

## EXECUTIVE SUMMARY

### 1.1. Introduction

Government of Madhya Pradesh has entrusted Madhya Pradesh Road Development Corporation for development of State highways in the state of Madhya Pradesh. M.P Road Development Corporation represented by the Managing Director has taken initiative and engaged in the development of state highways. Consultancy services for preparation of Feasibility report for Two Lane with paved Rigid/Flexi shoulders of selected stretches of newly declared and existing State Highway roads under Package-A in the State of Madhya Pradesh. Two lane with paved shoulder configuration to the various consultants eligible for assignment.

### 1.2. Objective & Scope of the Consultancy Services

The objective of this consultancy (the “Objective”) is to undertake feasibility studies and prepare a Feasibility Report of the Project Highway for the purpose of firming up the Authority’s requirements in respect of development and construction of the Project Highway 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:

- i. enhanced safety and level of service for the road users;
- ii. superior operation and maintenance enabling enhanced operational efficiency of the Project Highway;
- iii. minimal adverse impact on the local population and road users due to road construction;
- iv. minimal adverse impact on environment;
- v. minimal additional acquisition of land; and
- vi. Phased development of the Project Highway for improving its financial viability consistent with the need to minimize frequent inconvenience to traffic that may be caused if additional works are undertaken within a period of seven years from the commencement of construction of the Project Highway.

Scope of Services Comprise of:

- i. Traffic surveys and demand assessment
- ii. Engineering surveys and investigations.
- iii. Location and layout of toll plazas
- iv. Location and layout of truck lay byes
- v. Location and layout of bus bays and bus shelters
- vi. Social impact assessment
- vii. Environment impact assessment& obtaining TOR from MoEF for environmental clearance and conduct Public hearing. Consultant shall complete the process of final environmental clearance from MoEF.

- viii. Preliminary Designs of road, bridges, structures, etc. including GAD of ROB's and RUB's. The consultant shall be responsible for getting approval of Railways for GAD's of ROB/RUB's.
- ix. Preparation of Land Plan Schedules as per revenue records. Preparation of Land documents to publish notification of various stages as per Land Acquisition Act.
- x. Preparation of proposal of forest land diversion as per forest conservation act and obtaining clearance from MoEF.
- xi. Preparation of proposal for obtaining clearance from State Wild Life Board and National Wild Life Board.
- xii. Preparation of strip plan for relocation of utility shifting and their estimates for relocation approved by concerned Competent Authority.
- xiii. Preparation of indicative BOQ and rough Cost Estimates
- xiv. Financial analysis to assess the viability of the project.
- xv. Preparation of Schedules A, B, C, D and H of the Concession Agreement.
- xvi. Survey & Investigation of bypasses on the alignment.
- xvii. Obtaining Project related clearances from the concerned department/agencies like MOEF, Pollution control board, forest, wild life boards, Railways etc.

### **1.3. Project Stages**

The main objective of the consultancy service is to establish the technical, economical, and financial viability of the project and prepare Feasibility Report for up gradation of existing road to two lane with or without paved shoulders (as may be applicable) or higher configuration.

Stage 1: Inception Report

Stage 2: Report on Alignment and Traffic Survey results

Stage 3: Indicative GAD of structures

Stage 4: Draft Feasibility Report and Schedules to the Concession Agreement and Financial analysis

Stage 5: Report on Land Plan Schedules and Utility Relocation

Stage 6: Report on Environment, Social Impact Assessment and Forest clearance report

Stage 7: Final Feasibility Report

Stage 8: (a) Project related clearances from concerned departments

(b) Completion of services including assistance during bid process

### **1.4. Structures**

The services will be undertaken in different parts and is broadly as below;

Part A: As far as possible, the widening/improvement work to two/four/six lane with or without paved shoulders (as may be applicable) shall be within the existing right of way avoiding land acquisition

Part B: The Consultant shall study the possible locations and design of toll plaza (If any). Wayside amenities required on tolled highway shall also be planned.

Part C: The Consultants shall prepare documents for Hybrid Annuity/EPC contracts for each DPR assignment.

Part D: All ready to implement „good for construction” drawings shall be prepared.

Part E: Environmental Impact Assessment and Environmental Management Plan shall be carried out by the Consultant meeting the requirements of the Government of India

Part F: The consultant shall also suggest alternate traffic movement plan during construction

The Letter of Appointment for this assignment was issued by Chief Engineer (Proc.) M.P.R.D.C, Bhopal, M.P vide their letter No. 10001/425/MPRDC/Procu/FR/2019, Dated 16-10-2019.

### **1.5. Organization of Detailed Feasibility Report**

The Draft Feasibility Report is consisting of following chapters

1. Executive Summary,
2. Project Description,
3. Engineering Survey & Investigation,
4. Traffic surveys and analysis,
5. Improvement proposals,
6. Cost Estimates,
7. Conclusion and recommendations,

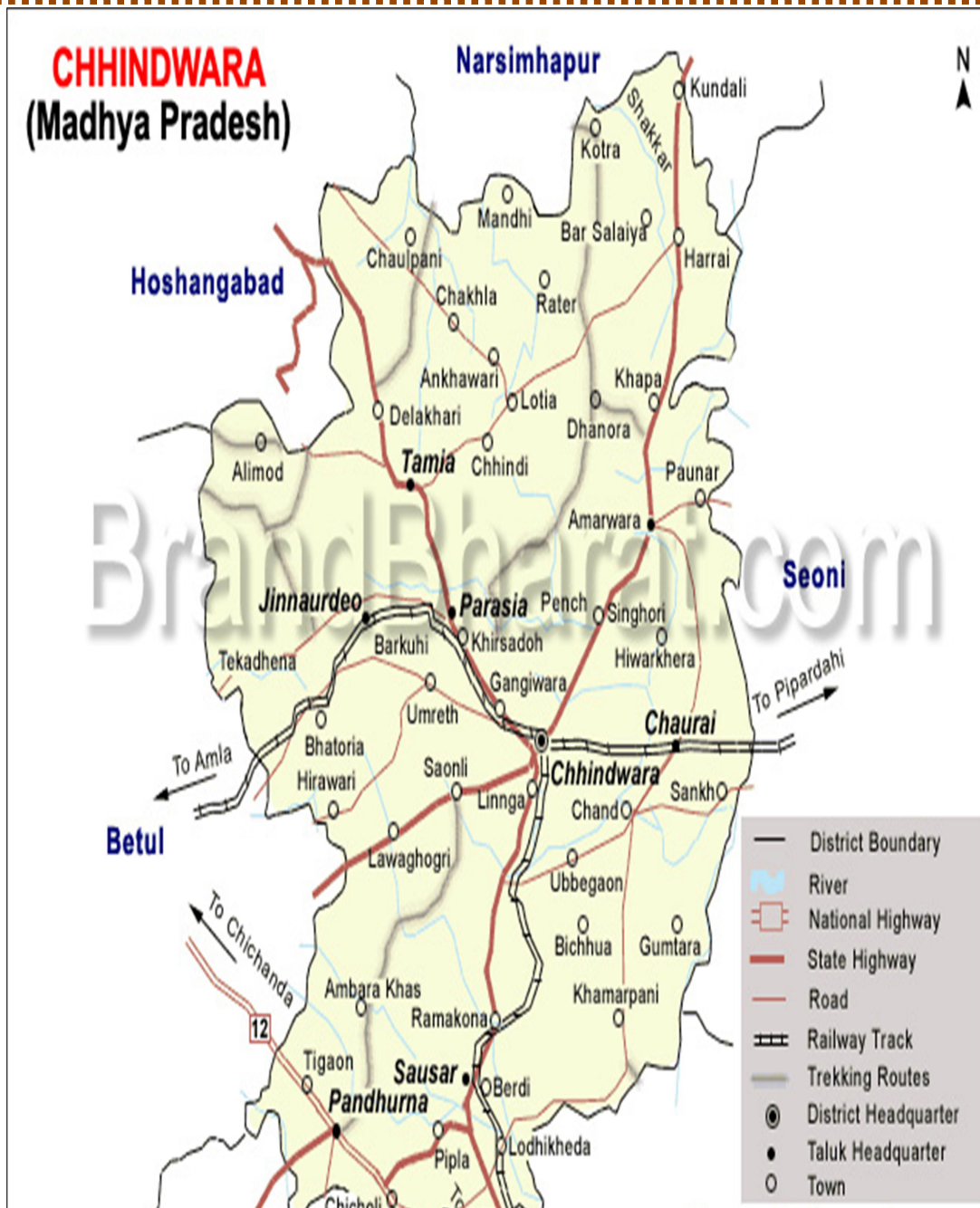
All data collected from field has been provided as a separate volume (appendix) with the main report.

### **1.6. Project Location & Background**

The project alignment Harrai – Bijouri Road through Chhindwara district in the state of Madhya Pradesh.

Chhindwara district was formed on 1st November 1956. It is located on the Southwest region of 'Satpura Range of Mountains'. The district is spread over an area of 11,850 Sq. km and is located at the southern boundary of the state, laying between North Latitudes 21° 28' and 22° 50' and East longitudes 78° 15' and 79° 25' falls under the Survey of India Topo Sheet No. 55 J, K, N, & O. The district is bounded by Narsinghpur and Hoshangabad district in the north, Seoni district in the east, Betul district in the west and by Maharashtra state in the south (Fig-1). The District is divided into 12 Tahsils (Chhindwara, Tamia, Parasia, Jamai, Chourai, Amarwara, Sausar, Bichhua Umreth, Mohkhed, Harrai and Pandhurna) and 11 Development Blocks (Chhindwara, Mohkhed, Tamia, Parasia, Jamai, Amarwara, Harrai, Chourai, Sausar Bichhua, and Pandhurna). There are 1984 villages in the district, out of which 1903 villages are inhabited.

The district lies in parts of the Narmada and the Godavari basin, Wainganga sub basins. The total catchments areas of the Narmada & the Wainganga rivers falling in the district are 3,555 and 8,295 Sq. km respectively. The major tributaries of the Godavari River are Kanhan, Pench and Wardha, while Sakkar, Sitarewa, Dudh are tributaries of Narmada River.



**Fig 1.1: Map of Chhindwara District**

### 1.7. Project Description

The name of the project road is Harrai - Bijouri Road. The total design length of project road is 72.731 km. Start point of the project road is at junction on NH-547 in Harrai Village and ends at junction of SH-19 in Bijouri village. The major towns and villages along the project road are Pandu Pipariya, Sidholi, Lotiya, Simaria, Pipariya Kalan, Madai, Barghi and Harrai. A number of small villages where population is very less are also situated on the project road in scattered manner.



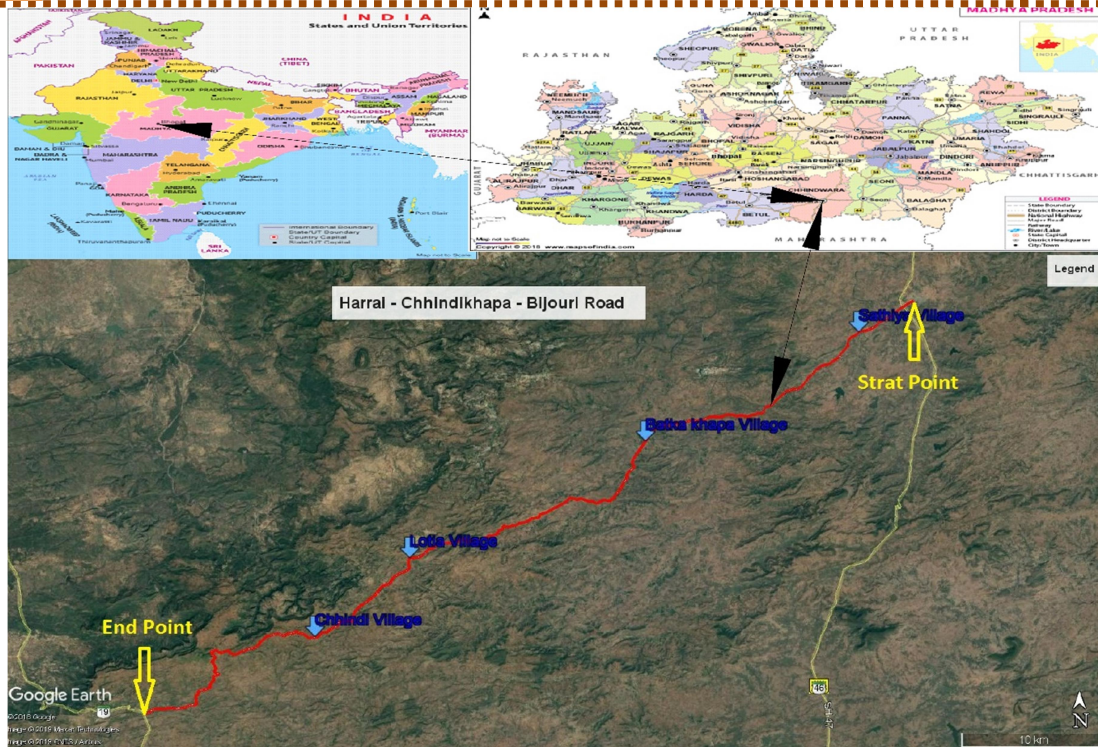


Fig 1.2: Proposed Road Alignment on Google Map

## 1.8. Summary of Investigations and Evaluations

This relates to the most suitable alignment for the project road sections and for optimum upgrading of existing road based on field data and detail study involving traffic, topographic, pavement and road condition and socio-economic aspects. Special attention has been given for augmentation of capacity for intended level of service in design period. A few appropriate design applications have been considered for operational efficiency and road safety.

Pavement design includes flexible pavement through all along the project road. Alignment options have been developed for the highway sections mostly concentric to existing alignment avoiding land acquisition on capitalization of existing ROW. Road side religious structures, graveyards, missionaries etc. have been mostly avoided by adjusting the alignment suitably and/or by eccentric widening. All major junctions/intersections have been analyzed with respect to vehicular movements and vehicular turning movements based on traffic study for providing appropriate grade/grade separated intersections for cross/turning traffic. Realignment has been fixed in providing the requisite geometrics to cater to the design speed.

### 1.8.1. Design Standards

#### 1.8.1.1. Terrain Classification

The project road lies in Plain, rolling & Hilly terrain. The geometric standards relevant to plain & rolling terrain as contained in IRC: 73-2018 and IRC SP: 48-1998 for hilly terrain been adopted.

### 1.8.1.2. Design Speed

The ruling design speed for this project has been adopted as 65/80 km/hr. in plain terrain and the same has been used to determine the various geometric design features. But at certain curve locations or Mountainous terrain ruling design speed for this project has been adopted as 40/50 km/hr.

### 1.8.1.3. Cross-sectional Element

2-Lane with Paved/Earthen shoulder is proposed for the project highway. Cross falls adopted is 2.5% for the Bituminous Pavement. The cross fall of the paved shoulders has been kept the same as that of main Carriageway, 3.5% for Hard / Earthen shoulders. Except where super elevation is applied. On super elevated sections, the shoulders will have the same cross fall as that of the pavement. The width of shoulders in open area is varies up to 1.5m earthen shoulder and in built-ups it's varies up to 1.5m paved shoulder. Typical cross sections are attached at the end of this report.

### 1.8.2. Improvement Proposal

### 1.8.3. Proposed Lane Configuration

Two Lane has been proposed for the project road in general. Proposal Typical Cross Section is given in table below:

**Table 1.1: Summary of proposed Typical Cross-sections**

S. No	Chainage (m)		Length (m)	Widening	TCS No.	Reference TCS	Remarks
	From	To		Scheme			
1	0+000	0+900	900	Concentric	TCS-5	Fig-2.6 modified IRC: SP:84-2014	Start point
2	0+900	3+040	2140	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
3	3+040	3+260	220	Concentric	TCS-4	Fig-2.8 IRC: SP:73-2018	
4	3+260	4+800	1540	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
5	4+800	5+200	400	Concentric	TCS-2	Fig-2.6 modified IRC: SP:73-2018	
6	5+200	11+500	6300	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
7	11+500	11+900	400	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
8	11+900	22+600	10700	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
9	22+600	24+200	1600	Concentric	TCS-5	Fig-2.6 modified IRC: SP:84-2014	
10	24+200	39+500	15300	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
11	39+500	41+240	1740	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
12	41+240	41+780	540	Concentric	TCS-3A	Fig-2.8 IRC: SP:73-2018	
13	41+780	51+900	10120	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
14	51+900	52+900	1000	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
15	52+900	62+800	9900	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
16	62+800	64+500	1700	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
17	64+500	64+800	300	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
18	64+800	65+800	1000	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	

S. No	Chainage (m)		Length (m)	Widening	TCS No.	Reference TCS	Remarks
	From	To		Scheme			
19	65+800	67+800	2000	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
20	67+800	68+700	900	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
21	68+700	70+200	1500	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
22	70+200	70+450	250	Concentric	TCS-3B	Fig-2.8 IRC: SP:73-2018	
23	70+450	72+200	1750	Concentric	TCS-1	Fig-2.2 IRC: SP:73-2018	
24	72+200	72+731	531	Concentric	TCS-5	Fig-2.6 modified IRC: SP:84-2014	End Point
<b>Total Length</b>		<b>72731</b>					

#### 1.8.4. Shoulders

Width of shoulders in open areas 1.5m (Hard/Earthen shoulder). In built-up area 1.5m paved shoulder/1.5m minimum width earthen shoulder flooring shall be provided on either side of carriageway as per the drawing attached.

#### 1.8.5. Traffic & Pavement Summary

Present AADT (Annual Average Daily Traffic) have been presented in the table below. Traffic expected on the project road has been calculated and then projected for 20 years after completion of construction (up to year 2041). Summary of traffic has been shown in the table below.

**Table 1.2: Traffic Summary and Requirements**

Location (km)	Existing Lane Configuration	Design AADT (PCU) For 20th yr.	Lane Requirement	Adopted Lane Configuration	Remarks
1+670	Single lane	5244	Intermediate Lane	2-lane with earthen shoulder	
72+270	Single lane	7485	2-Lane + P. S	2-lane with earthen shoulder	

If Provide, for flexible pavement BC=40mm, DBM=100mm, WMM=220mm, GSB=200mm, Subgrade=500mm, for rigid pavement PQC=250, DLC=100, GSB=150, Subgrade=500mm. Detail analysis of traffic surveys have been provided in the chapter “Traffic Surveys & Analysis”.

#### 1.8.6. Structural Summary

There are overall 173 Existing Structures in this project road. 121 HPC's, 22 Slab culverts, 11 Cut Stone Slab, 01 Box Culvert, 05 VCW's, 02 FCW and 11 Minor bridges. Proposal for Existing 11 MNB is reconstruction. Out of 22 Slab Culverts, 17 are reconstructed, 03 are Upgraded to Minor Bridge and 02 converted to HPC. 01 Box Culvert is reconstructed as Slab culvert. Out of 11 Cut Stone Slab 01 converted to Slab Culvert and 10 reconstructed as HPC, out of 02 FCW 02 are reconstructed as HPC. Out of 05 VCW's, 01 converted to Slab Culvert, 03 are upgraded to Minor Bridge and 01 upgraded to Major Bridge. Out of 121 HPC's, 113 are Re-constructed and 08 HPC are upgraded to slab culvert. 33 new HPC proposed.

**Table 1.3: Summary of Structure Proposal**

Existing Structures		Proposed Structures	
Type of Structure	Existing Nos.	Nos.	Type of Proposal
Minor Bridge	11	11	Reconstruction to MNB's
Slab Culvert	22	17	Reconstruction to Slab Culverts
		3	Reconstruction to Minor Bridges
		2	Reconstruction to HPC
Box Culvert	1	1	Reconstruction to Slab Culverts
Cut Stone Slab	11	1	Reconstruction to Slab Culverts
		10	Reconstruction to HPC
FCW	2	2	Reconstruction to HPC
VCW	5	1	Reconstruction to MJB's
		1	Reconstruction to Slab Culverts
		3	Reconstruction to Minor Bridge
HPC	121	113	Reconstruction to HPC's
		8	Reconstruction to Slab Culverts
New Proposals			
HPC's		33	New Construction
Total	173	206	

#### 1.8.7. Road Side Drainage

Drainage system including surface and subsurface drains for the Project Road shall be provided as per Section 6 of the Manual. Following sections should be provided with lined drains on both sides:

**Table 1.4: List of the proposed Covered RCC Drains**

Sr. No.	Design Chainage		Length(m)		Name of Village
	Km	Km	LHS	RHS	
1	0+000	0+900	900	900	Harrai
2	4+800	5+200	400	400	Bargi
3	22+600	24+200	1600	1600	Batkakhapa
4	72+200	72+731	531	531	Bijouri
	Length(m)		3431	3431	
	Total Length (Km)		6.862		

**Table 1.5: List of the proposed CC Drains in Forest/Hilly area**

Sr. No.	Design Chainage		Side	Length(M)	Remarks
	Km	Km			
1	3+040	3+260	One Side	220	Hilly Terrain
2	11+500	11+900	One Side	400	Hilly Terrain
3	39+500	41+240	One Side	1740	Hilly Terrain
4	41+240	41+780	One Side	540	Hilly Terrain



Sr. No.	Design Chainage		Side	Length(M)	Remarks
	Km	Km			
5	51+900	52+900	One Side	1000	Hilly Terrain
6	62+800	64+500	One Side	1700	Hilly Terrain
7	64+800	65+800	One Side	1000	Hilly Terrain
8	67+800	68+700	One Side	900	Hilly Terrain
9	70+200	70+450	One Side	250	Hilly Terrain
Total Length (Km)				7.750	

### 1.8.8. Junctions

There are 03 Major & 39 Minor Junctions on the existing alignment

**Table 1.6: List of the proposed Major Junction**

Sl. No.	Design Chainage (km)	Road No.	Type	Side	Type of Pavement	Destination
1	0+000	NH-547	T	Start point	BT	Narsinghpur to Chhindwara
2	0+869	NH-547 (By Pass)	X	Both	BT	Narsinghpur to Chhindwara
3	72+731	SH-19	T	End Point	CC	Matkuli to Chhindwara

**Table 1.7: List of the proposed Minor Junction**

Sl. No	Design Chainage (Km)	Side	Road No.	Type	Cross Road Type	Cross Road Name
1	2+728	LHS	VR	T	CC	towards mandir
2	2+738	RHS	VR	T	CC	towards rawratala village
3	5+192	RHS	VR	T	BT	towards bichua village
4	6+976	LHS	VR	T	BT	towards sajwa village
5	9+620	LHS	VR	T	BT	towards sathiya village
6	12+964	RHS	VR	T	CC	towards madai village
7	15+433	LHS	VR	T	BT	towards noniya village
8	17+752	RHS	VR	T	CC	towards pipariya kalan village
9	18+996	RHS	VR	T	BT	towards devri village
10	22+724	RHS	VR	T	BT	towards ojhalhdhana village
11	23+418	RHS	VR	T	CC	towards bhatka village
12	23+522	RHS	VR	T	BT	towards saldhana village
13	24+096	RHS	VR	T	BT	towards achankund village
14	26+385	LHS	VR	T	CC	towards junapani village
15	28+234	LHS	VR	T	BT	towards dhanora village
16	28+488	LHS	VR	T	BT	towards banka village
17	31+982	RHS	VR	T	BT	towards churi sajwa village
18	33+586	LHS	VR	T	BT	Towards chourai village
19	38+284	LHS	VR	T	CC	Towards bamri village
20	42+332	RHS	VR	T	BT	towards bhuipar village
21	43+306	RHS	VR	T	CC	towards lotiya village

Sl. No	Design Chainage (Km)	Side	Road No.	Type	Cross Road Type	Cross Road Name
22	44+090	LHS	VR	T	CC	Towards kuadhana village
23	44+794	RHS	VR	T	BT	towards ataria village
24	45+688	LHS	VR	T	CC	towards lotiya village
25	50+026	RHS	VR	T	BT	towards kareaam village
26	54+250	RHS	VR	T	BT	towards patalkot village
27	54+824	LHS	VR	T	BT	towards chindi village
28	55+498	LHS	VR	T	CC	towards thanakheda village
29	56+182	LHS	VR	T	CC	towards thanakheda village
30	58+106	RHS	VR	T	BT	Towards patalkot village
31	60+440	RHS	VR	T	CC	Towards sidhouli village
32	61+628	RHS	VR	T	CC	Towards sidhouli village
33	62+717	RHS	VR	T	BT	Towards gaildubba village
34	67+060	RHS	VR	T	CC	Towards jaitpur villagfe
35	67+484	RHS	VR	T	CC	Towards jaitpur villagfe
36	69+378	RHS	VR	T	CC	towards Bamhori Village
37	69+542	RHS	VR	T	CC	towards khadwa village
38	69+720	LHS	VR	T	CC	towards banki village
39	72+380	RHS	VR	T	BT	Towards Bhoriyapani Village

### 1.8.9. Project Cost

<b>MADHYA PRADESH ROAD DEVELOPMENT CORP. LTD.</b>			
<b>Two laning with paved ridge/flexi shoulders of selected stretches of Newly declared &amp; existing State Highways, Package-A (Length: 346.30 km.)</b>			
<b>Road Name:</b> Harrai- Chhindikhapa- Bijouri Road		<b>Length:</b> 72.731 Km	<b>District:</b> Chhindwara
<b>SUMMARY OF COST</b>			
<b>Sl. No.</b>	<b>Description</b>	<b>ORIGINAL CONTRACT</b>	
		<b>Amount (in Rs.)</b>	<b>Amount (in Cr.)</b>
1	Site Clearance	497034	0.05
2	Earth Work	134663907	13.47
3	Sub-Bases and Base- Course	294646276	29.46
4	Pavement	411913564	41.19
5	Traffic Signs, Markings & Other Road Appurtenances	94622957	9.46
6	Cross Drainage and Other Structures	557969638	55.80
7	Miscellaneous	16742287	1.67
<b>(A)</b>	<b>Total Cost of Civil Works</b>	<b>1511055663</b>	<b>151.11</b>
	<b>Cost per Km</b>	<b>20775951</b>	<b>2.08</b>
8	Add GST @12% on <b>Total (A)</b>	181326680	18.13
9	Add Price Escalation @10% on <b>Total (A)</b>	151105566	15.11
10	Add contingencies @3% on <b>Total (A)</b>	45331670	4.53
11	Add Maintenance charges @5% on <b>Total (A)</b>	75552783	7.56
12	Add Supervision charges @4% on <b>Total (A)</b>	60442227	6.04
<b>(B)</b>	<b>Total Cost of above centages</b>	<b>513758925</b>	<b>51.38</b>
<b>(C)</b>	<b>Total Cost to be borne by Developer (A+B)</b>	<b>2024814588</b>	<b>202.48</b>
	<b>Cost per Km</b>	<b>27839774</b>	<b>2.78</b>
	<b>Cost to be borne by MPRDC</b>		
13	Training and Capacity Building of Engineer of MPRDC/Concessionaire/IE@ 0.05% of Civil cost (A)	755528	0.076
14	Development of E-Maintenances System @0.1% of Civil Cost (A)	1511056	0.151
15	Shifting of Electrical Line	75552783	7.56
16	Shifting of Water Supply Line/ Hand Pump	75552783	7.56
<b>(D)</b>	<b>Total Cost to be borne by MPRDC</b>	<b>153372150</b>	<b>15.34</b>
	<b>Cost per Km</b>	<b>2067205</b>	<b>0.21</b>
<b>(E)</b>	<b>Total Landed Project Cost (C+D)</b>	<b>2178186738</b>	<b>217.82</b>
	<b>Cost per Km</b>	<b>29948533</b>	<b>2.99</b>

**Table 1.8: SALIENT FEATURES**

Description	Existing	Proposed																					
Terrain	: Plain, Rolling, Hilly	Plain, Rolling, Hilly																					
Length	: Existing Length = 72.050 Km	Proposed Length = 72.731 Km																					
Alignment	: The existing Alignment is almost Poor except at few locations.	The existing alignment is followed with minor improvements within existing row.																					
Design Speed	: 40 Km/h to 60Km/h.	40Kmph to 80Kmph.																					
Cross-Section	:  <b>C/W Width- Varying b/w 3.75m Shoulder- 2.25m</b>	<b>Open area- 61.550 Km Length for Flexible Pavement</b> 1.5m (Earthen Shoulder) +7m (Carriage Way) + 1.5m (Earthen Shoulder) = <b>10m.</b>  <b>Built Up area-0.400 Km Length for Rigid Pavement</b> 1.5(Drain) + 1.5m (Paved Shoulder) + 7 m (Carriage Way) +1.5 (Paved Shoulder) + 1.5(Drain) = <b>13 m.</b>  <b>Hilly/Forest area – 0.540 Km Length for Flexible Pavement with Retaining Wall</b> +1.5 m (Earthen Shoulder) + 7.0 m (Carriage Way) + 1.5 m (Cement Concrete Shoulder) + 1.3 m L shape PCC Drain = <b>10 m.</b> <b>6990 Km Length for Flexible Pavement with</b> 1.5 m (Earthen Shoulder) + 7.0 m (Carriage Way) + 1.5 m (Cement Concrete Shoulder) +1.3 m L shape PCC Drain = <b>10 m.</b> <b>0.220 Km Length for Flexible Pavement with</b> 1.3 m L shape PCC Drain + 1.5 m (Cement Concrete Shoulder) + 7.0 m (Carriage Way) + 1.5 m (Cement Concrete Shoulder) + 1.3 m L shape PCC Drain = <b>10 m.</b> <b>&amp;</b> <b>4-Lane 3.031 km with</b> 1.5(Drain) +1.5 (Paved Shoulder) + 5.5 m (Carriage Way) + 0.5 m Median + 5.5 m (Carriage Way) + 1.5 (Paved Shoulder) + 1.5 (Drain) = <b>17.50m.</b>																					
CBR Considered	: -	8%																					
Traffic (2019)	<b>Traffic at different survey locations:</b> <table><tr><th colspan="5">For Flexible Pavement</th></tr><tr><th rowspan="2">Section</th><th rowspan="2">ADT</th><th rowspan="2">PCU</th><th>Calculated MSA</th><th rowspan="2">Adopted MSA</th></tr><tr><th>(20 Year)</th></tr><tr><td>1+670</td><td>2565</td><td>1785</td><td>3.848</td><td>10</td></tr><tr><td>72+270</td><td>3797</td><td>2560</td><td>4.079</td><td>10</td></tr></table>		For Flexible Pavement					Section	ADT	PCU	Calculated MSA	Adopted MSA	(20 Year)	1+670	2565	1785	3.848	10	72+270	3797	2560	4.079	10
For Flexible Pavement																							
Section	ADT	PCU	Calculated MSA	Adopted MSA																			
			(20 Year)																				
1+670	2565	1785	3.848	10																			
72+270	3797	2560	4.079	10																			
Pavement Design Life	: Nil	20 Years																					
Pavement Crust Thickness for widening & new construction	:	<table><tr><th>Flexible</th><th>Rigid</th></tr><tr><td>BC - 40mm</td><td>PQC- 250mm</td></tr><tr><td>DBM - 100mm</td><td>DLC - 100 mm</td></tr><tr><td>WMM - 220 mm</td><td rowspan="2">GSB - 200mm</td></tr><tr><td>GSB - 200 mm</td></tr><tr><td>Subgrade – 500 mm</td><td>Subgrade – 500 mm</td></tr></table>	Flexible	Rigid	BC - 40mm	PQC- 250mm	DBM - 100mm	DLC - 100 mm	WMM - 220 mm	GSB - 200mm	GSB - 200 mm	Subgrade – 500 mm	Subgrade – 500 mm										
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Description		Existing		Proposed		
Structures	:	Existing Structures		Proposed Structures		
		Type of Structure	Existing Nos.	Nos.	Type of Proposal	
		Minor Bridge	11	11	Reconstruction to MNB's	
		Slab Culvert	22	17	Reconstruction to Slab Culverts	
				3	Reconstruction to Minor Bridges	
				2	Reconstruction to HPC	
		Box Culvert	1	1	Reconstruction to Slab Culverts	
		Cut Stone Slab	11	1	Reconstruction to Slab Culverts	
				10	Reconstruction to HPC	
		FCW	2	2	Reconstruction to HPC	
		VCW	5	1	Reconstruction to MJB's	
				1	Reconstruction to Slab Culverts	
				3	Reconstruction to Minor Bridge	
		HPC	121	113	Reconstruction to HPC's	
				8	Reconstruction to Slab Culverts	
New Proposals						
HPC's		33	New Construction			
Total		173	206			
Bus - Bay	:	Nil		Nil		
Bus Shelters	:	11		37 no's		
Truck Lay Bye	:	Nil		Nil		
Way Side Amenities	:	Nil		Nil		
Toll Plaza	:	Nil		Nil		
ROW	:			ROW For: - ➤ Built Up – 20 m ➤ Open area – 22 m		
Grade Separator	:	Nil		Nil		
ROBS	:	Nil		Nil		
Level Crossing	:	Nil		Nil		
RUBS	:	Nil		Nil		
Service Road	:	Nil		Nil		
Slip Road	:	Nil		Nil		
Protection &Other Works	:	Nil		➤ Crash barrier – 18.180 km ➤ Retaining Wall – 540 m.		
Total Cost (Rs.)	:			Cr 217.82 (2.99 Cr Per Km)		