SHREM FINANCIAL PRIVATE LIMITED

Four Laning of Mahagaon to Yavatmal section of NH-361 from Km.320.580 to Km.400.575 (Package-II) in the State of Maharashtra under NHDP Phase IV on Hybrid Annuity Mode

TECHNICAL DUE DILIGENCE REPORT

FEBRUARY, 2021

SUBMITTED BY

RUKY PROJECTS PRIVATE LIMITED
Hyderabad – 500 072
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CHAPTER 1. INTRODUCTION

1.1 General

DBL MAHAGAON YAVATMAL HIGHWAYS PRIVATE LIMITED (herein after referred to as the "Concessionaire"), had augmented the existing two-lane road Section of NH 361 from Mahagaon to Yavatmal in the state of Maharashtra, in accordance with the provisions of the Concession Agreement (CA) executed with National Highways Authority of India (herein after referred to as the "Authority") on 9th June 2017.

Project road starts at Km. 320+580 located near Mahagaon and ends at Km. 400+575 near Yavatmal on NH-361. The design length of the Project is 79.995 Km. The Project Highway passes through the urban stretches of Amboda, Lonbhel, Kolwan, Bhamb, Arjuna, Hivari and Kinhi located along the Project Corridor. Project location map is provided at **Figure 1.1.**

Figure 1.1: Project Location Map

SHREM INFRAVENTURE PVT. LTD. (SIPL) acquired DBL MAHAGAON YAVATMAL HIGHWAYS PRIVATE LIMITED vide agreement dated 26 March 2018.

SHREM FINANCIAL PVT. LTD (SFPL). appointed RUKY Projects Pvt. Ltd. as consultant for detailed Technical Due Diligence services of the above Road Project to know-how the present condition of Carriageway and Structures, probable costs of Operations and Maintenance during balance Concession period, additional road safety requirements if any and to review the annuity payments received and future schedule of annuity payments.

1.2 The Project Data

Table 1.1: Project Data

S. No.	Particulars	Details
1	Name of the project	Four Laning of Mahagaon to Yavatmal Section of NH-361 from Km.320.580 to Km.400.575 (Design Length79.995) in the State of Maharashtra under NHDP-IV on Hybrid Annuity Mode.
2	Road Type	National Highway
3	Name of the Authority	National Highways Authority of India
4	Name of the Concessionaire	DBL Mahagaon Yavatmal Highways Private Limited
5	Name of the EPC Contractor	Dilip Buildcon Limited
6	Date of LOA	28.03.2017
7	Date of Agreement	09.06.2017
8	Design Length as per Schedule B of CA	79.995 Kms.
9	Actual Length Constructed	72.089 Kms.
10	Project Lane Configuration	Four Lane
11	Bid Project Cost	1160.64
12	EPC Cost	857.76Cr
13	Nature of contract	Hybrid Annuity Mode
14	Toll collected by	The Authority
15	Concession Period	15 years from the Commercial Operation Date (**COD**)
16	Appointed date	28.02.2018
17	Concession End Date	22.05.2035
18	Construction Period	910 days from the Appointed Date
19	Schedule Completion Date	27.02.2020
20	Date of issuance of Provisional Certificate (COD)	23.05.2020
21	Bonus on early completion	Applicable as per Cl.23.5 of CA
22	Date of issuance of Completion Certificate	---
23	Annuity Amount	As per Cl.23.4 and Cl.23.6.3 of CA
24	Total Number of Annuities payable during concession period	30 Nos.
25	First Annuity Payment Date	23.11.2020
26	Total Number of Annuity Payments received as on January 2021	1 No.

1.3 Scope of Consultancy Services

The scope of work includes providing Technical Due Diligence of the Project Highway and providing estimate of the anticipated maintenance works. Scope of the work as defined in the consultancy work order is listed below:

- Review of various contractual documents
- Carryout detailed assessment of pavement condition and propose maintenance plan along with BOQ.
- Carrying out inventory & condition survey of all elements of road like embankment slope, plantation, road furniture, tolling system etc., of the project.
- Carrying out inventory & condition survey of all structures (Major Bridges, Minor Bridges, ROB, RE Wall, Flyovers, VUPs, PUPs, Culverts etc.), suggest any rehabilitation & maintenance requirements along with BOQ.
- Carryout out road safety audit on Project highway and provide suggestions for improvement.
- Assess and Provide BOQ and cost estimate for routine & periodic maintenance including O&M.
- Review of punch list items, NCR's to identify any uncompleted works as on date of submission of report.
- Review of validity of insurance and statutory compliances related to Project.
- Review of correspondences exchanged between parties on contract related issues and claims etc.
- Submission of detailed report on technical due diligence of the project.

CHAPTER 2. PROJECT DESCRIPTION & TECHNICAL DETAILS

2.1 Salient Features of the Project

The salient features of the Project as per schedule B and Schedule C of Concession Agreement (CA) including Change of scope are listed in the following Table.

Table 2.1: Salient Features

S. No.	Particulars	As per CA	As per COS	As per Site
1	Total Length of Main Carriageway with Rigid Pavement (Considering both sides)	79.995 Kms.	---	79.995 Kms.
2	Total Length of Main Carriageway with Flexible Pavement (Considering both sides)	---	---	---
3	Total length of Service Roads	14.59 Kms.	0.750 Km.	15.340 Kms.
4	Total length of Slip Roads	10.54 Kms.	---	10.54 Kms.
5	No of Toll Plazas	1 No.	---	1 No.
6	No of Bus Bays with Bus Shelters	38 Nos.	---	38 Nos.
7	Number of Truck Lay Bays	1 No.	---	1 No.
8	No of Rest Areas	1 No.	---	1 No.
9	No of Major Junctions	0 Nos.	---	7 Nos.*
10	No of Minor Junctions	50 Nos.	---	45 Nos.*
11	No of Vehicular underpasses	5 Nos.	---	5 Nos.
12	No of Light Vehicular underpasses	5 Nos.	---	5 Nos.
13	No of Small Vehicular Underpass	Nil	1 No	1 No
14	No of Pedestrian underpasses	3 Nos.	---	3 Nos.
15	No of Subways	Nil	---	Nil
16	No of Flyovers	Nil	---	Nil
17	No of Major Bridges	2 Nos.	---	2 Nos.
18	No of Minor Bridges	47 Nos.	---	39 Nos.
19	No of Hume Pipe Culverts	137Nos.	---	133Nos.*
20	No of Box / Slab Culverts	24 Nos.	---	24 Nos.

*As per site requirement 7 Major junctions are developed. 5 Minor junctions are not developed as per site condition.

* Four minor bridges closely are merged and constructed as 2 no of minor bridges. 6 Minor bridges are not constructed due to LA problem.

*4 Pipe culverts are not constructed due to LA Problem

2.2 Typical Cross Section (TCS) Schedule

The Concessionaire has followed the Typical Cross Section Schedule, shown below as per Schedule B of CA during the Construction.

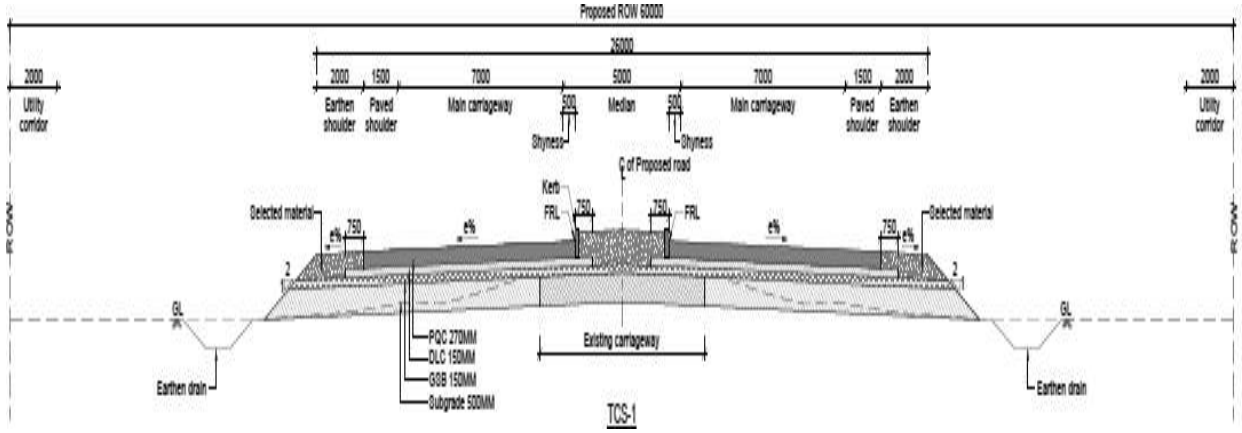

Figure 2.1: TCS-1 Typical Cross Section Of 4-Laning by Concentric Widening With 4.0m Raised Median

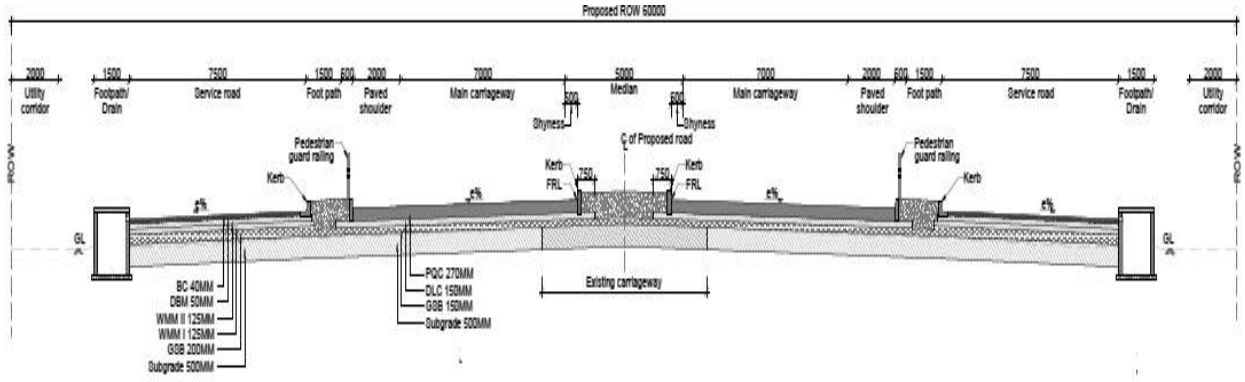

Figure 2.2: TCS-2 Built-Up Section-Plain /Rolling Terrain with Service Roads

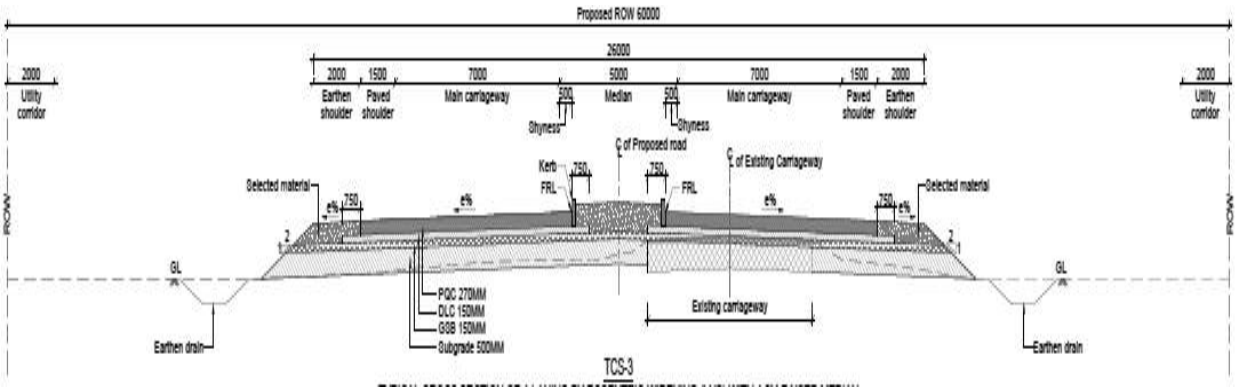

Figure 2.3: TCS-3 (Typical Cross Section Of 4-Laning By Eccentric Widening (LHS) With 4.0m Raised Median

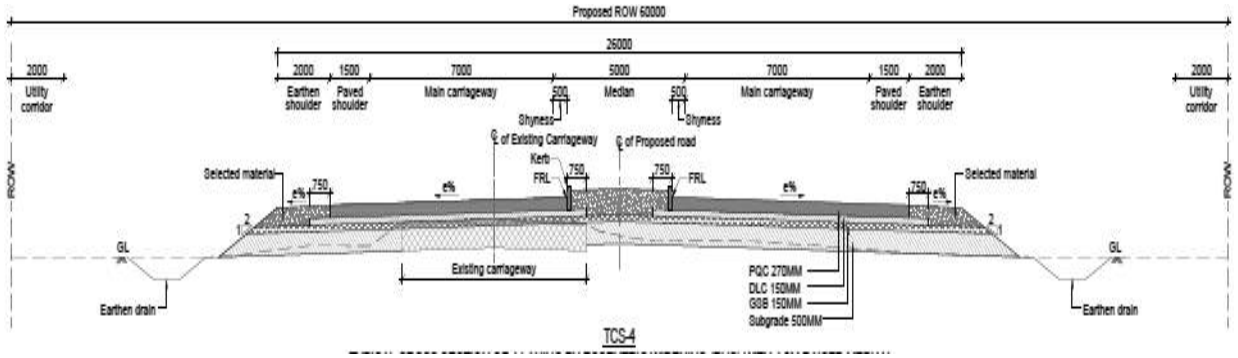

Figure 2.4: TCS-4 Typical Cross Section Of 4-Laning By Eccentric Widening (RHS) With 4.0m Raised Median

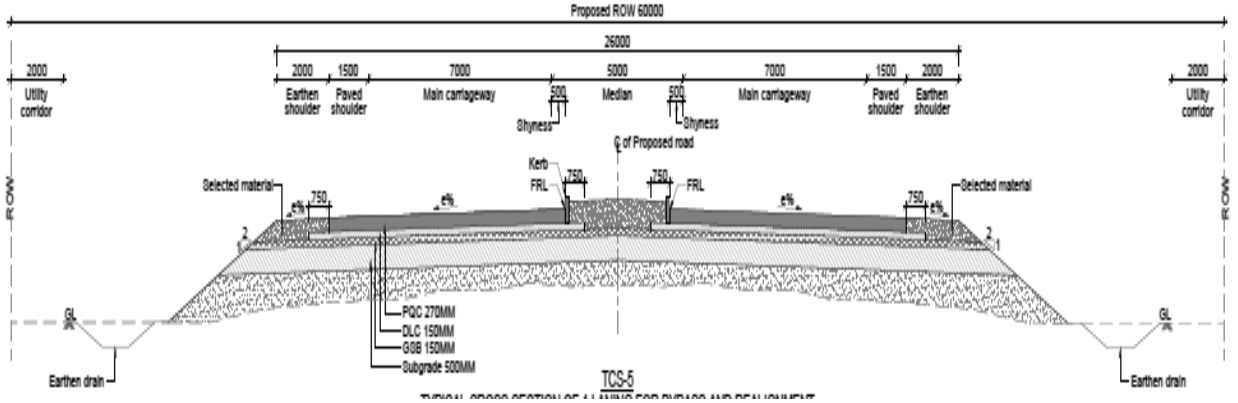

Figure 2.5: TCS-5 Typical Cross Section Of 4-Laning for Bypass and Realignment

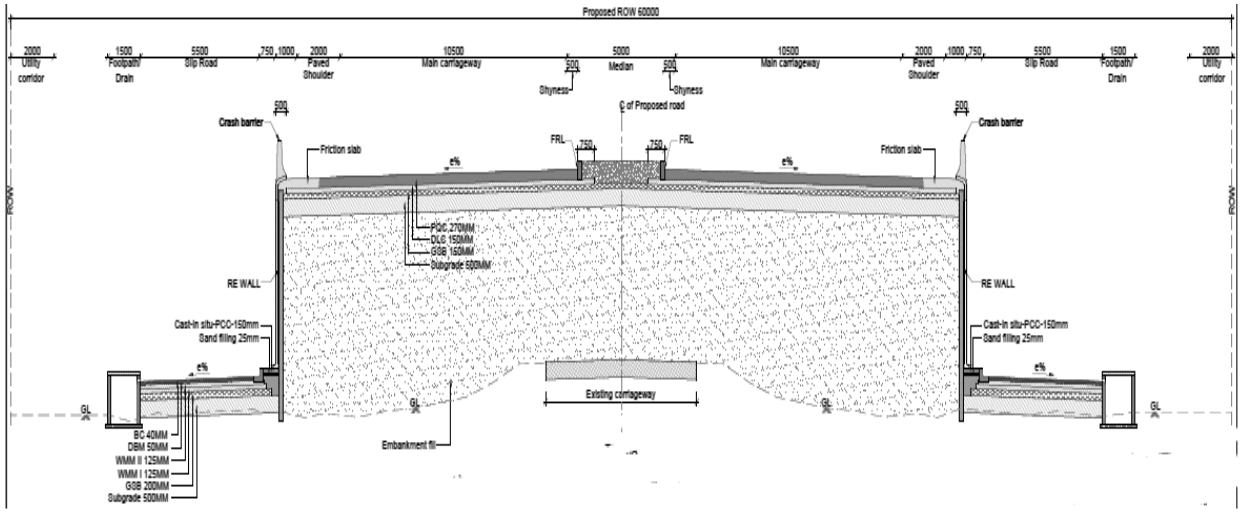

Figure 2.6: TCS-6A Typical Four Lane Underpass Cross Section with Slip Roads in the Existing Road

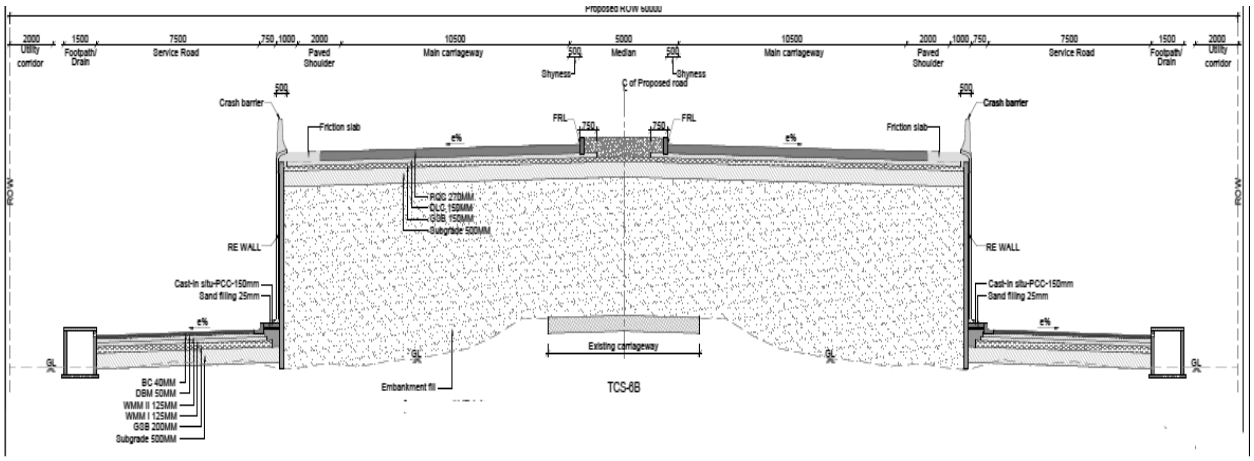

Figure 2.7: TCS-6B Typical Four Lane Underpass Cross Section with Service Roads in The Existing Road

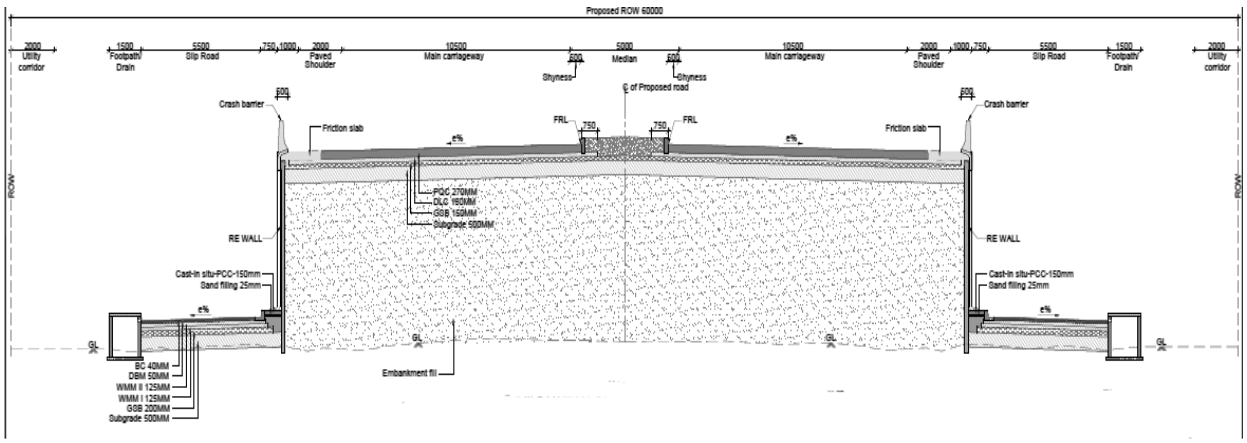

Figure 2.8: TCS-6C Typical Four Lane Underpass Cross Section With Slip Roads In Bypass & Realignment

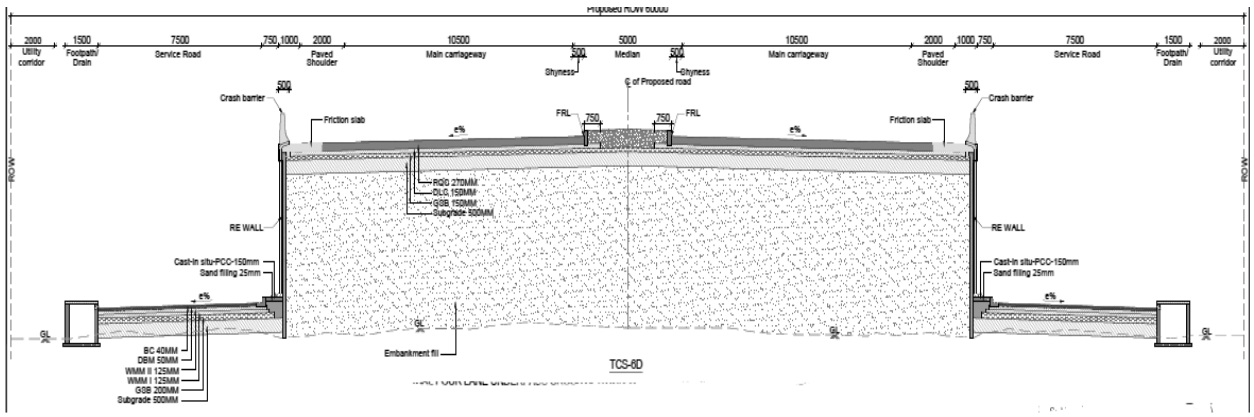

Figure 2.9: TCS-6D Typical Four Lane Underpass Cross Section with Service Roads in Bypass & Realignment

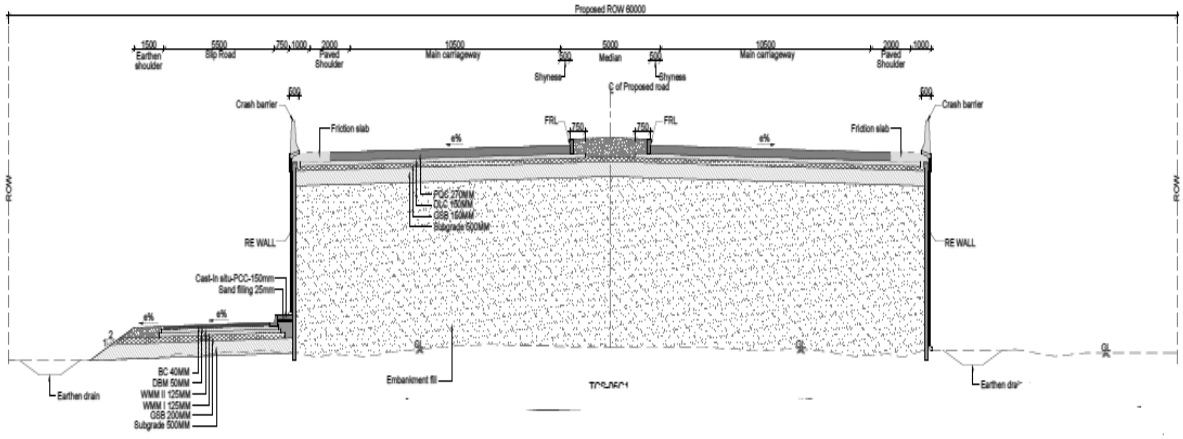

Figure 2.10:TCS-6C1 Typical Four Lane Underpass Cross Section with Slip Roads in Bypass & Realignment

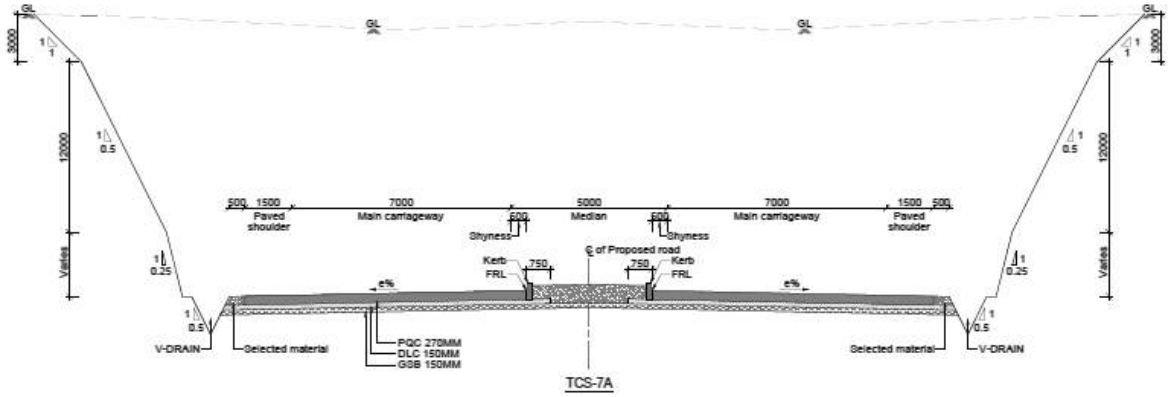

Figure 2.11:TCS-7A Typical Cross Section of 4-Lane Carriageway (Both Side Cutting)

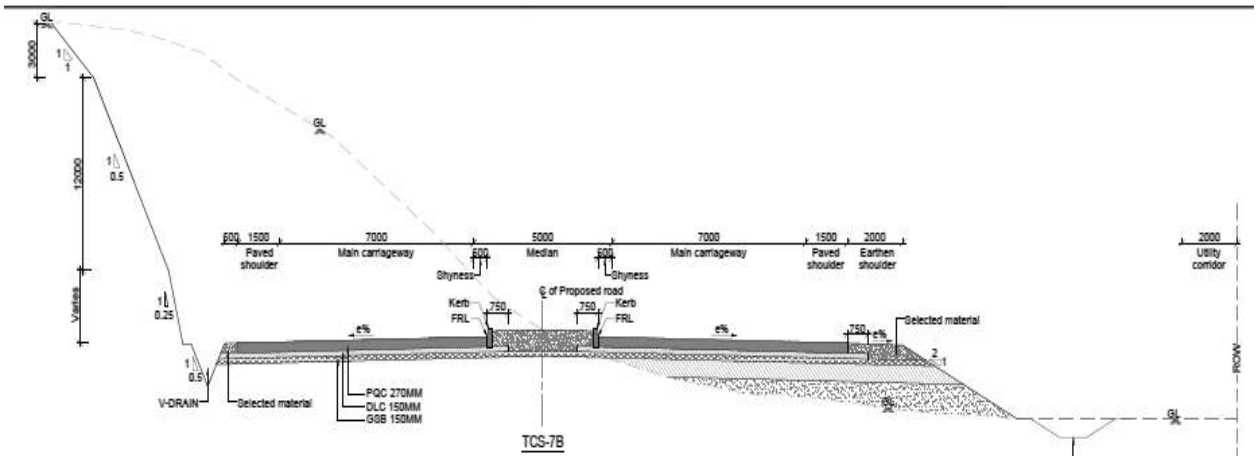

Figure 2.12:TCS-7B Typical Cross Section of 4-Lane Carriageway (One Side Cutting)

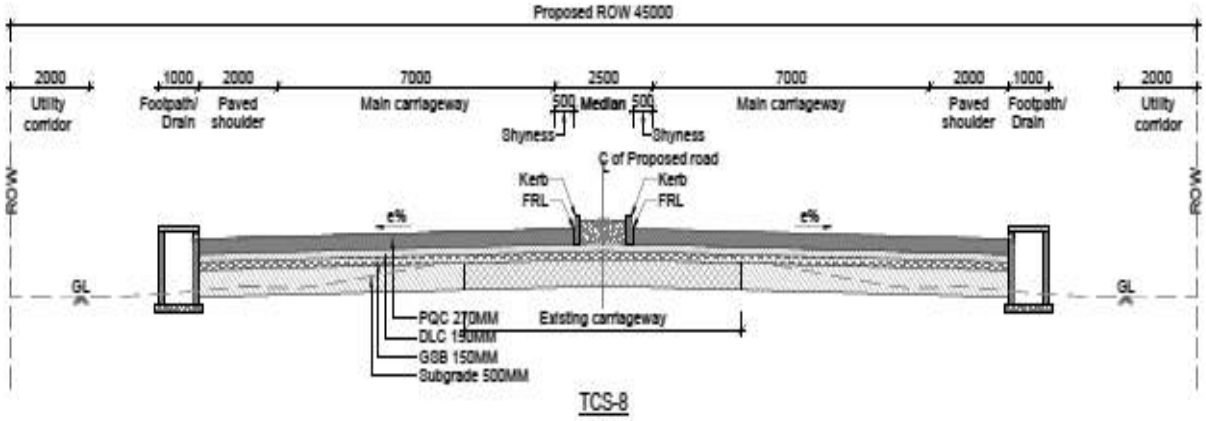

Figure 2.13: TCS-8 Typical cross section of 4-laning by concentric widening With 1.5m raised median for restricted row

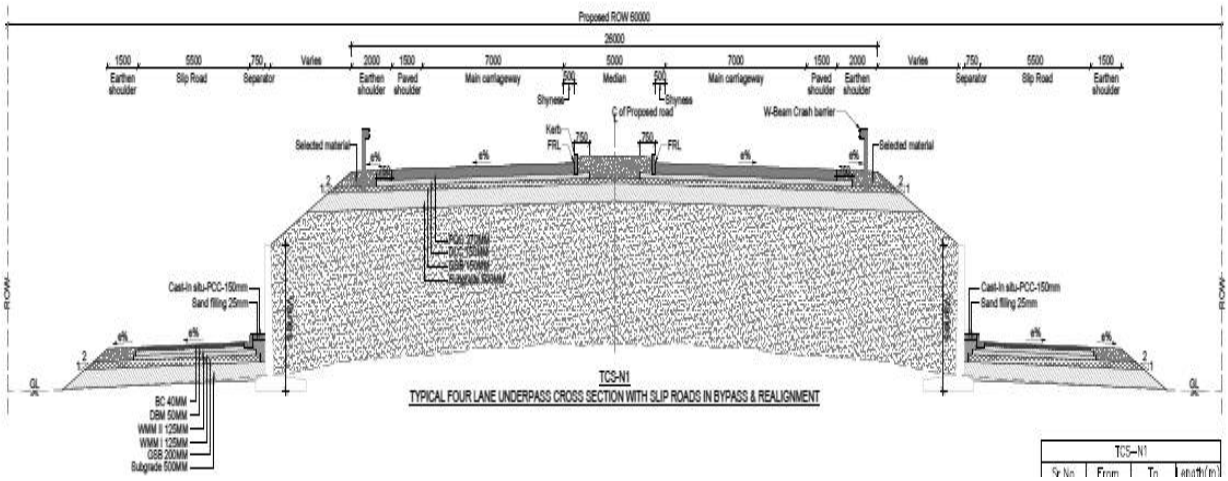

Figure 2.14: TCS-N1 Typical Four Lane Underpass Cross Section with Slip Roads in Bypass & Realignment

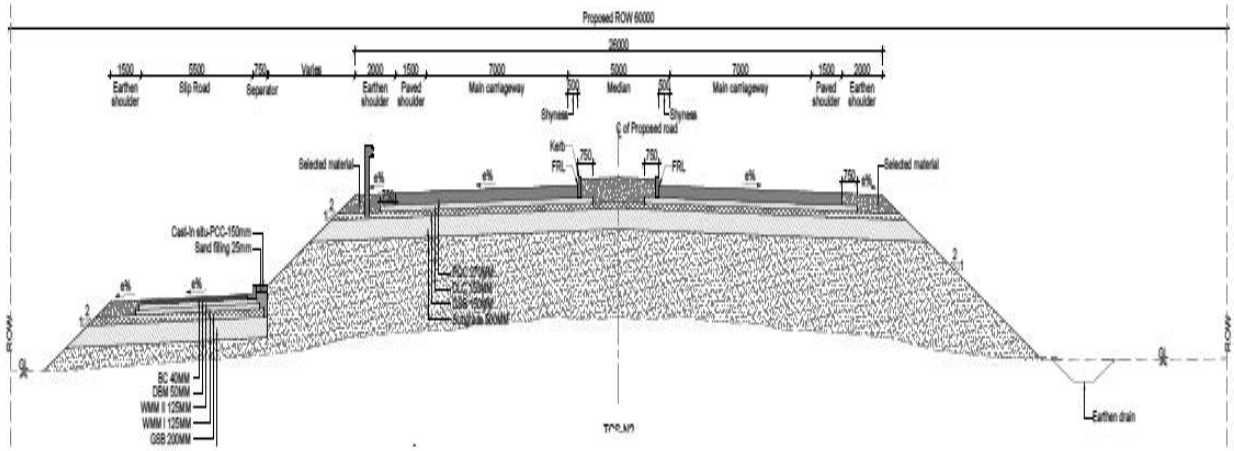

Figure 2.15: TCS-N2 Typical Four Lane Underpass Cross Section with Slip Roads in Bypass & Realignment

TCS Schedule is provided below.

Table 2.2: TCS Schedule

S. No.	From (Km.)	To (Km.)	Length (Kms.)	TCS TYPE
1	320+580	320+940	0.360	3
2	320+940	322+250	1.310	4
3	322+250	323+630	1.380	6B
4	323+630	324+440	0.810	4
5	324+440	326+220	1.780	3
6	326+220	327+310	1.090	6A
7	327+310	329+470	2.160	4
8	329+470	329+980	0.510	5
9	329+980	330+160	0.180	4
10	330+160	330+870	0.710	5
11	330+870	331+610	0.740	6C
12	331+610	331+960	0.350	5
13	331+960	332+070	0.110	4
14	332+070	332+260	0.190	5
15	332+260	333+910	1.650	4
16	333+910	334+810	0.900	6A
17	334+810	337+060	2.250	3
18	337+060	337+230	0.170	4
19	337+230	337+400	0.170	5
20	337+400	337+690	0.290	3
21	337+690	338+280	0.590	1
22	338+280	339+240	0.960	4
23	339+240	339+340	0.100	3
24	339+340	339+870	0.530	4
25	339+870	341+260	1.390	3
26	341+260	341+530	0.270	5
27	341+530	341+880	0.350	3
28	341+880	342+030	0.150	5
29	342+030	343+090	1.060	4
30	343+090	343+200	0.110	3
31	343+200	343+540	0.340	4
32	343+540	344+200	0.660	5
33	344+200	344+230	0.030	7B
34	344+230	345+200	0.970	7A
35	345+200	345+740	0.540	4
36	345+740	346+020	0.280	5
37	346+020	346+740	0.720	4
38	346+740	347+010	0.270	5

S. No.	From (Km.)	To (Km.)	Length (Kms.)	TCS TYPE
39	347+010	347+460	0.450	4
40	347+460	347+620	0.160	5
41	347+620	348+380	0.760	3
42	348+380	349+540	1.160	6B
43	349+540	349+750	0.210	2
44	349+750	350+440	0.690	4
45	350+440	350+740	0.300	4
46	350+740	351+460	0.720	4
47	351+460	353+010	1.550	3
48	353+010	354+500	1.490	4
49	354+500	354+750	0.250	5
50	354+750	355+320	0.570	4
51	355+320	355+520	0.200	3
52	355+520	356+720	1.200	4
53	356+720	356+930	0.210	3
54	356+930	357+140	0.210	4
55	357+140	357+890	0.750	6B
56	357+890	358+640	0.750	3
57	358+640	359+620	0.980	5
58	359+620	360+170	0.550	6C
59	360+170	360+360	0.190	6C1
60	360+360	360+570	0.210	5
61	360+570	361+000	0.430	N1
62	361+000	361+410	0.410	5
63	361+410	361+780	0.370	4
64	361+780	362+040	0.260	5
65	362+040	362+660	0.620	4
66	362+660	363+080	0.420	5
67	363+080	363+290	0.210	6A
68	363+290	363+810	0.520	6C
69	363+810	363+970	0.160	6A
70	363+970	364+980	1.010	1
71	364+980	365+570	0.590	4
72	365+570	368+960	3.390	3
73	368+960	369+460	0.500	4
74	369+460	370+110	0.650	5
75	370+110	371+210	1.100	6A
76	371+210	371+790	0.580	5
77	371+790	376+320	4.530	3
78	376+320	377+360	1.040	5
79	377+360	377+710	0.350	N2

S. No.	From (Km.)	To (Km.)	Length (Kms.)	TCS TYPE
80	377+710	378+260	0.550	5
81	378+260	379+030	0.770	4
82	379+030	379+200	0.170	5
83	379+200	379+440	0.240	4
84	379+440	379+900	0.460	5
85	379+900	380+010	0.110	4
86	380+010	380+400	0.390	5
87	380+400	380+480	0.080	4
88	380+480	380+940	0.460	3
89	380+940	382+100	1.160	6B
90	382+100	384+790	2.690	3
91	384+790	385+570	0.780	4
92	385+570	387+150	1.580	5
93	387+150	387+270	0.120	3
94	387+270	387+520	0.250	5
95	387+520	387+790	0.270	4
96	387+790	388+000	0.210	5
97	388+000	388+530	0.530	3
98	388+530	389+080	0.550	5
99	389+080	389+380	0.300	5
100	389+380	389+540	0.160	5
101	389+540	389+740	0.200	3
102	389+740	390+250	0.510	5
103	390+250	390+500	0.250	3
104	390+500	390+580	0.080	5
105	390+580	391+070	0.490	5
106	391+070	391+185	0.115	8
107	391+185	391+385	0.200	8
108	391+385	391+465	0.080	8
109	391+465	392+470	1.005	5
110	392+470	393+500	1.030	4
111	393+500	393+770	0.270	5
112	393+770	393+870	0.100	6D
113	393+870	394+980	1.110	6B
114	394+980	395+240	0.260	3
115	395+240	395+360	0.120	5
116	395+360	395+810	0.450	5
117	395+810	395+920	0.110	5
118	395+920	396+060	0.140	3
119	396+060	396+430	0.370	5
120	396+430	396+710	0.280	3

S. No.	From (Km.)	To (Km.)	Length (Kms.)	TCS TYPE
121	396+710	396+770	0.060	1
122	396+770	397+360	0.590	3
123	397+360	398+120	0.760	6B
124	398+120	400+060	1.940	3
125	400+060	400+575	0.515	2

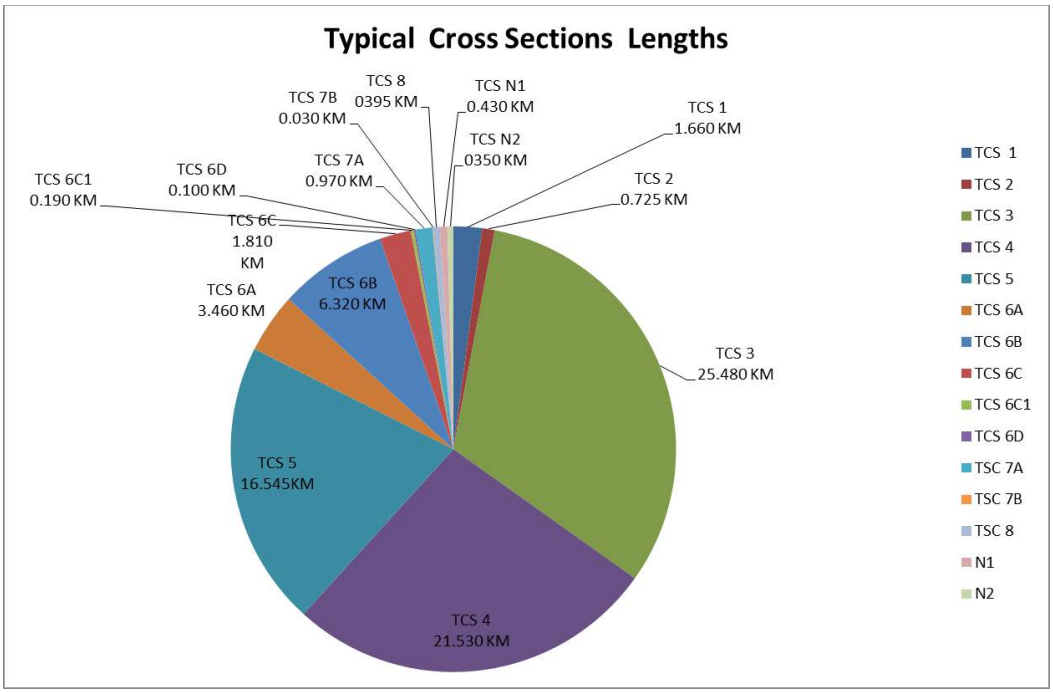

Figure 2.16: Pictorial Diagram of TCS Lengths.

2.3 Road Side Drainage

- To facilitate quick disposal of water from the Carriageway and to avoid accumulation of drainage from the Carriageway, RCC side drains are constructed along the main carriage way on both flanks as specified in Schedule B of CA in strict adherence to the Standard Specifications set forth in Schedule D of CA.
- The Concessionaire has provided RCC covered drains with footpath in built up areas while earthen drains are constructed in open and rural areas.

2.4 Service Roads

Service Roads and Slip Roads are provided as per the provisions of Schedule B of the Concession Agreement. The details are provided below.

Table 2.3: List of Service Road locations

S. No.	From (Km.)	To (Km.)	Side	Length (Kms.)	Remarks
1	322+240	323+620	BHS	2.760	40m on LHS is not constructed due to LA Problem*
2	348+340	349+710	BHS	2.740	270m on LHS is not constructed

S. No.	From (Km.)	To (Km.)	Side	Length (Kms.)	Remarks
					due to LA Problem*
3	357+100	357+850	BHS	1.500	
4	380+740	381+900	BHS	2.320	
5	393+620	394+830	BHS	2.420	
6	397+200	397+960	BHS	1.520	230m on RHS is not constructed due to LA Problem*
7	399+910	400+575	BHS	1.330	
			Total	**14.590**	

Note: * SRPL confirmed upon handing over of land uncompleted service roads shall be completed by the EPC Contractor at his cost and risk as provided under the EPC Agreement.

Table 2.4: List of Slip Road locations

S. No.	From Chainage (Km.)	To Chainage (Km.)	Side	Length (Kms.)
1	326+210	327+300	BHS	2.180
2	330+860	331+600	BHS	1.480
3	333+900	334+800	BHS	1.800
4	359+580	360+130	BHS	1.100
5	362+790	363+680	BHS	1.780
6	369+900	371+000	BHS	2.200
			Total	**10.540**

2.5 Realignment

As per the provisions of Schedule B of the Concession Agreement Realignment is provided at the following locations.

Table 2.5: Realignment stretches

S. No.	From Chainage (Km.)	To Chainage (Km.)	Length (Kms.)
1	329+460	329+970	0.510
2	330+150	331+950	1.800
3	332+060	332+250	0.190
4	337+220	337+390	0.170
5	341+250	341+520	0.270
6	341+870	342+020	0.150
7	343+530	344+540	1.010
8	345+730	346+010	0.280
9	346+730	346+970	0.240
10	347+420	347+580	0.160
11	354+460	354+710	0.250
12	358+600	361+400	2.800

S. No.	From Chainage (Km.)	To Chainage (Km.)	Length (Kms.)
13	361+540	361+810	0.270
14	362+360	362+790	0.430
15	363+000	363+520	0.520
16	369+250	371+580	2.330
17	376+110	378+060	1.950
18	378+830	379+000	0.170
19	379+240	379+700	0.460
20	379+810	380+200	0.390
21	381+000	381+500	0.500
22	385+390	386+970	1.580
23	387+090	387+340	0.250
24	387+610	387+820	0.210
25	388+350	389+360	1.010
26	389+560	390+070	0.510
27	390+320	390+885	0.565
28	391+280	392+300	1.020
29	393+350	393+620	0.270
30	395+080	395+760	0.680
31	395+900	396+270	0.370
		Total	**21.315**

2.6 Intersections

The details of the Major & Minor junctions are provided in Schedule B of the Concession Agreement. As per site condition 7 nos. of Major Junctions and 45 nos. of Minor Junctions are developed. Details are given below.

Table 2.6: List of Major Junctions

S. No.	Design Chainage (Km.)	Type of Junction	Side
1.	334+300	Y-Junction	RHS
2.	349+020	T-Junction	LHS
3.	357+525	Y-Junction	RHS
4.	370+733	X-Junction	LHS
5.	370+734	X-Junction	RHS
6.	381+502	X-Junction	BHS
7.	394+411	Y-Junction	RHS

Table 2.7: List of Minor Junctions

S. No.	Design Chainage (Km.)	Type of Junction	Side
1	321+799	T-Junction	LHS
2	322+702	Y-Junction	RHS
3	325+000	Y-Junction	LHS
4	325+600	Y-Junction	RHS

S. No.	Design Chainage (Km.)	Type of Junction	Side
5	325+861	Y-Junction	LHS
6	326+810	Y-Junction	LHS
7	328+750	X-Junction	LHS
8	328+758		RHS
9	337+900	Y-Junction	RHS
10	338+174	Y-Junction	LHS
11	339+865	Y-Junction	LHS
12	341+292	X-Junction	LHS
13	341+288		RHS
14	343+144	Y-Junction	RHS
15	352+286	T-Junction	LHS
16	352+426	T-Junction	RHS
17	352+979	T-Junction	LHS
18	353+314	Y-Junction	RHS
19	354+081	Staggered	RHS
20	355+262	Y-Junction	LHS
21	355+815	T-Junction	LHS
22	356+778	Y-Junction	RHS
23	365+964	X-Junction	LHS
24	365+953		RHS
25	366+127	T-Junction	LHS
26	367+484	Staggered	LHS
27	367+534		RHS
28	368+712	T-Junction	RHS
29	369+346	T-Junction	LHS
30	369+600	Y-Junction	LHS
31	371+725	Y-Junction	LHS
32	371+908	Y-Junction	LHS
33	373+118	Y-Junction	RHS
34	375+986	T-Junction	RHS
35	376+094	Y-Junction	LHS
36	376+580	Y-Junction	RHS
37	377+344	X-Junction	BHS
38	378+300	Y-Junction	RHS
39	382+032	Staggered	RHS
40	391+575	Y-Junction	LHS
41	392+781	T-Junction	RHS
42	398+913	T-Junction	LHS
43	399+052	Y-Junction	RHS
44	400+138	T-Junction	LHS
45	400+377	Y-Junction	LHS

2.7 Grade Separated Structures and underpasses

As per the provisions of Schedule B of the CA 3 Nos. of Pedestrian Underpass, 5 Nos. of Light Vehicular Underpass, 1 No of small vehicular underpass and 5 Nos. of Vehicular Underpass structures are provided in the Project Corridor. Details are provided in **Chapter 4**.

2.8 Road Over Bridge (ROB)

ROB is not proposed in the project road as per provisions of Schedule B of CA.

2.9 Carriageway and Pavement Details

Summary of Carriageway is given below:

Table 2.8: Summary of Carriageway and Pavement Details

S. No.	Description	Flexible (Km.)	Rigid (Km.)
1	Service Roads	14.590	
2	Slip Roads	10.540	
3	4 Lane Paved shoulder		79.995
4	Total Length	21.130	79.995
TYPE OF ALIGNMENT			
5	Widening		49.745
6	Realignment		16.545
7	Flyover approaches		12.210
8	Cutting Section		1.495
9	Total Length of the Project		79.995

2.10 Summary of Structures

Summary of Structures as per provisions of schedule B of the CA is given below.

Table 2.9: Summary of Structures

S. No.	Description	Major Bridges	Minor Bridges	Hume Pipe Culverts	Box/Slab Culverts	Underpasses
1	Retained					
2	Widening		21	51	3	
3	Reconstruction		11	46	13	
4	New	2	15	40	8	1 No. PUP 3 Nos. VUP 10 Nos. LVUP
5	Improvement					
	Total	**2**	**47**	**137**	**24**	**14**

2.11 Toll Plazas

- Toll Plaza is located on the project road at Km. 382+920, which comprises of eight lanes.
- The width of each toll lane is provided 3.2 m, except for the lane for over dimensioned vehicles, where it is 4.5 m.

- Between each toll lane of the toll plaza, traffic islands are constructed to accommodate tollbooth.
- Protective barriers of reinforced concrete and traffic impact attenuators are placed in the front of each island to prevent out of control approaching vehicles crashing into the tollbooth.
- The canopy is provided for weather protection to toll operators, drivers and facilities. The canopy is designed aesthetically pleasing with cylindrical support columns located at traffic island so that there is no restriction on visibility and traffic movement.
- Total 7 Nos. toll booths are provided in toll plaza.
- Toll Plaza is updated to ETC Lane system as per the Change of Scope Order issued to the Concessionaire.
- List of tolling equipment provided at site is furnished in the Detailed Report.

2.12 Bus bays/Bus shelters/Truck Lay bye

As per provisions of Schedule C of CA bus shelters are provided at 38 locations. Details are provided below.

Table 2.10: List of Bus shelters

S. No.	Location at Km.		S.No.	Location at Km.
1	323+000		20	323+100
2	331+360		21	331+140
3	334+450		22	334+550
4	337+750		23	338+000
5	340+750		24	340+950
6	342+850		25	342+800
7	349+300		26	349+310
8	352+060		27	354+400
9	357+620		28	356+900
10	361+300		29	361+400
11	362+235		30	362+950
12	364+900		31	364+980
13	366+130		32	366+280
14	368+600		33	368+750
15	370+400		34	370+700
16	375+700		35	375+650
17	381+100		36	381+150
18	393+100		37	392+800
19	395+070		38	395+120
Truck lay bye				
1	384+300		LHS	

2.13 Other Project Facilities Provided as per Schedule C of CA

- Roadside furniture: Sign Boards Kilometer stones, Road Marking and object/hazard markers are provided in accordance with IRC-SP: 84-2014.
- Traffic safety devices: W Beam Crash barriers, parapet walls are provided as per the provisions of Schedule C of CA.
- Landscaping: Provided at Toll Plaza location and being maintained
- Tree Plantation: Median plantation and Avenue plantation on both sides of the Project Corridor is provided all along the way and is being maintained.
- Medical Aid Post: Provided at Toll Plaza location and is operational
- Highway Lighting: Highway lighting is provided at Toll Plaza, Bus bays and Truck Lay byes and is functional.

Mini Nest at Km.383+400

Truck Lay bye at Km.384+300

Rest area at Km.385+300

Weigh Bridge at Km.383+200

Km.391+800

Junction at Km.392+800

Figure 2.17: Photos of Project facilities

CHAPTER 3. ROAD INVENTORY & PAVEMENT CONDITION

3.1 General

Road Inventory and pavement condition surveys were carried out by a team of Engineers and the features noted at site are presented in the sections provided below

3.2 Road Inventory

Inventory of the project road was carried out physically and the same is summarized in the following table. Few representative photographs are presented below.

Table 3.1: Road Inventory

S. No.	Features	Remarks
1	Terrain	Plain rolling Terrain
2	Land Use	Agriculture and forest
3	Four lane length	79.995 km
4	Earthen shoulder	1.0 m to 1.5m Width on site
5	Junctions	52 Nos.
6	Toll Plaza	At Km.382+920
7	Sign boards	Sign boards are provided as per Highway requirements
8	Road Markings	Lane markings are provided as per Highway requirement
9	Bus Bays /shelters	38 Nos.
10	Truck lay bye	1 No.
11	Highway Lighting	Provided as per requirement
12	Avenue plantation	Provided

3.3 Pavement Condition Survey

The survey on general pavement condition was primarily undertaken by means of slow drive- over survey, and supplemented with measurements wherever necessary. Pavement assessment was done with the help of simple instruments using measuring tape, Straight edge. It was carried out to quantify pavement deficiency on a representative basis. Aspects of pavement condition assessment include surface defects, rut depth, cracking, potholes, patched areas, shoulder conditions etc. An overall assessment of performance serviceability of the road was also done to rate the existing pavement and shoulder condition qualitatively.

The pavement condition was measured under the following sub-heads:

- Shoulder- (Composition/Condition)
- Riding Quality (Good/Fair/Poor/Very Poor)
- Pavement Condition

As per the provisions of Schedule B, the Concessionaire has constructed the Main Carriageway with Rigid Pavement and Service & Slip Roads with Flexible Pavement. Pavement Design submitted by the Concessionaire was reviewed and found in accordance with the provisions of IRC:37 and IRC 58. Design parameters are provided below. CBR considered for Flexible Pavement was 13% and Effective CBR for

Rigid pavement was 7%. Based on CBR values, axle loads and Traffic the crust designed is satisfactory. The crust details are given below.

Table 3.2: For Rigid pavement –Main carriage way

1	PQC	270mm
2	DLC	150mm
3	GSB	150mm
5	Sub Grade	500mm

Table 3.3: Flexible Pavement-Service Roads

1	BC	40mm
2	DBM	60mm
3	WMM	250mm
4	GSB	200mm
5	Sub Grade	500mm

- Based on the review on Designs submitted by the Concessionaire, the above crust is safe for project.

Upon verification of the Pavement condition in the above said manner, it is observed that the Pavement condition of Project road is good. The field measurements of the Pavement Condition survey are tabulated in the standard proforma as per IRC: SP-19. The summary of Pavement condition is given below.

Table 3.4: Pavement condition summary

From (Km)	To (Km)	Length (Kms.)	Condition
320+580	400+575	79.995	Good

Km. 320+000

Km. 389+100

Km.391+613

Km.391+800

Figure 3.1: Representative Photos of Pavement Condition.

CHAPTER 4. INVENTORY AND CONDITION OF STRUCTURES

4.1 General Assessment and Condition of the structures

Inspection of existing structures on the project section was carried out, detailed inventory and condition is examined during the site visit as per the guide lines provided in IRC SP: 52-1999 & IRC SP: 35-1990**.**

4.2 Inventory of Structures

The list of structures along this project highway.

Table 4.1 : List of Structures

S. No.	Type of Structure	Numbers
1	Major bridges	02 Nos.
2	Minor Bridge	39 Nos.
3	Underpasses	14 Nos.
4	Pipe culverts	133 Nos.
5	Slab/Box Culverts	24 Nos.

The major bridges of superstructure provided is RCC Solid slab resting on RCC wall type piers and abutments with open foundation. The minor bridges of superstructure are RCC solid slab/RCC Box type and the substructures are of PCC/RCC conventional wall type supported on open foundations. Detailed inventory and condition survey of bridges are given in **ANNEXURE 1.** The culverts observed along the project road are mainly of two types viz. pipe culverts and RCC slab/box culverts. Structural condition of most of the culverts is fair except in few locations. Detailed inventory and condition survey of culverts are given in **ANNEXURE 2.**

4.3 Details of Major Bridges

The total length of the major bridge at Km 360+485 is 75.0m with 5 spans. The superstructure consists of RCC solid slab. Each pier and whereas abutment is regular RCC Circular type abutment. Open foundations have been constructed for all piers and abutments. Superstructure is seated on Elastomeric/Tar paper bearings. Expansion joints are of Strip seal type. RCC railings have been provided on both sides of the deck.

The total length of the major bridge at Km 376+231 is 90.0m with 6 spans. The superstructure consists of RCC solid slab. Each pier and whereas abutment is regular RCC wall type abutment. Open foundations have been constructed for all piers and abutments. Superstructure is seated on Elastomeric/Tar paper bearings. Expansion joints are of Strip seal type. RCC railings have been provided on both sides of the deck

Table 4.2: List of Major Bridge

S. No.	Chainage (Km.)	Span	Total Length of Bridge (m.)
1	360+485	3 x 25.0	75.0
2	376+231	6 x 15.0	90.0

The condition of the superstructure and substructure is good. Certain minor maintenance operations such as quadrant pitching, reflector plates, drainage spouts and strip seal expansion joints are to be carried out.

Km.376+231

Figure 4.1: Representative photos of Major Bridges

4.4 Details of Minor Bridges

The details of minor bridges along the project stretch are listed. The type of superstructure for minor bridges is RCC solid slab/RCC Box type and the substructure is PCC/RCC conventional wall/Circular type, supported on open foundations. Expansion joints are buried type/Strip seal and bearings are tar paper and elastomeric bearings. RCC crash barriers and Railings are provided for most of the structures.

Table 4.3: List of Minor Bridge

S. No.	Chainage (Km.)	Span	Total Length of Bridge (m.)	Description
1	321+151	2 x 6.5	13	It has RCC Box structure. It has RCC Railing, bituminous wearing coat.
2	323+321	3X7.0	21	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
3	324+256	1x6.0	6	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
4	325+915	3X7.0	21	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
5	326+082	3x12.5	37.5	It has RCC solid slab superstructure supported on RCC wall type piers and abutment. Other features are RCC crash barrier/Railing, bituminous wearing coat, and Tar paper/Elastomeric Bearings and Strip seal expansion joints.
6	329+645	4 x 10.0	40	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
7	334+660	3x8.33	24.99	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
8	336+400	3x4.0	12	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
9	336+549	2x4.7	9.4	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
10	337+468	2X10.0	20	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
11	339+168	1X7.0	7	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
12	340+225	1X8.0	8	It has RCC Box structure. It has RCC Crash

S. No.	Chainage (Km.)	Span	Total Length of Bridge (m.)	Description
				barrier/Railing, bituminous wearing coat.
13	340+315	3X9.7	29.1	It has RCC solid slab superstructure supported on RCC wall type piers and abutment. Other features are RCC crash barrier/Railing, bituminous wearing coat, and Tar paper/Elastomeric Bearings and Strip seal expansion joints.
14	343+468	2x13.5	27	It has RCC solid slab superstructure supported on RCC wall type piers and abutment. Other features are RCC crash barrier/Railing, bituminous wearing coat, and Tar paper/Elastomeric Bearings and Strip seal expansion joints.
15	347+403	2X10.0	20	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
16	359+399	3x7.0	21	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
17	359+848	3x7.0	21	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
18	362+868	1x13.5	13.5	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
19	365+373	2x4.5	9	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
20	371+557	2x12.5	25	It has RCC solid slab superstructure supported on RCC wall type piers and abutment. Other features are RCC crash barrier/Railing, bituminous wearing coat, and Tar paper/Elastomeric Bearings and Strip seal expansion joints.
21	373+609	2x8.9	17.8	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
22	373+704	3x3.0	9	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
23	375+165	2x4.5	9	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
24	377+321	2x10.5	21	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
25	378+593	1x10.0	10	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
26	381+804	2x6.9	13.8	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
27	383+748	3x3.7	11.1	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
28	384+960	2x6.0	12	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
29	386+480	4x10.0	40	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
30	387+247	3x5.0	15	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
31	389+553	2x8.0	16	It has RCC Box structure. It has RCC Crash

S. No.	Chainage (Km.)	Span	Total Length of Bridge (m.)	Description
				barrier/Railing, bituminous wearing coat.
32	390+816	1x20.0	20 (skew)	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
33	391+043	3x6.6	19.8	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
34	391+255	3x4.2	12.6	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
35	393+111	2x6.0	12	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
36	393+810	2x7.5	15	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
37	394+722	2x5.1	10.2	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
38	395+290	1x7.5	7.5	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.
39	399+903	2x9.0	18	It has RCC Box structure. It has RCC Crash barrier/Railing, bituminous wearing coat.

Km.386+480

Km.393+111

Figure 4.2: Representative photos of Minor Bridges.

4.5 Details of Underpasses

The details of Underpasses in the project stretch are listed below. The type of superstructure for underpass is RCC Girder/RCC Box type and the substructure is PCC/RCC conventional wall type supported on open foundations. Expansion joints are buried type/Strip seal and bearings are tar paper and elastomeric bearings. RCC crash barriers are provided on all structures

Table 4.4: List of Underpasses

S. No.	Chainage (Km.)	Type of Structure	Span	Total Length of Bridge (m.)	Description
1	322+870	LVUP	1x10.5	10.5	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
2	326+810	VUP	1x12.0	12.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.

S. No.	Chainage (Km.)	Type of Structure	Span	Total Length of Bridge (m.)	Description
3	334+300	VUP	1x22.4	22.4	It has RCC Girder type & wall type abutment. It has RCC crash barrier, bituminous wearing coat, Strip seal expansion joints.
4	349+020	LVUP	1x10.5	10.5	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
5	357+525	PUP	1x7.0	7.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
6	360+165	VUP	1x12.0	12.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
7	360+350	LVUP	1x7.0	7.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
8	360+600	LVUP	1x7.0	7.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
9	363+500	VUP	1x12.0	12.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
10	370+733	VUP	1x12.0	12.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
11	377+344	PUP	1x7.0	7.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
12	381+502	LVUP	1x10.5	10.5	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
13	394+411	PUP	1x7.0	7.0	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.
14	397+753	LVUP	1x10.5	10.5	It has RCC Box structure. It has RCC Crash barrier, bituminous wearing coat.

Km. 334+300

Km.360+165

Km.394+411

Km. 397+753

Figure 4.3: Representative photos of Underpasses

4.6 Details of Culverts:

The culverts observed along the project road are mainly of two types' viz. RCC Slab/Box culverts and Pipe culverts. The condition of culverts is generally good. For some of the pipe culverts vegetation and vent cleaning is required. In general, the condition of all the structures is found satisfactory. The detailed condition of the same are given the following sections. Detailed inventory and condition survey of culverts are given in **ANNEXURE 2.**

4.6.1. Slab/Box Culverts

The details of Slab/Box culvert in the project stretch are listed below.

Table 4.5: List of Slab/Box Culverts

S. No.	Chainage (Km.)	Span (m.)	Vent Size (m.)
1	334+222	1x1.5x1.6	1.6
2	334+938	1x1.5x2.47	2.47
3	342+374	1x4.0x4.1	4.1
4	342+591	1x1.5x1.5	1.5
5	342+910	1x1.5x1.5	1.5
6	347+643	1x1.5x2.47	2.47
7	356+411	1x5.5x3.4	3.4
8	376+408	1x5.8x5	5
9	377+770	1x6x2.8	2.8
10	378+387	1x4.5x3.8	3.8
11	379+460	1x2x1	1
12	379+770	1x4x4	4
13	380+197	1x5.1x5.7	5.7
14	382+250	1x5.0x2.2	2.2
15	388+247	1x4x3.7	3.7
16	388+472	1x4x4.6	4.6
17	390+436	2x3.0x3.0	3.0
18	391+613	1x5x4.3	4.3

S. No.	Chainage (Km.)	Span (m.)	Vent Size (m.)
19	392+175	1x2x3.0	3.0
20	397+141	1x4.1x1.6	1.6
21	397+510	1x5.2x2.8	2.8
22	398+082	1x4.5x3.7	3.7
23	398+481	1x5.0x4.6	4.6
24	398+868	1x5.0x4.8	4.8

4.6.2. Condition of the Slab/Box Culverts:

The general condition of above Box/slab culverts is good. Maintenance is to be carried out before monsoon for vent clearance, Protection works etc.

Km.390+436

Km.391+613

Km.397+141

Km.398+481

Figure 4.4: Representative photos of Underpasses

4.6.3. General Description of the Pipe Culverts

The details of pipe culverts in the project stretch are as listed below.

Table 4.6: List of Pipe Culverts

S. No.	Chainage (Km.)	Span	S. No.	Chainage (Km.)	Span
1	320+765	2x1.2	68	353+838	1X0.9
2	320+892	2x1.2	69	354+230	1X1.2
3	321+417	3x1.2	70	354+915	1X1.2

S. No.	Chainage (Km.)	Span
4	321+814	1x1.2
5	322+142	2x1.2
6	322+418	1x0.9
7	322+620	2x1.2
8	322+658	1x1.2
9	322+775	2x1.2
10	323+101	2X1.0
11	323+885	1X1.2
12	324+514	2x1.0
13	324+918	1X1.2
14	325+012	1X1.2
15	325+024	1X1.0
16	325+258	2X1.2
17	325+475	1X1.2
18	325+720	1x1.2
19	326+320	3x1.2
20	326+550	1x1.2
21	326+560	2x1.2
22	326+790	1x1.2
23	327+254	2x1.2
24	327+604	2x1.2
25	327+795	2x1.2
26	327+917	1x1.2
27	328+916	1x1.2
28	329+235	2x0.9
29	329+904	3x1.2
30	332+200	1x1.2
31	332+542	2x1.2
32	332+846	1x0.9
33	332+996	1x1.0
34	333+110	1x1.2
35	333+724	1x1.2
36	335+495	1x0.9
37	335+719	2x1.2
38	335+870	1x1.2
39	336+023	2x1.2
40	336+936	1x1.2
41	338+406	2x1.2
42	338+600	1x1.2

S. No.	Chainage (Km.)	Span
71	355+140	1X1.2
72	355+411	1X0.9
73	355+959	2X0.9
74	356+511	1X1.2
75	357+390	1X1.0
76	357+884	2X1.2
77	359+200	1X1.2
78	360+734	2X1.2
79	360+877	3X1.2
80	360+923	1X1.2
81	361+186	2X1.2
82	361+323	2X1.2
83	361+677	2X1.0
84	361+910	2X1.0
85	362+118	2X0.8
86	362+306	2X0.8
87	362+414	2X1.2
88	362+705	1X1.2
89	362+745	1X1.2
90	363+167	3X1.0
91	363+730	1X1.2
92	364+239	1X1.2
93	364+854	2X1.2
94	365+121	7X1.2
95	366+630	1X1.2
96	367+037	5X1.2
97	367+210	1X1.2
98	367+657	3X1.2
99	368+916	3X1.2
100	369+562	1X1.2
101	371+683	2X1.2
102	371+848	1X1.2
103	372+109	2X1.2
104	372+351	1X1.0
105	372+468	1X0.9
106	373+230	2X1.2
107	373+987	3X1.2
108	374+042	1X1.2
109	375+272	1X1.2

S. No.	Chainage (Km.)	Span
43	339+454	6x1.2
44	339+714	1x1.2
45	341+270	1x1.2
46	341+298	1x1.2
47	341+621	1x1.2
48	341+908	1x1.2
49	342+258	1x1.2
50	343+930	1x1.2
51	344+080	1x1.2
52	345+627	2x1.2
53	346+321	1x1.2
54	346+643	2x1.2
55	347+805	1x1.0
56	347+958	1x1.2
57	348+622	4x1.2
58	348+730	1x1.2
59	349+409	1x1.0
60	349+659	1x1.0
61	349+918	2x1.0
62	350+200	1x1.2
63	350+970	2x0.9
64	351+372	1x0.9
65	351+687	1x0.9
66	352+581	2x1.2
67	352+777	2X1.2

S. No.	Chainage (Km.)	Span
110	376+790	2X1.2
111	377+040	1X1.2
112	379+100	1X1.2
113	379+400	1X1.0
114	380+671	2X1.0
115	382+740	1X1.2
116	384+018	1X1.0
117	385+702	1X1.2
118	386+080	2X1.2
119	387+650	1X1.2
120	387+933	1X1.2
121	388+920	1X1.2
122	389+900	1X1.2
123	389+965	1X1.2
124	390+228	2X1.2
125	390+259	1X1.2
126	391+434	1X1.2
127	391+926	1X1.2
128	395+130	2X1.2
129	395+760	1X1.2
130	395+942	1X1.2
131	396+29	1X1.2
132	399+434	1X1.2
133	399+488	1X1.2

4.6.4. Condition of the Pipe Culverts

The general condition of above pipe culverts is good. Maintenance is to be carried out before monsoon for vent clearance, Protection works etc.

The culverts are in fair condition and can be retained in the present condition with following repairs/rehabilitation measures.

- Chocked culverts must be cleared.
- Debris and garbage near outside the vents must be removed.

Km.384+018

Km.387+933

Figure 4.5: Representative photos of Pipe Culverts

CHAPTER 5. REVIEW OF PAVEMENT DESIGN

5.1 General

Review of Pavement design report includes providing insights on design life of pavement, crust thickness, history of overlays on the existing pavement, pavement condition and CA provisions for the upcoming renewal cycles.

5.2 Pavement design

The Pavement Design shall be carried out in accordance with Indian Roads Congress guidelines. The pavement is designed in accordance with IRC: 58 -2015 "Guidelines for the Design of Plain Jointed Rigid Pavements for highways", IRC: SP 84 -2014, IRC: 15-2011 "Construction Concrete Road (FOURTH REVISION)" and relevant clauses of schedule B of the EPC agreement. Pavement crust thickness for main carriageway as per pavement design report summarized below.

Table 5.1: Rigid Pavement Design for Main carriageway

Description	Design/Adopted Parameters
CBR of sub grade	6 %
Two way commercial traffic volume per day	1053
Design life in years	30
Pavement Quality Concrete (PQC) – (mm)	270
Dry Lean Concrete (DLC) – (mm)	150
Drainage Layer (GSB) - (mm)	150
Diameter of Dowel Bar (mm)	36
Length of Dowel Bar (mm)	450
Spacing of Dowel Bars (mm)	300
Diameter of Tie Bar (mm)	12 (Deformed)
Length of Tie Bar (mm)	640
Spacing of Tie Bars (mm)	580

As per schedule D, (Annexure-I), clause 2, pavements for Slip road/Service road shall be flexible pavement and designed as per provision of design manual IRC: SP: 84:2014. The design traffic in case of service road shall be ten million standard axles as per Cl:5.5.5 of IRC: SP: 84:2014. The crust composition shall be designed in accordance with the IRC:37. "Guidelines for the Design of Flexible Pavements".

Table 5.2: Flexible Pavement for service road

S. No.	Description/ Pavement layer	Design/Adopted Parameters
1	Sub Grade CBR (%)	9 %
2	Design Life (Years)	15 years for non-bituminous
3	Design Traffic (MSA)	10 MSA
4	Surface course (BC)	40mm
5	Binder course (DBM)	50 mm
6	Base course (WMM)	250 mm
7	Sub Base course (GSB)	200 mm

The Pavement crust has been designed according to IRC specification and found in order, the adopted/ constructed pavement layer thickness is adequately provided than actual/designed thickness.

5.3 Maintenance/ Overlay schedule

Periodic Maintenance includes Profile corrective course overlaid with the periodic renewal of the wearing course of BC for service roads. The detail maintenance schedule is summarized below.

Routine maintenance - Every year
Periodic Renewal for Flexible Pavement – Proposed for Service road on or before 2028.
Periodic Maintenance for Rigid Pavement – Re-texturing shall be done at least once in 10 years from construction. (As per IRC 58-2015).

CHAPTER 6. SAFETY AUDIT OF ROAD

6.1 General

Road Safety Audit (RSA) is defined as "the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users".

Road Safety is a multi- sectorial and multi- dimensional issues. It incorporates the development and management of road infrastructure, provisions of safer vehicles, legislations and law enforcements, mobility planning, provisions of health and hospital services, child safety, urban land use planning.

A Key feature of a road safety audit is the use of a team of professionals with varied expertise. The team shall include highway safety engineers, highway design engineers, maintenance personal, and law enforcement. Additional specialties shall be added to the team as needed.

Central Road Research Institute (CRRI) has studied road safety elements extensively in the past and has come up with various manuals such as manual for safety in road design (1998), Road safety Audit Manual (2003) and Revised Road Safety Audit manual (2010). Indian Road Congress (IRC) has published Special provision SP-88, Manual on road Safety Audit. The methodology used for the design stage audit process is based on these manuals like Type Designs for Intersections on National Highways, 1992.

Table 6.1: Referred IRC Publications

IRC Code No.	IRC Code Name
IRC: 35	Code of Practice for Road Markings
IRC: 38	Guidelines for Design of Horizontal curves for highways and Design tables
IRC: 67	Code of Practice for Road signs
IRC: 73	Geometric Design standards for rural highways (non-urban)
IRC:103	Guidelines for Pedestrian Facilities
IRC: SP-15	Ribbon Development along highways and its prevention
IRC: SP-23	Vertical curves for highways
IRC: SP-41	Guidelines on design of at-grade intersections in Rural and Urban areas
IRC: SP-55	Guidelines for safety in construction zones
IRC: SP- 88	Manual of Road Safety audit

6.2 Road Safety Audit

During the site visit it is observed that all safety items are provided as shown in the following table

Table 6.2: Existing Road Safety items

S. No.	Item Description		Status	Condition
Road Furniture				
1	Sign Boards	Chevron Signs	Available as per site requirement	Good
		Village sign boards	Available as per site requirement	Good
		Information Boards	Available as per site requirement	Good

S. No.	Item Description		Status	Condition
		Other Sign Boards	Available as per site requirement	Good
		Gantry Sign Boards	Available as per site requirement	Good
2	Road Marking	Studs &Lane marking	Available as per site requirement	Good
3	Metal Beam Crash Barriers	At High embankments & Bridge Approaches	Available as per site requirement	Good
4	Median kerb	Along the Project Highway	Provided as per IRC SP:84-2014	Good
5	Road studs & Solar Blinkers	Along the Project Highway	Provided as per IRC SP:84-2014	Good

This Project Section is part of an important corridor. It is the Concessionaire's duty and responsibility to provide safe road for the commuters by assuring safe and hindrance free movement for both Traffic and Pedestrians along urban locations & habitations.

The Concessionaire is maintaining the safety features in good condition from time to time in accordance with the provisions of Schedule K of the Concession Agreement.

Km. 392+800

Km.389+553

Km.360+165

Km.393+111

Figure 6.1: Representative photos during road safety audit

6.3 Conclusion

Safety arrangements are made for road users along the Project road are found to be in conformity with project road requirements and good industry practice. However, a continuous monitoring on safety arrangements is highly necessary during the maintenance period.

CHAPTER 7. TOLL PLAZA & HTMS

7.1 General:

There is one toll Plaza on the project road at Km. 382+920. The width of each toll lane is provided 3.2 m, except for the lane for over dimensioned vehicles, where it is 4.5 m. between each toll lane of the toll plaza, traffic islands is constructed to accommodate tollbooth. Protective barriers of reinforced concrete and traffic impact attenuators is placed at the front of each island to prevent out of control approaching vehicles crashing into the toll booth. The canopy is provided for weather protection to toll operators, drivers and facilities. The canopy is designed aesthetically pleasing with cylindrical support columns located at traffic island so that there is no restriction on visibility and traffic movement. Total 7 Nos. toll booths are provided in toll plaza.

Toll Plaza is updated to ETC Lane system as per the Change of Scope Order issued to the Concessionaire.

7.2 Tolling Equipment and Control Room Equipment

List of equipment provided at toll plaza and control room is given below.

Table 7.1: List of Equipment at Toll Plaza and Control Room

S .No.	Materials Description	Quantity
LANE ITEMS		
1	ETC RFID Readers	10
2	ETC RFID Readers (DETC: Physical installed)	2
3	Automatic Lane Barrier Gate (Exit)	10
4	User Fare Display (UFD)	10
5	AVC (V3.0)_ with RX & TX	10
6	AVC Incident Capture Camera with pole	10
7	Licence Plate Image Capture Camera	9
8	Traffic Light	8
9	Traffic Light (DETC: Physically Installed)	6
10	OHLS(Over Head Lane Signal)	8
11	OHLS (DETC: Physically Installed)	2
12	Vehicle Separator	14
13	MSWIN (1500 mm)	8
14	MSWIN (1750 mm)	2
15	WIM Panel	10
16	WIM Indicator	10
17	Electronic Enclosure	10
18	Handheld Reader	2
19	Handheld Reader Router	1
20	SWB (Static Weight Bridge)	2
21	SWB: Indicator, Printer	4
22	SURVEILLANCE ITEMS	

S .No.	Materials Description	Quantity
23	PTZ camera(both side)	2
24	Building Surveillance Camera(Night vision)	3
25	**SOFTWARE ITEMS**	
26	Lane Module Application	10
27	Plaza Module Application	2
28	CCH Integration	1
29	Antivirus (Symantec Endpoint Protection)	14
30	Chain way RFID Hand Held Reader	1
31	Chain way RFID Hand Held Reader	1
32	D-Link Wireless Router	1
33	Required Cabling & Implementation	1
E	**BOOTH ITEMS**	
26	Monitor LEDLG, 18.5"/47	10
27	Customized Keyboard	8
28	Qwerty Keyboard	2
29	Thermal Printer (TM-88V)_Epson	8
3)0	Barcode Scanner	8
31	Manual Booth Controller	10
32	Doom Camera(IP Based)_Hikvision	10
33	Smart Card Reader	8
34	Intercomm Slave	8
A) SERVER ROOM ITEMS		
1	Server Rack 42U, with Fan and 6, point power Manager, Cable Manager	1
2	Lenovo Think system Server SR 550(7x04S2FB00)	1
3	Server Monitor (LG, 18.5", 47 cm)	1
4	Keyboard, Mouse for TMS Server	1
5	Network Patch Panel (24 Port)_D-Link	1
6	Network Switch (24 Port)_D-Link	1
B) CONTROL ROOM ITEMS		
7	Monitor (Lenovo "18.5" Inch)	3
8	Control Room Workstation(Lenovo, 13, 4GB RAM, 1TB HOD) for POS, Audit & CCH Server	3
9	Key board, Mouse (Lenovo/Dell)	3
10	43" LED TV Samsung	1
11	NVR(HIKVISION, 32 CH 3 TB)	1
12	NVR Mouse	1
13	Master Intercom - (NIM - 20B)	1
14	PTZ CONTROL KEYBOARD-JOYSTICK	1
15	POS ETC RFID READER	1

S .No.	Materials Description	Quantity
16	Thermal Printer	1
C) UPS ROOM ITEMS		
17	10KVA ON LINE UPS	2
18	6KVA ONLINE UPS	1

7.3 Vehicles

The list of vehicles, which were observed at site, for operation of Highway and Toll Plaza are presented below.

Table 7.2: List of Vehicles

S. No.	Vehicle Type	Toll Plaza
1	Patrol Vehicle	1 No
2	Ambulance	1 No.

Toll Plaza at Km.382+920

Toll Building at Km.382+920

Figure 7.1: Photographs of Toll Plaza

CHAPTER 8. SCHEDULE OF ANNUITY PAYMENTS

8.1 Hybrid Annuity Model (HAM)

Hybrid annuity model is the PPP model which allows the payment of 40% of the Project cost during construction period based on progress milestones set forth by Authority to Concessionaire and Payment of balance 60% to the Concessionaire Bi annually with the Interest during the balance concession period.

8.2 Payment during Construction

As per the provisions of Article 23 of the Concession Agreement, 40% of the Bid Project Cost adjusted with Price Index in accordance with Clause 23.4 of the CA, shall be paid during the Construction Period. Amount payable during construction period shall be paid in five equal installments upon achieving the following Project Milestones.

Table 8.1 : Schedule of Payment Milestones

S. No.	Payment Milestone No	Criteria for releasing the Payment
1	Payment Milestone I	On Achievement of 10% of Physical Progress
2	Payment Milestone II	On Achievement of 30% of Physical Progress
3	Payment Milestone III	On Achievement of 50% of Physical Progress
4	Payment Milestone IV	On Achievement of 75% of Physical Progress
5	Payment Milestone V	On Achievement of 90% of Physical Progress

During the Operation Period, remaining 60% of the balance Completion Cost shall be paid in 30 Annuities each Annuity payable biannually. Each Annuity amount shall be based on the percentages of the balance Completion Cost mentioned in 23.6.3 of the Concession Agreement. During the Operation Period following payment components are payable.

- Annuity Payment as per the Annuity Payment Schedule provided in 23.6.3 of the Concession Agreement.
- Interest on the balance amount to be paid at an interest rate equal to the applicable Bank Rate Plus 3%
- O&M Payment as a lump sum amount as per Clause 23.7.1 of the Concession Agreement.

8.3 Schedule of Annuity Payments

Details of Annuity payments are as below.

Table 8.2 : Schedule of Annuity Payments

S. No.	Following the COD	% of Completion Cost remaining to be paid on COD	Due date for Payment	Date of Payment
1	Annuity 1	2.10%	18.11.2020	7-Dec-20
2	Annuity 2	2.17%	23.06.2021	
3	Annuity 3	2.24%	18.11.2021	
4	Annuity 4	2.31%	23.06.2022	
5	Annuity 5	2.38%	18.11.2022	
6	Annuity 6	2.45%	23.06.2023	

S. No.	Following the COD	% of Completion Cost remaining to be paid on COD	Due date for Payment	Date of Payment
7	Annuity 7	2.52%	18.11.2023	
8	Annuity 8	2.60%	23.06.2024	
9	Annuity 9	2.68%	18.11.2024	
10	Annuity 10	2.76%	23.06.2025	
11	Annuity 11	2.84%	18.11.2025	
12	Annuity 12	2.93%	23.06.2026	
13	Annuity 13	3.02%	18.11.2026	
14	Annuity 14	3.11%	23.06.2027	
15	Annuity 15	3.20%	18.11.2027	
16	Annuity 16	3.30%	23.06.2028	
17	Annuity 17	3.40%	18.11.2028	
18	Annuity 18	3.50%	23.06.2029	
19	Annuity 19	3.61%	18.11.2029	
20	Annuity 20	3.72%	23.06.2030	
21	Annuity 21	3.83%	18.11.2030	
22	Annuity 22	3.94%	23.06.2031	
23	Annuity 23	4.06%	18.11.2031	
24	Annuity 24	4.18%	23.06.2032	
25	Annuity 25	4.25%	18.11.2032	
26	Annuity 26	4.25%	23.06.2033	
27	Annuity 27	4.44%	18.11.2033	
28	Annuity 28	4.71%	23.06.2034	
29	Annuity 29	4.75%	23.06.2034	
30	Annuity 30	4.75%	18.11.2035	

CHAPTER 9. OPERATION AND MAINTENANCE

9.1 General

As per Article 17 of CA, the Concessionaire will operate and maintain the Project roads by itself or through O & M Contractors and comply with specification and standards, and other requirements set forth in the Agreement, Good Industry Practice, Applicable Laws, applicable permits and manufacturer guidelines and instructions with respect to toll system.

9.2 Inspection

Inspection system followed is illustrated as divided into the following 3 types.

- **Visual Inspection:** Visual inspections are done at frequent intervals, and are intended to determine any potential traffic hazards to the road user or hampering the aesthetics of the project stretch. Visual Inspections are meant to identify defects that constitute an imminent or immediate hazard to the public.

- **Detailed Inspection:** Detailed Inspections often require some measuring instruments, are done less frequently and are intended more towards determining performance and behavior of various elements. These inspections also indicate if there is any need for thorough inspections. Detailed inspections are carried out primarily to establish programs of periodic or major maintenance tasks, and enhancement requirements not requiring urgent execution

- **Thorough Inspection:** Thorough Inspections are aimed at finding the cause and remedy of specific problems and at specific locations. Specialist's inspections are required once in a while. Thorough Inspections shall be carried out with highly sophisticated instruments

The inspection procedures will assist in identifying the need for replacement or renewal under planned program of maintenance and rehabilitation. The elements viz. pavement, drainage, shoulders / slopes / Earthworks, structures and buildings are covered.

Maintenance program will be submitted to authority not later than 45 days prior to each accounting year.

9.3 Operations

9.3.1. Traffic Flow Operation & Traffic Management Plan

Following are the obligations of the Concessionaire for the regular and emergency operations of the Project road and Project Facilities.

i. Permitting smooth and uninterrupted flow of traffic during normal operating conditions.
ii. Carrying out preventive and periodic maintenance of the Project road;
iii. Undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;
iv. Undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;
v. Functioning of the lighting system;
vi. Functioning of the Patrolling System
vii. Functioning of rescue and medical aid services

viii. Ambulance as and when required
ix. Functioning of the Project Facilities
x. Administrative, Operational and Maintenance Base Camp
xi. Truck Lay byes
xii. Pickup Bus stops / Bus Bays
xiii. Protection of the environment and provision of equipment and materials therefor;
xiv. Operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project road
xv. Complying with Safety Requirements in accordance with Article 18.

9.4 Operation of Toll Plazas

There are two lanes in each direction operating at toll plaza, middle lanes are used by Car/LCV for collecting toll and extra wide lanes are utilized by wide vehicles like Bus/Trucks/Tractors and toll exempted vehicles. The cash collected is deposited on daily basis to the Escrow Account. In case of ETC system, Toll collection is connected with Network system and directly deposited into the Escrow account.

9.5 Maintenance of Project road

The maintenance methodology and yearly maintenance programme will guide the Maintenance team to undertake the routine & periodic maintenance works of the Project Facilities. This programme is the basic indicator of the intended works to be carried out by the Maintenance Team over a period of one year.

Road maintenance can be carried out in four ways as listed below.

i. Preventive Maintenance
ii. Routine Maintenance
iii. Periodic Maintenance
iv. Special repairs

9.5.1. Preventive Maintenance

Preventive maintenance is an organized, systematic process of applying a series of preventive treatments over the life of the pavement to minimize life cycle costs.

The strategy of applying periodic treatments at appropriate times in a pavement's life is economical than applying treatment at the end of pavement's life. Preventive maintenance is designed to retard pavement deterioration. Regular preventive maintenance will be carried out to ensure adherence to the Design Requirements and specifications throughout the Concession period.

The flexible pavement as well as rigid pavements are in good condition and hence does not require any immediate or preventive interventions.

9.5.2. Routine Maintenance

Routine maintenance, which involves repairing of cracks, replacement of safety girders along the highway, clearance of debris following accidents, ensuring functionality of sign posts, maintenance of a security set-up, and such other activities.

9.5.3. Periodic Maintenance

In contrast to preventive maintenance treatments, periodic maintenance treatments are ideally applied on pavements to improve surface integrity and waterproofing, or to improve skid resistance, without increasing the strength of the pavement significantly. They are sometimes referred to as "functional overlays," as they are intended to restore or enhance the ability of the roadway to serve its purpose (function), but do not increase the load-carrying capabilities. If the pavement failure is more and demands for a "structural overlay" they are intended to increase load-carrying capabilities of the project road. The details of periodic maintenance schedule are given below.

Table 9.1: Schedule and status of for Periodic Maintenance

Description	Schedule of Major Maintenance	Status of Major Maintenance
1st Periodic Maintenance	2027	Planned to execute
2nd Periodic Maintenance	2034	Planned to execute

9.5.4. Special Repairs

The group of activities performed to restore the roadway following damage due to natural calamities such as heavy floods, sand storms, hurricanes, cyclones, earthquakes or landslides which shall be unpredictable. The affected Project road shall be rectified, and the system shall be restored to function as per programme prepared in consultation with Independent Engineer. Typical activities include,

a. Culvert and bridge repairs
b. Retaining wall repairs and construction;
c. Construction of Diversions;
d. Floodway repairs; and
e. Flood damage restoration works, etc.

9.6 Review of Test Reports

9.6.1. Bump Integrator Test:

Maintenance of road is dependent on several factors, one of which is the condition of Pavement surface. As such Roughness is the measurement of the riding quality, which in turn is the effect of total surface deterioration. Bump Integrator (BI) is one of the equipment needed for roughness measurement. The roughness of pavement surface is designated as uneven index value and expressed as surface roughness from which the condition of the road can be assessed.

Further it is to be noted that during O&M period, the roughness value shall not exceed 2750mm/Km in accordance with Schedule K(a)(ii).Based on documents renewed, no NCRS were noticed pertinent to riding quality.

9.7 O&M Forecast

The O&M costs were estimated based on various parameters of CA, design reports.The cost summary is given below, and detailed cost estimations are given in **ANNEXURE 3.**

Table 9.2: Proposed Plan for Future Operation & Maintenance Cost (In Crores)

Year	Routine maintenance	Incidental maintenance	Periodic / Major maintenance	Operational Expenses	Total cost per year
2020	2.521	4.026		4.42	10.96
2021	2.596	4.147		4.55	11.29
2022	2.674	4.271		4.69	11.63
2023	2.754	4.399		4.83	11.98
2024	2.837	4.531		4.97	12.34
2025	2.922	4.667		5.12	12.71
2026	3.010	4.807		5.28	13.09
2027	3.100	4.951	30.97	5.43	44.46
2028	3.193	5.100		5.60	13.89
2029	3.289	5.253		5.77	14.31
2030	3.387	5.410		5.94	14.74
2031	3.489	5.573		6.12	15.18
2032	3.594	5.740		6.30	15.63
2033	3.701	5.912	36.54	6.49	52.64
2034	3.813	6.089		6.68	16.59
2035	3.927	6.272		6.88	17.08
2036	0.576	0.920		1.01	2.51
Total	**51.382**	**82.067**	**67.51**	**90.07**	**291.03**

CHAPTER 10. REVIEW OF CONCESSION AGREEMENT

10.1 General: Scope of Work (Article 2)

Article 2 of the CA provides the scope of work, which includes the following.

- Operation and Maintenance of the Project Highway on the Site set forth in Schedule A and as specified in Schedule B together with provision of Project Facilities as specified in Schedule C, and in conformity with the Specifications and Standards set forth in Schedule D;
- collection of Fee from the Users of the Project; subject and in accordance with the provisions of the Concession Agreement;
- performance and fulfillment of all other obligations of the Contractor in accordance with the provisions of this Agreement and matters incidental thereto or necessary for the performance of any or all of the obligations of the Contractor under this Agreement

10.2 Letter of Award

After evaluation of the bids received, Authority will select one bidder considering their score in technical and financial bids. Further Authority will issue a Letter called LOA (Letter of Award) to the selected bidder requiring the execution of agreement within stipulated time. The issued LOA copy given in **ANNEXURE - 4**.

10.3 Conditions precedent (Article 4)

Conditions precedent to be fulfilled by the Authority

- Providing adequate Right of Way
- Providing necessary approvals as per the Concession Agreement

Conditions precedent to be fulfilled by the Concessionaire

- Provide performance security to the Authority
- Executed and procured Escrow Agreement & Substitution Agreement
- Procured all applicable permits specified in Schedule E of CA
- Executed financing Agreements and delivering 3 copies of Financial Package
- Delivered to the Authority confirmation in original of the correctness of their representations and warranties set forth in Agreement and a legal opinion from the legal opinion from the legal counsel of the Concessionaire

10.4 Major Obligations of the Concessionaire (Clause 5.1)

- The Concessionaire shall obtain necessary permits in conformity with the applicable laws
- Procure appropriate rights for obtaining materials
- Perform and fulfill its obligations under financing Agreements
- To make reasonable efforts to facilitate the acquisition of land required for execution
- Transfer the Project road upon termination of the Concession Agreement

10.5 Performance Security (Article 9)

- The Concessionaire shall submit the Performance security to the Authority within 30 days from the date of the Agreement,
- The Performance security shall remain in force and effect for a period of one year from the Appointed Date

- Performance Security shall be released upon the Concessionaire expending on Project Construction an Aggregate sum that is not less than 30% of the Total Project Cost.

10.6 Tests (Clause 13.3)

For determining that the Project, conforms to the Maintenance Requirements, the Independent Engineer shall require the Concessionaire (Concessionaire shall in turn require the Contractor) to carry out, or cause to be carried out, tests specified by it in accordance with Good Industry Practice. One half of the costs incurred on such tests, and to the extent certified by the Independent Engineer as reasonable, shall be reimbursed by the Authority to the Concessionaire

10.7 Provisional Certificate (Clause 14.3)

- Upon completion of works in accordance with the specifications and standards set forth in the Schedule B, C and D of CA after determining the tests on completion successful the Independent engineer shall issue the Completion Certificate in the form set forth in Schedule J of CA. Provisional Completion Certificate given in **ANNEXURE - 5**.

10.8 Completion Certificate (Clause 14.4)

- Upon completion of Punch list items appended to the Provisional Completion Certificate within 90 days of issuance of Provisional Complete Certificate, Completion Certificate shall be issued to the Concessionaire.

10.9 Commercial Operation Date (COD) (clause 15.1)

- COD shall be the date on which the Provisional Completion Certificate is issued by the Independent Engineer.
- With COD the Project shall enter into commercial service and the Concessionaire is entitled to demand and collect Fee.

10.10 Change of scope (Article 16)

Change of scope proposals that were initiated during construction period and consented by the NHAI are provided in **Annexure 7**.

10.11 O&M Obligations of the Concessionaire (Clause 17.1)

- Permitting safe, smooth and uninterrupted flow of traffic on the Project road
- Collecting and appropriating the Fee
- Minimizing the disruption to traffic in the event of accidents
- Undertaking routine maintenance including prompt repairs of pot holes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices
- Undertaking major maintenance such as resurfacing of pavements, repairs and refurbishments of tolling system and other equipment
- Preventing any unauthorized use of the Project road.
- Protection of environment and provision of equipment and materials
- Complying with safety Requirements in accordance with the provisions of the CA.

10.12 Maintenance Requirements (Clause 17.2)

The Contractor shall procure that at all times during the Operations period; the Project road conforms to the maintenance requirements set forth in Schedule K of CA (**The "Maintenance Requirements").**

10.13 Maintenance Manual (Clause 17.3)

No later than 90 (ninety) days prior to the Scheduled Two Laning Date, the Contractor shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual (the "**Maintenance Manual**") for the regular and preventive maintenance of the Project in conformity with the Specifications and Standards, Maintenance Requirements, Safety Requirements and Good Industry Practice, and shall provide 5 (five) copies thereof to the Authority and 2 (two) copies to the Independent Engineer. The Maintenance Manual shall be revised and updated once every 3 (three) years and the provisions of this Clause shall apply, mutatis mutandis, to such revision.

10.14 Maintenance Programme (Clause 17.4)

- On or before COD and no later than 45 days prior to the beginning of each Accounting year during the Operation Period as the case may be the Concessionaire shall provide to the Authority and Independent Engineer its proposed annual Programme of preventive, urgent and the schedule maintenance.
- The Concessionaire has been submitting the Annual Maintenance Programme regularly as per the above clause.

10.15 Damages for breach of Maintenance Obligations (Clause 17.8)

- In the event that the Contractor fails to repair or rectify any defect or deficiency set forth in the Maintenance Requirements within the period specified therein, it shall be deemed to be in breach of the Agreement and the Concessionaire shall be entitled to recover Damages, to be calculated and paid for each day of delay until the breach is cured, at the higher of the following.
- 2% (two percent) of the performance security, and
- 0.1% (zero decimal one per cent) of the cost of such repair or rectification as estimated by the Independent Engineer.

10.16 Monthly status reports (Clause 19.1)

During the Operation Period, the Contractor shall, no later than 7 (seven) days after the close of each month, furnish to the Concessionaire, the Authority and the Independent Engineer a monthly report stating in reasonable detail the condition of the Project including its compliance or otherwise with the Maintenance Requirements, Maintenance Manual, Maintenance Program and Safety Requirements, and shall promptly give such other relevant information as may be required by the Concessionaire, Independent Engineer or the Authority. In particular, such report shall separately identify and state in reasonable detail the defects and deficiencies that require rectification.

10.17 Payment of Bid Project Cost (Article 23)

The Authority agrees to pay 40% of the Bid Project Cost in five installments against the achievement of Project Milestones specified in Clause 23.4 of the Concession Agreement and the amount shall be adjusted with Price index.

Remaining balance completion cost shall be paid as per the % of balance completion cost biannually from the date of COD. Percentage of amounts payable for each Annuity is specified in 23.6.3 of the Concession Agreement.

10.18 Change in Law (Article 35)

The Contractor acknowledges that the Contractor shall be responsible for any consequences arising from any Change in Law and the Contractor shall at its own costs and expenses, undertake the compliance with any such Change in Law, however, in the event any receivables are obtained by the Concessionaire from the Authority, towards the losses incurred by the Concessionaire on account of Change in Law, then the Contractor shall ensure that such receivables are passed to the Concessionaire.

CHAPTER 11. INSURANCE

11.1 Details of Insurance:

As per clause 26.1 of the CA, the Concessionaire shall effect and maintain at its own cost during the Operation Period such insurances for such maximum sums as may be required under the Financing Agreements and the Applicable laws, and such insurances as may be necessary or prudent in accordance with Good Industry Practice. Insurance copies are provided in **ANNEXURE 6.** Accordingly, the Concessionaire has procured the following insurances for mitigating the risks

Table:11-1 Insurance Details

Name of the Policy	Insurance Company	Policy No	Effective Period		Property covered
			From	To	
Employees Compensation Insurance	HDFC ERGO General Insurance Co Ltd	3114203384088500000	2.5.2020	1.5.2021	All categories of Employees of the Contractor & sub-contractor engaged in the Project
Standard Fire & Special Perils Policy	The Oriental Insurance Co Ltd	171200/11/2021/406	12.02.2021	04.10.2021	Fire Basic cover, STFI cover, Earth Quake cover
Fire Industrial All Risk Policy	The Oriental Insurance Co Ltd	171200/11/2021/405	12.02.2021	04.10.2021	Toll Plaza Building & Booths, TMS, HTMS, Office & IT Equipment, Road Furniture and Rigid Pavement etc.

CHAPTER 12. CONCLUSION

12.1 General

Based on detailed site inspection, review of various documents and reports as described in the preceding chapters technical over view of the Project is provided below.

12.2 Pavement Condition

The Pavement condition for the overall project is good. RCC drains are constructed in Built up locations and earthen drains in rural locations which facilitates, effective drainage system along the project road. Shoulder condition is fair.

12.3 Condition of Structures

General condition of Bridges is good. No major structural defects were noticed. General condition of Culverts is good. Observed vegetation growth in vents of Box and Hume Pipe culverts and they are being cleared during regular maintenance period.

12.4 Project Facilities

Toll plaza was constructed at Km.382+920 and is operational. Bus bays and truck lay byes are in good condition. Medical Aid posts found functional. Avenue plantation and landscaping at Toll Plaza is provided and being maintained well. Highway lighting is provided at toll plaza, bus bay and truck lay bye locations and the same is found functional.

12.5 Road safety

Pavement marking is in fair condition and number of sign boards are provided as per IRC SP 73-2007. The condition of signboards & other road appurtenances like metal beam crash barriers is fair.

12.6 Maintenance

- Routine maintenance is being carried out by O&M contractor effectively, based on documents reviewed, time-to-time observations made by client/Authority are being complied and no outstanding NCR's are to be attended as on date.
- Major maintenance (MM) /Periodic maintenance was carried recently and next MM is scheduled in the year 2027.

12.7 Epilogue

The project is designed and constructed as per the stipulated specifications besides maintenance work, being carried out timely and effectively to keep the road in traffic worthy and safe at all times.

Annexure 1: Condition of Bridges

S. No.	Chainage (Km.)	Type of Structure	Substructure	Superstructure	Wearing coat	Bearings	Quadrant Pitching	Toe wall	Aprons
1	321+151	Minor Bridge	Good	Good	Good	-	Good	Good	-
2	323+321	Minor Bridge	Good	Good	Good	-	Good	Good	-
3	324+256	Minor Bridge	Good	Good	Good	-	Good	Good	-
4	325+915	Minor Bridge	Good	Good	Good	-	Good	Good	-
5	326+082	Minor Bridge	Good	Good	Good	-	Good	Good	-
6	329+645	Minor Bridge	Good	Good	Good	-	Good	Good	-
7	334+660	Minor Bridge	Good	Good	Good	-	Good	Good	-
8	336+400	Minor Bridge	Good	Good	Good	-	Good	Good	-
9	336+549	Minor Bridge	Good	Good	Good	-	Good	Good	-
10	337+468	Minor Bridge	Good	Good	Good	-	Good	Good	-
11	339+168	Minor Bridge	Good	Good	Good	-	Good	Good	-
12	340+225	Minor Bridge	Good	Good	Good	-	Good	Good	-
13	340+315	Minor Bridge	Good	Good	Good	-	Good	Good	-
14	343+468	Minor Bridge	Good	Good	Good	-	Good	Good	-
15	347+403	Minor Bridge	Good	Good	Good	-	Good	Good	-
16	359+399	Minor Bridge	Good	Good	Good	-	Good	Good	-
17	359+848	Minor Bridge	Good	Good	Good	-	Good	Good	-
18	362+868	Minor Bridge	Good	Good	Good	-	Good	Good	-
19	365+373	Minor Bridge	Good	Good	Good	-	Good	Good	-
20	371+557	Minor Bridge	Good	Good	Good	-	Good	Good	-
21	373+609	Minor Bridge	Good	Good	Good	-	Good	Good	-
22	373+704	Minor Bridge	Good	Good	Good	-	Good	Good	-
23	375+165	Minor Bridge	Good	Good	Good	-	Good	Good	-

S. No.	Chainage (Km.)	Type of Structure	Substructure	Superstructure	Wearing coat	Bearings	Quadrant Pitching	Toe wall	Aprons
24	377+321	Minor Bridge	Good	Good	Good	-	Good	Good	-
25	378+593	Minor Bridge	Good	Good	Good	-	Good	Good	-
26	381+804	Minor Bridge	Good	Good	Good	-	Good	Good	-
27	383+748	Minor Bridge	Good	Good	Good	-	Good	Good	-
28	384+960	Minor Bridge	Good	Good	Good	-	Good	Good	-
29	386+480	Minor Bridge	Good	Good	Good	-	Good	Good	-
30	387+247	Minor Bridge	Good	Good	Good	-	Good	Good	-
31	389+553	Minor Bridge	Good	Good	Good	-	Good	Good	-
32	390+816	Minor Bridge	Good	Good	Good	-	Good	Good	-
33	391+043	Minor Bridge	Good	Good	Good	-	Good	Good	-
34	391+255	Minor Bridge	Good	Good	Good	-	Good	Good	-
35	393+111	Minor Bridge	Good	Good	Good	-	Good	Good	Fair
36	393+810	Minor Bridge	Good	Good	Good	-	Good	Good	Fair
37	394+722	Minor Bridge	Good	Good	Good	-	Good	Good	-
38	395+290	Minor Bridge	Good	Good	Good	-	Good	Good	-
39	399+903	Minor Bridge	Good	Good	Good	-	Good	Good	-
40	360+485	Major Bridge	Good	Good	Good	Good	Good	Good	-
41	376+231	Major Bridge	Good	Good	Good	Good	Good	Good	-
42	326+810	VUP	Good	Good	Good	-	Good	Good	-
43	334+300	VUP	Good	Good	Good	-	Good	Good	-
44	360+165	VUP	Good	Good	Good	-	Good	Good	-
45	363+500	VUP	Good	Good	Good	-	Good	Good	-
46	370+733	VUP	Good	Good	Good	-	Good	Good	Fair
47	357+525	PUP	Good	Good	Good	-	Good	Good	Fair
48	377+344	PUP	Good	Good	Good	-	Good	Good	-

S. No.	Chainage (Km.)	Type of Structure	Substructure	Superstructure	Wearing coat	Bearings	Quadrant Pitching	Toe wall	Aprons
49	394+411	PUP	Good	Good	Good	-	Good	Good	-
50	322+870	LVUP	Good	Good	Good	-	Good	Good	-
51	349+020	LVUP	Good	Good	Good	-	Good	Good	-
52	381+502	LVUP	Good	Good	Good	-	Good	Good	-
53	397+753	LVUP	Good	Good	Good	-	Good	Good	-
54	360+350	LVUP	Good	Good	Good	-	Good	Good	-
55	360+600	LVUP	Good	Good	Good	-	Good	Good	-

Annexure 2: Condition of Culverts

Hume Pipe Culverts

S. No.	Chainage (Km.)	Hume Pipe	Head wall	Quadrant pitching	Toe wall
1	320+765	Good	Good	Good	-
2	320+892	Good	Good	Good	-
3	321+417	Good	Good	Good	-
4	321+814	Good	Good	Good	-
5	322+142	Good	Good	Good	-
6	322+418	Good	Good	Good	-
7	322+620	Good	Good	Good	-
8	322+658	Good	Good	Good	-
9	322+775	Good	Good	Good	-
10	323+101	Good	Good	Good	Good
11	323+885	Good	Good	Good	Good
12	324+514	Good	Good	Good	Good
13	324+918	Good	Good	Good	Good
14	325+012	Good	Good	Good	-
15	325+024	Good	Good	Good	-
16	325+258	Good	Good	Good	Good
17	325+475	Good	Good	Good	Good
18	325+720	Good	Good	Good	Good
19	326+320	Good	Good	Good	Good
20	326+550	Good	Good	Good	Good
21	326+560	Good	Good	Good	Good
22	326+790	Good	Good	Good	Good
23	327+254	Good	Good	Good	Good
24	327+604	Good	Good	Good	Good
25	327+795	Good	Good	Good	Good
26	327+917	Good	Good	Good	Good
27	328+916	Good	Good	Good	Good
28	329+235	Good	Good	Good	Good
29	329+904	Good	Good	Good	Good
30	332+200	Good	Good	Good	-
31	332+542	Good	Good	Good	-
32	332+846	Good	Good	Good	Good
33	332+996	Good	Good	Good	-
34	333+110	Good	Good	Good	-
35	333+724	Good	Good	Good	Good
36	335+495	Good	Good	Good	-
37	335+719	Good	Good	Good	-
38	335+870	Good	Good	Good	-

S. No.	Chainage (Km.)	Hume Pipe	Head wall	Quadrant pitching	Toe wall
39	336+023	Good	Good	Good	Good
40	336+936	Good	Good	Good	Good
41	338+406	Good	Good	Good	Good
42	338+600	Good	Good	Good	-
43	339+454	Good	Good	Good	-
44	339+714	Good	Good	Good	-
45	341+270	Good	Good	Good	Good
46	341+298	Good	Good	Good	Good
47	341+621	Good	Good	Good	Good
48	341+908	Good	Good	Good	Good
49	342+258	Good	Good	Good	Good
50	343+930	Good	Good	Good	Good
51	344+080	Good	Good	Good	Good
52	345+627	Good	Good	Good	Good
53	346+321	Good	Good	Good	Good
54	346+643	Good	Good	Good	Good
55	347+805	Good	Good	Good	Good
56	347+958	Good	Good	Good	Good
57	348+622	Good	Good	Good	Good
58	348+730	Good	Good	Good	Good
59	349+409	Good	Good	Good	Good
60	349+659	Good	Good	Good	Good
61	349+918	Good	Good	Good	Good
62	350+200	Good	Good	Good	Good
63	350+970	Good	Good	Good	Good
64	351+372	Good	Good	Good	Good
65	351+687	Good	Good	Good	Good
66	352+581	Good	Good	Good	Good
67	352+777	Good	Good	Good	Good
68	353+838	Good	Good	Good	Good
69	354+230	Good	Good	Good	Good
70	354+915	Good	Good	Good	Good
71	355+140	Good	Good	Good	Good
72	355+411	Good	Good	Good	Good
73	355+959	Good	Good	Good	Good
74	356+511	Good	Good	Good	Good
75	357+390	Good	Good	Good	Good
76	357+884	Good	Good	Good	Good
77	359+200	Good	Good	Good	Good
78	360+734	Good	Good	Good	Good

S. No.	Chainage (Km.)	Hume Pipe	Head wall	Quadrant pitching	Toe wall
79	360+877	Good	Good	Good	Good
80	360+923	Good	Good	Good	Good
81	361+186	Good	Good	Good	Good
82	361+323	Good	Good	Good	Good
83	361+677	Good	Good	Good	Good
84	361+910	Good	Good	Good	Good
85	362+118	Good	Good	Good	Good
86	362+306	Good	Good	Good	Good
87	362+414	Good	Good	Good	Good
88	362+705	Good	Good	Good	Good
89	362+745	Good	Good	Good	Good
90	363+167	Good	Good	Good	Good
91	363+730	Good	Good	Good	Good
92	364+239	Good	Good	Good	Good
93	364+854	Good	Good	Good	Good
94	365+121	Good	Good	Good	Good
95	366+630	Good	Good	Good	Good
96	367+037	Good	Good	Good	Good
97	367+210	Good	Good	Good	Good
98	367+657	Good	Good	Good	Good
99	368+916	Good	Good	Good	Good
100	369+562	Good	Good	Good	Good
101	371+683	Good	Good	Good	Good
102	371+848	Good	Good	Good	Good
103	372+109	Good	Good	Good	Good
104	372+351	Good	Good	Good	Good
105	372+468	Good	Good	Good	Good
106	373+230	Good	Good	Good	Good
107	373+987	Good	Good	Good	Good
108	374+042	Good	Good	Good	Good
109	375+272	Good	Good	Good	Good
110	376+790	Good	Good	Good	Good
111	377+040	Good	Good	Good	Good
112	379+100	Good	Good	Good	Good
113	379+400	Good	Good	Good	Good
114	380+671	Good	Good	Good	Good
115	382+740	Good	Good	Good	Good
116	384+018	Good	Good	Good	Good
117	385+702	Good	Good	Good	Good
118	386+080	Good	Good	Good	Good
119	387+650	Good	Good	Good	Good

S. No.	Chainage (Km.)	Hume Pipe	Head wall	Quadrant pitching	Toe wall
120	387+933	Good	Good	Good	Good
121	388+920	Good	Good	Good	Good
122	389+900	Good	Good	Good	Good
123	389+965	Good	Good	Good	Good
124	390+228	Good	Good	Good	Good
125	390+259	Good	Good	Good	Good
126	391+434	Good	Good	Good	Good
127	391+926	Good	Good	Good	Good
128	395+130	Good	Good	Good	-
129	395+760	Good	Good	Good	-
130	395+942	Good	Good	Good	-
131	396+290	Good	Good	Good	-
132	399+434	Good	Good	Good	Good
133	399+488	Good	Good	Good	Good

Box/Slab Culverts

S.No	Chainage (Km.)	Condition	Return wall	Quadrant pitching	Toe wall	Parapet wall
1	334+222	Good	Good	Good	Good	Good
2	334+938	Good	Good	Good	Good	Good
3	342+374	Good	Good	Good	Good	Good
4	342+591	Good	Good	Good	Good	Good
5	342+910	Good	Good	Good	Good	Good
6	347+643	Good	Good	Good	Good	Good
7	356+411	Good	Good	Good	Good	Good
8	376+408	Good	Good	Good	Good	Good
9	377+950	Good	Good	Good	Good	Good
10	378+387	Good	Good	Good	Good	Good
11	379+460	Good	Good	Good	Good	Good
12	379+770	Good	Good	Good	Good	Good
13	380+197	Good	Good	Good	Good	Good
14	382+250	Good	Good	Good	Good	Good
15	388+247	Good	Good	Good	Good	Good
16	388+472	Good	Good	Good	Good	Good
17	390+436	Good	Good	Good	Good	Good
18	391+613	Good	Good	Good	Good	Good
19	392+175	Good	Good	Good	Good	Good
20	397+141	Good	Good	Good	Good	Good
21	397+510	Good	Good	Good	Good	Good
22	398+082	Good	Good	Good	Good	Good
23	398+481	Good	Good	Good	Good	Good
24	398+868	Good	Good	Good	Good	Good

Annexure 3: Operation & Maintenance cost

ROUTINE MAINTENANCE COST

S No.	Item		Unit	No	Frequency per year	Quantity	Rate	Amount	Remarks
1	General Cleaning in Carriageway & Shoulders Rural area	Monthly	Km	72.7	12	4	350	12,21,360	04 Nos. of Labour
2	General Cleaning in Carriageway & Shoulders Urban area	Twice in a month	Km	7.295	24	4	350	2,45,112	04 No. of Labour
3	Watering in Median Plants	Once in Week	Km	79.995	52	1	1939	80,65,736	01 No. of Labour
4	Watering in Avenue plants	Once in Week	Km	72.7	52	73	1939	73,30,196	
5	Median Maintenance (Grass cutting and plant trimming)	Once in Month	Km	72.7	12	12	21000	2,52,000	02 Nos. of Labour - 2 x 350 = 700 x 30 = 2,52,000
6	ROW Cleaning	Half yearly	Km	55.9965	2	10	350	3,91,976	10 Nos. of labour per KM (70% of the Project length)
7	Cleaning of Culverts	Half yearly	Nos.	268	2	3	650	10,45,200	3 Nos. of Labour along with JCB or Excavator
8	Road Furniture Cleaning	Quarterly	Km	79.995	4	2	350	2,23,986	02 Nos. of Labour
9	Maintenance of Bus shelters	Monthly	Nos.	38	12	2	350	3,19,200	2 Nos./ Bus shelter/month
10	General Cleaning in Building & Facilities	Daily	Nos.	2	12	60	350	5,04,000	02 Nos. of Labour for 30 days
11	Bridges	Half yearly	Nos.	77	2	4	350	2,15,600	04 Nos. of Labour for removal of vegetation/Structure

S No.	Item		Unit	No	Frequency per year	Quantity	Rate	Amount	Remarks
13	Carriageway Maintenance (Pot Holes etc)	Yearly	Sqm	15	1	550	124	10,23,000	2.5% of CW area considered 22.0x1000x2.5%
								2,08,37,365	
	EQUIPMENT SUPPLY							-	
1	TRUCK TIPPER 6-8 CUM CAPACITY	Monthly	Nos		12	1	400000	4,00,000	(2000000 is the cost of vehicle, considering 20% Rental per year) including maintenance
2	Water Tanker Cap 12 KL for Median	Monthly	Nos	79.995	12	0	440000	-	(2200000 is the cost of vehicle, considering 20% Rental per year) including maintenance
3	Tractor Mounted Water tanker Cap 6 KL for RoW	Monthly	Nos		12		160000	-	(800000 is the cost of vehicle, considering 20% Rental per year) including maintenance
4	Mechanical Sweeper	Monthly	Nos		12	2	250000	5,00,000	(2500000 is the cost of vehicle, considering 20% Rental per year) including maintenance
5	Grass cutter	Monthly	Nos	79.995	12	4	12000	47,997	(12000/year)
6	Manhoise/ Skyscrapper	Monthly	Nos		12	1	4,00,000	4,00,000	(2000000 is the cost of vehicle, considering 20% Rental per year) including maintenance
7	Bikes	Monthly	Nos	79.995	12	5	2500	1,59,990	Per Supervisor
8	Building Maintenance	Yearly			12	1	25000	3,00,000	25000/ month

S No.	Item		Unit	No	Frequency per year	Quantity	Rate	Amount	Remarks
9	Toll plaza AMC	Yearly	Nos		12	1	100000	12,00,000	100000/month
								30,07,987	
1	Patrolling vehicle	Monthly	Nos	12		2	300000	600000	(1500000 is the cost of vehicle, considering 20% Rental per year) including maintenance
2	Ambulance	Monthly	Nos	12		1	240000	240000	(1200000 is the cost of vehicle, considering 20% Rental per year) including maintenance (1 Ambulance/toll plaza)
3	Tow away trucks and Crane	Monthly	Nos	12		1	400000	400000	(2000000 is the cost of vehicle, considering 20% Rental per year) including maintenance
4	Consumables for Medical Aid Post and Ambulance	Monthly	Nos	12		1	5000	60000	5000 Per month for per set (Per set - Per toll plaza)
5	Consumables for Route Patrolling & Crane	Monthly	Nos	12		1	5000	60000	5000 Per month for per set (Per set - Per toll plaza)
								13,60,000	
								2,52,05,351.96	

INCIDENTAL COST

S No	Item		Unit	No	Frequency	Quantity	Rate	Amount	Remarks
1	Road marking	Half yearly	Sqm	1	1	23152.5	516	1,19,46,690	40 % of Total Project length on B/S for 1 year
2	Carriageway Maintenance (Pot Holes etc.)	Yearly	Sqm	1	1	255.243	168	42,881	2% of Flexible Pavement (changed quantities to only Service road portion)
3	Maintenance of Earthen Shoulder	Half yearly	Cum	1	1	1	19101	516	10% of total Shoulder length throughout the project
4	Sign Board	Quarterly	Km	1	1	1	201.739	168	5 % of Total sign boards per year (Lumpsum of 200000)
5	MBCB	Monthly	Km	79.995	1	3	2399.85	225	5% of Total qty per year - (considered 5000 for km per month)
6	Mile Stone (KM Stone/ HM Stone / ROW stone etc.)	Quarterly	Nos.	79.995	1	2	122.5	4000	5 % of total stones per year (unable to understand the backup)
7	ROW Fencing (If available)	Quarterly	Km				638	2500	10 % of total ROW fencing per year
8	Kerb	Yearly	Km	79.995	79.995	4	20	2250	2 % of total Kerbings per year
9	Electrical Poles	Yearly	Nos	4125		4			3 % of total poles per year
10	Replacement of Rigid pavement Panels	Yearly	Ls	1	79.995	1	3199.8	250	Considered 1% of the total volume in O & M period per year

S No	Item		Unit	No	Frequency	Quantity	Rate	Amount	Remarks
11	Providing Reinforced cement concrete crash barrier at the edges of the bridge structures constructed with M-40 grade concrete with HYSD-Fe 500 TMT reinforcement concrete per Rmt conforming to IRC:21 and fixing with dowel bars 16 mm dia to old concrete using epoxy grout as per drawing and Technical Specifications and as directed by the Engineer.	Yearly	Rmt	9150	4125	1	124	55000	3% of Length replacement in every 5 years (Quantity to be estimated)
	Total amount for 1 Year							**4,02,57,515**	

Operational Expenses

S.No.	Particulars	Amount
1	Man Power	₹ 1,27,20,000
2	Fuel for Generator & Vehicles	₹ 1,30,32,000
3	Electricity	₹ 1,32,00,000
4	Stationary	₹ 1,00,000
5	Replacement of Electrical Fixtures	₹ 45,32,291
6	Refurbishment of Toll Plaza Equipment	₹ 6,00,000
	Total Amount	**₹ 4,41,84,291**

Abstract Summary of Major/Periodic Maintenance

Description	Due date	Base cost	Esc Period	Escalation Rate per Year	Cost of MMR on due date @ 3% Escalation	In crores
Date of Estimation	23-May-20					
1st Major Maintenance - Highway	22-May-27	24,64,61,285	7.00	3.0%	29,82,18,155	29.82
1st Major Maintenance - Structures	22-May-27	95,24,788	7.00	3.0%	1,15,24,993	1.15
2nd Major Maintenance - Highways	22-May-32	25,60,10,685	12.00	3.0%	34,81,74,532	34.82
2nd Major Maintenance - Structures	22-May-32	1,26,52,020	12.00	3.0%	1,72,06,747	1.72
				Total	**₹ 67,51,24,428**	**67.51**

Major Maintenance

S. No	DESCRIPTION	Unit	1st Cycle			2nd Cycle		
			QUANTITY	RATE	AMOUNT	QUANTITY	RATE	AMOUNT
	Pavement (Asphalt & Concrete)							
1	Providing and applying tack coat with Rapid Setting Bitumen Emulsion using emulsion pressure distributor on the prepared bituminous/granular surface cleaned with mechanical broom, Ref. to Technical specification 503.			-			-	
(a)	On Bituminous surface @ 2.0 kg to 3.0 kg/10 sq.m.	Sqm	3,15,872.50	14.00	44,22,215	3,15,872.50	14.00	44,22,215
2	Providing and laying bituminous concrete using a batch type Hot Mix Plant using crushed aggregates of size (table 500-17), premixed with VG Grade Bitumen and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers, Pneumatic Tyre Rollers to achieve the desired compaction as per Technical specification clause No. 507 and mix design conforming the IRC -111 and IRC 37.	Cum	12,634.90	7,682.00	9,70,61,302	12,634.90	7,682.00	9,70,61,302
3	Repair of joint Grooves with Epoxy Mortar Repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in concrete pavements using epoxy mortar or epoxy concrete)	MTRS	1,67,988.45	250.00	4,19,97,113	1,67,988.45	250.00	4,19,97,113
4	Texturing of Rigid pavement (considering 25% for 7 years)	Sqm	7,67,787.50	130.00	9,98,12,375	7,67,787.50	130.00	9,98,12,375
5	Earthen shoulder @ service roads	cum	2,513.00	250.00	6,28,250	2,513.00	250.00	6,28,250
	Total				**24,39,21,254**	-	-	**24,39,21,254**

S. No	DESCRIPTION	Unit	1st Cycle			2nd Cycle		
			QUANTITY	RATE	AMOUNT	QUANTITY	RATE	AMOUNT
	Junctions, Traffic Signs Marking and Other Appurtenances			-		-	-	
1	Providing and laying of **cement concrete kerb without channel** (M-20 Grade) over WMM foundation using kerb laying machine & proper curing complete, as per drawing & technical specification clause no.409, 1700 and as per the instructions of Employer's representative. - **Consider 5% for construction period.**	Rmt	-	380.00		25,130.00	380.00	95,49,400
2	Providing and laying lane markings of hot applied thermoplastic compound 2.5 mm thick including reflectorizing glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes,Ref. to Technical specification 803.	Sqm	1,884.75	516.00	9,72,531	1,884.75	516.00	9,72,531
3	Road Studs	Nos	2,090.00	750.00	15,67,500	2,090.00	750.00	15,67,500
	Total			-	**25,40,031**	-	-	**1,20,89,431**
	Grand Total				**24,64,61,285**	-		**25,60,10,685**

Annexure 4: Letter of Award

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

NHAI/Tech/01/EPC/Mahag.-Yavat./2014/MAH/97366 — 28th March 2017

To,

M/s Dilip Buildcon Limited
Plot No. 5, inside Govind Narayan Singh Gate
Chuna Bhatti, Kolar Road
Bhopal – 462 016
Phone No.: 09300948396
Fax: 0755 4029998
Email: db@dilipbuildcon.co.in; diliph_99@rediffmail.com

(Kind Attention: Mr. Kundan Kumar Das, AGM – Business Development)

Subject: Four laning of **Mahagaon to Yavatmal** (Package-II) section of NH-361 from km 320.580 to km 400.575 (Design Length 80.195) in the State of Maharashtra Under NHDP Phase – IV on Hybrid Annuity Mode –**Letter of Award – Reg.**

Ref: 1. Your Proposal submitted on 15.02.2017
2. Opening of Financial proposal on 22.03.2017

Sir,

With Reference to NHAI's Request for Proposal for "Four laning of **Mahagaon to Yavatmal** (Package-II) section of NH-361 from km 320.580 to km 400.575 (Design Length 80.195) in the State of Maharashtra Under NHDP Phase – IV on Hybrid Annuity Mode" and considering you proposal in this regard submitted on 15.02.2017 vide reference no. (i), NHAI hereby accepts your proposal quoting Bid Project Cost of **Rs. 1160.64 crore (Rupees Eleven Hundred Sixty Crore and Sixty Four Lakh Only)** and first year O&M cost of **Rs. 3.00 Crore (Rupees Three Crore Only)** as included in Appendix- 1B of your document and declares you as the "Selected Bidder" as per the provisions of RFP Documents.

2. In accordance with the clause 3.8.4 of the RFP document, you are requested to sign the duplicate copy of the LOA and return the same as your acknowledgement within 7 (Seven) days of the receipt of the LOA. Thereafter you are required to execute the concession Agreement within 45 (Forty five) days from the date of issue of LOA as specified in Clause 1.3 of RFP.

3. Further, As per RFP document, you are required to incorporate a Special Purpose Vehicle solely for the purpose of domiciling the project (the "Concessionaire"). The Concessionaire For due and faithful performance of its obligations during the Concession Period shall furnish a Performance Security by way of irrecoverable and unconditional Bank guarantee of **Rs 58.04 Crores (Rupees Fifty Eight Crore Four Lakh only)** within a period of the 30 days from the date of signing of the Concession Agreement. Till the time the Concessionaire provides NHAI with the performance Security the Bid Security shall remain in full Force and Effect (refer Clause 4.1.2 and Clause of Article 9 of RFP).

4. You are required to comply with all the terms and conditions set forth in the RFP Documents. In case of any default on your part, you shall be liable for action as stated in the Bid Documents.

(Ashish Asati)
General Manager (Tech)
(Maharashtra Division)

Annexure 5: Provisional Certificate

Schedule-J (Page 194)

"PROVISIONAL CERTIFICATE"

1. We, Artefact Projects Ltd. acting as Independent Engineer, under and in accordance with the Concession Agreement dated 09.06.2017 **(the "Agreement"),** for development and operation of Four-Laning of the Mahagaon to Yavatmal Section of National Highway No. 361 (the **"Project Highway"**) on design , build, operate and transfer (the "DBOT Annuity or Hybrid Annuity") basis through DBL Mahagaon Yavatmal Highways Private Limited, hereby certify that the tests specified in Article 14 and Schedule-I of the Concession Agreement have been undertaken for the partial Project / section of **72.089 Km** of the Project to determine compliance thereof with the provisions of the Agreement.

2. Construction Works forming part of the Project/section of **72.089 Km** of the Project that were found to be incomplete and/or deficient have been specified in the Punch List appended hereto, and the Concessionaire has agreed and accepted that it shall complete and all such works in the time and manner set forth in the Agreement. [Some of the incomplete works have been delayed as a result of reasons attributable to the Authority or due to Force Majeure and the Provisional Certificate cannot be withheld on this account. Though the remaining incomplete works have been delayed as a result of reasons not attributable to the Concessionaire]. We are satisfied that having regard to the nature and extent of such incomplete works, it would not be prudent to withhold commercial operation of the Project/section of **72.089 Km** of the Project, pending completion thereof.

3. In view of the foregoing, We are satisfied that the partial Project/section of **72.089 Km** of the Project can be safely and reliably placed in commercial service of the Users thereof, and in terms of the Agreement, the Project/section of the Project is hereby provisionally declared fit for entry into commercial operation on this the 23rd day of May 2020.

ACCEPTED, SIGNED, SEALED AND DELIVERED
FOR AND ON **BEHALF** OF
CONCESSIONAIRE BY

Ramavtar Tyagi
Authorized Signatory
M/s DBL Mahagaon Yavatmal Highways (Pvt) Limited

SIGNED, SEALED AND DELIVERED

FOR AND ON **BEHALF** OF
INDEPENDENT ENGINEER

Siddharth Shah
Authorized Signatory
M/s Artefact Projects Limited

Annexure 6: Insurance

HDFC ERGO General Insurance Company Limited

Certificate of Insurance cum Policy Schedule

Policy No. 3114203384088500000 **Employees Compensation Insurance**

Insured Name	DILIP BUILDCON LIMITED (PAN Number:AACCD6124B)				**Business**	OTHERS	
Correspondence Address	PLOT NO. 5, GOVIND NARAYAN SINGH GATE,CHUNA BHATTI, BHOPAL,MADHYA PRADESH,BHOPAL,MADHYA PRADESH,462016.						
Mobile		**Phone**		**E Mail**		**Policy Issuance Date**	06/05/2020

Period of Insurance	From Date & Time	02/05/2020 00:01 AM	To Date & Time	01/05/2021 Midnight

LAW

The Policy covers Liability of the Insured under the following Law(s) shown as covered, subject to claim being otherwise admissible as per terms, conditions and exclusions of the Policy and subject to Limit of Indemnity as stipulated against each Law:

Sr. No.	Law	Limit of Indemnity
a.	Employee's Compensation Act, 1923 and subsequent amendments thereof prior to the date of issue of this Policy	Subject otherwise, to the terms, conditions & Exclusions of the Policy, the amount of liability incurred by the Insured
b.	Common Law	Subject otherwise, to the terms, conditions & Exclusions of the Policy, the amount of liability incurred by the Insured, but not exceeding:-
		a) Limit Per Employee for any number of accidents during Period of Insurance ₹. Unlimited
		b) Limit Per Accident for any number of Employees ₹.Unlimited
		c) Aggregate Limit for all accidents and claims arising there from during the Period of Insurance ₹.Unlimited

EC-13-0005
3114203384088500000 Page 2 of 13

HDFC ERGO General Insurance Company Limited

Details of Employees Covered

Description of work done by Employees	Declared Number of Employees	Declared Wages during the Period of Insurance	Place/Places of Employment
Road Paving, Tarring and Road Making-Road Paving, Tarring and Road Making-Road Paving, Tarring and Road Making_Road Paving, Tarring and Road Making_All categories of employees of DBL & Sub-contractor engaged in DBL - Highly Skilled, Skilled, Semi-Skilled, Unskilled, Engineers, Supervisors, Managers, Daily Labour Etc.	200	48000000.00	Four Laning of Mahagaon to Yavatmal (Package-II) Section of NH-361 from Km 320.580 to Km 400.575 (design length 80.195 km) in the state of Maharashtra Under NHDP Phase-IV on Hybrid Annuity Mode

Premium Details (₹)

Basic Premium	**72111.00**
Integrated Tax 18%	**12880.00**
Total Premium	**86091.00**

GST Registration No: 24AABCL5045N1ZE.The contract will be cancelled ab initio in case; the consideration under the policy is not realized.

List of Endorsements

Endt No	Description	Effective Date
EC_12_0003	Contractors Employees	02 May 2020
EC_12_0001	Medical Expenses	02 May 2020
WC-02-0008	Tariff Endorsement	02 May 2020
EC-13-0006	Insurance Contract	02 May 2020
EC-13-0005	Policy Schedule	02 May 2020
99901	Communicable Disease Exclusion- Wordings as per annexure attached	02 May 2020
	Warranted that there are no known losses and /or circumstances leading to losses (except for the claims and / or circumstances already reported to HDFC ERGO General Insurance Co. Ltd. This policy document is issued basis the information provided though request for quotation and/ or unsigned proposal form and / or other details provided by the insured / insurance intermediary and/ or though discussions	02 May 2020

3114203384088500000 Page 3 of 13

FIRE INDUSTRIAL ALL RISK POLICY SCHEDULE

Policy No	: **171200/11/2021/405**	**Prev Policy No**	:
Cover Note No	:	Cover Note Dt	:
Insured's Name	: 107457440 - DBL Mahagaon Yavatmal Highways Pvt. Ltd. (GSTIN: 27AAGCD1465M1ZD)	Issuing Office	: 171200 - CBU Vadodara (GSTIN: 24AAACT0627R2Z4)
Address	: SLPL DOCTOS COLONY, SAMAJ EKTA GRUHNIRMAN, SOMALWADA, NAGAPUR, NAGPUR, Nagpur, Maharashtra, NAGPUR 440002	Address	: Ist FLOOR, KIRTI TOWER, TILAK ROAD VADODARA GUJARAT 390001
Tel /Fax /Email	: / / 0 / Na	Tel /Fax /Email	: 0265-2427075 / 0265-2436654 / 171200@orientalinsurance.co.in
Dev.Officer	:	BROKER	: LC0000000179 (1149)UNISON INSURANCE BROKING SERVICES P LTD

Period of Insurance: FROM 00:00 ON 12/02/2021 TO MIDNIGHT OF 04/10/2021

Collection No & Dt : DC_I_INDCSH 3214001412 - 12/02/2021 GST INVOICE NO :2419835689 UIN :0

Gross Premium : 75,88,584 GST : 13,65,945 Stamp Duty : .5 Total : 89,54,529

Co Insurance Details :

S.No	Co Insurer Name	Share %
1	CBU Vadodara	60.00
2	IFFCO TOKIO GENERAL INSURANCE,	20.00
3	BAJAJ ALLINZE GEN INSURANCE	20.00

SECTION I : IAR - STANDARD FIRE AND SPECIALS PERILS SECTION

Location of the Risk : Operation & maintenance of Roads, Bridges and any other property on the stretch Four Laning of Mahagaon to Yavatmal (PKG-II) Section of NH-361 from KM 320.580 to KM 400.575 9 Length 80.195 KM, In the state of Maharashtra under NHDP Phase-IV on hybrid annuity mode

Deductible :

Risk Description : Roads

Block Description : 1

SMI Description	Nature of Stock	Sum Insured
Roads Incl Service Road, Structures, Bridges (Major, Minor, Railway, River Incl all Other Bridges) , Underpasses, Culverts, drainages,Utilities, Slabs Box, Causeways, Machineries Such as DG Sets, Transformers(Full descp as per annexure)		221,90,88,288

Place :
Date : 12/02/2021

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

This is an electronically generated document (Policy Schedule).The Policy document duly stamped will be sent by post.

In case of any query regarding the Policy please call Toll Free No. 1800 11 8485 and 011 33208485.

Authorised Signatory

CIN: U66010DL1947GOI007158 All the Amounts mentioned in this policy are in Indian Rupee Page 1 of 4

IRDA Regn. No. 556 - Now you can buy and renew selected policies online at www.orientalinsurance.org.in

Attached to and forming part of policy number 171200/11/2021/405

Risk Description : Roads

Block Description : 1

SMI Description	Nature of Stock	Sum Insured
Roads Incl Service Road, Structures, Bridges (Major, Minor, Railway, River Incl all Other Bridges) , Underpasses, Culverts, drainages,Utilities, Slabs Box, Causeways, Machineries Such as DG Sets, Transformers(Full descp as per annexure)		576,52,61,563

Cover Wise Details	Sum Insured	Premium
Fire Basic Cover	798,43,49,851	35,13,113.94
STFI Cover	798,43,49,851	22,35,617.96
Earth Quake	798,43,49,851	3,19,373.99

SECTION III : IAR-BREAKDOWN SECTION

Item Description	Identificaton No.	Year of Make
As per placement slip		

SMI Description	Sum Insured
Machinery Sum Insured	1,00,00,000

Cover Wise Details	Sum Insured	Premium
Breakdown Cover	1,00,00,000	2,000.00

SECTION II : IAR-FLOP SECTION

Type of Industry : CONTINUOUS INDUSTRY
Basis of Indemnity : TURNOVER BASIS
Indemnity Period : 12 Months
Annual Gross Profit : 1000000
Total Sum Insured : 10,00,000
Time Exclusion :

Cover Wise Details	Sum Insured	Premium
Fire LOP-Basic Cover	10,00,000	760.00

SCHEDULE OF PREMIUM

Fire Basic Cover	35,13,113.94
ADD :STFI Cover	22,35,617.96

Place :
Date : 12/02/2021

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

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Authorised Signatory

CIN: U66010DL1947GOI007158 All the Amounts mentioned in this policy are in Indian Rupee

Page 2 of 4

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STANDARD FIRE & SPECIAL PERILS POLICY SCHEDULE

Policy No	: **171200/11/2021/406**	**Prev Policy No**	: -
Cover Note No	: -	Cover Note Dt	:
Insured's Name	: 107457440 - DBL Mahagaon Yavatmal Highways Pvt. Ltd. (GSTIN: 27AAGCD1465M1ZD)	Issuing Office	: 171200 - CBU Vadodara (GSTIN: 24AAACT0627R2Z4)
Address	: SLPL DOCTOS COLONY, SAMAJ EKTA GRUHNIRMAN, SOMALWADA, NAGAPUR, NAGPUR, Nagpur, Maharashtra, NAGPUR 440002	Address	: Ist FLOOR, KIRTI TOWER, TILAK ROAD VADODARA GUJARAT 390001
Tel /Fax /Email	: / / 0 / Na	Tel /Fax /Email	: 0265-2427075 / 0265-2436654 / 171200@orientalinsurance.co.in

Agent/Broker Details

Dev.Off.Code :
Agent/Broker : **LC0000000179 (1149)UNISON INSURANCE BROKING SERVICES P LTD**
Address Tel/Fax/Email : **601-602 ,6TH FLOOR AURAM NR VASNA,HP PETROL PUMP MARKAND DESAI RAOD VADODARA 390015 GUJARAT INDIA,MOB NO 9898295111 PHONE NO 0265-2252274,BARODA,GUJARAT,396007**

Period of Insurance : FROM 00:00 ON 12/02/2021 TO MIDNIGHT OF 04/10/2021

Collection No & Dt : DC_I_INDCSH 3214001412 - 12/02/2021 GST INVOICE NO :2419836092 UIN :0

Gross Premium : 5,25,390 GST : 94,570 Stamp Duty : .5 Total : 6,19,960

Co Insurance Details :

S.No	Co Insurer Name	Share %
1	CBU Vadodara	60.00
2	IFFCO TOKIO GENERAL INSURANCE,	20.00
3	BAJAJ ALLINZE GEN INSURANCE	20.00

RISK DETAILS

1 Location of the Risk : Four Laning of Mahagaon to Yavatmal (PKG-II) Section of NH-361 from KM 320.580 to KM 400.575 9 Length 80.195 KM, In the state of Maharashtra under NHDP Phase-IV on hybrid annuity mode

MAHARASHTRA
YAVATMAL
445205
YEOTMAL

Risk Description : Roads

Place :
Date : 12/02/2021

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

This is an electronically generated document (Policy Schedule).The Policy document duly stamped will be sent by post.

In case of any query regarding the Policy please call Toll Free No. 1800 11 8485 and 011 33208485.

Authorised Signatory

CIN: U66010DL1947GOI007158 All the Amounts mentioned in this policy are in Indian Rupee

Page 1 of 4

IRDA Regn. No. 556 - Now you can buy and renew selected policies online at www.orientalinsurance.org.in

Signer: ATUL JERATH
Date: Tue, Feb 16, 2021 16:02:01 IST
Location: NOIDA
Reason: Signing Policy for OICL

Attached to and forming part of policy number 171200/11/2021/406

: 0265-2252274/0265-2357445/0265-2356033/

Block Description : 1

SMI Desc	Nature of Stock	Sum Insured
Toll Plaza Building and its assets & Toll Booths, TMS, HTMS, Office & IT Equipment, RoadFurniture, Fixtures, Electrical Poles, Lighting & Fittings, Signboard, Safety Barrier, concretebarrier(Full Desc as per annexure)		52,67,07,019

Cover Wise Details : Cover Name	Sum Insured	Premium
STFI Cover	52,67,07,019	1,47,477.97
Fire Basic Cover	52,67,07,019	2,31,751.00
Earth Quake Cover	52,67,07,019	21,068.00
Impact Damage Due To Insured's Own Rail/Road Vehicles, Fork Lifts, Cranes, Stackers And The Like And Articles Dropped Therefrom	52,67,07,019	20,226.00

SCHEDULE OF PREMIUM

TOTAL PREMIUM	5,25,390.00
ADD :IGST	94,570.00
STAMP DUTY	0.50
TOTAL AMOUNT	6,19,960.00

Total Sum Insured In Words : Indian Rupees Fifty-Two Crores Sixty-Seven Lakhs Seven Thousand Nineteen Only
Total Premium In Words : Indian Rupees Six Lakhs Nineteen Thousand Nine Hundred Sixty Only

Excess / Deductible :

The following minimum deductibles are applicable based on per Location Sum Insured of the policy.
(except dwelling with individual owners)

Sum Insured Band per Location (including endorsements, if any)	Material Damage	
	% Of Claim	Subject to Minimum deductible in INR.
Upto 10 Cr	5	10,000.00
Above 10 Cr and upto 100 Cr	5	25,000.00
Above 100 Cr and upto 1500 Cr	5	500,000.00
Above 1500 Cr and upto 2500 Cr	5	2,500,000.00
Above 2500 Cr	5	5,000,000.00

Place :
Date : 12/02/2021

IRDA-REGNO-556

For and on behalf of
The Oriental Insurance Company Limited

This is an electronically generated document (Policy Schedule).The Policy document duly stamped will be sent by post.

In case of any query regarding the Policy please call Toll Free No. 1800 11 8485 and 011 33208485.

Authorised Signatory

CIN: U66010DL1947GOI007158 All the Amounts mentioned in this policy are in Indian Rupee

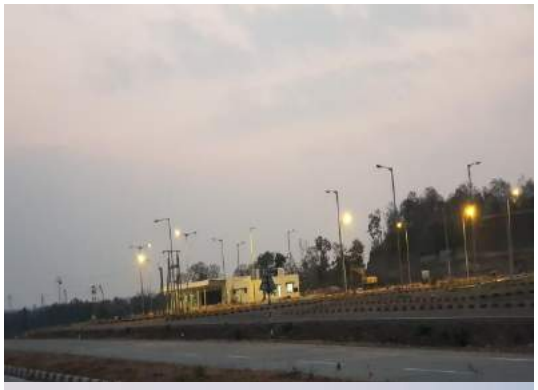
Page 2 of 4

IRDA Regn. No. 556 - Now you can buy and renew selected policies online at www.orientalinsurance.org.in

Annexure 7: Change of Scope

S. No	Description	Value of COS Approved (Rs in Crores)	Status of the work at site	Status of Approval
1	Service Road for PUP at Km.377.178	0.883	Completed	PD NAHI has forwarded the proposal to the RO NHAI seeking approval for issuance of Change of Scope Notice to the Concessionaire. Ref Letter: NHAI/PIU/YTL/COS/Pkg-II/2020/261 Dated 06.06.2020
2	SVUP at Km.360.360 and LVUP at 1km.360.500	7.59	Completed	RO NAHI has forwarded the proposal to the Competent Authority seeking approval for issuance of Change of Scope Order to the Concessionaire. Ref Letter: NHAI/RO-NAG/4/COS/MAH-YTL/2020/217 Dated 22.05.2020
3	Upgraded Ambulance	0.48	Provided	Proposal was Submitted by the Concessionaire vide letter No. DBL-MYHPL-HO/NHAI/Mahagaon Yavatmal/HAM/2019-20/51 Dated 03.01.2020
4	Highway mini nest	1.11	Completed	Approved vide letter No: NHAI/RO/NGP/4/4/M-Y/COS-1/Highway Nest/2019-20/3143 Dated:17.02.2020
Total		**10.063**		

Annexure 8: Project Photos




390/1
BC
2X3


1 Project Name
2 Length of the Project
3 Total Project Cost
4 Client
5 Independent Engineer
6 Concessionaire Name


DILIP BUILDCON LIMITED
Artefact Projects Ltd.
1 Project Name
Four-Laning of Mahagaon to Yavatmal From Km.320.580 to Km.400.575 Section of NH-361
2 Length of the Project
79.995 Km
3 Total Project Cost
1160.64 Crore
4 Client
National Highways Authority of India
5 Independent Engineer
Artefact Projects Ltd. Nagpur
6 Concessionaire Name
DBL Mahagaon Yavatmal Highways Pvt Ltd.


National Highways Authority Of India