0. EXECUTIVE SUMMARY

0.1 BACKGROUND

Public Works Department Government of Rajasthan, engaged in the up-gradation& widening of State Highways/ MDR's & Mining roads across the state, intends to come across the services of technically expert consultancy firms to prepare detailed feasibility report, detailed financial analysis & detailed traffic survey for development of roads including project design, planning and project preparation, surveys, devise suitable financing model and contract award structure for making the project viable under Private Sector Participation, bid management and preparation of tender documents, to perform detail engineering for the project including detailed cost estimates and land acquisition plans etc. Public Works Department, Government of Rajasthan intends to develop the roads. So, the above department invites offers from reputed firms to provided services for the above assignments for preparation of Detailed Project Report including detailed financial analysis and detailed traffic survey of the following roads –

PACKAGE No. - 14				
Sr. No.	**Road No.**	**Name of Road**	**District**	**Length (as per TOR) km**
1	Highway-I	Uniara – Indergarh Road (SH-29)	Tonk/Bundi	25
2	Highway-II	Lakheri – Bijoliya Road (SH-29)	Bundi/ Bhilwara	115
3	Highway-III	Sawai Madhopur to Palighat up to State Border Road (SH-34)	Sawai Madhopur	34
4	Highway-IV	Tonk - Nainwa - Keshoraipatan Road (SH-34)	Tonk/Bundi	113
5	Highway-V	**Mines Roads of Mandalgarh**	Bhilwara	51
a.)		Berisal to Sukhpura Road (Mining Road)		
b.)		Karangarh to Amadala Road (Mining Road)		
c.)		Khakharmala to Aasuna Road (Mining Road)		
d.)		Marewada to Bhanas Via Pandroo Road (Mining Road)		
e.)		Tilaswan to Salwatiya Road (Mining Road)		
6	Highway-VI	NH-12 - Laxmipura - Dora - Dabi - RanajiKaGuda Road	Bundi	50
7	**Highway-VII**	**Bundi - Silor - Gararda - Bhopatpura Road (SH-29)**	**Bundi**	**48**
8	Highway-VIII	Malarna Dungar to Chak Biloli Road	Sawai Madhopur	15
		Total		**451**
9	Additional Bypass	Sawai Madhopur Bypass (Kota Road to Lalsot Road)	Sawai Madhopur	15

In order to access the financial and technical feasibility, M/s L.N. Malviya Infra Project Pvt. Ltd. has been entrusted by Public Works Department, Government of Rajasthan for the task of carrying out the Detailed Feasibility Report for above said project sections.

0.2 Objectives

The objective of this consultancy is to undertake feasibility studies and prepare Final Feasibility Reports for all Highways comprising the Project for the purpose of firming up the Authority's requirements in respect of development and construction of the Project and Project Facilities and enabling the prospective bidders to assess the Authority's requirements in a clear and predictable manner with a view to ensuring:

- enhanced safety and level of service for the road users;
- superior operation and maintenance enabling enhanced operational efficiency of the Project;
- minimal adverse impact on the local population and road users due to road construction;
- minimal adverse impact on environment;
- minimal additional acquisition of land; and

0.2.1 Scope of Services

The scope of services for each of the Highways of the Project shall comprise:

- Traffic surveys and demand assessment
- Engineering surveys and investigations
- Location and layout of toll plazas
- Location and layout of truck lay byes
- Location and layout of bus bays and bus shelters
- Wayside amenities
- Safety
- Social impact assessment
- Environment impact assessment
- Preliminary Designs of road, bridges, structures, etc.
- Preparation of Land Plan Schedules and Utility Relocation Plans
- Preparation of indicative BOQ and rough Cost Estimates
- Preparation of Schedules A, B, C, D and H of the Concession Agreement.

0.3 PROJECT ALIGNMENT DESCRIPTION

The Project, **Bundi - Silor - Gararda - Bhopatpura Road** starts from Y-Junction with NH-12 (Kota-Bundi Section) near Bundi & terminates at T-Junction with SH-29 (Bijoliya-Bundi Section) in Bhopatpura.

The Project Road as described in the terms of References is 48 Km. Actual design length is 44.026 Km.

There are a number of junctions very important. Y-junction with NH-12 at km 0+000 (Kota-Bundi Section) near Bundi & T-Junction with SH-29 (Bijoliya-Bundi Section) at km 44+026 in Bhopatpura.

The index map depicting the project road is presented in Fig. 0.1-

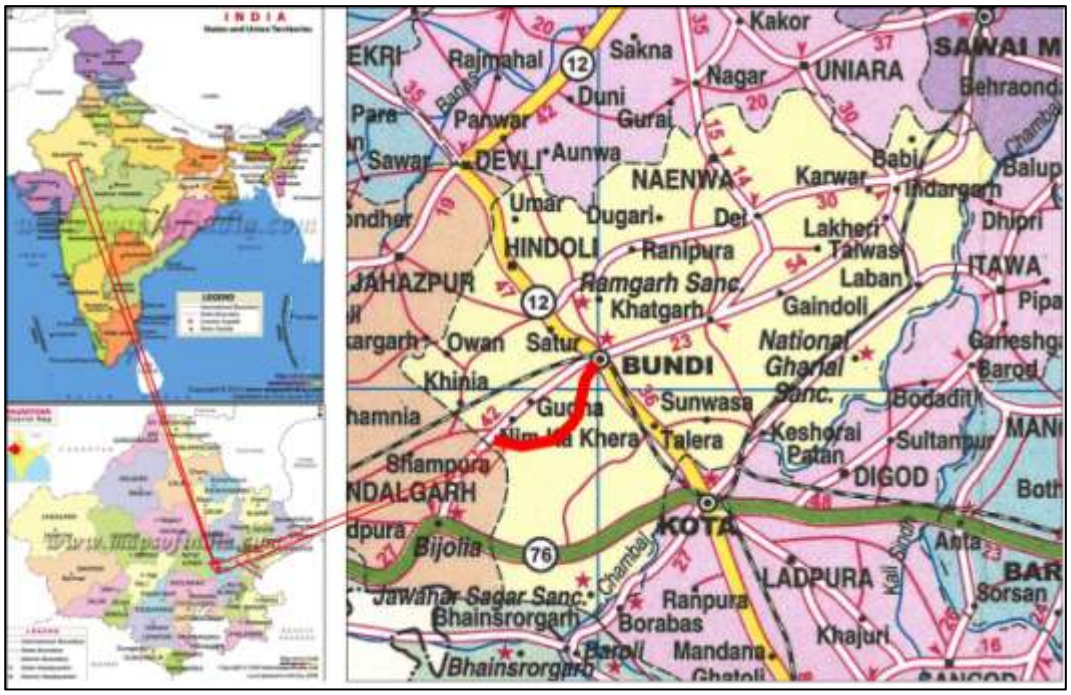


Figure 0.1 Index Map showing Project Road

The consultancy services for the same is to include design of best possible alignment and pavement composition, design of bridges, culverts and other structures in addition to analysis of costs, determining project feasibility, preparation of Land Acquisition Plan, if any, and obtaining of all requisite clearances.

Figure0.2:-Project Alignment of Bundi – Silor – Gararda – Bhopatpura Road

Details of existing carriageway of project road are as follows:

S. No.	Existing Chainage		Length (m)	Design Chainage		Length (m)	Carriageway		Width of Ex. shoulders (m)	Remarks
	From	To		From	To		Type	Width (m)		
1	0+000	0+395	395	0+000	0+400	400	BT	5.50	1.80	
2	0+395	4+495	4100	0+400	4+500	4100	BT	5.50	1.80	
3	4+495	5+865	1370	4+500	5+850	1350	BT	5.50	1.80	Seelor
4	5+865	6+570	705	5+850	6+550	700	BT	5.50	1.80	
5	6+570	7+031	461	6+550	7+000	450	BT	3.00	1.50	
6	7+031	7+735	704	7+000	7+700	700	BT	3.00	1.50	Karjoona Jagir
7	7+735	9+595	1860	7+700	9+550	1850	BT	3.00	1.50	
8	9+595	9+850	255	9+550	9+800	250	CC	5.50	1.50	Gopal Niwas
9	9+850	9+950	100	9+800	9+900	100	BT	3.00	1.50	Gopal Niwas
10	9+950	10+900	950	9+900	10+850	950	BT	3.00	1.50	
11	10+900	11+310	410	10+850	11+250	400	BT	3.00	1.5	Baori Kheda
12	11+310	12+925	1615	11+250	12+850	1600	BT	3.00	1.5	
13	12+925	13+780	855	12+850	13+700	850	BT	3.00	1.5	Namana
14	13+780	14+330	550	13+700	14+250	550	BT	5.50	1.5	Namana
15	14+330	19+660	5330	14+250	19+570	5320	BT	3.00	1.5	
16	19+660	20+295	635	19+570	20+200	630	BT	3.00	1.5	Sunderpura
17	20+295	25+195	4900	20+200	25+100	4900	BT	3.00	1.5	
18	25+195	25+600	405	25+100	25+500	400	BT	3.00	1.5	Gunwar
19	25+600	31+460	5860	25+500	31+250	5750	BT	3.00	1.5	
20	31+460	32+360	900	31+250	32+150	900	CC	3.00	1	Gararda
21	32+360	43+595	11235	32+150	43+350	11200	BT	3.00	1	
22	43+595	44+275	680	43+350	44+026	676	BT	3.00	1.5	Bhopatpura

0.4 CHAINAGE REFERENCES (EXISTING v/s DESIGN)

Table 0.1: - Chainage References (Bundi – Silor – Gararda – Bhopatpura Road)

Sr. No.	Existing Chainage		Design Chainage		Remarks
	From	To	From	To	
1	0+000	0+395	0+000	0+400	
2	0+395	4+495	0+400	4+500	
3	4+495	5+865	4+500	5+850	
4	5+865	6+570	5+850	6+550	Seelor
5	6+570	7+031	6+550	7+000	
6	7+031	7+735	7+000	7+700	
7	7+735	9+595	7+700	9+550	Karjoona Jagir
8	9+595	9+850	9+550	9+800	

Sr. No.	Existing Chainage		Design Chainage		Remarks
	From	To	From	To	
9	9+850	9+950	9+800	9+900	Gopal Niwas
10	9+950	10+900	9+900	10+850	Gopal Niwas
11	10+900	11+310	10+850	11+250	
12	11+310	12+925	11+250	12+850	Baori Kheda
13	12+925	13+780	12+850	13+700	
14	13+780	14+330	13+700	14+250	Namana
15	14+330	19+660	14+250	19+570	Namana
16	19+660	20+295	19+570	20+200	
17	20+295	25+195	20+200	25+100	Sunderpura
18	25+195	25+600	25+100	25+500	
19	25+600	31+460	25+500	31+250	Gunwar
20	31+460	32+360	31+250	32+150	
21	32+360	43+595	32+150	43+350	Gararda
22	43+595	44+275	43+350	44+026	

Ex. To Design Chainage reference (per km)

S. No.	EXISTING CH	DESIGN CH	REMARK
1	0+000	0+006	
2	1+000	1+010	
3	2+000	2+010	
4	3+000	3+010	
5	4+000	4+010	
6	5+000	5+002	
7	6+000	5+980	
8	7+000	6+970	
9	8+000	7+950	
10	9+000	8+960	
11	10+000	9+950	
12	11+000	10+940	
13	12+000	11+930	
14	13+000	12+930	
15	14+000	13+920	
16	15+000	14+920	
17	16+000	15+920	
18	17+000	16+915	
19	18+000	17+915	
20	19+000	18+910	

S. No.	EXISTING CH	DESIGN CH	REMARK
21	20+000	19+910	
22	21+000	20+910	
23	22+000	21+907	
24	23+000	22+910	
25	24+000	23+910	
26	25+000	24+905	
27	26+000	25+860	
28	27+000	26+800	
29	28+000	27+800	
30	29+000	28+795	
31	30+000	29+795	
32	31+000	30+790	
33	32+000	31+795	
34	33+000	32+790	
35	34+000	33+795	
36	35+000	34+795	
37	36+000	35+790	
38	37+000	36+760	
39	38+000	37+760	
40	39+000	38+760	
41	40+000	39+760	
42	41+000	40+760	
43	42+000	41+760	
44	43+000	42+760	
45	44+000	43+750	
46	44+272	44+026	

0.5 RIGHT OF WAY [ROW]

The available ROW is found to be 10m-25m varying at different locations. Existing Road pavement width varies from 3.0m to 7.0m.

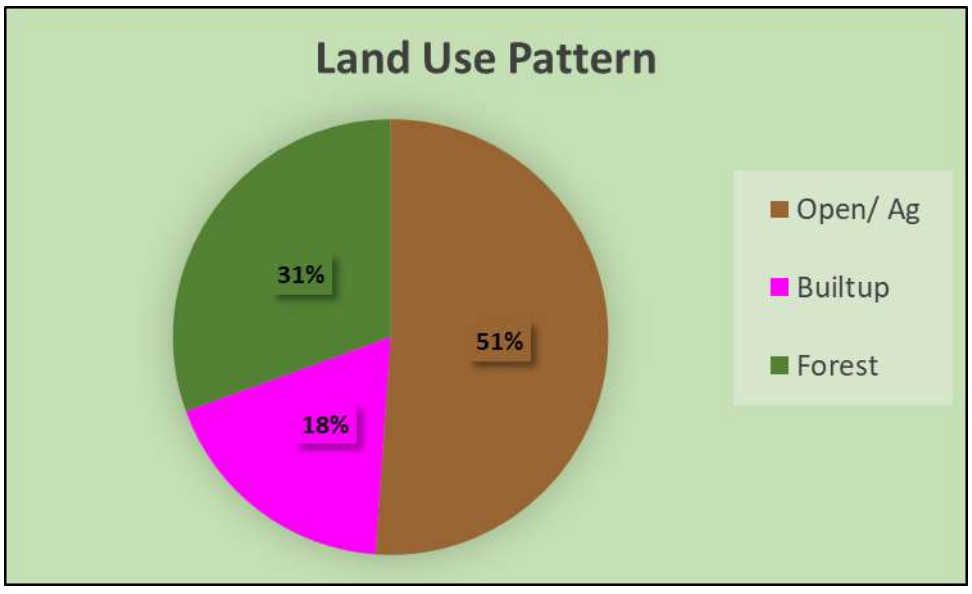
S. No.	Chainage		Length (m)	Available ROW (m)	Remarks
	From	To			
1	0+000	0+395	395	15-25m	
2	0+395	4+495	4100	15-25m	
3	4+495	5+865	1370	10-16m	Seelor
4	5+865	6+570	705	15-25m	
5	6+570	7+031	461	15-25m	
6	7+031	7+735	704	15-25m	Karjoona Jagir

S. No.	Chainage		Length (m)	Available ROW (m)	Remarks
	From	To			
7	7+735	9+595	1860	15-25m	
8	9+595	9+850	255	8-12m	Gopal Niwas
9	9+850	9+950	100	10-16m	Gopal Niwas
10	9+950	10+900	950	15-25m	
11	10+900	11+310	410	15-25m	Baori Kheda
12	11+310	12+925	1615	10-16m	
13	12+925	13+780	855	15-25m	Namana
14	13+780	14+330	550	8-12m	Namana
15	14+330	19+660	5330	10-16m	
16	19+660	20+295	635	15-25m	Sunderpura
17	20+295	25+195	4900	10-16m	
18	25+195	25+600	405	15-25m	Gunwar
19	25+600	31+460	5860	15-25m	
20	31+460	32+360	900	15-25m	Gararda
21	32+360	43+595	11235	15-25m	
22	43+595	44+275	680	10-16m	

0.6 ABUTTING LAND USE PATTERN

The existing alignment is a link between Silor, Hannan, Bauji ka Guda, Namana, Sunderpura, Guwar, Gararda, Bhopatpura. The pattern on both side of road is agricultural, built-up, open & forest land. The details of land use pattern along the project road are-

Open/ Ag.	-	51%
Built-up	-	18%
Forest	-	31%



The details of land use pattern for project road is as under -

Table 0.2:- Existing Land Use Pattern (Bundi – Silor – Gararda – Bhopatpura Road)

S. No.	Existing Chainage		Length (m)	Land Use	Remarks
	From	To			
1	0+000	0+395	395	Open/Ag	
2	0+395	4+495	4100	Open/Ag	
3	4+495	5+865	1370	Builtup	Seelor
4	5+865	6+570	705	Open/Ag	
5	6+570	7+031	461	Open/Ag	
6	7+031	7+735	704	Builtup	Karjoona Jagir
7	7+735	9+595	1860	Open/Ag	
8	9+595	9+850	255	Builtup	Gopal Niwas
9	9+850	9+950	100	Builtup	Gopal Niwas
10	9+950	10+900	950	Open/Ag	
11	10+900	11+310	410	Builtup	Baori Kheda
12	11+310	12+925	1615	Open/Ag	
13	12+925	13+780	855	Builtup	Namana
14	13+780	14+330	550	Builtup	Namana
15	14+330	19+660	5330	Open/Ag	
16	19+660	20+292	632	Builtup	Sunderpura
17	20292	24693	4401	Forest	
18	24+693	25+195	502	Open/Ag	
19	25+195	25+600	405	Builtup	Gunwar
20	25+600	31+460	5860	Open/Ag	
21	31+460	32+360	900	Builtup	Gararda
22	32+360	32+610	250	Open/Ag	
23	32610	36337	3727	Forest	
24	36337	36942	605	Open/Ag	
25	36942	42342	5400	Forest	
26	42+342	44+275	1933	Builtup	Bhopatpura
	Total Length		**44275**		

0.7 TERRAIN

The terrain is plane and has normal gradient throughout the road.

0.8 FOREST

As per site inspection, about 13.528 km length of the road passes through forest. Chainage wise detail is given below –

Table 0.3- Details of Forest

S. No.	Name of Forest area	Ex. Chainage (Km)		Length (m)	Design Chainage (Km)		Length (m)	Side
		From	To		From	To		(Left, Right, both)
1	Maradi	20292	24693	4401	20200	24600	4400	Both Side
2	Gararda	32610	36337	3727	32400	36100	3700	Both Side
3	Bhopatpura	36942	42342	5400	36700	42100	5400	Both Side
		Total Length (Km)		**13528**	**Total Length (Km)**		**13500**	

0.9 ARCHAEOLOGICAL/ANCIENT STRUCTURES

No such type of structure found along the road.

0.10 TRAFFIC

In this chapter, the report is concerned about **Bundi – Silor – Gararda – Bhopatpura Road**. Traffic Survey Locations and Schedules were, as given below:-

Table 0.4 – Different Traffic surveys and their dates of commencement

Location	Date of I Traffic Survey		Date of II Traffic Survey		Duration
	From	To	From	To	
Classified Traffic Volume Count					
0+500	20/11/2014	26/11/2014	16/03/2015	22/03/2015	7 Days/24 Hours
25+000	20/11/2014	26/11/2014	16/03/2015	22/03/2015	7 Days/24 Hours
42+750	20/11/2014	26/11/2014	16/03/2015	22/03/2015	7 Days/24 Hours
Axle load Survey					
0+500	22/11/2014	23/11/2014	16/03/2015	16/03/2015	24 Hours
42+750	22/11/2014	23/11/2014	16/03/2015	16/03/2015	24 Hours

The following ADT and PCU were observed on project road –

Table 0.5– Total ADT & PCU (Survey I & II)

Vehicle Category	Average of All Locations	
	ADT	PCU
Two-Wheeler	1440	720
Three-Wheeler	59	30
Car/Jeep	159	159
Mini Bus	1	2
Bus	7	21
Mini LCV	39	58
LCV	8	13
2 Axle	49	146
3 Axle	23	69
M Axle	4	19
Tractors	33	50
Tractor with Trailer	132	594
Cycle	69	35

Cycle Rickshaw	2	4
Animal Drawn	0	1
Horse Drawn	1	6
Hand Cart	0	1
Total	**2029**	**1928**

The projected traffic growth rate is taken as 5%.

Table 0.6-Projected traffic in different years

Year	ADT	PCU
2015 (Present Year)	2029	1928
2018 (Base Year)	2348	2231
2023	2997	2848
2028	3825	3635
2033	4882	4639
2038	6231	5921
2043	7952	7556

As per the projected traffic, the values of PCU are less due to discontinuity of Project road and poor pavement, after development of road, the traffic intensity will increase because of diverted traffic from adjacent roads. So the project road is proposed to be upgraded.

0.11 PAVEMENT COMPOSITIONS

The existing crust of project alignment is WBM and BT layer. The crust has been dismantled in most of the stretches.

The traffic used in design is in terms of the cumulative number of standard axles to be carried during the design life of the road.

Pavement thickness required for the designed MSA and as per IRC guidelines is shown in following table-

Table – 0.7

Sr. No.	Section	Calculated MSA (Max.)	Adopted MSA	CBR (%)	Pavement Composition (mm)			
					BC	DBM	WMM	GSB
1	Bundi – Silor - Bhopatpura	8.26	8.26	7%	40	60	250	230

0.12 PROPOSED BYPASSES/REALIGNMENT

There is not any Bypass or Realignment Proposed for this road.

Table 0.8- Details of proposed Bypasses

S. No.	City or Town of Bypass	Length (km)		Proposed ROW (m)	Start Chainage(m)		End Chainage(m)	
		Survey	Design		Existing	Design	Existing	Design
Nil								

Estimated Cost of Proposed Bypasses

Name of Bypass	Length (km)	Cost of civil works (INR)	Utility shifting Cost	Land Acquisition Cost	Total Project Cost
Nil					

0.13 ROAD JUNCTIONS/INTERSECTIONS

There are 2 junctions which are of primary importance and 56 Junctions of secondary importance. Their details are-

Table 0.9- Details of Existing Major and Minor Junctions

Sr. No.	Existing Chainage	Design Chainage	Type	Road Side	Directions
1.	0+000	0+000	X-Junction	LHS/RHS	L-To Kota road(NH-12), R-To Bundi road
2.	2+400	2+400	T-Junction	LHS	To Rayta
3.	4+545	4+545	Y-Junction	LHS	To Seelor
4.	4+603	4+630	Y-Junction	LHS	To Seelor
5.	4+705	4+705	Y-Junction	LHS	To Seelor
6.	4+009	4+090	X- Junction	LHS/RHS	L-To Chungipaka, R-To Ramnagar
7.	5+007	5+070	T-Junction	LHS	To Chungipaka
8.	5+207	5+270	Y-Junction	RHS	To Bhawanipura
9.	5+285	5+285	Y-Junction	LHS	To Chungipaka
10.	5+308	5+400	Y-Junction	LHS	To Chungipaka
11.	5+403	5+450	T-Junction	LHS	To Chungipaka
12.	6+006	6+040	Y-Junction	LHS	To Chungipaka
13.	6+408	6+460	Y-Junction	RHS	To Garnara
14.	7+207	7+230	Y-Junction	RHS	To Mahrampura
15.	7+306	7+320	T-Junction	LHS	To Viilage
16.	7+505	7+480	Y-Junction	RHS	To Jhopariya
17.	7+605	7+600	Y-Junction	LHS	To Karjoona
18.	8+202	8+180	Y-Junction	RHS	To Rampuriya
19.	8+603	8+590	T-Junction	LHS	To Dhola ki jhonpariya
20.	9+605	9+600	Y-Junction	RHS	To Byas baori
21.	9+806	9+800	Y-Junction	LHS	To Gopalniwas
22.	9+803	9+790	Y-Junction	RHS	To Viilage
23.	9+900	9+860	T-Junction	RHS	To kumhariya
24.	10+206	10+310	Y-Junction	LHS	To Viilage
25.	11+040	10+980	Y-Junction	LHS	To Viilage
26.	11+095	11+020	X- Junction	LHS/RHS	L-To Baorikhera, R-To Baorikhera

Sr. No.	Existing Chainage	Design Chainage	Type	Road Side	Directions
27.	11+530	11+480	Y-Junction	RHS	To kumhariya
28.	11+600	11+520	Y-Junction	LHS	To Baorikhera
29.	11+850	11+780	Y-Junction	LHS	To Viilage
30.	12+390	12+310	Y-Junction	RHS	To Viilage
31.	12+490	12+400	Y-Junction	LHS	To Andher
32.	12+820	12+760	Y-Junction	LHS	To Barundhan
33.	13+040	12+980	Y-Junction	LHS	To Namana
34.	13+270	13+200	X- Junction	LHS/RHS	L-To Namana, R-To Amli
35.	13+520	13+460	T-Junction	LHS	To Namana
36.	13+990	13+910	Y-Junction	LHS	To Namana
37.	17+160	17+080	Y-Junction	RHS	To Malipura
38.	17+195	17+105	Y-Junction	LHS	To Haripura
39.	15+780	15+700	Y-Junction	LHS	To Kishanpura
40.	18+480	18+400	T-Junction	RHS	To Sundarpura
41.	18+840	18+750	T-Junction	RHS	To Sundarpura
42.	19+470	19+370	Y-Junction	LHS	To Viilage
43.	19+670	19+580	T-Junction	RHS	To Holaspura
44.	24+680	24+600	Y-Junction	RHS	To Kewariya
45.	25+290	25+195	Y-Junction	RHS	To Guwar
46.	25+340	25+250	X- Junction	LHS/RHS	L-To Guwar, R-To Guwar
47.	31+510	31+300	Y-Junction	LHS	To Palka
48.	31+600	31+390	T-Junction	RHS	To Kewariya
49.	31+690	31+480	T-Junction	RHS	To Kewariya
50.	31+695	31+490	T-Junction	LHS	To Kewariya
51.	31+800	31+580	Y-Junction	RHS	To Kewariya
52.	31+865	31+650	T-Junction	LHS	To Palka
53.	31+900	31+700	T-Junction	LHS	To Kewariya
54.	32+300	32+100	Y-Junction	RHS	To Kewariya
55.	40+120	39+890	T-Junction	LHS	To Bhopatpura
56.	43+970	43+700	Y-Junction	LHS	To Uttamnagar
57.	44+150	43+900	T-Junction	LHS	To Uttamnagar
58.	44+273	44+026	X- Junction	LHS/RHS	L-To SH-29, R-To SH-29

0.14 ROAD SIDE DRAINS

Covered RCC drains are provided in Habitation/village portions, wherever required.
In case of rigid pavement in built-up areas, RCC drains should be provided near cement concrete carriageway.
Chainage wise details of RCC drain is given below-

Table – 0.10 Locations of Covered RCC Drains

Sr. No.	Design Chainage (Km)		Length (m)		Name of Village	Remarks, if any
	From	To	LHS	RHS		
1	4.500	5.850	1350.00	1350.00	Seelor	
2	7.000	7.700	700.00	700.00	Karjoona Jagir	
3	9.550	9.800	250.00	250.00	Gopal Niwas	
4	9.800	9.900	100.00	100.00	Gopal Niwas	
5	10.850	11.250	400.00	400.00	Baori Kheda	
6	12.850	13.700	850.00	850.00	Namana	
7	13.700	14.250	550.00	550.00	Namana	
8	19.570	20.200	630.00	630.00	Sunderpura	
9	25.100	25.500	400.00	400.00	Gunwar	
10	31.250	32.150	900.00	900.00	Gararda	
11	43.350	44.026	676.00	676.00	Bhopatpura	
	Length (m)		**6806**	**6806**		
	Total Length(Km)		**13.612**			

0.15 SUBMERGENCE

There are 4 Vented Causeways & 20 Flush Causeways along the road. 5 numbers of submersible minor bridges found in the project road.

0.16 CROSS DRAINAGE WORKS

Bridges

There are 10 minor bridges in the project road. 9 of which are proposed for reconstruction and 1 for widening.

Culverts

There are total 66 culverts. 2 of the existing culverts are proposed for widening, 55 are proposed for reconstruction and 6 are proposed for new construction and 3 are proposed to be retained.

Table 0.11- Details of culverts and bridges

Sr. No.	Existing Chainage	Design Chainage	Type	Span	Proposal	Span Arrangement
1	150	0+200	Slab	1X3m	Reconstruction	1X3m
2	1460	1+470	HPC	1X900mm	Retain	1X900mm
3	2600	2+600	HPC	1x1000mm	Widening	1x1000mm
4	3360	3+370	HPC	2x900mm	Reconstruction	2X1200mm
5	3840	3+850	Slab	2x3m	Reconstruction	3 X 10M
6	3850	3+860	Slab	1x2.7m		
7	3870	3+880	MNB	2x5.3m		
8	4940	4+930	MNB	3x3.1m(skew)	Reconstruction	2x9
9	5860	5+830	HPC	3x300mm	Reconstruction	1X1200mm
10	6780	6+740	Slab	1x3.1m	New Construction	1x3.1m

Sr. No.	Existing Chainage	Design Chainage	Type	Span	Proposal	Span Arrangement
11	6950	6+910	MNB	3x6.5m	Reconstruction	3x30(pile foundation)
12	7210	7+190	Slab	1x1.2m	Reconstruction	1x2
13	8130	8+090	not visible		Reconstruction	2X1200mm
14	8190	8+120	HPC	2x600mm	Reconstruction	2X1200mm
15	8200	8+130	MNB	2x3.2m	Reconstruction	2x3.2m
16	9050	9+000	Pipe	2x600mm	Reconstruction	2X1200mm
17	9400	9+350	Slab	1x1m	Reconstruction	1x2
18	9980	9+910	MNB	3x4m	Reconstruction	4 x 10
19	10500	10+450	MNB	2x4m	Widening	2x4m
20	10600	10+550	HPC	1x600	Reconstruction	1X1200mm
21	11930	11+860	Slab	1x1m	Reconstruction	1x2
22	13840	13+760	HPC	1x1000mm	Reconstruction	1X1200mm
23	13980	13+890	HPC	2x1200mm	Retain	2x1200mm
24	14080	13+990	HPC	1x600mm	Reconstruction	1X1200mm
25	14500	14+410	HPC	2x600mm	Reconstruction	2X1200mm
26	15760	15+690	Slab	1x1m	Reconstruction	1x2
27	15860	15+780	Pipe	1x300mm	Reconstruction	1X1200mm
28	15890	15+800	HPC	1x600mm	Reconstruction	1X1200mm
29	16180	16+090	Pipe	1x300mm	Reconstruction	1X1200mm
30	16650	16+580	MNB	2x4m	Reconstruction	2x7
31	16780	16+700	slab/skew	1x4m	Retain	1x4m
32	19480	19+380	VCW	2x4.5m 4x600mm 1x900mm	Reconstruction	3 X 7
33	21970	21+880	HPC	1x600mm	Reconstruction	1X1200mm
34	23060	23+060	HPC	1x600mm	Reconstruction	1X1200mm
35	23645	23+555	HPC	1x600mm	Reconstruction	1X1200mm
36	23700	23+600	HPC	1x600mm	Reconstruction	1X1200mm
37	24100	24+000	HPC	1x600mm	Reconstruction	1X1200mm
38	24220	24+140	HPC	1x600mm	Reconstruction	1X1200mm
39	24820	24+750	VCW	32x1000mm 2x3m	Reconstruction	10x10 MJB
40	25010	24+920	MNB	2x4m	Reconstruction	2x5
41	25760	25+600	HPC	1x600mm	New Construction	1X1200mm
42	26080	25+900	HPC	1x600mm	New Construction	1X1200mm
43	26290	26+090	HPC	1x600mm	New Construction	1X1200mm
44	26400	26+210	HPC	1x600mm	New Construction	1X1200mm
45	26550	26+350	HPC	1x300mm	New Construction	1X1200mm

Sr. No.	Existing Chainage	Design Chainage	Type	Span	Proposal	Span Arrangement
46	26700	26+500	HPC	3x600mm	Reconstruction	3X1200mm
47	28550	28+330	VCW	5X600mm	Reconstruction	1x10
48	29690	29+480	FCW		Reconstruction	1x2
49	29700	29+500	FCW		Reconstruction	1x2
50	30210	30+000	FCW		Reconstruction	1x2
51	30810	30+600	MNB	2X4M	Reconstruction	2x5
52	31560	31+350	HPC	1X600mm	Reconstruction	1X1200mm
53	31770	31+560	FCW		Reconstruction	1x4
54	32360	32+150	HPC	1x600mm	Reconstruction	1x1200
55	32400	32+200	MNB	15x3.5	Reconstruction	10x10
56	32600	32+400	HPC	1x600mm	Reconstruction	1x1200
57	32700	32+500	stone slab	1x1m	Reconstruction	1x2
58	32850	32+630	slab	1x0.5m	Reconstruction	1x2
59	33100	32+890	FCW		Reconstruction	1x4
60	33200	33+000	FCW		Reconstruction	1x4
61	34010	33+820	FCW		Reconstruction	1x4
62	34400	34+200	VCW	4x900mm	Widening	4x900mm
63	36350	36+100	FCW		Reconstruction	1x4
64	36450	36+200	FCW		Reconstruction	1x4
65	37300	37+090	FCW		Reconstruction	1x4
66	37500	37+290	FCW		Reconstruction	1x4
67	37600	37+380	FCW		Reconstruction	1x4
68	38330	38+100	FCW		Reconstruction	1x4
69	38450	38+200	FCW		Reconstruction	1x4
70	38550	38+300	FCW		Reconstruction	1x4
71	39200	38+960	FCW		Reconstruction	1x4
72	39600	39+350	FCW		Reconstruction	1x4
73	40100	39+870	FCW		Reconstruction	1x4
74	42850	42+600	FCW		Reconstruction	1x4
75	43010	42+780	FCW		Reconstruction	1x4
76	43200	42+950	HPC	1x300mm	Reconstruction	1X1200mm

0.17 RAILWAY TRACKS / CROSSINGS

There is a rail level crossing at Ch 0+380 (Design Ch 0+390).

0.18 TOLL PLAZAS

There is proposal of a toll plaza on the project road at km 21+700 (Design Chainage).

0.19 ROADWAY FACILITIES

(a) Way Side Amenities

There is not any proposal for way side amenities.

(b) Truck/Bus Lay Byes

Truck & bus lay byes are not provided. Bus shelters are proposed near villages. There are 9 villages along the road hence 18 (2 x 9) bus shelters proposed along the project road. Their details are given below-

Table 0.12- Locations of proposed Bus Shelters

S. No.	Location	Side	Village Name	Remarks, if any
1	4+500	LHS	Silor	
2	5+850	RHS		
3	7+000	LHS	Karjoona Jagir	
4	7+700	RHS		
5	9+550	LHS	Gopal Niwas	
6	9+900	RHS		
7	10+850	LHS	Baori Kheda	
8	11+250	RHS		
9	12+850	LHS	Namana	
10	14+250	RHS		
11	19+570	LHS	Sunderpura	
12	20+200	RHS		
13	25+100	LHS	Guwar	
14	25+500	RHS		
15	31+250	LHS	Gararda	
16	32+150	RHS		
17	43+350	LHS	Bhopatpura	
18	44+026	RHS		

0.20 RECOMMENDATIONS FOR CRUST

Depending upon detailed design for sections, the following lane configuration & pavement composition is proposed for Project Road.

Table 0.14 Pavement Composition Flexible Pavement As per IRC: 37:2012.

Sr. No	From	To	Length	Type of Pavement	Lane	Ref C/s	Pavement Composition (mm)			
							BC	DBM	WMM	GSB
1	0.000	0.400	400.00	BT	1.5	I	40	60	250	230
2	0.400	4.500	4100.00	BT	1.5	I	40	60	250	230
3	5.850	6.550	700.00	BT	1.5	I	40	60	250	230
4	6.550	7.000	450.00	BT	1.5	II	40	60	250	230
5	7.700	9.550	1850.00	BT	1.5	II	40	60	250	230
6	9.900	10.850	950.00	BT	1.5	II	40	60	250	230
7	11.250	12.850	1600.00	BT	1.5	II	40	60	250	230
8	14.250	19.570	5320.00	BT	1.5	II	40	60	250	230
9	20.200	25.100	4900.00	BT	1.5	II	40	60	250	230

Sr. No	From	To	Length	Type of Pavement	Lane	Ref C/s	Pavement Composition (mm)			
							BC	DBM	WMM	GSB
10	25.500	31.250	5750.00	BT	1.5	II	40	60	250	230
11	32.150	43.350	11200.00	BT	1.5	II	40	60	250	230
Total Length			**37.220**							

Table 0.15 Pavement Composition for Rigid Pavement

Sr. No.	From	To	Length	Type of Pavement	Lane	Ref C/s	Pavement Composition (mm)			Remark
							PQC	DLC	GSB	
1	4.500	5.850	1350.00	CC	2	III	300	150	150	Seelor
2	7.000	7.700	700.00	CC	2	IV	300	150	150	Karjoona Jagir
3	9.550	9.800	250.00	CC	2	V	300	150	150	Gopal Niwas
4	9.800	9.900	100.00	CC	2	IV	300	150	150	Gopal Niwas
5	10.850	11.250	400.00	CC	2	IV	300	150	150	Baori Kheda
6	12.850	13.700	850.00	CC	2	IV	300	150	150	Namana
7	13.700	14.250	550.00	CC	2	III	300	150	150	Namana
8	19.570	20.200	630.00	CC	2	IV	300	150	150	Sunderpura
9	25.100	25.500	400.00	CC	2	IV	300	150	150	Gunwar
10	31.250	32.150	900.00	CC	2	VI	300	150	150	Gararda
11	43.350	44.026	676.00	CC	2	IV	300	150	150	Bhopatpura
Total Length			**6.806**							

Table 0.16 Overlay Requirement for Strengthening

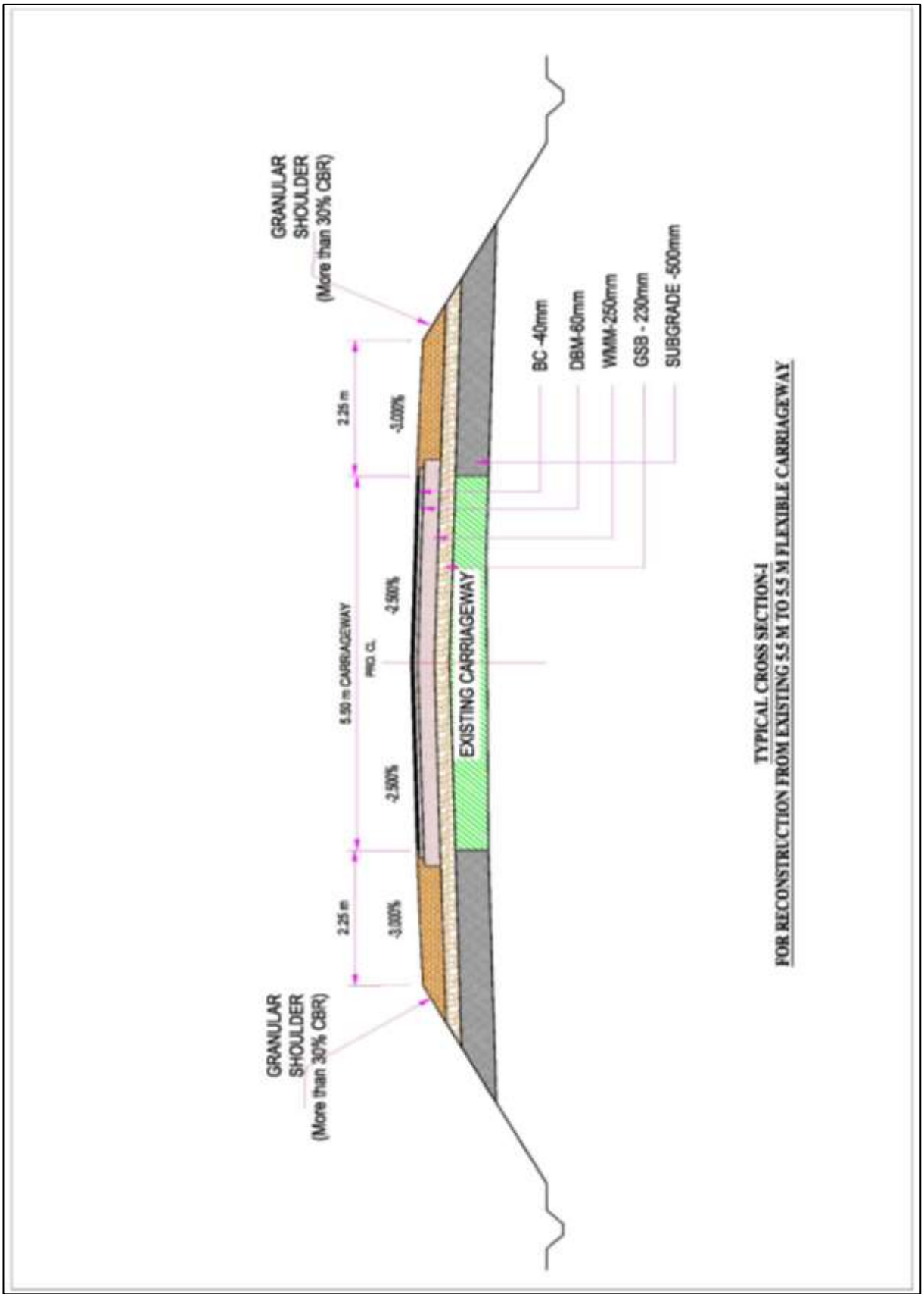
Sr. No.	Chainage		Length (m)	Type of Pavement	Lane	Ref C/s	Composition (mm)	
	From	To					BC	DBM
Nil								

0.21 RECOMMENDATION ON VIABILITY (VGF):

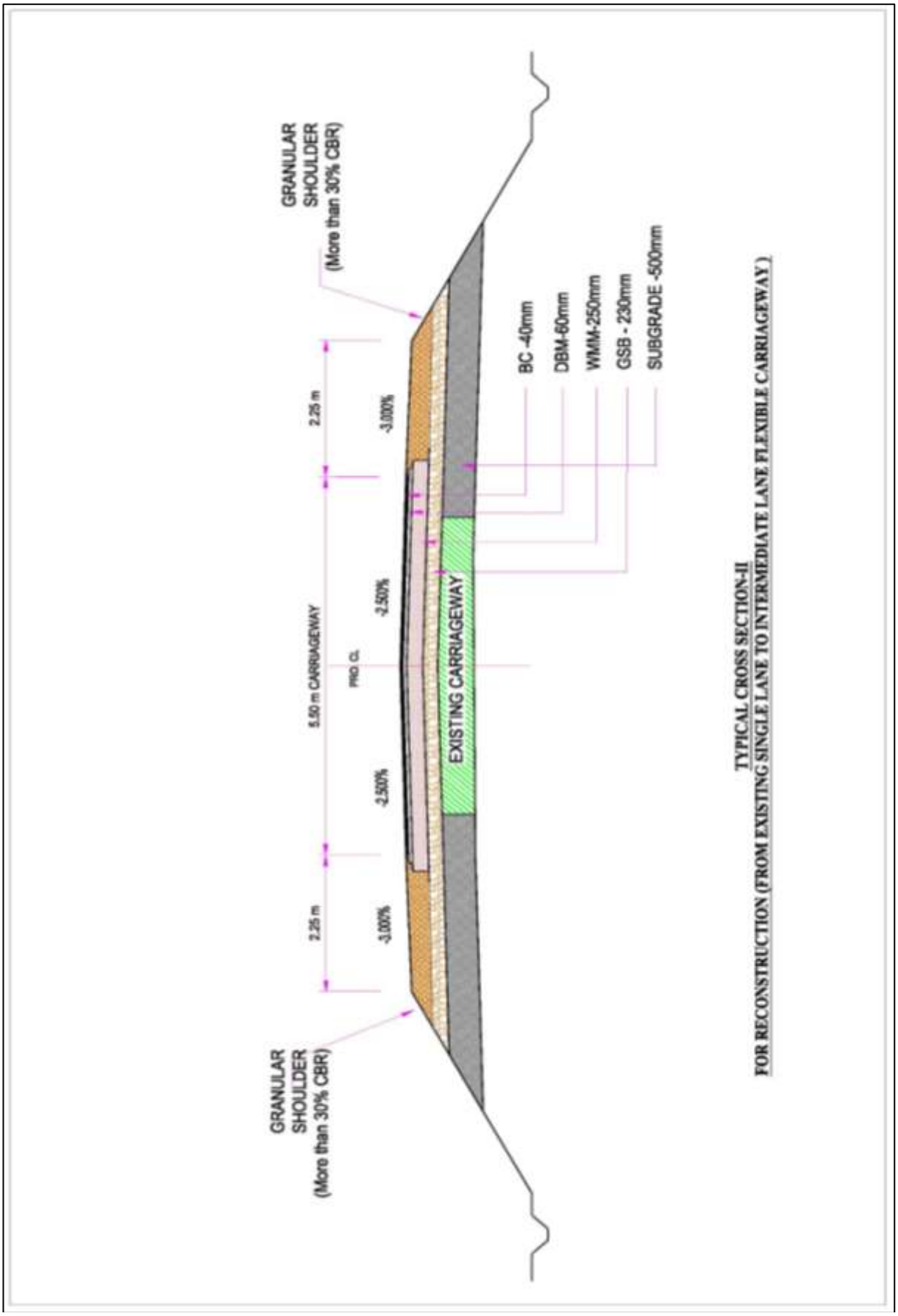
The project road was found to be Non-Viable on the VGF mode. Hence it is proposed for reconstruction on Annuity mode or funding by other agencies for the development work.

Typical Cross Section

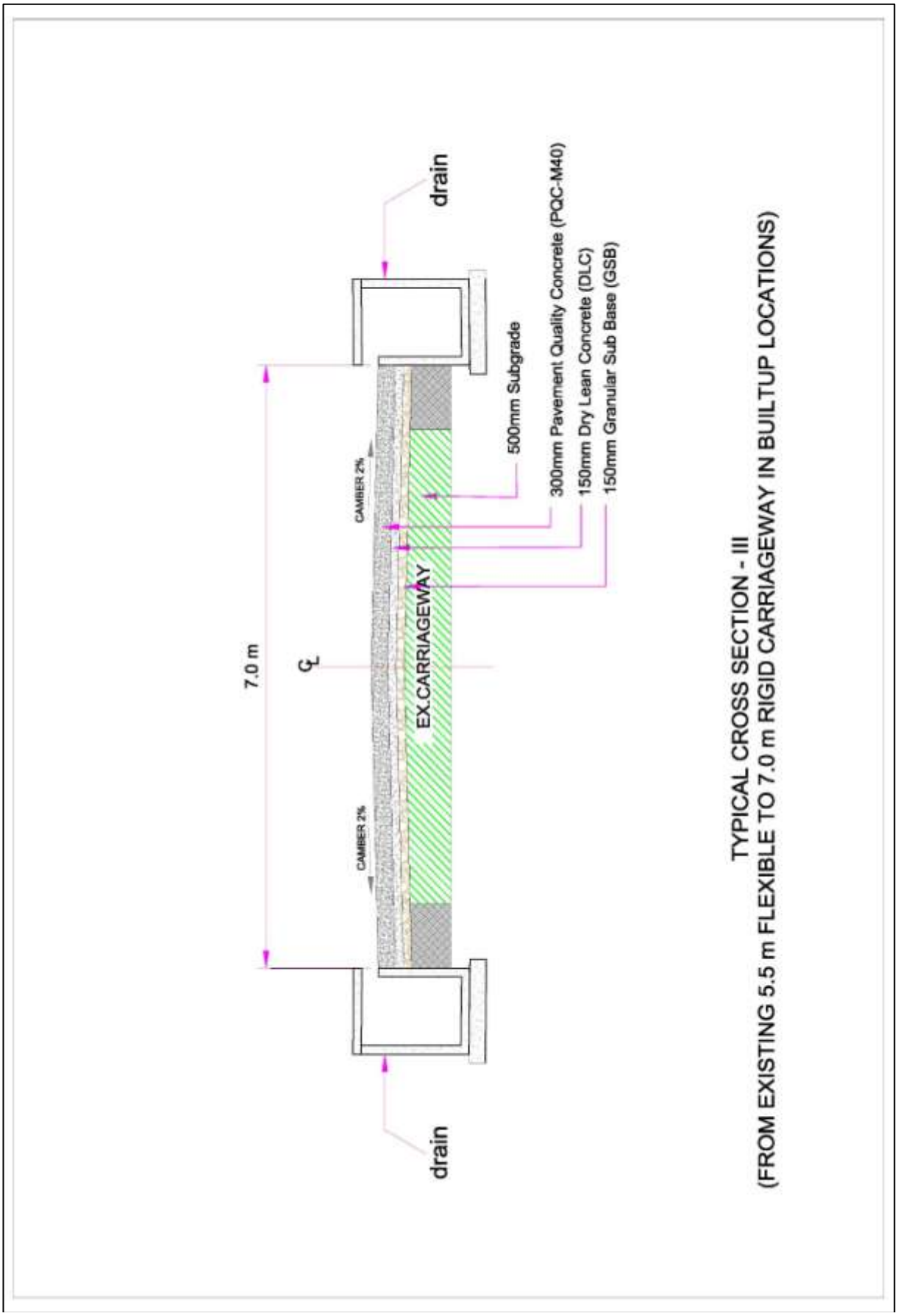
TCS I: Intermediate Lane Flexible Pavement in Open Area



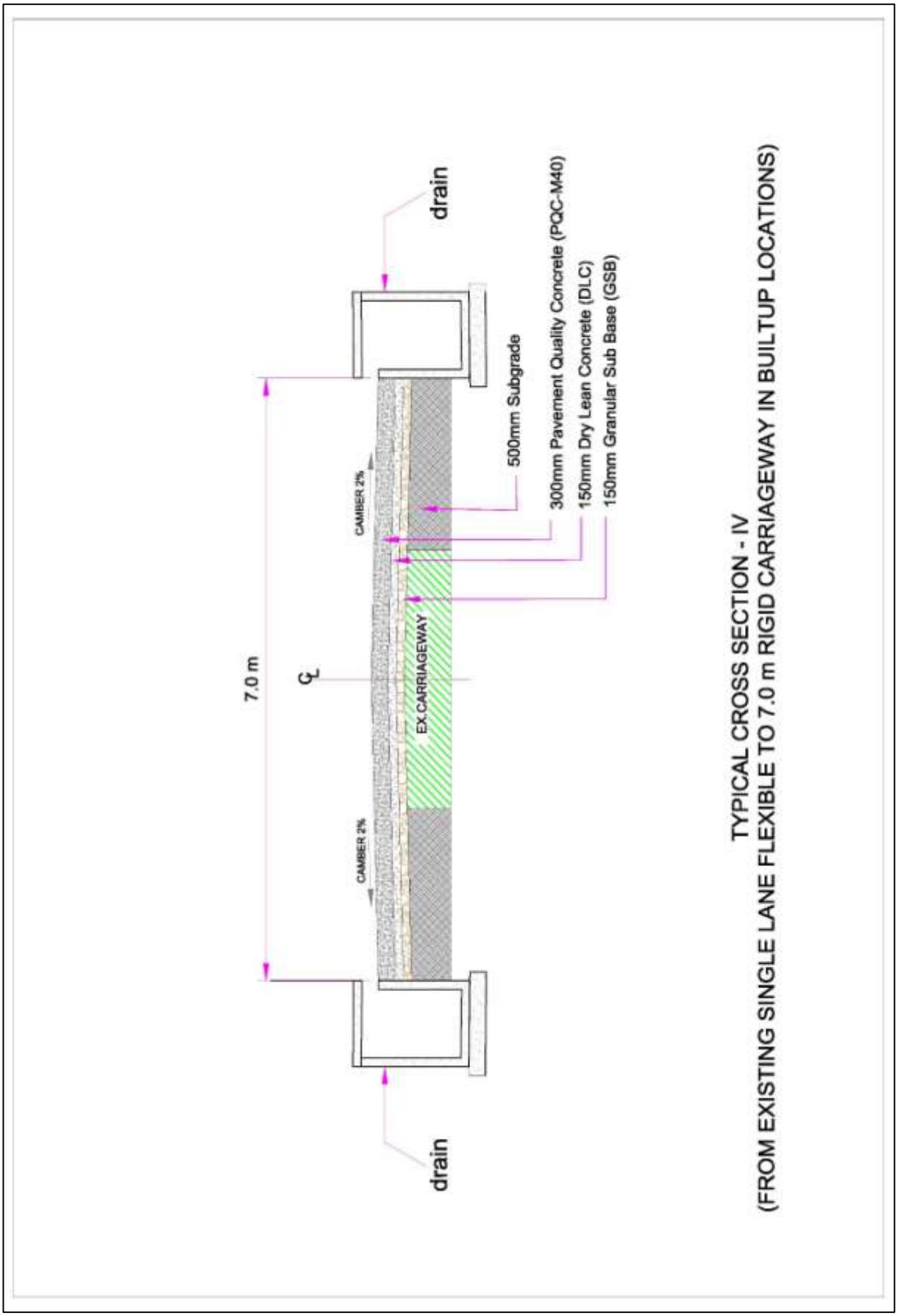
TCS II: Intermediate Lane Flexible Pavement in Open Area



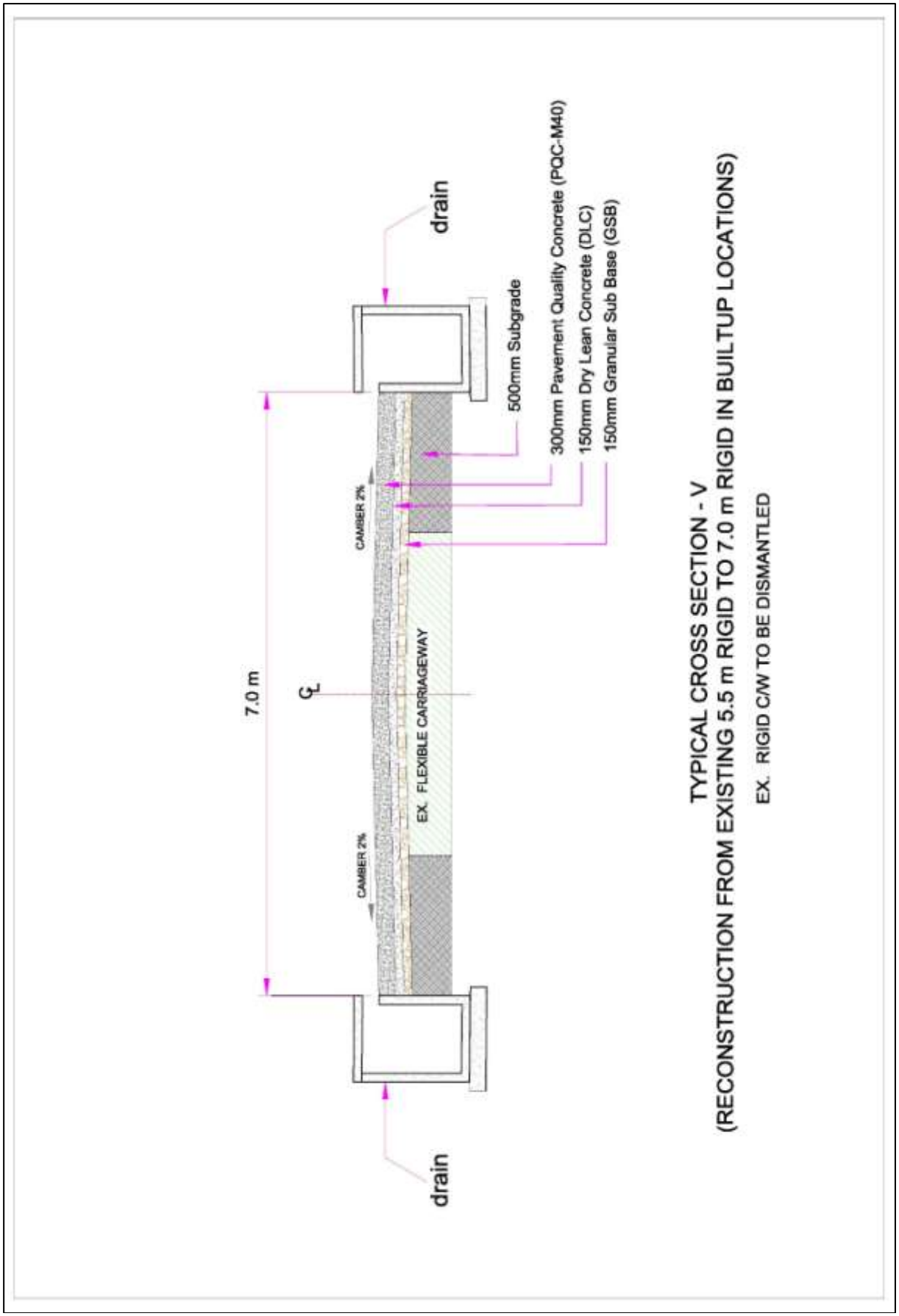
TCS III: Two Lane Rigid Pavement with drain in Builtup Area



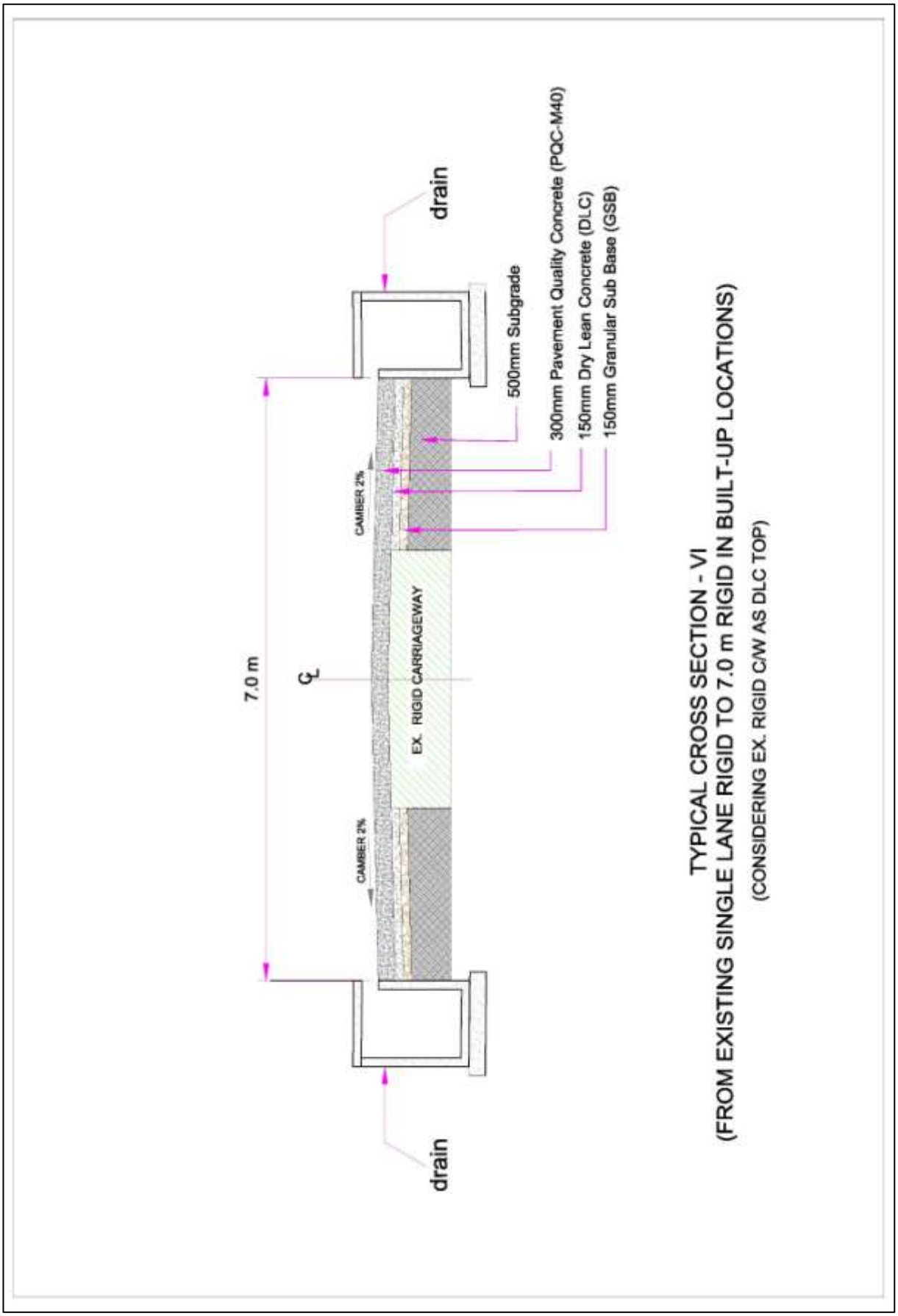
TCS IV: Two Lane Rigid Pavement with drain in Builtup Area



TCS V: Two Lane Rigid Pavement with drain in Builtup Area



TCS VI: Two Lane Rigid Pavement with drain in Builtup Area



0.23 RESETTLEMENT AND REHABILITATION (R & R) POLICY

The Project alignment is proposed in such a way with minimum Resettlement and Rehabilitation. Total Additional Land requirement is 1.447 Ha. Total 64 structures (that includes private, government and religious structures) are getting affected, as per table 0.17(a) & (b)

0.24 SOCIAL IMPACT ASSESSMENT & ENVIRONMENTAL IMPACT ASSESSMENT

A. Social impact assessment:

Important settlements & land acquisition required

There are total 64 structures, constructed within the existing ROW, which will be affected by the proposed road widening.

Table 0.17(a)- Summary Subproject Impacts

Sl. No.	Impacts	Number
1	Total number of structures affected (Private + Religious + Govt.)	64
2	Total number of private structures affected	58
3	Total number of affected households (TH + NTH)	58
4	Total number of Physically Affected Households (NTH)	NA
5	Total number of Economically Affected Households (TH + NTH)	NA
6	Total number of vulnerable households affected	NIL
7	Total number of affected persons (APs) (TH + NTH)	95
8	Total number of physically affected person (NYH)	NA
9	Total number of economically affected person (TH + NTH)	NA
10	Total number of CPR (structure) affected	06

Table 0.17(b) – List of Affected Persons/CPRs

S. N.	Side	Name of the Village	Name of Block	Name of District	Chainage	Name of the Owner	Type of Property
Affected Persons							
1	Left	Bundi	Bundi	Bundi	0+300	Mr.Mukesh singh	General shop
2	Right	Bundi	Bundi	Bundi	0+350	Mr.Mukesh gurjar	Tea shop
3	Left	Bundi	Bundi	Bundi	2+600	Mr. Ramraj gujar	General shop
4	Left/Right	Bundi	Bundi	Bundi	2+600	Mr. Rajkumar gujar	Boundary wall
5	Left	Silor	Bundi	Bundi	3+400	Mr.Ramsebak	Boundary wall
6	Right	Silor	Bundi	Bundi	3+400	Mr.Ramesh	Boundary wall
7	Left	Silor	Bundi	Bundi	4+600	Babulal kushbah	G boundarywall
8	Left	Silor	Bundi	Bundi	4+900	Mr.Bherulal ji	boundary
9	Left	Silor	Bundi	Bundi	5+700	Mr.Laxman	House
10	Right	Silor	Bundi	Bundi	7+500	Mr.Anil Seni	Boundary wall
11	Right	Karjuna	Bundi	Bundi	7+700	Mr.Bhura	Agri Land
12	Left	Karjuna	Bundi	Bundi	7+700	Mr.Bhura	Agri Land
13	Right	Gopalniwas	Bundi	Bundi	8+600	Mr.Jaikishan meena	Agri Land
14	Left	Gopalniwas	Bundi	Bundi	8+600	Mr.Uddha ji	Agri Land
15	Left	Babdikheda	Bundi	Bundi	11+600	Mr.Ramlal ji	boundary wall
16	Left	Babdikheda	Bundi	Bundi	11+600	Smt.sundi bai	House
17	Right	Namana	Bundi	Bundi	13+900	Mr.Satyanarayan	Agri Land
18	Right	Namana	Bundi	Bundi	14+600	Mr.Rajendra ji	Flour meel
19	Left	Namana	Bundi	Bundi	14+600	Mr.Noormohamad	Boundary wall
20	Right	Namana	Bundi	Bundi	16+100	Mr.Bajranglal	Agri Land
21	Left	Namana	Bundi	Bundi	16+100	Mr.Kalulal	Agri/boundary wall
22	Left	Sundarpura	Bundi	Bundi	17+100	Mr.Ramkishan	Agri/boundary wall
23	Right	Loicha	Bundi	Bundi	18+400	Mr.Devilal	Agri Land
24	Left	Loicha	Bundi	Bundi	18+400	Mr.Radhshyam Khati	Agri Land
25	Left	Loicha	Bundi	Bundi	18+950	Mr.Babulal	Agri/boundary wall
26	Right	Loicha	Bundi	Bundi	19+100	Mr.Rama bheel	Agri Land
27	Left	Loicha	Bundi	Bundi	19+100	Mr.Dalichandra	Agri/boundary wall

S. N.	Side	Name of the Village	Name of Block	Name of District	Chainage	Name of the Owner	Type of Property
28	Left	Loicha	Bundi	Bundi	19+110	Mr.Deva ji	Agri/boundary wall
29	Left	Loicha	Bundi	Bundi	19+250	Mr.Shankar ji	Agri Land
30	Left	Loicha	Bundi	Bundi	19+500	Mr.Gopilal	Agri Land
31	Left	Loicha	Bundi	Bundi	19+550	Mr.Ramnath	Agri Land
32	Right	Gunwar	Bundi	Bundi	19+600	kanha Gurjar	shop
33	Right	Gunwar	Bundi	Bundi	25+190	Mr.Bhairulal ji	Agri Land
34	Right	Gunwar	Bundi	Bundi	25+200	Mr.Bajranglal	Agri Land
35	Left	Gunwar	Bundi	Bundi	25+200	Mr.Kishanlal	Agri Land
36	Left	Gunwar	Bundi	Bundi	25+700	Mr.Burjulal	Boundary wall
37	Right	Gunwar	Bundi	Bundi	25+950	Mr.Chhotu	Agri/boundary wall
38	Right	Gunwar	Bundi	Bundi	26+500	Mr.Hanshraj Gurjar	boundary wall
39	Left	Gunwar	Bundi	Bundi	26+500	Mr.Mohanlal	Boundary wall
40	Left	Gunwar	Bundi	Bundi	26+500	Mr.Devilal	Agri Land
41	Right	Gunwar	Bundi	Bundi	26+600	Mr.Devilal	Agri/boundary wall
42	Left	Gunwar	Bundi	Bundi	26+800	Mr.Bishna ji	Agri/boundary wall
43	Right	Gunwar	Bundi	Bundi	26+800	Mr.Ramlal ji	Agri/boundary wall
44	Left	Gunwar	Bundi	Bundi	28+650	Mr.Ramswaroop	Agri/boundary wall
45	Left	Garadda	Bundi	Bundi	31+100	Mr.sukhlal	Gen Shop
46	Right	Garadda	Bundi	Bundi	31+100	Mr.Kishanlal	Agri Land
47	Left	Garadda	Bundi	Bundi	31+100	Mr.Bhoja Gurjar	shop
48	Left	Garadda	Bundi	Bundi	31+200	Mr.Jeetmal	shop
49	Right	Garadda	Bundi	Bundi	32+150	Mr.Tepaskumar	Agri Land
50	Right	Garadda	Bundi	Bundi	32+200	Mr.Shankarlal Khatik	Agri Land
51	Right	Garadda	Bundi	Bundi	32+200	Mr.Udaylal gurjar	Agri Land
52	Left	Garadda	Bundi	Bundi	32+300	Mr.Mahaveer Gurjar	shop
53	Right	Garadda	Bundi	Bundi	32+400	Mr.Ramprasad	hut
54	Right	Garadda	Bundi	Bundi	32+500	Mr.Kanhailal	hut
55	Right	Garadda	Bundi	Bundi	32+600	Mr. Madavlal	House
56	Left	Garadda	Bundi	Bundi	32+600	Mr.Nandlal	HouseA1 boundary wall
57	Right	Garadda	Bundi	Bundi	32+600	Mr.Kailash	House
58	Right	Bhopatpura	Bijoliya	Bhilwara	42+500	Mr.Shyamlal	Agri/boundary wall
Affected CPRs							
1	Right	Silor	Bundi	Bundi	3+400	Mosque	Mosque
2	Right	Gopalniwas	Bundi	Bundi	10+200	Temple	Temple
3	Left	Babdikheda	Bundi	Bundi	10+300	Temple	Temple
4	Left	Babdikheda	Bundi	Bundi	10+500	Govt.	water tank
5	Right	Loicha	Bundi	Bundi	18+300	Temple	Temple/Boundary wall
6	Right	Garadda	Bundi	Bundi	32+490	Govt.	drille drowing

Land acquisition is required at some stretches for curve improvement & at the location of toll plazas. Details are as given-

Table 0.18- Land Acquisition Required

S. No.	Chainage		Area (sq. m)	Area (ha)
	From	To		
1	4+150	4+280	1390.58	0.139
2	5+190	5+390	3650.623	0.365
3	5+790	5+900	806.246	0.081
4	6+550	6+810	4591.369	0.459
5	6+980	7+180	2766.413	0.277
6	7+470	7+590	1259.943	0.126
7	21560	21850	3	0.0003
Total			**14468.174**	**1.447**

B. Environmental impact assessment:

- The assessment of environment impacts for the sub-project road shows that there are no significant, long term adverse impacts. Most of the impacts are short term and limited to the construction stage.
- The project entails various impacts on the project setting. There are many positive impacts bearing benefits to the area against the limited number and magnitude of negative impacts. These include (i) The project will substantially improve the transport efficiency on the roads. (ii) The project once implemented will improve the overall environmental conditions with better roads, fuel efficiency and environmental protection measures (iii) will reduce traffic congestion particularly at junctions hence, air pollution due to idling of the vehicles.
- The finding of IEE indicates that project is unlikely to cause any significant adverse environmental impacts. While some of the minor impacts are negative, there are many bearing benefits to the area. Most of the impacts are likely to occur during construction stage and are temporary in nature. Anticipated minor impacts will be mitigated through the implementation of mitigation measures summarized in the Environmental Management Plan.
- The project got support and consent from most of local people. The local people did not perceive any adverse impact due to the proposed project. Environmental awareness and likewise concern were found generally low. People, however expressed the desire of minimizing the tree cutting.
- Cost for Environmental Management Plan, Training and Environmental Monitoring :

Table 0.19 - Cost for Environmental Management Plan, Training and Environmental Monitoring

S. No.	Parameters / Components	Parameter to be monitored	Guidelines	Unit Cost (Rs)	Total Cost (Rs)
1	Ambient Air Monitoring: 3 times in a year for 3 years or construction period at 6 sites & three time in a year during operation/ defect liability period at six sites	PM10, PM2.5, SO2, NOx & CO	High Volume samplers to be used and located 50 m from the construction site	9000	378000
2	Water Monitoring: 3 times in a year for 3 years or construction period At 6 locations, three time in a year for one year during defect liability period at six site	pH, BOD, COD, TDS, TSS, DO, Total coliform, Conductivity, Oil & Grease	Analyse as per the standard methods for examination of water and waste water	5000	135000
3	Noise Monitoring: 3 times in a year for 3 years or construction period , 6 locations & one year during operation/ defect liability period, three times in a year at six sites	Noise levels on dB (A) scale	Using an integrated noise level meter kept at a distance of 15 m from the construction site	3000	126000
	Total Monitoring Cost				**639000**
4.	Opening, running and restoration of stone quarry/sand extraction pits along the entire project length		IRC Code of Practice and MoSRT&H manual	LS	Engineering cost
5.	Gabion walls (above height 4 m) along		IRC Code of	LS	Engineering

S. No.	Parameters / Components	Parameter to be monitored	Guidelines	Unit Cost (Rs)	Total Cost (Rs)
	elevated embankment		Practice and MoSRT&H manual		cost
6.	Dust Suppression along the entire project Length Six tankers in a days for 240 Days		IRC Code of Practice and MoSRT&H manual	Rs2000/- per day per tanker	1440000/-
7.	Solid Waste management during entire project Period		As per MoEFCC guidelines	10000/ month	108000/-
8.	Erosion Control Measures (Turfing / Pitching / Seeding & Mulching) Provision of Cross drainage & side drainage Structures General Borrow area management and maintenance of haul roads related to borrow Areas Air/noise pollution control measures in construction equipment Management and disposal of scarified waste bituminous material Provision of Informatory Signs Bus shelters Construction of Speed Humps Management of quarries Redevelopment of Borrow Areas Construction Camp Management Costs Safety measures for workers		As per IRC Guidelines	Shall be included in contractor's quoted rates	Engineering cost
	Total Mitigation Cost				**1548000/-**

0.25 COST ESTIMATE

The total project cost is calculated based NH BSR-Circle KOTA-Yr-2016, Government of Rajasthan.

Table 0.20- Abstract of Cost Estimate

BILL NO.	DESCRIPTION	TOTAL AMOUNT (Rs.)	TOTAL AMOUNT (Crores)	Contribution in per km cost
a.	Site-Clearance	4,110,994.78	0.411	0.009
b.	Earthwork	60,252,362.79	6.025	0.137
c.	Sub-base, Base Courses	187,290,707.98	18.729	0.425
d.	Bases & Surface Courses (Bituminous)	155,339,647.25	15.534	0.353
e.	Cost of CC Pavement	100,738,453.20	10.074	0.229
1	**Cost of Road Works**	**507,732,166.00**	**50.773**	**1.153**
2	**Cost of Cross-Drainage structures**			
	Major Bridges	99,298,276.73	9.930	0.226
	Minor Bridges	71,177,943.27	7.118	0.162
	Pipe Culverts,Slab Culverts & Box Culverts	72,327,498.00	7.233	0.164
3	Cost of ROB (if any)	0.00	0.000	0.000
4	Cost of Toll Plaza	12,000,000.00	1.200	0.027
5	Cost of Bus Shelters	1,600,000.00	0.160	0.004
6	Cost of RCC drain in Builtup Area & Near Mines	61,254,000.00	6.125	0.139
7	Traffic Signs, Marking and Road Appurtenances	29,608,605.80	2.961	0.067
8	Cost of Metal beam crash barrier	8,843,400.00	0.884	0.020
9	Junction improvement	79,320,544.41	7.932	0.180
10	Protection Work (Retaining wall, Toe wall, Pitching etc.)	18,157,606.52	1.816	0.041
11	Miscellaneous Items	6,070,360.00	0.607	0.014
i	**Cost of Civil Works (Sub Total A)**	**967,390,400.73**	**96.739**	
	Per km Cost of Civil Works	**21,973,161.33**	2.197	
B	*Contingency Charges (2.8%)*	27,086,931	2.709	0.062
C	*Quality Control Charges (0.25 %)*	2,418,476	0.242	0.005
D	*Escalation Charges (5% per year for 2 Years)*	96,739,040.07	9.674	0.220
E	*Road Safety Audit Charges (0.25%)*	2,418,476	0.242	0.005
F	*Administrative Charges (11%)*	106,412,944.08	10.641	0.242
G	*Construction Supervision Charges (2%)*	19,347,808.01	1.935	0.044
H	*Maintenance Charges (0.5% for I Year 1.0% for II Year,1.5% for III & 2% for remaining period per year)*	48,369,520.04	4.837	0.110
I	***Grand Total***	**1,270,183,596**	127.018	2.885
	Cost per km	28,850,761	2.885	0.066
*	***Cost of Utility Shifting (3%)***	29,021,712.02	2.902	0.066
*	***EMP & EIA Cost***	8,805,200.00	0.881	0.020
*	***SIA Cost***	86,570,550.00	8.657	0.197
*	***LA Cost***	22,300,000.00	2.230	0.051
xiii	**TOTAL CAPITAL COST OF THE PROJECT**	**1,394,581,058.18**	**139.458**	**3.168**
	Cost per km	31,676,306.23	3.168	

SALIENT FEATURES

Description		Existing	Proposed	
Terrain	:	Plain	Plain	
Length	:	Existing Length = 48 Km (As Per TOR)	Proposed Length = 44.026 Km	
Alignment	:	The existing Alignment is almost Poor except at few locations.	The existing alignment with geometric improvements.	
Design Speed	:	Avg. 30-40Kmph.	65 Kmph to 80Kmph.	
Cross-Section	:	**C/W Width-** Varying b/w 3.0-5.5m **Shoulder-** 1m to 2 m Hence formation width varies from 5m to 9m	**Flexible Pavement** **2-Lane with Granular shoulder in Open / Rural Area** 2.50m Granular Shoulder + 5.50 m C/W + 2.50m Granular Shoulder = 10.0m **Rigid (CC) Pavement -2 Lane in Built-Up Area-** RCC Drain + 7.00m Rigid C/W+ RCC Drain	
CBR Considered	:	-	7%	
Traffic (Weighted Average of I & II Traffic Survey)	:	PCU – 1928 (In 2015) ADT-2029 CVPD-223	On basis of projected traffic,* From Km 00.000 to Km 44.026 : 1.5-Lane with Granular shoulder is considered	
Pavement Design Life	:	Nil	10 / 15 Years	
Design MSA	:	8.26 (15 yr)	* MSA = 8.26	
Pavement Crust Thickness for widening & new construction	:		**BC –** 40mm **DBM** – 60 mm **WMM** – 250 mm **GSB** – 230mm	**PQC –** 300mm **DLC –** 150mm **GSB –** 150mm
Bridges	:	10 minor bridges	Widening – 1 Nos. Reconstruction – 9 Nos.	
Culverts	:	Total Culvert = 66 Nos. HPC = 31 Nos. Slab Culvert = 11 Nos. VCW = 4 Nos. FCW = 20 Nos.	Reconstruction – 55 Nos. New construction –6 Nos. Widening – 2 Nos. Retain – 3 Nos.	

Description		Existing	Proposed
Bus - Bay	:	Nil	Nil
Bus Shelters	:	Nil	18
Truck Lay Bye	:	Nil	Nil
Way Side Amenities	:	Nil	Nil
Toll Plaza	:	Nil	1 (at km 21+700)
Forest	:	13.528 km	Nil
ROW	:	15-20 m	**16 m**
Major Junction/ Intersection	:	2	2
Minor Junction/ Intersection	:	56	56
Overpass	:	1	Retained
Grade Separator	:	Nil	Nil
Underpasses (VUP Cattle/Pedestrians)	:	Nil	Nil
ROBS	:	Nil	Nil
Level Crossing	:	1	@ km 0+380
RUBS	:	Nil	Nil
Service Road	:	Nil	Nil
Protection & Others Work	:	-	As Per Site requirement
Civil Cost (Rs.)	:		**Rs. 96.739 Cr (Rs 2.197 Cr/Km)**
Cost of Utility Shifting	:		Rs. 2,90,21,712.02
EMP Cost	:		Rs. 88,05,200.00
SIA Cost	:		Rs. 8,65,70,550.00
LA Cost	:		Rs. 2,23,00,000.00
Total Cost (Rs.)	:		**Rs. 139.458 Cr (Rs 3.168 Cr/Km)**