

Chapter - I Executive Summary

I.1 Introduction

Madhya Pradesh State Road Development Corporation (MPRDC) Ltd., has been entrusted preparation of Detailed Project Report of selected stretches/corridor of Highway for Two/Four lanning with paved shoulder configuration

The Detailed Project Report thus prepared shall contain the scheme and layout of the development of the highway and the project facilities, preliminary design, costing and financial viability based on present and future traffic. The Detailed Project Report would thus provide all technical details, based on which comprehensive bid document can be prepared so that realistic bids are received from prospective bidders.

In order to fulfil the traffic needs and road safety requirement, MPRDC has appointed the **LN Malviya Infra Projects Pvt. Ltd., Bhopal (M.P.)** as consultants to Providing Consultancy Services for Preparation of Detailed Project Report of Sawai Madhopur Sheopur to Goras Road in the State of Madhya Pradesh for up-gradation to Two Lanes with paved shoulder /Four lane configurations., the assignment for package no.-3 LOA NO.164/MPRDC/DPR/NHS/P-III/2016/15026 BHOPAL DATED 15 DECEMBER 2016.

I.2 Scope of Study

The project study consists of preparation of the following:

Stage 1 – Inception Report & Quality Assurance Plan;

Stage 2 – Feasibility, Strip Plan and Clearance & Land Acquisition Report

Stage 3 – (a) – Draft Detailed Project Report.

(b) – Final Detailed Project Report.

I.3 Socio - Economic Profile

The **Sawaimadhapur Sheopur to Goras Road** is located in the district of **Sheopur** which in turn is located in the State of Madhya Pradesh. Madhya Pradesh is the second largest state in terms of geographic extent, covering an area of 308,244 sq. km. The state is administratively divided into 51 districts. As per 2011 census, Madhya Pradesh has a population of 72 million accounting to 6 per cent of India's population. State population has grown at 20.3 per cent between 2001- 2011. Population density of the state is 236 persons per square kilometre and is significantly lower than the national average of 382 persons per square kilometre. Further, distribution of population among the districts is uneven with 21 districts registering population density of less than 200 persons per square kilometre resulting in regions with relatively higher and lowers human capital availability.

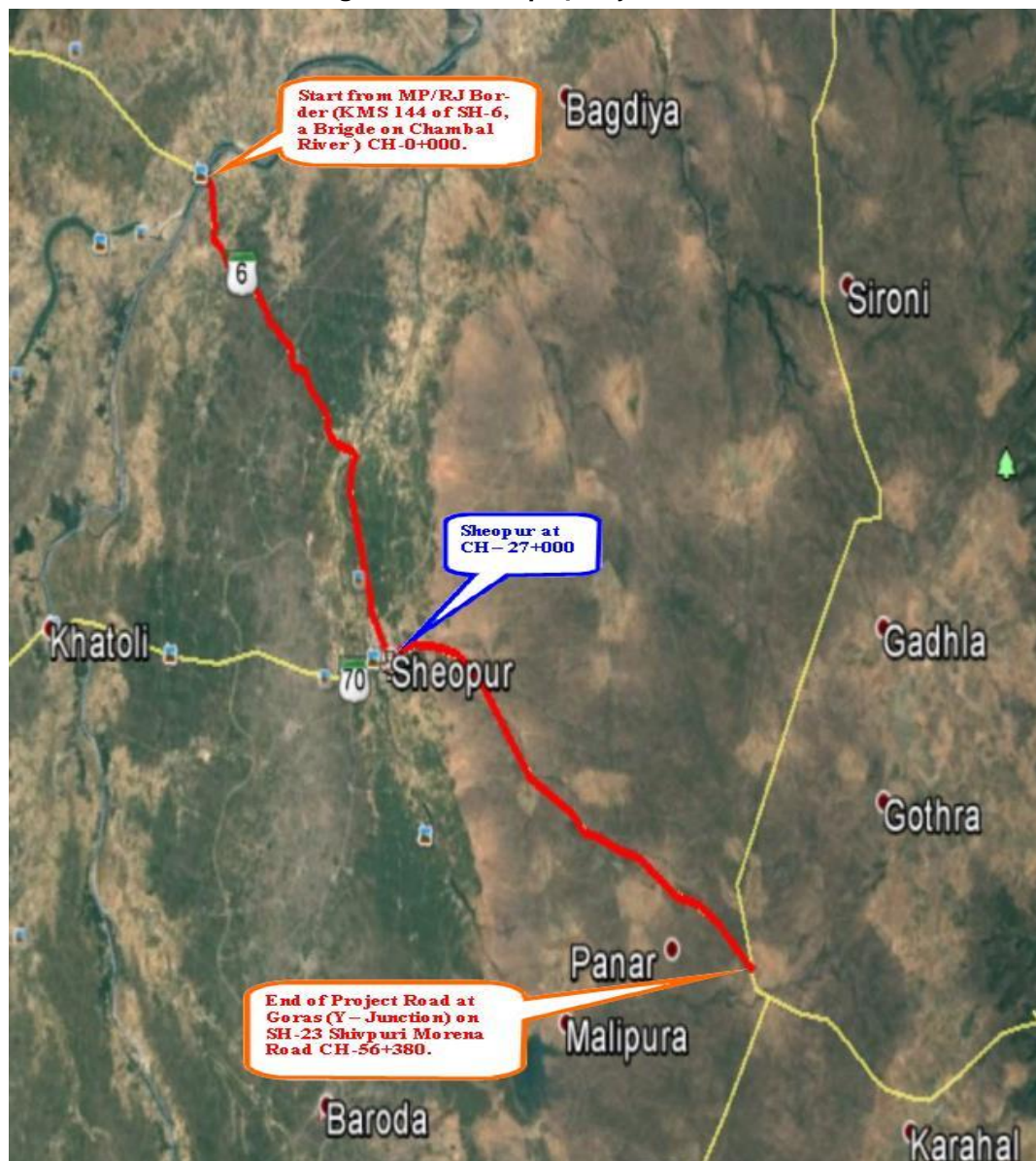
Majority of the state (around 72 per cent) population still lives in rural areas. However, there has been a steady growth in urbanization, with the emergence of industrial clusters in the districts of Indore, Bhopal, and Gwalior as destinations for intra state migration.

Index Map Enclosed Below

INDEX MAP



Fig-1-1 : Index Map of Project Road



1.4 Project Description

The project road starts from 0+000 km MP/RJ Border (Km stone 144 of SH-06, a Bridge on Chambal River, 25°51'29.66"N Latitude & 76°34'54.71"E Longitudes) and Ends at Goras (Y-Junction) on SH-23 Shivpuri – Morena Road Highway (25°32'41.34"N & 76°56'11.85"E Longitudes). The Project Road MP/RJ Border to Sheopur is situated in Madhya Pradesh. Having a total existing length 56.380 Kms and Design length 48.980 Kms.

Start point of the project road:



Photo - : Starting Point of Project Road

End point of the project road:



Photo-: End Point of Project Road

Climate of Sheopur District –

Sheopur District:

Sheopur district comes under Gwalior division, with its headquarters at Shiypuri town. As per Census 2011, Sheopur has a population of 6.87831lakh, which constitutes .01% of the total population of Madhya Pradesh. The density of population is around 104 per sq.km compared to 236 of Madhya Pradesh and 382 of India, as per Census, 2011. When it comes to rural population, Sheopur has a percentage of 84.1%, which is much higher than the state's average. The urbanization in the district is very low, with only 15.9% of people living in the urban areas. The male population in Sheopur District is around 52.5% and sex ratio is 902 per thousand males as per Census, 2011. The sex ratio of children below the age of 6 is also lower, and has declined over the last decade. There are only 888 girl children per thousand male children, which is higher compared to the 2001 Census figures of 837 per thousand.

Pavement Condition -

The existing road has an Two lane / Intermediate lane configuration from Km 0.00 to 56.380 Carriageway width varies from 5.50 m to 7.0 m bituminous surfaces and cement concrete surfaces (Generally Carriageway width varies from 5.0 m to 10.0 m in built up section and sheopur City CH-27+150 to 30+250 carriageway width is 4-lane) and condition of the pavement is good and having shoulder width of 1.2 m to 2.0 m on either side along the road and condition of shoulders is also poor and covered with vegetation. The entire project road traverses between plain terrains.



Photo:- Pavement Condition of Project Road

All major utilities follow the road alignment as the project road connects to Samarsa, Dantarda, Soi kalan, Sheopur city and Kalmee. Utilities like electric pole, Transformers, OFC, hand pumps etc. were observed on both sides of road.



Photo:- Location of Sheopur



Photo:- Location of near Soi Kalan

Table I-1 List of Villages

Sr. No.	Existing Chainage (m.)		Length (m)	Name of Village/Town
	From	To		
I	II	III	IV	V
1	0+680	1+080	400	Samarsa
2	2+200	2+520	320	Dantarda
3	2+880	4+100	1220	Dantarda kalan
4	7+780	7+860	80	Bogi ka Choraha
5	8+740	8+840	100	Devri Tapra
6	11+080	11+320	240	Bagadua
7	14+460	14+680	220	Soin
8	15+200	16+840	1640	Soi kalan
9	16+840	17+320	480	Jwalapur
10	20+080	21+600	1520	Raipura
11	22+800	23+320	520	Jatkheda
12	23+320	23+560	240	Salapura
13	23+560	30+250	6690	Sheopur
14	48+400	49+000	600	Kalmee
15	56+300	56+380	80	Goras

1.4.1 Geometrics

The horizontal alignment of the Project traverses through plain terrain. It is essential to improve substandard geometrics at various locations on project road. Geometric improvements shall be made as per standard and specifications. In order to upgrade the road to the geometric requirements commensurate with the design speed, improvement has been proposed for the Project Road. The alignment passes through several villages and habitation areas of which some have built-up sections.

The improvement works, consist of the existing two lane/Intermediate lane carriageway to 2 lane with paved shoulder carriageway (10.0 m width) of Rigid pavement with hard shoulder of 2.0 m on either side of rural section and two lane/Intermediate lane to 2 lane with paved shoulder of 2.50 m carriageway (12.0 m width) of rigid pavement on either side on built up section.

Longitudinal lined/unlined drain shall be provided near ROW in scattered built up section with outlets to cross drainage structures.

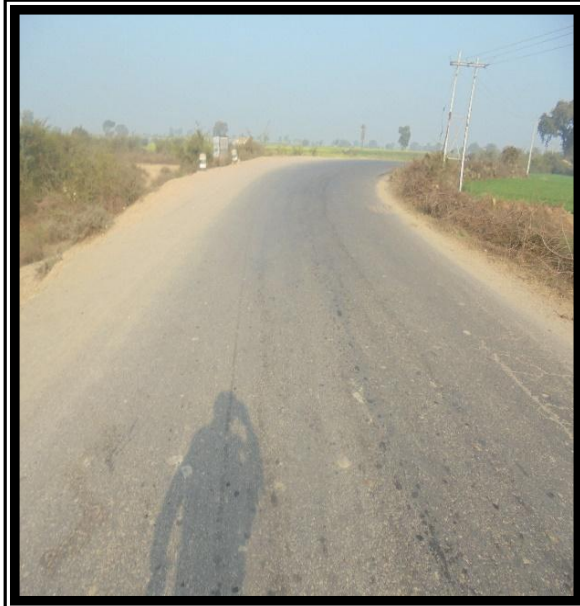


Photo-: Horizontal alignment along the project road.

1.4.2 Road Junctions

The project road traverses through various habitations and village. Various important cross roads also join the project road at different locations. Project road encountered with 2 Major and 26 Minor intersections. List of major and minor intersections is given in Table 1.2 below.



**Photo-Grade junction at Sheopur
(CH-26+810)**



**Photo-Grade junction at Goras
(CH-56+380)**

Table 1-2: List of Junctions

Sr. No.	Existing Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
1	0+510	L/S Banwada R/S Village	X-Junction	BHS	Minor Junction
2	1+160	Samarsa	Y-Junction	RHS	Minor Junction
3	2+520	Dantarda	Y-Junction	RHS	Minor Junction
4	3+440	Aldusapara	T-Junction	RHS	Minor Junction
5	3+520	Manpur	T-Junction	LHS	Minor Junction
6	4+020	Banwada	T-Junction	RHS	Minor Junction
7	7+400	Dhodar Manpur	T-Junction	LHS	Minor Junction
8	7+540	Village Road	T-Junction	RHS	Minor Junction
9	7+680	Devri Hanuman Mandir	T-Junction	RHS	Minor Junction
10	9+950	Tekna	Y-Junction	LHS	Minor Junction
11	10+190	Bagadwa	T-Junction	LHS	Minor Junction
12	10+920	Charond	T-Junction	RHS	Minor Junction
13	11+110	Village road	T-Junction	LHS	Minor Junction
14	11+680	Village road	T-Junction	LHS	Minor Junction
15	14+070	Daduni	T-Junction	LHS	Minor Junction
16	14+800	Charond	Y-Junction	RHS	Minor Junction
17	16+120	Nagargawoda	T-Junction	RHS	Minor Junction
18	16+240	Gurnawda	T-Junction	RHS	Minor Junction
19	16+920	Dantarda Khurd	T-Junction	LHS	Minor Junction
20	17+180	Dantarda Khurd	T-Junction	LHS	Minor Junction
21	21+960	L/S- Salanpur Khedi R/S- Dalarna Khurd	X-Junction	BHS	Minor Junction
22	22+840	Jat Kheda	T-Junction	RHS	Minor Junction
23	24+720	Nagda	T-Junction	RHS	Major Junction
24	26+620	Kota	Y-Junction	RHS	Minor Junction
25	26+850	Badoda	Y-Junction	RHS	Minor Junction
26	28+420	L/S-Bypass R/S- Bagbach	X-Junction	BHS	Minor Junction
27	39+220	Kalitalai	T-Junction	RHS	Minor Junction
28	42+400	L/S-Kakardha R/S- Kailor	X-Junction	BHS	Minor Junction
29	55+280	Awra	T-Junction	RHS	Minor Junction
30	56+380	Shivpuri	Y-Junction	RHS	Major Junction

I.4.3 Bridge & Cross Drainage Structures

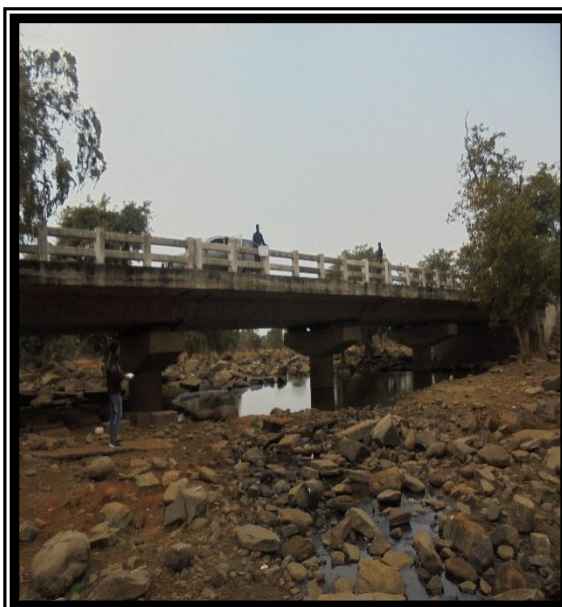
There are 2 Major, 2 Minor bridges along with 64 culverts on the project road. Table containing details about existing Major/ Minor Bridges and Culverts for this road may be seen in annexure-.

Table I-3: Summary of Existing Bridges and CD

Type of Structure	Major Bridges	Minor Bridges	Slab /Arch/BOX Culvert	Vented Causeway	Hume Pipe Culvert
I	II	III	IV	V	VI
Existing Structure 68 Nos.	2	2	16	1	47



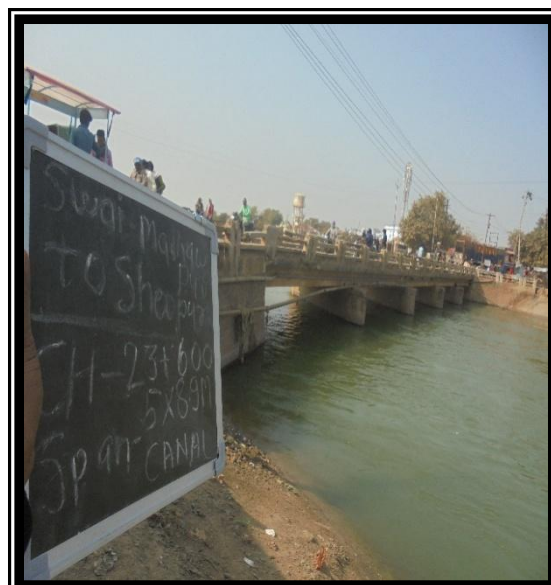
Major Bridge at CH-16+750



Major Bridge at CH-35+850



Minor Bridge at CH-10+010



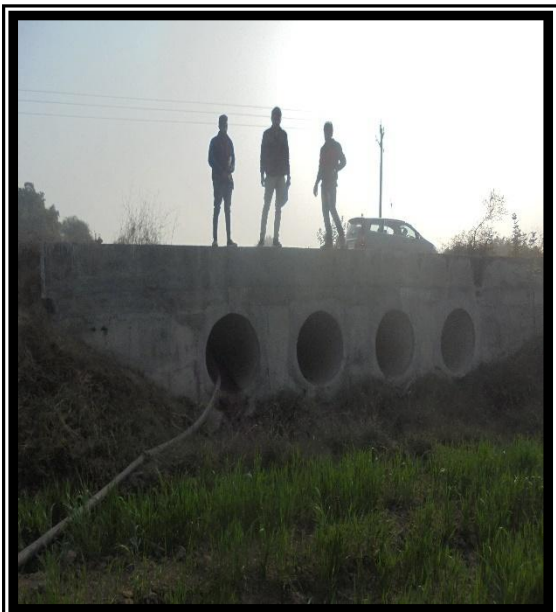
Minor Bridge at CH-24+670



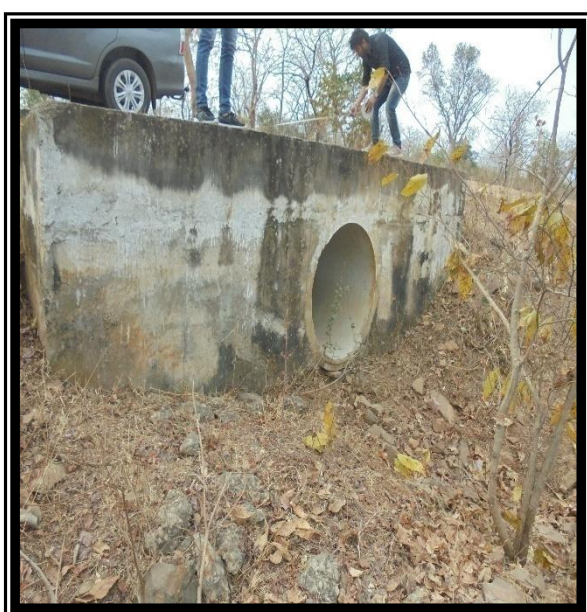
Slab Culvert at CH-2+760



Slab Culvert at CH-15+000



HPC at CH-1+600



HPC at CH-47+600

Photo:- Structure along the project road

Table I-4: Major Bridge

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	16+750	MJB	16 X 10.70	7.80	Fair
2	35+850	MJB	5 X 12.0	12.00	Good

Table I-5: Minor Bridge

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	10+010	MNB	2 X 5.5	13.20	Fair
2	24+670	MNB	5 X 9.0	7.20	Fair

Table I-6: - List of Existing HPC/VCW/Pipe Culverts

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	1+400	HPC	1 ROW 1000	11.00	Poor
2	1+600	HPC	4 ROW 1000	12.10	Good
3	3+760	HPC	1 ROW 1000	11.00	Poor
4	7+050	HPC	1 ROW 1000	12.60	Poor
5	7+410	VCW	3 ROW 900	10.00	Poor
6	7+750	HPC	2 ROW 1000	12.70	Good
7	8+250	HPC	1 ROW 1000	12.10	Good
8	9+540	HPC	1 ROW 1000	12.00	Good
9	9+710	HPC	1 ROW 1000	13.50	Good
10	10+350	HPC	1 ROW 1000	12.50	Good
11	10+760	HPC	1 ROW 1000	17.60	Good
12	10+910	HPC	2 ROW 1000	10.00	Fair
13	11+060	HPC	1 ROW 1200	12.10	Poor
14	11+460	HPC	1 ROW 1000	12.00	Good
15	11+900	HPC	1 ROW 1000	12.10	Good
16	12+630	HPC (Canal)	1 ROW 1200	12.20	Good
17	14+110	HPC	1 ROW 1000	17.00	Good
18	14+700	HPC	1 ROW 1000	12.60	Good
19	15+630	HPC	1 ROW 1000	12.50	Good
20	15+950	HPC	2 ROW 1000	14.00	
21	16+150	HPC	1 ROW 1000	15.50	Good
22	17+100	HPC	1 ROW 1000	13.80	Fair
23	17+800	HPC	1 ROW 1000	15.00	Poor
24	17+950	HPC	1 ROW 1000	15.20	Poor
25	18+700	HPC	1 ROW 1000	15.00	Good
26	19+050	HPC	1 ROW 1000	12.00	Good
27	20+100	HPC	1 ROW 1000	12.00	Good
28	21+610	HPC	1 ROW 1000	12.60	Fair
29	21+780	HPC	1 ROW 1000	12.00	Fair
30	21+950	HPC	1 ROW 1000	12.00	Good
31	22+170	HPC	1 ROW 1000	12.30	Fair
32	22+850	HPC	1 ROW 1000	12.00	Fair
33	23+210	HPC	1 ROW 1000	12.00	Fair
34	29+110	HPC	1 ROW 1000	12.80	Good
35	31+770	HPC	1 ROW 1000	10.10	Fair
36	33+580	HPC	1 ROW 1000	12.80	Good
37	35+150	HPC	1 ROW 1000	12.60	Good
38	38+040	HPC	1 ROW 1000	12.70	Fair
39	43+760	HPC	1 ROW 1000	12.60	Good
40	43+970	HPC	1 ROW 1000	15.10	Fair

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
41	44+090	HPC	2 ROW 1200	15.10	Good
42	47+170	HPC	1 ROW 1200	15.20	Good
43	47+600	HPC	1 ROW 1200	12.60	Good
44	49+070	HPC	2 ROW 1200	12.60	Good
45	50+090	HPC	1 ROW 1000	12.90	Good
46	51+040	HPC	1 ROW 1200	12.70	Good
47	52+970	HPC	4 ROW 1200	12.60	Good
48	53+390	HPC	1 ROW 1200	12.40	Fair

Table I-7: List Of Existing Slab/Arch Culverts

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	2+580	Slab	1 X 1.40	14.00	Poor
2	2+680	Slab	1 X 1.20	10.00	Good
3	2+760	Slab	1 X 3.0	13.90	Poor
4	4+180	Slab	1 X 5.0	12.10	Good
5	6+010	Slab (Canal)	1 X 1.80	12.20	Good
6	11+760	Slab	1 X 1.0	10.00	Poor
7	14+080	Slab	1 X 2.0	7.40	Poor
8	15+000	Slab	4 X 1.50	12.60	Poor
9	20+970	Slab	1 X 0.80	12.00	Good
10	22+720	Slab	1 X 1.20	12.00	Poor
11	29+450	Slab	1 X 1.00	13.90	Fair
12	30+690	Slab	1 X 1.2	10.30	Poor
13	37+210	Slab	1 X 0.8	10.10	Poor
14	39+590	Slab	2 X 1.50	10.10	Poor
15	43+430	Slab	1 X 1.20	10.30	Good
16	43+870	Slab	1 X 1.20	10.60	Poor

1.5 Railway line crossing

Along the project alignment there is no exists railway Level crossing.

Table I-8: List of Existing Level Crossing

S.No.	Existing Chainage (Km)	No. of line	Type of line
I	II	III	IV
		...Nil...	

1.6 Traffic Survey Analysis and Forecast

To establish the traffic flow characteristics and travel pattern of the project corridor between **Sawai Madhopur – Sheopur to Goras Road** the following traffic surveys were carried out:

- Classified Traffic Volume Count Survey
- Intersection Turning Movement Survey
- Axle Load Survey
- Origin Destination Survey

I.6.1 Classified Continuous Volume Count Survey

The objective of classified traffic volume count survey is to estimate traffic intensity on the project road. The classified volume count surveys have been carried out for 7 days, 24 hours. The traffic is counted in number of vehicles by vehicle category-wise in each direction over 24Hrs a day for 7 Days. The counts were recorded in the formats as per IRC specifications. Classified volume count survey has been carried out on two locations the details given in table I-10.



Table I-9: Average Daily Traffic (ADT)

S.No.	Chainage (km)	Location	Survey Dates
I	II	III	IV
1	17+500	Near Jwalapur	6.03.2017 to 12.03.2017
2	56+300	Near Goras	6.03.2017 to 12.03.2017

Reference: Details have been given in Annexure—4.1

I.6.2 Traffic Characteristics on Project Road

The summary of all data collected from traffic volume survey for the 2 locations on the Project Road is presented in annexure. -4.1 Average Daily Traffic (ADT) for the month of October 2015 is summarized in Table I-10. Traffic volume count summary sheets along with ADT s are presented in annexure-4.1 to this report

Table I-10 Traffic Volume at Two Locations of the Project Road (ADT)

Type of Vehicles	Survey	
	(km 17+500)	(km56+300)
I	II	III
2-Wheeler	3954	245
3-Seater	383	4
Car/Vans/Jeeps(Taxi)	519	110
Mini Bus	2	0
Buses	79	18
LCVs	69	89
2-Axle Trucks	78	25
3-Axle Trucks	93	22
Multi Axle Trucks	77	19

Type of Vehicles	Survey	
	(km 17+500)	(km56+300)
Tractor	19	6
Tractor with Trailor	345	39
Cycle	126	19
Cycle Rickshaw	2	1
Others	4	0
Total	5748	598

Source: Traffic Surveys, March, 2017

A. Near Jwalapur at Km. 17+500

Survey was carried out at Km 17+500 near jwalapur village. Selected location lies between Sawai modhopur sheopur goras is away from urban section to avoid influence of local traffic.

ADT recorded at this station is 5748 nos. / 5885 PCU. Fast moving vehicles were recorded as 99.18% of the total traffic (in PCU). Peak hour traffic flow of 520 nos. formed around 9.40% of the total traffic. Peak hour is identified during 11.00-12.00 AM.

B. Near Goras village at Km. 56+300

Survey was carried out at Km 56+300 near Goras village. The Selected location lies between Sawai modhopur sheopur goras is away from urban section to avoid influence of local traffic.

ADT recorded at this station is 598 nos. / 882 PCU. Fast moving vehicles were recorded as 99.93% of the total traffic (in PCU). Peak hour traffic flow of 230 nos. formed around 9.45% of the total traffic. Peak hour is identified during 10.00-11.00AM.

1.6.3 Turning Movement Count

The objective of turning movement count survey is to estimate the direction-wise movement of the traffic at all major intersections on the project road and thus to arriving at the contribution and diversion of the traffic from adjacent road network.

1.6.4 Origin Destination

Survey to capture the productions and attractions of passenger and goods movement, from the respective zones, OD survey was carried. Roadside Interview method, as detailed in IRC: 102-1988, was used for O-D survey. The survey was carried out for both passenger and goods vehicles for 24 hours (in both directions) and trip data was collected at the volume count locations by trained enumerators under the supervision of Transportation Engineers. From the O-D survey, travel characteristics like origin and destination, occupancy, trip purpose and length of trip by mode type are captured. For goods modes, the survey elicited characteristics like origin and destination, commodity type, trip frequency and length of trip. A reasonable sample size (about 10%) of vehicles was collected. Travel patterns for were established on the basis of these surveys.

1.6.5 Axle Load Survey

The vehicle damage factor is a multiplier for converting the number of commercial vehicles of different axle loads to the number of standard axle load repetitions. Design of new pavement for additional lane or strengthening of existing pavement is based upon the cumulative number of 80 KN (IRC-37-2012 clause no. 4.4.2) equivalent standard axles (ESA) that will pass over during the 15 year design period. The classes of traffic which lead to significant axle loads (or damage) to the pavement and accordingly considered for design are: LCVs, two / three axle and multi axle trucks. Cumulative standard axles (CSA) are calculated in accordance with the guidelines provided in IRC: 37 – 2012 and IRC: 81 - 1997. The overloaded vehicles have serious adverse impact on performance of pavement. It has been ascertained that the damaging effect of axles on flexible pavement is approximately proportional to the fourth power of the axle load (IRC-37-2012 clause no. 4.4.3).

The equivalent single axle loads (ESALs) have been calculated assuming that the project road will be opened to traffic in the year 2018.

Table I-11: Summary of VDF

LOCATION	DIRECTION	Commercial Vehicle			
		LCV	2 AXLE	3 AXLE	MAV
I	II	III	IV	V	VI
KM : 17+600	Sawai Madhopur to Goras	0.0162	3.3910	4.8570	11.5783
	Goras to Sawai Madhopur	0.0044	4.1057	3.7995	4.5195
Adopted Maximum VDF		0.0162	4.1057	4.8570	11.5783
KM : 56+300	Sawai Madhopur to Goras	0.0167	3.2934	2.6431	12.8030
	Goras to Sawai Madhopur	0.0047	1.8701	2.0726	2.0888
Adopted Maximum VDF		0.0167	3.2934	2.6431	12.8030

Reference: Details have been given in Annexure-4.2

Table I-12: Summary of MSA

Name of the road	MSA for 15 th (17+600)	MSA for 15 th (56+300)	Adopted Design MSA
Sawai modhopur Sheopur Goras Road	15.81	3.65	20

Reference: Details have been given in Annexure-4.3

1.6.6 Homogeneous Section

The entire Project Road is considering as one homogeneous sections based on traffic volume and its characteristics.

Table I-13: Homogeneous Section

Sec. No.	Homogenous Section	Existing Length (km)	Design Length (km)
I	Mp/RJ Border to Dantarda Kalan Bypass start	2.00	2.00
	Dantarda Kalan bypass End to Soi Kalan Bypass Start	9.55	9.45
	Soi Kalan bypass End to Sheopur bypass start	3.65	3.70
	Sheopur bypass End to Goras	24.48	19.88

Sec. No.	Homogenous Section	Existing Length (km)	Design Length (km)
II	Dantarda Kalan Bypass	3.45	3.15
	Soi Kalan Bypass	3.90	3.30
	Sheopur Bypass	9.35	7.50
Total		56.380	48.980

1.6.7 Growth Rate

Adopted growth rate is 5% Ref. IRC-37, 2012 Page 6 clause 4.2.2 for commercial vehicles along the project road. The growth of remain traffic moving vehicles is taken as 5% "Reference: Ministry of Shipping, Road Transport & Highways, (18th January, 2008 reference no. RW/NH-37011/57/2006-PIC)5% traffic growth rate."

Summary of projected traffic based on adopted growth rate is provided in Table given below:

Table I-14: Projected Traffic Volume, Veh/day and PCU/day
Sawai Madhopur – Sheopur – Goras Road

Project Road	Year 2017	Year 2020	Year 2027	Year 2032	Year 2034
I	II	III	IV	V	VI
Projection of ADT					
Total Fast Moving Vehicle (Motorised Traffic)	3097	3927	5525	7052	7774
Slow Moving Vehicle (Non-Motorised Traffic)	76	96	135	173	190
Traffic (Number)	3173	4023	5660	7224	7965
Projection (PCUs/day)	(3384)	(4290)	(6037)	(7705)	(8495)

Note: Values in bracket indicate PCUs/day

1.7 Capacity Analysis

Capacity analysis for project road has been carried out in order to define the Level of Service (LOS) offered by road sections under the prevailing roadway and traffic conditions.

Capacity and level of service guidelines

Capacity and design service volumes for various lane configurations specified by IRC: 64 – 1990 Capacity of Roads in Rural Areas' has been adopted for determining the Level of Service offered by the road sections during design period.

Based on the average rise & fall observed from the field surveys, the project corridor runs through Plain terrain only. The capacity and design service volumes for various lane configurations in case of plain terrain at different LOS's are presented in Table below.

Table I.15 Capacity and Design Service Volume

Road Configuration	Shoulder Type	Plain Terrain	
		LOS B	LOS C
2 Lane	Paved Shoulder	18000	25000
4 Lane	Earthen shoulders	35000	49000
	Paved shoulders	40000	60000

Capacity augmentation proposals (lane requirement)

The observations on the traffic data and traffic projections as per ministry circular no. **NH-14019/6/2012-P&M** dated 5 oct 2012

Table I-16: Capacity augmentation

Homogeneous Section	Chainage from Km (Design length)	Year by which Two lane with paved Capacity Terminates	Lane Width Ref. NH-14019/6/2012-P&M dated 5 oct 2012 2 lane with paved shoulders Proposed year
I	II	III	V
Sawai Madhopur to Goras Road	0.000 to 48.920	-	2020

Table I-17: Summary of ADT

AVERAGE DAILY TRAFFIC SURVEY OF SAWAI MADHOPUR - SHEOPUR - GORAS ROAD																		
(Date:06.03.2017 to 12.03.2017)																		
Section :	Sawai Madhopur - Sheopur - Goras Road																	
Direction :	Bothways												Location: AT CH - 17+500					
Location	Motorised Traffic										Non-Motorised Traffic					Grand Total		
	Passenger Vehicles					Goods Vehicles			Agricultural		Passenger		Goods Vehicles					
	Two Wheeler	Three Wheeler	Car/Jeep	Mini Bus	Bus	Tempo / LCV	Ord. Trucks			Tractor with Trailer	Tractor	Cycle	Cycle Rickshaw	Animal Drawn		Hand Cart	ADT	PCU
PCU Factor	0.5	1.0	1.0	1.5	3.0	1.5	3.0	4.5	4.5	4.5	1.5	0.5	2.0	8.0	4.0	3.0		
KM 17+500	3954	383	519	2	79	69	78	93	77	345	19	126	2	2	0	2	5748	5885
KM 56+300	245	4	110	0	18	89	25	22	19	39	6	19	1	0	0	0	598	882
AVG OF ALL LOCATIONS	2099	194	315	1	48	79	52	58	48	192	13	72	1	1	0	1	3173	3384

I.8 Results of Engineering Surveys and Investigations

I.8.1 Pavement Condition

The condition survey of existing pavement includes the assessment of pavement, shoulder, embankment and drainage condition. In pavement condition data regarding pavement distress like cracking, ravelling, potholes are recorded in terms of pavement affected. The edge break is measured in length and rutting is measured in mm depth. Shoulder Condition is assessed as earthen shoulder, corrugation or ruts development in mm and shoulder edge drop in mm.

Distresses like ravelling, Patching and Cracks are found during the investigation at many locations along the project road hence, entire project road goes under reconstruction from WBM layer, which is almost present in the entire project stretch Road. The existing crust WBM & GSB layers are consider as a thickness of proposed subgrade. The appropriate grade and profile correction is assumed in the reconstruction of existing pavement.



Photo-; Pavement Condition at Rural Section



Photo-; Pavement Condition at Built-up Section

I.8.2 Rigid Pavement

There is no existing rigid pavement.

Table I-18: Existing Rigid Pavement

Sr. No.	Chainage		Length (m)	Villages/Town	Width
	From	To			
I	II	III	IV	V	VI
...Nil...					

I.9 Improvement Proposals

The improvement proposals for proposed widening include the provisions for the following major items:

- Proposed Pavement Design
- Rearrangement of Junctions
- Traffic Control and Safety Measures
- Bridge and Cross Drainage Structures

1.9.1 Bypasses and Re-alignments

The present existing alignment of SH-06 passes through many villages/ towns where the present road becomes narrower due to parking of vehicles, lot of commercial activities, bus stand/market places and there is a no space for further improvement to segregate the local slow moving traffic. To reduce the huge demolition of built-up structures, to avoid traffic congestion and safe movement of vehicles, alternative routes have been proposed in terms of bypasses to divert the traffic from town areas.

Based on reconnaissance and detailed site visit 3 Nos. of locations were initially identified for alternate alignment at different sections of project road and bypasses will be provided as 2 lane with paved shoulder carriageway. The Influencing parameters considered for recommended option of bypass alignment are followings

- Length of Proposed Option
- Road Geometric Standards
- Land Acquisition
- Structures – Minor & Major Bridges
- Junctions with MDR's, Flyovers
- Environmental Constraint
- Social Impact – Relocation and Rehabilitation costs.
- Construction Problem
- Cost

The proposed bypass locations for the project road are given in Table 1-19

Table 1-19 Proposed Bypass Locations

S.No.	Existing km		Proposed Chainage		Length	Urban Area	Side
	From	To	From	To			
1	2+000	5+450	2+000	5+150	3150	Dantarda Kalan	LHS
2	15+000	18+900	14+600	17+900	3300	Soi Kalan	RHS
3	22+550	31+900	21+600	29+100	7500	Sheopur	LHS

A brief description of each bypass is presented in following paragraphs. Plan of bypasses are shown in the alignment plan. Other than the above listed towns/villages, there are small size habitations along the project road.

➤ **Dantarda Kalan Bypass**

The first major township encountered on the project road requiring bypass is Dantarda Kalan village. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

Table 1-20: Features of Proposed Dantarda Kalan Bypass Option-2 (Recommended by MPRDC & PCM)

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 2+00
2	Ending	Proposed Ch: 5+150
3	Route Alignment	HS
4	Length of Bypass	3.15 km
5	Length of existing alignment Bypassed	3.45 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Culvert - 4 nos.
12	Land Acquisition	45m wide strip of land is required



Photo-; Dantarda kalan Bypass all Option- 1 & 2

➤ **Soi Kalan Bypass**

The second major township encountered on the project road requiring bypass is Soi Kalan village. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

**Table 1-20: Features of Proposed Soi kalan bypass
Option-1 (Recommended by MPRDC & PCM)**

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 14+600
2	Ending	Proposed Ch: 17+900
3	Route Alignment	RHS
4	Length of Bypass	3.30 km
5	Length of existing alignment Bypassed	3.90 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Major Bridge-1 nos. and Culvert - 7 nos. Total no. of Structures is = 8 nos.
12	Land Acquisition	45m wide strip of land is required

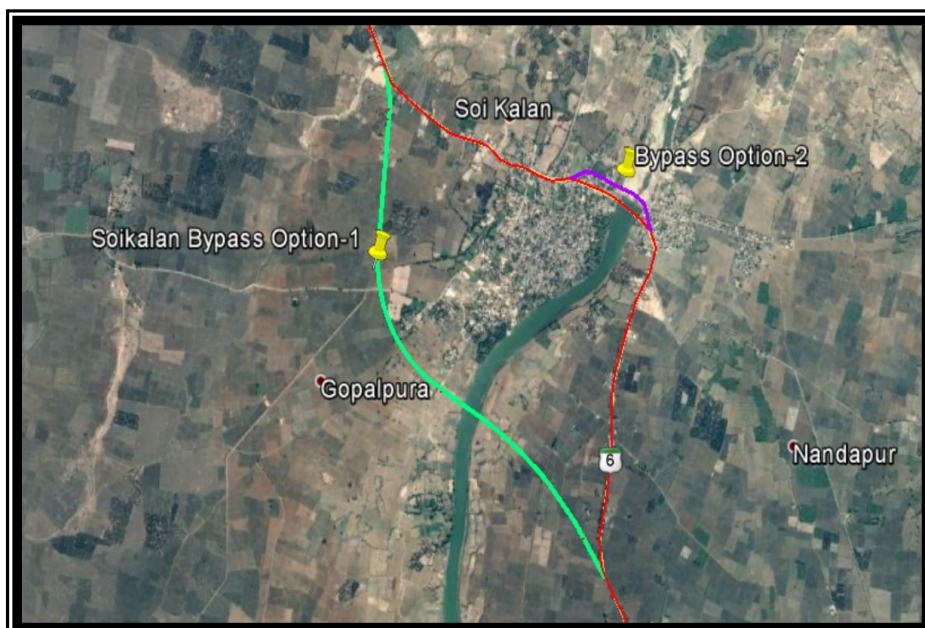


Photo-; Soi Kalan Bypass all option-1 & 2

➤ **Sheopur Bypass**

The third major township encountered on the project road requiring bypass is Sheopur City. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

**Table 1-21: Features of Proposed Sheopur bypass
Option-1 (Recommended by MPRDC & PCM)**

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 21+600
2	Ending	Proposed Ch: 29+100
3	Route Alignment	LHS
4	Length of Bypass	7.50 km
5	Length of existing alignment Bypassed	9.35 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Major Bridge-1 nos., Minor Bridge – 2 nos. and Culvert 10 nos., Total no of Structures is = 13 nos.
12	Land Acquisition	45 m wide strip of land is required

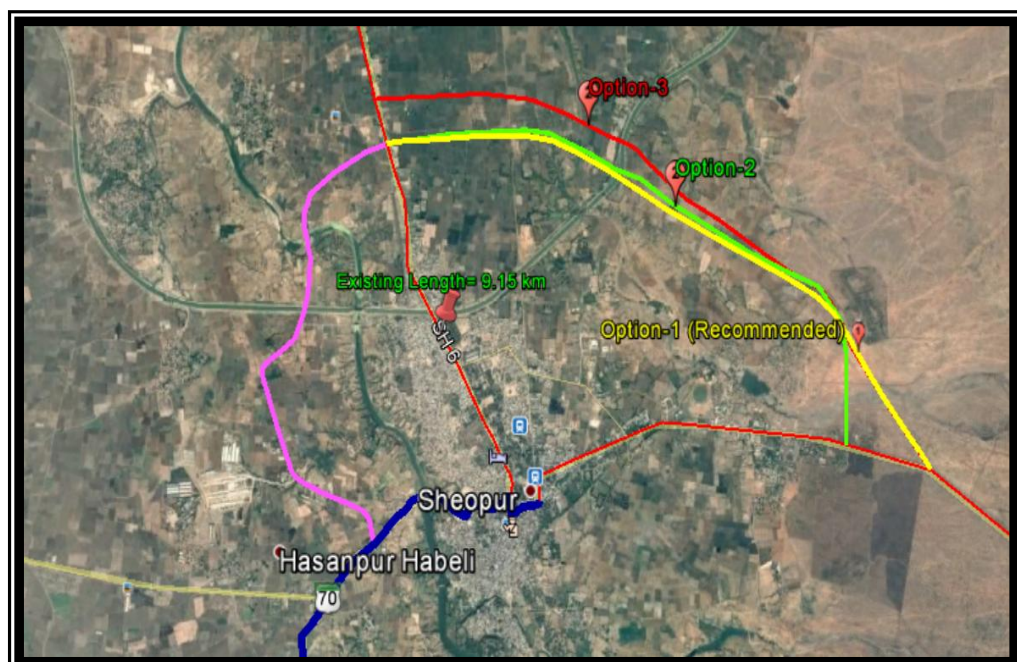


Photo-: Sheopur Bypass all Options 1, 2 & 3

Re-alignments: -

The present existing alignment of SH-6 passes through many villages/ towns where the present road becomes narrower due to parking of vehicles, lot of commercial activities, bus stand/market places and there is a no space for further improvement to segregate the local slow moving traffic. To reduce the huge demolition of built-up structures, to avoid traffic congestion and safe movement of vehicles, alternative routes have been proposed in terms of bypasses to divert the traffic from town areas.

Based on reconnaissance and detailed site visit 14 Nos. of locations were initially identified for alternate alignment at different sections of project road and Re-alignment will be provided as 2 lane with paved shoulder carriageway. The Influencing parameters considered for recommended option of bypass alignment are followings

- Length of Proposed Option
- Road Geometric Standards
- Land Acquisition
- Structures – Minor & Major Bridges
- Junctions with MDR's, Flyovers
- Environmental Constraint
- Social Impact – Relocation and Rehabilitation costs.
- Construction Problem
- Cost

The Re-alignment locations for the project road are given in Table I-22

Table I-22 Re-alignment Locations

S.No.	Existing km		Proposed Chainage		Length	Remark
	From	To	From	To		
1	5+750	6+230	5+450	5+900	450	
2	10+640	11+135	10+300	10+750	450	
3	14+130	14+530	13+740	14+100	360	
Total Length (in Km)					1.26	

1.9.2 Reconstruction Proposal

In order to meet future traffic requirement, the existing carriageway is proposed to upgrade to achieve high speed of travel with comfort and safety. Concentric widening scheme shall be followed to minimise land acquisition issues and to ensure maximum utilisation of existing carriageway. Tables given below shows relation between existing and proposed Chainage and section wise improvement proposed for the project road.

Table I-23: Existing – Proposed Chainage

Sr. No.	Section	Existing Chainage	Proposed Chainage
1	Mp/RJ Border to Dantarda Kalan Bypass start	0+000 to 2+000	0+000 to 2+000
2	Dantarda Kalan Bypass	2+000 to 5+450	2+000 to 5+150
3	Dantarda Kalan bypass End to Soi Kalan Bypass Start	5+450 to 15+000	5+150 to 14+600
4	Soi Kalan Bypass	15+000 to 18+900	14+600 to 17+900
5	Soi Kalan bypass End to Sheopur bypass start	18+900 to 22+550	17+900 to 21+600
6	Sheopur Bypass	22+550 to 31+900	21+600 to 29+100
7	Sheopur bypass End to Goras	31+900 to 56+380	29+100 to 48+980

Table I-24: Pavement Proposal for Project Road

Swaimadhampur Sheopur Goras, Length:- 48.980 KM												
Design Chainage From	Chainage To	Length (m)	Proposal	Design CBR (%)	Proposed Width (m)	Shoulder (BHS in m)		Proposed Pavement Composition (All Dimensions are in mm)				C/S Type
						Paved	Hard	PQC	DLC	GSB	Subgarde	
0+000	20+040	20040	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
20+040	20+650	610	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	-	300	150	225	500	II
20+650	45+600	24950	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
45+600	46+260	660	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	-	300	150	225	500	II
46+260	48+980	2720	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
	Total	48.98	Km									
EX. CH:02+000	EX. CH:05+450	3450	Thin White Topping		7.0	200 mm TWT					III	
EX. CH:15+050	EX. CH:18+850	3800	Thin White Topping		7.0	200 mm TWT					III	
EX. CH:22+600	EX. CH:25+100	2500	Thin White Topping		7.0	200 mm TWT					III	
EX. CH:25+100	EX. CH:26+400	1300	Thin White Topping		11.0	200 mm TWT					V	
EX. CH:26+400	EX. CH:27+150	750	Thin White Topping		10.0	200 mm TWT					IV	
EX. CH:27+150	EX. CH:30+250	3100	Thin White Topping		11.0	200 mm TWT					V	
EX. CH:30+250	EX. CH:31+850	1600	Thin White Topping		7.0	200 mm TWT					III	
Total Length (m)		16.50										

Table I-24(B) : Summary of Pavement Proposal

S.No.	TCS	Proposal	Length (km)
1	TCS-I	Reconstruction Rigid Pavement	47.710
2	TCS-II	Reconstruction Rigid Pavement with Drain)	1.270
Total Length (km)			48.980
White topping (200 mm TWT)			16.50

➤ The project road is to be designed for 80 km/hr to 100 km/hr speed in entire project road length.

1.9.3 Pavement Design

The existing pavement is reconstructed on base layer of WBM, which is almost present in the entire project stretch Road. The appropriate grade and profile correction is assumed in the reconstruction of existing pavement.

The rigid pavement is adopted for proposed carriageway reconstruction. Design period of 30 year for CC layer are adopted for carriageway and Flexible Pavement design period of 15 year. That has been designed as per **IRC 58:2015**

The proposed pavement design standard is presented in Table given below:

Table I-25: Rigid Pavement Design

Homogeneous Section	Sawaimadhapur Sheopur Goras road (Length = 48.980 km)
Design Period	30 Year
Design CBR (%)	8
Design CBR (%) for Hard Shoulder	12
PQC (mm)	300
DLC (mm)	150
Granular Sub-base (mm)	225
Sub grade (mm)	500

1.9.4 Junction Improvement

Simplicity and uniformity is the guiding principle for intersection design to ensure safe passage manoeuvres. The primary factors considered while proposing improvement to the geometry of the existing junctions are smooth turning of vehicles, reduction of conflicts, provision of corner sight distance and safety. The geometric design of junctions is based on IRC: SP 41: Guidelines for the Design of at grade Intersections in Rural & Urban Areas. The design and detailing of all intersections are based on the type designs as outlined in the document titled, .Type Designs for Intersections on National highways. Prepared by the MORTH New Delhi 1995.

Few of the notable major junctions along the project road are mentioned at Table I-27. Apart from these, there are several minor roads that are intersecting the project road. Most of the roads are constructed under schemes namely Pradhan Mantri Gram Sadak Yojana (PMGSY) and National Rural Employment Guaranty Act (NREGA). Thus, adequate connectivity to surrounding habitations from the project road is found.

Table I-27: Improvement Proposed for at-Grade Intersections

Table I-27 (A): Major Junction Details

Sr. No.	Existing Chainage (Km)	Major/ Minor Junction	Destination		Surface Type	Type of Junction	Width (m)
			Left	Right			
I	II	III	IV	V	VI	VII	VIII
Nil							

Table I-27(B): Minor Junction Details

Sr. No.	Existing Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
1	0+510	R/S Banwada L/S Village Road	X-Junction	BHS	Minor Junction
2	1+160	Samarsa	Y-Junction	RHS	Minor Junction
3	2+150	Datarda	Y-Junction	LHS	Minor Junction
4	5+130	Datarda	T-Junction	LHS	Minor Junction
5	7+070	Dhodar Manpur	T-Junction	LHS	Minor Junction
6	7+220	Village Road	T-Junction	RHS	Minor Junction
7	7+340	Devri Hanuman Mandir	T-Junction	RHS	Minor Junction

Sr. No.	Existing Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
8	9+610	Tekna	Y-Junction	LHS	Minor Junction
9	9+860	Bagadwa	T-Junction	LHS	Minor Junction
10	10+730	Village Road	T-Junction	LHS	Minor Junction
11	11+260	Village road	T-Junction	LHS	Minor Junction
12	13+690	Daduni	T-Junction	LHS	Minor Junction
13	14+370	Charond	Y-Junction	RHS	Minor Junction
14	14+570	Soi Kalan	Y-Junction	LHS	Minor Junction
15	17+940	Soi Kalan	Y-Junction	LHS	Minor Junction
16	21+000	L/S- Salanpur Khedi R/S- Dalarna Khurd	X-Junction	BHS	Minor Junction
17	21+600	Sheopur	Y-Junction	RHS	Minor Junction
18	29+080	Sheopur	Y-Junction	RHS	Minor Junction
19	36+440	Kalitalai	T-Junction	RHS	Minor Junction
20	39+620	L/S-Kakardha R/S-Kailor	X-Junction	BHS	Minor Junction

1.9.5 Geometric Improvement

In order to upgrade the road to the geometric requirements commensurate with the design speed, improvement has been proposed for the Project Road. The alignment passes through several villages and habitation areas of which some have built-up sections.

In order to utilize the existing carriageway to the maximum extent, the proposed centre line has been aligned within the existing carriageway with necessary correction to geometry.

Properly designed horizontal curves have been provided commensurate with design speed. All super-elevated curves have been provided with designed transition lengths. The existing geometry (both horizontal and vertical) is found to be inadequate. The alignments of the curves in these locations have been suitably corrected as per IRC standards. At the location of structures and back-to-back occurrence of summit and valley curves, correction of vertical profile is also carried out keeping in view the available and adequate sight distances.



Photo- ; Horizontal alignment along the project road.

Table I-28: List of Curve

Sl. No.	Stretch/Design Chainage (from km to km)		Type of deficiency		Remarks
			Radius of curve	Design Speed	
I	7+700	7+980	280	100 to 80 km per hr	All curve are improved

As per IRC : SP :73 – 2015 page no 13 the Ruling Minimum Radii for plain terrain is 400m & absolute Minimum radii for plain terrain is 250 m. Also the details are given in table no 2.5 of Section 2 at Page no 13.

1.9.6 Bus Lay bays

There is no proposed Bus Lay-bays

1.9.7 Truck Lay bays

There are 2 proposed Truck lay Bays

Road Name- Pachore to Astha Road		
Truck Lay Bay		
1	I+070	LHS
2	I+300	RHS

1.9.8 Bus Shelter

There is 9 Location proposed Bus Shelter.

1.9.9 TOLL PLAZA

S.No.	Design Chainage
I	II
I	6+050

1.9.10 Road Marking & Traffic Signs

Appropriate road markings are provided with stop signs, give-way signs, traffic merging and diverging signs, lane closure signs, compulsory keep left/right signs or any other signs as per IRC-67. Advance cautionary signs are proposed for sharp curves along with chevron signs at the outer edge of the curves with appropriate delineators.

1.9.11 Major Bridge/Minor Bridge & Cross Drainage Structures

There are existing 2 Major and 2 Minor bridges along with 64 numbers of culverts. During inventory and condition survey, the details of culverts wise Improvement Proposal containing Rehabilitation, Widening or Reconstruction is given in table: I-30.

Table I-29 Summary of Existing Bridges and CD works is as below

Type of Structure	Major Bridges	Minor Bridges	Slab /Arch/BOX Culvert	Vented Causeway	Hume Pipe Culvert
I	II	III	IV	V	VI
Existing Structure 68 Nos.	2	2	16	1	47

Table I-30: Summary of Improvement

Summary of Improvement								
S.No	Type of Structure	Existing Nos.	New Proposals				Total	Remark
			Rehabilitation	Widening	Reconstruction	New Proposed		
1	Hume Pipe Culverts	47	17	21	6	43	90	24 HPC proposed for Bypasses and 19 HPC Balancing proposed
2	Vented Causeway	1	Nil	Nil	1	Nil	1	1 VCW Upgrade to Slab
3	Slab/Arch Culverts	16	8	1	7	2	18	3 Slab New Proposed At Bypass
4	Box Culverts	Nil	Nil	Nil	Nil	Nil	Nil	1 Box Upgrade to Slab
5	Minor Bridge	2	2	Nil	Nil	2	4	2MNB New Proposed At Bypass
6	Major Bridge	2	2	Nil	Nil	2	4	2 MJB Proposed for Bypasses and 1 MJB Retain
Total Structures							95	27 structure and 1 ROB new proposed for bypasses

(a) **Table I-31: Details of Major Bridge**

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
					Over all			
I	II	III	IV	V	VI	VII	VIII	IX
1	16+750	-	MJB	16 X 10.70	7.80	MJB	16 X 10.70	Retain
2	-	16+600	At soi kalan bypass			MJB	7X25.00	New Construction
3	-	28+100	At sheopur bypass			MJB	9 X 14.40	New Construction
4	35+850	33+070	MJB	5 X 12.02	12.00	MJB	5 X 12.0	Rehabilitation

(b) **Table I-32: Details of Minor Bridge**

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
					Over all			
I	II	III	IV	V	VI	VII	VIII	IX
I	10+010	9+960	MNB	2 X 5.5	13.20	MNB	2 X 5.5	Rehabilitation

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Overall	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
2	-	24+020	At sheopur bypass			MNB	3X10.40	New Construction
3		24+470	At sheopur bypass			MNB	2X25.00	New Construction
4	24+670	-	MNB	5 X 9.0	7.20	MNB	5 X 9.0	Retain

(c) **Table I-33: Details of Hume Pipe Culverts**

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1	1+400	1+400	HPC	1 ROW 1000	11.00	HPC	1 ROW 1200	Reconstruction
2	1+600	1+600	HPC	4 ROW 1000	12.10	HPC	4 ROW 1000	Widening
3	3+760		HPC	1 ROW 1000	11.00	HPC	1 ROW 1000	Retain
4		2+370	At Dantarda Kalan Bypass			HPC	1 ROW 1200	New Construction
5		2+600	At Dantarda Kalan Bypass			HPC	1 ROW 1200	New Construction
6		2+840	At Dantarda Kalan Bypass			HPC	2 ROW 1200	New Construction
7		3+040	At Dantarda Kalan Bypass			HPC	1 ROW 1200	New Construction
8		3+150	At Dantarda Kalan Bypass			HPC	1 ROW 1200	New Construction
9		4+150	At Dantarda Kalan Bypass			HPC	2 ROW 1200	New Construction
10		4+600	At Dantarda Kalan Bypass			HPC	1 ROW 1200	New Construction
11		5+860	At Realignment Location			HPC	1 ROW 1200	New Construction
12	7+050	6+710	HPC	1 ROW 1000	12.60	HPC	1 ROW 1200	Reconstruction
13	7+750	7+420	HPC	2 ROW 1000	12.70	HPC	2 ROW 1000	Widening
14	8+260	7+925	HPC	1 ROW 1000	12.10	HPC	1 ROW 1000	Widening
15		8+440	Balancing Culvert			HPC	1 ROW 1200	New Construction
16	9+540	9+200	HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Widening
17	9+710	9+370	HPC	1 ROW 1000	13.50	HPC	1 ROW 1000	Widening
18	10+360	10+010	HPC	1 ROW 1000	12.50	HPC	1 ROW 1000	Widening
19	10+760		HPC	1 ROW 1000	17.60	HPC	1 ROW 1000	Retain
20	10+910		HPC	2 ROW 1000	10.00	HPC	2 ROW 1000	Retain
21		10+440	Realignment Location			HPC	2 ROW 1200	New Construction

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
22	11+060	10+680	HPC	1 ROW 1200	12.10	HPC	1 ROW 1200	Reconstruction
23	11+460	11+080	HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Widening
24	11+900	11+510	HPC	1 ROW 1000	12.10	HPC	1 ROW 1000	Widening
25	12+630	12+240	HPC (CANAL)	1 ROW 1200	12.20	HPC (CANAL)	1 ROW 1200	Reconstruction
26		12+760	Balancing Culvert			HPC	1 ROW 1200	New Construction
27	14+110	13+720	HPC	1 ROW 1000	17.00	HPC	1 ROW 1000	Rehabilitation
28		13+850	Realignment Location			HPC	1 ROW 1200	New Construction
29	14+700	14+265	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
30	15+630		HPC	1 ROW 1000	12.50	HPC	1 ROW 1000	Retain
31	15+950		HPC	2 ROW 1000	14.00	HPC	2 ROW 1200	Retain
32	16+150		HPC	1 ROW 1000	15.50	HPC	1 ROW 1000	Retain
33	17+100		HPC	1 ROW 1000	13.80	HPC	1 ROW 1000	Retain
34	17+800		HPC	1 ROW 1000	15.00	HPC	1 ROW 1200	Retain
35	17+950		HPC	1 ROW 1000	15.20	HPC	1 ROW 1200	Retain
36	18+700		HPC	1 ROW 1000	15.00	HPC	1 ROW 1000	Retain
37		14+860	At Soi Kalan Bypass			HPC	1 ROW 1200	New Construction
38		15+670	At Soi Kalan Bypass			HPC	1 ROW 1200	New Construction
39		17+170	At Soi Kalan Bypass			HPC	1 ROW 1200	New Construction
40		17+650	At Soi Kalan Bypass			HPC	1 ROW 1200	New Construction
41	19+050	18+090	HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Widening
42		18+680	Balancing Culvert			HPC	1 ROW 1200	New Construction
43	20+100	19+140	HPC	1 ROW 1000	12.00	HPC	1 ROW 1200	Reconstruction
44	21+610	20+650	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
45	21+780	20+810	HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Widening
46	21+950	20+985	HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Widening
47	22+170	21+215	HPC	1 ROW 1000	12.30	HPC	1 ROW 1000	Widening
48	22+850		HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Retain
49	23+210		HPC	1 ROW 1000	12.00	HPC	1 ROW 1000	Retain
50	29+110		HPC	1 ROW 1000	12.80	HPC	1 ROW 1000	Retain
51	31+770		HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
52		22+630	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
53		23+730	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
54		24+380	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
55		24+770	At Sheopur Bypass			HPC	1 ROW 1200	New Construction

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
56		25+120	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
57		26+050	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
58		26+300	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
59		26+840	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
60		27+230	At Sheopur Bypass			HPC	2 ROW 1200	New Construction
61		28+730	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
62		29+000	At Sheopur Bypass			HPC	1 ROW 1200	New Construction
63		29+600	Balancing Culvert			HPC	1 ROW 1200	New Construction
64		30+160	Balancing Culvert			HPC	1 ROW 1200	New Construction
65	33+580	30+800	HPC	1 ROW 1000	12.80	HPC	1 ROW 1200	Reconstruction
66		31+600	Balancing Culvert			HPC	1 ROW 1200	New Construction
67	35+150	32+375	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
68		33+880	Balancing Culvert			HPC	1 ROW 1200	New Construction
69	38+040	35+260	HPC	1 ROW 1000	12.70	HPC	1 ROW 1000	Widening
70		36+000	Balancing Culvert			HPC	1 ROW 1200	New Construction
71		37+480	Balancing Culvert			HPC	1 ROW 1200	New Construction
72		38+360	Balancing Culvert			HPC	1 ROW 1200	New Construction
73		38+900	Balancing Culvert			HPC	1 ROW 1200	New Construction
74		39+580	Balancing Culvert			HPC	1 ROW 1200	New Construction
75		40+060	Balancing Culvert			HPC	1 ROW 1200	New Construction
76	43+760	40+980	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
77	43+970	41+185	HPC	1 ROW 1000	15.10	HPC	1 ROW 1200	Widening
78	44+090	41+310	HPC	2 ROW 1200	15.10	HPC	2 ROW 1200	Widening
79		41+800	Balancing Culvert			HPC	1 ROW 1200	New Construction
80		42+360	Balancing Culvert			HPC	1 ROW 1200	New Construction
81		43+280	Balancing Culvert			HPC	1 ROW 1200	New Construction
82		43+820	Balancing Culvert			HPC	1 ROW 1200	New Construction
83	47+170	44+400	HPC	1 ROW 1200	15.20	HPC	1 ROW 1200	Widening
84	47+600	44+810	HPC	1 ROW 1200	12.60	HPC	1 ROW 1200	Widening

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
85		45+640	Balancing Culvert			HPC	1 ROW 1200	New Construction
86	49+070	46+290	HPC	2 ROW 1200	12.60	HPC	2 ROW 1200	Widening
87	50+090	47+300	HPC	1 ROW 1000	12.90	HPC	1 ROW 1000	Widening
88	51+040	48+255	HPC	1 ROW 1200	12.70	HPC	1 ROW 1200	Widening
89	52+970		HPC	4 ROW 1200	12.60	HPC	4 ROW 1200	Retain
90	53+390		HPC	1 ROW 1200	12.40	HPC	1 ROW 1200	Retain

(d) Table I-35 Details of VCW

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
I	7+390	7+050	VCW	3 ROW 900	10.00	slab	1 X 5.0	Reconstruction

(e) Table I-36 Details of Slab/BOX/Arch Culverts

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
					Over all			
I	II	III	IV	V	VI	VII	VIII	IX
1	2+580		SLAB	1 X 1.40	14.00	SLAB	1 X 1.40	Retain
2	2+680		SLAB	1 X 1.20	10.00	SLAB	1 X 1.20	Retain
3	2+760		SLAB	1 X 3.0	13.90	SLAB	1 X 3.0	Retain
4	4+180		SLAB	1 X 5.0	12.10	SLAB	1 X 5.0	Retain
5	6+010		SLAB (CANAL)	1 X 1.80	12.20	SLAB (CANAL)	1 X 1.80	Retain
6		5+600	Realignment Location			SLAB (CANAL)	1X3.00	New Construction
7	11+760	11+380	SLAB	1 X 1.0	10.00	SLAB	1 X 2.0	Reconstruction
8	14+080	13+680	SLAB	1 X 2.0	7.40	SLAB	1 X 3.0	Reconstruction
9	20+970	20+010	SLAB (CANAL)	1 X 0.80	12.00	SLAB (CANAL)	1 X 0.80	Widening
10	22+720		SLAB	1 X 1.20	12.00	SLAB	1 X 1.20	Retain
11	29+450		SLAB	1 X 1.00	13.90	SLAB	1 X 1.00	Retain
12	30+690		SLAB	1 X 1.2	10.30	SLAB	1 X 1.2	Retain

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
					Over all			
I	II	III	IV	V	VI	VII	VIII	IX
13		21+700	At Sheopur Bypass			Slab	1X4.00	New Construction
14	37+210	34+430	SLAB	1 X 0.8	10.10	SLAB	1 x 2	Reconstruction
	39+590	36+810	SLAB	2 X 1.50	10.10	SLAB	1 x 4	Reconstruction
16	43+430	40+650	SLAB	1 X 1.20	10.30	SLAB	1 x 2	Reconstruction
17	43+870	41+080	SLAB	1 x 2.0	10.60	SLAB	1 x 3.0	Reconstruction

(f) Table I-37 Details of ROB

Details of Existing Culvert						Details of Proposed Culvert			
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width	
I	II	III	IV	V	VI	VII	VIII	IX	
I	-	23+200	At sheopur bypass				ROB		New Construction

I.10 Cost Estimate

Cost estimate for the project Road is finalised based on the improvement proposals.

Table I-38: Total Cost of Project Road

Sec. No.	Section	Proposed Length (km)	Base Cost (Crores)	Base Cost Per K.M. (Crores)
I	II	III	IV	V
I	Mp/Rj Border to Dantarda Kalan Bypass start	35.03		
	Dantarda Kalan bypass End to Soi Kalan Bypass Start			
	Soi Kalan bypass End to Sheopur bypass start			
	Sheopur bypass End to Goras			
II	Dantarda Kalan Bypass	13.95		
	Soi Kalan Bypass			
	Sheopur Bypass			

Reference: - Details have been given in chapter -6

I.11 Conclusions and Recommendations

As per contract agreement the current stage of corridor comprises preparation of DPR for rehabilitation and upgrading of existing road to 2-lane with paved shoulder. We have conducted Classified Traffic Volume counts at 2 No locations for analysing the capacity. As per analysis of the traffic surveys total number of PCUs at all two locations has crossed the threshold limit (15000 PCU) of design service volume for 2 lane roads with paved shoulder configuration as per the IRC in year 2041.

The existing road has stretches whose geometrics do not conform to IRC standards will need to be improved by means of realignments and by reconstruction. The road passes through ribbon development at 2 Nos locations, where travel speed does not meet NH standards, hence bypasses have been proposed for them. The soil conditions along the project road are generally good and the construction materials like soil and aggregates are available nearby.

The existing ROW along the project road varies from 20 m to 30 m and also we proposed 3 Bypasses (at Dantarda Kalan, Soi kalan village and Sheopur) therefore land acquisition is required for widening of the project road, Improving black spots and Bypasses. Hence the project will have social impact in terms of loss of livelihood or shelter, which will have to be studied and a suitable mitigation plan prepared.

It is recommended that the project be undertaken for two laning with paved in the immediate future.