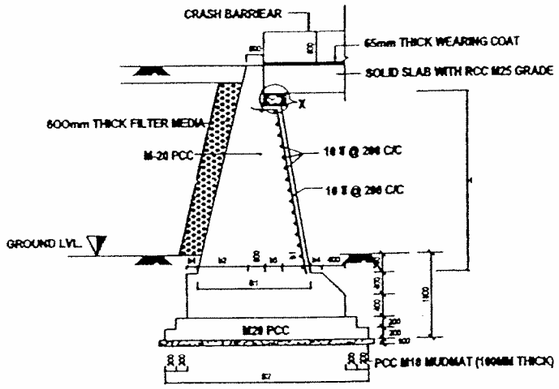
LONGITUDINAL SECTION ON A A

SCALE 1:125



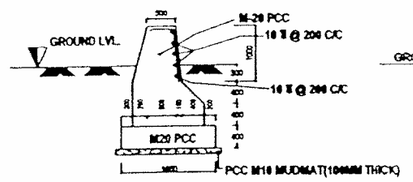
DETAIL AT X

SCALE 1:10



SECTION OF ABUTMENT

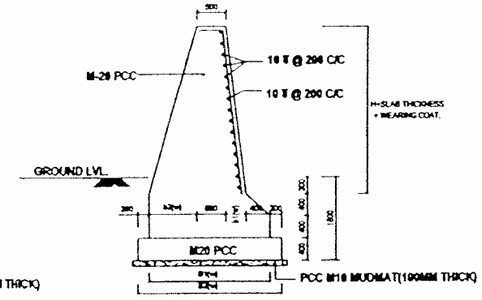
SCALE 1:50



WING WALL SECTION

(AT LOWER END FOR ALL SPANS)

SCALE 1:75



WING WALL SECTION

(AT HIGH END)

SCALE 1:75

ABUTMENT SECTIONS FOR CULVERTS

SPAN	6.0 m AND 5.0 m						4.0 m, 3.0 m, 2.0 m, 1.50 m, AND 1.0 m					
H	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1	0.20	0.25	0.30	0.35	0.40	0.50	0.25	0.20	0.25	0.30	0.35	0.40
b2	0.60	0.85	1.00	1.20	1.40	1.80	0.50	0.70	0.95	1.10	1.25	1.40
b3	0.40	0.40	0.40	0.40	0.40	0.50	0.30	0.30	0.30	0.30	0.30	0.30
b4	0.10	0.10	0.20	0.40	0.60	0.80	0.10	0.10	0.10	0.20	0.30	0.50
B1	1.70	2.00	2.20	2.45	2.70	3.30	1.55	1.70	2.00	2.20	2.40	2.60
B2	3.10	3.40	3.80	4.45	5.10	6.10	2.95	3.10	3.40	3.80	4.20	4.80

WING WALL SECTIONS FOR CULVERTS

SPAN	UP TO 2.00 m METRES						3.00 m METRES						4.00 m METRES						5.00 m METRES						6.00 m METRES				
H	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	5 TO 5.9 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m
b1(w)	0.18	0.23	0.28	0.33	0.38	0.43	0.19	0.24	0.29	0.34	0.39	0.44	0.19	0.24	0.29	0.34	0.39	0.44	0.25	0.30	0.35	0.40	0.45	0.55	0.25	0.30	0.35	0.40	0.45
b2(w)	0.45	0.59	0.70	0.82	0.95	1.07	0.46	0.59	0.71	0.84	0.95	1.09	0.46	0.48	0.73	0.85	0.98	1.10	0.62	0.75	0.87	1.00	1.13	1.75	0.63	0.75	0.88	1.00	1.13
B1(w)	1.53	1.72	1.88	2.05	2.23	2.40	1.55	1.73	1.90	2.08	2.25	2.43	1.55	1.62	1.92	2.09	2.27	2.44	1.77	1.95	2.12	2.30	2.48	3.20	1.78	1.95	2.13	2.30	2.48
B2(w)	1.93	2.12	2.28	2.45	2.63	2.80	1.95	2.13	2.30	2.48	2.65	2.83	1.95	2.02	2.32	2.49	2.67	2.84	2.17	2.35	2.52	2.70	2.88	3.60	2.18	2.35	2.53	2.70	2.88

GENERAL NOTES:

DESIGN SPECIFICATION:

01. IRC STANDARD SPECIFICATIONS AND CODE OF PRACTICE FOR ROAD AND BRIDGES SECTION I, II, III.

CONCRETE:

02. CONCRETE WITH A MINIMUM 28 DAYS WORKS STRENGTH OF 200 KG/CM2 CUBE FOR ABUTMENT 250KG/CM2 FOR DECK SLAB.
03. REINFORCEMENT HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS: 1786

COVER:

04. MINIMUM CLEAR COVER TO ANY REINFORCEMENT SHALL BE IN ACCORDANCE WITH CLAUSE 304.3.0 OF IRC: 21-1987
05. TOP SURFACE OF THE ABUTMENT/PIER CAP SHALL BE GIVEN A SMOOTH FINISH BY CARBORANDAM STONE FOR EVEN SEATING OF DECK SLAB.
06. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED.
07. JOINTS AND LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 304.6.3 OF IRC:21-1987
08. DIMENSIONS OF BARS APPEARING IN SCHEDULE ARE FOR THE PURPOSE OF ESTIMATING STEEL QUANTITY.
09. PROVIDE P.C.C. M10 MUD MAT (100 MM THICK) AS LEVELLING COURSE UNDER FOUNDATION SLAB OR ABUTMENT WING WALL.
10. ABUTMENT AND WING WALL SECTIONS FOR INTERMEDIATE HEIGHTS TO BE ADOPTED SUITABLY. THE VARIOUS DIMENSIONS TO BE SUITABLY ADJUSTED TO SUIT THE SIZE OF SECTIONS WHERE NECESSARY.
11. THE SECTIONS ARE APPLICABLE FOR CULVERT DESIGNED FOR IRC: CLASS A X 2LANE OR CLASS 70 R WHEELED WHICHEVER PRODUCES WIROST EFFECT WITHOUT PROVISION OF APPROACH SLAB.
12. THE SECTIONS SHALL BE IN CEMENT CONCRETE OF M-15 GRADE FOR FLOOR AND FOUNDATION BED
13. ABUTMENT AND WING WALL SECTIONS ARE PROVIDED ON THE BASIS OF PRESUMED BEARING CAPACITY OF SOIL OF 15.0 T/M2. THE ABUTMENT SECTIONS FOR 5M TO 5.9 M HEIGHT HAS BEEN PROVIDED FOR PRESUMED BEARING CAPACITY OF 22 T/M2. PRESUMED VALUE OF BEARING CAPACITY ARE TO BE ASCERTAINED AT SITE BY THE ENGINEER BEFORE CONSTRUCTION COMMENCES.
14. PCC ABUTMENTS AND WING WALLS SHALL BE PROVIDED WITH SURFACE REINFORCEMENT OF 10 MM @200 C/C BOTH WAYS ON EXPOSED SURFACE SEEN IN ELEVATION.
15. 65 MM THICK BITUMINOUS WEARING COAT WILL COMPRISE OF 50 MM THICK ASPHALTIC CONCRETE IN TWO LAYERS OF 25 MM EACH OVER MASTIC ASPHALT 15 MM THICK WITH PRIME COAT.
16. FOR ABUTMENT AND WING WALL SECTIONS IRC SP-13 MAY BE REFERRED TO
17. DRAWING SHOULD NOT BE SCALED AND FIGURED DIMENSIONS ARE TO FOLLOW
18. FOR SPANS BETWEEN 2M TO 3M, 3M TO 4M & SO ON, VALUES FOR H, b1, b2 ETC ARE TO BE INTERPOLATED FROM THE CORRESPONDING TABLES

National Highways Authority of India

GENERAL ARRANGEMENT DRAWING OF SOLID SLAB CULVERT WITH SERVICE ROAD (LEFT SIDE)

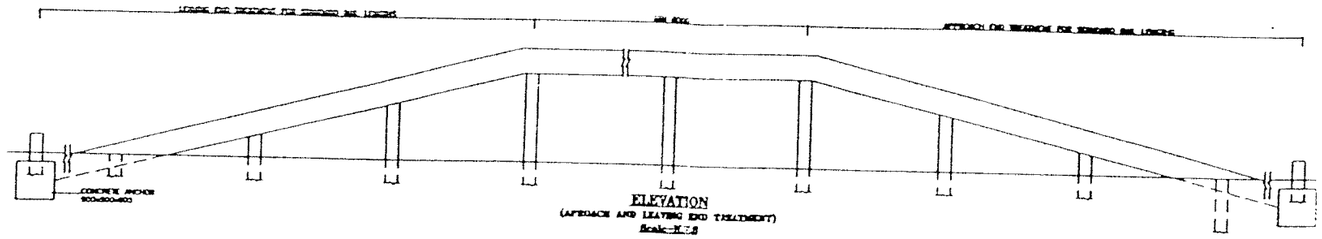
Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25

CRAPHTS Consultants (I) Pvt Ltd
14/3, Mathura Road,
Near Havells crossing
Faridabad - 121 003.

Scale : AS SHOWN	Prepared By	Designed By	Team Leader	Drawing Number :- 239
Date: 27–08–04	R.K. Murthy	A.K.Garg	H.Talukdar	CRTS/NHAI/E-W/NH-25/C-III/31/SC/018



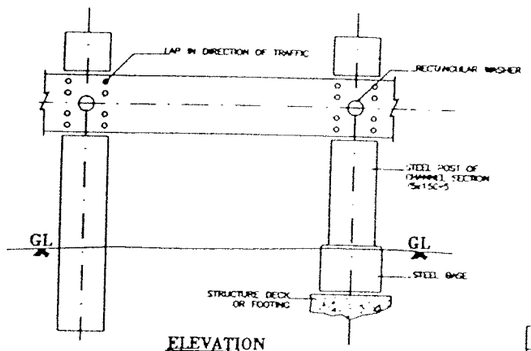
PLAN
Scale- N.T.S



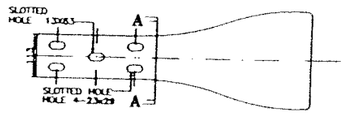
ELEVATION
(APPROACH AND LEAVING END TREATMENT)
Scale- N.T.S



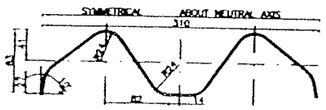
FRONT ELEVATION
Scale 1:50



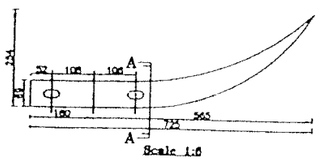
ELEVATION
Scale- N.T.S



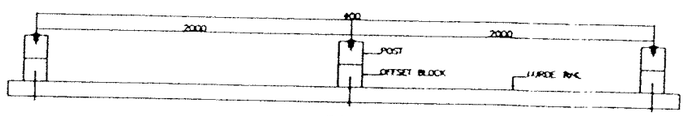
TERMINAL SECTION
Scale 1:8



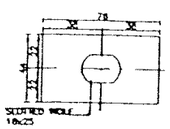
SECTION A-A OF 'W' BEAM RAIL
Scale 1:4



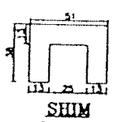
Scale 1:6



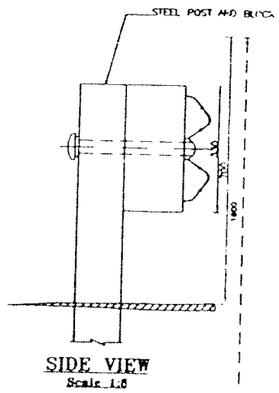
PLAN
Scale- 1:10



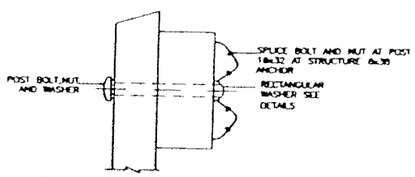
RECTANGULAR WASHER
Scale 1:2



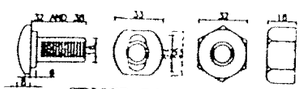
SHIM
Scale 1:2



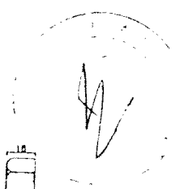
SIDE VIEW
Scale 1:6



ARRANGEMENT : POST
Scale 1:6



SPLICE BOLT AND NUT
Scale 1:2



DESIGN CONSULTANT:
EMA Unihorn (India) Pvt. Ltd.
In association with
Carl Bro a/s of Denmark
and
Unihorn bv of The Netherlands

SCALE
0 1 2 3 4m
SCALE

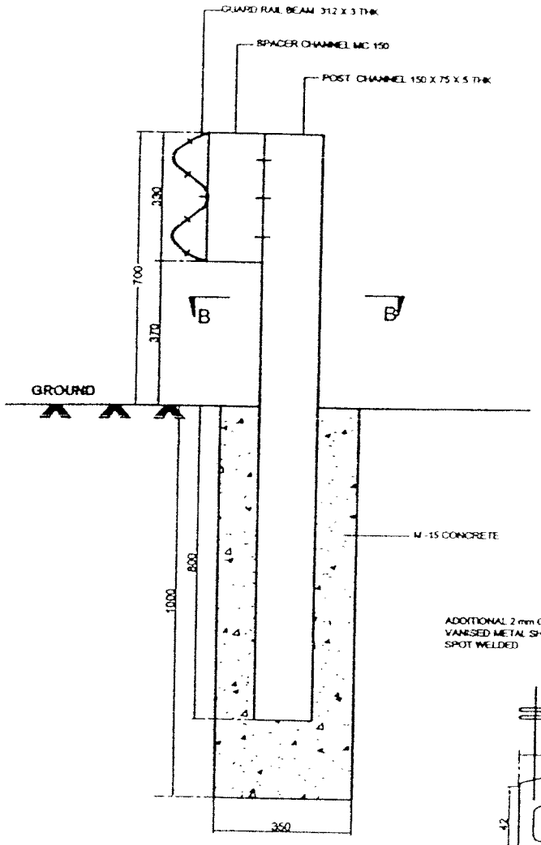
ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

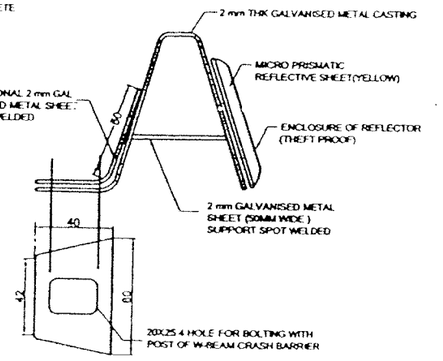
PROJECT:
REHAB. & UPGRADATION OF NH-25 TO FOUR LANE
BOT PACKAGE

TITLE:
TYPICAL DETAIL OF
METAL CRUSH BARRIERS

DRG. NO.	NHAI/GV/ JH/NH-25/MISC/CB/STD-04-BOT		
DATE	Feb. 2005	DRAWN	KAISER
DESIGNED	CHECKED	APPROVED	
MEHTA	F. CARLOS	BRIG. CHOWDHURY	



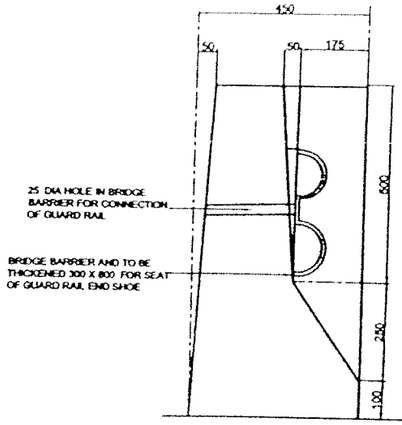
CROSS SECTION 'A-A'



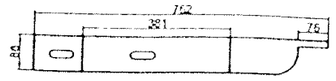
GUARD RAIL REFLECTOR

SHAPE : EQUILATERAL TRAPAZIUM	
DIMENSIONS	
FRONT CASTING	
TOP	95mm
BOTTOM	70mm
HEIGHT	80 mm
REFLECTIVE PORTION	
TOP	70 mm
BOTTOM	50 mm
HEIGHT	50 mm

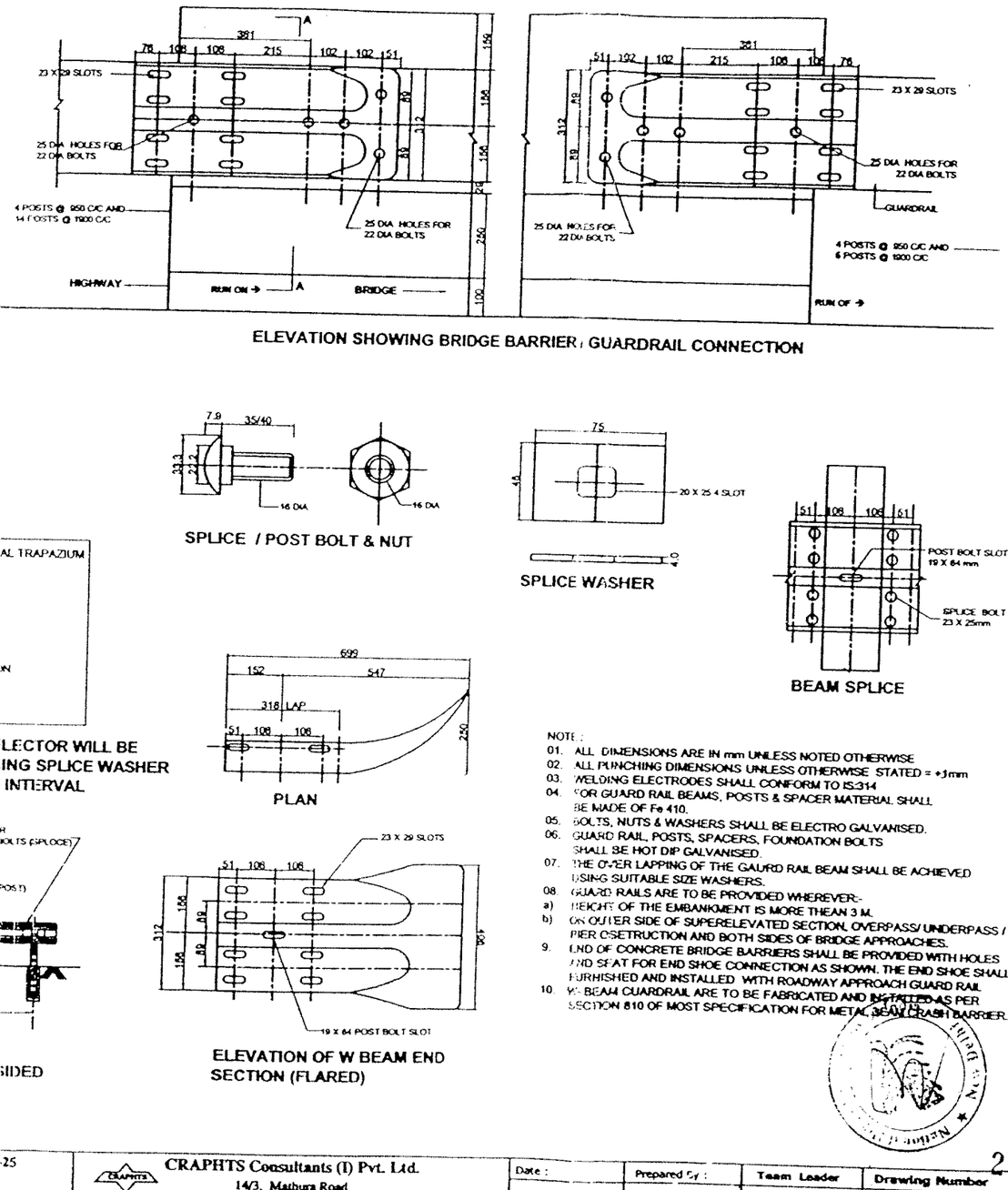
GUARD RAIL REFLECTOR WILL BE BOLTED REPLACING SPLICE WASHER EVERY 10 POSTS INTERVAL



SECTION A - A



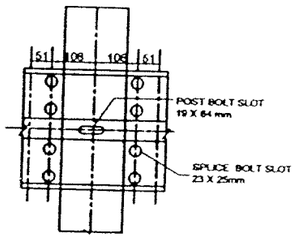
PLAN OF END SHOE



ELEVATION SHOWING BRIDGE BARRIER / GUARDRAIL CONNECTION

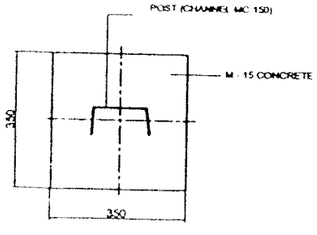
SPLICE / POST BOLT & NUT

SPLICE WASHER

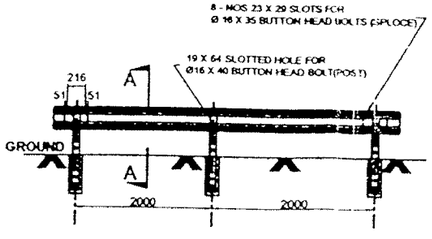


BEAM SPLICE

PLAN



SECTION 'B - B'



ELEVATION OF SINGLE SIDED GUARD RAIL

ELEVATION OF W BEAM END SECTION (FLARED)

NOTE :
01. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE
02. ALL PUNCHING DIMENSIONS UNLESS OTHERWISE STATED = +3mm
03. WELDING ELECTRODES SHALL CONFORM TO IS:814
04. FOR GUARD RAIL BEAMS, POSTS & SPACER MATERIAL SHALL BE MADE OF Fe 410.
05. BOLTS, NUTS & WASHERS SHALL BE ELECTRO GALVANISED.
06. GUARD RAIL, POSTS, SPACERS, FOUNDATION BOLTS SHALL BE HOT DIP GALVANISED.
07. THE OVER LAPPING OF THE GAURD RAIL BEAM SHALL BE ACHIEVED USING SUITABLE SIZE WASHERS.
08. GUARD RAILS ARE TO BE PROVIDED WHEREVER:-
a) HEIGHT OF THE EMBANKMENT IS MORE THEAN 3 M.
b) ON OUTER SIDE OF SUPERELEVATED SECTION, OVERPASS/ UNDERPASS / UNDERPASS PIER OBSETRUCTION AND BOTH SIDES OF BRIDGE APPROACHES.
9. END OF CONCRETE BRIDGE BARRIERS SHALL BE PROVIDED WITH HOLES AND SEAT FOR END SHOE CONNECTION AS SHOWN. THE END SHOE SHALL BE FURNISHED AND INSTALLED WITH ROADWAY APPROACH GUARD RAIL
10. W- BEAM GUARDRAIL ARE TO BE FABRICATED AND INSTALLED AS PER SECTION 810 OF MOST SPECIFICATION FOR METAL BEAM CRASH BARRIER.

National Highways Authority of India

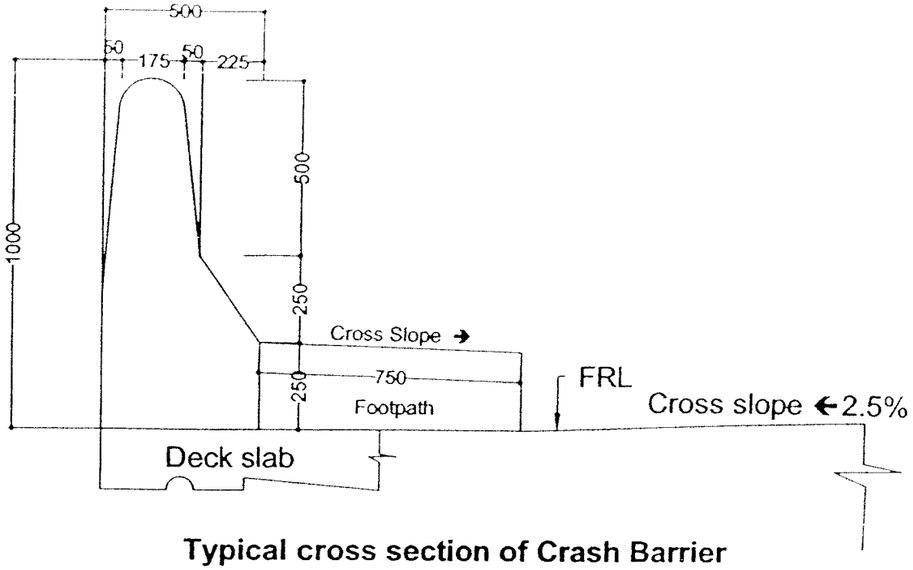
TYPICAL DETAILS OF METAL CRASH BARRIER

Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration
Contract package No. ————

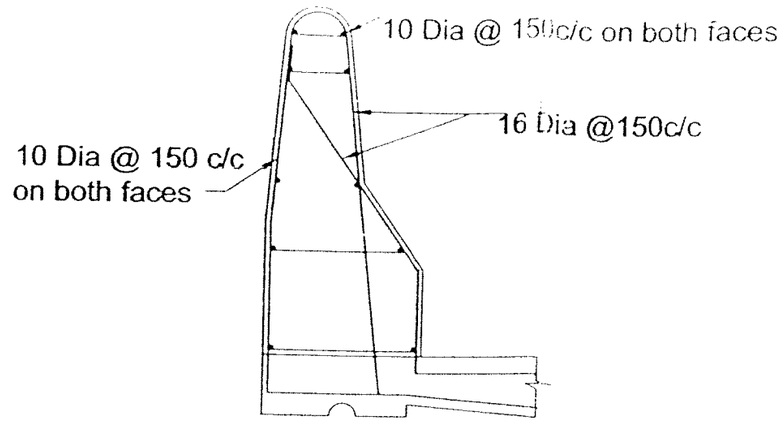
CRAPHTS Consultants (I) Pvt. Ltd.
14/3, Mathura Road,
Faridabad.
Ph - 95129-278813, 275948

Date :	Prepared by :	Team Leader	Drawing Number
Nov. - 20[illegible]	REJI	H.Talukdar	CRTS/NHAI/E-W/NH-25/C-III/31/MISC/005

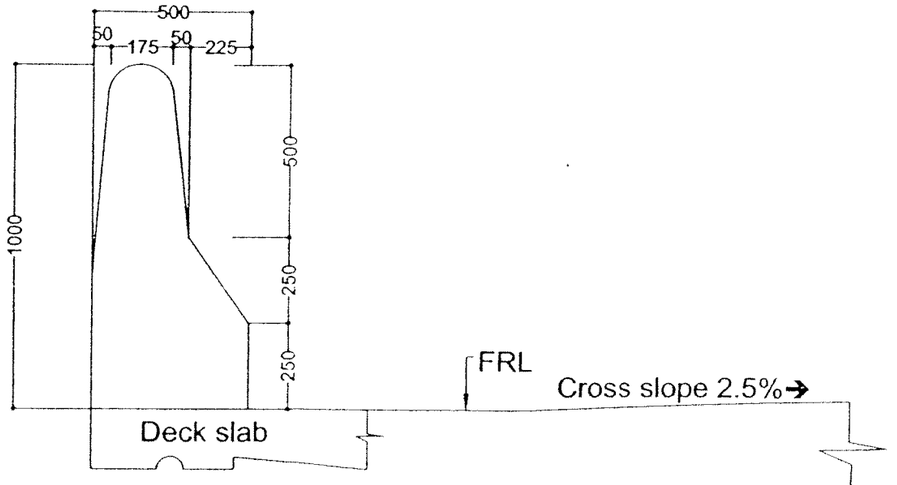
241



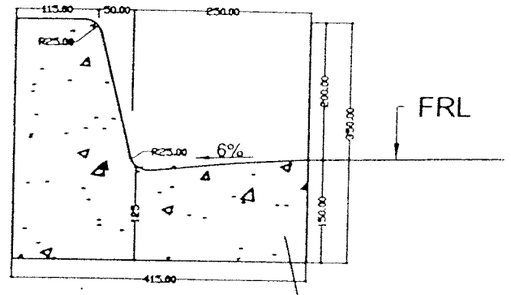
Typical cross section of Crash Barrier at the outer edge of deck slab



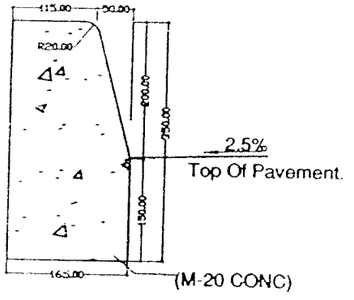
Typical Reinforcement details for Crash Barrier.



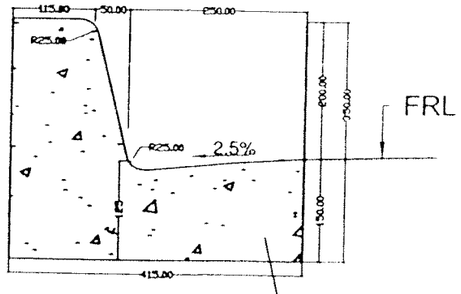
Typical cross section of Crash Barrier at the inner edge of deck slab



CURB WITH CHANNEL
ON MEDIAN SIDE FOR SUPER ELEVATED SECTION.



CENTRAL MEDIAN CURB STONE.
ON MEDIAN SIDE FOR NORMAL CAMBER SECTION.

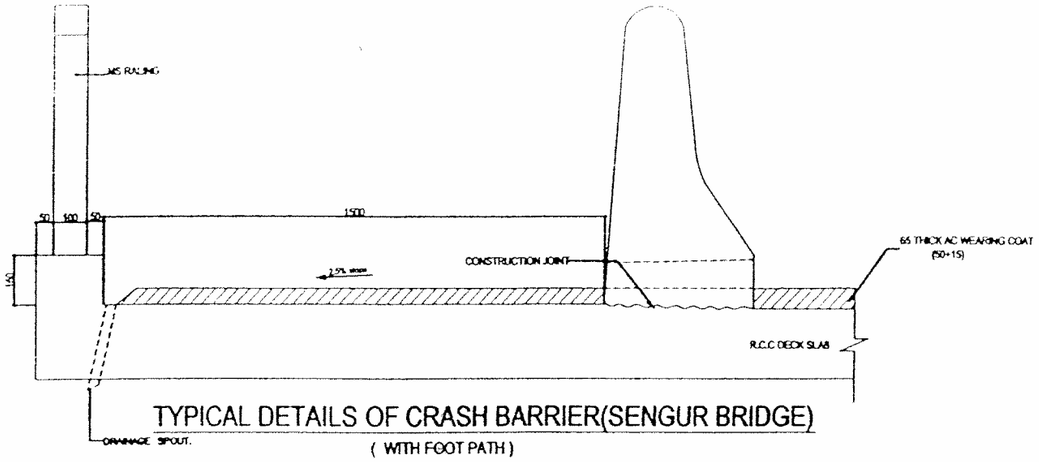


CURB WITH CHANNEL
ON FOOTPATH SIDE.

DRAWING FOR TENDER PURPOSE ONLY

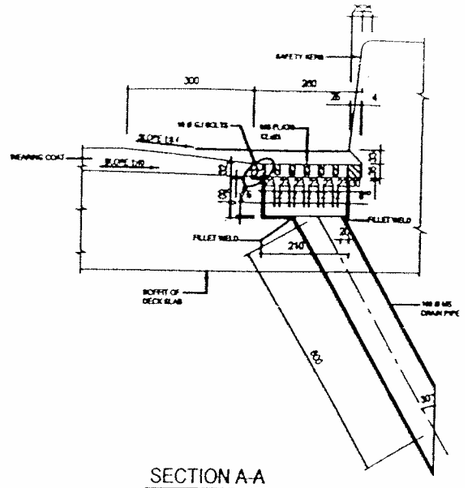
242

National Highways Authority of India	DETAILS OF CRASH BARRIER &CURBS	Rehabilitation and upgradation from km. 442 to km. 449 of NH-25 to 4 lane divided carriageway configuration Contract package No. ————	CRAPHTS Consultants (I) Pvt. Ltd. 14/3, Mathura Road, Faridabad. Ph - 95129-278813, 275948	Date	Prepared By	Team Leader	Drawing Number
				Nov. - 2004	REJI	H.Talukdar	CRTS/NHAI/E-W/NH-25/C-III/31/MISC/003

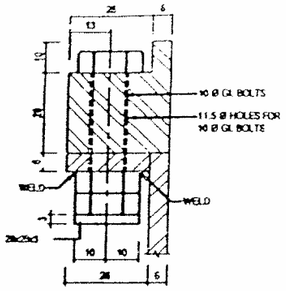


TYPICAL DETAILS OF CRASH BARRIER(SENGUR BRIDGE)

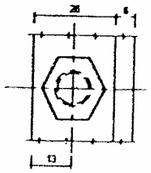
(WITH FOOT PATH)



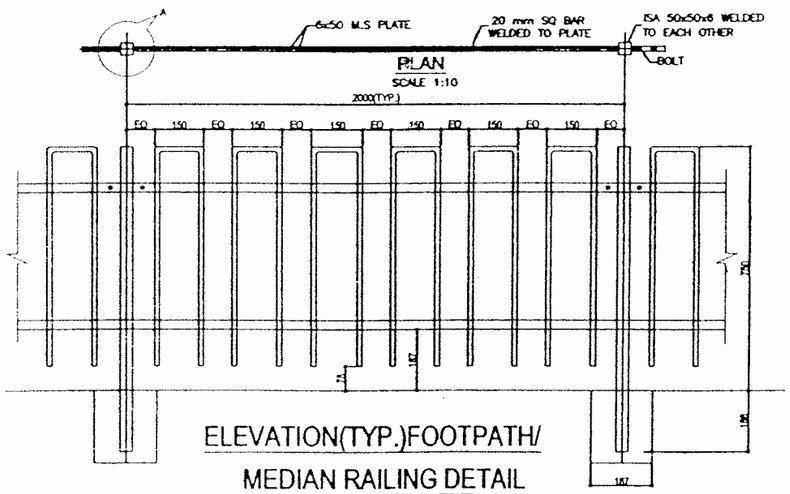
SECTION A-A



DETAIL-X

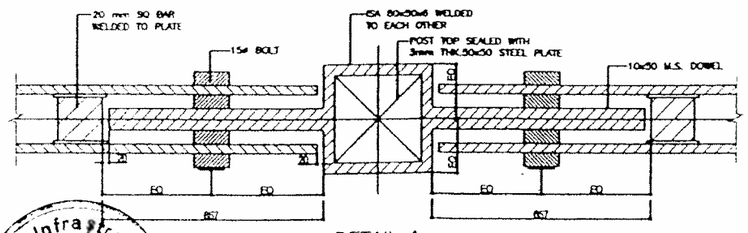


PLAN

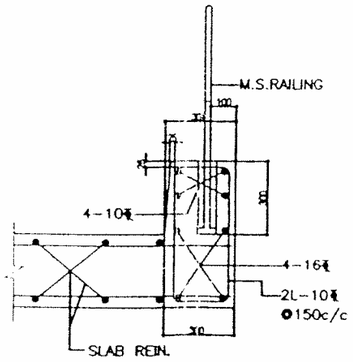


ELEVATION(TYP.)FOOTPATH/

MEDIAN RAILING DETAIL



DETAIL -A



DETAIL OF R.C.C

CURB AT FOOTPATH

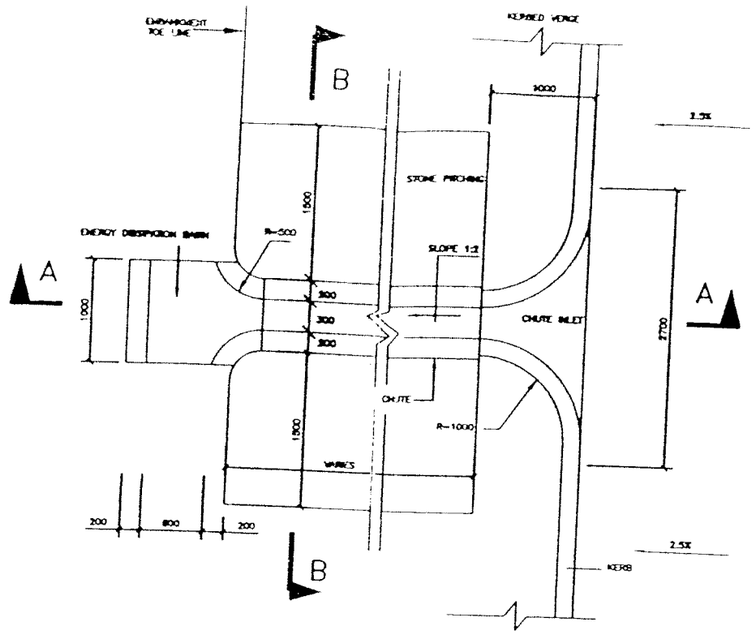
PLAN

(DETAILS OF DRAINAGE SPOUT AND COLLECTION PIT)

NOTES:

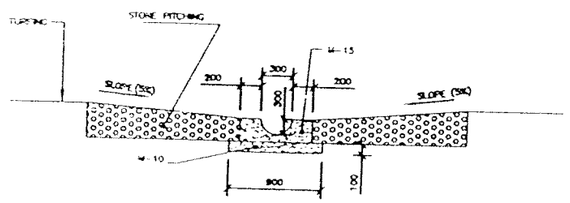
1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M.
2. GRADE OF CONCRETE M 40.
3. ALL REINFORCEMENT BARS DENOTE ø (TOR) SHALL BE H.Y.S.D. BARS CONFORMING TO IS:1786 WITH ANTICORROSIVE TREATMENT AS PER MOST SPECIFICATION CLAUSE 1009.3.
4. ANCHORAGE LENGTH SHALL BE 46 TIMES DIA OF BAR.
5. CLEAR COVER SHALL BE 50 mm UNLESS OTHERWISE NOTED.

National Highways Authority of India	DETAILS OF RAILING, CRASH BARRIER&DRAINAGE SPOUT	Rehabilitation and upgradation from km. 442 to km. 449 of NH 25 to 4 lane divided carriageway configuration Contract package No. ————	CRAPHTS Consultants (I) Pvt. Ltd. 14/3, Mathura Road, Faridabad. Ph - 95129-278813, 275948	North	Date : Nov. - 2014	Prepared By : REJI JACOB	Team Leader H.Talukdar.	Drawing Number CRT&NHAI/E-W/NH-25/C-III/31/MISC/002



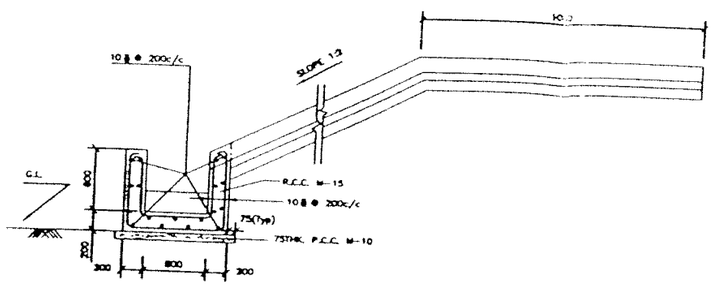
PLAN OF CHUTE

SCALE1:40



SECTION B-B

SCALE1:40



SECTION A-A

SCALE1:40

DATE	REV. NO.	REVISIONS

EMO Unithorn (India) Pvt. Ltd.
in association with
Carl Bro a/s of Denmark
and
Unithorn by of The Netherlands

SCALE

NOTE:-
1. ALL PIPES SHALL CONFORM TO IS-1161
2. DETAILED FABRICATION DRAWING SHALL BE PREPARED BY THE CONTRACTORS FOR EACH LOCATION OF PORTAL MOUNTED SIGN FOR APPROVAL
3. DETAILED WORKING DRAWINGS FOR IRON AREA WILL BE PROVIDED BY THE CONTRACTORS AS PER SITE REQUIREMENT AND AS DIRECTED BY ENGINEER IN CHARGE
4. THE TYPICAL DIMENSION 18000 WILL VARY WITH THE LOCATION OF TYPE GANTRY WITH INCREASE OR DECREASE IN WIDTH IN MULTIPLES OF 2150 LIMITED TO MAX. 2 Nos.

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

PROJECT:
ROAD & UPGRADATION OF NH-25 TO FOUR LANE BOT PROJECT

TITLE:
TYPICAL DETAIL FOR CHUTE DRAINS

NOTE: ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

DRG. NO. NHAI/JHANSI/NH-25/MISC/DRAIN/STD-01/BOT1

DATE	Dec. 2004	DRAWN	KAISER
DESIGNED	CHECKED	APPROVED	
MEHTA	F. CARLOS	BRIG. CHOWDHURY	

Four Laning of the Existing Orai -Bhognipur Section (Km 220.0 to Km 255.00) on NH-25 And Bhognipur – Barah Section (Km 421.20 To Km 449.00) on NH-2 on Build, Operate and Transfer (BOT) or BOT (Annuity) Basis in the State of Uttar Pradesh

Part IV: TECHNICAL SCHEDULES

SCHEDULE – C
PROJECT FACILITIES

Schedule - C

PROJECT FACILITIES

1. General

The following sections of this schedule indicate the details of amenities and facilities as situated on site and minimum facilities to be provided on the Project Highway with an aim to cater to the envisaged demand till the end of the concession period.

2. Existing Facilities

2.1 Rest Areas

Along the project highway, sufficient number of facilities such as eating-places with rest facility, fuel stations, repair shops etc., are available to cater the requirements of truck drivers and passengers on the highway.

3. Proposed Facilities

3.1 Toll Plaza

In all not more than 2 (two) toll plazas shall be allowed for collecting users fee, however it has been proposed to provide only one toll plaza for the project highway corridor. The location and layout of toll plaza shall be finalized in consultation with the Independent Consultant.

'Open System' of toll collection shall be provided on the Project Highway with collection of user fee from vehicles only at the toll plaza. There shall be a total of minimum 8 (Eight) lanes having a semi-automatic system of toll collection comprising equipments for registering of vehicle classification, ticket issuing, data processing and power supply. One toll lane in each direction shall be provided for traffic not required to pay user's fee. Appropriate technology for Toll Collection including Electronic Toll Collection (ETC) shall be used so that not more than 6 vehicles/Lane queue up in the peak hours during the entire concession period.

The design for toll plaza shall conform to the standards set out in **Schedule-D** of the Concession Agreement.

The tentative location of proposed Toll Plaza are given in the **Table C-1.** However, the exact location of toll plaza shall be decided & finalised in consultation with IC/NHAI/District Authorities.

Table C-1: Toll Plaza Locations along Project Highway

S. No.	Existing Chainage (km)	Nearest Place
1	226.662	Chamari Nala

3.2 Truck Parking/Lay-bye

At least 5 lay-bye for truk parking shall be provided by the Concessionaire under this Contract along the Project Highway. The provision of truck lay-bye shall be governed by site requirements. At least one of the lay-bye shall be provided as per drawing shown in **Fig. C-1**. The second lay-bye of adequate lengths as per drawings shall be constructed along the Project Highway. Parking shall be designed in the form of rectangle/trapezoidal area parallel to and separated from the carriageway by a physical barrier.

The parking lots shall be suitably landscaped. Basic facilities such as drinking water and toilets, with proper disposal system, shall be provided at each lay bye. Use shall be made of existing toilets and new toilets will be provided where none are available.

The tentative location of proposed Truck lay byes are given in the **Table C-2.** However, the exact location of truck lay-byes shall be decided & finalised in consultation with IC/NHAI/District Authorities.

Table C-2: Truck Lay Bye Locations along Project Highway

S. No.	Existing Chainage (km)	Nearest Place
1	240.450	Usargaon
2	243.250	Jolhupur
3	246.150	Chaurasi
4	254.300	Chauraha
5	259.650	Bhognipur
6	421.800	Bhognipur

The provision of truck lay-byes shall be governed by site requirements and parking demand and as per the guidelines of MORT&H Technical circular No. RW/34032/5/88 PO-II dated 22.8.88.

3.3 Bus Bays

There are few bus bay available along the Project Highway, which are covered under the scope of this contract. At least 15 new bus bays shall be constructed as per the standard specification and layout shown in **Fig. C-2** conforming to IRC: 80. Adequate drainage arrangements shall be provided at bus bays. List of bus bays given in **Table C-3**. The exact location and the details of the bus bays shall be finalised in consultation with IC NHAI.

Table C-3: Bus Bay Locations along Project Highway

S No.	Chainage LHS	Location
1	Km 232.580	
2	Km 239.440	
3	Km 247.350	
4	Km 444.500	Nabipur
5	Km 425.600	Pukhrayan

3.4 Highway Lighting

Highway Lighting shall be provided in urban and semi-urban areas of the project highway. Lighting shall also be provided at the locations of Truck lay-bye, rest areas, toll plazas, underpasses, ROBs, service road stretches and at intersections/interchanges. IS: 1944 (Part I and II) shall be followed in regard to lighting installations. At the major Junctions, location of ROB/Flyover/Underpasses/Grade Separator, Mast lighting system shall be provided. The exact location and other details of the highway lighting shall be finalised in consultation with IC/NHAI.

3.5 Arboriculture & Landscaping

Trees shall be planted in ROW and on either side of the road with staggered pitch as per IRC: SP-21. Indicate arrangements for plantation of trees shall be in accordance with the MORT&H technical Circle No. NH-41 (34) /69. A spacing of 10-15 m c/c is recommended for spacing of trees parallel to the roads. Set back distance of trees needed in different situations shall be as per the IRC: SP-21 and IRC: 66. Shrubs in medians shall not normally exceed 1-1.5 m heights and shall be as per IRC: SP-21. The Landscaping shall be carried out as per the extant policy of NHAI as is being done on NHAI's public funded projects.

3.6 Administrative, Operation And Maintenance Base Camp

A minimum of 300 sqm of constructed area for functional base camp shall be provided. The base camp shall be located near the toll plaza location. The proposed facilities available at base camp are described hereunder:

a. The main administrative, operation and maintenance base camp shall be provided to cater to the requirements of the following services:

   i) Fee Collection/Security Office
   ii) Highway Maintenance including functional Laboratory
   iii) Facilities for storage and repair of maintenance equipments, vehicles and materials
   iv) Any other requirement

b. The base camp shall be housed in suitable area. The layout of the different buildings and facilities shall be finalized in consultation with the Independent Consultant

c. The Administrative building shall primarily house the Main Control Centre, the Security Headquarters, the Central Store, the Toll audit and data processing units in addition to other secondary facilities such as computer room, office space, stores, sanitary facilities, canteen etc. The main base camp shall have adequate parking space for staff and visitors.

d. The maintenance area shall have a centrally located building to overlook the maintenance workshop etc. A separate storage area shall be earmarked for inflammable materials. The maintenance block shall have enough spaces to park the equipments and machinery deployed for maintenance activities. Adequate parking space shall be earmarked for the staff vehicles and visitors' vehicles. In addition, there shall be adequate and well-illuminated covered parking space for all the maintenance vehicles.

e. In addition the base camps shall have a power sub-station and supplies room to cater to the power requirements of the camp. The sub-station shall house a standby generator to provide the required power in case of failure of normal power.

f. The camps shall have adequate lighting during dark periods and night.

g. There shall be (preferably) underground fuel storage area with delivery facilities (Petrol/Diesel Filling Station) at the Main Base Camp site to adequately cater to the demands of maintenance and patrolling activities.

h. The base camps shall not have more than one entry and one exit point. Both of these shall be manned by security personnel at all times besides installing effective electronic security system.

i. The camps shall be landscaped so as to protect the area from dust and noise from the Project Highway.

j. The laboratory facility to be established for testing of various materials related to road construction and maintenance shall be located at the main base camp.

3.7 Project Vehicle

Two brand new vehicles (Make Toyota Qualis) shall be provided to the Employer with in 30 days of beginning of the concession agreement. The cost of running, maintenance driver's salary, fuel etc., complete shall be borne by the concessionaire. The vehicle shall be required at site of Project Highway for the use of Project Implementation Unit. The vehicle will run about 4000 km/month including Sundays/Holidays.

38mm THK. PRECAST CEMENT CONCRETE CHEQUERED TILES RAISED FOOT PATH 1.75m WIDE OF GRADE M-20 IN 1:3 CEMENT MORTAR 12mm THICK OVER 25mm THK. CEMENT CONCRETE OF M15 GRADE AND 150mm THK. GRANULAR SUBBASE INCLUDING POINTING OF TILES WITH NEAT CEMENT AS PER MOST CLAUSE 409.

CHAINAGE AS GIVEN IN THE TABLE

RAMP
END OF RAISED FOOTPATH

PEDESTRIAN CROSSING
FOR DETAIL REF. ROAD MARKING
DRAWING No. NHAI/JHANSI/NH25/B/MISC-05
85.00m/Tapering as per IRC:80-1981

FLUSHED PAVED
SHOULDER 1.0m Thk.

SHOULDER

PEDESTRIAN
CROSSING SIGN
VIDE IRC 67-2001

15.00m

BUS STOP FOR 2 BUSES AS PER IRC:80-1981
30.00m

PASSENGER SHELTER

PEDESTRIAN GUARD RAILING WITH
STEEL TUBULAR SECTION (IF REQUIRED)

40.00M/Tapering as per IRC:80-1981

FLUSHED PAVED
SHOULDER 1.0m WIDE

0.75m
1.75m
3.00m
7.00m
6.75m
7.25m

Earthen Shoulder (1.0m)
Paved Shoulder (1.5m)
Carriageway (7.25m)
Median (4.50m)
Carriageway (7.25m)
Paved Shoulder (1.5m)
Earthen Shoulder (1.0m)

100mm wide broken
White paint mark

ROAD MARKING

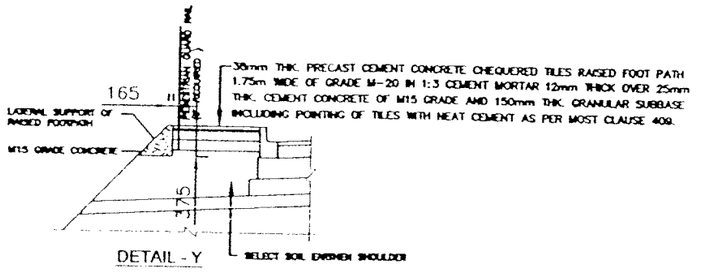
15.00m

100mm wide broken
White paint mark

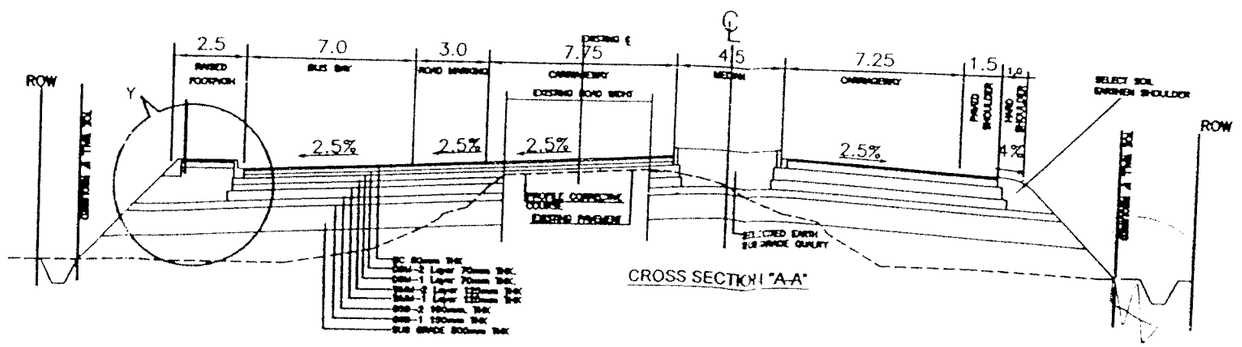
VIDE IRC 67-2001
CROSSING SIGN
PEDESTRIAN

TYPICAL LAYOUT PLAN FOR PICK-UP BUS BAY

TYPE -1



DETAIL - Y



CROSS SECTION "A-A"

NOTES:
1. For passenger shelter refer drawing No. (Latest Revision)
2. All the dimensions are in Meter unless otherwise specified, only the written dimensions shall be considered.
3. For Details of Pedestrian Guard Rail refer drawing No. (Latest Revision)

DESIGN CONSULTANT:
EMA Unihorn (India) Pvt. Ltd.
2/34, Kalkaji Extension, New Delhi-110019, India.
Tel.-26276316, 26220872, 26428004
in association with
Carl Bro a/s of Denmark
and
Unihorn by of The Netherlands

DATE	REV. NO.	REVISIONS

SCALE: 0 1 2 3 4m
SCALE

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

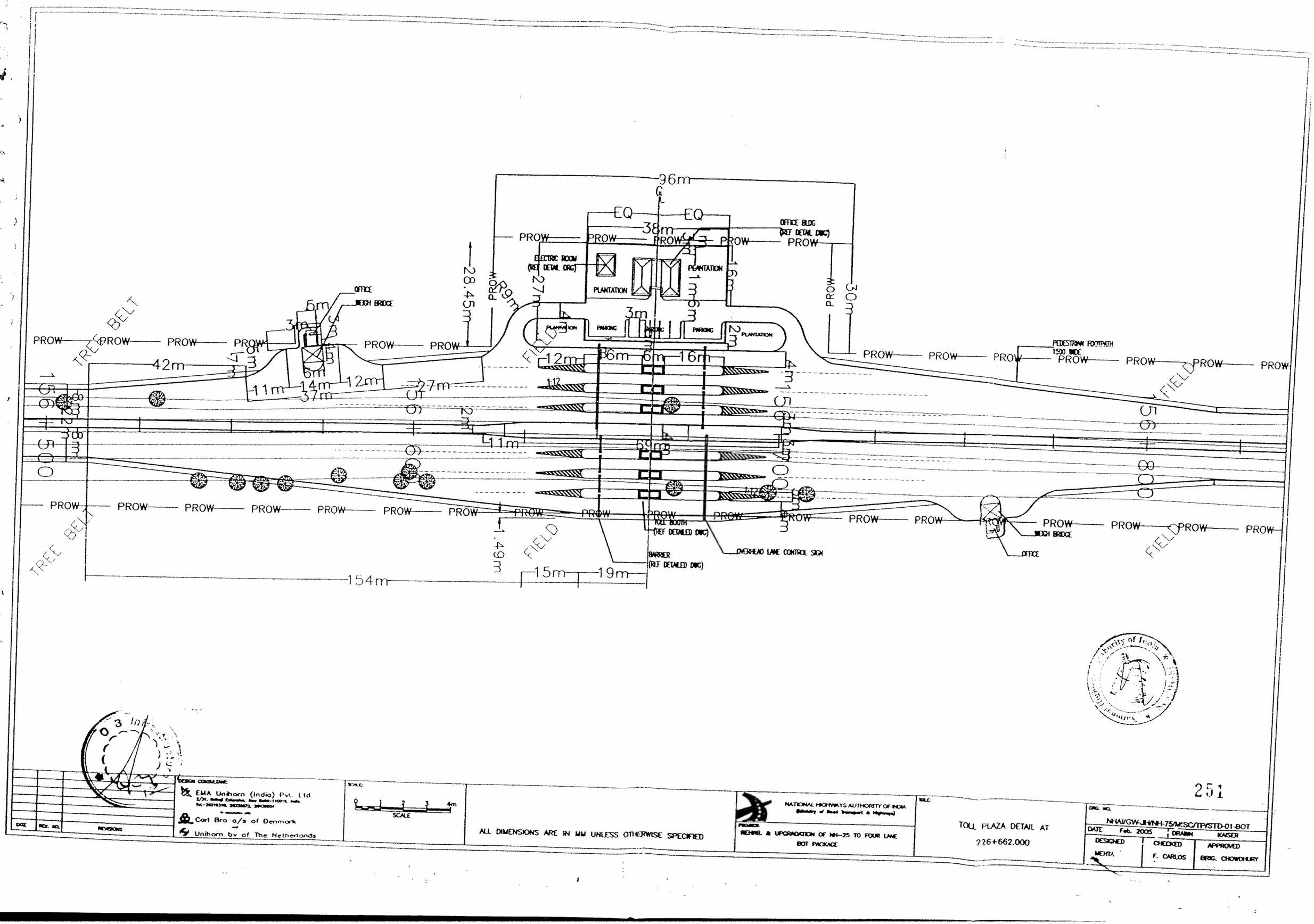
PROJECT:
REHAB. & UPGRADATION OF NH-25 TO FOUR LANE
BOT PACKAGE

TITLE:
TYPICAL DETAIL OF BUS BAY
TYPE -1

DWG. NO. NHAI/GA-JH/NH-75/MISC/C/BB/01-BOT

252

DATE	Feb. 2005	DRAWN	KAISER
DESIGNED	CHECKED	APPROVED
MEHTA	F. CARLOS	BRIG. CHOWDHURY



DESIGN CONSULTANT:
EMA Unihorn (India) Pvt. Ltd.
E/31, Mahipal Extension, New Delhi-110019, India
Tel.-26276390, 26233072, 26438004
in association with
Carl Bro a/s of Denmark
Unihorn bv of The Netherlands

DATE | REV. NO. | REVISIONS

SCALE: 0 1 2 3 4m
SCALE

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

PROJECT:
REHAB. & UPGRADATION OF NH-25 TO FOUR LANE
BOT PACKAGE

TITLE:
TOLL PLAZA DETAIL AT
226+662.000

DRG. NO.: NHAI/GW-JH/NH-75/M.SC/TP/STD-01-BOT
DATE: Feb. 2005 | DRAWN: KAISER
DESIGNED: MEHTA | CHECKED: F. CARLOS | APPROVED: BRIG. CHOWDHURY

251

SCHEDULE D

SPECIFICATIONS AND STANDARDS

1. INTRODUCTION

1.1 The Designs for various elements of the Project including facilities shall conform to the minimum design requirements set out in DPR and this Schedule. Alternative or additional designs submitted by the Concessionaire shall also meet these requirements.

1.2 Concessionaire in consultation with and approval of Independent Consultant / NHAI can adopt alternative designs for Bridges, Culverts, Flyovers, Retaining Earth Walls, Overpass and Underpass. In case the Concessionaire follows the DPR designs it shall carry out its own engineering surveys and shall be solely responsible for such designs. However, total length of viaduct portion of structure should not be reduced from that of mentioned in Schedule B. Notwithstanding anything to the contrary contained herein, the Concessionaire shall carry out its own engineering surveys and designs and shall be responsible for design, engineering and construction of the Project Highway as per the Specifications and Standards in accordance with the provisions of this Agreement

1.3 The Concessionaire shall strictly follow the horizontal alignment given in the DPR. In case DPR alignment design is deficient in terms of standards to be followed for the design speed of 100 kmph, improvements to alignment can be done with consultation and approval of Independent Consultant.

1.4 In no case the FRL of the additional 2/3 lanes shall be less than that of existing Carriageway. The vertical profile shall conform to the standards mentioned in this Schedule. In no case the depth of cut shall not be more than that mentioned in DPR at any section of the Project Highway.

1.5 The Cross sectional elements specified for the Project shall be strictly followed

1.6 All works related to the Project Highway shall conform to the Guidelines and Special Publications as applicable to National Highways and Ministry of Shipping, Road Transport and Highway earlier Ministry of Road Transport and Highway (MORT&H) Specifications and Indian Roads Congress (IRC) standards, Codes, with all updates till 30 days before the date of

bid submission by the Concessionaire. In the absence of any definite provisions on any particular issue related to the Specifications and/or standards, reference may be made to the latest codes and Specifications of Bureau of Indian Standards, British Standards, AASHTO, ASTM or any other International standard in that order. But, where even these are silent, the construction and completion of the works shall conform to sound engineering practice with the approval of the Independent Consultant / NHAI.

1.7 Amendments and/ or modifications carried out by the Ministry of Road Transport and Highway in the MORT&H Specifications and IRC standards, and codes and available to public 30 days before the date of receipt of bids shall be applicable.

1.8 Whenever any specific provision for any building works is given in the MORT&H Specifications, IRC standards and codes, those shall apply. All building works shall conform to Central Public Works Department (CPWD) Specifications for class I building works or standards given in the National Building Code (NBC) as amended and/or modified from time to time. For the purpose of this clause, building works shall be deemed to include road furniture, landscape elements and /or any other works incidental to the building works.

1.9 In case, any further amendments and/ or modifications in the said Specifications and/or standards and codes come into force after the said date (clause 1.8 above) and have financial impact, the matter shall be settled according to the Concession Agreement.

1.10 In so far as amended/modified/added clause supersedes a clause or part thereof in the said Specifications and standards, then any reference to the superseded clause elsewhere shall be deemed to refer to the amended/modified /added clause or part there of

1.11 If amended modified/added clause provision comes in conflict or be inconsistent with any of the provisions of the said Specifications and standards, the amended modified added clause shall always prevail

1.12 The Concessionaire shall plan and implement the quality assurance programme for the Project Highway and finalize it in consultation with the Independent Consultant at least one month prior to the commencement of the work.

1.13 The quality and/ or the quantities of various items shall primarily be the responsibility of the Concessionaire. The Independent Consultant shall, however, ensure and/ or verify it by devising suitable means. On noticing any deficiency in the quality and/ or quantity, corrective measures as ordered by the Independent Consultant shall be carried out by the Concessionaire at the Concessionaire's cost to the satisfaction of the Independent Consultant. In case of any disagreement or non-compliance by the Concessionaire, the dispute will be referred to NHAI to resolve it in terms of the Concession Agreement.

2. DESIGN STANDARDS

2.1 Design Standards comprise of MORT&H policy circulars and IRC codes, guidelines and special publications applicable to National Highways. The design standards adopted in DPR shall be generally followed. NHAI policy guidelines and respective State government current requirements and guidelines shall be adopted for landscaping and tree plantation along the corridor. Where the said standards are silent on any item, the following standards in order of preference shall be adopted with the approval of the Independent Consultant NHAI.

i. Bureau of Indian Standards (BIS)
ii. American Association of State Highway and Transport Officials (AASHTO)
iii. American Society of Testing Materials (ASTM)
iv. British Standards (BS)
v. Any other National or International Standard suggested by the Concessionaire

Designs offered by the Concessionaire shall comply with the standards as spelt out in clause 2.1 above.

The list of Codes in Annexure 1 is given to serve as a guide for design of various elements of Project Highway.

2.3 Geometric Design Standards

2.3.1 Geometric design standards shall be adopted as per IRC codes as applicable to the National Highways. The design Standards and design criteria adopted in DPR shall be followed

2.4 Geotechnical Design

2.4.1 Cut and fill slopes shall be appropriate to the nature of the material and the height of embankment or depth of cut. The slopes shall be safe against failure

2.4.2 Material used in the fill and its compaction requirements shall conform to IRC - 36-1970. Where these Specifications are in variance with the MORT&H Specifications the latter shall govern and be followed.

2.5 Pavement Design

2.5.1 The Pavement crust thickness requirement as mentioned in Schedule B for various elements shall be the bare minimum requirement for the Project. Any additional thickness above and over that mentioned in Schedule B shall be finalised in consultation with Independent Consultant.

2.5.2 The new flexible pavement shall have Bituminous Concrete (BC) [also termed Asphaltic concrete (AC)] wearing course laid over Dense Bituminous Macadam (DBM). Underneath DBM a bituminous base course of Bituminous Macadam (BM) shall be provided if necessary as per design requirements. It will be laid on Wet Mix Macadam (WMM) base course. The subbase granular material shall conform to the grading, density and other physical requirements stipulated in MORT&H Specifications and shall have a minimum CBR of 30% at 97% Maximum Dry Density (MDD). Material Chosen for subgrade shall have CBR not less than that suggested in DPR at 97% MDD.

2.5.3 Refinery Modified bitumen shall be used for bituminous concrete wearing courses in accordance with the stipulations of relevant and latest IRC & MORT&H guidelines.

2.5.4 The minimum requirement of thickness for Cement concrete pavement shall be as mentioned in Schedule-B. The flexural strength of concrete used for PQC should not be less than 45 Kg/cm^2. In case Concessionaire desires to adopt rigid pavement for new carriageway or any other facilities, the above mentioned minimum thickness shall be provided in consultation with Independent Consultant.

2.5.5 Rigid pavement should be provided below the underpass locations where the Project Highway is flying over the crossroad and proposed underpass is not a RCC box structure. In case the crossroad is NH or SH the rigid pavement of at least same thickness as that as

mentioned in Schedule B shall be provided. In case the crossroad is MDR/ODR the rigid pavement shall be designed and finalised in consultation with Independent Consultant.

2.5.6 To ensure internal drainage of the pavement structure, the lower drainage layer of the road subbase shall extend upto full formation width.

2.5.7 Unevenness index of the pavement on completion shall not be more than 2000 mm per km measured with Bump Integrator fitted in a vehicle or an equivalent device approved by the Independent Consultant/NHAI. The instrument used in the measurement of roughness shall be calibrated as per guidelines given in the World Bank Technical Note No 46.

2.6 Drainage System

2.6.1 An effective surface and sub surface drainage system of pavement structure shall be designed as stipulated in IRC SP: 42 (1994).

2.6.2 Rainwater Harvesting System shall be provided all along the Project Highway as per provisions of DPR and IRC SP 50:1999.

2.6.2 Drainage system as designed and adopted in DPR for the drainage of carriageways in urban areas, rural areas, medians, wayside amenities, truck parking areas, bus-bays, rain water harvesting systems and other highway features are the minimum requirement for the Project and shall be followed. Any further requirement for ensuring more effective drainage system shall be designed and finalised in consultation with Independent Consultant.

2.7 Design Standards for Culverts, Bridges, Underpasses, Over bridges

2.7.1 The design standards and loading to be considered for culverts, bridges, underpasses and over bridges shall be those laid down in the latest relevant IRC codes and / or IS codes. Where the said codes are found wanting or are silent other codes as stipulated in Clause 2.1 above shall be followed.

2.7.2 MORT&H specification (Clause 2607.2) shall be followed for the material of strip seal expansion joints.

2.7.3 Design of PCT/PTFE bearings design shall be done in accordance with IRC 83 (Part-III) Specifications.

2.7.4 Specifications for structural Concrete shall be as per IRC 21: 2000.

2.7.5 HDPE sheathing shall be used for pre-stressing.

2.7.6 Pre-stressing anchorages shall confirm to the latest BS code CEB-FIP recommendations.

2.7.7 Design of voided slabs shall conform to the draft Specifications as considered by the IRC council.

2.7.8 Provision of pile foundations if proposed by Concessionaire shall have the approval of Independent Consultant. Pile load test shall be performed by conventional load testing method and not by high-energy method.

2.7.9 Conduct of Field Pull Out test for RE walls is mandatory. In addition to this, Specifications given in DPR shall be followed for RE wall design and construction

2.8 Existing Culverts, Bridges

2.8.1 The unsafe and/or deficient bridge and culvert structures on the existing 2 lane carriageway shall be rehabilitated or replaced by sound structures to carry the IRC design loads spelt out in clause 2.7.1 above. The recommendations for rehabilitation of CD structures mentioned in DPR and Schedule-B are the bare minimum and any additional structure, which is required to be reconstructed, or any additional requirement for rehabilitation other than those mentioned in DPR and Schedule-B shall be finalised in consultation with Independent Consultant

2.8.2 Where the existing structures are retained and extended, the extension shall be done with same type of structure and properly adjusted and matched with the existing structure. The guidelines provided in DPR shall be followed for this purpose

2.9 Intersections

2.9.1 At-grade intersections shall be designed according to IRC Special Publication 41 'Guidelines for the Design of At-grade Intersections in Rural & Urban Areas' and the MORT&H Type Designs for Intersections on National Highways, with modifications where required. The designs set out in DPR for intersections shall form the basis for the design. Treatment at any additional intersection other than those mentioned Schedule-B, shall be finalized in consultation with Independent Consultant.

2.9.2 For the design of elements not covered in the said publications, the AASHTO publication "A Policy on the Geometric Design of Highways and Streets" shall be followed.

2.9.3 Geometric design standards for elements of grade-separated intersections given in DPR shall be adopted.

2.9.4 For elements not covered in DPR, Guidelines of IRC-92-1985 supplemented by relevant MORT&H and the AASHTO publication 'A Policy on Geometric Design of Highways and Streets' shall be used.

2.10 Litter Bins

2.10.1 The litterbins shall be located at no more than 100 m intervals in the rest area and the truck-parking lay-byes. The bus stops shall be provided with at least one litterbin.

2.10.2 The capacity of the litterbin shall be as per requirement, subject to a minimum of 30 litres.

2.11 Public Toilets

2.11.1 Requisite number of urinals, WC and bathing places supported by adequate water supply and sewerage facilities and appurtenances as per the National Building Code (NBC) shall be provided at truck parking lay-byes, subject to a minimum of 4 WC, 5 urinals and 3 bathing places. Number of urinals, WC and bathing spaces in all other places including the rest areas will be as per the NBC. The entrance of the ladies toilet shall be clearly marked and segregated from the men's toilet.

2.11.2 At least 2-m wide area around the toilet blocks shall be paved with adequate cross slopes and drainage to ensure speedy disposal of water. Arrangement for sewage disposal shall be provided.

2.12 Drinking Water Kiosk

2.12.1 Drinking water kiosks at the Truck Lay byes and Bus shelters shall have a minimum of 4 taps of push button type. The drinking water kiosks shall be easily accessible to children and handicapped people. The water kiosks shall be properly segregated and shall be at least 3 m away from the toilet blocks, if any. Water supply shall be through existing water pipe line. In absence of this, provisions for ground water extraction shall be made.

2.12.2 Water storage in the drinking water kiosks shall be as per the National Building Code (NBC), subject to a minimum of 200 litres. At least 2 sq.m. area around the drinking water kiosks shall be paved with adequate cross slopes and drainage to ensure speedy disposal of spilt water.

2.13 Highway Lighting System

2.13.1 The night-time illumination in the areas used by pedestrian shall not be less than 10 lux. In urban areas, it is recommended that semi-cut-off luminaries shall be provided. Arrangement of lighting installations shall be staggered except at curves. High mast lighting shall be adopted for lighting of all Grade Separated Junctions and any other locations as mentioned in Schedule-B.

2.13.2 The layout of masts, their height and spacing shall be fixed in consultation with the Independent Consultants so that the minimum illumination level prescribed in 2.13.1 above is achieved.

2.13.3 Non-Conventional Sources of lighting system shall be provided at all At-grade Intersections as mentioned in Schedule-B with solar energy. The general Specifications mentioned in DPR shall be followed for this purpose

2.14 Highway Traffic Management System (HTMS)

HTMS shall provide facilities to the highway users to make emergency calls through Emergency Call Booths (ECBs) to control centre in case of accidents, break down of vehicle and fire and to pre-warn the highway users about unusual conditions on the road. It shall provide information / data to traffic managers on traffic flow, conditions, speed and weather conditions, location of any incident and help required and on incoming calls. Based on these, the traffic managers should be able to exercise control on changing the variable message signs, mobilising the movement of ambulances, cranes, highway patrol units and fire tenders. HTMS shall also provide on line recording and reviewing of the voice and individual information for record and analysis.

2.14.1 All equipment shall comply and be installed in accordance with IEC 364, with minimum of CENELEC standards EN 50128 software integrity level 2.

2.14.2 The HTMS shall have an overall system mobility of better than 99% and shall be considered unavailable if any of the functions can not be properly executed. The mean time to restore to the normal operation following a failure shall be less than four hours all inclusive. The service life of HTMS shall be 10 years.

2.14.3 All outdoor equipment for the facility of the users such as Emergency Call Booths (ECB) and Message Signs (MS) shall be installed at locations which shall be clearly visible to the approaching drivers. The ECBs shall have proper sign identifications

2.15 Traffic Safety Measures

2.15.1 Highway Patrolling

The Concessionaire is required to provide round the clock route patrols to assist motorists. The patrol personnel should be adequately trained to the satisfaction of the Independent Consultant in traffic management road safety and in primary First Aid. The purpose of these patrols is to:

- Provide the users of the Project Highway with basic mechanical help for vehicles that break down on the National Highway Section, and protect other motorists from such vehicles
- Immediately identify traffic hazards of whatever nature, such as unauthorised parking, public transport vehicles obstructing traffic during passenger loading and unloading, debris, stray

animals and the like. The Concessionaire shall take the necessary measures to remove such obstructions.

- Provide emergency management at accident scenes until such time as the appropriate authorities arrive.
- Assist the motorist , for the removal of damaged or mechanically impaired vehicles from the Project Highway.
- Provide road user information and to further the image of the National Highway Section in a professional and friendly manner.
- Maintain daily records of assistance provided to motorists
- Observe, record and report suspect aspects of the highway, hazards and incidental damage caused by vehicles, floods, storms, or other random events, such that the highway maintenance records and data base are continuously improved.

2.15.1.1 Patrol vehicles

The Concessionaire will provide 4x4 drive Patrol vehicles as stipulated in the Contract. Each vehicle shall accommodate a minimum 3 persons including the driver. The Concessionaire will also make arrangements for standby vehicles.

2.15.1.2 Ambulances

The Concessionaire will provide ambulances having all facilities of emergency assistance required like stretcher to carry the patient, Emergency Medicines, oxygen etc.

2.15.1.3 Cranes

The Concessionaire will provide cranes of 15 MT capacity having all requisite arrangements of pulling and lifting of accidental/break down vehicles. Table D-1 presents the serviceability indicators, required maintenance level that shall be followed by Concessionaire as part of highway patrolling

Table D-1 Serviceability Indicators and required maintenance level for Patrolling

Sl. No	Serviceability Indicator	Required Maintenance Level	Frequency of Inspections by Engineer to Ensure Required Level of Service
1.	Tow trucks, cranes & ambulances etc.	within 30 minutes of incident occurrence	Daily on regular basis followed by weekly & monthly inspections
2.	Frequency of highway patrol	Every 4/6 hours on each carriageway for entire stretch (logging system)	Daily on regular basis followed by weekly & monthly inspections

2.15.2 Pedestrian Guard Rails and Safety Barriers

2.15.2.1 Pedestrian guardrail shall be provided at the following locations

i. At the places where pedestrian activity is high

ii. on raised foot path on the side of carriageway at bus stops and bus bays mentioned in Schedule-C, for adequate length for pedestrain safety , not less than 20 m on either side

The layout of pedestrian guard-rails at crossings, road intersections shall be as per the drawing given in DPR. On kerbed road sections, guard-rails shall be at least 15 cm away from the edge of carriageway.

2.15.2.2 Safety barriers shall be located at the following locations

i. At high embankments which have height > 3m when measured from the top of the pavement to the natural ground.

ii. At sharp horizontal curves whose radius is less than 500 m by the side of ponds, lakes, open wells even when the height of embankment is less than 3 m.

iii. Along the central median at places where median width is 1.5 m and also in the lengths where median tapers from 5.0 m to 1.5 m. Typical layout for safety barriers is given in DPR.

iv. on the approaches of major and minor bridges for a length of at least 25m on both sides even if the embankment height is less than 3m.

2.15.3 Traffic Blinker Signal with Liquid Electromagnetic Display (LED)

The road traffic signals, its configuration, size, location and other requirements shall be as per IRC: 93 - 1985 and IS: 7537 - 1974.

Blinker Signal shall be provided at all intersections with SH/MDR/ODR category roads in rural areas with non-conventional energy sources like solar energy. The general Specifications mentioned in DPR shall be followed for this purpose.

2.15.4 Road Studs

2.15.4.1 Nineteen degree (19°) tilted one-way reflective road studs with anchor and with 1x43 glass elements etc. complete shall be provided at 1 m c/c on pedestrian crossing with red reflective panel as per EN 1463 and BS873 part IV (1987). Road studs shall also be provided at 9 m c/c on edge lanes, lane lines for a length of at least 130 m on the approaching side of the intersection with white reflective panels as per BS873 part IV (1987) replaced partly with BS EN 1463-1: 1998.

2.16 Highway Signs

2.16.1 The design and location of route marker signs for National Highway shall be as per the IRC: 2-1968. The design and placement of highway kilometre stones, the dimensions of stones, size, color, arrangement of letters shall be as per IRC: 26-1967 and IRC: 8-1980. The design, location and materials to be used for Road delineators shall be as per IRC: 79-1981. The color, configuration, size and location of size of traffic signs shall be as per IRC: 67-2001.

2.16.2 For the road signs the standards set in IRC: 67-2001, Code of Practice for Road Signs shall be followed. As regards, the overhead signs the standards prescribed by MORT&H shall be followed. Where these are silent, standards prescribed in BIS/British Standards/AASHTO/ASTM or any other international standard in that order shall be adopted in consultation with the Independent Consultant / NHAI.

2.16.3 All the cautionary/mandatory signs shall be provided on shoulder and median for each direction of traffic for clear visibility during overtaking operations.

2.17.3 On kerbed road sections the edges of the road signs shall be at least 60 cm away from the edge of the kerb, where as on un-kerbed road sections the edge of the signs shall be at a distance of 2 m from the edge of the carriageway.

2.17 Pavement Markings

2.17.1 Pavement markings shall be designed and provided in accordance with IRC: 35-1997 "Code of Practice for Road Markings" in consultation with the Independent Consultant.

2.17.2 Centre line, Edge line (outer), Edge line (inner) and pedestrian crossing shall follow the guidelines mentioned in BS EN 1436 - 1998.

2.18 Pickup Bus Stops & Bus Bays

2.18.1 The layout, design and location of the pickup bus stops shall be as mentioned in Schedule C and shall follow the Specifications of IRC: 80 - 1981. The sizes of the bus shelters shall be 0.6 m^2 per person during peak load depending on the frequency of buses to be handled by each stop. Bus stops shall be provided on both sides of the road for either direction of traffic. 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. The height of seating shall be 0.4 m from floor level while the back of the seat shall be 0.35 m high. Seating space per person shall be 0.45m X 0.45m, while minimum leg and circulation space for each seat shall be 0.6 m. Each bus stop shall have at least one litter bin. The pedestrian guard rails shall be provided as described earlier in this Schedule.

2.18.2 No raised medians shall be constructed at bus bay locations. Chevron marking and bollard system shall be provided at the median portion between main carriageway and bus bay for delineation of bus bay from main carriage way.

2.19 Truck Parking Facility

2.19.1 The parking length at bays for each vehicle shall not be less than 15 m and parking width for each vehicle shall be 2.75 m. The length of the lay-bye shall be as per parking requirement subject to a minimum of 100 m and the minimum width of the raised separator between the lay-bye and the carriageway shall be 3m in rural sections. The parking spaces shall be parallel to the road. Parking lots shall be adequately illuminated and nighttime illumination shall not be less than 10 lux.

2.20 Landscaping

2.20.1 Trees shall be planted in rows and on either side of the road with staggered pitch as per the IRC: SP: 21-1979. A range of 10-15 m c/c is recommended for spacing of trees (parallel to the road). Setback distance of trees needed in different situations shall be as per the IRC: SP: 21-1979 and the IRC: 66-1976. The distance between the kerb, if any, and the nearest edge of tree trunk shall be at least 2 m. Shrubs in medians shall not normally exceed 1-1.5 m in height and shall be as per IRC: SP: 21-1979.

2.20.2 Relevant provisions of NHAI policy guidelines and respective State Government current requirements and guidelines shall be followed for landscaping.

2.20.3 The Environment and Social Impact Assessment Report, (Clause 13 Schedule C) attached shall be followed in respect of plantation.

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 set down in IRC: SP: 21-1979. The pit size, fencing, watering and maturing 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.

2.21 Utility Ducts

Two (2) Numbers of Utility ducts shall be provided at an interval of 500m in urban sections and 2000m in rural sections for cross connection. These ducts shall be made of NP4 pipes of minimum 300mm diameter and shall be provided below the ground level. The above mentioned size of the pipe is bare minimum. It shall be increased if necessary in consultation with respective service departments and Independent Consultant. Location and level of the cross utility ducts shall be finalized in consultation with the Independent Consultant and NHAI

3. SPECIFICATIONS

3.1 'Specifications' herein under mean the Specifications relating to the quality and other requirements for the Project Highway as set forth in this Schedule and any modifications there-of, or additions there-to as included in the Specifications of DPR for the Project Highway.

3.2 All Specifications (Additional & Modified) for materials used shall be consistent with DPR Specifications and other publications referred to therein.

3.3 The materials to be used in the work of the Project Highway (including facilities thereon) shall conform to DPR and MORT&H Specifications. However, where the said Specifications are silent in regard to Specification for the material in question in that case, Specifications under Bureau of Indian Standard/British Standards/AASHTO/ASTM shall apply in that order. But even where these standards are silent, the Concessionaire shall get the Specifications for the material in question approved by the Independent Consultant prior to its use in the work.

3.4 Fly ash shall be utilised in the road construction if it is available in adequate quantity within a radius of 100 Km from the Project corridor as per Ministry of Environment and Forest regulations.

3.5 In addition to road and bridge works, there will be other works, described herein under, on the Project Highway. Wherever the tailor made Specifications are not available for these works, specific approval of the Independent Consultant shall be obtained by the Concessionaire in respect to that particular item of work.

3.5.1 HIGHWAY LANDSCAPING

3.5.1.1 Planting of trees along the Project Highway shall follow a variety of schemes depending upon location requirement as per the IRC: SP: 21-1979. The choice of trees to be planted shall also be made as per IRC: SP: 21-1979: "Manual on Landscaping". Eucalyptus (all species) is not recommended for planting. Local, indigenous species that grow in high salinity microclimate shall be planted.

3.5.1.2 On medians and as under-crop, planting of dust and gaseous substance-absorbing shrubs such as nerium oleander album is recommended. To ensure survival from herbivorous animals, shrubs/plants containing latex shall only be planted.

3.5.1.3 Preparation of schemes for Project Highway development, restriction on building lines, control lines, control of access, prevention unauthorised occupation of land and removal of encroachment shall be as per IRC: SP : 15-1996

3.5.1.4 The treatment of the highway embankment slopes shall be as per the recommendations of IRC: 56-1974, depending upon the soil types involved. Pitching works on the slopes shall be as per the MORT&H Specifications.

3.5.1.5 Construction of CC (M-20) footpaths for pedestrians shall be as per MORT&H Specifications.

3.5.1.6 No advertisement shall be allowed to be erected within the RoW.

3.5.1.7 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.

3.5.2 BUILDINGS

3.5.2.1 All building works shall be designed to meet the functional requirements and shall be compatible with the regional architecture and microclimate. Locally available materials shall be given preference but not at the cost of construction quality. All brick and stone masonry works shall be of first class type and as per good practice. All steel works shall conform to section 6, Part VI of the NBC and section 1900 and 2000 of MORT&H Specifications.

3.5.2.2 Whenever any specific provision for any building works is given in the MORT&H Specifications, IRC standards and codes, those shall apply. All building works shall conform to Central Public Works Department (CPWD) Specifications for class 1 building works or standards given in the National Building Code (NBC) as amended and/or modified from time to time. For the purpose of this clause, building works shall be deemed to include road furniture, landscape elements and /or any other works incidental to the building works.

3.5.2.3 All the open spaces around the building(s) shall be landscaped. Boundary walls, fencing, controlled entry points and cattle-catches at all entry and exit points to the buildings shall be provided to protect them from intruders and animals.

3.5.2.4 The design of water distribution and storage systems, laying of mains and pipes, cleaning and disinfecting of the water supply system shall be as per relevant clauses of section 1, Part IX of the NBC.

3.5.2.5 The design, layout and construction of drains for sewage disposal system with all ancillary works such as connections, manholes and inspection chambers and septic tanks shall be as per relevant clauses of Section 2, Part IX of the NBC. Each septic tank, if provided, shall have a soak pit of adequate size. The location of the septic tanks and subsurface absorption system shall be as per clause 12.15.1 of part I of NBC.

3.5.2.6 The design and location of all electrical installations, distribution system, wiring, fittings, accessories and lightning protection of buildings shall be as per relevant clauses of Section 2, Part VI of the NBC.

3.5.3 HIGHWAY LIGHTING SYSTEM

3.5.3.1 The following codes shall be followed while designing the lighting system on the Project Highway for different locations such as urban areas, junctions, bridges, junction of slip roads with elevated roads, pedestrian crossing, base camps etc.

i) IS: 1944 (Parts 1 and 11) - 1970
ii) IS: 1944 (Part V) - 1981; and
iii) IS: 1944 (Part VI - 1981)

The layout of the lighting system together with type of luminaries and level of illumination for different locations shall be determined in consultation with the Independent Consultant.

3.5.3.2 Overhead electric power and telecommunication lines erected within the Right of Way (ROW) by the Concessionaire shall be provided with adequate clearance so that safe use of road is not affected. Vertical and horizontal clearances shall conform to the IRC:32-1969.

3.5.4 HIGHWAY TRAFFIC MANAGEMENT SYSTEM

3.5.4.1 The system and the equipment shall meet the following main climatic and environmental requirements as specified in IS 9000.

i) Temperature Range of Operation - Low of 0°C (± 2° centigrade) to high of 60°C (± 2° centigrade)

ii) Relative Humidity of 95%

iii) Vibration - Frequency Range of 10 Hz - 55 Hz.

3.5.4.2 The Emergency Communication System shall comprise Emergency Call Boxes with loud speaker, micro phone, activation button with LED indicating conversation and housed in a vandal proof fibre glass casing. They shall operate in full duplex mode in a noise level of up to 95 DB and would have in built diagnostic feature for detection in case of damage by any object. They shall be connected to the transmission system through the integrator by means of copper cable.

3.5.4.3 The mobile communication system shall comprise of mobile radio base station and control centre equipment. Mobile radio shall have provision for mounting mobile set on ambulances, cranes and patrolling vehicles. The system shall neither affect functioning of other telecom equipment nor get affected by the presence of other equipment. The system shall have the facility to connect mobile to mobile, mobile to controller and controller to mobile along with the system for waiting, holding and transfer of calls. The system shall use single frequency to be allotted by NHAI with the approval of Wireless planning and co-ordination, Department of Telecom. The equipment shall operate in semi duplex mode at 12V ±10% DC.

3.5.4.4 The design for 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, panel shall have minimum dimensions of 3m length x 1.8 m height x 0.2 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 minutes to perpendicular. The equipment shall be capable of storing minimum 10 frames than can be triggered on receiving the tele command. The sign panel shall be installed on structures, which are aesthetically pleasing and can withstand wind pressure. 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

3.5.4.5 The meteorological sensors shall comprise thermocouple / pyranometer, humidity meter, anemometer meter, 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 integrator. They shall have the facility to communicate on PIJF/Optical Fibre Cable.

3.5.4.6 The Automatic Traffic Counter-cum-Classifier shall be capable of detecting and recording all types of vehicles plying on the Project Highway, based on their length and number of axles. It shall be capable of taking input from portable sensors. The system shall be robust and capable of operating with minimum maintenance.

The temperature range of pavement in which the sensor shall work are -40° Centigrade to +80° Centigrade. The recording and display unit shall work accurately between -20° centigrade to +60° Centigrade. The sensor shall be combination of piezo electric sensor and inductive loops enabling counting / classification of up to four/six-lane traffic with user set time periods. The logic units shall be micro processors based. Vehicle counting / classification interval shall be programmable from one minute to 1440 minutes (24 hours). The system should be able to record and store vehicle data for a period of at least two weeks with Daily Traffic Volume upto 30,000 vehicles. The system shall have compatibility to transfer the data on PIJF/ Optical Fibre cable.

3.5.4.7 The control centre shall be designed for round the clock operations of monitoring, on line information acquisition and processing the same for decision taking. The control centre shall have equipment of central computer, call centre, terminal junction box, uninterrupted power supply (UPS), console operator with monitors and joy sticks, rack accommodation, large display board, line printer and general purpose office computer with monitor, printer, fax and telephone. The system shall also have Network Management System (NMS) or real time monitoring of ECBs and network diagnostic.

3.5.5 TRAFFIC SAFETY MEASURES

3.5.5.1 Highway Patrolling

3.5.5.1.1 The location and number of patrol control room centers shall be finalised with Independent Consultant. Highway patrolling establishment should have three shifts of 8 hours each. It would consist of at least 3 persons including driver.

3.5.5.1.2 Control Centers (Main & Sub) for HTMS would have a crane mounted on truck, Diesel Jeep or Station Wagon, ambulance, Motorcycle and other equipments as per requirement. All the vehicles shall conform to the Motor Vehicles Act 1988. The ambulance unit shall have 1 (one) nurse, 1 (one) compounder, 1 (one) photographer and 1 (one) driver.

3.5.6.2 Pedestrian Guard Rails and Safety Barriers

3.5.6.2.1 The Pedestrian Guard Rails along the Highway shall be constructed as per DPR.

3.5.6.2.2 The Safety Barrier shall conform to MORT&H Specifications Clause 810 and shall be constructed as mentioned in DPR. In case not mentioned in DPR it shall be W-beam metal crash barrier.

3.5.7 TRAFFIC CONTROL

3.5.7.1 Traffic Signals

3.5.7.1.1 There shall be no traffic signals on National highway except at the locations of major intersections mentioned in Schedule B, where pedestrian Zebra crossing facilities are to be provided in urban areas. Where provided as pedestrian facility and on the side road crossing/meeting the Project Highway, it will be governed by clause 3.5.7.1.2 herein under

3.5.7.1.2 The signal foundation shall be constructed as per clause 13 of IRC 93 - 1985. Constructional requirements shall conform to IS 7537- 1974, unless otherwise stated in IRC: 93-1985. Posts shall be painted and protected as per clause 3.7 of IS: 7537-1974. Traffic signals shall have a complete electronic mechanism with an auxiliary manual controller.

3.5.7.2 Highway Signs

3.5.7.2.1 The road signs erected on the Project Highway shall conform to IRC 67-2001, Code of Practice for Road signs. Road signs such as Chevron, overhead etc. not covered by IRC 67-2001 will be as per BIS/British Standard/AASHTO/ASTM in that order after approval by the Independent Consultant.

3.5.7.2.2 All road signs shall be with retro-reflective sheeting of high intensity grade with encapsulated lens fixed over aluminium substrata as per Clause 801 of MORT&H Specifications.

3.5.7.2.3 The overhead signs shall be placed on a structurally sound gantry or cantilever structure made of circular pipes or steel sections approved by the Independent Consultant. The said sign shall be with high intensity retro reflective sheeting. The height, lateral clearance and installation shall be as per the MORT&H Specifications.

3.5.7.3 Pavement Markings

3.5.7.3.1 Pavement markings shall be as per IRC: 35-1997. These markings shall be applied to road centre lines, edge line, continuity line, stop lines, give way lines, diagonal/chevron markings, zebra crossing and at parking areas by means of an approved self-propelled machine which has a satisfactory cut-off value capable of applying broken lines automatically.

3.5.7.3.2 Road markings shall be of hot applied thermoplastic paints with glass reflectorising beads as per relevant clauses of Section 803 of MORT&H Specifications.

3.5.7.3.3 Titanium of rutile grade, minimum 40% glass beads, bead size of 1-1.5 mm glass beads with minimum 95% true spheres with minimum reflectivity of 100 mcd/lx/sqm for a period of 12 months and minimum wet reflectivity after rain of 25 mcd/lx/sqm on centre line and pedestrian crossing shall be used. It should also have at least a life warranty of 24 months.

3.5.7.3.4 Instruments such as reflectometers shall be available in mobile battery operated units to check the reflectivity in the site.

3.5.8 PROJECT VEHICLES AND EQUIPMENT FOR OPERATION

3.5.8.1 All the vehicles used for activities pertaining to the highway operation shall conform to the Motor Vehicles Act 1988.

3.5.8.2 All the gadgets, equipment or any systems used for operation and maintenance of the highway shall be of standard make and shall conform to international standards

3.5.9 ROAD FURNITURE AND FACILITIES ON ROADSIDE

3.5.9.1 Road furniture on the Project Highway provided as per IRC Codes shall meet requirements of MORT&H Specifications. Where any item is not covered by it, then its specification shall conform to BIS/British standard/AASHTO/ASTM in that order after approval by the Independent Consultant.

3.5.9.2 Noise barriers and other measures as suggested in EMP for the Project in DPR shall be strictly adhered to.

3.5.9.3 Low height easily mountable kerb shall be placed at locations of pedestrian crossings and other facilities to accommodate physically handicapped people. These locations should be designed suitably to avoid usage of vehicular traffic, particularly two-wheelers. Design of such facilities shall be finalised in consultation with Independent Consultant.

3.5.9.2 Roadside facilities such as Litter bins, Pubic Toilets and Drinking Water Kiosks where provided shall follow the Specifications spelt out hereinunder.

3.5.9.3 **Litter Bins**: The litter-bin shall be simple in shape and its colour and finish shall be 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

3.5.9.4 **Public Toilets**: The public toilet shall be simple in design and the area around the toilet block shall be paved with cement concrete tiles or any other suitable material, and have

cross slope so as to ensure speedy disposal of water. The structure shall conform to relevant sections of clause 3.5.2 of this Schedule.

3.5.9.5 **Drinking Water Kiosk**: The design of the water kiosk shall be such as to require minimal maintenance. Area around the kiosk shall be paved with cement concrete tiles or any other suitable material, and have cross slope so as to ensure speedy disposal of water. The water supplied shall conform to IS: 10500:1991 for quality and purity of potable water.

3.5.10 PICKUP BUS STOPS

3.5.10.1 The bus stop layout shall provide safe entry and exit of buses from Project Highway and movement of passengers. The shelter structure shall be structurally safe and functional so as to protect the waiting passengers adequately from sun, rain and wind. The seating and plinth of the structure shall be of coursed stone masonry. The bus bay area shall be provided with an effective drainage system.

3.5.10.2 The bus bays shall be paved with flexible pavement as that of new carriageway.

3.5.11 TRUCK PARKING FACILITIES

3.5.11.1 The layout of the truck lay-byes and facilities thereon shall be as mentioned in Schedule C to cater to the estimated parking demand and shall be got approved by the Independent Consultant. Parking shall be parallel to the road and the lay-bye shall be setback from the edge of the carriageway. The lay-byes shall be landscaped with low-density plantation to provide shade.

3.5.11.2 The parking spaces shall have flexible pavement as that of main carriageway. Parking bays/lots shall have proper cross slope and drainage. They shall be marked with paint as per IRC: 35-1997 to demarcate parking and circulation spaces. Lighting shall be provided as per IS: 1944 (Part 1 and 11) - 1970.

3.5.11.3 The parking lay-bye shall have drinking water kiosk, independent of other existing facilities and of required capacity. The kiosk shall be well sheltered from the sun and rain and area around it shall be suitably and adequately paved with proper drainage to ensure disposal of spilt water.

3.5.11.4 The parking lay-bye shall have toilet facility to suit the requirement. It shall have covered soak pits and shall be away from the drinking water facility.

4. Safety During Project Execution, Operation and Maintenance

4.1 The Concessionaire shall ensure complete safety of construction staff during the construction work of the Project Highway. It shall also ensure minimum interference to the flow of traffic during widening of the existing 2-lane pavement. The additional lanes shall be constructed first and the traffic diverted to it before improvements to the existing road are taken up. Detailed plan for traffic management shall be worked out in consultation with the Independent Consultants prior to implementation. During construction, the Concessionaire shall take all necessary measures for the safety of traffic by providing and maintaining barricades, traffic signs and illumination during night.

4.2 The Concessionaire shall also ensure complete safety of the Road Users during the construction work of various nature spelt out in Schedule L.

4.3 Guidelines for safety measures during construction, operation and maintenance as given in Schedule S, shall be followed.

4.4 A situation arising at site not covered in Schedule L shall be carefully studied for solution, in consultation with Independent Consultant.

Annexure-1

LIST OF IRC CODES FOR THE DESIGN OF BRIDGE STRUCTURES AND CULVERTS

IRC: 5-1998	Standard Specifications & Code of Practice for Road Bridges. Section 1 - General Features of Design (Seventh Revision)
IRC: 6-2000	Standard Specifications & Code of Practice for Road Bridges Section 11 - Loads and Stresses (Fourth Revision)
IRC: 7-1971	Recommended Practice for Numbering Bridges and Culverts (First Revision)
IRC: 18-2000	Design Criteria for Pre-stressed Concrete Road Bridges (Post-Tensioned Concrete) (Third Revision)
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. (Second Revisison)
IRC: 45-1972	Recommendations for Estimating the Resistance of Soil Below the Maximum Scour Level in the Design of Well Foundations of Bridges.
IRC: 54-1974	Lateral and Vertical Clearances at Underpasses for Vehicular Traffic
IRC: 73-1980	Geometric Design Standards for Rural (Non-Urban) Highways
IRC: 78-2000	Standard Specifications and Code of Practice for Road Bridges. Section VII Foundations & Substructure (Second Revision)
IRC: 83-1999	Standard Specifications and Code of Practice for Road Bridges. Section IX Bearings, Part 1 : Metallic Bearings (First Revision)
IRC: 83-1987	Standard Specifications and Code of Practice for Road Bridges. (Part-II) Section IX-Bearings. Part II: Elastomeric Bearings
IRC: 89-1997	Guidelines for Design & Construction of River Training & Control Works for Road Bridges.(First revision)
IRC: SP:13-1973	Guidelines for the Design of Small Bridges and Culverts
IRC: SP:18-1978	Manual for Highway Bridge Maintenance Inspection
IRC: SP:33-1989	Guidelines on Supplemental Measures for Design, Detailing & Durability of Important Bridge Structures

IRC: SP:35-1990	Guideline for Inspection and Maintenance of Bridges
IRC: SP:40-1993	Guidelines on Techniques for Strengthening and Rehabilitation of Bridges

LIST OF IRC CODES/STANDARDS/ACTS FOR ROAD WORKS

IRC: 2-1968	Route Marker signs for National Highways (First Revision)
IRC: 8-1980	Type Designs for Highway Kilometer Stone (Second Revision)
IRC: 12-1983	Recommended Practice for Location and layout of Roadside Motor Fuel Filling and Motor Fuel Filling-cum Service Stations (Second Revision)
IRC: 15-2002	Standard Specification and Code of Practice for Construction of Concrete Roads (Third Revision)
IRC: 16-1989	Specification for Printing of Base Course with Bituminous Primers (First Revision)
IRC: 21-2000	Standard Specifications and Code of Practice for Road. Bridges. Section III- Cement Concrete (plain and Reinforced) (Third Division)
IRC: 25-1967	Type Designs for Boundary Stones
IRC: 26-1967	Type design for 200-meter stones
IRC: 30-1968	Standard Letters and Numbers of Different Heights for Use on Highway signs
IRC: 32-1969	Standards for Vertical and Horizontal Clearances of Overhead Electric Power and Telecommunication Lines as Related to Roads
IRC: 35-1997	Code of Practice for Road Markings
IRC: 36-1970	Recommended Practice for the Construction of Earth Embankment for Road Works
IRC: 37-2001	Guidelines for the Design of Flexible Pavement (Second Revision)
IRC: 38-1988	Guidelines for Design of Horizontal Curves for Highways and Design Tables (First Revision)
IRC: 56-1974	Recommended Practice for Treatment of Embankment Slopes for Erosion Control
IRC: 58-2002	Guidelines for the Design of Plain Jointed Rigid Pavements for Highways.
IRC: 62-1976	Guidelines for Control of Access on Highways

IRC: 64-1990	Guidelines for Capacity of Roads in Rural Areas (First Revision)
IRC: 66-1976	Recommended Practice for Sight Distance on Rural Highways
IRC: 67-2001	Code of Practice for Road Signs (First Revision)
IRC: 69-1977	Space Standards for Road in Urban Areas
IRC: 73-1980	Geometric Design Standards for Rural (Non Urban) Highways
IRC: 75-1979	Guidelines for the Design of High Embankments
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: 81-1981	Tentative Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Techniques
IRC: 84-1983	Code of Practice for curing of Cement Concrete Pavements
IRC: 86-1983	Geometric Design Standards for Urban Roads in Plains
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 Under Ground Utility Services Along and Across Roads in urban Areas (First Revision)
IRC: 103-1988	Guidelines for Pedestrian Facilities
IRC: 106-1990	Guidelines for Capacity of Urban Roads in Plain Areas
IRC: 108-1996	Guidelines for Traffic Prediction on Rural Highways
IRC:SP: 11-1988	Hand Book of Quality Control for Construction of Roads and Runways (Second Revision)
IRC:SP:15-1996	Ribbon Development along Highways and its Prevention
IRC:SP:21-1979	Manual on Landscaping of Roads
IRC:SP:23-1983	Vertical curves for Highways
IRC:SP:31-1992	New Traffic signs
IRC:SP:41-1994	Guidelines on Design of At-Grade Intersections in Rural and Urban areas
IRC:SP:42-1994	Guidelines on Road Drainage
IRC:SP:44-1994	Highway Safety Code
IRC:SP:50-999	Guidelines on Urban Drainage
IRC:SP:53-2002	Guidelines on the use of Polymer and Rubber Modified Bitumen in Road Construction

IRC:SP:58-2001	Guidelines for the use of Fly Ash in Road Embankment
IRC:SP:59-2002	Guidelines for the use of Geotextiles in Road Embankments and Associated Works.
IRC:SP:63-2004	Guidelines for the use of Interlocking Concrete Block Pavement

Ministry of Road Transport and Highway Publications

MORT&H, Manual for maintenance of roads, 1983

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

MORT&H, Addendum to Technical Circulars and Directives on National Highways and Centrally Sponsored Road and Bridge Works Projects (Jan 1995 to Dec 1997)

MORT&H, Type Designs for Intersections on National Highways, 1992

MORT&H, Addendum to Ministry's Technical Circulars and Directives on National Highways and Centrally Sponsored Road and Bridge Projects (August 1988 to December 1992), 1993

MORT&H, Addendum to Ministry's Technical Circulars and Directives on National Highways and Centrally Sponsored Road and Bridge Projects (Jan. 1993 to Dec. 1994) 1996

IS Publications

IS:7537-1974	Road traffic signals
IS:10500-1991	Drinking Water
IS: 1944(Parts 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 1 and 2 in one volume) (Amendments 2)
IS:1944 (Parts 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 (Parts VI) 1981	Code of Practice for lighting of Public Thoroughfare: Part 6 Lighting for Towns and city centres and areas civic importance (Group E)
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 VI, NBC	Structural Design

Part VIII, NBC:	Building Services
Part IX, NBC:	Plumbing Services
Part IV, NBC:	Fire Protection

British Standards

BS 873 part IV (1987)	Road traffic signs and internally illuminated bollards. Specification for road studs
BS EN 1463-1: 1998	Road traffic signs and internally illuminated bollards. Specification for road studs
BS EN 1436:1998	Road marking materials. Road marking performance for road users.

SCHEDULE E

APPLICABLE PERMITS

(to be obtained before/ on financial closure)

1. Ministry of Finance / RBI

i) Approval for foreign investment and foreign loans, if required
ii) Approval for import of equipment and machinery for construction and operation, if required
iii) Exemption of Excise duty on construction material, if required

2. Department of Telecommunication

i) Permission / clearance for setting up of wireless system, if required
ii) Clearance / permission for the use of optical fibre cables of DOT, if required

3. State Government Permits

Quarrying Permits:

- Permits for extraction of boulder from quarry from Additional District Magistrate (ADM) Mines
- Permit for installation of crusher from village Panchayat and State/Central Pollution Control Board
- License for explosives from the office of Explosive controller
- Explosive license for storing diesel

Electricity:

- Permission required from State Electricity Board (SEB) for installation of Diesel Generator (DG)
- Permission for electrical connection, if power source is available

Water:

- If water has to be taken from river/ reservoir, permission to be obtained from State Irrigation Department

Batching Plant:

- License from inspection of factories
- NOC consent from pollution department

Asphalt Plant:

- Clearance required from village panchayats & State/Central Pollution Control Board

Borrow Earth:

- Permission from irrigation department if land taken from irrigation land
- Permission required from village panchayat and ADM mines for Government & private land
- Permission from Local Municipalities and Development Authorities.

Cutting of trees:

- Permission from Forest Department.

Sewage Lines and Water Mains:

- Permission from Local Municipalities and Development Authorities.

SCHEDULE - F

NCC

NAGARJUNA CONSTRUCTION COMPANY LTD.

An ISO 9001:2000 Company

(Lead Member in NCC-KMC (Consortium))

NCC/HO-ROADS/ 2005-06/545
3rd February 2006

To
National Highways Authority of India,
G-5&6, Sector-10, Dwarka,
New Delhi - 110 075
Fax: 91-11-25093514 / 25093507

Kind Attention: **Shri B.D. Joshi, General Manager (EW-II)**

Sub: Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to km. 255.00 on Orai-Bhognipur section on National Highway No. 25 (NH-25) and of km. 421.20 to km. 449.00 on Bhognipur-Barah section on National Highway No. 2 (NH-2) in the state of Uttar Pradesh on BOT Basis. - **SUBMISSION OF PERFORMANCE SECURITY**

Ref: 1. Your LOA No. NHAI/EW-V/BOT/2005/429 dated January 06, 2006
2. Our Letter No. NCC/HO-ROADS/ 2005-06/504 dated January 18, 2006

Dear Sir

With reference to the above, we are hereby submitting our Performance Security in compliance to clause 1.37.1 Part- I of the Concession Agreement.

Sl No	BG No.	Name of Issuing Bank	Amount Rupees	Validity From	Validity To
1	0910306BG0000094 dated 02.02.2006	SBI, IFB Branch, Hyderabad	8,92,80,000/-	02.02.2006	30.04.2009
2	0910306BG0000093 dated 02.02.2006	SBI, IFB Branch, Hyderabad	5,95,20,000/-	02.02.2006	31.10.2006
3	0008BG00004806 dated 03.02.2006	ICICI Bank, Begumpet, Hyderabad	5,02,20,000/-	03.02.2006	30.04.2009
4	0008BG00004706 dated 03.02.2006	ICICI Bank, Begumpet, Hyderabad	3,34,80,000/-	03.02.2006	31.10.2006

Returned as it has been replaced by BG no 2006/106 dt 1/2/06

...Page 2 continued

1 programme 2 put up

6-06-02 DGM(EW-II) AD 6/2/06

Manager

& BG no 2006/107 dt 1/2/06 Returned with letter no NHAI/3C0(6)/EO/42/BOT(Amb-4)/ dt 26/4/06

It is to be noted that the Performance security is submitted on behalf of M/s NCC-KMC (Consortium) (Successful Bidder), since the formation of SPV is under process.

Hope you shall find the above in order.

Thanking you and assuring you of our best services at all times.

Yours faithfully,
for NCC - KMC (Consortium),

Kanchan Roy
Authorised Signatory

NAGARJUNA CONSTRUCTION COMPANY LTD.

An ISO 9001-2000 Company

9th Floor, JMD Regent Square, DLF Qutab Enclave, Phase-II, Mehrauli-Gurgaon Road, Gurgaon - 122 002
Tel.: 0124 - 2357493/4, 5052458/9, Fax: 0124-2355293, e-mail : nccdel@ncc-ltd.com

(Lead Member in NCC-KMC (Consortium))

NCC/HO-ROADS/ 2005-06/ 616
18th March 2006

National Highways Authority of India,
G-5&6, Sector-10, Dwarka,
New Delhi – 110 075
Fax: 91-11-25093514 / 25093507

Kind Attention: **Shri B.D. Joshi, General Manager (EW-II)**

Sub: Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to km. 255.00 on Orai-Bhognipur section on National Highway No. 25 (NH-25) and of km. 421.20 to km. 449.00 on Bhognipur-Barah section on National Highway No. 2 (NH-2) in the state of Uttar Pradesh on BOT Basis – **Performance Security Bank Guarantee**

Ref: 1. Your letter no. NHAI/30030/EW-II/BOT (Annuity)-UP/2006/784 dated 20.02.2006
2. Your letter no. NHAI/30030/EW-II/BOT (Annuity)-UP/2006/807 dated 06.03.2006
3. Our letter no. NCC/HO-ROADS/2005-06/585 dated 07.03.2006

Dear Sir,

With reference to the above and as advised by you, we are submitting our performance security Bank Guarantees duly modified in the name of SPV. The details are as follows:

B G No & Date	Amount	Valid up to	Bank guarantee issued by	Remarks
0910306BG0000093 dated 02.02.2006	Rs. 5,95,20,000/-	31.10.2006	State Bank of India, Industrial Finance Branch, Hyderabad	Name amended to O B Infrastructure Limited
0910306BG0000094 dated 02.02.2006	Rs. 8,92,80,000/-	31.04.2009	State Bank of India, Industrial Finance Branch, Hyderabad	Name amended to O B Infrastructure Limited

.. Continued page 2

21/03/06 DGM(EW-II)

2006/106 dated 18.03.2006	Rs. 3,34,80,000/-	16.12.2006	Andhra Bank, Sultan Bazar, Hyderabad	Fresh bank guarantee in favour of O B Infrastructure Limited
2006/107 dated 18.03.2006	Rs. 5,02,20,000/-	16.06.2009	Andhra Bank, Sultan Bazar, Hyderabad	Fresh bank guarantee in favour of O B Infrastructure Limited

Hope you shall find the above in order.

Thanking you and assuring you of our best services at all times.

Yours faithfully,
for NCC – KMC (Consortium)

Kanchan Roy
Authorised Signatory

O B Infrastructure Ltd.
41, Nagarjuna Hills, Punjagutta, Hyderabad - 500 082
Tel: 040 - 2335 1753 (5 Lines), Fax : 040 - 2335 0214

Ref: OBIL/BOT/2006/10 — 24th April, 2006

To,

The General Manager (EW-II),
National Highways Authority of India,
G-5&6, Sector - 10,
Dwarka,
New Delhi - 110 075

Kind Attn: Shri B.D. Joshi

Sub: Design, Engineering, Construction, Development, Finance, Operation and Maintenance of Km. 220.00 to Km. 255.00 on Orai - Bhognipur Section on National Highway No. 25 (NH-25) and of Km. 421.20 to Km. 449.00 on Bhognipur - Barah Section on National Highway No. 2 (NH-2) in the State of Uttar Pradesh on BOT Basis - **BANK GUARANTEES**

Ref: Your letter No. NHAI / 30030 / EW-II / BOT (Annuity) - UP / 2006 / 31 dated 19th April, 2006

Dear Sir,

This is in reference to the discussion; we had in your good office on 19/4/2006 in the presence of M/s Allianze Securities Limited and in continuation to our letter No. OBIL / BOT / 2006 / 09 dated 21st April, 2006. Please find enclosed herewith the amendments to the original Bank Guarantees as discussed. The details are as below:-

Amendment to B.G. No.	Amendment Date	Issued by	Amount
0910306BG0000093	20.04.2006	State Bank of India, Hyderabad	Rs. 5,95,20,000/-
0910306BG0000094	20.04.2006	State Bank of India, Hyderabad	Rs. 8,92,80,000/-
2006/107	20.04.2006	Andhra Bank, Hyderabad	Rs. 5,02,20,000/-
2006/106	20.04.2006	Andhra Bank, Hyderabad	Rs. 3,34,80,000/-

We hope you will find the above in order and look forward to sign the concession agreement at the earliest.

Thanking you and assuring you of our best services at all times,

Yours truly,
For O.B. INFRASTRUCTURE LIMITED
24/04/2006
(MUKESH RALHAN)
AUTHORIZED SIGNATORY

National Highways Authority of India
G-5&6, Sector-10, Dwarka
New Delhi-45, Ph. : 25074100
24 APR 2006
Received by.....

24/04/06
DGM EW II

Encl: As above

O B Infrastructure Ltd

288

F-5

National Highways Authority of India

Regional Office : 9th Floor, JMD Regent Square, DLF Qutab Enclave, Phase-II, Gurgaon - 122 002, INDIA
Phone : 0124 - 2357 493, 2357 494, Fax : 2355 293

100Rs.



09AA 357752

Sl. No. 26 Date 28.12.05 Rs. 100/-

Sold to

N. ANJAIAH
STAMP VENDOR
Lic. No 55/63, R. No 05/2005

Per Whom STATE BANK OF INDIA, IFB, SOMAJIGUDA, RAJ BHAVAN ROAD, HYDERABAD-082

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

02/02/2006

Guarantee Number	: 0910306BG000093
Amount of Guarantee	: Rs.5,95,20,000/-
Guarantee cover from	: 02/02/2006 To 31/10/2006
Last date for lodgement of claim	: 31/10/2006

This deed of Guarantee executed by the State Bank of India, constituted under the State Bank of India Act, 1955 having its Central Office at Nariman Point, Mumbai and amongst other places, a Branch at Industrial Finance Branch, Raj Bhavan Road, Somajiguda, Hyderabad - 500 082, Andhra Pradesh (hereinafter referred to as the "Bank") in favour of National Highways Authority of India, G-5 & 6, Sector-10, Dwarka, New Delhi - 110 075 (hereinafter referred to as the "Beneficiary") for an amount not exceeding Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only) at the request of M/s. NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad - 500 082, Andhra Pradesh (hereinafter referred to as Successful Bidder).

This Guarantee is issued subject to the condition that the liability of the Bank under this Guarantee is limited to a maximum of Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only) and the Guarantee shall remain in full force up to 31/10/2006 (date of expiry) and cannot be invoked otherwise than by a written demand or claim under this guarantee served on the Bank on or before 31/10/2006 (last date of claim) subject to as aforesaid.

1/5

STATE BANK OF INDIA
Chief General Manager
I.F.B., Hyderabad
(K. Nageshwara Gowd Lu)

K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9103
Ph: 040-23414058

NCC Infrastructure Ltd.

289

F-6

BANK GUARANTEE FOR PERFORMANCE SECURITY

From:
State Bank of India
Industrial Finance Branch
Raj Bhavan Road
Somajiguda
Hyderabad - 500 082
Andhra Pradesh (India)

B.G. No. 0910 3 06BG000093
Date: 02/02/2006

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

A. M/s. NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad - 500 082, Andhra Pradesh (the "Successful Bidder") has confirmed their acceptance vide letter No. NCC/HO-ROADS/2005-06/504 Dated 18/01/2006 in response to NHAI Letter (LOA) No. NHAI/EW-V/BOT/2005/429 dated 06/01/2006 issued to construct and operate the Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km. 255.00 on Orai-Bhognipur Section on National Highway No.25 (NH-25) and Km. 421.20 to Km. 449.00 on Bhognipur-Barah Section on National Highway No. 2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) basis (the "Project").

B. The Successful Bidder is required to give ("NHAI") a guarantee by a recognized bank based in India in the sum of Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only) as security for compliance with its obligations under the Concession Agreement during the Construction Period.

C. The Guarantor has agreed to give NHAI the above-mentioned guarantee on the terms set out herein.

GUARANTEE

1. We, State Bank of India, Industrial Finance Branch, Raj Bhavan Road, Somajiguda, Hyderabad - 500 082, Andhra Pradesh (the "Guarantor") with its Registered Office at Kolkata and Central Office at Nariman Point, Mumbai, unconditionally guarantee to pay NHAI upon first written demand and without any deduction any sum claimed by NHAI upto a maximum of Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only) (the "Guaranteed Sum") subject to the conditions set out below.

K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9103
Ph.: 040-23414058

290

F-7

2. The Guarantor unconditionally and irrevocably promises to pay on demand the Guaranteed Sum, without protest or demur whatsoever upon the receipt of a written demand from NHAI, which shall be final and conclusive as against the Guarantor requiring the Guarantor to make the payment to NHAI.

3. The Guarantor waives any requirement that NHAI demand any debt or payment from the Successful Bidder before presenting it with a demand under this Guarantee.

4. NHAI shall notify the Guarantor of its demand for payment of the Guaranteed Sum without any deduction of whatsoever nature and without reference to any claim or counter claim or set off, in accordance with the Concession Agreement.

Such notification by NHAI, shall be conclusive and binding on the Guarantor.

5. Upon encashment and appropriation of the whole or any portion of the Guaranteed Sum by NHAI in accordance with the Concession Agreement, the Guarantor shall be obliged to replenish the existing Guarantee or provide fresh guarantee of the Guaranteed Sum and the Successful Bidder is deemed to have made the request for such fresh guarantee upon the execution and furnishing of this Guarantee in the first instance.

6. No underlying dispute as between NHAI and the Successful Bidder nor any pending application for interim relief or arbitration proceedings or other legal proceedings shall constitute any ground for prevention, delay or obstruction for making payment to NHAI by the Guarantor and the existence of any disputes or differences or claims in arbitration or otherwise shall not constitute any ground for non-payment on this Guarantee.

7. This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the Successful Bidder, upon contribution of the Equity (excluding) Equity Support, if any by the Shareholders of the Successful Bidder to the extent of 100% and upon the Successful Bidder having expended on the project and paid out an aggregate sum of not less than 20% of the Total Project Cost as certified by the Statutory Auditors of the Successful Bidder but provided the Successful Bidder is not in breach of this Agreement or the Concession Agreement.

For National Highways Authority of INDIA

For Deputy General Manager

K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9103
Ph.: 040-23414058

291

F-8

8. The Guarantor agrees that its obligation to pay any demand made by NHAI before the termination of this Guarantee will continue until the amount demanded has been paid in full.

9. This Guarantee shall be valid and effective upto 31/10/2006 for enabling NHAI to lodge a claim for payment under the Guarantee till the date of expiry of the term of the Guarantee. The Guarantor shall be obligated to make payment upon the Guarantee forthwith on demand, if the claim is lodged within the claim validity period and the obligation to pay is subject to normal limitation for payment of claims upon a guarantee. Time is of essence for payment and in the event of failure to make payment, Guarantor shall be obligated to pay compound interest at 2% above the prime lending rate of the Guarantor institution, compounding quarterly in the event of the Guarantor's failure to make payment upon the Guarantee for any reason whatsoever. Payment of interest as provided is no excuse for delayed payment or non-payment of the Guaranteed Sum.

10. No change in the Constitution of the Successful Bidder or of the Guarantor shall be a ground for release of the Guarantee and no variation in the Concession Agreement made post selection of the bidder, or post making of the bid, shall constitute a variation, which would, subject to the terms and conditions of this agreement, discharge the Guarantor. The Guarantor shall notwithstanding such change, be bound to make payment upon the Guarantee on demand.

11. The Guarantor agrees that no change, addition to or other modifications to the terms of the Concession Agreement or to any documents which have or may be made between NHAI and the Successful Bidder will in any way release it from any liability under this Guarantee and that it waives any requirement for notice of any such change, addition or modification.

12. The Guarantor agrees that it will not assign its obligations under this Guarantee without the prior written consent of NHAI. NHAI will not unreasonably withhold its consent if the proposed assignee is of at least equal financial standing to the Guarantor and the assignee assumes in writing the obligations of the Guarantor under this Guarantee at the same time or before the assignment.

13. This Guarantee binds the Guarantor, its successors and permitted assigns.

Manager
I.D.B.I. Hyderabad

K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9193
Ph.: 040-23414058

F-9

Notwithstanding anything contained herein above:

a) Our liability under this Bank Guarantee shall not exceed Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only);

b) This Bank Guarantee shall be valid up to 31/10/2006; and

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 31/10/2006 (Date of Expiry of Guarantee).

ISSUING BRANCH ADDRESS, PHONE & FAX NUMBERS	
Name of Bank	State Bank of India
Address	Industrial Finance Branch Raj Bhavan Road Somajiguda Hyderabad - 500 082 Andhra Pradesh (India)
Phone & Fax Numbers	040-23402143 & 040-23403862

Dated this the 2nd day of February 2006 at Hyderabad, Andhra Pradesh.

5/5

(K Nandini Gandhi)



09BA 625132

N. ANJAIAH
STAMP VENDOR
Lic. No 5, 6, R. No 35, 2005
4-8-821, GOWLIGUDA, HYD. A. P.

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

Amendment to Original Bank Guarantee No.0910306BG0000093

Our Bank Guarantee No. **0910306BG0000093** Dated 02/02/2006 for Rs.5,95,20,000/- (Rupees Five Crores Ninety Five Lacs and Twenty Thousand only) issued on behalf of M/s NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad- 500 082, Andhra Pradesh.

We hereby inform you that the Applicant of captioned Bank Guarantee No. **0910306BG0000093** Dated 02/02/2006 for Rs.5,95,20,000/- (Rupees Five Crores Ninety Five Lacs and Twenty Thousand only) M/s NCC-KMC (Consortium) floated a Special Purpose Vehicle (SPV) **"O B INFRASTRUCTURE LIMITED"** With Effect From 23.02.2006. The name of the applicant in original Bank Guarantee and in all the extensions, if any, henceforth be read as **"O B INFRASTRUCTURE LIMITED"**.

For STATE BANK OF INDIA
For Deputy General Manager
IFB, Hyderabad
K. VANDANA CANDHI

For STATE BANK OF INDIA
For Deputy General Manager
IFB, Hyderabad

O B Infrastructure Ltd

294

F-11

Notwithstanding anything contained herein above:

d) Our liability under this Bank Guarantee shall not exceed Rs. Rs.5,95,20,000/- (Rupees Five Crores Ninety Five Lacs and Twenty Thousand only);

e) This Bank Guarantee shall be valid upto 31/10/2006; and

f) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 31/10/2006.

Please note that this letter is supplementary to the above guarantee and except as stated above all other terms and conditions of the original bank guarantee No. 0910306BG0000093 shall continue to be in force and remain unchanged.

Dated this the 14th day of March, 2006 at Hyderabad, Andhra Pradesh

For STATE BANK OF INDIA

For Deputy General Manager
SBI, IFB, Hyderabad

K. VANDANA GANDHI
SBI, IFB, HYD.-9102
Ph. 040-23414143

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4088
SBI, IFB, HYD.-9103
Ph. 040-23414058

3 Infrastructure Ltd

295

F-12

100Rs.



ఆంధ్ర ప్రదేశ్ आंध्र प्रदेश ANDHRA PRADESH 09AA 785926

2520 dt 5/4/2006 Rs. 100/-
Vide Lr. Laxmana Kopparthi Hyd
Per Whs. STATE BANK OF INDIA, HYD

N. A[illegible] H
STAMP VENDOR
Lic. No 57/65, R. No. 05/2005
4-8-821, [illegible]GUDA, HYD. A. P.

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

Sub: Amendment to Bank Guarantee No. 0910306BG0000093 dated 02.02.2006 and Amendment dated 14.03.2006

We further amend the above Bank Guarantee as under.

(a) The second paragraph of the amendment dated 14.03.2006 is replaced by the following.

We hereby inform you that the Applicant of captioned Bank Guarantee No. 0910306BG0000093 dated 02.02.2006 for Rs.5,95,20,000/- (Rupees Five Crores Ninety Five Lacs and Twenty Thousand only), M/s NCC-KMC (Consortium) has floated a Special Purpose Vehicle (SPV) named "O B Infrastructure Limited" With Effect from 23.02.2006. The words "successful bidder" in original Bank Guarantee and in all the extensions, if any, henceforth be read as "O B Infrastructure Limited." Except in paragraph A of the original bank guarantee.

For STATE BANK OF INDIA
Vandana
For Deputy General Manager
IFB, Hyderabad

K. VANDANA GANDHI
SBI, IFB, HYD - 9103
Ph. 040-23402143

For STATE BANK OF INDIA
For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4088
SBI, IFB, HYD.-9103
Ph. 040-23414058

OB Infrastructure Ltd

296

F-13

(b) The paragraph 7 of the original bank guarantee is replaced by the following:

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on achievement of financial close for the project as advised to the guarantor in writing by NHAI".

Notwithstanding anything contained herein above:

a) Our liability under this Bank Guarantee shall not exceed Rs.5,95,20,000/- only (Indian Rupees Five Crores Ninety Five Lacs Twenty Thousand only);

b) This Bank Guarantee shall be valid up to 31/10/2006; and

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 31/10/2006 (Date of Expiry of Guarantee).

Dated this the 20 day of April, 2006 at Hyderabad, Andhrapradesh

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

K. VANDANA GANDHI
SBI, IFB, HYD - 9103
Ph: 040-23402143

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4088
SBI, IFB, HYD.-9103
Ph. 040-23414058

Infrastructure Ltd.

297

F-14

National Highways Authority of India
New Delhi

100Rs.



09AA 357751

Sl. No. 8322 Date 28-12-2005 Rs. 100/-
Sold to Ramaiah Venkatesh Murthy
For Whom State Bank of India

N. ANJAIAH
STAMP VENDOR
Lic. No 58/65, R. No. 35/2005
4-8-321, BOWLIGUDA, HYD. A. P.

STATE BANK OF INDIA, IFB, SOMAJIGUDA, RAJ BHAVAN ROAD, HYDERBAD-082

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

02/02/2006

Guarantee Number	: 0910306BG000094
Amount of Guarantee	: Rs.8,92,80,000/- only
Guarantee cover from	: 02/02/2006 To 30/04/2009
Last date for lodgement of claim	: 30/04/2009

This deed of Guarantee executed by the State Bank of India, constituted under the State Bank of India Act, 1955 having its Central Office at Nariman Point, Mumbai and amongst other places, a Branch at Industrial Finance Branch, Raj Bhavan Road, Somajiguda, Hyderabad - 500 082, Andhra Pradesh (hereinafter referred to as the "Bank") in favour of National Highways Authority of India, G-5 & 6, Sector-10, Dwarka, New Delhi - 110 075 (hereinafter referred to as the "Beneficiary") for an amount not exceeding Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only) at the request of M/s. NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad - 500 082, Andhra Pradesh (hereinafter referred to as Successful Bidder).

This Guarantee is issued subject to the condition that the liability of the Bank under this Guarantee is limited to a maximum of Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only) and the Guarantee shall remain in full force up to 30/04/2009 (date of expiry) and cannot be invoked otherwise than by a written demand or claim under this guarantee served on the Bank on or before 30/04/2009 (last date of claim) subject to as aforesaid.

For STATE BANK OF INDIA
Deputy General Manager
IFB, Hyderabad
(Indira Gandhi)

For STATE BANK OF INDIA
K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9103
Ph.: 040-23414058

Infrastructure Ltd

F-15 298

BANK GUARANTEE FOR PERFORMANCE SECURITY

From:
State Bank of India
Industrial Finance Branch
Raj Bhavan Road
Somajiguda
Hyderabad - 500 082
Andhra Pradesh (India)

B.G. No. 0910306BG000cc94
Date: 02/02/2006

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

A. M/s. NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad - 500 082, Andhra Pradesh (the "Successful Bidder") has confirmed their acceptance vide letter No. NCC/HO-ROADS/2005-06/504 Dated 18/01/2006 in response to NHAI Letter (LOA) No. NHAI/EW-V/BOT/2005/429 dated 06/01/2006 issued to construct and operate the Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km. 255.00 on Orai-Bhognipur Section on National Highway No.25 (NH-25) and Km. 421.20 to Km. 449.00 on Bhognipur-Barah Section on National Highway No. 2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) basis (the "Project").

B. The Successful Bidder is required to give ("NHAI") a guarantee by a recognized bank based in India in the sum of Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only) as security for compliance with its obligations under the Concession Agreement during the Construction Period.

C. The Guarantor has agreed to give NHAI the above-mentioned guarantee on the terms set out herein.

GUARANTEE

1. We, State Bank of India, Industrial Finance Branch, Raj Bhavan Road, Somajiguda, Hyderabad - 500 082, Andhra Pradesh (the "Guarantor") with its Registered Office at Kolkata and Central Office at Nariman Point, Mumbai, unconditionally guarantee to pay NHAI upon first written demand and without any deduction any sum claimed by NHAI upon a maximum of Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only) (the "Guaranteed Sum") subject to the conditions set out below.

FOR STATE BANK OF INDIA
Deputy General Manager
I.B. Hyderabad

FOR STATE BANK OF INDIA
K. SAI PRASAD
Manager
SS No. S-10438
SBI-IFB, Hyd-9103
Ph.: 040-23314058

F-16

2. The Guarantor unconditionally and irrevocably promises to pay on demand the Guaranteed Sum, without protest or demur whatsoever upon the receipt of a written demand from NHAI, which shall be final and conclusive as against the Guarantor requiring the Guarantor to make the payment to NHAI.

3. The Guarantor waives any requirement that NHAI demand any debt or payment from the Successful Bidder before presenting it with a demand under this Guarantee.

4. NHAI shall notify the Guarantor of its demand for payment of the Guaranteed Sum without any deduction of whatsoever nature and without reference to any claim or counter claim or set off, in accordance with the Concession Agreement.

   Such notification by NHAI, shall be conclusive and binding on the Guarantor.

5. Upon encashment and appropriation of the whole or any portion of the Guaranteed Sum by NHAI in accordance with the Concession Agreement, the Guarantor shall be obliged to replenish the existing Guarantee or provide fresh guarantee of the Guaranteed Sum and the Successful Bidder is deemed to have made the request for such fresh guarantee upon the execution and furnishing of this Guarantee in the first instance.

6. No underlying dispute as between NHAI and the Successful Bidder nor any pending application for interim relief or arbitration proceedings or other legal proceedings shall constitute any ground for prevention, delay or obstruction for making payment to NHAI by the Guarantor and the existence of any disputes or differences or claims in arbitration or otherwise shall not constitute any ground for non-payment on this Guarantee.

7. This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the Successful Bidder, upon contribution of the Equity (excluding) Equity Support if any by the Shareholders of the Successful Bidder to the extent of 100% and upon the Successful Bidder having expended on the project and paid out an aggregate sum of not less than 20% of the Total Project Cost as certified by the Statutory Auditors of the Successful Bidder but provided the Successful Bidder is not in breach of this Agreement or the Concession Agreement.

For STATE BANK OF INDIA

For Deputy General Manager
LFB, Hyderabad

For

K. SA... S...
SB No. S...
... Hyderabad
... 23419050

30-8-17

8. The Guarantor agrees that its obligation to pay any demand made by NHAI before the termination of this Guarantee will continue until the amount demanded has been paid in full.

9. This Guarantee shall be valid and effective upto 30/04/2009 for enabling NHAI to lodge a claim for payment under the Guarantee till the date of expiry of the term of the Guarantee. The Guarantor shall be obligated to make payment upon the Guarantee forthwith on demand, if the claim is lodged within the claim validity period and the obligation to pay is subject to normal limitation for payment of claims upon a guarantee. Time is of essence for payment and in the event of failure to make payment, Guarantor shall be obligated to pay compound interest at 2% above the prime lending rate of the Guarantor institution, compounding quarterly in the event of the Guarantor's failure to make payment upon the Guarantee for any reason whatsoever. Payment of interest as provided is no excuse for delayed payment or non-payment of the Guaranteed Sum.

10. No change in the Constitution of the Successful Bidder or of the Guarantor shall be a ground for release of the Guarantee and no variation in the Concession Agreement made post selection of the bidder, or post making of the bid, shall constitute a variation, which would, subject to the terms and conditions of this agreement, discharge the Guarantor. The Guarantor shall notwithstanding such change, be bound to make payment upon the Guarantee on demand.

11. The Guarantor agrees that no change, addition to or other modifications to the terms of the Concession Agreement or to any documents which have or may be made between NHAI and the Successful Bidder will in any way release it from any liability under this Guarantee and that it waives any requirement for notice of any such change, addition or modification.

12. The Guarantor agrees that it will not assign its obligations under this Guarantee without the prior written consent of NHAI. NHAI will not unreasonably withhold its consent if the proposed assignee is of at least equal financial standing to the Guarantor and the assignee assumes in writing the obligations of the Guarantor under this Guarantee at the same time or before the assignment.

13. This Guarantee binds the Guarantor, its successors and permitted assigns.

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

(K. Nandana Gandhi)

For [illegible]

K. SAI PRASAD
SS No. S-10438
SBI-IFB, Hyd-9103
Ph.: 040-23414058

301
F-18

Notwithstanding anything contained herein above:

a) Our liability under this Bank Guarantee shall not exceed Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only);

b) This Bank Guarantee shall be valid up to 30/04/2009; and

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 30/04/2009 (Date of Expiry of Guarantee).

ISSUING BRANCH ADDRESS, PHONE & FAX NUMBERS	
Name of Bank	State Bank of India
Address	Industrial Finance Branch Raj Bhavan Road Somajiguda Hyderabad - 500 082 Andhra Pradesh (India)
Phone & Fax Numbers	040-23402143 & 040-23403862

Dated this the 2nd day of February 2006 at Hyderabad, Andhra Pradesh

5/5

OF INDIA

For Deputy General Manager
Hyderabad

(Chandrama Gandhi)

Infrastructure Ltd

B12



Rs. 125155

Rs.
Sold to
For Whom

N. VENKATAIAH
STAMP VENDOR
Lic. No. 55/55, R. No. 35/2005
1-8-821, BOWLIGUDA, HYD. A. P.

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

Amendment to Original Bank Guarantee No.0910306BG000[illegible]

Our Bank Guarantee No. **0910306BG0000094** Dated 02/02/2006 for Rs.8,92,80,000/- (Rupees Eight Crores Ninety Two Lacs and Eighty Thousand only) issued on behalf of M/s NCC-KMC (Consortium), 41, Nagarjuna Hills, Hyderabad - 500 082, Andhra Pradesh.

We hereby inform you that the Applicant of captioned Bank Guarantee No. **0910306BG0000094** Dated 02/02/2006 for Rs.8,92,80,000/- (Rupees Eight Crores Ninety Two Lacs and Eighty Thousand only) M/s NCC-KMC (Consortium) floated a Special Purpose Vehicle (SPV) "O B INFRASTRUCTURE LIMITED" With Effect From 23.02.2006. The name of the applicant in original Bank Guarantee and in all the extensions, if any henceforth be read as "O B INFRASTRUCTURE LIMITED".

For STATE BANK OF INDIA

Vandana

For Deputy General Manager
IFB, Hyderabad

303

K. VANDANA GANDHI
SBI, IFB, Hyderabad
Ph: 040-23402143

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4038
IFB, HYD.-9:03

F-20

Notwithstanding anything contained herein above:

a) Our liability under this Bank Guarantee shall not exceed Rs.8,92,80,000/- (Rupees Eight Crores Ninety Two Lacs and Eighty Thousand only);

b) This Bank Guarantee shall be valid upto 30/04/2009; and

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 30/04/2009.

Please note that this letter is supplementary to the above guarantee and except as stated above all other terms and conditions of the original bank guarantee No. **0910306BG0000094** shall continue to be in force and remain unchanged.

Dated this the14th day of March, 2006 at Hyderabad, Andhra Pradesh

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

K. VANDANA GANDHI
SBI, IFB, HYD - 9103
Ph: 040-23402143

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4098
SBI, IFB, HYD.-9103
Ph. 040-23414058

304
F-21

100Rs.



ఆంధ్ర ప్రదేశ్ आंध्र प्रदेश ANDHRA PRADESH 09AA 785928

Sold to ... For Whom ... STATE BANK OF INDIA

N. A... STAMP VENDOR ... 5.2005 ... HYD. A. P.

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

Sub: Amendment to Bank Guarantee No. 0910306BG0000094 dated 02.02.2006 and Amendment dated 14.03.2006

We further amend the above Bank Guarantee as under.

(a) The second paragraph of the amendment dated 14.03.2006 is replaced by the following.

We hereby inform you that the Applicant of captioned Bank Guarantee No. 0910306BG0000094 dated 02.02.2006 for Rs.8,92,80,000/- (Rupees Eight Crores Ninety Two Lacs and Eighty Thousand only), M/s NCC-KMC (Consortium) has floated a Special Purpose Vehicle (SPV) named "O B Infrastructure Limited" With Effect from 23.02.2006. The words "successful bidder" in original Bank Guarantee and in all the extensions, if any, henceforth be read as "O B Infrastructure Limited." Except in paragraph A of the original bank guarantee.

For STATE BANK OF INDIA
For Deputy General Manager
IFB, Hyderabad

K. VANDANA GANDHI
SBI, IFB, HYD - 9103
Ph: 040-23402143

For STATE BANK OF INDIA
For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4088
SBI, IFB, HYD.-9.03
Ph. 040-23414058

305

(b) The paragraph 7 of the original bank guarantee is replaced by the following:

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the issuance of completion certificate for the project as advised to the guarantor in writing by NHAI".

Notwithstanding anything contained herein above:

a) Our liability under this Bank Guarantee shall not exceed Rs.8,92,80,000/- only (Indian Rupees Eight Crores Ninety Two Lacs Eighty Thousand only);

b) This Bank Guarantee shall be valid up to 30/04/2009; and

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before 30/04/2009 (Date of Expiry of Guarantee).

Dated this the 20th day of April, 2006 at Hyderabad, Andhrapradesh

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

K. VANDANA GANDHI
IFB, HYD - 9103
Ph: 040-23402145

For STATE BANK OF INDIA

For Deputy General Manager
IFB, Hyderabad

N. KARUNA BABU
B-4088
SBI, IFB, HYD.-9103
Ph. 040-23414058

Infrastructure Ltd.

E-23306

100Rs.



ANDHRA PRADESH 09AA 708212

S. No. 41274 Dt. 17/3/2006 Rs. 100/-
Sold To A N Rao
S/o/W/o/D/o A Ramulu r/o Hyd
To Whom OB Infra Structure Ltd

K. RAMA CHANDRAVATHI
STAMP VENDOR (LNO: 27/99 R.L No. 20/2005)
6-3-387, Beside Banjara Durbar Hotel, Panjagutta,
HYDERABAD - 500 082 Phone. No: 23351799

BANK GUARANTEE FOR PERFORMANCE SECURITY

[illegible] Bank, Sultan Bazar Branch
Koti, Hyderabad 500 001

To: National Highways Authority of India
G-5 & G-6, Sector-10, Dwaraka
NEW DELHI – 110 075

A. **OB Infrastructure Limited**, 41, Nagarjuna Hills, Hyderabad – 500 082, Andhra Pradesh (the "**Concessionaire**") has agreed in accordance with the Letter of Acceptance (LOA) No. NHAI/EW-V/BOT/2005/429 dated 06.01.2006 issued by NHAI to construct and operate **the** "Design, Engineering, Construction, Development, Finance, Operation and Maintenance of Km 220.00 to Km 255.00 on Orai – Bhognipur Section on National Highway No. 25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur – Barah Section on National Highway No. 2 (NH-2) in the State of Uttar Pradesh" on BOT (Annuity) basis (the "**Project**").

ANDHRA BANK
S.B. 2006/107
Date 18/03/2006

For Andhra Bank

(M.B. Sankara Rao; S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

[illegible]
Sultan Bazar (Hyd.) Br.

307

F-24

B The Concessionaire is required to give ("**NHAI**") a guarantee by a recognized bank based in India in the sum of Rs.5,02,20,000/- only (Indian Rupees Five Crores Two Lakhs Twenty Thousand only) as security for compliance with its obligations under the Concession Agreement during the Construction Period.

C. The Guarantor has agreed to give NHAI the abovementioned guarantee on the terms set out herein.

GUARANTEE

1 We, Andhra Bank, Sultan Bazar Branch, Koti, Hyderabad – 500 001 **(the "Guarantor")** with its registered office at Dr. Pattabhi Bavan, Saifabad, Hyderabad, unconditionally guarantee to pay NHAI upon first written demand and without any deduction any sum claimed by NHAI upto a maximum of Rupees 5,02,20,000/- (Indian Rupees Five Crores Two Lakhs Twenty Thousand only) (the "**Guaranteed Sum**") subject to the conditions set out below.

2 The Guarantor unconditionally and irrevocably promises to pay on demand the Guaranteed Sum, without protest or demur whatsoever upon the receipt of a written demand from NHAI, which shall be final and conclusive as against the Guarantor requiring the Guarantor to make the payment to NHAI.

3 The Guarantor waives any requirement that NHAI demand any debt or payment from the Concessionaire before presenting it with a demand under this Guarantee.

4. NHAI shall notify the Guarantor of its demand for payment of the Guaranteed Sum without any deduction of whatsoever nature and without reference to any claim or counter claim or set off, in accordance with the Concession Agreement.

Such notification by NHAI, shall be conclusive and binding on the Guarantor.

Sultan Bazar (Hyd.) Br.

आन्ध्रा बैंक
ANDHRA BANK
2606/107
Date. 18/03/2006

F-25 308

5 Upon encashment and appropriation of the whole or any portion of the Guaranteed Sum by NHAI in accordance with the Concession Agreement, the Guarantor shall be obliged to replenish the existing Guarantee or provide fresh guarantee of the Guaranteed Sum and the Concessionaire is deemed to have made the request for such fresh guarantee upon the execution and furnishing of this Guarantee in the first instance.

6 No underlying dispute as between NHAI and the Concessionaire nor any pending application for interim relief or arbitration proceedings or other legal proceedings shall constitute any ground for prevention, delay or obstruction for making payment to NHAI by the Guarantor and the existence of any disputes or differences or claims in arbitration or otherwise shall not constitute any ground for non-payment on this Guarantee.

7 This Guarantee is valid and effective from its date. This Guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the Project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the concessionaire, upon contribution of the Equity (excluding) Equity Support, if any by the Shareholders of the concessionaire to the extent of 100% and upon the concessionaire having expended on the Project and paid out an aggregate sum of not less than 20% of the Total Project cost as certified by the Statutory Auditors of the concessionaire but provided the concessionaire is not in breach of this Agreement or the Concession Agreement.

8. The Guarantor agrees that its obligation to pay any demand made by NHAI before the termination of this Guarantee will continue until the amount demanded has been paid in full.

आन्ध्रा बैंक
ANDHRA BANK
...O.
... 2006/107
Date. 18/03/2006

For Andhra Bank

(M.B. Sankara Rao; S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

F-26 309

9 This Guarantee shall be valid and effective upto 16.06.2009 for enabling NHAI to lodge a claim for payment under the Guarantee till the date of expiry of the term of the Guarantee. The Guarantor shall be obligated to make payment upon the Guarantee forthwith on demand, if the claim is lodged within the claim validity period and the obligation to pay is subject to normal limitation for payment of claims upon a Guarantee. Time is of essence for payment and in the event of failure to make payment, Guarantor shall be obligated to pay compound interest at 2% above the prime lending rate of the Guarantor institution, compounding quarterly in the event of the Guarantor's failure to make payment upon the Guarantee for any reason whatsoever. Payment of interest as provided is no excuse for delayed payment or non-payment of the Guaranteed Sum.

10 No change in the constitution of the Concessionaire or of the Guarantor shall be a ground for release of the Guarantee and no variation in the concession agreement made post selection of the bidder, or post making of the bid, shall constitute a variation, which would, subject to the terms and conditions of this agreement, discharge the Guarantor. The Guarantor shall notwithstanding such change, be bound to make payment upon the Guarantee on demand.

11 The Guarantor agrees that no change, addition to or other modifications to the terms of the Concession Agreement or to any documents which have or may be made between NHAI and the Concessionaire will in any way release it from any liability under this Guarantee and that it waives any requirement for notice of any such change, addition or modification.

12 The Guarantor agrees that it will not assign its obligations under this Guarantee without the prior written consent of NHAI. NHAI will not unreasonably withhold its consent if the proposed assignee is of at least equal financial standing to the Guarantor and the assignee assumes in writing the obligations of the Guarantor under this Guarantee at the same time or before the assignment.

13 This Guarantee binds the Guarantor, its successors and permitted assigns.

For Andhra Bank

आन्ध्रा बैंक
ANDHRA BANK
- 40.
2006/107
Date. 18/03/2006

F-27 310

Notwithstanding any thing contained here in.

a) Our liability under this Bank Guarantee shall not exceed Rs.5,02,20,000/- (Indian Rupees Five Crores Two Lakhs Twenty Thousand only).

b) This Bank Guarantee shall be valid upto 16.06.2009.

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if you serve upon us written claim or demand on or before 16.06.2009.

SEAL OF **[THE BANK]** .....

NAME OF **[THE BANK]** .....

SIGNATURE

For Andhra Bank

(M.B. Sankara Rao; S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

NAME

TITLE

DATE 18/03/2006

F-28 311

भारतीय गैर न्यायिक

पचास रुपये

रु.50

भारत

सत्यमेव जयते

INDIA

FIFTY RUPEES

Rs.50

INDIA NON JUDICIAL

आन्ध्र प्रदेश ANDHRA PRADESH

663641

place: Hyderabad
Date: 20.04.06

From
Andhra Bank, Sultan Bazar Branch,
Koti, **HYDERABAD** – 500 001

To :
National Highways Authority of India,
G-5 & G-6, Sector-10, Dwaraka,
NEW DELHI – 110 075

Dear Sir,

Ref: **Amendment to BG No.2006/107 dated 18.03.2006 for Rs.5,02,20,000/-**
(Rupees Five crore two lakh Twenty thousand only)

With reference to the request made by **"M/S OB Infrastructure Limited"**, we amend the above Bank Guarantee as mentioned below :

For ANDHRA BANK
Malaya KU. Sahoo M-615
Asst. Manager
Sultan Bazar (Hyd.) Br.

आन्ध्रा बैंक
ANDHRA BANK
2006/107
दिनांक 18.03.06
Date. amended upto 31
20.04.2006
F-29

Contd..2..

For Andhra Bank

(M.B.S-268)
(Advances)
(Hyd.) Br



आन्ध्र प्रदेश ANDHRA PRADESH 663642

::2::

1. Paragraph "7" of 3rd Page:

To Be Read As

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on issuance of Completion certificate for the Project as advised to the Guarantor in writing by NHAI"

Instead Of

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the Concessionaire, upon contribution of the Equity (excluding) Equity Support, if any by the Shareholders of the Concessionaire to the extent of 100% and upon the concessionaire having expended on the project and paid out an aggregate sum of not less than 20% of the Total project cost as certified by the Statutory Auditors of the Concessionaire but provided the Concessionaire is not in breach of this Agreement or the Concession Agreement."

Contd..3

FOR ANDHRA BANK
Manoja Kumar Sahoo, M-616
(Asst. Manager)
Sultan Bazar (Hyd.) Br.

P-30

आन्ध्रा बैंक
ANDHRA BANK
313
2006/107
Date. dt. 18.03.06 Amended on 20.04.2006

For Andhra Bank
(M.B. Sankara Rao, S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

This amendment is part and parcel of original Bank Guarantee and except above, all terms and conditions remain unchanged.

Not Withstanding any thing contained herein :

a) Our liability under this Bank Guarantee shall not exceed Rs.5,02,20,000/- (Rupees Five crore Two lakh Twenty thousand only).

b) This Bank Guarantee shall be valid up to 16.06.2009.

c) We are liable to pay the Guaranteed amount or any part thereof under this Bank Guarantee only if you serve upon us written claim or demand on or before 16.06.2009.

For ANDHRA BANK

Malaya K.U. Sahoo M-616
Asst. Manager
Sultan Bazar (Hyd.) Br.

आन्ध्रा बैंक
ANDHRA BANK
2006/107
dt 18.03.06
दिनांक
Date. Amended on 20.04.2006

For Andhra Bank

(M.B. Sankara Rao, S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

Infrastructure Ltd.

F-31 314

National Highways Authority of India



100 Rs

ఆంధ్ర ప్రదేశ్ आंध्र प्रदेश ANDHRA PRADESH 09AA 708211

S. No. 4177 Dt. 17/3/2006 Rs. 100/-
Sold To. A.V. Rao
S/o./W/o./D/o. A. Ramulu & Co HO.
To Whom. OB Infrastructure Ltd.

K. RAMA CHANDRAVATHI
STAMP VENDOR (L.NO.27/99 R.L. No. 20/2005)
6-3-387, Beside Panjara Durbar Hotel, Panjagutta
HYDERABAD - 500 082 Phone. No. 233517

BANK GUARANTEE FOR PERFORMANCE SECURITY

From: **Andhra Bank, Sultan Bazar Branch**
Koti, Hyderabad – 500 001

To: **National Highways Authority of India**
G-5 & G-6, Sector-10, Dwaraka
NEW DELHI – 110 075

A. **OB Infrastructure Limited**, 41, Nagarjuna Hills, Hyderabad – 500 082, Andhra Pradesh (the "**Concessionaire**") has agreed in accordance with the Letter of Acceptance (LOA) No. NHAI/EW-V/BOT/2005/429 dated 06.01.2006 issued by NHAI to construct and operate **the** "Design, Engineering, Construction, Development, Finance, Operation and Maintenance of Km 220.00 to Km 255.00 on Orai – Bhognipur Section on National Highway No. 25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur – Barah Section on National Highway No. 2 (NH-2) in the State of Uttar Pradesh" on BOT (Annuity) basis (the "**Project**").

For Andhra Bank
Manager
Sultan Bazar (Hyd.) Br.

आन्ध्रा बैंक
ANDHRA BANK
2006/106
Date. 16/03/2006

For Andhra Bank
(M.S. Rao)
Manager
Sultan Bazar

315

F-32

B. The Concessionaire is required to give ("**NHAI**") a guarantee by a recognized bank based in India in the sum of Rs.3,34,80,000/- only (Indian Rupees Three Crores Thirty Four Lakhs Eighty Thousand only) as security for compliance with its obligations under the Concession Agreement during the Construction Period.

C. The Guarantor has agreed to give NHAI the abovementioned guarantee on the terms set out herein.

GUARANTEE

1. We, Andhra Bank, Sultan Bazar Branch, Koti, Hyderabad – 500 001 **(the "Guarantor")** with its registered office at Dr. Pattabhi Bavan, Saifabad, Hyderabad, unconditionally guarantee to pay NHAI upon first written demand and without any deduction any sum claimed by NHAI upto a maximum of Rupees 3,34,80,000/- (Indian Rupees Three Crores Thirty Four Lakhs Eighty Thousand only) (the "**Guaranteed Sum**") subject to the conditions set out below.

2. The Guarantor unconditionally and irrevocably promises to pay on demand the Guaranteed Sum, without protest or demur whatsoever upon the receipt of a written demand from NHAI, which shall be final and conclusive as against the Guarantor requiring the Guarantor to make the payment to NHAI.

3. The Guarantor waives any requirement that NHAI demand any debt or payment from the Concessionaire before presenting it with a demand under this Guarantee.

4. NHAI shall notify the Guarantor of its demand for payment of the Guaranteed Sum without any deduction of whatsoever nature and without reference to any claim or counter claim or set off, in accordance with the Concession Agreement.

Such notification by NHAI, shall be conclusive and binding on the Guarantor.

For Andhra Bank

(M.B. Sankara Rao, S-262)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

2006/106
Date 18/03/2006
F-33 316

5. Upon encashment and appropriation of the whole or any portion of the Guaranteed Sum by NHAI in accordance with the Concession Agreement, the Guarantor shall be obliged to replenish the existing Guarantee or provide fresh guarantee of the Guaranteed Sum and the Concessionaire is deemed to have made the request for such fresh guarantee upon the execution and furnishing of this Guarantee in the first instance.

6 No underlying dispute as between NHAI and the Concessionaire nor any pending application for interim relief or arbitration proceedings or other legal proceedings shall constitute any ground for prevention, delay or obstruction for making payment to NHAI by the Guarantor and the existence of any disputes or differences or claims in arbitration or otherwise shall not constitute any ground for non-payment on this Guarantee.

7 This Guarantee is valid and effective from its date This Guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the Project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the concessionaire, upon contribution of the Equity (excluding) Equity Support, if any by the Shareholders of the concessionaire to the extent of 100% and upon the concessionaire having expended on the Project and paid out an aggregate sum of not less than 20% of the Total Project cost as certified by the Statutory Auditors of the concessionaire but provided the concessionaire is not in breach of this Agreement or the Concession Agreement.

8. The Guarantor agrees that its obligation to pay any demand made by NHAI before the termination of this Guarantee will continue until the amount demanded has been paid in full.

Malaya Vihar, Sector M-016

बैंक
BANK
2006/106
Date. 18/03/2006
F-34

317

National Highways Authority of

9. This Guarantee shall be valid and effective upto 16.12.2006 for enabling NHAI to lodge a claim for payment under the Guarantee till the date of expiry of the term of the Guarantee. The Guarantor shall be obligated to make payment upon the Guarantee forthwith on demand, if the claim is lodged within the claim validity period and the obligation to pay is subject to normal limitation for payment of claims upon a Guarantee. Time is of essence for payment and in the event of failure to make payment, Guarantor shall be obligated to pay compound interest at 2% above the prime lending rate of the Guarantor institution, compounding quarterly in the event of the Guarantor's failure to make payment upon the Guarantee for any reason whatsoever. Payment of interest as provided is no excuse for delayed payment or non-payment of the Guaranteed Sum.

10. No change in the constitution of the Concessionaire or of the Guarantor shall be a ground for release of the Guarantee and no variation in the concession agreement made post selection of the bidder, or post making of the bid, shall constitute a variation, which would, subject to the terms and conditions of this agreement, discharge the Guarantor. The Guarantor shall notwithstanding such change, be bound to make payment upon the Guarantee on demand.

11. The Guarantor agrees that no change, addition to or other modifications to the terms of the Concession Agreement or to any documents which have or may be made between NHAI and the Concessionaire will in any way release it from any liability under this Guarantee and that it waives any requirement for notice of any such change, addition or modification.

12. The Guarantor agrees that it will not assign its obligations under this Guarantee without the prior written consent of NHAI. NHAI will not unreasonably withhold its consent if the proposed assignee is of at least equal financial standing to the Guarantor and the assignee assumes in writing the obligations of the Guarantor under this Guarantee at the same time or before the assignment.

13 This Guarantee binds the Guarantor, its successors and permitted assigns.

Infrastructure Leasing & Financial Services
Manager
Sultan Bazar (Hyd.) Br.

F-35

2006/106
Date. 18/03/2006

For Andhra Bank
(M.B. Sankara Rao; S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.
318

Notwithstanding any thing contained here in:

a) Our liability under this Bank Guarantee shall not exceed Rs.3,34,80,000/- (Indian Rupees Three Crores Thirty Four Lakhs Eighty Thousand only).

b) This Bank Guarantee shall be valid upto 16.12.2006.

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if you serve upon us written claim or demand on or before 16.12.2006.

SEAL OF **[THE BANK]** .....

NAME OF **[THE BANK]** .....

SIGNATURE .....

NAME .....

TITLE .....

DATE .....

Asst. Manager
Sultan Bazar (Hyd.) Br.

2006/106

18/03/2006

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100

ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

आन्ध्र प्रदेश ANDHRA PRADESH

139511

K. ANITHA

Licence No. 5/96 Lic. 53/05

HYDERABAD

Bl. No 15309 10/4/2006 Rs. 100/-

Y. Babu Rao S/o Y. Ramakoti Rao Hyd

OB Infrastructure Ltd. Hyd

Place: Hyderabad
Date:20.04.06

From
Andhra Bank, Sultan Bazar Branch,
Koti, **HYDERABAD** – 500 001

To :
National Highways Authority of India,
G-5 & G-6, Sector-10, Dwaraka,
NEW DELHI – 110 075

Dear Sir,

Ref: **Amendment to BG No.2006/106 dated 18.03.2006 for Rs.3,34,80,000/-**
(Rupees Three crore thirty four lakh eighty thousand only)

With reference to the request made by **"M/S OB Infrastructure Limited"**, we amend the above Bank Guarantee as mentioned below :

Contd..2

For ANDHRA BANK

Manager/CM: Sahoo M-616
Asst. Manager
Sultan Bazar Br.

आन्ध्रा बैंक
ANDHRA BANK

2006/106
dt. 18.03.06
Amended on
Date. 20.04.2006

For Andhra Bank

(M.B. Sankara Rao; S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

320

E-87

1. Paragraph "7" of 3rd Page

To Be Read As

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the achievement of financial close for the project as advised to the Guarantor in writing by NHAI"

Instead Of

"This guarantee is valid and effective from its date. This guarantee and the Guarantor's obligations under it will terminate on the Commercial Operations Date of the project as advised to the Guarantor in writing by NHAI. However the Guarantee shall be released earlier by NHAI to the Concessionaire, upon contribution of the Equity (excluding) Equity Support, if any by the Shareholders of the Concessionaire to the extent of 100% and upon the concessionaire having expended on the project and paid out an aggregate sum of not less than 20% of the Total project cost as certified by the Statutory Auditors of the Concessionaire but provided the Concessionaire is not in breach of this Agreement or the Concession Agreement."

This amendment is part and parcel of original Bank Guarantee and except above, all terms and conditions remain unchanged.

Not Withstanding any thing contained herein :

a) Our liability under this Bank Guarantee shall not exceed Rs.3,34,80,000/- (Rupees Three crore thirty four lakh Eighty thousand only).

b) This Bank Guarantee shall be valid up to 16.12.2006.

c) We are liable to pay the Guaranteed amount or any part thereof under this Bank Guarantee only if you serve upon us written claim or demand on or before 16.12.2006.

For ANDHRA BANK
Malaya KU. Sahoo M-616
Asst. Manager
Sultan Bazar (Hyd.) Br.

आन्ध्रा बैंक
ANDHRA BANK
2006/106
dt 18.03.06
Date. Amended on 20.04.2006

For Andhra Bank
(M.B. Sankara [illegible] S-268)
Sr. Manager (Advances)
Sultan Bazar (Hyd.) Br.

Infrastructure

F-38

ANDHRA BANK
SULTAN BAZAR BRANCH
KOTI, HYDERABAD
A.P.-500 095
Ph-24757429, 24757363 Fax-24757558

Lr.No.205/BG/KMC
Date:29.03.2006

To

Mr.Manish Sehgal
Manager (EW-II)
National Highways Authority of India
G-5 & 6, Sector-10
Dwarka, New Delhi-110 075

Dear Sir,

Reg:Confirmation of BG issued on behalf of M/s O B Infrastructure Ltd
Ref: Your Lr.No. NHAI/30030/EW-II/BOT(Annuity)-UP/2006/822 dated 23.03.2006

With reference to the above, we confirm that we have issued the following bank guarantees on behalf of M/s O B Infrastructure Ltd, a SPV promoted and incorporated by M/s NCC-KMC Consortium in favour of yourself.

BG No.	BG Date	Amount (Rs)	Valid up to
2006/106	18.03.2006	3,34,80,000/-	16.12.2006
2006/107	18.03.2006	5,02,20,000/-	16.06.2009

The officers who have signed the bank guarantees are authorised to sign on behalf of Andhra bank, Sultan Bazar Branch.

Yours faithfully,

(L V Ramanaiah)
Chief Manager

F-39 322

ANDHRA BANK
SULTAN BAZAR BRANCH
KOTI, HYDERABAD
A.P.-500 095
Ph-24757429, 24757363 Fax-24757558

Lr.No.205/BG/KMC
Date:18.04.2006

To

Mr.GSVS Prabhakara Rao
Manager Finance
National Highways Authority of India
First Floor, Plot No.25, Road No.2
Castle Hills, Masab Tank
Hyderabad-500057

Dear Sir,

Reg:Confirmation of BG issued on behalf of M/s O B Infrastructure Ltd
Ref: Your Lr.No. NHAI/PIU-HYD/12017/2006-291 dated 13.04.2006

With reference to the above, we confirm that we have issued the following bank guarantees on behalf of M/s O B Infrastructure Ltd, a SPV promoted and incorporated by M/s NCC-KMC Consortium in favour of National Highways Authority of India.

BG No.	BG Date	Amount (Rs)	Valid up to
2006/106	18.03.2006	3,34,80,000/-	16.12.2006
2006/107	18.03.2006	5,02,20,000/-	16.06.2009

Yours faithfully,

(L V Ramanaiah)
Chief Manager

Cc:Mr.Manish Sehgal
Manager (EW-II)
National Highways Authority of India
G-5 & 6 Sector-10
Dwarka, New Delhi-110075

F-40 323

Andhra Bank
(A Govt. of India Undertaking)

From :	To:
C&IFD ZONAL OFFICE HYDERABAD	The Manager National Highways Authority of India G-5&6, Sector -10, Dwarka, New Delhi - 110075.

Lr. No. 688/1/582/172 Dt: 25.04.2006

Dear Sir,

Reg: A/c M/s KMC Constructions Ltd – Issuance of BG - Confirmation.

Ref: NHAI/30030/EW-11/BOT(Annuity)-UP/2006/831 dt.12.04.06.

***

Referring to the above, we confirm that our Sultan Bazar branch has issued the following bank guarantees on behalf of M/s O B Infrastructure Ltd, an SPV promoted and incorporated by M/s NCC-KMC Consortium in favour of NHAI at the behest of our constituent M/s KMC Constructions Ltd.

BG No	Date of issue	Amount	Extended upto
2006/106	18.03.2006	3,34,80,000/-	16.12.2006
2006/107	18.03.2006	5,02,20,000/-	16.06.2009

(K.G.SRINIVASA RAO)
DY.GENERAL MANAGER

Maj King ac 24/04/06

DGM (Cons-II)

AZO 3/5

GM (EW-II) 3/5

DGM(EW-II)

O B Infrastructure Ltd.

F-41 324

భారతీయ స్టేట్ బ్యాంక్
भारतीय स्टेट बैंक
State Bank of India

పారిశ్రామిక ఫైనాన్స్ శాఖ
రాజ్ భవన్ రోడ్,
సోమాజిగూడ,
హైదరాబాద్ - 500 082.
Swift : SBININBB144,
GRAMS : "INDUSBRAN".

औद्योगिक वित्त शाखा,
राज भवन रोड,
सोमाजिगुडा,
हैदराबाद - 500 082.
Email : sa.09103@sbi.co.in

INDUSTRIAL FINANCE BRANCH
Raj Bhavan Road, Somajiguda,
HYDERABAD - 500 082.
✆ : 23409413, 23412767, 4058 (Accts)
EPABX : 23402143 / 23412961
Fax : 23403862, 0635 (Accts.), 2837 (IBD)

సంఖ్య / क्रमांक / No. :

తేది / दिनांक / Date :

SHRI MANISH SEHGAL,
MANAGER (EW-II),
NATIONAL HIGHWAYS AUTHORITY OF INDIA,
G5&6, SECTOR 10, DWARKA,
NEW DELHI 110 075

17.04.2006

Dear Sir,

CONFIRMATION OF BANK GUARANTEES

With reference to your letter No. NHAI/30030/EW-II/BOT(Annuity)-UP/2006/830 dated 12.04.2006, we hereby confirm the issue of the following Bank Guarantees in favour of yourselves, NHAI, New Delhi on behalf of M/s OB infrastructure Ltd.

BG No.	Dated	Amount Rs.	Amendt.dt	Expiry Dt.
0910306BG0000093	02.02.2006	5,95,20,000/-	14.03.2006	31.10.2006
0910306BG0000094	02.02.2006	8,92,80,000/-	14.03.2006	30.04.2009

The officers who have signed the guarantees are

1. Smt. K. Vandana Gandhi, Assistant Manager.
2. Sri. K. Sai Prasad, Manager, Accounts & Administration.

The address of our controlling office is

THE GENERAL MANAGER,
STATE BANK OF INDIA,
MIDCORPORATE GROUP,
LOCAL HEAD OFFICE,
KOTI, HYDERABAD.

CC TO
SRI GSVS PRABHAKARA RAO,
MANAGER(FINANCE),
NHAI, PROJECT IMPLEMENTATION UNIT,
MASAB TANK,
HYDERABAD
With reference to your letter No. NHAI/PIU-HYD/12017/2006/292 dated 13.04.2006.

For STATE BANK OF INDIA

OB Infrastructure Ltd.

E-42

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(पोत परिवहन, सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Shipping, Road Transport & Highways)
Project Implementation Unit
First Floor, Plot No. 25, Road No. 2, Castle Hills,
Masab Tank, Hyderabad - 500 057.

Telephone : 040-23532698
Tele Fax : 040-23534141
email : hyd@nhai.org

No.NHAI/PIU-HYD/12017/2006/301

18th April, 2006

Sh. Manish Sehgal
Manager (EW-II)
National Highways Authority of India
New Delhi – 110 075.

May kindly see
19/4/06
DGM(EW-II)
GM (EW-II)

Sir,

Sub:- NHAI, PIU-Hyderabad – Forwarding of Confirmation of Bank Guarantee obtained – Reg.

Ref:- NHAI/30030/EW-II/BOT(Annuity)-UP/2006, dated:12.04.2006.

With reference to the above letter, the following Banks have confirmed the issue of the said Bank Guarantees as detailed below.

Sl. No	Name of the Bank	Name of the Party	Amount (Rs.)	BG No. & Date	Details of the Confirmation Letter Ref.
1	State Bank of India, IF Branch, Hyderabad	M/s.OB Infrastructure Limited	5,95,20,000	0910306BG000 0093 & 02.02.06	Lr.No.Nil & Dt.17.04.06
2			8,92,80,000	0910306BG000 0094 & 02.02.06	
3	Andhra Bank, Sulthan Bazar, Kothi, Hyderabad	M/s.OB Infrastructure Limited	3,34,80,000	2006/106 & 18.03.06	Lr.No.205/BG/ KMC Dt.18.04.06
4			5,02,20,000	2006/107 & 18.03.06	

The above confirmation letters have been obtained from the respective banks and the same are enclosed herewith in Original.

Please acknowledge the receipt of the same.

Yours faithfully

Encl: As Stated

(GSVS Prabhakara Rao)
Manager (Finance)

21/04/06
DGM EW II

Corporate Office : G 5&6, Sector 10, Dwaraka, New Delhi - 110075
Phone : 91-011-25074200 Fax : 91-011-25093514

F-43

భారతీయ స్టేట్ బ్యాంక్
भारतीय स्टेट बैंक
State Bank of India

పారిశ్రామిక ఫైనాన్స్ శాఖ
రాజ్ భవన్ రోడ్,
సోమాజిగూడ,
హైదరాబాద్ - 500 082.
Swift : SBININBB144,
GRAMS : "INDUSBRAN".

औद्योगिक वित्त शाखा,
राज भवन रोड,
सोमाजिगुडा,
हैदराबाद - 500 082.
Email : sa.09103@sbi.co.in

INDUSTRIAL FINANCE BRANCH
Raj Bhavan Road, Somajiguda,
HYDERABAD - 500 082.
✆ : 23409413, 23412767, 4058 (Accts)
EPABX : 23402143 / 23412961
Fax : 23403862, 0635 (Accts.), 2837 (IBD)

సంఖ్య / क्रमांक / No. :

తేది / दिनांक / Date :

17 APR 2006

PROJECT DIRECTOR * OFFICE OF THE * NATIONAL HIGHWAYS AUTHORITY OF INDIA PIU, HYDERABAD

SHRI MANISH SEHGAL,
MANAGER (EW-II),
NATIONAL HIGHWAYS AUTHORITY OF INDIA,
G5&6, SECTOR 10, DWARKA,
NEW DELHI 110 075

17.04.2006

Dear Sir,

CONFIRMATION OF BANK GUARANTEES

With reference to your letter No. NHAI/30030/EW-II/BOT(Annuity)-UP/2006/830 dated 12.04.2006, we hereby confirm the issue of the following Bank Guarantees in favour of yourselves, NHAI, New Delhi on behalf of M/s OB infrastructure Ltd.

BG No.	Dated	Amount Rs.	Amendt.dt	Expiry Dt.
0910306BG0000093	02.02.2006	5,95,20,000/-	14.03.2006	31.10.2006
0910306BG0000094	02.02.2006	8,92,80,000/-	14.03.2006	30.04.2009

The officers who have signed the guarantees are

1. Smt. K. Vandana Gandhi, Assistant Manager.
2. Sri. K. Sai Prasad, Manager, Accounts & Administration.

The address of our controlling office is

THE GENERAL MANAGER,
STATE BANK OF INDIA,
MIDCORPORATE GROUP,
LOCAL HEAD OFFICE,
KOTI, HYDERABAD.

CC TO
SRI GSVS PRABHAKARA RAO,
MANAGER(FINANCE),
NHAI, PROJECT IMPLEMENTATION UNIT,
MASAB TANK,
HYDERABAD
With reference to your letter No. NHAI/PIU-HYD/12017/2006/292 dated 13.04.2006.

OB Infrastructure Ltd.

327

F-44

ANDHRA BANK
SULTAN BAZAR BRANCH
KOTI, HYDERABAD
A.P.-500 095
Ph-24757429, 24757363 Fax-24757558

OFFICE OF THE PROJECT DIRECTOR ★ NATIONAL HIGHWAYS AUTHORITY OF INDIA ★
18 APR 2006
PIU, HYDERABAD.

Lr.No.205/BG/KMC
Date:18.04.2006

To

Mr.GSVS Prabhakara Rao
Manager Finance
National Highways Authority of India
First Floor, Plot No.25, Road No.2
Castle Hills, Masab Tank
Hyderabad-500057

Dear Sir,

Reg:Confirmation of BG issued on behalf of M/s O B Infrastructure Ltd
Ref: Your Lr.No. NHAI/PIU-HYD/12017/2006-291 dated 13.04.2006

With reference to the above, we confirm that we have issued the following bank guarantees on behalf of M/s O B Infrastructure Ltd, a SPV promoted and incorporated by M/s NCC-KMC Consortium in favour of National Highways Authority of India.

BG No.	BG Date	Amount (Rs)	Valid up to
2006/106	18.03.2006	3,34,80,000/-	16.12.2006
2006/107	18.03.2006	5,02,20,000/-	16.06.2009

Yours faithfully,

(L V Ramanaiah)
Chief Manager

Cc:Mr.Manish Sehgal
Manager (EW-II)
National Highways Authority of India
G-5 & 6 Sector-10
Dwarka, New Delhi-110075

O B Infrastructure Ltd.

328

E-95

భారతీయ స్టేట్ బ్యాంక్
भारतीय स्टेट बैंक
State Bank of India

పారిశ్రామిక ఫైనాన్స్ శాఖ
రాజ్ భవన్ రోడ్,
సోమాజిగూడ,
హైదరాబాద్ - 500 082.
Swift : SBININBB144,
GRAMS : "INDUSBRAN",

औद्योगिक वित्त शाखा,
राज भवन रोड,
सोमाजिगुडा,
हैदराबाद - 500 082.
Email : sa.09103@sbi.co.in

INDUSTRIAL FINANCE BRANCH
Raj Bhavan Road, Somajiguda,
HYDERABAD - 500 082.
✆ : 23409413, 23412767, 4058 (Accts)
EPABX : 23402143 / 23412961
Fax : 23403862, 0635 (Accts.), 2837 (IBD)

సంఖ్య / क्रमांक / No. :

తేది / दिनांक / Date : 25.04.2006

Sri. Alok Depankar,
Deputy General Manager(EW-II),
National Highways Authority of India,
G-5& 6, Sector –10,
Dwarka,
New Delhi 110 075

Dear Sir,

CONFIRMATION OF BANK GUARANTEES

With reference to your letter No. NHAI/PIU-HYD/12017/2006/319 dated 24.04.2006, we hereby confirm having issued the following Bank Guarantees in favour of yourselves, NHAI, New Delhi at the request of M/s OB Infrastructure Ltd. incorporated by NCC-KMC Consortium.

S.No.	Guarantee No.	Dated	Amdt.dt	Amount Rs.	Expiry Dt.
1	0910306BG0000093	02.02.2006	20.04.2006	5,95,20,000	31.10.2006
2	0910306BG0000094	02.02.2006	20.04.2006	8,92,80,000	30.04.2009

This is for your information.

Yours Sincerely,

For State Bank of India

ASSISTANT GENERAL MANAGER &
CHIEF OPERATING OFFICER

CC : SRI A VENKATESWARA RAO,
MANAGER(TECH),
NHAI, PIU,
MASAB TANK,
HYDERABAD.

Does not pertain to EW-I dt.
May pl see at appropriate
DGM (EW-II)
(Alok Deepankar)

OB Infrastructure Ltd

329
I-46

National Highways Authority of India

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(पोत परिवहन और सड़क परिवहन एवं राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Shipping & Road Transport & Highways)
Project Implementation Unit
First Floor, Plot No.25, Road No.2, Castle Hills,
Masab Tank, Hyderabad - 500 057

Telephone: 040-23532698
Tele-Fax : 040-23534141
email : hyd@nhai.org

NHAI/PIU-HYD/12017/2006/320

26th April, 2006

To,
Sh.Alok Deepankar,
Dy.General Manager(EW-II)
National Highways Authority of India
New Delhi - 110 075.

Sir,

Sub:- NHAI, PIU-Hyderabad – Forwarding of Confirmation of Bank Guarantees obtained – Reg.

Ref:- NHAI/30030/EW-II/BOT (Annuity)-UP/2006/401 Dt:24.04.2006.

With reference to the above letters, the following Banks have confirmed the Amendment of the said Bank Guarantees as detailed below.

Sl. No	Name of the Bank	Name of the Party	Amount (Rs.)	BG No. & Date	Details of the Confirmation Letter Ref.
1	State Bank of India, IF Branch, Somajiguda, Hyderabad	M/s. O.B. Infrastructure Limited	5,95,20,000	0910306BG0 000093 & 02.02.2006	Lr. No.Nil Dt.25.04.2006
2			8,92,80,000	0910306BG0 000094 & 02.02.2006	
3	Andhra Bank, Sultan Bazar Branch, Koti, Hyderabad.	M/s. O.B. Infrastructure Limited	3,34,80,000	2006/106 & 18.03.2006	205/BG/KMC & Dt.25.04.2006
4			5,02,20,000	2006/107 & 18.03.2006	

The above confirmation letters has obtained from the respective Banks and the same are enclosed herewith in Original.

Please acknowledge the receipt of the same.

Encl: As Stated

Yours faithfully

(GSVS Prabhakara Rao)
Manager (F&A)

330

F-47

(2/3)

Andhra Bank
(A Govt. of India undertaking)

ANDHRA BANK
SULTAN BAZAR BRANCH
KOTI, HYDERABAD
A.P.-500 095
Ph-24757429, 24757363 Fax-24757558

Lr.No.205/BG/KMC
Date: 18.04.2006
24

To

Mr.A Venkateswara Rao
Manager (Tech)
National Highways Authority of India
First Floor, Plot No.25, Road No.2
Castle Hills, Masab Tank
Hyderabad-500057

OFFICE OF THE PROJECT DIRECTOR
25 APR 2006
PIU, HYDERABAD.
NATIONAL HIGHWAYS AUTHORITY OF INDIA

Dear Sir,

Reg:Confirmation of Amendment of BG issued on behalf of M/s O.B.Infrastructure Ltd a SPV promoted and incorporated by M/s NCC-KMC Consortinm
Ref: Your Lr.No. NHAI/PIU-HYD/12017/2006/318 dated 24.04.2006

With reference to the above, we confirm that we have issued the following bank guarantees on behalf of M/s O B Infrastructure Ltd, a SPV promoted and incorporated by M/s NCC-KMC Consortium in favour of National Highways Authority of India and the same was amended on 20.04.2006.

BG No.	BG Date	Amount (Rs)	Valid up to
2006/106	18.03.2006	3,34,80,000/-	16.12.2006
2006/107	18.03.2006	5,02,20,000/-	16.06.2009

Yours faithfully,

(L V Ramanaiah)
Chief Manager

Cc:Mr.Sh.Alok Deopujkar
Dy.General Manager (EW-II)
National Highways Authority of India

F-48 331

భారతీయ స్టేట్ బ్యాంక్
भारतीय स्टेट बैंक
State Bank of India

పారిశ్రామిక ఫైనాన్స్ శాఖ
రాజ్ భవన్ రోడ్,
సోమాజిగూడ,
హైదరాబాద్ 500 082
Swift : SBININBB144
GRAMS : [illegible]

औद्योगिक वित्त शाखा,
राज भवन रोड,
सोमाजिगुडा,
हैदराबाद - 500 082.
Email : sa.09103@sbi.co.in

INDUSTRIAL FINANCE BRANCH
Raj Bhavan Road, Somajiguda,
HYDERABAD - 500 082.
✆ : 23409413, 23412767, 4058 (Accts)
EPABX : 23402143 / 23412961
Fax : 23403882, 0635 (Accts.), 2837 (IBD)

సంఖ్య / क्रमांक / No. :

తేది / दिनांक / Date : 25.04.2006

Sri. Alok Depankar,
Deputy General Manager(EW-II),
National Highways Authority of India,
G-5& 6, Sector - 10,
Dwarka,
New Delhi 110 075

OFFICE OF THE PROJECT DIRECTOR
25 APR 2006
PIU, HYDERABAD.
NATIONAL HIGHWAYS AUTHORITY OF INDIA

Dear Sir,

CONFIRMATION OF BANK GUARANTEES

With reference to your letter No. NHAI/PIU-HYD/12017/2006/319 dated 24.04.2006, we hereby confirm having issued the following Bank Guarantees in favour of yourselves, NHAI, New Delhi at the request of M/s OB Infrastructure Ltd, incorporated by NCC-KMC Consortium.

S.No.	Guarantee No.	Dated	Amdt.dt	Amount Rs.	Expiry Dt.
1	0910306BG0000093	02.02.2006	20.04.2006	5,95,20,000	31.10.2006
2	0910306BG0000094	02.02.2006	20.04.2006	8,92,80,000	30.04.2009

This is for your information.

Yours Sincerely,
For STATE BANK OF INDIA

ASSISTANT GENERAL MANAGER &
CHIEF OPERATING OFFICER

CC : SRI A VENKATESWARA RAO,
MANAGER(TECH),
NHAI, PIU,
MASAB TANK,
HYDERABAD.

OB Infrastructure Ltd.

F-99

332

Schedule G

ANNUITY PAYMENT SCHEDULE

S.No.	Annuity Payment Date	Annuity Amount (Rs. in Crores)
1.	24/10/2009	44.82
2.	24/04/2010	44.82
3.	24/10/2010	44.82
4.	24/04/2011	44.82
5.	24/10/2011	44.82
6.	24/04/2012	44.82
7.	24/10/2012	44.82
8.	24/04/2013	44.82
9.	24/10/2013	44.82
10.	24/04/2014	44.82
11.	24/10/2014	44.82
12.	24/04/2015	44.82
13.	24/10/2015	44.82
14.	24/04/2016	44.82
15.	24/10/2016	44.82
16.	24/04/2017	44.82
17.	24/10/2017	44.82
18.	24/04/2018	44.82
19.	24/10/2018	44.82
20.	24/04/2019	44.82
21.	24/10/2019	44.82
22.	24/04/2020	44.82
23.	24/10/2020	44.82
24.	24/04/2021	44.82
25.	24/10/2021	44.82
26.	24/04/2022	44.82
27.	24/10/2022	44.82
28.	24/04/2023	44.82
29.	24/10/2023	44.82
30.	24/04/2024	44.82

Notes:

Signing of Concession Agreement:	**27th April 2006**
Commencement Date:	**24th October 2006**
Schedule Project Completion Date (SPCD):	**24th April 2009**
1st Annuity Payment Date:	**24th October 2009**
2nd Annuity Payment Date:	**24th April 2010**

Four Laning of the Existing Orai -Bhognipur Section (Km 220.0 to Km 255.00) on NH-25 And Bhognipur – Barah Section (Km 421.20 To Km 449.00) on NH-2 on Build, Operate and Transfer (BOT) or BOT (Annuity) Basis in the State of Uttar Pradesh

Part IV: TECHNICAL SCHEDULES

SCHEDULE – H
PROJECT COMPLETION SCHEDULE

Schedule - H

I. PROJECT COMPLETION SCHEDULE

S. No.	Activities	Completion Period (from the Appointed Date)
1.	Completion of Project Highway from Km 220.000 to Km 255.000 and Km 422.000 to Km 449.000 (Existing Chainage) on NH-25	**30 months**

The site shall be handed over as below from the date of financial close

Stretch	Remarks
30 KM	Within One month
Balance Length.	Within 6 months

Note: The above Handing over Schedule is subject to accomplishment of all type of obligations of the Concessionaire as mentioned in the Request for Proposal (RFP) Document.

III. PROJECT MILESTONES

S. No.	Project Mile Stone	Months																													
		1	2	3	4	5	6	7	8	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preconstruction Activities																															
1	Achievement of Financial Closure																														
2	Project Design																														
3	Handing Over the site to the Concessionaire																														
4	Mobilisation at site by concessionaire																														
5	Shifting of utilities including tree cutting																														
Construction Activities																															
6	Bridges and CD Structures																														
7	ROB, Underpass & Grade Separator																														
8	New Carriageway																														
9	Existing Carriageway																														
10	Toll Plaza and Administrative Blocks																														
11	Safety Features																														
12	C.O.D.																														

SCHEDULE-I: DRAWINGS

1. The Project Highway drawings, as defined in Clause 1.1, Definitions, Article I, Definition and Interpretation, Chapter I – Preliminary, of the Concession Agreement shall consist

   A. Working drawings of all the components/elements of the Project Highway as determined by Independent Consultant/NHAI, and

   B. As-Built drawings for the Project Highway components/elements as determined by Independent Consultant/NHAI.

   As-Built drawings shall be duly certified by the Independent Consultant.

2. Annexure "A" of this schedule gives the list of drawings (only drawing as defined in Dictionary) of the main components/elements of the Project Highway required to be submitted by the Concessionaire .

Annexure A

LIST OF DRAWINGS TO BE SUBMITTED BY CONCESSIONAIRE SHOULD INCLUDE BUT NOT BE LIMITED TO:

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

b) Drawings of interchanges, major intersections and grade separators.

c) General arrangement drawings of toll plaza layout, toll collection system and roadway near toll plaza.

d) Drawings of Administrative Base Camps and Control Centre.

e) Drawing of a bus-bay and bus shelters with furniture and drainage system.

f) Drawing of a truck parking layby with furniture and drainage system.

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

h) Drawing of traffic diversion plans and traffic control measures.

i) Drawings of road drainage measures.

j) Drawings of typical details of slope protection measures.

k) Drawings of landscaping and horticulture.

l) Drawings of Pedestrian Crossings.

m) Drawings of Street Lighting.

n) Drawings of general arrangement of cross-drainage works.

o) Layout Configuration of HTMS.

Schedule J

TESTS TO BE CONDUCTED

During the Construction Period, the Concessionaire shall carry out the Tests and Independent Consultant will carry out quality audit of the tests carried out by the Concessionaire. Independent Consultant may carry out more tests as per a pre-determined programme. These tests and quality audit shall include but not be limited to the following:

S.No.	Item	Test	Testing Procedure
1.0	**Earthwork for embankment, subgrade construction and cut formation**		
1.1	Embankment and subgrade borrow materials	Quality Audit of the following tests performed during construction for soil type, density, moisture content and CBR as required by Ministry of Surface Transport specifications for Road and Bridge works • Moisture Content test as per IS : 2720 (Part 2) • Sand Content Test according to IS : 2720 (Part 4) • Plasticity Characteristics of soils according to IS : 2720 (Part 5) • Moisture Content-Dry Density relationship using heavy compaction according to IS: 2720 Part 8. • Determination of total soluble sulphate content as per IS : 2720 Part 37 • IS : 2720 (Part 40): Determination of Free Swelling Index of solutions	As per relevant parts of IS - 2720
1.2	Compaction	Quality Audit of the following Tests performed during construction as required by MORT&H specifications for Road and Bridge works. • Compaction density and • Determination of dry density of soils in place according to IS-2720, Part 28 by the Sand Replacement Method	As per IS-2720, Part 28

Sl. No.	Item	Test	Testing Procedure
2.0	**Pavement Structure**		
2.1	Granular Sub base and base course:	Quality Audit of quality control tests on soils, aggregate and moisture content - density tests and CBR tests as required by MORT&H specifications for Road and Bridge works. • Plasticity Characteristics of soils according to IS : 2720 Part 5 • Dry density of soils in place according to IS : 2720 Part 28 • Determination of total soluble sulphate content as per IS : 2720 Part 37 • CBR test as per IS : 2720, Part 16 • Dry density-moisture content relationship as per IS: 2720 Part 8 • Aggregate grading as per Job Mix Formula • Aggregate Impact value as per IS: 2386 (Part 4) or IS : 5640 • Particle size and shape as per IS : 2386 (Part I)	As per relevant parts of IS – 2720, IS 2386 and IS 5640
2.2	Bituminous base and wearing courses	Quality Audit of quality control tests on aggregates and bitumen and on bituminous mixes as laid down in clause 903.4 of MORT&H specifications for Road and Bridge works. • Aggregate Impact Value as per IS2386 (Part 4) • Particle size and shape as per IS : 2386 (Part I) • Stripping value test as per AASHTO T182 • Water absorption as per IS : 2386 (Part 3) • Soundness Test as per IS : 2386 Part 5 • Marshall stability test as per ASTM D-1559	As specified in the codes IS 2386, parts 1,3,4 and 5, AASHTO T182 and ASTM D-1559
2.3	Cement concrete Pavement	Quality audit of sampling and testing of cubes and beams for strength of concrete and quality control tests on aggregates • Aggregate Impact Value as per IS : 2386 (Part 4) • Soundness Test as per IS: 2386 (Part 5) • Alkali Aggregate Reactivity IS : 2386 (Part 7) • Strength of Concrete (Tests on Cubes and beams) as per IS : 516	As per relevant parts of IS 2386, IS 516 and IS1199

Infrastructure

340 3-2

Sl. No.	Item	Test	Testing Procedure
		• Workability of fresh Concrete - Slump Test IS : 1199	
2.4	Riding Quality of Surface	Checking International Roughness index of the finished pavement surface for compliance with the requirement stated in clause 2.5.7 of Schedule D.	Roughness measurement by bump integrator (Annexure A) or an equivalent device approved by NHAI/IC
3.0	**Bridges**		
3.1	Cement, aggregate, reinforcement pre-stressing steel and Concrete	Tests and Standards of Acceptance as per MORT&H Specifications of Tests performed during construction	The Auditing shall be carried out in accordance with the IRC special publication on Quality Assurance
3.2	Superstructure	Static load testing of any one span of the structure for carrying design load as per IRC SP 37-1991	Test shall be carried out in accordance with Annexure B
3.3	Bearings	Checking and verification of the bearings to ascertain proper functioning as per MORT&H Specifications.	The inspection shall be carried out in accordance with requirement laid in MORT&H specifications for Road and Bridge works and shall meet the prescribed criteria.
3.4	Expansion Joints	Checking and verification of the Expansion joints to ascertain proper functioning as per MORT&H Specifications	The inspection shall be carried out in accordance with requirement laid in MORT&H specifications for Road and Bridge works and shall meet the prescribed criteria.
3.5	Foundation & Substructure	Checking and verification of the Foundation settlement and rotation	The settlement of foundation for superstructure load at completion shall be measured with reference to a fixed datum. (For this purpose, the records of measurements taken before the superstructure concreting should also be available.)
4.0	Highway Lighting System	Level of illumination	The illumination level shall be measured with luxmeter following the method as specified in its manual (Annexure C).
5.0	Traffic Signals	Test in accordance with the relevant clauses of	Meet the prescribed criteria in IRC 93 and IS 7537

Sl. No.	Item	Test	Testing Procedure
		IRC:93 and IS 7537	
6.0	Toll System Operations	1. Certified report of Factory Acceptance test (FAT) 2. Post installation site test to conform to the functionability and specifications of the contract	Real time test for individual functionality of each component which should conform both specifications / codes stipulated in the country of manufacture. It should include manual operations in case of no power
7.0	Rest Area Operations	Test in accordance with the functioning of facilities built in RAO	Standard building safety procedures as presented by NBC
8.0	Emergency Telephone System	Independent Systems to be developed to operate on the Project site	Real time test to be carried out to conform to the designed system.
9.0	Traffic Signage and Pavement Marking	Tests in accordance with ASTM standard E:810 relevant clauses of section 800 of MORT&H specifications for Road and Bridge works published by IRC 1997	To follow ASTM Standard E:810 as per section 800 of MORT&H specifications for Road and Bridge Works published by IRC 1997

1 **Schedule for Tests**

1.1 The Concessionaire shall, not later than 30 (thirty) days prior to the likely completion of [Four-Lanning], notify the Independent Consultant and NHAI of its intent to subject the Project Highway to Tests, and not later than 10 (ten) days prior to the actual date of Tests, furnish to the Independent Consultant and NHAI a detailed inventory and particulars of all works and equipment forming part of [Four-Lanning].

1.2 The Concessionaire shall notify the Independent Consultant of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Independent Consultant shall, in consultation with the Concessionaire, determine the date and time for each Test and notify the same to NHAI who may designate its representative to witness the Tests. The Independent Consultant shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 16 and this Schedule-J.

2 **Tests**

2.1 **Visual and physical Tests:** The Independent Consultant shall conduct a visual and physical check of [Four-Lanning] to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

2.2 **Test Drive:** The Independent Consultant shall take test drive of the Project Highway by a Car and a fully loaded Truck to determine that the quality of service conforms to the provisions of this 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 as mentioned at annexure A of this Schedule.

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) kilometers of the Project Highway. The first pit for the sample shall be selected by the Independent Consultant through an open draw of lots and every fifth kilometer 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 measurements 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) kilometer of the Project Highway. The first spot shall form part of the sample shall be selected bye the Independent Consultant through an open draw of lots and the spots located at every one kilometer from such first spot shall form part of the sample. For the bridge portion, one spot shall be selected at random by the Independent Consultant 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 random by the Independent Consultant.

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

2.8 **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 Consultant shall determine conformity of the Project Highway with the provisions of this Agreement.

3 **Completion/Provisional Certificate**

Upon successful completion of Tests, the Independent Consultant shall issue the Completion Certificate or the Provisional Certificate, as the case may be, in accordance with the provisions of Article 16.4.

Annexure-A

TEST PROCEDURE FOR MEASURING ROUGHNESS INDEX OF THE RIDING SURFACE OF A FLEXIBLE PAVEMENT

EQUIPMENT – Bump Integrator Fitted in a Vehicle

Test Procedure:

The following test procedure shall be adopted for the test

1) Check that the installation and operation of the equipment is in order and meets the requirements prescribed in its operational manual. The tyre pressure of wheels should be as prescribed.

2) The instrument shall be calibrated prior to its use for measurement as prescribed in its operational manual.

3) The operators shall familiarise themselves with the Bump Integrator & other equipment associated with its operation using its Test Mode before commencing a survey.

4) Generally a speed varying between 30 km./hour-40 Km/hour shall be maintained during measurements. The readings shall be taken for each carriageway independently.

5) The equipment shall run on a lane in both the directions once and the average of two values taken for its roughness index.

6) Pavement unevenness/roughness of 2/3 lane carriageway shall be obtained from the average of the values of the 2/3 lanes recorded.

7) The roughness index value is obtained by using the internationally accepted software associated with the equipment from the measured Bumps.

8) All data shall be properly recorded with appropriate referencing and stored in a prescribed manner as in the operational manual.

9) The roughness measurements shall be properly calibrated using the procedure recommended in the World Bank Technical Publication No. 46.

Annexure-B

LOAD TESTING OF A BRIDGE SUPERSTRUCTURE

The load test shall be carried out to check and establish the serviceability and working strength of the superstructure.

1.0 Test Load

The "Test Load" is the equivalent static load equal to the impacted working design Live Load (applied in addition to all dead loads) placed for maximum effect (bending moment, shear, deflection, etc. as the case may be) and applied either through an appropriate test loading truck or through loading platforms resting on tyre-contact area plates simulating the actual areas of wheels.

2.0 Load Application and Testing Procedure

I. Fix deflection gauges (supported on unyielding supports) under the superstructure, just touching its soffit, at the pre-marked critical 'points'.

II. Apply the test load in five equal increments (including the weight of platforms of trucks in the first increment), allowing about two hours in between completion of one load increment and commencement of the next. About an hour after completing a load increment, note the deflections and any crack patterns together with maximum crack widths.

III. After measuring the deflections, etc. one hour after applying the fifth increment, i.e. the final load increment, keep the test load maintained for about 24 hours and again measure the deflections and crack widths (if any)

IV. Remove the test load in five equal decrements, allowing about two hours in-between completion of one load decrement and commencement of the next. Note the deflections and crack widths (if any) at the end of each load decrement.

V. Note the deflection and crack widths (if any) 24 hours after removal of the test load in order to see whether the recovery is complete or there is any residual deflection, etc.

3.0 Acceptance Criteria

I. Increase and decrease in deflections at a point shall follow a linear relation, with actual deflections not exceeding the theoretically estimated ones by more than 10%;

II. The maximum crack width in reinforced concrete shall not exceed 0.25 mm to 0.30 mm (but no cracks in case of prestressed concrete);

III. The deflections at the end of the 24 hours of maintaining the test load shall not exceed the corresponding values at the start of this 24 hour period by 5% and

IV The residual deflection at any point 24 hours after complete unloading shall not exceed 10% of the maximum observed deflection at that point (i.e. recovery: 90% or more);

4.0 Observation

The cracks in reinforced concrete shall close upon removal of test load but may not completely disappear.

Annexure-C

Testing Procedure for Illumination intensity by Luxmeter

Instrument	Luxmeter (make of renowned company)
Basis	Comparison with a calibrated Luxmeter through a standard lamp by renowned Photometric Lab.

Test Procedure:

Following steps shall be taken for the test

- Calibration of the luxmeter
- Put off the lights to be tested
- Take calibrated luxmeter reading.
- Put on the lights in the area to be tested
- Observe the luxmeter reading
- Difference (positive or negative) in addition with standard light luminance level will give the actual luminance of existing lighting system.

Note: The testing procedure shall be as per the Manual of the Luxmeter used.

SCHEDULE - K

COMPLETION CERTIFICATE

(In case the Completion Certificate is being issued without the Provisional Certificate already being issued)

I/We, **(Name of Independent Consultant)** acting as Independent Consultant on the Project "**Design, Construction, Development, Finance, Operation and Maintenance of Km..... to Km....., and Improvement, Operations and Maintenance of Km _____ to Km _____ of section of NH (NH no.) in the state of (Name of the state)**, India on BOT (Annuity) basis" through the Concessionaire, **(Name of Concessionaire)** hereby issue this Completion Certificate in-terms of sub-clause 16.4 of Concession Agreement since the said Project has been completed and successfully tested as per Schedule 'J' as stipulated in the said Concession Agreement and is ready for commissioning of traffic commercially as provided in the Concession Agreement dated **(Date of Agreement)** between the said Concessionaire and the NHAI. The date of issue of this Completion Certificate shall be the COD, as defined in the said Concession Agreement.

Dated _____

(Date of Issue)

Team Leader

Authorised Representative of the Independent Consultant

(In case the Completion Certificate is being issued with the Provisional Certificate already being issued)

I/We, **(Name of Independent Consultant)** acting as Independent Consultant on the Project "**Design, Construction, Development, Finance, Operation and Maintenance of Km..... to Km....., and Improvement, Operations and Maintenance of Km _____ to Km _____ of section of NH (NH no.) in the state of (Name of the state)**, India on BOT (Annuity) basis" through the Concessionaire, **(Name of Concessionaire)** hereby issue this Completion Certificate

in-terms of sub-clause 16.4 of Concession Agreement since the said Project has been completed and successfully tested as per Schedule 'J' as stipulated in the said Concession Agreement and all the Punch List Items as mentioned in the Provisional Completion Certificate issued on----------completed as provided in the Concession Agreement dated **(Date of Agreement)** between the said Concessionaire and the NHAI.

Dated _____

(Date of Issue)

Team Leader

Authorised Representative of the Independent Consultant

SCHEDULE – K_1

PROVISIONAL COMPLETION CERTIFICATE

I/We **(Name of Independent Consultant)** acting as Independent Consultant on the Project, "**Design, Construction, Development, Finance, Operation and Maintenance of Km..... to Km....., and Improvement, Operations and Maintenance of Km _____ to Km _____ of section of NH (NH no.) in the state of (Name of the state)**, India on BOT (Annuity) basis" through the Concessionaire, **(Name of Concessionaire)** hereby issue this Provisional Certificate of Completion in-terms of sub-clause 16.5 of Concession Agreement dated **(Date of Agreement)**, between the said Concessionaire and the NHAI, on the request of the said Concessionaire subject to the appended Punch List containing a list of outstanding items since the tests stipulated in Schedule 'J' have been successfully carried-out and all parts of Project Highway can be legally, safely and reliably placed in commercial operations though certain works and things forming part thereof are not yet complete as indicated in the said Punch List. All the items of the said Punch List shall be completed by the said Concessionaire with in 120 (one hundred and twenty) days of the date of issue of this Provisional Certificate of Completion. The date of issue of this Provisional Completion Certificate shall be the COD, as defined in the said Concession Agreement.

Dated _____

(Date of issue)

_____
Team Leader

_____
Authorised Representative of the Independent Consultant

SCHEDULE L

OPERATION AND MAINTENANCE REQUIREMENTS

1. Introduction

The Concession Agreement stipulates that length of **Project Highway** shall be constructed, operated and maintained during the Concession Period by the Concessionaire in accordance with scope defined in Schedules B & C and thereafter transferred to National Highways Authority of India (NHAI). In addition, the Concessionaire is also responsible for improvement and operation and maintenance of the **Additional Highway** considered for the BOT Annuity package as mentioned in Schedule A. This Schedule elaborates the operation and maintenance requirements of the Concession and is to be read together with the Concession Agreement for this purpose. For clarification of doubt, the period during which the Concessionaire shall comply with the O&M requirements covers the entire Concession Period including the Construction Period. In particular, during the Construction Period, the Concessionaire is required to operate and maintain the existing two lanes as provided in the Concession Agreement and this Schedule. The Concessionaire shall operate and maintain the Project Highway such that during the Construction Period, the two existing lanes are ordinarily open to traffic at all times and from Commercial Operations Date (COD), lane availability at the end of each year of the Concession will be a minimum of 99% on a cumulative basis. For this purpose, lane availability at the end of each year will be computed as follows:

$$\frac{\text{(Length in Km x no. of lanes x number of days since COD)} - \Sigma \text{ (lane kms closed x number of days for which closed)}}{\text{(Length in Km x no. of lanes x number of days since COD)}}$$

Note:

- In the above formula the lane Km closed does not include the Additional Highway considered for BOT Annuity package if the same has not been completed by the time the Concessionaire completes developments to Project Highway.
- If the Additional Highway considered for BOT Annuity package is completed in all respects and handed over to Concessionaire, the above formula shall include total

length of BOT Annuity package from the day of handing over the Additional Highway to the Concessionaire.

- Any Lane closure due to emergency reasons shall be excluded for computing lane availability.

2. Operation and Maintenance (O&M) Requirements

2.1 The Concessionaire shall take all such actions and do all such things (including without limitation, organising itself, adopting measures and standards, executing procedures such as inspection procedures, highway patrols, and engaging and managing contractors, agents and employees) as will secure:

a) The safety of users of the Project Highway, workers or other persons on the Project Highway and/or facilities thereon;

b) Unimpaired performance of statutory duties and functions of the NHAI and other Authorities in relation to the Project Highway and/or other adjoining roads and facilities;

and, subject to paragraphs a) and b), above, ensure that:

2.1.1. adequate safety measures, taking into account Schedule 'S', are taken up on the Site during the Construction and Operation periods.

2.1.2. delay to users of the Project Highway and of adjoining roads or facilities is minimised;

2.1.3. risk of adverse effects on the environment and on the amenity enjoyed by the owners and occupiers of property and/or land adjacent to the Project Highway, adjoining roads and facilities is minimised;

2.1.4. accidents and emergencies on the Project Highway and facilities thereon are responded to as quickly as possible and their adverse effects minimised;

2.1.5. risk of disturbance or damage or destruction to property of third party is minimised;

2.1.6. members of the public are treated with due courtesy and consideration;

2.1.7. users are given adequate information and forewarning of any event on or any other matter affecting the Project Highway which will enable them to minimise any adverse consequences on them of that event or matter;

2.1.8. members of the public and others are given adequate opportunity to bring to the attention of the Concessionaire any matters affecting its ability to meet the O&M Requirements;

2.1.9. Traffic data and data relating to the operation and maintenance of the Project Highway and Project Facilities and events on the Project Highway are collected and disseminated such that the NHAI and other persons or bodies with statutory duties or functions in relation to the Project Highway or adjoining roads are able to perform those duties and functions efficiently.

2.1.10. the Project Facilities shall be operated and maintained in order to fulfil the requirements set forth in the Concession Agreement and in this Schedule L;

2.1.11. The Scope for operation and maintenance includes but not limited to following.

- Improvement - this includes improvement in the existing assets as per requirement of this Agreement and safety audit if any in consultation with IC
- Road maintenance – this includes routine maintenance, major maintenance, periodic preventive maintenance, disaster maintenance and inspections;
- Traffic Management – incident management; enforcement of regulations together with the relevant authorities, hazard response; information gathering and dissemination, road patrols and surveillance;
- Safety - accident prevention; after care; user behaviour; education, enforcement, data collection and analysis.
- Facility management – including periodic inspections, routine maintenance, rehabilitation and expansion planning
- Road property management – management of access, encroachment and ribbon development
- General responsibilities – including budgeting, compliance with legal and accounting requirements, and public relations
- Planning of Operations and Maintenance Centre – including the basic planning, comment on the detail design, and design co-ordination.
- Maintaining public relations unit to interface with and attend to suggestions from users of the highway, the media, Govt. agencies and other external agencies

The broad limit of responsibilities of the Concessionaire shall be as described below

(a) In general the limit of the Concessionaire 's responsibility is to maintain all areas within the Right-of-Way (RoW) of the Project Highways inclusive of all facilities such as

interchanges, street lighting facilities, traffic light facilities, emergency telephone networks and other facilities constructed by the Concessionaire within the Project Highways

(b) Limit of maintenance by the Concessionaire for another road joining or crossing the concession limit, shall be according to the following conditions:

(i) Where the other road crosses an underpass, the Concessionaire shall be responsible to maintain the crossing structure, viz., culverts, bridges and their abutments and related facilities, such as drainage, turfing, etc. The Concessionaire shall not be responsible for maintenance of the road surface, or the roadside drains of the other roads that are 100m beyond the RoW of Project Highway.

(ii) For the road that crosses an overhead bridge, and the bridge is not a part of an interchange, the Concessionaire shall be responsible for maintenance of the surface of the bridge, joints repairs, drainage linked to the bridge and its abutments.

(c) The Concessionaire shall operate and maintain all the street lighting, traffic light system, structures, roadway surface and the related facilities such as drainage, turfing, etc within the interchanges, and such maintenance shall be extended until the end of the flare and the deceleration and acceleration lanes of the interchanges.

(d) The Concessionaire shall be responsible for maintaining all cross roads indicated in Schedule B up to a length of 100 meters from the Right-of-Way of the Project Highways, and their flares to junctions at any interchange within the Project Highway, whichever is more.

(e) For setting out the limit of maintenance for the Concessionaire, National Highways Authority of India shall be responsible for negotiating with the local authorities or where required, with other relevant third parties. The Concessionaire shall maintain all the drainage system within the Right-of-Way including the culvert crossings and the drains. However, the Concessionaire shall not be liable to maintain rivers and the streams under

the jurisdiction of Irrigation Department, except when such maintenance is required as a result of exceptional discharge.

2.2. TRAFFIC MANAGEMENT AND LANE CLOSURE

2.2.1. Traffic Management during the entire Concession Period is an important activity that the Concessionaire has to attend to ensure safety of the road users as well as the construction workers simultaneously throughout the concession period. It is an usual activity to carryout various types of construction works at different stages and at different periods as per site requirements. Also, it is a vital activity during unforeseen and/or emergency situations arising on account of natural causes or accidents or administrative reasons.

2.2.2. Traffic Management is required during planned / scheduled construction and maintenance activities. However, traffic management will also be called for during unscheduled activities such as

(i) Emergency situation arising on account of

a) Force Majeure;

b) Accident/Incident on the Project Highway;

(ii) Special repairs required on account of failure of an element of the Project Highway; and

(iii) Default of the Concessionaire with respect to an operational activity on the Project Highway.

2.2.3. The basic principles to be followed for traffic management and lane closure on the Project Highway shall be as follows:

2.2.3.1. Work programme schedule shall be prepared such that diversion roads for the main traffic are minimized. The existing two lane carriageway is utilized to the maximum extent possible.

2.2.3.2. Measures shall be taken that the traffic is guided from a closed lane onto the operating lane without its conflict with the traffic from the opposite direction.

2.2.3.3. The activity of renewal of pavement surface and/or strengthening of the pavement structure shall not be taken up in a continuous length of more than 2 kilometres at a time to avoid long detour of the traffic.

2.2.3.4. The traffic diversion road where provided shall be appropriately designed for the traffic plying on the highway. It shall also be properly maintained during its operation period.

2.2.3.5. During Traffic detour involving traffic diversion adequate safety measures, Schedule 'S' shall be followed.

2.2.3.6. Proper and adequate information about the maintenance activity shall be notified to the users of the Project Highway in advance and displayed at the Site during the Operation Period.

2.2.4. Traffic Management plan and programme for a planned scheduled construction and/or maintenance activity shall be prepared in advance of that activity keeping 2.2.1 above in view and got approved by the Independent Consultant/NHAI as the case may be.

2.3. In case of un-scheduled activities, described in 2.2.2 (I) to (iii) above, an emergency traffic management for the affected reach of the highway shall be prepared and implemented in consultation with the Independent Consultant immediately. This emergency traffic management plan shall take into account the various requirements spelt out in the Concession Agreement as well as in this Schedule.

2.4. Lane closure is a vital activity during construction and/or maintenance in the Concession Period that the Concessionaire shall carryout in an organized, planned and disciplined manner.

2.4.1. Lane Closure involves traffic management in the affected reach of the highway, as such it is always a time bound activity and the Operation and Maintenance Manual incorporates it accordingly. In case where the Concessionaire fails to perform in time, a penalty shall

be levied on the Concessionaire for the delay in reopening the closed lane to the traffic in terms of the Concession Agreement.

2.4.2. The basic principles to be followed in preparation of a planned lane closure shall be as follows:

2.4.2.1. The activity of renewal of pavement surface and/or strengthening of the pavement structure shall be taken up in one lane of the 2/3 lane carriageway so that at least one lane of that carriageway is available to the traffic.

2.4.2.2. The activity of renewal or strengthening, item 2.5.1 below, shall not be carried out in a continuous length of more than 2 km in rural section and 1 km in urban section so that the closure of a lane is not more than 2 days and 1 day in rural and urban sections respectively.

2.4.2.3. Lane closure adopted for diverting the main traffic on account of the traffic management during construction works of the Project Highway shall be governed by the approved programme of Construction Works.

2.4.2.4. Lane Closure in short lengths less than or equal to 500 metres for carrying out a routine maintenance activity defined in item 4.2.1.1 of this Schedule shall not be for more than a continuous period of 1 day.

2.4.2.5. The lane closure needed on account of emergency shall be distinguished from the lane closure described in item 2.4.2.3 above. The lane closure on account of the Emergency shall be dealt with under sub clause 18.9, Emergency De-Commissioning, Article XVIII Operation and Maintenance, Chapter IV, Project Development and Operation of this Agreement.

Traffic Management and Lane Closures Requirements during various situations arising on the Project Highway needing Traffic Management are detailed below:

2.5. Initial Construction Stage

2.5.1. Rural Section

i) The widening of the existing 2 lane carriageway shall be generally eccentric to make a four/six (4/6) lane divided carriageway facility. A new 2/3 lane carriageway separated from the existing carriageway with a 4.5m central median will be constructed in the first instance and then strengthening and widening of existing 2 lane carriageway shall be undertaken.

ii) The construction sequence in this case will be as under:

a) 2/3 new lanes will be constructed initially. There will be no conflict area for the main traffic using the existing two lanes during this construction stage. It shall be ensured that the construction traffic does not conflict with the main traffic in this stage.

b) On completion of the 2/3 new lanes throughout, the total traffic will be diverted on it and the existing 2 lanes will be widened with paved shoulders /additional lane with paved shoulder depending upon the new carriageway configuration upto the existing road level. Thereafter, entire width including the existing 2 lanes and the widened portion shall be given bituminous base courses uniformly.

2.5.2. Urban Section

i) The widening of the existing 2 lane carriageway shall be generally concentric to make it a 4/6 lane divided carriageway facility. The divider will be a 1.5 m wide central median.

In addition, service road will be provided on either side of the 4/6 lane carriageway facility.

ii) The construction sequence in this case will be as under:

a) Service roads and side drains on both the sides will be constructed initially. There will be no conflict area for the main traffic, which will be using the existing two lanes. It will be ensured that the construction traffic does not conflict with the main traffic at exit and entry points.

b) On completion of the service roads on both sides, the main traffic will be diverted on them direction wise and the existing 2 lanes will be widened to 2/3 lanes on each side duly accounting for the 1.5 m wide central median. On completion of the widening upto the existing road level, the median will be constructed. On its completion, the existing road will be strengthened in such a manner that the bituminous base courses and the wearing course layers are laid uniformly in 2/3 lanes and paved shoulder on either side of the 1.5 m wide central median. During this operation, the construction traffic will not be conflicting with the main traffic on the service roads.

c) On completion of the divided lane carriageway of the Project Highway, the main traffic from the service roads shall be restored on them.

2.6. Operation and Maintenance Stage

2.6.1. This is applicable for the entire Operations Period for the Project Highway during the entire Concession Period. Various important activities to be carried out during this stage are:

a) Regular periodic maintenance activities:

i) Renewal of the wearing surface of the road pavement once every 5 years.

ii) Strengthening course to be provided on 'as required' basis.

b) Maintenance activities arising out of the specific need(s) on account of the site conditions are:

i. Strengthening course required on account of the Benkelman Beam Deflection (B.B.D) values in excess of the prescribed criteria obtained during regular testing as per the Concession Agreement requirement.

ii Wearing course required on account of the IRI values higher than the prescribed criteria obtained during regular testing as per the Concession Agreement requirement.

iii Localized repairs in short lengths less than 500 m on account of pot holes, cracking, subsidence in isolated spots or in scattered areas.

2.6.2. In order to cater to the execution of the said activities, para 2.6.1 above the main traffic will have to be diverted to an extent dependent on the site requirement

2.7. EMERGENCY STAGE

2.7.1. This stage could arise any time in an emergency situation and shall have to be addressed to on its own merits. The extent of the traffic management shall be assessed as per the site requirement and situation.

2.7.2. The emergency situation could be faced in the following three situations

a) During the period between the award of the work and commencement of the construction works on financial close.

In this situation the existing two lane facility is available only. The traffic management will have to be tailored accordingly. Either the existing one lane will have to be closed passing the traffic on another lane and its adjoining shoulder or both the existing lanes will be closed and a diversion road provided.

b) During the period when construction works are in progress.

In this case the availability of the carriageway at site shall decide the nature and extent of the traffic diversion.

c) During the period when the Project Highway is under operation and/or maintenance. the nature of emergency requirement in this case will determine the type and extent of the traffic diversion.

2.7.3. Traffic Management in emergency situation shall be provided immediately in consultation with the Independent Consultant

3. OPERATIONS

3.1. Introduction

3.1.1 The Concessionaire shall in consultation with the Independent Consultant evolve an Operations and Maintenance Manual (Maintenance Manual) as per sub-clause 18.2 of this Agreement.

3.1.2. The said Maintenance Manual shall have two separate sections, namely

(i) Section I - Operations; and

(ii) Section II - Maintenance

These are briefly described in items 3.2 and 4 of this Schedule respectively.

3.2. Section I - Operations

It shall prescribe procedures and systems for activities including but not limited to the following for the regular and emergency operations of the Project Highway and Project Facilities thereon

3.2.1. Regular Operations

- Permitting smooth and uninterrupted flow of traffic during normal operating conditions.
- Functioning of the lighting system.
- Functioning of the Patrolling System
- Functioning of rescue and medical aid services
  - Ambulance
  - Fire Brigade
  - Tow away truck and cranes
- Functioning of the Highway Traffic Management System
  - Emergency Call Boxes (ECBs) for Road Users
  - Central Control System
- Functioning of the Project Facilities
  - Administrative, Operational and Maintenance Base Camp
  - Rest Areas
  - Truck Parking Laybys
  - Electrical Services at Laybys, Bus Stops and Rest Areas
  - Potable Water supply system including supply of drinking water at truck parking laybys, rest areas etc.
  - Public toilets and other sanitary facilities
  - Pickup Bus
  - Solid waste disposal system including those from litterbins

3.2.2. Emergency Operations

Minimising disruption to traffic in the event of accidents and/or incidents affecting the safety and use of the Project Highway by providing a rapid and effective response and maintaining liaison procedures with emergency services.

- Reasonably smooth and safe movement of traffic during emergency activities such as special repairs during floods, storms, hurricanes and earthquakes
- Failure of a system due to human error, electrical or mechanical failure

3.3. The Concessionaire shall keep regular record of accidents that occur including the nature of accident, location of occurrence, time and date in the prescribed format, included in the Maintenance Manual and shall forward the monthly particulars of the same to the Independent Consultant and the NHAI regularly in the first week of the following month

3.4. The Concessionaire shall programme inspections of the Project Highway for its smooth operations in terms of the Concession Agreement classified in the following categories

- Visual Inspection
- Close Inspection
- Thorough Inspection

and described herein under

3.5. Visual Inspection

Visual Inspections are broad general inspections carried out quickly and frequently by highway /bridge maintenance engineers having knowledge of road structures. The purpose of this visual inspection is to report the obstacles to traffic and fairly obvious deficiencies, which could lead to accidents or maintenance problems. Such inspections should be frequent. The visual inspection may be carried out by visual assessment with careful observation of the specific object/item of the Project Highway for identification and for quantification of the deficiencies or damages of the Project Highway

3.6. Close Inspection

The close inspection may be visual and/or supplemented by standard instrumental aids for assessment of defects / deficiencies of Project Highway with careful observation of specific

element(s). The close inspection may be daily / periodic but it is more intensive and would require detailed examination of elements of the Project Highway. It should cover all the aspects of the specific element of Project Highway against a checklist. The close inspections are to be carried out quite frequently depending upon the nature of structure of Project Highway. This inspection is to be carried out by the Highway/Bridge Engineer having good knowledge of road structures with theoretical background to analyse the nature, and extent of defects/deficiencies, suggest suitable remedial measures to rectify/remedy them and quantify repair work.

3.7. Thorough Inspection

A thorough inspection is comprehensive and detailed for assessment of defects/deficiencies of the Project Highway by visual inspection or with aid of standard equipment and non-destructive testing where necessary. Such an inspection is to be carried out on the basis of comprehensive checklist of items related to the materials, condition and situation of the structure etc. The checklist is to be prepared meticulously well in advance of inspection. The thorough inspection should be undertaken during the most critical weather condition, which is generally rainy season in India. During rainy season the Road/Bridge structures are under severe condition, thereby the damage and deficiencies of the Project Highway are more pronounced. The inspection carried out during the said period offer the most critical evaluation of the performance of the structure.

The thorough inspections are all the more important for Bridges, Culverts and drainage structures, as well as road pavements during adverse weather condition of monsoon period.

Besides being a qualified Highway/Bridge engineer, the inspection team leader must be familiar with design and construction features of the Highway /Bridges to be inspected so that the condition can be properly and accurately assessed for a meaningful report and quantification of repair works. The competence of team leader to recognise any structural distress/deficiencies and assess its seriousness with complete recommendation for appropriate repairs are important pre-requisites for entrusting this assignment to him.

3.8. Frequency of Inspections

The inspection frequency of various items of Project highway has been indicated in the Table L-1 hereunder. The frequency of inspection can be suitably revised in consultation with the Independent Consultant if the emergencies so warrant.

Table L-1: Objective and Frequency of Inspection

(The objective and minimum frequency of inspections under normal circumstances shall be as under. If some exigencies arise, the interval of inspection may be reduced)

Object	Item	Daily	Monthly	Quarterly	Before and after rainy season
Riding Surface	Pavement				
	Expansion joints				
Median	Kerb				
Side Slopes	Shape				
	Turfing				
	Pitching & masonry				
	Retaining wall				
Drainage	Shoulder drain	❖			
	Median drain	❖			
	Side slope drain	❖			
	Bridge catch basin	❖			
	Gullies and catch pits	❖			
Bridges	Superstructure				
	Substructure				
	Head walls and aprons				
	Painting				
	Hand rail				

Object	Item	Daily	Monthly	Quarterly	Before and after rainy season
Culverts	RC Culverts				=
	HP Culverts				=
Guard rails	Shoulders	=	=	=	=
	Medians	=	=	=	=
Traffic operation facilities	Signs		=		
	Marking	=	=	=	
	Delineator	=	=	=	
	Lighting	=	=	=	
Other facilities	Vegetation / landscaping	=	=	=	
	Way side amenities	=	=		
Traffic conditions		=	=	=	
Encroachments					

LEGEND

= *visual inspection*

= *close inspection*

● *thorough inspection*

❖ *visual inspection during rainy season only*

4. MAINTENANCE

4.1. Introduction

4.1.1. The Concessionaire shall maintain the Project Highway in traffic-worthy condition and the Project Facilities in usable condition throughout the Concession Period or any extension thereof in terms of the Concession Agreement through regular maintenance and preventive maintenance of the various items and elements of the Project Highway.

4.1.2. The Concessionaire shall maintain the existing 2/3 lanes of the Project Highway and already constructed 4/6 lanes of the Project Highway during construction of new lanes in such a manner that the unevenness index of the pavement does not exceed 3000 mm per km or the present roughness value of the existing pavement, whichever is lesser and it is free of pot holes.

4.1.3. The following MORT&H and IRC publications shall be referred for preparation of the said Section - II Maintenance of the "Operation and Maintenance Manual"

- MORT&H Manual for Maintenance of Roads.
- IRC-SP-35-1990, Guidelines for Inspection and Maintenance of Bridges.
- The manufacturer's Maintenance manual(s) of the equipment to be used in the Project Highway Operations shall form part of the said O&M Manual

4.2. Maintenance Section of Maintenance Manual

The Section II Maintenance, of the Operation and Maintenance Manual, shall include the activities described hereinunder amongst other activities required for the regular and preventive maintenance of the equipment during the Operations Period, so that the Project Highway is maintained in a manner that at all times it complies with the specifications and standards and at the time of Divestment of Rights and Interests by the Concessionaire in terms of Article XXXIII of this Agreement it is in sound, durable and functional condition.

4.2.1. Regular Maintenance

It consists of the routine maintenance and periodic maintenance throughout the Concession Period and extension thereof, if any, for all elements of the Project Highway.

4.2.1.1 Routine Maintenance

The Concessionaire is required to perform all routine maintenance activities along the project road. The Routine Road Maintenance means planned ongoing works and activities required to ensure public safety, repair small defects and to maintain the road and the entire RoW in the required condition.

The Concessionaire is required to develop maintenance sheets for each component of the works. The Concessionaire has to utilise mechanised equipment, method and innovative solutions and technology to perform these obligations and include such process in the Maintenance Manuals.

All maintenance activities are to be carried out in accordance with relevant IRC Codes, Guidelines and Special Publications as are applicable to National Highways, MORT&H specifications and Technical circulars with all updates. In the absence of any definite provisions on any particular issue related to the specifications and/or standards, reference may be made to the latest codes and specifications of the Bureau of Indian Standards (BIS), AASHTO, ASTM, British Standards or any other International Standards. But where even these are silent, the work shall conform to sound engineering practice with the approval of the IC. The requisite Quality Control Tests as per specifications and codes are to be carried out by the Concessionaire at his cost as per the directions of the IC.

Routine Maintenance broadly includes:

(i) Maintenance of pavement
(ii) Maintenance of turfed areas.
(iii) Maintenance of landscaping
(iv) Maintenance of drainage system
(v) General cleaning including CD structures
(vi) Cleaning, maintenance of buildings within concession limits
(vii) Maintenance of main line structures.
(viii) Maintenance of Right-of-Way fences.
(ix) Maintenance of Highway Accessories
(x) Maintenance of guardrails

(xi) Other miscellaneous responsibilities such as stand by/on-call, emergency plant & equipment, stray animal catching operations etc.

(xii) Provision of traffic and safety control devices during the routine maintenance works or any accidents.

4.3. Periodic Maintenance of Pavement

The framework of activities relating to pavement maintenance and rehabilitation in respect of flexible and rigid pavement are given in the flow charts in Appendix 3.1 and Appendix 3.2 respectively. The Concessionaire shall set forth in the Operations and Maintenance Manual the detailed procedures to be followed under each of these activities, and also choose the operational and performance criteria from the performance standards set forth in this Schedule.

4.3.1. Pavement Riding Quality

The riding quality of the pavement shall be ensured by satisfying the minimum requirements given herein under.

i) Surface roughness of the Project Highway on completion of construction shall be 2000 mm/km as measured by vehicle mounted Bump Integrator.

ii) Surface roughness shall not exceed 3000 mm/km during the service life of pavement at any time. A renewal coat of bituminous concrete shall be laid every 5 years after initial construction or where the roughness value reaches 3000 mm/km whichever is earlier to bring it to the initial value of 2000 mm/km.

4.3.2. Structural Condition of the Pavement

I) The structural condition of the flexible pavement of the Project Highway shall be assessed every year by taking Benkelman Beam Deflections and working out characteristic deflections of homogeneous sections of the Project Highway as per IRC-81-1997. Wherever the characteristic deflection exceeds 1.2 mm a bituminous overlay shall be provided appropriately designed according to IRC-81-1997 or its latest versions or amendments to it

II) Recycling of existing crust using milling as an option can be explored by the Concessionaire in consultation with the IC to maintain the FRL at the same level throughout the concession period. However, while adopting such measures, the residual strength of existing pavement shall be estimated and equivalent thickness of new material added before laying the designed overlay. The design of profile with altered pavement treatments shall be finalised in consultation with IC.

III) In the case of cement concrete pavement, joints shall be thoroughly inspected every year and the loss of sealing compounds made good.

4.3.3. Preventive Maintenance

Preventive Maintenance shall include the activities related to each element and the system as a whole of the Project Highway to ensure that during the Concession Period and at its end, it is in sound, durable and functional condition.

4.3.4. Special Repairs

Damages occurring due to natural calamities like heavy floods, sand storms, hurricanes, cyclones, earthquakes to any element or system of the Project Highway, shall be rectified and the system restored to function as per programme prepared in consultation with Independent Consultant. All such activities shall fall under 'Maintenance' and shall form a part of the said Maintenance Manual.

4.4. Minimum Requirements of Maintenance Activities

4.4.1. Major Breaches in the Roadway

Major breaches in the roadway of any type endanger safety of traffic and cause obstruction in movement of vehicles. These breaches shall be repaired urgently. Steps as mentioned in O&M manual shall be followed by the Concessionaire for repairing the breaches.

The Concessionaire shall ensure speedy restoration of traffic and take immediate action to repair the damages as permanent measures for the Project Highway. The restoration of

traffic shall be made within 24 hours of its occurrence. The permanent measures shall be completed within a period of one week.

4.4.2. Minor cuts, rutting or blockage

Minor cuts, rutting and damages on Project Highway which do not completely obstruct the traffic but endanger the safety of traffic, shall be attended to on an urgent basis. For this purpose any cut which is in width more than 1 m shall be repaired within 24 hours. Any minor blockage, which partially obstructs the traffic and endangers safety, shall be removed by the Concessionaire immediately.

4.4.3. Branches of trees

The branches of the roadside trees if hanging closer than 5.5m over the road level of the Project Highway shall be cut, trimmed or lopped within 24 hours.

4.4.4. Shoulders

The shoulder (Earthen/Hard) shall be maintained in such a way that the shoulder drop off shall not be more than 25 mm for a length of 10m in a section length of 100m and/or there shall not be any false ditch causing the water to drain in reverse direction i.e. towards pavement instead of away from pavement surface, the same shall be rectified within 2 days as described below:

If the shoulders are deformed or scoured and are lower than 25mm from the adjacent carriageway, these shall be corrected by excavation, filling, dressing and compacting a material matching the existing material and it shall conform to the relevant MORT&H Specifications. In case of earthen shoulder repairs shall be carried out as per MORT&H Specifications 3003.

4.4.5. Drainage / Side Drains.

4.4.5.1. The Concessionaire must ensure that all drainage elements and structures are without any obstructions, which may reduce their normal cross section and impede the free flow of water. They should not have silting more than 25% of their size at any part of length.

4.4.5.2. All the Pipe and Box culverts shall have less than 10% deteriorated barrel and have more than 90% of the diameter/size open. There should be no evidence of flooding with end protection intact and no dip on the road over culvert indicating structural weakness.

4.4.5.3. Routine maintenance under this category shall cover pipe drainage system, slot drains, porous drains, gullies, catch-pits, open grills, ditches, side drains and median drains etc.

4.4.5.4. If the side drains / median drains where provided, and other drainage structures have been silted up in such a manner that it is causing obstruction in flow of water, the same shall be cleared off regularly within 7 days after detection in order to keep the drains free from obstructions all the time.

4.4.5.5. If the drainage system of Project Highway is covered and damaged, it obstructs the flow of water causing damage to the road pavement. Such damaged structures shall be reconstructed to required shape, size and proper slope within 21 days after detection or as instructed by IC.

4.4.6. Cross Drainage Works & Other Structures

4.4.6.1. The Concessionaire shall set forth in the Operation and Maintenance Manual, the detailed procedures to be followed for the maintenance and repairs of bridges and other structures keeping in view IRC-SP-35: 1990 'Guidelines for the Inspection and Maintenance of Bridges' in consultation with the Independent Consultant. The flow chart for Bridge and Culverts maintenance activities in given in Appendix 3.3.

4.4.6.2. The scouring of piers and abutments of bridges and culverts shall be observed carefully particularly before and after rainy season and suitable remedial measures as deemed fit looking to site conditions shall be taken in consultation with IC.

4.4.6.3. The bridge deck must be clean and have minimal spalls, cracks or scaling. The drains /scuppers on the deck must be clean and functional always.

4.4.6.4. The Super-structure should not have any cracks or loss of section. There should be no spalling and have proper vertical clearance and opening height. Paint on the super structure must be in good shape.

4.4.6.5. The sub-structure should not have spalls, cracks and scaling. The bearing assembly should be functional and lubricated periodically. Abutment /pier seats should be clean and sound.

4.4.6.6. The joints on the structures shall not be loose and should be sealed always.

4.4.6.7. Retaining walls should not have spalling or cracks and its weep holes must be open always. There should be no indication of settlement or rotation.

4.4.6.8. If any settlement cracks are appearing in substructure and superstructure of the CD works beyond permissible limits, the same shall be carefully observed and suitable remedial measures as per sound engineering practice taken.

4.4.6.9. The treatment for the damaged culverts/bridges shall be assessed at site after ascertaining the damaged portion as per site exigencies. The repair shall be carried out expeditiously in consultation with IC.

4.4.7. Pavement

As part of pavement maintenance the pavement shall be treated for various distresses occurring as described below.

4.4.7.1. Cracking

Cracking of bituminous pavements shall include all types of cracks such as hairline, alligator, longitudinal, transverse, shrinkage, reflective and edge cracking, linear and slippage etc. For any 50 m section of the pavement, the cracked area should not be more than 10% of the pavement surface of that section and/or the cracked area shall not exceed

0.5 sq.m at a place. The treatment shall be completely done within 7 days after their detection. The treatment shall be followed as described below:

i. If the width of the cracks is less than 3mm and resulting into settlement of pavement up to 10 mm in depth and exceeding in area more than 0.5 sq.m. at a place, such cracking shall be sealed by fog sealing in accordance with the MORT&H Specification 3004.

ii. If the width of the cracks is more than 3mm and resulting into settlement of pavement up to 10 mm in depth and exceeding in area more than 0.5 sq.m. at a place, such cracked surface shall be repaired by slurry sealing in accordance with MORT&H Specification 516.

iii. If the cracked portion has settled more than 10mm and its area exceeds 0.5 sqm, such areas shall be repaired by patching as per MORT&H Specification 3004.

iv. In case of alligator cracks, the permanent repair by full depth patching shall be carried out. The slippage cracks shall be repaired by removing the affected bituminous layer and replacing it with surface patch. In edge cracking, if shoulders are not providing adequate lateral support, the shoulder shall be reconstructed with good quality materials.

4.4.7.2. Rutting

For any 50 m section of the pavement, there shall not be ruts deeper than 10 mm and/or the length of rutting should not be more than 5m. The treatment shall be completely done within 15 days after their detection. The pavement surface shall be rectified/corrected as per directions laid out in IRC 82-1982 and based on sound engineering practice at such locations.

4.4.7.3. Corrugations and Shoving

If corrugations and shoving in the pavement area exceeds 1 sq. m at any place and depth / height of corrugation / shoving exceeds 10mm, the same shall be rectified/corrected within

2 days after its detection, as per directions laid out in IRC 82-1982 and based on sound engineering practice.

4.4.7.4. Settlement or Grade Depressions

If the settlements and grade depressions exceed 1 sqm in area and their depth is within 10mm, such defects shall be treated within 3 days after detection as per directions laid out in IRC 82-1982 and based on sound engineering practice.

4.4.7.5. Upheaval or Swell

For any 50 m section of the pavement, there shall not be upheaval or swell that exceeds 0.5 sq. m in area; if its height is more than 10mm, the same shall be treated within 7 days after its detection as per as per directions laid out in IRC 82-1982 and based on sound engineering practice.

4.4.7.6. Ravelling

For any 50 m section of the pavement, if the ravelling of bituminous surface is not more than 3% of the pavement surface of that section and/or the ravelled area does not exceed 1 sq.m. at a place, the same shall be rectified within 7 days after their detection by slurry seal treatment in accordance with the MORT&H Specification.

4.4.7.7. Potholes

There shall not be any pothole on the pavement surface. Irrespective of the size and depth, the potholes shall be repaired by patching / pothole filling in accordance with MORT&H Specification 3004. The potholes shall be repaired immediately if causing a threat to safety; other potholes shall be repaired within 2 days after their detection.

4.4.7.8. Skid Hazards

The skid resistance of the pavement surface shall be maintained in such a way that the skid number is a minimum of 55 when tested as per BS-812 Part 114ASTM-274. Skid hazards, irrespective of size, shall be corrected by improving the surface drainage and skid

O3 Infrastructure Ltd.

resistance including cleaning the surface of contamination, surface treatments or milling or resurfacing.

4.4.7.9. Bleeding or Flushing

For any 50 m section of the pavement, if the bleeding surface area is not more than 1% of the pavement surface of that section and/or the bleeding surface area does not exceeds 0.25 sq.m. at a place, the same shall be treated immediately within a day after its detection in accordance with IRC:82-1982 or any other relevant guidelines in consultation with the IC.

4.4.7.10. Edge deformation/Breaking

For any 100 m section of the pavement, if the edge breaking is more than 1m and/or the width of edge breaking is more than 0.1m at a place, the same shall be treated immediately within a day after its detection in accordance with IRC:82-1982 or any other relevant guidelines in consultation with the IC.

4.4.7.11. Loss of Cover Aggregate

If the loss of cover aggregate occurs in area exceeding 1 sqm of the pavement, treatment of seal coat shall be applied.

4.4.7.12. Longitudinal / Transverse Streaking

If the longitudinal and transverse streaking appears on the pavement surface in area exceeding 5sqm, the same shall be treated by application of new surface treatment or by a second treatment over the streak surface.

4.4.8. If any defects other than those mentioned above occur on the pavement of the Project Highway, the same shall be rectified/corrected by the Concessionaire as per directions laid out in IRC 82-1982 and based on sound engineering practice.

4.5. Other Maintenance Activities

4.5.1. Maintenance of Traffic Signals

The traffic signals shall be maintained at all times as per clause 18 of IRC: 93 -1985 and shall be periodically inspected, maintained and repaired so as to be in satisfactory working condition all the time.

4.5.2. Maintenance of Highway Lighting System

4.5.2.1. Maintenance of all lighting installations and related appurtenances shall be as per relevant clauses of IS : 1944 (Part I-V) 1981.

4.5.2.2. Lighting wherever provided shall be maintained by the Concessionaire in a condition nearly similar to original condition.

4.5.2.3. The faults shall be repaired instantly and lighting restored. Missing and damaged items shall be replaced instantly.

4.5.2.4. Cleaning shall be done at regular intervals to be mentioned in the Maintenance Manual to ensure that lighting is not below the specified standard.

4.5.2.5. All installations shall be safeguarded against weathering and ageing effects by repainting and other preventive measures.

4.5.2.6. The servicing of stand-by power generation units shall be carried out in accordance with the manufacturer's instructions.

4.5.3. Maintenance of Highway Signs and Pavement Markings

4.5.3.1. All traffic signs and markings shall always be kept clean, visible and in correct alignment and position.

4.5.3.2. Any damage to traffic signs, which reduces or threatens to reduce full and clear visibility shall be rectified within twenty four (24) hours of its occurrence. If they are used as base for posters, the posters shall be removed and the signs cleaned within 24 hours. Signs

shall be washed using detergent solution followed by clean water to maintain their visibility and reflectivity unimpaired due to dust etc.

4.5.3.3. Any part of traffic signs damaged due to weathering, corrosion, vandalism or any other cause shall be replaced by the Concessionaire within seven days.

4.5.3.4. Any mandatory signs including those for traffic safety, 'damaged beyond repair' shall be replaced within 2 days and all other signs with similar condition shall be replaced within 3 days.

4.5.3.5. Appropriate devices for measuring the luminosity and reflectivity shall be used to check visibility and reflectivity of signs, delineators and markings. These shall be replaced by similar material if the reduction in the level of these two requirements falls below 50% of the original level.

4.5.3.6. Pavement marking with thermo plastic paint shall be carried out soon after any overlay/renewal coat is provided.

4.5.4. Maintenance of Pickup Bus Stops

4.5.4.1. Maintenance of pickup bus stops shall include attending to repairs to the bus-bay pavement and also to various parts of the passenger shelter and connected facilities as and when necessary. Replacement of irreparable items shall be done within 2 days.

4.5.5. Maintenance of Control Centre

4.5.5.1. There shall be periodic inspection and maintenance of the Control Centres. This shall include attending to repairs and maintenance (both regular and periodic) to various parts of the building and connected services and facilities as and when necessary, and replacement of irreparable items of work. Cleaning & disinfecting of the water supply systems, inspection and maintenance of drainage/sanitation systems and electrical installations shall be as per relevant clauses of National Building Code (NBC).

4.5.5.2. Maintenance of Emergency Telephone system including its equipment shall include periodic servicing, checking of the system, replacement of components, attending to all necessary repairs and other incidentals to keep the system in working condition.

4.5.5.3. All the vehicles shall be maintained in smooth running condition at all times. In the event of any vehicle being off the road for maintenance or on account of breakdown, substitute vehicle shall be provided immediately.

4.5.5.4. At the end of the Concession Period or the extended period thereof, Control Centres together with all equipment in working order shall be handed over to NHAI.

4.5.6. Maintenance of Buildings

4.5.6.1. Maintenance of buildings shall include routine maintenance and attending to repairs to various parts of the building and connected services as and when necessary, and replacement of irreparable items of work, cleaning & disinfection of the water supply systems, inspection and maintenance of drainage/sanitation systems and electrical installations shall be as per relevant clauses of NBC.

4.5.6.2. At the end of the concession period or the extended period thereof, all buildings shall be in useable condition and handed over to NHAI.

4.5.7. Maintenance of Road Furniture and Facilities

4.5.7.1. Maintenance of road furniture and facilities shall include attending to repairs to various parts of the road furniture and connected services as and when necessary, and replacement of irreparable items of work in reasonable period.

4.5.7.2. All the hectometre stones, Kilometre stones and 5th Km stones shall be kept 100% clear of obstruction; and up to 5% surface damage shall be rectified within 3 days after detection and shall bring it to its original state. If the surface damage is more than 10%, the same shall be removed and replaced with new ones meeting IRC standards

4.5.7.3. At the end of the concession period or extended period thereof, all road furniture and facilities in useable and in working order shall be handed over to NHAI.

4.5.8. Maintenance of Highway Landscape

4.5.8.1. Maintenance of Highway Landscape shall include attending to repairs to elements of the landscape connected services as and when necessary, and replacement of irreparable items of work.

4.5.8.2. Trees shall be maintained as per the guidelines in IRC: SP: 21-1979 and no indiscriminate felling of trees shall be resorted to while upgrading, widening and improving the highway. The felling of trees shall be undertaken in consultation with the Independent Consultant and after obtaining due permission of the Forest Department, as applicable.

4.5.8.3. While borrowing earth from roadside land for routine maintenance it shall be ensured that no earth is removed around root of trees. All borrowing operations shall be as per IRC : 10-1961.

4.5.8.4 Maintenance operations include numbering and maintaining a register of all road side trees within the Right of Way.

4.5.8.5. The routine maintenance such as trimming and shaping shall also cover those hedges and trees within the RoW, which affect the performance of the Project Highway.

4.5.8.6. Cutting or clearance to safeguard visibility at intersections, road bends, accesses and signs shall be carried out in such a way as to avoid permanent damage to hedges and trees. Hedges and trees overhanging carriageways shall be trimmed to provide a minimum headroom of 5.5 metres at all times.

O3 Infrastructure Ltd.

4.5.8.7. Turfing within the RoW shall be mown as to achieve a visual pattern in harmony with adjacent areas. Mowing shall be done when the height of cut reaches 150 mm.

4.5.8.8. The grass/turf within RoW shall be maintained in such away that the roadway is free of obstruction and the availability of sight distance is ensured at intersections, passing zones, curves etc. The grass/turf around crash barrier, headwalls, paved ditches etc. shall be maintained neatly.

4.5.8.9. The Operation and Maintenance Manual shall include a maintenance and management plan for trees, shrubs, turfing and hedges to sustain their development in a manner pleasing in appearance.

4.6. Incident Management

4.6.1. Scope

- The Concessionaire shall initiate, co-ordinate and maintain an Incident Management System (IMS) and supply regular incident statistics to client.

- Incident Management entails a set of co-ordinated activities initiated by the Concessionaire when an incident (an extraordinary event resulting in the reduction of road capacity or creates a hazard for users) occurs, in order to minimise the effects of the incident and restore normal capacity and safety levels to all affected road facilities as efficiently as possible.

- If at the commencement date, there is no existing IMS at the site, then the Concessionaire should develop and implement an IMS within a period of not more than 3 months from the commencement date.

- The client shall assist the Concessionaire to identify relevant agencies (e.g. rescue, fire, hazardous materials, traffic, police, ambulance, alternative routes, cleanups) and their representatives and to liase with these representatives on behalf of the Concessionaire.

- The Concessionaire shall set up a steering committee, which shall include representatives of the various relevant agencies, to identify current & potential issues and problem areas which need addressing.

- The incident management centre shall be continuously staffed on a 24 hour basis. The Concessionaire shall record all incoming calls, along with the description of the nature of the call and the corresponding action taken.

- The Concessionaire shall record and maintain records of the details of all the SOS calls received (e.g. collision, hazardous material, breakdown, etc)

- After occurrence of any major incident, resulting in multiple loss of life, significant periods of road closure or major route rehabilitation work, an incident debriefing report shall be produced and forwarded to the client within one month of occurrence.

4.6.2. Levels of Service

The following levels of service apply to the incident management system:

- Implementation of fully functioning IMS system – 3 months after commencement
- Staffing – 24 hrs/day and 365 days/year
- Response time to a single incident – ½ an hour after receiving notification
- Multiple incidents – as soon as possible
- Incident debriefing reports – 1 month
- Steering committee monitoring report – quarterly

4.7. Safety Management

4.7.1. Scope & Levels of Service.

The following scope of operations and levels of service applies to facilities under management:

- The Concessionaire shall comply with all the requirements of the relevant Indian Laws on Occupational Health and safety, and the necessary certification/documentation proving compliance shall be made available by the Concessionaire at any time.

- The Concessionaire shall take all necessary measures to minimize accident occurrences on the highway section. For this purpose he shall liaise with the relevant local agencies such as Police, Hospital, Fire Brigade, Highway Police, etc. as required

- The Concessionaire shall maintain a comprehensive register and database of all accidents occurring on the Project Highway Section. The Concessionaire shall utilize this data to define and identify "Black Spots" and the like, make the necessary analysis of the cause of the "Black Spot" and make appropriate recommendations to the client for counter measures

- The Concessionaire shall provide educational programs for the improvement of safety for the Users of Roads under operation. This shall occur four times per annum. This shall be carried out by the issuing of pamphlets, billboards, etc. The Road Patrols shall in addition take every opportunity at events such as accidents and the like to educate Users.

- The Concessionaire shall repair all damaged fencing that prevents access to animals and pedestrians to the highway. In addition the Concessionaire shall recommend to the client for installation of additional fencing where necessary to prevent access to the Highway.

In addition, the Concessionaire shall assume full responsibility for the safety of employees by providing competent training, safety clothing and safety equipment.

In addition, the Concessionaire shall be responsible for the security of the project:

- Security guards shall patrol the route facilities areas and shall be provided by the Concessionaire. These guards shall operate on a 24 hour basis, for 365/6 days per year.
- The Concessionaire shall be responsible for maintaining/upgrading all facilities for site security, including fencing, intercom system, emergency communications system, access control system and the like.

4.8. Road Asset Management

4.8.1. Scope

The Concessionaire shall ensure the maximum availability and efficient utilisation of the assets for the client. This shall also include the protection of the right of way from encroachments and other unauthorised activities.

In addition to the main carriageways, the Concessionaire shall also provide for the management of rest areas, bus bays, bus parking areas and other facilities for highway users, so that these facilities operate without hindrance to the through traffic.

The Concessionaire shall maintain the buildings, plaza facilities in a manner that projects a well managed professional image to the motoring public. This shall require the Concessionaire to:

- Keep the plaza neat and litter free at all times.
- Maintain the vegetation, lawns and shrubs etc
- Maintain the parking areas and approaches neat and litter free.
- The Concessionaire shall ensure that any visual defects of the buildings, occasioned by accident or wear and tear are rectified within one week.

4.8.2. Encroachments:

The Concessionaire's enforcement of the requirements of the client shall be a significant obligation under the Contract. The client shall define the Right of Way and their requirements with respect to unauthorised accesses, encroachments and the like".

From the date of the commencement of O&M period, the Concessionaire shall be required to determine all encroachments and unauthorised accesses to the highway. The Concessionaire shall list the encroachments with a description, location and extent of each encroachment, draw up a method statement and programme for the removal of the accesses or encroachments for approval by the client. All encroachments shall be removed, and unauthorised accesses closed within 3 months of the commencement of O&M period.

4.8.3. Inspections

Full and component inspections of the highway section shall be undertaken at appropriate intervals. The Concessionaire shall draft Inspection procedures for each part and component of the National Highway Section that requires periodic inspection.

4.9. Inspection Reports and Remedial Measures

4.9.1. Periodicity of inspections for maintenance activities by the Concessionaire shall be regulated as per this Agreement and governed by the exigencies of the situation. The said inspections shall be followed by reports to the Independent Consultant and the NHAI. Based on reports, detailed investigations shall be undertaken by the Concessionaire itself and/or on advice of the Independent Consultant and the NHAI as the case may be.

4.9.2. The Concessionaire shall carry out any maintenance, repair or rehabilitation works found necessary by these investigations in accordance with the Maintenance Manual and this Agreement.

4.10. Maintenance of Facilities for Road Users

4.10.1. The Concessionaire shall ensure that all the Project Facilities provided for users of all categories are kept in a neat, hygienic and tidy condition. Special attention shall be given to the preparation of food items so that they are cooked with unadulterated ingredients in a hygienic manner.

4.11. Items of Maintenance

4.11.1. The Concessionaire shall maintain the Project Highway, Project Facilities and Project Assets in working and orderly condition at all times during the Concession Period or any extension thereof.

4.12. The specifications and standards for maintenance items shall be governed and regulated as per Schedule 'D' of this Agreement.

5. DIVESTMENT

5.1. The Concessionaire shall take action(s) in terms of Article XXXIV Defects Liability and Article XLIV Miscellaneous of this Agreement prior to proceeding with Transfer of the Project Highway, Facilities and Assets thereon to NHAI.

5.2. The Concessionaire shall obtain a Transfer Certificate as per Schedule L_1 appended to this Schedule, from the Independent Consultant, who shall issue it after satisfying itself that the Project Highway and Facilities and Assets thereon have been constructed, operated and maintained in terms of this Agreement during the Concession Period and meet the divestment requirements as per this Agreement for the issue of Vesting Certificate (Schedule V) by NHAI.

5.3. The Concessionaire shall take action(s) under Article XXXIII Divestment of Rights and Interests of this Agreement after obtaining the Transfer Certificate (Schedule L_1) from the Independent Consultant as spelt out in 5.2 above in order to obtain Vesting Certificate (Schedule V) from NHAI.

5.4. The issuance of the Vesting Certificate (Schedule V) by NHAI as per sub clause 33.4 of Article XXXIII Divestment of Rights and Interest, to the Concessionaire shall result in the completion of the transfer of the Project Highway in terms of this Agreement.

Schedule L1

TRANSFER CERTIFICATE

I/We._____(name of the Independent Consultant) issue this certificate, designated Transfer Certificate for widening of the existing 2-lanes to 4/6 lanes divided carriageway facility including rehabilitation of existing 2-lanes, from ------- Km to ------ Km on ---------- section of National Highway No. 7 (NH-7) in the State of _____, india on Build, Operate and Transfer (BOT) Annuity basis by the Concessionaire _____ (name of the Concessionaire) on Build, Operate and Transfer (BOT) Annuity basis as per the Concession Agreement between the National Highway Authority of India (NHAI) and the said Concessionaire, being satisfied that the Project Highway has been constructed, operated and maintained during the Concession Period is in sound, durable and operational condition on completion of the said concession period, and it is in a fit condition for transfer by the said Concessionaire to the NHAI or its nominee. The transfer of the said Project Highway together with facilities thereon shall be effected on the strength of this certificate.

Place of Issue _____

Date of Issue _____

(Independent Consultant)

Schedule L **Appendix – 3.4**

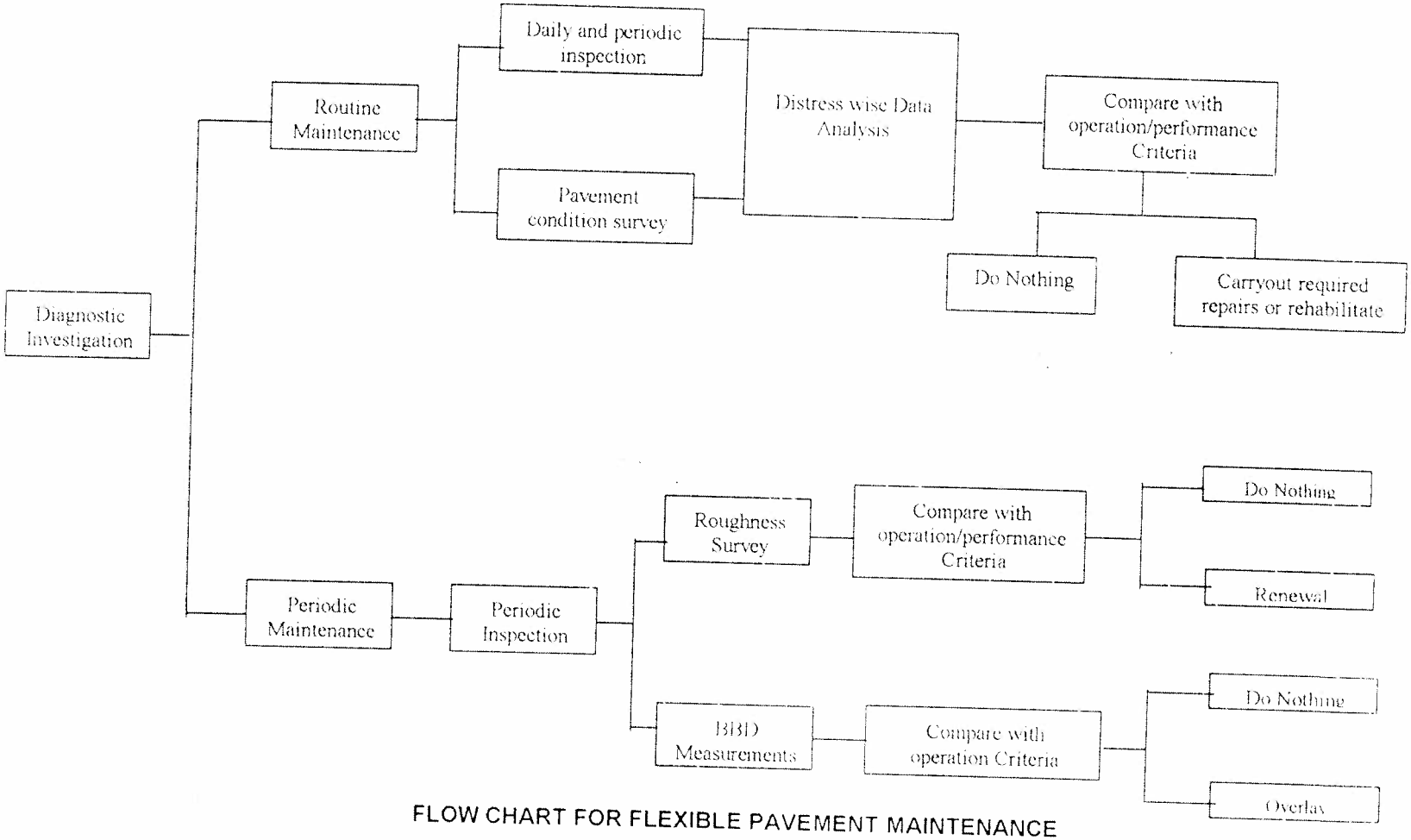
Equivalent Rating Conditions

Category	Status	Rating
Very Good condition	on completion as per specification and standards	9
Good Condition	no repairs needed	8
Generally good condition	potential exists for minor maintenance	7
Fair condition	potential exists for major maintenance	6
Generally fair condition	potential exists for minor rehabilitation	5
Marginal condition	potential exists for major rehabilitation	4
Poor Condition	repair or rehabilitation required immediately	3
Critical condition	need for repair or rehabilitation is urgent. Facility should be closed until the indicated repair is complete	2
Very Critical condition	facility is closed. Study should determine the feasibility for repair	1
Unserviceable	facility is closed and is beyond repair	0

Sufficiency Rating System

1. Load Performance
2. Safety Performance
3. Remaining Life

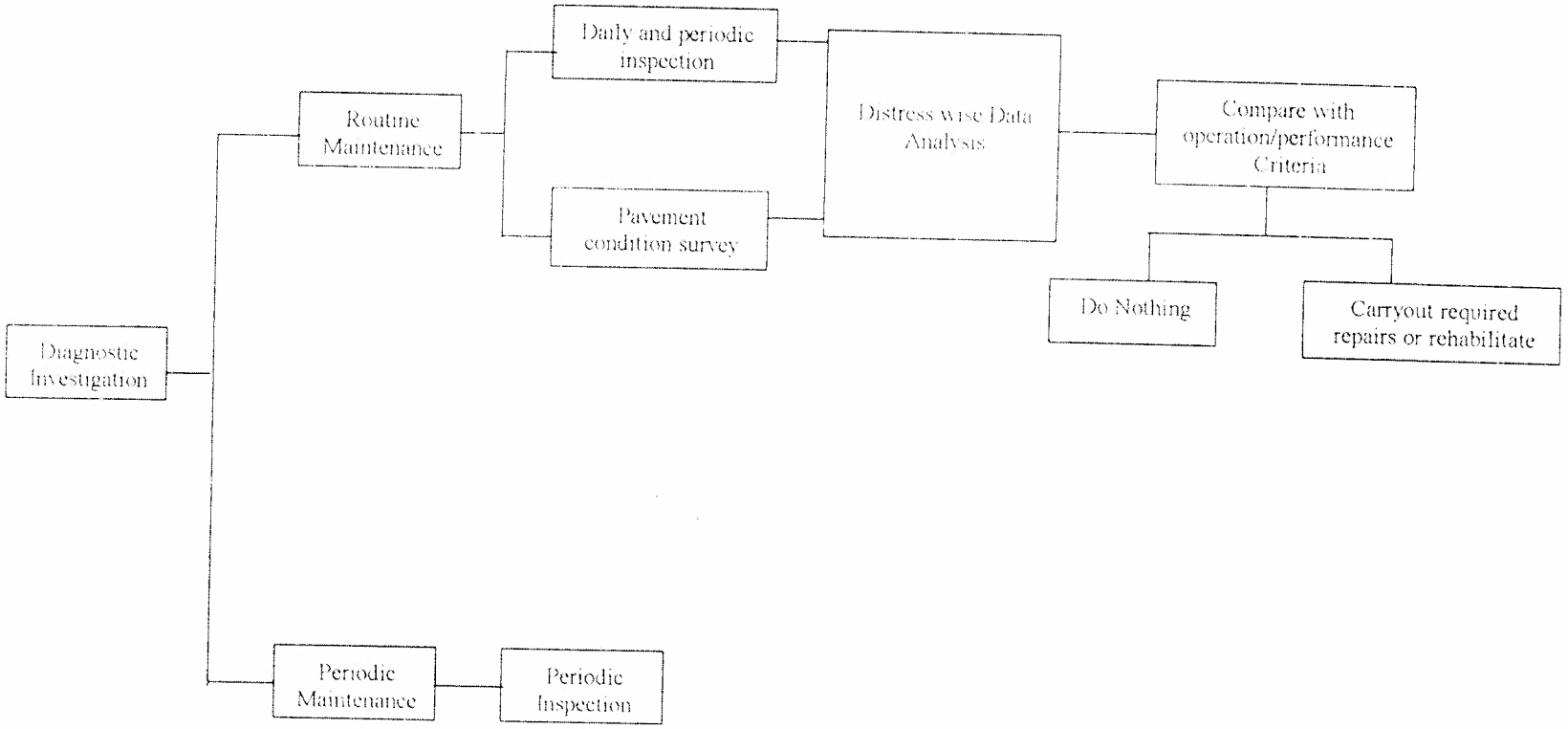
O3 Infrastructure Ltd.



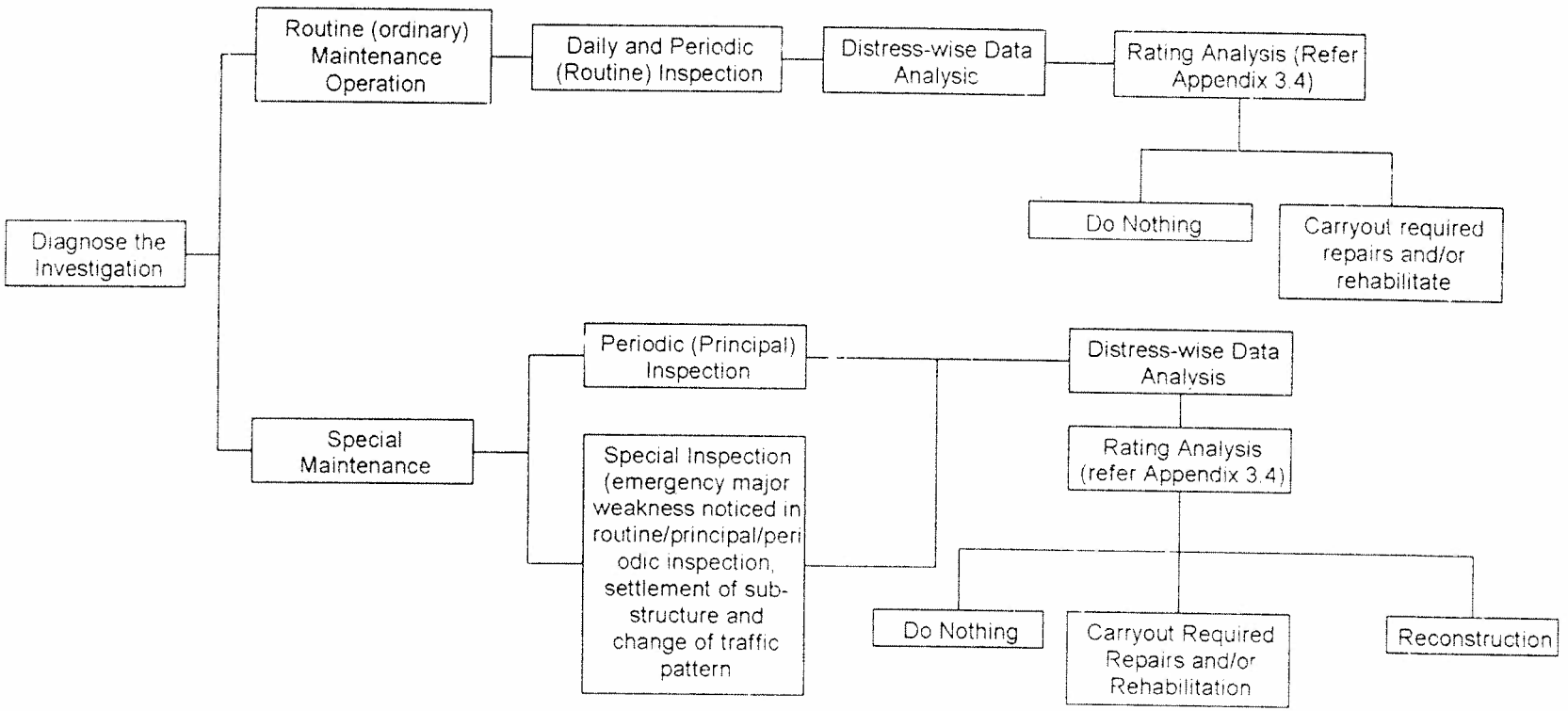
FLOW CHART FOR FLEXIBLE PAVEMENT MAINTENANCE

Schedule-L

Appendix 3.2



FLOW CHART FOR RIGID PAVEMENT MAINTENANCE



FLOW CHART FOR BRIDGES AND CULVERTS MAINTENANCE

SCHEDULE-M

NAGARJUNA CONSTRUCTION COMPANY LTD
An ISO 9001:2000 Company
(Lead Member in NCC-KMC (Consortium))

ANNEX 6 - B
Cash flow Projections

Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 255.00 on Orai-Bhognipur section on National Highway No.25 (NH-25) and km 421.20 to km 449.00 on Bhognipur-Barah section on National Highway No.2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) Basis (the "Project")

Bidders shall submit Cash flow Projections as part of the Price Proposal as per the format set out below.

Bidders shall be required to input the Annuity Amount in the relevant place in the table below for this purpose. Bidders would not be allowed to change any other item in the Cash flow Projections. All other relevant details of the Cash flow Projections have already been filled in by NHAI. The completed Cash flow Projections would form part of the Bidder's Price Proposal.

Bidders may note that provision of cost estimates in the Cash flow Projections by NHAI does not constitute any guarantee whatsoever by NHAI in respect of the same and the actual amounts incurred by the Concessionaire may vary.

While the Cash flow Projections shall not be used for the purpose of evaluation of the Price Proposal, the same shall be appended to the Concession Agreement and shall form part thereof.

Following are the details of the Cash flow Projections:

1. All amounts are in Rupees crores.
2. "**Demand Date of Investment**" (DID) means the date exactly midway between Commencement Date and Scheduled Project Completion Date (SPCD). For the purpose of Cash flow Projections, the Bidders may assume that:
   a. the Commencement Date is 1st October 2006.
   b. the Construction Period is 30 months.

Considering this, the DID works out to be 1st January 2008.

3. "Initial Investment" means an amount of Rs. 240.25 Crores and is considered as a cash outflow as on the DID.

Continued ...2

Corporate Office: Nagarjuna Hills, Hyderabad - 500 082. Tel: 040-23351753, Fax: 040-23356211, e-mail: ncchq@ncc-ltd.com, website: www.nagarjunaconstructionco.com

4. "Annuity Amount" means the annuity amount quoted by the Bidder as part of his Price Proposal as per the format in Appendix-A and is considered as a cash inflow occurring semi-annually after SPCD.

5. **"Projected Routine Maintenance Cost"** means an amount of Rs0.03 crores (amount to be filled in on the basis of the length of the Project Highway and will be Rs 0.03 crores per year multiplied by the length of Project Highway) , which is the cost of routine maintenance, as estimated by NHAI, escalated @2.5 % every six months.
This item of cost is considered as a cash outflow occurring every semi-annual period after SPCD.

6. **"Projected Cost of Periodic Maintenance"** means an amount of Rs0.25 crores (amount to be filled in on the basis of the length of the Project Highway and will be Rs .25 crores multiplied by the length of the Project Highway), which is the cost of Periodic Maintenance as estimated by NHAI, escalated @2.5% every six months.

This item of cost is considered as a cash outflow in the semi-annual periods as mentioned below:

First Periodic Maintenance - End of 10th semi-annual period from SPCD.
Second Periodic Maintenance - End of 20th semi-annual period from SPCD
Third Periodic Maintenance - End of 30th semi-annual period from SPCD

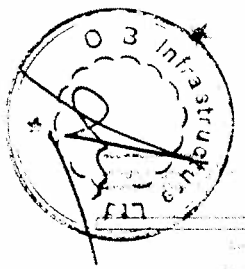
7. **"Projected Total O&M Expenses"** in a semi-annual period means the aggregate of Projected Routine Maintenance Cost and Projected Cost of Periodic Maintenance occurring in that semi-annual period.

8. **"Projected Net Cash flows"** in any period means the amount arrived at after considering,
(a) the Annuity Amount in that period as a cash inflow and
(b) the Projected Total O&M Expenses in that period as a cash outflow
(c) the Initial Investment, considered as a one time cash outflow as on the DID.

9. **"Internal Rate of Return"** means the annualized pre-tax internal rate of return of the Projected Net Cash flows.

11. **"Discounted Value of Future Net Cash flows"** on any date means an amount, the payment of which, on that date would result in the Concessionaire attaining the Internal Rate of Return.

Continued ...3





NAGARJUNA CONSTRUCTION COMPANY LTD.

(Lead Member in NCC-KMC (Consortium))

ANNEX 6-C

Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 255.00 on Orai-Bhognipur section on National Highway No.25 (NH-25) and km 421.20 to km 449.00 on Bhognipur-Barah section on National Highway No.2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) Basis

Bidders would be required to submit information on key assumptions for the Project (Key Assumptions) based on their estimates of various parameters pertaining to the Project. Key Assumptions must include information on the following:

i. Project Cost Estimates
   - Base Construction Cost as on Proposal Due Date
   - Contingencies
   - Details of Preliminary Expenses
   - Details of Pre-Operative Expenses

ii. Quarterly Phasing Schedule

iii. Estimated Total Project Cost as on COD

iv. Capital Structure
   - Debt-Equity Ratio
   - Equity capital
   - Debt funding
   - Quasi-equity, in any

v. Terms of Debt and Quasi-equity
   - Interest Rate
   - Maturity

vi. Economic Assumptions
   - Inflation Rate
   - Exchange Rate, if any

vii. O&M Cost Estimates
   - Routine Maintenance Costs as on Proposal Due Date
   - Periodic Maintenance Costs as on Proposal Due Date

viii. Other Cost and Charges
   - Establishment Cost
   - Depreciation Rates

ix. Taxation Assumptions
   - Tax Rates
   - Tax Benefits

Regd. Office: Nagarjuna Hills, Hyderabad - 500 082. Tel: 040-23351753, Fax: 040-23350211, e-mail: nccho@ncc-ltd.com, website: www.nccltd.com

REVISED SCHEDULE N

SELECTION CRITERIA FOR INDEPENDENT CONSULTANT

Selection of the Independent Consultant shall consist of the following steps:

1. Issue of Request of Proposal for selection of Independent Consultant by NHAI
2. Evaluation of Firms Credentials
3. Evaluation of Technical Proposal.
4. Evaluation of Financial Proposal of the firm.
5. Calculation of the combined score of a firm based on Technical and Financial score
6. Negotiation and selection of Independent Consultant.

SELECTION COMMITTEE

A selection committee shall do the selection. NHAI shall nominate the members of this committee

DETAILS OF THE SELECTION PROCESS

1. **Issue of Request of Proposal for selection of Independent Consultant by NHAI**

   NHAI will issue a Request for Proposal (RFP) for selection of Independent Consultant through single stage bidding process. This RFP shall include a Letter of Intent (LoI) and the Terms of Reference (ToR) besides information (Data Sheet) to the firms and the proposed form of contract. It shall contain the guidelines for the preparation of proposals by the firms and submission. ToR shall include the following details:

   1. Project background
   2. Objectives
   3. Scope of services
   4. Interaction with NHAI
   5. Reporting requirement
   6. Performance clause
   7. Consultant's Proposal
   8. Period of Services

1.1 The LoI shall state the intention of the NHAI to enter into a contract for the provision of consulting services and the date, time and address for submission of proposals. The Proposal should be submitted in Three Parts in 3 separate envelopes / packages and put together in one single outer envelope/package. The three parts of the proposal will be:

Part 1: Firms Credentials,
Part 2: Technical Proposal, and
Part 3: Financial Proposal

The proposal must be submitted in a hard bound form (hard bound implies binding between two covers through stitching or otherwise whereby it may not be possible to replace any paper without disturbing the document - spiral bound form, loose form, etc. will be not accepted) with all pages numbered serially, along with an index of submissions. All figures quoted in the financial Proposal should be covered with a transparent adhesive tape

2. Evaluation of Firms Credentials

The envelop containing the firms credentials (Part 1 of the proposal) would first be opened and evaluated based on the following criterion

S.no	Description	Marks
1	Year of Establishment of Firm	10
2	Average annual turnover (last three years)	10
3	Number of Key personnel	10
4	Experience of the firm in DRP preparation for Highways projects during the last 7 years.	10
5	Experience of the firm in DPR preparation/design review/supervision of major highway structures of length more than 200m during the last 7 years.	10
6	Experience of the Firm in as Independent Consultant or in Construction Supervision for Highway projects during the last 7 years.	50
	TOTAL	**100**

The firms should score at least 70 marks for qualifying to the next stage.

3. Evaluation of Technical Proposal

The technical proposals (Part 2 of the proposal) received from short listed firms shall be evaluated for selection of firms based on the following

Evaluation Criteria for Technical Proposal

S.No.	Description	Marks.
1	Specific Experience of the firm related to the assignment	20
2	Adequacy of the proposed work plan and methodology in response to the ToR	05
3	Qualifications and competence of the key staff for the assignment	75
	Total	**100**

Sub criteria for Specific Experience of the firm related to the assignment

Experience as Independent Consultant / Construction Supervision in Highway Projects	12
Experience in DPR preparation for Highway Projects	4
Experience in Construction Supervision/DPR /Design Review of Major structures having length of more then 200 meter.	4

Sub criteria for Adequacy of the proposed work plan and methodology in response to the ToR

Comments & Suggestions on TOR	1
Quality of Approach and Methodology	3
Work Programme & Manning Schedule	1

Sub criteria for qualification of key staff

General qualifications	25
Adequacy for the project	70
Experience in Region and language	5

Qualification and competence of key staff for the assignment. The weightage for various key staff are as under:-

Key Personnel	Marks.
Team Leader Cum Senior Highway Engineer	20
Senior Pavement Specialist	7
Senior Bridge Design Engineer	8
Highway Design Engineer	8
Bridge/Structural Engineer	10

HTMS/Toll Expert	6
Road Safety Expert	6
Senior Quality cum Material Expert	10

The technical proposal should score at least 75 points to be considered responsive for financial evaluation.

4. Evaluation of Financial Proposal

The Financial proposals (Part 3 of the proposal) of the firms shall be opened and evaluated as under:

The financial score of the lowest bidder shall be 100 marks. The financial score for the remaining bidders shall be calculated in proportionate to the lowest bidder by the following formula :

Financial Score of 'X' = {100 X Bid price of lowest bidder} / {Bid price of 'X'}

5. Calculation of the combined score of a firm

The combined score of the firm will be calculated as under:

The weightage given to the technical proposal : 80%

The weightage given to financial proposal 20%

The combined score of bidder 'X' = 0.20{Financial score of bidder 'X'} + 0.80{Technical score of bidder 'X'}

6. Negotiation and Selection of Independent Consultants

The combined score of technical and financial proposals shall be calculated and the firm scoring maximum marks shall be called for negotiations. After satisfactory agreement of all matters by both the parties, NHAI will appoint the said firm as Independent Consultant for the initial term of 48 months

SCHEDULE O

TERMS OF REFERENCE OF INDEPENDENT CONSULTANT

SECTION 1. LETTER OF INVITATION

Sub.: Independent Consultancy Services for 4-laning of Orai-Bhognipur Section from km 220.00 to km 255.00 on NH-25 and Bhognipur- Barah section from km 421.20 to km 449.00 on NH-2 in the state of Uttar Pradesh on BOT (Annuity) Basis

1. The National Highways Authority of India (NHAI) invites proposals for Independent Consultancy Services on the basis of international Competitive Bidding for the **Orai-Bhognipur Section from km 220.00 to km 255.00 on NH-25 and Bhognipur-Barah section from km 421.20 to km 449.00 on NH-2 in the state of Uttar Pradesh on BOT (Annuity) Basis**

2. The BOT projects basically comprise up-gradation and construction of 4/6-lane highways, construction and rehabilitation of bridges and culverts, construction of high embankment/elevated structures/ROBs etc. along the existing highways including realignment and bypasses. The proposed construction work will involve use of modern equipments and construction practices.

3. NHAI intend to appoint Consultants to act as Independent Consultants for implementation of the above BOT projects. As per Terms and Conditions of the Concession Agreement (s), the Independent Consultant is required to: (i) independently review activities associated with design, design review, construction and operation and maintenance of the project on behalf of both NHAI and Concessionaire so as to ensure compliance of requirements of Concession Agreement (ii) report to NHAI on the Financial and Technical aspects of the project, (iii) assist the parties to the Concession Agreement in arriving at an amicable settlement of disputes, if any.

4. The interested consultancy firms may obtain the RFP from NHAI office from address given below up to [ ] on all working days within 1000 hrs and 1700 hrs. IST by payment of non-refundable Demand Draft amounting to Rs. 5,000/- drawn in favour of "National Highways Authority of India" payable at any schedule bank in New Delhi. The RFP document is also available on NHAI website from [ ]. The Consultant who down load the RFP document from the website will be required to pay the non-refundable fee of Rs. 5,000/- at the time of the submission of the document.

5. For submission, evaluation and selection of Consultant a "single stage" process has been planned. The proposal should be submitted in three parts in three separate envelopes/packages and put together in one single outer envelope/package. The three parts of the proposal are (i) Part 1: Firms credential, (ii) Part 2: Technical Proposal and (iii) Part 3: Financial Proposal. Part 1 of the proposal would be first opened and evaluated and the firms scoring the qualifying marks as mentioned in RFP would be considered for further evaluation. The financial proposal of only those firms, who score qualifying marks in the technical proposal would be opened and evaluated. The

final selection of the firm would be based on combined score of technical and financial proposal. The weightage to technical and financial score would be 80% & 20% respectively.

6. The total time period for the assignment as independent consultant will be for **[48]** months.

7. A firm either individually or in joint venture/association may apply for _____. A firm cannot be a part of other joint venture/association for applying in more than _____ package. In case of Joint venture/association, maximum _____ firms are permitted.

8. NHAI will not be responsible for any delay, loss or non-receipt of RFP document sent by post/courier. Further, NHAI shall not be responsible for any delay in receiving the Proposal and reserves the right to accept/reject any or all applications without assigning any reason thereof.

9. The three parts of the Proposal (firms credentials, technical proposal and financial proposal) must be submitted in a hard bound form (hard bound implies binding between two covers through stitching or otherwise whereby it may not be possible to replace any paper without disturbing the documents-spiral bound form, loose form, etc. will be not accepted) with all pages numbered serially, along with an index of submission. All figures quoted in the financial Proposal should be covered with a transparent adhesive tape. In the event, any of the instructions mentioned herein have not been adhered to, NHAI will reject the Proposal.

10. RFP submission must be received not later than 1100 hrs on [ ] in the manner specified in the RFP document at the addressed given below.

Mr. B.D. Joshi
General Manager (EW)
National Highways Authority of India
G-5 & G-6, Sector 10, Dwarka
New Delhi 110 075.

SECTION 2. INFORMATION TO CONSULTANTS

1 INTRODUCTION

1.1 You are hereby invited to submit a proposal for consulting services required for the assignment named in the attached Letter of Invitation. Your proposal could form the basis for future negotiations and ultimately a contract between your firm and the NHAI.

1.2 A brief description of the assignment and its objectives are given in the Terms of Reference (TOR).

1.3 The assignment shall be implemented in various stages such as Design, Construction supervision, and Operation and Maintenance supervision. Continuation of services for the next stage shall be subject to satisfactory performance of the previous stage, as determined by the NHAI.

1.4 To obtain first hand information on the assignment and on the local conditions, you are encouraged to pay a visit to the NHAI before submitting a proposal and attend a pre proposal conference as specified in the data sheet. You must inform yourself of local conditions and take them into account in preparing your proposal.

1.5 Please note that (i) the costs of preparing the proposal and negotiating for the contract, including a visit to site, are not reimbursable as a direct cost of assignment and (ii) NHAI is not bound to accept any of the proposals received by it and reserves the right to annul the selection process at any time prior to contract award, without thereby incurring any liability to the Consultants.

1.6 We wish to remind you that in order to avoid conflict of interest situations, any firm associated with the Concessionaire of the Project Highway and its Design and/or Supervision Consultant and/or the Contractor(s) as Design Consultant and/or Construction Supervision Consultant is not eligible to participate in the bidding.

1.7 Consultant have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of their Client, or than may reasonably be perceived as having this effect. Failure to disclose said situations may lead to the disqualification of the Consultant or the termination of its Contract.

1.8 It is the NHAI's policy that the consultants observe the highest standard of ethics during the selection and execution of such contracts. In pursuance of this policy, the NHAI:

(a) Defines, for the purpose of this paragraph, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the selection process or in contract execution;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a selection process or the execution of a contract;

(iii) "collusive practices" means a scheme or arrangement between two or more consultants with or without the knowledge of the Client, designed to establish prices at artificial, noncompetitive levels;

(iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract.

(b) will reject a proposal for award if it determines that the Consultant recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the contract in question;

(c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract; and

(d) will have the right to require that a provision be included requiring consultants to permit the NHAI to inspect their accounts and records relating to the performance of the contract and to have them audited by authorized representatives of NHAI.

1.9 Consultants, their Sub-Consultants, and their associates shall not be under a declaration of ineligibility for corrupt and fraudulent practices. Furthermore, the Consultants shall be aware of the provisions on fraud and corruption stated in the specific clauses in the General Conditions of Contract.

1.10 Consultants shall furnish information on commissions and gratuities, if any, paid or to be paid to agents relating to this proposal and during execution of the assignment if the Consultant is awarded the Contract, in the Financial Proposal.

1.11 The Data Sheet indicates how long Consultants' Proposals must remain valid after the submission date. During this period, Consultants shall maintain the availability of Professional staff nominated in the Proposal. The Client will make its best effort to complete negotiations within this period. Should the need arise, however, the Client may request Consultants to extend the validity period of their proposals. Consultants who agree to such extension shall confirm that they maintain the availability of the Professional staff nominated in the Proposal, or in their confirmation of extension of validity of the Proposal. Consultants could submit new staff in replacement, who would be considered in the final evaluation for contract award. Consultants who do not agree have the right to refuse to extend the validity of their Proposals.

2. CLARIFICATIONS AND AMENDMENT OF RFP DOCUMENTS

2.1 Consultants may request a clarification of any of the RFP documents up to the number of days indicated in the Data Sheet before the Proposal submission date. Any request for clarification must be sent in writing by paper mail, cable, telex, facsimile, or electronic mail to the Client's address indicated in the Data Sheet. The Client will respond by cable, telex, facsimile, or electronic mail to such requests and will send copies of the response (including an explanation of the query but without identifying the source of inquiry) to all invited consultants who intend to submit proposals.

2.2 At any time before the submission of Proposals, the Client may for any reason, whether at its own initiative or in response to a clarification requested by an invited firm, modify the RFP documents by amendment. Any amendment shall be

issued in writing through addenda. Addenda shall be sent by mail, cable, telex, facsimile or electronic mail to all invited consultants and will be binding on them. The Client may at its discretion extend the deadline for the submission of Proposals.

3. PREPARATION OF PROPOSAL

3.1 You are requested to submit your proposal in Three Parts in 3 separate envelopes / packages and put together in one single outer envelope/package. The three parts shall be:

Part 1: Firms Credentials,
Part 2: Technical Proposal and
Part 3: Financial Proposal.
The proposal shall be written in the language specified in the data sheet

Part 1: Firms Credentials

3.2 This submission shall contain the following information/ details and should not include any other information

- Year of Establishment of Firm
- Average annual turnover (last three years)
- Number of Key personnel
- Experience of the firm in DRP preparation for Highways projects during the last 7 years
- Experience of the firm in DPR preparation/design review/supervision of major highway structures of length more than 200m during the last 7 years.
- Experience of the Firm as Independent Consultant or Supervision Consultant for Highway projects during the last 7 years.

Part 2: Technical Proposal

3.3 You are expected to examine all terms and conditions included in the documents. Failure to provide all requested information will be at your own risk and may result in rejection of your proposal.

3.4 During preparation of the technical proposal you may give particular attention to the following :

i. The estimated manmonths for the assignment is stated in the Terms of Reference for your information. The proposal shall however be based on the number of professional staff months estimated by the firm.

ii. The majority of the key professional staff proposed must be permanent staff of the firm.

iii. No alternative to key professional staff may be proposed and only one Curriculum Vitae (CV) may be submitted for each position and

iv. A good working knowledge of the language specified in the data sheet is essential for key professional staff on this assignment. Reports must be in the language (s) specified in the data sheet.

v. Joint venture are allowed as detailed in the data sheet

3.5 Your technical proposal must provide the following information, using but not limited to the formats attached in the Appendix I.

i. A brief description of the firm's organisation and an outline of recent experience of the Consultants and, in the case of Joint Venture, for each partner, on assignments of a similar nature. The information which you shall provide on each assignment should indicate, *inter-alia*, the profiles of the staff provided, duration, contract amount and firm's involvement.

ii. Any comments or suggestions on the ToR and a description of the methodology (work plan) which the firm proposes to execute the services, illustrated with bar charts of activities.

iii. The composition of the proposed staff team, the tasks which shall be assigned to each and their timing;

iv. **CVs recently signed in blue ink on each page** by both the proposed professional staff and the authorised representative submitting the proposal. Key information should include years with the firm and degree of responsibility held in various assignments. **Photocopy or unsigned CVs shall not be evaluated.**

v. Estimates of the total time effort (person x months) to be provided for the services, supported by bar chart diagrams showing the time proposed (person x months) for each professional staff and

vi. Any additional information requested in Data Sheet.

3.6 The technical proposal must not include any financial information.

Part 3: Financial Proposal

3.7 In preparing the Financial Proposal, consultants are expected to take into account the requirements and conditions of the RFP documents. The Financial Proposal should follow Standard Forms. It lists all costs associated with the Assignment, including (a) remuneration for staff (foreign and local, in the field and at headquarters), and (b) rentals/fixed rates reimbursable such as subsistence (per diem, housing), transportation (international and local, for mobilization and demobilization), services and equipment (vehicles, office equipment, furniture, and supplies), office rent, insurance, printing of documents, surveys, and training, if it is a major component of the assignment. If appropriate, these costs should be broken down by activity and if appropriate into foreign and local expenditures.

3.8 The Financial Proposal should clearly identify as a separate amount, the local taxes (including social security), duties, fees, levies and other charges imposed under the applicable law, on the consultants, the sub-consultants, and their personnel (other than nationals or permanent residents of the government's country), unless the Data Sheet specifies otherwise.

3.9 Consultants may express the price of their services in the Local currency (Indian Rupees) and/or US Dollar at the rate prevalent at the time of submission of the proposals. The Client may require consultants to state the portion of their price representing local cost in the national currency if so indicated in the Data Sheet.

4. SUBMISSION, RECEIPT AND OPENING OF PROPOSALS

4.1 The original proposal shall be prepared in indelible ink. It shall contain no interlineation or overwriting, except as necessary to correct errors made by the firm itself. Any such corrections must be initiated by the person or persons who sign(s) the Proposals.

4.2 An authorized representative of the firm shall initial all pages of the Proposal. The representative's authorization in *original/notarized* is confirmed by a written power of attorney accompanying the Proposal.

4.3 You must submit one original proposal only. The envelope must be clearly marked.

"DO NOT OPEN, EXCEPT IN PRESENCE OF THE EVALUATION COMMITTEE"

4.4 This outer envelope shall include three separate envelopes, each clearly marked as " Part 1: Firms Credentials", "part 2: Technical Proposal" or "Part 3: Financial Proposal" (each envelope indicating original or copy as appropriate).

4.5 The proposal must be submitted in a hard bound form (hard bound implies binding between two covers through stitching or otherwise whereby it may not be possible to replace any paper without disturbing the document - spiral bound form, loose form, etc. will be not accepted) with all pages numbered serially, along with an index of submissions. All figures quoted in the financial Proposal should be covered with a transparent adhesive tape

4.6 Your completed proposal must be delivered on or before the time and date stated in the data sheet.

5 PROPOSAL EVALUATION

5.1 A three -stage procedure shall be adopted in evaluating the proposals : (i) Firms Credentials, firms securing the qualifying marks mentioned in Clause 5.2 will be eligible for Technical and Financial evaluation (ii) Technical Evaluation, firms securing the qualifying marks mentioned in Clause 5.3 will be eligible for Financial evaluation and (iii) Financial Evaluation.

Firms Credentials

5.2 The Evaluation Committee appointed by the NHAI shall carry out its evaluation applying the evaluation criteria and point system specified in the data sheet. The firms should score at least 70 marks for qualifying to the next stage

Technical Proposal

5.3 The Evaluation Committee appointed by the NHAI shall carry out its evaluation applying the evaluation criteria and point system specified in the data sheet Each responsive proposal shall be attributed a technical score (St.) The technical proposal should score at least 75 points to be considered responsive for financial evaluation.

Financial Proposal

5.4 After the evaluation of technical proposal is completed, the Client may notify those consultants whose proposals were considered non-responsive to the RFP and Terms of Reference, indicating that their Financial Proposals will be returned unopened after

completing the selection process. The Client shall simultaneously notify the consultants that have secured the minimum qualifying mark, indicating the date and time set for opening the Financial Proposals. The opening date should allow Consultants sufficient time to make arrangements for attending the opening. The notification may be sent by registered letter, cable, telex, facsimile, or electronic mail.

5.5 The Financial Proposals shall be opened publicly in the presence of the consultants' representatives who choose to attend. The name of the consultant, the quality scores, and the proposed prices shall be read aloud and recorded when the Financial Proposals are opened. The Client shall prepare minutes of the public opening.

5.6 The Evaluation Committee will correct any computational errors. When correcting computational errors, in case of discrepancy between a partial amount and the total amount, or between word and figures the formers will prevail. In addition to the above corrections, activities and items described in the Technical Proposal but not priced, shall be assumed to be included in the prices of other activities or items. In case an activity or line item is quantified in the Financial Proposal differently from the Technical Proposal, (i) if the Time-Based form of contract has been included in the RFP, the Evaluation Committee shall correct the quantification indicated in the Financial Proposal so as to make it consistent with that indicated in the Technical Proposal, apply the relevant unit price included in the Financial Proposal to the corrected quantity and correct the total Proposal cost. (ii) if the Lump-Sum form of contract has been included in the RFP, no corrections are applied to the Financial Proposal in this respect. Prices shall be converted to a single currency using the selling rates of exchange, source and date indicated in the Data Sheet. The evaluation shall exclude those taxes, duties, fees, levies, and other charges imposed under the applicable law; and those applied to foreign and non-permanent resident consultants.

5.7 The Evaluation Committee shall determine if the financial proposal is complete and without computational errors. The lowest financial proposal (Fm) shall be given a financial score (Sf) of 100 points. The financial score of the proposals shall be computed as follows : Sf = 100 x Fm//F (F-amount of financial proposal).

5.8 Proposals shall finally be ranked according to their combined technical (St) and financial (Sf) scores using the weights indicated in the data sheet.

6 NEGOTIATIONS

6.1 Prior to the expiration period of validity of proposal, the NHAI shall notify the successful firm who submitted the highest scoring proposal in writing by registered letter, cable telex or facsimile and invite it to negotiate the contract.

6.2 Negotiations normally take two to five days. The aim is to reach agreement on all points, and initial a draft contract by the conclusion of negotiations

6.3 Negotiations shall commence with a discussion of your technical proposal, the proposed methodology (work plan), staffing and any suggestions you may have made to improve the ToR. Agreement must then be reached on the final ToR, the staffing and bar charts, which shall indicate activities, staff, periods in the field and in the home office, staff months, logistics and reporting. Special attention shall be paid to optimise the required outputs from the firm within the available budget and to define clearly the inputs required from the NHAI to ensure satisfactory implementation of the assignment

6.4 It is the responsibility of the Consultant, before starting financial negotiations, to contact the local tax authorities to determine the local tax amount to be paid by the Consultant under the Contract. The financial negotiations will include a clarification (if any) of the firm's tax liability in the Client's country, and the manner in which it will be reflected in the Contract; and will reflect the agreed technical modifications in the cost of the services. Unless there are exceptional reasons, the financial negotiations will involve neither the remuneration rates for staff nor other proposed unit rates.

6.5 Changes agreed upon shall then be reflected in the financial proposal, using proposed unit rates (no negotiation of the unit rates, including the man months rates).

6.6 Having selected a firm, among other things, on the basis of an evaluation of proposed key professional staff, the NHAI expects to negotiate, a contract on the basis of the staff named in the proposal and, prior to contract negotiations, will require assurance that this staff shall be actually available. NHAI shall not consider substitutions during contract negotiations except in cases of unexpected delays in the starting date or incapacity of key professional staff for reasons of health.

6.7 The negotiations shall be concluded with a review of the draft form of Contract. The NHAI and the firm will finalise the contract to conclude negotiations.

7 AWARD OF CONTRACT

7.1 After completion of negotiations with the consultants, the Client shall award the Contract to the selected Consultant. However, after signing of the Contract, the Client may return the unopened Financial Proposals to the unsuccessful Consultants.

7.2 The successful firm with whom the contract is signed is expected to commence the assignment on the date and at the location specified in the data sheet.

8. CONFIDENTIALITY

Information relating to evaluation of proposals and recommendations concerning awards shall not be disclosed to the consultants who submitted the proposals or to other persons not officially concerned with the process, until the winning firm has been notified that it has been awarded the contract.

DATA SHEET
(As Mentioned in Information to Consultants)

Sub clause No. in Information to Consultants

1.4 **Pre-Proposal Conference shall be held at: no pre-proposal conference shall be held.**

1.11 The proposal shall be valid for 120 days after the last date of submission.

2.1 Clarification may be requested 15 days prior to last date of submission. The address for requesting clarification are:

Mr. B.D.Joshi
GM (EW)
National Highways Authority of India
G-5&6, Sector 10, Dwarka,
New Delhi
Tel : 91-11-25074100

3.1 **The Language** of documents and correspondence will be English

3.4 Limitations to joint ventures or sub-consultant are : Joint Venture consisting of maximum two firms are permitted. In case of JV the experience of both the firms shall be counted. In case of association/sub-consultant the experience of associated firm/sub-consultant shall not be counted whereas the key personnel of the associated firm would be considered for evaluation.

All the personnel shall have working knowledge of English and all the reports etc shall be written in English.

3.8 Taxes – consultants are requested to consult Tax Consultants for details.

3.9 The Consultants to state local cost in INR.

4.6 The time and date of submission: 1100 hrs on 16.8.2005.

5.2 Firms Credentials

S. no	Description	Marks
1	Year of Establishment of Firm	10
2	Average annual turnover (last three years)	10
3	Number of Key personnel	10
4	Experience of the firm in DRP preparation for Highways projects during the last 7 years.	10
5	Experience of the firm in DPR preparation/design review/supervision of major highway structures of length more than 200m during the last 7 years.	10
6	Experience of the Firm as Independent Consultant or Supervision Consultant for Highway projects during the last 7 years.	50
	TOTAL	**100**

The firms should score at least 70 marks for qualifying to the next stage.

5.3 **The points assigned to Technical Evaluation criteria are** :

S.No.	Description	Marks
1	Specific Experience of the firm related to the assignment	20
2	Adequacy of the proposed work plan and methodology in response to the ToR	05
3	Qualifications and competence of the key staff for the assignment	75
	Total	**100**

Sub criteria for Specific Experience of the firm related to the assignment

Experience as Independent Consultant / in Construction Supervision in Highway Projects	12
Experience in DPR preparation for Highway Projects	4
Experience in Construction Supervision/DPR /Design Review of Major structures having length of more then 200 meter.	4

Sub criteria for Adequacy of the proposed work plan and methodology in response to the ToR

Comments & Suggestions on TOR	1
Quality of Approach and Methodology	3
Work Programme & Manning Schedule	1

Qualification and competence of key staff for the assignment. The weightage for various key staff are as under:-

Key Personnel	Marks.
Team Leader Cum Senior Highway Engineer	20
Senior Pavement Specialist	7
Senior Bridge Design Engineer	8
Highway Design Engineer	8
Bridge/Structural Engineer	10

HTMS/Toll Expert	6
Road Safety Expert	6
Senior Quality cum Material Expert	10

Sub criteria for qualification of key staff

General qualifications	25
Adequacy for the project	70
Experience in Region and language	5

The technical proposal should score at least 75 points to be considered responsive for financial evaluation.

5.6 The single currency for price conversion is INR. The conversion rate shall be RBI Reference Rate as was applicable 7 days prior to the last date for submission of proposal.

5.8 The weightage given to technical proposal is 80%.

The weightage given to financial proposal is 20%.

7.2 Commencement of Assignment : The firm shall begin carrying out the services within one month of signing of the Consultancy Agreement.

SECTION 3. FORMATS FOR SUBMISSION OF FIRMS CREDENTIALS

The proposal should contain the following information in enclosed format attached at Appendix A.

- Year of Establishment of Firm
- Average annual turnover (last three years)
- Number of Key personnel
- Experience of the firm in DRP preparation for Highways projects during the last 7 years.
- Experience of the firm in DPR preparation/design review/supervision of major highway structures of length more than 200m during the last 7 years.
- Experience of the Firm as Independent Consultant or Supervision Consultant for Highway projects during the last 7 years.

Note: The Firm shall submit Certificate of Incorporation and audited balance sheet for the last three years (FY 2002-2003, FY 2003-2004 and FY 2004-2005). In case audited balance sheet FY 2004-2005 is not available, firm may submit the audited balance sheet of 2001-2002. For claiming experience of Highway projects completion certificate from employer should be enclosed. The proposal should also contain the details of the key personnel viz. their name, qualification, expertise area, experience and years of association with the firm.

Appendix A

Firms credentials (to be filled by each of the constituent firm in case of JV).

1. Name of the packages to be applied for:-
2. Year of establishment of firm.

Consultant	Year of Establishment	Country	Type of Organisation			
			Individual	Partnership	Corporation	Other
Lead Partner						
Other Partner						

3. Office/Business Address/Telephone nos./Cable Address.
4. Consulting firms former name and year of establishment.
5. Narrative description of firms (Use other sheet, if necessary)
6. Name of, not more than two (2) principals who may be contacted with title and telephone number /fax number.
7. Number of Personnel in the Organisation.

Discipline	**Number**
Key Personnel	**With experience more than 10 years and associated with the firm with at least 1 year.**

8. Financial Statement of the last three years.

Sl. No.	Particulars	2004-2005	2003-2004	2002-2003
i.	Annual turnover from Consulting business			
ii.	Total Assets			
iii.	Current Assets			
iv.	Total Liabilities			
v.	Current Liabilities			
vi.	Net Worth			
vii.	Working Capital			
viii.	Net Profit			

Note i) The amount shall be stated in INR

ii) The currency conversion rate for the respective years shall be mentioned for other international currencies.

iii) **The application with amount sated in currencies other than INR shall be treated as non responsive.**

9. HIGHWAY PROJECTS HANDLED BY THE CONSULTING FIRMS DURING THE LAST SEVEN YEARS (Only those projects be included, which are supported the certificated of the Engineer/Employer mentioning that the consultancy work has been completed satisfactorily or has been substantially completed in case of project supervision works (substantial completion means 90% works in financial value having been executed) satisfactorily.

Sl. No.	Projects Name/Year	Type of Services Rendered	Length of Projects (kms)	Employer	Duration.
1	2	3	4	5	6

10. Supporting Statements to Employer's Certificates may be furnished giving full details of the projects carried out as below:

Name of the Project: _____
Owner's Name and Address: _____
_____
Completion (Actual and Estimated): _____
Description of Project:
_____
Description of Services Provided by the Firm:
_____

I certify that the information in the above Expression of Interest forms is true to the best of my knowledge.

PRESIDENT/MANAGING DIRECTOR OR AUTHORIZED SIGNATORY#

SUBSCRIBED AND SWORN to before me this _____ date of _____ 2005 _____ at _____.

Please attach Power of Attorney as described or valid authorisation.

NOTARY PUBLIC

SECTION 4. FORMAT FOR SUBMISSION OF TECHNICAL PROPOSAL

Appendix B-1	Technical proposal submission form.
Appendix B-2	Firm's references
Appendix B-3	Firm's comments and suggestions on the Terms of Reference and on data, services, and facilities to be provided by the NHAI.
Appendix B-4	Approach paper on methodology and work plan for performing the assignment.
Appendix B-5	Composition of the team and task(s) of each team member
Appendix B-6	Curriculum vitae of proposed professional staff.
Appendix B-7	Time schedule for deployment of professional personnel
Appendix B-8	Activity (works) schedule.

APPENDIX B-1

Technical Proposal submission Form.

FROM (Name of Firm)

_____

_____

_____

To: (Name and Address of Client)

_____

_____

_____

Ladies/Gentlemen:

Subject:

We, the undersigned, offer to provide the consulting services for the above in accordance with your Request for Proposal dated (Date), and our Proposal. We are hereby submitting our Proposal, which includes this Technical Proposal and a Financial Proposal sealed under a separate envelope.

If negotiations are held during the period of validity of the Proposal i.e. before (Date) we undertake to negotiate on the basis of the proposed staff. Our Proposal is binding upon us and subject to the modifications resulting from contract negotiations.

We understand you are not bound to accept any Proposal you receive

We remain,

Yours sincerely,

Authorised Signature
Name and Title of Signatory:
Name of Firm
Address:

Otai Bhograpur Bara Project

O-15

APPENDIX B-2 : FIRM'S REFERENCES

Relevant Services Carried Out in the Last Seven Years That Best Illustrate Qualifications

Using the format below, provide information on each reference assignment for which your firm/entity, either individually as a corporate entity or as one of the major companies within an association, was legally contracted.

<table>
<tr><td colspan="2">Assignment Name :</td><td>Country :</td></tr>
<tr><td colspan="2">Location within Country :</td><td>Professional Staff Provided by Your Firm:</td></tr>
<tr><td colspan="2">Name of Client :</td><td>No. of Staff :</td></tr>
<tr><td rowspan="2">Start Date (Month/Year)</td><td rowspan="2">Completion Date (Month/Year)</td><td>No. of Staff-Months :</td></tr>
<tr><td>Approx. Value of Services (in Current INR)</td></tr>
<tr><td colspan="2">Name of Associated Consultants, if any:</td><td>No. of Months of Professional Staff Provided by Associated Consultants :</td></tr>
<tr><td colspan="3">Name of Senior Staff involved :</td></tr>
<tr><td colspan="3">Narrative Description of Project :</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by Your Staff :</td></tr>
</table>

Firm's Name : _____

Note: In case of claiming experience of Highway projects completion certificate from employer must be enclosed.

APPENDIX B-3 : COMMENTS AND SUGGESTIONS OF CONSULTANTS ON THE TERMS OF REFERENCE AND ON SERVICES AND FACILITIES TO BE PROVIDED BY THE NHAI

On the Terms of Reference :

1.

2.

3.

4.

....

On the services and facilities to be provided by the NHAI

1.

2.

3.

4.

..

APPENDIX B-4 : APPROACH PAPER ON METHODOLOGY AND WORK PLAN FOR PERFORMING THE ASSIGNMENT

APPENDIX B-5 : COMPOSITION OF THE TEAM PERSONNEL, AND TASK(S) OF EACH TEAM MEMBER

1. **Technical/Managerial Staff**

Sl. No.	Name	Position	Task
1			
2			
3			
4			
..			
..			

2. **Support Staff**

Sl. No.	Name	Position	Task
1			
2			
3			
4			
..			
..			

APPENDIX B-6 : FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED PROFESSIONAL STAFF

Proposed Position : .....

Name of Firm : .....

Name of Staff : .....

Profession : .....

Date of Birth : .....

Years with Firm/Entity : ..... Nationality : .....

Membership of Professional Societies : .....

Detailed Task Assigned : .....

Key Qualifications :

[Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use about half a page.]

Education :

[Summarise college university and other specialised education of staff member, giving their names, dates attended, and degrees obtained. Use about one quarter of a page.]

Employment Record :

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, name of employing organisations, titles of positions held, and locations of assignments. For experience in last ten years, also give types of activities performed and client references, where appropriate. Use about three-quarters of a page.]

Languages :

[For English language indicate proficiency - excellent, good, fair, or poor, in speaking, reading, and writing]

Certification

I, the undersigned, (Name and Address) certify that I have not left any assignment with the consultants engaged by NHAI / contracting firm (firm to br supervised now) for any continuing work of NHAI without completing my assignment. I will be available for the entire duration of the current project (named.....). if I leave this assignment in the middle of the complition of the work, NHAI would be at liberty to debar me from taking any assignment in any of the NHAI works for an appropriate period of time to be decided by NHAI. I have no objection if my services are extended by NHAI for this work in future.

.... Date .....

[Signature of staff member or authorised representative of the Firm]
Day Month Year

APPENDIX B-7: TIME SCHEDULE FOR PROFESSIONAL PERSONNEL

A. Activity Schedule

Sl. No.	Name	Position	Monthwise Program (in form of Bar Chart) *[1st, 2nd, etc. are months from the start of assignment]*												
			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th and subsequent years	Number of Months
1															Subtotal (1)
2															Subtotal (2)
3															Subtotal (3)
4															Subtotal (4)
-															-
-															-

422

APPENDIX B-8 : ACTIVITY (WORKS) SCHEDULE

A. Activity Schedule

		Monthwise Program (in form of Bar Chart) *[1st, 2nd, etc. are months from the start of assignment]*											
Sl. No.	Item of Activity (Works)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
1	.....												
2	.....												
3	.....												
4	.....												
-	.....												
-	.....												

B. Completion and Submission of Reports

S.No	Reports :	Programme : (Date)
1	Monthly reports (Design and Construction)	
2	Quarterly Reports	
3	Various others reports as provided in the Concession Agreement such as Completion Report	

SECTION 5. FORMAT FOR SUBMISSION OF FINANCIAL PROPOSAL.

Appendix C-1 Financial proposal submission form

Appendix C-2 Summary of costs

Appendix C-3 Breakdown of local currency costs

Appendix C-4 Breakdown of foreign currency cost.

APPENDIX C-1 : FINANCIAL PROPOSAL SUBMISSION FORM

FROM : (Name of Firm)

TO :
National Highways Authority of India
G-5&6, Sector-10, Dwarka
New Delhi (India) - 110045

Subject :

We, the undersigned, offer to provide the consulting services for the above in accordance with your Request for Proposal dated [Date], and our proposal. Our attached financial proposal is for the sum of [Amount in words and figures]. This amount is exclusive of the local taxes which we have estimated at (Amount in Words and Figures).

Our financial proposal shall be binding upon us subject to the modifications resulting from contract negotiations, up to the expiration of the validity period of the proposal, i.e., [Date].

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

Commission and gratuities, if any, paid or to be paid by us to agents relating to this proposal and contract execution, if we are awarded the contract, are listed below

Name and Address of Agents	Amount and Currency	Purpose of Commission or Gratuity
.....	.....	.....
.....	.....	.....

We understand you are not bound to accept any proposal you receive.

We remain,

Yours sincerely,

Authorised Signature
Name and title of Signatory

APPENDIX C-2 : SUMMARY OF COSTS

No	Description	Amount (LC)*	Amount (FC**)
	Local Consultants		
I	Remuneration for Local Key Personnel		
II	Supporting Staff		
III	Transportation		
IV	Duty Travel to Site		
V	Office Rent		
VI	Office supplies, Utilities and communication		
	Office Furniture and Equipment		
VII	Reports and Document Printing		
VIII	Survey Equipment		
	Subtotal Local Consultants		
	Foreign Consultants		
F-I	Remuneration for Expatriate Staff		
F-II	Mobilization and Demobilisation		
F-III	Accommodation for Consultants' Staff		
F-IV	Other Costs		
	Subtotal Foreign Consultants		
	Total Cost Net of Tax (Local & Foreign Consultants)		
Local Taxes and Duties	Tax payable in India on fees for technical services provided by foreign consultants, including duties on equipment imported.		
	Consultancy Services Tax payable in India		
	TOTAL COSTS (Including Tax)**		

LC* Local Currency FC** in US Dollar (1+1)

Note: The ceiling cost of the consultancy is as shown in the Summary of Costs Payments will be made as per stipulations of the Conditions of Contract

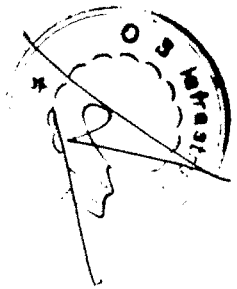
APPENDIX C-3 : BREAKDOWN OF LOCAL CURRENCY COSTS

REMUNERATION FOR STAFF

No.	Position	Name	Year 1			Year 2			Year 3			Year 4		
			Rate	SM	Amount	Rate	SM	Amount	Rate	SM	Amount	Rate	SM	Amount
	Key Personnel													
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
	Sub - Total													
	Sub-professional													
1.		TBN												
2.		TBN												
3.		TBN												
4.		TBN												
5.		TBN												
6.		TBN												
7		TBN												
8.		TBN												
9.		TBN												
10		TBN												

	Sub-Total													
	TOTAL													

SM Staff Month
TBN To be Named



827

II. Support Staff

No.	Position	Name	Staff Months	Billing Rate ( )	Amount ( )
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
				Total :	

III Transportation (Fixed costs)

S.No	Description	Qty.	Nos of months	Rate Month	Amount
1	The vehicles provided by the Consultants shall include the cost for rental, drivers, operation, maintenance, repairs, insurance, etc. A. For use of consultants				
	Total				

IV. Duty Travel to Site (Fixed Costs)

Trips	NO	Rate	Amount

V. Office Rent (Fixed Costs)

The rent cost includes maintenance, cleaning, repairs, etc.
__ months x

Total

VI. Office Supplies, Utilities and Communication (Fixed Costs)

No	Item	Months	Monthly Rate	Amount in Rs.
1.	Office Supplies			
2.	Drafting Supplies			

3.	Computer Running Costs			
4.	Domestic and International Communication			

TOTAL : ----------

VII. Office Furniture and Equipment (Rental)

No.	Description (*)	Unit	Quantity	Rate ( )	Amount ( )
	Office Furniture (Purchase)				
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
	Office Equipment (Purchase)				
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
				Total	

VII. Reports and Document Printing

No.	Description*	No. of Volumes	No. of Copies per Volume	Rate per Copy ( )	Amount
1	Monthly reports (Design and Construction)				
2	Quarterly Reports				
3	Various others reports as provided in the Concession Agreement such as Completion Report				
				Total	

APPENDIX C-4 BREAK UP OF COSTS IN FOREIGN CURRENCY

No.	Description	Currency*	Amount
I.	Remuneration for Expatriate Staff		
II.	Mobilisation and Demobilisation 1. International Airfares 2. Inland travel in Home Country 3. Inland Travel in Overseas Country 4. Excess Luggage Allowance 5. Unaccompanied Luggage Allowance 6. Relocation Storage Allowance 7. Miscellaneous Travel Expense 8. Temporary Lodging during Mobilisation/demobilization 9. Establishment 10. Exit charges		
III	Accommodation of Consultant's Expatriate Staff		
IV	Other costs		
	TOTAL COSTS ( )		

*** In US Dollar plus local currency (INR).**

1. Remuneration to Expatriate Staff

No.	Position	Name	Years 1 to 3		
			Rate ( )	SM	Amount ( )
			Total:		

2. Mobilization and Demobilization

1. International Airfares (Reimbursable)
(Economy Class)

Position	Round trips	Dependents
Total:		

Total costs for round trips home office to site at cost per person per round trip conform to the official IATA economy class fares

2. Inland Travel in Home Country (Fixed Rate)

Total cost for travel between consultants' Head office and airport

____X_____ _____

3. Inland Travel in Overseas Country (Fixed Rate)
local cost for travel from the airport to hotel

___X____X_____ _____

1. Excess Luggage Allowance (Reimbursable)

At cost per person per single trip to conform to the Official IATA rates

___x___kg. x_____ _____

2. Unaccompanied Luggage Allowance (Fixed Rate)

At cost per family per round trip

__x__kg. x_____ _____

3 Relocation/Storage Allowance (Fixed Rate)

For long term staff with an assignment of more than 12 months

- family(es) x_____ _____

4 Travel Documents and Miscellaneous Costs (Fixed Rate)

Travel documents, visa, health certificates, etc.

(a) Short term staff, first trip

___x_____ _____

(b) Short term staff subsequent trips

_____x_____ _____

(c) Long term staff first trip

- Family (es) x_____ _____

(d) Long term staff subsequent trip

- Family(es) x_____ _____

Total _____

8 Temporary Lodging during Mobilization/Demobilization (Reimbursable)

___Family x_____ day(s) x_____

9. Establishment allowance (Fixed Rate)

Expenses for legal documents in country extension
Of permits, work permits, etc.

(a) For short term staff assignments less than 6 months

___x_____ _____

(b) Long term staff

___person(s) x___trip (s)_____

Total: _____

10. Exit Charges (Reimbursable)

Allow for expatriate staff with assignments of
More than 6 months _____ per exit at cost

____person(s) x_____trip(s) ____ _____

3. Accommodation for Consultants' Expatriate Staff (Fixed Rate)

1. Per Diem allowance Short Term Staff

Total____ staff months of _____ days is_____ days
Reimbursement of the cost will be on actual day basis.

____days x_____ _____

2. Housing of Long Term Expatriate Staff (Fixed Rate)

Housing including furniture, costs for utilities and maintenance has to be
Arranged for 1 family

___months x ____ _____

4. **Other Costs (Reimbursable)**

Purchase of documents

Budget for purchase of documents, books, maps
Software, International standards etc. to be
Reimbursed at cost. Allow as ceiling amount _____

TOTAL _____

SECTION 6: TERMS OF REFERENCE

1. PROJECT BACKGROUND

(1) The Govt of India (GoI) through Ministry of Shipping, Roads & Highways (MoSRT&H) is contemplating to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on the heavily trafficked National Highway sections. The Project under consideration aims at developing section of NH-___ as mentioned in Schedule A, by widening the existing 2-lanes to 4/6 lanes dual carriageway, including strengthening of the existing 2-lanes on Build, Operate and Transfer (BOT) basis/ BOT (Annuity) basis.

(2) Though NHAI is preparing Land Acquisition proposals for acquiring land to accommodate the Project facilities along the Project corridor, the Concessionaire is solely responsible for making necessary arrangements for acquisition of land. It shall also identify and submit proposals for acquiring land in accordance with relevant Land acquisition (LA) act and pursue early accomplishment of land acquisition. NHAI will reimburse the cost of land to be acquired on the award of concerned Revenue Authority.

(3) The Concessionaire shall make necessary arrangements clearing the encumbrances along the Project corridor under the directions of the concerned agencies and officials at his own cost.

(4) The Concessionaire shall operate and maintain the Project Highway by itself, or through O&M Contractors including tolling contractor, if any, after carrying out improvements to comply with Standards and Specifications spelled out by the NHAI in the Concession Agreement.

(5) NHAI intends to appoint an Independent Consultant (IC) to oversee the activities of the Concessionaire during Design, Construction, Operation and Maintenance of the Project Highway.

2. OBJECTIVES

The objectives of consultancy service are to:

i) Act independently and on behalf of the NHAI to review all activities associated with Design Review, Construction and O&M to ensure compliance of requirements of Concession Agreement in order to have a sound Project.
ii) Report to NHAI on the financial and technical aspects of the project, after visiting the site at least once a week.
iii) Assist the parties to the Concession Agreement in arriving at an amicable settlement of dispute.
iv) Act, if required on behalf of the lenders and fulfil various reporting requirements of the lenders.

3. SCOPE OF SERVICES

The Project Highway provides for widening and strengthening of existing two lanes Section of NH ___ and its Operation and Maintenance (O&M) on BOT / BOT

(Annuity) basis. The work also includes the widening of existing bridges and culverts and construction of new bridges and culverts for new carriageway. The Project Highway shall include but not be limited to the following:

- Road works
- Fee Collection system including buildings and related structures, hardware and software
- Communication systems
- Administration and Maintenance Depots
- Rest Area and Fuel and Service facilities
- Rest areas
- Lighting system
- Interchanges
- Bridges
- Service Roads
- Lay byes, Bus bays
- Traffic safety, Landscaping, arboriculture and other Project facilities.

The Concession Agreement envisage the appointment of an Independent Consultant (IC) by the National Highways Authority of India (NHAI). The IC shall be, in principle, responsible for review of Designs, Drawings, Construction, Progress Monitoring, affirmation of all certifications done by the Concessionaire, etc. The IC shall be involved in day-to-day implementation of the Project. The Concession Agreement also envisages the appointment of a Consultant by the Concessionaire to undertake the design related work and the day-to-day technical audit and quality control of Construction, monitoring of progress, certification of works of the Contractor(s) to be appointed by the Concessionaire for the Project Highway.

The Independent Consultant shall supervise that all the requirements of the Concession Agreement and various schedules are met by the Concessionaire and in case of any discrepancy/ deviations, he shall inform NHAI and the Concessionaire. The responsibility of the IC during various stages of Design Review, Construction and Operation and Maintenance shall be as follows but not be limited to :

3.1 Design Review Stage

i) Review the adequacy of the geotechnical and sub-soil investigations for road, bridge and other structures and building works, hydrological investigation and the topographical survey.

ii) Review the Design and working drawings prepared for the construction of various components of the highway, bridges / structures, analysis of rates, estimates, reports and other deliverables.

iii) Review the impact of widening proposal on the Archaeological structures, if any.

iv) Review the Project report prepared by the Concessionaire, with respect to the traffic, toll management (only for BOT Projects), traffic management, etc.

v) Review the implementation schedule of Engineering, Design, Procurement and Construction of the Project submitted by the Concessionaire.

vi) Review the Planning and Design of way-side amenities, toll plazas, toll collection system (only for BOT Projects), communication facilities, emergency relief arrangements, traffic operation and safety arrangements.

vii) Review all Project contracts including Detailed Engineering and Design Consultancy Contract, Construction Supervision Consultancy contract , any other EPC contract, O & M Contract and Tolling contract (only for BOT Projects), made by the Concessionaire.

viii) Review the environmental management plan for the Project Highway during Construction and Operation and Maintenance phases.

ix) Review quality assurance and quality control provisions during the design, construction and maintenance stages.

x) Audit the safety of the Project Highway both during Construction and Operation and Maintenance stages.

xi) To mediate and assist in resolving disputes between NHAI and Concessionaire.

xii) Provide Management Information System to NHAI.

3.2 Construction Stage

3.2.1 The duties of the IC are to supervise the works on a day-to-day basis and to approve the materials and workmanship of the works. During the construction phase it should be made mandatory that, IC's key staff should check at least 25-30% of Request for Inspection (RFI) pertaining to each item of construction and close them. IC's Team Leader should at least close 5-10% of RFI as per such provisions of Inspection in the Concession Agreement. He/she shall have no authority to relieve the Concessionaire of any of their duties or to impose additional obligations. The IC shall administer the works contracts and ensure that the Contractual Clauses, whether related to quality or quantities of works, are respected. Request for Inspection (RFI) is a formal application from the Concessionaire (or EPC contractor) to Independent Consultant to examine all the aspects of work or activity pertaining to construction or development of the Project Highway. Submission of a RFI for construction activity must be made a minimum of 48 hours in advance of the time the Concessionaire (or EPC contractor) plans to begin work on the RFI activity.

3.2.2 Review and approve works programme.

3.2.3 Review the material testing results and Mix Designs and to order special tests of materials and/or completed works, and/or order removal and substitution of substandard materials and/or works as required.

3.2.4 Review quality assurance and quality control during Construction period.

3.2.5 Ensure that the Construction work is accomplished in accordance with the technical specifications.

3.2.6 Identify Construction delays and recommend to the NHAI the remedial measures to expedite the progress.

3.2.7 Review and certify the 'As Built' drawings for each component of the works prepared by the Concessionaire.

3.2.8 Review the safety measures provided for the traffic and Project workers.

3.2.9 Determine any extension of the Project Completion Schedule and the Concession period, to which the Concessionaire is entitled and shall notify the NHAI accordingly.

3.2.10 To mediate and assist in resolving disputes between NHAI and Concessionaire during Construction stage.

3.2.11 Assist the NHAI in arriving at any cost variation and its impact on Concession Agreement.

3.2.12 Evolve MIS and provide it to the NHAI

3.2.13 Issue Completion Certificate after checking the results of prescribed tests, with the approval of NHAI.

3.2.14 Issue Provisional Certificate duly appended with a list of outstanding items (Punch List, as defined in the Concession Agreement) established after joint inspection with the Concessionaire, if the Concessionaire requests for it, after approval of NHAI.

3.2.15 In case of Change in scope, while calculating the cost implications to the Concessionaire of complying with such Change of Scope Notice, the rates shall be worked out by based on the concerned State PWD (NH) current schedule of rates based on MORTH data book. In case an item is not covered under the above-mentioned schedule of rates, the rate of such item shall be worked out by the Concessionaire on the basis of the prevailing market rate so far as found reasonable and competitive by the IC.

3.2.16 To direct the Concessionaire in all matters concerning construction safety and care of the works and if required, to request the concessionaire to provide any necessary lights, guard, fencing etc.

3.3 Operations and Maintenance Stage

Maintenance shall include cleaning, replacement of equipment/consumables, roadside facilities, horticultural maintenance and repairs to equipment, pavements, bridges, structures, HTMS and other civil works. Maintenance shall not include the extension of any existing pavements, bridges, structures and other civil works unless part of the Project Highway.

3.3.1 Review work plan and schedules of various operation and maintenance activities.

3.3.2 Review Operation and Maintenance manual prepared by the Concessionaire.

3.3.3 Review the performance of Operation and Maintenance (O & M) activities including equipment, service, traffic operation and safety, toll plazas and fees collection system (only for BOT Projects), landscaping, environmental issues and way side amenities.

3.3.4 To mediate and assist in resolving disputes between NHAI and Concessionaire during O&M stage.

3.3.5 Initiate necessary action to undertake maintenance obligations of the Concessionaire at risk and cost of the Concessionaire in the event of his failure to carry out O&M.

3.3.6 Undertake audit of the traffic using the Project Highway at least once a month

3.3.7 Review and inspect the Project Highway at least once a month during the O&M period and issue an Inspection Report of such inspections.

3.3.8 Review the accident record on the Project Highway and suggest remedial measures.

3.4 **Transfer/Termination**

Satisfy itself that the entire divestment requirement have been met by the Concessionaire.

3.5 All other activities as per provisions of the Concessionaire Agreement

4. INTERACTION WITH NHAI

The Independent Consultants shall interact with the NHAI on a regular basis. NHAI shall generally hold meetings every month to review the progress etc. during the phase of Design and Construction, and every second month during the Operation and maintenance stage. Within 30 days of the receipt of the Drawings, the Independent Consultant shall review the same and convey its comments/observations to the Concessionaire with particular reference to the conformity or otherwise with the specifications and standards setforth in the Agreement.

5. REPORTING REQUIREMENT

The Independent Consultants shall prepare and submit to the NHAI three copies and Concessionaire two copies each of the following reports.

(a) Design Review Phase

- Monthly Progress Report.

(b) Construction Phase

- Monthly and Quarterly Inspection Report covering all aspects such as Progress Monitoring, Quality Assurance (QA)/Quality Control (QC) etc.

(c) Operation and Maintenance Phase

- Monthly and Quarterly report on existing condition of facility including advise on all aspects of Operation And Maintenance, Toll Booths, Bridges or other Structures, Traffic Management & Safety, Telephone, Ambulance, etc.
- Monthly report on audit of the traffic using the Project Highway at least once a month.
- Monthly and quarterly reports for Lane Availability (Including non-availability) (only in case of BOT (Annuity))
- Certification of Annuity Claims (only in case of BOT (Annuity))

(d) Various other reports as provided in the Concession Agreement such as Completion Report.

6. PERFORMANCE CLAUSE

Independent Consultants shall be expected to fully comply with all the provisions of the 'Terms of Reference', and shall be fully responsible for supervising that Designs, Construction and maintenance and operation of the facility takes place in accordance with the provisions of the Concession Agreement and other schedules. Any failure of the Independent Consultant in notifying to NHAI and the Concessionaire on non-compliance of the provisions of the Concession Agreement and other schedules by the Concessionaire, non-adherence to the provision of ToR and non-adherence to the time schedule prescribed under ToR shall amount to non-performance.

7. CONSULTANT'S PROPOSAL

7.1 Apart from the list of the key professionals, as mentioned herein below, the Independent Consultant shall appoint its authorised representative, who shall issue on behalf of the IC, the Provisional Completion Certification and Completion Certificate along with the Team Leader and shall carry out any such task as may be decided by NHAI. The IC shall take prior approval of NHAI before issuing Provisional Completion Certification and Completion Certificate. The proposal submitted shall also include the name of the authorised representative along with the authorisation letter and power of attorney.

7.2 List of key personnel to be fielded by the Consultants shall be as below :

i. Team Leader Cum Senior Highway Engineer
ii. Senior Pavement Specialist
iii. Senior Bridge Design Engineer
iv. Highway Design Engineer
v. Bridge/Structural Engineer
vi. HTMS/Toll Expert
vii. Road Safety Expert
viii. Senior Quality cum Material Expert

7.3 In addition to above, consultants are required to propose other key personnel, sub-professional staff and other field engineers as detailed in **Enclosure B**. and the minimum qualification requirements for the same is enclosed in **Enclosure–A**.

7.4 Broad job-description and minimum qualification for key personnel mentioned above is enclosed as **Enclosure–A**. However, higher marks shall be accorded to the Candidate with higher relevant qualification and experience. The Consultant should feel free to submit their proposal on the basis of the man-months which they consider to be necessary to undertake the assignment. All the key personnel mentioned in para 7.1 above shall be evaluated at the time of evaluation of technical proposal. Consultants are advised in their own interest to frame the technical proposal in an objective manner as far as possible so

that these could be properly assessed in respect of points to be given as part of evaluation criteria. The bio-data of the key personnel should be signed on every sheet by the personnel concerned and the last sheet of each bio-data should also be signed by the authorised signatory for the Consultant. The key personnel shall also certify at the end of their bio-data proforma that they have not left any of the NHAI works without completing of their assignment and have not accepted any other offer at the time of signing of the bio-data and as such shall be available to work with the Independent Consultant, if the Project is awarded. In case the key personnel leaves the assignment without approval of NHAI, NHAI would be at liberty to take any appropriate action against that key personnel including debarment.

8. PERIOD OF SERVICES

8.1 The services of an Independent Consultant will be in phases as per Article XX - Independent Consultant, of Concession Agreement.

8.2 The appointment of the Independent Consultant shall initially be for a period of **48 months**. Estimated Design and Construction schedule for completion of the Project for commercial operation is **30 months**. The proposed manpower deployment for this period shall be matching the activities to be performed during the said period. The time frame for services during the deployment of key personnel during this period shall be as shown in **Enclosure B**.

8.3 Thereafter, the services of the Independent Consultant shall be for a maximum period of 3 years each time till completion of the Concession period and transfer of the Project Highway.

Enclosure A

MINIMUM QUALIFICATION OF KEY PERSONNEL

TEAM LEADER CUM SENIOR HIGHWAY ENGINEER

This is the senior most position and the expert engaged as the team leader shall be responsible for reviewing the entire Project preparation and implementation activities of the Concessionaire. He shall check all the Designs being prepared by the Concessionaire, ensure execution of works on site as per specification and standards, and continuously interact with the NHAI and the Concessionaire. He shall undertake Project site visits and shall guide, supervise, coordinate and monitor the work of other experts in his team as well as those of the Concessionaire. The candidate should have a proven record of supervising, organising and managing of Project preparation and construction of highway projects of large magnitudes, as defined below, financed by international lending agencies and others. Knowledge of Project management shall be an added advantage

This position requires a Senior Highway Engineer who shall be a graduate in Civil Engineering with higher qualifications and specialisation in highway engineering. He should have a minimum 20 years of experience of highway engineering including 5 years of experience in similar capacity. He should have involved for at least 5 years for Highway Development Projects in developed countries. He should have handled as Team Leader or similar capacity at least two Project Preparation and Construction supervision work of major highway Project of four laning/ six-laning/ expressway costing more than Rs. 2000 million or of at least 50 km length.

SENIOR PAVEMENT SPECIALIST

The expert shall be continuously interacting with the Concessionaire, to ensure life cycle cost effectiveness and viable design of pavement including appropriate rehabilitation / strengthening of the existing two lane pavement which is significantly distressed. He shall also be responsible for ensuring complete adherence to maintenance standards during Construction and Operation period. Thus, the position requires a pavement specialist with thorough knowledge and understanding of international 'best practices' in the field of Design, Construction and maintenance of flexible/rigid type of pavements including latest codal stipulations and specifications.

The candidate should be a graduate in Civil Engineering with higher qualification and specialisation in Pavement Design. He should have a minimum of 15 years of professional experience of pavement Design, Construction and its maintenance out of which 5 years should be in similar capacity for 4 laning of major highway projects.. This position also requires experience of developed countries. The candidate should have involved in at least 2 major highway projects.

SENIOR BRIDGE DESIGN ENGINEER

The Senior Bridge Design Engineer shall be responsible for checking the designs of bridges, ROBs, interchanges and any other structure to be constructed in the Project highway. He shall also review the rehabilitation measures to be proposed by the Concessionaire for existing structures based on site condition and structural requirement

basis. His expertise shall include computer aided design methods for Civil/Structural Engineering with particular reference to Structural design.

He should be a graduate in Civil Engineering from a recognized University. Post Graduation in Structural Engineering would be preferred. Bridge Design Engineer should have a minimum of 15 years experience in Bridge Design out of which a minimum of 10 years experience in similar capacity for major highway bridges is required. He should have handled at least 4 major highway bridges. Experience in other countries, involvement in innovative bridge designing works with use of computer aided software and involvement in designing of bridges more than 200m span would be preferred.

HIGHWAY DESIGN ENGINEER

The Highway Design Engineer shall be responsible for the review of highway designs and drawings using sophisticated computer software. Should be a graduate in Civil Engineering from a recognized University (higher qualifications will be preferable). His expertise shall include computer aided design methods for Civil/Highway Engineering with particular reference to CAD application to the geometric design for highway rehabilitation and/or upgrading projects.

Highway Design Engineer should have a minimum of 15 years experience in Highway Designing work out of which a minimum of 5 years in major highway engineering projects. He should have handled at least 2 major road four laning improvement projects. He should have exposure of computer software programmes for design of highways. Experience in other countries would be preferred.

BRIDGE /STRUCTURAL ENGINEER

The Bridge Engineer shall be responsible for supervising the works of bridges, interchanges and any other structure to be constructed by the Concessionaire for this project. He shall also inspect the bridge rehabilitation and repair works to be undertaken by the Concessionaire.

The position requires a graduate in Civil Engineering, (preference would be given to Post Graduation in Structural Engineering). He should have minimum 15 years experience out of which at least 10 years in Construction of bridges/interchanges/any other structures including rehabilitation. He should have supervised at least two major highway bridges. The candidate should have a thorough understanding and experience with international 'best practices', and of modern bridge construction technology.

HTMS/TOLLING SYSTEM EXPERT

The candidate should be a senior Systems Engineer having experience of at least 15 Years. He should be an expert in preparation of standards for projects of toll collection and HTMS. He should have bachelors degree in Civil Engineering/Electronics/Computer Science/other relevant areas. He should have experience of international latest practices in the field of HTMS and tolling. He should have work experience on at least 2 similar projects in similar capacity.

ROAD SAFETY EXPERT

The candidate should be a graduate in Civil Engineering preferably Post Graduation in Traffic/Transportation/Safety Engineering. He should have at least 15 years of experience out of which 5 years should be in road safety works. The candidate should have undertaken at least 2 projects of roads safety audits, including at least 1 in design stages. The candidate should have internatic ıal exposure in the fields of road safety management plan. Preference would be given to the candidate who have been involved in preparation of road safety policy for any national/state/city. The experience for preparing road safety management plan for inter-urban highways in both developed and developing countries would be desirable.

SENIOR QUALITY/MATERIAL EXPERT

The Quality/Material Expert shall review the test results of bore holes, quarry and borrow area material to find out their strength characteristics and suitability for using them in construction. He shall inspect the Concessionaire's field laboratories to ensure that they are adequately equipped and capable of performing all the specified testing requirements of the contract. He shall look into the quality assurance aspect of the construction works and supervise the setting-up of the various Concessionaire's rock crushers and bituminous mixing plants to ensure that the specified requirements for such equipments are fully met

The position requires a graduate in Civil Engineering, preferably Post Graduation in Geotechnical Engineering. He should have a minimum of 15 years of professional engineering experience including 5 years in similar capacity for major highway projects. He should have handled at least 2 similar highway projects in similar capacity. He should have exposure quality assurance programs in highway projects using modern technology.

SUB PROFESSIONAL

SURVEY ENGINEER

The candidate should be Graduate in Civil Engineering/Survey Engineering. He should have at least 6 years experience in the field of surveying out of which 3 years should be for highway projects. He should have involved in at least 1 similar highway projects. This position requires thorough understanding of modern computer based method of surveying with total station digital level etc.

ASSISTANT HIGHWAY ENGINEER

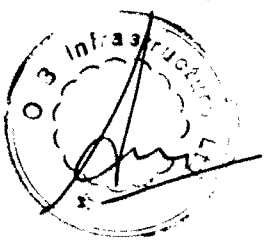
The Candidate should be Graduate in Civil Engineering with 3 years experience. He should have handled at least 1 road project.

CAD EXPERT

He should be Graduate in Civil Engineering/Computer Science having experience in computer related design method for highway engineering. The incumbent should have 3 years experience and should have handled at least 1 road project.

ENVIRONMENTAL ENGINEER

The Candidate should be Graduate in Civil Engineering/Environmental Engineering or other relevant qualification. He should have at least 6 years experience out of which 2



years in highway projects. He should have good knowledge of MOEF guidelines/requirements for mitigation measures.

ASSISTANT BRIDGE ENGINEER

The Candidate should be Graduate in Civil Engineering with 3 years experience. He should have handled at least 1 major bridge project.

ASSISTANT QUALITY CUM MATERIAL ENGINEER

The Candidate should be Graduate in Civil Engineering with 3 years experience or diploma in Civil Engineering with 5 years experience. He should have handled at least 1 road project.

ELECTRICAL ENGINEER

The Candidate should be Graduate in Electrical Engineering from recognised institute. He should have at least 6 years experience.

Enclosure B

MANMONTH INPUT FOR KEY PERSONNEL OF INDEPENDENT CONSULTANTS

S.No.	Key Personnel	Man month in Construction	Man month in O & M
1.	Team Leader Cum Senior Highway Engineer	33	3
2.	Senior Pavement Specialist	7	2
3.	Senior Bridge Design Engineer	7	0
4.	Highway Design Engineer	30	12
5.	Bridge/Structural Engineer	30	6
6.	HTMS/Toll Expert	3	2
7.	Road Safety Expert	3	1
8.	Senior Quality cum Material Expert	30	6
	Sub Total	**143**	**32**
	Sub Professional		
1.	Survey Engineer	30	2
2.	Assistant Highway Engineer	2 X 30	12
3.	CAD Expert	8	0
4.	Environmental Engineer	8	2
5.	Assistant Bridge Engineer	2 X 30	6
6.	Assistant Quality cum Material Engineer	2 X 30	6
7.	Electrical Engineer	6	2
	Sub Total	**232**	**30**
	Total	**375**	**62**

Note: The qualification and experience of Sub Professional would not be accounted in the evaluation. However, Consultant would have to get their CVs approved from NHAI before mobilisation. The other inputs like traffic engineer, financial expert, legal expert etc. would also be provided by the Consultant as a Head Quarters input out of the contingency provision.

SCHEDULE P

TRAFFIC SAMPLING

NHAI through independent Consultant shall have the right to undertake traffic sampling for the purpose of determination and/ or verification of the actual traffic on the project highway. This shall be done through Automatic Traffic Count -cum-classifier.

For the purpose of traffic sampling, the Concessionaire shall procure a portable type automatic traffic count-cum-classifier and provide it to the Independent Consultant. The traffic count -cum-classifier shall be light weight and portable with weather resistant casing. The system shall be capable of detecting and recording all types of vehicles plying on the Project Highway and of classifying any other vehicle category as per user needs. The vehicle classification shall be user selectable based on length of vehicle and number of axles. It would have the following main components :-

Sensor combination of piezo electric sensor and inductive loops. The sensor shall be portable as well as permanent so that either of these could be used as per the needs.

Electronic - the logic unit shall be micro processor based and programmable through a key board. It shall have legible electronic display with requisite number of entry ports and exit to communication system. The vehicle counting/classification interval shall be programmable from one minute to 1440 min. (24 hours). The system shall count and classify vehicle by each lane.

Data Collection - The system shall be capable of recording for later analysis on an individual vehicle basis time, date, speed, direction, lane, number of axles, axles spacing and site identification. The system should be able to record and store vehicle data for a period of at least two weeks.

Data Retrieval - The system shall have the capability of data retrieval through removable floppy diskette, data catridge, direct data transfer through a serial link to a portable computer and telemetory transmission via telephone link by modem.

Software - The system shall have software and manuals to analyse the data from output of vehicle count, classification speed and head-way. It should have capability of graphic/tabular representation of analysis data.

Before the use of portable automatic traffic counter cum classifier, it shall be validated and calibrated through sample counts to establish the reliability and acceptability of automatic Traffic Counter-cum-Classificater both by Concessionaire and the Independent Consultant.

The sampling shall be done at intervals of 15 days by continuous 24 hrs counting for three days. If no abnormal trends are observed in three days counting at the frequency of 15 days, the frequency would be increased to 1 month after a period of one year. The sensor/loops shall be permanently installed to capture the traffic on all the approaching lanes, in accordance with the instructions of the supplier. They shall be located about 5 kms away from the toll plaza transitions taking care that no diversion of traffic is possible in between. The portable logic unit shall be plugged to these sensors whenever counting is to be done. Portable sensor can be utilised for traffic counting at any other location as per the need.

Apart from these periodical counts, the Independent Consultant shall have the right for traffic counting at a request from the NHAI. The traffic count as obtained from the samples shall be taken as actual traffic on the Project Highway at the locations of the counting.

SCHEDULE Q

DRAFT
ESCROW ACCOUNT AGREEMENT

Among

..... (THE COMPANY)

And

.....

As Lenders Representative

And

.....

As Escrow Agent

And

NHAI

(Subject to terms of the facility Agreement(s) between the Concessionaire and Senior Lenders. However, NHAI position in the cashflows shall not be changed)

THIS AGREEMENT (the "Agreement") is made on the ..... day of ..... 200... by and among:

..... a company incorporated in India whose registered office is at ....., India (the "Company");

and

..... and having its registered office at ..... as Senior Lenders Representative (the "Lenders Representative");

and

....., and having its registered office at ..... (the "Escrow Agent").

And

National Highways Authority of India (NHAI), Government of India, as Employer and Sub-ordinate Lender (the "NHAI").

WHEREAS:

- The Company is undertaking a project for **"(Name of the Project) in the state of (Name of State)**, India on BOT (ANNUITY) basis"

- The Company has entered into a Concession Agreement dated as of ..... 200 . with NHAI (the "Concession Agreement") wherein NHAI has granted Concession to Company for the work referred to above, on BOT (ANNUITY) basis.

- The Company has entered into Financing Documents with Senior Lenders wherein Senior Lenders (the "Lenders") have agreed to lend and advance to the Company Rupee amounts aggregating ..... Lacs and foreign currency amounts aggregating US Dollars ..... in terms thereof;

- One of the terms of the Concession Agreement and the Financing Documents is that the Company is required to establish an Escrow Account, inter alia, on terms and conditions satisfactory to Senior Lenders.

NOW IN CONSIDERATION FOR THE PREMISES IT IS AGREED BY THE PARTIES AS FOLLOWS:-

1. Definitions and Construction

1.1 Definitions: Each capitalised term used herein and not otherwise defined shall have the definition assigned to such term in the Concession Agreement or the Substitution Agreement as the case may be

- "Account" means the Escrow Account to be opened by the Company in accordance with this Agreement;

- "Authorised Investment" means any authorised investments which Lenders Representative may, from time to time permit the Company to make in accordance with this Agreement;

- "Business Day" means any day on which banks are open for business in ..... or in relation to any notice or communication to be made under this Agreement, a day on which banks are open for business in the place of receipt of such notice or communication.

- "Company Account" shall mean any bank account of the Company, other than the Escrow Account.

- "Enforcement Notice" means any enforcement procedure commenced by the Lenders Representative under any of the Security Documents;

- "Escrow Account" means an Escrow Account established in terms of and under this Agreement;

- "Event of Default" means an event of default as defined and detailed in the Financing Documents;

- "INR" means the lawful currency of India;

- "Payment Date" means in relation to any Permitted Payment, the date(s) specified for such payment;

- "Permitted Payment" means the Payments Agreed to in this Agreement excluding payment to the Company Accounts as more particularly given in clause3.3.1;

- "Required Balance" means on any Date in relation to the Sub-Account of the Escrow Account, an amount in INR/Dollars which if proportionately built over the months, would be sufficient to meet Permitted Payment on the Payment Date(s).

- "Security Documents" means all or any of the Documents executed, delivered or furnished to secure the Financial Assistance under the Financing Documents including but not limited to the Deed of Hypothecation, Mortgage Deed, Equitable

Mortgage, Deed of Guarantee, Pledge Agreement, Undertakings, Negative Lien and other incidental or supplemental documents related thereto.

- "Sub-Accounts" means the Sub-Accounts of the Escrow Account, into which the monies due in relation to Permitted Payment 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 Sub Account and paid out therefrom on the Payment date.

- "Year" means each twelve month period ending on March 31.

1.2 Construction

In this Agreement,

- Unless the context otherwise requires, the singular includes the plural and vice versa;

- Headings and the use of bold typeface shall be ignored in its construction;

- A reference to a Clause, or Schedule is, unless indicated to the contrary, a reference to a clause or schedule to this Agreement;

- References to this Agreement shall be construed as references also to any separate or independent stipulation or agreement contained in it;

- The words "other", "or otherwise" and "whatsoever" shall not be construed to be as any limitation upon the generality of any preceding words or matters specifically referred to;

- References to the word "includes" or "including" are to be construed without limitation;

- References to a person shall include such person's successors and permitted assignees or transferees;

- All references to agreements, documents or other instruments include (subject to all relevant approvals) a reference to that agreement, document or instrument as amended, supplemented, substituted, novated or assigned from time to time;

- The words "herein", "hereto" and "hereunder" refer to this Agreement as a whole and not to the particular Clause in which such word may be used;

- Words importing a particular gender include all genders;

- "person" includes any individual, partnership, firm, trust, body corporate, government, governmental body, authority, agency, unincorporated body of persons or association;

- any reference to a public organisation shall be deemed to include a reference to any successor to such public organisation or any organisation or entity which has taken over the functions or responsibilities of such public organisation;

- references to "Party" means a party to this Agreement and references to "Parties" shall be construed accordingly; and

- references to any law shall include references to such law as it may, after the date of this Agreement, from time to time be amended, supplemented or re-enacted.

- terms and expressions not expressly defined herein shall subscribe the meanings ascribed thereto in the Concession Agreement

2. THE ACCOUNTS

2.1 Acceptance of Appointment of Escrow Agent

(a) The Escrow Agent hereby agrees to act as such and to accept all payments and other amounts to be delivered to or held by the Escrow Agent pursuant to the terms of this Escrow Agreement. Escrow Agent shall hold and safeguard the Escrow Account during the term of this Escrow Agreement and shall treat the amount in the Escrow Account as monies deposited by Company / NHAI with the Escrow Agent, as agent for the benefit of the Lenders Representative, or its nominee, successors or assigns, in trust in accordance with the provisions of this Escrow Agreement. In performing its functions and duties under this Escrow Agreement, the Escrow Agent shall act as agent for the Lenders Representative.

The Company also hereby declares that all right, title and interest in and to the Escrow Account, the Authorised Investments and Permitted Payments made from the Escrow Accounts shall be vested in the Escrow Agent and held in trust for the Senior Lenders acting through Lender's Representative, NHAI and the Company in accordance with the terms of this Agreement and as their respective interests are provided for herein. Amounts deposited in the Escrow Account from time to time shall be held by the Escrow Agent in trust and received and applied as provided in and in accordance with the Agreement. No person other than the Lenders Representative, NHAI and the Company shall have any rights hereunder as the beneficiaries of or as third party beneficiaries under this Agreement.

(b) The rights of Company/NHAI in the monies held in Escrow Account are set forth in their entirety in this Escrow Agreement and Company/NHAI shall have no other rights against or to the monies in the Escrow Account.

2.2 Establishment of Escrow Account

At least thirty (30) days prior to seeking any disbursement (including issue of guarantees or all forms of Financial Assistance), the Company shall establish the Escrow Account with the Escrow Agent.

2.3 Maintenance of the Account

The Escrow Agent 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 its customers on the balance in the said account from time to time.

2.4 Operating Procedures

The Escrow Agent and the Company shall agree (after consultation with the Lenders Representative) on the detailed mandates, terms and conditions and operating procedures for the Escrow Account but in the event of any inconsistency between this Agreement and such mandates, terms and conditions or procedures, this Agreement shall prevail.

3. Currency

3.1 The Escrow Account shall be established with the ..... Branch of the Escrow Agent. The Escrow Account shall be denominated in INR

3.2 Deposits

3.2.1 The Company

(A) agrees, confirms and undertakes that it shall deposit and/or credit the Escrow Account with:

(i) all its receivables;

(ii) all proceeds received pursuant to any insurance claims; and

(iii) all monies received from any other sources in relation to and in respect of the Project.

(B) may make other deposits of the Company's other funds into the Escrow Accounts at any time. Provided however that the terms of this Agreement shall apply to such other funds deposited in the Escrow Account by the Company.

The NHAI agrees, confirms and undertakes that it shall deposit and/or credit the Escrow Account with:

(i) all Fees collected by NHAI in exercise of its rights under Concession Agreement;

(ii) **Revenue Shortfall Loan;**

(iii) Grant, termination payments and other monies paid or disbursed in accordance with the provisions of the Concession Agreement and or the Substitution Agreement..

3.2.2 The Escrow Agent shall ensure that all interest, if any, on the balances of the Escrow Accounts and interest on Authorised Investments made from the Escrow Accounts shall be credited to or deposited in the Escrow Account

3.3 Withdrawals

3.3.1 The Escrow Agent shall withdraw amounts from the Escrow Accounts and appropriate in the following order every month as more particularly given in the Bank Proforma in Schedule I and deposit in the relevant Sub-Account for payments and if not due in a month then appropriate proportionately in such month and retain in the Sub-Account and pay out therefrom on the Payment Date(s)

(a) All taxes due and payable by the **Company**;

(b) All expenses in connection with and relevant to the Construction of Project Highway by way of payment to the EPC Contractor and such other persons as may be specified in the Financing Documents

(c) O&M Expenses including Fees collection expenses incurred by the **Company** directly or through O&M Contractor and/or Tolling Contractor, if any, subject to the items and ceiling in respect thereof as set forth in the Financing Documents but not exceeding one twelfth (1/12) of the annual liability on this account;

(d) The whole of the expense on completion of Punch List items incurred by NHAI and 2.0 times of such expenses subject to a minimum of Rs. 1,000,000 (Rs. One million) in case the Punch List items are not completed by the Concessionaire within 120 days from the issue of the provisional completion certificate in accordance with the Specifications and Standards and as detailed in clause 16.5 of the Concession Agreement

(e) The whole or part of the expense on repair work or O&M Expenses including Fees collection expenses incurred by NHAI, and 1.25 times of the O&M expenses incurred by the NHAI, if any, in the event of repair and maintenance work being carried out by NHAI (pursuant to the failure on part of the Company in doing so) to maintain and / or repair the Project Highway or a part thereof up to and in accordance with the Specifications and Standards and / or failure on part of the Company to commence remedial works within 30 (thirty) days of receipt of notice in this regard from NHAI or the Independent Consultant, if any, including those on account of exercise of any of its rights under this Agreement provided NHAI certifies to the Escrow Agent that NHAI had incurred such expenses in accordance with the provisions of this Agreement;

(f) All Concession Fees and Negative Grants payments due to NHAI from the **Company** under this Agreement.

(g) Monthly proportionate provision of Debt Service Payments due in an Accounting Year and payment of Debt Service Payments in the month when due;

(h) Reimbursements of expenditure incurred by NHAI, if any, for payment of insurance premia, etc., which are otherwise company's responsibility, on account of failure on part of the Company to keep such insurance(s) effective and in force,

(i) One-half of such remuneration, cost and expenses of the Independent Consultant in case the Concessionaire does not reimburse the remuneration, cost and expenses of the Independent Consultant to NHAI within 15 (fifteen) days of receiving a statement of expenditure from NHAI.

(j) Any payments and Damages due and payable by the **Company** to NHAI pursuant to this Agreement including Recovery due to reduction in Scope of Work and repayment of Revenue Shortfall Loans; and

(k) Balance in accordance with the instructions of the **Company**.

The amounts specified in Clause 3.3.1 (a) to (i) constitute the Permitted Payments.

For each year, Bank Proforma would be separately provided by the Company to the Escrow Agent, with the permission of Lenders Representative, not later than 60 days prior to the first day of each year.

3.3.2 Notwithstanding anything to the contrary contained in this Agreement upon the earlier of (i) issue of Termination Notice (ii) termination of Concession Agreement, or (iii) the expiry of Concession Period, all amounts standing to the credit of the Escrow Account shall be appropriated and dealt with in the following order:-

(a) all taxes due and payable by the **Company**;

(b) all Concession Fees **(including Negative Grant)** due and payable to NHAI under this Agreement;

(c) all accrued Debt Service Payments;

(d) any payments and Damages due and payable by the **Company** to NHAI pursuant to this Agreement, including Recovery due to reduction in Scope of Work, Termination claims and repayment of Revenue Shortfall Loans;

(e) all accrued O&M Expenses;

(f) any other payments required to be made under this Agreement; and

(g) balance, if any, on the instructions of the Company.

3.3.3 Not withstanding anything to the contrary contained in this agreement, any termination payments made by NHAI into the Escrow account shall not be appropriated therefrom for any purpose whatsoever, until the Vesting Certificate has been issued by NHAI. Provided, however, that this restriction shall not apply to appropriation in favour of the Senior Lenders to the extent of debt due.

3.3.4 From the date, which is two years prior to the expiry of the Concession period, a sum equal to the fees realizable during the last two years of the Concession period for a traffic volume calculated at the rate of 10,000 (ten thousand) PCUs per day per year, or, a higher sum estimated by the Independent Consultant for renewal works, shall not withstanding anything to the contrary contained in this agreement, be retained in the Escrow Account provided that if a Bank Guarantee of an equivalent sum in the form and content acceptable to NHAI has been furnished by the Company to NHAI, no such retention shall be made. If following the second Inspection, it is agreed or determined that no renewal works are required, then within 14 days of such agreement, 50 % of the sums thus retained shall be released from the Escrow account to the company. Within 14 days after the issue of Vesting Certificate issued (in accordance with Article XXXIII of the Concession agreement) the sums thus retained shall be released from the Escrow account to the Company.

3.4 Application of Insufficient Funds

As provided in Clause 3.3, the application of funds in the Escrow Account shall be in the serial order of priority set forth therein. If the funds available for payment to the Sub-Accounts are sufficient to pay a portion, but not all, of the amount required to be paid to any Sub-Account, the Escrow Agent shall apply such funds in the serial order of priority set forth in Clause 3.3, until exhaustion thereof.

4. Authorised Investments

4.1 Power to Invest

The Escrow Agent shall invest the amounts standing to the credit of any of the Sub-Accounts in Authorised Investments on the instructions of the Company as approved by the Lenders Representative, from time to time, in accordance with the provisions of the Agreement. The Escrow Agent shall not be bound to and shall not make investments under the Indian Trusts Act, 1882 without prior approval of the Lenders Representative.

4.2 Procedure for Investments

4.2.1 All Authorised Investments shall be made and/or realised by the Escrow Agent on the instructions of the Company as approved by the Lenders Representative from time to time, in accordance with the provisions of this Agreement.

4.2.2 All documents of title or other documentary evidence of ownership with respect to Authorised Investments made out of any Escrow Account will be held in the custody of the Escrow Agent.

4.3 Realisations

Upon the realisation of any investment made under this Clause, the proceeds of realisation shall immediately be credited to the relevant Sub-Account by the Escrow Agent or immediately invested in another Authorised Investment in accordance with the Company's instructions as approved by the Lenders Representative.

4.4 Mandatory Realisations

In the event that the Company becomes aware that any Authorised Investment has ceased to be an Authorised Investment, the Company shall immediately instruct the Escrow Agent on a best efforts basis to realise such Authorised Investment on its maturity date or earlier if possible under intimation to the Lenders Representative or NHAI.

4.5 Accounts include Investments

Any reference in this Agreement to the balance standing to the credit of the Escrow Account shall be deemed to include a reference to the amount of the Authorised Investments in which all, or part of, such balance is for the time being invested.

4.6 Interest on Investments

Any interest or other income received on account of Authorised Investments shall be to the credit of the Escrow Account.

4.7 Enforcement Notice

On receipt of an Enforcement Notice from the Lenders Representative, the Escrow Agent shall realise the Authorised Investments, whether such investments have matured or not on a best effort basis, and apply the proceeds as directed by the Lenders Representative.

5. Withdrawals following Event of Default

5.1 If the Lenders Representative notifies the Escrow Agent that an Event of Default is likely to occur or has occurred, and is continuing, then, until such time as the Lenders Representative has notified the Escrow Agent that the Event of Default has been cured or waived under the Financing Documents, the Escrow Agent shall only make withdrawals from the Escrow Accounts which constitute Permitted Payment and shall not make any payments from the Escrow Account to the Company Accounts.

6. Escrow Agent Provisions

6.1 The Escrow Agent and the Lenders

The Company hereby appoints the Escrow Agent to act as trustee for the Lenders Representative in connection herewith and authorises the Escrow Agent to exercise such rights, powers, authorities and discretion as are specifically delegated to the Escrow Agent by the terms hereof together with all such rights, powers, authorities and discretion as are reasonably incidental hereto, and the Escrow Agent accepts such appointment pursuant to the terms hereof.

6.2 Particular Duties of the Escrow Agent

The Escrow Agent,

(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 Company upon a certificate signed by or on behalf of the Company;

(B) may, in the absence of bad faith or gross negligence on its part, rely upon the authenticity of any communication or documents believed by it to be authentic;

(C) shall, within five (5) Business Days after receipt, deliver a copy to the Lenders Representative of any notice or document received by the Escrow Agent in its capacity as the Escrow Agent from the Company or any other person hereunder or in connection herewith; and

(D) shall, within five (5) Business Days after receipt, deliver a copy to the Company of any notice or document received by the Escrow Agent from the Lenders Representative in connection herewith.

6.3 Segregation of Funds

Monies and other property received by the Escrow Agent under this Agreement shall, until used or applied in accordance with this Agreement, be held by the Escrow Agent in trust for the purposes for which they were received, and shall be segregated from other funds and property of the Escrow Agent.

6.4 Termination

6.4.1 This Agreement shall remain in full force and effect so long as amounts remain outstanding from the Company in respect of the Financial Assistance received by it from the Senior Lenders or its obligations to NHAI, unless terminated earlier by the mutual consent of the parties or otherwise in accordance with the provisions of this Clause.

6.4.2 The Company may, by not less than 45 days prior notice to the Escrow Agent, NHAI and the Lenders Representative, terminate this Agreement and appoint a new Escrow Agent, provided that the new Escrow Agent 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 Agent

6.5 Fees

The Company shall pay the Escrow Agent fees in an amount and at such times as may be agreed between the Escrow Agent and the Company.

7. Escrow Agreement Defaults

7.1 If the Company is in breach of any of its obligations under this Agreement and, following a notice of default from the Lenders' Representative, fails to remedy the same:

(A) in the case of a failure to deposit funds received by the Company in the Escrow Account, by depositing the same in the Escrow Account within five Business Days of receipt of such notice;

(B) in the case of a breach consisting of causing the Escrow Agent to transfer funds to any Company Account in breach of the terms of this Agreement, by depositing the relevant funds in the Escrow Account or any Sub-Account in which such transfer should have been made within five Business Days of receipt of such notice.

(C) in the case of a breach of the Company's obligations under Clause 4, by instructing the Escrow Agent to realise any investment made in breach of Clause 4 within five (5) Business Days of receipt of such notice; or

(D) in the case of any other breach, by remedying the same within five (5) Business Days to the satisfaction of the Lenders Representative.

7.2 The Company and the Escrow Agent agree and confirm that any default by either the Company or the Escrow Agent in the performance of their respective obligations under this Agreement resulting, in the opinion of the Lenders Representative, in a breach of this Agreement, shall qualify as an Event of Default under the Financing Documents/Security Documents.

8. Miscellaneous

8.1 Closure of Accounts

The Escrow Agent shall, at the request of the Company made on or after the payment by the Company of all outstanding amounts under the Financing Documents / Concession Agreement and upon confirmation of receipt, close the Escrow Accounts and pay any amount standing to the credit thereof to the Company.

Notwithstanding anything to the contrary contained in this Agreement, this

Agreement shall remain in full force and effect till the Transfer Date provided however if NHAI shall certify to the Escrow Agent that Concession Agreement and/or the Concession has been terminated on account of default of the Concessionaire under this Agreement, then notwithstanding anything to the contrary contained herein, all the amounts standing to the credit of the Escrow Account shall be dealt with in accordance with provisions of Clause 3.3.2.

8.2 Successors and Assignors

This Agreement shall be binding on and shall enure to the benefit of the Parties and their respective successors and permitted assigns.

8.3 No Set Off

The Escrow Agent 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 Accounts. For the avoidance of doubt, it is declared by the Escrow Agent that the monies and properties held by the Escrow Agent shall not be considered as part of the assets of the Escrow Agent and being trust property, shall in the case of bankruptcy or liquidation of the Escrow Agent be wholly excluded from the assets of the Escrow Agent in such bankruptcy or liquidation.

8.4 Notices

8.4.1 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, registered or certified mail or facsimile. The address for service of each Party and its facsimile number is set out under its name on the signing pages hereto. All notices shall be effective upon actual receipt save that where a notice is received after 5.30 p.m. on a Business Day or on a day that is not a Business Day, such 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 of such notice

or communication personally, by courier or mail to the addressee of such notice or communication.

8.4.2 Any party may by notice change the addresses and/or addresses 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.

8.5 Waiver

Failure by any Party at any time to enforce any provision of this Agreement or to require performance by other Parties of any provision of this Agreement shall not be construed as a waiver of such provision and shall not affect the validity of this Agreement or any part of it or the right of the relevant Party to enforce any provision in accordance with its terms.

8.6 Severability

If any condition, Clause or provision of this Agreement not being of a fundamental nature, is held to be illegal or unenforceable, the validity or enforceability of the remainder of this Agreement shall not be affected thereby.

8.7 Amendments

No amendment to this Agreement shall be binding unless in writing and signed by the duly authorised representatives of the Parties.

8.8 Governing Law

This Agreement shall be governed by and construed in accordance with Indian law.

8.9 Regulatory Approvals

The Escrow Agent shall use its best efforts to procure and shall thereafter maintain and comply with all regulatory approvals required for it to establish and operate the Escrow Accounts. The Escrow Agent represents and warrants that it is not aware

of any reason why such regulatory approvals will not be ordinarily granted to the Escrow Agent.

8.10 Notification of Balances

Seven Business Days prior to each Payment Date (and for this purpose the Escrow Agent shall be entitled to rely on an affirmation by the Company and/or the Lenders Representative as to the relevant Payment Dates), the Escrow Agent shall notify the Lenders Representative of the balance of the Escrow Account as at the close of business on the immediately preceding Business Day.

IN WITNESS whereof the Company has caused its Common Seal to be affixed hereto and to a triplicate hereof on the date first above written and the Escrow Agent, NHAI and the Lenders Representative have caused the said triplicate to be executed by the hand of an authorised official.

SIGNED AND DELIVERED BY)
..... within named Escrow Agent)
by the hand of)

an authorised official of the Account)
Trustee)
Address:

Fax Number:

Attention: .....

SIGNED AND DELIVERED by THE)
..... within named Lenders)
Representative by the hand of)

)

an authorised official of the Lenders)

Representative

Address:

Fax Number:

Attention: .....

SIGNED AND DELIVERED by)
NHAI within named by the hand of)

)

an authorised official of the NHAI)

Address:

Fax Number:

Attention: .....

THE COMMON SEAL OF .....)
has pursuant to the Resolution)
of its Board of Directors passed in)
that behalf on the ..... day of .....200)
hereunto been affixed in the presence of)
Shri ..... and Shri .....)
Directors who have signed these)
Presents in token thereof and)
Secretary/authorised)
Person who has countersigned the)

Same in token thereof)

Address:

Fax Number:

Attention:.....

SCHEDULE R

STATE SUPPORT AGREEMENT

THIS SUPPORT AGREEMENT is made on this _____day of _____ 200_ AMONG

1 THE GOVERNOR OF **THE STATE OF (Name of State)** through the Secretary, Ministry of _____, **Government of (Name of State)**, (hereinafter referred to as "**GO***" which expression shall, unless repugnant to the context or meaning thereof include its successors and assigns).

2 **National Highways Authority of India, Government of India** , (hereinafter referred to as "NHAI" which expression shall unless repugnant to the context or meaning thereof include its administrators, successors and assigns).

AND

3 [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 substitutes).

WHEREAS

A. The NHAI intends to take up the improvement of (Name of the Project) in the state of (Name of the State), India on BOT (Annuity) basis.

B NHAI had invited Request for Proposals for selection of BOT Entrepreneurs for executing the Project on BOT (Annuity) basis

D. After evaluation of the bids so received, NHAI had accepted the bid of the Consortium and issued its Letter of Acceptance No._____ dated _____ (the"LOA") to the Consortium requiring, inter alia, the execution of an Concession Agreement pursuant thereto.

E. The Consortium has 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, construction, operation and maintenance of the Project Highway, as defined hereinafter on BOT (Annuity) basis as referred to in Recital 'A' and to fulfill other obligations of the Concessionaire pursuant to the LOA and has 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 the obligation to enter into the Concession

Agreement for the design, engineering, financing, procurement, Utility Shifting , Tree cutting, construction, operation and maintenance of the Project Highway on BOT (Annuity) basis.

F. NHAI has agreed to the said request of the Consortium and has accordingly agreed to enter into the Concession Agreement with the Concessionaire pursuant to the LOA for, inter alia, the design, engineering, financing, procurement, Utility Shifting , Tree cutting, construction, operation and maintenance of the said Project Highway on BOT (Annuity) basis.

G. **GO***, NHAI and the Concessionaire agree that the implementation of the Concession 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 **GO*** and is an essential pre-condition for mobilization of resources therefore by the Concessionaire.

NOW THEREFORE THE PARTIES HERETO HEREBY AGREE AND THIS AGREEMENT WITNESSETH AS FOLLOWS.

1. DEFINITIONS AND INTERPRETATIONS

1.1 For the purposes of this Agreement the following terms shall have the meaning hereinafter respectively assigned to them.

1.1.1 "Agreement" means this 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, and shall include all of its annexures and appendices and any amendments made thereto in accordance with the provisions contained in this behalf therein.

1.1.3 "MOSRTH" means Ministry of Shipping, Road Transport and Highways, earlier Ministry of Road Transport & highways.

1.1.3. "Substitution Agreement" means the Substitution Agreement dated _____ entered into between the Senior Lenders, NHAI and the Concessionaire providing for substitution of the Concessionaire by the Selectee selected by the Senior Lenders in the manner and subject to and on the terms and conditions set forth therein. A copy of the said Substitution Agreement is annexed hereto and marked as "Annexure "B"."

1.1.4 "**GO*** Support" means the obligations assumed and the facilities agreed to be provided by **GO*** to the Concessionaire hereunder or pursuant hereto.

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 statutory provision shall include such provision as is from time to time modified and re-enacted or consolidated 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 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);

(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 **GO*** 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 duly 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 the date hereof and shall continue to be in full force and effect for the period the Concession Agreement is in force and effect including any extension thereof.

3. SUPPORT OF **GO***

3.1. Upon and with effect from the date hereof, GO* agrees:

(i) so long as the Concessionaire is not in breach of its obligations under this Agreement, **GO*** agrees to enable 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 **GO*** or persons claiming through or under it;

(ii) subject to the Concessionaire complying with Applicable Laws, provide to the Concessionaire Applicable Permits to the extent **GO*** or any Governmental Agency of **GO*** is entitled to issue;

(iii) upon written request from the Concessionaire, assist the Concessionaire in obtaining access to all necessary infrastructure facilities and 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 by **GO*** or any Governmental Agency of **GO*** that interrupts free flow of traffic on the Project Highway except on account of any law and order situation 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 obligation 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, assist the Concessionaire in the procurement of all Applicable Permits required from any municipal and other local authorities and bodies including Panchayats in the State of _____ for the implementation of the Project;

(x) ensure, 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 **(Name of the State)** do not put any barriers or other obstructions that interrupt free flow of traffic on the Project Highway; and

(xi) 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.

3.2. Notwithstanding anything to the contrary contained in the Agreement, **GO*** may construct and operate either itself or have the same, inter alia, built and operated on BOT (Annuity) basis or otherwise any Expressway or other toll road, not being a bye-pass, between inter alia, **(Name of Project Section)** (the "Additional Tollway")

3.3. **GO*** agrees and undertakes that it shall not levy any toll, fee, charge or tax on the use of whole or any part of the Project Highway. **GO*** acknowledges the rights of Senior Lenders and NHAI under the Substitution Agreement and hereby covenants that upon substitution of the Concessionaire by the Selectee pursuant to 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 substitution of the Concessionaire by the Selectee

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) Observe, comply and perform its obligations under this Agreement

5. REPRESENTATIONS AND WARRANTIES

5.1. The Concessionaire represents and warrants to **GO*** that :

(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 **GO*** 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 and the Balance Sheet and Profit and Loss Account of the Concessionaire for each of its Accounting Year after the Appointed Date furnished to **GO*** shall give true and fair view of the affairs of the Concessionaire.

(vii) The Concessionaire shall furnish a copy of its audited Balance Sheet within 120 (one hundred twenty) days of the close of its each Accounting Year after the Appointed Date and any material change subsequent to the date of such Balance Sheet shall be notified to **GO*** by the Concessionaire within 30 (thirty) days of its occurrence and warrants that the Balance Sheet and the information furnished as aforesaid shall be true and correct;

(viii) 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;

(ix) 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;

(x) 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 Agency which may result in any material adverse effect or impairment of the Concessionaire's ability to perform its obligations and duties under this Agreement;

(xi) 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;

(xii) 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 **GO***;

(xiii) No representation or warranty by the Concessionaire contained herein or in any other document furnished by it to **GO***, or to any Governmental 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;

(xiv) 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, GOI or **GO*** in connection therewith; and

(xv) The Concessionaire is subject to civil and commercial laws of India with respect to this Agreement.

5.2. **GO*** 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 GO* enforceable against it in accordance with its terms

6. SOVEREIGN IMMUNITY

6.1. **GO*** hereto 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 against it or its assets in relation to this Agreement or any transaction contemplated by this Agreement, no sovereign immunity from such proceedings, execution, attachment or other legal process shall be claimed by or on behalf of itself or with respect to any of its assets, to the extent permitted by law; and

(iii) to the extent permitted by law, waives any right of sovereign immunity, which it or its assets now has or may acquire in the future.

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 **GO*** is in breach of any of its obligations under this Agreement, which breach is not cured within 30 days of receipt of a notice in writing from the Concessionaire to **GO*** and NHAI and which has not occurred as a result of Concessionaire's breach of its obligations under this Agreement or the Concession Agreement, **GO*** 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 **GO***.

7.2. In case of any dispute by **GO*** on admissibility of the claim or extent of compensation determined by MOSRTH, the claim shall be settled as per provisions of the Dispute Settlement mechanism provided in Article IX of this Agreement

7.3. Any such compensation payable shall be paid to the Concessionaire, in one lumpsum within 90 (ninety) days of receiving MOSRTH's determination of compensation.

8. INDEMNITY

8.1 The Concessionaire will indemnify, defend and hold **GO*** 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, 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. **GO*** 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 **GO*** to fulfill any of its obligations under this Agreement 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 **GO***, its officers, servants and agents.

8.3. Without limiting the generality of Clause 8.2, the **GO*** 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 **GO*** or any municipal, 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 **GO*** shall be under no obligation to reimburse Expected Taxes to the Concessionaire or any person claiming through or under the Concessionaire.

8.4. In the event that either party hereto receives a claim from a third party in respect of which it is entitled to the benefit of an indemnity under Clause 8 or in respect of which it is entitled to reimbursement (the "Indemnified Party") within 14 (fourteen) days of receipt of the claim or payment, as the case may be, 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 all cooperation and assistance in contesting any claim and shall sign all such writings, and documents as the Indemnified 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 shall survive the termination of this Agreement.

9.2. Any dispute, difference or claim arising out of or in connection with or in relation to this Agreement which is not resolved amicably shall be decided finally by reference to arbitration to a Board or Arbitrators comprising of one nominee of each party to the dispute. Such arbitration shall be held in accordance with the Rules of Arbitration of the Indian Counsel of Arbitration and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996. The Arbitrators shall issue a reasoned award. The venue of such arbitration shall be New Delhi, India. The Award shall be final and binding on the Parties.

10. MISCELLANEOUS

10.1. 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 authorized representatives of **GO*** and the Concessionaire.

10.2. Time or Indulgence Allowed

An indulgence by one Party to the other in respect of any obligation or matter hereunder including time for performance to the other party hereunder or to remedy any breach hereof shall not be construed as a waiver of any of its rights hereunder Party may be on such terms and subject to such conditions as the Party giving it may specify and shall be without prejudice to that Party's then accrued rights under this Agreement except to the extent expressly varied in writing when giving such time or other indulgence.

10.3. Severance 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 post, with copy by facsimile transmission or other means of telecommunication 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 **GO***

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. 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 its such authorised representative by similar notice.

10.7. Original Document

This Agreement is made in two counterparts, each of which shall be deemed to be an original.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE PUT THEIR HANDS HEREUNTO ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN

FOR CONCESSIONAIRE

BY : _____

Name : _____

Title: _____

FOR **GOVT. OF (Name of the State)**

BY : _____

Name: _____

Title: _____

FOR NHAI

BY : _____

Name : _____

Title _____

In the presence of :

1. 2.

SCHEDULE-S

SAFETY REQUIREMENTS

1. OBJECTIVE

1.1 Safety of road users and Project workers is a vital requirement which the Concessionaire has to attend during the Concession Period under the Concession Agreement

2. SAFETY STANDARDS

2.1 Objective

2.1.1 The objective of Safety Standards is to provide safe travel to the drivers of vehicles plying on the Project Highway at all times of the day, throughout the year and provide protection to the Project workers when they are on the work. This Schedule delineates the Safety Standards in terms of construction zones signs and safety measures in work zones and during normal operations.

2.1.2 The guiding principles for safety measures shall include

(i) warning to the drivers unambiguously and sufficiently in advance of the situation on the highway;
(ii) providing clear demarcation for movement of vehicles;
(iii) providing devices to guide the drivers and their movements through construction zones/lane closures/traffic diversions etc.
(iv) protection to Project workers on work site.

2.2 Construction zone

In order to plan and provide appropriate traffic management and safety measures, it is necessary to appreciate the concept of a construction zone. A construction zone can be defined as an area of the Project Highway which involves the conflict of the right of use between the road users and authority responsible for the maintenance /improvement of the Project Highway. From traffic safety point of view, a construction zone comprises four sub-zones as described hereinunder:

2.2.1 Advance Warning Sub-Zone

The advance warning sub-zone is meant to prepare the driver for an alert behaviour and is an essential part of any traffic control system. The warning system shall prepare the driver well in advance by providing information regarding distance, extent and type of hazard ahead so that the can gradually reduce the speed of his vehicle. For the operating speeds on the Project Highway, length of this sub-zone shall be 100m and 500m. in plain and hilly terrain respectively. Information in this sub-zone will be conveyed through a series of traffic signs, which will include "Men at Work" and the speed reduction signs at the start and middle of this sub-zone.

2.2.2 Transition Sub-Zone

The transition sub-zone is the area in which the traffic is steered and guided into and out of the diverted path around the work sub-zone. This is the most crucial sub-zone from safety point of view since most of the movements are turning movements. The traffic in this sub-zone is mostly taken across with the help of barricades and channelizers

The elements for designing this sub-zone are speed of the vehicles, extent of lateral shift and elevation difference between the normal and the diverted paths. The essential safety measures shall include delineation of the travel path and prevention of wayward movements of vehicles by means of barricades, channelizers, red cones, and red lamps during hours of darkness etc., as appropriate.

In the design of this sub-zone adequate attention shall be paid for providing necessary turning radius of the curves, grade to permit for safe passage of animal driven vehicles, drainage and dust-proofing. Where necessary traffic control shall be affected through manual flagging and by (electrically / Battery operated) traffic lights during hours of darkness. Where vehicles have to wait, the waiting area shall be demarcated by stop lines. Length of the sub-zone will generally be between 50 and 100m.

2.2.3 Work Sub-Zone

This is the actual area where construction or maintenance activity is taking place and the main concern, therefore, is the safety of the workers at the site from the plying traffic. The path of the traffic must, therefore, be very clearly delineated to avoid intrusion of vehicles moving into the work area. The work sub-zones shall not be close to each other and the distance between the two work sub-zones shall be such that the flow of traffic can return to normal stream by permitting fast moving traffic to overtake slow moving vehicles. These distances shall preferably be 2 km on urban sections and 5 to 10 km on rural sections of the highway. The length of work sub-zones will vary. The length of warning and transition sub-zones shall be basically governed by the speed of approaching vehicles and shall be regulated as shown in table S-1 below:

Table S-1: Recommended Length of Construction Zones

Average Speed (Kmph)	Length of Advance Warning Sub-Zone (m)	Length of Transition Sub-Zone (m)	Length of Work Sub-zone (m)
50	100	50	Varies
51-80	100-300	50-100	
81-100	300-500	100-200	
Over 100	1000	200-300	

The traffic across these sub-zones is guided and taken with the help of various traffic control devices erected at the site.

2.2.4 Termination Sub-Zone

The sub-zone is intended to inform the road users of the end of the construction zone. An information signboard shall be erected to inform road users of the end of construction Zone.

2.3 Traffic Control Devices

Traffic control devices in the construction zones perform the crucial task of warning, informing and alerting the driver apart from guiding the vehicle movements so that the driver of the vehicle as well as the workers on site are protected and safe passage to the traffic is possible.

The primary traffic control devices used in work sub-zones are signs, delineators, barricades, cones, pylons, pavement markings, flashing lights etc. They shall be such that they are easily understood without any confusion, are clearly visible during day and night, conform to the prevailing speeds in immediate vicinity, stable against sudden adverse weather conditions and are easy in installation, removal and maintenance.

2.3.1 Signs

The construction and maintenance signs fall into the same three major categories viz. regulatory signs, warning signs and guide signs as other traffic signs do. The IRC: 67-2001 (Code of Practice for Road Signs) gives a comprehensive list of traffic signs to which the size, colour and placement of signs shall conform. IRC: SP: 55-2001 gives details of special signs and other safety devices to be used in construction. These signs shall be placed on the left hand side of the road. Some of the common types of signs, which shall be provided in construction zones, are discussed in the following paragraph.

2.3.1.1 Regulatory signs

Regulatory signs mean legal restrictions on the traffic. They shall be used only in consultation with the local police and /or authorities. The most common types for use in construction zones are "Do not Enter", "Road Closed", Give Way to Pedestrians", "Speed limit" etc.

2.3.1.2 Warning Signs

The most common type of warning signs to alert the drivers of the possible dangers ahead in construction zones are "Lane Closed", "Diversion to other Carriageway", "Divided Carriageway Starts", "Divided Carriageway Ends" and "Two Way Traffic" etc. Sometimes it might be advisable to explain these signs with the help of a rectangular definition plate of size appropriate to the size of warning triangle and placed 0.15 m below, from the bottom of the triangle.

2.3.1.3 Guide Signs

Guide signs in construction zones shall have different background colour than the normal informatory signs of IRC: 67-2001. These signs shall have black messages and arrows on yellow (Traffic Yellow of IS: 5-1978) background. The commonly used guide signs are: "Diversion", "Road Ahead Closed" and "Sharp Deviation of route" etc. (As per IRC: SP: 55-2001).

2.3.2 Delineators

These channelising devices such as cones, traffic cylinders, tapes are placed in or adjacent to the roadway to guide the drivers along a safe path and to control the flow of traffic. These shall normally be retro-reflectorised for night visibility. IRC: 79-1981 (Recommended Practice for Road Delineators) gives details of some of the delineators. The other delineators are discussed below.

2.3.2.1 Traffic Cones and Cylinders

Traffic cones shall normally be 0.5m to 0.75m high and 0.3m to 0.4m in diameter or in square shape at the base. These are mostly made of plastic or rubber with retro reflectorised red and white band and have suitable anchoring so that they are not easily blown over or displaced. it might be preferable to use double cones, one over the other. The cones shall be placed close

enough together to give an impression of the continuity. The spacing shall be 3m (close) to 9m (normal). Larger size cones can be used for high speeds or where more conspicuous guidance is required.

New Jersey type plastic barrier of height 0.6m to 0.75m and 0.3m x 0.9m rectangular base could also be used with retro-reflectorised red and white band. Water or sand can be filled to stay in position without displacement. The spacing shall be 3m to 4m.

2.3.2.1 Barricades

Whenever the traffic has to be restricted from entering the work areas, such as excavations or material storage sites so that protection to workers is provided or there is a need for separating the two way traffic, barricades can be used. The barricades can be portable or permanent type and can be made of iron Jolly, metal or other suitable material. Size of the frame shall be 1.2m x 1m. Suitable support or ballasting shall be provided so that they do not over turn or are not blown away in strong winds. In case of a permanent type barricade, a gate or movable section shall be separately provided to allow the movement of construction/supervision vehicles. Red retro reflective stickers shall be affixed to barricade boards.

2.3.4 Flagmen

In large construction sites, flagmen with flags and sign paddles shall be effectively used to guide the safe movements. The flags for signalling shall be 0.60 m x 0.60 m size, made of a good red cloth and securely fastened to a staff of approximately 1m in length. The sign paddles shall conform to IRC: SP: 55-2001 and provided with a rigid handle.

For one-way traffic operation at a time during hours of darkness, battery operated red/green lights shall be used at either end of the affected section.

2.3.5 Road studs and Blinkers (L.E.D.)

Road studs with red flashers shall be provided across the road on either side of the construction zone and Blinkers (L.E.D) shall also be proved at appropriate locations as per the direction of IC and/or NHAI.

2.4 Safety & Management Practices

Measures for providing safe movement of traffic in some of the most commonly occurring work zones on highways shall be as follows:

2.4.1 Detour on Temporary Diversion

In the cases of major repairs or reconstruction of cross drainage structures on a highway section, damaged due to flood etc., the traffic may have to pass on a diversion, moving parallel to the highway.

2.4.1.1 A temporary diversion road shall basically satisfy the following requirements:

i) It shall have smooth horizontal and vertical profile with smooth vertical and horizontal curves;
ii) It shall not get overtopped by flood or drainage discharge under any conditions;
iii) It shall have adequate capacity to cater for the diverted traffic;
iv) It shall be dust free and shall ensure clear visibility at all times of day and night;

v) It shall be provided with the required safety standards; and
vi) It shall be provided with suitable barricades to prevent intrusion affecting the movement of the traffic.

2.4.1.2 The warning for the construction ahead shall be provided by the sign "Men at Work" about 1 km earlier to the work zone. In addition, a supplementary plate indicating "Diversion 1 km ahead" and a sign "Road Closed Ahead" shall be placed. "Compulsory Turn Right/Left Sign" shall follow it. The "Detour" and "Sharp Deviation" sign shall be used to guide the traffic onto the diversion. Hazard markers shall be placed just where the railings for the cross drainage structures on the diversion starts.

2.4.2 Partial Closure of existing two lane Carriageway

2.4.2.1 Such an eventuality will arise only in a special situation where the existing two lanes in use for the main traffic need emergency repairs and the new lanes under construction are not available for diversion of the traffic. It will become necessary to carryout special repairs through partial closure of the existing two lane facility.

2.4.2.2 In the said situation care shall be taken that the traffic is guided from the closed lane onto the operating lane without conflicting with the traffic from opposite direction.

2.4.2.3 The warning sign for "Men at Work" shall be the first sign to be seen by the drivers of the approaching vehicles. This sign shall have supplementary plate also showing the distance of work zone. The next warning sign shall be for the "Road Narrowing" (depending upon the lane closure). Compulsory "Keep Right" or "Keep Left" sign depending upon the situation, shall be provided at the beginning of the transition zone and taper. The point from where the traffic is to deviate from its normal path, the channel for traffic shall be clearly marked with the aid of painted drums or traffic cones. The spacing of these cones and/or drums shall be about 9 m or closer as per site requirement.

"The traffic lane or carriageway closed" sign shall also be provided at barricades along with "Keep Right/Left" sign.

2.4.3 Closure for Work on one side Carriageway of a 4/6 lane divided carriageway

The first sign shall be for the "Men at Work" alongwith distance plate for construction zone. Thereafter the sign for "Road Narrowing" shall be provided, followed by the signs for lane closure one after another. This shall be followed by sign for compulsory "Keep right/Left (depending upon site situation). The sign for the "Closure of carriageway" along with that for "keep Left Right" shall be provided at the point from where the vehicle is expected to change the lane for the diversion. The sign for the "Diversion to the other carriageway" shall be provided between the "Carriageway Closure" sign and the median gap. The sign for "Sharp Diversion of Route" along with compulsory "Turn right/Left" shall be provided at the location where the gap in median opening starts and traffic is expected to get diverted to the other carriageway. The warning signs for "Two way traffic" alongwith the plate indicating the distance, up to which the two way traffic is allowed, shall be placed at the median, which shall be to the left of the moving traffic. Cones or painted drums shall be placed for delineation, starting from the sign location for "Carriageway Closed".

2.4.4 Carriageway Repairs

When the work is of small magnitude, to be done in the middle of the carriageway, such as minor repairs of potholes, cracks and patches, then the traffic control measures shall mainly

consist of providing cautionary signs of "Men at Work", about 500m before the work zone for the approaching vehicle and other cautionary sign of "Road Narrows". shall be placed at 100m ahead of work area. Regulatory sign of "Keep Left/Right" shall be placed at the commencement point of the work zone and next to the barriers for the approaching vehicles. Movable type of barriers shall also be placed on both sides of the work area. Cones or drums shall be placed at suitable interval to demarcate the work area. The "Work Zone Ends" sign shall be installed 120m beyond the work area. If the operation is to continue during nighttime, necessary lighting arrangements with flashing lights shall be provided.

2.4.5 Construction of New Carriageway

2.4.5.1 Urban Section of the Project Highway

(a) The service roads on either side together with side drains shall be constructed initially. During this period the main traffic shall use the existing two lane carriageway. The construction traffic in the work zone shall be safely brought out from the mainstream traffic by erecting appropriate signs at the beginning of the work site. Also on return it will be amalgamated with the mainstream traffic by erecting appropriate signs at the end of the work site. It shall be ensured that there shall be identified entry and exist points duly designed so that haphazard entry or exit of construction traffic is avoided. Conflicting turning movements shall be avoided.

(b) On completion of the Stage-I, the main traffic shall be diverted on their respective directions on to the newly constructed service roads and the additional 4/6 lanes shall be constructed (2/3 lanes on each side) of the existing carriageway duly including the 1.5m wide central median.

(c)

(d) On completion of the divided 4/6 lane carriageway of the Project Highway, the main traffic from the service roads shall be restored on them and informatory signs shall be installed.

2.4.5.2 Rural Section of the Project Highway

In rural section the new 2/3 lane carriageway and the central median shall be constructed eccentric to the Centre line of the existing carriageway. During this construction phase. the existing two lane carriageway shall be used for the main traffic. The construction traffic using the existing highway shall be guided on to the work zone and allowed to return to the main traffic stream safely. For this purpose identified exist and entry points duly designed shall be provided. It shall ensure against haphazard entry or exist of the Construction Traffic to/from the existing highway. Conflicting turning movements of the Construction traffic shall be avoided. During this phase, sign/barricading shall be on the construction side of the road.

On completion of the new 2/3 lane carriageway and the median throughout, the traffic on the existing highway shall be diverted on it and the strengthening and widening of the existing carriageway shall be taken up.

At the construction stages described above, situations may arise requiring diversion of traffic for cross over from the new carriageway to the existing carriageway when construction of new lanes is done in stretches, during which suitable traffic safety measures shall adopted.

2.5 Safety Measures During Normal Operation

2.5.1 Introduction

It is observed that the drivers park their vehicles on the carriageways leading to accidents. Many a times, the accidental vehicles and/or debris on the carriageway are the cause of further accidents besides obstructing the smooth flow of the traffic. For smooth and normal flow of the traffic on the Project Highway, the actions stated hereinunder in 2.5.2 would be taken for the normal operation of the Project Highway.

2.5.2 Highway Patrol

Highway Patrolling shall be done to ensure safe, uninterrupted and smooth traffic flow so that:

(i) No parking of a vehicle on any of the divided carriageway takes place at anytime;

(ii) Immediate assistance is provided to accident victims and their rescue as per clause 18.8.2 of the Concession Agreement.

(iii) Minor debris and stalled vehicles are removed from carriageway within an hour's time;

(iv) In the event of traffic congestion, adequate measures shall be taken to mitigate the same in maximum one-hour's time and the approaching traffic is duly cautioned about it.

2.5.3 Safety, Vehicle Breakdown and Accident

2.5.3.1 In case of unsafe condition, vehicle breakdowns and accidents, the Concessionaire shall follow the relevant operating procedures, which shall include the setting up of temporary traffic cones and lights as well as the removal of obstruction and debris expeditiously as per clause 18.8.1 of the Concession Agreement.

2.5.3.2 The Concessionaire shall ensure that any diversion or interruption of traffic is remedied without delay as per clause 18.8.1 of the Concession Agreement.

2.5.6 Safety Measures During Concession Period

2.6.1 During the Concession Period or extension thereof as per the Concession Agreement many activities are involved at different stages and at various periods in respect of construction, operation and maintenance of the Project Highway. Safety of the road users and the Project workmen at site is of paramount importance and obligatory for the Concessionaire throughout the said period.

2.6.2 In Emergency arising on account of Force Majeure due to nature or administrative reasons special safety measures may be called for the traffic and/or the workmen at site to be taken by the Concessionaire.

2.6.3 The following principles shall be kept in view in Emergency situations from safety considerations:

2.6.3.1 Where part width of the existing 2/3 lane carriageway is envisaged to be used for passage of two way traffic, paved shoulders shall be used on the side on which work is not proposed. A maximum of one lane (3.5 m wide) closure shall be allowed for a short duration depending on the extent on Emergency.

2.6.3.2 At the points where traffic is to deviate from its normal path, the channel for traffic shall be clearly marked with the aid of pavement markings or other similar device as directed by the Independent Consultant. At night the passage shall be delineated with lamps or lanterns or any suitable light source.

2.6.3.3 On the approach of any type of closure suitable regulatory/warning signs as approved by the Independent Consultant shall be installed for guidance of road users. At least two signs shall be put up one lose to the carriageway where transition of carriageway begins and the other 120 m ahead. The signs shall be of approved design and of reflectory type as directed by Independent Consultant.

2.6.4 The Concessionaire shall ensure that safety standards specified in this Schedule are strictly complied with in the event of any lane closure or diversion of traffic.

2.7 Safety of Project workmen at Site

2.7.1 Safety of the Project Workers at site during duty hours is the responsibility of the Concessionaire. It shall be ensured by him that safety measures appropriate for the job a workman performs shall be provided.

2.7.2 Also, safety measures against accidents of the Workers by the traffic using the highway and/or diversions shall be taken. The Concessionaire shall provide helmets and protective chest vests to its workmen at site and make it compulsory for them to wear the same.

2.7.3 The Concessionaire shall insure all the Project Workers against accident.

2.7.4 Labour Laws in force shall be followed.

2.8 Safety Requirements

2.8.1 Safety of Road users and workers on the Project Highway during its Construction, Operation and Maintenance is obligatory and the Concessionaire shall be fully responsible to discharge it in terms of the Concession Agreement including its Schedules.

2.8.2 In case of emergency situations the Concessionaire shall take action(s) for the safety of the road users and the workers as required by the site conditions immediately without waiting for consultation with the Independent Consultant and/or NHAI because any delay in it will not absolve the Concessionaire of its responsibilities under the Concession Agreement including its Schedules.

2.8.3 A breach by the Concessionaire of its obligations in respect of the safety standards shall be dealt with in terms of clause 18.8.3 of the Concession Agreement

2.9 Safety of workers

In respect of all labour directly or indirectly employed in the work for the performance of the Concessionaire's part of this agreement, the Concessionaire shall at his expense arrange for the safety provisions as per Indian Standard Safety codes shown below and shall at his own expense provide for all facilities in connection there with. In case the Concessionaire fails to make arrangement and provide necessary facilities as aforesaid, he shall be liable to pay penalty prescribed under relevant clauses of this concession agreement for each default and in addition the IC shall be at liberty to make arrangement and provide facilities as aforesaid and recover the cost incurred on that behalf from the Concessionaire, and no claims whatsoever shall be entertained.

1. IS: 3696 (part 1) - 1966 Safety code for scaffolds and ladders.
2. IS: 3696(part II) - 1966 Safety code for scaffolds and ladders
3. IS: 3764-1966 Safety code for excavation work.
4. IS: 4081-1967 Safety code for blasting and drilling operations

5.	IS: 4138 -1977	Safety code. for working in compressed air
6.	IS: 5121	Safety code for piling and other deep foundations.
7.	IS: 5916 - 1970	Safety codes for construction involving use of hot bituminous materials.
8.	IS: 7293-1974	Safety code for working with construction machinery.
9.	IS: 7969 -1975	Safety code for storage and handling of building materials.

10. Any other code and/or as per directions of IC.

10.0 Safety Precautions

Since heavy loads have to be handled over moving traffic during erection of superstructure. safety is of utmost importance. The Concessionaire shall enforce a strict Safety System with all necessary precautions and instructions (safety tools. nets. railings. personal protection equipment. proper training of workers. first aid. etc.). No unskilled / untrained personnel shall be engaged at site to perform the critical activities above the flowing traffic at GL. The Concessionaire shall be solely responsible for ensuring safety at site during entire construction period.

SCHEDULE T

CRITERIA FOR LIST OF CHARTERED ACCOUNTANTS

Selection of the Chartered Accountants for a mutually agreed list shall consist of the following steps :

1. Shortlisting of Chartered Accountants by the NHAI
2. Issue of Letter of Invitation (LoI) along with Terms of Reference to shorlisted Chartered Accountants.
3. Evaluation of Technical Proposal and selection of maximum of 15 (fifteen) Chartered Accountants.
4. Forwarding list of maximum 15 (fifteen) Chartered Accountants to Concessionaire to select a maximum of 10 (ten).

SELECTION COMMITTEE FOR SHORTLISTING

A Selection Committee shall do the selection; the members of this committee shall be nominated by the NHAI.

1. Shortlisting by NHAI

For shortlisting, NHAI shall advertise for Expression of Interest (EoI) to serve as Statutory Auditors/ Chartered Accountants for the ongoing National Highway **(NH-(NH No.))** improvement project. The EoI will ask for summary information on

- Number of Partners and Professional Staff
- Experience of the firm on roads project
- Presence in India and in the region
- Experience of the firm on other similar work in other sectors.

2. Request for Technical Proposal

The request for technical proposals shall be sent to the shortlisted firms. This shall include a ToR besides information (Data Sheet) to the firms. It shall contain the guidelines for the preparation of technical proposals by the firms and submission.

The ToR shall include the following details :

1 Project background
2 Objectives

3. Scope of services
4. Interaction with NHAI
5. Reporting requirement
6. Performance clause
7. Consultant's Proposal
8. Period of Services

3. Evaluation of Technical Proposal

The technical proposals received from shortlisted firms shall be evaluated based on the following :

- Specific experience of the firm related to the assignment
- Adequacy of the proposed work plan and methodology in response to the ToR
- Qualifications and competence of the key staff for the assignment

SCHEDULE U

SUBSTITUTION AGREEMENT

THIS SUBSTITUTION AGREEMENT is made at New Delhi on this the _____ day of _____ 200_

BETWEEN

1. THE **National Highways Authority of India** (hereinafter referred to as "NHAI" which expression shall unless repugnant to the context or meaning thereof include its 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 it successors and assigns).

AND

3. _____, _____and having its registered office at _____acting for itself and for and on behalf of the Senior Lenders listed in Schedule 1 hereto (hereinafter referred to as the "Senior Lenders").

(NHAI, the Concessionaire and the Senior Lenders are hereinafter collectively referred to as the "Parties" and individually are hereinafter referred to as "Party").

WHEREAS

A. By the Concession Agreement dated ..... entered into between the NHAI and the Concessionaire, NHAI has granted to the Concessionaire the Concession for **Name of the Project in the State of (Name of the State)**, India on Build, Operate and Transfer (BOT) basis subject to and on the terms, conditions and covenants setforth in the said Concession Agreement or forming part thereof.

B. With a view to help facilitate obtaining of financing for the said Project by the Concessionaire so as to enable the Concessionaire to build, operate and maintain

the same pursuant to and in accordance with the Concession Agreement, the Parties have agreed subject to the terms and conditions of the Concession Agreement and the Financing Documents, that the Senior Lenders shall have the right to substitute the Concessionaire by a Selectee for the residual period of the Concession on the terms, conditions and covenants mentioned hereinbelow.

C. As a condition to making any disbursement pursuant to the Financing Documents, the Senior Lenders have required and it is deemed necessary and expedient to record the terms, conditions and covenants of the above agreement between the Parties.

NOW THEREFORE THE PARTIES HITHERTO HEREBY AGREE AND THIS AGREEMENT WITNESSES AS FOLLOWS:

ARTICLE 1

DEFINITIONS

1.1 For the purpose of this Agreement, the following terms shall have the meaning hereinafter respectively assigned to them :

1.1.1 "Concession" means the bundle of rights, obligations and covenants of the Concessionaire under and as setforth in the Concession Agreement.

1.1.2 "Concession Agreement" means the Concession Agreement dated ..... entered into between NHAI and the Concessionaire granting the Concession to the Concessionaire in respect of the Project Highway and includes without limitation any amendments thereto made in accordance with the provisions contained in this behalf therein.

1.1.3 "Event of Default" means occurrence of any of the following events :

(i) A Material Breach by the Concessionaire of the Concession Agreement, or the occurrence of a Concessionaire Event of Default as defined in the Concession Agreement.

(ii) A material default in payment by the Concessionaire to all or any of the Senior Lenders under the Financing Documents of any two instalments, either of principal or interest or both, due and payable by it on account of Lenders Dues.

(iii) Any event of default under or breach of any of the terms of any of the Financing Documents or Project Agreements concerning the Project which in the sole opinion of the Lenders Agent is material or major and which may seriously affect the ability of the Concessionaire to meet its payment obligations to the Senior Lenders under the Financing Documents or to design engineer, construct, complete, operate and maintain the Project Highway pursuant to and in accordance with the Concession Agreement.

1.1.4 "Financial Assistance" means the loans, advances and other funding assistance including any syndicated/ participation facility provided by the Senior Lenders as setforth in Schedule II hereto for financing the whole or any part of the Project Cost.

1.1.5 "Financing Documents" means the documents executed/ to be executed by the Concessionaire or entered/to be entered into by the Concessionaire with the Senior Lenders and/or the Lenders Agent in respect of the Financial Assistance and include loan agreements, guarantees, notes, debenture, bonds and other security agreements and other documents relating to the Financial Assistance and brief particulars whereof are setforth in Schedule II hereto in relation to each Senior Lender.

1.1.6 "Lenders Agent" means ..... a company established under the provisions of the ..... and having its principal office ..... and any replacement thereof appointed by all the Senior Lenders, inter alia, on the condition that as security for the Financial Assistance they shall have the right to seek transfer and assignment of the Concession Agreement including the Concession in accordance with the provisions of this Agreement.

1.1.7 "Lenders Certificate" shall have the meaning ascribed thereto in Clause 2.2(b).

1.1.8 "Lenders Dues" means the aggregate of all monies owned by the Concessionaire to the Senior Lenders under the Financing Documents on account of principal thereunder for funding the Project Cost, and all accrued interest, additional interest, liquidated damages, commitment fees, commission, prepayment premium, costs, charges and other monies including financing charges and fees owed by the

Concessionaire to the Senior Lenders under the Financing Documents for the Project upto the Transfer Date payable under the Financing Documents.

1.1.9 "Notice of Default" shall have the meaning ascribed thereto in Clause 2.2(a).

1.1.10 "Proposal" shall have the meaning ascribed thereto in Clause 3.1(iii).

1.1.11 "Project Agreements" means this Agreement, the Concession Agreement and certain other agreements and contracts entered into by the Concessionaire with NHAI and others relating to the Project and brief particulars whereof are setforth in Schedule III hereto.

1.1.12 "Project Cost" means the total capital cost of the Project upto the COD as approved by the Senior Lenders.

1.1.13 "Senior Lenders" means the financial institutions, trusts, funds, banks and such other persons who have provided or agreed to provide the finance to the Concessionaire under any of the Financing Documents for meeting all or any part of the Total Project Cost and who hold pari passu charge on the Project Assets.

1.1.14 "Selectee" means a new Concessionaire proposed by the Senior Lenders pursuant to this Agreement and approved by NHAI for substituting the Concessionaire for the residual period of the original Concession by amendment of the Concession Agreement or by execution of a fresh Concession Agreement.

1.1.15 "Substitution Notice" means the notice given by the Lenders Agent pursuant to Clause 2.2 (c) of this Agreement.

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

1.3 In this agreement unless the context otherwise requires :

a) any reference to a statutory provision shall include such provision as is from time to time modified or re-enacted or consolidated 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 words denoting natural persons shall include partnerships, firms, companies,

corporations, joint ventures, trusts, associations, organisations or other entities (whether or not having a separate legal entity);

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 Schedules 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 NHAI hereunder or pursuant hereto in any manner whatsoever;

j) references to Recitals, clauses, sub-clauses, paragraphs, or schedules in this Agreement shall, except where the context otherwise requires, be deemed to be references to Recitals, Articles, clauses, sub-clauses, paragraphs, Annexures, appendices of this Agreement.

k) any agreement, consent, approval, authorisation, 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 duly authorised 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.

ARTICLE 2

SUBSTITUTION OF THE CONCESSIONAIRE BY A SELECTEE

2.1 NHAI hereby irrevocably agrees to substitute the Concessionaire by a Selectee (selected by the Senior Lenders in accordance with the provisions of this Agreement and approved by NHAI) by amendment of the Concession Agreement or by execution of a fresh Concession Agreement in favour of the Selectee for the purpose of securing the payments of the Lenders Dues, provided that nothing contained herein shall entitle the Senior Lenders to operate the Concession themselves as a Concessionaire under and in accordance with Concessionaire Agreement either individually or collectively. However, Senior Lenders may exercise the right of step-in to cure any breach or default subsisting on the day of such step-in or substitution. Provided further that if the Senior Lenders step in to operate and manage the Concession for a period not exceeding 90 (ninety) days, their liabilities shall be restricted to the obligations relating to and arising during such 90 (ninety) days period.

2.2 (a) The Lenders Agent shall notify by a notice in writing to the Concessionaire, with a copy thereof simultaneously to NHAI, about the occurrence of an Event of Default and requiring the Concessionaire to remedy and cure such default within 30 (thirty) days from the date of delivery of such notice of the Concessionaire (the "Notice of Default"). The Notice of Default shall be accompanied by the Lenders Certificate.

(b) A certificate under the hands of an authorised officer of the Lenders Agent annexed to the Notice of Default certifying –

(i) the occurrence of an Event of Default, and

(ii) the Lenders Dues

(the "Lenders Certificate") shall be conclusive evidence of occurrence of such Event of Default and of such Lenders Dues. Such Lenders Certificate shall be final, conclusive and binding upon the Concessionaire for the purposes of this Agreement and the Financing Documents.

(c) NHAI and the Concessionaire hereby irrevocably agree that the Lenders Agent may within 30 (thirty) days of the date of delivery of the Notice of Default of the Concessionaire and without prejudice to any other right or remedy available to the Senior Lenders under the Financing Document, notify NHAI and the Concessionaire on behalf of all the Senior Lenders about the Senior Lenders decision to invite, negotiate and procure offers, either through private negotiations or public auction or process of tendering for the residual period of the Concession and the rights and obligations of the Concessionaire under the Concession Agreement, by a Selectee, subject to the approval of such Selectee by NHAI (the "Substitution Notice")

(d) Upon assumption by the Selectee of the liability and obligations of the Concessionaire under the Financing Documents and the Concession Agreement including obligation to pay any sums then due and payable to NHAI under the Concession Agreement, NHAI shall grant the Concession to the Selectee on the same terms and conditions for the residual period of the original Concession, by amendment of Concession Agreement or, if required by the Lenders Agent by a separate agreement with the Selectee.

2.3 The Lenders Agent shall apply in the selection of the following criteria :

(i) the Selectee shall be capable of properly discharging the duties, obligations and liabilities of the Concessionaire under the Concession Agreement;

(ii) the Selectee shall provide security to the satisfaction of Senior Lenders for repayment of the Lenders Dues;

(iii) the Selectee shall have the capability and shall unconditionally consent to assume the liability for the payment and discharge of dues of the Concessionaire to NHAI under and in accordance with the Concession Agreement and of Lender's Dues upon terms and conditions as agreed to with the Senior Lenders ;

(iv) the Selectee shall have the networth, experience and technical equity parameters as setforth in the Concession Agreement or prescribed by NHAI thereunder in respect of the Concessionaire or as relaxed subsequently by NHAI;

(v) the Selectee shall have not been in breach of any agreement between the Selectee and NHAI ; and

(vi) any other appropriate circumstance, whereby continuity in the performance of the Concessionaire's obligations under the Concession Agreement is maintained and the security in favour of Senior Lenders under the Financing Documents is preserved.

2.4 At any time prior to the acceptance of the Selectee by NHAI pursuant to this Agreement, the NHAI may require the Lenders Agent to satisfy NHAI as to the eligibility of the Selectee and the decision of the NHAI in this behalf (which shall be reasonable), shall be final, conclusive and binding on the Senior Lenders and the Selectee.

ARTICLE 3

MODALITY FOR SUBSTITUTION

3.1 The following modalities shall be applicable to any substitution of the Concessionaire by the Selectee pursuant to this Agreement :

(i) The Lenders Agent may invite, negotiate or procure offers either through private negotiations or public auction or process of tender or otherwise for the substitution of the Concessionaire by the Selectee.

(ii) The Lenders Agent shall on behalf of the Senior Lenders propose to NHAI pursuant to sub-clause (iii) below, the name of the Selectee for acceptance and shall apply as necessary to NHAI for :

a) grant to the Selectee (as substitute for the Concessionaire) the right to build, construct, complete, maintain, and operate the Project Highway under and in accordance with and subject to and on the terms and conditions setforth in the Concession Agreement.

b) amendment of the Concession Agreement so as to grant to the Selectee on the same terms and conditions, the residual period of the Concession under original Concession Agreement,

c) the execution of a new Substitution Agreement with the proposed Selectee for the residual period of Concession on the same terms and conditions, and

(iii) The Lenders Agent on behalf of the Senior Lenders shall be entitled, within a period of 120 (one hundred twenty) days from the date of delivery to NHAI of the Substitution Notice pursuant to Clause 2(c) above, to select and propose to NHAI for its approval a Selectee (the "Proposal"). The Proposal of the Lenders Agent pursuant to this sub-clause (iii) shall contain the particulars and information in respect of the Selectee, the Lenders Dues and other data and information, all as prescribed in Schedule IV hereto. Without prejudice to the foregoing the Lenders Agent agrees and undertakes to provide to NHAI such further and other information and such clarifications in respect of any data, particulars or information furnished pursuant hereto by the Lenders Agent as NHAI may reasonably require. NHAI shall convey its approval or otherwise of such Proposal, including of Selectee, in its sole discretion within 60 (sixty) days of (a) the date of receipt of the Proposal by NHAI, or (b) the date when last of further and other information and such clarifications in respect of any data, particulars or information comprised in the Proposal, as have been provided in the Lenders Agent to NHAI, whichever is later. It is expressly agreed that the Proposal shall be accompanied by an unconditional undertaking of the Selectee that it shall upon approval by NHAI of the Proposal including the Selectee, observe, comply, perform and fulfill the terms, conditions and covenants of the Concession Agreement which according to its terms are required to be observed, complied with, performed and fulfilled by Concessionaire thereunder on the footing as if such Selectee were the concessionaire under the Concession Agreement and shall be liable for and shall assume, discharge and pay the Lenders Dues to the Senior Lenders under and in accordance with the Financing Documents. Upon approval of

the Proposal including of the Selectee by NHAI, such Selectee shall become the Selectee hereunder.

(iv) NHAI shall, upon its satisfaction of the eligibility of the Selectee and in accordance with the provisions of this Agreement and subject to the provisions of Sub-clause (v) below proceed to substitute the Concessionaire or the Selectee by amendment of the Concession Agreement or by execution of fresh agreement or such other writing as NHAI may reasonably require on the same terms and conditions for the residual period of the Concession in favour of the Selectee.

(v) The substitution as aforesaid shall be subject to the Selectee, obtaining requisite Indian Government approvals, clearances and permission necessary for operating the Concession under and in accordance with the Concession Agreement.

(vi) The objection if any of NHAI to the substitution as aforesaid shall be reasoned and be made after hearing the Lenders Agent, provided however, that in the event of a refusal as stated above, the Lenders Agent may propose another Selectee. In the event that no objection is raised with respect to the Selectee by NHAI within the period setforth in sub-clause (iii) above, the Selectee shall be deemed to have been accepted by NHAI. NHAI shall, subject to the provisions of Sub-clause (v) above, grant the Concession for the residual period within 15 days of its acceptance/deemed acceptance of the Selectee.

(vii) The substitution as aforesaid, pursuant to the security interest hereby created in favour of the Senior Lenders, shall be deemed to be complete only upon the Selectee as Concessionaire accepting and complying with the terms and conditions stipulated in the Concession Agreement.

(viii) The decision of the Senior Lenders and NHAI in the selection of the Selectee shall be final and binding on the Concessionaire and shall be deemed to have been made with the concurrence of the Concessionaire and the Concessionaire hereby expressly waives all rights to objects to or challenge such selection of the Selectee on any ground whatsoever No

third party shall have the right to question the decision of the Senior Lenders/Lenders Agent and NHAI.

(ix) All actions of the Lenders Agent hereunder shall be deemed to be on behalf of the Senior Lenders, and be binding upon them. The Lenders Agent is authorised to receive payment of compensation, payment to cure default and any other payments, consideration for transfer in accordance with the Substitution Notice and the Financing Documents and give valid discharge on behalf of all Senior Lenders.

3.2 The terms and conditions for substitution of the Concessionaire by the Selectee shall be proposed by the Senior Lenders through the Lenders Agent to the NHAI, on the occurrence of an Event of Default and continuance thereof for six months but atleast 2 months prior to the anticipated date of substitution as aforesaid for the residual period of the Concession.

3.3 The Concessionaire hereby irrevocably agrees and waives any right to challenge the Senior Lender's decision to apply to NHAI for substitution as aforesaid and neither the Concessionaire nor NHAI shall be entitled to prevent the Lenders Agent from proceeding to seek such a substitution of the Concessionaire by Selectee as hereinbefore provided. Notwithstanding NHAI's permission for substitution pursuant to Lenders Agent's request, the Concessionaire agrees and confirms that the Concessionaire shall not have any right to seek re-valuation of the Concessionaire's assets including the Concession under the Concession Agreement, otherwise than as contracted in the Financing Documents. The Parties acknowledge that the rights of the Senior Lenders hereunder are irrevocable and shall not be contested in any proceedings before any court of authority and the Concessionaire shall have no right or remedy to prevent, obstruct, injunct or restrain NHAI and/or the Senior Lenders from effecting or causing the substitution as aforesaid.

3.4 Where no suitable Selectee can be found by the Lenders Agent, or NHAI shall decide to take over the concession then NHAI shall advise the Lenders Agent of all steps it proposes to take under the Concession Agreement for determination of Termination Payments thereof.

3.5 (i) If NHAI decides to substitute the Concessionaire by any other person (NHAI Nominee), it

shall take into account the Senior Lender's Dues while considering offers from such persons and shall include a suitable condition as agreed to by the Lenders Agent on behalf of the Senior Lenders for payment or take over of such dues by such NHAI nominee to the extent agreed by the Lenders Agent while substituting the Concessionaire by the NHAI nominee. The NHAI nominee shall similarly be bound to execute a supplementary/fresh substitution agreement on the same terms and conditions as provided herein.

(ii) Notwithstanding anything contained in Clause 3.4 and this Clause 3.5, NHAI shall not be required to take over, upon Termination of the Concession Agreement including the Concession, the liabilities representing the Lender's Dues save and except to the extent of Termination Payments due and payable upon such Termination under the Concession Agreement. In such an event NHAI's obligation shall be limited to assumption of such liabilities and payments of dues as NHAI has agreed to bear under the Concession Agreement.

3.5.1 Nothing contained in these presents shall mean or be interpreted as provision of any guarantee

or surety by NHAI and it is expressly agreed that NHAI has not provided any surety, guarantee or counter guarantee whether directly or indirectly for the recovery of amount of Financial Assistance advanced by the Senior Lenders to the Concessionaire.

ARTICLE 4

INTERIM PROTECTION OF SERVICE AND PRESERVATION OF SECURITY

4.1 In the event of the Senior Lenders notify NHAI and the Concessionaire of the Event of Default (and the Concessionaire has not cured the default for a period of 30 days) or in special circumstances affecting the security of the Senior Lenders, the Senior Lenders shall be entitled to institute protective legal proceedings for a receivership (the "Receiver") to maintain, preserve and protect the assets (other than the Concession Agreement including the Concession) held as security by the

Senior Lenders provided always that such receiver shall be NHAI if such assets are in the opinion of NHAI necessary and required for the operation and maintenance of the Project Highway and the Parties hereby consent and agree to the same. The Lenders Agent shall in such an event notify NHAI to assume receivership of the assets held as security and NHAI shall operate and maintain the same pending the substitution of the Concessionaire by the Selectee. In the event NHAI does not assume receivership and declines the request of the Lenders Agent, the Lenders Agent shall for itself and each of the Senior Lenders, be entitled to seek the appointment of a Court Receiver for the Concessionaire's assets held as security and NHAI shall operate and maintain the same pending substitution as aforesaid and/or the takeover of the Concession Agreement including the Concession and the Project Highway in accordance with the Concession Agreement or this Agreement by the NHAI. All the receivables shall be deposited by the Receiver in the Escrow Account and shall be dealt with in accordance with the Concession Agreement. The Receiver shall be responsible for protecting the assets in receivership and shall render a true and proper account of the receivership to the Senior Lenders in accordance with the terms of its appointment. The Receiver shall make best efforts to operate and maintain the Project Highway, in accordance with the obligations of the Concessionaire under the Concession Agreement. Any person other than NHAI may be appointed as Receiver only with the prior consent of NHAI. In a declaratory suit for appointment of a Receiver, notwithstanding that no recovery or mortgage suit or any suit or proceeding for enforcement of the Senior Lenders' security under the Financing Documents is instituted by the Lenders Agent for itself or the Senior Lenders, any action for appointment of NHAI as Receiver or appointment of an Independent Court Receiver shall be without prejudice for the other rights and remedies of NHAI, and of the Senior Lenders under the Financing Documents.

ARTICLE 5

TERMINATION OF THE CONCESSION BY THE NHAI

5.1 If under the Concession Agreement an event occurs which shall entitle NHAI to Terminate the Concession Agreement, NHAI shall intimate the Senior Lenders prior to exercising of its decision to Terminate the Concession and advise the

Senior Lenders to ensure the cure of the event which otherwise can result in termination of the Concession and the Concession Agreement. Such a notice shall entitle the Senior Lenders to cure any financial or other default of the Concessionaire within a period of two months from the date of the notice received from the NHAI failing which NHAI without any further notice to either the Concessionaire or the Lenders Agent/Senior Lenders, shall be entitled to Terminate the Concession Agreement

5.2 Upon receipt of the Notice as referred to in Clause 5.1, intimating occurrence of an event which can entail Termination of the Concession Agreement including the Concession, the Senior Lenders shall be entitled to consider such notice as an Event of Default and may initiate steps to invite, negotiate and procure offers for the substitution of the Concessionaire by a Selectee in accordance with the procedure set forth in this Agreement.

ARTICLE 6

SENIOR LENDERS RIGHT TO RECEIVE TERMINATION PAYMENTS

6.1 NHAI and Concessionaire hereby agree, and confirm that without prejudice to any other right or remedy, NHAI shall be entitled to deposit the Termination Payments into the Escrow Account and the Senior Lenders shall be entitled to receive the same without any further reference to or consent of the Concessionaire under and in accordance with the Concession Agreement towards the satisfaction of the Senior Lenders Dues out of and limited to the sum of Termination Payments worked out under and in accordance with the Concession Agreement. The Senior Lenders shall be entitled to appropriate any consideration received for the substitution as hereinabove provided from the Selectee towards the payment of their and NHAI's respective dues to the exclusion of the Concessionaire.

6.2 The Concessionaire hereby nominates, constitutes and appoints the Lenders Agent as its constituted attorney for doing all acts, deeds and things as may be required to be done for the substitution of the Concessionaire by the Selectee pursuant hereto and for receiving consideration for discharge of the Lenders' Dues pursuant to Clause 6.1

6.3 The Concessionaire hereby expressly authorises payment of sums by NHAI on account of Termination Payments into Escrow Account and the Lenders Agent to draw the same therefrom for and on behalf of the account of the Senior Lenders notwithstanding the pendency of any dispute or objection or claim that the Concessionaire may have against the Senior Lenders and/or NHAI. The deposit by NHAI into the Escrow Account and payment to the Senior Lenders directly or through the Lenders Agent in accordance with this Agreement, made or caused to be made by NHAI shall constitute a valid discharge of its obligation of the payment thereof to the Concessionaire. All such payments shall stand charged to the Senior Lenders under the Financing Documents and shall be receivable by the Lenders Agent from the Escrow Account on behalf of the Senior Lenders to the exclusion of any receiver or liquidator appointed.

ARTICLE 7

GENERAL

7.1 The Parties hereto expressly represent and warrant that they are duly empowered to sign and execute this Agreement and the Lenders Agent is duly and fully authorised by each of the Senior Lenders to enter into this Agreement on their behalf.

7.2 Notices under this Agreement shall be sent to the Addresses first hereinabove mentioned. Any change in the address of any Party shall be duly notified by a Registered post acknowledgement due and delivered to the other Parties.

7.3 The expressions "NHAI", the "Concessionaire", the "Senior Lenders" and the "Lenders Agent" herein used shall unless there be anything repugnant to the subject or context include their respective successors, legal representatives, administrators and permitted assigns.

7.4 This Agreement shall not be affected by reorganisation of any Senior Lender, Lenders Agent or NHAI and the successor – in interest of such Senior Lender, Lenders Agent or NHAI shall have the benefit of this Agreement.

7.5 No amendment, variation or modification to this Agreement shall be valid and effectual unless made in writing and executed by the duly authorised representatives of all the Parties hereto.

7.6 All stamp duties or other imposts and charges as are applicable on this Agreement or on amendment of the Concession Agreement or execution of fresh Concession Agreement for the purpose of substitution as aforesaid shall be borne by and be to the account of the Concessionaire. In the event of the Senior Lenders making such payment for the time being, it shall be deemed to be a part of the Lenders Dues.

7.7 The Parties hereby expressly agree that for the purpose of giving full and proper effect to this Agreement, the Concession Agreement and this Agreement shall be read together and construed harmoniously. The terms of this Agreement shall prevail in the event of any inconsistency with the Concession Agreement.

7.8 The consultation, recommendation or approval of the Lenders Agent under this Agreement shall always be taken as consultation, recommendation or approval of every concerned Senior Lender and each such Senior Lender shall be bound by the same and hereby waives its right to question or dispute the same.

7.9 This Agreement shall be in addition to and shall not be in derogation of the terms of the Financing Documents.

7.10 It shall not be necessary for the Senior Lenders or the Lenders Agent to enforce or exhaust any other remedy available to them before invoking the provisions of this Agreement

7.11 Any dispute, difference or claim arising out of or in connection with or in relation to this Agreement which is not resolved amicably shall be decided finally by reference to arbitration to a Board of Arbitrators comprising of one nominee of each party to the dispute. Such arbitration shall be held in accordance with the Rules of Arbitration of the Indian Council of Arbitration and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996. The arbitrators shall issue a reasoned award. The venue of such arbitration shall be New Delhi, India. The Award shall be final and binding on the Parties. The Parties agree and undertake to carry out the award of the arbitrators (the "Award") without delay.

This Agreement and rights and obligations of the Parties shall remain in full force and effect pending the Award in any arbitration proceeding hereunder. The Courts in New Delhi alone shall have jurisdiction over all matters arising out of or relating

to the arbitration agreement contained herein or proceedings arising out of or relating to the arbitration proceedings thereunder.

IN WITNESS WHEREOF THE PARTIES HITHERTO HAVE SET THEIR HANDS HEREUNTO ON THE DAY, MONTH AND YEAR HEREIN ABOVE MENTIONED.

SIGNED AND DELIVERED ON BEHALF OF

_____ LIMITED

BY : _____

Name :

Title :

SIGNED AND DELIVERED ON BEHALF OF **THE NATIONAL HIGHWAYS AUTHORITY OF INDIA**

BY : _____

Name :

Title :

SIGNED AND DELIVERED ON BEHALF OF

SENIOR LENDERS

BY: _____

Name :

Title :

Scheduie V

VESTING CERTIFICATE

National Highway Authority of India ("NHAI") hereby acknowledges:

1. Compliance and fulfillment by the Concessionaire of the Divestment Requirements setforth in Clause 33.4 of the Concession Agreement in respect of the Project Highway;
2. Receipt of actual possession of the Project Highway from the Concessionaire; and
3. Receipt from the Concessionaire of a certificate confirming that there are no liens or encumbrances whatsoever on the Project Highway including Project Assets; on the basis that upon the issue of this Vesting Certificate, NHAI 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 NHAI free from all encumbrances, charges and liens whatsoever.

Notwithstanding anything to the contrary contained hereinabove it shall be a condition of this Vesting Certificate that in the event of any defect or efficiency in any of the Divestment Requirements setforth in Clause 33.4 of the Concession Agreement being found or discovered at any time hereafter, nothing contained in this Vesting Certificate shall be construed or interpreted as waiving the obligation of the Concessionaire to rectify and remedy the same and/or relieving the Concessionaire in any manner of the same.

Agreed and accepted

For the Concessionaire

By:

Name:

Title:

Dated:

For National Highway Authority of India

By:

Name:

Title:

Dated:

SCHEDULE W

PASSENGER CAR UNIT FACTORS

The equivalency factor for the conversion of different types of vehicles into equivalent Passenger Car Units (PCUs) based on their relative interference value shall be as per the following table:

Sl. No.	Vehicle Type	Equivalency factor**
Fast Vehicles		
1.	Motor Cycle or Scooter	0.50
2.	Passenger Car, Pick-up Van or Auto-rickshaw	1.00
3.	Agricultural Tractor, Light Motor Vehicle	1.50
4.	Truck or Bus	3.00
5.	Truck-trailer, Agricultural Tractor-trailer	4.50
Slow Vehicles ***		
6.	Cycle	0.50
7.	Cycle-rickshaw	2.00
8.	Hand Cart	3.00
9.	Horse-drawn vehicle	4.00
10.	Bullock Cart*	8.00

* *For smaller bullock-carts, a value of 6 shall be appropriate.*

** *Recommended PCU factors for various types of vehicles in accordance with IRC:64-1990 on "Guidelines for Capacity of Road in Rural Areas"*

*** *While computing the Design service volumes and the capacity of highway, slow vehicles (of the table) shall not be considered* ***for the sections where Service Roads are provided***

SCHEDULE X

REPORTING AND RECORD REQUIREMENTS

1.0 INTROUDUCTION

The reporting and records requirements spelt out hereinunder have been provided in terms of the indicative type of information required. The Independent Consultant shall determine the following:

- Format of such reports and record requirements
- Software standards
- Number of Copies required
- The Language of the reports and records shall be English

2.0 Part I
Reporting Requirements

From the date of the Concession Agreement until the end of the Concession Period, the Concessionaire shall prepare and submit to the NHAI and Independent Consultant 1 copy each of the following reports/ Documents/ Drawings else otherwise stated in the Concession Agreement.

A. Design & Construction Stage

1 A detailed work plan supported with CPM/PERT charts for completion of all project activities related to the Project Highway, at the beginning of the Design Works.

2 **Monthly Progress Report**: Within 5 Days of end of each month or a part thereof, which falls within the Construction Period, the Concessionaire shall provide to the NHAI and the Independent Consultant the monthly report, which shall at least identify the following:

- Working drawings submitted/ resubmitted to NHAI/ Independent Consultant during the month ended
- NHAI Independent Consultant's comments there on, if any
- Concessionaire's compliance with NHAI/ Independent Consultant's comments on the drawings submitted to NHAI/ Independent Consultant, during the month ended

- "As built" drawings submitted to NHAI/ Independent Consultant during the month ended.
- Progress of pre-construction activities such as utility relocation and other obstructions.
- Concessionaire' compliance with the Inspection Report during the month ended, if any.
- Construction Constraints.
- Progress data with 'S' curves, if applicable; Project Data with contract detail and sectional completion details.
- Tests carried out during the month ended, if any; results of these Tests furnished to the NHAI/ Independent Consultant during the month ended, if any.
- Remedial measures taken by the Concessionaire on the basis of these Tests, if any.
- Traffic management steps undertaken by the Concessionaire during the month (particularly on the existing two lanes of the Project highway).
- Achievement of a Project milestone (Schedule H) during the month, if any. The Concessionaire shall also provide information on delay in achievement of such milestone, if any.
- Any suspension of the Construction Works by NHAI as per provisions of the Concession Agreement, if any. The Concessionaire shall also provide information on reason of such suspension, duration of such suspension and the steps undertaken by it to revoke such suspension.
- Any Change of Scope Notice issued by NHAI and status thereof.
- All actual or potential departures from the Project Completion Schedule (Schedule H).
- All grounds for a substantial Dispute which have occurred or which may reasonably be foreseen as likely to occur.
- All substantial disagreements among the Concessionaire, and the NHAI and/or Independent Consultant to the design/ construction of the Project Highway.
- The proposed measures to be taken by the Concessionaire to overcome such departures or to resolve such grounds for a Dispute.
- The date on which the Concessionaire expects the Project Highway to be completed.
- The Concessionaire is required to maintain the existing two lanes during the Construction Period. This monthly construction report shall also contain information in respect of maintenance activity, if any carried out by the Concessionaire during the month ended in respect of these existing two lanes. The

Concessionaire and the Independent Consultants shall agree on the information requirements in respect of these two existing lanes during the Construction Period.

- Monthly Weather Report giving daily temperature maximum and minimum value, rain fall and any other significant event.

3 Detailed Engineering Design Report including working drawings, and Environmental Management Plan.

4 Video Recording as per clause 44.1 of the Concession Agreement.

5 Monthly Escrow Account Report: With in 5 Days of end of each month which falls within the Operations Period, the Concessionaire shall provide to the NHAI and the Independent Consultant a copy of the report containing the summary of the receipts in and payments from the Escrow Account for the month ended.

6 The Concessionaire shall supply to the NHAI free of charge the following documents prior to requesting the issue of the Completion Certificate:

6.1 Detailed, accurately scaled, and sequentially numbered plans of the Project Highway "As Built" covering all relevant engineering features, which in relation to structures shall also include cross sections in each plane; and

6.2 Copies of all geo-technical and borehole reports obtained by the Concessionaire in preparation for and during the construction of the Project Highway.

7 All other reports in accordance with the provisions of the Concession Agreement.

8 Such other reports as may be reasonably required by NHAI/ Independent Consultant.

9 Additional Reports: The Concessionaire shall supply to the NHAI free of charge copies of all information, records and test results (including any interpretation of such test results) resulting from any ground, physical or geophysical investigation or archaeological or ecological survey of the Site or Adjacent Areas

B. <u>Operation Phase</u>

1 Monthly Traffic Report: With in 5 Days of end of each month which falls within the Operations Period, the Concessionaire shall provide to the NHAI and the Independent Consultant a copy of the report containing the following information

2 Monthly Escrow Account Report: With in 5 Days of end of each month which falls within the Operations Period, the Concessionaire shall provide to the NHAI

and the Independent Consultant a copy of the report containing the summary of the receipts in and payments from the Escrow Account for the month ended.

3 Monthly Operations Report: With in 5 Days of end of each month or a part thereof, which falls within the Operations Period, the Concessionaire shall provide to the NHAI and the Independent Consultant a copy of the report, which shall identify the following, at the minimum:

- Inspections undertaken by the Concessionaire during the month ended, if any.
- Maintenance Reports submitted to the Independent Consultant during the month ended, if any.
- O&M Inspection Compliance Report submitted to NHAI/ Independent Consultant during the month ended, if any.
- Preventive/ Periodic maintenance undertaken during the month ended, if any.
- Any material modifications made to the Project Highway during the month ended, if any.
- All the accidents or incidents on the Project Road during the month under report (including all accidents on which a report has previously been made to the Concession Agreement).
- Tests performed during operation and maintenance stage along with the defects identified on the Project Highway, if any.
- Number and type of the complaints received from Users and others in respect of the Project Highway and the conduct of Operations.
- Incidents of emergency de-commissioning of the Project Highway during the month ended, if any.
- Incidents of lane-closure on the Project Highway during the month ended, if any. The Concessionaire shall provide information on reason, time of such lane-closures.
- all actual or potential departures from the O&M Requirements as specified in 'Schedule L'.
- all grounds for substantial Dispute which have occurred or may reasonably be foreseen as likely to occur.
- the proposed measures to be taken by the Concessionaire to overcome such departures or to resolve such grounds for a Dispute.

4. Accident Reports: As soon as practicable and in any event no later than 7 days following the occurrence of any accident on the Project Highway involving a fatality or serious personal injury or substantial property damage, the Concessionaire shall investigate the circumstances of such accident and submit to the NHAI and Independent Consultant a report setting out details of such accident and, to the extent they are known, the causes of such an accident, and the Concessionaire shall thereafter promptly report to the NHAI and/or Independent Consultant any additional details of such accident or its causes which become known to it.

5. Concessionaire shall submit a copy of the audited accounts within 120 days of the close of each Accounting Year after the Appointed Date.

7. All other reports in accordance with the provisions of the Concession Agreement.

8. Such other reports as may be reasonably required by NHAI/ Independent Consultant.

9. Additional Reports: The Concessionaire shall supply to the NHAI/Independent Consultant free of charge copies of all information, records and test results (including any interpretation of such test results) resulting from any ground, physical or geophysical investigation or archaeological or ecological survey of the Site or Adjacent Areas.

3.0 Part II

Record Requirements

The Concessionaire shall take the following action(s) in respect of preparation of the record, its submission to NHAI and retention by the Concessionaire itself.

1.	**Design**	**Retention Period of the Concessionaire**
1.1	Design standards containing all relevant design assumptions, codes of practice, design loadings, design parameters and product data sheets for all components of Project Highway.	Till handover to NHAI at Termination of the Concession
1.2	Full set of final design calculations for all parts of the Project Highway including details of the influence on design of actual construction methods, and any changes or any remedial works during construction.	Till handover to NHAI at Termination of the Concession
1.3	Full set of working drawings	Until 2 years after issue of the Completion Certificate
1.4	Full specification for construction and all revisions made thereto.	Until 2 years after issue of the Completion Certificate
1.5	Change of Scope Order(s)	Till handover to NHAI at Termination of the Concession
2.	**Construction**	
2.1	Video recording submitted to NHAI	Until 2 years after the issue of Completion Certificate
2.2	Full set of construction site records relating to progress, testing of materials, monitoring of standards of workmanship, meteorological conditions, instructions issued and other site correspondence.	Till handover to NHAI at Termination of the Concession
2.3	Full set of "As-Built" drawings and schedules incorporating all changes to the design and all remedial measures applied to the Project Highway during construction, and all final As-built details and dimensions of the Project Highway. These drawings shall include permanent modifications made to suit the construction method.	Till handover to NHAI at Termination of the Concession
2.4	Full set of Tests results	Till handover to NHAI at Termination of the Concession
2.5	The appropriate proprietary rights, licenses, agreements and permissions for materials, methods, processes and systems used or incorporated into the Project Highway.	Till handover to NHAI at Termination of the Concession

2.6	Monthly Progress Reports	Till handover to NHAI at Termination of the Concession.
3.	**Operations and Maintenance**	
3.1	Full records of all incidents which affect the operation and/or maintenance of the Project Highway including traffic accidents.	Till handover to NHAI at Termination of the Concession
3.2	Full records of inspections and surveys and results of such inspections and surveys (including photographs where applicable).	Till handover to NHAI at Termination of the Concession
3.3	Details of all repairs to the Project Highway and/or replacement, including photographs. As-built drawings and other documentary records.	Till handover to NHAI at Termination of the Concession
3.4	Full sets of all Monthly Reports	Till handover to NHAI at Termination of the Concession
3.5	Adequate records of adverse meteorological conditions.	Till handover to NHAI at Termination of the Concession
3.6	Records of landscape planting.	Till handover to NHAI at Termination of the Concession
3.7	Schedule and strip plan of grassed areas with details of the Routine Maintenance required in the normal course.	Till handover to NHAI at Termination of the Concession
3.8	Record of all permanent traffic signs on the Project Highway.	Till handover to NHAI at Termination of the Concession
3.9	All financial and accounting records to be maintained as per Applicable Laws	Till handover to NHAI at Termination of the Concession
3.10	Encroachment particulars and details	Till handover to NHAI at Termination of the Concession

4. All other records in accordance with the provisions of the Concession Agreement.

5. Additional Requirements

5.1 When there is a conflict between the Reporting and Record Requirement of Schedule 'X' and a requirement in respect of these stated elsewhere in this Agreement, the latter shall take precedence.

5.2 The requirements set out in Reporting and Record Requirements of this Schedule 'X' indicate the minimum requirements to be complied with but are not limited to else only.

5.3 Availability of Records shall be as follows.

5.3.1 All records of operational aspects of the record keeping system shall be retained.

5.3.2 Operations' Records shall be systematically and periodically up-dated and filed so as to be readily retrievable.

5.3.2 Operations' Records shall be systematically and periodically up-dated and filed so as to be readily retrievable.

5.3.3 All records which have been superseded but are still of historical, contractual or legal importance shall be retained and filed systematically so as to be available anytime.

5.3.4 Texts of all documents shall be prepared and recorded using agreed software systems and retained in hard form and on diskette, with full back-up diskettes available in case of diskette corruption.

SPV DETAILS

Ref: OBIL / BOT/ 2006 / 02

Date: 23/02/2006

General Manager (EW-II)
National Highways Authority of India
G-5 & 6, Sector – 10, Dwarka
New Delhi – 110 075

Kind Attn: Shri. B D Joshi

Sub: Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km. 255.00 on Orai-Bhognipur section on National Highway No.25 (NH-25) and of Km. 421.20 to Km. 449.00 on Bhognipur-Barah section on National Highway No.2 (NH-2) in the state of Uttar Pradesh on BOT Basis. – *Letter of Acceptance*

Ref : ***Your Letter of Acceptance – NHAI/EW-V/BOT/2005/429 Dated : 06th Jan, 20006***

Dear Sir,

We thank you for issuing us LOA for the said project.

we are pleased to inform you that SPV Company O B Infrastructure Limited is formed under Company Act, 1956 having its registered office at 41, Nagarjuna Hills, Punjagutta, Hyderabad for execution of project and we are submitting the following documents for your perusal:

1. Memorandum of Association of article O B Infrastructure Limited.
2. Certificate of Incorporation.
3. Legal Opinion of the Counsel with respect to the authority of the concessionaire to enter in to agreement.
4. General Power of attorney of O B Infrastructure Limited in favour of under signed

We shall be forwarding our comments of draft concession agreement shortly so that date for signing the agreement can be fixed.

Thanking you and assuring you of our best services at all times,

Yours faithfully,

for O B Infrastructure Limited

MUKESH TALHAN
CHIEF GENERAL MANAGER

Corporate Office: 41, Nagarjuna Hills, Punjagutta, Hyderabad - 500 082. Tel: 040-23351753, Fax: 040-23350214

O.B. INFRASTRUCTURE LIMITED

Ref: OBIL / BOT / 2006 / 03 — 22nd March, 2006

General Manager (EW-II)
National Highways Authority of India
G-5 & 6, Sector – 10, Dwarka
New Delhi – 110 075
Fax: 91-11-25093514 / 25093507

Kind Attn: Shri. B D Joshi, General Manager (EW-II)

Sub: Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km. 255.00 on Orai-Bhognipur section on National Highway No.25 (NH-25) and of Km. 421.20 to Km. 449.00 on Bhognipur-Barah section on National Highway No.2 (NH-2) in the state of Uttar Pradesh on BOT Basis. - *Letter of Acceptance*

Dear Sir,

This has reference to the discussions we had with you regarding observation made by the financial consultant. As desired, please find enclosed herewith copy of the following.

1. Copy of Board Resolution passed by Directors of NCC on 30th December, 2005
2. Copy of Board Resolution passed by Directors of KMC on 12th January, 2006
3. Copy of Memorandum of Association of OB Infrastructure Limited showing shareholding pattern in SPV.
4. Copy of Present share holding pattern in the SPV.
5. Certificate of commencement of business of OB Infrastructure Limited

As regards copy of MoU executed between consortium members, the same has already been submitted to NHAI along with the tender submission. The authorized capital of SPV is kept as Rs. 25 lakhs initially, which shall be increased as and when required and as per the requirements of the project.

We hope you will find the above in order, if you need any other information / clarification, we shall be pleased to provide the same.

Thanking you and assuring you of our best services at all times,

Yours faithfully,
for O B Infrastructure Limited

22/03/2006

MUKESH RATHAN
Authorise signatory

Corporate Office: Nagarjuna Hills, Panjagutta, Hyderabad - 500 082. Tel: 040 23301754 Fax: 040 23350214

NAGARJUNA CONSTRUCTION COMPANY LTD.

An ISO 9001 : 2000 Company

CERTIFIED COPY OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS HELD ON 30TH DECEMBER, 2005 AT THE REGISTERED OFFICE OF THE COMPANY

Formation of Special Purpose Vehicle for implementing the road project on BOT basis in the sate of Uttar Pradesh..

RESOLVED THAT the Company do promote a Special Purpose Vehicle for implementing the Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to km 225.00 on Bhognipur – Barach section on National Highway No. 25 (NH-25) and of km 421.00 to km 445.00 on Bhognipur-Barah section on National Highway No 2 (NH-2) in the sate of Uttar Pradesh on BOT Basis" if awarded to M/s NCC-KMC (Consortium)

RESOLVED FURTHER THAT the Company do make an application to the Office of the Registrar of Companies, Andhra Pradesh for making available any of the below mentioned names or such other names as may be recommended by the Company and approved by the Office of the Registrar of Companies, Andhra Pradesh

1. M/s. U P Infrastructure Ltd.,
2. M/s. O B Infrastructure Ltd,
3. M/s. N K Infrastructure Ltd.

RESOLVED FURTHER THAT the Company do subscribe initially Seven (Seven thousand) Equity Shares of Rs.10/- each on its own name and minimum number of Equity Shares of Rs.10/- each to be held in the names of its nominees in the aforesaid Special Purpose Vehicle for the purpose of maintaining the minimum number of subscribers as required under the Companies Act, 1956

RESOLVED FURTHER THAT Sri A Ranga Raju, Managing Director be named as the First Director on the Board of the Special Purpose Vehicle

RESOLVED FURTHER THAT Sri A Ranga Raju, Managing Director be and is hereby authorized to make necessary applications to the Office of the Registrar of Companies, sign and submit such documents as may be necessary for formation of the Special Purpose Vehicle and for implementing the above said decision of the Board

//CERTIFIED TRUE COPY//

For Nagarjuna Construction Company Ltd

M V Srinivasa Murthy

Company Secretary & G.M (Fin)

KMC Constructions Limited

CERTIFIED COPY OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS HELD ON 12TH JANUARY 2006, AT THE REGISTERED OFFICE OF THE COMPANY

Formation of Special Purpose Vehicle for implementing the road project on BOT basis in the state of Uttar Pradesh on BOT Basis

RESOLVED THAT the Company do promote a Special Purpose Vehicle for implementing the Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 225.00 on Bhognipur – Barach section on National Highway No. 25 (NH-25) and of km 421.00 to km 449.00 on Bhognipur-Barah section on National Highway No.2 (NH-2) in the state of Uttar Pradesh on BOT Basis awarded to M/s. NCC –KMC (Consortium)

RESOLVED FURTHER THAT the Company do make an application to the Office of the Registrar of Companies, Andhra Pradesh for making available any of the below detailed names or such other names as may be requested by the Company and approved by the office of the Registrar of Companies, Andhra Pradesh

1. M/s. U P Infrastructure Ltd.
2. M/s. O B Infrastructure Ltd.
3. M/s. N E Infrastructure Ltd.

RESOLVED FURTHER THAT the Company do subscribe initially 50,000/- (Fifty Thousand) Equity Shares of Rs. 10 - each on its own name

RESOLVED FURTHER THAT Sri. M. Pruthvi Kumar Reddy, Director be named as the First Director on the Board of the Special Purpose Vehicle

RESOLVED FURTHER THAT Sri. M. Pruthvi Kumar Reddy, Director be and is hereby authorized to make necessary applications to the Office of the Registrar of Companies, to sign and submit such documents as may be necessary for formation of the Special Purpose Vehicle and for implementing the aforesaid decision of the Board

//CERTIFIED TRUE COPY//

For KMC Constructions Ltd.

DIRECTOR

525

MCH No 555, Vijaya Colony, Road No 3, Banjara Hills, Hyderabad - 50
Tel: 23541388, 23541330, 23541331, 23541345 Fax: (040) 23541325
Website: www.thekmc.com E-mail: kmc_motor_corp@rediffmail.com

Memorandum of Association

and

Articles of Association

of

O B INFRASTRUCTURE LIMITED

प्रारुप आई आर
Form I
[See Regulation 16(1)]
निगमन का प्रमाण - पत्र

CERTIFICATE OF INCORPORATION

ता ..... का सं .....
No. 01- 49067 of 05 -- 2006

मैं एतद्द्वारा प्रमाणित करता हूं कि आज .....

.....

.....

कम्पनी अधिनियम, 1956 के आधीन निगमित की गई है यह कम्पनी परिसीमित है।

I hereby certify that O B INFRASTRUCTURE LIMITED

.....

.....

is this day incorporated under the Companies Act, 1956 * (and that the Company is limited.)

मेरे हस्ताक्षर से आज ता ..... को दिया गया।

Given under my hand at HYDERABAD this EIGHTH day of FEBRUARY Two thousand and SIX

(NINETEENTH MAGHA, 1927 SAKA)

CIN - U45200AP2006PTC49067

Seal
जे.एस.सी.
J.S.C - 1

(N.S.PONNUNAMBI)
कम्पनियों का रजिस्ट्रार
Registrar of Companies
Andhra Pradesh : Hyderabad.

O B Infrastructure Limited

INCORPORATED
UNDER THE COMPANIES ACT, 1956
(1 OF 1956)
COMPANY LIMITED BY SHARES
MEMORANDUM OF ASSOCIATION
OF
O B INFRASTRUCTURE LIMITED

I. The name of the Company is **O B INFRASTRUCTURE LIMITED.**

II. The Registered Office of the Company will be situated in the State of Andhra Pradesh.

III. The objects for which the Company is established are:

A. THE MAIN OBJECTS TO BE PURSUED BY THE COMPANY ON ITS INCORPORATION ARE:

1. To design, engineer, build, construct, erect, upgrade, repair, improve, strengthen, widen, develop, operate and maintain, own or control or transfer, including on 'build, operate and transfer' basis, annuity basis or otherwise, in India or in any part of world, either alone or jointly with others, all kinds of road projects, infrastructure projects, building projects, civil construction works and conveniences, (which expression in this Memorandum includes roads, road projects, national and international highways, express ways, bridges, airports, railways, tramways, docks, harbours, piers, wharves, canals, reservoirs, embankments, irrigations, reclamations, sewage, drainage, sanitary, water, thereof, terminals and other related facilities for storage, handling, supply and distribution thereof and rural developments, waterways, bridges, factories, mills, ships and vessels of all kinds) and to negotiate for and obtain, from the government, concessions, franchises, subsidies, grants, toll collection rights, aid or other assistance in furtherance of all or any of the above objects.

2. To construct, erect, commission, toll gates, toll collection points on road projects and highway projects and to own, operate, maintain, lease out and transfer the same.

3. To act as project managers, technical/management consultants, operation and maintenance contractors for infrastructure projects including power projects, highway and expressway projects.

O 3 Infrastructure Ltd

B. THE OBJECTS INCIDENTAL OR ANCILLARY TO THE ATTAINMENT OF THE MAIN OBJECTS:

1. To enter into any arrangement, agreement, contract, sub-contract, lease with Central or any State Government Departments and undertakings, municipality, Local Authority, Corporation, Cooperative society, Company, Partnership Firm, Person or Persons, individual or Group of individuals in furtherance of any objects of the company, to establish branches, work spots, site offices for purposes of carrying out the objects of the company and to act as consulting engineers, contractors, civil engineers, architects, designers, decorators, founders, Electrical Engineers and structural engineers.

2. To purchase take on lease or in exchange, for hire or otherwise acquire any immovable or movable property, any rights or privileges licenses or easement which the Company may think necessary or convenient with reference to any of these objects and capable of being profitably dealt with in connection with any of the Company's property or rights for the time being and to pay for the same out of the funds of the Company.

3. To acquire, enter into agreement, enter into partnership or into any arrangement for sharing profits, union of interests, co-operation, joint venture, reciprocal, concession or otherwise with any person or company carrying on or engage in any business or transaction capable of being conducted so as directly or indirectly to benefit the Company and to take or otherwise acquire shares and securities of any such companies and to sell, hold, with or without guarantee such shares or securities.

4. To invest and deal with the moneys of the Company not immediately required in such manner as may from time to time be determined, and in particular to invest money in lands, buildings, estates, plantations, mines, securities and other property, real and personal, movable and immovable, and generally to lend money on, or otherwise acquire mortgages, charges, bonds, obligations, loans, securities, and all other instruments upon such terms and conditions as may seem expedient.

5. To sell or dispose of the whole or any part of the undertaking and property or any or all of the assets, whether tangible or intangible, of the Company for cash or such other consideration as the Company may think fit and in particular for shares, debentures or securities of any other Company.

6. To lend money with or without security generally to such persons and upon such terms and conditions as may seen expedient, and in particular to persons having dealings with the Company or undertakings to build on or improve any property in which the Company is interested and to tenants, contractors, and others.

7. To receive money on deposit at interest, or otherwise and to make, draw, accept, endorse, discount, execute and issue, deposit receipts, promissory notes, bills of exchange, bills of lading, warrants, debentures and other negotiable or transferable securities or instruments.

8. To borrow and raise money for the Company's business in such manner as the Company thinks fit and in particular by mortgage or charge of the undertaking and all or any of the assets, movable and immovable property and un-called capital for the time being of the Company.

9. To issue shares, debentures, debenture stock, bonds, obligations, and securities of all kinds, and to frame, constitute and secure the same as may seem expedient, with full power to make the same transferable by delivery or by instrument of transfer or otherwise, and either perpetual or terminable, and either redeemable or otherwise, and to charge or secure the same by trust deed or otherwise, on the undertaking of the Company on upon any specified property and rights, present and future, of the Company or otherwise howsoever.

10. From time to time to subscribe or contribute to any charitable, benevolent or other objects of a public character, and also to political parties or for political purposes subject to the Provisions of Section 293A and other applicable Provisions if any, of the Companies Act, 1956.

11. To establish agencies, appoint or employ representatives, collaborators, distributors, commission agents, either in India or foreign countries for the manufacture, sale, purchase, exchange, hire or distribution, supply or for carrying out of the aforesaid main objects of the company and to regulate and discontinue the same and to provide for the remuneration of such person for their services by payment in cash or by the issue of shares, debentures or other securities of the Company.

12. To acquire and carry on all or any part of the business or property and or undertake any liabilities of any person, firm association or Company possessed of property suitable for any of the purposes of this Company or carrying on any business which the Company is authorized to carry on, and upon any terms and for any consideration and in particular for cash or consideration of the issue of shares stocks or obligations of the Company.

13. To amalgamate with or enter into any arrangement for sharing profits, joint ventures reciprocal concessions or arrangements of a like nature with other persons or companies or partnership concerns of Government undertaking carrying on any similar or other business.

14. To undertake, promote, assist or engage in all kinds of research and development work and to set up laboratories, purchase and acquire any instruments required for the same and/or give endowments, scholarships or any other assistance either monetary or otherwise to whomsoever for the purpose in India or outside India.

15. To grant bonus, allowances gratuities, pensions and to provide any other amenities to the employees, ex-employees of the Company and/or other dependents and to support or

O B Infrastructure Ltd.

National ... University of India New Delhi

subscribe to any charitable bodies and institution, societies or charitable or benevolent funds and to support and subscribe to any national or public object and any institutions which may be for the benefit of the Company or its employees or may be connected with any town or place where the Company carries business and contribute to provident and benefit funds for the benefit of any person employed.

16. To accumulate capital, reserves, or create any depreciation fund, reserve fund sinking fund or any special or other fund for any purposes of the Company, for repairing, improving, extending or maintaining any of the properties of the Company of for repayment of debentures of redeemable preference shares.

17. Subject to provisions of the Companies Act, 1956 and the rules framed there under and the directives issued by the RBI, as may applicable, to borrow or raise money or to receive money on deposit at interest or otherwise in such manner as the Company may think fit from members, Directors, Banks, Financial Institutions, and in particular by the issue of debenture perpetual or otherwise including debentures convertible into shares of this Company and in security of such money so borrowed, raised or received to mortgage, pledge or charge the whole or any part of the property assets or revenue of the Company, present of future, including uncalled capital by special assignment or otherwise or to transfer or convey the same absolutely or in trust and to give the lenders power of sale and other powers as may seem expedient and to purchase redeem or pay off any such securities.

18. To pay out of the funds of the Company all costs charges and expenses preliminary and incidental to the promotion, establishment and registration of the Company.

19. To sell and dispose of property, assets or undertaking of the Company for any consideration including shares, debentures or securities of any other Company having objects altogether, or in part similar to those of the Company or otherwise.

20. To undertake and execute any Trusts which may seem beneficial to the Company and to vest its property in such trust(s) which may seem to the Company desirable either gratuitously or otherwise.

21. To apply for purchase or otherwise acquire any parents, patent rights, brevets d' invention, copy rights, trade marks formula, licenses, concessions and the like subject to or royalty or otherwise, conferring any exclusive or non-exclusive or limited rights to use any secret or other information as to any invention which may seem capable of being used for any of the purposes of the Company or the acquisition of which may seem directly or indirectly to benefit the Company and to use, exercise and develop or grant license in respect of or otherwise turn to account the property, rights or information so acquired.

22. To train or pay training in India or abroad of the Company's employees, Directors or others in the interest of the Company's business.

23. To send out to foreign countries Directors, employees or any other persons for investigating possibilities of any business, trade or procuring and buying any machinery or establishing trade connections or in promoting the interest of the Company and to pay all expenses incurred in this connection.

24. To open accounts with any individual firm, company or bank and to pay into and to withdraw money from such accounts.

25. To do all such other things as may be deemed incidental or conducive to the attainment of the above objects or any of them.

C. OTHER OBJECTS:

1. To carry on the business of decorators, merchants, and dealers in stone, sand, lime, cement, bricks, timber, hardware, and other buildings requisites, brick and tile and terra cotta makers, job masters, carriers, licensed victuallers, and house agents, and to develop and turn to account any land acquired by or in which the Company is interested, and in particular by laying out and preparing the same for building purposes, constructing, altering, pulling down, decorating, maintaining, furnishing, fitting up and improving buildings, and by planting, paving, draining, farming, cultivating, letting on buildings lease or building agreement, and by advancing money to and entering into contracts and arrangements of all kinds with builders, tenants and others.

2. To carry on the business of manufacturers of, makers of, dealers in, distributors, hirers and repairers of articles or goods of any description relating to or made or prepared with concrete and all or any materials and things used for or in connection with the manufacture, making, dealing in distributing, hiring and repair of such concrete articles or goods.

3. To import, export, buy, sell, let on hire, exchange, alter, improve, manipulate, process, prepare for market and otherwise deal in or distribute all kinds of merchandise goods, articles, machinery and components of any kind whatsoever including agricultural, agro-based materials, all kinds of chemicals (organic or inorganic), plastic goods, synthetic products, electric goods, engineering goods, tools, machines, parts or any other marketable commodities whatsoever.

4. To buy, sell, import, export, produce, manufacture, manipulate, treat, prepare and deal in all kinds of hardware goods, pipe and pipe-fittings, electrical equipment's, metals, pulp and paper textiles, wood and timbers, machinery, tools, motors, automobiles, stationery drugs, chemicals, dyes, colors, iron and steel, radios, rubber, tea cereals, oils, cotton, wool jute, hemp, sugar, spirits, wines, subject to the law in force, minerals, cement, leather goods, photographic materials, furniture, surgical and scientific instruments, hospital instruments and appliances glass, earthen, crockery, cosmetics, toilets, hosiery goods, paints, varnishes, optical, plastic goods, bullion, shares and securities.

5. To manufacture, import, export, buy, sell and deal in all raw materials and other substances used in the manufacture production or treatment of any product or other substance articles and things the manufacture of which the company is authorized to undertake and to turn to account render marketable and del in any of the by-products of manufacturing process which the company may undertake.

6. To carry on business as manufacturers, assemblers, repairers and converters of machinery and equipments, engineers in all its respective branches including marine, chemical, civil structural mechanical and electrical and electronic and aeronautic, metallurgical, engineering, tool makers, machinists, moulds, pattern makers, railway, public, works and general contractors, boiler makers, owners, sellers, builders manufacturers, repairers, converters and letter for hire of ship, steam launches, vessels and boats of every description, bridge builders, mill wrights, iron masters, welders, iron and steel makers, tin plate makers, forgers, metal founders in all their respective branches, galvanisers, annealers, enamellers, electroplaters, and job masters and as manufacturers of and dealers in rolling stock, implements, tools, utensils and apparatus of all kinds.

7. To invest, apply for, and acquire, or otherwise employ monies belonging to or entrusted with the Company upon debentures securities and shares in Investment Trusts, Banks and Insurance Companies and other Limited Companies upon such terms as may from time to time be considered proper.

8. To establish or to promote or concur in establishing or promoting any company or companies including floating of subsidiaries for carrying on the business activities of the company or for any other related purposes by way of acquisition of all of the property, rights and liabilities of such companies or subscription to or otherwise acquisition of all or any part of the shares, debentures, debenture stock or other securities of such companies is due compliance with the permissible laws for the time being in force.

9. Generally to do all such other things as may appeal to be incidental and is in any way conducive to the attainment of the above objects or any of them."

IV. The Liability of the members of the Company is limited.

V. The Authorised Share Capital of the Company is Rs.25,00,000 (Rupees Twenty Five Lakhs only) divided into 2,50,000 (Two Lakhs Fifty Thousand) Equity Shares of Rs.10/- each (Rupees Ten only) to be increased or reduced in accordance with the Companies Act, 1956 and the Memorandum as and when thought fit by the Board of Directors.

IL&FS Infrastructure Ltd.

National Highways Authority of India ★ New Delhi ★

VI. We the several persons whose names and addresses are subscribed hereto, are sdesirous of being formed into a Company in pursuance of this Memorandum of Association and we respectively agree to take the number of shares in the capital of the Company set opposite our respective names:

Sl. No.	Name, Addresses, Description and Occupation of subscribers with their signatures	Number of Equity Shares taken by each subscriber	Signature, Name, Address, Description and Occupation of Witness
1.	SD/- NAGARJUNA CONSTRUCTION CO. LTD. Rep. by: A Ranga Raju S/o Sri A.V.S.Raju 41, Nagarjuna Hills, **HYDERABAD – 500 082.** Occ: LIMITED COMPANY	50,000 (Fifty thousand only)	SD/- S SREENIVAS S/o.Sri S D Sarma 12-2-709-C-60 Padmanabha Nagar HYDERABAD – 500 028 Occ: Company Executive
2.	SD/- A RANGA RAJU S/o.A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS	100 (One Hundred only)	
3.	SD/- A G K RAJU S/o. Sri A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS	100 (One Hundred only)	
4.	SD/- M V SRINIVASA MURTHY S/o. Late Sri M V Subrahmanyam Flat No 201, Padmaja Towers Plot No 51, Srinagar Colony **HYDERABAD – 500 073.** Occ: Service	100 (One Hundred only)	

5.	SD/- Y D MURTHY S/o. Sri. Y J Rao Flat No.904, Srinath Complex, S.D Road, **SECUNDERABAD – 500 003.** **Occ: Service**	100 (One Hundred only)	
6.	SD/- A S N Raju S/o. Sri A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS	100 (One Hundred only)	SD/- S SREENIVAS S/o Sri S D Sarma 12-2-709-C-60 Padmanabha Nagar HYDERABAD – 500 028 Occ: Company Executive
7.	SD/- K M C CONSTRUCTION Limited Rep by: M.Pruthvi Kumar Reddy MCH No.555, Arora Colony, Road No.3, Banjara Hills, Hyderabad – 500 034. Occ: Limited Company.	50,000 (Fifty Thousand Only)	
Total no. of Equity Shares taken		100500 (One Lakh Five Hundred Only)	

Date: 02.02.2006
Place: Hyderabad

O B Infrastructure Ltd.

National Highways Authority of India
New Delhi

INCORPORATED

UNDER THE COMPANIES ACT, 1956

(1 OF 1956)

COMPANY LIMITED BY SHARES

ARTICLES OF ASSOCIATION

OF

O B INFRASTRUCTURE LIMITED

1. Constitution

The Regulations contained in Table 'A' of the First Schedule to the Companies Act, 1956, shall not apply to the Company except in so far as they are embodied in the following articles which shall be the regulations for the management of the Company.

2. Definitions

In these presents, the following words and expressions shall have the following meanings, unless excluded by the subject or context:

(a) 'The Act' means 'The Companies Act, 1956' and any amendment thereto or re-enactment thereof.

(b) 'The Company' or 'This Company' means O B Infrastructure Limited.

(c) 'Directors' means the Directors for the time being of the Company or as the case may be the Directors assembled at a Board Meeting.

(d) 'In writing' includes printing, lithography, typewriting and any other usual substitutes for writing.

(e) 'Members' shall mean Members of the Company holding a share or shares of any class and registered in the Share Register of the Company.

O B Infrastructure Ltd.

(f) 'Month' shall mean the Calendar Month.

(g) 'The Office' means the Registered Office of the Company.

(h) 'Paid Up' shall include "Credited as fully paid up".

(i) 'Persons' shall include any Corporation as well as individuals.

(j) 'Proxy' includes attorney duly constituted under a Power of Attorney.

(k) 'These Presents' or 'Regulations' means these Articles of Association as originally framed or altered from time to time and in force for the time being and include the Memorandum of Association where the context so requires.

(l) 'The Register' shall mean the Register of Members to be kept as required under the provisions of the Act.

(m) 'The Seal' means the Common Seal for the time being of the Company.

(n) 'Special Resolution' shall have the meaning assigned thereto by Section 189 of the Act.

(o) Words importing the singular shall include the plural, and words importing the plural shall include the singular.

(p) 'Section' means Section of the Companies Act, 1956.

(q) 'Year' means year of account of the company.

3. CAPITAL

The Authorised Share Capital of the Company is Rs.25,00,000/- (Rupees Twenty Five Lakhs only) divided into 2,50,000 (Two Lakhs Fifty Thousand) Equity Shares of Rs.10/- (Rupees Ten only) each.

4. Alteration and consolidation of Capital

The Company may from time to time but subject to the provisions of the Act, alter the conditions of its Memorandum as follows:

(a) Increase its share capital by such amount as it thinks expedient by issuing new shares.

(b) Consolidate and divide all or any of its share capital into shares of larger amount than its existing shares.

(c) Subdivide its shares, or any of them, into shares of smaller amount than is fixed by the Memorandum, so however, that in the sub-division the proportion between the amount, if

any unpaid on each reduced share shall be the same as it was in the case of other share from which the reduced share is derived.

(d) Cancel any shares which, at the date of the passing of the resolution in that behalf, have not been taken or agreed to be taken by any person, and diminish the amount of its share capital by the amount of the shares so cancelled.

(e) The resolutions whereby any share is subdivided may determine that, as between the holders of the shares resulting from such sub-division one or more of such shares shall have some preference or special advantage as regards dividend, capital, voting or otherwise over or as compared with the others.

5. Reduction of capital etc. by Company

The Company may, by Special Resolution, reduce in any manner and with, and subject to, any incident authorised and consent required by law:

(a) its share capital
(b) any capital redemption reserve account; or
(c) any share premium account

6. Boards' right to issue shares

The Board may, at its discretion, may issue any part or parts of the unissued shares upon such terms and conditions and with such privileges annexed thereto as the Board at its discretion and subject to the provisions of the Act, thinks fit, and in particular may issue such shares with such preferential or qualified right to dividends and in the distribution of the assets of the Company as the Board may subject to the aforesaid section determine. The Board shall have the right to issue shares/securities/ other financial instruments on preferential basis subject to the compliance of applicable rules, regulations and statutory provisions prescribed in this regard from time to time

7. Power of General Meeting to offer shares to such persons as the Company may resolve.

In addition to and without derogating from the powers for that purpose conferred on the Board under these Articles the Company in General Meeting, subject to the provisions of the Act and the Regulations framed by the Securities and Exchange Board of India (SEBI) and/or any other Statutory Authority may determine that any shares (whether forming part of the original capital or of any increased capital of the Company) shall be offered to such persons (whether members holders of debentures of the Company or not) in such proportions and on such terms and conditions and either at a premium or at par, or at a discount, such option being exercisable at

such times and for such consideration as may be directed by such General Meeting or the Company in General Meeting may make any other provisions whatsoever for the issue, allotment or disposal of any shares.

8. Variation of rights

The rights attached to each class of shares (unless otherwise provided by the terms of issue of the shares of that class) may, subject to the provision s of the Act be varied with the consent in writing of the holders of three-fourths of the issued shares of that class or with the sanction of a special resolution passed at a separate meeting of the holders of the shares of that class. To every such separate meeting, the provisions of these Articles relating to General Meetings shall mutatis mutandis apply, except that the necessary quorum shall be five persons at least holding or representing by proxy one-tenth of the issued shares of that shares.

9. Issue of further shares pari passu shall not affect the right of shares already issued.

The rights conferred upon the holders of the shares of any class issued with preferred or other rights shall not, unless otherwise expressly provided for by the terms of issue of the shares of that class, be deemed to be varied by the creation or issue of further shares ranking pari passu therewith.

10. No issue with disproportionate rights.

The Company shall not issue any shares, not being Preference Shares, which carry voting rights or right in the Company as to dividend, capital or otherwise which the disproportionate to the rights attached to the holders of other shares not being preference shares.

11. Commission for placing shares, debentures etc.

(a) Subject to the Provisions of the Act the Company may at any time pay a commission to any person for subscribing or agreeing to subscribe (whether absolutely or conditionally) for any shares or debentures, of the Company or procuring or agreeing to procure subscriptions (whether absolute or conditional) for shares or debentures for the Company.

(b) The Company may also in any issue, pay such brokerage as may be lawful.

12. Issue other than for cash

The Directors may subject to the provisions contained in the Act, or any other applicable Statutory Regulations allot and issue shares in the Capital of the company as payment or part payment for any property sold or transferred, goods or machinery and appliances supplied, or for services rendered to the Company in or about the formation or promotion of the company or the acquisition and or conduct of its business; or for the services rendered by the Promoters/Directors by way of Sweat Equity as permitted under the Act, or to the Employees under the Stock Option Scheme

O B Infrastructure Ltd.

National Highways Authority of India New Delhi

framed in pursuance of the Employees Stock Option Regulations framed by SEBI or any other Statutory Authority and any shares which may be so allotted, may be issued as fully paid up or partly paid up shares.

13. Joint Holders of Shares

Where two or more persons are registered as joint holders of any share they shall be deemed to hold the same as joint tenants with benefit of survivorship subject to the following provisions.

(a) The person whose name stands first on the register in respect of such shares shall alone by entitled to delivery of certificate thereof;

(b) Any one of such persons may give effectual receipts for any dividend, bonus or return of capital payable in respect of such share, and such joint holders shall be severally, as well as jointly liable for payment of all installments and calls due in respect of such share/shares.

(c) Any one of such persons may vote at any meeting either personally or by proxy in respect of such shares, as if he were solely entitled thereto, and if more than one of such joint holders be present at any meeting personally or by proxy, that one of the said persons so present whose name stands first on the register in respect of such shares, shall alone be entitled to vote in respect thereof. Several executors or administrators, of a deceased member in whose names any share stands shall for the purpose of this article, be deemed joint holders, thereof.

(d) In case of death of any one or more of such joint holders, the survivors shall be the only persons recognised by the company as having any title to or interest in such share, but the Directors may require such evidence of death, as they may deem fit; and nothing herein contained shall be taken to release the estate of deceased joint holder from any liability on shares held by him jointly with any other person.

(e) all notices directed to be given to the members shall be given to whichever such persons is named first in the register, and notice so given shall be sufficient notice to all the holders of such shares.

SHARE CERTIFICATES

14. Issue of Share Certificates

Every Certificate of title to shares shall be issued under the seal of the company. Every share certificate and every document of title to the shares whether in renewal of an existing share certificate or other document of title or issued for the first time shall issue, under the authority of the Board of Directors and in accordance with provisions of the Company (Issue of Share Certificates) Rules, 1960 or any modification thereof and in accordance with the provisions of

Law or other rule having the force of law applicable thereto.

15. Company's lien on shares

The Company shall have a first and paramount lien upon all the shares (other than fully paid-up shares) registered in the name of each member (whether solely or jointly with others) and upon the proceeds of sale thereof for all moneys (whether presently payable or not) called or payable at a fixed time in respect of such shares and no equitable interest in any shares shall be created except upon the footing and the condition that this Article will have full effect. And such lien shall extend to all dividends and bonuses from time to time declared in respect of such shares.

16. Buy Back of shares and other securities

Notwithstanding the restrictions contained in these Articles the Company may subject to the provisions of Section 77A, 77AA and 77B and other provisions of the Act or any amendment thereto buy back its shares or other securities up to such limit and on such terms as stipulated in the said Sections 77A, 77AA and 77B or any amendment thereto.

CALLS ON SHARES

17. Calls

Subject to the provisions of Section 91 of the Act, the Board of Directors may from time to time make such calls as they think fit upon the members in respect of all moneys unpaid on the shares held by them respectively and not by the conditions of allotment thereof made payable at fixed times, and each member shall pay the amount of every call so made on him to the persons and at the date, time and place or at the dates times and places appointed by the Board of Directors.

18. Calls when deemed to be made

The Board of Directors, may when making a call by resolution, determine the date on which such call shall be deemed to have been made not being earlier than the date of resolution making such call, and thereupon the call shall be deemed to have been made on the date so determined and if no such date is fixed the call shall be deemed to have been made on the date on which the resolution of the board making the call was passed.

19. Notice for call

Not less than 'fourteen days' notice of any call shall be given specifying the date, time and place of payment provided that before the time for payment of such call, the Directors may, by notice in writing to the members, extend the time for payment thereof.

20. Sums payable at fixed date to be treated as calls

If by the terms of issue of any share or otherwise any amount is made payable at any fixed date or by instalments at fixed dates whether on account of the share or by way of premium, every such amount or instalment shall be payable as if it were a call duly made by the directors and of which due notice had been given, and all the provisions herein contained in respect of calls shall relate to such amount or instalment accordingly.

21. Calls to carry interest

(a) If a sum called in respect of the shares is not paid before or on the day appointed for payment thereof, the person from whom the sum is due shall pay interest upon the sum at such rate fixed by the Board of Directors from the day appointed for the payment thereof to the time of the actual payment, but the Board of directors shall be at liberty to waive payment of that interest wholly or in part.

(b) The provisions of this Article as to payment of interest shall apply in the case of non-payment of any sum which by the terms of issue of a share becomes payable at a fixed date, whether on account of the amount of the share or by way of premium, as if the same had become payable by virtue of a call duly made and notified.

22. Payment on calls in advance

The Board of Directors may, if they think fit, receive from any member willing to advance the same, all or any part of the moneys uncalled and unpaid upon any share held by him, and upon all or any part of the moneys so advanced, may (until the same would, but for such advance, become presently payable) pay interest at such rate as permitted under law from time to time and as may be agreed upon between the member paying the sum in advance and the Board of Directors but shall not in respect of such advances confer a right to the dividend or to participate in profits or to any such voting rights.

FORFEITURE OF SHARES FOR NON PAYMENT OF CALLS

23. If call or instalment not paid notice may be given

If a member fails to pay any call or instalment of a call on the day appointed for the payment thereof, the Board of Directors may at any time thereafter during such time as any part of such a call or instalment remains unpaid serve a notice on him requiring payment of so much of the call or instalment as unpaid, together with any interest, which may have accrued.

24. Form of notice of forfeiture

The notice shall name a further day (not earlier than the expiration of fourteen days from the date of service of the notice), on or before which the payment required by the notice is to be made, and

shall state that, in the event of non-payment on or before the day named, the shares, in respect of which the call was made will be liable to be forfeited.

25. Board's right to forfeit if requirements of notice are not complied with

If the requirements of any such notice as aforementioned are not complied with, any share in respect of which the notice has been given may at any time thereafter before the payment required by the notice has been made, be forfeited by a Resolution of the Board of Directors to that effect, such forfeiture shall include all dividends declared in respect of the forfeited shares, and not actually paid before the forfeiture.

26. Sale of forfeited shares

A forfeited share may be sold or otherwise disposed of on such terms and in such manner as the Board of Directors may think fit, and at any time before a sale or disposition, the forfeiture may be cancelled on such terms as the Board of Directors may think fit.

27. Liability after forfeiture

A person whose shares have been forfeited shall cease to be member in respect of the forfeited shares but shall notwithstanding the forfeiture remain liable to pay and shall forthwith pay the company all monies which at the date of forfeiture were presently payable by him to the Company in respect of the shares, but his liability shall cease if and when the Company received payment in full of the nominal amount of shares whether legal proceeding for the recovery of the same had been barred by limitation or not.

28. Declaration of forfeiture

A duly verified declaration in writing that the declarant is a Director/Secretary of the Company and that a share in the company has been duly forfeited on a date stated in the declaration shall be conclusive evidence of the facts therein stated as against all persons claiming to be entitled to the shares and that declaration and receipt of the company for the consideration, if any given for the shares on the sale or disposition thereof, disposed of shall be registered as the holder of the share and shall not be bound to see to the application of the purchase money (if any) nor shall his title to the shares be affected by way of irregularity or invalidity in the proceedings in reference to the forfeiture, sale or disposal of the shares.

29. Non-payment of sums payable at fixed times

The provisions of these Regulations as to forfeiture shall apply in the case of non-payment of any sum which by the terms of issue of a share, become payable at a fixed time, whether on account of the amount of the share or by way of premium or otherwise as if the same had been payable by virtue of a call duly made and notified.

O B Infrastructure Ltd.

National Highways Authority of India New Delhi

TRANSFER & TRANSMISSION OF SHARES

30. Procedure as to transfer of Shares

(a) The instrument of transfer of any shares in the Company shall be executed both by the transferor and the transferee and the transferor shall be deemed to remain holder of the shares until the name of the transferee is entered in the register of members in respect thereof. The instrument of transfer shall be in respect of only one class of shares and should be in the form prescribed under the Act.

(b) The Board of Directors shall not register any transfer of shares unless a proper instrument of transfer duly stamped and executed by the transferor and the transferee has been delivered to the Company along with the certificate relating to the shares and such other evidence as the company may require to prove the title to the transferor or his right to transfer the shares. Provided that where it is provided to the satisfaction of the Board of Directors that an instrument of transfer signed by the transferor and transferee has been lost, the company may, if the Board of Directors, think fit, on an application in writing made by the transferee and bearing the stamp required on an instrument of transfer, register the transfer on such terms as to indemnity, as the Board of Directors may think fit.

(c) An application for the registration of the transfer of any share or shares may be made either by the transferor or by the transferee, provided that where such application is made by the transferor no registration shall in the case of partly paid shares be effected unless the Company gives notice of the application to the transferee and the Company shall, unless objection is made by the transferee within two weeks from the date of receipt of the notice, enter in the register the name of the transferee in the same manner and subject to the same conditions as if the application for registration was made by the transferee.

(d) For the purpose of sub clause (3) Notice to the transferee shall be deemed to have been duly given if despatched by prepaid registered post to the transferee at the address given in the instrument of transfer and shall be deemed to have been delivered in the ordinary course of post.

(e) Nothing in clause (4) shall prejudice any power of the Board to register as a shareholder any person to whom the right to any share has been transmitted by operation of law.

(f) Nothing in this Article shall prejudice the power of the Board of Directors to refuse to register the transfer of any shares to a transferee, whether a member or not.

31. Board's right to refuse to register

(a) Subject to the provisions of Section 111 of the Act, and Section 22A of the Securities Contracts (Regulations) Act, the Board may at any time in their absolute discretion and without assigning any reasons decline to register any transfer of or transmission by

operation of law of the right to a share whether paid fully or not and whether the transferee is a member of the Company or not and may also decline to register any transfer of shares on which the Company has a lien.

Provided further that the registration of transfer shall not be refused on the ground of the transferor being alone or either jointly with any other person or persons indebted to the Company on any account except a lien on the shares.

(b) If the Board refuses to register any transfer or transmission of right, they shall within one month from the date on which the instrument of transfer or the intimation of such transmission was delivered to the Company send notice of the refusal to the transferee and transferor or to the person giving intimation of such transmission, as the case may be.

32. Register of Members

The Company shall keep a book to be called the "Register of Members" and therein shall be entered the particulars of every transfer or transmission of any shares and all other particulars of shares required by the Act to be entered in such Register.

33. Transmission of Registered Shares

(a) The Executors or administrators of a deceased member (not being one of several joint holders) shall be the only persons recognised by the company, as having any title to the Shares registered in the name of such member and in the case of death of any one or more the joint holders of any registered shares, the survivors shall be only persons recognised by the Company as having any title to or interest in such shares.

(b) Nothing in clause (i) shall release the estate of a deceased joint holder from any liability in respect of any shares which ere jointly held by him with other persons.

34. Rights and liabilities of legal representatives

(a) Any person becoming entitled to a share in consequence of the death or insolvency of a member may, upon such evidence being produced as may from time to time be required by the Board and subject as hereinafter provided, elect either:

i) to be registered himself as holder of the shares; or

ii) to make such transfer of the share as the deceased or insolvent member could have made.

(b) The Board shall, in either case, have the same right to decline or suspend registration as they would had had, if the deceased or insolvent member had transferred the shares before his death or insolvency.

DEMATERIALISATION OF SECURITIES

35. Definitions

For the purpose of Articles 35 to 43 the following words and expressions shall have the following meanings:

'Beneficial Owner' means a person(s) whose name is recorded as such with a depository;

'SEBI' means the Securities & Exchange Board of India;

'Depositary' means a company formed and registered under the Companies Act, 1956 and which has been granted a certificate of registration to act as a depository under the Securities & Exchange Board of India Act, 1992; and

'Security' means such security as may be specified by SEBI from time to time.

36. Dematerialisation of Securities

Notwithstanding anything contained in these Articles, the Company shall be entitled to dematerialise its securities and to offer securities in a dematerilised form pursuant to the Depositories Act, 1996.

37. Option for Investors

Every person subscribing to securities offered by the Company shall have the option to receive security certificates or to hold the securities with a depository. Such a person who is the beneficial owner of the securities can at any time opt out of a depository, if permitted by the law, in respect of any security in the manner provided by the Depositories Act, and the company shall, in the manner and within the time prescribed, issue to the beneficial owner the required certificates of securities.

If a person opts to hold his security with a depository, the Company shall intimate such depository the details of allotment of the security, and on receipt of the information, the depository shall enter in its record the name of the allottee as the beneficial owner of the security.

38. Securities in Depositories to be in fungible form

All securities held by a depository shall be dematerialised and be in fungible form. Nothing contained in Sections 153, 153A, 153B,187B, 187C and 372Aof the Act shall apply to a depository in respect of the securities held by it on behalf of the beneficial owners.

39. Rights of Depositories and Beneficial Owners

(a) Notwithstanding anything to the contrary contained in the Act or these Articles, a depository shall be deemed to be the registered owner for the purposes of effecting transfer of ownership of security on behalf of the beneficial owner.

(b) Save as otherwise provided in (1) above, the depository as the registered owner of the securities shall not have any voting rights or any other rights in respect of the securities held by it.

(c) Every person holding securities of the Company and whose name is entered as the beneficial owner in the records of the depository shall be deemed to be a member of the Company. The beneficial owner of securities shall be entitled to all the rights and benefits and be subject to all the liabilities in respect of his securities which are held by a depository.

40. Service of Documents

Notwithstanding anything in the Act or these Articles to the contrary, where securities are held in a depository, the records of the beneficial ownership may be served by such depository on the Company be means of electronic mode or by delivery of floppies or discs.

41. Transfer of Securities

Nothing contained in Section 108 of the Act or these Articles shall apply to a transfer of securities effected by a transferor and transferee both of whom are entered as beneficial owners in the records of a depository.

42. Allotment of Securities dealt with in a Depository

Notwithstanding anything in the Act or these Articles, where securities are dealt with by a depository, the Company shall intimate the details thereof to the depository immediately on allotment of such securities.

43. Distinctive numbers of Securities held in a Depository

Nothing contained in the Act or these Articles regarding the necessity of having distinctive numbers for securities issued by the Company shall apply to securities held with a depository.

44. Register of Index of Beneficial Owners

The Register and Index of beneficial owners maintained by a depository under the Depositories Act, 1996, shall be deemed to be the Register and Index of Members and Security-holders for the purposes of these Articles.

547

DIRECTORS

45. Board of Directors

a) The number of Directors of the Company shall not be less than three and not more than twelve.

b) The following persons shall be the first Directors of the Company.

(1) Mr. A Ranga Raju
(2) Mr. A G K Raju
(3) Mr. M.Pruthvi Kumar Reddy

46. Share qualification not necessary

Any person whether a member of the Company or not may be appointed as Director and no qualification by way of holding shares shall be required of any Director.

47. Directors' power to fill up casual vacancy

Any casual vacancy occurring in the Board of Directors may be filled up by the Directors, and the person so appointed shall hold office up to the date up to which the Director in whose place he is appointed would have held office if he had not been vacated as aforesaid.

48. Additional Directors

The Board of Directors shall have power at any time, and from time to time to appoint one or more persons as Additional Directors. An Additional Director so appointed shall hold office up to the date of the next annual general meeting, but he shall be eligible for election by the Company at that Meeting.

49. Alternate Directors

The Board of Directors may appoint an Alternate Director to act for a Director (hereinafter called the original Director) during the absence of the original Director for a period of not less than three months from the State in which the meetings of the Board are ordinarily held. An Alternate Director so appointed shall vacate office if and when the original Director returns to the State in which meetings of the board are ordinarily held. If the term of office of the original Director is determined before he so returns to the State aforesaid, any provision for the automatic reappointment of retiring Director in default of another appointment shall apply to the original, and not to the Alternate Director.

50. Remuneration of Directors

Every Director other than the Managing Director and the Whole-time Director shall be paid a sitting fee not exceeding such sum as may be prescribed by the Act or the Central Government from time to time for each meeting of the Board of Directors or any Committee thereof attended by him and shall be paid in addition thereto all travelling, hotel and other expenses properly incurred by him in attending and returning from the meetings of the Board of Directors or any Committee thereof or General Meetings of the company or in connection with the business of the Company to any from any place.

51. Remuneration for extra services

If any Director being willing, shall be called upon to perform extra services or to make any special exertions in going or residing away from the town in which the Registered Office of the Company may be situated for any purposes of the Company or in giving special attention to the business of the Company or as a member of the Board, then subject to the provisions of the Act the Board may remunerate the Director so doing either by a fixed sum or by a percentage of profits or otherwise and such remuneration may be either in addition to or in substitution for any other remuneration to which he may be entitled.

52. Continuing Directors may act

The continuing Directors may act notwithstanding any vacancy in the Board but if and so long as their number is reduced below three, the continuing Directors or Director may act for the purpose of increasing the number of Directors to three or for summoning a General Meeting of the company but for no other purpose.

53. Vacation of office of Director

The Office of a Director shall be deemed to have been vacated under the circumstances enumerated under Section 283 of the Act.

54. Equal power to Directors

Except as otherwise provided in these Articles all the Directors of the company shall have in all matters equal rights and privileges and be subject to equal obligations and duties in respect of the affairs of the Company.

ROTATION OF DIRECTORS

55. (a) Not less than one-third of the total number of the Directors of the Company for the time being holding office shall be directors whose period of office is liable to be determined by retirement by rotation and who shall be appointed by the Company in General Meeting.

O B Infrastructure Ltd

National Highways Authority of India
New Delhi

(b) At the first Annual General Meeting of the Company the whole of the Board of Directors excepting the Managing Director and Whole Time Director shall retire from office and at the Annual General Meeting in every subsequent year, one third of such of the Directors as are liable to retire by rotation for the time being or if their number is not three or multiple of three, the number nearest to one-third shall retire from office.

56. Retiring Directors eligible for re-election

A retiring Director shall be eligible for re-election and the Company, at the Annual General Meeting at which a Director retires in the manner aforesaid may fill up the vacated office by electing a person thereto.

57. Which Director to retire

The Directors to retire in every year shall be those who have been longest in office since their last election, but as between persons who became directors on the same day, those to retire shall unless they otherwise agree among themselves be determined by lots.

58. Retiring Director to remain in office till successors appointed

Subject to the provisions of the Act, if at any meeting at which an election of Directors ought to take place, the place of the vacating Director(s) is not filled up and the meeting has not expressly resolved not to fill up the vacancy, the Meeting shall stand adjourned till the same day in the next week at the same time and place or if that day is a public holiday till the next succeeding day which is not a public holiday at the same time and place, and if at the adjourned meeting the place of the retiring Director(s) is not filled up and the Meeting has also not expressly resolved not to fill up the vacancy then the retiring director(s) or such of them as have not had their places filled up shall be deemed to have been re-appointed at the adjourned meeting.

59. Power to remove Directors by ordinary resolution

Subject to the provisions of the Act, the Company may by an ordinary resolution in General meeting remove any Director before the expiration of his period of office, and may by an ordinary resolution appoint another person instead; the person so appointed shall be subject to retirement at the same time as if he had become a Director on the day on which the Director in those whose place he is appointed was last elected as Director.

60. Right of persons other than retiring Directors to stand for Directorship

A person not being a retiring Director shall be eligible for appointment to the office of a Director at any General Meeting if he or some other member intending to propose him as a Director not less than 14 days before the meeting has left at the office of the Company a notice in writing under the hand signifying his candidature for the office of the Director or the intention of

O3 Infrastructure Ltd

National Highways Authority of India New Delhi

such member to propose him as a candidate for that office as the case may be, along with the prescribed deposit amount which shall be refunded to such person or as the case may be, to such member if the person succeeds in getting elected as Director.

PROCEEDINGS OF THE MEETINGS OF THE BOARD

61. Meetings of the Board

(a) The Board of Directors shall meet at lest once in every three calendar months for the despatch of business, adjourn and otherwise regulate its meetings and proceedings as it thinks fit provided that at least four such meetings shall be held in every year.

(b) The Managing Director may at any time summon a meeting of the Board and the Managing Director or a Secretary on the requisition of a Director shall at any time summon a meeting of the Board. Notice in writing of every meeting of the Board shall be given to every Director for the time being in India, and at his usual address in India to every other Director.

62. Quorum

The quorum for a meeting of the Board shall be one-third of the total strength (any fraction contained in that one-third being rounded off as one) or two Directors whichever is higher provided that where at any time the number of interested Directors is equal to or exceeds two-third of total strength, the number of remaining Directors, that is to say the number of Directors who are not interested present at the meeting being not less than two, shall be the quorum during such time. The total strength of the Board shall mean the number of Directors actually holding office as Directors on the date of the resolution or meeting, that is to say, the total strength of Board after deducting therefrom the number of Directors, if any, whose places are vacant at the time.

63. Right of continuing Directors when there is no quorum

The continuing Directors may act notwithstanding any vacancy in the Board but if and so long as their number is reduced below three, the continuing Directors or Director may act for the purpose of increasing the number of Directors to three or of summoning a General Meeting of the company but for no other purpose.

64. Chairman of Board

(a) The Board may elect a Chairman of its meeting and determine the period for which he is to hold office.

(b) If no such Chairman is elected, or at any meeting the chairman is not present within five minutes after the time appointed for holding the meeting, the Directors present may choose one among themselves to be the Chairman of the Meeting.

(c) In case of any equality of votes the Chairman shall have a second or casting vote in addition to his vote as a Director.

65. Resolution by Circulation

Save as otherwise expressly provided in the Act, a resolution in writing circulated in draft together with the necessary papers, if any, to all the Directors or to all the members of the Committee then in India, not being less in number than the quorum fixed for the meeting of the Board of the Committee, as the case may be, and to all other Directors or members at their usual addresses in India and approved by such of the Directors as are then in India or by a majority of such of them as are entitled to vote on the resolution shall be valid and effectual as if it had been a resolution duly passed at a meeting of the Board or Committee duly convened and held.

POWERS & DUTIES OF DIRECTORS

66. General powers of Company vested in Directors

The business of the Company shall be managed by the Board of Directors, who may exercise all such powers of the Company as are not by the Act or any statutory modification thereof for the time being in force, or by these presents, required to be exercised by the Company in General Meeting, subject nevertheless to any regulation of these presents, to the provisions of the said Act, and to such regulations being not inconsistent with the aforesaid regulations or provisions as may be prescribed by the Company in General Meeting; but no regulation may by Company in General Meeting shall invalidate any prior act of the Board which would have been valid if that regulation had not been made.

67. Further powers of Directors

Without prejudice to the generality of the foregoing, it is hereby expressly declared that the Directors shall have the following powers, that is to say, power:

(a) To carry on and transact the several kinds of business specified in the Memorandum of Association of the Company.

(b) To draw, accept endorse, discount, negotiate and discharge on behalf of the Company all bills of exchange, promissory notes, cheques, hundies, drafts, railway receipts, dock warrants, delivery orders, Government promissory notes, other Government instruments, bonds, debentures or debenture stocks of Corporation, Local bodies, Port Trusts, Improvements Trusts of Corporate Bodies and to execute transfer deeds for transferring stocks, share or stock certificates of the Government and other local or corporate bodies in

connection with any business or any subject of the Company.

(c) At their discretion, to pay for any property rights or privileges acquired by or services rendered to the Company, either wholly or partially in cash or in shares, bonds, debentures or other securities of the Company, and any such shares may be issued either as fully paid up or with such amount credited as paid up thereon as may be agreed upon; and any such bonds debentures, or other securities may be either specifically charged upon all or any of the property of the company or not so charged.

(d) To engage and in their discretion to remove, suspend, dismiss and remunerate bankers, legal advisers, accountants, cashiers, agents, commission agents, dealers, brokers, foremen, servants, employees of every description and to employ such professional or technical or skilled assistants as from time to time may in their option be necessary or advisable in the interest of the company and upon such terms as to duration of employment, remuneration or otherwise and may be required security in such instances and to such amounts as the Directors think fit.

(e) To secure the fulfillment of any contracts or agreements entered into by the Company, by mortgage or charge of all or any of the property of the Company or in such other manner as they may think fit.

(f) To institute, conduct, defend, compound or abandon any actions, suits and legal proceedings by or against the Company or its officers or otherwise concerning the affairs of the Company and also to compound or compromise or subject to arbitration the same actions, suits and legal proceedings.

(g) To make and give receipts, releases and other discharges for money payable to the Company and for the claims and demands of the Company.

(h) To determine who shall be entitled to sign on the Company's behalf bills of exchange, pronotes, dividend warrants, cheques and other negotiable instruments, receipts acceptance endorsements, releases, contracts, deeds and documents.

(i) From time to time to regulate the affairs of the company in such manner as they think fit in particular to appoint any person to be the attorney(s) or agent(s) of the Company either abroad or in India with such powers including power to sub-delegate and upon such terms as may be thought fit.

(j) To invest and deal with any money(s) of the company not immediately required for the purposes thereof upon such securities as they think fit.

(k) To execute in the name and on behalf of the Company in favour of any Director or other person who may incur or be about to incur any property personal liability for the benefit of the Company such mortgages of the company's property (present and future) as they

think fit and any such mortgage may contain a power of sale and such other powers, covenants and provisions as shall be agreed upon.

(l) To give to any person employed by the Company a commission on the profits, or any particular business or transactions, or a share in the general profits of the company, and such commission or share of profits, shall be treated as part of the working expenses of the Company.

(m) From time to time to make, vary and repeal bye laws for the regulations of the business of the Company, its officers and servants.

(n) To enter into all such negotiations and contracts and rescind and vary all such contracts, and execute and do all such acts, deeds and things in the name and on behalf of the Company as they may consider expedient for or in relation to any of the matters aforesaid or otherwise for the purpose of the Company.

(o) To pay gratuities, bonus, rewards, presents and gifts to employees or dependents of any deceased employees to charitable institutions or purposes, to subscribe for provident funds and other associations for the benefit of the employees.

(p) To donate/contribute amounts to any Political party or for political purposes subject to the limits prescribed under the Act.

68. Powers to delegate to Committee

Subject to the provisions of Section 292 of the Act, and other provisions of the Act, the Board may delegate from time to time and at any time to a Committee formed out of the Directors or to any of the Director or Officials(s) of the Company all or any of the powers, authorities, and discretions for the time being vested in the Board and any such delegations may be made on such terms and subject to such conditions as the Board may think fit.

69. Attorney of the Company

The Board may appoint, at any time and from time to time by a power of attorney under the company's seal any person to be the attorney of the company for such purposes and with such powers, authorities and discretions not exceeding those vested in or exercisable by the Board under these Articles and for such period and subject to such terms and conditions as the Board may from time to time think fit.

70. Power to authorise sub-delegation

The Board may authorise any such delegate or attorney as aforesaid to sub-delegate all or any of the powers, authorities and discretions for the time being vested in it.

OB Infrastructure Ltd.

National Highways Authority of India New Delhi

71. Secretary

The Board shall have power to appoint as the Secretary a person possessing the prescribed qualifications and fit in their opinion for the said office, for such period and on such terms and conditions as regards remuneration and otherwise as they may determine. The Secretary shall have such powers and duties as may, from time to time, be delegated or entrusted to him by the Board and/or the Managing Director and/or Whole Time Director.

BORROWING

72. Borrowing

(a) The Board of Directors may from time to time but with such consent of the company in General Meeting as may be required under the Act raise any moneys or sums of money for the purpose of the Company provided that the moneys to be borrowed by the Company apart from temporary loans obtained from the company's bankers in the ordinary course of business shall not without the sanction of the Company at a General Meeting exceed the aggregate of the paid up Capital of the company and its free reserves that is to say reserves not set apart for any specific purpose and in particular, but subject to the provisions of Section 292 of the Act, the Board may from time to time at their discretion raise or borrow or secure the payment of any such sum of money for the purpose of the company, by the issue of debentures perpetual or otherwise including debentures convertible into shares of this or any other Company or perpetual annuities and in security of any such money so borrowed, raised or received mortgage, pledge or charge, the whole or any part of the property, assets or revenue of the company present or future, including its uncalled capital by special assignment or otherwise or to transfer or convey the same absolutely or in trust and to give the lenders powers of sale and other powers as may be expedient and to purchase redeem or pay off any such securities.

Provided that every resolution passed by the Company in General Meeting in relation to the exercise of the power to borrow as stated above shall specify the total amount up to which moneys may be borrowed by the Board of Directors.

(b) The Directors may by a resolution at a meeting of the Board delegate the above power to borrow money otherwise than on debentures to a Committee of Directors or the Managing Director, if any, within the limits prescribed.

(c) Subject to the provisions of the above sub-clause, the Directors may, from time to time, at their discretion, raise or borrow or secure the repayment of any sum or sums of money for the purpose of the company, at such time and in such manner and upon such terms and conditions in all respects as they may think fit, and in particular, by promissory notes or by opening current accounts or by receiving deposits and advances with or without security or by the issue of bonds, perpetual or redeemable debentures (both present and future) including its uncalled capital for the time being or by mortgaging or charging or

555

O B Infrastructure Pvt. Ltd.
National Highways Authority of India New Delhi

pledging any lands, buildings, goods or other property and securities of the company, or by such other means as they may seem expedient.

73. Nominee Directors

(a) So long as any moneys remain owing by the Company to the Industrial Development Bank of India (IDBI), Infrastructure Development Finance Company Ltd (IDFC), Life Insurance Corporation of India (LIC), Unit Trust of India (UTI), The Oriental Insurance Company Limited (OICI), The New India Assurance Company Limited (NIA), United India Insurance Company Limited (UI), or any Scheduled Bank belonging to Public Sector or Private Sector or a State Financial Corporation or any financial institution owned or controlled by the Central Government or a State Government or the Reserve Bank of India or by two or more of them or by Central Government or State Government by themselves (each of the above is hereinafter in this Article referred to as "the Corporation") out of any loans/debentures assistance granted by them to the Company or so long as the Corporation holds or continues to hold Debentures/shares in the Company as a result of underwriting or by direct subscription or private placement, or so long as any liability of the company arising out of any guarantee furnished by the Corporation on behalf of the Company remains outstanding, the Corporation shall have a right to appoint from time to time, any person or persons as a Director or Directors, whole time or non whole time, (which Director or Directors is/are hereinafter referred to as "Nominee Director/s") on the Board of the Company and to remove from such office any person or persons so appointed and to appoint any person or persons in his or their place(s).

(b) The Board of Directors of the company shall have no power to remove from office the Nominee Director(s). At the option of the Corporation such Nominee Director(s) shall not be liable to retirement by rotation of Directors. Subject as aforesaid, the Nominee Director(s) shall be entitled to the same rights and privileges and be subject to the same obligations as any other Director of the Company.

MANAGING DIRECTOR(S)/WHOLETIME DIRECTOR(S)

74. (a) The Board may from time to time with such sanction of the Central Government as may be required by law, appoint one or more of their body to the office of the Managing Director or Managing Directors or Whole time Director(s).

(b) In the event of any vacancy arising in the office of a Managing Director or Whole time Director or if the Directors resolve to increase the number of Managing Directors or Whole time Directors, the vacancy shall be filled by the Board of Directors and the Managing Director or Whole time Director so appointed shall hold the office for such period as the Board of Directors may fix.

(c) If the Managing Director or Whole time Director ceases to hold office as director, he shall ipso facto and immediately cease to be a Managing Director/ Whole time Director.

(d) The Managing Director or Whole Time Director shall not be liable to retirement by rotation as long as he holds office as Managing Director or Whole Time Director.

75. Powers and duties of Managing Director or Whole Time Director

Managing Director / Whole Time Director shall subject to the supervision, control and direction of the Board and subject to the provisions of the Act, exercise such powers as are exercisable under these presents by the Board of Directors as they may think fit and confer such powers for such time and to be exercised for such objects, purposes and upon such terms and conditions and with such restrictions as they may think expedient and they may confer such power either collaterally with or to the exclusion of any such substitution for all or any of the powers of the Board of Directors in that behalf, and may from time to time revoke, withdraw, alter or vary all or any of such powers. The Managing Directors/ Whole time Directors may exercise all the powers entrusted to them by the Board of Directors in accordance with the Board's discretion.

76. Remuneration of Managing Director / Whole time Directors

Subject to the provisions of the Act and subject to such sanction of the Central Government as may be required for the purpose, the Managing Director / Whole Time Directors shall receive such remuneration (whether by way of salary, commission or participation in profits or partly in one way and partly in another) as the Company in General Meeting may from time to time determine.

77. Reimbursement of expenses

The Managing Director / Whole time Director shall be entitled to charge and be paid for all actual expenses, if any, which they may incur for or in connection with the business of the Company. They shall be entitled to appoint part time employees in connection with the management of the affairs of the Company and shall be entitled to be paid by the Company any remuneration that they may pay to such part time employees.

78. Business to be carried on by Managing Director / Whole time Director.

(a) The Managing Director / Whole time Director shall have subject to the supervision control and discretion of the Board, the management of the whole of the business of the company and of all its affairs and shall exercise all powers and perform all duties in relation to the Management of the affairs and transactions of Company, except such powers and such duties as are required by law or by these presents to be exercised or done by the Company in General Meeting or by the Board of Directors and also subject to such conditions or restriction imposed by the Act or by these presents.

(b) Without prejudice to the generality of the foregoing and subject to the supervision and control of the Board of Directors, the business of the Company shall be carried on by the Managing Director / Whole time Director and he shall have and exercise all the powers, except those which are by law or by these presents or by any resolution of the Board required to be done by the Company in General Meeting or by the Board.

(c) The Board may, from time to time, delegate to the Managing Director or Whole time Director such of their powers and duties and subject to such limitations and conditions as they may deem fit. The Board may from time to time revoke, withdraw, alter or vary all or any of the powers conferred on the Managing Director or Whole time Director by the Board or by these presents.

GENERAL MEETINGS

79. Annual General Meeting

The Company shall in addition to other meetings hold a general meeting which shall be styled as its Annual General Meeting at intervals and in accordance with the provisions of the Act.

80. Extra-ordinary General Meeting

The Board of Directors may whenever they think fit, convene an Extra-ordinary General Meeting at such time and at such place as they deem fit, subject to such directions if any, given by the Board, the Managing Director or the Secretary may convene an Extra-ordinary General Meeting.

81. Extra-ordinary General Meeting by requisition

The Board of Directors shall on the requisition of such number of members of the Company as is prescribed under the Act proceed to call an Extra-ordinary General Meeting of the Company and comply with the provisions of the Act in relation to meetings on requisition.

82. Length of notice for calling meeting.

General Meeting of the Company may be called by giving not less than 21 days notice in writing, provided that a General Meeting may be called after giving shorter notice if consent thereto is accorded in the case of the Annual General Meeting by all the members entitled to vote there at and in the case of any other meeting, by members of the company holding not less than 95% of that part of the paid-up share capital which gives the right to vote on the matters to be considered at the meeting, provided that where any members of the company are entitled to vote only on some resolution or resolutions to be moved at a meeting and not on the others, those members shall be taken into account for purpose of this Article in respect of the former resolution or resolutions and not in respect of the latter.

83. Accidental omission to give notice not to invalidate meeting.

The accidental omission to give notice of any meeting to or the non-receipt of any such notice by any of the members shall not invalidate the proceedings of, or any resolution passed at such meeting.

PROCEEDINGS AT GENERAL MEETINGS

84. Quorum

Five members personally present shall be a quorum for a general meeting and no business shall be transacted at any general meeting unless the requisite quorum is present at the commencement of the business.

85. If quorum not present when meeting to be dissolved and when to be adjourned.

If within half an hour from the time appointed for the meeting a quorum is not present, the meeting, if called upon by the requisition of members, shall be dissolved; in any other case, it shall stand adjourned to the same day in the next week at the same time and place or such other day and at such other time and place as the Board may determine and if at the adjourned meeting, a quorum is not present within half an hour from the time appointed for the meeting the members present shall be a quorum.

86. Chairman of General Meeting

The Chairman, if any, of the Board of Directors shall preside as Chairman at every General Meeting of the Company.

87. When Chairman absent, choice of another to take the chair

If there is no such Chairman, or if at any meting he is not present within fifteen minutes after the time appointed for holding the meeting, or is unwilling to act as Chairman, the Directors present shall choose another Director as Chairman, and if no Directors be present or if all the Directors decline to take the chair, then the members present shall choose someone from amongst themselves to be the Chairman.

88. Adjournment of Meeting

The Chairman may, with the consent of any meeting at which a quorum is present (and shall, if so directed by the meeting) adjourn that meeting from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place. When a meeting is adjourned for 30 days or more, notice of the adjourned meeting shall be given as nearly as may be in the case or original meeting. Save as aforesaid, it shall not be necessary to give any notice of any adjournment or of the business to be transacted at an adjourned meeting.

89. Questions at General Meeting how decided

At any General Meeting resolution put to the vote at the meeting shall be decided on a show of hands, unless a poll is (before or on the declaration of the result of the show of hands) demanded in accordance with the provisions of the Act. Unless a poll is so demanded, a declaration by the Chairman, that a resolution, on a show of hands, has been carried unanimously or by a particular majority or lost shall be conclusive evidence of the fact without proof of the number or proportion of the votes recorded in favour of, or against that resolution.

No member shall be entitled to vote in any General Meeting unless all calls or other sums presently payable by him in respect of each shares in the company have been paid.

90. Taking of Poll

If a poll is duly demanded in accordance with the provisions of the act, it shall be taken in such a manner as the Chairman in accordance with the provisions of the Act direct and the results of the poll shall be deemed to be the decision of the meeting on the resolution on which the poll was taken.

91. Chairman to have casting vote

In the case of an equality of votes, the Chairman shall, both on a show of hands and on a poll, have casting vote in addition to the vote or votes to which he may be entitled to as a member.

92. In what case poll taken without adjournment

A poll demanded on the election of Chairman or on a question of adjournment shall be taken forthwith. A poll demanded on any other question shall be taken at such time not being later than 48 hours from the time when demand was made, as the Chairman may direct.

93. Proxies

(a) Any member entitled to attend and vote a meeting of the Company shall be entitled to appoint any person whether a member or not as his proxy to attend and vote instead of himself, but the proxy so appointed shall not unless he be a member have any right to speak at the meeting and shall not be entitled to vote except on a poll.

(b) The instrument appointing a proxy and the power of attorney or other authority if any, under which it is signed or a notarially certified copy of that power of authority, shall be deposited at the Registered Office of the Company not less than 48 hours before the time for holding the meeting or adjourned meeting at which the person named in the instrument proposes to vote, or in the case of poll: and in default, the instrument of proxy shall not be treated as valid.

94. Instrument of proxy

The instrument appointing a proxy shall be in writing under the hand of the appointer or of his attorney duly authorised in writing, or if the appointer is a Corporation either under the common seal or under the hand of an officer or attorney so authorised. Any person may act as proxy whether he is a member or not.

The instrument appointing a proxy and the power of attorney or other authority if any, under which it is signed or a notarially certified copy of that power of authority, shall be deposited at the Registered Office of the Company not less than 48 hours before the time for holding the meeting or adjourned meeting at which the person named in the instrument proposes to vote, or in the case of poll: and in default, the instrument of proxy shall not be treated as valid.

95. Voting by Postal Ballot

Notwithstanding anything contained herein above and as provided/permitted under the Act if the Central Government by a notification directs that in the case of resolution(s) relating to such business(s) (as may be specified in the notification) should be transacted only by postal ballot then such business shall be transacted by the Company by a postal ballot conducted in such manner and on such terms as may be stipulated under the regulations framed by the Central Government.

ACCOUNTS

96. Books of Account to be kept

(a) The Board of Directors shall cause true accounts to be kept of all sums of money received and expended by the Company and matters in respect of which such receipts and expenditure takes place, of all sales and purchases of goods by the Company, and of the assets, credits and liabilities of the Company.

(b) If the Company shall have a Branch Office, whether in or outside India, proper books of account relating to the transactions effected at that office shall be kept at that office, and proper summarised returns made up to date at intervals of not more than three months, shall be sent by the Branch Office to the Company at its registered office or to such other place in India, as the Board thinks fit, where the main books of the company are kept.

(c) All the aforesaid books shall give a fair and true view of the affairs of the Company or of its Branch Office, as the case may be, with respect to the matters aforesaid, and explain its transactions.

O B Infrastructure Ltd.

National Highways Authority of India New Delhi

97. Where Books of Accounts to be kept

The Books of Account shall be kept at the Registered Office or at such other place in India as the Directors think fit.

98. Inspection by Members

The Board of Directors shall from time to time determine whether and to what extent and at what times and places and under what conditions or regulations the accounts and books and documents of the Company or any of them shall be open to the inspection of the members, and no member (not being a Director) shall have any right of inspecting any account or books or documents of the Company except as conferred by statute or authorised by the Directors or by a resolution of the Company in General Meeting.

DIVIDEND

99. Right to dividend

(a) The profits of the Company, subject to any special rights, relating thereto created or authorised to be created by these presents and subject to the provisions of these presents as to the Reserve Fund, shall be divisible among the members in proportion to the amount of capital paid up on the shares held by them respectively on the last day of the year of account in respect of which such dividend is declared and in the case of interim dividends on the close of the last day of the period in respect of which such interim dividend is paid.

(b) Where capital is paid upon any shares in advance of calls, such capital shall not, confer a right to participate in profits.

100. Declaration of Dividends

The Company in General Meeting may declare dividends but no dividend shall exceed the amount recommended by the Board.

101. Interim Dividends

The Board may from time to time pay to the members such interim dividends as appear to them to be justified by the profits of the Company.

102. Deduction for arrears

The Board may deduct from any dividend payable to any members all sums of money, if any, presently payable by him to the Company on account of calls or otherwise in relation to the shares of the company.

O B Infrastructure Ltd

562

National Highways Authority of India New Delhi

CAPITALISATION OF PROFITS

103. Capitalisation of profits

(a) The Company in General Meeting, may on recommendation of the Board, resolve:

i) That it is desirable to capitalise any part of the amount for the time being standing to the credit of the Company's reserve accounts or to the credit of the profit and loss account or otherwise available for distribution; and

(b) The sum aforesaid shall not be paid in cash but shall be applied, either in or towards:

i) Paying up any amounts for the time being unpaid on shares held by such members respectively;

ii) Paying up in full, unissued shares of the Company to be allotted and distributed, credited as fully paid up, to and amongst such members in the proportions aforesaid; or

iii) Partly in the way specified in sub-clause (i) and partly in that specified in sub-clause (ii).

(c) The Board shall give effect to the resolutions passed by the Company in pursuance of this regulation.

104. Power of Directors for declaration of bonus.

(a) Whenever such a resolution as aforesaid shall have been passed the Board shall:

i) make all appropriations and applications of the undivided profits resolved to be capitalised thereby and all allotments and issues of fully paid shares, if any; and

ii) generally do all acts and things required to give effect thereto.

(b) The Board shall have full power:

i) to make such provision, by the issue of fractional certificates or by payments in cash or otherwise as it thinks fit, in the case of shares or debentures becoming distributable in fraction; and also

ii) to authorise any person to enter on behalf of all the members entitled thereto into an agreement with the Company providing for the allotment to them respectively

credited as fully paid up of any further shares or debentures to which they may be entitled upon such capitalisation or (as the case may require) for the payment of by the Company on their behalf, by the application thereto of their respective proportions of the profits resolved to be capitalised of the amounts or any part of the amounts remaining unpaid on the shares.

(c) Any agreement made under such authority shall be effective and binding on all such members.

COMMON SEAL

105. COMMON SEAL

(a) The Board of Directors shall provide for a Common Seal and also for the safe custody of the same.

(b) The Seal shall not be affixed to any instrument except by authority of a resolution of the Board or of a committee and unless the Board otherwise determines every deed or other instruments to which the seal is required to be affixed shall, unless the same is executed by a duly constituted attorney for the company, be signed by one of the directors atleast in whose presence, the seal shall have been affixed and countersigned by the secretary or such other person as may from time to time be authorised by the Board, provided nevertheless that any instrument bearing the seal of the Company and issued for valuable consideration shall be binding on the company notwithstanding any irregularity touching the authority to issue the same.

AUTHENTICATION OF DOCUMENTS

106. Authentication of documents and proceedings

Save as otherwise expressly provided in the Act or these Articles, a document or proceeding requiring authentication by the Company may be signed by a Director, the Managing Director, the Manager, the Secretary or an authorised officer of the Company and need not be under its seal.

INDEMNITY AND RESPONSIBLITY

107. Director's and others right to indemnity

(a) Subject to the provisions of the Act, the Managing Director and every Director, Manager, Secretary and other Officer or Employee of the Company shall be indemnified by the Company against any liability, and it shall be the duty of Directors out of the funds of the

78

company to pay, all costs and losses and expenses (including travelling expenses) which any such Director Officer or Employee may incur or become liable to by reason of any contract entered into or act or deed done by him as such Managing Director, Directors, Officers or Employee or in any way in the discharge of his duties.

(b) Subject as aforesaid the Managing Director and every Director, Manager, Secretary or other Officer or Employee of the Company shall be indemnified against any liability incurred by them or him in defending any proceedings whether civil or criminal in which judgement is given in their or his favour or in which he is acquitted or discharged or in connection with any application under Section 633 of the Act in which relief is given to him by the Court.

108. Not responsible for acts of others

(a) Subject to the provisions of Section 201 of the Act no Director or other Officer of the Company shall be liable for the acts, receipts, neglects or defaults of any other Director or Officer, or for joining in any receipt or other act for conformity or for any loss or expenses happening to the Company through insufficiency or deficiency of title to any property acquired by order of the Directors for or on behalf of the company, or for the insufficiency or deficiency of any security in or upon which any of the moneys of the company shall be invested, or for any loss or damage arising from the bankruptcy, insolvency, or tortious act of any person, Company or Corporation, with whom any moneys, securities or effects shall be entrusted or deposited or for any loss occasioned by any error of judgement or oversight on his part or for any other loss or damage or misfortune whatever which shall happen in the execution of the duties of his office or in relation thereto, unless the same happen through his own willful act or default.

(b) Without prejudice to the generality of foregoing it is hereby expressly declared that any filing fee payable or any document required to be filed with the Registrar of Companies in respect of any act done or required to be done by any Director or other officer by reason of his holding the said office, shall be paid and borne by the Company.

SECRECY CLAUSE

109. Secrecy

No member shall be entitled to inspect the Company's works without the permission of the Director or Managing Director or to require any information relating to any detail of the Company's trading or any matter which is or may be in the nature of a trade secret, process which may relate to the conduct of the business of the Company and which in the opinion of the Directors that it will be inexpedient in the interests of the members of the Company to communicate to the public.

565

110. Duties of Officers to observe secrecy

Every Director, Managing Director, Manager, Secretary, Auditor, Trustee, Members of a Committee, Officer, Servant, Agent, Accountant or other person employed in the business of the Company, shall if so required by the Board of Directors before entering upon his duties, or at any time during his term of office, sign a declaration pledging himself to observe strict secrecy in respect of all transactions of the company and the state of Accounts and in matters relating thereto and shall by such declaration pledge himself not to reveal to any of the person(s) any information which may come to his knowledge in the discharge of his duties except when required so to do by the Board of Directors or by a Court of Law or by the person to whom such matters relate and except so far as may be necessary in order to comply with any of the provisions of these Articles or Law.

O B Infrastructure Ltd

National Highways Authority of India New Delhi

Sl. No.	Name, Addresses, Description and Occupation of subscribers with their signatures	Signature, Name, Address, Description and Occupation of Witness
1.	SD/- NAGARJUNA CONSTRUCTION CO. LTD. Rep. by: A Ranga Raju S/o Sri A.V.S.Raju 41, Nagarjuna Hills, **HYDERABAD – 500 082.** Occ: LIMITED COMPANY	SD/- S SREENIVAS S/o.Sri S D Sarma 12-2-709-C-60 Padmanabha Nagar HYDERABAD – 500 028 Occ: Company Executive
2.	SD/- A RANGA RAJU S/o.A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS	
3.	SD/- A G K RAJU S/o. Sri A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS	
4.	SD/- M V SRINIVASA MURTHY S/o. Late Sri M V Subrahmanyam Flat No 201, Padmaja Towers Plot No 51, Srinagar Colony **HYDERABAD – 500 073.** Occ: Service	

	SD/- 5. Y D MURTHY S/o. Sri. Y J Rao Flat No.904, Srinath Complex, S.D Road, **SECUNDERABAD – 500 003.** **Occ: Service** SD/- 6. A S N Raju S/o. Sri A V S Raju Plot No.168-A, Road No.10, Jubilee Hills, **HYDERABAD – 500 033.** Occ: BUSINESS SD/- 7. K M C CONSTRUCTION Limited Rep by: M.Pruthvi Kumar Reddy MCH No.555, Arora Colony, Road No.3, Banjara Hills, Hyderabad – 500 034. Occ: Limited Company.	SD/- S SREENIVAS S/o Sri S D Sarma 12-2-709-C-60 Padmanabha Nagar HYDERABAD – 500 028 Occ Company Executive

Date : 02.02.2006

Place: Hyderabad



O B INFRASTRUCTURE LIMITED

41, Nagarjuna Hills, Punjagutta,
Hyderabad – 500 082.

Shareholding Pattern of the company as on 21-03-2006

Sl.No	Name of the shareholder	No.of Eq.shares
1	Nagarjuna Construction Company Ltd	50,000
2	KMC Constructions Ltd	50,000
3	*A Ranga Raju	100
4	*A S N Raju	100
5	*A G K Raju	100
6	*M V Srinivasa Murthy	100
7	*Y D Murthy	100
	Total paid up capital	1,00,500

* Holding shares in O B Infrastructure Ltd as Nominees of Nagarjuna Construction Company Ltd and with a view to maintain the minimum number of subscribers required as per the Companies Act, 1956.

//Certified True Copy//

For O B Infrastructure Limited

Authorised Signatory

O B Infrastructure

Company No. 01- 49067

सत्यमेव जयते

CERTIFICATE OF COMMENCEMENT OF BUSINESS

Pursuant of Section 149(3) of the Companies Act, 1956.

I hereby certify that the O B INFRASTRUCTURE LIMITED

which was incorporated under the Companies Act, 1956, on the EIGHTH day of FEBRUARY 2006 and which has this day filed a duly verified declaration in this prescribed from that the conditions of Section 149(1) (a) to (d) / 149 (2) (a) to (c) of the said Act, have been complied with is entitled to commence business.

Given under my hand at Hyderabad this TWENTY THIRD day of FEBRUARY Two Thousand and SIX.

(N. S. PONNUNAMBI)
REGISTRAR OF COMPANIES
ANDHRA PRADESH, HYDERABAD

570

A. Venkatesh
ADVOCATE

Ph. : 27611261, 55105113, T. Fax : 2761 1368,
2nd Floor, SVSKL Mansions, 3-6-369/A/18,
Street No. 1, Himayatnagar, Hyderabad - 29.

Date: February 18, 2006

To
National Highways Authority of India
(Ministry of Shipping, Road Transport and Highways)
G-5 & 6, Sector – 10, Dwarka,
NEW DELHI – 110 075.

Dear Sir,

Sub : Legal Opinion.

I hereby confirm and certify that NCC – KMC (Consortium) who have been awarded the project "Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 255.00 on Orai – Bhognipur Section on National Highway No.25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur – Barah Section on National Highway No.2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) basis vide Letter of Intent bearing No.NHAI/EW-V/BOT/2005/429, dated.6.1.2006 have formed a Special Purpose Vehicle under the name M/s.O.B Infrastructure Ltd. The aforesaid M/s.O B Infrastructure Ltd has been registered with the office of the Registrar of Companies, Andhra Pradesh on 8th February, 2006 vide certificate of incorporation bearing No. 49067 of 2005-2006. I hereby confirm and certify that M/s.O B Infrastructure Ltd;

(a) is duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation.
(b) has full power and authority to execute, deliver and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;
(c) 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;

Thanking you,

Yours faithfully,

A VENKATESH
ADVOCATE

Resi : Flat No. 601, Mothi Apartments 3-4-859, Barkatpura, Hyderabad-500 027. ✆ : 27565112

O B Infrastructure

GENERAL POWER OF ATTORNEY

KNOW ALL MEN By These presents that we, O.B Infrastructure Limited, a Company having its registered office at 41, Nagarjuna Hills, Hyderabad – 500 082 (hereinafter called 'the Company') represented herein by its Director, Sri A.Ranga Raju.

WHEREAS, we are engaged in the business of Construction of Roads, Highways, Bridges etc.

WHEREAS, M/s.NCC – KMC Consortium having its office at 41, Nagarjuna Hills, Hyderabad – 500 082 has been awarded the "project "Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 255 00 on Orai – Bhognipur Section on National Highway No.25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur – Barah Section on National Highway No.2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) basis" by the National Highways Authority of India vide Letter of Intent bearing No.NHAI/EW-V/BOT/2005/429, dated.6.1.2006.

WHEREAS, it is one of the requirements of the award of the aforesaid contract that the said project shall be executed through a Special Purpose Vehicle to be formed in this connection.

WHEREAS, pursuant to the aforesaid stipulation M/s.NCC – KMC Consortium have formed a Special Purpose Vehicle viz., O.B Infrastructure Limited.

...STRUCTURE LIMITED

Contd ...2

Director

Now, therefore, know all men that we, M/s O B Infrastructure Limited, do hereby nominate, authorise, and empower Mr.Mukesh Ralhan, , Chief General Manager, to be our lawful attorney and agent for the following purposes, namely:

In our name and on our behalf to sign the Concession Agreement for the project "Design, Engineering, Construction, Development, Finance, Operation and Maintenance of "Km 220.00 to Km 255.00 on Orai – Bhognipur Section on National Highway No.25 (NH-25) and Km 421.20 to Km 449.00 on Bhognipur – Barah Section on National Highway No.2 (NH-2) in the State of Uttar Pradesh on BOT (Annuity) basis" awarded to M/s.NCC-KMC (Consortium)" by National Highways Authority of India.

AND we the above named M/s.O B Infrastructure Limited do hereby agree to ratify all such acts, deeds and things to be done by our attorney Mr.Mukesh Ralhan, Chief General Manager, as if the same were done by us in person.

IN WITNESS WHEREOF, we, M/s. O B Infrastructure Limited, through Sri A.Ranga Raju, Director have set our hands to this General Power of Attorney on this 15th day of February, 2006.

WITNESS:

1.

2.

for O B INFRASTRUCTURE LTD.

A RANGA RAJU
DIRECTOR

ACCEPTED:

MUKESH RALHAN
CHIEF GENERAL MANAGER

ATTESTED

NOTARY
P. RAGHAVA REDDY

NOTARIAL

O B Infrastructure Ltd

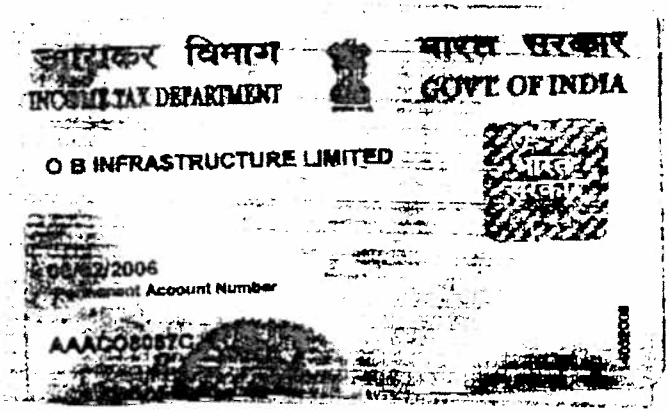
15 FEB 2006

573

INCOME TAX PAN SERVICES UNIT

(Managed by National Securities Depository Limited)

4th Floor, 'A' Wing,Trade World, Kamala Mills Compound, S. B. Marg,
Lower Parel, Mumbai - 400 013.



The Income Tax Department takes pleasure in informing that the PAN allotted to you is :

AAACO8087C

and the PAN card is enclosed herewith. Further, for filing the return of income, please contact :

ITO DO BULK FILING SUVIDHA

Quoting of PAN on return of income and challans for payment of taxes is necessary to ensure accurate **credit of taxes paid by you and faster processing of** return of income. Moreover, quoting PAN on all other communications with the department will help to improve taxpayer services.

We may inform that it is **mandatory to quote PAN** in several transactions specified under the Income Tax Act, 1961. For further details of such transactions, reference is invited to rule 114B of the Income Tax Rules, 1962 read with section 139A of the Income Tax Act, 1961.

In the unlikely event of **more than one PAN being allotted**, this fact should be brought to the notice of your Assessing Officer, as **possessing or using more than one PAN is against law** and may attract **penalty of upto Rs. 10,000/-**.

Any er s in the data printed on your PAN Card m be brought to the notice of IT PAN **Services** Unit at the address given above and on the reverse of the PAN Card.

Income Tax Department

PKG ID PRC / 00043 / 13032006_01 AFL

APR / 44 / 8820201009678431141 / 2923513

O B INFRASTRUCTURE LIMITED

O B INFRASTRUCTURE LIMITED,
PLOT NO 41,, NCC HOUSE,
NAGARJUNA HILLS, PUNJAGUTTA, HYDERABAD,
ANDHRA PRADESH - 500082
TEL NO. 40 - 23351753

(This being a computer-generated letter, no signatures are required)

O B Infrastructure Ltd.
41, Nagarjuna Hills, Punjagutta, Hyderabad - 500 082
Tel: 040 - 2335 1753 (5 Lines) Fax : 040 - 2335 0214

Ref: OBIL/BOT/2006/06

April 4, 2006

To,

The General Manager (EW-II)
National Highways Authority of India
G - 5 & G 6, Sector - 10,
Dwarka,
New Delhi - 110 075

Kind Attn.: Shri B D Joshi

Sub: Design, Engineering, Construction, Development, Finance, operation and Maintenance of Km 220.00 to Km 255.00 on Orai - Bhognipur section on national highway No. 25 (NH - 25) and of Km 421.20 to Km 449.00 on Bhognipur - Barah Section on National Highway No. 2 (NH - 2) in the state of Uttar Pradesh on BOT Basis.

Dear Sir,

This is in continuation to our earlier letter no. OBIL/BOT/2006/06 dated 21/03/2006.

O B Infrastructure Limited (OBIL) was incorporated with an initial capital of Rs. 25.00 lacs. We hereby agree and undertake to enhance the Authorized Share Capital of OBIL as and when required as per the requirements of the Project and as per the cash flow statement submitted along with the financial proposal.

The present Paid up capital of O B Infrastructure Limited is Rs. 10.05 Lacs. Out of the present paid up capital of Rs. 10.05 Lacs, NCC and its nominees hold 50.25% i.e. Rs. 505000/- only. The nominees of NCC are holding the shares in OBIL only with a view to maintain the minimum number of shareholders as permitted under section 49 (3) of the Companies Act, 1956. The amount of Rs. 5000/- standing in the names of nominees has been invested by M/s NCC and the ownership of these shares lie with NCC. We are hereby enhancing the paid up capital of OBIL to Rs. 15.05 Lacs in order to ensure that the NCC's holding in OBIL is more than 51% of the total paid up capital. Copy of the share holding pattern of the company as on 03/04/2006 is attached.

Thanking you and assuring you of our best services all the times.

Yours truly,

for O B Infrastructure Limited

Mukesh Ralhan
Authorized Signatory

O B Infrastructure Ltd.

National Highways Authority

5/5

O B Infrastructure Ltd.
41, Nagarjuna Hills, Punjagutta, Hyderabad.- 500 082
Tel: 040 - 2335 1753 (5 Lines) Fax: 040 - 2335 0214

Shareholding Pattern of the company as on 03-04-2006

Sl.No	Name of the shareholder	No.of Equity shares of Rs.10/- each	Paidup Capital in Rs.
1	Nagarjuna Construction Company Ltd	1,00,000	10,00,000
2	KMC Constructions Ltd	50,000	5,00,000
3	*A Ranga Rao	100	1000
4	*A S N Raju	100	1000
5	*A G K Raju	100	1000
6	*M V Srinivasa Murthy	100	1000
7	*Y D Murthy	100	1000
	Total paid up capital	1,50,500	15,05,000

* Holding shares in O B Infrastructure Ltd as Nominees of Nagarjuna Construction Company Ltd and with a view to maintain the minimum number of shareholders required as per the Companies Act 1956.

Certified True Copy

For O B Infrastructure Limited

Authorised Signatory

O B Infrastructure Ltd.

National Highways Authority of India
New Delhi

ADDENDUM/CLARIFICATION

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(पोत परिवहन, सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Shipping, Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110 075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone 91-11-25074100/25074200
फैक्स / Fax 91-11-25093507 / 25093514
एक्स. / Extn 2223 / 2318 / 2468 / 2553

F.No.NHAI/EW-V/BOT/2005/ 362 **7th December, 2005**

To

All bidders

Sub.: Upgradation and strengthening of Palanpur-Swaroopganj section (km 340.00 to km 264.00 of NH-14) and Orai-Bhognipur-Barah section (km 220.00 to km 255 of NH-25 & km 421.20 to km 449.00 of NH-2) on BOT or BOT (Annuity) basis

Sir,

This has reference to pre-bid meeting held on 29.11.2005 for the above packages.

2. The addendum/corrigendum and clarifications to the bid documents for the above cited works are enclosed herewith. Further, it is informed that there is no change in the last date of submission of bids and date of opening of bids.

Kindly acknowledge the receipt of this letter.

Yours faithfully

(B. D. Joshi)
General Manager (EW-II)

Encl. *As above*

IRB Infrastructure Ltd

517

National Highways Authority of India

National Highways Authority of India

Upgradation and strengthening of Palanpur-Swaroopganj section (km 340.00 to km 264.00 of NH-14) and Orai-Bhognipur-Barah section (km 220.00 to km 255 of NH-25 & km 421.20 to km 449.00 of NH-2) on BOT / BOT (Annuity) basis

Reply / Response to the Queries of the Bidders

(Enclosure to letter no.NHAI/EW-V/BOT/2005/362 dated December 7th, 2005)

List of Participants

I. **National Highways Authority of India**

i) Sh.B. N. Singh, CGM (EW-II)
ii) Sh. B. D. Joshi, GM (EW-II)
iii) Sh. Alok Deepankar, DGM (EW-II)

II. **Financial Advisor**

i) Sh. Anuj Agrawal, M/s.Allianz Securities Ltd.,
ii) Sh.Nitin Suri, M/s.Allianz Securities Ltd.

III. **Design Consultant**

i) Sh. Rajiv Bhatnagar, M/s.SNC Lavalin-SAI (JV).
ii) Sh. P.Alam, M/s.Craphts Consultants (I) Pvt. Ltd.
iii) Sh. P. N. Dhar, M/s Craphts Consultants (I) Pvt. Ltd.
iv) Dr. T. V. Krishnamurthy, M/s.EMA-Unihorn (I) Pvt. Ltd.

IV. **Contractors**

i)	Larsen and Toubro Ltd.	-	Dr.Esther Malini
ii)	Shristi Infrastructure Development Corporation Ltd.	-	Sh. R. K. Grover
iii)	PLUS Mudajaya - BSBK	-	Sh. Autl Agarwal
iv)	P.B.A. infrastructure Ltd.	-	Sh. H. S. Vohra
v)	N.C. C. Ltd.	-	Arvind Raizada
vi)	Dinesh Chandra R. Agarwal Infracon Pvt. Ltd.	-	D. R. Agarwal
vii)	Unitech Ltd.	-	S. P. Shrivastava
viii)	Gammon India Ltd.	-	Sh.S. S. Mani
ix)	Punj Lloyd Ltd.	-	Bhara Gupta
x)	IL & FS	-	M. Ravi
xi)	Gayatri Projects Ltd.	-	Dinesh C. Fulara

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

Bidder: Gammon India Limited

Document: Annuity Part-I: Instructions to Bidders

Sr. No.	Part & Clause No.	Subject/ Issue As per Document	Comments/ Clarifications Sought	Proposed Reply
	Schedule of Bidding Process	Last date of submission of Proposals	Also, as per the normal practice adopted by NHAI, a time frame of 4-5 weeks is provided for submission of RFP documents to the bidders from the date of issuing pre-bid clarifications. Therefore, we request you to extend the date of submission of Proposals by at least 2 weeks.	No change
2.	Clause 1.15 Proposal Validity Period	Proposal shall remain valid for a period not less than 280 days from	The Proposal Validity Period of 280 days is too high. We request you to reduce the Proposal Validity Period to 180 days.	No Change
3.	Clause 1.16.2 Extension of Proposal Validity Period	The Bid Validity Period of the Successful----------	As per clause 1.36.1, the Concession Agreement has to be executed within 30 days of acceptance of LOA. If Concession Agreement does not get executed within this time frame, due to reasons not attributable to the Concessionaire, then the Concessionaire shall not be asked to extend the Bid Validity Period. Hence, this clause should be modified to read as under The Bid Validity Period of the successful bidder shall be automatically extended to a date 30 days from the acceptance of LOA.	No Change
4.	Clause 1.36.2 Acceptance of Letter of Acceptance (LOA)	In case, the Concession Agreement does not ----------	The delay in the execution of Concession Agreement can happen due to a number of various reasons, which may not be attributable to the Concessionaire. We believe that the	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

	and execution of Concession Agreement		Concessionaire should not be penalised for such reasons. We suggest that this clause to be modified as – In case, the Concession Agreement does not get executed within thirty – (30) days of acceptance of LOA due to reasons attributable to the Concessionaire, NHAI reserves the right to annul the bidding process.	
5.	Clause 1.36.3 (Last line) Acceptance of Letter of Acceptance (LOA) and execution of concession Agreement	NHAI will notify other Bidders…. in any case not later than 56 days from, the date of announcement of ….	The bid security of unsuccessful Bidders must be returned in the shortest possible time; the period of 56 days seems very high. We suggest that the bid security of unsuccessful bidders must be returned within 28 days of announcement of successful bidders.	No Change
6.	Clause 1.37 (6th line) Performance Security	……. Performance Security within the period expiring on the 30th day from the date of issue of LOA but …..	This clause should be modified as under – Performance Security within the period expiring on the30th day from the date of acceptance of LOA by the Successful bidder but…..	No Change.
7.	Annex 2A (4th line) Power of Attorney for signing of Proposal	…. Who is presently employed with us and holding the position of _____	It is possible that with interest being generated at national and international level, there may be companies who may give the Power of Attorney to the employees of their Associate Companies, Representative Offices who may not be employed with the Company. For the above said reasons, it is requested to delete the words "who is presently employed with us and holding the position of	No Change
	Annex 2B Power of Attorney for Lead Member of Consortium	To be executed by all the members in the Consortium and accepted by the Lead Member	The Members of the consortium appoint one of them as the Lead Member of the Consortium by giving the Power of Attorney in favour of Lead Member.	Yes

580

			Kindly clarify whether the Lead Member has to execute / sign this Power of Attorney in both capacities, viz., as a member (giving the POA) and as Lead Member (accepting the POA)	
	Clause 1.5.3 Minimum Equity Requirement Annex 2C Format for Memorandum of Understanding (MoU)	(i) The Lead Member would commit to hold--- --- (ii) In case of a member of the Consortium Format For MOU 1. That M/s _____ who the Lead Member of ..... 2. That M/s _____, M/s _____ and M/s _____ who are not Lead Members of	Since equity contribution by Associates of all the Consortium members is permitted (as per Clause 1.5.2 of the RFP), these two clauses of the MoU should be modified as under – 3. That M/s --------- who is the Lead Member and its Associates of the Consortium commits to hold a minimum equity stake equal to 51% of the aggregate shareholding of the Consortium in the SPV at all times during the Concession Period. 4. That M/s _____, M/s _____ and M/s _____ and their respective Associates who are not Lead Members of the Consortium commit to hold a minimum equity to 10% of the aggregate shareholding of the Consortium in the SPV at all times during the Concession Period.	No Change
10.	Annex 5A C.1 Step 2 (a)	Average Aggregate Net Worth of the Bidder	We believe that Net Worth of the bidder is used as a qualification criterion to ensure that the bidder has adequate capacity to execute the project. The past Net Worth of the bidder is of little consequence in establishing the bidder's execution capability. On the other hand, by averaging the Net Worth for last 3 years, a firm that has recently infused capital is not being given due credit. Hence, we suggest that this criteria should be modified to – **Net Worth of the Bidder (either sole or consortium) *as per latest audited accounts* should be at least 25% of the Total Project Cost of this Project.**	No Change
11.	Annex 5B	Eligible Project Details	Consortium of Gammon India Limited and Punj Lloyd Limited has been awarded the following	Queries do not relate to the RFP

	Qualification Response Sheet 12	Row No. 9 in the Table: Equity Shareholding Experience Instruction No. 10: For Development Experience, the Applicant	two BOT (Annuity) projects by NHAI in the year 2001. 1. Rajahmundry – Dharmavaram Section of NH-5 (Concessionaire: Rajahmundry Expressway Ltd.) 2. Dharmavaram-Tuni Section of NH-5 (Concessionaire: Andhra Expressway Ltd.) Both these projects have achieved Commercial Operations and Provisional Certificate has been issued by NHAI (dated 20.09.2004 and 30.10.2004 for REL and AEL respectively). 1. Gammon Infrastructure Projects Ltd. (GIPL) - a 100% subsidiary of Gammon India Ltd. - is the infrastructure holding company of Gammon group. As on Provisional Commercial Operations Date, GIPL holds more than 26% in both the SPVs. Keeping in mind this Project development experience of Gammon Infrastructure Projects Ltd., kindly clarify whether - 1. GIPL can use this development experience for the purpose of qualification as an eligible project under Category 1? 2. Provisional Certificate is a valid evidence for the date of commissioning of these projects? 3. Status of GIPL in REL and AEL can be taken as "member", as on date of commissioning of the Project? (Refer Instruction 10, Page No. 46)	Contents/ Criteria. Project/ Bidder Specific Queries cannot be entertained at this stage, as it amounts to advance evaluation of the proposal to be submitted by the bidder.

582

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

Document: Annuity Part-II : Draft Concession Agreement

1.	1.1 Definitions	Definition of "COD"	Definition is required as the reference of it is coming at many places.	Please refer Addendum/ Corrigendum.
2.	1.1 Definitions	"Commencement Date" means the date---------- Construction Period means the period beginning from the-----------	Subject to the provisions of the Concession Agreement can the Concessionaire take up the construction works after the signing of the Concession Agreement i.e. before the start of " Construction Period" as defined in Cl. 1.1 at his own costs and risk?	It would be decided on case to case basis based on specific request of concessionaire and at no cost and liability to NHAI.
3.	6.1 (b) LC opening from a Scheduled Bank	(b) NHAI shall as security for payment of Annuity, provide to the Concessionaire a Letter of Credit from a Scheduled Bank	(b) NHAI shall as security for payment of Annuity, provide to the Concessionaire a irrevocable and revolving Letter of Credit from a Scheduled Bank..... The LC should be irrevocable and revolving to give comfort to the Lenders and Concessionaire as previously provided by NHAI in the Annuity Projects.	Please refer Addendum/ Corrigendum.
4.	6.1 (C) Payment of Annuity	Upon the Concessionaire being handed over the Additional Highway	The term " Additional Highway is not defined in the Agreement. Kindly Clarify	There is no additional highway on this project as adjoining stretches on both sides are four laned.
5.	6.4 (b) Payment Mechanism	Upon receipt of the invoice together with recommendation for payment forwarded by the Independent Consultant, NHAI shall take all necessary steps and	In case there is delay on part of NHAI in payment of the Annuity on the Annuity Payment Date, NHAI should pay interest to the Concessionaire along with the Annuity Amount @ SBI PLR+3% p.a. for the period of delay.	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

		ensure payment of Annuity on the relevant Annuity Payment Date.	We request you to modify the clause accordingly.	
6.	9.1 (v) written notice to NHAI prior to entering into amending or replacing any Project Agreement.	(v) give NHAI 30 days written notice prior to entering into, amending or replacing any Project Agreement so as to enable NHAI to provide its consent or offer its comments	There should not be any prior written approval or notice for amending or replacing any Project Agreement. However, a certified true copy will be provided within 7 days of signing	No Change
7.	Cl. 9.1 (xxix) Obligations of the Concessionaire	"Make all necessary arrangements for accomplishing the tasks of physical removal of the encroachments at his own cost"	Removal of encroachment by the Concessionaire will not only be difficult task but also may create problems with the local people resulting into the hindrance, security and difficulties during construction and operation of the project. As such, removal of encroachment is a matter of law and order that is better dealt by the owner of the land; otherwise, Concessionaire is subjected to undue cost and public unrest. However, Concessionaire may be responsible for removal of vacated establishments within only ROW at his own cost.	No Change
8.	9.1 (xxx) Obligations of the Concessionaire	Obtain all the necessary	In principle, the Government approves a project for implementation after environmental clearance is obtained. It is therefore, responsibility of NHAI to obtain necessary clearances before award of the project for implementation. This clause may therefore be deleted	Not agreed.
	9.1 (xxxvi) State Support Agreement	(xxxvi) enter into the State Support Agreement with NHAI and the Government of Bihar	It should be the responsibility of NHAI, and hence the obligation of NHAI.	The project stretch is in Rajasthan, Gujarat and Uttar Pradesh.

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

				However, there is no change in the clause.
10	15.3 Completion	The Concessionaire guarantees that the Project Completion shall be achieved in accordance with the provisions of this Agreement on a date not later than 36 (thirty six) months from the Appointed Date ("Scheduled Project Completion Date")	(i) Kindly clarify whether the Construction Period is 36 months or 30 months (as indicated in Part-I of the RFP document) (ii) The reference to Appointed Date seems misplaced, should be replaced by Commencement date.	The Construction period is 30 Months. Please read Commencement date in place of Appointed Date.
11	17.1 Change of Scope	Changes for any increase/ reduction in expenditure exceeding 10% of the Total Project Cost	For the provision of addition/ deletion of works and services on or about the Project Highway, instead of 10% change in total Project Cost, the percentage change in the expenditure should not be more than 5%. A 10% change would lead to a major impact on the project and therefore, we suggest the change should be restricted to 5%	No Change
12	25.1 Establishment of Escrow Account	The Concessionaire shall within 60 days from the date of this Agreement ..... to such Escrow Account	As the date of achieving Financial Closure is 180 days from the date of this Agreement, therefore to establish an Escrow Account should be 60 days from the date of Commencement Date.	Concessionaire may make specific request in case he is not successful in opening the account and NHAI may consider on case to case basis.
13	29.2 Non Political Force Majeure Events	(ii) radioactive contamination of ionising radiation. (v) Any judgement or order of any event ..... By the Concessionaire	In case of Termination due to Force Majeure Event which is a non Political Event, the concessionaire will get only insurance proceeds, whereby (ii) radioactive contamination of ionising radiation and (v) Any judgement or order of any court of competent ..... (of clause 29.2) is not insurable.	No Change

			Hence (ii) radioactive contamination of ionising radiation should be classified as Indirect Political Force Majeure Event, and (v) Any judgement ..... (of clause 29.2) should be classified as Political Force Majeure Event.	
14.	Cl. 29.3 (i), (ii), (iii) Force Majeure Indirect Political Event	(i) an act of war (ii) industry wide or state wide or India wide strikes or industrial action (iii) Public agitation Which prevents the Affected Party from performing any of its obligations for a continuous period of not less than 7 days from the date of its occurrence	Force Majeure resulting from Events under Clause 29.3 (i), (ii), (iii), are most common in BOT Projects. However it is highly unlikely that any industry wide or state wide or India wide strikes or industrial action OR public agitation would last for 7 continuous days. Hence we request you to consider deleting the word " continuous" in Cl. 29.3 (i), (ii), and (iii)	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

Bidder's R &FS

Document: Annuity Part-I: Instructions to Bidders

Sr. No.	Part & Clause No.	Subject/ Issue As per Document	Comments/ Clarifications	Proposed Reply
1.	Cl. 1.4.2 (vi)	Should be accompanied--------- Registered Partnership deed (in case of partnership firms and sales tax)	In case of company, NHAI to clarify that submission of Memorandum/ Articles of Association is sufficient.	Clause 1.4.2 (vi) is amply clear.
2.	1.5.3 (i):	The Lead member would commit to hold a minimum equity stake equal to 51% of the aggregate shareholding of the Consortium in the SPV as all times during the Concession Period.	This clause may be modified as follows: "The minimum equity shareholding of the Lead Member in the aggregate shareholding of the Consortium in the SPV shall not be less than 50% (fifty percent) instead of 51% during the Concession Period, as 51% equity stake would mean a subsidiary company and large number of obligations are attached with a subsidiary company under the Company Act". Hence, the necessary changes as mentioned above may be made considered by NHAI.	No Change
3.	1.6	Total Project Cost	NHAI to provide break up of total project cost. NHAI to clarify what is included in the Total Project Cost. The Total Project Cost put in the bid document (data sheet) should be calculated w.r.t. Current prices. Also, NHAI to provide indicative BOQ, for arriving at Project Cost.	Total Project Cost includes Civil Cost at current prices, contingencies, financing charges and Interest During Construction. However, it is again clarified that bidder should have its own assessment about the project cost. Hence indicative BOQ is not being provided.

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

4.	1.32.3 (b) (i) & (ii)	The Average Aggregate Net worth & Average Aggregate Net Cash Accruals	We understand that Net Worth / Net Cash Accruals of the last three financial years could be either Average or Aggregate. But not both. NHAI to clarify.	Average aggregate of last three financial years in case of Consortium and average of last three financial years in case of Sole Applicant
5.	1.32.3 (a)	The Bidder (sole or consortium) should have executed----------	NHAI is requested to replace "executed" with "developed or constructed"	No Change
6.	Annexure 2D	Format for Board Resolution for Companies	Since power of Attorney is being provided by the bidder as part of his bid, NHAI should consider PoA to be sufficient for establishing Power of designated person to commit the bidder. NHAI to consider deleting submission of this Annexure	No Change
7.	Annexure 5A	Financing Plan of the Bidder	For the purpose of substantiation of Reserves & Surpluses of the Bidder, NHAI to consider certificate from Chartered Accountants as was submitted for Lot II projects of NHAI.	No Change
8.	Qualif. Resp. Sheet; 3.4;	Bank/ Financial Institution Certificate	NHAI to consider deleting submission of this by bidders, as bankers are not comfortable to issuing open certificate with Head Office approval without undertaking due diligence of the project.	No Change
9.	Annexure 6-B, Point No 5	Cash Flow Projections Table	NHAI is requested to provide the multiplication factors for Routine and Periodic Maintenance Costs at the time of Operations starting period so as to avoid discrepancies in NHAI calculations and bidders calculations	Please refer item no 5 & 6 of Annexure 6-B of Bid Document Part-I, Instructions to Bidders
Document : Annuity Part – II : Draft Concession Agreement				
10.	Page 5 (iii) & (iv)	Definition of Change in Law	Change Point No. (iii) & (iv) as Commencement of any Indian Law, Which has not entered into effect until date of	No change

			submissions of tender. NHAI to confirm.	
11		Definition of Debt Due	The Debt Due may be defined as the aggregate of the following sums expressed in Indian Rupees or in the currency debt, as the case may be, outstanding and payable to the Secured Lenders and Unsecured Lenders under the financing Document. NHAI to consider defining lenders as Secured and Unsecured Lenders & Replacing Senior Lender at all places in the agreement as Lenders.	No Change
12.		Definition of Project Assets & Project Highway	Since Project Assets includes Project Highway, NHAI should delete Project Assets from the definition from Project Highway	No Change
13.		Punch List Definition	In addition to the Punch List items defined in the agreement, NHAI to consider adding the following two items: (xii) Numbering painting of all structures (x) Any other item as agreed by Independent Consultant / NHAI	No Change
		Definition of Termination Payment & Total Project Cost (a)	Since the Termination Payment is linked to the Total Project Cost, NHAI is requested to put the Total Project Cost in the bid document (data sheet) as calculated w.r.t. current prices.	Total Project Cost includes Civil Cost at current prices, contingencies, financing charges and Interest During Construction.
15.	4.1 (a)	Conditions Precedent – Procurement of Permits as detailed at Schedule E of Part III	NHAI to consider modifying this clause to be read as "Concessionaire shall obtained all such Applicable Permits as required at the time of Financial Close..."	No Change
16	4.1 (c)	Conditions Precedent – Obtaining all Central Government Clearances	NHAI to inform all bidders the status of procurement pf MoEF Clearance for the Project. Procurement of MoEF Clearance for	The case is with Ministry of Environment and

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

			Project shall be responsibility of NHAI. Also all Central Government Clearances shall be the responsibility of NHAI .Please confirm.	Forest and the clearance is likely to be granted shortly.
17	4.1 (d)	Deleted	NHAI is requested to include State Support Agreement execution as Conditions Precedent under NHAI scope of work	No Change
18	5.1	Performance Security	As was done in other BOT Projects of NHAI, NHAI is requested to consider release of Performance Security to the Concessionaire upon Equity contribution by shareholders to the extent of 100%.	No Change
19	6.1 (b)	Letter of Credit	NHAI is requested to confirm this clause as it is a Lender's concern owing to their experience in previous NHAI Annuity Projects.	The relevant provision is amply clear.
20	6.1(c)	Sharing of Additional Highway	NHAI to provide the % of the Annuity to be shared.	There is no additional highway
21	6.4 (b)	Payment of Annuity	NHAI is requested to include Payment of Annuity plus interest in case of delayed payments of Annuity.	No Change
22	9.1 (xxx)	Obligations of Concessionaire – Obtain all the necessary environmental clearances	These clause to be modified as follows: "Concessionaire to assist NHAI in obtaining environmental clearances..." i.e. the primary responsibility of procuring environmental clearance should vest with NHAI only.	Please refer Addendum/ Corrigendum
23	9.1 (xxxiii)	Liase with Government of Gujarat & Rajas than	NHAI to modify this clause as this is responsibility of NHAI	No Change
24	10.1 (vi)	Obligations of NHAI	There is need to clearly define the time frame for NHAI to execute the State Support Agreement with the Concessionaire and the respective State Government for the comfort of Lenders. Time Frame for execution of State Support Agreement be within 3 months of Appointment Date.	No Change
25	10.1 (vii)	Obligations of NHAI	Modify this clause as "assist the	No Change

			Concessionaire in obtaining and for exercising necessary authority to regulate the traffic on the project site / project facilities subject to and in accordance with the Applicable laws"	
26	10.1 (xiii)	Obligations of NHAI – NHAI provides necessary support..... for rehabilitation & resettlement.	The prime responsibility for procurement of clearances from MoEF, tree cutting, shifting of utilities and rehabilitation & resettlement shall be with NHAI. Please confirm.	Please refer Addendum/ Corrigendum.
27	10.1	Obligations of NHAI	To add a clause as (xv) to the effect that "NHAI shall ensure that all utility service providers including for electricity, water, telecommunications, gas pipeline etc. shall take the prior approval of the Concessionaire before taking up any repair, maintenance or any similar kind of which shall or likely to cause disruption in the project site / project facilities during the Concession Period." Any non-availability of lane during such works would not constitute breach/ non-availability under relevant clauses.	No Change
28.	11.1 (xiii)	Aggregate Equity Shareholding of the Consortium Members.	The clause may be modified as follows: "The aggregate equity shareholding of the Consortium Members and their Associates in the issued and paid up equity share capital of the Concessionaire shall not be less than 50% (fifty percent) instead of 51% during the Construction Period and 26% (Twenty Six Percent) during Operations Period as 51% mean a subsidiary company and large number of obligations are attached with a subsidiary company under the company act." "The minimum equity shareholding of the Lead Member in the aggregate shareholding of the Consortium in the SPV shall not be less than 50% (fifty percent) instead of 51%	No Change

			during the Concession Period, as 51% equity stake would mean a subsidiary company and large number of obligations are attached with a subsidiary company under the Company Act." Hence, the necessary changes as mentioned above may be made considered by NHAI.	
29	13.5.1	Existing Right of Way – Payment to Concessionaire by NHAI	Existing Right of Way – Payment to Concessionaire by NHAI This clause should include availability of land free from all encumbrances and payments (compensation as mentioned in the agreement plus compensation for idling of manpower, plant & machinery) under this clause should be made to Concessionaire within 7 days of letter issued by Concessionaire and any delay should attract interest @ SBIPLR plus two percent as mentioned in case of clause no. 13.6.	No Change
30	13.5.2	Additional Right of Way	NHAI to provide Land Handing over schedule for the Project	Refer Schedule H of Part IV of Bid Document
31	13.6	Additional Right of Way	NHAI to consider deleting the following statement from this clause. "Provided that the scheduled project completion date as set forth in Schedule H has not been extended from the data defined at the time of the signing of this Concession Agreement for any reason"	No Change
32	17.4	Procedure for change of scope	In the second last line of this clause NHAI to delete the word "and" & replace with "or"	No Change
33	18.12	Operation and Maintenance	The damages to be paid seems to be in addition to the deduction in annuity for non-availability of lane which is not required. NHAI to delete this clause.	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

34	25.1	Escrow Account	Escrow Account is opened only when financial close is achieved. NHAI to modify " within 60 days of this Agreement" with "within 60 days of financial close"	Concessionaire may make specific request in case he is not successful in opening the account and NHAI may consider on case to case basis.
35	25.2.1 (vii)	Escrow Account	NHAI to prioritize Debt Service Payment above the Negative Grant due to NHAI. This is a requirement of Lenders.	No Change
36	32.1.1 (3)	Termination Payments – Concessionaire event of default	The non-compliance of "procurement of environmental clearances" by the Concessionaire should not be treated as Concessionaire event of default	No Change
37	35.3 (ii)	Assignments & Charges	NHAI to modify this clause as follows, as this is a major concern shown by all bankers: "Mortgages/pledges/hypothecation of goods/assets over project assets other than project highway and those covered..."	No Change

595

Document: Part-IV: Technical Schedules (Palanpur – Swaroopgunj Project)

Sr. No.	Comments/ Clarifications Sought	Proposed Reply
1.	Typical cross sections for project Highways are attached in figure B-1 (a) to (e)" as mentioned in Clause no. 2.6 of Schedule – B (Scope of the Project) of Part-IV (Technical Schedules) of bid Document, however no Cross Section are attached with the Bid Document for reference.	Cross section is in the drawing part of the bid document.
2.	Types of Cross- Sections (Type – I to XIII) are mentioned in the Table B.1 of Schedule –B (Scope of the Project) of Part – IV (Technical Schedule) that are nowhere given in the Bid documents.	Cross section is in the drawing part of the bid document.
	Please clarify that all the utilities shall be provided / shifted by the concerned department or concessionaire shall be responsible for shifting of the same.	Please refer Addendum/ Corrigendum.

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

	If the concessionaire is responsible for shifting of the utilities then who shall bear the cost for same?	
	The DPR uploaded on the internet does not mention any finished road level (FRL) hence the FRL should be provided to bidder immediately. Any changes in FRL due to shifting of location of structure or optimization of design of structure above existing carriageway level shall be permitted or not?	FRLs are given in DPR drawings. Regarding the change in FRL please refer Clause 2.6 (A) of Schedule B of Technical Schedules (Part IV) and Clause 1.4 of Schedule D of Non Technical Schedules (Part III).
5.	Although minimum FRL shall be maintained above the existing carriageway level but whether any changes from the DPR level shall be allowed or not?	Regarding the change in FRL please refer Clause 2.6 (A) of Schedule B of Technical Schedules (Part IV) and Clause 1.4 of Schedule D of Non Technical Schedules (Part III).
6.	**Disclaimer in Clause 1.1 of Schedule – A (Site of the Project) of Part-IV (Technical Schedule)** Is the particular clause applicable even for DPR also and if the design responsibility is of Bidder than disclaimer clause should be removed. In case of wrong data supplied in the DPR, what is the remedial measure and additional cost impact.	No change.
7.	**Clause 2.7.2 of Schedule – B (Scope of the Project) of Part – IV (Technical Schedule)** If this clause is applicable in true sense then thickness of various pavements layer provided elsewhere in the Contract Document or DPR shall not be binding on the Concessionaire. Please clarify. Any reduction / increase in the thickness of the Pavement Crust shall not be considered as variation.	The Clause is amply clear.
8.	Any change in start and end chainage of Reinforced earth wall/ RCC retaining wall/ PCC retaining wall constructed as per the site condition at underpasses/ flyover/ RoB location would be treated as variation with respect to Bid Document. At the same time any change in the length as per the site condition shall attract the variation with respect to the bid document. Whether, concessionaire shall be allowed for alternate design/	Refer corrigendum/addendum.

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

	alternative measures as per the site condition in terms of slope protection works without any variation.	
9.	Whether all the project facilities including toll plaza and its equipment as set out in the Schedule C of bid document shall have to be provided and maintained as toll collection is not the Concessionaires responsibility? Partially Closed system" needs to be defined clearly? Maintenance?	No change in clause is envisaged. Partially closed system means semi-access controlled highway with no toll collection on minor access road. Toll plaza maintenance is also concessionaire responsibilities as part of the project assets.
10.	**Clause 3.9 of Schedule C of bid document** Please clarify that the said clause is applicable for implementation or maintenance period.	This clause is applicable till end of concession period.
11.	**Schedule B (Scope of the Project), Schedule C (Project Facilities) and Schedule D (Specification and Standard)** NHAI to confirm that the project scope shall be as per Schedule B & C.	As per RFP
12	Clause 3.6 (g) of Schedule C (Project Facilities) Please clarify that the said clause is applicable only for maintenance activities and petroling activities. If the said clause is applicable for providing the fuel to the public then the concessionaire is not eligible to get the NOC for storage of the fuel as per the central government policy.	The clause is self explanatory.
13	Please clarify how many ambulances are to be provided by concessionaire.	Refer Clause 3.5.5.1.2 of Schedule D of Non Technical Schedules (Part III)

593

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

Bidder: L&T Limited

Document: BOT Part-I: Instructions to Bidders

Sr. No.	Part & Clause No.	Subject/ Issue As per Document	Comments/ Clarifications	Proposed Reply
1.	1.6	Total Project Cost	Kindly confirm if the Total Project Cost includes various pre-operative expenses and cost of financing of the project.	Total Project Cost includes Civil Cost at current prices, contingencies, financing charges and Interest During Construction
2.	1.9	Contents of RFP Parts II and III viz. Draft Concession Agreement and Non-Technical Schedules to under go change	The proposed changes may be initiated at the earliest and adequate time be given to the Bidders to assess the changes and also another opportunity to clarify issues.	Please refer Addendum/ Corrigendum.
3.	Form at 3.2	Real Estate Liquidation	Mortgage or liquidation of Real Estate assets should not be considered, as valuation of the same may not be objective.	No Change

Document: BOT Part-II: Draft Concession Agreement

Sr. No.	Part & Clause No.	Subject/ Issue As per Document	Comments/ Clarifications	Proposed Reply
4		Definition of " Encumbrances"	All underground and above ground Utilities such as pipeline for oil, gas, water, telephone line, OFC cables, power cables, posts etc which exists within the ROW shall be included as encumbrances	No Change
5		Definition of "Project Agreements"	The definition need not include EPC, O&M and Toll Agreements. This could be dispensed with as these agreements are internal agreements of Concessionaire for implementation of the Project and the responsibility lies with Concessionaire for entire activities relating to Concession	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

6		Subsistence Revenue Level-O&M expense ceiling of 1.5% per annum is inadequate; Also the basis of 1.5% could not be ascertained. The ceiling of 1.5% would not work and the ceiling may exceed if at any given year if overlays and renewal are executed	This shall be left to the Concessionaire and prevailing market conditions.	No Change
7	4.1 (a)	Conditions Precedent-Applicable Permits, Schedule E	The Applicable Permits are mostly construction related and hence cannot be fulfilled prior to financial close. This may be removed from the list of Condition Precedent (CP)	No Change
8	4.1 (c)	Confusion between this clause and Cl 9.1 (xxx) in terms of clearance for reserved forest or similar features	The exemption clause in 9.1 (xxx): ------- excluding clearances pertaining to the Project Highway passing through protected forest or sanctuary or other similar features" may be included so that both the clauses read the same.	Please refer Addendum/ Corrigendum.
9	4.1 (e)	"--------conditions precedent to be fulfilled before financial close"	Some of the conditions like final agreements on financing, EPC, O&M contract, tolling contract etc shall be delivered after financial close. Hence clause may be modified.	No Change
10.	6.1	Rounding off of toll fee to nearest five rupees. "----that such fee shall be rounded off to the nearest five rupee for ensuring-------"As per the addendum it is to the nearest rupee.	The confusion between the rounding off figure as in Schedule G and the draft CA may be cleared.	***Please refer Addendum/ Corrigendum.***
11	6.4	"-----shall not collect any fees from Local personal traffic and	Local personal traffic and local commercial traffic-----not defined. Policy	***Please refer definition point no. (iv) of Schedule G.***

		Local Commercial Traffic------- "	of NHAI on local traffic may please be furnished.	
12	9.1 xi	Project Land	Land for additional facilities as required by contract or requested by NHAI shall be made available by NHAI to the concessionaire free of cost	No Change
13	9.1 xxvii	Divestment Requirements	Divestment requirements-this clause shall be applicable only under normal termination of project at the end of the concession period and under all other conditions this shall be on mutually agreeable terms. The transfer cost of the project including applicable stamp duties and related transfer charges shall be borne by NHAI	No Change
14	9.5	The concessionaire shall submit to NHAI the drafts of---------- EPC Contract, the Financing Documents, the O&M contract and the Tolling Contract for its review	This could be dispensed with as these agreements are internal agreements of Concessionaire for implementation of the Project and the responsibility lies with Concessionaire for entire activities relating to Concession Agreement	No Change
15	9.6	Discrepancy between Cl 9.6, Schedule D, Cl 4.1 (page D23), Schedule L Cl 1 Line 13 (page L1), Schedule L Cl 2.5.1 (page L8) and Schedule L Cl 2.5.2 (page L8)-(The sequence of construction is inconsistent among these clauses and is also not in line with the revised land transfer schedule as in Clauses 13.5.1 and 13.5.2 of the CA)	The construction schedule mentioned is not in line across all the clauses. It is also not in line with the land transfer schedule. The discrepancy may be cleared.	Please refer Addendum/ Corrigendum
	10.1	There is no mention about demolition of structures in ROW. It shall be part of NHAI obligation	A suitable clause be incorporated to this effect.	Please refer clause 9.1 (xxix) of Part II.

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

17	10.1 (i)	Enable access to the Site to the Concessionaire, free from Encumbrances, in accordance with this Agreement	To add "Encroachment, "and free of all utilities including power lines, Telephone line, OFC, Oil and gas pipe lines, service or water pipe line, underground cables, OH masts transmission towers etc. Also the vertical clearances required for the road as per IRC shall be taken into account for making any shifting" in this clause and be read as Enable access to the Site to the Concessionaire, free from Encumbrances & encroachment, in accordance with this Agreement	No Change
18	11.1 xiii	Equity holding structure	Equity holding structure for the Concessionaire should not be restricted and the Concessionaire should be allowed to modify it without affecting his responsibilities and performance as per the Concession Agreement	No Change
19	16.5	'------concessionaire hereby expressly authorizes NHAI and hereby gives irrevocable instructions to the Escrow bank------with the instructions of NHAI	Withdrawals directly from the Escrow account by NHAI may not go well with the lenders	No Change
20	18.9 to 18.15	Lane Closure	Lane closure & repairs, emergency & regular-the administrative procedures are to be simplified; lane closing & opening could be related to industry practices; penalty amount could be reduced & related to drops in travel time beyond a limit for a given level of traffic	No Change
	25.1	The concessionaire shall with in 60 days from this agreement open and establish the Escrow Account with a bank----------	Opening of escrow account with in 60 days of CA is not possible. Usually these accounts are opened after occurrence of the FC. Hence the time period should get extended upto Financial Closure.	Concessionaire may make specific request in case he is not successful in opening the account and NHAI may consider on case to case basis.

22	25.2.1 (iii)	Disbursement from Escrow Account	Monthly O&M expenses limiting to 1/12 of annual budget can be removed allowing monthly variations due to seasonal & actual variations	No Change
23	Article XXIX	Force Majeure	The period of subsistence of Force Majeure shall be changed from 7 days to 3 days under all events of Force Majeure	No Change
24	29.3 (iii)	Indirect political force Majeure events	Any Public agitation/ Strikes by Organization, which prevents collection of fees even partly for more than 3 days to be considered as Force-Majeure Clause.	No Change
25	29.6	Effect of Force Majeure after Financial Closure	Extension of concession period should be related to the rate of returns and not by no. of days of the event.	No Change
26	29.7 (b)	Force Majeure	The loss due to indirect political event such as public agitation etc, should be compensated at 100% by NHAI/STG	No Change
Document : BOT-Part III : Non-Technical Schedules				
27	G-3	Toll Fee	Earth moving equipment and heavy construction machinery including over sized vehicles carrying boilers, turbines, generators etc shall be a separate category for tolling than MAV	*Please refer Addendum/ Corrigendum.*

009

Document: Annuity Part-I: Instructions to Bidders

Sr. No.	Part & Clause No.	Subject/ Issue As per Document	Comments/ Clarifications	Proposed Reply
1.	1.6	Total Project Cost	Kindly confirm if the Total Project Cost includes various pre-operative expenses and cost of financing of the project.	Total Project Cost includes Civil Cost at current prices, contingencies, financing charges and Interest During Construction
2.	1.9	Contents of RFP Parts II and III viz. Draft	The proposed changes may be initiated at the earliest and adequate time be given to	Please refer Addendum/ Corrigendum.

		Concession Agreement and Non-Technical Schedules to under go change	the Bidders to assess the changes and also another opportunity to clarify issues.	
	Form at 3.2	Real Estate Liquidation	Mortgage or liquidation of Real Estate assets should not be considered, as valuation of the same may not be objective.	No Change
Document : Annuity Part – II : Draft Concession Agreement				
1	Definitions	Discounted Value of Future Net Cash Flows	Schedule M is not available. May be furnished	It is available
2.	6.1 (c)	Additional Highway	% of Additional Annuity Amount for inclusion of additional Highway to be specified before hand to quantify the financial implication to the Concessionaire	There is no additional highway
3.	8.6	Termination Payment	Discount rate to be specified	The rate will be specified in the bid documents for capacity augmentation as per prevalent conditions.
4	13.5.1	Land handing over Schedule	Schedule H and Clause 13.5.2 does not match. The discrepancy may be clarified	Please refer Addendum/ Corrigendum.
5.	15.3	Appointed Date	There is no definition of Appointed Date. Is this the same for Commencement date?	Please read Commencement date in place of Appointed Date
6.	16.5	"---------Concessionaire hereby expressly authorizes NHAI and hereby gives irrevocable instructions to the Escrow bank--------with the instructions of NHAI	Withdrawals directly from the Escrow account by NHAI may not go well with the lenders.	No Change
7	21.1	Traffic Sampling	Is this part of Concessionaire's scope for Annuity Project? This may be included in the scope of tolling contractor.	No Change

Reply to Queries – Palanpur-Swaroopgunj & Orai-Bhognipur-Barah Project on BOT/ BOT (Annuity) Basis.

GENERAL (Palanpur – Swaroopgunj Project)

1. Please clarify the scope of compensatory afforestation?

Compensatory afforestation includes Plantation and maintenance in next two consecutive years of two times the trees to be cut; plus Plantation and maintenance in next two consecutive years over the area equivalent to two times the forest land required for the project.

2. Tree cutting, Environmental Clearance, compensatory afforestation, resettlement and rehabilitation and shifting of utilities to be the obligation of NHA

Please refer Clause 9.1 (xxx) and Clause 10.1 (xiv) of RFP Part-II: Draft Concession Agreement.

3. Please clarify if there are any protected/ reserved forest or sensitive land use in the project area

All roadside plantation is under Protected Forest, 1.84 km long road stretch is in Balaram wild life sanctuary.

4. What is the status of environmental clearance for the project?

The case is with Ministry of Environment and Forest and the clearance is likely to be granted shortly.

209

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)

BOT Part I: Instructions to Bidders

Sl. No	As in issued document	Revised to
1	Point No 3 (Page 4) The bidder can bid for the project on BOT or BOT (Annuity) basis or both the basis. NHAI will first open the bids received on BOT basis for evaluation. It is however mentioned that this will be followed in case two or more bids are received on BOT basis. After evaluation, if bids on BOT basis are found to be reasonable, the same would be awarded and bids on BOT (Annuity) basis would be returned unopened. In case, bids on BOT basis are found to be unreasonable, the same would not be awarded and bids on BOT (Annuity) basis would be opened for evaluation. It is reiterated that in case only one bid (i.e. less than two) is received on BOT basis, the same would not be opened and only BOT (Annuity) bids, if more than one, would be opened for evaluation. In case single bid is received from both BOT and BOT (Annuity) basis, the same would be returned unopened.	Point No 3 (Page 4) The bidder can bid for the project on BOT or BOT (Annuity) basis or both the basis. NHAI will first open the bids received on BOT basis for evaluation. It is however mentioned that this will be followed in case two or more bids are received on BOT basis. After evaluation, if bids on BOT basis are found to be reasonable, the same would be awarded and bids on BOT (Annuity) basis would be returned unopened. In case, bids on BOT basis are found to be unreasonable, the same would not be awarded and bids on BOT (Annuity) basis would be opened for evaluation. It is reiterated that in case only one bid (i.e. less than two) is received on BOT basis, the same would not be opened and only BOT (Annuity) bids, if more than one, would be opened for evaluation. In case single bid is received from both BOT and BOT (Annuity) basis, the same would be considered on case to case basis.
2	Page 11 Clause No.1.9: Contents of RFP (2nd Para Below Table) "Part II & Part III of this RFP is currently being reviewed and may Undergo changes. Any changes incorporated in the Part II & III of this RFP will be communicated to the Bidders through addendum by NHAI"	Deleted

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)
Annuity: Part I: Instructions to Bidders

S. No	As in issued document	Revised to
1	Point No 3 (Page 5) The bidder can bid for the project on BOT or BOT (Annuity) basis or both the basis. NHAI will first open the bids received on BOT basis for evaluation. It is however mentioned that this will be followed in case two or more bids are received on BOT basis. After evaluation, if bids on BOT basis are found to be reasonable, the same would be awarded and bids on BOT (Annuity) basis would be returned unopened. In case, bids on BOT basis are found to be unreasonable, the same would not be awarded and bids on BOT (Annuity) basis would be opened for evaluation. It is reiterated that in case only one bid (i.e. less than two) is received on BOT basis, the same would not be opened and only BOT (Annuity) bids, if more than one, would be opened for evaluation. In case single bid is received from both BOT and BOT (Annuity) basis, the same would be returned unopened.	Point No 3 (Page 5) The bidder can bid for the project on BOT or BOT (Annuity) basis or both the basis. NHAI will first open the bids received on BOT basis for evaluation. It is however mentioned that this will be followed in case two or more bids are received on BOT basis. After evaluation, if bids on BOT basis are found to be reasonable, the same would be awarded and bids on BOT (Annuity) basis would be returned unopened. In case, bids on BOT basis are found to be unreasonable, the same would not be awarded and bids on BOT (Annuity) basis would be opened for evaluation. It is reiterated that in case only one bid (i.e. less than two) is received on BOT basis, the same would not be opened and only BOT (Annuity) bids, if more than one, would be opened for evaluation. In case single bid is received from both BOT and BOT (Annuity) basis, the same would be considered on case to case basis.
2	Page 12 Clause No.1.9: Contents of RFP (2nd Para Below Table) "Part II & Part III of this RFP is currently being reviewed and may Undergo changes. Any changes incorporated in the Part II & III of this RFP will be communicated to the Bidders through addendum by NHAI"	Deleted

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)
BQE: Part II: Draft Concession Agreement

S.No.	As in issued document	Revised to
	Clause 4.1 (c) The Concessionaire shall have obtained all Central Government clearances and permits under the applicable laws relating to environmental protection and conservation from the Ministry of Environment and Forest.	Clause 4.1 (c) The Concessionaire shall have obtained all Central Government clearances and permits under the applicable laws relating to environmental protection and conservation from the Ministry of Environment and Forest including the project highway passing through protected forest or sanctuary or other similar features.
2.	Page 22 Clause 6.1 (last line): Fees ---------rounded off to the nearest five rupee for ensuring ease of payment and collection	---------rounded off to the nearest rupee for ensuring ease of payment and collection
3.	Page 28 Clause 9.1(xxx) Obligations of Concessionaire obtain all the necessary environmental clearances, cut the trees and carry out compensatory afforestation, as per the applicable state laws, at his own cost excluding clearances pertaining to the Project Highway passing through protected forest or sanctuary or other similar features.	obtain all the necessary environmental clearances, cut the trees and carry out compensatory afforestation, as per the applicable state laws including clearances pertaining to the Project Highway passing through protected forest or sanctuary or other similar features. However, the cost would be borne by NHAI. In case of ROBs, concessionaire shall obtain all clearances from railway and also bear on expenses relating to clearances/maintenance/construction etc.
4.	Page 28 Clause 9.1(xxxi) Obligations of Concessionaire carry out shifting of utility services.	Carry out shifting of utilities. The cost towards utility shifting as per the demand note of concerned Government/ Semi-Government agencies shall be borne by NHAI.
5.	Page 32 Clause 10.1 (xiv) Obligations of NHAI bear all expenses as per the demand note raised by the	bear all expenses as per the demand note raised by the

S. No	As in issued document	Revised to
	concerned government or other concerned agencies in respect of shifting of all types of utility services and rehabilitation and resettlement. Obtain approvals from Railways for GADs for construction of ROB/RUB on Railway lines.	concerned government or other concerned agencies in respect of shifting of all types of utility services, environmental clearances, tree cutting, compensatory afforestation and rehabilitation and resettlement. However, responsibility for shifting/approval etc. rests with the concessionaire.
	Page 37 Clause No 13.5.2 (6^{th}, 7^{th}, 8^{th} & 9^{th} Line) : Additional Right of Way "50% of Additional Right of Way for construction of main carriageway on or before 6 (six) months from the Appointed Date balance 50% of the Additional right of way for construction of main carriageway on or before 12 months from the Appointed Date."	Deleted

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)

Annuity: Part II: Draft Concession Agreement

S. No	As in issued document	Revised to
1	Definitions Definition of COD not mentioned in the document	The following definition is added between the definitions of "Bidder" and "Capacity Augmentation" on page 5------- "COD means the commercial operations date of the Project Highway and shall be the date on which the Independent Consultant has issued the final Completion Certificate or the provisional Certificate certifying Project Completion of the Project Highway in accordance with Article XVI of this Agreement.
2.	Clause 4.1 (c) The Concessionaire shall have obtained all Central Government clearances and permits under the applicable laws relating to environmental protection and conservation from the Ministry of Environment and Forest.	Clause 4.1 (c) The Concessionaire shall have obtained all Central Government clearances and permits under the applicable laws relating to environmental protection and conservation from the Ministry of Environment and Forest including the project highway passing through protected forest or sanctuary or other similar features.
3.	Page 24 Clause 6.1 (b): Payment of Annuity NHAI shall as security for payment of Annuity, provide to the Concessionaire a Letter of Credit from a Scheduled Bank in India for a sum equal to ____(one annuity payment amount). Such Letter of Credit shall be established within 30 days from the expected date of COD as intimated by the Concessionaire.	NHAI shall as security for payment of Annuity, provide to the Concessionaire a Irrevocable Revolving Letter of Credit from a Scheduled Bank in India for a sum equal to----------(one annuity payment). Such Letter of Credit shall be established with in 30 days from the expired date of COD as intimated by the Concessionaire.

S. No	As in issued document	Revised to
4.	Page 35 Clause 9.1(xxx) Obligations of Concessionaire obtain all the necessary environmental clearances, cut the trees and carry out compensatory afforestation, as per the applicable state laws, at his own cost excluding clearances pertaining to the Project Highway passing through protected forest or sanctuary or other similar features.	obtain all the necessary environmental clearances, cut the trees and carry out compensatory afforestation, as per the applicable state laws including clearances pertaining to the Project Highway passing through protected forest or sanctuary or other similar features. However, the cost would be borne by NHAI. In case of ROBs, concessionaire shall obtain all clearances from railway and also bear on expenses relating to clearances/maintenance/construction etc.
5.	Page 35 Clause 9.1(xxxi) Obligations of Concessionaire carry out shifting of utility services.	Carry out shifting of utilities. The cost towards utility shifting as per the demand note of concerned Government/ Semi-Government agencies shall be borne by NHAI.
6.	Page 40 Clause 10.1 (xiv) Obligations of NHAI bear all expenses as per the demand note raised by the concerned government or other concerned agencies in respect of shifting of all types of utility services and rehabilitation and resettlement. Obtain approvals from Railways for GADs for construction of ROB/RUB on Railway lines.	bear all expenses as per the demand note raised by the concerned government or other concerned agencies in respect of shifting of all types of utility services, environmental clearances, tree cutting, compensatory afforestation and rehabilitation and resettlement. However, responsibility for shifting/approval etc. rests with the concessionaire.
7.	Page 46 & 47 Clause No 13.5.2 (6^{th}, 7^{th}, 8^{th} & 9^{th} Line) : Additional Right of Way "50% of Additional Right of Way for construction of main carriageway on or before 6 (six) months from the Appointed Date balance 50% of the Additional right of way for construction of main carriageway on or before 12 months from the Appointed Date."	Deleted

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)

BOT: Part III: Non-Technical Schedules

S. No	As in issued document	Revised to
1	Schedule D-Specifications & Standards Clause 4.1 (3rd, 4th & 5th Line): Safety During Project Execution, Operation & Maintenance "The additional lanes shall be constructed first and the traffic diverted to it before improvements to the existing road are taken up."	Delete the sentence. Add the following at the end of Cl. 4.1: "Concessionaire shall however ensure smooth flow of traffic during construction."
2	Schedule G	The table and clause 3 & 8 of notes of schedule has been revised and the revised table and clause 3 & 8 of notes are at Annexure 10

Addendum/ Corrigendum to the Bid Documents
(Palanpur-Swaroopgunj Section and Orai-Bhognipur-Barah Section)

Annuity: Part III: Non-Technical Schedules

S. No	As in issued document	Revised to
1	Schedule D-Specifications & Standards Clause 4.1 (3rd, 4th & 5th Line): Safety During Project Execution, Operation & Maintenance "The additional lanes shall be constructed first and the traffic diverted to it before improvements to the existing road are taken up."	Delete the sentence. Add the following at the end of Cl. 4.1: "Concessionaire shall however ensure smooth flow of traffic during construction."

610

Addendum/ Corrigendum to the Bid Documents
Palanpur-Swaroopgunj Section

Part IV: Technical Schedules

S. No	As in issued document	Revised to
1.	Schedule B: Scope of the Project Clause 2.4 (e) Phasing of works: " Construct 27 minor bridges and ----------	"Construct 20 minor bridges and----------
2.	Schedule B: Scope of the Project Clause 2.10.2: Bridges: " Six Major bridges and 27 minor bridges----------	"Six major bridges and 20 minor bridges (as specified in Annexure B.3 of Schedule B)----------
3.	Schedule B: Scope of the Project Clause 2.13: Slope Protection Measures:	Add followings as new para below Table B.7 as seventh para: "The details including location given in Tables B.3, B.4, B.5, B.6 and B.7 are for guideline only and exact location and design shall be finalized at the detailed design stage in consultation with the Independent Consultant and NHAI."
4.	Schedule B: Scope of Project Clause 3.3: Clearances to be obtained	Refer Chapter III, Clause IX and X, Part II (Draft Concession Agreement)
5.	Schedule B: Scope of Project Clause 3.4: Encroachment Removal NHAI shall bear entire cost for removal of all Encroachments along the "Project Highway". However Physical removal is to be done by Concessionaire by providing all necessary support in terms of resources for carrying out the activities	NHAI would coordinate with Government of Gujarat and Rajasthan authorities for completing the legal requirements and maintaining law and order during removal of encroachments by the Concessionaire.
6.	Schedule C: Project Facilities	Add para 3.10 as per Annexure 1.
	Schedule C : Clause 3.9 Project Vehicle "Two brand new vehicles (Make : Toyoto Quailis)....."	"Two brand new vehicles (Make : Scorpio or equivalent)....."

3.10 Highway Traffic Management System (HTMS)

Project Highway shall be provided with Highway Traffic Management Systems (HTMS) to collect/disseminate information for traffic and incident management and for the safety of Users. The system shall comprise following sub-systems:

i) Emergency Communication System.
ii) Mobile Communication System.
iii) Variable Message Sign System.
iv) Meteorological Data system.
v) Automatic traffic counter- cum-classifier system
vi) Power Supply System.
vii) CCTV Surveillance System.

Emergency Communication System shall have Emergency Call Boxes (ECBs) installed at the spacing of 2 km on either side of the highway for both direction of travel and connected to the control centre through the transmission system of optical fibre cable and copper cables with suitable interfacing. The toll plaza shall have main control centre so that any user making emergency call from ECBs can be provided the assistance of ambulance, crane and highway patrol unit depending upon the location of caller.

Mobile Communication System shall have mobile sets provided on ambulances, cranes and patrolling vehicles for facilitating speedy communication even when they are on the move.

Variable Message Signs shall be provided at minimum six locations to guide and forewarn the users about the traffic and weather conditions on highways. These messages can be varied from control centres based on the data received through surveillance system, highway patrolling, traffic censors etc. The locations shall be decided for their maximum utility to the users.

Meteorological Data System shall be installed at minimum two locations to provide weather information on temperature, wind speed, humidity and visibility. These informations shall be available to the users through variable message signs as per requirements

Automatic Traffic Counters cum-classifier shall be installed at minimum two locations for traffic data collection and monitoring.

CCTV Surveillance system – For the close circuit TV Surveillance, Video Cameras shall be installed at major intersections and at least two mid block sections on the highway for visual information collection and distance surveillance system.

These systems shall have outdoor equipments consisting of ECBs, VMS panels, weather sensors, traffic sensors, video camera etc. The outdoor equipment shall be connected to the control centre through transmission system preferably comprising optical fibre cable, copper cable, interface equipment and weather proof. The control centre shall have monitoring equipment, on line information acquisition equipment, processing equipment etc. It shall also have a graphic display board showing the highway and the locations of equipments and of incidents. The main control centre and sub-centre would also have ambulance, tow-away trucks and cranes, and fire tenders for dispatching these emergency services to the required locations.

Addendum/ Corrigendum to the Bid Documents
Orai-Bhognipur-Barah Section

Part IV: Technical Schedules

Sl. No.	As in issued document	Revised to
1.	Schedule A Clause 1.1: The project site relates to the 2-Lane section of NH-25 from Orai (km 220.00) to Bhognipur (km 255.400) and from Bhognipur (422.00) to Barah (km 449.00)	This project relates to four-laning of 2-lane section from Orai (km 220.00) to Bhognipur (km 255.00) of NH-25, and 2 lane section of Bhognipur Junction (km 421.20) to Barah (449.00) of NH 2 including junction at Bhognipur so that a continuous four lane stretch is available from Orai to Bara.
2.	General	The project stretch should be considered as mentioned at Sl. No. 1 above wherever the project stretch is mentioned in the bid document.
3.	Schedule A: Clause 2.1 (b) The Project Highway covers km 220.00 (End of Orai) to km 255.00 (Bhognipur) and km 422.00 (Bhognipur) to km 449.00 (Barah) of NH-25 at Barah.	As per Sl. No. 1 above.
4.	Schedule A: Clause 2.9: The Project Highway has total 76 culverts consisting of 6 Hume Pipe, 39 RCC Slab and remaining 31box/arch/slab culverts.	Clause 2.9: The Project Highway has total 75 culverts consisting of 6 Hume Pipe, 39 RCC Slab and remaining 30box/arch/slab culverts
5.	Schedule A: In Table A-9 Length (km) 63.22	As mentioned at Sl. No. 1 above.
6.	Schedule A Annexure A-2 : Details of existing junctions	Annexure A-2 has been modified and modified Annexure A-2 is at Annexure 2.
7.	Schedule A Annexure A-3 : Road Inventory	Page A-16 and A-17 of Annexure A3 has been modified and modified pages are at Annexure 3.
8.	Schedule A Table A-8 : Details of Existing Pavement Composition	Table A-8 has been modified and modified Table A-8 is at Annexure 4.

9.	Schedule B; Clause 2.4.1 2nd Para "There are a total of 67 culverts--------given in Annexure B-1"	"There are a total of 75 culverts as detailed in Annexure A-8. The improvement scheme of these culverts is as given in Annexure B-1. One new box culvert (STR NO. 443/2) has been added to the existing no of Culverts."
10.	Schedule B Annexure B-2 : Improvement Proposal for Bridges and Structures	Annexure B-2 has been modified and modified Annexure B-2 is at Annexure 5.
11.	Schedule B	Add **Clause 2.0 (A) (Phasing of works) and Clause 2.0 (B) (Preparatory works)** after Clause 2 (pg. B-2) as per Annexure 6.
12.	Schedule B	Add **para 2.4.2(A)** after para 2.4.2 as per Annexure 7.
13.	Schedule B: Clause 2.1 (A); The Project highway (length=63.22 km)---------- ---	As per Sl. No. 1 above.
14.	Schedule B; Clause 8.3: Clearances to be obtained	Refer Chapter III, Clause IX and X of Part II (Draft Concession Agreement)
15.	Schedule B; Clause 8.4: Encroachment approval "Encroachments shall be removed by NHAI at his own cost"	"NHAI would coordinate with Government of Uttar Pradesh authorities for completing the legal requirements and maintaining law and order during removal of encroachments by the Concessionaire."
16.	Schedule B: Drawing: CRTS/NHAI/E-W/NH-25/C-III/31/MISC/005 and NHAI/GW-JH/NH-25/MISC/CB/STD-04-BOT for metal crash barrier.	There are two drawings (CRTS/NHAI/E-W/NH-25/C-III/31/MISC/005 and NHAI/GW-JH/NH-25/MISC/CB/STD-04-BOT) for metal crash barrier. The exact drawing to be adopted for metal crash barrier for the project would be finalized by independent Consultant.
17.	Drawings	Drawing (CRTS/NHAI/NS-NH-25/FL-2/002) for Flyover at km 425.15 of NH 2 to be added (Annexure 8)
18.	Schedule C : Project Facilities	Add para 3.8, 3.9 & 3.10 as per Annexure 9.

19.	Annexure B-1, pg. B-17, Column No. 8 (Remarks column)	Abbreviation used are as under: REFL : New construction for full length NCBL : New construction for balance length NCNA : New construction for new alignment DEO : Demolishing existing one.
20.	Schedule C : Clause 3.7 Project Vehicle "Two brand new vehicles (Make Toyota Qualis)....."	"Two brand new vehicles (Make : Scorpio or equivalent)....."

616

Annexure A-2: Details of Existing Junctions

S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
1	225.536		5		LHS	
2	227.250		2		LHS	
3	232.350		5		RHS	
4	238.350					Madaripur crossing (start)
5	238.425					Hamirpur Junction
6	249.462		1		RHS	
7	249.478		5		LHS	
8	249.759		1		RHS	
9	249.918		1		RHS	
10	249.919		5		LHS	
11	252.016		5		RHS	
12	252.036		5		LHS	
13	255.000					Etawah Junction
14	255.460		1		RHS	
15	256.268		1		LHS	
16	256.559		1		LHS	
17	256.550		1		LHS	
18	421.407		BT	3.0	Right	To Ghatampur
19	422.555		BT	3.0	Left	To Khusrujapur
20	423.00		BT	3.0	Right	To Pukhrayan
21	423.100		BT	3.5	Right	To Pukhrayan

Annexure A-2: Details of Existing Junctions

S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
22	423.450		BT BT	3.0 3.0	Left Right	To Arauli To Pukhrayan
23	423.984		GR GR	4.0 3.0	Left Right	To Alapur To Kashwa
24	424.168		GR	3.0	Right	To Pukhrayan
25	424.478		GR	3.0	Right	To Pukhrayan
26	424.837		BT BT	3.0 3.0	Left Right	To Harthawa To Pukhrayan
27	424.871		BT	3.0	Right	To Pukhrayan
28	425.00		BT	3.0	Right	To Pukhrayan
29	425.115		BT BT	3.0 3.0	Left Right	To Harthawa To Pukhrayan
30	425.388		BT BT	3.0 3.0	Left Right	To Chaura To Pukhrayan
31	425.662		BRICK ROAD	3.0	Right	To Pukhrayan
32	426.263		BT	3.0	Left	To Chora
33	426.863		GR	4.0	Right	To Pukhrayan
34	427.066		BT	3.0	Right	To Thalal Nagar
35	428.062		BT	3.0	Left	To Patoli
36	428.500		BT	3.0	Right	To Hatwa
37	428.710		BT	3.0	Left	To Hadarpur
38	429.672		GR	3.0	Right	To Harshmer
39	429.794		BT GR	3.0 3.0	Left Right	To Hadarpu To Harshmer
40	431.458		BT	3.0	Left	To Dhopa
41	431.633		BT	3.0	Right	To Mujeyapur
42	431.700		GR	2.0	Right	To Chhataine Village

Annexure A-2: Details of Existing Junctions

S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
43	432.177		GR	3.0	Left	To Blacl Malsa
44	432.551		BT	4.0	Left	To Jalalpur
45	433.482		BT BT	3.0 3.0	Left Right	To Baroor To Digh
46	433.780		GR	3.0	Right	To Digh
47	434.719		BT	3.0	Left	To Baroor
48	434.759		BT	3.0	Right	To Malasa
49	435.085		BT	3.0	Right	To Magamathpur
50	437.152		BT	3.0	Left	To Maapur
51	439.181		GR	3.0	Right	To Zeenatpur
52	439.389		BT	3.0	Left	To Goraw Village
53	440.724		BT	3.0	Right	To Musha Nagar
54	440.865		GR	4.0	Right	To Musha Nagar
55	441.00		BT	3.0	Left	To Karasa
56	441.834		BT GR	3.0 3.0	Left Right	To Akbarpur To Latupur
57	443.229		BT	3.50	Left	To Akbarpur
58	443.591		BT	3.0	Right	To Kantnya
59	444.065		BT	7.0	Left	To Akbarpur
60	445.414		GR GT	4.0 6.0	Left Right	To Nabipur To Mushapur
61	446.053		BT BT	5.0 7.0	Left Right	To Jainpur
62	446.659		BT BT	3.0 4.5	Left Right	To Surupur To Jainpur
63	447.079		BT	3.0	Left	To Surupur

Annexure A-2: Details of Existing Junctions

S. No.	Location (km)	Category	Type	Carriageway Width (m)	Crossing Left/Right	Remarks
64	447.161		BT	3.0	Left	To Surupur
65	447.464		BT	5.0	Right	To Mangolpur

Note: NH=National Highway; SH=State Highway; MDR=Major District Road; ODR=Other District Road; VR=Village Road
BT= Bituminous Road; GR= Gravel Road; ER= Earthen Road

Annexure 3

Annexure A-3: Road Inventory

From	To	Geometric Deficiencies	ROW Width	Road way Width	Ht of Fill (m)	Pavement		Shoulders			Drain Type
						Type	Width	Type	Width (m)		
									Left	Right	
220.00	221.00		30.00	7.00	0.35	Bituminous	7.00	Earthen			-
221.00	222.00		35.00	7.00	0.70	Bituminous	7.00	Earthen			-
222.00	223.00		30.00	7.00	3.25	Bituminous	7.00	Earthen			-
223.00	224.00		36.00	7.00	1.00	Bituminous	7.00	Earthen			-
224.00	225.00		36.00	7.00	0.40	Bituminous	7.00	Earthen			-
225.00	226.00		37.00	7.00	0.60	Bituminous	7.00	Earthen			-
226.00	227.00		37.00	7.00	0.90	Bituminous	7.00	Earthen			-
227.00	228.00		34.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
228.00	229.00		37.00	7.00	0.50	Bituminous	7.00	Earthen			-
229.00	230.00		37.00	7.00	0.90	Bituminous	7.00	Earthen			-
230.00	231.00		36.00	7.00	1.20	Bituminous	7.00	Earthen			-
231.00	232.00		34.00	7.00	0.20	Bituminous	7.00	Earthen			-
232.00	233.00		34.00	7.00	0.75	Bituminous	7.00	Earthen			-
233.00	234.00		39.00	7.00	0.60	Bituminous	7.00	Earthen			-
[illegible]00	235.00		37.00	7.00	0.40	Bituminous	7.00	Earthen			-
[illegible]00	236.00		36.00	7.00	0.80	Bituminous	7.00	Earthen			-

621

236.00	237.00		36.00	7.00	1.25	Bituminous	7.00	Earthen			-
237.00	238.00		34.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
238.00	239.00	-	33.00	7.00	0.50	Bituminous	7.00	Earthen			-
239.00	240.00		35.00	7.00	1.00	Bituminous	7.00	Earthen			-
240.00	241.00		36.00	7.00	0.60	Bituminous	7.00	Earthen			-
241.00	242.00	Sharp Horizontal Curves	36.00	7.00	0.50	Bituminous	7.00	Earthen			-
242.00	243.00	Sharp Horizontal Curves	36.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
243.00	244.00	Back-to Back Horizontal Curves	45.00	7.00	0.25	Bituminous	7.00	Earthen			-
244.00	245.00		45.00	7.00	Natural Ground	Bituminous	7.00	Earthen			-
245.00	246.00		Kalpi Bridge		-	Bituminous	7.00	Earthen			-
246.00	247.00		39.00	10.50	1.20	Bituminous	7.50	Paved	1.5	1.5	-
247.00	248.00		39.00	10.50	2.10	Bituminous	7.50	Paved	1.5	1.5	-
248.00	249.00		39.00	10.50	1.10	Bituminous	7.50	Paved	1.5	1.5	-
249.00	250.00		39.00	10.50	0.90	Bituminous	7.50	Paved	1.5	1.5	-
250.00	251.00		39.00	10.50	1.00	Bituminous	7.50	Paved	1.5	1.5	-
251.00	252.00		39.00	10.50	1.30	Bituminous	7.50	Paved	1.5	1.5	-
252.00	253.00		39.00	10.50	0.70	Bituminous	7.50	Paved	1.5	1.5	-
253.00	254.00		40.00	10.50	1.20	Bituminous	7.50	Paved	1.5	1.5	-
254.00	255.00		40.00	10.50	0.50	Bituminous	7.50	Paved	1.5	1.5	-

Table A-8: Details of Existing Pavement Composition

Chainage	Thickness Crust -Layers in mm					Remarks
	Bituminous Course	WBM	Base Course	Soling (Brick / Talford base)	Granular Material	
220.000	150	100			150	
225.000	150	75			160	
230.000	130	130			130	
235.000	150	155			150	
240.000	75	90			250	
248.000	240	140		200		
250.000	125	100		150		
255.000	125	120		150		
421.500	170	210		70		
422.000	125	80		150		
422.5	185	240		120		
423.000	220	150		180		
423.500	260	170		140		
424.000	170	30		140		
424.500	210	220		180		
425.000	200	160		180		
425.500	200	230		260		
426.000	180	180		90		
426.500	160	150		160		
427.000	320	130		220		
427.500	300	120		100		
428.000	240	140		80		

428.500	280	135		85		
429.000	230	140		160		
429.500	260	55		165		
430.000	200	180		80		
430.500	280	100		140		
431.000	290	140		80		
431.500	280	180		80		
432.000	160	140		80		
432.500	150	100		160		
433.000	150	100		100		
433.500	160	--		--		
434.000	150	130		80		
434.500	210	170		--		
435.000	80	70		60		
435.500	90	120		60		
436.000	50	90		60		
436.500	50	100		60		
437.000	40	120		80		
437.500	40	70		80		
438.000	40	90		70		
438.500	35	90		70		
439.000	40	80		80		
439.500	50	90		70		
440.000	40	100		70		
440.500	50	100		80		

441.000	60	160		70		
441.500	40	120		70		
442.000	80	180		70		
442.500	60	110		70		
443.000	60	90		70		
443.500	55	100		70		
444.000	70	160		40	Soling	
444.500	60	65		--	(90-45) 120*	
445.000	60	60		--	100*	
445.500	60	160		--		
446.000	70	110		--		
446.500	70	170		--		
447.000	100	100		--	80*	
447.500	170	130		120		
448.000	180	60		240		
448.500	250			--	120	
449.000	170	230		60		

Annexure 5

Annexure B-2: Improvement Proposal for Bridges & Structures

S. No.	Bridge No.	Proposed Chainage (Km)	Proposed Scheme	Span Arrangement (Nos. x m)	Skew	Superstructure Type	Substructure		Foundation		Remarks
							Abutments	Pier	Abutments	Pier	
Minor Bridges											
1	446/2	445.15	Additional 2 Lane	6.3+6.0+6.2		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
2	222/1	222.00	Additional 2 Lane	14.6x2+14.5x1		RCC Solid slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
Major Bridges											
1	438/1	437.64	Additional 2 Lane	3 x 26.3		PSC Guider & RCC Slab	Wall Type	Wall Type	Well foundation	Well foundation	
2	246/1	245.00	Additional 2 Lane	8x85+2x42.5		RCC Slab	Wall Type	Octagonal shape	Well foundation	Well foundation	
Grade Separator											
1		421.200	2 x 2 Lane	11 x 26.25		PSC Guider & RCC Slab	Wall Type	Wall Type	Pile Foundation	Pile Foundation	
2		425.150	2 x 2 Lane	1 x 10.5		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	
3		434.763	2 x 2 Lane	1 x 30.0		PSC Guider & RCC Slab	Circular		Pile Foundation		
4		442.144	2 x 2 Lane	1 x 10.5		RCC Solid Slab	Wall Type	Wall Type	Open Foundation	Open Foundation	

626

Annexure B-2: Improvement Proposal for Bridges & Structures

S. No.	Bridge No.	Proposed Chainage (Km)	Proposed Scheme	Span Arrangement (Nos. x m)	Skew	Superstructure Type	Substructure		Foundation		Remarks
							Abutments	Pier	Abutments	Pier	
5		444.066	2 x 2 Lane	1 x 30.0		PSC Guider & RCC Slab	Circular		Pile Foundation		
6		448.929	2x2 Lane	2 x 30.0		PSC Guider & RCC Slab	Circular	Circular	Pile Foundation	Pile Foundation	

2.0 (A) Phasing of works

The work of 4-Laning from Orai to Barah section (km 220 to km 255 of NH-25) and Bhognipur junction to Bara (km 421.2 to km 449 of NH-25) including junction at Bhognipur, so that a continuous four lane stretch is available from Orai to Bara, is required to be completed in single phase only as per the following broad scope of work:

a. Build a new carriageway on left or right or both sides of the existing road as given in Table B-1.It should be noted that where possible the existing road is to be retained for strengthening
b. Realign parts of existing road;
c. Extend/Reconstruct 76 existing cross drainage structures under the new carriageway and service roads (wherever provisioned) throughout the alignment ;
d. Build one vehicular underpass at locations mentioned in Annexure B-3
e. Construct 02 minor bridges and 02 major bridges as per details given in Annexure B-2
f. Build parallel service roads at vehicular underpass/flyover locations and at built up area locations as per details given in Table B-2;
g. Strengthening the existing carriageway over a continuous stretch from Orai to Bara;
h. Build six Grade separators as per details given in Annexure B-2;
i. Improve at-grade junctions as per MORTH Type design of intersection and minor intersections at locations as given in Annexure A-2
j. Construct not more than two toll plazas, however it has been proposed to provide one toll plaza for project highway corridor details are given in Table C-1. At least 6 lay bye shall be provided as per Table C-2 and at least 15 new bus bays shall be constructed.
k. Construct lined and unlined drains at least at the locations detailed below,
   (i) Side drains of required cross sections for area drainage for both sides of carriageway in rural sections.
   (ii) Covered pucca drains underneath the sidewalk in the urban sections
   (iii) Open pucca drains underneath the median between main carriageway with service with proper connection to the outfall location in the urban sections
   (iv) Chute drains along with shoulder drains in high embankment zones
   (v) Median drains at super elevated sections ;
l. Provide markings and traffic road signs and other required appurtenances;
m. Trees shall be planted in ROW and on either side of road with staggered pitch as per IRC: SP 21, arrangement for plantation of trees shall be in accordance with MoRTH technical circular no. NH-41 (34)/69.
n. Repair of existing bridges and culverts as directed by the independent engineer
o. Construct road users amenities (Toilets, rest areas, drinking water kiosk etc) and

p. Beautification and land scaping project highway highway

The detailed design of the project work as given above and maintenance and management of the project highway during concession period are included in the scope of project

2.0 (B) Preparatory works

The work shall, inter-alia, include, but not limited, to the following as specified or as directed:

(i) Conducting his own field survey for design and setting out horizontal alignment and vertical profile in accordance with IRC: 38-1988 and IRC: SP23-1983 respectively.

(ii) Site clearance, removal of trees stumps and dismantling of obstructions etc.

(iii) True and proper setting out and lay out of the works, setting of bench marks, preparations of working drawings and provisions of all necessary labour, instruments, appliance in connection therewith.

(iv) Shifting and reconstruction of existing religious structure.

2.4.2 (A) Two major bridges and two minor bridges are to be constructed over the additional two lane carriageway. At the location of major/minor river bridges, the necessary river training works also form part of the scope of the project.

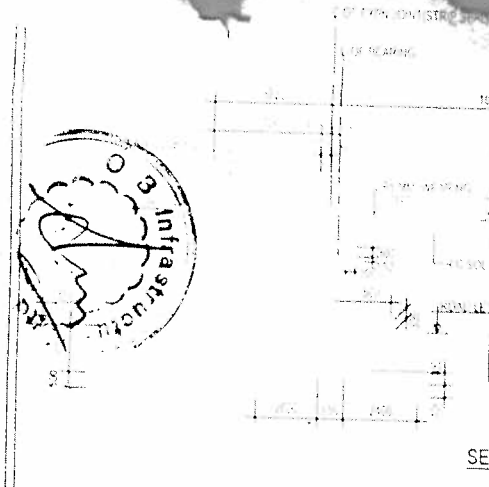
Major Bridges

(i) New 2-lane bridge along side of the existing bridge No.246/1 and 438/1

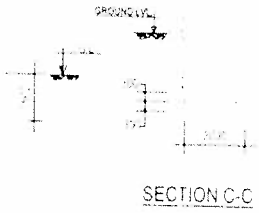
Minor Bridges

(ii) New 2-lane bridge along side of the existing bridge No. 222/1 and 446/2

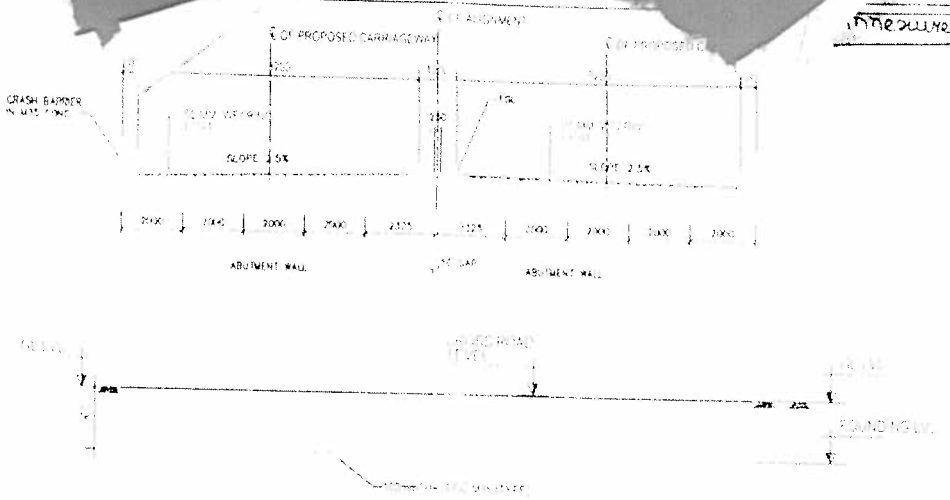
Annexure 8



SECTION A-A



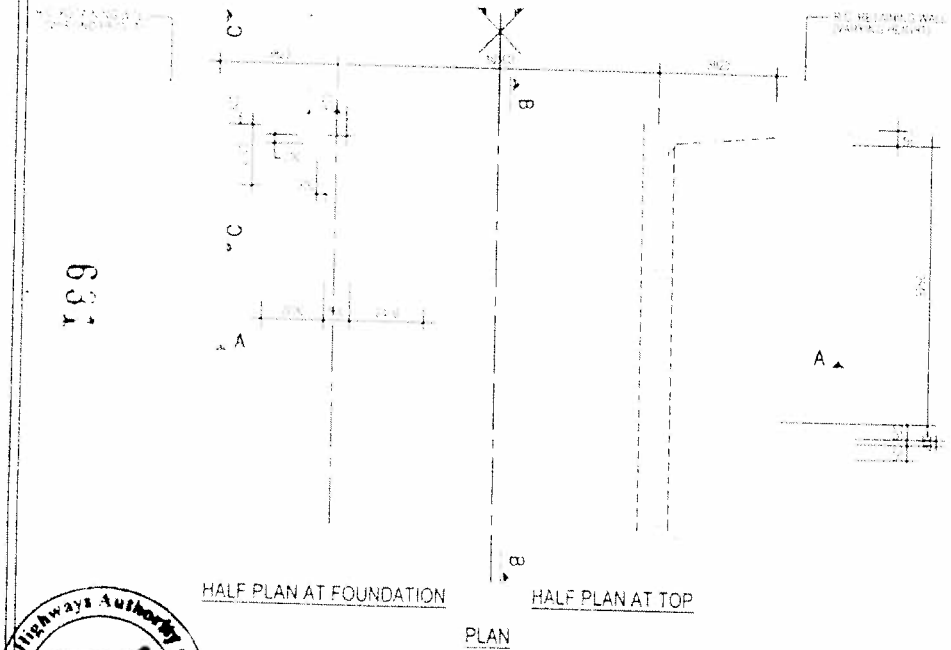
SECTION C-C



SECTION B-B

SCHEDULE FOR UNDERPASSES

FLYOVER NO	CHAINAGE	GROUND LEVEL	EXISTING CROSS ROAD LEVEL	F.G.L.	TOP OF ABUT CAP LEVEL	FOUNDING LEVEL	MINIMUM CLEARANCE (M)
1	2	3	4	5	6	7	8
	424.15	129.20	131.2	134.80	136.80	127.30	3.60



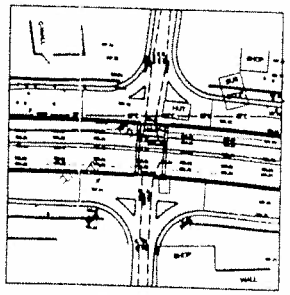
HALF PLAN AT FOUNDATION

HALF PLAN AT TOP

PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS IN M.
2. NO. OF CARRIAGEWAYS BETWEEN ABUTMENTS
   a) TWO LANES OF CLASS 'A'
   b) ONE LANE OF CLASS 'A'
3. BACK FILL MATERIAL SHALL BE AS PER CL. NO. 305 OF MORTH SPECIFICATION OF ROADS AND BRIDGES (FOURTH REVISION) AND CBR VALUE SHALL BE AS PER CONSULTANCY SPECIFICATION.
4. ABUTMENT FILTER MATERIAL SHALL BE AS PER CL. NO. 2504 OF MORTH SPECIFICATION AND BE CONSIDERED TOWARDS THE COST OF ABUTMENT.
5. PROVIDE ALL BEARING RETURN WALLS AS SHOWN IN DRG.
6. PROVIDE WEEP HOLES AS PER DETAIL SHOWN IN DRG. (BOTH VERTICALLY AND HORIZONTALLY AT 1.5 M C/C EACH).
7. GRADE OF CONCRETE FOR STRUCTURES AS UNDER
   a) PCC MEMBERS - M 15 FOR SOLID SLAB OUT SPANDREL SLAB
   b) REINFORCED CONCRETE - M 30
8. ALLOWABLE SAFE BEARING CAPACITY OF SOIL - 15 T/SQ.M.
9. TO BE CHECKED BEFORE EXECUTION.



KEY PLAN

National Highways Authority of India	GENERAL ARRANGEMENT DRAWING OF FLYOVER AT KM 425.15 (AT PUKHRAYAN) FLYOVER NO 2	Preparation of DPR for 4 Laning from km 422.00 to km 449.00 of Bhognipur To Barah section of NH-25	CRAPHTS Consultants (I) Pvt Ltd 14/3, Mathura Road, Near Havells crossing Faridabad - 121 003	Scale : AS SHOWN	Prepared By R.K. Murthy	Designed By A.K.Garg	Team Leader H.TALUKDAR	Drawing Number : CRTS/NHAI/NS-NH25/FLY-2/002

3.8 Surveillance and Safety Measures

These are proposed to be in the form of Police Patrols, backed by a regular feedback data to the Central Control Room from the User fee plazas. These would cover safety measures like rescue vehicles to minimize obstructions to vehicular traffic including management and operation of the Project Highway.

3.9 Emergency Telephone communication system

The Project Highway shall be provided with an emergency telephone communication system, which shall function as a public access telephone system dedicated to a control centre. The telephone booths shall be located at bus shelters, user fee plaza, rest area and truck lay-byes. All telephone booths shall have basic STD facility.

3.10 Highway Traffic Management System (HTMS)

Project Highway shall be provided with Highway Traffic Management Systems (HTMS) to collect/disseminate information for traffic and incident management and for the safety of Users. The system shall comprise following sub-systems:

i.) Emergency Communication System.
ii.) Mobile Communication System.
iii.) Variable Message Sign System.
iv.) Meteorological Data system.
v.) Automatic traffic counter- cum-classifier system
vi.) Power Supply System.
vii.) CCTV Surveillance System.

Emergency Communication System shall have Emergency Call Boxes (ECBs) installed at the spacing of 2 km on either side of the highway for both direction of travel and connected to the control centre through the transmission system of optical fibre cable and copper cables with suitable interfacing. The toll plaza shall have main control centre so that any user making emergency call from ECBs can be provided the assistance of ambulance, crane and highway patrol unit depending upon the location of caller.

Mobile Communication System shall have mobile sets provided on ambulances, cranes and patrolling vehicles for facilitating speedy communication even when they are on the move.

Variable Message Signs shall be provided at minimum six locations to guide and forewarn the users about the traffic and weather conditions on highways. These messages can be varied from control centres based on the data received through surveillance system, highway patrolling, traffic censors etc. The locations shall be decided for their maximum utility to the users.

Meteorological Data System shall be installed at minimum two locations to provide weather information on temperature, wind speed, humidity and visibility. These informations shall be available to the users through variable message signs as per requirements

Automatic Traffic Counters cum-classifier shall be installed at minimum two locations for traffic data collection and monitoring.

CCTV Surveillance system – For the close circuit TV Surveillance, Video Cameras shall be installed at major intersections and at least two mid block sections on the highway for visual information collection and distance surveillance system.

These systems shall have outdoor equipments consisting of ECBs, VMS panels, weather sensors, traffic sensors, video camera etc. The outdoor equipment shall be connected to the control centre through transmission system preferably comprising optical fibre cable, copper cable, interface equipment and weather proof. The control centre shall have monitoring equipment, on line information acquisition equipment, processing equipment etc. It shall also have a graphic display board showing the highway and the locations of equipments and of incidents. The main control centre and sub-centre would also have ambulance, tow-away trucks and cranes, and fire tenders for dispatching these emergency services to the required locations.

Annexure 10

I. **Revised Table**

The fee shall be collected at toll plaza located at km. ___

Sr.No.	Type of Vehicle Rate of base fees per vehicle per one way trip (in rupees per km.)	Rate of base fees per vehicle per one way trip (In rupees per km.)
1	2	3
1	Car/Jeep/Van	0.40
2	Light Commercial Vehicles (LCV)	0.70
3	Truck, Bus	1.40
4	Multi Axle Vehicles (>2 axles), Heavy Construction Machinery and Earth Moving Equipment	2.25

II. **Revised Clause 3 of notes of schedule**

3. **General Concession**

(i) User can avail a monthly pass by paying 30 times of single journey rate for 60 one way journeys.

(ii) User can avail a pass for 2 one way journeys valid for 24 hours by paying 1.5 times of single journey rate.

III. **Revised clause 8 of notes of Schedule**

8. **Additional Concessions**

Sr. No.	Type of Vehicle	Type of Concession	Eligibility
I	Car/Jeep/Van	Monthly pass at Rs. 150	For residents within a radius of 10 km from plaza
II	Car/Jeep/Van	Monthly pass at Rs. 300	For residents within a radius from 10 km to 20 Km.
III	MAVs, Heavy Construction Machinery and Earth Moving Equipment, Truck/Bus, and LCV	Monthly pass on payment of 12 times of single journey rate	For vehicles with address within a radius of 20 km of the plaza as given in Registration Certificate