ENVIRONMENT IMPACT ASSESSMENT REPORT

For

4 LANING OF NH-12 FROM JABALPUR TO BHOPAL,

(HIRAN RIVER TO SINDOOR RIVER)

KM. 66.000 TO KM. 130.00 = 64.00 KM

(PACKAGE-II)

Madhya Pradesh Road Development Corporation Ltd.

EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Ministry of Road Transport and Highways (MoRTH), Government of India has proposed to up-grade, rehabilitate and widen the existing National Highway No. 12 commencing from Jabalpur at km 10.400 and extending up to Bhopal at km 301.800, a fully modern system for safe and efficient movement of traffic. This will be up-graded from two lane carriageway with paved and earthen shoulder on either side of the road to 4 lane project corridor. The Project Road mainly passes through Jabalpur, Narsinghpur, Raisen and Bhopal districts. The entire stretch falls in Madhya Pradesh State.

1.2 DESCRIPTION OF THE PROJECT

The National Highway No. 12 runs within the States of Madhya Pradesh and Rajasthan. The eastern terminal is in Jabalpur at the intersection of NH-7 and the western terminal is in Jaipur at the intersection of NH-8. Jabalpur-Bhopal section of NH-12 start from Jabalpur bypass junction at Jabalpur City (10.400 km) and ending at Misrod in Bhopal Town of NH-12 (301.800 km). The project road section lies between 79°51'52.67"E to 77°27'43.66"E longitude and 23°09'17.13"N to 23°10'17.70"N latitude. Total cost of the Pkg-II Km 66/000 (Hiran River) to Km 130/00 (Sindoor River) of NH-12 (Pkg-II) (Design Length 64.00 Km) project is 505.20 Crores. The proposed project is four lane with paved shoulder under NHDP-III through Engineering, Procurement & construction (EPC) Basis Contract of the project National Highway in the State of Madhya Pradesh under NHDP-III programme of Ministry of Road Transport and Highways (MoRTH), and executing agency is Madhya Pradesh Road Development Corporation Ltd. (MPRDC), a Government of Madhya Pradesh entity. The location of present section has been shown in Figure-1.

Salient features of the project are as under:

The salient features of the project are given below:

- Present section of NH-12 traverses from east to west, starting from Jabalpur (10.4 km) to Bhopal (301.800 km) in Madhya Pradesh;
- The present condition of the road is 2-lane road with width and hard shoulder;
- The project road to be upgraded to 4 lane road with paved shoulder with provision of vehicular and pedestrian underpasses with junction improvement;

- The corridor (Pkg-II) crosses 3 major rivers, namely, Hiran river (km 65/6), Pandajhir river (km 113.2), Sindoor river (km 130/2);
- Construction of 4-lane highway (Pkg-II) 14 numbers of Truck lay bays & Bus lay bays 1 toll plaza in Ch 101.600 and 1.90 km service road on both side;
- Widening & strengthening, reconstruction and new construction of total 4 Major bridge, 21 Minor bridge, 45 Hume pipe Culvert & 20 Slab Culvert & 30 Box Culvert will be done along the project road; (Pkg-II)
- Nauradehi Wildlife Sanctuary passes this road;
- The total land requirement for the project is 90.362 ha out of which 10.770 ha is forest land & 39.75 ha in Reserve/Protected forest land for Nauradehi sanctuary.
- Villages that are falling all along the present section of NH-12 are given in Table-1.

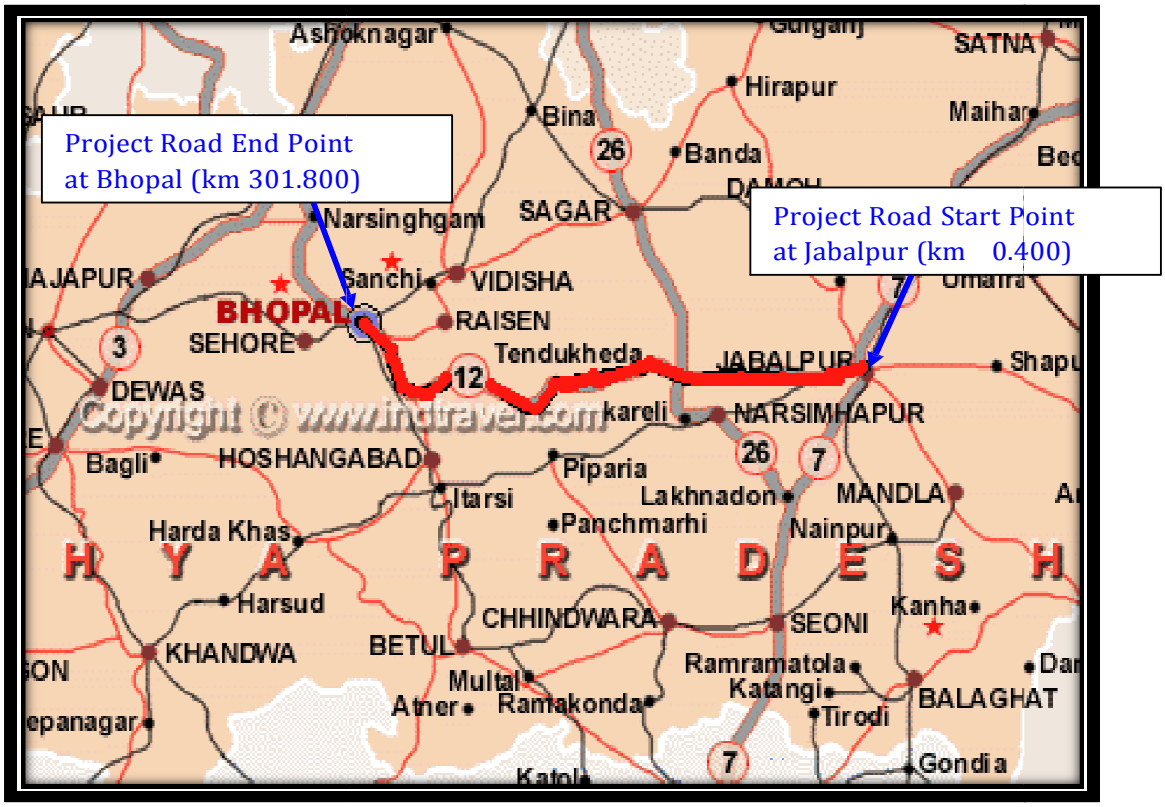

Figure 1: Location of the Project Road

Table 1: List of Villages Falling along NH-12

S. No.	Village Name	S. No.	Village Name
1.	Vikrampur	2.	Dharampura
3.	Dongar Village	4.	Poundi
5.	Jothkhera	6.	Kisrond
7.	Biltha	8.	Khirkakhera
9.	Banghi	10.	Bhamki
11.	Sarsala	12.	Poundi Phatak
13.	Ramkhirya	14.	Kaithara
15.	Samnapur	16.	Shahpura
17.	Kumharhoth	18.	Ganjkatanga
19.	Bamhorhi	20.	Natwara
21.	Sarasdol	22.	Surai
23.	Ktangi	24.	Agasi
25.	Kungawa	26.	Umariya
27.	Tewar	28.	Manegoan
29.	Lolri	30.	Mangawa
31.	Deori	32.	Biha
33.	Ronsara	34.	Jhinna
35.	Jamunia	36.	Bhitaa
37.	Simariya	38.	Bikharwa
39.	Gutori	40.	Khairy
41.	Biguvan	42.	Hirapur Bhandha
43.	Mehka	44.	Sahajpur
45.	Rampura	46.	Meregaon
47.	Saagoni	48.	Silari Kalan
49.	Tendukhera	50.	Bisawadi
51.	Madanpur	52.	

1.3 BACKGROUND OF THE EIA REPORT

The Ministry of Environment and Forests (MoEF), Government of India, in its notification S.O. 1533 dated September 14, 2006 has made it mandatory to obtain environmental clearance for any expansion, widening or construction of a new road project before its implementation. As a requirement for seeking environmental clearance the EIA consultants are required to prepare the Environmental Impact Assessment (EIA) report and the Environmental Management Plan (EMP) for getting environmental clearances from the Ministry of Environment and Forests. The EIA report has been prepared on the basis of model TOR specified by MoEF for Highway Projects as prescribed in the MoEF Notification dated 22.08.2013.

1.4 SUMMARY OF THE PROJECT FEATURES

Summarized features of the project are described in Table-2

Table 2: Summarized Features of the Project

S.No.	Salient Features		Description
1.	Length	:	64 km (Km 66/00 to Km 130/00)
2.	Terrain	:	Plain and Rolling
3.	Major Bridges	:	04 nos
4.	Minor Bridges	:	21 nos.
5.	Flyovers/Grade Separators	:	-
6.	ROB	:	-
7.	Underpasses (Box Culvert)	:	25 Nos.
	- Vehicular	:	-
	- Pedestrian/ Cattle Crossing	:	-
8.	Toll Plaza	:	1 Nos. (at km. 101/600)
9.	Traffic	:	Varies from 11368 PCUs to 21134 PCUs (Year-2012)
10.	No. of bypasses	:	-
11.	Length of bypasses	:	-
12.	Junctions		
	- Major	:	1 Nos.
	- Minor	:	29 Nos.
13.	Culverts	:	95 Nos. (Hume Pipe-45; Slab-20; Box-30)
14.	Bus Bays & Truck lay bays	:	14 Nos.
15.	Pavement Composition		
16.	New Pavement:		
	PQC	:	300mm
	DLC	:	150mm
	GSB	:	150mm
17.	Service/Slip Road:		
	BC	:	40mm
	DBM	:	60mm
	WMM	:	250mm
	GSB	:	200mm

1.4.1 Land Requirement

Land will be acquired for widening of existing 2-lane to 4-lane road improvement work; also short realignment & curve improvement have been proposed to minimize social impacts. The total land requirement for the project is 90.362 ha out of which 50.52 ha is forest land.

1.4.2 Water Requirements

Water for construction works will be independent of community water sources. Water will be procured from private suppliers. Similarly, drinking water sources will be through bore-well or procured through local sources and supplied by tankers. After completion of project, such water sources can be dedicated to the community. Water use will be approximately 2000 KLD.

1.4.3 Solid Waste Generation

- Spoil, overburden or mine wastes: borrow area overburden will be utilized during its rehabilitation. Surplus/unsuitable excavated soil shall be transported to nearby borrow areas for final disposal.
- Municipal waste (domestic or commercial waste): liquid waste generated at labour camps and contractor's site office will be disposed off in septic tank through soak pits. Solid waste will be buried in pits and covered with soil.
- Hazardous wastes (as per Hazardous Waste Management Rules): no hazardous wastes will be generated.
- Other industrial process wastes: dismantled bituminous waste, specifically scarified bituminous debris will be used in quarry area reclamation to prevent the chances of contamination of water and soil.

- Surplus Products: 3 categories of surplus product will be generated – topsoil, roadway excavation and overburden:

    1. Top soil: topsoil will be carefully stripped and will be utilized on embankment slopes prior to turfing/sodding.
    2. Roadway excavation: suitable excavated material will be re-used in road embankments formation. Surplus material will be disposed off in quarries and borrow areas to be used I their reclamation/rehabilitation.
    3. Overburden: Overburdens generated from borrow pits/quarries will be used in their

rehabilitation for covering the waste material. Final surface will be made up from topsoil layering to receive grassing/tree plantation.

- Construction/demolition Waste: demolition/construction waste will be utilized ion road construction wherever possible. Unusable waste will be used to back fill the borrow/quarry areas and will be covered with overburden and top soil stockpiled earlier and re-vegetated.

1.5 INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

(a) At-grade intersections (Major – 1 No.)

S. No.	Location of Intersection (Design Chainage)	Type of Intersection	Other features	Road classification
1	103.100	+ Junction	Rajmarg Junction with NH-26	Major

(b) At-grade intersections (Minor–29 Nos.)

S. No.	Location of Intersection (Design Chainage)	Type of Intersection	Other features	Classification
1.	66.200	Y	Viraghat	Minor
2.	68.600	Y	Village	Minor
3.	72.150	Y	Amoda	Minor
4.	78.800	Y	Dangargaon	Minor
5.	79.250	Y	Village	Minor
6.	79.800	Y	Jolkheda	Minor
7.	80.700	Y	Murgakheda	Minor
8.	82.280	Y	Bildha	Minor
9.	85.650	Y	Bandhu	Minor
10.	87.550	Y	Sarsala	Minor
11.	87.850	Y	Dangargaon	Minor
12.	88.800	+	R/s Tapria, L/s Sarsala	Minor
13.	89.800	Y	Ramkhedi	Minor
14.	90.100	Y	Village	Minor
15.	92.600	Y	Village	Minor

S. No.	Location of Intersection (Design Chainage)	Type of Intersection	Other features	Classification
16.	95.980	Y	Kumrola	Minor
17.	96.005	Y	Bichoa	Minor
18.	99.600	**+**	R/s Rechai, Bamhori	Minor
19.	100.700	Y	Sarasdol	Minor
20.	101.700	Y	Village	Minor
21.	104.100	Y	ODR to Deori	Minor
22.	106.100	Y	ODR to Rausara	Minor
23.	108.100	Y	ODR to PadriyaJamuniya	Minor
24.	110.600	Y	ODR to Gutori	Minor
25.	113.600	**+**	ODR to BilguwaPiparpani	Minor
26.	115.600	Y	ODR to Dhopkheda	Minor
27.	116.100	Y	ODR to Rampura	Minor
28.	122.000	Y	VR to Bhama Village	Minor
29.	124.800	Y	ODR to Dhilwar	Minor

1.6 SCOPE OF THE EIA/EMP STUDY

The scopes of the EIA/EMP study are: -

- Identification of the potential impacts during pre-construction, construction and operation phases.
- Developing mitigative measures to sustain and maintain the environmental scenario.
- Providing compensatory developments wherever necessary, including plans for highway side tree plantation.
- Designing and monitoring the Environmental Management Plan.
- Suggesting the Environmental Enhancement Scheme and its monitoring.
- Screening, scoping and consultations with public, experts in various fields, non-government organization (NGOs), etc.
- Review of policies and legal framework.

1.7 OBJECTIVES

The objectives of the EIA include:

- Collection of baseline data on various components of the environment.
- Determination of the magnitude of environmental impacts so that due consideration is given to them during planning, construction and operational phases of the project

implementation.

- Assessment of the socio-economic conditions of the project affected persons and suggestions for their improvement.
- Identification of areas and aspects, which are environmentally or socio-economically significant.
- Submission of environmental enhancement plan and environmental management plans for enhancing and mitigating the negative impacts.
- Development of the road alignment in such a way that the environment and settlements are least affected.
- Presentation of public view on various aspects of environment and socio-economic issues.

1.8 BASELINE ENVIRONMENTAL STATUS

The baseline environmental parameters were monitored during October & November, 2013 as per the Model ToR specified by MoEF.

The ambient air quality was monitored at thirteen locations along the project road and crusher sites, as per National Ambient Air Quality Standards, 2009. It is observed from the data analysis that the highest values for most of the monitored parameters were recorded at Mandideep and lowest at Baari. It may be due to industrial establishment at Mandideep and poor condition of roads. The Results show that all the parameters are well below the National Ambient Air Quality Standard, 2009.

The noise level was monitored at thirteen locations along the project road and crusher sites. The Noise levels recorded at various locations are below the National Ambient Air Quality Standards with respect to Noise. Highest noise level of 74.2 dB was measured at Sony Crusher, which is 40 km away from the project road. However, highest noise level along the project road was observed 64.1 dB at Rajmarg and the lowest noise level along the project road was observed 47.7 dB at Tendukheda.

Five surface water & thirteen ground water samples were collected along the project alignment. The water quality of the study area is good and meeting the IS: 10500 drinking water standards and CPCB standards, except bacteriological parameters in surface water samples. The present use of water is mainly in agriculture activities and in drinking water supply.

The soil pH is neutral to Alkaline and its salinity is normal. Texture of soil was observed Sandy Loam. Moisture content of soil ranges from 10.62 to 16.26 % at all locations except for

Tendukheda where moisture content is found highest as 34.12 %. Calcium content in soil ranges from 4.2 to 6.2 meq/100gm at all locations except for two locations Baari & Udaipura where calcium content was found to be 7.1 and 8.2 meq/100gm respectively. Sodium content in soil ranges from 32.6 to 42.0 mg/100g. Potassium content in soil ranges from 0.6 to 0.9 mg/100g. Phosphorous content in soil of the study area was found in the range from
82.6 to 98.2 mg/100g at all locations except Nandora and Tendukheda where Phosphorous content was found to be 102.7 and 190.2 mg/100gm respectively.

1.9 ANTICIPATED ENVIRONMENTAL IMPACT

As the project road is an existing road, there will not many changes in present physiography of the region. The most important impact on land environment in road construction or improvement project is the soil erosion. The construction activities require excavation of soil and removal of vegetation, which leads to loss of topsoil leading to localized ecological degradation. The soil erosion also adds to air and water pollution.

A few hand pumps and open wells are coming within ROW, which are used by local villagers for drinking purposes. Apart from these, no ground water resource is being impacted. Construction of minor bridges on streams and distributaries and road embankment will have potential impact on the quality of surface water bodies.

The project site impact on ambient air quality within the project site and nearby areas may be significant during the construction phases. The particulate matter will be the main pollutant due to the excavations, handling and transport of earth and construction material etc. at site. The other pollutants will be NO_x due to the construction activities like operation of construction equipment and traffic movement. Since the construction activities is a temporary activity and hence the increase in particulate matter and NO_x will be for short duration and its impact will be felt close to the construction site only. The construction camp shall be established at least one kilometer away from settlements. Outside the boundary of project activities, the Impacts would be marginal or insignificant.

The impacts of noise due to the project will be of temporary significance locally in the construction phase and slight increase may occur during the operation stages.

The economic and social interaction of communities is going to be improved by the road projects. However, the widening of the existing road and new alignment could cause disruption to

local interactions.

It has been observed that no archaeological site or monument and cultural heritage site exists close to highway. Therefore there would not be any kind of significant impact on the cultural heritage sites.

The planning and designing of the new road is in accordance with the improved safety measures and better health conditions. The chances of accidents could be minimized by (1) widening of existing carriageway, (2) strengthening the pavements, (3) improving upon the curves in road geometrics, (4) improving upon road crossings (5) putting right signals and signboards, (6) new under passes, (7) fly-over and grade separators.

The human diseases caused by the contamination of water, increase in air pollutants and noise may go up by 5-10% but proper mitigation can take care of the situation.

1.10 PROJECT BENEFITS

Highways projects generally promote access to markets, materials and opportunities by facilitating movement of persons and goods and improve earning and thereby level of living. This in turn enhances the demand for transport. This two-way interactions works through a host of inter-sectoral forward and backward linkages effects and dynamic externalities, tends to relocate industries, services and labour thus help the shape the economic geography of the region. The ultimate aim of the developmental activities, such as widening of NH-12 is to promote social welfare of the various districts and villages which reside along the road from Jabalpur to Bhopal stretch. The developments of above widening project play a significant role in changing the socio-economic condition and living of people of a region through dynamic externalities that such development often generates.

1.11 PUBLIC CONSULTATION

Public consultation at all stages of planning and implementation of a project is necessary. It helps in making the project more environment-friendly and easy to implement. Public consultation in this project is done by field-testing of questionnaires for various environmental/ socio-economic parameters.

1.12 ENVIRONMENT MANAGEMENT & MONITORING PLAN

The Environmental Management Plan is prepared for avoidance, mitigation and management of the negative impacts of the project. It also covers remedial measures require to be taken for hot spots. EMP includes the list of all the project related activities, their chainage-wise impacts at different stages of project during pre-construction phase / design phase, construction phase and operational phase on environment and remedial measures to be undertaken to mitigate these impacts. Total cost for environment management plan for the project is Rs. 81,41,00,000.

The Environmental Monitoring Programs are suggested to provide information on which management decisions may be taken during construction and operational phase. The objectives of these programs are:-

1.12.1 To evaluate the efficiency of mitigation and enhancement measures;

1.12.2 Updating the actions & impacts of baseline data;

1.12.3 Adaptation of additional mitigation measures (if the present measures are insufficient);

1.12.4 Generation of the data that may be incorporated in the environmental management plan in future projects.

Physical Infrastructure Transportation Roads

Roads carry 80 per cent of the goods and passenger traffic in Madhya Pradesh. Hence, systematic development of the road network is a pre-requisite for the overall development of the state. The total length of roads spanning MP is 67,600 km. About5,200 km of national highways (NH) run through the state. The road network provides convenient linkages to ports on the west coast, including Kandla and Jawahar Nehru Port Trust.

There are 18 national highways in the state, including trunk routes of Delhi-Mumbai, Delhi-Chennai, Delhi- Bangalore and Delhi-Hyderabad. The total length of state highways (SH) is9,885 km.

Under the Madhya Pradesh State Road Sector Development Programme funded by the Asian Development Bank, 1,750 km of state roads were also upgraded by 2006 at a cost of $150million.

The Madhya Pradesh government has accorded high priority to improve the road infrastructure and has been successful in attracting private sector participation (PSP) in the developmentof highways. It has constructed 17 bridges and bypasses to four of its cities through PSP. Maintenance of three state highways has been outsourced to the private sector. Currently, IJM Corporation of Malaysia is implementing two SH projects totaling 380 km with an investment of $50 million.

3.4.2 Registered Vehicles

The number of registered vehicles rose to 4.6 million in 2005-06. The highest increase has been in the number of motorcycles, scooters and mopeds in the Tenth Plan period (2002-2007). Thenumber of commercial vehicles like taxi cabs and three wheelers, buses and trucks increased substantially during this period.

There were 500,000 such vehicles in 2005-06, constituting 10.83 per cent of the total registered vehicles

3.4.3 Railways

The significant presence of mineral-based industries in the state and availability of efficient railway links is critical to fully exploit the potential. The total length of the railway network in Madhya Pradesh is 5,992 km. Of this, almost 1,880 km is electrified. Currently, railway up gradation projects include adding 1,151 km of railway lines at a cost of $460 million and implementing a major track modernization programme to convert 285 km of existing meter gauge routes to broad gauge at a cost of $112 million. The completion of these projects will further strengthen the railway network in the state. **3.4.4 Airports**

To provide a boost to the tourism sector, the state aims at positioning air transport as a reliable all-weather, low-cost transport option.

The state has five operational airports and 25 airstrips with regular services. The State has shown significant growth of air traffic.

There are convenient flights from Delhi and Mumbai to Bhopal, Jabalpur, Gwalior, Indore and Khajuraho. Indore airport has the capability to handle international cargo. An international airport is being proposed for Bhopal.

The data below indicates the growth of air traffic up to 2004. After introduction of private airlines the air traffic has almost doubled during the period from 2004 to 2009.

Madhya Pradesh - Growth in air traffic

Airport	2001-02	2002-03	2003-04
Bhopal	71,294	87,784	113,700
Indore	170,963	195,072	226,900
Total	242,257	282,856	340,600

Source: Review of Madhya Pradesh Economy, CMIE, August 2004

3.4.5 Water Supply

The state has several major rivers including Mahi, Narmada, Tapti, Chambal, Betwa, Wainganga, Ken, Sindh and Pench, which offer 56.85 MAF (million acre feet) of water. Of this, 69.74 per cent has the potential to be harnessed for irrigation purposes. Besides, 23.55 MAF of ground water is also available, of which 50 per cent can be utilized for irrigation purposes. The net irrigated area in the state in 2005-2006 was 5.68 million ha, which was 37.69 per cent of the net area sown.

The state has developed an irrigation potential of 2.4 million ha; the utilization, however, is only about 50 per cent. Besides this, the Narmada Valley Development Authority (NVDA) has developed a potential of 230,000 ha. The Rural Development and Agriculture departments are also contributing to water harvesting and creation of irrigation potential.

3.5 Socio-Economic Profile in the Project Area

3.5.1 General

Socio-economic data play a key role in identification of environmental parameters likely to be affected due to the project. This also facilitates the decision maker to assess a particular environmental parameter which needs further detailed investigation. With rapid strides in economic development, the need to rationalize the development is imperative. During the process of development, there has been intensive use of natural resources, very often leading to ecological imbalances. In a road project like this involving wide ranging construction activities, conservation of flora, fauna and the ecosystem forms important aspect of overall sustainable development process. The data / features documented hereunder have been collected through field investigation, interaction with local population and desk research and published data sources.

The environmental baseline data comprise the features present within a strip of 10 km on either side of the existing road. This area is referred to as study area in the report. It includes environmental features such as forest areas, conservation areas, water bodies (rivers, lakes ponds and reservoirs), industries, wildlife and, places of historical importance, tourism etc.

As mentioned, project road is situated in the districts of Jabalpur, Mandla and Balaghat hence can be described as influenced districts along this project road. Jabalpur, Mandla and Balaghat districts are located in East part of the Madhya Pradesh State.

3.5.2 Socio-economic Features

This section deals with the description of existing socio-economic profile if the project Influence Area. The data have been collected from various sources and field visits. Data has been collected on the

following aspects:

- Climate
- Land Environment,
- Water Environment,
- Air Environment,
- Noise Environment
- Biological and Ecological Environment
- Cultural and Socio-Economical Environment.

These have been described in detail in the chapter related to environmental studies.

The socio-economic features of the three districts are presented in the following sections. **3.5.3 Population**

The population of the three districts and the corresponding figure for the whole state in the year 2001 is presented in Table 3.1. It may be seen that Jabalpur is the most populated district with population density almost twice of the whole state. Whereas the two other districts have population density, lower than the whole state.

3.5.4 Food Production

Main crops of Madhya Pradesh are wheat, rice, chana, Jowarand groundnuts. Soybean is also produced to some extent. The quantities of production of the chief crops for the three districts are presented in Table 3.5.

The area under irrigation is not much in Madhya Pradesh. In the whole of Madhya Pradesh only 37.67 per cent of the total agricultural land is under irrigation. The distribution is varying for different districts. Balaghat has vast areas having agricultural land and the area under irrigation is more than 40 per cent till 2007. The same figures for Jabalpur are high. Mandla district is in hilly area and the area under irrigation is significantly low. The comparative analysis is indicated in Table 3.6.

3.6 Mining and mining products

Madhya Pradesh is very rich in mines. Mining forms a very important industry in the state. The following are the main mining and mineral products of Madhya Pradesh :

• Coal	• Bauxite	• Copper	• Iron	• Manganese	• Silica
• Lime Stone	• Laterite	• Kaolin	• Dolemite	• Fire Clay	• Rock Phosphate
•Slate	• Stalactite	• Diamond			

Apart from these there are several minor mining works. There is no documented record of distribution of the minerals in the districts. However the State earns huge revenue out of export of the mineral products. The details of revenue earnings from the mineral products from 2003 to 2007 are presented in Table 3.5.

Table 3.5

Revenue earned from Mineral products (Rs in lakhs)

Items	2003-2004	2004-2005	2005-2006	2006-2007
Primary minerals	633.47	682.52	726.90	795.91
Secondary minerals	45.74	66.42	92.48	128.00
Total	679.21	748.94	819.38	923.91
%of primary minerals	93.27	91.13	88.71	86.14
%of secondary minerals	6.73	8.97	11.29	13.85

Source: Indian Mines Bureau, Nagpur, Maharashtra, Mining Authority, Madhya Pradesh

It may be seen that revenue earned from the minerals over years are ever-increasing. Particular attention may be given to the secondary mining products, the earning from which increased at very high rates over the years.

3.7 Forest

The forest area for the whole state is covered earlier in this chapter. The State has large areas of reserved forests and even wild life sanctuaries. The area of forest started increasing from 2004-2005. Thereafter it is more or less stationery. The distribution of forest areas in the entire state and the PIA Districts are presented

3.8 Electricity Generation and Distribution

Records available from 2002-2003 to 2006-2007 indicates that there had been a steady increase in electricity consumption. However there had been not much significant growth in production in electricity. Indicates the production and consumption of electricity from 2002-2003 to 2006-2007. The corresponding consumption for the PIA districts is indicated in Table. The rural electrification in the three PIA Districts

3.9 Summary of Objectives with Respect to Road Transport

The State Government is committed to upgrade the road network in the State to the best of National standards within the forthcoming plan period.

Following are the objectives over the plan period :

- All the National Highways will be upgraded to two-lane carriageway at least.
- Four-lane will be provided where traffic demands.
- All the State Highways will be upgraded to 2-lane configuaration.
- All Major District Roads will be upgraded to Intermediate lane configuration.
- Improvement of roads in major urban cities.
- Almost all major rivers are connected by the bridges. All are being up-graded to at least two-lane bridges on State Highways and Major District Roads.
- Construction of minor bridges for all weather connectivity in rural areas under various schemes.

3.10 Future Growth in Economy

Madhya Pradesh has witnessed economic growth in the last Five Year Plan. The following key variables require to be considered in right earnest to sustain the economic growth achieved so far and to continue with it.

- To make the state attractive for Private Investment.
- The State should take the full advantage of the Central investments already made.
- Permitting the development of downstream industries from existing Central investment
- Better management of usage of raw materials of the state to meet the energy deficiency. • The State has to succeed in harnessing its rich water potential through the optimum utilization of resources and adoption of new technology
- Madhya Pradesh has many towns Class-B towns of category of Jabalpur. The State should attempt for more urbanization, to create a few classic towns, which will attract investments. This will lead to generation of more business and employment.
- The State has vast mineral and forest resources. It is necessary to harness these resources to the maximum for maximum revenue generation. The forest reserves can be developed into classified reserved categories and wild life sanctuaries, which will lead to more tourism.
- Good governance and stable policy framework to initiae more private investment, which will brighten the economic future of Madhya Pradesh.

3.11 Justification of Project Impacts and Benefits

Any road improvement project brings economic development to the area. This project is no exception but in a different manner. This road is in hilly terrain and in very poor condition. Improvement to 4-lane road can be viewed as boosting tourism, economic growth and more specifically reduction of distance among tourist locations around the PIA. The possible direct and indirect positive impacts are listed below.

- The immediate benefits of road improvement will come in the form of direct employment opportunities for the roadside communities and specially those who are engaged as wage laborers, petty contractors and suppliers of raw materials;

- Improved road networks provides for improved linkages between the village communities and urban centre, which provides wider marketing facilities ;

- Road networks not only links the village communities to better markets, but also opens up wider work opportunities in Capital Bhopal. People can shuttle to distant work sites and towns and engage in construction, factories, business as well as domestic works. In this case Jabalpur and Narsighpur are the main destinations :

- Improved road networks encourage urban entrepreneurs to invest in far and remote areas in commercial farming and industrial activities;

- Improved roads also help people building strong institutional network with outside agencies. Essential and emergency services can be availed fast like schools, health centre, public distribution system etc.

- Increased frequency of interaction with outsiders will increase the awarenesss level of the people in the village with regard to their health and nutrition, living style, value of education and proper utilization of available resources; and

- Increased with the government, non-government and other development agents, help people gain new knowledge on improved farming, land development, development and maintenance of natural resources through the formation of various economic and social development committees.

- To enhance project benefits for roadside communities and road users, the project design will incorporated the following:

- Saving in vehicle operating cost

- Time saving – freight and passenger movement

•Employment potential-direct employment in road construction and allied activities and greater mobility

• Lower accidents, quick access to services like hospitals, markets, offices etc.

• Improvement of geometric deficiencies;

• Effective surface and sub-surface drainage system to ensure that there will be no sinking and sliding zones;

• Safety measures such as pedestrian rails, barriers, highway signs, pavement marking, traffic signals, landscaping, illumination, road furniture, truck lay-bye, and bus-bays

• Addition of truck parking for improved road safety and reduced road congestion; •Development of public amenities such as rest rooms, telephone booths, facilities for public conveniences.