Initial Environmental Examination

June 2018

IND: Second Rural Connectivity Investment Program-Tranche 2

Madhya Pradesh

Prepared by National Rural Road Development Agency, Ministry of Rural Development, Government of India for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 8 June 2018)

Currency unit	–	Indian Rupees (INR/Rs)
INR1.00	=	$ 0.014835
$1.00	=	INR 67.41

ABBREVIATIONS

ADB	:	Asian Development Bank
BIS	:	Bureau of Indian Standards
CD	:	Cross Drainage
MPRRDA		Madhya Pradesh Rural Road Development Authority
CGWB	:	Central Ground Water Board
CO	:	carbon monoxide
COI	:	Corridor of Impact
DM	:	District Magistrate
EA	:	Executing Agency
EAF	:	Environment Assessment Framework
ECOP	:	Environmental Codes of Practice
EIA	:	Environmental Impact Assessment
EMAP	:	Environmental Management Action Plan
EO	:	Environmental Officer
FEO	:	Field Environmental Officer
FGD	:	Focus Group Discussion
FFA	:	Framework Financing Agreement
GOI	:	Government of India
GP	:	Gram panchyat
GSB	:	Granular Sub Base
HA	:	Hectare
HC	:	Hydro Carbon
IA	:	Implementing Agency
IEE	:	Initial Environmental Examination
IRC	:	Indian Road Congress
LPG	:	Liquefied Petroleum Gas
MFF	:	Multitranche Financing Facility
MORD	:	Ministry of Rural Development
MORTH	:	Ministry of Road Transport and Highways
MOU	:	Memorandum of Understanding
MPRRDA	:	Madhya Pradesh Rural Road Development Agency
NAAQS	:	National Ambient Air Quality Standards
NGO	:	Non-governmental Organisation
NOx	:	nitrogen oxide
NC	:	Not Connected
NGO	:	Non-government Organization
NRRDA	:	National Rural Road Development Agency
PIU	:	Project Implementation Unit
PIC	:	Project Implementation Consultants
PRIs	:	Panchyati Raj Institutions
PMGSY	:	Pradhan Mantri Gram Sadak Yojana
POL	:	Petroleum, Oil and Lubricants
PPTA	:	Project Preparation Technical Assistance

RCIP	:	Rural Connectivity Investment Program
ROW	:	Right-of-Way
RPM	:	Respirable Particulate Matter
RRP	:	Report and Recommendation of the President
RRSP	:	Rural Road Sector Project
SRRDA	:	State Rural Road Development Agency
SBD	:	Standard Bidding Documents
SO_2	:	sulphur dioxide
SPM	:	Suspended Particulate Matter
TA	:	Technical Assistance
TOR	:	Terms of Reference
TSC	:	Technical Support Consultants
UG	:	Upgradation
WBM	:	Water Bound Macadam
CGRRA		Madhya Pradesh Rural Road Development Agency
ZP	:	Zilla Parisad

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EXECUTIVE SUMMARY

1. Pradhan Mantri Gram Sadak Yojana (PMGSY) aims to provide all-weather road connectivity to currently unserved habitations in India's rural areas, where 70% of the population live. The Government of India (GOI) launched PMGSY in 2000. The objective of PMGSY is to provide all-weather road connectivity to all rural habitations with a population of more than 500 persons in plains and and 250 persons in hill states. This program is being implemented through National Rural Road Development Agency (NRRDA) under the Ministry of Rural Development (MORD) at central level and through State Rural Road Development Authorities/Agencies (SRRDAs) at state levels.

2. The Second Rural Connectivity Investment Program (RCIP 2) is the continuation of Rural Connectivity Investment Program (RCIP) and is a Multitranche Financing Facility (MFF) that will be implemented in the states of Assam, Chhattisgarh, Orissa, Madhya Pradesh and West Bengal.

3. The Government of Madhya Pradesh is now planning to submit to ADB the second Periodic Finance Request (PFR) that includes the proposal for about 204 rural roads, consisting of 168 packages and with a total distance of 2859.09 km in the state of Madhya Pradesh. Madhya Pradesh Rural Road Development Authority (MPRRDA) is the Implementing Agency. The preparatory works for the proposed roads under the second tranche have been completed for the state. As per the requirements of ADB, it is mandatory that the subprojects under the programme comply with ADB's environmental safeguards policy. The project has been categorised as 'Category B' project and therefore requires an Initial Environmental Examination (IEE).

4. A review of international agreements and conventions where India is a member were made to ensure compliance. These agreements are: Conventions on Wetlands of International Importance Especially as Water Fowl Habitats (Ramsar), Convention Concerning the Protection of the World Cultural and Natural Heritage, Convention on International Trade in Endangered Species of Wild Fauna & Flora (CITES), Convention on the Conservation of Migratory Species of Wild Animals (CMS 1979), and the United Nations Framework Convention on Climate Change, and Convention on Biological Diversity.

A. Physical Environment

5. Madhya Pradesh has a topography that is crossed from north to south by plains separated by upland areas. The climate is extreme in the north of Madhya Pradesh. It is cool and breezy in the central parts and humid in the eastern and southern regions. The state has three main seasons: a) winter from November to February; b) summer from March to May; and c) monsoon season from June to September.

6. Most of the project area lies in vast open agricultural land and is largely free from air pollution sources other than traffic and few brick-kilns existing in the area. These are located in open area and operate only for a few months. As such, the ambient air quality for major pollutants like SO_2, SPM and NO_X are expected to be within the limits.

7. There is neither significant industrial activity nor significant vehicular traffic contributing to ambient noise levels. The occasional vehicular movement on the unpaved roads contributes to increased noise levels over short duration and limited to daytime. The existing roads do not appear to have vehicular traffic at nighttime.

8. Madhya Pradesh, the second largest state in India, has an area of 30.82 million hectares. This represents 9.37% of the land area of the country. Landlocked in the central part of the country, the state has topography that is crossed from north to south by plains separated by upland areas. Geographically, the state consists of a plateau with a mean elevation of 1600 ft above sea level, interspersed with the mountains of the Vindhya and the Satpura ranges with the Chhattisgarh plains to the east. The hills give rise to the main river systems - the Narmada and the Tapti, running from east to west, and the Chambal, Sone, Betwa, Mahanadi, and the Indravati west to east. Ground elevation varies from 270 m to 750 m above mean sea level.

9. The soils of the state are rich and fertile. The state has a variety of soils ranging from rich clayey to gravely. The major groups of soils found in the state can be divided in four categories i.e. alluvial, medium & deep black; shallow & medium black; and mixed red & black. Categorically state has two agro-climatic zones namely (i) Central Plateau & Hill Region and (ii) Western Plateau & Hill Region. These two zones have been further sub-grouped and the description regarding area and its soil &geological features.

B. Biological Environment

10. The project state lies in tropical climate zone. It has a medium range of flora and fauna. Flora, fauna and vegetation types found in the areas. However, none of the roads consists of any rare, endangered or threatened floral and faunal species.

11. Of the 204 roads proposed under tranche 2, 7 roads pass through forest area. None of them pass through reserve forest or wildlife sanctuaries though. All of them are existing roads and the improvement within the forest stretches will be within the existing road width. Still, some trees might require felling during clearing up operations for construction of rural roads. In most cases, tree cutting has been minimized by suitably modifying the alignment.

C. Socio-economic Environment

12. Madhya Pradesh has a total population of 60 million persons. It has one of the largest tribal populations in the country. The literacy rate of the state is 70.6%, which is close to the national literacy rate of 74.04 %. About 18.8 million people are considered living below poverty line in Madhya Pradesh. Agriculture is the main occupation in the state. About half of the land area is cultivable. The extent of availability of cultivable land varies depending on topography, rainfall, and soils. The larger cultivable land is found in the Chambal Valley, Malwa Plateau, Rewa Plateau, and Chhattisgarh Plain. The prime crop of the state is cereal (about 41%), followed by pulses (about 20%), oilseed (about 30%) and vegetables, fruits, fodder and other horticultural crops (about 9%).

13. The state has various industrially developed estates. The major industrial produce includes cement, pig iron, steel ingots, news print, and sugar. Industrialization is low in the subproject areas. However, there is high potential for the growth of cottage and small industries in subproject areas.

D. Anticipated Enviromental Impacts and Mitigating Measures

14. Significant enviromental impacts were anticipated mostly during construction phase. Some of these significant impacts include a) impact on common utilities and community properties; b) loss of productive soil; c) impact on hydrology and drainage; d) compaction and contamination of soil; e) generation and management of construction debris and wastes; f)

increased air pollution level; g) increased noise level; h) impact on ground and surface water quality and availability; i) loss of trees; j) increased level of vehicle traffic; and k) health and economic hazards to the community. Mitigating measures were proposed in the enviromental management measures to address all the anticipated environmental impacts.

15. Total annual emissions without the project (business as usual) at the middle of the design life of 7.5 years is estimated at **96,084 tons/year** and with project scenario is estimated at **94,554 tons/year**, for all 204 roads proposed for Tranche 2 of RCIP 2. The with project scenario is still far below the 100,000 tons per year threshold set in the ADB SPS 2009 and therefore not required to implement options to reduce or offset CO_2 emissions.

16. The following measures will be incorporated in the design of rural roads for Madhya Pradesh in consideration of the identified climate risks: (a) Increase in road embankment height in flood prone areas/sections; (b) Improvement and provision of lined longitudinal and cross drains and new culverts; and (c) Protection works. Provisions have also been made in the bidding documents for the contractor to prepare EMPs based on the final detailed design to address climate related risks and vulnerabilities.

17. The total cost of climate adaptation measures for Tranche 2 is **$17.174 million**, representing **5.72%** of the total project cost of **$300.47 million**. The cost of adaptation to be financed by ADB for Tranche 2 (Madhya Pradesh only) is **$6.29 million**.

18. **EMP implementation**. The Ministry of Rural Development (MoRD), the executing agency has the responsibility for monitoring implementation of the EMP for all subprojects and undertaking necessary due diligence. MoRD ensure this through its Nodal Agency, the National Rural Road Development Agency (NRRDA). NRRDA is responsible for the implementation of the environmental management plan (EMP). SRRDA is the state level agency responsible for implementation of PMGSY program in the state. Since only Madhya Pradesh will be covered under Tranche 2, Madhya Pradesh Rural Road Development Agency (MPRRDA) will be responsible for the implementation of PMGSY program in the state.

19. NRRDA has developed various guidelines and defined institutional arrangements for effective and timely implementation of PMGSY program, which also covers measures for environmental and social safeguards. In line with the defined institutional requirements, each SRRDA has set up district level project implementation units (PIUs). NRRDA also appoints Technical Support Consultant (TSC) to provide technical support for capacity building in SRRDA/PIUs, facilitating them for environmental and social safeguard compliance monitoring and due diligence. SRRDA appoints PIC (project implementation consultant) for supervision of construction work (MPRRDA for Tranche 2). PIC also helps PIU in monitoring the EMP.

20. **Environmental Management and Monitoring Plans**. The environmental monitoring program is prepared with aim to monitor the environmental performance of environmental management plan. For rural roads, Environmental Monitoring plan will be more observation oriented and it provides observation areas with frequency of monitoring at pre-construction aspects[1], construction stage and operation stage.

21. **Grievance Redress Mechanism.** PRI administered village level committee is the first contact point for any aggrieved person. This committee will try to settle the concern by them self or in consultation with contractor or PIU. The unresolved concerned are forwarded to PIU for

[1] Aspects related to alignment selection for inclusion of new roads

further action. PIU resolves these concerns in consultation with PIC, SRRDA, and contractor as the situation demands. This is an established practice and is seen effective enough in Rural Road Sector Project II (RRSP II) and RCIP. PIC will also collect concerns received by the committee in the intervening period and report the effectiveness of action taken. At national level, NRRDA has made provision of registering complain / suggestion through its website. NRRDA forwards these complains to concerned SRRDA for necessary actions (MPRRDA for Tranche 2). MPRRDA directly or through concerned PIU initiate the appropriate action and update the complainant as well as NRRDA. It is proposed that NRRDA website will be cross-linked to each SRRDA (including MPRRDA) website as well or SRRDA will also make provision of complain registry at its website.

E. Conclusion and Recommendations

22. **Conclusion.** The proposed Second Rural Connectivity Investment Program Tranche 2 has been categorized as "B" for environment under SPS 2009. No categorization is made under the environmental legislation of India, since these small roads do not require any environmental clearance in accordance with Environment (Protection) Act and Rules, 1986 amended till date. The findings of environment assessment of sample roads indicate that impacts are mostly similar and subprojects are unlikely to cause any significant environmental impacts. Most of the impacts are likely to occur during construction stage, are temporary in nature, and can be mitigated with minor to negligible residual impacts. All sample roads included under Tranche 2 were selected based on ecological and climate change consideration defined under EARF. Accordingly, none of the sample roads passes through protected areas or encroaches precious ecology (sensitive or protected areas) or any historical or archeologically protected areas.

23. Significant impacts are not considered adverse and typical to road constructions that are simple to mitigate. Impacts related to road siting in flood and erosion prone areas are mitigated through proper design. During construction, impacts can be mitigated through good engineering practices and compliance to permits and clearances issued by the regulatory agencies. The mitigating measures are institutionalized through the EMP and EMoP, and institutional arrangements were established to implement these plans.

24. **Recommendations**. Any major changes or any additional work other than the proposed project activities indicated in the IEE and Environment Checklist (formerly Environmental Code of Practice or ECOP) will require updates in the IEE. The updated Environment Checklists and IEE will have to be submitted to NRRDA and ADB for concurrence prior to commencement of civil works.

25. Executing agency shall ensure that updated road specific EMP forms part of DPR and is available to contractor at the time of bidding. The contractor will specify the quantity and budget for various activities like rehabilitation of borrow earth pits, first aid and sanitation facilities at construction camp and temporary office/material storage place as per EMP requirements. The same shall be revised if there is any change in the project design. Any such change shall be reported to ADB as well.

I. INTRODUCTION

A. Project Background

1. Pradhan Mantri Gram Sadak Yojana (PMGSY) aims to provide all-weather road connectivity to currently unserved habitations in India's rural areas, where 70% of the population live. The Government of India (GOI) launched PMGSY in year 2000. The objective of PMGSY is to provide all-weather road connectivity to all rural habitations with a population of more than 500 persons in plains and and 250 persons in hill states. This program is being implemented through National Rural Road Development Agency (NRRDA) under the Ministry of Rural Development (MORD) at central level and through State Rural Road Development Authorities/Agencies (SRRDA) at state levels.

2. The Second Rural Connectivity Investment Program (RCIP 2) is the continuation of Rural Connectivity Investment Program (RCIP) and is a Multitranche Financing Facility (MFF) that is being implemented in the states of Assam, Chhattisgarh, Orissa, Madhya Pradesh and West Bengal. Investments in rural roads will improve connectivity, cut transport costs, and provide enabling infrastructure to areas currently with poor access to markets and urban towns, and thus contribute to growth and equity in the country's largest sector.

3. The Government is now planning to submit to ADB the second Periodic Finance Request (PFR) that includes the proposal to upgrade 204 rural roads, consisting of 168 packages and with a total distance of 2,859.09 km of rural roads in Madhya Pradesh. Madhya Pradesh Rural Road Development Agency (MPRRDA) is the implementing agency (IA) for the ADB funded subprojects in the state. The preparatory works for the second batch of roads have been completed for the state. As per the requirements of ADB, it is mandatory that the subprojects under the programme comply with ADB's environmental safeguards. The project as per classification of ADB has been categorised as 'Category B' project and therefore requires an Initial Environmental Examination (IEE). The IEE report has been prepared by using environmental checklist for sample roads.

B. Project Roads Identification and Location

4. PMGSY has prepared specific guidelines for the selection of roads under this programme. The key requirement is that any road will be eligible for construction or up-gradation only if it is part of the Core Network[1] and satisfy the following environmental safeguards:

i. The selected road shall not disturb any cultural heritage designated by the Government or by international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance.
ii. The selected rural road shall not pass through any designated wildlife sanctuaries, national parks, notified ecological sensitive areas or area of internationally significance (e.g., protected wetlands designated by the Ramsar Convention);

[1] Core Network is that minimal network of roads (routes) that is essential to provide access to essential social and economic services to all eligible habitations in the selected areas through at least single all-weather road connectivity. A core network comprises of through routes and link routes. Through routes are the ones, which collect traffic from several link roads or a long chain of habitations and lead it to marketing centres either directly or through the higher category roads i.e., the district roads or the state or national highways. Link routes are the roads connecting a single habitation or a group of habitations to through routes or district roads leading to market centres. Link routes generally have dead ends terminating on a habitation, while through routes arise from the confluence of two or more link routes and emerge on to a major road or to a market centre.

iii. The subprojects shall only involve activities that follow Government of India laws and regulations and meets funding agency safeguard policies.

5. Summary of the proposed subprojects is as under:

- No. of districts where subprojects are located : 34
- Total number of roads proposed under Tranche 2 : 204
- Total number of packages : 168
- Total length of roads (km) : 2,859.09

6. These districts are located all over the state covering 34 out of the 50 districts. In this batch of subprojects, the longest road is 46.0 km (T06-Tejgarh-Hinoti Sarra-Pura-Jhalon-Bamnoda-Taradehi Road in Tendukheda block of Damoh district), while MRL01-Badkummed Road to Kesoni (0.95 km) in Ujjain block of Ujjain district is the shortest. The average length of roads works out to14.02 km.

C. ADB Safeguard Policies and Category of the Project

7. The Asian Development Bank has defined its Safeguard requirements under its 'Safeguard Policy Statement 2009' (SPS 2009). The SPS 2009 requires environmental assessment, mitigation and commitment towards environmental protection. The prime objectives of these safeguard policies are to (i) avoid adverse impacts of projects on theenvironment and affected people, where possible; and (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible. ADB as per SPS 2009 classifies a project into category A, B or C depending on potential adverse environmental impacts.

8. All environmentally sensitive components along each subproject is critically analysed to assess the magnitude and extent of likely impacts. These sample subproject roads stretches do not pass through any protected areas nor located near any archeologically important monument. As per selection guidelines, none of the selected subproject passes through reserved forests either. Few trees cutting though may be involved. The roads primarily pass through agricultural and residential areas. Most of the sample roads aligned along existing village roads and unpaved movement paths. As such, there is no land acquisition as the additional land required for the project is availed through voluntary donation from the affected persons. Hence, the project will fall under category B as per ADB Safeguard Policy Statement 2009.

9. No categorisation is made under environmental legislation since these small roads do not require any environmental clearance in accordance to Indian Environmental (Protection) Act and Rules, 1986 amended till date.

Figure 1: District Locations of Tranche 2 Roads

D. Objectives and Approach for Environmental Assessment

10. The prime objectives of the environmental assessment include identification of the likely environmental impacts during design, construction and operation stage of each sub project; and implementation of cost effective mitigation and monitoring measures with institutional mechanisms.

11. Since there are 204 rural roads involved under Tranche 2 of Second RCIP and each road is small, preparation of individual IEEs for each road will be difficult and time consuming. ADB had finalised Environmental Code of Practices (ECOP) checklist under Rural Road Sector Project II (RRSP II) and RCIP I, which is modified for second RCIP. Subprojects specific Initial Environmental Assessment (IEE) is carried out as per this ECOP checklist. Sample ECOP checklist with annexures on tree, utility and community structures, strip maps and photographs is enclosed as ***Appendix 2*****.**

12. The findings of subproject specific assessment suggest that similar issues exist among rural roads in Madhya Pradesh, with very few subproject specific issues. Therefore, state specific IEE report has been prepared based on ECOP checklist of selected sample roads in Madhya Pradesh.

E. IEE Methodology and Content

13. The state specific IEE has been largely structured as per SPS, 2009 and ADB's Environmental Assessment Guidelines (2003). The IEE reports, including EMPs, monitoring plans, cover the most environmentally sensitive components in state as well as specific to subproject roads.

14. **Corridor of Impact**: The direct area of influence or the corridor of impact (COI) has been considered as 10 m on either side of the proposed sample roads alignment based on the proposed cross-section.

15. **Field visits, and primary and secondary data collection:** Each selected sample road was visited along with concerned PIU officials for environmental assessment and identification of associated environmental issues. Each road specific strip map was prepared during the field visit to capture the information related to tree inventory, utility and community structures located along the proposed road alignment, surface water bodies, and ecological sensitivities. Secondary environmental information pertaining to the environmental issues, protected area, forests areas were collected from various government and non-governmental / research institutions for assessment of the baseline environment of the project locations, district and state as a whole.

16. **Data analysis, impact identification and mitigation measures:** Information collected was analysed. The impacts were identified using expert's assessment and following established practices. Mitigative measures are proposed common to all roads under second RCIP and specific to the roads. EMP is prepared considering mitigative measures and institutional framework of MPRRDA.

17. The IEE report includes following seven chapters including this introduction Chapter.

- Chapter 1- Introduction
- Chapter 2- Description of Project
- Chapter 3- Description of Environment
- Chapter 4- Anticipated Impacts and Mitigation Measures
- Chapter 5- Institutional Requirement and Environmental Monitoring Plan
- Chapter 6- Public Consultation and Information Disclosure
- Chapter 7- Conclusion and Recommendation

F. Legal Framework and Legislative Requirements:

18. India has well defined institutional and legislative framework. The legislation covers all components of environment, which includes air, water, soil, terrestrial and aquatic flora and fauna, natural resources, and sensitive habitats. India is also a signatory to various international conventions and protocols.

19. As per Environment (Protection) Act, 1986; the Environmental Impact Assessment Notification, 2006; amended in 2009 defines the environmental impact assessment for defined development projects. All new or expansion of National and State Highways requires Environmental Impact Assessment and Environmental Clearance from central or state level Environmental Appraisal Authority. However, small roads projects as proposed under Tranche 2 of Second RCIP in Madhya Pradesh state do not require environmental assessment or clearance as per above notification.

20. In addition to above, new road construction or road improvement work involves a number of legislations including diversion of forest land, tree cutting, opening of new quarry, establishment of temporary workshops, construction camps, hot mix plants, and use of vehicles for construction. The legislations relevant for Tranche 2 roads are listed below:

Sl. No.	Legislation	Applicability
1.	Environment (Protection) Act 1986-EIA Notification 2006 (Amended 2009)	Not applicable to rural roads. It is applicable only to National and State highways**.**
2.	Forests (Conservation) Act 1980 (Amended 1988), and Forest (Conservation) Rules, 1981, (Amended 2003)	As per above Act/Rules *Forest Clearance* from Department of Forests/Ministry of Environment and Forests Govt. of India is required for diversion of forest land (if any) for non-forest purpose. Prior permission is required from forests department to carry out any work within the forest areas and felling of roadside trees. Cutting of trees need to be compensated by compensatory afforestation as per permission condition.
3.	The Wildlife (Protection) Act, 1972 (Amended 1993); Not applicable in this case since no roads will be selected passing through protected areas or sanctuaries	Not applicable, as no road passing through protected areas is selected
4.	The Water (Prevention and Control of Pollution) Act 1972 (Amended 1988), and the Water (Prevention and Control of Pollution) Rules, 1974	Placement of hot-mix plants, quarrying and crushers, batch mixing plants, discharge of sewage from construction camps requires *No Objection Certificate (Consent to Establish and Consent to Operate)* from State Pollution Control Board prior to start of construction or setting up specific facility. *Authorisation* will also be required for disposal of Hazardous Waste like waste oil etc. from State Pollution Control Board
5.	The Air (Prevention and Control of Pollution) Act, 1981, (Amended 1987), and the Air (Prevention and Control of Pollution) Rules, 1982	
6.	The Noise Pollution (Regulation and Control) Rules, 2000 (Amended 2002)	
7.	The Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 (Amended 2009), and the Batteries (Management and Handling) Rule, 2001	
8.	Guidelines for Ground Water Extraction Prescribed by Central Ground Water Authority under the power granted under Environment (Protection) Act 1986	*Permission* from Central Ground Water Authority (CGWA) is required for extracting ground water for construction purposes, from declared as Semi-critical, Critical and Overexploited areas from ground water potential prospective. For NOC, an application in the prescribed Proforma is to be submitted either to the Office of the Regional Director, (CGWB) of the concerned state, or to Member Secretary, CGWA, New Delhi

21. The PMGSY Scheme and Guidelines (2004) No. 12025/8/2001-RC, Ministry of Rural Development (MORD) also defines environmental safeguards particularly with respect to road selection and regulatory compliance which is also to be complied with.

G. Acknowledgement

22. The Technical Support Consultants (TSC) gratefully acknowledge the support received from NRRDA and MPRRDA throughout the environmental assessment process. We also acknowledge the assistance received from respective PIUs and the PIC during field visits

and other government agencies for primary and secondary data collection as well as the assistance during public consultations.

II. DESCRIPTION OF THE PROJECT

A. General

23. The PMGSY program has a mandate to provide all-weather roads to all the rural habitations within the country. Second RCIP is planned to meet above objectives. Thirty-four (34) roads with a total length of 430.31 km are identified as sample roads for Madhya Pradesh under Tranche 2 of Second RCIP. The broad specification for road alignment selection, payment design, construction methodology, geometric design etc. are same and is as per the "Specification for Rural Roads" published by IRC on behalf of the Ministry of Rural Development, Government of India. The design details presented in this chapter are as per above specifications. Minor changes will apply depending on road specific issues and design consideration.

24. Since topography of most of the project districts in Madhya Pradesh state is largely flat, the design details applicable to flat terrain are presented in following section.

B. Sample Roads Selected in Madhya Pradesh State

25. The Madhya Pradesh state has selected 204 roads with a total length of 2859.09 km spread over 34 districts as detailed at **Appendix 1.** The 34 sample roads are indicated in **Table 1**.

Table 1: Summary of District Wise Sample Rural Roads

Sl No	District	Block	Road Name	Length (Km)
1	Alirajpur	Sondwa	ML01-Alirajpur-Mathwad Road to Baheda-Baddala	24.29
2	Balaghat	Baihar	T24-Baihar To Katangi	10.60
3	Barwani	Pati	ML01-Osada Semli Bamnali to Rosar Road	17.89
4	Betul	Athner	T02-Athner Ghoghrajod Mendha Chhindwad to Bothi	34.69
5	Bhind	Gohad	MRL08-Chitora to Pali (Dirman)	7.70
6	Bhopal	Phanda	T17-T07 (Kolar road) to T05 Ratanpur	10.00
7	Burhanpur	Burhanpur	T02-Dariyapur-Jasondi Road to Fopnarkala	2.80
8	Chhatarpur	Bijawar	T04-Amroniya to Amarpura	6.00
9	Damoh	Patera	T07-Patera-Bilakhurd Road	11.54
10	Dewas	Bagli	T01-Bagli Punjapura road	15.00
11	Dhar	Dharmpuri	T02-Dhamnod To Rupatta Fata Via Sundrel Road	12.60
12	Gwalior	Bhitwar	T04-Gadhota Tiraha to Mastura, Rahi, Bela, Itma Upto Bargawan	18.24
13	Harda	Harda	T01-Sirali to Harda Magradha Road (Sukharas)	18.64
14	Hoshangabad	Seoni Malwa	T09-Shivpur Bhiladiya Rd to Richhi	5.68
15	Indore	Depalpur	T01-Chittoda to Pitawali	16.60
16	Jhabua	Ranapur	T23-T04 Tandi Kanjwani Road to Mandlinatu To Sotiya Jalam To Gujrat Border	12.88
17	Katni	Vijayraghavgarh	MRL01-Barhi Road (Singodi) to Khirwa No.1	5.05
18	Khandwa	Khandwa	T01-Khandwa Mundi Road to Dudhwas	15.40
19	Khargone	Bagwanpura	T04-Dhulkot Kabri Road to Gujar bawadi-II	6.20
20	Mandsour	Garoth	T03-Kurawan to Basai	19.93
21	Morena	Kailaras	T01-M.S. Road to Arroda	9.60
22	Neemuch	Nemuch	T01-Manasa Parda Kanjarda Deiken Road	26.50
23	Panna	Ajaygarh	T02-App. Road to Pista	11.00
24	Raisen	Obedullaganj	T02-NH-12 (Mandideep) - (Via Dahod) NH-12Noorganj to Dahod Road	17.75
25	Ratlam	Sailana	T03-Jaora Amba Road to Badayalamata Sailana Road	23.00
26	Rewa	Naigarhi	T22-T002 To Harditiwariyan	11.03

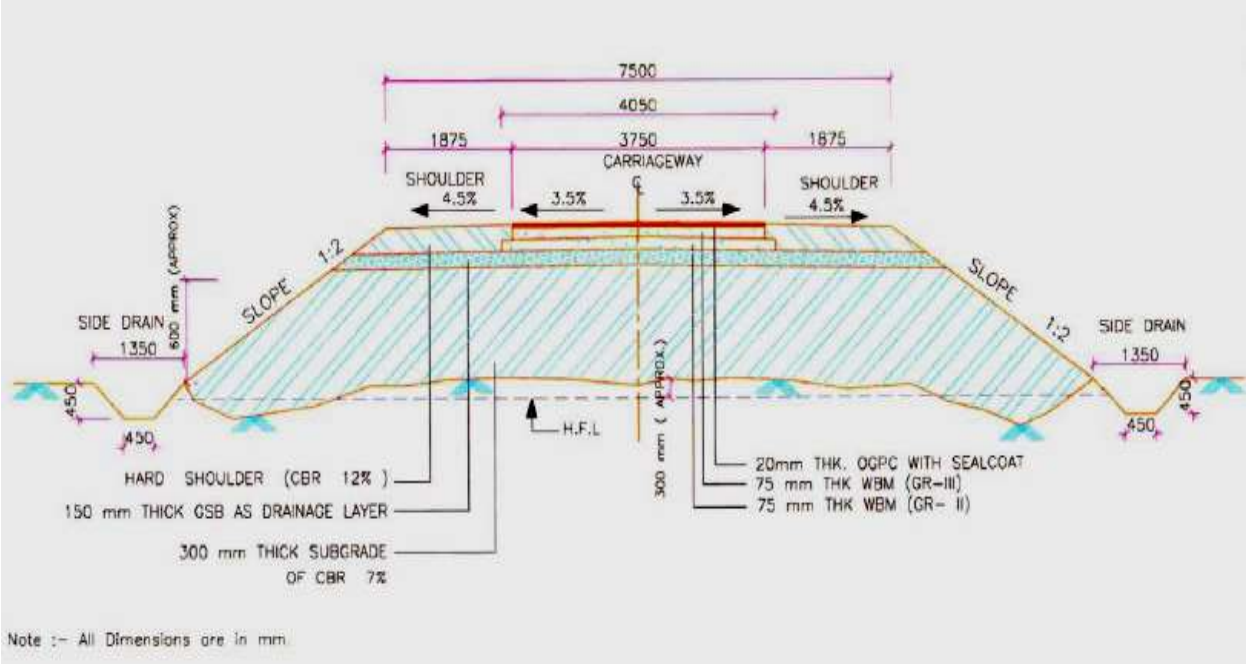
Sl No	District	Block	Road Name	Length (Km)
27	Sagar	Deori	MRL01-T-09 to Jaitpur Kachhya	4.76
28	Satna	Ram Nagar	MRL04-T03 to Semariya	6.10
29	Seoni	Seoni	T03-Diwthi to Bhomatola	7.80
30	Shajapur	Moman Badodiya	T04-Chitawad to Manglaj	6.64
31	Shivpuri	Karera	T12-Shivpuri Jhansi Road (NH25) to Teela	5.10
32	Tikamgarh	Jatara	T01-Acharra to Ghumtaghat	8.10
33	Ujjain	Ujjain	T01-Ujjain Maxi Road to Biaora	3.20
34	Vidisha	Vidisha	MRL04-Bhairokhedi (NH-86) to Ahmedpur via Palki Tharr	18.00
Total				430.31

C. Project Description

1. Rural Road Construction Proposals

26. The proposed rural road construction work will provide 3.75 to 7.5 m roadway width[1] with 3.75 m carriageway in accordance with the IRC-SP 20: 2002 in plain terrain. The proposal considers a 3.75 m cement concrete pavement with lined storm water drains for stretches passing through built-up areas, waterlogged/water overtopping/ flood prone areas. The pavement design considers a base layer of variable thickness as per the design with granular sub base, 150 mm thick water bound macadam (WBM grade I & II) and finally topped with 20 mm thick bituminous pavement. Adequate cross drainage structures like pipe or slab culverts/bridge structures are considered for drainage channels across the roads. Few minor bridges are also proposed for construction. **Figure 2** shows the typical cross section of the rural roads.

Figure 2: Cross-section of Rural Roads



[1] The road width may be reduced to 6m in case of BT and 3.75 m in case of CC as per PMGSY recent guideline.

27. The rural road construction works will be in conformance with the Rural Roads Manual and / or Technical Specifications (IRC: SP20: 2002) for Rural Roads published by the Indian Road Congress (IRC) on behalf of Ministry of Rural Development, Government of India. The broad design considerations are given at later part of this chapter.

2. Present Condition

28. The project roads mainly pass through plain or riverine terrain and agricultural area. The project roads have several cross-drainage structures, electric posts and telephone post along the existing alignment. There are some community physical structures like temple, mosque, primary or secondary schools beside the roads alignment, but largely will not be affected due to the road works.

3. Alignment and Profile

29. The existing rural roads are generally of earthen track with some stretches of brick flat soling. Thus, the project roads are new connectivity roads. The construction works are to be confined to the existing alignment. The existing horizontal and vertical alignment / profile will be generally maintained except for minor smoothening or corrections to sustain consistent design speed without causing any land acquisition requirements and thereby the possible social and/or environmental concerns.

4. Design Considerations

30. **Geometrical Design and ROW Requirements**: The geometric design standards for this project will conform to PMGSY II guidelines. Recommended design standards vis-à-vis the standards followed for this road are described below. The requirement of ROW as per PMGSY II guidelines considered for the design is given at Table 2 below:

Table 2: ROW Requirement

Road classification	Plain and Rolling Terrain (ROW in m)			
	Open Area		Built-up Area	
	Width	Range	Width	Range
Rural roads (ODR and VR)	15	15-25	6.0	6.0

ODR: Other District Roads; VR: Village Roads

31. Since terrain is plain and the proposed carriage way will be between 3.75 to 7.5m depending on the traffic flow, the design speed considered is as per recommended design speed of 60 Km/h. The radius of horizontal curve is considered as 90 m ruling minimum (60m absolute minimum). The vertical alignment is designed as per ruling gradient of 3.3% applicable for plain terrain.

32. **Pavement and Embankment Design**: Considering the sub-grade strength, projected traffic and the design life, the pavement design for low volume PMGSY roads are proposed to be carried out as per guidelines of IRC: SP: 72 – 2007 or IRC SP:77 “Design of Gravel Roads” and IRC SP:62-2004 “Cement Concrete Roads”. In built up area for hygienic and safety reasons, C.C pavement is proposed with a hard shoulder and appropriate line drain. A design life of 10 years is considered for the purpose of pavement design of flexible and granular pavements. The embankment height considered as 1m (average) from ground to crust except at the approaches of cross drainage structures. The embankment height will vary in flood prone area as per the HFL.

33. **Road side drain**: As the insufficient drainage of surface water leads to rapid damage of road, road side drain (**Figure 2**) are provided on the locations of habitation areas with concrete pavement. The rainwater will flow along the longitudinal slope and intermittent gaps in concrete curbs

34. **Carriageway:** The carriageway is proposed to be between 3.75 m to 7.5 m as per IRC-SP20: 2002. It may be even restricted to 3.0m, where traffic intensity is less than 100 motorised vehicles per day and where the traffic is not likely to increase due to situation, like dead end, low habitation and difficult terrain condition. The ROW requirement in built-up/constricted area may be even reduced to 4 m.

35. **Shoulder:** Earthen shoulder shall be constructed in layers and compacted to 100% of Proctor's Density. It is proposed to have 1.875 m wide shoulder (0.875 m hard shoulder and 1 m earthen shoulder) on either side of carriage way.

36. **Surfacing**: Slow setting bitumen emulsion will be applied as primer on water bound layer. Rapid setting bituminous emulsion shall be used for Tack coat. Premixed carpet 20 mm thick and mixed with equivalent viscosity grade bitumen shall be laid as surfacing course. 6 mm thick, Type B seal coat is considered for sealing of the premixed carpet.

37. **Structural Works**: Following grades of concrete are proposed for structural works as per specified MORD and IRC specifications:

- Concrete in superstructure of Slab Culvert – M-25 (RCC)
- Concrete in Abutment cap, Dirt wall of slab culverts – M-25 (PCC)
- Brickwork in Abutment, Return Wall, Headwall – Cement mortar (1:4)
- Concrete below Abutment, Return Wall, Headwall – M-10 (PCC)
- Concrete in pavement (on carriageway) – M-30 (PCC)
- Concrete in pavement (on shoulder and drain) – M-25 (PCC

5. Construction Methods

38. Since the proposed rural roads are short in length, NRRDA has framed specific guidelines for cost effective construction of these rural roads. As per the guideline of NRRDA, construction by more of manual means is preferred. Motor grader & tractor-towed rotavator shall be used for handling of bulk materials like spreading of aggregates in sub-base & base courses by mix-in-place method. Ordinary smooth wheeled roller shall be used for compaction if the thickness of the compacted layer does not exceed 100 mm. It is also considered that, hot mix plant of medium type & capacity with separate dryer arrangement for aggregate shall be used for bituminous surfacing work that can be easily shifted. A self-propelled or towed bitumen pressure sprayer shall be used for spraying the materials in narrow strips with a pressure hand sprayer. For structural works, concrete shall be mixed in a mechanical mixer fitted with water measuring device. The excavation shall be done manually or mechanically using suitable medium size excavators.

6. Available Right of Way

39. As per the information available from transect walk; ROW is largely available for the rural roads. However, in most of the roads, the required ROW is encroached and in some of the roads, it is put to agricultural use by the adjacent landowners. The private landowners along the proposed right of way (ROW) however, are voluntarily parting the encroached land and in some cases

parted even their own private land without any compensation, anticipating the developmental benefits from the road construction works.

7. Traffic

40. The present traffic data on each of these rural roads typically varies between 10-15 vehicles per day on most of the rural stretches. The traffic largely comprises motor cycles/two wheelers, tractors, light commercial vehicles, animal drawn carts and bicycles.

8. Economic Assessment

41. The economic analysis carried out for the project has indicated that the rural road construction works will act as a catalyst for the rural economic growth and poverty alleviation of communities traversed by the upgraded roads.

III. DESCRIPTION OF THE ENVIRONMENT

A. Background

42. Baseline physical, biological, and socio-economic environmental conditions have been established using both primary and secondary sources, consultations with local people, and interaction with forests officials and other government officials. Efforts have been made to collect the latest information both at regional as well as local levels especially along the project roads alignment. This will help to predict likely changes in the environment due to the second RCIP road construction and will serve as performance indicators for various components.

43. The baseline information is presented below at state level and district levels. Road specific environmental salient features has also been summarised in this chapter.

44. Madhya Pradesh is located between latitude 21°04'N and longitude 74°02' and 82°49' E. The geographical area of the state is 308,144 km^2 (118,975 sq mi) which constitutes 9.38% of the land area of India. The forest area of the state is 95,221 km^2 (36,765 sq mi) constituting 31% of the geographical area of the state and 12.44% of the forest area of the country. The state boundary touches five states of the country, namely Chhattisgarh, Maharashtra, Rajasthan, Gujarat and Uttar Pradesh. The selected sample roads fall in 34 out of the 50 districts in the state. Summary key environmental features of some of these districts from all spatial regions are given in **Table 3.**

B. Physical Environment

1. Meteorology and Climate

45. Madhya Pradesh has a topography that is crossed from north to south by plains separated by upland areas. The climate is extreme in the north of Madhya Pradesh. It is cool and breezy in the central parts and humid in the eastern and southern regions. The state has three main seasons:

- **Winter**: November to February are the winter months with average temperatures that range from 10° to 27° C (50° to 81° F). Winters are usually pleasant and dry.
- **Summer**: The March to May months are hot and dry. Summers are hot, with average temperature of 29° C (85° F) and high temperature that at times reaches 48° C (118° F).
- **Monsoon season**: The climate is monsoonal between June to September. During the monsoon season, temperatures average 19° to 30° C (66° to 86° F). Madhya Pradesh receives an average annual rainfall of about 1200 mm (nearly 50 in), of which 90 percent falls during the monsoon season.

2. Ambient Air Quality

46. Most of the project area lies in vast open agricultural land and is largely free from air pollution sources other than traffic and few brick-kilns existing in the area. These were located in open area and operate only for few months. As such, the ambient air quality (for parameters SO_2, RSPM and NO_X) is expected to be within the limits in most of rural and semi urban areas. However, in absence of any existing data on ambient air quality levels of the project area, secondary sources were referred.

Table 3: Summary Key Environmental Features of the Sample Roads Districts

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
Bhopal	Bhopal district has an area of 2772. 40 sq. km. Bhopal is divided into two sub-divisions-Berasia and Huzur Bhopal district has a total population of 2,368,145 as per 2011 census Bhopal is surrounded by Guna to the north, Vidisha in north-east, Raisen in East and South-East, Sehore in south and south-west and Rajgarh in the north-west zone	The climate is dry to sub-humid and the average yearly rainfall is around 1130 mm.	Van Vihar is a forest area around Bhopal	The district is part of the Vindhya Plateau		The soil is medium to shallow black		
Sagar	District is located in the north central region of Madhya Pradesh and lies between north latitude 23º10' to 24º27' and east longitude 78º4' to 79º21'. Covering a total area of 10,252 km2 and a population of 2,021,783 as per census 2001 District is surrounded by Vidisha, Raisen, Lalitpur Narsinghpur, Damoh and Chatarpur in west, westsouth, south, east, and northeast respectively. It is located at an elevation of 427 metres (1401 ft)	The climate of the district is classified in four seasons: Summer (mid March to mid June), Winter (mid November to mid March) and Rainy Season (mid June to mid September) and Autumn (mid September to Mid November). The maximum and minimum temp ranges from 48 ° C (in May/June) to 6 ° C in January. The annual rainfall varies from 850 mm to is 1140 mm	Nauradehi Sanctuary is present in the district but none of subprojects passes through this protected area	The district extends over two Physiographic divisions: *Bundelkhand massif in the north.* *Malwa Plateau in the* south. Major land use is agriculture	The district is drained by the following four rivers: *Ganga Basin* *Ken sub basin* *Betwa sub basin* *Narmada basin*	The major soils are Clay loam, Sandy clay loam and Sandy loam	The principal crops are Wheat, Rice, Jowar, Maize, Gram, Sugar cane	The district has no key environmental issue except that its surface water sources in major town are not safe for drinking due to increasing urbanisation. Ground water is suitable for drinking as per Central Ground Water Board. The district has substantial agriculture activities. District area lies in tropical climate zone and has medium range of flora and fauna.

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
Mandsaur	Total geographical area of Mandsaur district is 5521 Sq. Km The total population of Mandsaur district as per 2001 census is 1183274 Mandsaur has four sub-divisions namely Mandsaur, Sitamau, Malhargarh andGaroth	The climate is semi-arid and average annual rainfall rnages between 850 and 900 mm		Mandsaur forms part of the Malwa and Nimar Plateau		The soil is medium to deep black	Wheat, Jowar, Maize and pulses like Gram, Urad and Arhar are the main crops	
Neemuch	Neemuch lies between 24.15 and 24.35 degrees north longitude, and between 74.45 & 75.37 degrees east latitude The population of Neemcuh as per 2011 census is 825958	The climate is semi-arid and average annual rainfall rnages between 850 and 900 mm		Neemuch forms part of the Malwa and Nimar Plateau		The soil is medium to deep black	Wheat, Jowar, Maize and pulses like Gram, Urad and Arhar are the main crops	
Satna	Satna district is located between Longitude 80"21' and 81"23' east Latitude : 23" 58' and 25"12' north Satna district has an area of 7502 sq kms The population of Satna is 2,228,619 as per 2011 census Raghuraj Nagar, Rampur Baghelan, Nagod, Amar Patan and Maihar are the five sub-divisions of Satna Satna has seven tehsils, namely Raghuraj Nagar, Rampur Baghelan, Nagod, Unchehra, Amarpatan, Ram Nagar and Maihar	The climate is dry sub-humid and the average annual rainfall ranges between 1050 to 1100 mm	Mixed forests cover an area of 900 square miles in the district, extending over four ranges with headquarters at Satna, Majhgawan (both in Raghuraj Nagar tehsil) Nagod and Maihar. Teak (tectona grandis) occurs in about 10 square miles of Satna range, 8 square miles of Nagod range	The Kaimurs, the Panna hills, and the Vindhyachal ranges, all belonging to the Vindhya system togeter with their spurs constitute the principal hills of the district. Satna district lies on Vindhyan Plateau, which has an average altitude of 1000' to 11000'. The southern portion of Nagod Tehsil below 24"30' north latitude is a hilly country	Tons, Son, and Paisuni are the impurtant rivers of the district draining it into the Bay of the Bengal through the Ganga. Other major rivers of Satna are Satna river, Amran river, Tons river, Behar river	The soil is of medium to deep black type		

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
			and 5 square miles of Maihar range. There is no Sal (Shorea robusia) in any one of the ranges. Bamboo is found in all the ranges. Other trees that occur in the district are saja (Terminalia tomentosa), salai (Boswellia serrata), tendu (Diospyros tomentosa), Woodfordia floribunda, Khair (Acacia catechu), etc	consisting of a tangled mass of low hills, and enclosing considerable stretches of level ground. The Kaimur ridge, with its scarp side to the south, rises suddenly like a wall about eight miles to the north of Son river, going towards the east, with slight northerly inclination, almost parallel to the Son river. The south western Maihar tehsil consists mainly of sandstones of Bhander series, concealed in great part by alluvium.	and Barua river.			
Tikamgarh	Tikamgarh extends between the latitude 24 degrees, 26 minutes and 25 degrees, 34 minutes N and between 78 degree, 26 minutes and 79 degrees, 21 minutes longitude	The climate is dry sub-humid and average annual rainfall rnages between 700 to 750 mm		Tikamgarh forms part of the Bundelkhand Plateau region	Betwa, Dhasan, Jamni, Bagri and Barua are the main rivers of Tikamgarh	The soil is of mixed red and black type	The main crops are Jowar, Wheat, Paddy, Urad and Till, Soyabean amongst the oilseeds	

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
	Tikamgarh District is bounded by Chhatarpur district to east, Lalitpur district Uttar Pradesh to West, Jhansi to North and Sagar to South The total area is 5048 sq km The total population is 1,202,998 as per 2001 census Tikamgarh has three sub-divisions namely Tikamgarh, Niwari and Jatara; and six tehsils namely, Niwari, Jatara, Tikamgarh, Prithvipur, Baldeogarh and Palera						while Sugarcane also is grown to a certain extent. Important pulses grown in the district are Gram, Urad and Moong grown generally in Kharif.	
Betul	Betul is one of the marginally located southern districts of Madhya Pradesh, lying almost wholly on the Satpura plateau. It occupies nearly the whole width of the Satpura range between the valley of the Narmada on the north and the Bearer plains on the south. It forms the southernmost part of the Bhopal Division. The District extends between 21-22 and 22-24 degrees North Latitude and between 77-10 and 78-33 degrees East Longitude				The Western boundary is associated for some distance with the Ganjal river (Southern), a tributary of Tapti, and then with the watershed line between the Morand and the Ganjal (Northern), the tributaries of the Narmada.			

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
					The Northern boundary is marked by the course of the Morand river, and by the TAWA river beyond Dhodra Mohar Railway station. The Eastern Boundary runs through small streams and hills among which Khurpura and Rotia Nalas are of some significance.			
Bhind	This district of Madhya Pradesh is geographically known for its ravines, fertile land and dense forests. Bhind was one among the 16 districts of United State of Madhya Bharat which was constituted on 28th May 1948.							
Dewas	Dewas is situated on the Malwa plateau in the West-central part of Indian state of Madhya			Dewas lies northeast of Indore, southeast of Ujjain, and	The main river in dewas is Kshipra,			

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
	Pradesh, about 143 km south west from state capital, Bhopal and 35 km from Indore the commercial capital of the state.			southwest of Shajapur. The city is located on the level plains of the Malwa plateau; to the south, the land rises gently to the Vindhyan Range,	which is known as holy river. Chambal, Kali and Sindh rivers flow north through the district on their way to the Ganges.			
Hoshangabad	Hoshangabad district lies in the central Narmada Valley and on the northern fringe of the Satpura Plateau. It lies between the parallels of 22 degrees 15 minute and 22 degrees 44 minutes east. In shape, it is an irregular strip elongated along the southern banks of Narmda river. Its greatest length from south-east to north-east is 160 kms.	The climate of Hoshangabad district is normal. All the seasons come in the district. An average height from the sea level is 331 mts.and avearge rain fall is 134 cms. The average maximum and minimum temperatures are 32 deg.C and 19 deg.C respectively. Overall, the climate of the district is neither hot nor cold except the winter season of the Pachmarhi.			:In Hoshangabad district, there are two main rivers namely the Narmada and the Tawa., which join each other at the village Bandra Bhan. In the spot, a holy mela also organise on the occassion of Kartik purnima. Other small rivers are the Dudhi and the Denwa.A very big lake is also at Pachmarhi,			

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
					which is one of the main tourist place of the district			
Katni	Katni district is located in the Northeastern part of Madhya Pradesh it forms the northern district of Jabalpur commissionerate division. Mudwara was the biggest (areawise) Tahsil of Jabalpur before katni came as district in 1998. The district extends from 23 °37'N to 24 °80' N and from 79 °57' E to 80 °58' E. and hight from sea level is 392 m. There are three major rivers in Mudwara Katni, Chhoti Mahanadi And Umdar and the name katni of mudwara is given after the Katni River, which is two km away from mudwara. The shape of this district is roughly oval.	Climate of Katni is average it gains all the seasonal advantage from it. Average rainfall in Katni district varies 754.5 to 1439.7		Katni is also known as city of lime so many types of minerals are hidden in the heart of Katni like dolomite bauxite latrite clay, fire clay soapstone quartz batrize colsite etc			Main crops of katni are paddy wheat ,gram and pulses. In cash crop mainly vegetables are grown and sent to market of Satna District and Umaria also	
Khandwa	Khandwa District is situated South West of the state of Madhya Pradesh The District is in Indore Division of Madhya Pradesh. maximum and minimum height above mean sea level is 905.56 m and 180.00 m respectively. The District is bounded on the east by	The climate of the District is pleasant and healthy. The District falls in the drier part of India. Average annual rainfall in the District is 980.75 mm. The northern part of the District receives more rainfall than the southern part. The			Two major rivers, theNarmada and Tapti ar e flowing parallel to each other from east to west through the District.			

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
	the Betul and Hoshangabad District of Hoshangabad Dvision, and Burhanpur District of Indore Division on south, on the west by West Nimar District of Indore Division, and on the north by Dewas District of the Indore Division	monsoon season starts approximately by 10th June every year and extends up to early October. The days are quite humid. The maximum temperature recorded in the month of May is 42^{O} C and minimum recorded in the month of December as 10^{O}C						
Khargaon	The district is situated between 21°22' and 22°35' north latitudes and 74°25' and 76°14' east longitudes. The district is surrounded by Dhar, Indore and Dewas in the north, state of Maharashtra state in the south, Khandwa, Burhanpur in the east and Barwani in the West.			Area of the district is 8030 km².				
Ratlam	Ratlam is situated in North-West region of Madhya Pradesh from 23 05' North to 23 52' North Longitude and 74 31' East to 75 41' East Latitude. It is bounded by Mandsaur District in North, Jhabua and Dhar on the South, Ujjain on the East, Chhitorgarh and Banswara District of Rajasthan on the West, Shajapur District of Madhya Pradesh and	The Average temperature of Ratlam is 55 F. The average rainfall of the District is 90 cm. Most of the rain occur in the month of July and August.		Total Area of Ratlam District is s 4861 Sq.km. which is 1.11% of Total Area of Madhya Pradesh.			Main crop of Ratlam is Soyabin, Wheat, Gram and Maize. It is also well known for Strawberry and Grapes	

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
	Jhalawar District of Rajasthan on the North.							
Rewa	Rewa lies between 24'18 and 25'12 north latitudes and 81'2 and 82'18 east longitudes in the north-east of the division of the same name . The district is bounded on the north and east by the state of Uttar Pradesh, in the south Sidhi district and in the west with Amarpatan and Raghurajnagar tahsils of Satna district. In shape the district can be compared to an isosceles triangle, with its base along the Satna border and the two longer arms converging towards Mauganj in east			The district can be divided into the four natural parts-kymore pahar, Binjh Pahar, Rewa Plateau and Lower-Northern Plain				
Sagar	The district of Sagar (previously Saugor) lies in the north central region of Madhya Pradesh.A major road and agricultural trade centre, it has industries such as oil and flour milling, saw-milling , ghee processing handloom cotton weaving, railway and engineering works. It is known in all over India due to its University named as Dr. Harisingh							

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
	Gaur University, Army Cantonment and Bhagyodyay Tirth."							
Seoni	The district is situated on a narrow, North-South section of satpura plateau in the South of Jabalpur Division. The District lies between latitude 21 36' & 22 57' North and longitude 79 19' & 80 17' East.		Pench Tiger Sanctuary which lies 195 Km from Jabalpuran d 92 Km from Nagpur whi ch is a worth visiting place during March-June.		Wainganga River is the lifeline of Seoni district. It originates at "Mundara" village in Seoni district. Asia's largest mud dam has been built on this river at Bhimgarh village in Chhapara block of the district.			
Shivpuri	District lies between Latitude 24.6 - 25.6 degrees & Longitude 77.0-78.4 degrees and Sea level Height is 521.5. The district is bounded on the North by Morena, Gwalior and Datia districts, on the East by Jhansi district of U.P, on the West by Kota district of Rajasthan and on the South by Guna district.						Soyabean, Grain, Urad, Moong, Jower, Maize, Groundnut, Til are main crops	

Districts	Location	Climate	Ecologically Sensitive Area (Wild Life Sanctuaries/National Park etc)	Geomorphology (Major Physiographic Units and land use)	Major Drainage	Major Soil Type	Principal Crops	Key Environmental Issues
Ujjain	The district is bounded by the districts of Shajapur on the northeast and east, Dewas to the southeast, Indore to the south, Dhar to the southwest, and Ratlam to the west and northwest.			The district has an area of 6,091 km^2,				
Vidisha	Vidisha district of Madhya Pradesh extends between Latitude 230 21' and 240 22' North and Longitude 770 15' 30" and 780 18' East. The District is situated in Eastern part of the fertile Malwa Region. The Tropic of Cancer passes through the Southern stretch of the District about 2 km South of the District Head Quarters. It is bounded in the North by Guna District in the South by Raisen District and in the East by Sagar District							

Table 4: Maximum Observed Ambient Air Quality during 2008

Area Classification	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	RSPM ($\mu g/m^3$)
Industrial (maximum observed value)	30	27	265
Residential (maximum observed value)	8	20	105
National Ambient Air Quality Standards for Industrial and Residential Areas	80	80	100

Source: National Ambient Air Quality Status, 2008, CPCB, and Table 3.3

47. **Table 4** reveals that the concentration of all the pollutants is higher in industrial areas especially respirable suspended particulate matter. The levels of sulphur dioxide and nitrogen dioxide are however, well within the limits (NAAQS). The higher particulate matter levels are attributed to the vehicular movement on unpaved roads and the loose dust in the agricultural fields that lead to formation of dust clouds over short periods. The same can be concluded from **Table 5,** which provides a comparison of the air quality at different locations.

Table 5: Ambient Air Quality Status of Madhya Pradesh in Previous Years

City	Location	Type of Area	SO_2	NO_2	RSPM	SPM
			2008	2008	2008	2008
Bhopal	Govindpura	1	7	17	91	205
	Arera colony	R	BDL	34	129	356
	Hamidia road	R	9	20	124	308
	T.T. Nagar	R	5	11	62	120
Dewas	Eid Parry(I)Ltd	I	20	27	96	218
	Vikas Nagar	R	15	22	72	187
Gwalior	Dindyal Nagar	R	8	18	133	234
	Maharaj Bada	R	9	14	92	306
Indore	Polo ground	I	12	22	240	357
	Kothari market	R	12	22	217	325
	Scheme no. 78	R	6	12	131	203
Jabalpur	Vijay Nagar	R	BDL	25	136	297
Nagda	Chem. D Labour club	I	30	18	113	158
	Grasim guest house no 2	R	15	25	92	132
	Grasim Kalyan Kendra	R	22	32	97	141
Sagar	Pt. Deendayal Nagar	R	3	17	115	232
Satna	Sub divisional Off.	I	4	BDL	265	410
	Regional office	R	BDL	BDL	115	166
Ujjain	District office	I	15	16	154	317
	Regional office	R	7	9	70	151
	Mahakal temple	S	12	12	82	174
Singrauli	Jayant township	R			78	386
	NTPC Vidyanagar	R			86	326
	Waidhan	R			49	227
National Ambient Air Quality Standards	Industrial Area (I) & Residential Area (R) (24 hourly average)	80	80	80	100	NP

Source: National Ambient Air Quality Monitoring Series, CPCB
R – Residential and other areas, I – Industrial area, L- Low, M- Moderate, H – High and C – Critical levels of pollution based on exceedence factor (calculated for n > 50 days), NP – Not Prescribed

3. Noise

48. Along the proposed road construction proposals, there is neither significant industrial activity nor significant vehicular traffic contributing to ambient noise levels. The occasional vehicular movement on the unpaved roads contributes to increased noise levels over short duration and limited to daytime. The existing roads do not appear to have vehicular traffic in the nighttime. Therefore, the ambient noise levels are expected to be within the National Ambient Noise Standards

4. Topography and Geomorphology

49. State of Madhya Pradesh is the second largest state of the country has covers an area of 30.82 million hectares, which constitutes 9.37% of the land area of the country. “Madhya Pradesh” by virtue of its geographical location can be termed as “Heart of India”. The state is surrounded by Gujarat in the West, Rajasthan in the North-West, Uttar Pradesh in the North-east, Chhattisgarh in the East and Maharashtra in the South. Landlocked in the central part of the country, Madhya Pradesh has topography that is crossed from north to south by plains separated by upland areas. Geographically, Madhya Pradesh consists of a plateau with a mean elevation of 1600 ft above sea level, interspersed with the mountains of the Vindhya and the Satpura ranges with the Chhattisgarh plains to the east. The hills give rise to the main river systems - the Narmada and the Tapti, running from east to west, and the Chambal, Sone, Betwa, Mahanadi, and the Indravati west to east. Ground elevation varies from 270 m to 750 m above mean sea level.

50. The soils of state are rich and fertile. The state has a variety of soils ranging from richclayey to gravely. The major groups of soils found in the state can be divided in to following four categories i.e. alluvial, medium & deep black; shallow & medium black; and mixed red & black. Categorically state has two agro-climatic zones namely (i) Central Plateau & Hill Region and (ii) Western Plateau & Hill Region. These two zones have been further sub-grouped and the description regarding area and its soil &geological features.

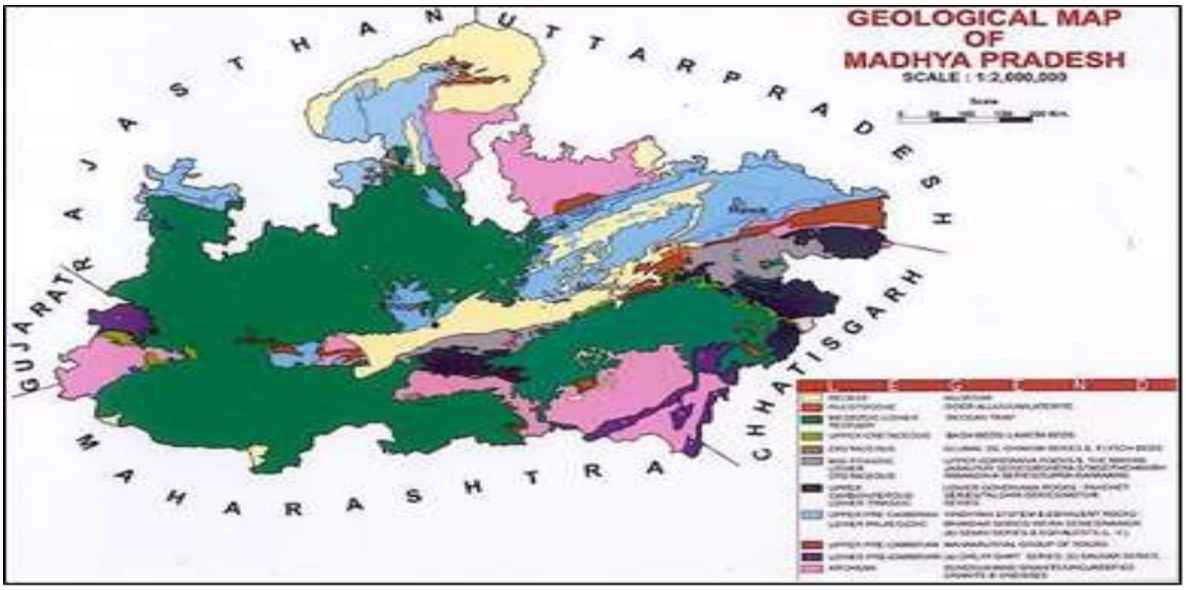


Figure 3:Geographical / Geological Map of Madhya Pradesh

5. Geology/Soil

51. The geology /soil of the state of Madhya Pradesh is given below

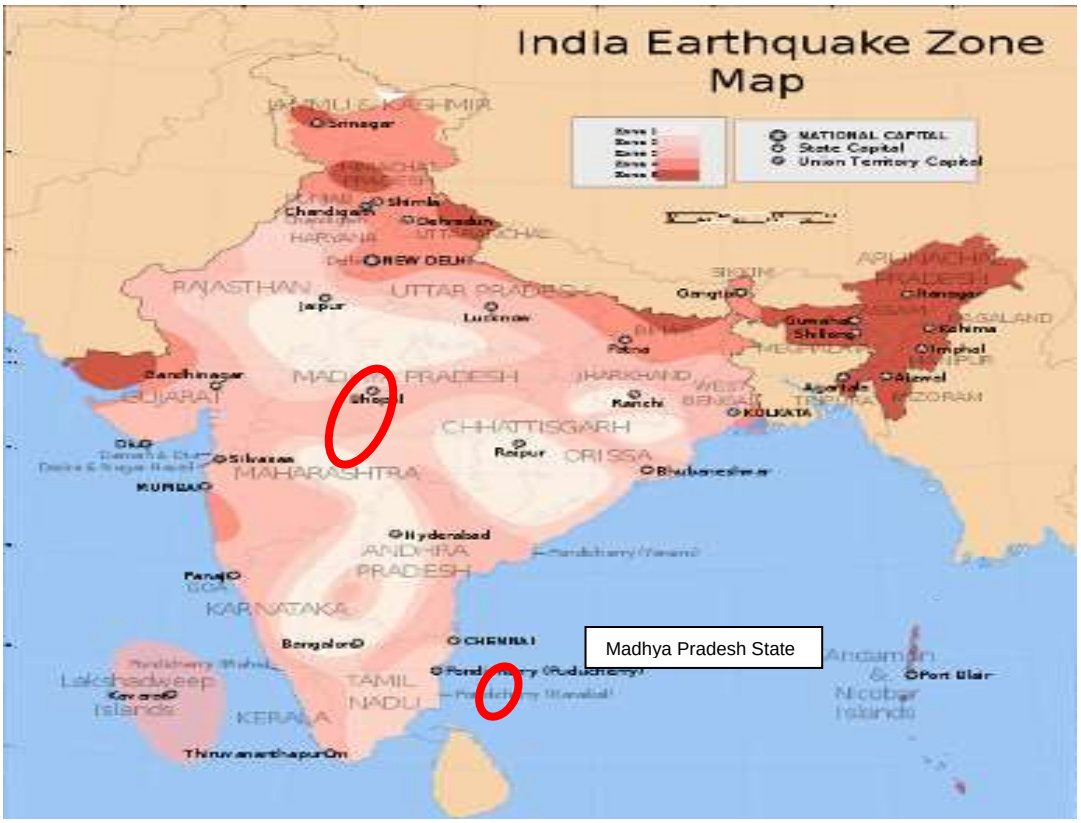
Zone	Sub-group (Region)	District covered	Rainfall (mm)	Climate	Type of Soil
Central Plateau and Hill Region	Bundelkhand	Chattarpur, Tikamgarh,	700	Dry sub-humid	Mixed red & Black
	Chhattisgarh Hills	Mandla, Dindori	1570	Moist sub-humid	Red & Yellow
	Kaimur Plateau & Satpura Hills	Jabalpur, Panna, Satna, Rewa, Sidhi, Seoni, Katni, Balaghat, Shahdol, Anooppur, Umariya	1100	Dry sub-humid	Medium Black
	Vindhya Plateau	Bhopal, Damoh, Raisen, Sagar, Sehore, Vidisha	1130	Dry sub-humid	Shallow to Medium Black
	Satpura Plateau	Betul, Chhindwara, Narsinghpur	1220	Dry sub-humid	Shallow to Medium Black
	Central Narmada Valley	Hosangabad, Harda	1300	Dry sub-humid	Deep Black
	Gird	Morena, Bhind, Gwalior, Guna, Shivpuri, Ashok , Sheo	670	Semi-arid	Medium Black alluvial
Western Plateau and Hill Region	Jhabua Hills	Jhabua	988	Semi-arid	Medium to black deep
	Malwa & Nimar Plateau	Indore, Dhar, Ujjain, Ratlam, Dewas, Mandsaur, Rajgarh, Shajapur, Khandwa, Khargone, Neemuch, Badwani, Burhanpur	874	Semi-arid	Medium to deep black

52. **Soil**. The major soil types within the project districts can be classified into three groups namely vertisol altisol and entisols. These soil types are further classified into red yellow loamy, black cotton soils. The entisols is sub classified into younger alluvial, and laterite soils. The Atlisols is sub-classified into lateritic and alluvial soils. The vertisol is sub-classified into baslic black cotton soil, older alluvial soils. Textures of soils are medium to heavy grained.

6. Earthquake &Seismicity

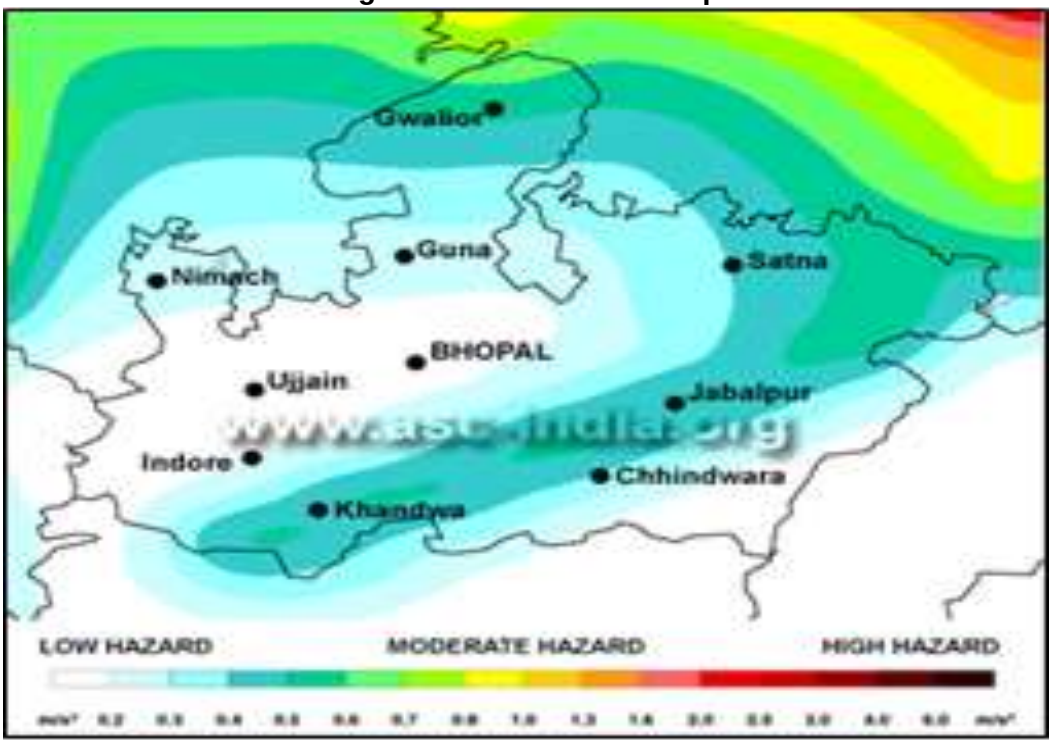
53. **Seismic Hazard.** The seismic hazard map of India was updated by Bureau of Indian Standards (BIS) in 2000[4] . The main change was merging of Zones I & II. As per this updation. Zone II and III (low to moderate Risk) stretches across the length of the M P State (**Figure 4**). According to GSHAP data, the state of Madhya Pradesh falls in a region of low to moderate seismic hazard.

[4] *IS 1893 (Part 1): 2002 Indian Standard Criteria for Earthquake Resistant Design of Structures Part 1 General Provisions and Buildings (Fifth Revision).*



Source: Amateur Seismic Centre, Pune

Figure 4: Seismic Zone Map



Source: IS 1893 (Part 1) 2002

Figure 5: Hazard Zone Map

7. Land Use

54. Most of the geographical area (307, 560 sq. km i.e. about 98 percent) of the state is available for utilization. Agriculture is the major land use in state followed by forests. The area under various land uses in the state is presented in the **Table 6.** Land use pattern along the project road is also mixed type dominated by agriculture, barren forest land and residential areas.

Table 6:Land Use Pattern in the State

Land Use	Area in '000 ha	Percentage
Total Geographical area	30,825	
Reporting area for land Utilization	30,756	99.78
Forests	8683	28.17
Not Available for cultivation	3350	10.87
Permanent pastures and other grassing land	1360	4.41
Land under miscellaneous tree crops & groves	19	0.06
Culturable wasteland	1177	3.82
Fallow lands other current fallows	621	2.01
Current fallows	599	1.94
Net area sown (as per MP Annual Plan 2010-11)	14,790	47.98

Source: State of Forest Report, 2005, Forest Survey of India Dehradun

8. Hydrology and Water Quality

55. Madhya Pradesh is criss-crossed by India's four major rivers namely Narmada, Tapti, Sone and Mahanadi along-with their numerous tributaries. Availability of water in from these rivers to the sate is more than 81,000 million cubic meters annually, out of which approximately 56,857million cubic meters i.e. 69.74% could be utilized.

56. None of the rural road crosses any natural stream except two roads, which crosses Keth River and Chamla rivers. Sample roads are mostly crossed by seasonal small channels. Ground water being extracted through hand pumps or tubewell is the main source of water supply to villagers.

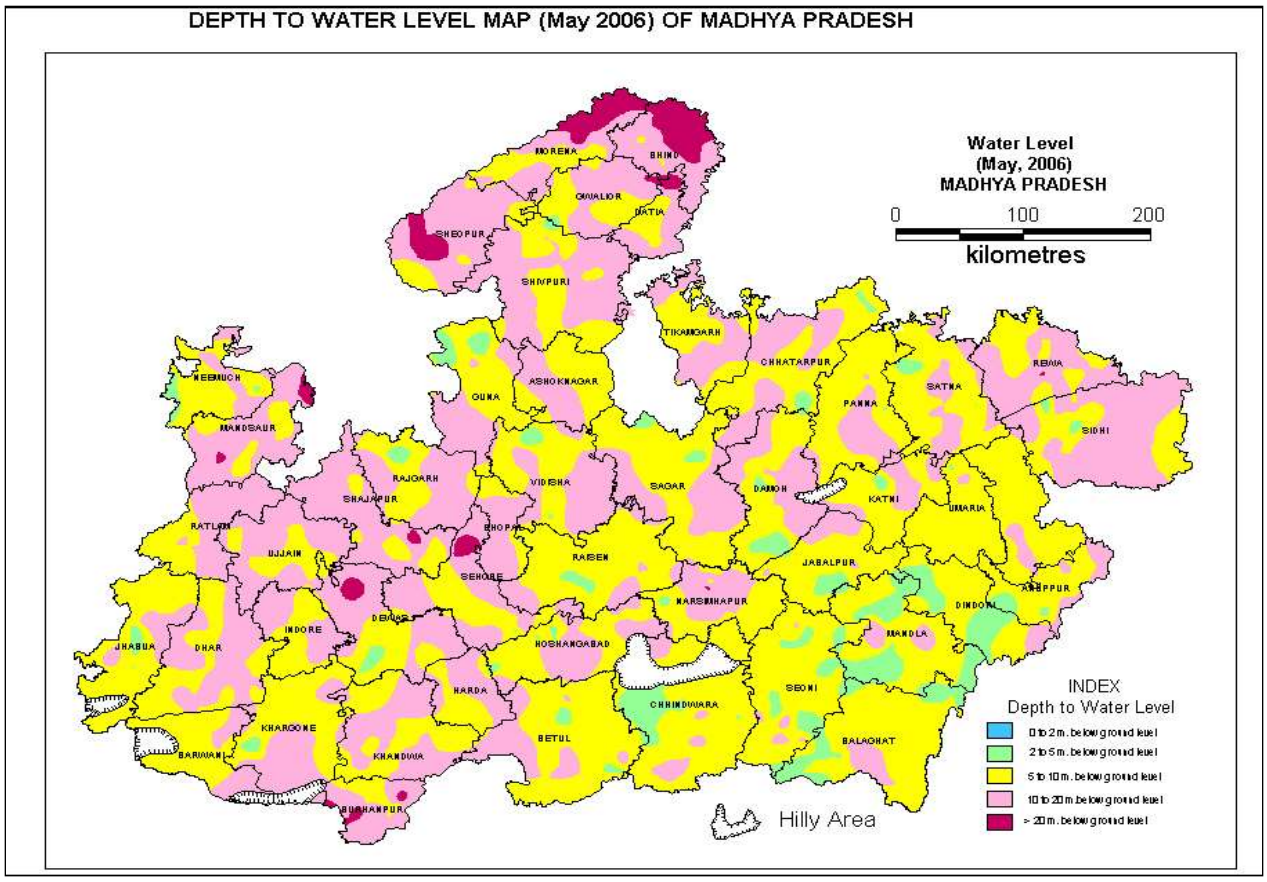
57. **Surface Water Quality**: In Madhya Pradesh, pollution is increasing in most of surface water resources in major towns due to increasing urbanization trend. The estimated surface water available for use is around 306,682 Million Cubic Meter (MCM). None of the water sources are safe for drinking or bathing without conventional water treatment. Rivers such as Narmada, Sone, Tapti Chambal, Ken and Betwa etc. are found to be polluted at different stretches due to industrial, domestic and agricultural pollution. Among all the rivers, Narmada and Ken River is the most polluted.

58. **Groundwater Quality and Availability:** The total Net Ground Water availability of Madhya Pradesh (1998) is 31,093,575.60 ha of which total current Ground Water Draft is 1,437,520.00 ha. The state is currently exploiting 46% of the available ground water. Of the 70% dependable yield, groundwater usage is around 66%. In hilly and undulating regions, springs, rivulets and wells provide drinking water. Most households in rural areas now rely on hand pumps for their supply of drinking water.

59. Among the 50 districts of the state, current ground water condition is safe in 40 districts. In 10 districts the ground water condition is in critical in 5 blocks and overexploited in 24 blocks. In sample project districts, five blocks fall under overexploited category.

60. Fluoride, salinity and iron affect the quality of water in Madhya Pradesh. There are 4,018 villages with 7,746 sources in 22 districts that have been affected by fluoride; 562 villages with 1,269 sources in 13 districts that have been affected by salinity; and 856 villages with 1, 449 sources in eight districts that have been affected by iron.

61. As per the central ground water board (CGWB) report, the groundwater quality of all the project districts Sagar, Sidhi, Dhar and Damoh, in both shallow and deeper aquifers is good and suitable for drinking, irrigation and industrial purposes. The Decadal (1995-2005) water table condition during Pre-monsoon is shown in **Figure 6.**



Source: Central Ground Water Board Northern Region Bhopal

Figure 6: Decadal Water Table Conditions in the Project Districts

62. **Hydrogeology:** The largest State of the country is underlain by formations in age ranging from Achaean to Recent. One fifth of the area is occupied by granite gneisses and meta-sedimentary rocks, whereas one tenth by Gondwanas comprising sand stones, lime stones & marbles. The Deccan Trap covers a larger part of the State whereas the Quaternary alluvium covers 6% of the State area. The alluvial deposits form prolific aquifers where tube wells can yield in the range of 50-80 m^3/hr. The yield of tube wells in sand stones of Gondwanas ranges between 20-30 m^3/hr; whereas in limestone of Gondwanas, it varies between 50-80 m^3/hr. The yield of tube wells in select area ranges between 20-30 m^3/hr.

C. Ecological Resources

63. Variability in climatic and edaphic conditions brings about significant difference in the forest types of the state. There are four important forest types - tropical moist, tropical dry, tropical thorn, and subtropical broad-leaved hill forests. The forest area can also be classified based on the composition of forest and terrain of the area. Based on composition, there are three important forest formations namely Teak forest, Sal forest and miscellaneous forests. Bamboo bearing areas are widely distributed in the state. To obviate pressure on the natural forests, plantations have been undertaken in forest and nonforest areas to supplement the availability of fuel wood, small timber, fodder etc.

64. The forest cover has been classified in dense forest and open forest. The latest estimates of Forest Survey of India (FSI), published in the State of Forest Report (SFR) 2003, suggest that the total forest cover of M.P. is 76,429 sq. km., which is 24.79% of the land area - dense forest constituting 13.57% and open forest 11.22%. In addition to these two categories of cover, the land having canopy cover of less than 10% is classified as scrub. The area under scrub is not included in the forest cover. Central, eastern and southern parts of the state are rich, whereas northern and western parts are deficient in forest. **Figure 7** shows the forest map of the state. Project districts largely have open forests.

Figure 7: Forest Map of Madhya Pradesh

65. The project state lies in tropical climate zone. It has a medium range of flora and fauna. Flora, fauna and vegetation types found in the areas have been described separately below. However, none of the roads consists of any rare, endangered or threatened floral species.

66. Of the 204 roads proposed under Tranche 2, 7 roads pass through forest area. None of them pass through reserve forest or wildlife sanctuaries. All of them are existing roads/tracks and the road improvement within the forest stretches will be within the existing road width. Stll some trees might require felling during clearing up operations for construction of rural roads. In most of cases, tree cutting has been minimized by suitably modifying the alignment. The list of commonly found flora in the sample road districts is given at **Table 7.**

67. The clearance of the vegetation and felling of trees for the road construction is an environmental concern. However, very small number of tree is falling within ROW and which can be saved with design considerations.

Table 7: List of Common Flora of Project Districts

S. No.	Local Name	Botanical Name	Family
Large Trees			
1.	Achar	*Buchanania lanzan (spreg)*	Anacardiaceae
2.	Arjun	*Terminalia arjuna (Bedd)*	Combretaceae
3.	Aam	*Mangifera indica (Linn)*	Anacardiaceae
4.	Awla	*Emblica officinalis*	Euphorbiaceae
5.	Imli	*Tamarindus indica (Linn)*	Caesalpiniaceae
6.	Kardhai	*Anogeissus pendula*	Combrataceae
7.	Kala siras	*Albizia lebbek*	Leguminosae (Mimoseae)
8.	Kevlor	*Bauhinia purpurea*	Caesalpinaceae
9.	Kumbhi	*Careya arborea*	Myrtaceae
10.	Kullu	*Sterculia urens*	Stcrculiaceae
11.	Kem	*Mitragyna parvifolia*	Rubiaceae
12.	Khair	*Acacia catechu*	Leguminosae (Mimoseae)
13.	Gular	*Ficus glomerata*	Moraceae
14.	Gunja	*Gardenia pinnata*	Burseraceae
15.	Jamun	*Syzygium cuimini*	Myrataceae
16.	Tendu	*Diospyros melanoxeon*	Ebenaceae
17.	Dhavda	*Anogeissus latifolia*	Combretaceae
18.	Dhobin	*Dalbergia paniculata*	Leguminosae (Papilionaceae)
19.	Nilgiri	*Eucalyptus spp*	Myrtaceae
20.	Neem	*Azadirachta indica*	Meliaceae
21.	Palas	*Butea monosperma*	Leguminosea (papilionaceae)
22.	Pangra	*Erythrina Suberosa*	Leguminosae (Pipilionaceae)
23.	Pipal	*Ficus religiosa*	Moraceae
24.	Bad	*Ficus bengalensis*	Moraceae
25.	Bahera	*Terminalia belerica*	Combretaceae
26.	Babul	*Acacia nilotica*	Legumenosae (Mimoseae)
27.	Bel	*Aegle marmelos*	Rutaceae
28.	Bhirra	*Chloroxylon swietenia*	Meliaceae
29.	Maharukh	*Ailanthus excelsa*	Simarubiaceae
30.	Mahua	*Madhuca indica*	Sapotaceae
31.	Shisham	*Delbergia latifolia, Roxb*	Leguminosae (Papilionaceae)
32.	Safed Siras	*Albizzia procera, Benth*	Leguminosae (Mimoseae)
33.	Sagwan	*Tectona grandis*	Verbenaceae
34.	Saj	*Terminalia tomentosa*	Combretaceae
35.	Salai	*Boswellia serrata*	Burseraceae
36.	Seja	*Lagerstroemia parviflora*	Lythraceae
37.	Semal	*Bombax cieba*	Malvaceae
38.	Haldu	*Adina cardifolia*	Rubiaceae
Small Tree			

S. No.	Local Name	Botanical Name	Family
39.	Amaltash	*Cassia fistula*	Leguminosae (Caesalpiniaceae)
40.	Astara	*Bauhinia malabarica*	Leguminosae (Caesalpiniaceae)
41.	Asta	*Bauhinia racermosa*	Leguminosae (Caesalpiniaceae)
42.	Ghont	*Zizyphus xylopyra*	Rhamnaceae
43.	Ber	*Zizyphus jujube*	Rhamnaceae
44.	Lokhandi	*Ixora arborea*	Rubiaceae
45.	Sehra	*Bauhinia retusa*	Leguminosae (Caesalpiniaceae)
Shrubs and Herbs			
46.	Adusa	*Adhatoda vasica*	Acanthaceae
47.	Arandi	*Ricinus communis*	Euphorbiaceae
48.	Aak	*Calotropis gigantean*	Asclepiadaceae
49.	Gokhru	*Tribulus terrestris*	Zygophllaceae
50.	Zhadneri	*Zizyphus nummularia*	Rhamnaceae
51.	Tulsi	*Ocimum sanctum*	Labiatae
52.	Thuar	*Euphorbia nerifolia*	Euphorbiaceae
53.	Dhavai	*Woodfordia fruticosa*	Lythraceae
54.	Nirgudi	*Vitex negundo*	Verbenaceae
55.	Neel	*Indigofera pulchella*	Leguminosae
56.	Pawar	*Cassia tora*	Leguminosae (Caesalpiniaceae)
57.	Beshram	*Ipomoea pescaparae*	Convolvulaceae
58.	Bhatkatiya	*Solanum nigrum*	Solanaceae
59	Vidyasini	*Lantana camara*	Verbenaceae
60.	Shatavari	*Asparagus recemosus*	Liliaceae
61.	Sitafal	*Anona squamosa*	Anonaceae
62.	Harsingar	*Nyctanthes arbortristis*	Oleacaae
63.	Ratanjot	*Jatropha curacas*	Evphorbiaceae
64.	Gunja	*Abrus precatorious*	Leguminosea
65.	Amrbel	*Cuscuta reflexa*	Convolvulaceae

1. Terrestrial/Avian fauna:

68. The general faunal assessment was carried out in subproject area. The species generally found are given in **Table 8.**

Table 8: List of common fauna of Project Districts

S. No.	Local Name	Zoological Name	Family
Mammals			
1.	Common Langur	*Presbytia entellus*	Colobidae
2.	Rhesus macaque	*Macaca mulatta*	Circopthecidae
3.	Common Mongoose	*Herpestes edwardsi*	Herpestidae
4.	Common five Stripped squirrel	*Funambulus pennanti*	Sciuridae
5.	Field rat	*Bandicota bengalensis*	Muridae
6.	Common house rat	*Rattus rattus-refescena*	Muridae
7.	Common Indian hare	*Lepus nigricollis*	Leporidae
Reptiles			
1.	*Python molurus*	Indian python	Pythonidae
2.	*Mabuya carinata*	Common skink	Scincidae
3.	*Ptyas mucosus*	Rat snake	Colubridae
4.	*Hemidactyhus flaviviridis*	House Lizard	Gekkonidae
5.	*Calotes versicolor*	Garden Lizard	Agamidae
6.	*Naja naja*	Indian cobra	Elapidae
7.	*Varanus bengalensis*	Moniter Lizard	varanidae

S. No.	Local Name	Zoological Name	Family
Avifauna			
1.	White Egret	*Egretta alba*	Ardeidae
2.	Little Egret	*Egretta garzetta*	Ardeidae
3.	Common or Grey Quail	*Cotuenix coturnix*	Phasianidae
4.	Red wattled Lapwing	*Vanellus indicus*	Charadridae
5.	Blue Rock Pigeon	*Columba livia*	Collumbidae
6.	Indian Ring Dove	*Streptopelia decaocto*	Collumbidae
7.	Spotted Dove	*Streptopelia chinensis*	Collumbidae
8.	Large Indian Parakeet	*Psittacula eupatria*	Psittacidae
9.	Rose Ringed Parakeet	*Psittacula krameri*	Psittacidae
10.	Blossom Headed Parakeet	*Psittacula cyanocephala*	Psittacidae
11.	Koel	*Eudynamys scolopaceae*	Cuculidae
12.	Coucal	*Centropus sinensis*	Cuculidae
13.	Small Blue King Fisher or Common Kingfisher	*Alcedoatthis*	Alcedinidae
14.	White Breasted Kingfisher	*Halcyon smyrnensis*	Alcedinidae
15.	Green Bee Eater	*Merops orientalis*	Meropidae
16.	Indian Pitta	*Pitta brachyuran*	Pittiade
17.	King Crow; Black Drongo	*Dicrurus adsimilis*	Dicruidae
18.	Large Racket tailed Drango	*Dicrurus paradiseus*	Dicruidae
19.	Common Mynah	*Aeridotheres tristis*	Sturnidae
20.	Jungle Mynah	*Aeridotheres*	Sturnidae
21.	House Crow	*Corvus splendens*	Corvidae
22.	Jungle Crow	*Corvus macrorhynchos*	Corvidae
23.	Red vented Bulbul	*Pyenonotus cafer*	Pycnontidae
24.	Jungle Babbler	*Turdoidesstriatus*	Muscicapidae Timalinae
25.	Pied Bush Chat	*Saxicola caprata*	Muscicapidae
26.	Magpie Robin	*Copsychus-saularis*	Muscicapidae Turdinae
27.	Indian Robin	*Saxicola fulicatus*	Muscicapidae Turdinae
28.	Grey Wagtail	*Motacilla cinerea*	Motacillidae
29.	Purplesun Bird	*Nectarinia asiatica*	Nectarinidae
30.	House Sparrow	*Passer-domesticus*	passerinae
31.	Red Munia	*Estrilda amandava*	Estrildinae

2. Wild Life and Protected Areas

69. Madhya Pradesh is a pioneer state in the national movement for conservation of flora and fauna. Conservation oriented legal provisions were made in the erstwhile Acts regulating hunting of game-birds and wild animals. There are 9 National Parks and 25 Sanctuaries spread over an area of 10,862 sq. km constituting 11.40% of the total forest area and 3.52% of the geographical area of the state **(Figure 8).** Efforts are under way to increase the protected area network to 15% of the forest or 5% of the geographical area as suggested by State Wildlife Board. None of the project roads pass through Wildlife Sanctuaries/National Parks, Tiger Reserves etc.

Legend: ☐ National Park ● Sanctuaries

SL No shown above are synchronised with Sl. No in the table below

Figure 8: Protected Areas of Madhya Pradesh

70. **Table 9** provides details of National park and Sanctuaries corresponding to serial Number indicated at **Figure 8** above.

Table 9: List of Protected Areas in Madhya Pradesh

I. List of National Park in M. P. (Sl. No. Below Corrospond to Figure above)			
S. No.	**Name and District of National Park**	**Area in km²**	**Fauna**
1.	Kanha National Park, District Mandla#	940	Tiger, Panther, Gaur, Chital, Sambar, Nilgai, Chinkara, Barking Deer, Swamp Deer, (Barasingha), Wild Boar & variety of upland birds.
2	Bandhavgarh National Park, District Umaria#	437	Tiger, Panther, Gaur, Chital, Sambar, Nilgai, Chinkara, Barking Deer, Wild Boar & variety of upland birds.
3	Panna National Park, District Panna, Chhatarpur#	543	Tiger, Chital, Chinkara, Sambar and the Sloth Bear
4	Pench Tiger Reserve, District Seoni, Chhindwara#	293	Tiger, Panther, Bison, Chital, Sambhar, Nilgai, Chinkara, Barking Deer, Chowsingha, Wild Boar & variety of upland birds.
5	Satpura National Park, Pachmarhi	524	Tiger, Leopard, Sambar, Chital, Bherki, Nilgai, Four-horned antelope, Chinkara, Bison (gour), Wild Boar, Wild Dog, Bear, Black Buck, Fox, Porcupine
6	Sanjay National Park, Sidhi	193.8	Tiger, Panther, Sambar, Chital, Gaur, etc.

I. List of National Park in M. P. (Sl. No. Below Corrospond to Figure above)			
S. No.	**Name and District of National Park**	**Area in km²**	**Fauna**
7	Madhav National Park, Shivpuri#	354	Panther, Chital, Sambar, Nilgai, Chinkara, Black Buck, Chausingha, Wild Boar, Crocodiles in lake, & variety of upland birds.
8	Van Vihar National Park, Bhopal#	4.45	Tiger, Panther, Lion, Bear, Hyena etc.
9	Mandla Plant Fossils National Park, Mandla#	0.27	Plant Fossils
II. List of Wild Life Sanctuaries in M.P.			
S.N	**Sanctuary**	**S.No.**	**Sanctuary**
1.	Bori	13.	Panpatha
2.	Bagdara	14.	Kuno
3.	Phen	15.	Pench
4.	Ghatigaon	16.	Ratapani
5.	Gandhisagar	17.	Sanjay Dubri
6.	Karera	18.	Singhori
7.	Ken Ghariyal	19.	Son Ghariyal
8.	Kheoni	20.	Sardarpur
9.	Narsinghgarh	21.	Sailana
10.	N. Chambal	22.	Ralamandal
11.	Nauradehi	23.	Orchha
12.	Pachmari	24.	Gangau
		25.	V. Durgawati

Project districts

3. Aquatic Biology:

71. No wetland or large water body falls in and around the selected project roads area. Fisheries activities are also minimal in subproject areas.

D. Socio-Economic Environment

1. Demography:

72. As per census 2011, Madhya Pradesh has a total population of 60 million (**Table 10**). It has one of the largest tribal populations in the country. Out of the 50 districts in the State, 19 are predominantly tribal. Eighty-nine blocks (approx. 28%) of the total 313 development blocks are tribal blocks.

Table 10: Demographic Profile

Indicators	Status	Indicators	Status
Population (2011 Census)		**Literacy**	
Total	60,348,023	Total	70.6%
Male	31,443,652 (52.1%)	Male	80.5%
Female	28,904,371 (47.9%)	Female	60.0%
SC	9,155,177 (15.17%)	SC (2001)	58.57%
ST	12,233,474 (20.27%)	ST (2001)	41.16%
Urban	15,967,145 (26.46%)	Urban	92.91%
Rural	44,380,878 (73.54%)	Rural	65.32%
Sex ratio	919		

Source: Census of India, 2011

2. Literacy and Education

73. The State literacy rate presently is 70.6%, which is close to the national literacy rate of 74.04 %. While the female literacy has considerably improved over the last decade, a great disparity persists in the literacy rates of males and females. However, during the decade 2001-2011 some districts such as Alirajpur, Jhabua, Barwani have shown a huge improvement in the literacy rate.

3. Poverty

74. About 18.8 million are living below poverty line in Madhya Pradesh, which constitutes about 43% of total population.

4. Agricultural

75. Agriculture is the main occupation in the state. About half of the land area is cultivable. The extent of availability of cultivable land varies depending on topography, rainfall, and soils. The larger cultivable land is found in the Chambal valley, Malwa Plateau, Rewa Plateau, and Chhattisgarh Plain.

76. The prime crop of the state is cereal (about 41%), followed by pulses (about 20%), oilseed (about 30%) and vegetables, fruits, fodder and other horticultural crops (about 9%).

5. Industries, Cottage and Small Industries:

77. The state has various industrially developed estates. The major industrial produce includes cement, pigiron, steel ingots, news print, and sugar. Industrialization is low in the subproject areas. However, there is high potentiality for the growth of cottage and small industries in subproject areas. Better communication and transport facilities may be contributory in this growth.

6. Public Facilities (Communication, Health Services, Water Supply, Power):

78. State has well-developed postage and telephone system. Subprojects areas also have good access to these facilities. Educational facilities are available in the village areas as well. However, rural population has to depend on urban areas for undergraduate level education. The urban area has well organised water supply systems. However, rural areas including subproject areas still depends on hand pumps.

79. MP state has total power generation capacity of 6,305 MW. However, state is still power deficient. About 97.43 % villages in the state have access to electricity.

E. Salient Environmental Features of Sample Roads

80. The salient environmental features of sample roads are summarized in **Table 11**.

Table 11: Salient Environmental Features of Sample Roads

S. No.	District	Block	Road Name	Length Km	Features with 10m either side of existing road centre line							
					Landslide prone	Water Body	Water Stagnation Area	Forest Area	Trees		Utlity Structures	
									No.	Likely to be affected	No.	Likely to be affected
1.	Alirajpur	Sondwa	ML01-Alirajpur-Mathwad Road to Baheda-Baddala	24.29	No	No	No	No	20		EP 56, HP 1	
2.	Balaghat	Baihar	T24-Baihar To Katangi	10.60	No	River at ch-2425m, 9300 m	No	Yes	No		EP 7	
3.	Barwani	Pati	ML01-Osada Semli Bamnali to Rosar Road	17.89	No	No	No	Yes	11	1	EP 9 LT 2 HP 1	
4.	Betul	Athner	T02-Athner Ghoghrajod Mendha Chhindwad to Bothi	34.69	No	No	No	Yes	No		EP 30 HP 2	
5.	Bhind	Gohad	MRL08-Chitora to Pali (Dirman)	7.70	No	No	No	No	No		EP 8	
6.	Bhopal	Phanda	T17-T07 (Kolar road) to T05 Ratanpur	10.00	No	No	No	No	No		No	
7.	Burhanpur	Burhanpur	T02-Dariyapur-Jasondi Road To Fopnarkala	2.80	No	No	No	No	No		EP 10	EP 3
8.	Chhatarpur	Bijawar	T04-Amroniya to Amarpura	6.00	No	No	No	No	No		No	
9.	Damoh	Patera	T07-Patera-Bilakhurd Road	11.54	No	Nala Ch 3+500	No	No	No		EP 2	
10.	Dewas	Bagli	T01-Bagli Punjapura road	15.00	No	No	No	No	12	1	EP 17	Shift 7 Raise 6
11.	Dhar	Dharmpuri	T02-Dhamnod To Rupatta Fata Via Sundrel Road	12.60	No	No	No	No	68		EP 30 HP 1	
12.	Gwalior	Bhitwar	T04-Gadhota Tiraha to Mastura, Rahi,	18.24	No	No	No	No			EP 6 HP 1	

S. No.	District	Block	Road Name	Length Km	Features with 10m either side of existing road centre line							
					Landslide prone	Water Body	Water Stagnation Area	Forest Area	Trees		Utlity Structures	
									No.	Likely to be affected	No.	Likely to be affected
			Bela, Itma Upto Bargawan..									
13.	Harda	Harda	T01-Sirali to Harda Magradha Road (Sukharas)	18.64	No	No	No	No	20		EP 18	
14.	Hoshangabad	Seoni Malwa	T09-Shivpur Bhiladiya Rd to Richhi	5.68	No		No	No	Nil	Nil		
15.	Indore	Depalpur	T01-Chittoda to Pitawali	16.60	No	No	No	No	5		EP 38	Shift 14 Raise 7
16.	Jhabua	Ranapur	T23-T04 Tandi Kanjwani Road To Mandlinatu To Sotiya Jalam To Gujrat Border	12.88	No	No	No	No	2	Nil		
17.	Katni	Vijayraghavgarh	MRL01-Barhi Road (Singodi) to Khirwa No.1	5.05	No	1 pond	No	No	5	1		
18.	Khandwa	Khandwa	T01-Khandwa Mundi Road to Dudhwas	15.40	No	No	No	No	5	Nil	EP 99, HP 2	
19.	Khargone	Bagwanpura	T04-Dhulkot Kabri Road to Gujar bawadi-II	6.20	No	1 pond	No	No	54	6	EP 5 LT 5	
20.	Mandsour	Garoth	T03-Kurawan to Basai	19.93	No	No	No	No	8		EP 10 HP 6 LT 19	
21.	Morena	Kailaras	T01-M.S. Road to Arroda	9.60	No	No	No	No	4		EP 48	
22.	Neemuch	Nemuch	T01-Manasa Parda Kanjarda Deiken Road	26.50	No	No	No	No	13		EP 40 HP 20 LT 5	
23.	Panna	Ajaygarh	T02-App. Road to Pista	11.00	No	Nalah Ch 9+600	No	No	Nil	Nil	EP 11	

S. No.	District	Block	Road Name	Length Km	Features with 10m either side of existing road centre line							
					Landslide prone	Water Body	Water Stagnation Area	Forest Area	Trees		Utlity Structures	
									No.	Likely to be affected	No.	Likely to be affected
24.	Raisen	Obedullaganj	T02-NH-12 (Mandideep) - (Via Dahod) NH-12Noorganj to Dahod Road	17.75	No	No	No	yes	no			
25.	Ratlam	Sailana	T03-Jaora Amba Road to Badayalamata Sailana Road	23.00	No	Maleni River	No	No	94	16	EP26 HT 4 LT 16	
26.	Rewa	Naigarhi	T22-T002 To Harditiwariyan	11.03	No	No	No	No	Nil	Nil	EP 4	
27.	Sagar	Deori	MRL01-T-09 to Jaitpur Kachhya	4.76	No	No	No	No	3			
28.	Satna	Ram Nagar	MRL04-T03 to Semariya	6.10	No	No	No	No			EP 18	
29.	Seoni	Seoni	T03-Diwthi to Bhomatola	7.80	No	Nalah at Ch-1935m, 2295m, 7040m	No	No			EP 2	
30.	Shajapur	Moman Badodiya	T04-Chitawad to Manglaj	6.64	No	1 pond	No	No	19	0	EP 9	
31.	Shivpuri	Karera	T12-Shivpuri Jhansi Road (NH25) to Teela	5.10	No	No	No	No	4	0	Nil	
32.	Tikamgarh	Jatara	T01-Acharra to Ghumtaghat	8.10	No	No	No	No	7	0	EP 8	EP 1
33.	Ujjain	Ujjain	T01-Ujjain Maxi Road to Biaora	3.20	No	Nalah Ch CH-920 CH1820	No	No	2	0	EP 10	
34.	Vidisha	Vidisha	MRL04-Bhairokhedi (NH-86) to Ahmedpur via Palki Tharr	18.00	No	Ch- 1285	No	No	Nil	Nil	EP 6	

IV. ANTICIPATED ENVIRONMENTAL IMPACTS AND ITS MITIGATION MEASURES

81. Road improvements work brings substantial economic and social benefits to rural communities and national economies. However, it may also cause adverse environmental impacts though of smaller magnitude, since rural road subprojects aligned along the existing road alignments and will be of 8-12 m width only (in special cases it will be between 5-6m). The impacts are expected largely during construction phase, which can be mitigated through engineering measures and adoption of best construction practices. This section outlines the identified impacts during design, construction and operation phases along with proposed mitigation measures for eliminating or minimizing the adverse impacts.

82. The associated environmental impacts are assessed considering present environmental setting of the project area, nature, and extent of the proposed activities. Impacts are analysed on both generic and specific nature and are classified as insignificant, minor, moderate and major.

Since the issues associated with most of the roads are similar, the impacts and mitigation measures given below are applicable to most of the subprojects. Any issue specific to a road, is separately mentioned.

A. Common Impacts during Design and Construction Phase

1. Climate change

83. **Impact**: The proposed roads are analysed considering climate change vulnerability screening checklist defined under EARF to second RCIP. The resource (like borrow earth, aggregate, cement, concrete) requirements for these rural roads as such are minimal. None of these resources is likely to be affected by climate changes (such as changes in temperature and precipitation). None of the project roads is located in natural hazard areas or passes through protected areas or flood prone areas. The habitations are less along these rural roads and as such, no exponential population growth is expected considering the generic trend of population migration from rural to urban areas. Most of the sample roads pass through agricultural fields and along the existing road alignments with low embankment height of 1m (average) from ground to crust except at the approaches to cross drainage structures. As such, the sub project roads are unlikely to be vulnerable or increase the vulnerability of surrounding areas (with respect to population growth, settlement patterns, increasing runoff or landslides

84. **Mitigation Measures**: Compensatory tree plantations[5] (1:3) will be made to compensate the loss of trees cut for construction of sub project roads. Efforts shall be made to plant additional trees for increasing the carbon sink. The tree may be planted with help of village Panchayat[6]. All non-sample rural roads to be included in second RCIP will also be screened for climate change vulnerability and necessary mitigation measures shall be adopted for minimisation of identified vulnerability if any.

2. Finalization of Alignment

[5]SRRDA mostly undertake this activity in convergence with other government programs undertaken through schemes like MGNREGA, social forestry etc. The forest department also plants trees either along the proposed roads if land is available otherwise on nearby degraded forest land.

[6] Village Panchayats and district authorities are planting trees along rural roads with funding under Mahatma Gandhi National Rural Employment Act (MGNREGA) scheme. The PIUs may facilitate with them for planting trees along the road. Some of the PIUs in different states are already helping Village Panchayats for the same.

85. **Impact**: The proposed rural road will be constructed to provide 8-12 m roadway in accordance with PMGSY II guidelines and technical specifications (IRC-SP 20: 2002) for plain terrains. Sample rural roads are aligned to existing road (earthen track with some stretches of brickbat soling). The existing road passes through plain terrain and primarily agriculture areas. None of the sample roads passesclose to any protected monument or through protected areas. Impacts due to road alignment and design is expected to be minor and limited to shifting of some common utilities, community structures (temple, school) and cutting of trees falling within road way.

86. **Mitigation Measures**: The road alignment is finalised considering availability of right of way. The ROW is reduced in built up area or constricted areas to minimize additional land requirement. The road alignment has also been modified to avoid tree cutting, shifting of utilities or community structure to the extent feasible. Some of the measures taken include widening of the road on one end to maintain the tree on the road edge to avoid its cutting, using retaining wall to minimise the road width to 5m wherever required. The road is aligned to follow natural topography to avoid excessive cut and fill. All future roads to be included in second will follow above measures. In addition, these subprojects will comply with the following criteria for alignment finalisation:

- The road will be part of district core network and will comply with PMGSY guidelines
- Subproject shall not disturb any cultural heritage designated by the government or by the international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance.
- Subproject will not pass through any designated wild life sanctuaries, national park, notified Eco sensitive areas or area of international significance such as protective wet land designated under Wetland Convention, and reserve forest area.
- Subproject to comply with local and National legislative requirements (such as forest clearance for diversion of forestland) and ADB's Safeguard Policy Statement 2009.

3. Land Acquisition

87. **Impact**: Minor impact, since no land acquisition is involved due to various measures considered for finalisation of road alignment. Villagers have volunteered to donate their land if at certain stages land is required for geometrical correction or alignment adjustment for avoiding tree cutting or shifting of community structure. There could be some impact on the encroachers; however, most of them have also volunteered to shift from the proposed alignment.

88. **Mitigation Measures**: All efforts shall be made to minimize the land acquisitionwhile finalising the alignment. In an unavoidable situation, adopt suitable engineering measures to reduce the ROW requirement or donation of land from landowners. In the encroached areas, efforts shall be made to restricted road construction to the available space.

4. Protected Areas (National parks, wild life sanctuaries, Eco sensitive zones, protected /historical monuments) and Forest Areas.

89. **Impact**: Madhya Pradesh state has many wild life sanctuaries but none of the sample road is located within 10 km radius of the wildlife sanctuaries. The nearest national parks and sanctuaries (Panna National Park in Panna and Chhatarpur, Pench Tiger Reserve in Seoni, Madhav National Park in Shivpuri and Van Vihar National Park in Bhopal district) are located at a distance of

minimum 10km away from the project roads. Four out of the 34 sample roads pass through forest area and the PIUs have already applied clearance from the Forest department for the purpose of the road construction. As the roads already exist in case of all these cases, the project will have very little impact on forest cover of the state/Country. Madhya Pradesh is also known to have several archaeological monuments and historical monuments spread all over the state. However, none of them is located within 5 km of sample roads.

90. **Mitigation Measures**: As there are no Protected/Ecologically sensitive areas in the sub project areas, no such measures are proposed. In case of a diversion of forestland, prior forest clearance shall be obtained under Forest (Conservation) Act 1980 (amended 1988).

5. Land Clearing Operations

91. **Impact**: The site clearing operations may have impact on common utilities, community properties, land use and vegetation profile of the area if adequate considerations not given to road alignment finalisation, utility and community structure shifting plan, tree felling, and demolition waste disposal.

92. **Mitigation Measures**: The following steps shall be taken to minimise the associated impact with land clearing operations.

- The land clearing operation should be undertaken as per the defined road alignment and community structure, utility and road furniture shifting plan.
- The road land width shall be clearly demarcated on the ground.
- The utility and community structure shifting shall be as per plan and with consultations and concurrence of the community.
- Tree felling shall be limited to those, which could not be saved even by design measures. The tree shall be cut with a permission of Forest department. The vegetable cover shall be removed and disposed in consultation with community.
- All public utilities shall be shifted with a concurrence of respective agencies/authority and to the adjacent location approved by them.
- The top soils shall be collected and preserved for reuse as a base for turfing of embankment slopes or development of barren areas along roadside. The top soil shall be preserved at identified location with the provision of watering /grass development on the heap surface to prevent air pollution.

6. Cut and Fill and Embankment construction

93. **Impact**: Inadequate alignment planning may increase the cut and fill requirement as well as need for more borrow earth for embankment formation leading to some impact on land use. Inadequate provision for drainage and embankment slop protection may lead to soil erosion. Due consideration is given to above aspect for alignment finalisation of sample roads. With the adoption of appropriate mitigation measures, the impact due to above activity on land use and other environmental component is expected to be minimal.

94. **Mitigation Measures:** The alignment design shall consider options to minimise excessive cuts and fills. The cut and fill quantities shall be used for embankment to minimise barrow earth requirement. The design shall be as per relevant IRC provisions for cut and fill, slope protection and drainage. Adequate provision shall be made for cross drainage structures for maintaining natural drainage pattern in the subproject area and preventing soil erosion. The top soil of the cut and fill area shall be used for embankment slope protection.

7. Establishment of Construction Camp, Temporary office and Storage Area

95. **Impact**: The congregation of labour population and technical staff in the subproject area during the construction phase is likely to put considerable stress on the limited resources of village areas. Some of the associated impacts are related to health, safety of the labourers at the construction camp sites, availability of safe drinking water, and sanitation.

96. The establishment of construction camp temporary office and storage area will reduce land productivity if these are established on agricultural land. Loading and unloading of construction material, transportation of material, handling of fuel and waste disposal from these areas may have direct and indirect impact on soil, water and air quality

97. **Mitigation Measures**: The following steps shall be taken to minimise/reduce these impacts:

- Construction camp sites shall be located away from any local human settlements (minimum 1 km away) and preferably located on lands, which are not productive barren/waste lands presently. Similarly, temporary office and storage areas shall be located away from human settlement areas (minimum 500 m).
- The construction camps, office and storage areas shall have adequate water supply, sanitation and all requisite infrastructure facilities. This would minimize dependence of construction personnel on outside resources, presently being used by local populace and minimize undesirable social friction thereof.
- The construction camps shall be located at a minimum 500m from forest land/areas to deter the construction labour in trespassing. Similarly, temporary office and storage areas shall be located at a minimum 500m from forest land/areas.
- The construction camps, office and storage areas shall have septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use.
- All construction camps shall have rationing facilities particularly for kerosene/LPG so that dependence on firewood for cooking is avoided completely to the extent possible.
- The construction camps, office and storage areas shall have health care facilities for adults, pregnant women and children.
- All construction personnel shall be subjected to routine vaccinations and other preventive/healthcare measures.
- Contractor shall arrange all personal protective equipment (PPEs) like helmet, boots, and earplugs for workers, first-aid and fire fighting equipment at construction sites. An emergency plan shall be prepared to fight with any emergency like fire.
- Garbage bins must be provided in the camp and regularly emptied and disposed off in a hygienic manner. Domestic solid waste shall be disposed of in a control manner. The recyclable waste shall be sold off and non-saleable and biodegradable waste shall be disposed through secured land filling.
- All fuel oil/lubricant unloading and storage shall be made on the paved areas away from storm water drainage.
- After completion of construction work, the camp /temporary office/storage areas sites shall be restored to its original condition.

8. Traffic Movement

98. **Impact**: Construction work along the existing road could cause disturbances to traffic movements. It will also pose risk of accident to motorist at night if these blockages and disruption are not clearly demarcated.

99. **Mitigation Measures**: The contractor will prepare appropriate traffic diversion scheme, which shall be implemented in different stretches of the road as per the progress of the construction work. This plan shall be approved by PIU and implemented before start of any construction work to avoid any inconvenience to the present road users. The diversion plan should ensure smooth flow of traffic, minimise accidents to road users during construction works. Adequate signboards shall be placed much ahead of diversion site to caution the road users. The road signs should be bold and visible and retro reflective in nature for day and night visibility.

9. Associated Impacts due to Construction Activities

a. Loss of productive soil, erosion and land-use

100. **Impact**: No land use will change due to the project, since required ROW is available throughout the alignment. Land use though will change temporarily of construction camp, temporary office storage areas for the period of construction. This will also result in loss of soil productivity. Soil erosion may take place along steep and un-compacted embankment slope, and wherever vegetation is cleared. Soil erosion may have cumulative effect viz. siltation, embankment damage, drainage clogging etc. The siltation, due to soil erosion may occur only in the ponds located close to the roads. Nine out of the 34 sample roads reviewed have ponds and major nalah/river located close to the existing road or crossing it. Loss of soil due to run off from earth stockpiles may also lead to siltation. Land use may also change due to borrowing the earth.

101. **Mitigation Measures**: It shall be ensured that the land taken on lease for access road, construction camp and temporary office of the storage facilities, is restored back to its original land use before handing it over back to land owner. The top soil from the productive land (borrow areas, road widening areas etc.) shall be preserved and reused for plantation purposes. It shall also be used as top cover of embankment slope for growing vegetation to protect soil erosion. The topography of all the sample roads through out the stretch is plain except in case rolling/ undulating terrain for very small stretches in few of them especially located in Koria district. Therefore, cut and fill shall be planned as per IRC provisions and rural road manual. All steep cuts shall be flattened and benched. Shrubs shall be planted in loose soil area.IRC: 56 -1974 recommended practice for treatment of embankment slopes for erosion control shall be taken into consideration. Soil erosion shall be visually checked on slopes and embankment areas. If soil erosion observed, suitable measuresshall be taken to control it.

b. Borrow Areas and Quarries

102. **Impact**: Borrow areas if left un-rehabilitated may pose risk to people, particularly children and animals of accidentally falling into it. This may also become potential breeding ground for mosquitoes and vector born disease. Illegal quarrying may lead to unstable soil condition; destroy the landscape of the terrain, air and noise pollution.

103. **Mitigation Measures**: Borrowing earth from agricultural land shall be minimised to the extent possible. Further, no earth shall be borrowed from already low-lying areas. The borrow earth shall be sourced from identified locations and with prior permission of landowner and with clear understanding for its rehabilitation. The Indian Road Congress (IRC):10-1961 guideline should be used for selection of borrow pits and quantity that can be borrowed. The borrow area

shall be located/ rehabilitated as per the guidelines given at **Appendix 3**. Fly ash shall also be used in road embankment as per IRC guidelines wherever thermal power plant is located within 100 km of the road alignment. The stone aggregate shall be sourced from existing licensed quarries only. The quarry should have requisite consent to operate from State Pollution Control Board. No new quarry shall be opened for the proposed project.

c. Hydrology and Drainage

104. **Impact:** The activities involved with proposed road development may alter the hydrology and drainage pattern of the area in absence of adequate provision for cross drainage structure, construction wastes disposal and drainage in habitat areas.

105. Six sample roads have river crossings. Certain project roads are crossing local and seasonal nalas. Village ponds are also located close to few roads.

106. **Mitigation Measures:** Adequate engineering measures like embankment height above high flood line, retaining wall, cros drainage structures are proposed for protection of sample roads. Adequate provisions are also made for bank stabilisation (like toe wall, slope stabilisation), and prevention of silt runoff during construction and operational stages.

107. The provision of adequate cross drainage structures shall be made to ensure smooth passage of water and maintaining natural drainage pattern of the area. The discharge capacity of the CD structure shall be designed accordingly. The construction work shall be planned in dry season so that water quality of the water channel is not affected due to siltation. Elaborate drainage system shall be provided to drain the storm water from the roadway and embankment and to ensure minimum disturbance to natural drainage of surface and subsurface water of the area. Provision of additional cross drainage structures shall be made in the areas where nearby land is sloping towards road alignment in both the both sides.

108. Provision of CC road construction in habitat area with drainage of both side of the road shall be made as per the design specifications and with adequate slope to prevent any water logging.

d. Compaction and Contamination of Soil

109. **Impact:** Soil in the adjoining productive lands beyond the ROW, haulage roads, and construction camp area may be compacted due to movement of construction vehicles, machineries, equipments and construction camps/storage facilities. It may get contaminated due to inappropriate disposal of liquid waste, (lubricating oil and fuel spills, waste oil and lubricant and vehicle/equipment washing effluent) and solid waste (fuel filters, oily rags) likely to be generated from repair and maintenance of transport vehicles, construction equipment and machinery.

110. **Mitigation Measures:** To prevent soil compaction in the adjoining productive lands beyond the ROW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. The productive land shall be reclaimed after construction activity. Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. Domestic solid waste at construction camp shall be segregated into biodegradable and non-biodegradable waste. The non-biodegradable and recyclable waste shall be sold off. Fuel and lubricants shall be stored at the predefined storage location. The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. All efforts shall be made to minimise

the waste generation. Unavoidable waste shall be stored at the designated place prior to disposal. To avoid soil contamination at the wash-down and re-fuelling areas, “oil interceptors” shall be provided. Oil and grease spill and oil-soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to SPCB/ MoEF authorized re-refiners.

e. Construction Debris and Wastes

111. **Impact:** Uncontrolled disposal of debris and waste may create unhygienic and unsafe condition around the disposal areas.

112. **Mitigation Measures:** All excavated materials from roadway, shoulders, verges, drains, cross drainage shall be used for embankments formation if feasible, filling pits, and landscaping. Unusable debris material should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority. The bituminous wastes shall be disposed in secure landfill sites only in environmentally accepted manner. MORTH guidelines shall be followedfor debris, wastes removal and disposal at unproductive/wastelands which shall be selected with the consent of villagers and Panchayat. The dumping site should be of adequate capacity and to be located away from residential areas (at least 1000m away). It should also be located away from water bodies to prevent any contamination of these bodies.

f. Air Quality

113. **Impact:** The potential sources of air emission during the construction phase of the project are given below which can cause localised air pollution.

- Dust from earth works (during site preparation).
- Emissions from the operation of construction equipment and machines.
- Fugitive emissions from vehicles plying on the road, during the transport of construction materials.
- Emissions other than dust particularly from the hot mix plants and laying of bitumen. Hot mix plant will generate carbon monoxide (CO), un-burnt hydrocarbon (HC), sulphur dioxide (SO_2), particulate matters (PM), and nitrogen oxides (NOx) emissions.
- Localised increased traffic congestion in construction areas. Most of the emissions will be in the form of coarse particulate matter, which will settle down in close vicinity of construction site. This may affect the air quality of nearby areas, especially, due to emission discharge from low height of the stack.

114. **Mitigation Measures:** All theseimpacts will be temporary and hence, no significant impact is envisaged. The following measures will be taken to minimise these:

- Vehicles delivering loose and fine materials like sand and aggregates shall be covered.
- Dust suppression measures like water sprinkling, shall be applied in all dust prone locations such as unpaved haulage roads[7], earthworks, stockpiles and asphalt mixing plant areas.
- Mixing plants and asphalt (hot mix) plants shall be located at least 0.5 km away and in downwind direction of the human settlements.

[7]Water suppression of fugitive dust can reduce emissions from 12% to 98%

- Material storage areas shall also be located downwind of the habitation area.
- Hot mix plant shall be fitted with stack of adequate height (30 m) or as may be prescribed by state pollution control board (SPCB) to ensure enough dispersion of exit gases. Consent to establish and operate shall be obtained from State Pollution Control Board and comply with all consent conditions.
- Diesel Generating (DG) sets shall also be fitted with stack of adequate height. Low sulphur diesel shall be used in DG sets and other construction machineries. Construction vehicles and machineries shall be periodically maintained.
- The requisite PPE (helmet, mask, boot, hand gloves) shall be provided to the construction workers.

g. Noise Quality

115. **Impact:** Ambient noise level may increase temporarily in the close vicinity of various construction activities, maintenance workshops, vehicles movement and earthmoving equipment.

116. **Mitigation Measures:** The noise level will be intermittent and temporary and will attenuate fast with increase in distance from noise source. Further, vehicles and equipment should be fitted with silencers and maintained regularly. The workers shall be provided with personal protection devices such as earplugs and earmuffs. Workers' exposure to noise will be restricted to less than 8 hours a day. Workers duty shall be regulated accordingly.

h. Groundwater and Surface Water Quality and Availability

117. **Impact:** Water will be required for compaction of formation and domestic purposes in the workers camp. These requirements will be mainly sourced from groundwater. Any uncontrolled abstraction of ground water can deplete the ground water table fast. Contamination of groundwater is not envisaged since all construction camps will have septic tanks or mobile toilets depending on the number of workers in each camp. The drinking water supply to the habitat is primarily through hand pumps and bore wells. No significant impact is anticipated on surface water bodies except probability of siltation during construction. Due to non-perennial nature of surface water bodies, water requirements for drinking and construction purpose shall be met from ground water sources.

118. **Mitigation Measures:** Requisite permission shall be obtained for abstraction of groundwater from State Ground Water Board/Central Ground Water Authority[8] if applicable. The contractor shallarrange for water required during construction in such a way that the water availability and supply to nearby communities remains unaffected. Water intensive activities shall not be undertaken during summer period to the extent feasible. Provision shall be made to link side drains with the nearby ponds for facilitating water harvesting. Where ponds are not available, the water harvesting pits shall be constructed as per the requirement and rainfall intensity. Measures are already purposed in earlier section for prevention of siltation in water bodies.

i. Biological Environment

[8]As per Central Ground Water Authority (CGWA), there are 43 notified blocks in India where prior permission is required for extraction of ground water. Currently there are no notified areas in MP state. CGWA is continually updating the list of notified areas.

119. **Impact:** Some of the sample roads are passing through forest area; however, there is no diversion of forest land as the construction will be within the existing ROW. The major adverse impacts will be due to tree cutting, Siltation and contamination of water bodies may affect the aquatic life. Since there are only ponds and non-perennial water bodies (local nallas and few canals) no significant impact is anticipated on aquatic life.

120. **Mitigation Measures:** All efforts shall be taken to avoid tree cutting wherever possible. Requisite permission from forest department shall be obtained for cutting of roadside trees. Compensatory Afforestation shall be made on 1:3 ratio basis. Additional trees shall be planted wherever feasible. All care shall be taken to avoid siltation/contamination of water bodies. Movement of herbivores likeCattle, Goats, Cows etc., have been observed in the surrounding agriculture fields. Disturbance to these animals will be avoided to the extent possible.

j. Impact on Common Property Resources

121. **Impact:** There are public utilities like Electric transformer, electric poles, and hand pumps all along the rural roads. The road construction may require shifting of these utilities. There are many community structures like school, playground village office and temples. One of the roads i.e Majholi to Suhajni in Jabalpur district has a small temple located adjacent to the road that will be affected due to the project.

122. **Mitigation Measures:** All efforts are made to minimize shifting of common utilities and community structures. ROW has been reduced in constricted areas with appropriate engineering measures to minimize land acquisition and shifting of community structures. The community structures/utilities which can not be saved will be shifted to adjacent area with the concurrence and in consultation with community.

B. Common Impacts during Post Construction and Operation Phase

1. Air Quality

123. **Impact:** Decrease in air quality due to increase in traffic, idling at congestions.

124. **Mitigation Measures:** The bad road conditionis the main cause of poor air pollution at present. The improved road conditions will result in the improved ambient air quality. Also, the subproject road is largely traversing through vast open agriculture areas, which will provide adequate dispersion to gaseous pollutants, generated from vehicles and will offset the increased pollutants.

2. Noise

125. **Impact:** During the operational phase, movement of traffic will be the prime source of noise. Traffic congestion and pedestrian interferences increase the use of horns. This may result in increased noise levels at habitat areas, nearby schools and religious places.

126. **Mitigation Measures:** Awareness signboard shall be provided for safe driving near the habitat areas. Speed limitation and honking restrictions may be enforced near sensitive locations.

3. Land, Soil, Tree Plantation

127. **Impact:** The better access can lead to conversion of agriculture land for residential and commercial purposes close to roads, which may result in loss of productive land and agricultural produce. Since the rural road are aimed at connecting the villages, and with the general trend of migration of rural population to urban areas, the phenomena of conversion of agriculture land to residential area is unlikely to change.

128. The land occupied for construction camp /temporary office/material storage area will remain unproductive if it is not restored after completion of construction activities.

129. It shall be essential to ensure the survivability of the compensatory tree planted

130. **Mitigation Measures:** It shall be ensured that all construction camp/temporary office/material storage areas are restored to its original conditions. The borrow area rehabilitation will also be ensured as per the agreed plan with the landowner. Contractor and PIC will ensure the same and obtained clearance from PIU before handling over the site to SRRDA.

131. The PIC will undertake survivability assessment and report to PIU the status of compensatory tree plantation at a stage of completion of construction with recommendation for improving the survivability of the tree if required.

4. Groundwater

132. No impact is anticipated on groundwater due to the project during operation phase, hence, no specific mitigation is proposed.

5. Hydrology and Drainage

133. **Impact:** Water accumulation incidence may occur due to inadequate availability of cross drainage structure or clogging of cross drainage structures.

134. **Mitigation Measures:** Regular removal/cleaningof deposited silt shall be done from drainage channels and outlet pointsbefore the monsoon season. Rejuvenation of the drainage system by removing encroachments/ congestions shall be regularly conducted.

6. Socio-Economic Impact

135. Assessment of project impact on socio-economic conditions point to the conclusions that positive benefits are many fold compared to its adverse impact.

136. **Positive Impacts**: The better road access is likely to contribute the overall economic condition of village community. With the quick access to urban market areas, the farmers are likely to get better prices for their farm produce. Children will also be able to access the school and education facilities in the near by urban areas.

137. **Safety Measures** shall be adopted as per NRRDA guidelines. Some of them are highlighted below:

- Speed breakers (Rumble strips) as per IRC: 99-1988 shall be provided at sharp curves and bends where the curve design speed is less than 40 km per hour.
- Speed breakers shall also be provided at a threshold of habitation (as per NRRDA guidelines) at regular intervals (150-200 m) through habitation.

- The speed breakers are provided and directional sight boards installed at sites where reverse horizontal curves are closely spaced and speed reduction is required.
- Hazard markers to be installed at each end of all box culverts, river crossing causeways and similar CD structures
- Shoulder side slopes shall not be steeper than 2h:1V unless stone pitching of the slopes is provided.
- Cement concrete pavement and V-shaped drain is constructed to the full width of the available roadway within densely populated habitation.
- Directional sight board are installed on all sharp curves and bends
- At main road, intersection or crossing “STOP” sign and ‘T-intersection’ warning sign shall be installed on the village road.

C. Road Specific Impacts

138. The assessment of sample roads indicates that environmental issue associated with all the roads are similar. Hence mitigation measures applicable to all the road are also will be similar except variation in terms of magnitude which will depend on length of the road, the presence various environmental components. These components may be assessed in terms of no of pond, number of community structure (mostly temples, playground, school, gram Panchayat office) likely to be shifted, number and type of common utilities (hand pump, water tank, electric transformer, electrical poles).

139. Forest areas are located along four out of the 34 sample roads at different chainages. Appropriate measures relating to location of camp sites and working hours etc. should be maintained as provided in the environment management plan.

D. Climate Change Impacts and Risks

1. Climate Change Mitigation

140. The Transport Emissions Evaluation Model for Projects (TEEMP) is an excel based tool to assess CO_2 gross emissions without (business as usual or BAU) and with the project improvements (with project scenario or WPS). The tool, which was developed by Clean Air Asia and the Institute for Transportation and Development Policy, was funded by ADB. The main improvement from the project that was considered for the model are better surface roughness with less than 2.5m/km, and improved traffic speed and hence less fuel consumption. The model has also been used for CO_2 emission assessment during construction stage. The model also allows for the inclusion of impacts related to traffic congestion with and without project through provisions for inserting data on the traffic numbers, lane width, number of lanes and volume/capacity saturation limit. The model also computes for emission and emission intensity of PM and NOx.

141. The following information were used to project CO_2 emissions for Tranche 2 of the Facility:

a. RCIP 2 subprojects in Madhya Pradesh state will upgrade 204 rural roads with a total length of 2,859.09 km;
b. Road improvements will be confined to the existing road right-of-way, with lined storm water drains for stretches passing through built-up areas, waterlogged/ water overtopping, and flood prone area; and
c. Road roughness will improve from the current 8.0 m/km to 2.5 m/km.

142. Traffic forecasts were generated from the economic analysis for each road section, disaggregated into vehicle types and share to the annual average daily traffic (AADT). The cumulative AADT for the state is indicated in **Table12**.

Table 12. AADT Composition

Vehicle Type	Average Number	Percentage
Motorized		
Two-wheeler	298	45.22
Three-wheeler	21	3.19
Car/Jeep/Van	116	17.60
Multi-axle	53	8.04
Bus	27	4.10
Two-axle	144	21.85
Total (motorized)	659	100
Non-motorized		
Bicycle	1	4.55
Bullock cart	21	95.45
Total (non-motorized)	22	100.00

143. There are 204 rural roads with a total length of 2,859.09 km proposed in Madhya Pradesh for Tranche 2, and with a carriageway width of 3.75-7.5m. Road capacity of 7,200 PCU/lane/day for rural roads was adopted for the project. The design life of the roads is 15 years.

144. Emission factors were taken from CBCP/ MOEF Draft Report on Emission Factor Development for Indian Vehicles (2007) and the Automotive Research Association of India.

Table 13. CO_2 Emission Factors

Vehicle Type	Gasoline (kg/liter)	Diesel (kg/liter)	LPG (kg)
2-wheeler	1.37		
3-wheeler	2.12	2.63	3.0
Car	2.24	2.59	
Multi-axle		3.21	
Bus		3.61	
2-axle		3.50	

145. To account for construction emission, the amount of emission per km was estimated. For rural roads, the emission factor for rural road in India (kg CO_2/km) was estimated at 48.4 tons/km[9]. These emissions were from construction materials used (aggregates/base materials, cement, bitumen and emulsion), and fuel used for transporting construction materials.

146. The total annual emissions without the project (business as usual) at the middle of the design life of 15 years is estimated at **96,084 tons/year** and with project scenario is estimated at **94,554 tons/year** for all 204 rural roads proposed for Tranche 2 of RCIP 2. The with project scenario is still far below the 100,000 tons/year threshold set in the ADB SPS 2009.

2. Climate Risks and Adaptation Needs

[9] https://www.adb.org/sites/default/files/publication/28555/estimating-carbon-footprints-road-projects.pdf

147. Climate risks in the State were identified following both top down and bottom up approaches. Under the top down approach changes of key climate parameters, mainly temperature and precipitation were projected for 2050 using an ensemble of Global Climate Models (GCMs). Given the projected variations of temperature and precipitation the project roads were screened for various types of climate risks specific to the State of Madhya Pradesh. Climate risk maps based on information from the GCMs were created for the project area using Geographic Information System (GIS) maps. After overlaying the road locations on climate risk maps, main risks identified for the project roads was flooding and landslides triggered by precipitation. The study reports that although the overall climate change risk level identified by the exercise was found to be low, the key risk identified was flooding due to increased precipitation intensity and increased storminess. As part of the initial environmental examination for Tranche 2 for Madhya Pradesh, a section on climate risk and vulnerability assessment has been prepared. Under this section, key climate change risks identified were, increased frequency and intensity of rainfall and related flooding triggered by precipitation.

148. The following measures will be incorporated in the design of rural roads for Madhya Pradesh in consideration of the identified climate risks: (a) Increase in road embankment height in flood prone areas/sections; (b) Improvement and provision of lined longitudinal and cross drains and new culverts; and (c) Protection works. Provisions have also been made in the bidding documents for the contractor to prepare EMPs based on the final detailed design to address climate related risks and vulnerabilities.

149. The total cost of climate adaptation measures for Tranche 2 is **$17.174 million**, representing **5.72%** of the total project cost of **$300.47 million**. The cost of adaptation to be financed by ADB for Tranche 2 (Madhya Pradesh only) is **$6.29 million**.

V. ENVIRONMENTAL MANAGEMENT PLAN, INSTITUTIONAL ARRANGEMENTS AND GRIEVANCE ADDRESS MECHANISM

A. Environmental Management Plan

150. The Environmental Management Plan (EMP) is prepared to facilitate effective implementation of recommended mitigations measures with defined roles and responsibility for implementation and monitoring, regulatory compliance requirements, stages of implementation with location, period and costs. The mitigation measures are proposed to eliminate or minimise the identified impact associated with design, construction and operation stages of the project, to acceptable level by adopting the most feasible options.

151. The EMP is prepared as per Environmental Management Standard (ECOP) applicable to rural road defined by ADB at RRSP I stage.

152. The identified impacts are insignificant and are related to clearing operations of RoW, traffic diversions, setting and operation of construction camps, quarry and borrowing operations, transportation of materials, construction of cross drainage structures, air & noise pollution due to construction activities and operation of construction equipment, tree cutting and shifting of utilities and physical community structure.

153. Appropriate mitigation measures are identified for all rural road construction and operation activities. The identified impacts associated with rural roads and mitigative measures are largely common to most of the roads. The EMP is detailed at **Appendix 4**. It provides action common to all roads at pre-construction, construction and operation stage. Since IEE is carried out, prior to preparation of DPR, the EMP will be updated specific to road as per DPR requirements by PIU and included with DPR, which shall be available to contractor at the time of bidding. The areas to be updated as per DPR provisions are highlighted under location column of EMP.

154. Since, these are rural road, the vehicular density and speed will be low. Movement of vehicles would be confined primarily for transfer of agricultural produce to market places. As such, no major emergency is anticipated. In any accidental eventuality, local administration can be reached quickly for help though Gram Panchayat (village administration) communication systems.

B. Environmental Monitoring Plan

155. The environmental monitoring program is prepared with aim to monitor the environmental performance of environmental management plan. The EMOP is planned with the focus on following objectives:

- To the assess the effectiveness of mitigation measures proposed
- To assess the change in environmental quality during construction and operation stage with respect to before the project scenario.
- To assess compliance to regulatory requirements
- To monitor the status of corrective action taken in case of deviation from the planned measures or regulatory requirements.

156. For rural roads, Environmental Monitoring plan will be more observation oriented and it provides observation areas with frequency of monitoring at pre-construction aspects[10],

[10] Aspects related to alignment selection for inclusion of new roads

construction stage and operation stage. A monitoring plan with monitoring indicator and frequency of monitoring is given at **Appendix 5.** In case of any unanticipated impacts or non-compliance, a time-bound and budgeted corrective action plan will be agreed between ADB and the EA. Environmental monitoring report will be submitted and disclosed in ADB website on an annual basis during construction and operation phases.

C. Institutional Arrangements and Responsibilities

1. Institutional Arrangement

157. NRRDA constituted by MORD is the nodal agency for the implementation of PMGSY in India. SRRDA is the state level agency responsible for implementation of PMGSY program in the state. NRRDA has developed various guidelines and defined institutional arrangements for effective and timely implementation of PMGSY program, which also covers measures for environmental and social safeguards. In line with the defined institutional requirements, each SRRDA has set up district level project implementation units (PIUs). NRRDA also appoints Technical Support Consultant (TSC) to provide technical support for capacity building in SRRDA/PIUs, facilitating them for environmental and social safeguard compliance monitoring and due diligence. SRRDA appoints PIC (project implementation consultant) for supervision of construction work. PIC also helps PIU in monitoring the EMP.

158. NRRDA is also responsible to coordinate with SRRDA and ensure compliance to ADB safeguard requirements.

159. The institutional arrangement at National Level and state level for implementation of PMGSY including second RCIP is shown at **Figure 9.**

D. Institutional Environmental Responsibilities

160. The institutional environmental responsibilities for different level and function is elaborated below

161. **MORD**[11] the executing agency has the responsibility for monitoring implementation of the EMP for all subprojects and undertaking necessary due diligence. MORD ensure this through its Nodal Agency NRRDA (National Rural Road Development Agency). MORD will also ensure that

- ADB is given access to undertake environmental due diligence for all subprojects, if and when needed as per EARF requirements.
- SRRDA meet all environmental assessment requirements in accordance with EARF
- It undertakes random monitoring of the implementation of the EMP
- Ensure compliance to legislative requirements such as forest clearance for diversion of forest land for non-forest purposes and Consent to Establish/Operate for hot mix plant, batching plant
- Appoint Technical Support Consultant (TSC) to assist SRRDA for various environmental aspect and safeguard compliances

[11] MoRD implements it through its nodal agency NRRDA which undertakes this with the help of Environmental Expert of Technical Support Consultant

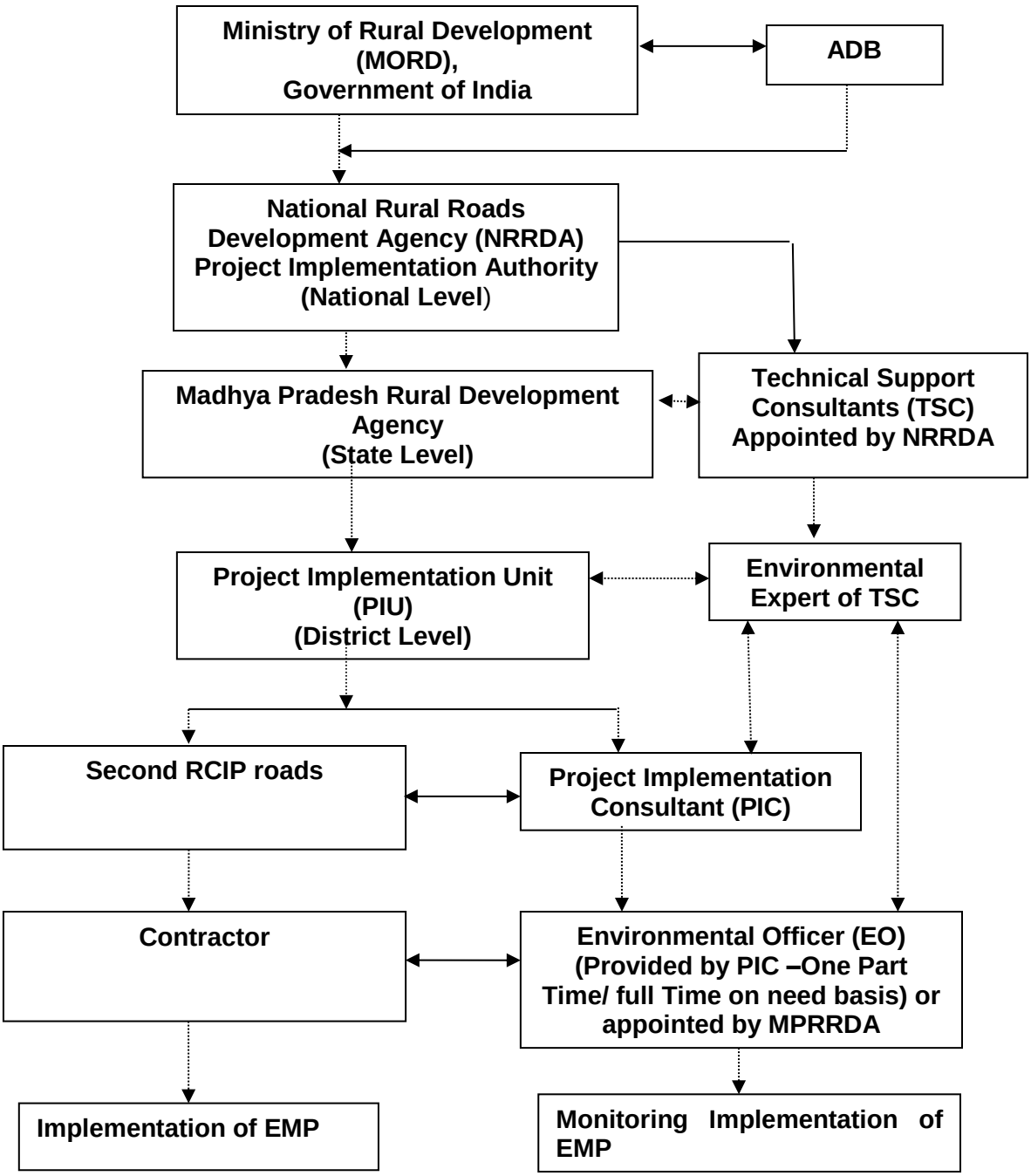


Figure 9: Institutional Arrangement for EMP Implementation

162. **MPRRDA**[12]will ensure that:

- ECOP checklist is prepared for each road
- The completed ECOP checklist is included in the DPR with the help of PIC.
- Ensure that all required statutory environmental clearances are obtained and comply with clearance conditions;
- Ensure that all safeguard requirements,subproject specific EMPs and respective budget are included in the bidding documents;
- Ensure that the ECOP checklists and EMP (including general and sitespecific issues) are made available to the contractors;
- Undertake routine monitoring of the implementation of the EMP including spot checks on site and prepare monitoring reports at least once a year; and
- With the support of technical support consultants prepare satisfactory environmental due diligence reports of the earlier tranche/periodic financing request before implementing the next tranche.
- Appoint Project Implementation Consultant (PIC) for construction supervision and assist PIUs for EMP implementation and related safeguard compliances.

163. **PIU** will be responsible to:

- Complete the ECOP checklists and prepare subproject specific EMPs (including monitoring plan) for each subproject
- Obtain necessary statutory environmental clearance prior to commencement of civil works
- Update the respective ECOP checklists and EMPs if there are any changes in alignment of the subprojects
- To conduct monitoring of all subprojects and prepare pre-, during and post-construction monitoring checklists through the project implementation consultants,
- Prepare and submit to SRRDA annual monitoring report as per ADB defined format

164. **The Technical Support Consultants (TSC)** appointed by NRRDA. The Environmental Expert of TSC:

- Will provide technical assistance to SRRDA/PIU regarding environmental aspects, environmental permitting/clearances requirement,
- Periodically review EMP implementation status including spot site inspections.
- Conduct workshops/capacity building program at different level and functions.
- Prepare environmental Due Diligence report for each trench before implementing next trench
- Prepare state Level IEE reports and EMPs for non-sample roads based on the ECOP checklist completed by the PIC

165. **Project Implementation Consultant (PIC) is** appointed by SRRDA. PIC will provide one Environmental Officer (EO). The EO will be responsible to ensure adherence and implementation of EMP at all stages of works by the contractor. The EO, if found warranting may also conduct field tests, independent of the contractor to determine the effectiveness of EMP under approval of PIC/PIU. The broad duties / responsibilities of the Environmental Officer will include:

[12] With assistance from PIC (Project Implementation Unit)

- Review of project design and specifications to ensure their adequacy and suitability with respect to the implementation of EMP.
- Collection and dissemination of relevant environmental documents including amendments to environmental protection acts issued by the various agencies, namely, ADB, Government of India / State and local bodies;
- Interact with the counterpart of the Contractor(s), review work progress/plans and ensure implementation of the EMP;
- Co-ordination with the NGOs, community groups and Government departments on environmental issues, provide clarifications/ and obtain clearances during project implementation if any, as required from the regulatory authorities and/or submitting periodic compliance reports as required by the State Authorities;
- Monitoring sensitive environmental attributes during construction and operation stages[13]to ensure that the suggested mitigation measures in the EMP are implemented. This will also serve as the basis for the annual environmental monitoring reports.
- Facilitate PIU for preparation of annual monitoring report as per ADB defined format
- Documentation of the environmental management/monitoring activities for the regular project implementation progress report; which will serve as the basis for the annual environmental monitoring reports.
- Conducting environmental training/awareness programs for the contractors, the project implementation personnel and the communities.

166. **Contractor** is appointed by SRRDA for construction of road and ensure implementation of EMP proposed. The broad duties of constrictor are as follows**:**

- Make adequate costs provision for EMP requirements while biding
- Ensure effective implementation of mitigative measures as per road specific EMP
- Comply with all applicable legislative requirements and obtain necessary consents for to Establish/Operate before start of hot mix plant and batching plants. Comply with al permit conditions
- Create awareness amongst workers for environment, occupational health and safety aspects. Participate in training and awareness programme along with its executives conducted by PIC.
- Provide PPE and adequate resources for Environment Occupational Health and Safety
- Follow all the guidelines for borrowing earth and restoration of borrow areas, setting up construction camps
- Sourcing of quarry material from approved quarries only
- Provide all required input to PIC for environmental monitoring as per EMP.

E. Environmental Assessment and Review Framework (EARF) for Second RCIP

[13]Normally PIC is supposed to undertake five site visits and five monitoring reports as per contracts being issued by different SRRDA. It is proposed that PIC shall submit the following five monitoring reports: (1) First report at preconstruction stage, (2) Second report after three months of start of construction or on completion of 25% construction (3) Thrid report after seven months of start of construction or on completion of 75% of construction, (4) Fourth report after one month of completion of construction and first year of operation stage (5) Fifth report in second month of seond year of operation stage.

167. ADB has prepared an Environmental Assessment and Review Framework (EARF) which identifies the broad scope of the MFF, outlines the policy, environmental screening and assessment, and institutional requirements for preparing the environmental assessments to be followed for all batches and tranches under Second RCIP. This EARF also specifies criteria for eligibility for selection rural roads under second RCIP. The sample roads are selected following these criteria. The EMP, monitoring requirement, institutional aspects, capacity building, grievance redress mechanism presented in this chapter are developed in line with above EARF. The eligibility criteria for selection of roads under second RCIP, environmental assessment requirement for each trench and legal framework are given below:

1. Selection Criteria and Environmental Assessment Requirement

168. The following criteria will be followed for selection of non-sample roads.

(i) No Category A (as per ADB's SPS) subproject will be included in the MFF.

(ii) Subprojects will be eligible for construction or upgrading in accordance with the PMGSY guidelines and be included in the respective district core network.

(iii) The subprojects shall not disturb any cultural heritage designated by the Government or by international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance.

(iv) The subproject will not pass through any designated wildlife sanctuaries, national parks, other sanctuaries, notified ecological sensitive areas or area of internationally significance (e.g., protected wetland designated by the Wetland Convention).

(v) The projects shall only involve activities that follow Government of India laws and regulations, ADB's Safeguard Policy Statement (2009)

169. The following environmental Assessment requirement will be followed for all roads included under second RCIP

(i) ECOP checklists with annexes on trees, utility structures, community structures, strip plans and photographs will be completed for each and every road.

(ii) Based on the requirements of the PMGSY guidelines separate ECOP checklists will be prepared for bridges that are longer than 50 m.

(iii) Based on the completed ECOP checklists for roads and bridges, IEE reports will be prepared at a state level. These reports must contain a general EMP and a site specific EMP where there are site specific issues.

(iv) ADB's REA checklist for roads and highways will be completed based on the state level IEE reports prepared and submitted to ADB to confirm categorization

170. The vulnerable to climate change will also be screened following screening checklists, which was integrated in the ADB REA Checklists and corresponding mitigation measures will be prepared.

(i) Is the project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate change?

(ii) Could changes in precipitation patterns or evaporation rates over the lifespan of the project affect its sustainability and cost (i.e., increased landslides increase maintenance costs)?
(iii) Does the project use or depend on resources which could be affected by climate changes such as changes in temperature, precipitation, wind (increased soil moisture content in the sub-grade)?
(iv) Are there any demographic or socioeconomic aspects of the subproject and project area (e.g., population growth, settlement patterns) that increase the vulnerability of the project and surrounding area?
(v) Could the subproject potentially increase the vulnerability of the surrounding area (i.e., by increasing runoff, encouraging settlement in earthquake zones)

2. Legal Framework

171. As per Indian legislation, an environmental clearance is not required for rural roads. However, it may attract provisions of Forest Conservation Act, Wild Life (Protection) Act, and other legislation related with Air, Water and Noise pollution controls and prevention. The legislative applicability screening is presented in chapter 1 of this report and it will apply for non-sample road as well. Additionally, to ensure conformance to ADB's Safeguard Policy Statement, 2009 (SPS), the subprojects will be subject to the following requirements:

(i) Submission of a completed Rapid Environment Assessment (REA) checklist for Roads and Highways and a categorization form for each state level IEE that is prepared.
(ii) An Initial Environmental Examination[14] (IEE) report including the preparation of an Environmental Management Plan (EMP) and a Monitoring Plan.
(iii) Regular monitoring of implementation of the EMP and submission of monitoring reports and due diligence reports to ADB as necessary

F. Capacity Building

172. Existing capacity of the State Rural Roads Development Agencies (SRRDAs) and Project Implementation Units (PIUs) for implementing environmental safeguard issues need substantial strengthening. Capacity building activities will mainly comprise training workshops for SRRDA and PIU environmental officers on (i) completion of environmental code of practice (ECOP) checklists; (ii) preparation of environmental management plan (EMP) and monitoring plans; (iii) monitoring of EMP implementation and completion of pre-, during and post-construction monitoring checklists; and (iv) preparation of monitoring reports. These few workshops have already been conducted at participating states though ADB appointed Environmental specialist. Additional training will be carried out periodically, by In-house trained and experienced officials.

G. Consultation and Information Disclosure

173. During the preparation of ECOP and Detailed Project Report (DPR), the PIU has to ensure consultation, and addressal of concerns of the affected people.

174. All environmental assessment documents are subject to ADB's Public Communication Policy (2005) and will be made available to the public, upon request. The SRRDAs are responsible for ensuring that all environmental checklist documentation, including the environmental due

[14] As per selection criteria, no Category A subproject will be included under RCIP.

diligence and monitoring reports, are properly and systematically kept as part of the Investment Program specific records. MORD must disclose state specific sample road IEE reports on its website.

H. Grievance Redress Mechanism

175. PRI administered village level committee is the first contact point for any aggrieved person. This committee will try to settle the concern by them self or in consultation with contractor or PIU. The unresolved concerned are forwarded to PIU for further action. PIU resolves these concerns in consultation with PIC, SRRDA, and contractor as the situation demands. This is an established practice and is seen effective enough in RRS II and RCIP I. PIC will also collect concerns received by this committee in the intervening period and report the effectiveness of action taken. Stakeholder engagement will be ensured, including participation of women and the vulnerable people all throughout the project cycle.

176. At national level NRRDA has made provision of registering complain /suggestion through its website. NRRDA forwards these complains to concerned SRRDA for necessary actions. SRRDA directly or through concerned PIU initiate the appropriate action and update the complainant as well as NRRDA. It is proposed that NRRDA website will be cross-linked to each SRRDA website as well or SRRDA will also make provision of complain registry at its website.

177. The following indicative timeline to resolve grievances at different levels will be observed: Subproject level – 3 days; Village level – 1 week; District level – 1 week; and National level – 2 weeks. GRM related costs, which mostly include travel expenses and meeting related expenses such as refreshments, will be covered by PIU. The GRC meetings will only be convened only if and when necessary. Hence, GRC members will not be required to be present in all times during project implementation. Cost for other activities such as recording complaints, minutes of meetings, preparing reports, etc., will be carried out by the PIU / PIC. Complainant has the option to resort to legal redress at any stage.

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. General

178. Public consultation was undertaken consistent with the ADB requirements. All the five principles of information dissemination, information solicitation, integration, co-ordination and engagement into dialogue were incorporated in the consultation process. A framework of different environmental impacts likely from the project was strengthened and modified based on opinions of all those consulted, especially in the micro level by setting up dialogues with the village people from whom information on site facts and prevailing conditions were collected.

179. Stakeholder's consultations were held with the intent to understand their concerns, apprehensions, overall opinion and solicit recommendations to improve project design. Informal meetings, interviews were organized covering the entire project stretch. The informal consultation generally started with explaining the sub projects, followed by an explanation to potential impacts. Participant's views were gathered with regard to loss of agricultural land, shifting of utilities, shifting of common cultural properties, effect on air and noise quality of the area due to traffic, water availability, accident and risk.

180. The discussions were designed to receive maximum inputs from the participants regarding their acceptability and environmental concerns arising out of the sub-project. They were given the brief outline of the project to which their opinion was sought. Suggestions were also sought for mitigating any potential adverse impact.

B. Compliance with Relevant Regulatory Requirements

181. In India, public consultation is mandatory in case of Category A and B1 category projects[15] in select conditions. Being a category B project as per Safeguards Policy Statement (2009), consultation was carried out during the early stage of IEE report preparation. The requirement of public consultation during the implementation of the project has been proposed as part of the mitigation plan.

C. Beneficiaries' Comments

182. The project has immense acceptability among the local people. They perceived that in addition to providing all weather connectivity, the sub-project road would bring positive socio-economic changes in the area. Local people mainly discussed on issues related to drainage and commencement of the construction work.

183. Some of the general issues raised during the different consultation sessions are summarised below:

- **Construction Camp** - The participants did not apprehend any adverse impact due to the construction camp near to their villages. They responded positively towards providing support to these, if required, in terms of any food, water requirements.
- **Water Logging and Drainage** - Participants informed about few low-lying areas where water logging takes place during monsoon season. The villagers requested for provision of adequate cross drainage structures at these locations.

[15] As per schedule I of EIA notification number S.O. 1533, dated 14th September 2006. This notification also defines when a public consultation is mandatory. However, the project roads doe not require environmental clearance under this notification.

- **Loss of Livelihood and Income Restoration Options** - those who had encroached on the proposed alignment raised this issue. However, they offered the encroached space for the proposed project, if demanded.
- **Road Safety** - Safety issues were not of major concern among the inhabitants including women.
- **Land Requirement** - People were in full support of the project and were ready to donate their land for the same, if required.
- **Losses of Idols/Shrines -** Participants supported the project and were willing to shift the idols, burial grounds and other religious structures observed at certain locations if required.
- **Loss of Trees Due to Road Construction** - Respondents were of the opinion that trees cutting should be avoided or else minimised. For trees to be cut compensatory plantation should be done. Some villagers expected additional plantation should be carried out. They recommended to plant only local tree species.
- **Impacts on Health** – Villagers do not perceive any impact due to this road project. However, issues pertaining to sexually transmitted diseases (STDs), HIV- AIDS may be an issue during construction stage however, this aspect is analysed by Social Impact Assessment team separately.
- **Ambient Air & Noise Quality** – The respondents viewed that these are the problems of urban areas and their villages are still untouched from this aspect. They even do not anticipate any of these problems after the completion of the project. However, they do not want increased in pollution during construction phase.
- **Inconvenience during Construction** - The participants viewed that they will manage it, as it will be temporary in nature.
- **Employment during Construction** - The locals expected that they should be given preference in employment during project implementation.
- **Perceptions and Expectations -** The public and the affected persons appreciated need and supported the project fully. Community at large appreciated overall benefits to them resulting from project development;

D. Addressal of Issues

184. The efforts made to address all the issues raised during consultations through design changes/adjustments and environmental best practices. Some of the provisions made under the project to address the issues and concerns of the community are given in**Table 14**.

Table 14: Addressal of Issues and Concerns under the Project

Issue/Concern	Addressal under the project
Water Logging and Drainage	Adequate cross drainage structures have been planned
Road Safety	Adequate safely signage is planned all along the rural road.
Land acquisition and Mode of compensation	The proposed RoW is 12m along the rural road. No land acquisition is planned in project road.
Loss of roadside idols/shrines	Idols and shrines will be relocated to the other nearby places with consultation and proper rituals
Loss of trees	Compensatory Afforestation would be done at the ratio of three trees for each tree to be cut. Additional tree plantation shall be made wherever feasible

Issue/Concern	Addressal under the project
Increased pollution levels	Ambient air quality, water quality largely meets the prescribed standard. Al efforts shall be made to prevent pollution. No construction activity shall be taken at night in village area.
Utilities and basic infrastructure	All the effected utilities, electric poles, telephone lines, wells, tube wells etc. shall be relocated under the project cost. Primary water sources like hand pump and open well should be relocated first if affected.
Employment of locals during construction	Locals will be given preference for employment during the project implementation

VII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

185. The findings of Environment Assessment of sample roads indicate that impacts are mostly similar and subprojects are unlikely to cause any significant environmental impacts. While some of the impacts are negative, there are many bearing benefits to the area. Most of the impacts are likely to occur during construction stage, are temporary in nature and can be mitigated with minor to negligible residual impacts.

186. The project received immense support from local people as they perceive that this project will improve the overall connectivity and bring various economic opportunities to the people of the area

187. All sample roads included under Second RCIP were selected based on ecological and climate change consideration defined under EARF and the through route linking the rural hubs. Accordingly, none of the sample roads passes through protected areas or encroaches precious ecology (sensitive or protected areas) or any historical or archeologically protected areas. As per selection guidelines, none of the selected sample road passes through reserved forests either. Few trees cutting though may be involved.

188. None of the rural road crosses any river, only local nallas are crossed where adequate engineering measures are proposed for the protection of road from the flood.

189. All the sample roads are aligned with existing village roads and unpaved movement paths. As such, land acquisition is nil or very minimal which is also acquired through donations from villagers.

190. Considering insignificant environmental sensitivity, the project is categorised as category B as per ADB Safeguard Policy Statement 2009.

191. No categorisation is made under environmental legislation of India, since these small roads do not require any environmental clearance in accordance to Indian Environmental (Protection) Act and Rules, 1986 amended till date. However, clearance from Forest Department will be required for cutting of trees.

192. The impacts identified are mostly related to alignment selection, land clearing, borrowing earth, cutting of trees, shifting of utilities and community structures, establishment of construction camp or material storage areas, transportation of material and operation of hot mix plant. All identified impacts are either eliminated or minimised through design consideration and suitable mitigative measures.

193. To address climate change, the following measures will be incorporated in the design of rural roads for Madhya Pradesh in consideration of the identified climate risks: (a) Increase in road embankment height in flood prone areas/sections; (b) Improvement and provision of lined longitudinal and cross drains and new culverts; and (c) Protection works. Provisions have also been made in the bidding documents for the contractor to prepare EMPs based on the final detailed design to address climate related risks and vulnerabilities.

194. Environmental Management plan covering all stages of road construction (design, construction and operation) is prepared with defined responsibility for its implementation. Environmental Monitoring plan is also prepared to ensure effective implementation of EMPs.

195. NRRDA/SRRDA has defined institutional setup including with specified responsibility for environmental management. Existing capacity of the State Rural Roads Development Agencies (SRRDAs) and Project Implementation Units (PIUs) for implementing environmental safeguard issues need substantial strengthening. The capacity enhancement is proposed through focused workshops and training session. Few workshops have already been conducted at participating states through ADB appointed Environmental specialist. Trained and experienced in-house officials should carry out more raining in future periodically.

The IEE also indicate that rural road construction works does not warrant further EIA study for subsequent rural road construction works in Madhya Pradesh.

B. Key Recommendations

196. Any major changes or any major additional work other than the proposed project activities will require updation of ECOPs and IEE. The updated ECOPs and IEE will have to be submitted to NRRDA, and ADB for concurrence before civil works commence.

197. The implementation of prescribed mitigation measures will minimize/avoid the adverse impacts. Moreover, the impacts shall be monitored continually by implementing and updating the Environmental Management plan and Environmental Monitoring Plan.

198. These IEE is prepared based on ECOPs and feasibility stage. Subproject specific EMP shall be improved as per the final provisions made under DPRs. The updated EMP if there is any change, shall also be sent to ADB for information.

199. All safeguards requirements, including the IEE, shall be incorporated in the bidding documents. Executing agency shall ensure that updated road specific EMP forms part of DPR and is available to contractor at the time of bidding. The contractor will specify the quantity and budget for various activities like rehabilitation of borrow earth pits, first aid and sanitation facilities at construction camp and temporary office/material storage place as per EMP requirements. The same shall be revised if there is any change in the project design. Any such change shall be reported to ADB as well.

200. Executing agency shall also ensure that climate adaptation measures for Tranche 2 will be incorporated in the construction and upgrading of rural roads.

APPENDIX 1: DETAILS OF ROADS IN MADHYA PRADESH

Madhya Pradesh – District wise List of Roads Proposed under RCIP II Tranche 2

S. No.	District	Block	Name of Road	Length (km)
1	Alirajpur	MP49601	ML01-Alirajpur-Mathwad Road to Baheda-Baddala	7.25
2	Alirajpur	MP49602	ML01-Chotipole to Barzer	8.00
3	Alirajpur	MP49603	T02-Umrali Sondwa Walpur to Fadtala	24.29
1	Alirajpur		3	39.54
4	Balaghat	MP01606	T24-Baihar To Katangi	10.60
5	Balaghat	MP01606	T22-Sijora To Khajra	8.57
6	Balaghat	MP01601	T22-Naharwani To Hatta	4.13
7	Balaghat	MP01601	T21-Chacheri To Laveri	2.68
8	Balaghat	MP01607	T25-Km 13 of T07 To Devgaon	28.40
9	Balaghat	MP01602	T22-Khajri to Lingapaunar	18.15
10	Balaghat	MP01608	T21-Paraswada - Mundesara To Kirnapur	13.40
11	Balaghat	MP01608	T23-Halditola -Badgaon -Dahedi -Bhalwa -Mate-road	14.18
12	Balaghat	MP01603	MRL21-Lawada - Kope To Newargaon	10.00
13	Balaghat	MP01609	T23-Dulhapur to Kalpathari	8.20
14	Balaghat	MP01609	T25-Singola To Ladsa Road	9.30
15	Balaghat	MP01604	T21-Dora to Gudma	12.10
16	Balaghat	MP01605	T22-Budbuda to Bodalkasa - Jaramohgaon	12.70
2	Balaghat		13	152.40
17	Barwani	MP2606	ML01-Osada Semli Bamnali to Rosar Road	17.89
3	Barwani		1	17.89
18	Betul	MP03609	T02-Amla-Tirmau-Kharpadakhedi to Bahmni Pankha Multai Bordehi Road	26.38
19	Betul	MP03608	T02-Athner GHOGHRAJOD MENDHA CHHINDWAD to Bothi	34.69
20	Betul	MP03601	T01-Dhoul To Gehuras Mathni	7.45
21	Betul	MP03601	T04-NH-69 to Arul	7.18
22	Betul	MP03607	T02-Sawalmendha to Gadrajhiri (Bothi khairwada to Bakud jod)	17.00
23	Betul	MP03602	T02-Duliya To Titwi (Maharashtra Border)	4.80
24	Betul	MP03602	T01-Khedi to Chunaloma	14.00
25	Betul	MP03603	T01-Nasirabad - Ratanpur to Alampur	20.70
26	Betul	MP03604	MRL01-Pandhra To Chordongri	3.95
27	Betul	MP03604	T05-Siwanpat to Dulhara	8.90
28	Betul	MP03604	MRL03-Padhar(Ghana) to Chhuri	6.60
29	Betul	MP03606	T02-S.H.-26 Lendagondi-Dob- Siladehi-Semariya Pandri to N.H.47	16.88
30	Betul	MP3610	T04-Ghat Amrawati Baghoda Devgaon Devbhilai to Narkhed	12.30
31	Betul	MP03605	T05-Bondari To kanhegoan	3.33
32	Betul	MP03605	T06-Kesiya to Sehra	7.18
33	Betul	MP03605	T04-Kajli To Dudar	1.83
4	Betul		16	193.14
34	Bhind	MP0488	T03-Bhind-Seoda- Pandari Tehngur road	32.58
35	Bhind	MP0489	T07-Gohad Road to Khurd	7.00
36	Bhind	MP0489	T03-Gohad mou road to Katrol	9.40
37	Bhind	MP0489	MRL08-Chitora to Pali (Dirman)	7.70
38	Bhind	MP0489	T05-Mou seonda to Amayan	10.10
5	Bhind		5	66.78
39	Bhopal	MP05602	T17-T07 (Kolar road) to T05 Ratanpur	10.00
6	Bhopal		1	10.00

S. No.	District	Block	Name of Road	Length (km)
40	Burhanpur	MP48601	T04-Pura To Lingafata Road	5.20
41	Burhanpur	MP48602	T04-Pura To Lingafata Road	8.85
42	Burhanpur	MP48603	T01-Burhanpur-Dharni Road To Jainabad-Sarola	4.25
43	Burhanpur	MP48604	T02-Dariyapur-Jasondi Road To Fopnarkala	2.80
44	Burhanpur	MP48605	T03-Indore-Ichhapur Road To Borsar	5.10
45	Burhanpur	MP48601	T01-Ghanshyampura To Badziri Road	2.75
7	Burhanpur		6	28.95
46	Chhatarpur	Bijawar	T04-Amroniya to Amarpura	6.00
8	Chhatarpur		1	6.00
47	Damoh	MP08603	MRL01-Damoh-Jujhar-Hinoti-Sakha-Ghangri-Nohta Road	32.00
48	Damoh	MP08604	MRL01-Singrampur -Kondakalan-Pondi-Mala Road	24.40
49	Damoh	MP08605	T07-Patera-Bilakhurd Road	11.54
50	Damoh	MP08606	T06-Tejgarh-Hinoti Sarra-Pura-Jhalon-Bamnoda-Taradehi Road	46.00
9	Damoh		4	113.94
51	Dewas	MP10601	T01-Bagli Punjapura road	15.00
52	Dewas	MP10603	T01-Vijayganj Mandi to Jawasia	10.70
53	Dewas	MP10607	T01-MDR(Gadiya) to Bhatasa ajnas (Amoda)	24.19
54	Dewas	MP10606	T01-Pipliyanankar (SH-22)to Kolari	11.30
55	Dewas	MP10604	T01-Pushpagiri Bhopal Road to Anabad Salamkhedi	12.00
56	Dewas	MP10605	T01-Bhorasa Budasa Tonkkhurd Gorwa Aagrod	22.00
10	Dewas		6	95.19
57	Dhar	MP11604	T10-Badnawar (Delchi) to Rajod	19.33
58	Dhar	MP11608	T03-Tisgaon to Gunawad	21.13
59	Dhar	MP11609	MRL04-Kiloli to Sadalpur	9.38
60	Dhar	MP11602	T02-Dhamnod To Rupatta Fata Via Sundrel Road	12.60
61	Dhar	MP11607	T11-Chickli Phata (Haranchapda) to Gandhwani Singhana	22.70
62	Dhar	MP11603	T07-Ganpur to Bakaner (IB)	29.93
63	Dhar	MP11610	T02-MHOW NEEMUCH ROAD TO SAGORE	14.10
64	Dhar	MP11601	T01-MDR/Kukshi-Sighana(Lohari) to SH-26/New (Piplia)	9.90
65	Dhar	MP11605	T06-Amjhera to Bhopawar Ringnod road	26.38
66	Dhar	MP11606	T09-Rajgarh (T05) to Timaychi (Jhaknawada Phata)	14.15
67	Dhar	MP11611	T01-Salkanpur fata to Dhar (Via Dilawara)	16.63
11	Dhar		11	196.21
68	Gwalior		T04-Gadhota Tiraha to Mastura, Rahi, Bela, Itma Upto Bargawan..	18.24
12	Gwalior		1	17.9
69	Harda	MP15601	T01-Sirali to Harda Magradha Road (Sukharas)	18.64
70	Harda	MP15602	T01-Sirali to Rahatgaon	24.76
71	Harda	MP15603	T01-Balagaon to Khamgaon	16.45
13	Harda		3	59.85
72	Hoshangabad	MP16606	T02-Sirwad-Gajanpur-Talkesri-Furtala	5.70
73	Hoshangabad	MP16607	T03-SH 22 (Anchalkheda) - Manwada-Madawan to Babai Ari road	7.75
74	Hoshangabad	MP16601	T01-Bankhedi to Padrai Thakur	5.35
75	Hoshangabad	MP16602	T06-SH 22 to Kamthi	8.35
76	Hoshangabad	MP16609	T01-Itarsi Lohariya -Tararoad to Rampur	12.50
77	Hoshangabad	MP16608	T02-Itarsi- Dharamkundi Road to Parcha	9.53
78	Hoshangabad	MP16603	T06-Kanhwar (Crossing) to Purenakala	16.54
79	Hoshangabad	MP16610	T06-Seoni Malwa to Nanderwada	11.66

S. No.	District	Block	Name of Road	Length (km)
80	Hoshangabad	MP16611	T09-Shivpur Bhiladiya Rd to Richhi	5.68
81	Hoshangabad	MP16604	T03-Gujarkhedi Bhokhedi Biladiya Sonsarkheda Road	11.02
82	Hoshangabad	MP16605	T02-Guramkhedi to Pamli	13.05
14	Hoshangabad		11	107.13
83	Indore	MP17601	T01-Chittoda to Pitawali	16.60
84	Indore	MP17602	T01-Byepass T02 to Jhalariya	8.53
85	Indore	MP17603	T01-MDR 1505 (Bagdi Manpur Road) to Malipura	20.60
86	Indore	MP17604	T01-Indore-Ujjain Road to Rajoda	30.10
15	Indore		4	75.83
87	Jhabua	MP19601	T22-T03 Jhabua Jobat Road To Bhoira Road To Dekal Choti To Kalapan Road To Ranapur Kundanpur Road	17.97
88	Jhabua	MP19602	T24-T04 Agral Chaipura Kotnai Road (PWD)	20.50
89	Jhabua	MP19602	T23-T03 Dedla Fata To Patlawad Road	8.01
90	Jhabua	MP19603	T21-T02 Ratlam Ghughari Road To Sarangi	17.85
91	Jhabua	MP19601	T26-To7 Jhabua Para Road To Jhekela To Rotla Gomla Road	7.65
92	Jhabua	MP19604	T23-T04 Tandi Kanjwani Road To Mandlinatu To Sotiya Jalam To Gujrat Border	12.88
93	Jhabua	MP19605	T22-T01 Bamniya Talawada road to Khawasa Bajana	5.00
16	Jhabua		7	89.85
94	Katni	MP20601	T01-Singaudi Road to Pipariyakala	10.64
95	Katni	MP206010	L022-Kuwan to Baran Mahgawan	11.60
96	Katni	MP20602	MRL02-Dhanwahi to Neemkheda	12.70
97	Katni	MP20604	MRL01-Katni-V-Garh To Dithwara	20.00
98	Katni	MP20605	MRL02-Deori kalan to Hardwara (Khamariya No.1)	9.84
99	Katni	MP20606	MRL01-Barhi Road (Singodi) to Khirwa No.1	5.05
17	Katni		7	69.83
100	Khandwa	MP21601	T01-Khirkiya to Malood	18.95
101	Khandwa	MP21602	T01-Ahemadpur to Indore Burhanpur Road	10.60
102	Khandwa	MP21606	T02-Indore Icchapur Road (Bhojakhedi) to Chirwel	11.10
103	Khandwa	MP21605	T01-Khandwa Hoshangabad to Barud	8.10
104	Khandwa	MP21604	T01-Sunderdev Fata to Gulai Road	15.58
105	Khandwa	MP21607	T02-Khandwa Harsud road to Khar	13.70
106	Khandwa	MP21603	T01-Khandwa Mundi Road to Dudhwas	15.40
18	Khandwa		7	93.43
107	Khargone	MP22603	T02-Gawalu to okhla(upto dist Border Dewas)	22.79
108	Khargone	MP22609	T04-Dhulkot Kabri Road to Gujar bawadi-II	6.20
109	Khargone	MP22608	T01-Rodia to Anjangaon MDR	13.52
110	Khargone	MP22607	T01-Bagdara to Nagjhiri Khargone	15.30
111	Khargone	MP22604	T03-Kasarawad- Lohari Road To Selda Plant	25.15
112	Khargone	MP22606	T01-Barud Phata (SH26) - Balwadi to Mohna Phata	20.33
113	Khargone	MP22605	T04-Maheshwar to Karhi Via Mahetwada Bablai	33.65
19	Khargone		7	136.93
114	Mandsour	MP24603	T03-Kurawan to Basai	20.03
115	Mandsour	MP24604	T01-Nahargarh Hingoriya road	20.80
116	Mandsour	MP24605	T01-Sitamau to Kayampur	16.93
20	Mandsour		3	57.75
117	Morena	MP25601	T01-Dimni (SH-2) to Jkhona Road (T-02 of Morena block)	4.44
118	Morena	MP25608	T01-A.B. Road NH-3 Jarah Rd to ABC canal via Khandoli,Kok Sigh Ka Pura	13.20
119	Morena	MP25607	T02-M.S. Road (Mungawali) to Devgarh Via Galetha	23.97
120	Morena	MP25605	T01-M.S. Road to Arroda	9.60

S. No.	District	Block	Name of Road	Length (km)
121	Morena	MP25602	T01-Shikarpur Fatak to MDR Bichola Road Via Bicholi , Nagra , Kajibasai	13.50
122	Morena	MP25603	T02-Mragpura Road to Kulhada via Gadora	10.30
123	Morena	MP25604	T01-Ambah Pinahat Road (MDR) to Porsa Ater Road (SH-2)	22.48
124	Morena	MP25606	MRL03-Heerapur Jhundpura Road	4.61
21	Morena		8	102.09
125	Neemuch	MP27603	T01-Manasa Parda Kanjarda Deiken Road	26.50
22	Neemuch		1	26.50
126	Panna	MP28604	T02-App. Road to Pista	11.00
23	Panna		1	11.00
127	Raisen	MP29204	MRL01-NH-12-Magardha-Maheswar Road	12.03
128	Raisen	MP29210	MRL02-T01 (Begamganj) to Sunehra	7.25
129	Raisen	MP29212	T02-Beerpur to Badgawan Munjfta	13.35
130	Raisen	MP29206	MRL01-Gairatganj- Rampura Road to Andhiyari	5.10
131	Raisen	MP29207	SH-42 Chandoniganj To Padariyaganj	3.80
132	Raisen	MP29208	T04-Gairatganj to Rampura kala	9.45
133	Raisen	MP29201	T01-Mandideep-Polaha-Nandor Road	10.10
134	Raisen	MP29202	T02-NH-12 (Mandideep) Via Dahod) NH-12Noorganj to Dahod Road	17.75
135	Raisen	MP29209	MRL02-Bhopal-Vidisha Road to Bhartipur (Shahpur)	4.23
136	Raisen	MP29200	MRL01-Silwani-Udaipura Road to Chunetiya Madhiya Road	10.20
137	Raisen	MP29203	MRL01-NH-12 (Udaipura) to Anghora	11.00
24	Raisen		11	104.25
138	Ratlam	MP31601	T03-Alote Sherpur Via Malya Road	15.13
139	Ratlam	MP31602	T03-Adwaniya chandgrah Road to Bajna Baswada (Mandliya) Road	15.70
140	Ratlam	MP31603	T07-M.N.Rd Lasudiyanathi to Naveli Thikriya Rajshthan Border	21.23
141	Ratlam	MP31604	T03-Jaora Amba Road to Badayalamata Sailana Road	23.00
142	Ratlam	MP31605	T06-Palsoda to Panched road	18.88
25	Ratlam		5	93.93
143	Rewa	MP32607	T22-T002 To Harditiwariyan	11.03
144	Rewa	MP32609	T21-Sirmour To Gondaha (Part) Ajgaraha Via Dol Maghiyar	36.25
26	Rewa		2	47.28
145	Sagar	MP33601	ML01-MDR toTinsuwa	18.71
146	Sagar	MP33602	ML05-Basari to Dhand	17.65
147	Sagar	MP33612	MRL01-T-09 to Jaitpur Kachhya	4.76
148	Sagar	MP33613	MRL02-Chandpur to Anantpura	3.80
149	Sagar	MP33614	MRL03-T-09 to Marhi Jamuniya	2.13
150	Sagar	MP33617	T02-Raja Bilhara to Khamkua	12.13
151	Sagar	MP33611	ML01-Bhusora to Deori Naharmau	16.58
152	Sagar	MP33603	ML08-SH14 to Bhilon	16.28
153	Sagar	MP33604	T08-Rajwans to Rounda	21.70
154	Sagar	MP33616	MRL04-NH26 to Mothi	23.25
155	Sagar	MP33615	ML01-NH86 to Mohli	11.45
156	Sagar	MP33605	ML04-T004 to Baraj	4.35
27	Sagar		12	12
157	Satna	MP34608	T31-Gulwar Gujara rd. to Sagouni Kala	8.83
158	Satna	MP34609	MRL04-T03 to Semariya	6.10
159	Satna	MP34610	MRL05-Satna Amarpatna Rd to Pondi Garada	7.40

S. No.	District	Block	Name of Road	Length (km)
160	Satna	MP34611	MRL10-Nimi Baraj to Kuwan Poindha Kala Road	10.20
28	Satna		4	32.53
161	Seoni	MP36604	T04-Jamuntola to Gudma	13.55
162	Seoni	MP36606	T04-Bakhari to Ramgarh	28.75
163	Seoni	MP36601	T04-Barbaspur-Harduli to Sunwara-Amanala(Ganeshganj Sunwara (T06) to Harduli)	13.93
164	Seoni	MP36602	T02-Mehta to Barela (Baroda)	13.68
165	Seoni	MP36609	MRL01-Dokarranji to Panwas - Paraspani	4.80
166	Seoni	MP36605	T02-Badalpar to Belpeth	11.20
167	Seoni	MP36603	T01-Joba Adegaon-Madhi-Khakariya-Bijori to District Border (Joba (NH-26) to Chhapara (NH-7) (Up to LDon B.B.)	27.82
168	Seoni	MP36607	T03-Diwthi to Bhomatola	7.80
169	Seoni	MP36608	T04-Katiya to Meharapipariya-Karkoti	13.20
170	Seoni	MP36605	T02-Badalpar to Belpeth	11.20
29	Seoni		10	141.22
171	Shajapur	MP39601	MRL01-Palda to Ladwan	12.00
172	Shajapur	MP39602	T01-Nipania Hanuman to Agar	15.27
173	Shajapur	MP39605	T02-Ranyal to Khamlaya	22.10
174	Shajapur	MP39607	T04-Chitawad to Manglaj	6.64
175	Shajapur	MP39608	T02-Tingajpur to Shujalpur Road 17.2 km	7.90
176	Shajapur	MP39603	T01-Susner Zirapur Road to Badagaon	37.90
177	Shajapur	MP39609	T02-Devla Bihar to Kamkheda via Semli Chacha	15.00
178	Shajapur	MP39611	T01-Polaikalan Khatsue Road via Himaleshwar Mahadev	27.50
179	Shajapur	MP39604	T01-Dehariya Susner to Susner	13.30
30	Shajapur		9	157.61
180	Shivpuri	MP40608	T12-Shivpuri Jhansi Road (NH25) to Teela	5.10
181	Shivpuri	MP40609	T11-Sirsod-Pichore Road(T05) TO Kurrol (T04) Via Badora	23.95
182	Shivpuri	MP40610	T22-Singhanwas (SH06) To Kunwarpur	14.84
183	Shivpuri	MP40611	T24-NH-27 (Surwaya) To Pichhore Gora Road (MDR-T05) Via Mohangarh, Bira	27.83
31	Shivpuri		4	71.72
184	Tikamgarh	Jatara	T01-Acharra to Ghumtaghat	8.10
32	Tikamgarh		1	8.10
185	Ujjain	MP43606	T02-Pirjhalar to Ralayata (District Boundry)	6.24
186	Ujjain	MP43606	T04-Unhel Chambal Road to Kanjad	9.00
187	Ujjain	MP43601	T01-Sodang to Pipliyahama Road	14.83
188	Ujjain	MP43605	T02-Ranipipliya to Mundla Parwal	8.50
189	Ujjain	MP43605	T01-Buranabad to Padsutiya	6.50
190	Ujjain	MP43602	T01-Jharda Kundikheda To kheda Khjuriya Road	27.20
191	Ujjain	MP43603	T01-Tarana Limbadit Makdon Kadodiya Dupada Road	38.83
192	Ujjain	MP43604	MRL05-Dewas Road to Harnawada	2.14
193	Ujjain	MP43604	MRL02-Indore Road to Navakheda	1.55
194	Ujjain	MP43604	T01-Ujjain Maxi Road to Biaora	3.20
195	Ujjain	MP43604	MRL01-Badkummed Road to Kesoni	0.95
196	Ujjain	MP43604	T02-Lekoda to Kakariya Chirakhan	5.99
33	Ujjain		12	124.92
197	Vidisha	MP45607	MRL08-NH-86 Kasba Bagrod to Borodiya Bagrod	9.4
198	Vidisha	MP45608	MRL07-T03 Tyonda Pathari Road to Sairwasa Turn	11.325
199	Vidisha	MP45605	T02-NH-86 (Kalapatha) to Haidargarh	11.83
200	Vidisha	MP45606	MRL04-Sihora (Mandi Bamora) to Barual	17.9

S. No.	District	Block	Name of Road	Length (km)
201	Vidisha	MP45603	MRL01-Anandpur to Pagrani	16.65
202	Vidisha	MP45601	ML02-Dhadhon to Golna Via Amkheda Sukha, Satpada Hat	18.942
203	Vidisha	MP45602	T01-Rusalli Dama (SH-14) to Barej (PWD)	29.738
204	Vidisha	MP45604	MRL04-Bhairokhedi (NH-86) to Ahmedpur via Palki Tharr	18.00
34	Vidisha		8	133.79
Grand Total			204	2843.52

APPENDIX 2: RURAL ROADS: ENVIRONMENTAL CHECKLIST

Road Name:	**T-02 Dhamnod to Rupattafata, via Sundrel Road**
Block Name:	**Darampuri**
District Name:	**Dhar**
Total Length of the Road:	**12.60 Km**
Package No.	MP11602

A. Climatic Condition

Temperature	High: 37 **(June)** Low: 9.8 **°C (Dec)**
Humidity	High: 88 % **(Aug)** Low: 17 **%**
Rainfall Rainy Season	805 mm/year **June** to **September**

B. Location of the Road and Generic description of Environment

No.	Type of Ecosystem	Yes	No	Explanation
1.	Coastal area Mangrove (along roadside)		√	Distance from Coastline: km ( ) more than 50% ( ) less than 20%
2.	Type of Terrain–(Plain/Hilly/ Mountainous etc.) *(Explain the topography of the area and how many km of the road are located in the hilly area)*	√		There were hilly area located between Ch- 9500m to 10000m on LHS. Altitude: The topography of the project road is flat at almost all locations.
3.	Forest Area *(Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?*		√	Type of Vegetation: Legal Status of the Forest Area: *(Reserved, National Park, Sanctuaries, Unclassified, etc.)* No part of the project road passes through any forest area.
4.	Wildlife (*Explain whether there are any wildlife species in the project area*)		√	Name of animals: **NA** Endangered species (if any): **None**
5.	Inhabited Area	√		Inhabited area lies between Ch-00m to 1000m, Ch-1500m to Ch-2000m, Ch- 6500m to 7500m & Ch-10000m to 10500m both side connecting villages Dhamnod, Bikhron, Sundrel & Pedvi respectively.
6.	Agricultural Land	√		The agriculture land lies between Ch-1000m to Ch-1500m, Ch- 2000m to 3500m, Ch-4000m to 6000m, Ch- 8000m to 10000m & Ch-10500m to Ch-12600m both side along the proposed alignment.
7.	Grazing grounds		√	Grazing ground was not found along the proposed alignment.
8.	Barren Land		√	Barren Land was not found along the proposed alignment.

C. Specific description of the Road Environment

(Note: Questions number 1, 4, 5, 7 and 8 must be answered after discussions with the local community people)

No.	Parameter/ Component	Yes	No	Explanation
1.				No part of the project road is passing through hilly terrain prone to landslide or erosion. However, sufficient cross

No.	Parameter/ Component	Yes	No	Explanation
	Are there any areas with landslide or erosion problems along the road? **(*If yes, indicate the location (right or left side) and the chainage)***		√	drainage structures will be constructed to avoid any erosion. ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any lakes/swamps beside the road? **(*If yes, list them indicating the location (right or left side) and the chainage*)**	√		There were 2 Ponds found between Ch-7000m to Ch-7500m on LHS & Ch-7500m to Ch-8000m on RHS respectively. All of 2 were approximately 10m far from proposed alignment.
3.	Are there any nallas/streams/rivers etc. along/crossing the road? **(*If yes, list them indicating the location (right, left or crossing) and the chainage)***	√		Few water bodies are crossing the proposed alignment and cross drainage structures are provided at these locations. **Existing CD:** Between Ch-500m to Ch-1000m, Ch-1000m to Ch-1500m, Ch-1500m to Ch-2000, Ch-2500m to Ch-3000m, Ch-4000m to 4500m, Ch-5000m to 5500m, Ch-5500m to 6000m, Ch-6500m to 7000m, Ch-7500m to 8000m-2, Ch-8000m to 8500m-2, Ch-8500m to 9000m-2, Ch-9500m to 1000m-2, Ch-10000m to 10500m, Ch-10500m to 11000m & Ch-12000m to 12600m. **Proposed CD:** Between Ch-11500m to Ch-12000m.
4.	Are there problems of water stagnation and other drainage issues on or near the road? (***If yes, mention chainage*)**	√		There are some points of water stagnation and other drainage issues on or near the road which is discussed above S. No.3 along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
5.	Is the area along the project road prone to flooding? ***(If yes, mention flood level and frequency)***	√		No flood prone area is observed along the proposed alignment except as discussed in S.No.3. ( ) No Secondary Information is available and local Community is not aware of this matter
6.	Are there any trees with a dbh of 30 cm or more within 10 m on either side from the center line of the road alignment? **(*If yes attach list of trees indicating the location (right or left side)and the chainage)***	√		There are 138 trees of 30 cm dbh or more within 10m from C/L on both sides along the proposed alignment. Tree locations and distance from C/l is given in **Attachment I.** There is 1 tree loss identified at the alignment.
7.	Along the road and within 100m of the road shoulder, are there any faunal habitat areas, faunal breeding ground, bird migration area, or other similar areas? **(*If yes, specify details of habitat with chainage*)**		√	No Faunal Habitat Area, Faunal breeding ground and bird migration areas exist within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
8.	Along the road and within 100m of the road shoulder is there any evidence of floral and faunal species that are classified as endangered species?		√	No evidence of rare, endangered or threatened species are noticed or informed within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information Available and Local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
9.	Are there any utility structures[16] within 10 m on either side from the center line of the road alignment? ***(If yes, attach list with chainage)***	√		There are few utility structures observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment II.**
10.	Are there any religious, cultural or community structures/buildings[17] within 10 m on either side from the center line of the road alignment? ***(If yes attach list with chainage)***	√		There are few religious cultural or community structures/buildings observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment III.**

D. Public Consultation

No	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. ***(Attach list of people met and dates)***	√		Yes, consultation with the community was held on 08/07/2017 & 01/01/18. Participants list is attached with CPF document.
2.	Any suggestion received in finalizing the alignment	√		Suggestion received regarding Proposed CD: Between Ch-11500m to Ch-12000m.
3.	If suggestions received, were they incorporated into the design.	√		PIU agreed with the suggestion made by community.

E. Please attach the following:

1) Sketch a map showing the bridge and the trees
2) List of trees indicating location (left or right side of the road) and chainage (as required under C. 6)
3) List of utility structures indicating location (left or right side of the road) and chainage (as required under C. 9)
4) List of community structures indicating location (left or right side of the road) and chainage (as required under C. 10)
5) Sketch of strip map of the road covering details of at least 10 m on either side from the center line of the road
6) Photographs of the project area showing at least 10 m on either side from center line of road alignment. Every 2 km or less of road must have at least 1 photograph.

[16] Water tap, hand pump, electric pole, telephone pole, water pipe and other similar structures.
[17] Mandir, Masjid, Church, religious/cultural/historical monuments, school, health center, public toilet and other similar structures.

Attachment I

List of Trees

Chainage (m)			Left	Right
0	to	500	19	13
500	to	1000	2	4
1000	to	1500	5	-
1500	to	2000	4	6
2000	to	2500	5	6
3000	to	3500	2	-
3500	to	4000	2	12
4000	to	4500	-	1
4500	to	5000	-	2
5000	to	5500	-	4
5500	to	6000	2	1
6000	to	6500	9	5
7000	to	7500	-	9
10500	to	11000	2	4
11000	to	11500	-	1
11500	to	12000	-	1
12000	to	12500	10	7
Total			**62**	**76**

Attachment II

List of Utilities

Chainage (m)			Left	Right
0	to	500	TF	TF, EP
500	to	1000	2EP, HTL	HP, TF, 6EP, HTL
1500	to	2000	TF, 8EP	4EP
2000	to	2500	4EP, 2HTL, ELC	F, 4EP, 2HTL, ELC
2500	to	3000	3EP	-
3500	to	4000	3EP, HP, HTL	HTL
4000	to	4500	6EP	-
4500	to	5000	4EP	-
5000	to	5500	ELC, HTL	Well, ELC, HTL
6500	to	7000	-	TF
7000	to	7500	Pond	Power House
7500	to	8000	5EP, Well	Pond, EP
8000	to	8500	6EP	-
8500	to	9000	4EP	-
9000	to	9500	4EP	-

Attachment III

List of Community Structures

Chainage (m)			Left	Right
0	to	500	School	School
1500	to	2000	2School, Gas Godam	-
3000	to	3500	-	Godam
3500	to	4000	-	Warehouse, 2Temple
5500	to	6000	Gas Agency	-
6500	to	7000	School, Temple, Market	-
7000	to	7500	Cultural building, GP, Homeopathic hospital, PHC, Hostel, School	Temple, Bank
7500	to	8000	School, GP	-
8000	to	8500	Temple	-
10000	to	10500	Temple, GP	Temple

Attachment-IV

Left					Chainage (m)			Right				
8 to 10m	**6 to 8m**	**4 to 6m**	**2 to 4m**	**0 to 2m**				**0 to 2m**	**2 to 4m**	**4 to 6m**	**6 to 8m**	**8 to 10m**
1T, School	-	18T, TF	-	-	0	-	500	-	-	13T, EP, TF	-	School
-	-	2T	2EP	-	500	-	1000	-	6EP	4T, HP, TF	-	-
5T	-	-	-	-	1000	-	1500	-	-	-	-	-
School, Gas Godam	-	4T, TF, DP	-	-	1500	-	2000	-	-	6T, 4EP	-	-
-	5T	4EP	-	-	2000	-	2500	-	-	4EP	6T, TF	-
-	3EP	-	-	-	2500	-	3000	-	-	-	-	-
School	2T	-	-	-	3000	-	3500	-	-	-	-	Godam
-	HP, 3EP	2T	-	-	3500	-	4000	-	-	-	12T, Temple	Warehouse, Temple
3EP	-	3EP	-	-	4000	-	4500	-	-	1T	-	-
-	-	4EP	-	-	4500	-	5000	-	-	2T	-	-
-	-	-	-	-	5000	-	5500	-	-	4T	-	Well
Gas Agency	2T	-	-	-	5500	-	6000	-	-	1T	-	-
-	-	9T	-	-	6000	-	6500	-	-	5T	-	-
Temple, Market	-	-	-	-	6500	-	7000	-	TF	-	-	-
Pond, CB, GP, HH, PHC, Hostel, School	-	-	-	-	7000	-	7500	-	1T	8T, Temple, Bank	-	Power House
5EP, Well, School, GP	-	-	-	-	7500	-	8000	-	-	EP	-	Pond
Temple	-	6EP	-	-	8000	-	8500	-	-	-	-	-
-	4EP	-	-	-	8500	-	9000	-	-	-	-	-
-	-	4EP	-	-	9000	-	9500	-	-	-	-	-
-	-	-	-	-	9500	-	10000	-	-	-	-	-
Temple, GP	-	-	-	-	10000	-	10500	-	6EP, TF	Temple	-	-
-	-	2T	-	-	10500	-	11000	-	-	4T	-	-
Well, TF	TW	-	-	-	11000	-	11500	-	1T	-	-	-
-	-	-	-	-	11500	-	12000	-	-	1T	-	-
Well	-	10T, TW	-	-	12000	-	12600	-	-	7T	-	-

E.P- Electric Pole, H.P. – Hand Pump, T.W.; T.W., P.H.C; Primary Health Center, C.B.- Cultural Building, Homeopathic Hospital, A.L. – Agricultural Land; C.D. – Cross Drainage structure, W.T.-Water Tank, G.P.- Gram Panchayat

Chainage wise Transect Walk Findings

Chainage (m)			Existing Land Width (m)	Addl. Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
0	-	500	6	-	-	-	-	-	-	Dhamnod	2School, 2TF, 7EP, Habitation area
500	-	1000	6	-	-	-	-	-	-	Dhamnod	8EP, HTL, TF, HP, Ex CD
1000	-	1500	10	-	-	-	-	-	-	-	Ex CD, 3EP, Under Bridge
1500	-	2000	6	-	-	-	-	-	-	Bikhron	Habitation area, School, TF, 12EP, Gas Godam, Temple, Ex CD
2000	-	2500	10	-	-	-	-	-	-	-	2HTL, 2ELC, 8EP, TF
2500	-	3000	10	-	-	-	-	-	-	-	Ex CD, 3EP
3000	-	3500	10	-	-	-	-	-	-	-	Warehouse
3500	-	4000	10	-	-	-	-	-	-	-	3EP, HP, HTL, 2Temple, Warehouse
4000	-	4500	10	-	-	-	-	-	-	-	6EP, HTL, Ex CD
4500	-	5000	10	-	-	-	-	-	-	-	4EP, Well
5000	-	5500	10	-	-	-	-	-	-	-	HTL, ELC, Ex CD, Well
5500	-	6000	10	-	-	-	-	-	-	-	Gas Agency, Ex CD
6000	-	6005	9.5	-	0.5	-	0.5	-	Platform	-	-
6005	-	6500	10	-	-	-	-	-	-	-	-
6500	-	7000	6	-	-	-	-	-	-	Sudrel	Habitation area, Market, School, Temple, TF
7000	-	7500	6	-	-	-	-	-	-	Sudrel	Pond, Cultural Building, Homeopathic Hospital, GP, PHC, Hostel
7500	-	8000	10	-	-	-	-	-	-	-	GP, Well, School, EP, Pond, 2Ex CD
8000	-	8500	10	-	-	-	-	-	-	-	6EP, Temple, 2Ex CD
8500	-	9000	10	-	-	-	-	-	-	-	4Ex CD, 4EP
9000	-	9500	10	-	-	-	-	-	-	-	EP, Quarry
9500	-	10000	10	-	-	-	-	-	-	-	Hilly area on LHS
10000	-	10500	6	-	-	-	-	-	-	Pedvi	Habitation area, 2Temple, GP, ELC, 6EP, TF, Ex CD
10500	-	11000	10	-	-	-	-	-	-	-	Ex CD
11000	-	11500	10	-	-	-	-	-	-	-	5Well, TW, TF, HTL, ELC
11500	-	12000	10	-	-	-	-	-	-	-	Prop CD
12000	-	12600	10	-	-	-	-	-	-	-	HTL, ELC, TW, Well

Road Name:	**Katni Vijayraghavgarh To Dithwara**
Block Name:	**Katni**
District Name:	**Katni**
Total Length of the Road:	**20.02Km**
Package No.	

A. Climatic Condition

Temperature	High: 40.4 **(May)** Low: 9.8 **°C (Dec)**
Humidity	High: 58 % **(Aug)** Low: 23 **%**
Rainfall Rainy Season	890 mm/year **June** to **September**

B. Location of the Road and Generic description of Environment

No.	Type of Ecosystem	Yes	No	Explanation
1.	Coastal area Mangrove (along roadside)		√	Distance from Coastline: km ( ) more than 50% ( ) less than 20%
2.	Type of Terrain—(Plain/Hilly/ Mountainous etc.) *(Explain the topography of the area and how many km of the road are located in the hilly area)*		√	Altitude: The topography of the project road is flat at almost all locations.
3.	Forest Area *(Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?*		√	Type of Vegetation: Legal Status of the Forest Area: *(Reserved, National Park, Sanctuaries, Unclassified, etc.)* No part of the project road passes through any forest area.
4.	Wildlife (*Explain whether there are any wildlife species in the project area*)		√	Name of animals: **NA** Endangered species (if any): **None**
5.	Inhabited Area	√		Inhabited area lies between Ch-770m to 900m, Ch-2596m to Ch-3000m, Ch- 4300m to 5120m Ch-7700m to 8000m Ch-8750 to8959 & Ch- 10800 To11200 both side connecting villages Dhitwaa jobokhurd, padkhuri, patharhathi & rajarwara& kharkhari respectively.
6.	Agricultural Land	√		The agriculture land lies between Ch-00m to Ch-770m, Ch- 900m to 2596m, Ch-3000m to 4300m, Ch- 5120m to 7700m, Ch-8000m to Ch-8750m, Ch-8959 to 10800&,ch-11200 to18638 both side along the proposed alignment.
7.	Grazing grounds		√	Grazing ground was not found along the proposed alignment.
8.	Barren Land		√	Barren Land was not found along the proposed alignment.

C. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? ***(If yes, indicate the location (right or left side) and the chainage)***		√	No part of the project road is passing through hilly terrain prone to landslide or erosion. However, sufficient cross drainage structures will be constructed to avoid any erosion. ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any lakes/swamps beside the road? ***(If yes, list them indicating the location (right or left side) and the chainage)***	√		There were 0 Ponds found between. All of 0 were approximately 10m far from proposed alignment.
3.	Are there any nallas/streams/rivers etc. along/crossing the road? ***(If yes, list them indicating the location (right, left or crossing) and the chainage)***	√		Few water bodies are crossing the proposed alignment and cross drainage structures are provided at these locations. **Proposed CD:** Ch-1840,4195,6683,7380,7769,9436,13700,17922,18810, **Existing CD:** 1840,1854,2010,2127,2719,3227,3752,4195,4594,4720,4832,4977,6350,6519,6683,7159,7380,7733 8231,8703,8991,9317,9436,9920,93952,14262,14654,14800,15100,15293,16100,16440,16673,16868,17922,18294
4.	Are there problems of water stagnation and other drainage issues on or near the road? (***If yes, mention chainage)***		√	There are some points of water stagnation and other drainage issues on or near the road which is discussed above S. No.0 along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
5.	Is the area along the project road prone to flooding? ***(If yes, mention flood level and frequency)***		√	No flood prone area is observed along the proposed alignment except as discussed in S.No.0. ( ) No Secondary Information is available and local Community is not aware of this matter
6.	Are there any trees with a dbh of 30 cm or more within 10 m on either side from the center line of the road alignment? ***(If yes attach list of trees indicating the location (right or left side)and the chainage)***	√		There are 99 trees of 30 cm dbh or more within 10m from C/L on both sides along the proposed alignment. Tree locations and distance from C/l is given in **Attachment I.** There are 0 trees loss identified at the alignment.
7.	Along the road and within 100m of the road shoulder, are there any faunal habitat areas, faunal breeding ground, bird migration area, or other similar areas? ***(If yes, specify details of habitat with chainage)***		√	No Faunal Habitat Area, Faunal breeding ground and bird migration areas exist within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
8.	Along the road and within 100m of the road shoulder is there any evidence of floral and faunal species that are classified as endangered species?		√	No evidence of rare, endangered or threatened species are noticed or informed within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information Available and Local Community is not aware of this matter
9.	Are there any utility structures[18] within 10 m on either side from the center line of the road alignment? ***(If yes, attach list with chainage)***	√		There are few utility structures observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment II.**

[18] Water tap, hand pump, electric pole, telephone pole, water pipe and other similar structures.

No.	Parameter/ Component	Yes	No	Explanation
10.	Are there any religious, cultural or community structures/buildings[19] within 10 m on either side from the center line of the road alignment? ***(If yes attach list with chainage)***	√		There are few religious cultural or community structures/buildings observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment III.**

D. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. ***(Attach list of people met and dates)***	√		Yes, consultation with the community was held on 25/05/2017Participants list is attached with CPF document.
2.	Any suggestion received in finalizing the alignment		√	Suggestion received regarding Community Suggested.
3.	If suggestions received, were they incorporated into the design.	√		PIU agreed with the suggestion made by community.

E. Please attach the following:

1) Sketch a map showing the bridge and the trees
2) List of trees indicating location (left or right side of the road) and chainage (as required under C. 6)
3) List of utility structures indicating location (left or right side of the road) and chainage (as required under C. 9)
4) List of community structures indicating location (left or right side of the road) and chainage (as required under C. 10)
5) Sketch of strip map of the road covering details of at least 10 m on either side from the center line of the road
6) Photographs of the project area showing at least 10 m on either side from center line of road alignment. Every 2 km or less of road must have at least 1 photograph.

[19] Mandir, Masjid, Church, religious/cultural/historical monuments, school, health center, public toilet and other similar structures.

Attachment I

List of Trees

Chainage (m)			Left	Right
0	to	500	10	5
500	to	1000	4	1
1000	to	1500	5	2
1500	to	2000	16	14
2000	to	2500	5	1
2500	to	3000	1	1
3000	to	3500	1	2
3500	to	4000	2	4
4000	to	4500	1	2
4500	to	5000	1	0
5000	to	5500	0	1
5500	to	6000	2	0
6000	to	6500	1	0
6500	to	7000	0	0
7000	to	7500	0	0
7500	to	8000	2	0
8000	to	8500	1	0
8500	to	9000	0	0
9000	to	9500	1	1
9500	to	10000	7	0
10000	to	10500	4	1
10500	to	11000	0	0
11000	to	11500	0	0
11500	to	12000	0	0
12000	to	12500	0	0
12500	to	13000	0	0
13000	to	13500	0	0
13500	to	14000	0	0
14000	to	14500	0	0
14500	to	15000	0	0
15000	to	15500	0	0
15500	to	16000	0	0
16000	to	16600	0	0
Total			**64**	**35**

Attachment II

List of Utilities

Chainage (m)			Left	Right
0	to	500	2HTL,	2EP,HP
500	to	1000	5EP,HTL	TF,EP
1000	to	1500	TEMPLE,2EP	EP,HTL
1500	to	2000	-	-
2000	to	3000	TF,5EP,HP	EP ,TF,HTL
3000	to	3500	EP,HTL	EP
3500	to	4000	EP	-
4000	to	5000	5EP,HP,TEMPLE	2HTL,6EP,2TEMPLE,HP
5000	to	5500	HP.TF,7EP	5EP
5500	to	6000	-	-
6000	to	6500	-	-

Chainage (m)			Left	Right
6500	to	7000	-	-
7000	to	7500	TEMPLE 3EP	2HTL,EP
7500	to	8000	2EP	HP
8000	to	8500	HP,	4EP
8500	to	9000	9EP	2HTL,5EP,TEMPLE,TF
9000	to	9500	5EP,TF	3EP
9500	to	10000	3EP	-
10000	to	10500	-	-
10500	to	11000	-	3HP,TEMPLE,TF
11000	to	11500	-	HP
11500	to	12000	-	--
12000	to	12500	-	HP,2HTL
12500	to	13000	HTL	-
13000	to	14000	-	3HTL
14000	to	14500	2HTL	-
14500	To	15000	-	HTL
15000	To	16000	-	-
16000		17000	5HTL	-
17000		18638	5HTL	2HP

Attachment III

List of Community Structures

Chainage (m)			Left	Right
0	to	500	-	-
500	to	1000	-	School
2000	to	5000	Temple	School,TEMPL
5500	to	6000	-	-
6000	to	8000	Temple	-
8000	to	10000	-	Temple
10000	to	15000	-	Temple
11500	to	12000	-	-

Attachment-IV

Left					Chainage (m)			Right				
8 to 10m	**6 to 8m**	**4 to 6m**	**2 to 4m**	**0 to 2m**				**0 to 2m**	**2 to 4m**	**4 to 6m**	**6 to 8m**	**8 to 10m**
I	-	10T		-	0	-	500	-	T	4T,2EP	-	-
-	-	2T,5EP	2T	-	500	-	1000	-			TF,EP	SCHOOL
-	TEMPLE	3T	2T	-	1000	-	1500	-		EP,2T	-	-
	-	13T	4T	-	1500	-	2000	-		14T	-	-
	-	4T	T	-	2000	-	2500	-	-	T	-	-
-	TF,HP	T,5EP	-	-	2500	-	3000	-	-	T,3EP	TF	-
-	-		T,EP	-	3000	-	3500	-		2T,EP	-	
	-	2T,EP	-	-	3500	-	4000	-		3T	-	
-		3EP,T	HP	-	4000	-	4500	-		2T,2EP	-	
-	2EP	TEMPLE,T		-	4500	-	5000	-		3EP,HP	TEMPLE	-
-	HP,TF	7EP		-	5000	-	5500	-		4EP,T	-	-
		2T		-	5500	-	6000	-	--		-	-
		T		-	6000	-	6500	-	-		-	-
-	-	-		-	6500	-	7000	-			-	-
-	-	TEMPLE,3EP		-	7000	-	7500	-	-	EP	-	-
	-	2T,2EP		-	7500	-	8000	-	HP		-	-
	-	HP,T		-	8000	-	8500	-	-	5EP	-	-
	-	9EP		-	8500	-	9000	-	-	5EP,TF	TEMPLE	-
-		5EP,T	TF	-	9000	-	9500	-	-	3EP	T	-
-		3EP,7T		-	9500	-	10000	-	-		-	-
-		4T		-	10000	-	10500	-	T			
-				-	10500	-	11000	-	-	2HP,TF	HP,TEMPLE	-
-				-	11000	-	11500	-	-	-	-	-
-				-	11500	-	12000	-	-	-	-	-
-				-	12000	-	12500	-	-	HP	-	-
-				-	12500	-	13000	-		-	-	-
-				-	13000	-	13500	-	-	-	-	-
-				-	13500	-	14000	-	-	-	-	-
				-	14000	-	14500	-				
-	-	-		-	14500	-	15000	-	-			
-	-	-		-	15000	-	15500	-	-			
-	-	HP		-	16000	-	18000	-	-			-
-		-		-	18000	-	18638	-	-	-	-	HP

E.P- Electric Pole, H.P. – Hand Pump, T.W.; T.W., P.H.C; Primary Health Center, C.B.- Cultural Building, Homeopathic Hospital, A.L. – Agricultural Land; C.D. – Cross Drainage structure, W.T.-Water Tank, G.P.- Gram Panchayat

Chainage wise Transect Walk Findings

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
0	-	500	8	-	-	-	-	-	-	-	2EP,HTL,HP
500	-	1000	8	-	-	-	-	-	-	Dithora	6EP,
1000	-	1500	5.5							-	EP,TEMPLE,EX.CC
1500	-	2000	5.5	-	-	-	-	-	-	-	EX.CD,PR.CD,EX.CC
2000	-	2500	8	-	-	-	-	-	-	-	EX.CD
2500	-	3000	8	-	-	-	-	-	-	jobikhurd	HP,2TF,8EP,EX. CD,HTL,SCHOOL
3000	-	3500	8	-	-	-	-	-	-	-	HTL,2EP,CD,
3500	-	4000	8	-	-	-	-	-	-	-	EX.CD ,EP
4000	-	4500	5.5	-	-	-	-	-	-	padkhuri	6EP,EX.PR.CD,2HTL,HP,EX.CC
4500	-	5000	5.5	-	-	-	-	-	-	-	4EX.CD,5EP,3TEMPLE,HP,EX.CC SCHOOL
5000	-	5500	8	-	-	-	-	-	-	-	HP,11EP
5500	-	6000	8	-	-	-	-	-	-	-	EP,
6000	-	6500	8	-	-	-	-	-	-	-	3EX.CD,
6500	-	7000	8	-	-	-	-	-	-	-	TEMPLE.EX.CC,PRCD
7000	-	7500	5.5	-	-	-	-	-	-	-	PR.CD,2EX.CD,4EP,2HTL
7500	-	8000	5.5							-	2EX/CD,HP,EP,EX/CC
8000	-	8500	5.5	-	-	-	-	-	-	-	HP,EX.CD,5EP
8500	-	9000	5.5	-	-	-	-	-	-	rajarwara	12EP,EX.CC,2HTL,TEMPLE,TF
9000	-	9500	8	-	-	-	-	-	-	-	8EP,2EX.CD,TF,EX.CC,PR.CD,
9500	-	10000	8	-	-	-	-	-	-	-	3EP EX.CD
10000	-	10500	8	-	-	-	-	-	-	-	JUNCTION,
10500	-	11000	8	-	-	-	-	-	-	kharkhari	3HP,TEMPLE,
11000	-	11500	8	-	-	-	-	-	-	--	HTL
11500	-	12000	8	-	-	-	-	-	-	-	3EX.CD
12000	-	12500	8	-	-	-	-	-	-	-	EX.CD,2HTL,HP,EX.CC
12500	-	13000	8	-	-	-	-	-	-	-	HTL,
13000	-	13500	8	-	-	-	-	-	-	-	HTL,1EX.CD
13500	-	14000	8	-	-	-	-	-	-	-	,PR.EX.CD,HTL
14000	-	14500	8	-	-	-	-	-	-	-	2HTL,EX.CD
14500	-	15000	8	-	-	-	-	-	-	-	2X.CD.HTL
15000	-	15500	8	-	-	-	-	-	-	-	2EX.CD
15500	-	18000	8	-	-	-	-	-	-	-	4EX.CD,6HTL,3JUNCTION,HP,PR.CD
18000	-	1900	8	-	-	-	-	-	-	-	4HTL,JUNCTION,EX.CD,HP,EX.CC

Road Name:	**Indore Road to Nawadkheda**
Block Name:	**Ujjain**
District Name:	**Ujjain**
Total Length of the Road:	**1.55 Km**
Package No.	**MP-436040**

A. Climatic Condition

Temperature	45 □C (May)High 20 □C (Dec) Low
Humidity	72% (Aug) High 28% (Dec) Low
Rainfall Rainy Season	950 June to September

B. Location of the Road and Generic description of Environment

No.	Type of Ecosystem	Yes	No	Explanation
1.	Coastal area Mangrove (along roadside)		√	Distance from Coastline: km ( ) more than 50% ( ) less than 20%
2.	Type of Terrain——(Plain/Hilly/ Mountainous etc.) *(Explain the topography of the area and how many km of the road are located in the hilly area)*		√	Altitude: The topography of the project road is flat at almost all locations.
3.	Forest Area *(Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?*		√	Type of Vegetation: Legal Status of the Forest Area: *(Reserved, National Park, Sanctuaries, Unclassified, etc.)* No part of the project road passes through any forest area.
4.	Wildlife (*Explain whether there are any wildlife species in the project area*)		√	Name of animals: **NA** Endangered species (if any): **None**
5.	Inhabited Area	√		Inhabited area lies between Ch-800m to 1550m both side connecting village Nawakheda.
6.	Agricultural Land	√		The agriculture land lies between Ch-00m to Ch-300m on both side & Ch-300m to Ch-800m on LHS along the proposed alignment.
7.	Grazing grounds	√		Grazing ground was found between Ch-300m to 800m on RHS along the proposed alignment.
8.	Barren Land		√	Barren Land was not found along the proposed alignment.

C. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? **(*If yes, indicate the location (right or left side) and the chainage)***		√	No part of the project road is passing through hilly terrain prone to landslide or erosion. However, sufficient cross drainage structures will be constructed to avoid any erosion. ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any lakes/swamps beside the road? **(*If yes, list them indicating the location (right or left side) and the chainage*)**		√	There is no pond found along the proposed alignment.
3.	Are there any nallas/streams/rivers etc. along/crossing the road? **(*If yes, list them indicating the location (right, left or crossing) and the chainage)***	√		Few water bodies are crossing the proposed alignment and cross drainage structures are provided at these locations. **Proposed CD:** Between Ch-00m to 100m, Ch-300m to 400m & Ch-600m to 700m. **Community suggested FD:** Between Ch-200m to 300m.
4.	Are there problems of water stagnation and other drainage issues on or near the road? (***If yes, mention chainage)***	√		There are some points of water stagnation and other drainage issues on or near the road which is discussed above S. No.3 along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
5.	Is the area along the project road prone to flooding? ***(If yes, mention flood level and frequency)***	√		No flood prone area is observed along the proposed alignment except as discussed in S.No.3. ( ) No Secondary Information is available and local Community is not aware of this matter
6.	Are there any trees with a dbh of 30 cm or more within 10 m on either side from the center line of the road alignment? **(*If yes attach list of trees indicating the location (right or left side)and the chainage)***	√		There are 29 trees of 30 cm dbh or more within 10m from C/L on both sides along the proposed alignment. Tree locations and distance from C/l is given in **Attachment I.** There is 1 tree loss identified at the alignment.
7.	Along the road and within 100m of the road shoulder, are there any faunal habitat areas, faunal breeding ground, bird migration area, or other similar areas? ***(If yes, specify details of habitat with chainage)***		√	No Faunal Habitat Area, Faunal breeding ground and bird migration areas exist within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
8.	Along the road and within 100m of the road shoulder is there any evidence of floral and faunal species that are classified as endangered species?		√	No evidence of rare, endangered or threatened species are noticed or informed within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information Available and Local Community is not aware of this matter
9.	Are there any utility structures[20] within 10 m on either side from the center line of the road alignment?	√		There are few utility structures observed during the transect walk. The location and type of utility structure

[20] Water tap, hand pump, electric pole, telephone pole, water pipe and other similar structures.

No.	Parameter/ Component	Yes	No	Explanation
	(If yes, attach list with chainage)			along with their approximate distance from C/L is given in **Attachment II.**
10.	Are there any religious, cultural or community structures/buildings[21] within 10 m on either side from the center line of the road alignment? ***(If yes attach list with chainage)***	√		There are few religious cultural or community structures/buildings observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment III.**

D. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. ***(Attach list of people met and dates)***	√		Yes, consultation with the community was held on 27/08/2017 & 13/01/18. Participants list is attached with CPF document.
2.	Any suggestion received in finalizing the alignment	√		Suggestion received regarding FD location: Between Ch-300m to 400m.
3.	If suggestions received, were they incorporated into the design.	√		PIU agreed with the suggestion made by community.

E. Please attach the following:

1) Sketch a map showing the bridge and the trees
2) List of trees indicating location (left or right side of the road) and chainage (as required under C. 6)
3) List of utility structures indicating location (left or right side of the road) and chainage (as required under C. 9)
4) List of community structures indicating location (left or right side of the road) and chainage (as required under C. 10)
5) Sketch of strip map of the road covering details of at least 10 m on either side from the center line of the road
6) Photographs of the project area showing at least 10 m on either side from center line of road alignment. Every 2 km or less of road must have at least 1 photograph.

[21] Mandir, Masjid, Church, religious/cultural/historical monuments, school, health center, public toilet and other similar structures.

Attachment I

List of Trees

Chainage (m)			Left	Right
0	to	100	2	-
100	to	200	3	3
200	to	300	1	3
300	to	400	-	1
400	to	500	-	1
500	to	600	-	1
800	to	900	1	-
1000	to	1100	-	3
1100	to	1200	-	3
1300	to	1400	-	3
1400	to	1550	-	4
Total			**7**	**22**

Attachment II

List of Utilities

Chainage (m)			Left	Right
0	to	100	2ELC, 2EP	2ELC
200	to	300	EP	-
300	to	400	ELC, 4EP	-
400	to	500	2EP	-
500	to	600	3EP	-
700	to	800	3EP, Brick Kilns	-
900	to	1000	EP	-
1000	to	1100	4EP, HP	Brick Kilns
1200	to	1300	TF, EP	HP
1300	to	1400	5EP	-
1400	to	1550	TF, HP, 3EP	-

Attachment III

List of Community Structures

Chainage (m)			Left	Right
0	to	100	WR	-
600	to	700	Temple	-
900	to	1000	Temple	PDS
1000	to	1100	-	School
1300	to	1400	-	Temple
1400	to	1550	Temple, School, GP	Temple

Attachment-IV

Left					Chainage (m)			Right				
8 to 10m	6 to 8m	4 to 6m	2 to 4m	0 to 2m				0 to 2m	2 to 4m	4 to 6m	6 to 8m	8 to 10m
-	-	1T, 2EP	1T, WR	-	0	-	100	-	-	-	-	-
-	-	3T	-	-	100	-	200	-	-	3T	-	-
-	-	1T, EP	-	-	200	-	300	-	-	3T	-	-
-	-	-	4EP	-	300	-	400	-	-	1T	-	-
-	-	2EP	-	-	400	-	500	-	-	1T	-	-
-	-	-	3EP	-	500	-	600	-	-	1T	-	-
-	-	-	Temple	-	600	-	700	-	-	-	-	-
Brick Kilns	3EP	-	-	-	700	-	800	-	-	-	-	-
-	-	1T	-	-	800	-	900	-	-	-	-	-
-	-	EP, Temple	-	-	900	-	1000	-	-	PDS	-	-
-	-	-	4EP, HP	-	1000	-	1100	-	3T	School	-	Brick Kilns
-	-	-	-	-	1100	-	1200	-	3T	-	-	-
-	-	-	TF, EP	-	1200	-	1300	-	-	HP	-	-
-	-	5EP	-	-	1300	-	1400	-	Temple	3T	-	-
Temple, School	-	TF, HP, GP	3EP	-	1400	-	1550	-	Temple	4T	-	-

E.P- Electric Pole, H.P. – Hand Pump, T.W.- Tube Well, W. T.-Water Tank, P.H.C.- Primary Health Center, A.L. - Agricultural Land, C.D.- Cross Drainage structure, PDS-Public Distribution Center

Chainage wise Transect Walk Findings

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
0	-	100	7.5	-	0.5	-	0.5	-	Gumthi	-	Prop CD, 2ELC, WR
100	-	200	8	-	-	-	-	-	-	-	-
200	-	300	8	-	-	-	-	-	-	-	FC, EP
300	-	400	8	-	-	-	-	-	-	-	Prop CD, ELC, 4EP, Junction
400	-	500	8	-	-	-	-	-	-	-	2EP, Boundary
500	-	600	8	-	-	-	-	-	-	-	3EP, Junction
600	-	700	8	-	-	-	-	-	-	-	Temple, Prop CD
700	-	800	8	-	-	-	-	-	-	-	3EP, Junction, Brick Kilns
800	-	900	5	-	-	-	-	-	-	Nawakheda	Habitation area start, CC Prop.
900	-	1000	5	-	-	-	-	-	-	Nawakheda	EP, Temple, PDS
1000	-	1100	4.5	-	0.5	-	0.5	-	Platform	Nawakheda	HP, 4EP, School, Junction, Brick Kilns, TW
1100	-	1200	4.5	-	0.5	-	0.5	-	Platform	Nawakheda	Junction
1200	-	1300	5	-	-	-	-	-	-	Nawakheda	TF, 3Junction, HP
1300	-	1400	5	-	-	-	-	-	-	Nawakheda	5EP, 2Junction, Temple
1400	-	1550	5	-	-	-	-	-	-	Nawakheda	2Temple, School, GP, HP, TF, 3EP

Road Name:	**T01 BYPASS T02 TO JHALARIYA**
Block Name:	**Indore**
District Name:	**Indore**
Total Length of the Road:	**8.525 Km**
Package No.	**MP-176020**

A. Climatic Condition

Temperature	High: 40.4 **(May)** Low: 9.8 **°C (Dec)**
Humidity	High: 58 % **(Aug)** Low: 23 **%**
Rainfall Rainy Season	890 mm/year **June** to **September**

B. Location of the Road and Generic description of Environment

No.	Type of Ecosystem	Yes	No	Explanation
1.	Coastal area Mangrove (along roadside)		√	Distance from Coastline: km
				( ) more than 50% ( ) less than 20%
2.	Type of Terrain——(Plain/Hilly/ Mountainous etc.) *(Explain the topography of the area and how many km of the road are located in the hilly area)*		√	Altitude: The topography of the project road is flat at almost all locations.
3.	Forest Area *(Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?*		√	Type of Vegetation: Legal Status of the Forest Area: *(Reserved, National Park, Sanctuaries, Unclassified, etc.)*
				No part of the project road passes through any forest area.
4.	Wildlife (*Explain whether there are any wildlife species in the project area*)		√	Name of animals: **NA** Endangered species (if any): **None**
5.	Inhabited Area	√		Inhabited area lies between Ch-00m to 200m, Ch-2400m to Ch-3200m, Ch- 4400m to 4600m on RHS & Ch-7200m to 7800m both side connecting villages respectively Jhalatiya, Hingoniya, Updinatha & Nignoti respectively.
6.	Agricultural Land	√		The agriculture land lies between Ch-200m to Ch-2400m, Ch- 3200m to 4400m, Ch-4400m to 4600m on LHS, Ch- 4600m to 7200m & Ch-7800m to Ch-8225m both side along the proposed alignment.
7.	Grazing grounds		√	Grazing ground was not found along the proposed alignment.
8.	Barren Land		√	Barren Land was not found along the proposed alignment.

C. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? ***(If yes, indicate the location (right or left side) and the chainage)***		√	No part of the project road is passing through hilly terrain prone to landslide or erosion. However, sufficient cross drainage structures will be constructed to avoid any erosion. ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any lakes/swamps beside the road? (***If yes, list them indicating the location (right or left side) and the chainage***)	√		There were 2 Ponds found between Ch-2000m to Ch-2200m on LHS & Ch-4400m to Ch-4600m on RHS respectively. All of 2 were approximately 10m far from proposed alignment.
3.	Are there any nallas/streams/rivers etc. along/crossing the road? (***If yes, list them indicating the location (right, left or crossing) and the chainage)***	√		Few water bodies are crossing the proposed alignment and cross drainage structures are provided at these locations. **Existing CD**: Between Ch-4600m to Ch-4800m, Ch-5000m to Ch-5200m, Ch-6200m to Ch-6400m Ch-7000m to Ch-7200m, Ch-7200m to 7400m-2, Ch-7600m to 7800m & Ch-7800m to 8000m-2. **Proposed CD:** Between Ch-00m to Ch-200m, Ch-200m to Ch-400m, Ch-800m to Ch-1000, Ch-1200m to Ch-1400m, Ch-1800m to 2000m, Ch-2600m to 2800m, Ch-3000m to 3200m, Ch-3200m to 3400m, Ch-3400m to 3600m, Ch-36000m to 3800m, Ch-3800m to 4000m-2, Ch-4200m to 4400m, Ch-4400m to 4600m-2, Ch-4800m to 5000m & Ch-6000m to 6200m. **Community suggested FD:** Between Ch-5800m to Ch-6000m, Ch-8000m to 8200m, Ch-8200m to 8400m & Ch-8400m to Ch-8525m.
4.	Are there problems of water stagnation and other drainage issues on or near the road? (***If yes, mention chainage)***	√		There are some points of water stagnation and other drainage issues on or near the road which is discussed above S. No.3 along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
5.	Is the area along the project road prone to flooding? ***(If yes, mention flood level and frequency)***	√		No flood prone area is observed along the proposed alignment except as discussed in S.No.3. ( ) No Secondary Information is available and local Community is not aware of this matter
6.	Are there any trees with a dbh of 30 cm or more within 10 m on either side from the center line of the road alignment? ***(If yes attach list of trees indicating the location (right or left side)and the chainage)***	√		There are 22 trees of 30 cm dbh or more within 10m from C/L on both sides along the proposed alignment. Tree locations and distance from C/l is given in **Attachment I.** There are 2 trees loss identified at the alignment.
7.	Along the road and within 100m of the road shoulder, are there any faunal habitat areas, faunal breeding ground, bird migration area, or other similar areas?		√	No Faunal Habitat Area, Faunal breeding ground and bird migration areas exist within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
	(If yes, specify details of habitat with chainage)			
8.	Along the road and within 100m of the road shoulder is there any evidence of floral and faunal species that are classified as endangered species?		√	No evidence of rare, endangered or threatened species are noticed or informed within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information Available and Local Community is not aware of this matter
9.	Are there any utility structures[22] within 10 m on either side from the center line of the road alignment? ***(If yes, attach list with chainage)***	√		There are few utility structures observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment II.**
10.	Are there any religious, cultural or community structures/buildings[23] within 10 m on either side from the center line of the road alignment? ***(If yes attach list with chainage)***	√		There are few religious cultural or community structures/buildings observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment III.**

D. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. ***(Attach list of people met and dates)***	√		Yes, consultation with the community was held on 22/08/2017. Participants list is attached with CPF document.
2.	Any suggestion received in finalizing the alignment	√		Community suggested FD: Between Ch-5800m to Ch-6000m, Ch-8000m to 8200m, Ch-8200m to 8400m & Ch-8400m to Ch-8525m.
3.	If suggestions received, were they incorporated into the design.	√		PIU agreed with the suggestion made by community.

E. Please attach the following:

1) Sketch a map showing the bridge and the trees
2) List of trees indicating location (left or right side of the road) and chainage (as required under C. 6)
3) List of utility structures indicating location (left or right side of the road) and chainage (as required under C. 9)
4) List of community structures indicating location (left or right side of the road) and chainage (as required under C. 10)
5) Sketch of strip map of the road covering details of at least 10 m on either side from the center line of the road
6) Photographs of the project area showing at least 10 m on either side from center line of road alignment. Every 2 km or less of road must have at least 1 photograph.

[22] Water tap, hand pump, electric pole, telephone pole, water pipe and other similar structures.

[23] Mandir, Masjid, Church, religious/cultural/historical monuments, school, health center, public toilet and other similar structures.

Attachment I

List of Trees

Chainage (m)			Left	Right
800	to	1000	3	-
1200	to	1400	1	-
1400	to	1600	1	-
2000	to	2200	-	3
2200	to	2400	-	1
2400	to	2600	1	-
3600	to	3800	3	-
6600	to	6800	2	2
6800	to	7000	-	2
7000	to	7200	1	-
7400	to	7600	2	-
Total			**14**	**8**

Attachment II

List of Utilities

Chainage (m)			Left	Right
0	to	200	ELC	TF, 3EP, ELC
200	to	400	4EP	3EP
400	to	600	-	3EP
600	to	800	-	WT
800	to	1000	-	2TW
1000	to	1200	HTL	TW, HTL
1200	to	1400	-	2EP
1400	to	1600	2HTL	2HTL, TF
1600	to	1800	HTL	HTL, EP
2000	to	2200	Pond	-
2200	to	2400	Pond	HP
2400	to	2600	2ELC, 2EP, HP	2ELC, 2EP, HP
2600	to	2800	WT, HP, ELC	EP, TF, ELC
2800	to	3000	TF	-
3000	to	3200	2EP, HTL	4EP, HTL
3200	to	3400	-	3EP
3400	to	3600	WT	2EP
3600	to	3800	-	3EP
3800	to	4000	3EP, HTL	HTL
4000	to	4200	4EP, HTL	HTL
4200	to	4400	4EP, HTL	HTL
4400	to	4600	3EP	5EP, Pond
4600	to	4800	3EP, HTL	3EP, HTL
5000	to	5200	HTL	HTL
5800	to	6000	Pond	-
6000	to	6200	HTL	HTL
6200	to	6400	EP, ELC	
6800	to	7000	HP	
7200	to	7400	HP, ELC	2EP, ELC
7400	to	7600	TF, WT, HP, 2HTL	EP, HP, TW, 2HTL
7600	to	7800	TF, 3EP	-
7800	to	8000	HTL, ELC	HTL, ELC
8200	to	8400	-	3EP
8400	to	8525	-	4EP

Attachment III

List of Community Structures

Chainage (m)			Left	Right
0	to	200	-	Temple
800	to	1000	Temple	Funeral Place
1800	to	2000	-	Collagre
2200	to	2400	-	Community Building, Temple
2400	to	2600	Temple	-
3600	to	3800	2Temple	-
4400	to	4600	Temple	-
5000	to	5200	Temple	-
5200	to	5400	School, Warehouse	-
7000	to	7200	Temple	-
7200	to	7400	-	Temple, Anganwari, School
7400	to	7600	Temple	Temple

Attachment-IV

Left					Chainage (m)			Right				
8 to 10m	**6 to 8m**	**4 to 6m**	**2 to 4m**	**0 to 2m**				**0 to 2m**	**2 to 4m**	**4 to 6m**	**6 to 8m**	**8 to 10m**
-	-	-	-	-	0	-	200	-	TF, 3EP	Temple	-	-
-	-	-	4EP	-	200	-	400	-	3EP	-	-	-
-	-	-	-	-	400	-	600	-	3EP	-	-	-
-	-	-	-	-	600	-	800	-	-	WT	-	-
-	Temple	3T	-	-	800	-	1000	-	-	-	TW	Funeral Place
-	-	-	-	-	1000	-	1200	-	-	TW	-	-
-	-	1T	-	-	1200	-	1400	-	2EP	-	-	-
-	-	1T	-	-	1400	-	1600	-	-	TF	-	-
-	-	-	-	-	1600	-	1800	-	-	EP	-	-
-	-	-	-	-	1800	-	2000	-	-	-	-	Collage
-	-	Pond	-	-	2000	-	2200	-	-	3T	-	-
-	-	Pond	-	-	2200	-	2400	1T	HP, Temple	Community Building	-	-
-	-	-	EP, Temple	1T, 2EP	2400	-	2600	2EP	HP	-	-	-
-	-	WT	HP	-	2600	-	2800	EP	-	TF	-	-
-	-	-	-	-	2800	-	3000	-	-	-	-	-
-	-	-	-	-	3000	-	3200	-	-	-	-	-
-	-	-	-	-	3200	-	3400	-	-	-	-	-
-	-	-	-	-	3400	-	3600	-	-	-	-	-
-	1T, Temple	2T	Temple	-	3600	-	3800	-	-	-	-	-
-	-	-	-	-	3800	-	4000	-	-	-	-	-
-	-	-	-	-	4000	-	4200	-	-	-	-	-
-	-	-	-	-	4200	-	4400	-	-	-	-	-
-	Temple	-	-	-	4400	-	4600	-	-	-	-	-
-	-	-	-	-	4600	-	4800	-	-	-	-	-
-	-	-	-	-	4800	-	5000	-	-	-	-	-
-	-	-	Temple	-	5000	-	5200	-	-	-	-	-
School, Warehouse	-	-	-	-	5200	-	5400	-	-	-	-	-
-	-	-	-	-	5400	-	5600	-	-	-	-	-
-	-	-	-	-	5600	-	5800	-	-	-	-	-
-	-	-	-	-	5800	-	6000	-	-	-	-	-
-	-	-	-	-	6000	-	6200	-	-	-	-	-
-	-	-	EP	-	6200	-	6400	-	-	-	-	-

Left					Chainage (m)			Right				
8 to 10m	6 to 8m	4 to 6m	2 to 4m	0 to 2m				0 to 2m	2 to 4m	4 to 6m	6 to 8m	8 to 10m
-	-	-	-	-	6400	-	6600	-	-	-	-	-
-	2T	-	-	-	6600	-	6800	-	-	-	-	2T
-	-	HP	-	-	6800	-	7000	-	-	2T	-	-
-	-	Temple	-	-	7000	-	7200	-	-	-	-	-
-	-	-	HP	-	7200	-	7400	-	Temple, 2EP	Anganwari	-	-
-	2T	-	Temple, TF, HP, WT	-	7400	-	7600	-	Temple, TW, EP, HP	-	-	-
-	-	-	TF, 3EP	-	7600	-	7800	-	-	-	-	-
-	-	-	-	-	7800	-	8000	-	-	-	-	-
-	-	-	-	-	8000	-	8200	-	-	-	-	-
-	-	-	-	-	8200	-	8400	-	3EP	-	-	-
-	-	-	-	-	8400	-	8600	-	4EP	-	-	-

E.P- Electric Pole, H.P. – Hand Pump, T.W.; T.W., P.H.C; Primary Health Center
A.L. – Agricultural Land; C.D. – Cross Drainage structure, W.T.—W.T

Chainage wise Transect Walk Findings

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
0	-	200	8	-	-	-	-	-	-	Jhalariya	TF, Ex CD, ELC, 3EP, Temple, Habitation
200	-	400	8	-	-	-	-	-	-	-	Prop. CD, 7EP, Boundry
400	-	600	8	-	-	-	-	-	-	-	HTL, 3EP, Junction, Boundry
600	-	800	8	-	-	-	-	-	-	-	Well
800	-	1000	8	-	-	-	-	-	-	-	Prop. CD, Funeral Place, Bore, Boundry, Temple, Junction
1000	-	1200	8	-	-	-	-	-	-	-	HTL, Bore
1200	-	1400	8	-	-	-	-	-	-	-	Prop. CD, 2EP, Boundry
1400	-	1600	8	-	-	-	-	-	-	-	2HTL, TF, Collage, Junction
1600	-	1800	8	-	-	-	-	-	-	-	HTL, FC, EP
1800	-	2000	8	-	-	-	-	-	-	-	Poro. CD, Collage, Juction
2000	-	2200	8	-	-	-	-	-	-	-	Pond
2200	-	2400	8	-	-	-	-	-	-	-	Communtiy Building, Juction, Temple

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
2400	-	2600	4	0.5	0.5	0.5	0.5	Platform	Platform	Hingoniya	ELC, EP, HP, Junction, HP, Temple, CC road required, Habitation area
2600	-	2800	4	0.5	0.5	0.5	0.5	Platform	Platform	Hingoniya	HP, WT, Prop. CD, ELC, EP, TF
2800	-	3000	5	-	-	-	-	-	-	Hingoniya	TF
3000	-	3200	5	-	-	-	-	-	-	Hingoniya	2EP, ELC, Prop. CD, 4EP
3200	-	3400	8	-	-	-	-	-	-	-	Ex CD, 3EP
3400	-	3600	8	-	-	-	-	-	-	-	WT, Prop. CD
3600	-	3800	8	-	-	-	-	-	-	-	2Temple, Junction, 3EP, Prop. CD
3800	-	4000	8	-	-	-	-	-	-	-	3EP, HTL, Prop. CD
4000	-	4200	8	-	-	-	-	-	-	-	4EP, HTL
4200	-	4400	8	-	-	-	-	-	-	-	4EP, HTL, Prop. CD
4400	-	4600	8	-	-	-	-	-	-	Updinatha	8EP, Prop. CD, Pond, Temple, Habitation
4600	-	4800	8	-	-	-	-	-	-	-	6EP, HTL, Ex CD
4800	-	5000	8	-	-	-	-	-	-	-	Prop. CD
5000	-	5200	8	-	-	-	-	-	-	-	Ex CD, HTL, Temple
5200	-	5400	8	-	-	-	-	-	-	-	Warehouse, School
5400	-	5600	8	-	-	-	-	-	-	-	
5600	-	5800	8	-	-	-	-	-	-	-	TF, Quarry
5800	-	6000	8	-	-	-	-	-	-	-	Pond, Junction, FD
6000	-	6200	8	-	-	-	-	-	-	-	HTL. Prop. CD
6200	-	6400	8	-	-	-	-	-	-	-	HTL, Ex CD
6400	-	6600	8	-	-	-	-	-	-	-	Prop. CD, Quarry
6600	-	6800	8	-	-	-	-	-	-	-	
6800	-	7000	8	-	-	-	-	-	-	-	HP
7000	-	7200	8	-	-	-	-	-	-	-	Temple, Ex CD
7200	-	7400	5	-	-	-	-	-	-	Nignoti	Habitation area, 2Ex CD, Quarry, HP, ELC, 2EP, School, AW, Temple
7400	-	7600	5	-	-	-	-	-	-	Nignoti	2Temple, WT, HP, 3HTL, EP, HP, TW

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remark/Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
7600	-	7800	5	-	-	-	-	-	-	Nignoti	Ex CD, TF, 3EP
7800	-	8000	8	-	-	-	-	-	-	-	2Ex CD, 2HTL
8000	-	8200	8	-	-	-	-	-	-	-	Prop. FD
8200	-	8400	8	-	-	-	-	-	-	-	Junction, Prop. FD
8400	-	8525	8	-	-	-	-	-	-	-	Junction, Prop. FD

Road Name:	**T01-Pushpagiri Bhopal Road to Anabad Salamkhedi**
District Name:	**Dewas**
Block Name:	**Sonkachh**
Total Length of the Road:	**12.00 Km**
Package No.	**MP10604**

A. Climatic Condition

Temperature	High: 40 **°C (May)** Low: 11 **°C (Dec)**
Humidity	High: 86 % **(Aug)** Low: 47 **% (Dec)**
Rainfall Rainy Season	**1012** mm/year **June** to **September**

B. Location of the Road and Generic description of Environment

No.	Type of Ecosystem	Yes	No	Explanation
1.	Coastal area Mangrove (along roadside)		√	Distance from Coastline: km ( ) more than 50% ( ) less than 20%
2.	Type of Terrain——(Plain/Hilly/ Mountainous etc.) *(Explain the topography of the area and how many km of the road are located in the hilly area)*		√	Altitude: The topography of the project road is flat at almost all locations.
3.	Forest Area *(Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?*		√	Type of Vegetation: Legal Status of the Forest Area: *(Reserved, National Park, Sanctuaries, Unclassified, etc.)* No part of the project road passes through any forest area.
4.	Wildlife (*Explain whether there are any wildlife species in the project area*)		√	Name of animals: **NA** Endangered species (if any): **None**
5.	Inhabited Area	√		Inhabited area lies between Ch-2500m to Ch-3500, Ch-4500m to Ch-5000, Ch-9000m to Ch-9500, Ch-11500m to Ch-12000 both side connecting village Kumariya rao, Bhishkedi, Eanabad and Salam khedi respectively.
6.	Agricultural Land	√		The agriculture land lies between Ch-00m to Ch-2500m, CH-3500m to CH-4500m, Ch-4500m to Ch-9000m and Ch-9000m to Ch-11500m on both side along the proposed alignment.
7.	Grazing grounds		√	Grazing ground was not found along the proposed alignment.
8.	Barren Land		√	Barren Land was not found along the proposed alignment.

C. Specific description of the Road Environment

(Note: Questions number 1, 4, 5, 7 and 8 must be answered after discussions with the local community people)

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? ***(If yes, indicate the location (right or left side) and the chainage)***		√	No part of the project road is passing through hilly terrain prone to landslide or erosion. However, sufficient cross drainage structures will be constructed to avoid any erosion. ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any lakes/swamps beside the road? (***If yes, list them indicating the location (right or left side) and the chainage***)		√	There is no pond found along the proposed alignment.
3.	Are there any nallas/streams/rivers etc. along/crossing the road? (***If yes, list them indicating the location (right, left or crossing) and the chainage)***	√		Few water bodies are crossing the proposed alignment and cross drainage structures are provided at these locations. **Proposed CD:** Between Ch-9500m to Ch-10000, Ch-10000m to Ch-10500m, and Ch-11000m to Ch-11500m (2 CD) **Community suggested FD:** Between Ch-2500m to Ch-3000m **Existing CD –** Between Ch- 1000m to Ch-1500m, Ch-2000m to Ch-2500m, Ch-2500m to Ch-3000m, Ch-3500m to Ch-4000m (2 CD), Ch-5000m to Ch-5500m (2 CD), Ch-6000m to Ch-6500m (2 CD), Ch-6500m to Ch-7000m, Ch-8000m to Ch-8500m (2 CD), and Ch-8500m to Ch-9000m
4.	Are there problems of water stagnation and other drainage issues on or near the road? (***If yes, mention chainage***)	√		There are some points of water stagnation and other drainage issues on or near the road which is discussed above S. No.3 along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter
5.	Is the area along the project road prone to flooding? ***(If yes, mention flood level and frequency)***	√		No flood prone area is observed along the proposed alignment except as discussed in S.No.3. ( ) No Secondary Information is available and local Community is not aware of this matter
6.	Are there any trees with a dbh of 30 cm or more within 10 m on either side from the center line of the road alignment? (***If yes attach list of trees indicating the location (right or left side)and the chainage)***	√		There are 163 trees of 30 cm dbh or more within 10m from C/L on both sides along the proposed alignment. Tree locations and distance from C/l is given in **Attachment I.** There is no tree loss identified at the alignment.
7.	Along the road and within 100m of the road shoulder, are there any faunal habitat areas, faunal breeding ground, bird migration area, or other similar areas? (***If yes, specify details of habitat with chainage***)		√	No Faunal Habitat Area, Faunal breeding ground and bird migration areas exist within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information is available and local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
8.	Along the road and within 100m of the road shoulder is there any evidence of floral and faunal species that are classified as endangered species?		√	No evidence of rare, endangered or threatened species are noticed or informed within 100 m of the road shoulder on both sides along the proposed alignment. ( ) No Secondary Information Available and Local Community is not aware of this matter
9.	Are there any utility structures[24] within 10 m on either side from the center line of the road alignment? ***(If yes, attach list with chainage)***	√		There are few utility structures observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment II.**
10.	Are there any religious, cultural or community structures/buildings[25] within 10 m on either side from the center line of the road alignment? ***(If yes attach list with chainage)***	√		There are few religious cultural or community structures/buildings observed during the transect walk. The location and type of utility structure along with their approximate distance from C/L is given in **Attachment III.**

D. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. ***(Attach list of people met and dates)***	√		Yes, consultation with the community was held on 27/08/2017 & 18/02/18. Participants list is attached with CPF document.
2.	Any suggestion received in finalizing the alignment	√		Suggestion received regarding FD location: Between Ch-2500m to Ch-3000m
3.	If suggestions received, were they incorporated into the design.	√		PIU agreed with the suggestion made by community.

E. Please attach the following:

1) Sketch a map showing the bridge and the trees
2) List of trees indicating location (left or right side of the road) and chainage (as required under C. 6)
3) List of utility structures indicating location (left or right side of the road) and chainage (as required under C. 9)
4) List of community structures indicating location (left or right side of the road) and chainage (as required under C. 10)
5) Sketch of strip map of the road covering details of at least 10 m on either side from the center line of the road
6) Photographs of the project area showing at least 10 m on either side from center line of road alignment. Every 2 km or less of road must have at least 1 photograph.

[24] Water tap, hand pump, electric pole, telephone pole, water pipe and other similar structures.

[25] Mandir, Masjid, Church, religious/cultural/historical monuments, school, health center, public toilet and other similar structures.

Attachment I

List of Trees

Chainage (m)			Left	Right
0	-	500	3	4
500	-	1000	4	4
1000	-	1500	0	3
1500	-	2000	4	3
2000	-	2500	7	0
2500	-	3000	8	11
3000	-	3500	7	9
3500	-	4000	-	-
4000	-	4500	6	6
4500	-	5000	-	-
5000	-	5500	8	8
5500	-	6000	6	6
6000	-	6500	1	0
6500	-	7000	1	2
7000	-	7500	1	2
7500	-	8000	1	3
8000	-	8500	-	-
8500	-	9000	2	3
9000	-	9500	1	0
9500	-	10000	2	1
10000	-	10500	4	6
10500	-	11000	6	7
11000	-	11500	6	7
11500	-	12000	-	-
Total			**78**	**85**

Attachment II

List of Utilities

Chainage (m)			Left	Right
0	-	500	3 ELC, HTL, 8 EP	3 ELC, HTL, 1 EP
500	-	1000	ELC, 7 EP	ELC
1000	-	1500	3 ELC, 5 EP	3 ELC, 3 EP, TF
1500	-	2000	2 ELC, 5 EP	2 ELC, 4 EP
2000	-	2500	ELC	ELC, 4 EP
2500	-	3000	ELC	ELC, 4 EP
3000	-	3500	ELC, 1 EP, TF	ELC, 4 EP
3500	-	4000	-	HP
4500	-	5000	-	HP, 3 EP
5000	-	5500	TF	Well
5500	-	6000	HTL	HTL
6000	-	6500	ELC, 1 EP	ELC
6500	-	7000	ELC	ELC, HP
7000	-	7500	3 ELC	1 EP, 3 ELC
7500	-	8000	ELC	ELC
8500	-	9000	2 ELC	2 ELC, 1 EP
9000	-	9500	TF	1 EP
10000	-	10500	ELC	ELC
10500	-	11000	HTL	HTL
11500	-	12000	2 HTL	2 HTL

Attachment III

List of Community Structures

Chainage (m)			Left	Right
0	-	500	Religious Place	Radha Swami Ashram
1500	-	2000	School	-
2000	-	2500	Religious Place	-
2500	-	3000	Religious Place	-
3500	-	4000	Religious Place	-
4500	-	5000	2 Samadhi, 2 Religious Structure	School
5000	-	5500	Religious Place	Religious Place
5500	-	6000	Religious Place	-
6000	-	6500	2 Religious Place	-
6500	-	7000	2 Religious Place	-
7500	-	8000	Religious Place	Religious Place
8500	-	9000	Religious Place	-
9000	-	9500	PDS Shop, Temple	2 Religious Place
9500	-	10000	Religious Place	2 Religious Place
11500	-	12000	-	Temple

Attachment-IV

Left					Chainage (m)			Right				
8 to 10m	**6 to 8m**	**4 to 6m**	**2 to 4m**	**0 to 2m**				**0 to 2m**	**2 to 4m**	**4 to 6m**	**6 to 8m**	**8 to 10m**
-	-	Religious Place, 3 Trees, 8 EP	-	-	0	-	500	-	-	3 Trees, 1 EP	-	Radha Swami Ashram, 1 tree
-	7 EP	4 Trees	-	-	500	-	1000	-	-	4 Trees	-	-
-	5 EP	-	-	-	1000	-	1500	-	-	3 Trees	TF	3 EP
School	5 EP	4 trees	-	-	1500	-	2000	-	-	3 Trees	4 EP	-
Religious Place (50m)	-	7 trees	-	-	2000	-	2500	-	-	-	-	4 EP
-	8 trees	Religious Place	-	-	2500	-	3000	-	-	11 trees, 4 EP	-	-
1 EP, TF	-	7 trees	-	-	3000	-	3500	-	-	9 trees, 4 EP	-	-
-	-	Religious Place	-	-	3500	-	4000	-	-	HP	-	-
-	6 trees	-	-	-	4000	-	4500	-	-	-	6 trees	-
Samadhi,	-	Samadhi,	-	-	4500	-	5000	-	-	HP, 3 EP	-	School (15m)
8 trees, TF	-	Religious Place	-	-	5000	-	5500	-	-	-	Religious Place, 8 trees	Well
-	Religious Place	6 trees	-	-	5500	-	6000	-	-	-	-	6 trees
Religious Place	-	1 tree, 1 EP	Religious Place	-	6000	-	6500	-	-	-	-	-
-	-	2 Religious Place	1 tree	-	6500	-	7000	-	-	HP	2 trees	-
-	-	1 tree	-	-	7000	-	7500	-	-	1 EP	-	2 trees
-	1 tree	Religious Place	-	-	7500	-	8000	-	-	3 trees	Religious Place	-
-	-	-	-	-	8000	-	8500	-	-	-	-	-
-	2 trees	Religious Place	-	-	8500	-	9000	-	-	3 trees, 1 EP	-	-

Left					Chainage (m)			Right				
8 to 10m	6 to 8m	4 to 6m	2 to 4m	0 to 2m				0 to 2m	2 to 4m	4 to 6m	6 to 8m	8 to 10m
-	-	PDS, Temple, TF	1 tree	-	9000	-	9500	-	1 EP	2 Religious Place	-	-
-	Religious Place	2 trees	-	-	9500	-	10000	-	-	2 Religious Place	1 tree	-
-	-	4 trees	-	-	10000	-	10500	-	-	6 trees	-	-
-	-	6 trees	-	-	10500	-	11000	-	-	4 trees	-	-
-	-	6 trees	-	-	11000	-	11500	-	-	7 trees	-	-
-	-	-	-	-	11500	-	12000	-	-	Temple	-	-

E.P- Electric Pole, H.P. – Hand Pump, T.W.- Tube Well, W. T.-Water Tank, P.H.C.- Primary Health Center, A.L. - Agricultural Land, C.D.- Cross Drainage structure, PDS-Public Distribution Center

Chainage wise Transect Walk Findings

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remarks /Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
0	-	500	9	1	-	1	-	Shop's platform	-	-	Religious place, 3 ELC, HTL, Radha Swami Ashram, Junction
500	-	1000	10	-	-	-	-	-	-	-	ELC, Junction LHS and RHS
1000	-	1500	10	-	-	-	-	-	-	-	Existing CD, 3 ELC, Junction RHS and LHS, TF
1500	-	2000	10	-	-	-	-	-	-	-	Junction, School, 2 ELC
2000	-	2500	10	-	-	-	-	-	-	-	Religious Place, Existing CD, ELC
2500	-	3000	6	-	-	-	-	-	-	Kumariya	Existing CD, FC, Religious place, 3 Junction, ELC, Habitation area
3000	-	3500	6	-	-	-	-	-	-	"	TF, Existing CD, ELC, Junction-RHS
3500	-	4000	10	-	-	-	-	-	-	-	2 Existing CD, Religious place, HP
4000	-	4500	10	-	-	-	-	-	-	-	3 Junction RHS and LHS
4500	-	5000	5.5	-	0.5	-	0.5	Shop's platform	-	Bishakhedi	Habitation area, 2 Samadhi, Religious place, 4 Junction RHS & LHS, School, HP
5000	-	5500	10	-	-	-	-	-	-	-	2 Existing CD, TF, 2 Religious place, Well, Poultry from
5500	-	6000	10	-	-	-	-	-	-	-	Religious place, Junction RHS& LHS, HTL
6000	-	6500	10	-	-	-	-	-	-	-	2 Religious Place, Junction, ELC, 2 Existing CD
6500	-	7000	10	-	-	-	-	-	-	-	3 Religious place, Existing CD, Junction, HP
7000	-	7500	10	-	-	-	-	-	-	-	3 ELC, 4 Junction RHS & LHS

Chainage (m)			Existing Land Width (m)	Additional Land Required		Losses		Type of loss		Village	Remarks /Suggestion
				LHS	RHS	LHS	RHS	LHS	RHS		
7500	-	8000	10	-	-	-	-	-	-	-	2 Religious Place, Junction, ELC
8000	-	8500	10	-	-	-	-	-	-	-	Junction, 2 Existing CD
8500	-	9000	10	-	-	-	-	-	-	-	Religious Place, 2 ELC, Existing CD, Junction
9000	-	9500	5.5	0.5	-	0.5	-	Fencing	-	**Eanabad**	Habitation area, Temple, PDS, TF, 3 Junction, Religious place
9500	-	10000	10	-	-	-	-	-	-	-	Junction RHS & LHS, Existing CD, 3 Religious place- RHS & LHS
10000	-	10500	10	-	-	-	-	-	-	-	Existing CD, ELC
10500	-	11000	10	-	-	-	-	-	-	-	HTL
11000	-	11500	10	-	-	-	-	-	-	-	2 Proposed CD
11500	-	12000	6	-	-	-	-	-	-	**Salama khedi**	HTL, Habitation area, Temple

Attachment V

Photo Plates
Community Consultation











APPENDIX 3: GUIDELINES FOR BORROW AREAS MANAGEMENT

I. SELECTION OF BORROW AREAS

1. Location of borrow areas shall be finalized as per IRC: 10-1961guidlines. The finalization of locations in case of borrows areas identified in private land shall depend upon the formal agreement between landowners and contractor. If, agreement is not reached between the contractor and landowners for the identified borrow areas sites, arrangement for locating the source of supply of material for embankment and sub-grade as well as compliance to environment requirements in respect of excavation and borrow areas as stipulated from time to time by the Ministry of Environment and Forests, Government of India, and local bodies, as applicable shall be the sole responsibility of the contractor.

2. The contractor in addition to the established practices, rules and regulation will also consider following criteria before finalizing the locations.

(1) The borrow area should not be located in agriculture field unless unavoidable i.e. barren land is not available.
(2) The borrow pits preferably should not be located along the roads.
(3) The loss of productive and agriculture soil should be minimum.
(4) The loss of vegetation is almost nil or minimum.
(5) The Contractor will ensure that suitable earth is available.

II. CONTRACTOR'S RESPONSIBILITY

3. The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing program approved by the Engineer. It shall be ensured that the sub-grade material when compacted to the density requirements shall yield the design CBR value of the sub-grade. Contractor shall begin operations keeping in mind following;

(1) Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plants is operating at the place of deposition.
(2) No excavated acceptable material other than surplus to requirements of the Contract shall be removed from the site. Contractor should be permitted to remove acceptable material from the site to suit his operational procedure, then shall make consequent deficit of material arising therefrom.
(3) Where the excavation reveals a combination of acceptable and un-acceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the un-acceptable materials. The acceptable material shall be stockpiled separately.

III. BORROWING FROM DIFFERENT LAND-FORMS

A. Borrow Areas located in Agricultural Lands

(i) The preservation of topsoil will be carried out in stockpile.
(ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
(iii) Borrowing of earth will be carried out up to a depth of 1.5m from the existing ground level.

(iv) Borrowing of earth will not be done continuously through out the stretch.
(v) Ridges of not less than 8m widths will be left at intervals not exceeding 300m.
(vi) Small drains will be cut through the ridges, if necessary, to facilitate drainage.
(vii) The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal).
(viii) The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside.

B. Borrow Areas located in Elevated Lands

(i) The preservation of topsoil will be carried out in stockpile.
(ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
(iii) At location where private owners desire their fields to be levelled, the borrowing shall be done to a depth of not more than 1.5m or up to the level of surrounding fields

C. Borrow Areas near River side

(i) The preservation of topsoil will be carried out in stockpile.
(ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
(iii) Borrow area near to any surface water body will be at least at a distance of 15m from the toe of the bank or high flood level, whichever is maximum.

D. Borrow Areas near Settlements

(i) The preservation of topsoil will be carried out in stockpile.
(ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
(iii) Borrow pit location will be located at least 0.75 km from villages and settlements. If un-avoidable, the pit will not be dug for more than 30 cm and drains will be cut to facilitate drainage.
(iv) Borrow pits located in such location will be re-developed immediately after borrowing is completed. If spoils are dumped, that will be covered with a layers of stockpiled topsoil in accordance with compliance requirements with respect MOEF/SPCB guidelines.

E. Borrow Pits along the Road

4. Borrow pits along the road shall be discouraged and if deemed necessary and permitted by the Engineer; following precautions are recommended.

(i) The preservation of topsoil will be carried out in stockpile.
(ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal).
(iii) Ridges of not less than 8m widths should be left at intervals not exceeding 300m.
(iv) Small drains shall be cut through the ridges of facilitate drainage.

(v) The depth of the pits shall be so regulated that there bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of bank, the maximum depth of any case being limited to 1.5m.

(vi) Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10m.

IV. REHABILITATION OF BORROW AREAS

5. The objective of the rehabilitation program is to return the borrow pit sites to a safe and secure area, which the public should be able to safely enter and enjoy. Securing borrow pits in a stable condition is fundamental requirement of the rehabilitation process. This could be achieved by filling the borrow pit floor to approximately the access road level.

6. Re-development plan shall be prepared by the Contractor before the start of work inline with the owners will require and to the satisfaction of owner. The Borrow Areas shall be rehabilitated as per following;

- Borrow pits shall be backfilled with rejected construction wastes and will be given a vegetative cover. If this is not possible, then excavation sloped will be smoothed and depression will be filled in such a way that it looks more or less like the original round surface.
- Borrow areas might be used for aquaculture in case landowner wants such development. In that case, such borrow area will be photographed after their post use restoration and Environment Expert of Supervision Consultant will certify the post use redevelopment.

7. The Contractor will keep record of photographs of various stages i.e., before using materials from the location (pre-project), for the period borrowing activities (construction Phase) and after rehabilitation (post development), to ascertain the pre and post borrowing status of the area.

APPENDIX 4: ENVIRONMENTAL MANAGEMENT PLAN

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
	Measures common to all sample roads						
	Design and Pre Construction Stage						
1.	Climate Change Consideration and Vulnerability screening	○ Compliance to climate change vulnerability check point given under EARF and adoption of necessary mitigative measures as may be required ○ Efforts shall be made to plant additional trees for increasing the carbon sink. The tree may be planted with help of PRI (Panchyati Raj Institution)	All through the alignment of each rural road	Pre Construction Phase	Part of Project Cost	Project Preparation Consultant/ design consultant	PIU/ MPRRDA
2.	Finalization of alignment	○ The road will be part of district core network and will comply with PMGSY guidelines ○ Subproject shall not disturb any cultural heritage designated by the government or by the international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance. ○ Subproject will not pass through any designated wild life sanctuaries, national park, notified Eco sensitive areas or area of international significance such as protective wet land designated under Wetland Convention, and reserve forest area.. ○ Subproject to comply with local and National legislative requirements such as forest clearance for diversion of forestland and ADB's Safeguard Policy Statement 2009. ○ Alignment finalization considering availability of right of way and in consultation with local people. ○ ROW may be reduced in built up area or constricted areas to minimize land acquisition as per PMGSY Guidelines. ○ Adjust alignment to the extent feasible to avoid tree cutting, shifting of utilities or community structure. ○ The road shall follow natural topography to avoid excessive cut and fill.	All through the alignment of each rural road	Pre Construction Phase	Part of Project Cost	Project Preparation Consultant/ design consultant	PIU/ MPRRDA

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
3.	Land acquisition	○ Avoid or minimize land acquisition. ○ Land acquisition, compensation packages, resettlement and rehabilitation, poverty alleviation programs for affected people and all other related issues are addressed through Social Impacts and Resettlement & Rehabilitation report.	All through the alignment of each rural road	Pre Construction Phase	Land to be made available by the state Government	PIU, Govt. of Madhya Pradesh , and other	Environmental officer under the PIC will also coordinate and ensure implementation
4.	Biological environment - Tree planting	○ All efforts shall be taken to avoid tree cutting wherever possible. ○ Requisite permission from forest department shall be obtained for cutting of roadside trees. ○ Provision of Compensatory Afforestation shall be made on 1:3.ratio basis. ○ Permission shall be taken for diversion of any forest land if involved. Provision shall be made for additional compensatory tree plantation.	Throughout the project section of the road. *(Highlight Tree cutting locations & proposed likely plantation location)*				
5.	Planning for land clearing	○ The road land width shall be clearly demarcated on the ground. ○ The utility and community structure shifting shall be planned in consultations and concurrence of the community. ○ Tree felling shall be limited to those, which could not be saved even by design measures. The tree shall be cut with a prior permission of Forest department. ○ The vegetable cover shall be removed and disposed in consultation with community. ○ All public utilities shifting shall be planned with prior concurrence of respective agencies/authority and to the adjacent location approved by them	All through the Rural roads excepting in stretches of habitations *(Attach or Refer to specific sections of DPR for the utilities to be shifted along with chainages for the location of such structures)*	Pre Construction Phase	Necessary cost provisions have been made. All other costs are included under project cost.	PIC, PIU, Forest Department NGOs (shifting of utilities shall be carried out by respective governmental bodies at cost to be reimbursed by project, implementing agency). To increase survival rate of new saplings, a core Tree Management Committee is to be created to ensure complete retrieval of vegetative cover and timely replacement of perished plantations. implementation Unit (PIU) of MPRRDA,	Environmental officer under the PIC will coordinate and ensure Officials of Forest Department, Contractor and local NGOs and coordinated by Environmental officer of Construction Supervision Consultant for specific package.

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
8.	Shifting on Common Properties Resources	○ All efforts are made to minimize shifting of common utilities and community structures. ○ The community structures/utilities which can not be saved will be shifted to adjacent area with the concurrence and in consultation with community.	As determined by contractor under approval of PIC /PIU *(Attach or Refer to specific sections of DPR for community structures to be shifted along with chainages for the location of such structures)*	Construction Phase	Borne by Contractor	Contractor is responsible for ensuring provision of facilities under approval by PIC / PIU	Environmental officer and other team members of PIC will monitor and ensure appropriate implementation Environmental officer will regularly interact with the local people who are likely to be affected to ensure that their interests are protected and no social resentment sets in.
6.	Cut and Fill and Embankment Construction design & planning	○ The alignment design shall consider options to minimize excessive cuts and fills. ○ The cut and fill quantities shall be used for embankment to minimize barrow earth requirement. ○ The design shall be as per relevant IRC provisions for cut and fill, slope protection and drainage. ○ Adequate provision shall be made for cross drainage structure for maintaining natural drainage pattern in the subproject area and preventing soil erosion. ○ Side drain for channelizing water to nearby natural drain in water stagnation /logging prone area. ○ The top soil of the cut and fill area shall be used for embankment slope protection ○ Embankment will be designed above High Flood Level (HFL) wherever, area is prone to flood.	All through the alignment of each rural road *(Highlight the high flood level, chainage for action and linkages to DPR section)*	Pre Construction Phase	Part of Project Cost	Project Preparation Consultant/ design consultant	PIU/ MPRRDA

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
7.	Hydrology and Drainage	○ Provision of adequate cross drainage structure shall be made to ensure smooth passage of water and maintaining natural drainage pattern of the area. The discharge capacity of the CD structure shall be designed accordingly. ○ Provision of adequate side drainage shall be made in water stagnant/logging areas. ○ The construction work near water body shall be planned preferably in dry season so that water quality of the water channel is not affected due to siltation and rain water runoff. ○ Elaborate drainage system shall be provided to drain the storm water from the roadway and embankment to ensure minimum disturbance to natural drainage of surface and subsurface water of the area. ○ Provision of additional cross drainage structure shall be made in the areas where nearby land is sloping towards road alignment on both the sides. ○ Provision of concrete road construction in habitat area with drainage of both side of the road shall be made as per the design provision and with adequate slope to prevent any water logging. ○ Road level shall be fixed above HFL. Embankment slope stabilization measures shall be planned. Stabilization measures may include vegetative treatment, stone pitching, retaining wall where feasible, low cost options such as bamboo / eucalyptus tree pilling .	Near all drainage crossing , nalas and river crossings etc. *(indicate HFL Level and Highlight the chainage for action and linkages to DPR section)*				
8.	Establishment of Construction Camp, temporary office and storage area	○ Construction camp sites shall be located away from any local human settlements (minimum 0.5 km away) and preferably located on lands, which are not productive barren/waste lands presently. ○ Similarly temporary office and storage areas shall be located away from human settlement areas (minimum 500 m).	As determined by contractor under approval of PIC/PIU/ (ref- Labelled: WASTE OIL; and hazardous sign be displayed at oil	Pre-construction and construction stage	To be included in contractor's cost	All facilities are to be planned and implemented by contractor under approval by PIU / PIC	PIU

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
		○ The construction camps, office and storage areas shall have provision of adequate water supply, sanitation and all requisite infrastructure facilities. ○ The construction camps shall be located at a minimum 0.5 km from forest land/areas to deter the construction labour in trespassing. Similarly, temporary office and storage areas shall be located at a minimum 0.5 km from forest land/areas. ○ The construction camps, office and storage areas shall have provision of septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use. ○ All construction camps shall have provision of rationing facilities particularly for kerosene/LPG so that dependence on firewood for cooking is avoided completely to the extent possible. ○ The construction camps, office and storage areas shall have provision of health care facilities for adults, pregnant women and children. ○ Personal Protective Equipments (PPEs) like helmet, boots, earplugs for workers, first aid and fire fighting equipments shall be available at construction sites before start of construction. An emergency plan shall be prepared to fight with any emergency like fire. ○ Provision shall be made for domestic solid waste disposal in a control manner. The recyclable waste shall be sold off and non-saleable and biodegradable waste shall be disposed through secured land filling. ○ Provision of paved area for unloading and storage of fuel oil, lubricant oil, away from storm water drainage.	handling areas and sold off to SPCB/ MoEF authorized re-refiners). *(Contractor to specify the cost provision made for PPE and other environmental sanitation measures required per construction camp / temporary office/ storage area)*				
	Traffic Movement	○ The contractor will identify the areas were temporary traffic diversion may be required. He would prepare appropriate traffic movement plan for ensuring continued flow of	As proposed under DPR and determined by contractor and	Pre-construction and	To be included in contractor's cost	All facilities are to be planned and implemented by	PIU

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
9.		traffic during construction phase. This may include movement of the traffic from the site of the construction area. This kind of a temporary diversion shall be finalized with the concurrence of respective PIU. o Wherever, cross drainage structure work require longer construction time and road is to be blocked for longer duration, the PIU / DPR Consultant shall define appropriate measures for traffic diversion before the start of the construction. o The diversion plan should ensure smooth flow of traffic, minimize accidents to road users during construction works. o Adequate signboards shall be placed much ahead of diversion site to caution the road users. The road signs should be bold and retro reflective in nature for good visibility in day and night both.	approved by PIC/PIU/ *(Highlight the chainages which may require traffic diversions)*	construction stage		contractor under approval by PIU / PIC	
10.	Occupational Health and Safety	o Speed breakers (Rumble strips) as per IRC: 99-1988 shall be provided at sharp corves design and bends where the curve design speed is less than 40 km per hour in plain and rolling terrain. o Speed breakers shall also be provided at a threshold of habitation (as per NRRDA guidelines) at regular intervals (150-200 m) through habitation. o The speed breakers shall be provided and directional sign boards installed at sites where reverse horizontal curves are closely spaced and speed reduction is required. o Provision shall be made for Hazard markers at each end of all box culverts, river crossing causeways and similar CD structures o Shoulder side slopes shall not be steeper than 2h:1V unless stone pitching of the slopes is provided. o Cement concrete pavement and V-shaped drain shall be constructed to the full width of the available roadway within densely populated habitation and as per feasibility.	Throughout the project section at the location determined by contractor and approved by PIU *(Highlight the location with chainage for such requirements)*				

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
		○ Provision shall be made for Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing "STOP" sign and 'T-intersection' warning sign shall be installed on the village road. ○ It is proposed to approach railways for adequate safety at unmanned railway crossing where applicable. Adequate clearly visible sign shall be provided on both side of the railway crossing					
	Construction Stage						
11.	Sourcing and transportation of construction material (aggregates , earth)	**Borrow Earth:** ○ The borrow earth shall be obtained from identified locations and with prior permission for landowner and clear understanding for its rehabilitation. The Indian Road Congress (IRC):10-1961 guideline should be used for selection of borrow pits and amount that can be borrowed. ○ Borrowing earth from agricultural land shall be minimized to the extent possible. Further, no earth shall be borrowed from already low-lying areas. ○ A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). ○ Borrowing of earth will not be done continuously through out the stretch. ○ Ridges of not less than 8m widths will be left at intervals not exceeding 300m. ○ Small drains will be cut through the ridges, if necessary, to facilitate drainage. ○ The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal). ○ The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside.	As Borrow sites and quarries (if required) location. *(List the probable locations for borrow areas. (Highlight the identified quarries, if already identified. Contractors should also indicate the quarry they are likely to use if not already identified at DPR stag)*	During Design and construction Stage	Engineering cost	The selection of quarries and material selection will be the responsibility of contractor under approval of PIC /PIU/TSC Environmental officer and other team members of PIC will ensure appropriate implementation of mitigation actions.	PIC /PIU/TSC Environmental officer and other team members of PIC will monitor

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
		○ Fly ash will also be used in road embankment as per IRC guidelines wherever thermal power plant is located within 100 km of the road alignment. ○ The borrow area shall be rehabilitated as per the understanding arrived with the land-owner. The re-habilitation plan may include the following: ▪ Borrow pits shall be backfilled with rejected construction wastes and will be given a vegetative cover. If this is not possible, then excavation sloped will be smoothed and depression will be filled in such a way that it looks more or less like the original ground surface. ▪ Borrow areas might be used for aquaculture in case landowner wants such development. **Aggregate :** ○ The stone aggregate shall be sourced from existing licensed quarries ○ Copies of consent/ approval / rehabilitation plan for use of existing source will be submitted to PIU. ○ Topsoil to be stockpiled and protected for use at the rehabilitation stage **Transportation of Construction Material** ○ Existing tracks / roads are to be used for hauling of materials to the extent possible. ○ Prior to construction of roads, topsoil shall be preserved or at least shall be used for any other useful purposes like using in turfing of embankment rather than allowing its loss by construction activities. ○ The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation. In any case, the transportation links are to be inspected at least twice daily to clear accidental spillage, if any.					

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
12.	Loss of Productive Soil, erosion and land use change	○ It shall be ensured that the land taken on lease for access road, construction camp and temporary office of the storage facilities is restored back to its original land use before handing it over back to land owner. ○ The top soil from the productive land (borrow areas, road widening areas etc.) shall be preserved and reused for plantation purposes. ○ It shall also be used as top cover of embankment slope for growing vegetation to protect soil erosion. ○ Cut and fill shall be planned as per IRC provisions and rural road manual. ○ All steep cuts shall be flattened and benched. ○ Shrubs shall be planted in loose soil area. ○ IRC: 56 -1974 recommended practice for treatment of embankment slopes for erosion control shall be taken into consideration. ○ Soil erosion shall be visually checked on slopes and embankment areas. In case soil erosion is found, suitable measures shall be taken to control the soil erosion	Thought out the road section ***(The contractor shall include the cost for the measures as part of the construction cost)***	During the Construction stage	Included in project cost	Design Consultant and Contractor	PIU / MPRRDA
13.	Compaction and Contamination of Soil	○ To prevent soil compaction in the adjoining productive lands beyond the ROW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. ○ The productive land shall be reclaimed after construction activity. ○ Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. ○ Domestic solid waste at construction camp shall be segregated into biodegradable and non-biodegradable waste. ○ The non-biodegradable and recyclable waste shall be sold off. ○ Fuel and lubricants shall be stored at the predefined storage location.	Throughout the project section of the road s ***(The contractor shall include the cost for the measures as part of the construction cost)***	• Design and construction stage	• Project preparation cost and construction cost •	• Design consultant and Contractor,	PIU

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
		○ The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. ○ All efforts shall be made to minimise the waste generation. Unavoidable waste shall be stored at the designated place prior to disposal. ○ To avoid soil contamination at the wash-down and re-fuelling areas, "oil interceptors" shall be provided. Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to SPCB/ MoEF authorized re-refiners.					
14.	Construction Debris and waste	○ All excavated materials from roadway, shoulders, verges, drains, cross drainage will be used for backfilling embankments, filling pits, and landscaping. ○ Unusable debris material should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority. ○ The bituminous wastes shall be disposed in secure manner at designated landfill sites only in an environmentally accepted manner. ○ For removal of debris, wastes and its disposal MOSRTH guidelines should be followed. Unproductive/wastelands shall be selected with the consent of villagers and Panchayat for the same. The dumping site should be of adequate capacity. It should be located at least 500 m away from the residential areas. Dumping sites should be away from water bodies to prevent any contamination of these bodies.	• Throughout the project section of the road	• Design and construction stage	• Project preparation cost and construction cost	• Design consultant and Contractor,	PIU
	Air and Noise Quality	○ Vehicles delivering loose and fine materials like sand and aggregates shall be covered. ○ Dust suppression measures like water sprinkling, shall be applied in all dust prone locations such as unpaved haulage roads,	• Near all drainage crossing , nalas and river	• During Construction stage	• Included in engineering cost	Contractor	PIU/ MPRRDA

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
15.		earthworks, stockpiles and asphalt mixing areas. o Mixing plants and asphalt (hot mix) plants shall be located at least 0.5 km away and in downwind direction of the human settlements. o Material storage areas shall also be located downwind of the habitation area. o Hot mix plant shall be fitted with stack of adequate height (30 m) or as may be prescribed by SPCB to ensure enough dispersion of exit gases. Consent to establish and operate shall be obtained from State Pollution Control Board and comply with all consent conditions. o Diesel Generating (DG) sets shall also be fitted with stack of adequate height (as per regulation height of the stack of open to air DG set shall be about 0.5 m for 5 KVA and about 0.7 m for 10 KVA DG sets, above top of sound proofing enclosure of the Dg set). . Low sulphur diesel shall be used in DG sets and other construction machineries. Construction vehicles and machineries shall be periodically maintained. o The requisite PPE (helmet, mask, boot, hand gloves, earplugs) shall be provided to the construction workers. o Workers' exposure to noise will be restricted to less than 8 hours a day. Workers duty shall be regulated accordingly.	crossings etc. ***(The contractor shall include the cost for the measures as part of the construction cost)***				
16.	Biological environment - Tree planting	o Compensatory Afforestation shall be made on 1:3.ratio basis as per the plannings. o Additional trees shall be planted wherever feasible.	Throughout the project section of the road ***(Highlight Tree cutting locations & proposed likely plantation location)***	during the design and Construction stage	Part of engineering work cost included	MPRRDA	PIU and MPRRDA

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
17.	Ground Water and Surface Water Quality and Availability	○ Requisite permission shall be obtained for abstraction of groundwater from State Ground Water Board/Central Ground Water Authority if applicable. ○ The contractor shall arrange for water required during construction in such a way that the water availability and supply to nearby communities remains unaffected. ○ Water intensive activities shall not be undertaken during summer period to the extent feasible. ○ Provision shall be made to link side drains with the nearby ponds for facilitating water harvesting if feasible ○ Where ponds are not available, the water harvesting pits shall be constructed as per the requirement and rainfall intensity. ○ Preventive measures like slop stabilisation, etc shall be taken for prevention of siltation in water bodies.	Throughout the project section of the road ***(The contractor shall include the cost for the measures as part of the construction cost)***	construction stage	construction cost	Contractor,	PIC/PIU
19.	Occupational Health and Safety	○ Verification of implementation of provision made at planning stage. ○ Each worker is provided with requisite PPE ○ Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing "STOP" sign and 'T-intersection' warning sign shall be installed on the village road. ○					
	Operation Stage						
19.	Air and Noise Quality	○ Awareness sign board shall be provided for slow driving near the habitat areas to minimize dust generation due vehicle movement.. Speed limitation and honking restrictions may be enforced near sensitive locations.	Throughout the project section at the location determined by contractor and approved by PIU	Operation stage stage	construction cost	Contractor,	PIC/PIU
	Site restoration	○ All construction camp/temporary office/material storage areas are to be restored to its original conditions.	***(The contractor shall include the cost for***				

SL. NO.	Project Action/Environmental Attributes	Mitigation Measures	Location	Time Frame	Cost	Responsible for Implementing	Responsible for Monitoring
		○ The borrow areas rehabilitation will be ensured as per the agreed plan with the landowner. ○ Obtained clearance from PIU before handling over the site to SRRDA. ○ PIC to undertake survivability assessment and report to PIU the status of compensatory tree plantation at a stage of completion of construction with recommendation for improving the survivability of the tree if required	***the measures as part of the construction cost)***				
20.	Hydrology and Drainage	○ Regular removal/cleaning of deposited silt shall be done from drainage channels and outlet points before the monsoon season. ○ Rejuvenation of the drainage system by removing encroachments/ congestions shall be regularly conducted	Throughout the project section at the location determined by contractor and approved by PIU	Operation stage stage	construction cost	Contractor,	PIC/PIU
21.	Occupational Health and Safety	○ Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing "STOP" sign and 'T-intersection' warning sign shall be installed on the village road.	Throughout the project section at the location determined by contractor and approved by PIU	Operation stage stage	construction cost	Contractor,	PIC/PIU

Note :

1. Road specific measures may vary depending on its location and environmental setting around. The exact extent of activities and related measures requires will depend on final alignment selection. Table 1 provides the list of common utilities, ponds, or community structures falling within 2-4 M of the road and may require shifting. Efforts shall be made to adopt the mitigative measures listed under respective section above including measures of aligning road on one end to save the the structures/trees as much as possible. The PIU will update this EMP before attaching it with the DPR and either list or refer to the section of DPR for highlighting the exact location with chainage of action areas (regarding shifting of common utilities, community structures, location of CD structures, embankment height in the flood prone areas, slope stabilization measures with locations near ponds or water bodies, tree cutting locations)

2. The information to be updated in the standard EMP before attaching it with DPR is highlighted under location column of the standard EMP.

APPENDIX 5: ENVIRONMENTAL MONITORING PLAN

I. ENVIRONMENTAL MONITORING DURING DESIGN AND PRE-CONSTRUCTION STAGE

Monitoring Responsibility: PIU with Support from PIC
Monitoring Frequency: Once prior to start of construction
Road Name with Block and District Name:…….
Road Length: ……
Report No.: …….

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Climate Change Consideration and Vulnerability screening	○ Compliance to climate change vulnerability check point given under EARF and adoption of necessary mitigative measures as may be required ○ Efforts shall be made to plant additional trees for increasing the carbon sink. The tree may be planted with help of PRI (Panchyati Raj Institution)	All through the alignment	No. of Additional Tree plantation Proposed		
2.	Finalization of alignment	○ The road will be part of district core network and will comply with PMGSY guidelines ○ Subproject shall not disturb any cultural heritage designated by the government or by the international agencies, such as UNESCO, and shall avoid any monuments of cultural or historical importance. ○ Subproject will not pass through any designated wild life sanctuaries, national park, notified Eco sensitive areas or area of international significance such as protective wet land designated under Wetland Convention, and reserve forest area.. ○ Subproject to comply with local and National legislative requirements such as forest clearance for diversion of forestland and ADB's Safeguard Policy Statement 2009. ○ Alignment finalization considering availability of right of way and in consultation with local people. ○ ROW may be reduced in built up area or constricted areas to minimize land acquisition as per PMGSY Guidelines. ○ Adjust alignment to the extent feasible to avoid tree cutting, shifting of utilities or community structure. ○ The road shall follow natural topography to avoid excessive cut and fill.	All through the alignment of each rural road	Compliance to Conditions of Forest Clearance if applicable		
3.	Land acquisition	○ Avoid or minimize land acquisition. ○ Land acquisition, compensation packages, resettlement and rehabilitation, poverty alleviation programs for affected people and	All through the alignment of each rural road			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		all other related issues are addressed through Social Impacts and Resettlement & Rehabilitation report.				
4.	Biological environment - Tree planting	○ All efforts shall be taken to avoid tree cutting wherever possible. ○ Requisite permission from forest department shall be obtained for cutting of roadside trees. ○ Provision of Compensatory Afforestation shall be made on 1:3.ratio basis. ○ Permission shall be taken for diversion of any forest land if involved. Provision shall be made for additional compensatory tree plantation.	Throughout the project section of the road			
5.	Planning for land clearing	○ The road land width shall be clearly demarcated on the ground. ○ The utility and community structure shifting shall be planned in consultations and concurrence of the community. ○ Tree felling shall be limited to those, which could not be saved even by design measures. The tree shall be cut with a prior permission of Forest department. ○ The vegetable cover shall be removed and disposed in consultation with community. ○ All public utilities shifting shall be planned with prior concurrence of respective agencies/authority and to the adjacent location approved by them	All through the Rural roads excepting in stretches of habitations	Tree cutting permission from Forests or Revenue department as applicable Permission of concerned utility Authorities No and proposed location of compensatory trees plantation, Concurrence from community for utility, community structure, and vegetation cover removal		
6.	Shifting on Common Properties Resources	○ All efforts are made to minimize shifting of common utilities and community structures. ○ The community structures/utilities which can not be saved will be shifted to adjacent area with the concurrence and in consultation with community.	As determined by contractor under approval of PIC /PIU			
7.	Cut and Fill and Embankment Construction design and planning	○ The alignment design shall consider options to minimize excessive cuts and fills. ○ The cut and fill quantities shall be used for embankment to minimize barrow earth requirement. ○ The design shall be as per relevant IRC provisions for cut and fill, slope protection and drainage. ○ Adequate provision shall be made for cross drainage structure for maintaining natural drainage pattern in the subproject area and preventing soil erosion. ○ Side drain for channelizing water to nearby natural drain in water stagnation /logging prone area.	All through the alignment of each rural road			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ The top soil of the cut and fill area shall be used for embankment slope protection ○ Embankment will be designed above High Flood Level wherever, area is prone to flood.				
8.	Hydrology and Drainage	○ Provision of adequate cross drainage structure shall be made to ensure smooth passage of water and maintaining natural drainage pattern of the area. The discharge capacity of the CD structure shall be designed accordingly. ○ Provision of adequate side drainage shall be made in water stagnant/logging areas. ○ The construction work near water body shall be planned preferably in dry season so that water quality of the water channel is not affected due to siltation and rain water runoff. ○ Elaborate drainage system shall be provided to drain the storm water from the roadway and embankment to ensure minimum disturbance to natural drainage of surface and subsurface water of the area. ○ Provision of additional cross drainage structure shall be made in the areas where nearby land is sloping towards road alignment on both the sides. ○ Provision of concrete road construction in habitat area with drainage of both side of the road shall be made as per the design provision and with adequate slope to prevent any water logging. ○ Road level shall be fixed above HFL. Embankment slope stabilization measures shall be planned. Stabilization measures may include vegetative treatment, stone pitching, retaining wall where feasible, low cost options such as bamboo / eucalyptus tree pilling .	Near all drainage crossing, nalas and river crossings etc.			
9.	Establishment of Construction Camp, temporary office and storage area	○ Construction camp sites shall be located away from any local human settlements (minimum 0.5 km away) and preferably located on lands, which are not productive barren/waste lands presently. ○ Similarly temporary office and storage areas shall be located away from human settlement areas (minimum 500 m). ○ The construction camps, office and storage areas shall have provision of adequate water supply, sanitation and all requisite infrastructure facilities. ○ The construction camps shall be located at a minimum 0.5 km from forest land/areas to deter the construction labour in trespassing. Similarly, temporary office and storage areas shall be located at a minimum 0.5 km from forest land/areas.	As determined by contractor under approval of PIC/PIU/ (ref- Labelled: WASTE OIL; and hazardous sign be displayed at oil handling areas and sold off to SPCB/ MoEF	Location of Construction camp with planning of requisite facilities and making provision of such facilities prior to start of construction. Availability of consent to establish from pollution control board for setting up the camp.		

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ The construction camps, office and storage areas shall have provision of septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use. ○ All construction camps shall have provision of rationing facilities particularly for kerosene/LPG so that dependence on firewood for cooking is avoided completely to the extent possible. ○ The construction camps, office and storage areas shall have provision of health care facilities for adults, pregnant women and children. ○ Personal Protective Equipments (PPEs) like helmet, boots, earplugs for workers, first aid and fire fighting equipments shall be available at construction sites before start of construction. An emergency plan shall be prepared to fight with any emergency like fire. ○ Provision shall be made for domestic solid waste disposal in a control manner. The recyclable waste shall be sold off and non-saleable and biodegradable waste shall be disposed through secured land filling. ○ Provision of paved area for unloading and storage of fuel oil, lubricant oil, away from storm water drainage.	authorized re-refiners).			
10.	Traffic Movement	○ The contractor will prepare appropriate traffic diversion scheme approved by respective PIU. This shall be implemented prior to start of construction to avoid any inconvenience to the present road users. This shall be implemented in other stretches of the road as per the progress of the construction work. ○ The diversion plan should ensure smooth flow of traffic, minimize accidents to road users during construction works. ○ Adequate signboards shall be placed much ahead of diversion site to caution the road users. The road signs should be bold and retro reflective in nature for good visibility in day and night both.	As proposed under DPR and determined by contractor and approved by PIC/PIU			
11.	Occupational Health and Safety	○ Speed breakers (Rumble strips) as per IRC: 99-1988 shall be provided at sharp corves design and bends where the curve design speed is less than 40 km per hour in plain and rolling terrain. ○ Speed breakers shall also be provided at a threshold of habitation (as per NRRDA guidelines) at regular intervals (150-200 m) through habitation. ○ The speed breakers shall be provided and directional sign boards installed at sites where reverse horizontal curves are closely spaced and speed reduction is required. ○ Provision shall be made for Hazard markers at each end of all box culverts, river crossing causeways and similar CD structures	Throughout the project section at the location determined by contractor and approved by PIU			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ Shoulder side slopes shall not be steeper than 2h:1V unless stone pitching of the slopes is provided. ○ Cement concrete pavement and V-shaped drain shall be constructed to the full width of the available roadway within densely populated habitation and as per feasibility. ○ Provision shall be made for Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing “STOP” sign and ‘T-intersection’ warning sign shall be installed on the village road. ○ It is proposed to approach railways for adequate safety at unmanned railway crossing where applicable. Adequate clearly visible sign shall be provided on both side of the railway crossing				
	Grievance Redress	○ Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.

II. ENVIRONMENTAL MONITORING DURING CONSTRUCTION STAGE

Monitoring Responsibility : PIU with Support from PIC

Monitoring Frequency : (First Report after third month of start of construction or 25% construction . Second report after ninth month of construction or 75% construction).

Project Details:…….

Road Stretch Name : …….

Monitoring Report Quarter No.: ……..

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Sourcing and transportation of construction material (aggregates , earth)	**Borrow Earth:** o The borrow earth shall be obtained from identified locations and with prior permission for landowner and clear understanding for its rehabilitation. The Indian Road Congress (IRC):10-1961 guideline should be used for selection of borrow pits and amount that can be borrowed. o Borrowing earth from agricultural land shall be minimized to the extent possible. Further, no earth shall be borrowed from already low-lying areas. o A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). o Borrowing of earth will not be done continuously through out the stretch. o Ridges of not less than 8m widths will be left at intervals not exceeding 300m. o Small drains will be cut through the ridges, if necessary, to facilitate drainage. o The slope of the edges will be maintained not steeper than 1:4 (vertical: Horizontal). o The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside. o Fly ash will also be used in road embankment as per IRC guidelines wherever thermal power plant is located within 100 km of the road alignment.	At Borrow sites and quarries (if required) location.	Compliance to IRC guidelines and stated criteria, Permission from land owners, Rehabilitation of borrow areas Availability of valid consent of quarries		

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ The borrow area shall be rehabilitated as per the understanding arrived with the land-owner. The re-habilitation plan may include the following: ▪ Borrow pits shall be backfilled with rejected construction wastes and will be given a vegetative cover. If this is not possible, then excavation sloped will be smoothed and depression will be filled in such a way that it looks more or less like the original ground surface. ▪ Borrow areas might be used for aquaculture in case landowner wants such development. **Aggregate :** ○ The stone aggregate shall be sourced from existing licensed quarries ○ Copies of consent/ approval / rehabilitation plan for use of existing source will be submitted to PIU. ○ Topsoil to be stockpiled and protected for use at the rehabilitation stage **Transportation of Construction Material** ○ Existing tracks / roads are to be used for hauling of materials to the extent possible. ○ Prior to construction of roads, topsoil shall be preserved or at least shall be used for any other useful purposes like using in turfing of embankment rather than allowing its loss by construction activities. ○ The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation. In any case, the transportation links are to be inspected at least twice daily to clear accidental spillage, if any.				
2.	Loss of Productive Soil, erosion and land use change	○ It shall be ensured that the land taken on lease for access road, construction camp and temporary office of the storage facilities is restored back to its original land use before handing it over back to land owner. ○ The top soil from the productive land (borrow areas, road widening areas etc.) shall be preserved and reused for plantation purposes. ○ It shall also be used as top cover of embankment slope for growing vegetation to protect soil erosion.	Thought out the road section			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ Cut and fill shall be planned as per IRC provisions and rural road manual. ○ All steep cuts shall be flattened and benched. ○ Shrubs shall be planted in loose soil area. ○ IRC: 56 -1974 recommended practice for treatment of embankment slopes for erosion control shall be taken into consideration. ○ Soil erosion shall be visually checked on slopes and embankment areas. In case soil erosion is found, suitable measures shall be taken to control the soil erosion				
3	Compaction and Contamination of Soil	○ To prevent soil compaction in the adjoining productive lands beyond the ROW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. ○ The productive land shall be reclaimed after construction activity. ○ Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. ○ Domestic solid waste at construction camp shall be segregated into biodegradable and non-biodegradable waste. ○ The non-biodegradable and recyclable waste shall be sold off. ○ Fuel and lubricants shall be stored at the predefined storage location. ○ The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. ○ All efforts shall be made to minimise the waste generation. Unavoidable waste shall be stored at the designated place prior to disposal. ○ To avoid soil contamination at the wash-down and re-fuelling areas, “oil interceptors” shall be provided. Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to SPCB/ MoEF authorized re-refiners.	• Throughout the project section of the road s			
4	Construction Debris and waste	○ All excavated materials from roadway, shoulders, verges, drains, cross drainage will be used for backfilling embankments, filling pits, and landscaping. ○ Unusable debris material should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority.	• Throughout the project section of the road			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
		○ The bituminous wastes shall be disposed in secure manner at designated landfill sites only in an environmentally accepted manner. ○ For removal of debris, wastes and its disposal MOSRTH guidelines should be followed. Unproductive/wastelands shall be selected with the consent of villagers and Panchayat for the same. The dumping site should be of adequate capacity. It should be located at least 500 m away from the residential areas. Dumping sites should be away from water bodies to prevent any contamination of these bodies.				
5.	Air and Noise Quality	○ Vehicles delivering loose and fine materials like sand and aggregates shall be covered. ○ Dust suppression measures like water sprinkling, shall be applied in all dust prone locations such as unpaved haulage roads, earthworks, stockpiles and asphalt mixing areas. ○ Mixing plants and asphalt (hot mix) plants shall be located at least 0.5 km away and in downwind direction of the human settlements. ○ Material storage areas shall also be located downwind of the habitation area. ○ Hot mix plant shall be fitted with stack of adequate height (30 m) or as may be prescribed by SPCB to ensure enough dispersion of exit gases. Consent to establish and operate shall be obtained from State Pollution Control Board and comply with all consent conditions. ○ Diesel Generating (DG) sets shall also be fitted with stack of adequate height (as per regulation height of the stack of open to air DG set shall be about 0.5 m for 5 KVA and about 0.7 m for 10 KVA DG sets, above top of sound proofing enclosure of the Dg set). . Low sulphur diesel shall be used in DG sets and other construction machineries. Construction vehicles and machineries shall be periodically maintained. ○ The requisite PPE (helmet, mask, boot, hand gloves, earplugs) shall be provided to the construction workers. ○ Workers' exposure to noise will be restricted to less than 8 hours a day. Workers duty shall be regulated accordingly.	• Near all drainage crossing , nalas and river crossings etc.			
6.	Biological environment - Tree planting	○ Compensatory Afforestation shall be made on 1:3.ratio basis as per the plannings. ○ Additional trees shall be planted wherever feasible.	Throughout the project section of the road			

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
7.	Ground Water and Surface Water Quality and Availability	○ Requisite permission shall be obtained for abstraction of groundwater from State Ground Water Board/Central Ground Water Authority if applicable. ○ The contractor shall arrange for water required during construction in such a way that the water availability and supply to nearby communities remains unaffected. ○ Water intensive activities shall not be undertaken during summer period to the extent feasible. ○ Provision shall be made to link side drains with the nearby ponds for facilitating water harvesting if feasible ○ Where ponds are not available, the water harvesting pits shall be constructed as per the requirement and rainfall intensity. ○ Preventive measures like slop stabilisation, etc shall be taken for prevention of siltation in water bodies.	Throughout the project section of the road			
8.	Occupational Health and Safety	○ Verification of implementation of provision made at planning stage. ○ Each worker is provided with requisite PPE ○ Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing “STOP” sign and ‘T-intersection’ warning sign shall be installed on the village road.	Throughout the project section at the location determined by contractor and approved by PIU			
9.	Grievance Redress	○ Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.

III. ENVIRONMENTAL MONITORING DURING OPERATION STAGE

Monitoring Responsibility: PIU with Support from PIC
Monitoring Frequency: On completion of construction and after one month of first and second year of maintenance period
Project Details :…….
Road Stretch Name: …….
Monitoring Report No.: ……..

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Additional Monitoring Indicator if applicable	Compliance status	Corrective action proposed in case of delay
1.	Air and Noise Quality	○ Awareness sign board shall be provided for slow driving near the habitat areas to minimize dust generation due vehicle movement.. Speed limitation and honking restrictions may be enforced near sensitive locations.	Throughout the project section at the location determined by contractor and approved by PIU			
2.	Site restoration	○ All construction camp/temporary office/material storage areas are to be restored to its original conditions. ○ The borrow areas rehabilitation will be ensured as per the agreed plan with the landowner. ○ Obtained clearance from PIU before handling over the site to SRRDA. ○ PIC to undertake survivability assessment and report to PIU the status of compensatory tree plantation at a stage of completion of construction with recommendation for improving the survivability of the tree if required	Throughout the road stretch	Survivability report, land owner concurrence of land reversal		
3	Hydrology and Drainage	○ Regular removal/cleaning of deposited silt shall be done from drainage channels and outlet points before the monsoon season. ○ Rejuvenation of the drainage system by removing encroachments/ congestions shall be regularly conducted	Throughout the project section at the location determined by contractor and approved by PIU			
4.	Occupational Health and Safety	○ Directional sight board shall be installed on all sharp curves and bends ○ At a main road, intersection or crossing “STOP” sign and ‘T-intersection’ warning sign shall be installed on the village road.	Throughout the project section at the location determined by contractor and approved by PIU			
5.	Grievance Redress	○ Obtaining information from Village level Grievance redress committee, PIU as applicable	Each Sample road once.			

NOTE: Each report must enclose Photograph to the maximum possible action points, even if work is in progress.