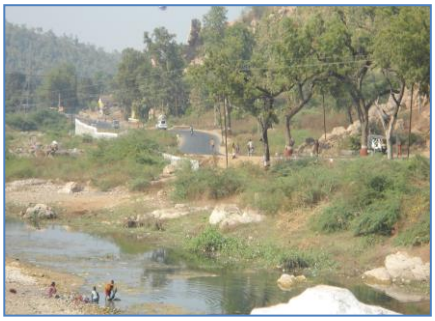

ROADS AND BUILDINGS DEPARTMENT

GOVERNMENT OF GUJARAT

GUJARAT STATE HIGHWAY PROJECT-II

Part -1: Environmental Management Framework (EMF)

- Upgradation (Widening and Strengthening) Corridors

and

Part -2: Environment and Social Management Framework (ESMF)

- Maintenance/ Rehabilitation Corridors

May 2013

Part 1: Environmental Management Framework (EMF)

-Upgradation (Widening and Strengthening) Corridors

This Environmental Management Framework (EMF) is prepared to help and facilitate consistent preparedness on Environmental aspects of yet to be initiated up-gradation (Widening and Strengthening) road corridors of GSHP-II only.

Part 2: Enviornment and Social Management Framework (ESMF)

-Maintenance and Rehabilitation Corridors

This ESMF is prepared to help and facilitate consistent preparedness on Environment and Social aspects of yet to be initiated Maintenance (Rehabilitation) road corridors of GSHP-II only.

Part -1: Environmental Management Framework (EMF)

- Upgradation (Widening and Strengthening) Corridors

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Chapter 1: Introduction

1.1 Overview

1. The objective of this Environmental Management Framework (EMF) is to assist the PIU (R&BD) in the preparation of a quality Environmental and Social Assessment (ESA) Report for the corridors, which under goes upgradation (strengthening and widening) through preparation of Detailed Project Reports (DPR's). This environmental management framework is prepared based on the existing environmental rules and regulations adopted by the Ministry of Environmental and Forest (MoEF), India and World Bank operational policies. This EMF contains concepts and good practices for the PIU (R&BD) to adopt while preparing the ESA report. This EMF has been structured in such a way to act as a self-explanatory guide with separate procedures for conducting ESA with Impact prediction, mitigation and management measures.

1.2 Rationale and Background

2. The Government of Gujarat (GoG), through the Roads and Buildings Department (R&BD), has taken up the second Gujarat State Highway Project (GSHP-II), covering up-gradation, maintenance and improvement of identified core road network in the state. The GoG has proposed to take up this project with financial assistance from the World Bank. The improvements of 1003.22 km in the project includes: (i) upgradation corridors for a length of 644.05 km, involving the strengthening and upgrading of single/intermediate lane roads to standard 2-lane/ 2-lane-with-paved-shoulders / 4-lanes, and (ii) major maintenance, of the remaining 359.17km. In line with the prioritization exercise, R&BD has selected nine corridors, aggregating to about 394 km in length. The upgradation corridors to be taken up for implementation include thirteen corridors. Out of these, as part of DPR preparation, EAs have been prepared for 8 corridors which are listed in Table 1-1and **Error! Reference source not found.**. The EA summary and EMPs for each of these corridors have been disclosed[1]. Further, based on the experience of preparation of EAs, an Environmental Management Framework (EMF) has been prepared in order to assist the PIU (R&BD) to carry out the EA/EMP for the remaining 5 corridors listed in Table 1-2 and shown in **Error! Reference source not found.**.

Table 1-1: Project Corridors

Sl.no	Link Name	Length (km)	Present Configuration	Improvement Options
1	Dabhoi – Bodeli	38.60	2L	2L+PS+HS
2	Dhandhuka - Dholera	27.00	IL	2L+HS
3	Atkot – Gondal	35.55	NTL	2L+HS
4	Mehsana-Himatnagar	60.70	2L/2L+PS	4L+HS+Drain
5	Umreth- Vasad (incl. Ladvel -Kapadvanj)	41.91	2L	2L+PS+HS & 4L+FP+CD
6	Bayad – Lunawada	44.86	IL, SL/2L	2L+HS

[1] All the Bank - approved EA documents (EA summary, EA and EMPs) will be disclosed 120 days prior to the state of the construction.

Sl.no	Link Name	Length (km)	Present Configuration	Improvement Options
7	Dhansura – Meghraj	43.05	SL, IL	2L+HS
8	Lunawada – Khedapa	56.70	2L/SL	2L+HS

SL – single lane, 2L – two lane, IL – intermediate lane, NTL – narrow two lane, 4L – four lane, PS – paved shoulders, HS – hard shoulders, FP+CD – footpath with closed drain

Source: R&BD & LASA

Table 1-2: Project Corridors

Sl.no	Link Name	Length (km)	Present Configuration	Improvement Options
1	Bagodara - Bhavnagar	129.30	2L	4L
2	Jamnagar – Mewasa (Link to Bhavad-Jamjodhpur)	68.20	IL, SL/2L	2L+HS
3	Tarapur - Anand	34.60	2L	2L+PS
4	Kheda - Nadiad	29.70	2L	2L+PS
5	Kapadwanj - Balasinor	29.45	2L	2L+PS

SL – single lane, 2L – two lane, IL – intermediate lane, NTL – narrow two lane, 4L – four lane, PS – paved shoulders, HS – hard shoulders, FP+CD – footpath with closed drain

Source: R&BD

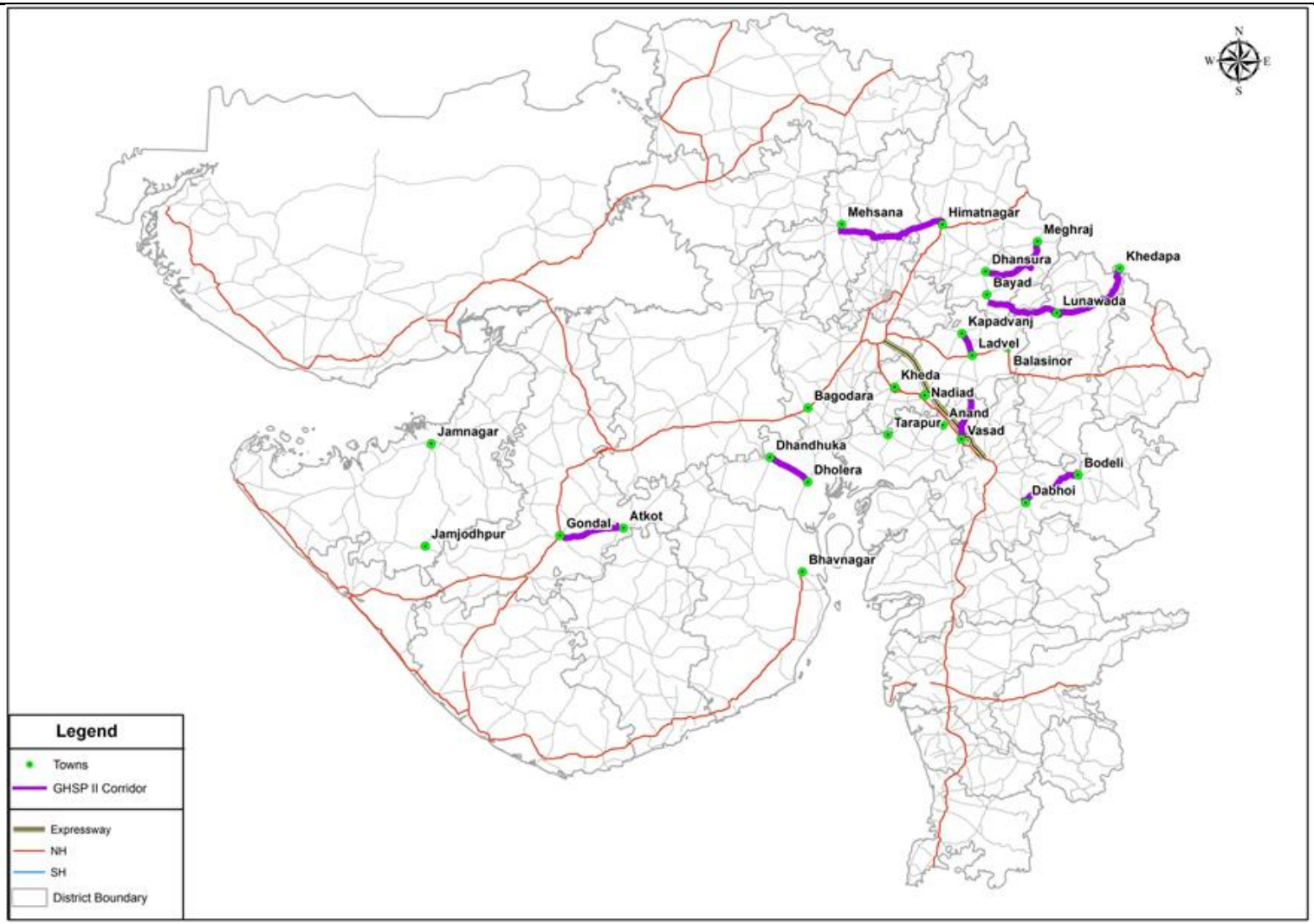


Figure 1-1: Eight GSHP-II Corridors (DPR's Completed)

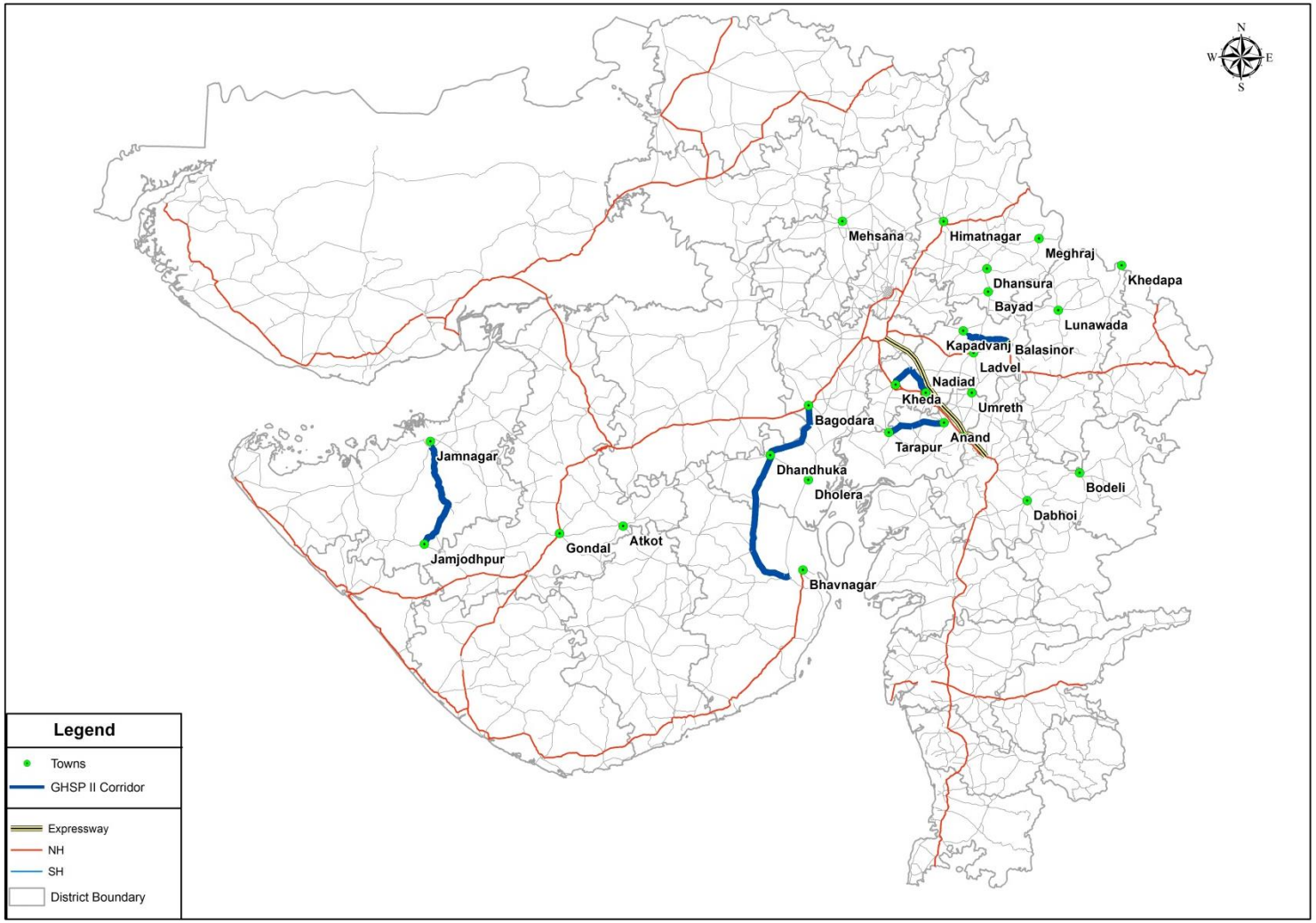


Figure 1-2: Five GSHP-II Corridors (DPR's proposed)

1.3 GSHP-II Proposed Improvements

1.3.1 Design Intervention for Upgradation Corridors

3. The upgradation (strengthening and widening) proposal incorporating the various cross sections to accommodate with in the rural and urban stretches has been suggested based on the traffic projections estimated till the year 2042 for the 8 corridors. The typical cross sections that are being adopted are depicted in the Figure 1-3 to Figure 1-6. The suggested cross sections shall be referred while formulating upgradation proposal for the remaining 5 corridors. The proposed road cross sections are designed keeping in view of the following (i) to minimise additional land acquisition and forest land diversion, (ii) to minimise the felling of avenue trees for the proposed widening, (iii) for the provision of economically feasible safety interventions and (iv) to minimise the environmental degradation to the surroundings.

4. In addition to the improvement of road cross section by widening, strengthening and/or reconstruction of the pavement, other design measures undertaken are presented below:

- Improvement of horizontal alignment and vertical profile of the roads with minimum land acquisition and through avoidance of obstructions such as trees, utilities, road side building structures, etc. to the extent possible,
- Improvement of intersections and junctions,
- Provision of road side appurtenances such as signage, delineators, guard rails, street lighting, etc., and
- Provision of road side facilities such as road side drains, pedestrian footpaths, pedestrian and cattle crossings, bus bays, bus shelters, parking bays, etc.

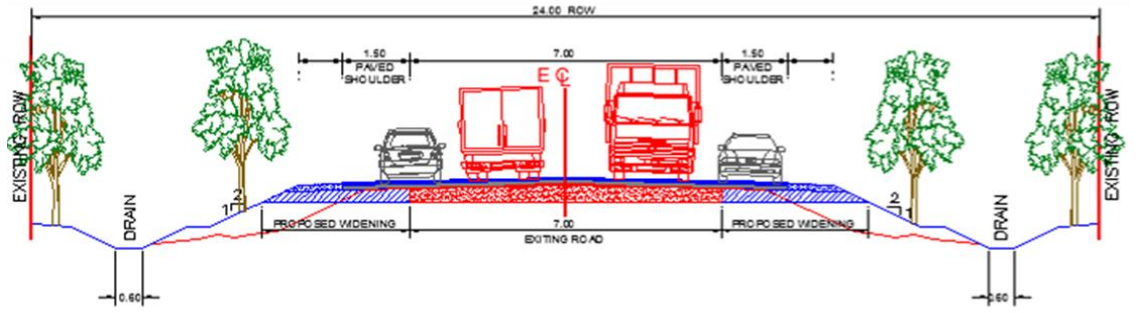


Figure 1-3: Typical Rural Cross Section for 2 Lanes with Hard Shoulder (2L+HS) Option

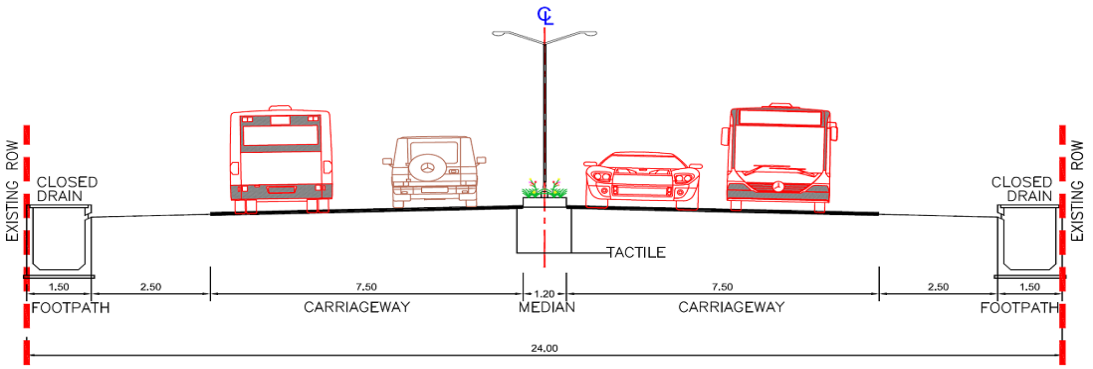


Figure 1-4: Typical Urban Cross Section for 4 Lanes with Hard Shoulder (4L+HS) with Foot Path and Closed Drain Option

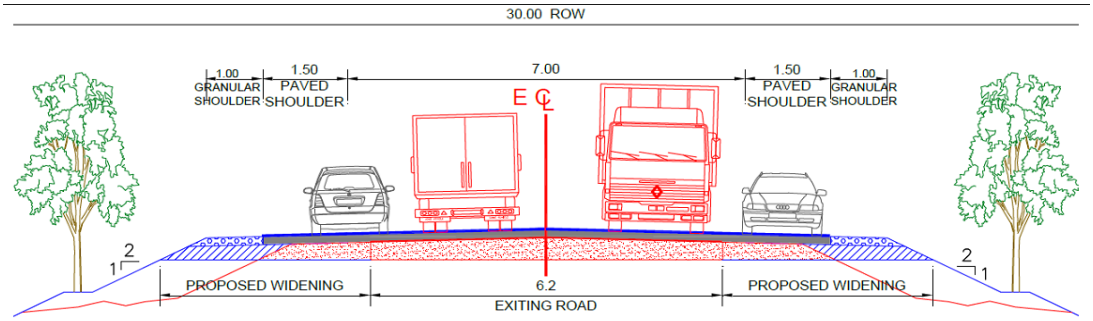


Figure 1-5: Typical Cross Section for 2 Lanes with Paved and Hard Shoulder (2L+PS+HS) Option

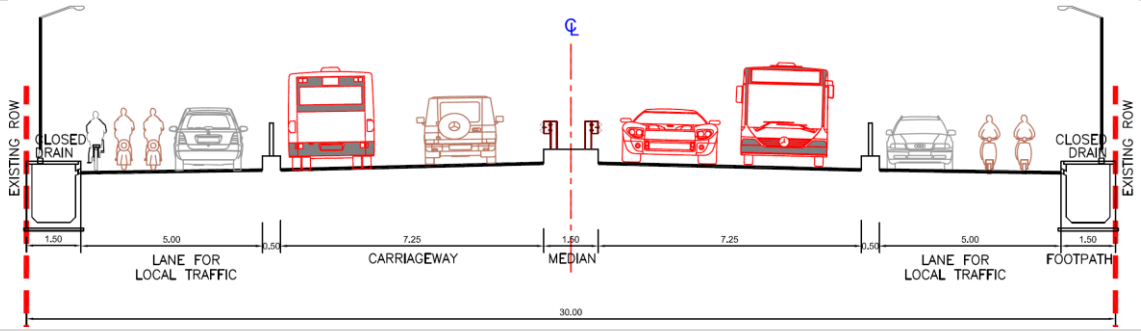


Figure 1-6: Typical Urban Cross Section for 4 Lanes with Hard Shoulder (4L+HS) with Drain Option

1.4 Need for the EMF

5. The aim of this EMF is to guide the Roads and Building Department (R&BD)/PIU, in subproject selection, screening and categorization, environmental assessment, social assessment and preparation and implementation, monitoring, and preparation of environmental management plans for the project roads to facilitate compliance with the requirements specified in the World Bank Operational Policies and Government of India (GoI) rules and regulations. This EMF shall be applicable to all upgradation components proposed to be taken up under GSHP-II.

6. The proposed development envisaged in GSHP-II pertains mostly to improvements/ strengthening/widening/ maintenance of existing State Highways (SH). The proposed road improvement work would be concentrated along the existing alignments; there are some roads which pass through or would be adjacent to the environmentally sensitive areas. This EMF shall assist PIU (R&BD), in identification, assessment and management of environmental and social concerns at all stages of the project.

1.5 Purpose and use of EMF

7. The EMF is prepared in-line with the MoEF's EIA Guidance Manual for Highways and World Bank operational policies. It also provides a framework for managing environmental responsibilities efficiently by integrating the overall operations. It helps in the management of environmental programs in a comprehensive, systematic, planned and documented manner. The EMF addresses environmental concerns through allocation of resources, assignment of responsibilities, procedures and processes, and focuses on continual improvement of the system.

8. It also highlights the importance of the environmental screening and scoping exercises detailing the procedures to be followed for the better understanding of the project impacts to the environment at the initial stage of the project itself. The EMF also helps to categorise the sub - project based on the environmental severity. For the identified environmental impacts and issues arising during planning, designing, construction and operation phase, a generic environmental management plan is also developed. The EMF will be used to define the criteria required to determine the level of EA required (either detailed or limited EA) for the project and the processes involved, determines their sequence to conduct the EA studies for various components/phases of road projects considering the legal requirements and its implications.

9. This EMF is a living document, and thus it needs to be updated and revised as necessary in order to incorporate the changes based on the status of the prevailing laws, as well as revisions that might arise due to GSHP-II project development process. The EMF shall be reviewed by the PIU (R&BD) staff annually. For further updates and modifications of the EMF, a check list shall be prepared, with dates detailing each revision status. A data sheet shall be maintained in order to show that records are maintained for all the changes that have been carried out.

10. The recommended approach for the end users of the EMF are detailed, as follows:

- Read through the environmental and socioeconomic subjects described in the EIA projects, bid documents, environment monitoring during the various phases of project implementation. An appreciation of these issues will help to understand the significance of the guidelines set out in subsequent sections of the manual.
- The effective implementation of environmental protection and mitigation measures requires the coordinated effort of all those involved with a project. PIU (R&BD) shall appraise the issues and concerns involved in each stage of a project. It is also important that PIU (R&BD) assume personal and collective responsibility for the stewarding of the environment in discharging their tasks.

11. This EMF is intended to guide its users in:

- Undertaking / understanding environmental and social issues in road projects
- Standardizing work efforts and environmental documents;
- Improving the quality of the documents and the analysis;
- Facilitating the development and review of documents by PIU (R&BD) staff; and
- Providing technical guidance on impact assessment

Chapter 2: Legal Frame work

2.1 Environmental Rules and Regulations

12. In order to understand the extent of the environmental and social assessment for the proposed improvement works, applicable laws, legislation and policies have been reviewed. A summary of environmental legislations / regulations relevant to GSHP II is furnished in Table 2-1**.**

Table 2-1: Environmental Legislations / Regulations applicable to GSHP – II

Policy/Act/Rule	Year	Purpose	Responsible Institution	Applicability (Yes/No)
Environment (Protection) Act.	1986	To protect and improve the overall environment	MoEF	Yes
Notification on Environment Impact Assessment of Development projects (and amendments) (referred to as the Notification on Environmental Clearance)	2006 2009 2011	To provide environmental clearance to new development activities following environmental impact assessment.	MoEF	Yes
Notification on use of fly ash	2007	To mandate reuse of large quantities of fly ash from thermal power plants for development projects within 100km radius.	MoEF	Yes
Wildlife Protection Act	1972	To protect wild animals and birds through the creation of National Parks and Sanctuaries	MoEF	Yes
Coastal Regulation Zone (CRZ) notification	2011	To provide for protection of the fragile coastal belt, through development controls and regulations	SCZMA	No
Forest (Conservation) Act	1980	To protect and manage forests, to check deforestation by restricting conversion of forest areas into non-forest areas	Forest department, GoG/ MoEF	Yes
The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act	2006	To recognise and vest the forest rights and occupation in forest land in forest dwelling STs and other traditional forest dwellers	Forest department, GoG & Dept of Tribal Development, GoG	Yes
Government of Gujarat, Gazette dt 5th July, 1973, declaring notified protected forest (NPF) along the state and national highways.[2]	1973	To protect and preserve the existing green cover across the state of Gujarat	Forests department, GoG	Yes, for diversion of forest land for non-forest purpose
Biological Diversity Act	2000	Disclosure of species survey	MoEF	Yes

[2] As per the Gujarat Government Gazette dated 5th July, 1973, the corridors which had been declared as State Highways before 1980 will have 9.75m width (Black Top) as R&BD land and corridors that have been declared after 1980 as State Highways will have the actual (existing) width of the black top as R&BD land. The remaining land as per the records which denotes the RoW shall be declared as Notified Protected Forest (NPF).

Policy/Act/Rule	Year	Purpose	Responsible Institution	Applicability (Yes/No)
		or collection activities to the National Biodiversity Authority		
Water (Prevention and Control of Pollution) Act (and subsequent amendments)	1974	To provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.	CPCB	Yes, as per the EPA, 1986
Air (Prevention and Control of Pollution) Act (and subsequent amendments)	1981	To provide for the prevention, control and abatement of air pollution, and for the establishment of Boards to carry out these purposes.	CPCB	Yes, as per the EPA, 1986
Noise Pollution (Regulation and Control) rules 2000	2001	Noise pollution regulation and controls	CPCB	Yes, as per the EPA, 1986
Central Motor Vehicle Act Central Motor Vehicle Rules	1988 1989	To control vehicular air and noise pollution. To regulate development of the transport sector, check and control vehicular air and noise pollution.	Ports and Transportation Department, GoG	Yes, for all the vehicles used for construction purposes
The Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act	2010	To amend the Ancient Monuments and Archaeological Sites and Remains Act, 1958, including declaration of regulated and prohibited areas around the monuments.	Department of Archaeology, GoG, National Monuments authority	Yes, If there are ASI identified sites along the GSHP-II corridor
The Land Acquisition Act	1894 1984	Set out procedures for acquisition of land by government	Revenue Department, GoG	Yes
National Resettlement and Rehabilitation Policy (NRRP)	2007	Resettlement and Rehabilitation of population affected due to development projects	MoRD and respective state institutions undertaking the development projects	Yes
Vanbandhu KalyanYojana (CM's Ten Point Program)	2007	To ensure very high quality social and civil infrastructure and sustainable employment to the tribal families in next five years	Tribal Development Department, GoG	Yes

Source: GoI, MoEF and GoG

2.2 World Bank safeguard policies

13. In addition to the national and state policies, acts and rules, the World Bank policies and directives on environmental and social safeguards need to be adhered to in the present assignment. The applicability of the relevant policies pertaining to the corridors that are undergoing upgradation (strengthening and widening) are summarized in Table 2-2.

Table 2-2: Applicability of WB Safeguard policies

WB Safe Guard Policy	Policy objectives
OP 4.01 Environmental Assessment	Help to ensure the environmental and social soundness and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process
OP 4.04 Natural Habitats	Promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.
OP 4.12 Involuntary Resettlement	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.
OP 4.10 Indigenous people	Design and implement projects in a way that fosters full respect for indigenous peoples' dignity, human rights, and cultural uniqueness and so that they (1) receive culturally compatible social and economic benefits, and (2) do not suffer adverse effects during the development process.
OP 4.11 Physical cultural resources (PCR)	Assist in preserving PCR and in avoiding their destruction or damage. PCR includes resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.

2.3 Other legislations applicable to GSHP-II

14. Environmental issues during road construction stage generally involve equity, safety and public health issues. The road construction agencies require complying with laws of the land, which include inter alia, the following:

15. ***Workmen's Compensation Act 1923***: The Act provides for compensation in case of injury by accident arising out of and during the course of employment;

16. ***Contract Labour (Regulation and Abolition) Act, 1970****:* The Act provides for certain welfare measures to be provided by the contractor to contract labour;

17. ***Minimum Wages Act, 1948****:* The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act;

18. ***Payment of Wages Act, 1936****:* It lays down as to by what date the wages are to be paid, when it will' be paid and what deductions can be made from the wages of the workers;

19. ***Equal Remuneration Act, 1979****:* The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees;

20. ***Child Labour (Prohibition and Regulation) A; 1986****:* The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry;

21. ***Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979****:* The inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back, etc.;

22. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.;

23. ***The Factories Act, 1948****:* The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities;

24. ***Hazardous Wastes (Management and Handling) Rules, 1989****:* Occupiers generating hazardous wastes given in the list shall take all practical steps to ensure that such wastes are properly handled, i.e. collection, reception, treatment, storage, and disposed of without any adverse effects to human health and environment (Rule 4 Such occupier shall apply for authorization in prescribed format to the State Pollution Control Board).

25. ***Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996****:* The Rules provide for mandatory preparation of On-Site Emergency Plans by the industry and Off-Site Plans by the district collector and the constitution of four tier crisis groups at the centre, district, and local levels for the management of chemical disaster.

2.4 Clearance Requirements

2.4.1 Environmental clearance (EC)

26. EIA notification of the MoEF dated 14th September 2006, categorizes all projects and activities into two categories[3] - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and manmade resources. Environmental Impact Assessment Notification, amendment in 2009, states that "all state highways and state highways undergoing expansion in hilly terrain (above 1000m AMSL) and / or ecological sensitive area" should obtain environmental clearance from State Environmental Impact Assessment Authority (SEIAA). The amendment also states that prior environmental clearance is needed for all State Highway projects, which was eventually superseded in the subsequent amendment of 2011.

27. Environmental Impact Assessment Notification, amendment 2011, "All new state highway projects should obtain environmental clearance from SEIAA". The new amendment excludes carrying

[3]All projects or activities included as ***Category 'A'*** in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification; All projects or activities included as ***Category 'B'*** in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, will require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification.

out widening, strengthening and improvement works on the existing state highways from environmental clearances.

28. As per the amendment dated 4th April, 2011 to EIA notification 2006, environmental clearance has been made mandatory only for new state highways. Hence, the widening / strengthening and improvement works on existing State Highways are not covered under the ambit of the notification and are not categorized either as Category A or Category B.

2.4.2 Consent from Gujarat Pollution Control Board

29. The project shall require obtaining consent from competent authorities such as the Gujarat Pollution Control Board (GPCB), for '***Consent to Establish***' by submitting an online Common Application (as per Schedule-I), under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981) and authorization under Hazardous Wastes (Management and Handling) Rules, 1989, as amended.

2.4.3 Forest Clearances

30. As per the Gujarat Government Gazette dated 5th July 1973, some of the State Highways (SH) and National Highways (NH) within the state of Gujarat are declared as Notified Protected Forest (NPF), under Forest (conservation) Act 1980. Hence, any infrastructure development in the identified corridors, including strengthening and widening activity would attract Forest clearance. As per the Forest act, Form 'A' (refer **Appendix 2-1**) needs to be filled by the project proponent and has to be submitted along with the necessary enclosures to the District Forest Office, further stages of forest clearance (*as per IRC –SP-93-2011*) procedures is shown in the following Figure 2-1.

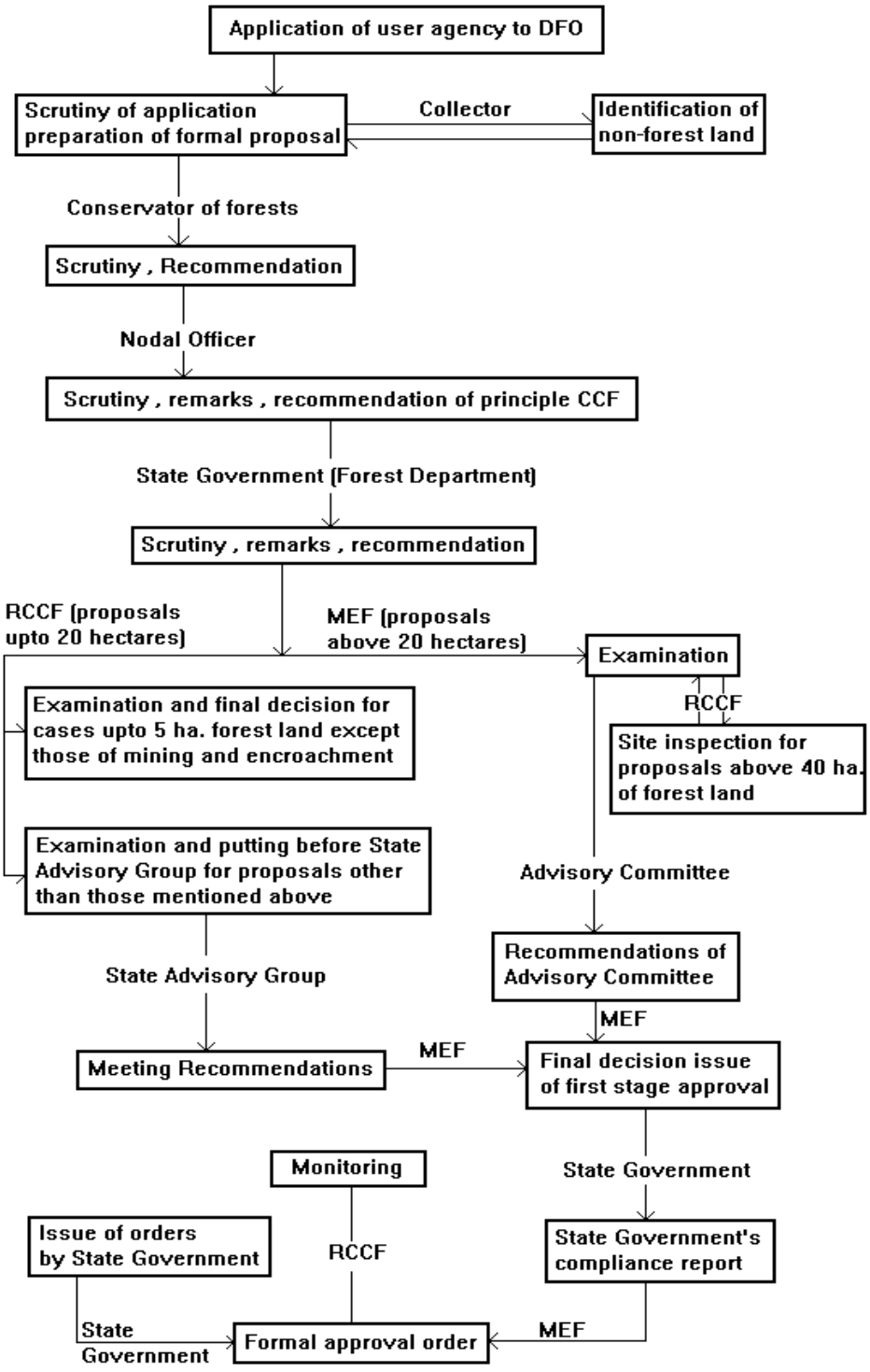


Figure 2-1: Forest Clearance Procedures

2.5 Summary of Clearance Requirements

31. Table 2-3 summarizes the clearance requirements for the project, including the agency responsible for obtaining the clearances, the time period required.

Table 2-3: Clearance requirements

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Estimated Time Frame[4]	Responsibility	
						Execution	Supervision
PROJECT PREPARATION STAGE							
1	No Objection Certificate (NOC)	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Gujarat Pollution Control Board	Applicable	3-6 months	PIU	-
2	Diversion of forest land for Non-forest use	Forest Conservation Act (1980) Forest Conservation Rules (2003) and Guidelines issued to date Government of Gujarat, Gazette dt 5th July 1973	Regional Office Western Zone, MoEF, Bhopal	Applicable	9-12 months	PIU	-
3	Permission for removal of avenue tree within the ROW	Forest Conservation Act (1980) Forest Conservation Rules (2003) and Guidelines issued to date	Forest Department, GoG	Applicable	3-6 month for each workout area	PIU	-
PROJECT IMPLEMENTATION STAGE							
4	Permission for Withdrawal of Surface Water from Rivers, Nala, Water harvesting structure/ Reservoirs/ Ponds/ Irrigation canals	Gujarat Water Supply and Sewerage Board Act, 1978	Gujarat Water Supply and Sewerage Board	Applicable (If the contractor is extracting surface water)	3months	Contractor	Engineer
5	Permission for Sand Mining from river bed	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 months	Contractor	Engineer
6	Permission for Opening of New Quarry	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 months	Contractor	Engineer
7	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer
8	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer
9	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer
10	Disposal of Construction Waste and liquid effluent from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer
11	Pollution Under Control Certificate	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	Engineer
12	Employing Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	Engineer

[4] The right of permission vests with the Competent Authority

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Estimated Time Frame[4]	Responsibility	
						Execution	Supervision
13	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	Engineer

Source: Acts, Rules and Regulation from Central and State Government

Chapter 3: Procedure for Conducting Environmental Assessment

3.1 Introduction

32. The Environmental Management Framework (EMF) shall be applied once the need/justification of a project is finalized based on the engineering parameters (like traffic, economic and financial analysis, Screening of the project road) to ascertain the category of Environmental Assessment as the first step.

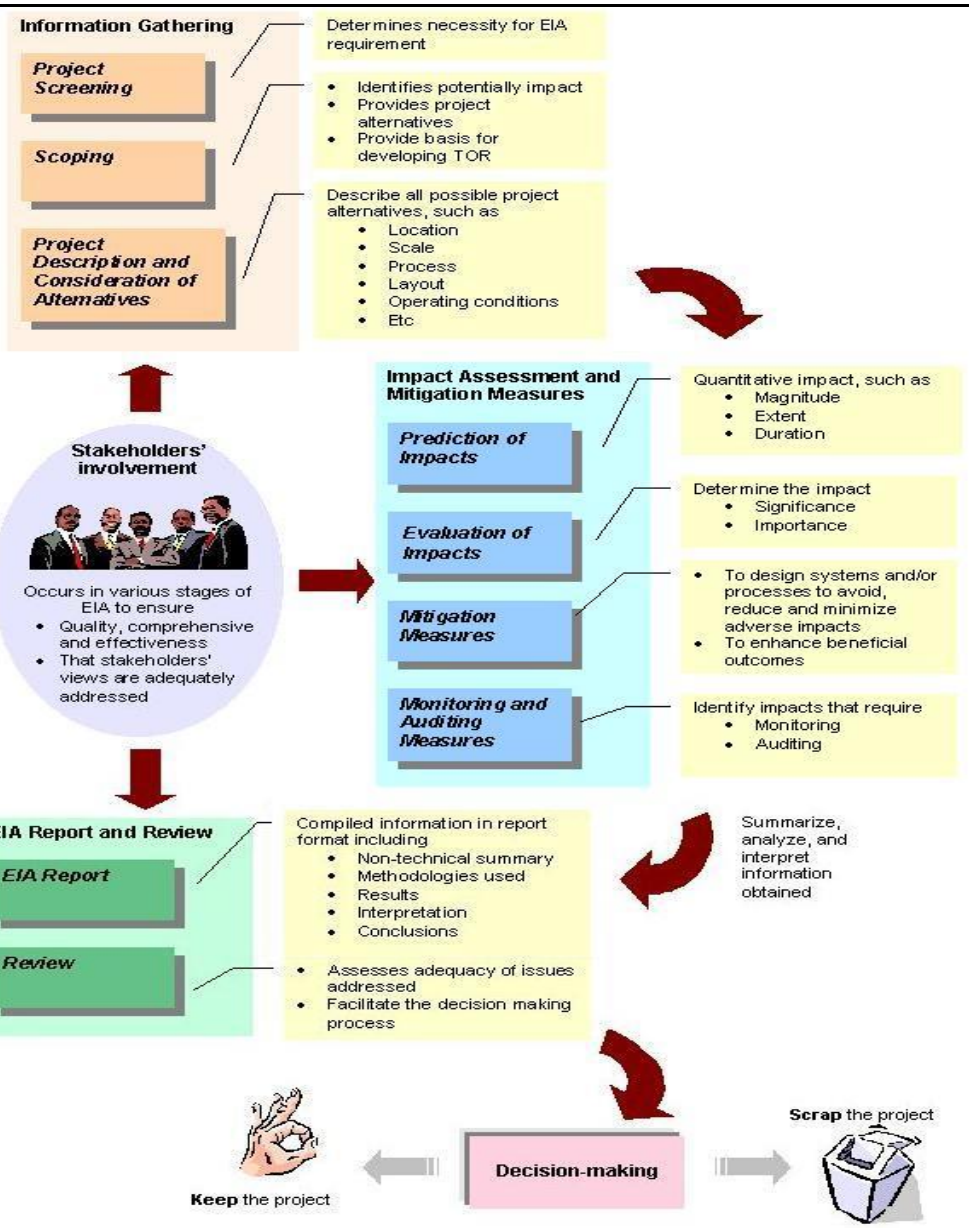


Figure 3-1: The EIA processes in sequences of application

Source: The manual in perspective, EIA Training Resource Manual, United Nations Environment Programme, 2002

3.2 Step 1: Screening

33. Screening is the process by which the appropriate level and type of EA is determined for a given project on the basis of its likely environmental impacts. For identification of sensitive sub-projects with respect to the environmental and social issues, a screening and review process shall be worked out. This exercise will be a useful tool to identify the environmental and social issues, and integrate them into the project preparation, and not as an exclusion criterion for avoiding environmental and social impacts. The PIU (R&BD) shall carry out screening exercises for all roads in order to determine the subsequent stages of the project prior to initiation of the DPR activities.

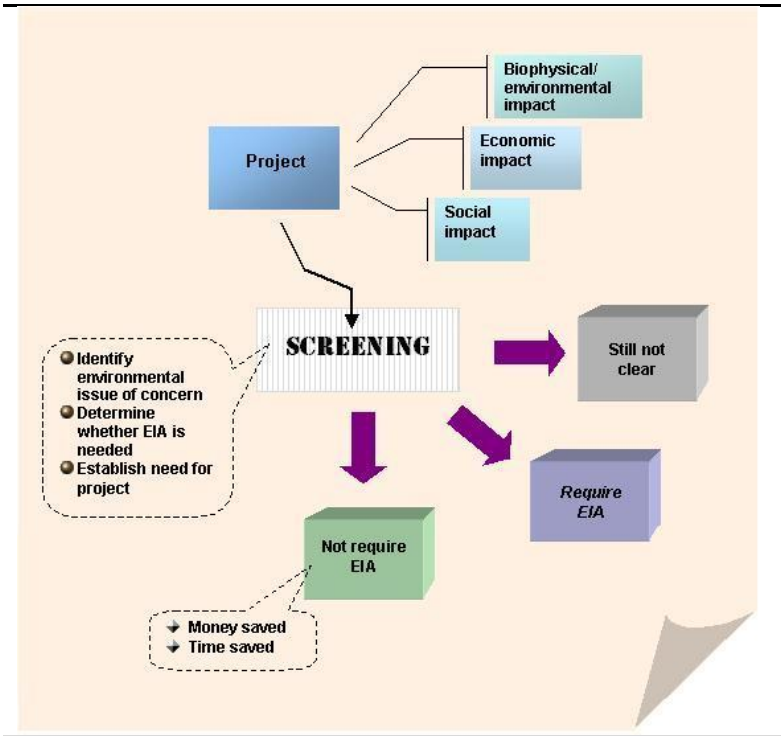


Figure 3-2: The Project Screening Process

34. The screening criteria include:

- Environmental factors, including:
  - Sensitive areas, natural habitats, protected areas
  - Felling of trees outside the protected areas
  - Clearance of vegetative cover
  - Loss of productive agricultural land
  - Cuts across perennial streams or surface water bodies
  - Vulnerability to natural hazards, landslides/slips and
  - Environmental features as marshy areas, sand dunes etc.
- Social factors, including:
  - Land availability
  - Loss of structures
  - Loss of livelihood
  - Impacts on Indigenous population
  - Impacts on common property resources, and
  - Demand from communities for the road

35. The methodology for screening includes Desk study, Reconnaissance survey and review based on available literature.

36. **Desk Study**: Involves collection of secondary information and then chalk out the methodology for carrying out EA study and fix responsibilities of EA team members for preparing a complete Environmental Management Plan, EMP addressing all issues.

- Gathering and reviewing existing environmental data (Secondary Data) relevant to the proposed development, in the form of toposheets, physical maps, thematic maps showing details of soil type, geology, seismic activity, hydrology etc.
- Collecting the various environmental and engineering studies conducted earlier in project influence area.

37. **Reconnaissance survey**: Involves collection of the first hand information about the project area and develop a perspective of the entire team and revise the methodology and work programme.

- Verifying the data collected during desk study, assessing the likely impacts, identifying the major/main issues and preparing the methodology for detailed investigation.

38. **Screening Statement**: Involves compiling of the collected primary & secondary data, and checking with the legal framework of State and National level thereby suggesting the requirement/category of Environmental Assessment Required. There are usually three possible outcomes (categories) of a screening process:

a. Environmental Category:

- As per Environmental Impact Assessment Notification - 2006, amendment 2011; the existing state highway which is undergoing expansion, widening or improvement need not be categorised either as 'A' or 'B'. However, if the project corridor falls / attracts the general conditions given in the EIA notification, 2006, it can be categorised as 'A' or 'B' based on the severity of the impact associated with the project improvement. Form -1 for environmental clearance has to be prepared and submitted to MoEF for category 'A' projects and SEIAA for category 'B' projects. The environmental sensitive locations like major water bodies (rivers, lakes, ponds, swamp area and wetlands); biodiversity hotspots (national parks, sanctuaries and reserved forest) and flora and fauna with respect to Gujarat are enclosed in **Appendix 3-1** in this report for clarification/ guidance.
- For the purpose of this project, a detailed analysis of the locations (as listed in the **Table 3-1**) where sensitive environmental components are found shall be conducted to ensure that these components are not affected due to the project. In the projects where these environmentally sensitive components exist and are likely to be impacted, the Categorisation will be elevated from Category B to Category A to correspond to the categorisation of projects funded by the World Bank. In such cases, a detailed EA in line with the project ToR for EA shall be initiated. Hence, final categorisation of the projects will correspond to the Categorisation of the Projects as per MoEF and the World Bank.

Table 3-1: List of Sensitive Environmental Components

S. No	Sensitive Environmental Component
1	Religious, heritage historic sites and cultural properties
2	Archaeological monuments/sites
3	Scenic areas
4	Hill resorts/Mountains/ Hills
5	Health resorts
6	Biosphere reserves / Wetland / Beel
7	National park and Wildlife sanctuaries and reserves
8	Natural lakes, Swamps Seismic zones tribal Settlements
9	Areas of scientific and geological interests
10	Defense installations, especially those of security importance and sensitive to pollution
11	Border areas (international)

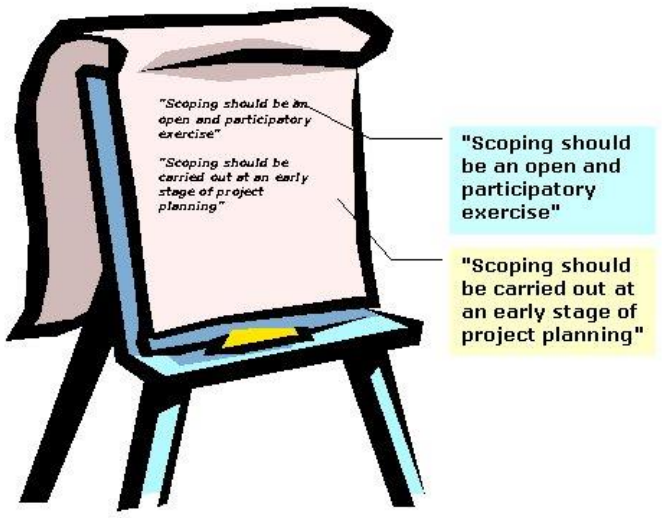
S. No	Sensitive Environmental Component
12	Tiger reserves/Elephant reserve/Turtle nestling grounds
13	Habitat for migratory birds
14	Lakes, Reservoirs, Dams
15	Streams/Rivers/Estuary/Seas

3.3 Step 2: Environmental Assessment

39. The assessment process shall constitute a systematic approach to the evaluation of a project in the context of the natural, regulatory and environment of the area in which development is proposed.

3.3.1 Scoping

40. The next step in the EA will be to define the proposed project activities and the natural, regulatory (i.e. legal) and environment of the area in which development will occur. This shall be achieved through Scoping. Scoping shall identify the activities that have a potential to interact with the environment. Scoping will be conducted early in the EA process so that a focus on the priority issues (i.e. those that have the greatest potential to affect the natural and/or environment) can be established for the rest of the EA process.



41. Key elements/inputs to the scoping exercise will be as follows:

- Gathering and reviewing existing environmental data like land width, encroachment, congestion area, bye-pass/ realignment requirement, land use pattern along bypass / realignment, drainage pattern, major river and waterways, cultural heritage sites and eco sensitive areas.
- Identifying project stakeholders; including PAP, Government and non-government agencies (utilities) Forest Department, Irrigation Department, Pollution Control Board etc.
- Assemble and review relevant legislative requirements, environmental standards and guidelines (national and international) associated with the proposed development as well as World Bank's operational policies and standards.
- Gathering existing information sources and local knowledge;
- Informing stakeholders of the project and its objectives and get input on the EA;
- Identifying the key environmental concerns (community and scientific) related to a project and the relative importance of issues;
- Defining/preparing the EA work program, including a plan for public and stakeholder involvement;
- Carrying out monitoring of natural environment including air, water, soil, noise etc.
- Defining the range of project alternatives to be considered.
- Determining/freezing the spatial and temporal boundaries for the EA studies.

42. The main focus of Scoping will be pertaining to the collection and analysis of pertinent data and the assessment of significant environmental attributes. The end result will be a work program

which is well focused and cost-effective. The following issues shall be addressed through Scoping, but will not be limited to.

- To improve the quality of EA information by focusing scientific efforts and EA analysis on truly significant issues;
- To ensure environmental concerns identified and incorporated early in the project planning process, at the same time as cost and design factors are considered;
- To ensure research efforts are not wasted on insignificant issues, rather focused on core issues.
- Reducing the likelihood of overlooking important issues;
- Thinning the chance of prolonged delays and conflicts later in the EA process by engaging stakeholders in a constructive participatory process early in the EA process
- Establish terms of reference (TOR) for EIA study

3.3.2 Environmental Impact Assessment

43. Following Scoping, legislative requirements, engineering, environmental and socio-economic data shall be assessed in greater detail to ensure that all the proposed activities and their consequences / likely impacts are considered completely.

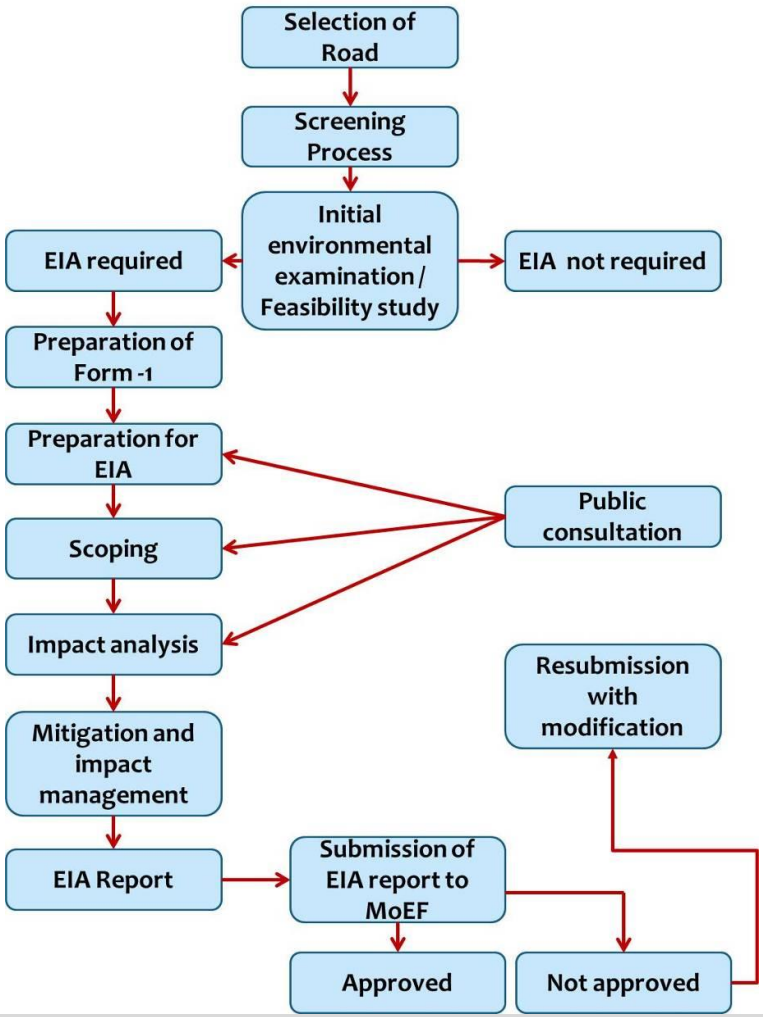


Figure 3-3: Environmental Assessment Process- Flow Chart

Source: The manual in perspective, EIA Training Resource Manual, United Nations Environment Programme, 2002

3.3.3 Existing Environmental Conditions

44. In order to identify any potential impact and potential changes to the natural and socio-economic environments, the existing baseline environmental data are to be collected. Baseline data shall include but not limited to following:

Baseline data are collected for two main purposes:

(i) To provide a description of the status and trends of environmental factors (e.g., air pollutant concentrations) against which predicted changes can be compared and evaluated in terms of importance.

(ii) To provide a means of detecting actual change by monitoring once a project has been initiated.

- Primary data/monitoring shall define characteristics of the existing natural environment including soil, water, air, noise, land use, cultural properties and flora & fauna.
    - Monitoring to be carried at critical locations
    - Identification of residential, commercial, industrial and forest areas for monitoring
    - Air and Noise Monitoring at Junctions, major settlements, school and hospitals etc.
    - Water Monitoring at river/streams/ponds and ground water sources near major settlements.
    - Soil Monitoring at major settlements, near surface water bodies.
    - Tree inventory to be carried out, in consultation with Forest Department.
    - Inventory of Cultural Property Resources shall be done along with measurements, details and photographs; consultation shall be done for gathering public opinion.
- Secondary Data to define meteorology, geology, seismicity, quarries, borrow areas, disposal sites etc.
    - Details of quarry and borrow areas that are likely to be used shall be collected (Photographs, measurements and public opinion) and a comprehensive plan for extracting material shall be prepared.
    - Meteorological data from IMD, Topo-sheets and maps from Survey of India, geological and soil data from GSoI.
    - Social data including ownership pattern, identification of tribal, vulnerable social groups, land estimates etc.

3.3.4 Assessment of Policy and Regulations

45. Regulatory and administrative framework at the national and state level, applicable World Bank requirements are presented in Chapter 2: Legal Framework

3.3.5 Impact Prediction

46. Impact prediction being the most challenging and controversial stage of the EA process it is necessary that it should be dealt with utmost care. Reliable methods available for predicting some environmental parameters, e.g. air quality impacts should be used, whereas other predictions should be based on professional judgement as these shall be qualitative and there are no reliable models existing for quantification of the predicated impacts e.g. impacts arising due to construction activity on flora/ fauna.

3.3.6 Analysis of Alternatives

47. An analysis of various alternative options for the project are to be assessed for varying level of impacts and their addressal shall be part of the EA / SA. The best fit alternative with respect to the engineering economic, social and environmental aspects are to be considered for implementation. Various alternatives that could be considered are as below:

- With or without the project.
- Analysis criteria to include environmental, social, technical/design and economic options.
- Alignment options within existing RoW
- Alternatives of Bypass
- Other engineering alternatives.

3.3.7 Stakeholder Consultation at all stages of project

48. Stakeholder consultations are an integral part of the project design process. The stakeholders are to be consulted at two stages of the project, at a minimum, once in the initial stage of the project conceptualisation and an alternative analysis and another one has to be conducted after finalisation of the design. Both stages of consultations are critical for the success of the project with the community. Various stages in the consultation process are outlined as below.

- Identification of stakeholders both primary as well as secondary
    - Primary stakeholders include people having direct impact.
    - Secondary Stakeholders includes village representatives, women's group, Voluntary organizations NGOs, experts, field level officers and staff, other government officials.

- Structured Consultation
    - Consultation at Village Level
    - Consultation at District Level
    - Consultation at State level
- *Consultation at Village Level*
    - Along with preliminary inventory and survey information, dissemination shall be done along the alignment by one by one canvassing about the project. Date and venue for detailed consultation shall be fixed.
    - Pictorial method (Pamphlet) shall be adopted to explain proposed improvements and possible environmental impact in the concerned villages.
    - Public consensus shall be arrived at for the proposed mitigation.
    - Public suggestion and grievances shall be addressed at appropriate level.
- *Consultation at District Level*
    - Consultation with officers of Revenue, Forest and line department
    - Consultation with the elected representatives and other stakeholders
- *Consultation at state level*
    - Consultation with senior department officers, principal secretary and others to formalize the procedure and mechanism of regulatory clearance, utility shifting, land acquisition etc.

3.3.8 Environmental impacts identification

49. Based on base line data collected along with engineering and social inputs, a comprehensive study shall be undertaken to identify the possible impact on environmental attributes. The impacts will be defined in terms of their temporal and spatial implications.

50. An EIA document should typically include:

- **Project Description** describing about the existing as well as proposed scenario with a mention on Right of Way (RoW), roadway improvements, cross drainage structures, community facilities, traffic projections etc.
- **Environmental Regulatory Framework** presents the legal and administrative framework of Government of India and Government of Gujarat. This section underlines various clearances applicable for the project corridor at the State / Central level.
- **Baseline Environmental Status**, the existing environmental conditions along the corridor to be ascertained by conducting a reconnaissance survey along with collection of secondary information pertaining to the corridor. Primary data for various environmental parameters has to be generated using suitable monitoring devices. The methodology has to be strictly adhered to the guidelines stipulated by Central Pollution Control Board's.
- **Public Consultation** to be carried out in order to know the reactions of local population and the project affected people (PAP). Meetings to be held with the stake holders to record their views on the impacts caused and the suggested remedies to be adopted for the proposed project corridor.
- **Analysis of Alternatives** to be presented shall be carried out during feasibility stage, covered in Environmental Screening Report, and the approved alternative to be discussed in detail along with environmental attributes under impact.

51. **Environmental Impacts**, addressing all the anticipated impacts on the physical and social environment of the corridor. The quanta of all the impacts on Natural Environment and Social/Cultural environment are presented in **Table 3-2** and

52. **Table 3-3** respectively

Table 3-2: Possible Impacts on Physical Environment

Project Activity	Planning and Design Phase	Pre-construction Phase		Construction Phase					Operation	Indirect effects of operation or Induced development
Environmental Component Affected	Land Acquisition	Removal of Structures	Removal of Tress & Vegetation	Earthworks including Quarrying	Laying of Pavement	Vehicle & Machine Operation & Maintenance	Concrete & Crusher Plants	Sanitation & Waste (labour campus)	Project Operation	
Air		Dust generation during dismantle	Reduced buffering of air and noise pollution, hotter, drier microclimate	Dust Generation	Asphalt odour	Noise, dust pollution	Noise, soot, odour, dust pollution	Odour, smoke	Noise, dust pollution	Other pollution
Land	Loss of Productive Land	Generation of debris	Erosion and loss of top soil	Erosion and loss of top soil	Contamination of soil	Contamination by fuel and lubricants compaction	Contamination compaction of soil	Contamination from wastes	Spill from accidents, Deposition of lead	Change in cropping pattern
Water	Loss of water resources	Siltation due to loose of earth	Siltation due to loose of earth	Alteration of drainage, Break in continuity of ditches, Siltation, Stagnant water pools in quarries	Reduction of ground water recharge area	Contamination by fuel and lubricants	Contamination by leakage of fuel	Contamination from wastes overuse	Spill contamination by fuel, lubricants	Increased contamination of ground water
Noise		Noise pollution	Noise pollution	Noise pollution	Noise Pollution	Noise pollution	Noise pollution		Noise pollution	Noise pollution
Flora		Loss of biomass		Lowered productivity, Loss of ground for vegetation		Removal of vegetation	Lower productivity, Use as fuel wood	Felling trees for fuel	Impact of pollution on vegetation, Lowered productivity, Toxicity of vegetation	
Fauna			Disturbance, Habitat loss	Disturbance		Disturbance	Disturbance	Poaching	Collision with traffic	Distorted habitat

Table 3-3: Possible Impact on Social and Cultural Environment

Project Activity	Planning & Design Phase	Pre-construction Phase			Construction Phase					Operation	
										Direct	Indirect Induced development
Environmental Component Affected	Design decisions & Implementation policies	Land Acquisition	Removal of Structures	Removal of Tress & Vegetation	Earthworks including Quarrying	Laying of Pavement	Vehicle & Machine Operation & Maintenance	Asphalt and crusher plants	Labour Camps	Project Operation	-
Agricultural Land		Change in land prices	Loss of land economic value	Loss of standing crops	Loss of productive land	-	-	Dust on agricultural land, reduce productivity	-	-	Conversion of agricultural land
Building & Built Structures	-	-	Loss of structures, debris generation, noise & air pollution	-	Noise, vibration may damage to structures	-	Noise, vibration may damage to structures	Dust accumulation on building & structures	-	Vibration & noise	Change in building use & characteristics
People & Community	Anxiety & fear among community	-	Displacement of people, psychological impact on people, loss of livelihood	Loss of shade & community trees, loss of fuel wood & fodder, loss of income	Noise & air pollution	Odour & dust	Noise & air pollution, collision with pedestrians, livestock & vehicles	Air & noise pollution and discomfort	Community clashes with migrant labours	Noise pollution, risk of accident	Induced pollution
Cultural Assets	-	-	Displacement, loss of structure from RoW	Loss of sacred trees	Noise, vibration may cause damage to structure	-	Damage from vibration & air pollution	Dust accumulation	-	Damage from vibration & air pollution	-
Utilities and Amenities	-	-	Interruption in supply	-	-	-	Damage to utilities & amenities	Dust accumulation on water bodies	Pressure on exiting amenities	-	-
Labour's Health & Safety	-	-	-	-	Increase of stagnant water & disease	Asphalt odour and dust	Collisions with vehicles, pedestrians & livestock	Impact on health due to inhale of dust	Increase in communicable diseases	Collision of pedestrians & livestock	-

3.3.9 Determining degree of impact

53. After identifying all environmental aspects of the project, the level of impact that may result from each of the activity-receptor interactions shall be assessed. In assessing the level of impact that an activity may cause, two key elements are to be considered namely:

- **Consequence**: the resultant effect (positive or negative) of an activity's interaction with the legal, natural and/or socio-economic environment's; the categorization for consequence are presented in **Table 3-4** below.

Table 3-4: Consequence categories and rankings

Consequence Category	Addressed
Major	Severe, alternative/avoidance will be proposed
Moderate	Less Severe, measures will be proposed to minimize impact
Minor	Lesser Severe, mitigation measures will be proposed
Negligible	Least Severe, mitigation and enhancement measures will be prepared.
None	No impact, enhancement measures will be proposed.
Positive	Positive Impact

- **Likelihood:** the likelihood that an activity will occur. The categorization for likelihood is presented in **Table 3-5** below**.**

Table 3-5: Likelihood categories and rankings

Likelihood Category	Definition
Certain	The activity will occur under normal operating condition
Very Likely	The activity is very likely to occur under normal operating condition
Likely	The activity is likely to occur at some time under normal operating condition
Unlikely	The activity is unlikely to occur but may occur at some time under normal operating conditions
Very unlikely	The activity is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances.

3.3.10 Mitigation and Monitoring Plan

Mitigation Measures

54. Mitigation measures shall be considered starting with Environmental Assessment process. Severe impacts identified in consequence category and or likelihood category shall be further analyzed to identify additional mitigation measures that are potentially available to eliminate or reduce the predicted level of impacts. Potential mitigation measures shall include:

- Habitat compensation program
- Species specific management program
- Engineering design solutions
- Alternative approaches and methods to achieving an activity's objective
- Stakeholders participation in finalizing mitigation measures
- Construction practice, including labour welfare measures
- Operational control procedures
- Management systems

55. If identified impacts "Physical/Social/Cultural", i.e. are significant and/or important, it is necessary to identify and implement mitigation measures. Mitigation measures are selected to reduce or eliminate the severity of any predicted adverse environmental effects and improve the overall environmental performance and acceptability of the project. Where mitigation is deemed appropriate, the impacts would be addressed in the following order of priority, to:

- Eliminate or avoid adverse effects, where reasonably achievable.
- Reduce adverse effects to the lowest reasonably achievable level.
- Regulate adverse effects to an acceptable level, or to an acceptable time period.
- Create other beneficial effects to partially or fully substitute for, or counter-balance, adverse effects.

56. Mitigation is an integral part of impact evaluation. It looks for better ways of doing things so that the negative impacts of the proposal are eliminated or minimized and the benefits are enhanced. As soon as significant adverse impacts are identified, discussions should be held to see if they can be 'designed out' through changes in project design, location or operation. For measures that are unavoidable, the Environmental Management Plan should address the anticipated impact.

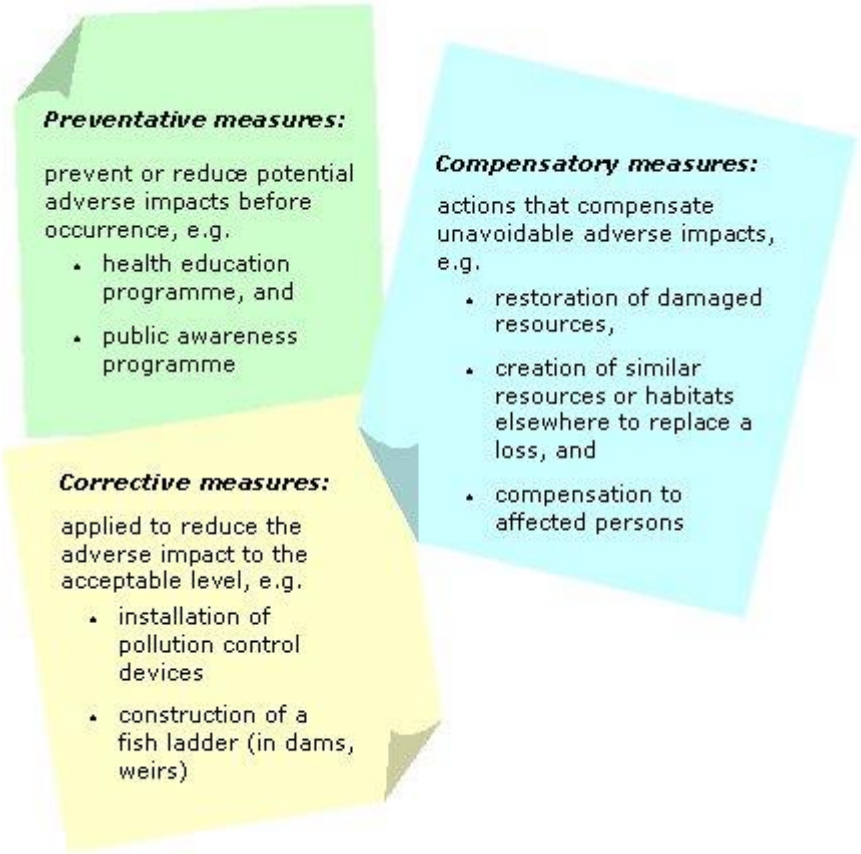


Figure 3-4: Measures Most Relevant To Development Projects

Chapter 4: Environmental Management Plan

57. The EMP should be developed so as to mitigate the impacts assessed during EA process and also the likely impacts during the construction and operational phase. The avoidance, mitigation and management measures for generic construction activities are to be included in the EMP. A generic EMP has been presented in

58. **Table 4-1** below for reference as sample guidance. This can be used as a reference material for comprehending the scope of EMP.

Table 4-1: Environmental Management Plan

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
1.	**PRE-CONSTRUCTION STAGE**					
	1.1.	**Pre-construction activities by PIU**				
		1.1.1.	Utility Relocation and Common Property Resources (CPRs)	**Clause 110.1.** and **110.7 of MoRTH**	• PIU and concerned line departments shall take necessary precautions, and shall provide barricades/delineation of such sites to prevent accidents including accidental fall into bore holes, pits, drains both during demolition and construction/ relocation of such facilities. Standard safety practices shall be adopted for all such works.	PIU
	1.2.	**Pre-construction activities by the Contractor/Engineer**				
		1.2.1.	Joint Field Verification		• The Engineer and Contractor shall ascertain the feasibility of implementing the Environmental Management Plan (EMP) through Joint field verification. • Any observations / modification required in updating EMP shall be done by the Engineer and a copy of the modified EMP shall be submitted to the PIU for review and approval.	Contractor under the supervision of the Engineer
		1.2.2.	Procurement of Machinery			
		1.2.2.1	Crushers, Hot-mix Plants & Batching Plants	(i) Emission control legislations of **CPCB/ GPCB** for air, noise etc. (ii) **Clause 111.5 of MoRTH (**Pollution from Hot mix and Batching Plant**)**	• The contractor shall follow all stipulated conditions for pollution control as suggested by the GPCB in the consent/ NoC for establishing and operating the Hot-mix and Batching Plant. • No such installation by the Contractor shall be allowed till all the required legal clearances are obtained from the competent authority and the same is submitted to the PIU. • The location of the hot-mix and batching plant shall be at least (i) 1000m away from settlements and shall be placed in the downwind direction and (ii) 10 km aerial distance away from the protected areas (sanctuary, national parks etc.).	Contractor under the supervision of the Engineer
					• The contractor shall submit the detailed layout plan for approval to the Engineer before getting into formal agreement with landowners for setting up of such site. Actions by Engineer and PIU against any non-compliance shall be borne by the Contractor at his own cost	

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		1.2.2.2.	Other Construction Vehicles, Equipment and Machinery	Discharge standards and Noise limits as per **Environment Protection Act, 1986 (EPA)** Emission standards as per **Bureau of Indian Standard (BIS)** preferably **Bharat IV emission norms**	• Equipment's conforming to the latest noise and emission control measures shall be used. • Pollution under Control (PUC) certificates for all vehicles and machinery shall be made available to the Engineer and PIU for verification whenever required.	Contractor under the supervision of the Engineer
		1.2.3.	Identification & Selection of Material Sources			
		1.2.3.1.	Borrow Areas	**Clause 305.2.2. of MoRTH Clause 111.2** (borrow pits for embankment construction)	• The Engineer shall inspect every borrow area location prior to issuing approval for use of such sites. • Care shall be taken to avoid agriculture areas for planning haul roads for accessing borrow materials. In case of damage, the contractor shall be solely responsible and shall rehabilitate it, as approved by Engineer. • All borrow areas shall be restored either to the original condition or as per the approved rehabilitation plan by the Engineer, immediately upon completion of the use of such a source.	Contractor under the supervision of the Engineer
		1.2.3.2.	Quarries	**Clause 111.3. of MoRTH (**procuring Quarry materials**)**	• No quarry and/or crusher units shall be established, which is within 1000m from the residential/ settlement locations, forest boundary, wildlife movement path, breeding and nesting habitats and national parks/sanctuaries. • Contractor shall work out haul road network to be used for transport of quarry materials and report to Engineer who shall inspect and approve the same.	Contractor under the supervision of the Engineer
		1.2.3.3.	Arrangement for Construction Water		• The contractor shall source the requirement of water preferably from surface water bodies, rivers, canals and tanks in the project area. • To avoid disruption/disturbance to other water users, the contractor shall extract water from fixed locations. The contractor shall consult the local people before finalizing the locations. • Only at locations where surface water sources are not available, the contractor can contemplate extraction of ground water, after intimation and consent from the Engineer. • The contractor shall comply with the requirements of Gujarat Groundwater Authority and seek their approval for extraction of ground water.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		1.2.3.4.	Sand (all river and stream beds used directly or indirectly for the project)	**Clause 111.3. of MoRTH**	• In case of selection of new sites for sand quarrying, the Contractor shall obtain prior approval and concurrence from Competent District Authority. • To avoid accidents and caving in of sand banks at quarry sites, sand shall be removed layer by layer. Digging deeper than the permissible limit (0.9 metres) shall not be allowed. Such quarry shall be barricaded 10m away from the periphery on all sides except the entry point, so as to prevent accidental fall of domestic cattle, wildlife and human beings.	Contractor under the supervision of the Engineer
		1.2.4.	Setting up construction sites			
		1.2.4.1	Construction Camp Locations – Selection, Design & Layout		Construction camps shall not be proposed: (i) Within 1000m of ecologically sensitive areas (if any) (ii) Within 1000m from the nearest habitation to avoid conflicts and stress over the infrastructure facilities, with the local community	Contractor under the supervision of the Engineer
		1.2.4.2.	Arrangements for Temporary Land Requirement	**Clause 108.3. of MoRTH**	• The Engineer shall ensure that the temporary site is cleared prior to handing over to the owner (after construction or completion of the activity) and it is included in the contract	Contractor under the supervision of the Engineer
		1.2.4.3.	Stock-yards		• The contractor shall identify the location for stockyards for construction materials at least 1000m from water courses. • Separate enclosures shall be planned for storing construction materials containing fine particles such that sediment-laden water does not drain into nearby storm water drains	Contractor under the supervision of the Engineer
		1.2.4.4.	Fuel storage and refuelling areas	**Clause 2.1.1.7. of EMP (**Stripping of Soil**)** **Clause 2.1.4.1.2 of EMP (**dispose the spent oil and grease**)**	• The contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites are located at least 500 m from rivers and irrigation canal/ponds.	Contractor under the supervision of the Engineer
		1.2.5.	Labour Camp Management			
		1.2.5.1	Location of Construction labour camps: Accommodation	**Factories Act, 1948** and **Building & other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (**construction & maintenance of labor camp**)**	• The contractor shall provide, if required, erect and maintain necessary (temporary) living accommodation and ancillary facilities for labourers, to standards approved by the Engineer. • Labour camps shall not be located within 1000m from the nearest habitation to avoid conflicts and stress over the infrastructure facilities, with the local community. The location, layout and basic facility provision of labour camps shall be submitted to Engineer for approval prior to construction.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		1.2.5.2	Potable Water	**The Contract Labour (Regulation and Abolition) Act, 1970** and **Factories Act, 1948**	• The contractor shall supply portable water through municipal/ panchayat sources. In case of groundwater it shall be treated prior to supply.	Contractor under the supervision of the Engineer
		1.2.5.3	Sanitation facilities	**Factories Act, 1948** for sanitation	• The sanitation facilities for the camp shall be designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place.	Contractor under the supervision of the Engineer
		1.2.5.4	Waste Disposal	**Municipal Solid Waste (Management and Handling) Rules – 2000** for effective waste disposal	• The contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in a hygienic manner	Contractor under the supervision of the Engineer
		1.2.5.5	HIV/ AIDS Prevention Measures		• The Contractor shall implement the following measures towards ensuring HIV/AIDS prevention during the entire contract period • (i) conduct awareness campaign including dissemination of IEC materials on HIV/AIDS for all construction personnel (including labourers, supervisors, engineers and consultants) on HIV/AIDS/STDs within 3 months of mobilization and once a year subsequently during the contract period; • (ii) carry out screening of construction personnel for HIV/ AIDS, within the 3 month of mobilisation • (iii) conduct semi-annual health check-up of all construction personnel including testing for STDs; • (iv) erect and maintain hoardings/ information signages on HIV/AIDS prevention at the construction sites, labour camps and truck parking locations; • (v) install condom vending machines at the labour camps, including replenishment of supplies.	Contractor under the supervision of the Engineer
2.	**CONSTRUCTION STAGE**					
	2.1.	**Construction Stage Activities by Contractor**				
		2.1.1.	Site Clearance			
		2.1.1.1.	Clearing and Grubbing	**Clause 201. of MoRTH**	• All works shall be carried out in a manner such that the damage or disruption to flora is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from Engineer.	

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.1.2.	Dismantling of Bridgework/ Culverts	**Clause 202. Of MoRTH**	• The contractor shall follow all necessary measures (including safety) especially while working close to cross drainage channels to prevent earthwork, stonework, materials and appendage from impeding cross drainage at rivers, streams, water canals and existing irrigation and drainage systems.	Contractor under the supervision of the Engineer
		2.1.1.3.	Generation & disposal of Debris	**Clause 202.5 of MoRTH**. For Disposal of materials	• Disposal of unutilized non-toxic debris shall be either through filling up of borrow areas or at pre-designated disposal sites, subject to the approval of the Engineer. • At locations identified for disposal of residual bituminous wastes, the disposal shall be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. • Debris generated from pile driving or other construction activities along the rivers, streams and drainage channels shall be carefully disposed in such a manner that it does not flow into the surface water bodies or form puddles in the area. • The pre-designated disposal locations shall be part of **Comprehensive Solid Waste Management Plan** to be prepared by Contractor in consultation and with approval of Engineer.	Contractor under the supervision of the Engineer
		2.1.1.4.	Non-bituminous construction wastes disposal	**Clause 202. Of MoRTH**	• The contractor shall finalise the location of disposal site based on the following. ○ not located within designated forest area ○ does not impact natural drainage courses ○ No endangered/rare flora is impacted by such dumping. ○ Settlements are located at least 1000m away from the site. The Engineer shall approve disposal sites after conformation	Contractor under the supervision of the Engineer
		2.1.1.5.	Bituminous wastes disposal	**Clause 202.5. of MoRTH**	• The disposal of residual bituminous wastes shall be done by the contractor at secure land fill sites, with the requisite approvals for the same from the concerned government agencies.	Contractor under the supervision of the Engineer
		2.1.1.6.	Stripping, stacking and preservation of top soil	**Clause 301.3.2** for stripping and preservation **Clause 305.3.3** for construction and for embankments **Clause 301.7**. for preservation of Top Soil	• Contractor shall strip the topsoil at all locations opened up for construction, including temporarily acquired land for traffic detours, storage, materials handling or any other construction related or incidental activities.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.1.7.	Accessibility		• The Contractor shall provide safe and convenient passage for vehicles; pedestrians and livestock to and from roadsides and property accesses by providing temporary connecting road, as necessary. • Construction activities that shall affect the use of side roads and existing accesses to individual properties, whether public or private, shall not be undertaken without providing adequate provisions to ensure uninterrupted access, as approved by the Engineer. • The Contractor shall take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up in a manner that traffic movement in any given area does not get affected.	Contractor under the supervision of the Engineer
		2.1.1.8.	Planning for Traffic Diversions and Detours	**Clause 112. of MoRTH**	• Detailed traffic control plans shall be prepared by the contractor and the same shall be submitted to the Engineer. • The Contractor shall provide specific measures for safety of pedestrians and workers as a part of traffic control plans. The Contractor shall ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. • The Contractor shall inform local community of changes in traffic routes and pedestrian access arrangements with assistance from Engineer and PIU.	Contractor under the supervision of the Engineer
		2.1.2.	Construction Materials			
		2.1.2.1.	Earth from Borrow Areas for Construction	**IRC 010-1961 (**procurement of earth materials**)**		Contractor under the supervision of the Engineer
		2.1.2.2.	Quarries	**Clause 111.3. of MoRTH (**procurement of materials**)**		Contractor under the supervision of the Engineer
		2.1.2.3.	Blasting	**Clause of 302. Of MoRTH**		Contractor under the supervision of the Engineer
		2.1.2.4.	Transporting Construction Materials	**Clause 111.9. of MoRTH**	• All vehicles delivering materials to the site shall be covered to avoid spillage of materials. • The unloading of materials at construction sites close to settlements shall be restricted to daytime only.	Contractor under the supervision of the Engineer
		2.1.3.	Construction work			

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.3.1.	Disruption to other users of Water	**Annexure "A" Protection of the Environment of MoRTH**and**Clause 2 Water Quality of MoRTH**	• In case of diversion of water bodies, the Contractor shall take prior approval of the Irrigation Department and Engineer for any such activity. The PIU shall ensure that Contractor has served the notice to the downstream users of water well in advance where such diversion of the flow is likely to affect the downstream population subject to the condition that under no circumstances the downstream flow shall be stopped.	Contractor under the supervision of the Engineer
		2.1.3.2.	Drainage and Flood Control	**Clause 202. Of MoRTH**	• Contractor shall ensure that construction materials like earth, stone, ash or appendage disposed off does not block the flow of water of any water course and cross drainage channels. • Where necessary, adequate mechanical devices to bailout accumulated water from construction sites, camp sites, storage yard, excavation areas are to be arranged well in advance before the rainy season besides providing temporary cross drainage systems. • The contractor shall take all adequate precautions to ensure that construction materials and excavated materials are enclosed in such a manner that erosion or run-off of sediments is controlled. Silt fencing shall be installed prior to the onset of the monsoon at all the required locations, as directed by Engineer and PIU. • The contractor shall ensure that no material blocks the natural flow of water in any water course or cross drainage channel. Prior to monsoon, the contractor shall provide either permanent or temporary drains to prevent water	Contractor under the supervision of the Engineer
		2.1.3.3.	Siltation of Water Bodies and Degradation of Water Quality	**Clause 306. of MoRTH** for soil erosion and sedimentation control		Contractor under the supervision of the Engineer
		2.1.3.4.	Slope Protection and Control of Soil Erosion	**Clause 306. of MoRTH** for soil erosion and sedimentation control **Clause 307. of MoRTH** for Turfing works **Clause 308. of MoRTH** for other measures of Slope Protection	• The contractor shall construct slope protection works as per design, or as directed by the Engineer	Contractor under the supervision of the Engineer
		2.1.4.	Pollution Control			
		2.1.4.1.	Water Pollution			

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.4.1.1.	Water Pollution from Construction Wastes	**Schedule VI - General Standards for Discharge of Environmental Pollutants** (Liquid Waste Disposal) - **CPCB** **The Environment (Protection) Rules, 1986** and **Water Act, 1974**	• The Contractor shall take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation channels. • Contractor shall avoid construction works close to the streams or water bodies during monsoon.	Contractor under the supervision of the Engineer
		2.1.4.1.2.	Water Pollution from Fuel, Lubricants and Chemicals	**Petroleum Act and Rules** and **Environment (Protection) Rules, 1986** (**Standards for Emission or Discharge of Environmental Pollutants Schedule – I**) for Liquid Waste Disposal **Clause 111.** (Precaution and Safeguarding the Environment) **Annexure 'A'** to **Clause 501** (Protection of Environment) - **Section 2 water quality** **Clause 301.3.2 of MoRTH. (**Stripping and preservation of top soil)	• Oil interceptors shall be provided for vehicle parking, wash down and refuelling areas. • In all, fuel storage and refuelling areas, if located on agricultural land or areas supporting vegetation, the top soil shall be stripped, stockpiled and returned after cessation of such storage.	Contractor under the supervision of the Engineer
		2.1.4.2.	Air Pollution			
		2.1.4.2.1.	Dust Pollution	**Annexure 'A' to Clause 501** (Protection of Environment) - **Section 3 Air Quality** **Clause 111.5. of MoRTH. (**Hot mix plant and batch mix plant**)**	• The conditions for pollution control given in the **NoC (consent for establish and operate)** by the GPCB shall be strictly followed. • Air pollution monitoring shall be conducted as per the Environmental Monitoring Plan and results shall be used to identify any additional pollution control measures required to be adopted.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.4.2.2.	Emission from Construction Vehicles, Equipment and Machineries	**Schedule-I: Standards for Emission** suggested by **CPCB/ GPCB**	• Certification issued for such contrivances obtained from designated/approved authority shall be submitted along with the specified reporting format to the Engineer. • The contractor shall maintain a separate file and submit PUC certificates for all vehicles/equipment/machinery used for the project. Monitoring results shall be submitted to Engineer and PIU.	Contractor under the supervision of the Engineer
		2.1.4.3.	Noise Pollution			
		2.1.4.3.1.	Noise Pollution: Noise from Vehicles, Plants and Equipments	**Noise Limits for vehicles (Environment (Protection) Amendment Rules, 2000)** and **Part 'E', Schedule – VI of Environment (Protection) Rules, 1986.** **Clause 5A The Noise Pollution (Regulation and Control) Rules, 2000 (**sound emitting construction equipments**)** **Clause 201.2 of MoRTH** for Idling of temporary trucks	• All plants and equipment used in construction shall strictly conform to the MoEF/ CPCB noise standards. • Noisy construction activities (such as crushing, concrete mixing, batching etc.) within 150m of the nearest habitation/ educational institutes/health centers (silence zones) shall be stopped during the night time between 9.00 pm to 6.00 am. • Contractor shall provide noise barriers to the suggested locations of select schools/ Temples/health centers prior to commencement of work. • Monitoring shall be carried out at the construction sites as per the monitoring schedule and results shall be submitted to Engineer. Based on the monitoring results, the Engineer, if required, shall recommend any additional noise mitigation measures required to be implemented by the Contractor.	Contractor under the supervision of the Engineer
		2.1.4.4.	Safety			
		2.1.4.4.1	Safety Procedures		The Contractor shall: • Comply with all applicable safety regulations, • Take care for the safety of all persons entitled to be on the Site, • Use reasonable efforts to keep the site and works clear of unnecessary obstruction so as to avoid danger to these persons, • Provide fencing, lighting, guarding and watching of the works until completion and taking over and provide any temporary works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the works, for the use and protection of the public and of owners and occupiers of adjacent land	Contractor under the supervision of the Engineer
		2.1.4.4.2	Care and supply of Documents		• The contractor shall prepare, submit and obtain approval of the Engineer for construction Safety Management Plan 14 days prior to commencement of construction works at site.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.4.4.3	Contractors general obligations		• All design calculations and fabrication drawings for temporary works (such as form-work, staging, centring, scaffolding, specialized construction, handling and launching equipment and the like)material lists for structural fabrication as well as detailed drawings for templates, and anchorage and temporary support details for pre stressing cables as well as bar bending and cutting schedules for reinforcement, etc shall be prepared by the contractor at his own cost and forwarded to the Engineer at least six weeks in advance of actual constructional requirements. The Engineer will check the same for the contractor's use with amendments.	Contractor under the supervision of the Engineer
		2.1.4.4.4	Personal Safety Measures for Labour, Material handling , Painting etc.	**Factory Act, 1948, Factories (Amendment) Act, 1987 (Chapter -5 Safety)** **Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996**	Construction Safety Plan shall be prepared by the Contractor during mobilization and approved by Engineer shall be adhered to by the Contractor throughout the construction period, and shall include provision of. • Protective footwear and protective goggles to all workers employed in mixing asphalt materials, cement, lime mortars, concrete etc. • Welders protective eye-shields to workers engaged in welding works • Protective goggles and clothing to workers engaged in stone breaking activities and workers shall be seated at sufficiently safe intervals • The contractor shall comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • The contractor shall ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint. • Contractor shall provide facemasks to the workers when paint is applied in the form of spray or a surface having dry lead paint is rubbed and scrapped. • The Contractor shall mark ‘hard hat’ and ‘no smoking’ and other ‘high risk’ areas and enforce non-compliance of use of PPE with zero tolerance.	Contractor under the supervision of the Engineer
		2.1.4.4.5	Health and Safety		• The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the contractor’s personnel. In collaboration with local health authorities, the contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the site.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
					• The contractor shall appoint an accident prevention officer at the site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the works, the contractor shall provide whatever is required by this person to exercise this responsibility and authority. • The contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. • The contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.	
		2.1.4.4.6	Traffic Safety & Pedestrian Safety	**Clause 112. of MoRTH (**Arrangement for traffic during construction**)**	• Pedestrian Safety shall be ensured. Pedestrian circulation shall be demarcated prior to start & unsafe areas shall be cordoned off.	Contractor under the supervision of the Engineer
		2.1.4.4.7	Risk from Electrical Equipment(s)	**Factory Act, 1948 – Chapter -5 (Safety**) and **Factories (Amendment) Act, 1987**	• No material shall be so stacked or placed as to cause danger or inconvenience to any person or the public. • All machines to be used in the construction shall conform to the relevant Indian Standards (IS) codes, shall be free from patent defect, shall be kept in good working order, shall be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer	Contractor under the supervision of the Engineer
		2.1.4.4.8	Safety during Road Works	**Clause 112.4. of MoRTH (**Traffic safety**)** **Clause 112.5. of MoRTH (**Maintenance and Diversions**)** **IRC:SP:55 (**Road signage and markings **)**	• The contractor shall provide adequate signage and markings as per the instruction of the Engineer in the construction zones.	Contractor under the supervision of the Engineer
		2.1.4.4.9	First Aid	**Section 36 (First Aid) of Building and the other Construction Workers(Regulation of Employment and Conditions of Service) Act, 1996**	• First aid measure shall be provided in the construction zones and labour camps.	Contractor under the supervision of the Engineer
		2.1.4.5.	Cultural Property			

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.1.4.5.1.	Chance Found Archaeological Property	**Ancient Monuments and Archaeological Sites and Remains Rules 1959** **Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act 2010**	• All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site are the property of the Government and shall be dealt with as per provisions of the relevant legislation. • The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing.	Contractor under the supervision of the Engineer
		2.2.	Environmental enhancement and special issues			
		2.2.1.	Enhancement measures		• Landscaping at junctions to improve aesthetics etc. • Rehabilitation of cultural and community properties	Contractor under the supervision of the Engineer
		2.2.2.	Rehabilitation/ enhancement of Cultural and Religious Properties	**Physical Cultural Resources (WB OP/BP 4.11)**	• The architectural elements of the structure shall be conserved/reflected/translated into the design of new structures/ enhancements in accordance with wishes of the community.	
		2.2.3.	Flora and Chance found Fauna		• The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. • If any wild animal is found near the construction site at any point of time, the contractor shall acquaint the Engineer and execute the Engineer's instructions for dealing with the same. • The Engineer shall report to the nearby forest office (range office) and shall take appropriate steps/ measures in consultation with the forest officials.	Contractor under the supervision of the Engineer
		2.2.4.	Sensitive receptors		• Sensitive receptors like schools, hospitals are provided with permanent noise barriers prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement (during / post construction). Their effectiveness to be checked during operation phase. • Construction activities shall be confined within the present available CoI, regularly strict monitoring/supervision shall be done to minimize/control air-noise pollution and abatement of dust particles at minimum level possible using well maintained modern machineries.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
		2.3.	Contractor Demobilization			
		2.3.1.	Clearing of Construction of Camps & Restoration		• Contractor to prepare site restoration plans for approval by the Engineer. The plan shall be implemented by the contractor prior to demobilization. • On completion of the works, all temporary structures shall be cleared, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer. • The topsoil removed and conserved earlier shall be spread over the restoration area as per the direction of the Engineer to facilitate the growth of vegetation. • Residual topsoil shall be distributed on adjoining/proximate barren/rocky areas as identified by the Engineer in a layer of thickness of 75mm – 150mm.	Contractor under the supervision of the Engineer
		2.3.2.	Redevelopment of Borrow Areas		• Redevelopment of borrow areas shall be taken up in accordance with the plans approved by the Engineer	Contractor under the supervision of the Engineer
3.	**OPERATION STAGE (Activities to be Carried Out by the Contractor/R&BD/PIU)**					
	3.1.		Monitoring and Evaluation of Operational Performance of Environmental Mitigation Measures		• The PIU shall monitor the operational performance of the various mitigation/ enhancement measures carried out as a part of the project.	Contractor under the supervision of the Engineer
	3.2.		Maintenance of Drainage		• PIU shall ensure that all drains (side drains and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding without damaging the spurs and check dams erected to stabilize the course and flow of all such drainage channels. • PIU shall ensure that all the sediment/oil and grease traps set up at the water bodies are cleared once in every three months.	Contractor under the supervision of the Engineer
	3.3.		Pollution Monitoring		• The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil pollution/contamination are to be continued at pre-designated locations and if necessary, at additional locations for comparative study of pre and post operation data in order to ensure further improvement/modification in similar future works.	Contractor under the supervision of the Engineer

ENVIRONMENTAL ISSUES				Ref: CLAUSES	ADDITIONAL MEASURES TO BE ADOPTED BY THE CONTRACTOR	RESPONSIBILITY
	3.4.		Atmospheric Pollution		• Ambient air concentrations of various pollutants shall be monitored as envisaged in the Environmental Monitoring Plan at pre designated locations to compare the levels with the pre-construction data. • Additional data at other location may be collected as per any site specific requirement.	Contractor under the supervision of the Engineer
	3.5.		Noise Pollution		• Noise pollution shall be monitored as per **Environmental Monitoring Plan** at sensitive locations where pre-construction noise data was collected. The functioning of the noise barriers shall be supervised and monitored for further improvement/replication at other affected points if necessary. • Signage near sensitive locations shall be maintained and kept clean. Monitoring the effectiveness of the pollution attenuation measures shall be performed	Contractor under the supervision of the Engineer
	3.6.		Soil Erosion and Monitoring of Borrow Areas		• Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, shall be carried to record and monitor the effectiveness of such structures after the completion of project, so as to evaluate the beneficial effects of each type of activity together with the cost involved.	Contractor under the supervision of the Engineer
	3.7.		Road Safety and Maintenance of Assets		• No advertisement/hoardings shall be allowed within the Right of Way limits of the project road. • Regular maintenance and cleaning of assets such as sign boards, bus stops, drains etc. shall be undertaken.	Contractor under the supervision of the Engineer

4.1 EMP in Bid Documents

- Preparation of EMP cost estimates that needs to be incorporated in Bid Documents.
- Environmental Management Plan, EMP along with the good environmental construction guidelines that has to be incorporated in the Bid document's work requirements.
- Preparation of work requirement (addendum/corrigendum to MoRTH specifications) and Corrigendum / Addendum to FIDIC as Special provisions to be incorporated in Bid Document. Penalty clauses for not complying with EMP requirements to be incorporated. Indicative penalty clauses proposed in the upgradation project are presented below.

Clause for Nonconformity to EMP - Protection of the Environment

The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the EMP Report. Any lapse in implementing the same will attract the damage clause as detailed below:

1. All lapse in obtaining clearances / permissions under statutory regulations and violations of any regulations with regard to eco-sensitive areas shall be treated as a major lapse.

2. Any complaints of public, within the scope of the Contractor, formally registered with the CSC, R & BD or with the GoG and communicated to the Contractor, which is not properly addressed within the time period intimated by the CSC / R & BD, GoG shall be treated as a major lapse.

3. Non-conformity to any of the mitigation measures stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.

4. On observing any lapses, CSC shall issue a notice to the Contractor, to rectify the same.

5. Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.

6. If a major lapse is not rectified upon receiving the notice CSC shall invoke reduction, in the subsequent interim payment certificate.

7. For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum of 0.5% of the contract value.

8. If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

4.2 Environmental Monitoring Plan

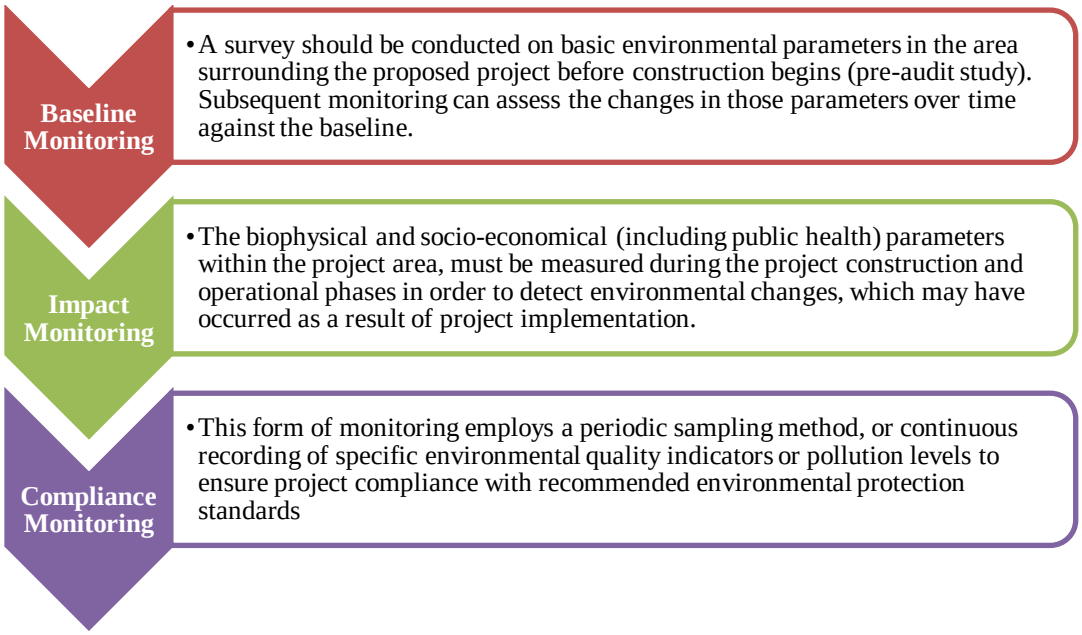
4.2.1 Monitoring Parameters and Standards

59. Environmental monitoring is defined as ***"an activity undertaken to provide specific information on the characteristics and functions of environmental and social variables in space and time"***.

60. The environmental monitoring programme will be devised to ensure that the envisaged purpose of the project is achieved and results in the desired benefit to the target population. To ensure the effective implementation of the EMP, it is essential that an effective environmental monitoring programme be designed and carried out. Broad objectives of the monitoring programme will be:

- To evaluate the performance of mitigation measures proposed in the EMP
- To suggest improvements in the management plans, if required
- To satisfy the statutory and community obligations

61. Types of Environmental Monitoring:



- The monitoring programme contains monitoring plan for all performance indicators, reporting formats and necessary budgetary provisions. Monitoring plan for performance indicators and reporting system is presented in the following sections.

4.2.2 Monitoring Plans for Environment Condition

62. The Environmental monitoring of the parameters involved and the threshold limits specified are discussed below:

- **Ambient Air Quality Monitoring (AAQM)**

63. The air quality parameters viz: Sulphur Dioxide (SO_2), Oxides of Nitrogen (NO_X), Carbon Monoxide (CO), Hydro-Carbons (HC), Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM) , Ammonia (NH_3), Ozone (O_3), Lead (Pb), Benzo (a) pyrene (BaP), Arsenic (As) and Nickel (Ni)shall be regularly monitored at identified locations from the start of the construction activity. The air quality parameters shall be monitored in accordance with the National Ambient Air Quality Standards as given in **Table 4-2**.

Table 4-2: Ambient Air Quality Standards (National)

S. No	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
1	Sulphur Dioxide (SO_2), µg/m^3	Annual* 24 hours**	50 80	20 10	• Improved West and Gaeke • Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m^3	Annual* 24 hours**	40 80	30 80	• Modified Jacob & Hochhieser (Na-Arsenite) • Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m^3	Annual* 24 hours**	60 100	60 100	• Gravimetric • TOEM • Beta attenuation
4	Particulate Matter (size less than 2.5µm) or PM_{25}µg/m^3	Annual* 24 hours**	40 60	40 60	• Gravimetric • TOEM • Beta attenuation
5	Ozone (o_2) µg/m^3	8 hours* 1 hours**	100 180	100 180	• UV photometric • Chemiluminescence • Chemical Method
6	Lead (Pb) µg/m^3	Annual* 24 hours**	0.50 1.0	0.50 1.0	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper • ED-XRF using Tefloa filter
7	Carbon Monoxide (CO) µg/m^3	8 hours* 1 hours**	02 04	02 04	• Non Dispersive Infra-Red (NDIR)spectroscopy
8	Ammonia (NH_3) µg/m^3	Annual* 24 hours**	100 400	100 400	• Chemiluminescence • Indophenol blue method
9	Benzene (C_6H_6) µg/m^3	Annual*	05	05	• Gas chromatography based continuous analyser • Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) particulate phase only, ng/m^3	Annual*	01	01	• Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As) ng/m^3	Annual*	06	06	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper
12	Nickel (Ni) ng/m^3	Annual*	20	20	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper

**Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals*

***24 hourly or (8 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.*

- **Noise Quality Monitoring**

64. The noise levels shall be monitored at already designated locations in accordance with the Ambient Noise Quality standards given in **Table 4-3.**

Table 4-3: Ambient Noise Quality Standards (National)

Area Code	Category of Zones	Limits of Leq in dB(A) Day*	Night*
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45

D	Silence Zone **	50	40

** Daytime shall mean from 6.00am to 10.00 pm and Night shall mean from 10.00 pm to 6.00 am*

***Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicles horns, loud speakers and bursting of cracking are banned in these zones.*

- **Water Quality Monitoring**

65. Water quality parameters such as pH, BOD, COD, DO, Coliform count, total suspended solids, total dissolved solids, Iron, etc. shall be monitored at all identified locations during the construction stage as per standards prescribed by Central Pollution Control Board and Indian Standard Drinking water specifications IS 10500, 1991, presented in **Table 4-4.**

Table 4-4: National Standard of Water

Sr. No	Parameters	IS:2296 (Class C)	Method to be Adopted
1	pH	6.5-8.5	pH meter
2	BOD (3 days 27^0C)	3.0	DO-Azide modification of Wrinkler's method
3	Temperature (^{0}C)	NS	Thermometer
4	Dissolved oxygen	4	Azide Modification of Wrinkler's method
5	Color (Hazen)	300	Visual Comparison method
6	Fluorides (F)	1.5	SPANDS method
7	Chlorides (Cl)	600	Argentometric Titration
8	Total Dissolved Solids	1500	Gravimetric Analysis
9	Sulphates (SO4)	400	Barium Chloride method
10	Iron (Fe)	50	Phenanthrolin method
11	Oil and Grease	0.1	Partition – Gravimetric method
12	Nitrates	50	Chromotropic acid
13	Chromium (Cr6+)	0.05	Atomic Absorption Spectrophotometry
14	Cadmium (Cd)	0.01	Atomic Absorption Spectrophotometry
15	Lead (Pb)	0.1	Atomic Absorption Spectrophotometry
16	Copper (Cu)	1.5	Atomic Absorption Spectrophotometry
17	Cyanide (CN)	0.05	Chloramine-T-method
18	Selenium (Se)	0.05	Atomic Absorption Spectrophotometry
19	Arsenic (As)	0.2	Atomic Absorption Spectrophotometry
20	Phenols	0.005	Spectrophotometer
21	Detergents	1.0	Spectrophotometer
22	DDT	Absent	Spectrophotometer
23	Total Coliform (MPN/100 ml)	5000	Multiple Tube Fermentation Technique

NS: Not specified; Brackets ([ ]) indicates extended limits. All the values in mg/l if otherwise mentioned

Table 4-5: Water Quality Criteria

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6mg/l or more • Biochemical Oxygen Demand 5 days 20oC 2mg/l or less
Outdoor bathing (Organised)	B	• Total Coliforms Organism MPN/100ml shall be 500 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 5mg/l or more • Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	• Total Coliforms Organism MPN/100ml shall be 5000 or less • pH between 6 to 9

Designated-Best-Use	Class of water	Criteria
		• Dissolved Oxygen 4mg/l or more • Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Propagation of Wild life and Fisheries	D	• pH between 6.5 to 8.5 • Dissolved Oxygen 4mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	• pH between 6.0 to 8.5 • Electrical Conductivity at 25oC micro mhos/cm Max.2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

4.2.3 Environmental Monitoring Locations

66. In addition of the critical locations selected during design stage, the environmental monitoring will also be done at the construction camp site and any other plant site during construction stage. List of critical locations for caring out monitoring should be presented in EIA report.

4.3 Monitoring and Post Auditing

67. Construction monitoring, including field inspections and surveys, should be carried out by an environmental expert (to be hired by PIU (R&BD) on regular or contractual basis) to ensure that environmental protection requirements are being met. The monitoring and reporting is to be in line with the reporting system developed for the project and is presented as **Appendix 4-1**. It is important to plan and budget for environmental construction monitoring as part of the project. If construction is to be contracted out, PIU (R&BD) to reconfirm that specific environmental requirements during construction (as already specified) are built into construction bidding documents and contracts to ensure, they are met (e.g. requirements for local hiring, penalty for not adhering to EMP clause requirements etc.).

68. Post construction monitoring is used to identify environmental changes resulting from the implementation of the project. In the context of EIA, post construction monitoring programs are carried out to achieve the following results:

- To ensure that the facility is meeting all environmental regulatory requirements, and that commitments made in the EIA document and/or the conditions of approval are being met;
- To test impact hypotheses, and to verify the predictions and assessment of environmental effects, thus contributing to better assessments in the future;
- To evaluate the performance effectiveness of mitigation;
- To compare actual and predicted changes to the environment, so that immediate actions can be taken to mitigate unanticipated impacts;
- To strengthen confidence by both government and the public in the EIA process, the decisions made the road design etc.

69. The monitoring programs to be carried out during the construction and operation of the undertaking are normally described in the EIA document.

4.4 Implementation of EMP

70. The Environmental Management Plan, EMP process does not stop once a project (planning and design) got approval for implementation. During implementation of project PIU (R&BD), Construction Supervision Consultant, CSC (if any) and Contractor will be responsible for ensuring that the environmental commitments made to regulatory agencies, lending agencies and other stakeholders during the EIA process are met. To execute EMP is a cumulative responsibility of all three parties involved, indicative responsibility mechanism has been presented in **Table 4-6**, as developed for upgradation projects

Table 4-6: Institutional Responsibilities

System	Designation	Responsibilities
Coordinating/Facilitating Agency	Chief Engineer (WB), R&BD	• Overview of the project implementation • Ensure timely budget for the EMP • Coordination with different state level committee, to obtain Regulatory Clearances • Participate in state level meetings • Monthly review of the progress.
	Superintending Engineer PIU	• Overall responsible for EMP implementation • Reporting to various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Coordination with PIU Staff (Environmental officer). • Responsible for obtaining Regulatory Clearances • Review of the progress made by contractors • Ensure that BOQ items mentioned in EMP are executed as per Contract provisions.
	Environment and R&R Specialist (PIU)	• Assisting SE in overall implementation of EMP • Review of periodic reports on EMP implementation and advising SE in taking corrective measure. • Conducting periodic field inspection of EMP implementation • Assisting SE to reporting various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Preparing environmental training program and conducting the same for field officers and engineers of contractor
Implementing/ Monitoring Agency	Engineer (Supervision consultant SC)	• Responsible for supervision of effective implementation of EMP measures by the contractor • Review progress reports and periodic reporting to PIU about the status of EMP implementation • Work in close coordination with ERRS (PIU) and contractor
	RAP implementation NGO	• Conducting awareness campaign for all construction personnel (including labourers, supervisors, engineers and consultants) about HIV/AIDS/STDs in the construction and labour camps. • Facilitating the medical testing/ routine check-up for labours as suggested in the HPP

Contractor	Environmental Manager of Contractor	• Responsible for ensuring the implementation of EMP as per provision in the document. • Directly reporting to the Project Manager of the Contractor • Discuss the various environmental/social issues and environmental/social mitigation, enhancement and monitoring actions with all concerned directly or indirectly • Assist the project manager to ensure social and environmentally sound and safe construction practices are adopted • Conduct periodic environmental and safety training for contractor's engineers, supervisors and workers along with sensitization on social issues that may be arise during the construction stage of the project • Assist the PIU on various environmental monitoring and control activities including pollution monitoring; and • Prepare and submit monthly reports to PIU on the status of implementation safeguard measures

Source: LASA

Chapter 5: Good Environmental Construction Guidelines

71. Comprehensive environmental construction guidelines have been prepared to guide the planning and implementing agency in preparing the project specific environmental code of conduct for contractor. The list of good environmental practices is as follows. All guidelines listed are presented as **Appendix 5-1** for reference and implementation into the Environmental Management Plans for the specific projects.

Table 5-1: Guideline for Good Environmental Practices

Guidelines	Activities
Guideline-1	Site Preparation
Guideline-2	Construction and Labour Camps
Guideline-3	Borrow Areas
Guideline-4	Topsoil Salvage, Storage and Replacement
Guideline-5	Quarry Management
Guideline-6	Water for Construction
Guideline-7	Slope Stability and Erosion Control
Guideline-8	Waste Management and Debris Disposal
Guideline-9	Water Bodies
Guideline-10	Drainage
Guideline-11	Construction Plants & Equipment Management
Guideline-12	Labour and Worker's Health and Safety
Guideline-13	Cultural Properties
Guideline-14	Tree Cutting and Afforestation
Guideline-15	Forests and Other Natural Habitats
Guideline-16	Air and Noise Pollution

Appendix 2.1: Form ‘A’ Forest Clearance

APPENDIX

(See Rule 6)

FORM – 'A'

Form For Seeking Prior Approval Under Section 2 of The Proposals By The State Governments and Other Authorities

PART-I

(To be filled up by user agency)

1. Project details:

   (i) Short narrative of the proposal and project/scheme for which the forest land is required.

   (ii) Map showing the required forest land, boundary of adjoining forest on a 1:50,000 scale map.

   (iii) Cost of the project:

   (iv) Justification for locating the project in forest area.

   (v) Cost-benefit analysis (to be enclosed).

   (vi) Employment likely to be generated.

2. Purpose-wise break-up of the total land required:

3. Details of displacement of people due to the project, if any:

   i. Number of families.

   ii. Number of Scheduled Castes/Scheduled Tribe families

   iii. Rehabilitation plan. (to be enclosed)

4. Whether clearance under Environment (Protection) Act, 1986 required? (Yes/ No).

5. Undertaking to bear the cost of raising and maintenance of compensatory afforestation and/or penal compensatory afforestation as well as cost for protection and regeneration of Safety Zone, etc. as per the scheme prepared by the State Government (undertaking to be enclosed).

6. Details of Certificates/documents enclosed as required under the instructions.

Signature

Date:_____ (Name in Block letters)

Palce:_____ Designation

Address (of User Agency)

State serial No. of proposal_____

(To be filled up by the Nodal Officer with date of receipt)

PART-II

(To be filled by the concerned Deputy Conservator of Forests)

State serial No. of proposal_____

7. Location of the project/Scheme:

i. State/Union Territory

ii. District.

iii. Forest Division

iv. Area of forest land proposed for diversion (in ha.)

v. Legal status of forest

vi. Density of vegetation.

vii. Species-wise (scientific names) and diameter class-wise enumeration of trees (to be enclosed. In case of irrigation / hydel projects enumeration at FRL, FRL-2 meter & FRL-4 meter also to be enclosed.)

viii. Brief note on vulnerability of the forest area to erosion.

ix. Approximate distance of proposed site for diversion from boundary of forest.

x. Whether forms part of National Park, wildlife sanctuary, biosphere reserve, tiger reserve, elephant corridor, etc. (If so, the details of the area and comments of the Chief Wildlife Warden to be annexed).

xi. Whether any rare/endangered/unique species of flora and fauna found in the area- if so details thereof.

xii. Whether any protected archaeological/heritage site/defence establishment or any other important monument is located in the area. If so, the details thereof with NOC from competent authority, if required.

8. Whether the requirement of forest land as proposed by the user agency in col. 2 of Part-I is unavoidable and barest minimum for the project. If no, recommended area item-wise with details of alternatives examined.

9. Whether any work in violation of the Act has been carried out (Yes/No). If yes, details of the same including period of work done, action taken on erring officials. Whether work in violation is still in progress.

10. Details of compensatory afforestation scheme:

i. Details of non forest area/degraded forest area identified for compensatory afforestation, its distance from adjoining forest, number of patches, size of each patch.

ii. Map showing non-forest/degraded forest area identified for compensatory afforestation and adjoining forest boundaries.

iii. Detailed compensatory afforestation scheme including species to be planted, implementing agency, time schedule, cost structure, etc.

iv. Total financial outlay for compensatory afforestation scheme.

v. Certificates from competent authority regarding suitability of area identified for compensatory afforestation and from management point of view. (To be signed by the concerned Deputy Conservator of Forests).

11. Site inspection report of the DCF (to be enclosed) especially highlighting facts asked in col. 7 (xi, xii), 8 and 9 above.

12. Division/District profile:

i. Geographical area of the district.

ii. Forest area of the district.

iii. Total forest area diverted since 1980 with number of cases.

iv. Total compensatory afforestation stipulated in the district/division since 1980 on

(a) forest land including penal compensatory afforestation,

(b) non-forest land.

v. Progress of compensatory afforestation as on (date) _____ on

(a) forest land

(b) non-forest land.

13. Specific recommendations of the DCF for acceptance or otherwise of the proposal with reasons.

Signature

Date:_____ Name

Palce:_____ (Official Seal)

PART-III

(To be filled by the concerned Conservator of Forests)

14. Whether site, where the forest land involved is located has been inspected by concerned Conservator of Forests (Yes/No). If yes, the date of inspection & observations made in form of inspection note to be enclosed.

15. Whether the concerned Conservator of Forests agree with the information given in Part-B and the recommendations of Deputy Conservator of Forests.

16. Specific recommendation of concerned Conservator of Forests for acceptance or otherwise of the proposal with detailed reasons.

Signature

Date:_____

Name

Palce:_____ (Official Seal)

PART-IV

(To be filled in by the Nodal Officer or Principal Chief Conservator of Forests or Head of Forest department)

17. Detailed opinion and specific recommendation of the State Forest Department for acceptance of otherwise of the proposal with remarks.

(While giving opinion, the adverse comments made by concerned Conservator of Forests or Deputy Conservator of Forests should be categorically reviewed and critically commented upon).

Signature

Date:_____ Name &
Designation
Palce:_____ Official
Seal

PART- V

(To be filled in by the Secretary in charge of Forest Department or by any other authorised officer of the State Government not below the rank of an Under Secretary)

18. Recommendation of the State Government:

(Adverse comments made by any officer or authority in Part-B or Part-C or Part-D above should be specifically commented upon)

Signature

Date:_____ Name &
Designation
Palce:_____ (Official
Seal)

INSTRUCTIONS (for Part-I):-

1. The project authorities may annex a copy of the approved project/plan in addition to filling Col. 1 (i) e.g. IBM approved mining plan for major minerals/CMPDI plan with subsidence analysis reports, etc.
2. Map has to be in original duly authenticated jointly by project authorities and concerned DCF – Col. 1 (ii).
3. Complete details of alternative alignments examined especially in case of project like roads, transmission lines, railway lines, canals, etc. to be shown on map with details of area of forest land involved in each alternative to be given - Col. 1 (iii).
4. For proposals relating to mining, certificate from competent authority like District Mining Officer about non-availability of the same mineral in surrounding/nearby non-forest areas.
5. In case the same company/individual has taken forest land for similar project in the State, a brief detail of all such approvals/leases be given as an enclosure along with current status of the projects.
6. The latest clarifications issued by the Ministry under Forest (Conservation) Act, 1980 may be kept in mind. In case such information do not fit in the given columns, the same shall be annexed separately.

GENERAL INSTRUCTIONS:-

1. On receipt of proposal, Nodal Officer shall issue a receipt to the user agency indicating therein the name of the proposal, user agency, area in hectare, serial number and date of receipt.
2. If the space provided above is not sufficient to specify any information, please attach separate details/documents.
3. While forwarding the proposal to the Central Government, complete details on all aspects of the case as per Form prescribed above read with the clarifications issued by the Ministry of Environment and Forests, Government of India, New Delhi should be given. Incomplete or deficient proposals shall not be considered and shall be returned to the State Government in original.

Appendix 3-1

Environmental and Social Baseline

As the project corridors are spread all across the state of Gujarat, the environmental and social baseline has been assessed for the entire state. Information collected from secondary and primary sources has been utilized for evaluating the existing environmental and social condition.

1.1 ENVIRONMENTAL BASELINE

1.1.1 Climate

Gujarat has a tropical climate with hot summers and cold winters. The year can be divided into: the winter season from November to February, the hot season from March to May, the south-west monsoon season from June to September and the intervening month of October. Gujarat receives its rainfall from the southwest monsoon [June to September].The annual rainfall varies between 300mm in the North to 2500 mm in the South. The summer months are from April to June with temperatures ranging from 27°C to 42°C. Winters are better with a temperature variance of 14°C to 29°C. The relative humidity in all parts of the State is low.

1.1.2 Physiography

The state has been divided into five major physiographic divisions:

- **Alluvial Plains**: These extend in North Gujarat to Valsad in the south, and westwards to the little Rann and Banni area of Kachchh.
- **The Eastern hilly tract**: This tract lies between the altitude of 300-1400 m and forms a major divide.
- **Uplands of Kachchh and Saurashtra:** These are upland consisting of sandstone, shale and basalt rock with elevations of about 150-500 m sloping radically towards the coast, the Gimar hill forest is at an elevation of 1117 m.
- **The low-lying coastal tract** ranges in elevation from 3-25 m surrounding the Kachchh and Saurashtra uplands. These low-lying areas extend from Rann of Kachchh to little Rann of Kachchh and to the low-lying delta region of Bhadar, Bhogavo Sabarmati, Mahi, Dhadar, Narmada and Tapi rivers.
- **The Rann and little Rann of Kachchh** are a vast expanse of saline wilderness which extend into the saline Tracts around the Gulf of Khambhat. The general elevation of this tract varies between 1-4 m.

1.1.3 Soil

The predominant soil types in Gujarat are Brown Soil, Black Soil and alluvium. The region wise distribution of soil type for the state has been given in following **Figure 1**.

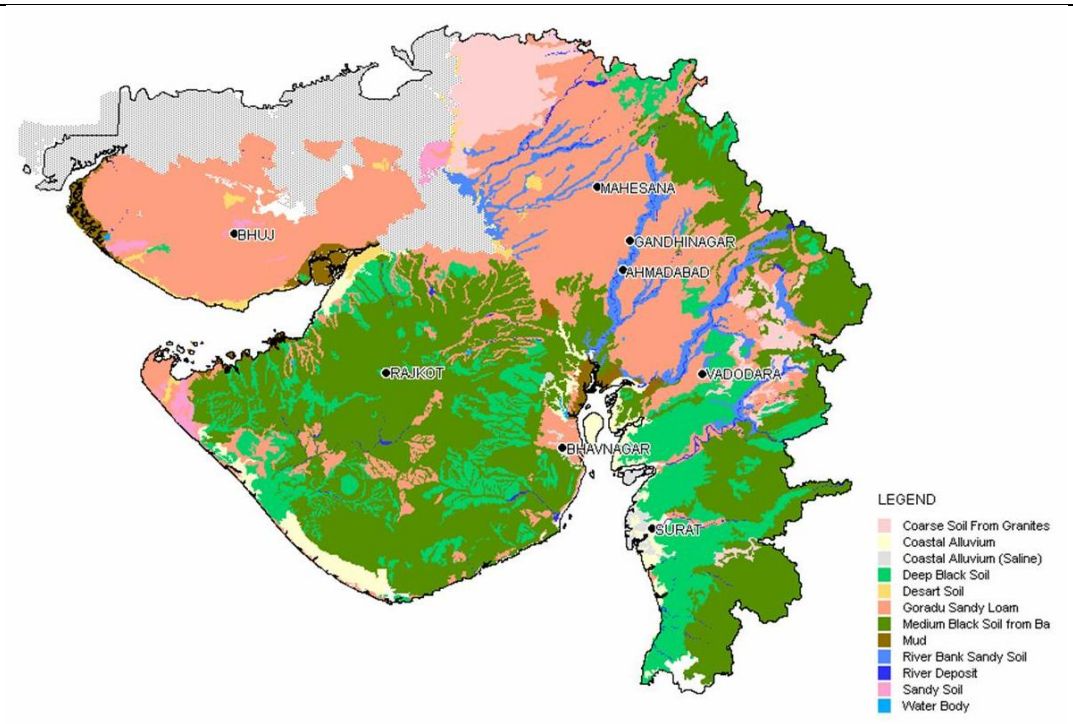


Figure 1: Soil Map of Gujarat

1.1.4 Drainage

The rivers Banas, Sabarmati, Mahi, Narmada and Tapi are the important drainage lines of the Gujarat plain draining into the Gulf of Khambatt while the rivers Bhadar, Ojat and Shetrunji are those of the Kathiawar peninsula draining into the Arabian sea. There are few seasonal and small rivers draining into the Gulf of Kachchh.

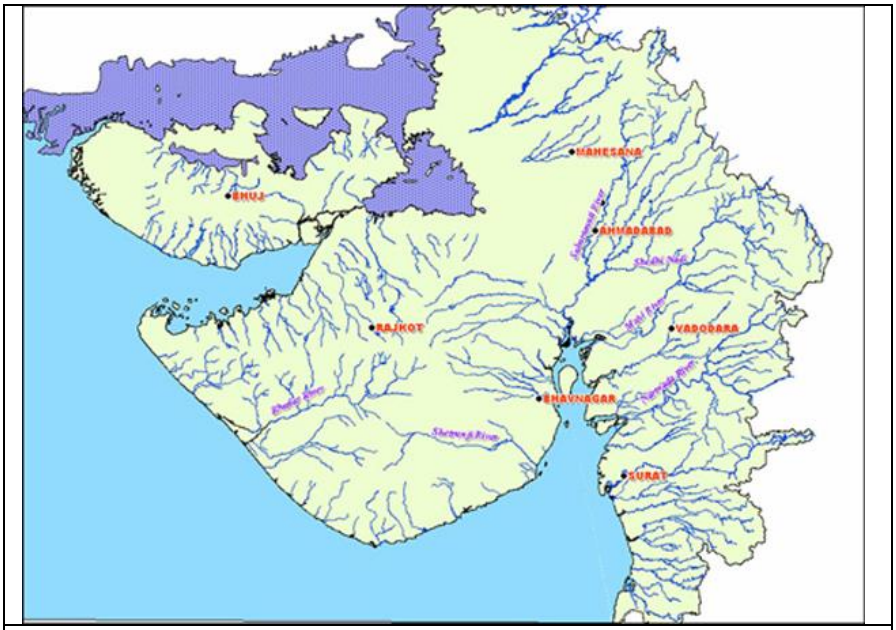


Figure 2: Drainage Map of Gujarat

1.1.5 Floral

Forest Cover in Gujarat

The Net Forest Cover in the state has increased by 3245 sq. km continuously from 1991 to 2001. The Details of forest cover of the state in 2001 as per the report of Forest Survey of India 2001 are shown in **Table 1**.

Table 1: **Present Status of Forest Cover in Gujarat in 2001**

Type of forest cover	Area in sq.km
Dense Forest	8,673
Open Forest	6,479
Sub Total	15,152 (7,7 % of total geographical area)
Scrub	2408
Total Area	**17,560**

Gujarat has about 17560 sq.km of land under forest. A large part of the forest cover which is economically exploitable is distributed in the districts of Dangs, Panchmahals, Bharuch, Surat, Valsad, Junagadh, Sabarkantha and Banaskantha. Dangs, Surat and Bharuch which are the three southern districts of the state, have a sizable area under forest. The districts of Panchmahals and Sabarkantha in northeast Gujarat and Junagadh in Saurashtra are other important areas of forest cover. The south and southeastern parts of the state support the growth of a tropical deciduous forest typified by teak, Shorearobusta for which the district of Valsad is well known

1.1.6 Fauna

Though, Gujarat has saved many known endangered and threatened species from getting extinct such as Asiatic Lion, Leopard, Indian Crocodile, The Wild-Ass, Indian Wolf, Black-buck, Chinkara, Great Indian Bustard, Lesser Florican, etc. populations of many species particularly Tiger and its associate species in south and eastern Gujarat and those of birds and plants, are declining.

Gujarat is home to several species of avian fauna, some of the most commonly occurring avian fauna family being herons, storks, spoonbills, flamingoes, grebes, pelicans, pheasants, quails, water hens, bustards, jacanas etc.

1.1.7 Biodiversity (Protected Areas)

The protected area (PA) network of the State of Gujarat comprises of 26 PAs including 22 Sanctuaries and 4 National Parks having total area of 16422.71 sq.km. (8.37%) and 479.67 sq.km.(0.24%), respectively. Though, the geographical area of Gujarat is only 5.9% of the total area of India, it contributes 11.37% (16902.38 sq. km.) area to the total PA (148532 sq.km) of the country. List of protected area is given in the

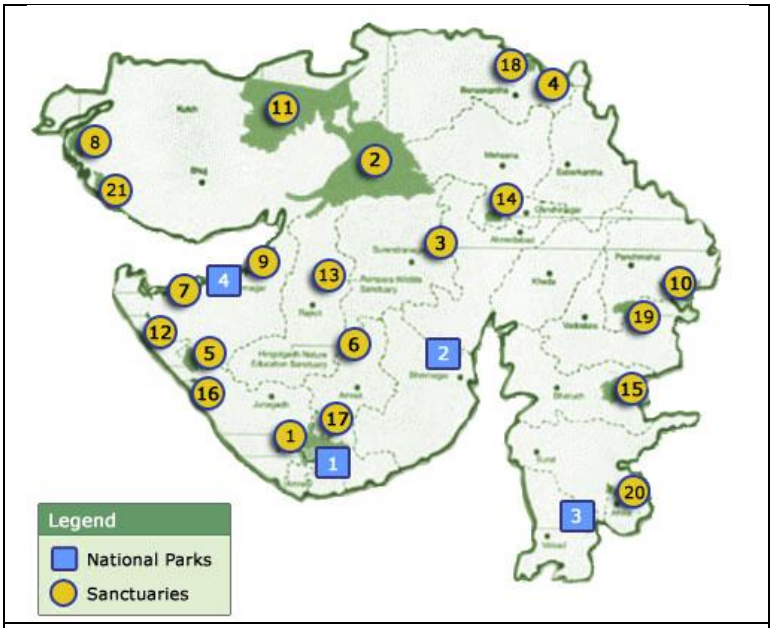


Figure 3: Biodiversity Protected Area

Table 2.

Table 2: List of Protected Areas

Name of Park	Year of Estt	Area in Sq.Kms.	Location	Major Species
Gir National Park	1975	258.71	SasanGir, Dist : Junagadh	Lion, Leopard, Chital, Chausinga, Hyena, Sambar, Chinkara, Herpetofauna, Crocodiles and birds.
Black National Park	1976	34.08	Velavader, Dist : Bhavnagar	
Vansda National Park	1979	23.99	Vansda, Dist: Navasari	Leopard, Hyena Chital, Chausinga, Birds, Herpetofauna
Marine National Park	1982	162.89	Gulf of Kachchh, Dist : Jamnagar	Sponges, Corals, Jelly fish, Sea horse, Octopus, Oyster, Pearl oyster, Starfish, Lobster, Dolphin, Dugon, Waterfowls.
Name of Sanctuary	**Year of Estt**	**Area in Sq.Kms.**	**Location**	**Major Species**
Gir Wild Life Sanctuary	1965	1153.42	SasanGirDist: Junagadh, Amreli	Lion, Leopard, Chausinga, Chital, Hyena, Sambar, Chinkara, Herpetofauna, Crocodiles and birds
Wild Ass Sanctuary	1973	4953.7	Little Rann of Kachchh	Wild Ass, Chinkara, Blue bull, Houbara bustard, Wolf, Waterfowls, Herpetofauna

NalSarovar Birds Sanctuary	1969	120.82	NalSarovarDist:Amdavad&Surendranagar	Flamingos, Pelicans, Coot, ducks, waders, storks, Herons and other spp. of waterfowls, Herpetofauna
Jessore Sloth BearSanctuary	1969	120.82	NalSarovarDist:Amdavad&Surendranagar	Flamingos, Pelicans, Coot, ducks, waders, storks, Herons and other spp. of waterfowls, Herpetofauna
Barda Wild Life Sanctuary	1979	192.31	HingolgadhDist:Rajkot	Leopard, Blue bull, Hyena, wild boar, Jackal, Birds, Herpetofauna
Hingolgadh Sanctuary	1980	6.54	HingolgadhDist: Rajkot	Chinkara, Blue bull, Wolf, Hyena, Fox, Birds, Herpetofauna
Marine Sanctuary	1980	295.03	Gulf of KachchhDist: Jamnagar	Sponges, Corals, Jellyfish, Sea horse, Octopus,Oyster, Pearloyster, Starfish, Lobster, Dolphin, Dugong, waterfowls
Narayan SarovarSancuary	1981	444.23	Narayan SarovarDist: Kachchh	Chinkara, Caracal, Desert Cat, Hyena, Desert Fox,Jackal, Birds, Herpetofauna
Khijadia Bird Sanctuary	1981	6.05	KhijadiaDist: Jamnagar	Indian Skimmer, Ibises, Painted stork, Cormorants, etc. App. 220 spp. of birds, Herpetofauna
Ratanmahal Sanctuary	1982	55.65	RatanmahalDist: Dahod	Sloth bear, Leopard, Hyena, Jackal, Chausinga, Civet Cat, Jungle cat, Birds, Herpetofauna
Kutch Desert Sanctuary	1986	7506.22	Great Rann of Kachchh	Chinkara, Hyena, Fox, Flamingo, Pelicans & other waterfowls, Herpetofauna
Gaga Wild Life Sanctuary	1988	3.33	Gaga Dis: Jamnagar	Great Indian Bustard, Wolf, Jackal, Birds, Herpetofauna
Rampara Sanctuary	988	15.01	RamparaDist: Rajkot	Blue bull, Chinkara, Wolf, Fox, Jackal, Birds, Herpetofauna
Thol Lake Bird Sanctuary	1988	6.99	TholDist: Mahesana	Cranes, Geese, Famingos, Sarus and app. 125 spp. of other waterfowls
Shoolpaneshwar Sanctuary	1982	607.7	Dist: Narmada	Sloth bear, Leopard, Rhesus macaque, Chausinga, Barking deer, Pangolin, Herpetofauna, birds including Alexandrian parakeet
Porbandar Birds Sanctuary	1988	0.09	PorbandarDist: Porbandar	Flamingos, Pelicans, Spoonbill and various bird spp.
Pania Wild Life Sanctuary	1989	39.63	Dist: Amreli	Lion, Chinkara, Leopard, Chital, Hyena, wild board, four horned antelope, pangolin, Blue bull, birds
BalaramAmbaji Sanctuary	1989	542.08	Dist: Banaskantha	Sloth bear, Leopard, Blue bull, Hyena, Wolf, Jungle cat, Birds, Herpetofauna
Jambuhoda Sanctuary	1990	130.38	JambughodaDist: Panchmahal	Sloth bear, Leopard, Jungle cat, Hyena, Wolf, Four Horned Antelope, Herpetofauna, Birds
Purna Wild Life Sanctuary	1990	160.84	Dist: Dangs	Leopard, Barking deer, macaques, Four horned antelope, Sambhar, Hyena, Herpetofauna, birds
Kutch Bustard Sanctuary	1992	2.03	Near NaliyaDist: Kachchh	Great Indian Bustard, Lesser Florican, Houbara bustard, Chinkara, Blue bull, Herpetofauna
Mitiyala Wildlife Sanctuary	2004	18:22	MitiyalaDist: Amerli	Lion, Leopard, Chital, Blue bull, Pangolin, Sambar,Chinkara, Herpetofauna, Birds

Source: Forest Department, GoG

1.2 SOCIO-ECONOMIC BASELINE PROFILE

1.2.1 Area and Population

Gujarat has an area of about 1.96 lakh sq. kms. The state is divided into 26 districts and 224 blocks. The population of the state, as per provisional figures provided by Census 2001, stood at 4.84 crores excluding earthquake affected areas. With the inclusion of the estimated figures of earthquake affected areas, the population of Gujarat was 5.06 crores. Gujarat accounts for 6.19 percent of the area of India. The population of the state, including estimated figures of earthquake-affected areas, is 4.93 percent of the total national population.

1.2.2 Population Density

The population density of Gujarat was 258 persons per sq. km. in 2001. The highest densities of 718 persons per sq. km. were observed in the district of Ahmedabad, while the least density of 35 persons per sq. km. was found in the district of Kutch.

1.2.3 Sex ratio

The sex ratio of Gujarat has reduced to 921 from 934 in 2001. The Dangs and Amreli have the highest sex ratio of 986, while the lowest sex ratio of 835 was found in Surat. The sex ratio for Scheduled Caste

population in the state is 925, while it is 911 in urban areas and 934 in rural areas. The sex ratio for Scheduled Tribe population in the state is 974, while it is 926 in urban areas and 978 in rural areas.

1.2.4 Literacy

The literacy rate in the state (excluding children in the age-group 0-6 years) has increased from 61.29 percent in 1991 to 69.14 percent in 2001. Among males, it has increased from 73.13 percent in 1991 to 79.66 percent in 2001, whereas among females, it has increased from 48.64 percent in 1991 to 57.86 percent in 2001. The literacy rate for rural areas is 61.29 percent, while it is 81.84 percent in urban areas. Out of the 24 districts where population enumeration was conducted, Ahmedabad has the highest literacy rate of 79.89 percent, while Dahod has the lowest literacy rate of 45.65 percent.

1.2.5 Urbanisation

As per the provisional figures of Census 2001, 37.35 percent population of Gujarat resides in urban areas, excluding the areas of districts Kutch, Jamnagar and Rajkot, where census could not be conducted due to earthquake. This proportion of urbanization was 34.49 percent in 1991. In Gujarat, Ahmedabad is the most urbanized district where 80.09 percent of population resides in urban areas, while Dangs is fully rural area having no urban population at all.

1.2.6 Scheduled caste and scheduled tribes

According to 2001 census, the population of Scheduled Castes in the state is 35,92,715, which is 7.09 percent of the total population. It consists of 18,66,283 males comprising 7.07 percent and 17,26,432 females comprising 7.11 percent. The urban SC population in the state is 14,12,274, which is 39.31 percent. The SC population in rural areas is 21,80,441, which is 60.69 percent.

According to 2001 census, the population of Scheduled Tribes in the state is 74,81,160, which is 14.76 percent of the total population. It consists of 37,90,117 males comprising 14.36 percent and 36,91,043 females comprising 15.20 percent. The urban ST population in the state is 6,14,523 which is 8.21 percent. The ST population in rural areas is 68,66,637, which is 91.79 percent.

The following taluks in Gujarat have been specified[1] as Scheduled Areas,

- Uchchhal, Vyara, Mahuwa, Mahuwa, Mandvi, Nizar, Songadh, Valod, Mangrol and Bardoli talukas in Surat district.
- Dediapada, Sagbara, Valia, Nandod and Jhagadia talukas in Bharuch district
- Dangs district and taluka
- Bansda, Dharampur, Chikhali, Pardi and Umbergaon talukas in Valasad district
- Jhalod, Dohad, Santrampur, Limkheda and Deogarh Baria talukas in Panchmahal district
- Chhotaudepur and Naswadi talukas and Tilakwada mahal in Vadodora district
- Khedbrahma, Bhiloda and Meghraj talukas, and Vijayanagar mahal in Sabarkantha district.

[1] The Scheduled Areas in the States of Bihar and Gujarat were originally specified by the Scheduled Areas (Part A States) Order, 1950 (Constitution Order, 9) dated 23.1.1950 and have been respecified as above by the Scheduled Areas (States of Bihar, Gujarat, Madhya Pradesh and Orissa) Order, 1977 (Constitution Order, 109) dated 31.12.1977 after rescinding the Order cited first so far as that related to the States of Bihar & Gujarat.

Appendix 4-1

Environmental Monitoring Formats

Format EM1: Selection of disposal site locations

From _____ To _____

(Give chainage and nearest settlements from both ends)

Criteria on which information for each site is to be collected	Site 1	Site 2	Site 3	Site 4
Area covered (m^2)				
Total Material that can be dumped within the site (m^3)				
Depth to which disposal is feasible (m)				
Distance of nearest watercourse (m)				
Nearest Settlement (m)				
Date/s of Community Consultation/s				
Whether the community is agreeable to siting of dumping site (Y/N)				
Date of Permission from Village Council President(VCP)				
Proposed future use of the Site				

Selected Site (tick any one column only)
Certified that the above information is correct to the best of my knowledge and belief.

Contractor

Signed: Date:
Name & Designation:

Recommendation on the suitability of the site

Decision Taken (tick one): Approved/Not Approved

Engineer – In-Charge

Signed: Date:
Name and Designation of Deciding Authority

Enclosures
(Tick as appropriate)
1 Maps of each location
2 Photographs
a Each disposal location
b Each community consultation
3 Photocopies of permissions from VCPs

Format EM2: Construction Camp and Storage Area

Construction Stage: Report - Date____ Month_____ Year_____

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)
Format to be submitted before target date (decided by PIU) of establishing camps

Location of Camp (km_____)

Sl. No	Item	Unit	Details	Remarks
1	**Detail of item camp**			
a	Size of Camp	mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.3m.			
h	Details of Storage area(Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	Cum		
2	**Details of top soil stacking**			
a	Quantity of top soil removed	Cum		
b	Detail of storage of topsoil	Describe stacking arrangement		
3	**Details of workforce**			
a	Total No of Labourers	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
f	No of children	nos		
4	**Details of dwelling units**			
a	No of dwellings/huts	nos		
b	Minimum Size of Dwelling	mxm		
c	No of openings per dwelling	nos		
d	Minimum size of opening	mxm		
e	Walls	specifications		
f	Roofing	specifications		
g	Flooring	specifications		
h	Drinking Water Tank	specifications		
i	Capacity of Drinking water Tank	cum		
j	Size of Drinking Water Tank	mxmxm		
k	Total no of WC	nos		
l	No of Wcs for female workers	nos		
m	Minimum Size of WC	mxm		
n	Total No of Bathrooms for female workers	nos		
o	Size of septic tank for WC/Baths	mxmxm		
p	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
q	Fencing around camp	Y/N		
5	**Details of facilities**			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 ltr)	nos		

Certified that the furnished information is correct the quality of work is as per god practice and all relevant information as required is attached

Contractor

Engineer – In -Charge

Format EM3: Reporting for Borrow Areas

Construction Stage Report: Date ____ Month_____ Year_____ Site Layout of Borrow Area and Proposed Borrow Area Redevelopment Plan to be attached with format Format to be submitted before target date as (decided by PIU) for establishing Borrow Areas Borrow Area No. BA_____
Location of Borrow Area (Km_____)

Sl. No	Item	Unit	Details	Remarks by CSC, if any
1	**Details of Borrow Area**			
a	Date of Borrow Area becoming operational dd/mm/yy			
b	Current Landuse			
c	Distance from Nearest Settlement	Km		
d	No of settlements within 200m of Haul Road	No.		
e	No of settlements within 500m of Borrow Area	No.		
f	Total Capacity	cum		
g	No of Trees with girth more than 0.3 m	No.		
h	Length of Haul Road	km		
i	Width of Haul road	m		
j	Type of Haul Road	metal/dirt		
k	Size of Borrow Area	sqkm		
l	Area of Borrow Area	km x km		
m	Quantity Available	cum		
n	Distance of Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
o	Quantity of top soil removed	cum		
p	Detail of storage of topsoil			
q	Daily/occasional use of the Borrow Area by the community, if any	-		
r	Probable reuse of Borrow pit-ask community	-		
s	Drainage channels/slope/characteristics of the area	-		
2	**Enhancement Elements**			
a	Quantity of top soil removed	sq.m		
b	Detail of storage of topsoil	sq.m		
c	Adjoining land use/Natural elements			
d	Near by catchment for storing water			
e	Erosion Control Programme			
f	Preventive measures for			
i	Leaching			
ii	Mosquito Breeding			
iii	Water run-off/contamination			
iv	Any other environmental degradation			
3	**Details of workforce**			
a	Total No of Labourers	No.		
b	Total no of Male Workers	No.		
c	No of Male Workers below 18 years of age	No.		
d	Total No of Female Workers	No.		
e	No of Female workers below 18 years of age	No.		
4	**Details of redevelopment, Plan to be enclosed**			

Certified that the furnished information is correct the quality of work is as per good practice and all relevant information as required is attached

Contractor

Engineer – In -Charge

Format EM4: Tree Felling

S.No	Links	Physical Target				Completion Target		
		Total	Target	Target Achieved	% of task completed	Target Date	Date of Completion if task completed	Reason for Delay if any
		Unit						
1		nos						
2		nos						
3		nos						
4		nos						

Contractor

Engineer – In -Charge

EM 5 Topsoil Conservation Monitoring

Contract _____

Report No. _____ Date_____

Location (Chainage)	Original Use of Topsoil removed	Measures for preventing spillage of topsoil on Haul Roads(Earthen/ Metalled)	Present Method of Storage	Anticipated period of Storage (Months)	Distance of nearest Water course (m)	Present Slope of Pile (V: H)	Whether silt fencing provided?	Is any other covering / measure provided? If yes, what is it?	Improvements required	Extent of Compliance as on date of report

Certified that the above is true.

Signed_____

Contractor

Verified

Signed_____

Engineer – In-charge

EM 6 Redevelopment of Borrow Areas

Operation Stage: Report: Date ____ Month_____ Year_____

To be monitored by PIU during operation period

Details of remarks to be appended wherever necessary.

Sl. No	Activity	Particulars	Drawbacks Identified			Improvements Required		
			Construction	Financial	Others (Ask Community)	Technical	Financial	Remarks/ Suggestions
1	Details of Borrow area and Surrounding Landuse							
2	End use of the borrow area							
3	Whether rehabilitation has been carried out in line with owners request							
4	Erosion Control Measures							
5	Number of trees planted							
6	Reuse of topsoil							
7	Preventive measures taken for -Mosquito Breeding -Water runoff/ contamination -Other Environmental Degradation							
8	Any problems faced by owner							
9	Any problems faced by the local community							
10	If it has been developed as a fish pond,							
a	Details of available catchment for storing water							
b	Economic Benefits/Utility							
11	If it has been developed as an orchard							
a	Details of suitability of soil and water.							
B	Type of Plantation							
c	Economic Benefits/Utility							
12	Any Other End use							
a	Particulars							
b	Economic Benefits/Utility							

Contractor

Engineer – In -Charge

EM 7 Checklist for Construction Safety

Sl. No.	Safety Issues	Yes	No	Non compliance	Corrective Action	Penalty	Remarks
Safety during Construction Stage							
1	Appointment of qualified Construction safety officers						
2	Approval for Construction Safety Management Plan by the Engineer.						
3	Approval for Traffic Management/control Plan in accordance with IRC: SP: 55-2001						
4	Maintenance of the existing road stretches handed over to the Contractor.						
5	Provision of Temporary Traffic Barriers/Barricades/caution tapes in construction zones						
6	Provision of traffic sign boards						
7	Provision for flags and warning lights						
8	Provision of metal drum/empty bitumen drum delineator, painted in circumferential strips of alternate black and white 100mm wide 2 coats fitted with reflectors 3 Nos of 7.5cm diameter						
9	Providing plastic crash barrier						
10	Provision of adequate staging, form work and access (ladders with handrail) for works at a height of more than 3.0 m						
11	Provision of adequate shoring / bracing / barricading / lighting for all deep excavations of more than 3.0 m depth.						
12	Demarcations (fencing, guarding and watching) at construction sites						
13	Provision for sufficient lighting especially for night time work						
14	Arrangements for controlled access and entry to Construction zones						
15	Safety arrangements for Road users / Pedestrians						
16	Arrangements for detouring traffic to alternate facilities						
17	Regular Inspection of Work Zone Traffic Control Devices by authorized contractor personnel						
18	Construction Workers safety - Provision of personnel protective equipments						
19	A. Helmets						
	B. Safety Shoe						
	C. Dust masks						
	D. Hand Gloves						
	E. Safety Belts						
	F. Reflective Jackets						
	G. Earplugs for labour						
20	Workers employed on bituminous works, stone crushers, concrete batching plants etc. provided with protective goggles, gloves, gumboots etc.						

21	Workers engaged in welding work shall be provided with welder protective shields						
22	All vehicles are provided with reverse horns.						
23	All scaffolds, ladders and other safety devices shall be maintained in as safe and sound condition						
24	Regular healthcheckup for labour/ Contractor's personnel						
25	Ensuring the sanitary conditions and all waste disposal procedures & methods in the camps.						
26	The Contractor shall provide adequate circuit for traffic flow around construction areas, control speed of construction vehicles through road safety and training of drivers, provide adequate signage, barriers and flag persons for traffic control						
27	Provision for insurance coverage to the contractor's personnel						

Contractor

Engineer – In -Charge

Format EC1: Target Sheet for Pollution Monitoring

Construction Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted as per EMP)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Water Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted at all the locations specified in the EMP

Contractor

Engineer – In -Charge

Format EC 2: Target Sheet for Pollution Monitoring

Operation Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Water Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted at all the locations specified in the EMP

Contractor

Engineer – In -Charge

Appendix 5-1

Guidelines for Environmental Management

GUIDELINE-1: SITE PREPARATION

1. GENERAL

The preparation of site for construction involves: (i) clearing of land required for construction; and (ii) management of activities such as traffic during construction. These activities have been detailed out for road construction activities separately.

2. ROAD CONSTRUCTION

2.2 Site Preparation Activities

After obtaining the consent of the community on the alignment, the Project Implementation Unit (PIU) of the Divisional Office shall be responsible to stake out the alignment by establishing working benchmarks on ground. It shall be the responsibility of the PIU to take over the possession of the proposed RoW and hand over the land width required clear of all encumbrances to the Contractor. Activities pertaining to the clearance of land and relocation of utilities need to be initiated by the PIU well in advance to avoid any delays in handing over of site to the Contractor. Assistance of the Revenue Department shall be sought in accomplishing the task. To summarize, the PIU's responsibilities before handing over the site to the contractor include:

- Clearance of encroachments within proposed RoW;
- Initiation of process for legal transfer of land title;
- Alignment modification or Relocation of common property resources in consultation with the local community;
- Alignment modification or Relocation of utilities in consultation with the various government departments; and
- Obtain clearances required from government agencies for
- Cutting of trees; and
- Land Diversion of forestlands, etc.

2.2 Site Preparation Activities by the Contractor

Site preparation shall involve formation of the road base wherein it is ready for construction of protective/drainage works, carriageway, shoulders, parapets and other road furniture. The PIU shall transfer the land for civil works to the Contractor after peg marking of the alignment.

The Contractor shall verify the benchmarks soon after taking possession of the site. The Contractor, prior to initiation of site preparation activities, shall highlight any deviations/discrepancies in these benchmarks to the Engineer - Inchargein writing. The contractor shall submit the schedules and methods of operations for various items during the construction operations to the Engineer - Inchargefor approval. The Contractor shall commence operations at site only after the approval of the schedules by the Engineer - Incharge.

The activities to be undertaken by the contractor during the clearing and grubbing of the site are as follows:

The clearance of site shall involve the removal of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, part of topsoil and rubbish. Towards this end, the Contractor shall adopt the following measures: (i) Limiting the surface area of erodible earth material exposed by clearing and grubbing; (ii) Conservation of top soil and stock piling as per the measures suggested as part of **Guideline 4**, "Top Soil Salvage Storage and Replacement"; and (iii) Carry out necessary backfilling of pits resulting from uprooting of trees and stumps with excavated or approved materials to the required compaction conforming to the surrounding area.

To minimize the adverse impact on vegetation, only ground cover/shrubs that impinge directly on the permanent works shall be removed. Cutting of trees and vegetation outside the working area shall be avoided under all circumstances. In case the alignment passes through forest areas, The Forest Ranger shall be consulted for identification of presence of any rare/endangered species within the proposed road way. Protection of such species if found shall be as per the directions of the Forest Department.

The locations for disposal of grubbing waste shall be finalized prior to the start of the works on any particular section of the road. The selection of the site shall be approved by the Engineer – in - charge. The criteria for disposal of wastes shall be in accordance with the measures given in Guideline on, "Waste Management and Debris Disposal" (**Guideline 8**).

In locations where erosion or sedimentation is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion and sedimentation control features can follow immediately, if the project conditions permit.

Dismantling of CD structures and culverts shall be carried out in a manner as not to damage the remaining required portion of structures and other surrounding properties. The disposal of wastes shall be in accordance with the provisions given in **Guideline 8**, "Waste Management and Debris Disposal". The following precautions shall be adopted: (i) The waste generated shall not be disposed off in watercourses, to avoid hindrance to the flow, and (ii) All necessary measures shall be taken while working close to cross drainage channels to prevent earthwork, stonework as well as the method of operation from impeding cross drainage at rivers, streams, water canals and existing irrigation and drainage systems.

The designated sites duly approved by Implementing Agency shall be cleared of its existing cover for setting up of the construction sites, camps and related infrastructure facilities, borrow areas and other locations identified for temporary use during construction. The contractor shall comply with all safety requirements in consideration as specified in the **Guideline 12** on, "Labour& Worker's Health and Safety". Before initiation of site preparation activities along these lands to be used temporarily during construction, it shall be the responsibility of the Contractor to submit and obtain approval of the site redevelopment plan from the implementing agency. The letter/contract agreement between the owner(s) of the land parcel for temporary usage shall include site redevelopment to its original status. The guidelines for the same are furnished in the Guideline on, "Construction Plants & Equipment Management"; guideline, "Construction and Labour Camps"; and "Borrow areas".

2.2 Traffic management during construction

Traffic management during construction is an activity specific to the contractors. Contractors must ensure a reasonably smooth flow of traffic during construction. The following are the general principles to be followed for traffic management during construction:

- Partial pavement construction **over long lengths will not be permitted.** The contractor should concentrate his activities over sections such that he can complete continuous fronts of up to a maximum of 1 km before starting the adjacent front. The contractor may open more than one continuous 1 km front provided that he has the separate resources to do so. The resources working on a 1 km front may not be shifted to another front until no longer required on that front.
- The construction activities should be staggered over sub-sections to the extent that the use of plant and equipment is optimized to maximum efficiency and to avoid idling. For road widening operations, excavation **adjacent to the existing road shall not be permitted on both titles simultaneously.** Earthworks must be completed to the level of the existing road before excavation work on the opposite side will be permitted.
- The construction operations taking place on a particular front must be managed efficiently such that delays between successive pavement layers are minimized.
- Before the start of the monsoon season (June) the contractor shall ensure that the pavement over any front is complete, full width, at least upto Dense Bituminous Macadam, DBM level, but preferably with Asphaltic Concrete, AC wearing course. The contractor **should not start any sections of pavement that he cannot complete by the start of the monsoon season.**
- In the absence of permanent facilities, temporary drainage and erosion control measures, as required by the Specifications, are to be implemented prior to the onset of the monsoon.

In cases where separate traffic diversions are not essential or cost effective the construction methodology should be in accordance with the guidelines following:

On a 1km section, the pavement construction (except new alignments) should be limited to 500m sub-sections with a minimum of 1 to 1.5 km between successive sub-sections to ease traffic management and safety issues. The earthworks in the widening portions are not limited in, this respect. Excavation on both sides of the existing, road over the same sub-section simultaneously shall not be permitted for reasons of safety to the traffic, particularly at night.

Sub-sections longer than 500 m may be authorized by the Engineer if two-way traffic flow can be comfortably managed and the Contractor **can demonstrate his ability to maintain dust control, proper road edge delineation, proper signage and traffic control.** Where single file traffic is permitted ('only applicable to final wearing course operations), the sub-sections shall be reduced to a maximum length whereby safe traffic regulation can be physically managed. Single file traffic may not be permitted at certain locations or times of the day when traffic volumes are such that excessive congestion shall occur.

GUIDELINE-2: CONSTRUCTION AND LABOUR CAMPS

1. INTRODUCTION

The scope of this guideline pertains to the siting, development, management and restoration of construction and labour camps to avoid or mitigate impacts on the environment. The area requirement for the construction camp shall depend upon the size of contract, number of labourers employed and the extent of machinery deployed. The following sections describe the siting, construction, maintenance, provision of facilities in the camps and finally rehabilitation of the construction and labour camps. These are described in three stages, pre-construction, construction and post-construction stage. The issues related to construction camps are similar in the case of road construction and hence have been taken together.

2. PRE-CONSTRUCTION STAGE

Identification of site for construction and labour camps is the first task. The Contractor shall identify the site for construction camp in consultation with the individual owners in case of private lands and the concerned department in case of Government lands. The suitable sites shall be selected and finalized in consultation with the Engineer -incharge. **Table 1** gives the lands that could be avoided for construction camps and conversely those that could be preferred.

Table 2-1: Selection Criterion for Construction Camps.

Avoid the following …	Prefer the following …
• Lands close to habitations. • Irrigated agricultural lands. • Lands belonging to small farmers. • Lands under village forests. Lands within 100m of community water bodies and water sources as rivers. • Lands within 100m of watercourses. • Low lying lands. • Lands supporting dense vegetation. • Grazing lands and lands with tenure rights. • Lands where there is no willingness of the landowner to permit its use.	• Waste lands. • Waste Lands belonging to owners who look upon the temporary use as a source of income. • Community lands or government land not used for beneficial purposes. • Private non-irrigated lands where the owner is willing. • Lands with an existing access road.

The contractor will work out arrangements for setting up his facilities during the duration of construction with the land owner/concerned department. These arrangements shall be in the form of written agreement between the contractor and the land owner (private/government) that would specify:

a) photograph of the proposed camp site in original condition;

b) activities to be carried out in the site;

c) environmental mitigation measures to be undertaken to prevent land, air, water and noise pollution;

d) detailed layout plan for development of the construction and labour camp that shall indicate the various structures to be constructed in the camp including temporary, drainage and other facilities (**Figure 1** gives a layout plan for a construction camp); and

e) Restoration plan of camp site to previous camp conditions.

The arrangements will be verified by the Engineer -incharge to enable redressal of grievances at a later stage of the project.

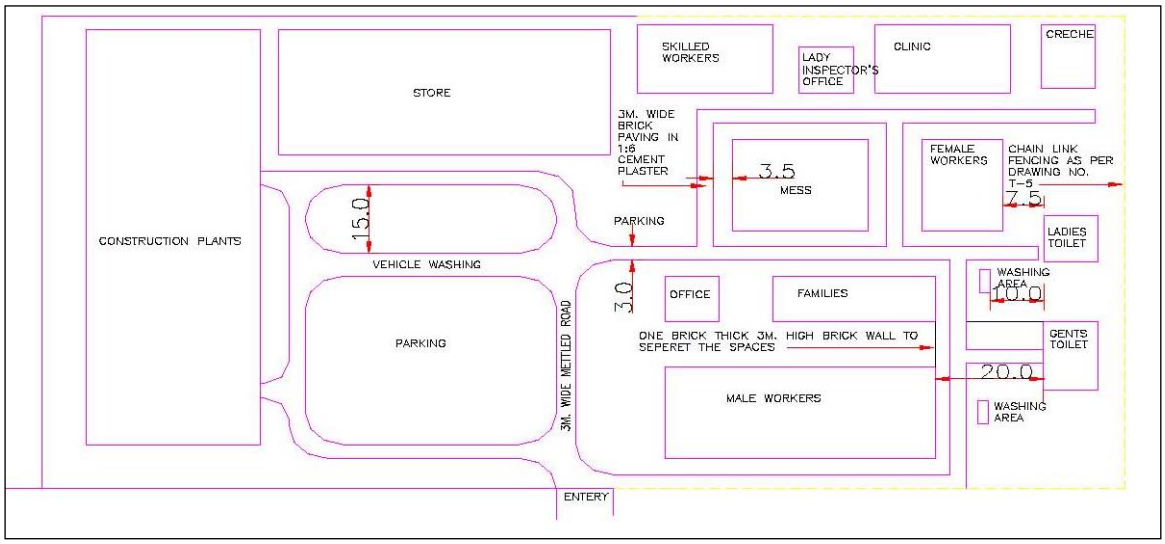


Figure 2-1: Layout Plan for Construction Camp

2.2 Setting up of labour camp

The contractor shall provide, free of cost in the camp site, temporary living accommodation to all the migrant workers employed by him for complete construction/maintenance work is in progress. A minimum area of 6 sq.mts per person shall be provided. The rooms of labour shall be well lighted and ventilated. The facilities to be provided for the labour are discussed below:

a) Drinking Water

Towards the provision and storage of drinking water at the construction camp, the contractor shall ensure the following provisions

- The contractor shall provide for a continuous and sufficient supply of potable water in the camps, in earthen pots or any other suitable containers.
- The contractor shall identify suitable community water sources for drinking. Only in the event of non-availability of other sources of potable water, the Contractor shall obtain water from an unprotected source only after the testing for its potability. Where water has to be drawn from an existing open well, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with dust proof trap door.
- Every water supply or storage shall be at a distance of not less than 15m from any wastewater / sewage drain or other source of pollution. Water sources within 15m proximity of toilet, drain or any source of pollution will not be used as a source of drinking water in the project.
- A pump shall be fitted to covered well used as drinking water source, the trap door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month.

b) Washing and Bathing Facilities

In every site, adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein. Separate and adequate bathing shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions.

c) Toilets Facilities

Sanitary arrangements, latrines and urinals shall be provided in every work place separately for male and female workers. The arrangements shall include:

- A latrine for every 15 females or part thereof (where female workers are employed).
- A latrine for every 10 males.
- Every latrine shall be under cover and so partitioned as to secure privacy, and shall have a proper door and fastenings.

- Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men Only" or "For Women Only" as the case may be.
- The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times and should have a proper drainage system;
- Water shall be provided in or near the latrines and urinals by storage in suitable containers.

d) Waste Disposal

- Disposal of sanitary wastes and excreta shall be into septic tanks.
- Kitchen waste water shall be disposed into soak pits/kitchen sump located preferably at least 15 meters from any water body. Sump capacity should be at least 1.3 times the maximum volume of wastewater discharged per day. The bottom of the pit should be filled with coarse gravel and the sides shored up with board, etc. to prevent erosion and collapse of the pit. New soak pits shall be made ready as soon as the earlier one is filled.
- Solid wastes generated in the kitchen shall be reused if recyclable or disposed off in land fill sites.

e) Medical and First Aid Facilities

Medical facilities shall be provided to the labour at the construction camp. Visits of doctor shall be arranged twice a month wherein routine checkups would be conducted for women and children. A separate room for medical checkups and keeping of first aid facilities should be built. The site medical room should display awareness posters on safety facilitation hygiene and HIV/AIDS awareness.

- First Aid Box will be provided at every construction campsite and under the charge of a responsible person who shall always be readily available during working hours. He shall be adequately trained in administering first aid-treatment. Formal arrangement shall be prescribed to carry injured person or person suddenly taken ill to the nearest hospital. The first aid box shall contain the following.
- 6 small sterilized dressings
- 3 medium size sterilized dressings
- 3 large size sterilized dressings
- 3 large sterilized burns dressings
- 1 (30 ml) bottle containing 2 % alcoholic solution of iodine
- 1 (30 ml) bottle containing salvolatile
- 1 snakebite lancet
- 1 (30 gms) bottle of potassium permanganate crystals
- 1 pair scissors
- Ointment for burns
- A bottle of suitable surgical antiseptic solution

In case, the number of labour exceeds 50, the items in the first aid box shall be doubled.

f) Provision of Shelter during Rest

The work place shall provide four suitable sheds, two for meals and two for rest (separately for men and women). The height of the shelter shall not be less than 3.0m from the floor level to the lowest part of the roof. These shall be kept clean.

g) Crèches

In case 20 or more women workers are employed, there shall be a room of reasonable size for use of children under the age of six years. The room should have adequate light and realisation. A caretaker is to be appointed to look after the children. The use of the room shall be restricted to children, their mothers and the caretaker.

2.2 Storage of Construction Material in Construction Camps

For storage of Petrol/Oil/Lubricants, brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage. These should be kept away from labour residential areas. The storage of cement shall be at Damp-proof flooring, as per IS codes.

All materials shall be stored in a barricaded area. In case of electrical equipments, danger signs shall be posted. The batch mix plant is to be located away from the residential area and not in the wind direction. Separate parking areas for vehicles and also workshop areas need to be provided.

2.2 Fire fighting arrangement

- The following precautions need to be taken:
- Demarcation of area susceptible to fires with cautionary signage;
- Portable fire extinguishers and/or sand baskets shall be provided at easily accessible locations in the event of fire;
- Contractor shall educate the workers on usage of these equipments.

2.2 Interactions with host communities

To ensure that there is no conflict of the migrant labor with the host communities, the contractor shall issue identity cards to labourers and residents of construction camps.

3. CONSTRUCTION STAGE

Construction camps shall be maintained free from litter and in hygienic condition. It should be kept free from spillage of oil, grease or bitumen. Any spillage should be cleaned immediately to avoid pollution of soil, water stored or adjacent water bodies. The following precautions need to be taken in construction camps.

- Measures to ensure that no leaching of oil and grease into water bodies or underground water takes place.
- Wastewater should not be disposed into water bodies.
- Regular collection of solid wastes should be undertaken and should be disposed off safely.
- All consumables as the first aid equipment, cleaning equipment for maintaining hygiene and sanitation should be recouped immediately.
- The debris/scrap generated during construction should be kept in a designated and barricaded area.

The Engineer - incharge will monitor the cleanliness of construction campsites and ensure that the sites are properly maintained throughout the period of the contract.

4. POST CONSTRUCTION STAGE

At the completion of construction, all construction camp facilities shall be dismantled and removed from the site. The site shall be restored to a condition in no way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include:

- Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas.
- Soak pits, septic tanks shall be covered and effectively sealed off.
- Debris (rejected material) should be disposed off suitably (Refer **Guideline - 10** on "Waste Management and Debris Disposal").
- Ramps created should be levelled.
- Underground water tank in a barren/non-agricultural land can be covered. However, in an agricultural land, the tank shall be removed.
- If the construction camp site is on an agricultural land, top soil can be spread so as to aid faster rejuvenation.
- Proper documentation of rehabilitation site is necessary. This shall include the following: −Photograph of rehabilitated site;
- Land owner consent letter for satisfaction in measures taken for rehabilitation of site;
- Undertaking from contractor; and
- Certification from Engineer in-charge.

In cases, where the construction camps site is located on a private land holding, the contractor would still

have to restore the campsite as per this guideline. Also, he would have to obtain a certificate for satisfaction from the landowner.

GUIDELINE-3: BORROW AREAS

1. INTRODUCTION

Embankment fill material is to be procured from borrow areas designated for the purpose. Borrow areas cause significant adverse environmental impacts if appropriate mitigation measures are not taken. The scope of this guideline includes measures that are required during project planning and design stage, pre-construction, construction stage and post construction stage. Borrow areas are related only to road construction activities.

2. PROJECT PLANNING AND DESIGN STAGE

Design measures for reduction in the quantity of the earthwork will have to be undertaken to reduce the quantity of material extracted and consequently decrease the borrow area requirement. Borrow area siting should be in compliance with IRC: 10-1961. The DPR shall contain (i) Guidelines for locating site of borrow areas and borrow material specifications.

3. PRE-CONSTRUCTION STAGE

The contractor shall identify the borrow area locations in consultation with the individual owners in case of private lands and the concerned department in case of government lands, after assessing suitability of material. The suitable sites shall be selected and finalized in consultation with the Engineer - incharge. Borrowing to be avoided on the following areas:

- Lands close to toe line.
- Irrigated agricultural lands (In case of necessity for borrowing from such lands, the topsoil shall be preserved in stockpiles. The subsequent Guidelines discuss in detail the conservation of topsoil.
- Grazing land.
- Lands within 0.8km of settlements.
- Environmentally sensitive areas such as Reserve Forests, Protected Forests, Sanctuary, wetlands. Also, a distance of 1000 m should be maintained from such areas.
- Designated protected areas / forests.
- Unstable side-hills.
- Water-bodies.
- Streams and seepage areas.
- Areas supporting rare plant/ animal species;
- Ensure unsuitable soft rock is not prominent within the proposed depth of excavation which will render rehabilitation difficult.

3.1 Arrangements for Borrow Area

The Contractor will work out arrangements for borrowing with the land owner/concerned department. The arrangements will include the redevelopment after completion of borrowing. The arrangements will be verified by the Engineer - incharge to enable redressal of grievances at a later stage of the project. The Engineer -Incharge shall approve the borrow area after inspection of the site to verify the reclamation plan and its suitability with the contractor and landowner. The contractor shall commence borrowing soil only after the approval by the Engineer - Incharge. The contractor shall submit to the Engineer-Incharge the following before beginning work on the borrow areas.

- Written No-objection certificate of the owner/cultivator;
- Estimate extent of earth requires;
- Extent of land required and duration of the agreement;
- Photograph of the site in original condition; and
- Site redevelopment plan after completion.

The depth of excavation should be decided based on natural ground level of theland and the surroundings, and rehabilitation plan. In case higher depth of excavation is agreed with backfilling by unsuitable

excavated soil (from roadway), then filling should be adequately compacted except topsoil, which is to be spread on the top most layer (for at least 20m thick). The guidelines for location, depth, size and shape of the borrow areas are available in the following:

- Clause 305.2.2.2 of MoRTH specification for roads and bridge works of IRC;
- Guidelines for environmental impact assessment of highway projects, Indian Roads Congress, 1989: (IRC: 104-1988);
- IRC: 10-1961-Recommended practice for borrow pits for road embankments constructed by manual operations, as revised in 1989;
- IRC SP: 58-2001 guideline for use of fly ash in road construction;
- EIA manual of MoEF, 2001;
- MoEF notification on utilisation of fly ash dated 27 August, 2005.

3.2 Documentation of Borrow Pit

The contractor must ensure that following data base must be documented for each identified borrow areas that provide the basis of the redevelopment plan.

- Chainage along with offset distance;
- Area (Sq.m);
- Photograph of the pit from all sides;
- Type of access/width/kutcha/puccaetc from the carriageway;
- Soil type;
- Slope/drainage characteristics;
- Water table of the area or identify from the nearest well, etc;
- Existing landuse, for example barren/agricultural/grazing land;
- Location/name/population of the nearest settlement from borrow area;
- Present usage of borrow area; and
- Community facility in the vicinity of borrow pit.

3.3 Redevelopment Plans for Borrow Pits

The following checklist provides guidelines in order to ensure that redevelopment of borrow areas must comply with MoRTH, clause 305.2.2.2 and EMP requirement. Borrow areas can be developed as:

- Ponds (various types) (eg: Drinking Water only; Washing and for other Domestic Chores; Only for Cattle; Mixed Uses etc.) (a large pond can be divided into two parts - each having a defined use)
- Farmland submission
- Water Recharging Zones
- Pastureland
- Fish Ponds (pissiculture)
- Waste disposal Sites (depending upon the location, distance from settlements, pollution risks, safety, associated environmental risks and hazards, regulations/ permissions of appropriate authority and other such factors)
- Plantation Zones
- Recreational Zones (depending upon location, size, potential of the site, willingness of the local bodies to develop it)
- Wildlife Refuge and Drinking Area (applicable only in case of sensitive environs with appropriate planning and understanding including regulation of depth for safety of animals etc.)

The rehabilitation measures for the borrow areas shall be dependent on the following factors:

- Land use objectives and agreed post-borrowing activities;
- Physical aspects (landform stability, erosion, re-establishment of drainage);
- Biological aspects (species richness, plant density,) for areas of native re vegetation;

- Water quality and soil standards; and
- Public safety issues.

Rehabilitation should be simple and maintenance free. Depending on the choice of the individual land owner/community, the contractor shall prepare redevelopment plans for the borrow areas. The options can be: (i) Restoring the productive use of the land (ii) Development of detention ponds in barren areas.

Option I: Suitable in locations with high rainfall and productive areas

Topsoil must be placed, seeded, and mulched within 30 days of final grading if it is within a current growing season or within 30 days of the start of the next growing season. Vegetative material used in reclamation must consist of grasses, legumes, herbaceous, or woody plants or a combination thereof, useful to the community for the fuel and fodder needs.

Plants must be planted during the first growing season following the reclamation phase.

Selection and use of vegetative cover must take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth. The vegetative cover is acceptable if within one growing season of seeding, the planting of trees and shrubs results in a permanent stand, or regeneration and succession rate, sufficient to assure a 75% survival rate.

Option II: In barren land, the borrow areas can be redeveloped into detention ponds.

These will be doubled up as water bodies and also for removal of sediment from runoff flowing through the ponds. Design of the detention basin depends upon the particle size, settling characteristics, residence time and land area. A minimum of 0.02 mm size particle with a settling velocity of 0.02 cm/sec (assuming specific gravity of solids 2.65) can be settled in the detention basin.

Following parameters are to be observed while setting up a detention pond:

- Pond should be located at the lowest point in the catchment area. Care should be taken that the horizontal velocity should be less then settling velocity to prevent suspension or erosion of deposited materials.
- Minimum Effective Flow Path: 5 times the effective width
- Minimum Free Board: 0.15 m
- Minimum Free Settling Depth: 0.5 m
- Minimum Sediments Storage Depth: 0.5 m
- Maximum interior slope: 2H : 1V
- Maximum exterior slope: 3H : 1V
- The inlet structure should be such that incoming flow should distribute across the width of the pond. A pre-treatment sump with a screen should provide to remove coarse sediments. Settled sediment should be removed after each storm event or when the sediment capacity has exceeded 33% of design sediment storage volume. Accumulated sediment must be disposed of in a manner, which will prevent its re-entry into the site drainage system, or into any watercourse.

4. CONSTRUCTION STAGE

No borrow area shall be operated without permission of the Engineer. The procurement of borrow material should be in conformity to the guidelines laid down in IRC: 10-1961. In addition, the contractor should adopt precautionary measures to minimise any adverse impacts on the environment. Checklists for monitoring borrow areas operation and management has been prepared (**Table 3-1**).

Table 3-1: Checklist for Monitoring Borrow Area Operation and Management

Attributes	Requirements
Access Road	Access road shall be used for hauling only after approved
Top soil preservation	To soil, if any, shall be stripped and stored at corners of the area before the start of excavation for material collection; Top soil should be reused / re-laid as per agreed plan; In case of riverside, borrow pit should be located not less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood. In no case shall be borrow pit be within 1.5m from the Toe line of the proposed

Attributes	Requirements
	embankment.
Depth of excavation	For agricultural land, the total depth of excavation should be limited to 150cm including top 30 cm for top soil preservation; For river side borrow area, the depth of excavation shall be regulated so that the inner edge of any borrow pit, should not be less than 15m from the toe of the bank and bottom of the pit should not cut the imaginary line of 1:4 projected from the edge of the final section of the embankment. To avoid any embankment slippage, the borrow areas will not be dug continuously, and the size and shape of borrow pits will be decided by the Engineer.
Damage to surrounding land	Movement of man and machinery should be regulated to avoid damage to surrounding land. To prevent damages to adjacent properties, the Contractor shall ensure that an undisturbed buffer zone exists between the distributed borrow areas and adjacent land. Buffer zone shall be 3 m wide or equal to the depth of excavation whichever is greater.
Drainage control	The Contractor shall maintain erosion and drainage control in the vicinity of all borrow pits and make sure that surface drains do not affect the adjacent land or future reclamation. This needs to be rechecked by the Engineer-Incharge.
Dust Suppression	Water should be sprayed on kutcha haul road twice a day or as may be required to avoid dust generation during transportation of material; Depending on moisture content, 0.5 to 1.5% water may be added to excavated soil before loading during dry weather to avoid fugitive dust emission.
Covering material for transport material	Material transport shall be provided with tarpaulin cover
Personal Protective Equipment	Workers should be provided with helmet, gumboots and air mask and their use should be strictly enforced.
Redevelopment	The area should be redeveloped within agreed timeframe on completion of material collection as per agreed rehabilitation plan.

5. POST CONSTRUCTION STAGE

All reclamation shall begin within one month of abandonment of borrow area, in accordance with the redevelopment plan. The site shall be inspected by the Engineer-Incharge after implementation of the reclamation plan. Certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The final payment shall be made after the verification by Engineer-Incharge.

6. CHECKLIST FOR INSPECTION OF REHABILITATION AREA

Inspection needs to be carried out by the Engineer - Incharge for overseeing the redevelopment of borrow areas as per the plan. The checklist for the inspection by the Engineer - Incharge is given below.

- Compliance of post-borrowing activities and land use with the restoration plan;
- Drainage measures taken for inflow and outflow in case borrow pit is developed as a detention pond;
- Levellingof the bottom of the borrow areas;
- In case the borrow area is on private property, the contractor shall procure written letter from landowner for satisfaction on rehabilitation. In case of no rehabilitation is desired by the landowner, the letter should include statement "no responsibility of R&BD on contractor in the event of accident.
- Condition of the reclaimed area in comparison with the pre-borrowing conditions.

GUIDELINE-4: TOPSOIL SALVAGE, STORAGE AND REPLACEMENT

1. INTRODUCTION

Loss of topsoil is a long term impact along roads due to (i) site clearance and widening for road formation (ii) development of borrow areas (iii) temporary construction activities such as construction camps, material storage locations, diversion routes etc. The environmental measures for both these activities during all stages of construction activity are discussed in the subsequent sections.

2. PROJECT PLANNING & DESIGN STAGE

At the project preparation stage, the following shall be estimated: (i) Extent of loss of top soil due to widening and siting of construction activities (ii) Estimates of borrow area requirements and (iii) Area requirement for topsoil conservation. The bid document shall include provisions that necessitate the removal and conservation of topsoil at all locations opened up for construction by the Contractor.

3. PRE-CONSTRUCTION STAGE

The arrangements for temporary usage of land, borrowing of earth and materials by the Contractor with the land owner/concerned department shall include the conservation / preservation of topsoil.

4. CONSTRUCTION STAGE

It shall be the responsibility of the Contractor to strip the topsoil at all locations opened up for construction. The stripped topsoil should be carefully stockpiled at suitable accessible locations approved by the Engineer - Incharge. At least 10% of the temporarily acquired area shall be earmarked for storing topsoil. In case of hilly and desert areas, topsoil with humus wherever encountered while opening up the site for construction shall be stripped and stockpiled. The stockpiles shall be located at:

- Areas away from Grade, Subsoil & Overburden materials;
- Areas away from pit activities and day-to-day operations;
- Areas that do not interfere with future pit expansion; and
- Areas away from drainage paths and uphill of sediment barriers.

The stockpiles for storing the topsoil shall be designed such that the slope should not be less than 1:2 (Vertical to horizontal), and the height of the pile is restricted to 2m. A minimum distance of 1m is required between stockpiles of different materials.

In cases where the topsoil has to be preserved for more than a month, the stockpile is to be stabilised within 7 days of forming. The stabilisation shall be carried out through temporary seeding. It consists of planting rapid-growing annual grasses or small grains, to provide initial, temporary cover for erosion control.

After spreading the topsoil on disturbed areas, it must be ensured that topsoil is seeded, and mulched within 30 days of final grading. During construction, if erosion occurs from stockpiles due to their location in small drainage paths, the sediment-laden runoff should be prevented from entering nearby watercourses. The Contractor shall preserve the stockpile material for later use on slopes or shoulders as instructed by the Engineer.

Vegetative material for stockpile stabilisation…

Must consist of grasses, legumes, herbaceous, or woody plants or a mixture thereof • Selection & use of vegetative cover to take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth

Vegetative material for stockpile stabilisation…

Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur.

Divert runoff around stockpiles unavoidably located in drainage paths using a perimeter bank uphill.

The stockpiles shall be covered with gunny bags or tarpaulin immediately in case they are not stored for periods longer than 1 month

5. POST CONSTRUCTION STAGE

The topsoil shall be re-laid on the area after taking the borrow earth to maintain fertility of the agricultural

field, finishing it to the required levels and satisfaction of the farmer. The area to be covered with vegetation shall be prepared to the required levels and slope as detailed in the DPR. The stockpile material shall be spread evenly to a depth of 5-15cm to the designed slopes and watering the same as required. The growth of the vegetation shall be monitored at frequent intervals. All temporary arrangements made for stockpile preservation and erosion control are to be removed after reusing the stockpile material. The top soil can also be used for the following purposes:

a. Covering the borrow areas;

b. Embankment and turfing;

c. Median; and

d. Rehabilitation of construction and labour camp.

GUIDELINE-5: QUARRY MANAGEMENT

1. INTRODUCTION

This guideline pertains to the measures to be taken to address environmental concerns in quarry areas. The general practice adopted is to procure materials from existing quarries operating with the requisite permits. The measures to be taken for operation and management for quarries during all stages of construction have been discussed in this Guideline.

2. PROJECT PLANNING AND DESIGN STAGE

The PIU shall provide in the DPR / bid document, a list of licensed quarries operating within the district and adjoining districts. In addition, the DPR shall contain the following: (i) Quantity of materials available in quarries (ii) Lead from the various existing quarries and (iii) Adequacy of materials for the project in these quarries. **Table 5-1** and **5-2** give the format for preparing a list of quarries.

Table 5-1 Details of Sand Quarry

Sample No.	Source of Sand	Name of quarry area	Site Identification/ Location			Approximate Quantity (cum)	Approximate basic cost of the material (Rs.)	Remarks
			Nearest Chainage (Km.)	Left/Right	Offset from nearest chainage (km)			

Table 5-2 Details of Quarry Area for Aggregates

Sample No.	Chainages (Km.)	Left/ Right	Name of Quarry Area	Name of Crusher	Lead from nearest chainage (Km.)	Basic cost of the material (Rs.)	Available land/terrain	Surrounding land Terrain	Remarks

Only in the event of non-availability of existing quarries, the Contractor shall open a new quarry in accordance with Mines and Minerals (Development & Regulation) Act, 1957. The bid document shall include the exhaust quarry reclaim plan per needs of the landowner / community.

3. PRE-CONSTRUCTION STAGE

The Contractor shall select an existing licensed quarry identified in DPR for procuring materials. The Contractor shall establish a new quarry with the prior consent of the Engineer - Incharge only in cases when: (i) Lead from existing quarries is uneconomical and (ii) Alternative material sources are not available. The Contractor shall prepare a Redevelopment Plan for the quarry site and get it approved by the Engineer - Incharge.

The construction schedule and operations plans to be submitted to the Engineer - Incharge prior to commencement of work shall contain a detailed work plan for procuring materials that includes procurement, transportation and storage of quarry materials.

4. CONSTRUCTION STAGE

4.1 Development of Quarry Area

To minimize the adverse impact during excavation of material following measures are need to be undertaken:

- Adequate drainage system shall be provided to prevent the flooding of the excavated area
- At the stockpiling locations, the Contractor shall construct sediment barriers to prevent the erosion of excavated material due to runoff.
- Construction of offices, laboratory, workshop and rest places shall be done in the up-wind of the

plant to minimize the adverse impact due to dust and noise.

- The access road to the plant shall be constructed taking into consideration location of units and also slope of the ground to regulate the vehicle movement within the plant.
- In case of storage of blasting material, all precautions shall be taken as per The Explosive Rules, 1983.

4.2 Setting up of Crushers and other equipments

The following measures shall be undertaken for setting up of crushers are other equipments.

- The contractor shall obtain "No Objection Certificate (NoC)" from the Gujarat State Pollution Control Board.
- All vehicles must possess Pollution Under Control (PUC) Certificate and shall be renewed accordingly
- All machinery, equipments, and vehicles shall comply with existing CPCB noise and emission norms.
- The Engineer - Incharge must ensure that contractor shall submit the copy of NoC and PUC Certificate before the start of work.

4.3 Quarry operations

The followings precautions shall be undertaken during quarry operations. vii) Overburden shall be removed and disposed as per **Guideline 8** "Waste Management and Debris Disposal".

- During excavation slopes shall be flatter than 20 degrees Guideline 8 on to prevent their sliding
- In case of blasting, the procedure and safety measures shall be taken as per The Explosive Rules, 1983
- The Contractor shall ensure that all workers related safety measures shall be done as per measures for, "Labour& Workers Health & Safety" (**Guideline 12**).
- The Contractor shall ensure maintenance of crushers regularly as per manufacturer's recommendation.
- Stockpiling of the excavated material shall be done as per stockpiling of topsoil explained in **Guideline 4**, "Topsoil Salvage, Storage & Replacement."
- During transportation of the material, measures shall be taken as per **Guideline 11** "Construction Plants and Equipment Management" to minimize the generation of dust and to prevent accidents
- The Engineer-Incharge and the concerned authority shall review the quarry site for the management measures during quarry operation, including the compliance to pollution norms.

5. POST CONSTRUCTION STAGE

A quarry redevelopment plan shall be prepared by the Contractor. All haul roads constructed for transporting the material from the quarries to construction site shall be restored to their original state.

The Engineer - Incharge and the concerned authority shall be entrusted the responsibility of reviewing the quarry site for the progress of implementation of Redevelopment Plan.

The plan shall include:

- Photograph of the quarry site prior to commencement
- The quarry boundaries as well as location of the materials deposits, working equipments, stockpiling, access roads and final shape of the pit.
- Drainage and erosion control measures at site
- Safety measures during quarry operation
- Design for redevelopment of exhaust site.

Two options for redevelopment of quarry areas are given below:

Option A: Vegetating the quarry to merge with surrounding landscape. This is done by conserving and reapplying the topsoil for the vegetative growth.

Option B: Developing exhausted quarries as water bodies. The pit shall be reshaped and developed into pond, for harvesting rainwater. This option shall only be considered where the location of quarry is at the lowest point, i.e. surrounding areas/ natural drainage slopes towards it.

GUIDELINE-6: WATER FOR CONSTRUCTION

1. INTRODUCTION

The scope of this guideline includes the procurement of water required for construction of roads. Except bituminous works, water is required during all stages of road construction such as Embankment Sub-Grade; Granular sub-base (GSB) and Water Bound Macadam (WBM). Management of water in various stages of construction is given in the following sections.

2. PROJECT PLANNING & DESIGN STAGE

- The Detailed Project Report for both road constructions shall contain the following information:
- Estimate of water requirement during different seasons based on construction schedule of various stages of construction.
- Identification of potential sources of water for construction,
- Arrangements to be worked out by the contractor with individual owners, when water is obtained from private sources, and
- Whether scarcity of water would have any impact on schedule of construction.

In water-scarce regions, provide the following additional information in Project Reports…

- Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users.
- Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works.
- Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.

In water scarce regions, if water-harvesting structures are to be constructed, suitable locations and mechanism for siting these structures will be identified. These are envisaged to be permanent water tanks for collection of stream water. Detailed drawings of water harvesting structures based on site conditions will need to be worked out and presented in the DPR. No extra payment shall be generally made for these works and the Contractor has to include the cost of these items in his offer while quoting his tendered rate.

Scheduling Construction in Water Scarce Areas: As part of the project preparation, the Engineer - Incharge shall conduct an assessment of water requirement and availability in water scarce regions. As far as possible, schedule for construction in these water scarce areas shall be prepared such that earthwork for embankment is carried out just before monsoon, so that water requirement for subsequent construction works such as granular sub-base and water bound macadam are met in monsoon and post monsoon season. Carrying out these activities even during the monsoon is possible as the rainfall may not be high enough to disrupt construction.

3. PRE-CONSTRUCTION STAGE

Prior to commencement of extraction of water for construction, the contractor shall work out arrangements as specified in the DPR.

In water-scarce regions, provide the following additional information in Project Reports…

- Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users.
- Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works.
- Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.

from any septic tank/soak pit or other source of pollution.

- **In case of water harvesting structures** (if required), the Contractor shall in consultation with the residents, identify suitable locations for siting the structure and construct the same.
- **In case of perennial sources,** the Contractor shall adhere to all administrative procedures pertaining to procurement of water from such sources.

CONSTRUCTION STAGE

During construction, the Contractor shall be responsible to monitor the following:

- The arrangements worked out with the Panchayat/individual land owners for water extraction is adhered to;
- Extraction of water is restricted to construction requirement and domestic use of construction workers;
- Water requirement for curing of concrete shall be minimized by pooling of water over the concrete or by covering with wet gunny bags; and
- The potable water used for drinking purposes of construction workers shall be as per the Indian Standard for Drinking Water IS: 10500, 1991.

GUIDELINE-7: SLOPE STABILITY AND EROSION CONTROL

1. INTRODUCTION

Stability of slopes is a major concern in locations of high embankment. In cases of high embankment, water retention at the embankment base initially causes toe failure and subsequently failure of the whole embankment. Soil erosion is consequent to high runoff on hill slopes. Embankments made up of silty and sandy soils get eroded, in the absence of vegetative cover, when the slopes are steep say more than 20 Degree.

The scope of this guideline includes measures to minimize the adverse environmental impacts due to slope instability and soil erosion. The adverse environmental impact can be: (i) Damage to adjacent land, (ii) Silting of ponds and lakes disturbing the aquatic habitat (iii) Erosion of rich and top fertile top layer of soil (iv) Contamination of surface water bodies and (v) Reduction in road formation width due to erosion of shoulders/berms.

2. PROJECT PLANNING AND DESIGN STAGE

During the detailed project preparation phase, the following investigations shall be carried out prior to finalisation of alignment.

- Topographical;
- Hydrological;
- Geo-technical; and
- Geological Investigation (in case of roads in hill areas and areas of high seismic activity)

In addition to the slope stability analysis the alignment should be such that (i) steep as well as heavy cuts are avoided, (ii) Flora and fauna of the area are not disturbed and (iii) Natural drainage pattern is not obstructed.

For high embankments, geo-technical investigations (determination of C, φ, density etc.) of the available material need to be done to check its suitability as fill material.

In case of the CD structures, measures for preventing siltation and scouring shall be undertaken as per Guideline on, “Drainage”.

Following guidelines shall be followed in desert areas while using cohesion-less soils for embankment construction.

- The alignment should follow the natural ground level to the extent possible and the embankment shall be restricted to minimum to achieve ruling grades.
- Slope of the embankment should be 3 (H): 1(V) or flatter.
- The corners of the embankment should be rounded for better aerodynamic performance.

3. PRE-CONSTRUCTION STAGE

Interceptor ditches are constructed along hilly slopes or areas with high rainfall to protect the road bench and hillside slope from erosion due to heavy rainfall and runoff. Interceptor ditches are very effective in the areas of high intensity rainfall and where the slopes are exposed. These are the structures designed to intercept and carry surface run-off away from erodible areas and slopes, thus reducing the potential surface erosion. The Engineer - Incharge must ensure that the layout and siting of ditches is as per specifications.

4. CONSTRUCTION STAGE

When alternative material such as fly ash is used for embankment formation, it needs to be ensured that sufficient filter bed is provided along with the top cap. All tests as per IS: 2720 (Parts: 4, 5, 8 & 40) and IRC: SP: 20-2002 are to be conducted on the embankment to keep a check on the compaction achieved. Slope stabilisation techniques and erosion control measures such as stone pitching, use of geotectile and turfing.

Box-1: Detailed specifications for Vegetative cover

Description:

The vegetative cover should be planted in the region where the soil has the capacity to support the plantation and at locations where meteorological conditions favours vegetative growth.

Site Preparation:

- To prevent the seeds from being washed away subsequent to sowing, the area should be protected with surface roughening and diversions.
- Soil samples should be taken from the site and analysed for fertiliser and lime requirements.

Seed Application:

- The seed should be sown uniformly as soon as preparation of the seedbed has been completed.
- No seed should be sown during windy weather. The best time for needing would be during monsoon.

Maintenance:

During first six weeks, the planting should be inspected by the PIC, to check if the growth is uniform and dense. Appropriate moisture levels shall be maintained. There may be requirement of watering the plantings regularly during the dry seasons.

5. POST CONSTRUCTION STAGE

All the exposed slopes shall preferably be covered with vegetation using grasses, brushes etc. Locally available species possessing the properties of (i) good growth (ii) dense ground cover and (iii) deep root shall be used for stabilization.

In case of steep and barren slopes, in order to retain the seedling to the ground asphalt mulch treatment shall be given. Seedling are covered with asphalt emulsion and spread into a thin layer. The asphalt film gradually disintegrates and a carpet of green vegetation and deep-rooted species of grass and clovers, takes its place. Anchoring shall be carried out as per IRC: SP: 48-1998.

Regular inspection of check dams and repositioning/replacement of dislodged or stolen stones need to be carried out.

Repair and maintenance of eroded side drain inverts is to be done in order to arrest retrogation of levels in side drains. Slopes of high embankment can give a fertile base for growth of vegetative cover / sodding.

In arid areas, in order to avoid the deposition of sand over or near the road surface, shrubs are to be planted at an appropriate distance from the formation. The shrubs should not be abutting the road and the distance for carrying out plantation shall be determined based on prevalent wind speeds as well as quantity of sand being carried amongst various other factors. There should be a clear gap between the roadway and shrubs to allow the wind to pick up its velocity and carry along with it any sand that is deposited.

GUIDELINE-8: WASTE MANAGEMENT AND DEBRIS DISPOSAL

1. INTRODUCTION

This guidance describes procedures for handling, reuse and disposal of waste materials during road construction. The Guideline describes waste management measures in all stages of construction. Also, the Guideline discusses the measures to be taken for debris disposal.

2. PROJECT PLANNING AND DESIGN STAGE

As part of DPR preparation, the Engineer - Incharge shall carry out the following measures

- Finalize road design and alignment to minimize waste generation through balancing of cut and fill operations and minimizing excess cuts requiring disposal.
- Identify the type of wastes as well as sources of waste during construction and suggest options for possible reuse
- Provide guidelines to the contractor for locating waste disposal sites for non-toxic wastes
- Identify existing landfill sites if available for disposal of toxic materials.
- Incase no existing landfill sites are available, identification of landfill site as well as identification of the clearance requirements.
- Identify sites of disposal of debris.

3. PRE-CONSTRUCTION STAGE

The contractor shall identify the activities during construction, that have the potential to generate waste and work out measures for reducing, reusing and proper disposing of the generated waste in the construction schedule to be submitted to the Engineer - Incharge. A sequential listing of the activities during road construction and the nature of wastes together with the possible options for reuse are specified in **Table 8-1**. For the disposal of excess cut and unsuitable (non-toxic) materials, the contractor shall identify the location for disposal in consultation with the community / concerned department. Any toxic materials shall be disposed in existing landfill sites that comply with legislative requirements. Prior to disposal of wastes onto private/community land, it shall be the responsibility of the Contractor to obtain a No-objection Certificate (NOC) from the land owner/community. The NOC shall be submitted to the Engineer - Incharge prior to commencement of disposal.

Practices to avoid – waste disposal …
•Tipping of waste into stream channels, water bodies, forests and vegetated slopes
•Non-cleaning of wastes after day's work
•Leaching of wastes
•Littering in construction camps / sites
•Storing wastes on private land

The Contractor shall educate his workforce on issues related to disposal of waste, the location of disposal site as well as the specific requirement for the management of these sites.

4. CONSTRUCTION STAGE

The contractor shall either reuse or dispose the waste generated during construction for roads depending upon the nature of waste, as specified in **Table 1**. The reuse of waste shall be carried out by the contractor only after carrying out the specific tests and ascertaining the quality of the waste materials used, and getting the same approved by the Engineer - Incharge. Wastes that were not reused shall be disposed off safely by the contractor. The contractor shall adopt the following precautions while disposing wastes:

- Bituminous wastes shall be disposed off in 60mm thick clay lined pits and covered with 30cm good earth at top, so as to facilitate growth of vegetation in long run.
- In case of filling of low-lying areas with wastes, it needs to be ensured that the level matches with the surrounding areas. In this case care should be taken that these low lying areas are not used for rainwater storage
- In case oil and grease are trapped for reuse in a lined pit, care shall be taken to ensure that the pit should be located at the lowest end of the site and away from the residential areas.

The waste management practices adopted by the Contractor, including the management of wastes at construction camps etc shall be reviewed by the Engineer - Incharge and the Pollution Control Board (PCB) during the progress of construction.

5. POST CONSTRUCTION STAGE

On decommissioning of construction sites, the Contractor shall hand over the site free of all debris/wastes to the satisfaction of Engineer - Incharge. In case of any temporary disposal of wastes on private land, certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The same is to be submitted to the Engineer - Incharge before final payment is claimed.

Table 8-1: Type of wastes and scope for reuse- road construction

S. No	Activity	Type of waste	Scope for possible reuse	Disposal of waste
I	**CONSTRUCTION WASTES**			
1.	Site Clearance and grubbing	Vegetative cover and top soil	Vegetating embankment slopes	
		Unsuitable material in embankment foundation	Embankment Fill	Low lying areas Land fill sites
2.	Earthworks			
a)	Overburden of borrow areas	Vegetative cover and soil	Vegetating embankment slopes	
b)	Overburden of quarries	Vegetative cover and soil	Vegetating embankment slopes	
		Granular material	Embankment Fill, Pitching	
c)	Accidental spillages during handling	Dust		
d)	Embankment construction	Soil and Granular Material	Embankment Fill	
e)	Construction of earthen drains	Soil	Embankment Fill	
3.	Concrete structures Dust			
a)	Storage of material	Dust, Cement, Sand	Constructing temporary structure, embankment fill	
		Metal Scrap		Scrap Yard
b)	Handling of materials	Dust		
c)	Residual wastes	Organic matter	Manure, Revegetation	
		Cement, sand	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail	
4	Reconstruction works			
a)	Dismantling of existing pavement	Bitumen Mix, granular material	sub-base	
		Concrete	Road Sub-base, reuse in concrete, fill material and as rip rap on roads	
		Guard rail sign post, guard stone	Reuse for same	
b)	Dismantling of cross drainage structures	Granular material & bricks	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail Culvert	
		Pipes	Culvert	

S. No	Activity	Type of waste	Scope for possible reuse	Disposal of waste
5	Decommissioning of sites			
a)	Dismantling of temporary structures	Granular material and bricks	Constructing temporary structure, embankment fill	
6	Maintenance operation			
a)	Desilting of side drains	Organic matter and soil	Revegetation	
II	**OIL AND FLUIDS**			
1	Construction machinery – maintenance and refueling	Oil and Grease	Incineration, Cooking, Illumination	
2	Bituminous works			
a)	Storage	Bitumen	Low Grade Bitumen Mix	
b)	Mixing and handling	Bitumen	Low Grade Bitumen Mix	
		Bitumen Mix	Sub-base, Paving access & cross roads	
c)	Rejected bituminous mix	Bitumen Mix	Sub-base, Paving access & cross roads	
III	**DOMESTIC WASTES**			
1	Construction camps	Organic waste,	Manure	
		Plastic and metal scrap		Scrap Yard
		Domestic effluent	Irrigation	

6. Disposal of Debris

For the purpose of disposal of debris, dumping sites need to be selected. The criteria for selection of dumping sites include:

- No residential areas are located downwind side of these locations;
- Dumping sites are located at least 1000 m away from sensitive locations;
- Dumping sites do not contaminate any water sources, rivers etc; and
- Dumping sites have adequate capacity equal to the amount of debris generated;
- Public perception about the location of debris disposal site has to be obtained before finalizing the location;
- Permission from the Village Panchayat is to be obtained for the dumping site selected;
- Productive lands are avoided; and
- Available waste lands shall be given preference

GUIDELINE-9: WATER BODIES

1. INTRODUCTION

Water bodies may be impacted when the road construction is adjacent to it or the runoff to the water body is affected by change of drainage pattern due to construction of embankment. The following activities are likely to have an adverse impact on the ecology of the area:

- Earth moving;
- Removal of vegetation;
- Vehicle/Machine operation and maintenance;
- Handling and laying of asphalt; and
- Waste disposal from construction camps.

Impacts on water bodies impairs …

- Change in Catchment area of the water body
- Drainage system
- Flood level and water logging
- Flora and fauna dependant on the water body
- Ground water recharging
- Animal husbandry as water bodies are used by animals
- Water quality &
- Runoff (increase/ decrease)

2. PROJECT PLANNING AND DESIGN STAGE

All efforts are to be taken to avoid the alignments passing adjacent or close to water bodies. Where possible, it should be realigned away from the water body without cutting its embankment, decreasing the storage area or impairing the catchment area. Adequate drainage arrangements as per IRC guidelines have to be provided. Stream bank characteristics and hydrology of the area are to be studied before finalizing the alignment, the profile and cross-drainage structures.

Complete filling of water body with soil is not contemplated in the project. The DPR and its cost estimates have to accommodate costs of rehabilitation (to be estimated as lump sum at DPR stage) of water bodies impacted by the project. Water body rehabilitation shall be as per the Rehabilitation Plan prepared by the Contractor which should have approval of the Engineer - Incharge. Details of the tasks to be performed as per the sequence of activities during the project planning and design are as follows:

- Consultations with the people regarding alternate routes that were devised to avoid the pond. If alternate routes are not available, consent of the villagers is to be sought for affecting the pond and also the measures that would be taken to mitigate the impacts.
- Final design is to be prepared indicating the pond location in the alignment drawings.
- If impacting the pond, the extent of impact is to be clearly indicated on a separate drawing showing blown up portion of the pond. The drawing should aid the contractor in setting up exact lines for cutting the pond.
- All necessary measures for mitigation of impacts and precautionary measures while working close to the water body are to be incorporated into the DPR and cost estimates. The measures to be incorporated shall be as per this guideline.

PRE-CONSTRUCTION STAGE

The Contractor after an assessment of the likely impacts on the water body and review of the provisions of this guideline shall prepare a detailed work plan at the pre-construction stage. The Contractor shall prepare a Rehabilitation Plan for rectifying the likely impact to be caused and approval of Engineer - Incharge shall be sought prior to commencement of work. The Rehabilitation Plan should include:

- Locations of erosion protection works and silt fencing to prevent sediment laden runoff entering the water body;
- Location of side drains (temporary or otherwise) to collect runoff from the embankment before entering the water body in accordance with IRC guidelines;
- Work program in relation to the anticipated season of flooding/overflowing of the water body;
- Obstructions likely to cause temporary flooding and information to seek clearance to remove the

obstruction; and
- Drawings in Rehabilitation Plan should indicate the landscape details along with species to be planted in the surrounding environs of the water body.

The rehabilitation of water body should be with the objective of restoring it to its original state or to a better state with necessary enhancement of its environs. Rehabilitation Plan shall include:

- Reconstruction and stabilization of embankment in case it is impacted;
- If storage area is lost, then the water body is to be deepened to regain an equivalent volume;
- Further enhancement of the water body as a focal point with place for seating and provision of shade; and
- Costs of rehabilitation

Concurrence of the community has to be sought on the Rehabilitation Plan prepared by the Contractor. Concerns of the community have to be incorporated into the plan before submitting it for approval of the Engineer - Incharge.

The Engineer - Incharge shall scrutinize the Rehabilitation Plan, verify the implementation on site and finally approve the plan. The Rehabilitation Plan should be implemented by the Contractor immediately after completion of construction at the stretch near the water body.

Working near Water Bodies – Precautions

- Avoid locating roads on pond embankment
- Collect road runoff before entering the water bodies
- Runoff to be filtered of sediments before letting into water bodies
- Avoid debris disposal into water bodies
- Avoid disposal of oil/grease/other contaminants into water bodies

When there is interruption to regular activities of villagers near water body due to construction or rehabilitation work, following are the Contractor's responsibilities:

- Restriction on use of water, if any, should be intimated to the community in advance;
- Alternate access to the water body is to be provided in case there is interruption to use of exiting access. The access provided should be convenient for use of all the existing users whether community or cattle; and
- If the water body affected is a drinking water source for a habitation, alternate sources of water are to be provided to the users during the period for which its use is affected.

3. CONSTRUCTION STAGE

It should be ensured by the contractor that the runoff entering the water body is free from sediments

Silt fencing and/or brush barrier shall be installed in the drainage channels for collecting the sediments before letting them into the water bodySilt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be revegetated.Cutting of embankment reduces the water retention capacity and also weakens it, hence:

- The contractor should ensure that the decrease in water retention should not lead to flooding of the construction site and surroundings causing submergence and interruption to construction activities.
- Any perceived risks of embankment failure and consequent loss/damage to the property shall be assessed and the contractor should undertake necessary precautions as provision of toe protection, erosion protection, sealing of cracks in embankments. Failure to do so and consequences arising out of embankment failure shall be the responsibility of the contractor. The Engineer - Incharge shall monitor regularly whether safe construction practices near water bodies are being followed.

Alternate drain inlets and outlets shall be provided in the event of closure of existing drainage channels of the water body.Movement of machinery and workforce shall be restricted around the water body, and no waste from construction camps or sites shall be disposed into it.

4. POST CONSTRUCTION STAGE

With the completion of construction, the Engineer - Incharge has to ensure implementation of rehabilitation/restoration plan for the water body, as indicated by the Contractor in the bid submission. The precincts of the water body have to be left clean and tidy with the completion of construction. Drainage channels of adequate capacity shall be provided for the water body impacted.

GUIDELINE-10: DRAINAGE

1. INTRODUCTION

Inadequate and faulty drainage arrangements during road construction result in obstruction to natural drainage pattern. The problem is further aggravated in the low-lying areas and flood plains receiving high intensity rainfall, which can lead to the instability of embankment, damage to pavement, sinking of foundation, soil erosion, safety hazards and disruption in traffic. Provision of cross-drainage and longitudinal drainage increases the life of the road and consequently reduces water logging and related environmental impacts. The functioning of the drainage system is therefore a vital condition for a satisfactory road.

However, construction or upgradation of CD structures and longitudinal drains is likely to increase sediments, scour the banks, change water level and flow, and also affect the ecology of the surrounding area. The guideline shall address the environmental concerns related to drainage aspects during different stages of the project execution.

2. PROJECT PLANNING AND DESIGN

Drainage shall be broadly divided as (i) Cross-Drainage and (ii) Longitudinal Drainage both surface & subsurface drainage. The alignment shall be routed such that minimum drainage crossings are encountered. Also the geometric design criteria as per IRC 73, guidelines for effective surface drainage should be ensured.

All drains crossing the alignment shall be identified on site and marked on map while undertaking transect walk. Basic information on the width of channel, frequency of traffic holdup and flow would provide inputs into screening of alternate alignments as well as fixing the alignment. Consultations with the community shall provide information on the HFL in the area.

In areas of high and medium intensity rainfall (>400 mm/year), flood prone areas and hilly areas, detailed hydrological studies will need to be conducted. The studies shall be conducted as per IRC: SP-13: 1973 “Guidelines for the Design of Small Bridges & Culverts” and IRC: SP-33:1989 “Guidelines on Supplemental Measures for Design, Detailing & Durability of Important Bridge Structures”.

Design of cross-drainage structures shall be based on the inputs from the hydrological studies as per clause 12.2.3 and in other areas, the C-D structure design shall be as per IRC: SP-13. Design of C-D structure shall be such that:

- Normal alignment of the road is followed even if it results in a skew construction of culverts and stream bank protections are incorporated.
- Afflux generated is limited to 30 cm in plains with flat land slopes.
- It is fish friendly – fish passage is not interrupted either in upstream or downstream direction.
- Adequate scour protection measures for stream bank, roadway fill as head walls, wing walls and aprons are included.
- Reinforced road bed (of concrete or rock) for protection against overflow in case of low water crossing (floods/causeways) is included.
- The design of C-D structure (minor and major bridge) should have stairs leading to the bed of the drainage channel, for regular inspection of the sub-structure.
- Schedule of construction of C-D structures should be confined to dry months to avoid contamination of streams.

Longitudinal drains are to be designed to drain runoff from highest anticipated rainfall as per rainfall data for the past 20 years or 50 years as per hydrological analysis in high rainfall areas (annual rainfall > 1000 mm) and hill areas. For design of longitudinal drains in other areas, the design shall be as per IRC: SP-20:2002.

Outfall of the roadside drains shall be into the nearby stream or culvert. The outfall should be at such

a level that there would be no backflow into the roadside drain. Wherein pond/low lying areas exist in the vicinity, the flow may be diverted into them after removal of sediment for possible ground water recharge.

In case of high embankment (>1.0m) or bridge approaches, lined channels shall be provided to drain the surface runoff, prevent erosion from the slopes and avoid damage to shoulders and berms. Detailed specifications shall be as per IRC: SP-20:2002. The type of drains that can be constructed include bricklined, pucca with RCC, covered drain with RCC slabs and piped drain.

3. PRE-CONSTRUCTION STAGE

Following measures are to be undertaken by the contractor prior to the commencement of CD/Bridge construction:

- The downstream as well as upstream user shall be informed one month in advance
- The contractor shall schedule the activities based on the nature of flow in the stream.
- The contractor should inform the concerned departments about the scheduling of work. This shall form part of the overall scheduling of the civil works to be approved by Engineer - Incharge.
- Erosion and sediment control devises are to be installed prior to the start of the civil works.
- Interceptor drains to be dug prior to slope cutting to avoid high runoff from slopes entering construction sites in case of hill roads
- Runoff from temporary drains and interceptor drains to be directed into natural drains in hill roads
- In case of up-gradation of the existing CD Structures, temporary route / traffic control shall be made for the safe passage of the traffic, depending upon the nature of the stream
- All the safety/warning signs are to be installed by the contractor before start of construction

In case of utilization of water from the stream, for the construction of the CD structures, the contractor has to take the consent from the concerned department (refer Guideline on “Water for Construction”)

4. CONSTRUCTION PHASE

Drainage structures at construction site shall be provided at the earliest to ensure proper compaction at the bridge approach and at the junction of bridge span and bridge approach. Velocity of runoff to be controlled to avoid formation of rills/gullies as per guideline, “Slope stability & erosion control”

While working on drainage channels, sediment control measures shall be provided. Silt fencing (as per the detailed specifications of guideline, “Slope Stability & Erosion Control”) shall be provided across the stream that carries sediment.

The sediments collected behind the bunds shall be removed and after drying, can either be reused or disposed off as per guideline, “Waste Management and Debris Disposal”. Safety devises and flood warning signs to be erected while working over streams and canals.

5. POST CONSTRUCTION

Inspection and cleaning of drain shall be done regularly to remove any debris or vegetative growth that may interrupt the flow. HFL should be marked as per hydrological data on all drainage structure. Temporary structure constructed during construction shall be removed before handing over to ensure free flow through the channels. The piers and abutments should be examined for excessive scour and make good the same if required. The upstream and downstream areas should be cleared of all CD works.

In case of Causeway following aspect shall be taken into consideration:

- Dislocation of stones in stone set pavements, scouring of filler material due to eddy currents.
- Floating debris block the vents. Incase of large amount of floating material, debris arrestor shall be provided in upstream side.
- Damage to guide stones, information board shall be inspected and replaced accordingly.

Schedule of Inspection shall be drawnup for checking cracks, settlements and unusual backpressures.

It must be ensured that all the rectification shall be undertaken as and when required. Following are broadly the items to be checked:

- Settlement of piers/abutments & settlement of approach slabs have to be checked;
- Cracks in C-D structures or RCC slabs;
- Drainage from shoulders to be ensured;
- Ditches & drains to be kept clean of debris or vegetation growth; and
- Repairs to parapet of culverts whenever required are to be undertaken.

GUIDELINE-11: CONSTRUCTION PLANTS & EQUIPMENT MANAGEMENT

1. GENERAL

During execution of the project, construction equipments, machinery and plants are likely to cause adverse impact on the environment. The impact can be due to the emissions, dust, noise and oil spills that concern the safety and health of the workers, surrounding settlements and environment as a whole. This guideline describes the activities during the project stages where pollution control measures are required.

2. PROJECT PLANNING AND DESIGN STAGE

Selection criteria for setting up a plant area and parking lot for equipments and vehicles shall be done as per siting criteria for construction camp specified in Guideline on "Construction and Labour Camps".

3. PRE-CONSTRUCTION STAGE

The Contractor must educate the workers to undertake safety precaution while working at the plant / site as well as around heavy equipments. Before setting up the crusher, hot-mix plant and generator, the Contractor shall acquire "No Objection Certificate (NOC)" from the GujaratState Pollution Control Board for the same. The Contractor shall ensure all vehicles must possess Pollution under Control (PUC) Certificate, which and shall be renewed regularly. The Contractor must ensure that all machinery, equipments, and vehicles shall comply with the existing Central Pollution Control Board (CPCB) noise and emission norms. The Engineer - Incharge must ensure that the Contractor shall submit a copy of the NOC and PUC Certificates before the start of work. The Contractor shall design the service road with protection measures as black topping at vulnerable points as in low lying areas.

4. CONSTRUCTION STAGE

The Contractor shall undertake measures as per **Table 11-1** to minimize -the dust generation, emissions, noise, oil spills, residual waste and accidents at the plant site as well as during transportation of material to construction site.

Table 11-1: Measures at Plant Site

Concern	Causes	Measures
Dust Generation	Vehicle Movement	•Water sprinkling •Fine Materials shall be Transported in Bags or Covered by Tarpaulin during Transportation •Tail board shall be properly closed and sealed to be spill proof
	Crushers	• Regular Water Sprinkling to keep the dust below visibility level
	Concrete-Mix Plant	• Educate the workers to follow/adopt good engineering practices while material handling
Emissions	Hot-Mix Plant	•Site Selection as per Clause 6.5.2, Section 6.5, IRC's Manual for Construction & Supervision of Bitumen Work •Regular maintenance of Dust Collector as per manufacture's recommendations
	Vehicles	• Regular maintenance as per manufacture's recommendation
	Generators	• Exhaust vent of long length and emission to confirm to PCB norms.
	Heavy Load Vehicles	• Exhaust silencer, Regular maintenance as per manufacture schedule
Noise	Crushers	• Siting as per guideline, "Construction and Labour Camps"
	Generators	• All generators should have mandatorily acoustic enclosures and confirms to PCB norms.
Oil Spills	Storage and Handling	• Good practice, guideline, "Waste Management and Debris Disposal"
Residual waste	Dust Collector and Pits	• Guideline , "Waste Management and Debris Disposal"
Concrete waste	Concrete-Mix plant	• Guideline, "Waste Management and Debris Disposal"
Bitumen and bitumen mix	Hot-mix Plant	• Guideline, "Waste Management and Debris Disposal"
Stone chips	Crushers	• Guideline, "Waste Management and Debris Disposal"
Safety	Trajectory of Equipments	• No worker shall be present in the vicinity of the equipments

Concern	Causes	Measures
	Movable Parts ofEquipments	• Caution Sign, awareness among workers
	Plant Area / Site	• Caution Sign, Safety Equipments
	Accidents / Health	•First Aid Box, Periodic Medical Checkup Break down of
	Break down of vehicles	• Arrangement for towing and bringing it to the workshop

During site clearance, all cut and grubbed materials shall be kept at a secured location so that it does not raise any safety concerns. During excavation, water sprinkling shall be done to minimize dust generation. Frequent water sprinkling shall be done on the haul roads to minimize dust generation. In case of loose soils, compaction shall be done prior to water sprinkling. Cautionary and informatory sign shall be provided at all locations specifying the type of operation in progress. The contractor must ensure that there is minimum generation of dust and waste while unloading the materials from trucks. The construction waste generated shall be disposed as per Guideline on, "Waste Management and Debris Disposal". The equipments, which are required to move forward and backward, shall be equipped with alarm for backward movement. It shall be ensure that the workers shall remain away from the working areas at such times. Also, equipments at construction camp should be barricaded and kept away from residential quarters of workers.

The Engineer - Incharge shall carry out periodic inspections to ensure that all the pollution control systems are appropriately installed and comply with existing emission and noise norms.

Safety Measures During Bitumen Construction Work…

- The Contractor shall ensure that bitumen storing, handling as well as mixing shall be done at hot-mix plant or designated areas[1] to prevent contamination of soil and ground water.
- Skilled labour shall be used while hand placing the pre-mixed bitumen material. The hand placing of pre-mixed bituminous material shall be done only in following circumstances:
  - For laying profile corrective courses of irregular shape and varying thickness
  - In confined spaces where it is impracticable for a paver to operate and
  - For filling potholes
- The Contractor shall provide safety equipments i.e. gumboots and gloves to the workers while handling bitumen.
- While applying Tack Coat, spraying of bitumen shall be done in the wind direction. The labour shall wear jacket while spraying the bitumen.
- All the bituminous work shall be done as per IRC's Manual for Construction and Supervision of Bituminous Works.

5. POST-CONSTRUCTION STAGE

The Engineer - Incharge shall ensure that all the haul roads are restored to their original state. Incase any inner village road is damaged while transporting the procured material; the contractor shall restore the road to its original condition. The Engineer - Incharge must ensure that the decommissioning of plant shall be done in environmentally sound fashion and the area to bring its original state.

Designated area refers to paved surfaces and barren parcels of land, with adequate drainage and disposal system. It must be ensure that these are away from agriculture land, water body and other sensitive areas.

GUIDELINE-12: LABOUR AND WORKER'S HEALTH AND SAFETY

1. INTRODUCTION

The safety and health concerns of the workers and the community are impacted due to the hazards created during the construction of road. **Box: 1** gives the safety concerns during construction. This Guideline describes the hazards and measures that need to be taken to mitigate the impacts.

2. PROJECT PLANNING AND DESIGN STAGE

To address health and safety concerns, the DPR shall contain selection criteria for setting up:

- Construction Camps (as per guideline);
- Borrow Areas (as per guideline); and
- In case of opening new quarry areas (as per guideline).

To address the safety concerns to road user during operational phase, the DPR shall contain the following:

- Selection and location of regulatory as well as informatory signs as per IRC: 67-2001, depending upon the geometry of the road.

Box 1: Safety Concerns during Construction

Community due to:

- Improper scheduling of construction activities especially near the settlements and sensitive areas;
- Parking of equipments and vehicles at the end of the day likely to cause accidents to the general public especially during night hours;
- Transportation of uncovered loose material or spillage of material increases the chances of accidents to road users and surrounding settlements.

Workers due to:

- Improper handling of materials like bitumen, oil and other flammable material at construction sites, likely to cause safety concerns to the workers;
- Lack of safety measures such as alarm, awareness and safety equipment result in accidents, especially working with or around heavy machinery / equipments.

PRE-CONSTRUCTION STAGE

In order to incorporate public health and safety concerns, the Engineer - Incharge and the Contractor shall disseminate the following information to the community:

- Location of construction camps, borrow areas and new quarry areas;
- Extent of work;
- Time of construction;
- Diversions, if any;
- Precaution measures in sensitive areas;
- Involvement of local labours in the road construction;
- Health issues - water stagnation, exposure to dust, communicable disease; and
- Mechanism for grievances.

Health Concerns are adversely impacted……

Public due to:

- Unhygienic conditions due to water logging (improper drainage of waste water), either by improper decommissioning of Construction Camps and parking lots, or improper disposal of construction wastes, leading to the breeding of vectors that are likely to impact the health of the general public
- Interaction between workers and host community is likely to increase the risk of spread of communicable diseases.

Workers due to:

- Low quality drinking water as well as inappropriate storage of drinking water likely to cause water borne diseases among workers.
- Absence of proper sanitary facility likely to act as a breeding ground for vectors raising health concerns among workers.

The information dissemination could be through the local newspaper, billboards, panchayats meetings, etc. The Contractor must educate the workers to

undertake the health and safety precautions. The contractor shall educate the workers regarding:

- Awareness on HIV/AIDS awareness and usage of safety measures such as condoms;
- Awareness on hygienic sanitary practices;
- Personal safety measures and location of safety devices;
- Interaction with the host community;
- Protection of environment with respect to:
- Trampling of vegetation and cutting of trees for cooking;
- Restriction of activities in forest areas and also on hunting;
- Water bodies protection;
- Storage and handling of materials;
- Disposal of construction waste.

3. CONSTRUCTION STAGE

During the progress of work, following are the safety requirements that need to be undertaken by the contractor at the construction site:

- Personal Protective Equipments (PPE) for the workers. **Table 12-1** gives the safety gear to be used by the workers during each of the construction activities.
- All measures as per bidding document shall be strictly followed.
- Additional provisions need to be undertaken for safety at site:
- Adequate lighting arrangement;
- Adequate drainage system to avoid any stagnation of water;
- Lined surface with slope 1:40 (V:H) and provision of lined pit at the bottom, at the storage and handling area of bitumen and oil, as well as at the location of generator (grease trap); and
- Facilities for administering first aid.

FIRST AID FACILITIES

- First Aid Kit, distinctly marked with Red Cross on white back ground and shall contain minimum of following:
  - 6 small-sterilized dressings
  - 3 medium and large sterilized dressings
  - 1 (30 ml.) bottles containing 2 % alcoholic solution of iodine
  - 1(30 ml) bottle containing salvolatile
  - 1 snakebite lancet
  - 1 pair sterilized scissors
  - 1 copy of first-aid leaflet issued by the Director General, Factory Service & Labour Institute, Government of India
  - 100 tablets of aspirin
  - Ointment for burns
  - A suitable surgical antiseptic solution
- Adequate arrangement shall be made for immediate recoupment of the equipments, whenever necessary.
- A trained personnel incharge of first aid treatment to be readily available during working hours at construction site
- Suitable transport to the nearest approachable hospital should be made available.
- Tetanus injection must be made compulsory for all workers every 6 months.

Table 12-1: Worker Safety Measures

Sl. no.	Activity	Safety Requirement
1.	Setting out and levelling	• Luminous jackets; • Helmets; • Boots for protection against insect bite; and Dust Mask
2.	Tree cutting	• Helmet Boots • Luminous safety jackets
3	Reinforced yard/ carpentry/ reinforcement cutting/ bending work.	• Hand gloves
4.	Shuttering work	• Goggles Hand gloves
5.	Plant and Machinery	• Hand gloves • Boots • Helmets • Dust Mask
6.	Material handling	• Hand gloves • Dust mask
7.	Batching plant	• Goggles • Hand gloves • Dust mask
8.	Weeding	• Goggles

Sl. no.	Activity	Safety Requirement
9.	Binding reinforcement	• Safety belt • Boots
10.	Manual concrete laying	• Gum boots • Hand gloves • Helmet
11.	Piling	• Helmet • Hand gloves, gumboots.

The following measures need to be adopted by the contractor to address public safety concerns:

- The Contractor shall schedule the construction activities taking into consideration factors such as:
  - Sowing of crops;
  - Harvesting;
  - Local hindrances such as festivals etc.; and
  - Availability of labour during particular periods.
- All the cautionary signs as per IRC: 67-2001 and traffic control devices (such as barricades, etc) shall be placed as soon as construction activity get started and shall remain in place till the activities get completed.
- Following case specific measures need to be followed during the progress of the activity:
  - Incase of blasting, the Contractor must follow The Explosives Rules, 1983.
  - Incase of construction activity adjoining the water bodies, measures shall be taken as per measures suggested in Guideline on "Water Body".
  - If construction of road is within the settlement, the contractor must ensure that there shall not be any unauthorized parking as well as storage of material, adjacent to road.
  - Approved chemicals should be sprayed to prevent breeding of mosquitoes and other disease-causing organisms, at all the water logging areas

The Engineer - Incharge shall carry out periodic inspections in order to ensure that all the measures are being undertaken as per the guideline.

4. POST-CONSTRUCTION STAGE

During this stage a major concern is on road user safety. Following are the measures that need to be undertaken by the Engineer -Incharge to ensure safer roads:

- Inspection and maintenance of installed regulatory and informatory signs.
- Ensure that the location of signage does not obstruct the visibility
- Incase of hill roads, maintenance of parapet wall as well as of overtaking zones.

The Engineer - Incharge must ensure that during the maintenance operation of road, road materials are stored at a location such that they shall not create any risk to road users.

The construction site shall be cleaned of all debris, scrap materials and machinery on completion of construction for the safety of public and road users, as per the measures given in Guideline on "Construction and labour Camp" and "Waste Management and Debris Disposal."

GUIDELINE-13: CULTURAL PROPERTIES

1. INTRODUCTION

The cultural properties located close to the road are likely to be impacted by the road construction. Most of the properties are avoided in general during finalization of alignment. This Guideline discusses the mitigation measures for cultural properties.

2. PROJECT PLANNING AND DESIGN STAGE

Measures for mitigation of impacts on cultural properties during project preparation shall be as per the following steps:

- Identification of locally significant cultural properties should be done;
- Assessment of likely impacts on each cultural property due to project implementation;
- The extent of impact on the identified culture property should be assessed and possible measures for avoidance should be devised based on the site investigation. Incase impact is not avoidable, identification of alternative routes or possibility of relocation of the culture property shall be assessed in consultation with the local public, based on the economic feasibility.

Information to be collected…
• Location
• Direction (North/ South/East/West) With Respect to Road
• Distance of the structure from existing centerline of the road
• Type of Property eg: temple/mosque/shrine/dargah etc
• Plan of the structure
• Importance of the structure – historical/social/archeological
• Ownership of the property
• Probable loss to the property
• Specific periods/durations in which large congregations as festivals/mela take place causing hindrance to vehicular movement
• Choice of community, issue of relocation

Incase of relocation, relocated site should be suggested by the local people and the size of relocated structure should at least be equal to the original structure. A written consent letter is to be obtained from the community regarding the relocation site of the cultural property in the form of resolution on the letter pad of the sarpanch/gram panchayat or with the signatures of community members.

A detailed design of the relocated structure and its site plan along with the necessary BoQ are to be presented DPR. The relocation and other avoidance measures should be carried out before the start of the road work

It must be ensured by the Engineer - Incharge that the BoQ and rates are incorporated into the contract document.

3. CONSTRUCTION STAGE

Major impacts on the properties during this stage are mainly due to movement of construction machinery as well as due to construction activity in the vicinity of the cultural property. Following are precautionary measures that need to be undertaken by the contractor while working near these structures:

- Restrict movement of heavy machinery near the structure
- Avoid disposal or tipping of earth near the structure
- Access to these properties shall be kept clear from dirt and grit

During earth excavation, if any property is unearthed and seems to be culturally significant or likely to have archeological significance, the same shall be intimated to the Engineer. Work shall be suspended until further orders from Engineer - Incharge. The State Archeological Department shall be intimated of the chance find and the Engineer shall carry out a joint inspection with the department. Actions as appropriate shall be intimated to the Contractor along with the probable date for resuming the work.

The Engineer - Incharge must ensure that the contractor implements the precautionary measures as suggested. Also, the Engineer - Incharge must conduct monitoring for the cultural property.

GUIDELINE-14: TREE CUTTING AND AFFORESTATION

This Guideline discusses the issue of tree cutting and afforestation. Loss of trees creates adverse environmental impacts. In order to mitigate there impacts, suitable measures have been suggested as part of this Guideline. These measures have been given for each of the stages of the road construction activities.

1. PROJECT PLANNING AND DESIGN STAGE

During alignment finalisation, due consideration shall be given to minimise the loss of existing tree cover, encroachment of forest areas / protected areas etc as specified in guideline on**,** "Site preparation". Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done.

The plantation/afforestation would be carried out by the forest department. It should be ensured that plantation is carried out only in areas where water can be made available during dry seasons and the plant can be protected during the initial stages of their growth. The species shall be identified giving due importance to local flora (suggested in **Table 14-1**). It is recommended to plant mixed species in case of both avenue or cluster plantation.

The plantation strategy shall suggest the planting of fruit bearing trees and other suitable trees. Development of cluster plantations will be encouraged in the community lands, at locations desired by the community. The choice of species will be based on the preferences of the community. The Engineer - Incharge shall oversee the plantation to check the following:

- Whether trees are obstructing live of right at junctions;
- Whether trees are at the inside of the junctions;
- Whether trees are within 5 mts of the proposed centerline.

2. POST-CONSTRUCTION STAGE

The maintenance of the saplings (including activities much as weeding, watering, planting of replacement saplings, etc application of manure etc) shall be the responsibility of the forest department. The Engineer - Incharge shall ensure the following:

- Shoulder of roads to be kept clear of weeds/undesirable undergrowth; and
- Branches of trees do not obstruct clear view of the informatory and cautions signs.

Table 14-1: Endemic Species of Gujarat

Sl.no	Tree Species Endemic species)	Sl.no	Tree Species Endemic species)
1	*Tectonagrandis*	9	*Brideliasquamosa*
2	*Anogeissuspendula*	10	*Emblicaofficinallis*
3	*Boswelliaserratta*	11	*Buteamonosperma*
4	*Acacia nilotica*	12	*Diospyrosmelanoxylon*
5	*Euphorbia caducifolia*	13	*Anogeissuslatifoia*
6	*Flacourtiaindica*	14	*Lanneacoromandelica*
7	*Helicteresisora*	15	*Sterculiaurens*
8	*Holarrhenaantidysentrica*	16	*Mitragynaparviflora*

GUIDELINE-15: FORESTS AND OTHER NATURAL HABITATS

1. INTRODUCTION

This guideline envisages measures to be undertaken during blacktopping / widening of road sections passing through natural habitats. These measures shall be undertaken in addition to the measures laid down in the other Guidelines.

Conservation of natural habitats is essential for long-term sustainable development. A precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development has been adopted for the project.

Natural Habitats means…
• National Park
• Reserve Forest
• Sanctuaries
• Notified Wetlands
• Fisheries and Aquatic Habitats

2. PROJECT PLANNING AND DESIGN

To minimize the adverse impact on the ecology of the natural habitats, selection of alignment should be as per guideline. An officer of at least the rank of a forest ranger shall be deputed for detailed inventory of ecological features along the road. The nature and type of impact on natural habitats due to road construction shall be identified. Magnitude of the impact to the extent feasible on the ecological features shall also be assessed.

Ecological Features…	Adverse Impacts…
• Area of natural habitat; • Type and number of endangered species of flora and fauna; • Stream and water bodies; • Breeding ground and seasons; • Migration season of bird species; and • Animal crossing.	• Diversion of forest land; • Cutting of trees; • Trampling of vegetation; • Contamination of water due to the usage of water from the source within the natural habitat; • Loss of breeding grounds; and • Interruption to animal crossings during the construction.

Impacts identified on the natural habitats shall be minimized to the extent required. Minimization shall be through precautionary measures or through appropriate mitigation measures. Following are the measures should be undertaken along the road passing through natural habitats:

- Constricting the road width to 6.0 m and embankment height to 0.5 m to minimize the extent of diversion of forest land and cutting of trees
- Drainage Structures shall be designed strictly in accordance with guideline on “Drainage”.
- Rumble strips shall be provided at every kilometer along the length of the natural habitat and invariably at the start and end of the natural habitat
- Signage (viz. speed limit, animal crossing, switch of headlight etc) shall be provided as per IRC: 67-2001 Code of Practice for road sign (first revision)

In addition to the above measures, specific impacts identified on site shall be mitigated as per the recommendation of the forest department / officer in charge of the identified natural habitat.

In case proposed alignment falls within the catchments of a water body or a stream, a flush causeway shall be constructed without impacting the drainage system. The length of the causeway shall be as per the existing water spread. The causeway shall be strictly in compliance with IRC:SP-20:2002. In no circumstances a water body within the natural habitat shall be cut across or filled for the purpose of laying the road.

3. PRE-CONSTRUCTION STAGE

No Construction Camps, Stockyards, Concrete Batching or Hot Mix Plants shall be located within the natural habitat or within 500m from its boundary.

Contractor in consultation with forest ranger or any other concerned authority shall prepare a schedule of construction within the natural habitat. Due consideration shall be given to the time of migration, time of crossing, breeding habits and any other special phenomena taking place in the area for the concerned flora or fauna.

4. CONSTRUCTION STAGE

Procurement of any kind of construction material (as quarry or borrow material) from within the natural habitat shall be strictly prohibited. No water resources within the natural habitat shall be tapped for road construction. Use of mechanized equipment shall be kept minimum within the natural habitat. Contractor must ensure that there will be no parking of vehicles machine and equipment within the natural habitat. Disposal of construction waste within the natural habitat shall be strictly prohibited and as far as possible reuse shall be undertaken as per **Table -1** type of waste of guideline, "Waste Management and Debris Disposal".

5. POST CONSTRUCTION STAGE

The road passing through the natural habitat shall be declared as a silence zone. Compensatory tree plantation within the available Right of Way shall be done in accordance with guideline, on "Tree Cutting and Afforestation". The Engineer - Incharge must ensure maintenance of drainage structure shall be undertaken as per guideline, "Drainage"

GUIDELINE-16: AIR AND NOISE POLLUTION

1. INTRODUCTION

This guideline deals with the mitigation of adverse impacts due to air and noise pollution. Both of these have been discussed in the subsequent sections respectively.

2. AIR POLLUTION

The types of air pollution due to construction activities might include generation of dust, emission from hot mix plants and batching plants, odour from construction labour camps, emission from construction machinery/vehicles etc. The measures for mitigation of impacts from each of these are given below.

Generation of Dust

- All vehicles delivering materials to the site shall be covered to avoid spillage of materials.
- The Contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the Engineer in accordance with the relevant emission norms.
- All existing highways and roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similarly roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres.
- Spillage shall be cleared immediately by manual sweeping and removal of debris or if so directed by the Engineer, by mechanical sweeping and clearing equipment, and all dust, mud and other debris shall be removed completely. Additionally, if so directed by the Engineer, the road surfaces shall be hosed or watered using necessary equipments.
- Plants, machinery and equipment shall be so handled (including dismantling) so as to minimize generation dust.
- All earthwork shall be protected in a manner acceptable to the Engineer to minimise generation of dust.
- The hot mix plant is sited at least 1000m from the nearest habitation. The hot mix plants shall be fitted with dust extraction units in order that the exhausts comply with the requirements of the relevant current emission control legislation.
- Generation of dust should be suppressed during unloading of construction material and also during storage of the construction material.

Emission from Hot-Mix Plants and Batching Plants

- Hot mix plants and batching plants shall be located sufficiently away from habitation, agricultural operations or industrial establishments. Where possible such plants will be located at least 1000m away from the nearest habitation.
- The exhaust gases shall comply with the requirements of the relevant current emission control legislation. All operations at plants shall be undertaken in accordance with all current rules and regulations protecting the environment.

Odour from Construction Labour camps

- Construction labourers camp shall be located at least 500 m away from the nearest habitation.
- The waste disposal and sewerage system for the camp shall be properly designed, built and operated so that no odour is generated. Compliance with the Factory Act, the construction workers (regulation of employment and conditions of service) Act, 1996 and all other relevant legislation shall be strictly adhered to.

Emission from Construction Vehicles, Equipment and Machinery

- The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. All vehicles, equipment and machinery used for construction shall conform to the relevant Indian Standard (IS) norms.
- All vehicles, equipment and machinery used for construction shall be regularly maintained to ensure that pollution emission levels\comply with the relevant requirements of SPCB & the

Engineer.

Pollution from Crusher

- All crushers used in construction shall confirm to relevant dust emissions control as legislated. Clearance for siting shall be i obtained from the SPCB. Alternatively, only crushers already licensed by the SPCB shall be used.
- Dust screening vegetation will be planted on the edge of RoW for all existing roadside crushers.
- If crusher owned by contractor, the suspended particulate matter contribution value at a distance of 40m from a controlled isolated as well as from a unit located in a cluster should be less than 600 ug/Nm^3. The monitoring is to be conducted at least twice a month for all the 12 months in a year during the crushing operation for the project.

3. NOISE POLLUTION

Noise from Vehicles, Plants and Equipment

- The plants and equipment used in construction (including the aggregate crushing plant) shall strictly conform to the Gol noise standards.
- All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.
- Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB(A), as specified in the Environment (Protection) Rules, 1986.
- Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum.
- In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 2200 hours to 0600 hours. In silence zone (areas up to 100 m around such premises as hospitals, educational institutional and courts) no hot-mix, batching or aggregate crushing plant will be allowed. No construction shall take place within 100m around hospitals between 21.00 hours to 06.00 hours.
- Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall wear earplugs.

Noise from Blasting (or) Pre splitting Operations.

- Blasting shall be carried out only with permission of the Engineer. All the statutory laws, regulators, rules, etc., pertaining to acquisition, transport, storage, handling and use of explosives shall be strictly followed.
- Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500m (200m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200m (50m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting.

Part -2: Environment and Social Management Framework (ESMF)

Maintenance/ Rehabilitation Corridors

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List of Abbreviation

BOQ	Bill of Quantity
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
CoI	Corridor of Impact
CO	Carbon monoxide
CPR's	Common Property Resources
GPCB	Gujarat Pollution Control Board
GSHP-II	Gujarat State Highways Project – II
GoG	Government of Gujarat
LASA	LEA Associates South Asia Pvt. Ltd.
LHS	Left Hand Side
MoRTH	Ministry of Road Transport and Highways
NOC	No Objection Certificate
NO_X	Nitrates of Oxygen
NH_3	Ammonia
NGO	Non-Government Organisation
PIU	Project Implementation Unit
Pb	Lead
O_3	Ozone
R&BD	Roads and Buildings Department
RPF	Resettlement Policy Framework
RoW	Right of Way
RAP	Resettlement Action Plan
RPM	Respiratory Particle Matter
RHS	Right Hand Side
SC	Supervision consultant
SO_2	Sulfur di oxide
SPM	Suspended Particle Matter

1. INTRODUCTION

1.1 BACKGROUND

1 The Roads and Buildings Department (R&BD), Government of Gujarat (GoG) has taken up the preparation of the second Gujarat State Highway Project (GSHP-II), covering up-gradation, maintenance and improvement of identified core road network for loan appraisal with the World Bank. The GSHP II proposes improvements to 1577 km of roads. The improvements include upgradation corridors which include widening and strengthening of 20 corridors totalling 1072.42 km and 11maintenance corridors totalling 504.49 km. The details of the maintenance corridors are given in Table 1-1.

Table 1-1: List of Maintenance corridors

Sl.no	GSHP-II Maintenance Corridors	Length(km)	District
1.	Paliyad-Dhandhuka (DPR Corridor)	46.00	Ahmedabad
2.	Palanpur – Danta	36.00	Banas kantha
3.	Atkot-Paliyad	22.25	Rajkot,Bhavnagar
4.	Tharad – Deesa	54.89	Banas Kantha
5.	Chanasma – Deesa	45.05	Patan
6.	Vallabhipur-Rangola	26.60	Bhavnagar
7.	Viramgam–Nandasan	51.85	Mehsana,Ahmedabad
8.	Pardi – Dixal	67.40	Valsad
9.	Bechraji-Chanasma	29.00	Patan,Mehsana
10.	Karjan – Borsad (Partly under RMC)	55.15	Anand,Vadodara
11.	Savar Kundla – Dhasa	70.30	Amreli,Bhavnagar
	Total	**504.49**	

Source: R&BD

2 R&BD has retained M/s LEA Associates South Asia Pvt. Ltd. (LASA) as Project Preparatory Works Consultants (PPWCS) to prepare detailed designs including the environment and social assessments for 460km roads to be taken up in the first year of the GSHP –II. The 460km includes 9 upgradation corridors and one maintenance corridor. As part of the PPWCS assignment, the designs and bid documents for the Dhanduka – Paliyad (46km), maintenance corridor has been prepared. The templates and documentation prepared for this corridor shall form basis for replication in other maintenance corridors to be prepared in-house by the State Roads Project (SRP) division of the R&BD.

3 The contract period for the maintenance corridors shall be four years, which shall include (i) one year of construction, and, (ii) one year of defect liability period (DLP) followed by two years of maintenance. The key maintenance activities to be carried out during the first year of construction are as follows:

- **Rehabilitation**, to be carried out where pavement structure has defects and needs strengthening by structural overlay, which may or may not require prior additional excavation of some badly deteriorated sections,
- **Periodic maintenance**, to be carried out where only the surface has sufficient defects to warrant resurfacing.

4 During DLP and the subsequent maintenance period, the activities are expected to be limited to

- **Routine or ordinary maintenance** (OM), where the defects are minor and can be treated under the OM activities.

5 All improvements to the maintenance corridors are proposed within the available RoW. Up-gradation and widening of corridor shall not be carried out along maintenance corridors. Land acquisition and resettlement is not permitted under the maintenance component. No impacts on assets and structures, including those of non-titleholders shall be permitted. On similar lines, tree cutting and consequent diversion of protected forests is also not considered under the maintenance component of GSHP II. As a result, the impacts on environment and social features are expected to be minimal, and shall be limited to typical construction stage / maintenance related impacts which are short term and not significant.

1.2 PURPOSE OF THE ESMF

6 This Environment and Social Management Framework (ESMF) is prepared to guide the PIU to address the limited environmental and social impacts likely due to the maintenance operations, at the various stages of project preparation, implementation and maintenance of the corridors. The provisions of the ESMF shall facilitate the PIU to comply with the requirements of the World Bank Safeguard Policies and the GoI / GoG rules and legislative requirements. This ESMF (i) describes the project interventions, (ii) provides an overview of the maintenance corridors; (ii) explains the general anticipated environmental /social impacts of the subprojects which are to be taken up under the maintenance components; (iii) specifies the methods and process to be followed by the PIU towards Inventorisation of the environmental/social features, assessment of impacts, arrangements for meaningful consultation with stakeholders and information disclosure requirements, followed by integration of measures into the bid documents etc; (iv) provides guidance to the PIU on the various clearance requirements including obtaining clearances for corridors in eco-sensitive zones, corridors passing through notified tribal areas etc, (v) specifies monitoring and reporting requirements; and (vi) describe the responsibilities in relation to the preparation, implementation, and progress review of safeguard documents of subprojects.

2. OVERVIEW OF MAINTENANCE INTERVENTIONS

2.1 GENERAL

7 This chapter provides an overview of the maintenance measures that shall be taken up along the various maintenance corridors under GSHP –II.

2.2 PAVEMENT MAINTENANCE MEASURES

8 The design of pavement shall be based on cognizance of the existing road characteristics, the soil and pavement investigation test results overlay and treatment works by R&BD.

2.1.1. Pavement Design for Maintenance Corridor

9 The pavement design along the maintenance corridor in GSHP-II will focus primarily on thin resurfacing, shape correction, shoulder repairs and drainage, with some potential for inclusion of modest structural overlay. The design of the overlay shall be carried out to determine the strengthening requirement for a forecast period of 7-years traffic demand. The requirement of overlay shall be deduced from the design curves relating characteristic deflection to the cumulative number of standard axles to be carried over the design life given in IRC 81;1997.

2.1.2. Rising of Road Level

10 Rising of road levels are normally not envisaged along maintenance corridors. Rising of levels shall be allowed only at specific locations where the inventory of the road and local enquiry suggest that dip/flush causeway exists at locations along the corridors which may overtop in rainy season causing interruption in traffic movement. To overcome overtopping, the road level shall be raised with embankment and subgrade to match with the highest levels of the road. The pavement shall be designed for new construction along these stretches.

2.1.3. Profile Corrective Course

11 Along stretches where the cross profile of the existing pavements have been either disturbed or inadequate, profile correction will be carried out simultaneously while laying of overlay.

2.1.4. Pavement Preparatory Works

12 The pavement preparatory work includes repair to distressed areas such as crack sealing, full depth repair and pothole repair. The preparatory works will be carried out on the existing pavement surface prior to application of profile corrective course.

2.1.4.1 Localized Full Depth Repairs

13 The road surfaces where the depth of depression is greater than 75mm and exceeding in an area 1 sq.m will receive full depth repair treatments. The full depth repair treatment shall be carried out by dismantling the existing pavement and excavating the sub-base and sub-grade to a depth of 30 cm. Dismantling of the pavement and excavation will be carried out in a length and width not less

than 5m and 3m respectively. The exposed surface of sub-grade will be loosened upto a depth of 20 cm and re-compacted to 97% of MDD. On the compacted sub-grade, GSB material will be laid to a 30cm compacted thickness. A WMM granular course of adequate thickness (equal to existing crust thickness) will be provided over the compacted sub-base. However, the thickness of each layer of WMM layer shall not exceed 150 mm. The final WMM layer will be laid to a proper camber and treated with primer and surface dressing (second coat).

2.1.4.2 Pothole Repairs

14 The potholes shall be repaired with granular base course material and bituminous macadam depending upon its depth.

2.1.4.3 Filling of Depression

15 The depressions on the surface of road pavement shall be filled up in layers by bituminous material in accordance with the MoRTH Specification.

2.1.4.4 Crack Sealing

16 Slurry seal will fill up the wide cracks more than 3mm in width, whereas, cracks less than 3mm in width will be treated by fog sealing.

2.1.5. Shoulders

17 The shoulders wherever deficient in width shall be extended to 1.0 m. The top surface of the shoulders shall be treated with 150 mm thick compacted granular sub base material. The side slopes of the extended shoulders are to be maintained at 2.00:1.00. The width of the shoulders shall be determined based on the presence of trees. No trees shall be felled towards development of shoulders. Adequate safety provisions in such locations shall be provided.

2.1.6. Side Drains

18 The cleaning of the existing side drains and provision of missing drains where necessary has been included in this project. Side drains shall be designed and developed as per the land availability and presence of trees.

2.3 CROSS DRAINAGE STRUCTURES

19 Existing cross-drainage structures will be repaired and attended with due maintenance.

2.4 INTERSECTIONS/JUNCTION DESIGN

20 The intersections and junction improvements shall be carried out within the available RoW and shall be designed avoiding any impacts on existing structures and assets, including impacts on non-titleholders within the RoW. The typical cross sections are shown in the Figure 2-1 & Figure 2-2.

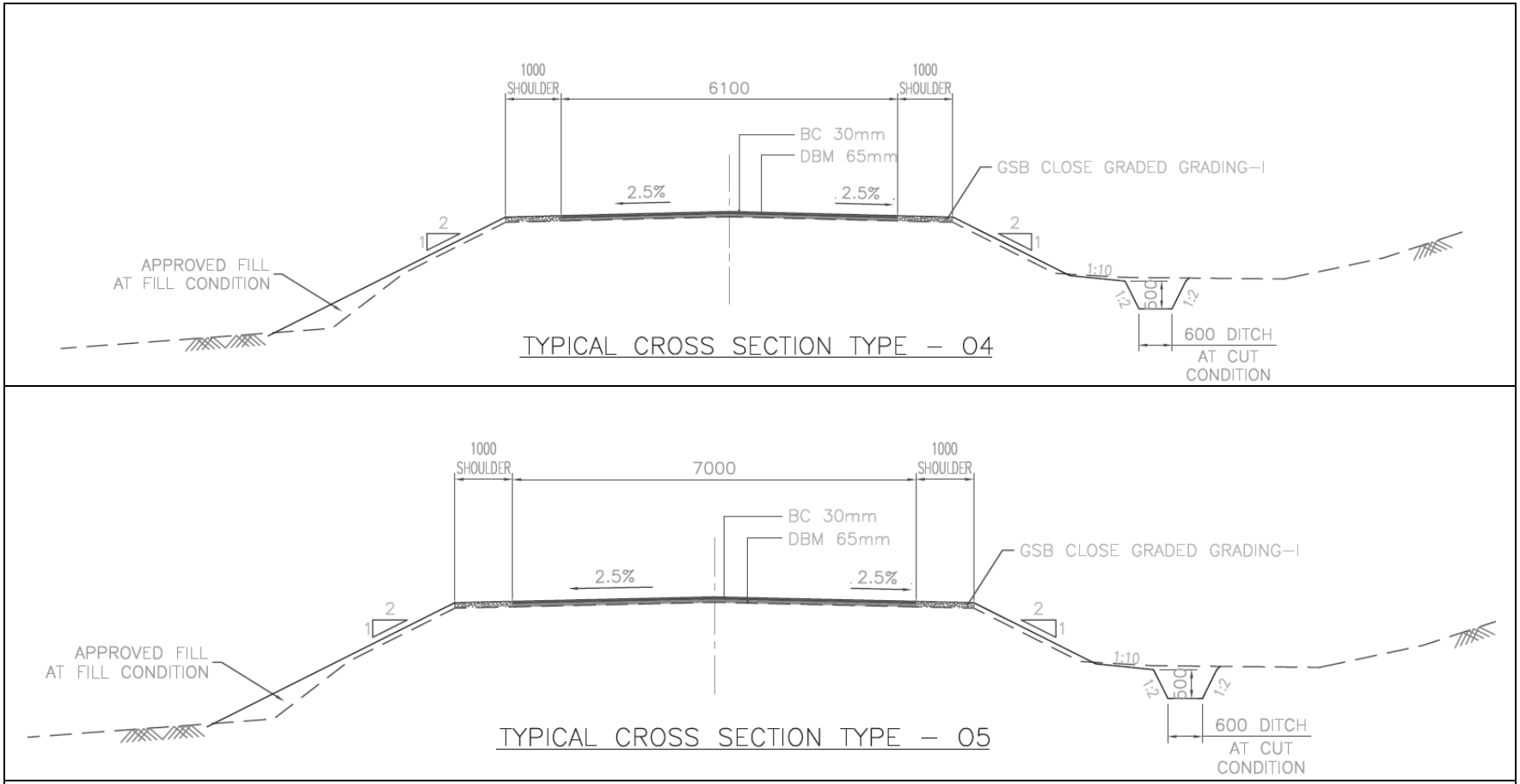


Figure 2-1: Typical Cross section for Maintenance Corridor

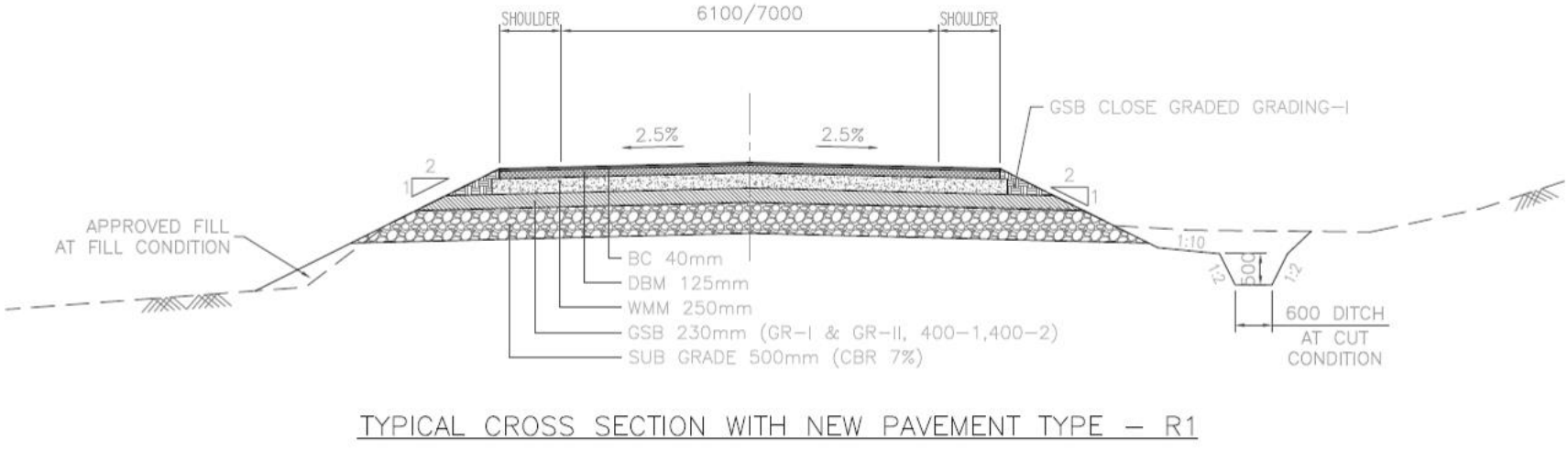


Figure 2-2: Typical Cross section for New Pavement Type

3. CORRIDOR CHARACTERISTICS

3.1 CORRIDOR PROFILES

21 An overview of the environmental and social features along the maintenance corridors is presented based on information on the corridors compiled during the screening surveys and site visits. This information shall be reviewed and updated during the designs preparation by the SRP divisions of the R&BD.

3.1.1. Dhandhuka - Paliyad

22 The corridor traverses 2 districts of Ahmedabad and Bhavnagar covering Dhandhuka, Ranpur and Botad Taluka. For the entire length of 46 km, 17 census villages and 1 town Dhandhuka abuts the project corridor. Total population of these villages and town as per census 2001 was 80,009. The villages along the corridor are Sakardi, Paliyad, Ranpur, Umrad and Paliyad. The salient features of the corridor are presented in Table below.

<table>
<tr><td>1</td><td>Name of Road</td><td>:</td><td>Dhandhuka - Paliyad , SH - 001</td></tr>
<tr><td>2</td><td>District</td><td>:</td><td>Ahmedabad</td></tr>
<tr><td>3</td><td>Corridor Length</td><td>:</td><td>46.40 km (Ch. 104+800 to 151+200)</td></tr>
<tr><td>4</td><td>Terrain</td><td>:</td><td>Plain</td></tr>
<tr><td rowspan="3">5</td><td>RoW</td><td>:</td><td></td></tr>
<tr><td>Existing</td><td>:</td><td>30 m</td></tr>
<tr><td>Proposed</td><td>:</td><td>30 m</td></tr>
<tr><td rowspan="3">6</td><td>CW Configuration</td><td>:</td><td></td></tr>
<tr><td>Existing</td><td>:</td><td>Two Lane</td></tr>
<tr><td>Proposed</td><td>:</td><td>Maintenance (MN)</td></tr>
<tr><td>7</td><td>CD Structures</td><td></td><td></td></tr>
<tr><td></td><td>Bridges</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Major Bridges</td><td>Minor Bridges</td></tr>
<tr><td>No. of existing Bridges</td><td>0</td><td>26</td></tr>
</table>
</td></tr>
<tr><td></td><td>Culverts</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Slab</td><td>HP</td><td>Box</td><td>Others</td><td>Total</td></tr>
<tr><td>No. of existing culverts</td><td>20</td><td></td><td>1</td><td>7</td><td>28</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Forests / environmentally sensitive areas</td><td>:</td><td>NPF area within RoW</td></tr>
<tr><td>9</td><td>Trees within existing RoW</td><td></td><td>Approximately 600 avenue trees, all the trees within RoW are saved.</td></tr>
<tr><td>10</td><td>Religious Structures Within RoW</td><td>:</td><td>1 Temple within RoW
3 Dargah within RoW
11 Shrines within RoW</td></tr>
<tr><td>11</td><td>River crossings</td><td>:</td><td>River crossings –0
Canal crossings – 1
Drains – 45</td></tr>
<tr><td>12</td><td>Water bodies / ponds</td><td>:</td><td>1 Pond (115+600)</td></tr>
<tr><td>13</td><td>Sensitive receptors</td><td>:</td><td>1 School within RoW</td></tr>
<tr><td>14</td><td>Transshipment areas/truck parking locations</td><td>:</td><td>2 Truck Parking areas at Dhandhuka (104+800), Nagnesh (LHS) and Bodiya (RHS) 126+600</td></tr>
<tr><td>15</td><td>Other features / issues if any</td><td>:</td><td>Quarry site (127+800), Gas Pipe Line (107+800), Industrial area at: Kotda(106+800 to 107+600), Nagnesh, Bodiya (127+200 to 129+800)</td></tr>
</table>

3.1.2. Palanpur - Danta

23 The Palanpur-Danta corridor passes through Palanpur, Vadgom and Danta talukas of Banas Kantha district. 17 census villages abut the project corridor for the length of 36km comprising a total population of 29, 929 as per 2001 census. The corridor passes through plain terrain. Villages adjoining project corridor are Dhanyona junction, Ratanpur village, Jhalotra village, Mumanvas village, Motasada village and Keralu junction (the corridor end). The salient features of the corridor are presented in Table below.

<table>
<tr><td>1</td><td>Name of Road</td><td>:</td><td>Palanpur-Danta (SH-870)</td></tr>
<tr><td>2</td><td>District</td><td>:</td><td>Bansas kantha and Sabar Kantha</td></tr>
<tr><td>3</td><td>Corridor Length</td><td>:</td><td>36 km (Ch. 0+000 to 36+000)</td></tr>
<tr><td>4</td><td>Terrain</td><td>:</td><td>Plain</td></tr>
<tr><td>5</td><td>RoW</td><td>:</td><td>30 m</td></tr>
<tr><td>6</td><td>CW Configuration</td><td>:</td><td></td></tr>
<tr><td></td><td>Existing</td><td>:</td><td>Double Lane</td></tr>
<tr><td></td><td>Proposed</td><td>:</td><td>Maintenance</td></tr>
<tr><td>7</td><td>CD Structures</td><td></td><td></td></tr>
<tr><td></td><td>Bridges</td><td></td><td>
<table>
<tr><td>Particulars</td><td>Major Bridges</td><td>Minor Bridges</td><td>Total</td><td></td></tr>
<tr><td>No. of existing Bridges</td><td>3</td><td>2</td><td>5</td><td></td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Culverts</td><td></td><td>
<table>
<tr><td>Particulars Slab</td><td>HP</td><td>Box</td><td>Total</td></tr>
<tr><td>Numbers of existing Culverts</td><td>2</td><td>29</td><td>31</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Forests / environmentally sensitive areas</td><td>:</td><td>NPF area within RoW</td></tr>
<tr><td>9</td><td>Trees within existing RoW</td><td></td><td>Approximately 5,000 avenue trees, all the trees would be saved from cutting</td></tr>
<tr><td>10</td><td>Religious Structures Within RoW</td><td>:</td><td>1 Temple (Chainage 32.700) with the distance of 20m from CL</td></tr>
<tr><td>11</td><td>Tribal districts</td><td>:</td><td>Danta Taluka, District Sabar Kantha</td></tr>
<tr><td>12</td><td>River crossings</td><td>:</td><td>River Crossings: 1 (Ch:7+600)
Canal Crossings: 0
Drains: 0</td></tr>
<tr><td>13</td><td>Water bodies / ponds</td><td>:</td><td>Open Well-3 (Distances of 30 to 40 m from Centre line of road)
Ponds-0</td></tr>
<tr><td>14</td><td>Sensitive receptors</td><td>:</td><td>3 Schools
2 Public Health Centres</td></tr>
<tr><td>15</td><td>Transshipment areas/truck parking locations</td><td>:</td><td>Keralu Junction, Near Danta</td></tr>
<tr><td>16</td><td>Other features / issues if any</td><td>:</td><td>Water tanks (small) for drinking purpose-3
Water pipelines-2 (elevated) (ch:32+000 and 10+000)</td></tr>
</table>

3.1.3. Atkot-Paliyad

24 Atkot-Paliyad corridor passes through 2 talukas i.e. Jasdan of Rajkot district, and Botad of Bhavnagar district. For a length of 22.25 km from Atkot to Paliyad, 5 census villages abuts project corridor with the total population of 18,415. Village settlements observed along the corridor are Jasdan, Atkot and Vichiya. Industrial units along the corridor located near Atkot junction. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Atkot – Paliyad, SH - 001						
2	District	:	Bhavnagar						
3	Corridor Length	:	22.25 km (Ch.153+500 – 167+000, 199+000 – 207+750)						
4	Terrain	:	Plain						
5	RoW	:							
	Existing	:	30.00 meters						
	Proposed	:	30.00						
6	CW Configuration	:							
	Existing	:	Double lane (DL)						
	Proposed	:	Maintenance (MN)						
7	CD Structures								
	Bridges	:	Particulars		Major Bridges		Minor Bridges		
			No. of existing Bridges				11		
	Culverts		Particulars	Slab	HP	Box	Total		
			No. of existing culverts	24	43		67		
8	Forests / environmentally sensitive areas	:	NPF area within RoW						
9	Trees within existing RoW	:	Approximately 60 avenue trees, all the trees would be saved from cutting						
10	Religious Structures Within RoW	:	3 temples (156+600- Kumbhora village, 202+100- Khanpur village, 206+200 - Atkot), 7 Shrines and 1 Dargah (207+600- Atkot).						
11	River crossings	:	River crossings- 00 Canal crossings- 01						
12	Other features / issues if any	:	Features: 2 Bus Stops (158+100, 165+200), 2 Wells (155+900, 199+600). Issues: 1 Accidental Curve (156+800) in Kumbhora village. Road side Plantation 199+400 to 207+000,						

3.1.4. Tharad - Deesa

25 Tharad-Deesa corridor passes through Tharad and Deesa talukas of Banas kantha district. The corridor passes through plain terrain adjoining 23 census villages. The total population of these villages, according to 2001 census is 56,079. Settlements along the corridor are Tharad, Lakhani, Agtali village, Dama village and Deesa town. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Tharad-Deesa (SH-54)					
2	District	:	Banas kantha					
3	Corridor Length	:	54.89 km (Ch: 33+500 to 88+390)					
4	Terrain	:	Plain					
5	RoW	:	45.70 m					
6	CW Configuration	:						
	Existing	:	Two Lane					
	Proposed	:	Maintenance					
7	CD Structures							
	Bridges	:	Particulars		Major Bridges		Minor Bridges	
			No. of existing Bridges		0		0	
	Culverts	:	Particulars Slab		HP	Box	Total	
			No. of existing culverts		28		28	
8	Forests / environmentally sensitive areas		NPF area within RoW, 1 Green tunnel					
9	Trees within existing RoW		Approximately 20,000 avenue trees. (*Large number of trees recorded since existing RoW varies between 40 to 45m.)* All the trees would be saved from cutting.					
10	Religious Structures Within RoW	:	1 Shrine (with the distance of 10 m from CL)					
11	Sensitive receptors	:	Primary school-3 (within 15 to 30 m from CL)					
12	Transshipment areas/truck parking locations		Tharad (33+500)					
13	Other features / issues if any		OFC (MH)- 4 (5 to 10 m from CL Water Pipelines (elevated)-4 (40 m from CL) Water tanks (for drinking purpose)-2 (15 to 40 m distance from CL)					

3.1.5. Chanasma – Deesa

26 The corridor traverses Chanasma, Patan, and Vagdod talukas of Patan district. 23 census villages and 2 towns (Chanasma and Patan) abut the corridor for the length of approximately 46km. Population of these towns and villages as per census 2001 are 1.77 lakhs. Villages enrouting the project corridor are Chanasma town, Mehmadpur village, Rajpur village, Patan town, Vadu junction, and Vagdod village. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Chanasma-Deesa (SH-007)
2	District	:	Patan
3	Corridor Length	:	45.05 km (76+000 to 124+200)
4	Terrain	:	Plain
5	RoW	:	24 m
6	CW Configuration	:	

	Existing	:	Narrow Two Lane						
	Proposed	:	Maintenance						
7	CD Structures								
	Bridges	:	Particulars		Major Bridges		Minor Bridges		
			No. of existing Bridges		3		7		
	Culverts	:							
			Particulars	Slab	HP	Box	Total		
			No. of existing culverts	8	69	1	78		
8	Forests / environmentally sensitive areas		NPF area within RoW						
9	Trees within existing RoW		Approximately 2,500 trees, all the trees would be saved from cutting						
10	Religious Structures Within RoW	:	7 Temples within RoW						
11	River crossings	:	River Crossing : 3 Canal crossing: 6 (including1 canal with Siphon system) Drain crossing: 2						
12	Water bodies / ponds	:	3 ponds located within 12 to 25 m from CL, 1 Lake at Vavdi village on LHS with distance of 10 m from CL						
13	Sensitive receptors	:	3 Schools (including 1 schools building under construction) (35 to 40m from CL) 1 Arts and Commerce college (Boundary wall within RoW) at 76+900 1 Hospital (Boundary wall within RoW) at 94+200						
14	Transshipment areas/truck parking locations	:	Chanasma (76+000)						
15	Other features / issues if any	:	11-OFC cables (Reliance, Bharat and TBN) (within RoW), 1-Water pipeline (elevated) at Vavdi village (50 m CL), 5- Water tanks for drinking purpose (from 5 to 25 m from CL)						

3.1.6. Vallabhipur-Rangola

27 Vallabhipur-Ranghola corridor passes through 2 talukas i.e. Vallabhipur and Umrala of Bhavnagar district. Within a length of 26.60 km from Vallabhipur to Ranghola, 10 census villages abut the project corridor. Total population of these villages is 43,026. Village settlements along the corridor are Parwala and Umrala. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Vallabhipur - Ranghola (SH 039)
2	District	:	Bhavnagar
3	Corridor Length	:	26.60 km (0+950 to 27+550)
4	Terrain	:	Plain
5	ROW	:	
	Existing	:	30.00 m
	Proposed	:	30 m
6	CW Configuration	:	
	Existing	:	Double Lane (DL)

	Proposed	:	Maintenance (MN)				
7	CD Structures						
	Bridges	:	Particulars	Major Bridges		Minor Bridges	
			No. of existing Bridges	1		8	
	Culverts	:	Particulars	Slab	HP	Box	Total
			No. of existing Culverts	7	6		13
8	Forests / environmentally sensitive areas	:	NPF area within RoW, Reported crossings of Blue bulls in a 6 km stretch from Vallabhipur to Rampur village (0+950 to 6+000)				
9	Trees within existing RoW	:	Approximately 500 avenue trees , all the trees would be saved from cutting				
10	Religious Structures Within RoW	:	6 temples (9+900, 15+100, 17+600, 17+800, 19+800, 22+300), 5 Shrines				
11	Tribal districts	:	NIL				
	River crossings	:	River crossing – 01 Canal crossing - 01				
12	Water bodies / ponds	:	2 Ponds (5+600, 15+000)				
13	Sensitive receptors	:	2 Hospitals (10+000- in Umrala village, 15+00in Timbi village), 2 Schools (15+100- Timbi village), (23+000- Parwala village).				
14	Transshipment areas/truck parking locations	:	1 Truck Parking area (28+000).				
15	Other features / issues if any	:					

3.1.7. Viramgam–Nandasan

28 The Nadasan-Viramgam corridor passes through Kadi taluka of Mehsana district. Total 14 census villages and 2 towns (Kadi and Nandasan) border the corridor for the length of 42.85 km. The corridor passes through plain terrain. Village/town settlements along the corridor are Nandasan junction, Kadi, Khavad village, Vekra village, Kalyanpura and Sachana junction. Industrial areas comprising cotton and oil industries are identified for the length of 11km at Nandasan-Kadi section (Ch. 7 + 000 to 1+000) and Kadi-Kalyanpur section (Ch. 2+500 to 10+700). The salient features of the corridor are presented in Table below.

1	Name of Road	:	Nandasan-Viramgam – SH-189		
2	Districts	:	Mehsana		
3	Corridor Length	:	42.85 km		
4	Terrain	:	Plain		
5	RoW	:			
	Existing	:	24 m		
	Proposed	:	24 m		
6	CW Configuration	:			
	Existing	:	Narrow Two Lane		
	Proposed	:	Maintenance		
7	CD Structures				
	Bridges	:	Particulars	Major Bridges	Minor Bridges

			No. of existing Bridges		1		2	
	Culverts		Particulars	Slab	HP	Box	Others (Buried)	Total
			No. of existing culverts	3	40	0	0	43
8	Forests / environmentally sensitive areas	:	NPF area within RoW					
9	Trees within existing RoW	:	Approximately 5,000 avenue trees, all the trees would be saved from cutting					
10	Religious Structures Within RoW	:	7 Temples (within 15 m from the CL) 3 Temple Boundary walls within 15 m and Structures 20 to 100 m from CL 10 Shrines (with the distance of 3 to 15 m from CL)					
11	River crossings	:	5 Canals (including 1 canal with syphon system)					
12	Water bodies / ponds	:	9 Ponds with the distance of 10 to 50 m from CL					
13	Sensitive receptors	:	3 Schools within 15 m from CL 4 School boundary walls within 15 m from CL 1 College boundary wall within 15 m from CL 1 Public Health Centre boundary wall 15 m from CL					
14	Transshipment areas/truck parking locations	:	Kadi Town					
15	Other features / issues if any	:	2 OFC (Reliance) within ROW 4 Water pipelines within the distance of 15 m from CL 5 water tanks within the distance of 15 m from CL 1 Over Head tank 10m from CL					

3.1.8. Pardi - Dixal

29 The corridor Pardi-Dixal passes through plain and rolling terrain. The corridor traverses Pardi and Kaprada taluka of Pardi district, enrouting 27 census villages for the length of approximately 67 km, comprising a total population of 56185 (Census 2001). Villages enrouting the corridor are those of Nanaponda, Dhagadhma, Motavaghchipa and Pardi.

Pardi and Kaprada taluks are part of Fifth schedule areas in Valsad district. Predominant tribes along the corridor are Dubla, Dhodia, Nayak and Varli. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Pardi-Dixal					
2	District	:	Valsad					
3	Corridor Length	:	67.40km (Ch. 2+200 to 91+600)					
4	Terrain	:	Plain and Rolling					
5	RoW	:	20-30 m.					
6	CW Configuration	:						
	Existing	:	Double					
	Proposed	:	Maintenance					
7	CD Structures							
	Bridges	:	Particulars		Major Bridges		Minor Bridges	
			No. of existing Bridges		0		4	
	Culverts		Particulars	Slab	HP	Box		Total

			No. of existing culverts	6	102	3		111
8	Forests / environmentally sensitive areas		NPF, 1 green tunnel					
9	Trees within existing RoW	:	Approximately 2,500 avenue trees, all the trees would be saved from cutting					
10	Religious Structures Within RoW	:	11 Temples, 1 Dargah, 1 Mosque and 1 shrine					
11	Tribal Taluka	:	Pardi					
12	Water bodies / ponds	:	1 Open Well, 1 Pond and 1 Check dam within RoW					
13	Sensitive receptors within RoW	:	8 School boundary walls 1 Hospital boundary wall					
14	Transshipment areas/truck parking locations	:	2 truck parking areas at 24+800, 52+500					
15	Other features / issues if any	:	3 Water taps and OFC, GAIL within RoW					

3.1.9. Becharaji-Chanasma

30 The Becharaji-Chanasma corridor passes through 2 districts of Mehsana and Patan. It includes Becharaji taluka of Mehsana district and Chanasma taluka of Patan districts. 11 census villages and 1 town with a population of 50,723 (as per Census 2001) abut the corridor for the length of 29 km. The corridor passes through plain terrain. Villages adjoining the corridor are Becharaji, Kalaji, Modhera, Vadvali and Karoda. An ASI Protected Monument (Modhera Vov) is located adjacent to the RoW (Ch. 60+400). The salient features of the corridor are presented in Table below.

1	Name of Road	:	Becharaji-Chanasma (SH-007)					
2	District	:	Mehsana, Patan					
3	Corridor Length	:	29 km					
4	Terrain	:	Plain					
5	RoW	:						
	Existing	:	30 m					
	Proposed	:	30 m					
6	CW Configuration	:						
	Existing	:	Double Lane					
	Proposed	:	Maintenance of the corridor					
7	CD Structures							
	Bridges	:	Particulars		Major Bridges		Minor Bridges	
			No. of existing Bridges		4		3	
	Culverts		Particulars	Slab	HP	Box		Total
			No. of existing	2	27	0		29

			culverts					
8	Forests / environmentally sensitive areas	:	ASI Protected Monument (Modhera Vov) Boundary wall at 5m and structure 8m from Centre of CW), NPF area within RoW					
9	Trees within existing RoW	:	Approximately 2,000 avenue trees, all the trees would be saved from cutting					
10	Religious Structures Within RoW	:	2 Temples within RoW 7 shrines within RoW					
11	River/Canal crossings	:	River Crossings: 4 Canal crossings:2 (including canal with siphon system)					
12	Water bodies / ponds	:	1 Ponds (45m distance from CL)					
13	Sensitive receptors	:	2 schools (within 20m from CL)					
14	Other features / issues if any	:	1 Water tanks (with distance of 10 m from CL) 12 OFC lines (BSNL, TTS) (within RoW)					

3.1.10. Karjan – Borsad (Partly under RMC)

31 Karjan-Borsad corridor passes through 4 talukas i.e. Anklav, Borsad, Padra, Karjan of Anand and Vadodara district. The corridor abuts 23 census villages and 1 town of these two districts. The corridor traverses through plain terrain. Significant road side plantation with large girth size trees are amongst the prominent features of the corridor. The salient features of the corridor are presented in Table below.

1	Name of Road	:	Karjan Borsad					
2	District	:	Anand					
3	Corridor Length	:	55.15km (ch. 22+300 to 59+00)					
4	Terrain	:	Plain					
5	ROW	:	24.00					
6	CW Configuration	:						
	Existing	:	Two lanes (2L)					
	Proposed	:	Maintenance					
7	CD Structures							
	Bridges	:	Particulars		Major Bridges		Minor Bridges	
			No. of existing Bridges		0		3	
	Culverts		Particulars	Slab	HP	Box	Total	
			No. of existing culverts	20	25	4	49	
8	Forests / environmentally sensitive areas	:	NPF area within RoW					
9	Trees within existing RoW	:	Approximately 7,000 avenue trees					
10	Religious Structures Within RoW	:	7 Temple Structures within RoW (Ch. 0+200, 18+200, 22+700, 2+800, 3+590, 3+600, 14+200) 2 Temples boundary wall within RoW (50+700, 19+200)					

			3 shrines within RoW (3+900 and 0+600)
11	Water bodies / ponds	:	7 ponds with RoW (38+600, 1+300, 8+400, 8+400, 11+400, 18+600, 22+300) 1 Lake within RoW (6+400)
12	Sensitive receptors	:	1 school structure within RoW (5+200) 3 schools boundary wall within RoW (36+000, 42+300, 50+700)
13	Transshipment areas/truck parking locations	:	Gambhira Chokdi at 54+400 to 54+600
14	Other features / issues if any	:	1 Irrigation Bore well (4+000) GSCL Pipe line (42+600), ONGC pipeline (4+700), Gas pipe line OPCL (1+100), OFC Idea (16+000) Bus stand (1+400, 10+400, 13+600) Goriyat Village Library (3+500)

3.1.11. Savar Kundla – Dhasa

32 Savar Kundla Dhasa corridor passes through 4 talukas i.e. Savar Kundla, Lilia, and Lathi of Amreli district, and Gadhada of Bhavnagar district. For a length of 70.30 km from Savar Kundla to Dhasa, 26 census villages abut the project corridor. Total population of these villages as per census 2001 is 1.38 lakhs. The villages observed along the corridor are Savar Kundla, Junasavar, Liliya Mota, Damnagar and Dhasa. Wild life crossings are indicated along the corridor due to location of of Pania Wildlife Sanctuary at 20 km. The salient features of the corridor are presented in Table below.

<table>
<tr><td>1</td><td>Name of Road</td><td>:</td><td>Savar Kundla - Dhasa SH (236, 110, 115, 236, 021, 021)</td></tr>
<tr><td>2</td><td>District</td><td>:</td><td>Amreli</td></tr>
<tr><td>3</td><td>Corridor Length</td><td>:</td><td>70.3. km (ch. 0+00 to 20+100- SH 236
15+800 to 22+800- SH 110
0+00 to 13+00 – SH 115
30+00 to 46+800 – SH 236
2+300 to 12+900 – SH 021
97+400 to 100+200 – SH 021)</td></tr>
<tr><td>4</td><td>Terrain</td><td>:</td><td>Plain</td></tr>
<tr><td>5</td><td>RoW</td><td></td><td></td></tr>
<tr><td></td><td>Existing</td><td>:</td><td>30m</td></tr>
<tr><td></td><td>Proposed</td><td>:</td><td>30m</td></tr>
<tr><td>6</td><td>CW Configuration</td><td></td><td></td></tr>
<tr><td></td><td>Existing</td><td>:</td><td>Narrow 2L</td></tr>
<tr><td></td><td>Proposed</td><td>:</td><td>Maintenance</td></tr>
<tr><td>7</td><td>CD Structures</td><td></td><td></td></tr>
<tr><td></td><td>Bridges</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Major Bridges</td><td>Minor Bridges</td><td>Total</td></tr>
<tr><td>No. of existing Bridges</td><td>3</td><td>30</td><td>33</td></tr>
</table>
</td></tr>
<tr><td></td><td>Culverts</td><td>:</td><td>
<table>
<tr><td>Particulars</td><td>Slab</td><td>HP</td><td>Box</td><td>Total</td></tr>
<tr><td>No. of existing culverts</td><td>13</td><td>19</td><td>0</td><td>32</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Forests / environmentally sensitive areas</td><td>:</td><td>NPF area within RoW,
Reported wild life crossings of Blue bulls, Fox and Reptiles at Ch. 6+00 to 10+00, 15+00 to 20+00 due to presence of Pania Wild life Sanctuary at 20 km.</td></tr>
</table>

9	Trees within existing RoW	:	Approximately 500 avenue trees, all the trees would be saved from cutting
10	Religious Structures Within RoW	:	4 temples (2+800, 11+100, 11+400 and 16+500), 1 Dargah (16+900) and 9 shrines at SH 236, 2 temples (1+600) and 2 shrines at SH 115, 3 temples (42+600, 44+900, and 46+100) and 4 shrines at SH 236, 3 temples (2+400, 2+800, 3+800) and 6 shrines at SH 021. 2 temples (98+100, 99+400) and 1 Shrine at SH 021.
11	River crossings	:	River crossings- 03
12	Sensitive receptors	:	3 schools and 2 Hospitals - 1 School (SH 115- 1+600,) 1 school (SH- 236 – 35+200) 1 School (SH – 021, 12+600). 1 Hospital (SH- 021, 12+800), 1 Hospital (SH – 021, 98+600).
13	Other features / issues if any	:	-

3.2 MAINTENANCE CORRIDORS AND SENSITIVE AREAS

3.2.1 Notified-Protected Forests

33 As per the Gujarat Government Gazette dated 5th July, 1973, *the roadside trees and avenue plantations along the State Highways (SH) and National Highways (NH) are declared as Notified Protected Forest (NPF), under Forest (conservation) Act 1980*. Hence, any infrastructure development, including strengthening and widening activity would attract Forest clearance. As per the Gazette, the corridors which are declared as State Highways before 1980 will have 9.75m width (Black Top) as R&BD land and corridors that are declared after 1980 as State Highways will have the actual (existing) width of the black top as R&BD land. Adopting this criterion, provisional NPF area in the maintenance corridors for various RoW options are worked out and furnished in the given

34 **Table 3-1**. The proposed maintenance activity does not require diversion of forest land.

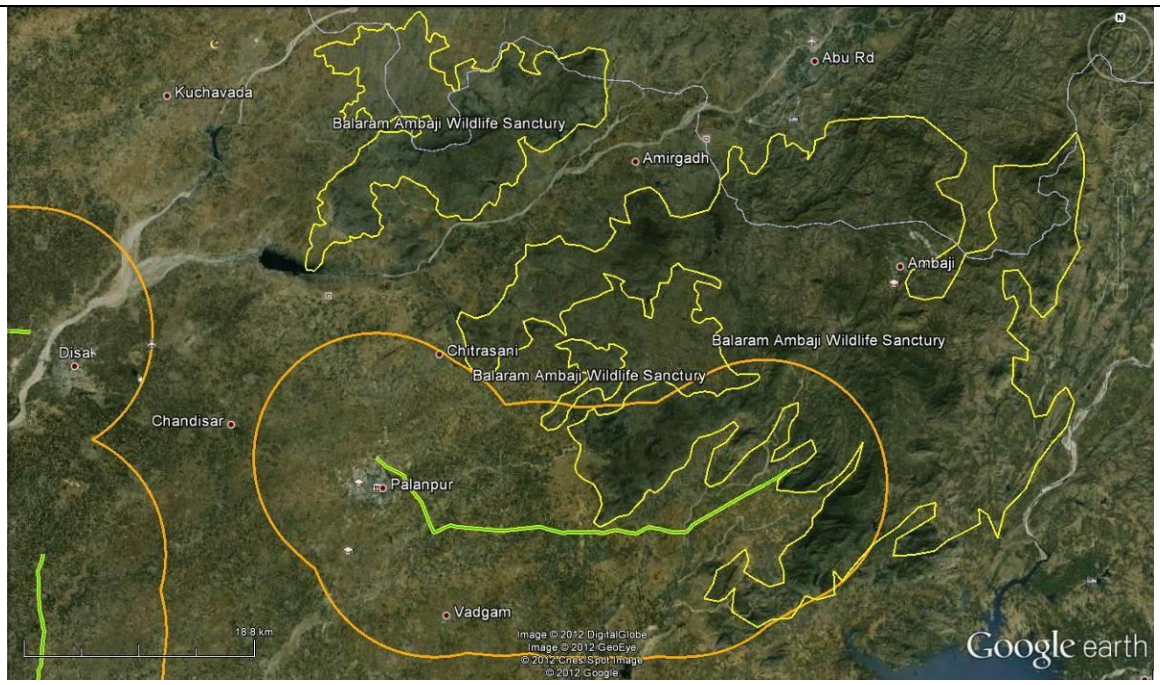
No trees shall be cut and diversion of Notified Protected Forests is not allowed as part of the Maintenance corridors.

Table 3-1: NPF areas of Maintenance Corridors

Sl.no	Corridors	Notified Protected Forest area (ha)
1.	Dhandhuka - Paliyad	93.15
2.	Palanpur-Danta	36.00
3.	Atkot – Paliyad	22.20
4.	Tharad-Deesa	141.00
5.	Chanasma-Deesa	27.03
6.	Vallabhipur – Ranghola	26.60
7.	Nadasan-Viramgam	30.60
8.	Pardi – Dixal	46.04
9.	Becharaji-Chanasma	29.00
10.	Karjan-Borsad	24.20
11.	SavarKundla - Dhasa	98.00

3.2.2 National Parks/ sanctuaries

35 As per the Wildlife Protection Act 1972 and guideline documents (issued by MoEF in 2011) for taking up non-forestry activities in wildlife habitats, *a buffer of 10km from the National Parks and Sanctuaries should be treated as Eco-Sensitive Zone (ESZ) and for carrying out any infrastructure development; Wildlife clearance is mandatory from the National Wildlife Board of India*). Of the 11 maintenance corridors, Palanpur-Danta corridor falls within 10km radius from Balaram Ambaji Sanctuary and attracts wildlife clearance[1]. (Refer Annexure-1for Wildlife clearance Proforma).



Source: Google Image 2005

Figure 3-1: Balaram Ambaji Sanctuary within 10km of Palanpur-Danta Corridor

36 While the SavarKundla – Dhasa corridor is 20km away from the Pania Wildlife Sanctuary, wildlife movement is recorded based on consultations. While no clearance is required for this corridor, consultations with the forest department officials shall be required to identify any specific measures required to ensure addressal of any impacts pertaining to wildlife crossings.

3.2.3 Archaeological Monuments

37 *As per the Ancient Monuments and Archaeological sites and Remains (Amendment and Validation) Act, 2010, any monument identified by the state (or) Central government shall be preserved and protected upto an area of 300m. This includes a Prohibited Area of 100m and Regulated Area of*

[1] The applicability of the communication (dated 2nd July 2012) from the MoEF to the Government of Andhra Pradesh stating that *"Projects falling in ESZs, which are not covered under the EIA notification, and which do not require environmental clearance, would also not require "prior" approval of the Standing Committee of National Board for Wildlife"*, shall be ascertained, in consultation with the Department of Forests and Environment, GoG. If prior approval is required, the application for the same shall be prepared as per the Wildlife Clearance Proforma in Annexure-1.

another 200m. The ASI protected monument "**ModheraVov**" is located 8m adjacent to the RoW (Ch 60+400) in Becharaji-Chanasma Corridor. Hence the proposed activity requires clearance from the National Monuments Authority (Refer Annexure-2 for the application form).

3.2.4 Green tunnels

38 The presence of green tunnels is observed in three maintenance corridors and the locations are given in **Table 3-2**. As there is no tree cutting proposed along the maintenance corridors, there are no impacts envisaged on these green tunnels.

Table 3-2: Green tunnel locations along the Maintenance Corridors

Sl.no	Corridors	Green tunnel Locations
1.	Palanpur-Danta	(i) Ch. 33+600 near Dhanyona junction (ii) Ch. 20+000 to 21+000 for 1 km stretch near Ruppura village
2.	Tharad-Deesa	Ch. 55+200 to 55+800
3.	Pardi – Dixal	Ch. 5+200 to 5+600

3.2.5 CRZ / wetlands

39 There are no corridors which are along the coast, and none of the maintenance corridors are within the CRZ zones or designated wetlands.

3.2.6 Tribal Areas

40 Pardi – Dixal and Palanpur – Danta corridors pass through notified tribal areas. The Pardi and Kaprada taluk in the Pardi – Dixal corridor and the Danta taluk in Palanpur – Danta corridor forms part of Fifth schedule areas.

41 No land acquisition or impacts on private assets, either of tribal or non-tribal communities along the maintenance corridors are envisaged. *However, in line with the requirements of the WB OP 4.10 on Indigenous Peoples, Free, Prior and Informed Consent (FPIC) of the tribal communities along the corridors shall be obtained through consultations with the tribal communities, elected representatives in the tribal areas, the institutions at the taluk level and the officials of the Tribal Development Department, GoG. Tribal Development plan for the corridors through notified tribal areas shall be prepared by the SRP division.* Sample formats for carrying out the FPIC consultations, materials for disclosure etc in Tribal areas are provided in Annexure-3. Template for preparation of TDP is given in the Annexure-4.

4. POTENTIAL IMPACTS

4.1 ENVIRONMENTAL IMPACTS

42 The avoidance approach to environmental and social attributes shall ensure that there are no direct impacts triggered on environmental features or private lands and assets within the proposed construction areas. As a result, the impacts likely are largely construction stage /maintenance related impacts associated with civil works of such magnitude. Potential adverse impacts are less significant, low magnitude, localized and could be easily mitigated. Following are anticipated potential environmental impacts for maintenance activity:

- Temporary impact on land and air environment due to locating and operating borrow areas, construction sites, labour camps etc;
- Temporary impact on land, air and water environment due to establishing and operating construction plants (Hot Mix Plant and Diesel Generator(DG) sets);
- Impact on biophysical environment due to quarry operations;
- Impact on air quality, water quality, drainage, road users due to on-site maintenance works;
- Impact on land and water environment due to disposal of waste materials; and,
- Impact on occupational health and safety due to all onsite and offsite maintenance works.

4.2 SOCIAL IMPACTS

43 Avoidance of land acquisition and resettlement impacts shall ensure that there is no land acquisition, impacts on assets or private properties, including those of non-titleholders along the maintenance corridors. The proposed maintenance activities do not envisage any impact on cultural properties, residential properties, and commercial properties. No squatters and encroachers located within the RoW are likely to be affected due to the proposed maintenance improvements. Utility lines, if located within the CoI, and require relocation shall be shifted in consultation with the concerned agency/department.

44 Therefore, anticipated potential social impacts due to the maintenance activity largely relate to temporary occupation of lands for borrowing/ siting of hot mix plants / storage yards/ construction sites /labour camps and haul roads. Arrangements for temporary use of land or structures outside the RoW shall be worked out by the Contractor. Such use of lands shall be through written agreement between the land owner and the Contractor, and shall include conditions that all areas disturbed by the construction activities shall have been restored to their original condition. However, in case of any temporary loss of access and/or livelihood, damage to crops and/or structures due to construction work, such impacts shall be addressed and mitigated based on provisions laid down in the Resettlement Policy Framework (RPF) approved for GSHP II. In case of any grievances Grievance Redressal Committee operationalized for the project shall record such grievances , carry out an assessment of such claims and decide on the amount of compensation as per provision in the RPF and based on the decision of the committee, such claims shall be settled.

45 Post construction, while no impacts on temporary use of land outside the RoW is envisaged, the Contractor shall ensure the protection of the formation width from any further encroachments or squatters settling down. Materials if required as bitumen, concrete etc shall be procured from market by the Contractor. As a result, there are no impacts envisaged due to hotmix plants, borrow areas during the maintenance period.

5. POLICY AND LEGAL REQUIREMENTS

46 **Environmental (Protection) Act, 1986** as per the amendment dated 6th April, 2011 to EIA notification 2006, environmental clearance has been made mandatory only for new state highways. Hence, *the proposed maintenance works on existing State Highways / Major district roads are not covered under the ambit of the notification and are not categorized either as Category A or Category B*. However, the project shall require obtaining consent from competent authorities such as the Gujarat Pollution Control Board (GPCB), for '*Consent to Establish*' by submitting an online Common Application (as per Schedule-I), under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981 and authorization under Hazardous Wastes (Management and Handling) Rules, 1989, as amended.

47 **Wildlife Protection Act, 1972**: This act is promulgated to provide for the protection of wild animals, birds and plants and for matters connected therewith. The provisions under this act are as below

- Section 9 of the Act mentions that no person shall hunt any wild animal specified in Schedule-I
- The act prohibits picking, uprooting, damaging, destroying, acquiring any specified plant from any forestland
- It bans the use of injurious substances, chemicals, explosives that may cause injury or endanger wildlife in a sanctuary
- No alteration of the boundaries of a National Park shall be made except on a resolution passed by the Legislature of State
- Destruction or damage of wildlife property in a National Park is prohibited

GUIDELINES FOR TAKING NON-FORESTRY ACTIVITIES IN WILDLIFE HABITATS

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PROCEDURE TO BE FOLLOWED FOR ACTIVITIES WITHIN 10 KMS FROM BOUNDARIES OF NATIONAL PARKS AND WILDLIFE SANCTUARIES:

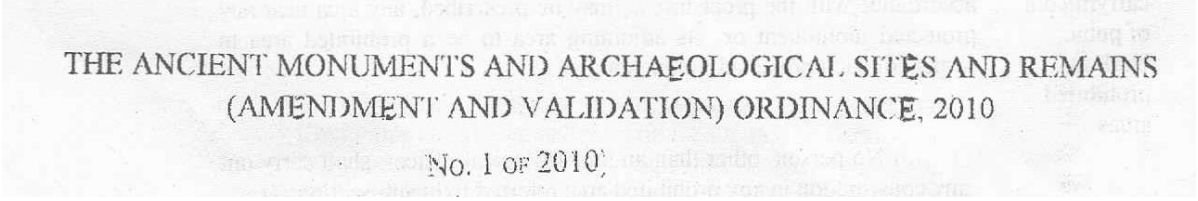
In case the project site is located within the eco-sensitive zone or 10 Kms in absence of delineation of such a zone from the boundaries of National Parks, Wildlife Sanctuaries or is an Elephant Reserve/Tiger Reserve and/or important corridors of wildlife movement, the User agency/Project Proponent should seek prior clearance from the Standing Committee of NBWL before seeking Environmental Clearance and the procedure as mentioned under paragraphs 2.1 to 2.8 above are required to be followed in such cases also.

48 **Forest (Conservation) Act, 1980, (as Amended In 1988):** *No diversion of forests (either protected or reserved forests) is envisaged as part of the maintenance corridors, and the clearance requirements as per the Act, are not triggered.* The Forest (Conservation) Act, 1980 prohibits large-scale diversion of forestland for non-forest use. As amended in 1988, no State Government or authority shall

make such diversions except with the prior approval of the Central Government. Salient features of the act are summarised below.

- The Indian Forest Act, 1927: Section 5 states that after declaring a particular land as reserved forest, no fresh clearings for any purpose shall be made, except in accordance with such rules as made by the state government.
- Section 26 states the acts prohibited in such forests, in addition to section 5.
- Sections 30, 32 furnish power to the State government to regulate certain acts (clearing for cultivation, building or any other purpose) in such forests as specified in the section
- Section 35 furnishes power to the State government to prohibit certain acts (clearing of vegetation etc.) in lands not being the property of the government.
- The Forest (Conservation) Act, 1980: Section 2 of the Act restricts the state government on the de-reservation of forests or use of forestland for non-forest purposes

49 **The Ancient Monuments and Archaeological sites and Remains (Amendment and Validation) Act, 2010.** Archaeological monuments identified / listed either by the state (or) central government shall be preserved/ protected to an area of 300m, which includes 100m as prohibited area and 200m as regulated area. Further to take up any activity, near archaeology site, ASI clearance shall be obtained from National Monuments Authority. *The ASI protected monument "**ModheraVov**" is located 8m adjacent to the RoW (Ch 60+400) in Becharaji-Chanasma Corridor, and requires clearance from the National Monuments Authority.*



THE ANCIENT MONUMENTS AND ARCHAEOLOGICAL SITES AND REMAINS (AMENDMENT AND VALIDATION) ORDINANCE, 2010

No. 1 OF 2010

2. The limits of prohibited area and regulated area around the monuments, archaeological sites and remains declared by the Central Government as protected have been specified in the principal Act as 100 m and 200 m, respectively. The limits so fixed may be further extended on the basis of gradation and classification of the monuments, archaeological sites and remains to be done by the National Monument Authority, which is to be constituted by the Central Government by virtue of the Amendment in the principal Act.

4. Henceforth, no permission for construction of any public projects or any other nature shall be granted in the prohibited areas of the protected monument and protected area. However, permission for repair and renovation could be granted by the Competent Authority, to be specified by the Central Government, on the recommendation of the National Monument Authority, subject to the condition that the building or structure is pre-1992 or permission for construction or reconstruction of such building or structure had been granted by the Archaeological Survey of India.

50 **The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.** The Act has been framed to recognise and vest the forest rights and occupation in forest land in forest dwelling STs and other traditional forest dwellers who have residing in such forests for generations but whose rights could not be recorded. The Act intends to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. *Since no diversion of forest lands is proposed under the maintenance corridors, the provisions of the Forest Rights Act, 2006 shall not be applicable.*

51 ***Equal Remuneration Act, 1979****:* The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees;

52 ***Child Labour (Prohibition and Regulation) A; 1986****:* The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry.

53 ***Minimum Wages Act, 1948****:* The employer/ contractor is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act;

54 ***Panchayats (Extension to the Scheduled Areas) Act, 1996:*** Recognises the traditional rights of tribals over community resources, the land, water, and forests.

55 ***Operational Policy 4.10***: Ensures that indigenous population benefits from development projects and those projects' potentially adverse effects are avoided or mitigated. The Policy seeks the borrower to engage in a process of free, prior and informed consultation. Preparation of Tribal Development plan (TDP) is required if the project has impact on the indigenous people.

56 ***Operational Policy 4.12***: Avoid or minimize involuntary resettlement and, where this is not feasible, the impacts shall be mitigated as per the provisions of RPF.

57 **Other legislations applicable for the project:** Implementation of the project works would require clearances from the Gujarat Pollution Control Board (GPCB) as well as several other line agencies. These would have to be obtained by the contractor before commencement of civil works in the project area. The clearances to be obtained are presented in the Table 5-1.

Table 5-1: Applicable Laws and Regulations

Sl. No	Clearances	Acts	Approving Agency	Applicability to the Project	[2]Indicative Time Frame	Responsibility	
						Execution	Supervision
PROJECT PREPARATION STAGE							
1	No Objection Certificate (NOC)/ Consent to Establish	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Gujarat Pollution Control Board	Applicable	3-6 months	EE, SRP Division	
PROJECT IMPLEMENTATION STAGE							

[2] The right of permission vests with the Competent Authority

Sl. No	Clearances	Acts	Approving Agency	Applicability to the Project	[2]Indicative Time Frame	Responsibility	
						Execution	Supervision
2	Permission for Withdrawal of Surface Water from Rivers, Nala, Water harvesting structure/ Reservoirs/ Ponds/ Irrigation canals	Gujarat Water Supply and Sewerage Board Act, 1978	Gujarat Water Supply and Sewerage Board	Applicable (If the contractor is extracting the surface water)	3 months	Contractor	EE, SRP Division
3	Permission for Sand Mining from river bed	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	EE, SRP Division
4	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Boa**r**d	Applicable	3 months	Contractor	EE, SRP Division
5	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	Gujarat Pollution Control Board	Applicable	3 months	Contractor	EE, SRP Division
6	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	EE, SRP Division
7	Disposal of Construction Waste and liquid effluent from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Gujarat Pollution Control Board	Applicable	2 months	Contractor	EE, SRP Division
8	Certificate of Pollution Under Control	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	EE, SRP Division
9	Employing the Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	EE, SRP Division
10	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	EE, SRP Division

Source: Acts, Rules and Regulation from Central and State Government

6. APPLICATION OF ESMF

58 The Executive Engineer (EE) of the State Roads Project (SRP) Division of the R&BD shall be responsible for the effective implementation of the provisions put forth in the ESMF. While the implementation of the measures proposed shall be the Contractor's responsibility, the SRP division shall be responsible for supervision and ensuring compliance to the provisions. The Table 6-1presents the measures to be taken up by the SRP division at the various stages of preparation and implementation of the maintenance corridors.

Table 6-1: Implementation Steps for ESMF

Sl.No.	Activity	Items to consider	Measures to address
1.	Inventorisation of environmental /social features	Trees / notified protected forests	• Avoid tree cutting, impacts on non-titleholders, impacts on cultural properties, water bodies. • Avoidance, design modifications to minimize adverse environmental impacts • Incorporating community concerns into finalizing designs • Integrating the design modifications and mitigation measures into the Bid documents • If unavoidable, relocation of the utilities impacted, through the line agencies ***Refer Annexure -5 for Inventory Formats***
		Non-titleholders within the existing formation width	
		Rivers / water crossings / canals	
		Reserved Forests	
		Water bodies	
		Cultural properties within and adjoining the RoW	
		Settlements along the corridor	
		Community facilities	
		Utilities within the RoW	
		Major junctions	
		Sensitive receptors along the corridor, educational institutions, hospitals, silence zones.	
		Locations with reported wildlife crossings	
2.	Clearances	Protected areas (national parks, wildlife sanctuaries within 10km)	• Obtain necessary clearances from the MoEF/ NWBL/ Supreme Court
		Archaeological monuments (corridors within protected and regulated areas of the monuments)	• Obtain necessary clearances from the National Monuments Authority, GoI.
		Use of fly ash for corridors within 100km of thermal power plants	• Explore possibilities of use of fly ash in the project • Confirm availability of fly ash for the project use from the power plants • Material testing to ascertain suitability of use of fly ash
3.	Corridors in tribal areas	Tribal Districts (corridors within notified tribal areas under the Fifth Schedule)	• Carry out Free Prior and Informed Consent (FPIC) of the tribal communities in notified tribal areas, in co-ordination with the Tribal Development Department and the local tribal institutions • Prepare Tribal development plans for the corridors, as required.
4.	Identification of material sources	Borrow material	• Identification of potential suitable sources in the vicinity of the corridor
		Quarry material	
		Water availability	
5.	Mitigation measures to	Water bodies within RoW, abutting the RoW	• Provision of silt fencing, other control

Sl.No.	Activity	Items to consider	Measures to address
	address environment / social impacts	Trees within formation width	• Avoidance through design modifications
		Stability of slopes	• Measures for slope stabilization
		Soil erosion	• Erosion control measures
		Loss of productive lands	• Agriculture lands avoidance from setting up construction camps, borrow areas
			• MoU/ Agreement between the land owner and the Contractor
			• Conservation of top soil
			• Site restoration after construction
		Cultural properties	• Avoidance through design modifications, protection measures
		Common Property Resources	• Avoidance through design modifications, protection measures
		Drainage	• Provision of adequate number of CD Structures
		Sensitive receptors along the corridor, educational institutions, hospitals, silence zones, settlement areas	• Provision of measures to be adopted during construction
		Corridors through forests, near to sensitive areas, wildlife crossings, monuments	• Avoidance through design modification or formulating additional measures for avoiding impacts during construction
6.	Measures to be adopted during construction	Top soil	• Stockpile topsoil and preservation
		Construction sites	• Provision of pollution control measures
			• Environmental Monitoring (***Refer Annexure – 6 for monitoring formats)***
			• All measures to ensure public & worker's health/safety
			• Water Management
		Construction camps	• Criteria for identification of sites and Infrastructure arrangements
			• Safe disposal of all wastes
			• Enforcement of pollution control measures
		Borrow areas	• Arrangements with land owners to include redevelopment
		Quarry areas	• Licensed quarries to be utilized for sourcing materials • Rehabilitation of quarry areas if new quarries are opened
		Public/workers health & safety	• Personal Protective Equipment to be provided
			• Public safety at construction sites to be undertaken
			• Measures for worker's health & hygiene at construction camps
		Traffic during construction	• Traffic safety measures, for pedestrians and traffic

7. ENVIRONMENTAL MANAGEMENT PLAN

59 Appropriate mitigation measures have been formulated to ensure that any adverse impact is within the acceptable limit. The responsible agencies for implementing and supervising each of the suggested mitigation measure have been identified. Accordingly, the Environmental Management Plan (EMP) comprising environmental impacts, mitigation measures and responsible implementing and supervising/ monitoring agencies is given in **Table 7-1.**

Table 7-1: Environmental and Social Management Plan (EMP)

Sl. No.	Issues	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase					
PC.1	Corridors passes through Tribal Areas/ Taluka	Along the project corridors	• Free Prior and Informed Consent (FPIC) consultations shall be conducted as suggested in Annexure–3	EE, SRP	Concerned competent authority
PC.2	Statutory Clearance	Utility Relocation & Consent to Establish	• Obtain NoC from the concerned agencies for shifting utilities. • Obtain Consent from competent authorities (Gujarat Pollution Control Board (GPCB)), for 'Consent to Establish' under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981). • If any conditions are laid down by the concerned /competent authority, the same shall be integrated in the Bid Document.	EE, SRP	-
Construction Phase					
C.1	Air Pollution	Construction plants, equipment and vehicles	• All vehicles used by the Contractor shall have copies of currently valid Pollution under Control (PUC) Certificates as per the requirement of the Gujarat Motor Vehicles Department for the duration of the Contract. • The contractor shall obtain Consent-to-Operate under Air and Water Acts from the Gujarat Pollution Control (GPCB) and follow the conditions stipulated in the NoC (Consent to Operate) by the GPCB • **Other measures to be factored in selection of location** • 1.0 km away from settlement, school, hospital on downwind directions • 300m from any archaeological site • 10 km from environmental sensitive areas i.e. national park, sanctuary • 500m from water bodies (rivers, streams, lakes and ponds) • away from agricultural land • preference to barren land	Contractor	EE, SRP &Third party TA&QA
		Dust during earth works or from spoil dumps	• Maintaining adequate moisture at surface of any earthwork layer completed or non-completed to avoid dust emission.	Contractor	EE, SRP &Third party TA&QA
		Storage of maintenance materials	• Proper stockpiling and sprinkling of water as necessary.	Contractor	EE, SRP &Third party TA&QA

Sl. No.	Issues	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.2	Water Pollution	Clearing of waterways of cross drainage works including bridges and clearing of longitudinal side drains	• Clearance of waterway will be undertaken before onset of monsoon. • Debris generated due to clearing of longitudinal side drains and waterways of cross drainage will be stored above high flood level and away from waterway, and reused on embankment slope or disposed at designated areas[3].	Contractor	EE, SRP &Third party TA&QA
		Construction vehicles	• Avoiding cleaning / washing of construction vehicle in any water body	Contractor	EE, SRP &Third party TA&QA
		Construction camp and workers' camp	• Minimum distance of 500m from water bodies (river, stream, lake and ponds) • Locate facilities in areas not affected by flooding and clear of any natural or storm water courses. • The ground should have gentle slope to allow free drainage of the site. • Vehicle parking areas, warehouses and work shop locations must have impervious flooring to prevent seepage of any leaked oil & grease into the ground. The area should be covered with a roof to prevent the entry of rainwater. • Degreasing can also be carried out using mechanical spray type degreaser, with complete recycle using an enclosure with nozzles and two sieves, coarse above and fine below, may be used. • All the waste oil collected, from skimming of the oil trap as well as from the drip pans, or the mechanical degreaser shall be stored in accordance with the Environment Protection (Storage and Disposal of Hazardous Wastes) Rules, 1989. For this purpose, metallic drums should be used.	Contractor	EE, SRP &Third party TA&QA
C.3	Noise Pollution and Vibration	Vehicles and Construction machinery	• All plants and equipment used in construction shall strictly conform to the CPCB noise standards • Noisy construction activities (such as crushing, concrete mixing, batching etc.) within 150m of the nearest habitation/ education institutes/health centres (silence zones) shall be stopped during the night time 9.00pm to 6.00pm.	Contractor	EE, SRP &Third party TA&QA

[3] Designated areas are to be identified and finalized by Contractor in consultation with EE, SRP.

Sl. No.	Issues	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.4	Land Pollution	Spillage from plant and equipment at construction camp	• Providing impervious platform and oil & grease trap for collection of spillage from construction equipment vehicle maintenance platform • Collection of oil and lubes drips in container during repairing construction equipment vehicles • Providing impervious platform and collection tank for spillage of liquid fuel and lubes at storage area • Providing impervious base at bitumen and emulsion storage area and regular clearing of any bitumen spillage for controlled disposal	Contractor	EE, SRP &Third party TA&QA
		Domestic solid waste and liquid waste generated at camp	• Collecting organic waste at separate bins and disposing of in a pit at designated area/s • Collecting inorganic wastes in separate bins and storing them in a secure area within the camp location, and disposal of the same in the nearest municipal solid waste site.	Contractor	EE, SRP &Third party TA&QA
		Temporary use of lands, including construction sites, construction camps, and borrow areas.	• Identify and finalize all lands to be temporarily used in the project in consultation with the EE SRP after entering into a written agreement with the land owners for rehabilitation of the land parcel prior to handing over. • Avoid locating borrow area close to any road (maintain at least 30m distance from CoI and 10 m from toe of embankment, whichever is more); • Rehabilitation within agreed timeframe before handing over to the landowner	Contractor	EE, SRP &Third party TA&QA
C.5	Occupational health and safety of workers	Construction camp	• Water supply, sanitation, drainage and medical health facilities at campsite • Providing and using PPEs(Personal Protective Equipments) • Using working reverse horn for all construction equipment and vehicles • Providing earth link circuit breaker (ELCB) for all electrical connections • Maintaining first aid at construction sites	Contractor	EE, SRP &Third party TA&QA
C.6	Accidents and safety	Arrangement of traffic during construction	• Providing and maintaining traffic management comprising diversion; warning, guiding and regulatory signage; channelisers and delineators; lighting, flagmen; dust control system etc. as specified in the contract	Contractor	EE, SRP &Third party TA&QA

Sl. No.	Issues	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
C.7	HIV/ AIDS Prevention Measures		• The Contractor shall implement the following measures towards ensuring HIV/AIDS prevention during the entire contract period • (i) conduct awareness campaign including dissemination of IEC materials on HIV/AIDS for all construction personnel (including labourers, supervisors, engineers and consultants) on HIV/AIDS/STDs within two months of mobilization and once a year subsequently during the contract period; • (ii) conduct semi-annual health check-up of all construction personnel including testing for STDs; • (iii) erect and maintain hoardings/ information signages on HIV/AIDS prevention at the construction sites, labour camps and at established truck parking locations; • (iv) install condom vending machines at the labour camps, including replenishment of supplies.	Contractor	Contractor under the supervision of the EE, SRP

8. IMPLEMENTATION ARRANGEMENTS

8.1 INSTITUTIONAL SETUP

60 During implementation of project EE, SRP Division and Contractor will be responsible for ensuring that the environmental and social commitments made to regulatory agencies, lending agencies and other stakeholders. The responsibility mechanism is presented in Table 8.1.

Table 8.1: Institutional Responsibilities

System	Designation	Responsibilities
Implementing/ Monitoring Agency	EE, SRP Division	• Overall responsible for EMP implementation • Reporting to various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Responsible for obtaining Regulatory Clearances (if any) • Review of the progress made by contractors • Conducting periodic field inspection of EMP implementation • Maintaining progress reports on EMP implementation
	Environmental and R&R Specialist, PIU	• Assist the SRP division in the implementation of the EMP provisions • Provide guidance to the SRP division on implementation of EMP provisions • Carry out periodic field visits and ensure compliance with the EMP provisions • Preparing environmental training program and conducting the same for field officers (SRP division) and engineers of contractor • Assist the SRP division in the compilation of the monitoring reports and progress reports on EMP implementation
	Grievance Redress Committee	• Support PAPs in resolving issues related to temporary disruption/ damage. • Record grievance and resolve them within stipulated time • Inform SRP division about any serious cases • Report to the aggrieved parties about the decisions of the SRP division
Contractor	Environmental Engineer of Contractor	• Responsible for ensuring the implementation of EMP as per provision in the document. • Reporting to Implementing / monitoring agency • Discussing various environmental/social issues and environmental/social mitigation and monitoring actions with all concerned directly or indirectly • Conducting periodic environmental and safety training for contractor's engineers, supervisors and workers along with sensitization on social issues that may be arising during the construction stage of the project • To carry out environmental monitoring and control activities including pollution monitoring; and • Conducting awareness campaign for all construction personnel (including labourers, supervisors and engineers) about HIV/AIDS/STDs in the construction and labour camps. • Facilitating the medical testing/ routine check-up for labours as suggested in the EMP • Preparing and submitting monthly reports to Implementing agency (EE, SRP Division) on status of implementation safeguard measures
TA/QA consultants	Environment and Social expert	• Carry out periodic audit of the effective implementation of EMP provisions • Provide course correction / improvement measures to the SRP division on enhancing the implementation effectiveness of EMP provisions • Carry out capacity building of the SRP division officers on the EMP implementation.

8.2 ENVIRONMENTAL MONITORING PLAN

61 The environmental monitoring plan is prepared based on the environmental monitoring indicators as shown in Table 8.2.

Table 8.2: Environmental Monitoring Indicators

Sr. No.	Indicator	Details	Stage	Responsibility
A	**Environmental Condition Indicators and Monitoring Plan**			
1	Air Quality	The parameters to be monitored, frequency and duration of monitoring shall be as per the Monitoring Plan prepared **(Refer Table 8.3)**	Pre-Construction	Contractor under the supervision of EE,SRP & TA&QA
			Post Construction (DLP)	
			End of Maintenance period	
2	Noise Levels		Pre-Construction	Contractor under the supervision of EE,SRP & TA&QA
			Post Construction (DLP)	
			End of Maintenance period	
B	**Environmental Management Indicators and Monitoring Plan**			
1	Construction Camps	Occupational health & Safety of workers and construction camp management (including pollution control at construction camp)	Pre-construction	Contractor under the supervision of EE,SRP & TA&QA
2	Borrow Areas	Identification of borrow area in accordance with permission from the landowners, sensitivity etc.	Pre-construction	Contractor under the supervision of EE,SRP & TA&QA
3	Construction and Labour Camps	Infrastructure provisions at camps, provision of PPE to workers, health facilities at camps including implementation of HIV/ AIDS Prevention Measures	Construction	Contractor under the supervision of EE,SRP & TA&QA
4	Rehabilitation of Borrow Areas	Engineer will undertake site visits to determine how many borrow areas have been rehabilitated in line with the landowner's request and to their full satisfaction.	Construction	Contractor under the supervision of EE,SRP & TA&QA

62 For each of the environmental monitoring indicator, the monitoring plan specifies the parameters to be monitored, location of the monitoring sites, frequency and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for the environmental condition indicators of the project in construction and operation stages is presented in Table 8.3.

Table 8.3: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Pre-Construction	SO_2, NO_x, PM_{10}, $PM_{2.5}$, CO	High volume sampler to be located 50m from the road in the Downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 2009	One season (before monsoon)	24 hours Sampling	As suggested by the Engineer	Contractor under the supervision of EE,SRP & TA&QA
	Post Construction (DLP)							
	End of Maintenance period							
Noise	Pre-Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement	MoEF Noise Rules, 2000	One season (before monsoon)	Leq in dB(A) of day time and night time	As suggested by the Engineer	
	Post Construction (DLP)							
	End of Maintenance Period							
Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a month	-	Borrow area location	
HIV/ AIDS Prevention Measures	Construction	Awareness campaign	-	-	Annual	-	Construction and Labour Camp sites	
		IEC materials distribution			Quarterly			
		Condom Distribution			Once a month			

8.3 REPORTING SYSTEM

63 The **contractor** will operate the reporting system for environmental condition and environmental management indicators (Table 8.2). The Contractor will report to the EE, SRP Division on the progress of the implementation of environmental conditions and management measures as per the EMP. The reporting formats are enclosed in the Annexure-6 and the summary of reporting is given in the Table 8.4.

Table 8.4: Summary details of Reporting

Format No.	Item	Stage	Contractor	EE, SRP Division & TA&QA
			Implementation & Reporting to EE, SRP Division	**Oversee / Field Compliance Monitoring**
EM 1	Identification of Disposal Locations	Pre-Construction	One Time	One Time
EM 2	Setting up of Construction Camp	Pre-Construction	One Time	One Time
EM 3	Borrow Area Identification	Pre-Construction	One Time	One Time
EM 4	Top Soil Monitoring	Construction	Quarterly	Quarterly
EM 5	Status Regarding Rehabilitation of Borrow Areas	Construction	-	Half Yearly
EC 1	Pollution Monitoring	Pre-Construction	As Per Monitoring Plan	Quarterly
		Post Construction (DLP)		
		End of Maintenance Period		

8.4 INTEGRATION OF EMP WITH BIDDING DOCUMENT

64 The environmental management measures proposed as part of the ESMF shall be integrated in the construction contract in the form of technical specifications and environmental performance requirements. Further, ESMF has been referred in the bid document for contractors to allocate the necessary provision in their bids so as to ensure compliance with various safeguard measures suggested herein. The Contractor's checklists for identifying environmental and social issues are given in Annexure -7.

8.5 BUDGETARY PROVISIONS

65 The proposed safeguard measures mainly consist of management measures which are to be implemented by the Contractor as part of good engineering practices in road construction and maintenance. The costs incurred shall be incidental to the civil works and therefore, no separate environment budget is provided, with the exception of the costs towards environmental monitoring during construction and maintenance periods and to implement HIV/ AIDS prevention measures in the construction & Labour camps. The environmental monitoring and HIV/ AIDS Prevention measures shall be separately costed in the EMP and included in the technical specification of bidding documents.

Annexures (Part -2-ESMF)

Annexure -1

Proforma for Wild life Clearance (Sanctuaries and National Parks) - *Applicable for Palanpur-Danta Corridor*

(**All documents to be submitted in triplicate and signed in Blue Ink**)

PART - I

Proposal for Investigation and Survey in the National Park / Sanctuary
(Details to be provided by the Applicant)

1. Name of the Organization

2. Aims and Objectives of the Proposed Project

3. Location and Map (1:150000 scale) of the area duly authenticated by the competent authority to be investigated/ surveyed

4. Whether investigation/survey requires clearing of vegetation

5. If yes, please specify the extent (in Ha.)

6. Opinion of the Officer In Charge of the N.P./ WLS (Attach signed copy)

7. Opinion of the Chief Wild Life Warden (Attach signed copy). The following be included in the opinion:
   - i) Brief history of the Protected Area
   - ii) Current status of Wildlife
   - iii) Current status of pressures on protected Areas.
   - iv) Projected impacts of projects on wildlife, habitat management and access/ use of resource by various stakeholders.
   - v) Contiguous wildlife areas which would benefit wildlife if added to National park/Sanctuary.
   - vi) Other areas in the State which have been recommended by State Government, Wildlife Institute of India, BNHS, SACON, IISC, IUCN or other expert body for inclusion in Protected Area network.

Signed	Signed	Signed
Project Head Name Organization	The Officer In Charge of the N.P./ WLS Office Seal	The CWLW Office Seal

Date of submission to Govt. of India by the CWLW

PART –II
(To be filled in by the Applicant)

1 Project details:

(i) Copy of the Investigation and Survey report.

(The report should include the dates of survey and the names of the investigators, surveyors and all officials of the concerned NP/ WLS who remained present during the period.)

(ii) Self-contained and factual project report for which NP/WLS area is required

(Enclose copy of the Project Appraisal document)

(iii) Map (Duly authenticated by the Divisional / District Head of the Department dealing with Forests and Wild Life) on a scale of 1: 150000 showing the boundaries of the NP/WLS, delineating the area in question in red color).

(iv) Self-contained and factual report of at least two alternatives considered by the project authorities along with technical and financial justification for opting national park/ sanctuary area.

(v) Copy of the Bio diversity Impact Assessment report in case the proposal involves diversion of more than 50 ha. NP/WLS area.

2 Location of the project/Scheme

(i) State/Union Territory

(ii) District

(iii) Name of the National Park/ Sanctuary

3 Details of the area required (in Hectares only)

(Provide breakup of the land use under the project e.g., construction of dam, submergence, housing for staff, road etc.)

4 Details of displacement of people, if any, due to the project

(i) Total number of families involved in displacement

(ii) Number of Scheduled Caste/Schedule Tribe families involved in displacement

(iii) Detailed rehabilitation plan

5 Any other information relevant to the proposal but not covered in any of the columns above.

Signed by

Project Head
Name
Organization

Date of submission to the Head of the National Park / Sanctuary

Annexure-2

Application for grant of permission for undertaking repair/ renovation in the prohibited area and construction/reconstruction/ repair/renovation in the regulated area of protected monuments (*Applicable for Becharaji-Chanasma Corridor)*

Form I

(See rule 5)

Application for grant of permission for undertaking repair / renovation in the prohibited area and construction / reconstruction / repair / renovation in the regulated area of protected monument or archaeological site and remains declared as of national importance under the Ancient Monuments and Archaeological Sites and Remains Act, 1958

1. Name of the applicant :

2. Address of the applicant :
   (a) Present
   (b) Permanent
3. Name of the owner(s) :
   (if the applicant is other than the owner)

4. Address of the owner(s) :
   (a) Present address
   (b) Permanent address
5. Whether the property is owned by individual or jointly
   (furnish documents)

6. Whether the property is owned by Government/Public Sector Undertaking/Private Sector Undertaking/Firm (if so, details to be furnished with complete address and phone numbers) :

7. Locality of the proposed construction :
   (with full details plot number, etc.)

8. Name of the nearest monument or site :
   (a) Locality :
   (b) Taluk :
   (c) District :
   (d) State :
   (Enclose area map showing the monument and the site of repair / renovation / construction / reconstruction)

9. Distance of the site of construction related activities from the protected boundary of the monument:

(a) Distance from the main monument:

(b) Distance from the protected boundary wall of the monument:

10. Nature of the work proposed:
(Repair/renovation/construction/reconstruction, etc.)

11. Details of work proposed
(furnish complete details with drawings of building / structure)

(i) Number of storeys
(ii) Floor area (storey-wise)
(iii) Height (excluding mumty, parapet, water-storage tank, etc.)
(iv) Height (including mumty, parapet, water-storage tank, etc.)
(v) basement, if any proposed with details

(Enclose plan, section and elevation drawings of the existing building duly approved by the Building Plan Sanctioning Authority and proposed building plan with section and elevation in case of reconstruction. Enclose building plan, section and elevation of the proposed building in case of construction/reconstruction.)

12. Purpose of the proposed work :
(residential/commercial/institutional/public/community)

13 Approximate date of the commencement of the proposed works:

14 Approximate duration for completion of the proposed work:

15. Maximum height of the existing modern buildings in the close vicinity of -
(a) near the Monument:
(b) near the site of construction related activity:

16. Whether the monument is located within the limits of Municipal Corporation / Municipalities/ Nagar Panchayat / Village Panchayat

17. Does any Master Plan/zonal development plan/layout plan approved by concerned local authorities exists for the city / town / village:

18. Status of modern constructions in the vicinity of the monument and the proposed site of construction/reconstruction:

19. Open space/park/green area close to the protected monument / protected area:

20. Whether any road(s) exists between the monument and the site of construction/reconstruction:

21. Remarks/additional information, if any:

I .....declare that the above information is correct. I also undertake to observe the provisions of the Ancient Monuments and Archaeological Sites and Remains Act, 1958 as amended by the, the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 and the rules made there under.

Place:

Seal of firm (if any)

Date: Signature of the applicant

Note:

1. If the application is on the behalf of the organisation/firm, the signature should be of the head of that organisation/firm.
2. Enclose photographs showing the monument and the existing modern constructions.
3. Google Earth Images of the area under reference showing the monument and the site of construction related activities.
4. Enclose ownership documents duly attested by an authorized officer of the Government.
5. In case of repairs/renovation a report from a duly authorised/licenced architect to be submitted by the applicant.

Form II

(See rule 10)

Forwarding of proposal from competent authority to the Authority for recommendation / approval for grant of permission for undertaking repairs/ renovation in the prohibited area and construction / reconstruction / repairs / renovation in the regulated area of an protected monument or archaeological site and remains declared as of national importance

1. Name of the applicant :

2. Address of the applicant :

   (a) Present
   (b) Permanent

3. Status of the ownership :

4. Whether the property is owned by individual or jointly / Government / Public Sector Undertaking / Private Sector Undertaking / Firm

5. Locality of the proposed construction, etc. :

6. Name of the nearest protected monument or protected area :
   (a) Locality :
   (b) District :
   (c) State :

7. Distance from the protected monument/protected area:
   (distance should be given from all sides)

8. Nature of the work proposed :
   (repair/renovation/construction/reconstruction)

9. Details of work proposed :
   (furnish complete details with drawings showing the nature of work)
   (i) Number of stories
   (ii) Floor area (storey-wise)
   (iii) Height (excluding mumty, parapet, water-storage tank, etc.)
   (iv) Height (including mumty, parapet, water-storage tank, etc.)
   (v) Basement, if any proposed with details

10. Purpose of the proposed work :
    (residential/commercial/institutional/public/community)

11. Status of maximum height of the existing modern buildings in the close vicinity of:
(a) near the Monument:
(b) near the site of construction related activity:

12. Whether the monument is located within the limits of Municipal Corporation / Municipalities / Nagar Panchayat/Village Panchayat:

13 Does any Master Plan/zonal development plan duly approved by the respective local authorities exists for the city/town/village:

14. Category of the Application:

15. Date of inspection of the site:
(by the Competent Authority or other designated officer)

16. Name & Designation of the site inspecting official:

17. Report of the inspecting official :
(Photographs, aerial view of the site to be submitted)

18. Assessment reports by Experts, if any:

19. Specific recommendations of Competent Authority:
(with three sets of the proposal)

Place:

Date:
F.No.

Signature of the Competent Authority

SEAL

Annexure -3

Formats to carry out Free Prior and Informed Consent (FPIC) in Tribal Areas (*Applicable for Pardi – Dixal and Palanpur – Danta corridors*)

CONSULTATION MEETING: AGENDA

Venue:

Date:

Time:

1	**Introductory speech and welcome address – by Representative from PPWCS Consultant**	**:**	**10 minutes**
2	**Government of Gujarat initiatives in Fifth Schedule Areas (special focus to Meghraj) – by Representative from Tribal Development Department or Taluka Development Office**	**:**	**10 minutes**
3	**Gujarat State Highways Project-II and Scheduled Tribes – by Representative from R&BD**	**:**	**10 minutes**
4	**Dhansura-Meghraj road development: Project Description – by Representative from PPWCS Consultant**	**:**	**10 minutes**
5	**Open Discussion on proposed road development (Dhansura-Meghraj) and other development initiatives of Government of Gujarat along the corridor – by Participants facilitated by PPWCS Consultant**	**:**	**15 minutes**
6	**Group Discussion related to proposed road development – Focus Groups to discuss issues Gender, Livelihood, Community rights – by Focus Groups**	**:**	**15 minutes**
7	**Presentation of the findings of Group discussion – by Group Facilitators**	**:**	**10 minutes**

Stakeholder Consultation – Attendance Record

Sl.No.	Name	Designation/Address	Contact Number	Signature

FPIC – Presentation (Sample document from Dhansura-Meghraj Corridor)

AGENDA POINT – 1

INTRODUCTORY SPEECH AND WELCOME ADDRESS

- Government of Gujarat (GoG) has undertaken the second Gujarat State Highway Project (GSHP-II) covering up-gradation, maintenance and improvement of identified core road network for loan appraisal with the World Bank. As a prerequisite towards loan appraisal with the World Bank, Roads and Buildings Department (R&BD), GoG has selected ten corridors, aggregating 459.71km length for preparation of detailed project report (DPR). R&BD has engaged M/s LEA Associates South Asia Pvt. Ltd., for the preparation of DPR. The project intends to improve the efficiency and safety of the core state highway network, and strengthen institutional effectiveness geared towards improved service delivery and financing strategies.

- Out of ten corridors selected for detailed study, four corridors namely (a) Lunawada-Khedapa (56.70 km), (b) Dhansura-Meghraj (43.05 km), (c) Dabhoi-Bodeli (38.60 km) and (d) Bodeli-Alirajpur (65.20 km) passes through Fifth Schedule areas.

- Consultations with tribal community, Panchayati Raj Institutions (PRIs), Tribal Development Department, Community Based Organizations (CBOs) and Non-government Organizations (NGOs), etc., has been planned to elicit participation of tribal community in various stages of the project implementation.

- With this, we welcome the participants.

AGENDA POINT – 2

GOVERNMENT OF GUJARAT INITIATIVES IN FIFTH SCHEDULE AREAS (SPECIAL FOCUS TO MEGHRAJ) – BY TALUKA DEVELOPMENT OFFICER, MEGHRAJ

AGENDA POINT – 3

GUJARAT STATE HIGHWAYS PROJECT-II AND SCHEDULED TRIBES

- **Fifth Schedule Areas** in Gujarat comprises parts of seven districts such as Surat, Bharauch, Dangs, Valsad, Panchmahal, Vadodara, Sabarkanta. Out of these seven districts, GSHP-II roads passes through three districts such as,
    - **Vadodara,**
    - **Panchmahal, and**
    - **Sabarkantha.**
- Out of the 10 Project Corridors, 4 [Dabhoi-Bodeli, Bodeli-Alirajpur (both in Vadodara district), Lunawada-Khedapa (in Panchmahal district) and Dhansura-Meghraj (in Sabarkantha district)] pass through tribal Talukas such as,
    - **Sankheda,**
    - **Chota Udaipur,**

- **Jetpur Pavi,**
- **Kadana,**
- **Santrampur, and**
- **Meghraj.**

- The tribal region of Gujarat consists of 43 Talukas, 15 Pockets and 4 Clusters, covered under the 12 Integrated Tribal Development Projects (ITDP). The total population of 43 Talukas is 89.96 lakh. Within this population, 55.58 lakh people (62%) belong to Scheduled Tribes. The total population of 15 Pockets and 4 Clusters is 11.68 lakh, of which 5.80 lakh (50%) are tribal.

- Dhansura-Meghraj corridor passes through 33 villages of 3 Talukas (Dhansura, Malpur and Meghraj), of which Meghraj falls under Fifth Schedule Area.

- Government of Gujarat has set a unique model with respect to tribal development through the flagship programme, Chief Minister's ten-point programme (TPP) – Vanbandhu Kalyan Yojana. Assimilating the holistic development approach of TPP, GSHP-II has given special emphasis for the road infrastructure development in Fifth Schedule areas. Out of the prioritized total length of 459.71 km taken up for upgradation under GSHP-II, 203.55 km (about 44 percent) passes through Fifth Schedule areas. Benefits perceived from GSHP-II is summarized as follows:

    - Faster movement of people and goods providing a boost to local as well as State economy;
    - Substantial improvement in interconnectivity of settlements along the corridor which reduces travel time and lowers transport costs;
    - Help alleviate development constraints in agriculture, commerce, education, health and social welfare by way of improved access to markets, jobs, education and health services; and
    - Reduced rates of accidents due to better designs and safety measures.

- GSHP-II seeks to ensure genuine participation of the tribal community at all stages of the project. GSHP-II appreciates the role of Panchayati Raj Institutions, Community Based Organisations and other grass root level government and non-government functionaries. The cooperation these agencies are anticipated for the smooth implementation proposed project.

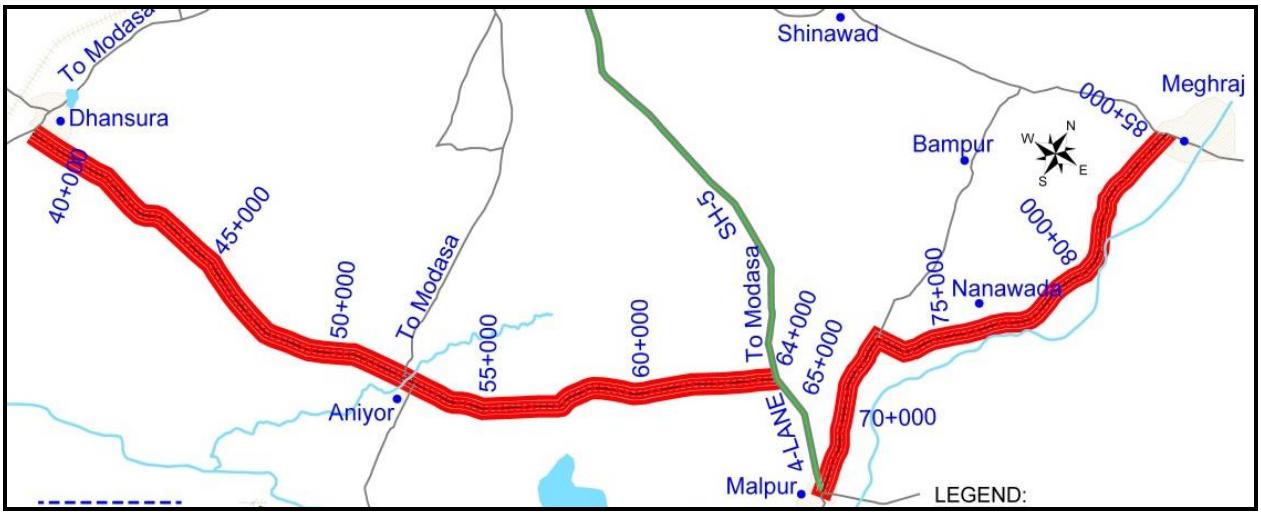
- Government of Gujarat gives due respect and takes obligatory measures to safeguard the customary rights or livelihood of tribal people. GSHP-II has taken special care to protect the customary rights and livelihood of tribal people. By and large, the proposed road improvement will be carried out within the available land and avoids any adverse impact on land and property of tribal people. The views, suggestions and consent of the tribal people will be considered and appropriately integrated into the project design.

AGENDA POINT – 4

DHANSURA-MEGHRAJ ROAD DEVELOPMENT – PROJECT DESCRIPTION

- The Dhansura-Meghraj (SH-011) starts from Dhansura (SH-145) at km 37+100 and joins SH 005 near Sonpur by covering a stretch of nearly 26.4km, it overlaps with SH-005 for about 3.7km and

reconnects SH-145 (Chainage 67+100) near Malpur. From Malpur it connects Meghraj leading towards Rajasthan border.



Dhansura-Meghraj Corridor

- The proposed road development will be taken up within the available right of way of 24 m, avoiding land acquisition in Meghraj Taluka. However, 11 kiosks, 12 residential structures (minor impact), 2 religious structures and 2 community assets will be affected which are located alongside the road (2 community assets – 1 hand pump and 1 bore-well – are located in Meghraj Taluka) [supported by pictures].
- Efforts have been taken to protect trees alongside the road [supported by pictures].
- Provision of Parking, road safety measures at required locations will be provided for the safety of road users [supported by pictures].
- Tentative project implementation schedule.

AGENDA POINT – 5

DISCUSSION POINTS

- Discussions shall be arranged on various issues related to the proposed road improvement. The overview of issues to be discussed is as follows:
    - Awareness and opinion about the road project.
    - Awareness about Chief Minister's Ten Point Programme – Vanbandhu Kalyan Yojana.
    - Distinctive customs or economic activities maintained by the community (access to forest produce, fishing, grazing land, firewood, etc.).
    - Discussions regarding customary behavior, economic opportunities, customary institutions, way of living etc.
    - Customary rights over forest land, community land or private land.
    - Benefits perceived and outcome expected from the road development project.

- Safety issues along the corridor (road accidents/avoidance/suggestions etc. – specific cases of accidents taking place in particular locations – reasons for such accidents – increase/decrease in accidents).
- Religious properties / common property resources – enhancement of such properties, support and involvement of panchayati raj institutions and tribal community organizations.

AGENDA POINT – 6

FOCUS GROUP DISCUSSIONS

- After the discussion on aforementioned points, Group Discussion shall be arranged: Separate groups shall be formed for discussion. Respective groups and discussion points are as follows:

    - **GROUP A:** Discussion on issues related to women and children:
        - Travel pattern of women;
        - Access to health care institutions;
        - Access to educational institutions;
        - Safety of travel [street lights, road accidents, etc];
        - Safety of children;
        - Accessibility and availability of public transport facilities [adequacy, time and frequency of vehicles, sitting arrangement in passenger-shelters, public conveniences, etc];
        - Self Help Groups and its functioning; and
        - Income generation activities among women.
    - **GROUP B:** Discussion on issues related to environment, forest, customary rights, community assets, etc:
        - Water bodies, sources of water, non-timber forest produce located alongside the road– access and rights;
        - Community assets [religious structures, community gathering locations, schools, markets, etc.].
    - **GROUP C:** Issues related to Livelihood and Income Generation Activities:
        - Major sources of livelihood;
        - Access to market centres;
        - Accessibility and availability of transportation facilities for agriculture produces;
        - Participation in ongoing income generating schemes and other development programmes of Government of Gujarat (special mention Vanbandhu Kalyan Yojana); and
        - Participation in any of the schemes of development programmes of Non-Government Organisations.

AGENDA POINT-7

PRESENTATION OF GROUP DISCUSSION FINDING BY GROUP FACILITATOR

- After the discussion, the Group Facilitator will present the findings of discussions. This will form the basis for finalization of the road design and for the preparation of Tribal Development Plan.

Project Note for Consultation in Tribal Area

1. INTRODUCTION

1. Government of Gujarat (GoG) has undertaken the second Gujarat State Highway Project (GSHP-II) covering up-gradation, maintenance and improvement of identified core road network for loan appraisal with the World Bank. As a prerequisite towards loan appraisal with the World Bank, Roads and Buildings Department (R&BD), GoG has selected ten corridors, aggregating 459.71km length for preparation of detailed project report (DPR). R&BD has engaged M/s LEA Associates South Asia Pvt. Ltd., for the preparation of DPR. The project intends to improve the efficiency and safety of the core state highway network, and strengthen institutional effectiveness geared towards improved service delivery and financing strategies.

2. Out of ten corridors selected for detailed study, four corridors namely (a) Lunawada-Khedapa (56.70 km), (b) Dhansura-Meghraj (43.05 km), (c) Dabhoi-Bodeli (38.60 km) and (d) Bodeli-Alirajpur (65.20 km) passes through Fifth Schedule areas.

3. Consultations with tribal community, Panchayati Raj Institutions (PRIs), Tribal Development Department, Community Based Organizations (CBOs) and Non-government Organizations (NGOs), etc., has been planned to elicit participation of tribal community in various stages of the project implementation.

2. PARTICIPATORY DEVELOPMENT APPROACH

4. Government of Gujarat has set a unique model with respect to tribal development through the flagship programme, Chief Minister's ten-point programme (TPP) – Vanbandhu Kalyan Yojana. Assimilating the holistic development approach of TPP, GSHP-II has given special emphasis for the road infrastructure development in Fifth Schedule areas. Out of the prioritized total length of 459.71 km taken up for upgradation under GSHP-II, 203.55 km (about 44 percent) passes through Fifth Schedule areas. Economic benefits perceived from GSHP-II is summarized as follows:

- Faster movement of people and goods providing a boost to local as well as State economy;
- Substantial improvement in interconnectivity of settlements along the corridor which reduces travel time and lowers transport costs;
- Help alleviate development constraints in agriculture, commerce, education, health and social welfare by way of improved access to markets, jobs, education and health services;

- Reduced rates of accidents due to better designs and safety measures

5. GSHP-II seeks to ensure the genuine participation of the tribal community at all stages of the project. GSHP-II appreciates the role of PRIs, CBOs and other grass root level government and non-government functionaries and their cooperation is anticipated for the smooth implementation proposed project.

6. Government of Gujarat gives due respect and takes obligatory measures to safeguard the customary rights or livelihood of tribal people. GSHP-II has taken special care to protect the customary rights and livelihood of tribal people. By and large, the proposed road improvement will be carried out within the available land and avoids any adverse impact on the land and property of tribal people. The views, suggestions and consent of the tribal people will be considered and appropriately integrated into the project design.

3. CONSULTATION WITH TRIBAL COMMUNITY

7. Informed consultation will be carried out at Taluka level along the proposed corridors. This consultation anticipates participation of tribal people, local leaders from PRIs, officers from Tribal Development Department and representatives of CBOs and NGOs. People residing in the villages along the corridor will be informed about the time and venue of consultation. Tribal Development Officer at Taluka level will facilitate the consultation meeting.

3.1 Discussion Points

- Awareness and opinion about the project.
- Awareness about Chief Minister's Ten Point Programme – Vanbandhu Kalyan Yojana.
- Distinctive customs or economic activities maintained by the community (access to forest produce, fishing, grazing land, firewood, etc.).
- Discussions regarding customary behavior, economic opportunities, customary institutions, way of living etc.
- Customary rights over forest land, community land or private land.
- Benefits perceived and outcome expected from the road development project.
- Safety issues along the corridor (road accidents/avoidance/suggestions etc. – specific cases of accidents taking place in particular locations – reasons for such accidents – increase/decrease in accidents).
- Religious properties / common property resources – enhancement of such properties, support and involvement of panchayati raj institutions and tribal community organizations.

Project Note in Gujarati

લુણાવડા – ખેડપ્પા કોરીડોર

પરામર્શ સભા – કાર્યસુચિ

સ્થળ:

તારીખ:

સમય:

૧	પ્રાસ્તવિક સંભાષણ અને આવકાર સંબોધન - પીપીડબલ્યુસીએસ સલાહકાર ના પ્રતિનિધિ દ્વારા	૧૦ મિનિટ
૨	ગુજરાત સરકાર ની પાંચમા સુચિ પત્ર પ્રદેશો માં પહેલ (સંતરામપુર અને કડાણા ઉપર ખાસ કેંદ્રીત કરીને) – આદિવાસી વિકાસ વિભાગ અથવા તાલુકા વિકાસ કચેરી ના પ્રતિનિધિ દ્વારા	૧૦ મિનિટ
૩	ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ અને અનુસુચિત જાતિઓ – માર્ગ અને મકાન વિભાગના પ્રતિનિધિ દ્વારા	૧૦ મિનિટ
૪	લુણાવડા – ખેડપ્પા રસ્તા નો વિકાસ – પ્રોજેક્ટ નું વર્ણન – પીપીડબલ્યુસીએસ સલાહકાર ના પ્રતિનિધિ દ્વારા	૧૦ મિનિટ
૫	રસ્તા ના સુચિત વિકાસ પર અને ગુજરાત સરકાર ની આ કોરીડોર પરની અન્ય વિકાસ પહેલો ઉપર ખુલ્લા મનની ચર્ચા – સભા માં ભાગ લેનારસભ્યો દ્વારા – પીપીડબલ્યુસીએસ સલાહકાર દ્વારા સુવિધા કરવા માં આવશે	૧૦ મિનિટ
૬	સુચિત રસ્તા વિકાસ સંબધિત જુથ ચર્ચા (ગ્રુપ ડિસ્કસન) – કેંદ્રીત જુથો (ફોકસ્ડ ગ્રુપ્સ) જાતિ / લિંગ, ગુજરાનના સાધનો, સામુહિક હક્કો વગેરે પર ચર્ચા કરશે – કેંદ્રીત જુથ (ફોકસ્ડ ગ્રુપ) દ્વારા	૧૦ મિનિટ
૭	જુથ ચર્ચા ના તારણો નું પ્રદર્શન (પ્રેઝંટેશન) – કેંદ્રીત જુથોના સુવિધાકારકો દ્વારા	૧૦ મિનિટ
૮	સારાંશ, આભાર દર્શન અને સમાપન – પીપીડબલ્યુસીએસ સલાહકાર ના પ્રતિનિધિ દ્વારા	૧૦ મિનિટ

પ્રોજેક્ટ પ્રીપેરેટરી વર્કસ કંસલ્ટંસી સર્વીસીઝ, ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ – ૨

માર્ગ અને મકાન વિભાગ, ગુજરાત સરકાર

આદિવાસી વિસ્તાર માં પરામર્શ માટે પ્રોજેક્ટ નોંધ

૧ પ્રસ્તાવના

૧. ગુજરાત સરકારે રાજ્યના વિકાસ માટે હાર્દ રૂપ રસ્તા જાળ (કોર રોડ નેટવર્ક) માં થી પસંદ કરેલ રસ્તાઓની ઉન્નતિ, મરામત અને સુધારણા ને આવરી લેતો "બીજો ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ" હાથ ધરવા વિચારણા કરી છે. આ માટે વિશ્વ બેંક ના મુલ્યાંકન માટે પ્રોજેક્ટ તૈયાર થઇ રહેલ છે. વિશ્વ બેંક ના મુલ્યાંકન ની પુર્વ જરૂરિયાત પ્રમાણે માર્ગ અને મકાન વિભાગે વિગતવાર પ્રાયોજના અહેવાલ બનાવવા માટે કુલ ૪૫૯.૭૧ કી.મી લંબાઇ ના દસ કોરીડોર (રસ્તાઓ) પસંદ કરેલ છે. ગુજરાત સરકારે વિગતવાર પ્રાયોજના અહેવાલ બનાવવા માટે મે. લી એસોસીએટ સાઉથ એશીઆ પ્રા. લી. ને રોકેલ છે. પ્રોજેક્ટ થવાથી હાર્દ રૂપ રસ્તા જાળ (કોર રોડ નેટવર્ક) ની માર્ગ સલામતિ અને કાર્યક્ષમતા માં સુધારો થવા ની ધારણા છે. તથા સેવા વહેંચણી (સર્વીસ ડીલીવરી) માં સુધારણા અને નાણા વ્યવસ્થા ની વ્યુહ રચના (ફાઇનાંસીગ સ્ટ્રેટેજી) તરફ સંસ્થાકીય પ્રભાવને પ્રબલીત કરશે.

૨. પસંદ કરેલ દસ કોરીડોર માં થી ચાર કોરીડોર (અ) લુણાવડા – ખેડપ્પા (૫૬.૭૦ કી.મી.), (બ) ધનસુરા – મેઘરજ (૪૩.૦૫ કી.મી.), (ક) ડભોઇ – બોડેલી (૩૮.૬૦ કી.મી.) અને (ડ) બેડેલી – અલીરાજપુર (૬૫.૨૦ કી.મી.) પાંચમા સુચિ પત્ર માં જાહેર કરાયેલ વિસ્તારો માંથી પસાર થાય છે.

૩. પ્રોજેક્ટ અમલીકરણ ના વિવિધ તબક્કાઓ માં આદીવાસી સમુહો ની સહભાગીતા માટે આદીવાસી સમુહો, પંચાયતી રાજ્ય સંસ્થાઓ, આદીવાસી વિકાસ વિભાગ, સમુહ આધારીત સંસ્થાઓ (કોમ્યુનીટી બેઝડ ઓર્ગેનીશનસ), બીન સરકારી સંસ્થાઓ (નોન ગવર્નમેન્ટ ઓર્ગેનીશનસ) વગેરે સાથે પરામર્શ નું આયોજન કરવામાંઆવેલ છે.

૨ સહભાગીતાથી વિકાસ નો અભીગમ

૪. આદીવાસી વિકાસ માટે ગુજરાત સરકારે પાસે એક અનોખો અને નમૂનારૂપ કાર્યક્રમ, મુખ્ય મંત્રીશ્રી નો દસ-મુદ્દાનો કાર્યક્રમ (ટીપીપી) - વન બંધુ કલ્યાણ યોજના કાર્યક્રમ છે. ટીપીપીના સાકલ્યવાદી અભીગમ ને આત્મસાત કરી, ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ- ૨ દ્વારા રસ્તા આંતરમાળખાકીય સુવિધા ને ખાસ ભાર આપવા માં આવ્યો છે. ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ- ૨ હેઠળ ઉન્નતિ માટે લેવામાં આવનાર ૪૫૯.૭૧ કી.મી પૈકી આશરે ૪૪%

એટલેકે ૨૦૩.૫૫ કી.મી રસ્તાઓ પાંચમીસુચિ વિસ્તારો માંથી પસાર થાય છે. ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ- ૨ દ્વારા સંભવિત આર્થીક લાભો નો સારાંશ નીચે જણાવેલછે.

- લોકો અને સામાનની ઝડપી અવરજવર થતા સ્થાનીક અને રાજ્યના આર્થીક વિકાસ માં વૃધ્ધી
- રસ્તાઓની લંબાઇવાર વસાહતોના પરસ્પર જોડાણ માં સારો એવો વધારો થતા મુસાફરી સમયમાં અને મુસાફરીખર્ચમાં ઘટાડો
- ખેતી, વાણિજ્ય, શીક્ષણ, આરોગ્ય અને સામાજીક સુખમાં આવતા નિગ્રહો નું બજારો,રોજગારો, શીક્ષણ, આરોગ્યસેવાઓ સુધી પહોંચ દ્વારા શમન
- વધારે સારા આલેખન અને માર્ગ સલામતિ પગલાઓ થકી માર્ગ અકસ્માત દર માં ઘટાડો

૫. ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ- ૨ આદીવાસી સમુહો ની પ્રોજેક્ટના પ્રત્યેક તબક્કે ખરેખરની સહભાગિતા સુનિશ્ચિતપણે ચાહે છે. ગુજરાત સ્ટેટ હાઇવે પ્રોજેક્ટ- ૨ પંચાયતી રાજ્ય સંસ્થાઓ, સમુહ આધારીત સંસ્થાઓ (કોમ્યુનીટી બેઝડ ઓર્ગેનીશનસ), બીન સરકારી સંસ્થાઓ (નોન ગવર્નમેન્ટ ઓર્ગેનીશનસ) અને મૂળિયા સ્તરે કામ કરનારી સંસ્થાઓ ના કામની ભારે કિંમત આંકે છે તથા સુચિત પ્રોજેક્ટ સરળતાપૂર્ણ અમલીકરણ માટે તેઓના સહકાર ની આશા રાખે છે.

૬. ગુજરાત સરકાર આદીવાસીલોકોના રુઢિ આધારિત હક્કો તથા રોજગારો ને જરૂરી સન્માન આપે છે અને તેના સંરક્ષણ માટે કાયદા કાનૂન અંવયે આવશ્યક પગલા લે છે. ગુજરાત સરકારે આદીવાસીલોકોના રુઢિ આધારિત હક્કો તથા રોજગારો ના સંરક્ષણ માટે ખાસ સંભાળ લીધેલ છે. મોટાભાગે સુચિત રસ્તા વિકાસનું કાર્ય ઉપલબ્ધ જમીન માંજ કરવામાંઆવશે અને આદીવાસી લોકોની જમીન અને મિલકત પર તેની ખાસ વિપરીત અસર નહી પડે. આદીવાસી લોકોના દ્રષ્ટિકોણ, સુચનો અને સંમતિઓ ને ધ્યાનમાં લેવામાં આવશે અને યોગ્ય રીતે પ્રોજેક્ટ ના આલેખનમાં સંમિલિત કરવામાં આવશે.

૩. આદીવાસી સમુહો સાથે પરામર્શ

૭. સુચિત રસ્તાની લંબાઇવાર તાલુકા સ્તરે સુમાહિતગાર પરામર્શ કરવામં આવશે. આ પરામર્શમાં આદીવાસી લોકો, પંચાયતી રાજ્ય સંસ્થાઓ ના સ્થાનિક અગ્રણીઓ, આદીવાસી વિકાસ વિભાગના અધિકારીઓ, અને સમુહ આધારીત સંસ્થાઓ (કોમ્યુનીટી બેઝડ ઓર્ગેનીશનસ) તથા બીન સરકારી સંસ્થાઓ (નોન ગવર્નમેન્ટ ઓર્ગેનીશનસ) ના પ્રતિનિધિઓ ભાગ લેશે તેવી આશા છે. રસ્તાની લંબાઇવાર આવેલા ગામો માં રહેતા લોકો ને પરમર્શ સભા ના સ્થળ અને સમય અંગે જાણ કરવામાં આવશે. પરામર્શ સભા ને તાલુકા સ્તરના આદીવાસી વિકાસ અધિકારી સુવિધિત કરશે.

૩.૧ ચર્ચાના મુદ્દાઓ

- પ્રોજેક્ટ અંગે જાણકારી અને મંતવ્ય
- મુખ્ય મંત્રીશ્રી ના દસ મુદ્દાના કાર્યક્રમ – વનબંધુ કલ્યાણ કાર્યક્રમ અંગે જાણકારી
- આદીવાસી સમુહો દ્વારા નિભાવાતી વિશિષ્ટ રૂઢિઓ અને આર્થિક પ્રવૃત્તિઓ (જંગલ પેદાશ, માછીમારી, ગોચર જમીન, જલાઉ લાકડા વગેરે)
- રૂઢિગત શિષ્ટાચાર, આર્થિક તકો, રૂઢિગત સંસ્થાઓ, જીવનશૈલી વગેરે અંગે ચર્ચા
- જંગલનીજમીન, સામુહિક જમીનો અથવા ખાનગી જમીન પર ના રૂઢિગત હક્કો
- રસ્તાવિકાસ પ્રોજેક્ટ માંથી ધારેલા લાભો અને પરિણામો
- રસ્તાની લંબાઇવાર માર્ગ સલામતિ મુદ્દાઓ (માર્ગ અકસ્માત /તેને બચાવવા/સુચનો વગેરે – ખાસ જગ્યાએ થતા અકસ્માતો ના ચોક્કસ દાખલા – આવા અકસ્માતો ના કારણો – અકસ્માત મા થતી વધ ઘટ)
- ધાર્મીક મિલકત / સહિયારી મિલકત સંશાધનો – આવી મિલકતો ની વૃધ્ધી, પંચાયતી રાજ્ય સંસ્થાઓ તથા આદીવાસી સામુહિક સંસ્થાઓ નો ટેકો અને તેઓની સમાવિષ્ટતા

Annexure - 4

Template for Tribal Development Plan (TDP)

Annexure – 5

Inventory of Environmental and Social Features[1]

Corridor name:

Sl.no	Chainage (Km)	Urban/Rural	Location (Left / Right)	Name of property	Distance from centre of carriage way		Area (approx.)	Age of structure, whether any annual fairs
					Boundary Wall	Structure		
1.	0+000 – 0+200							
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								

[1] *Inventory of social and environment features comprises the details of structures, water bodies, ponds etc. within RoW*

Inventory of Landuse and Trees

Corridor name:

LANDUSE AND TREE INVENTORY

Left side						Chainage	Right side						Land use		
Girth		Total trees	Spacing (m)	Distance from CL	Row		Row	Distance from CL	Spacing (m)	Total trees	Girth		LHS	RHS	Tree species
						0+000 – 0+200									

LandUse:1. Agriculture 2. Residential 3. Commercial 4. Residential and commercial 5. Industrial 6. Barren 7. Plantation 8. Other - specify
Water Body: P-Pond; L- Lake; R-River; S-Stream
Forest: RF-Reserve Forest, PF-Protected Forest

Inventory of Common property resources

Corridor name:

Structure ID.	Chainage (Km.)	Location (Left / Right)	Name of property	Distance from centre of cw		Area (approx.)	Remarks
1				**BW**	**Structure**		**Age of structure, whether any annual fairs**
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
Water body – pond, lake etc. what is the water body, what is the use, whether community use them,							
Canal /river crossing – what canal / river							
Religious – temple /dargah/ church – what is the church, age of the structure, any special festivals							
Shrines – record shirines within the RoW							
Market – weekly markets, nature of goods sold, volume of visitors, any issues, related to parking, wastes etc.							
Educational institutions – number of students, any issues of safety							
Health institutions – no of beds, any issues							
Crematorium / burial ground							

Annexure - 6

Environmental Monitoring Formats

Format EM 1: Selection of disposal site locations

From _____ **To** _____

(Give chainage and nearest settlements from both ends)

Criteria on which information for each site is to be collected	Site 1	Site 2	Site 3	Site 4
Area covered (m^2)				
Total Material that can be dumped within the site (m^3)				
Depth to which disposal is feasible (m)				
Distance of nearest watercourse (m)				
Nearest Settlement (m)				
Date/s of Community Consultation/s				
Whether the community is agreeable to siting of dumping site (Y/N)				
Proposed future use of the Site				

Selected Site (tick any one column only)
Certified that the above information is correct to the best of my knowledge and belief.

Contractor

Signed: Date:
Name & Designation:

Recommendation on the suitability of the site

Decision Taken (tick one): Approved/Not Approved

EE, SRP Division

Signed: Date:
Name and Designation of Deciding Authority

Enclosures
(Tick as appropriate)
1 Maps of each location
2 Photographs
a Each disposal location
b Each community consultation

Format EM 2: Construction Camp and Storage Area

Construction Stage: Report - Date____ Month_____ Year_____

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format) Format to be submitted before target date (decided by PIU) of establishing camps

Location of Camp (km_____)

Sl. No	Item	Unit	Details	Remarks
1	**Detail of item camp**			
a	Size of Camp	mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.3m.			
h	Details of Storage area(Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	cum		
j	Quantity of Topsoil removed	cum		
k	Detail of storage of topsoil			
2	**Details of workforce**			
a	Total No of Labourers	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
f	No of children	nos		
3	**Details of dwelling units**			
a	No of dwellings/huts	nos		
b	Minimum Size of Dwelling	mxm		
c	No of openings per dwelling	nos		
d	Minimum size of opening	mxm		
e	Walls	specifications		
f	Roofing	specifications		
g	Flooring	specifications		
h	Drinking Water Tank	specifications		
i	Capacity of Drinking water Tank	cum		
j	Size of Drinking Water Tank	mxmxm		
k	Total no of WC	nos		
l	No of Wcs for female workers	nos		
m	Minimum Size of WC	mxm		
n	Total No of Bathrooms for female workers	nos		
o	Size of septic tank for WC/Baths	mxmxm		
p	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
q	Fencing around camp	Y/N		
4	**Details of facilities**			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 ltr)	nos		

Certified that the furnished information is correct the quality of work is as per god practice and all relevant information as required is attached

Contractor

EE, SRP Division

Format EM 3: Reporting for Borrow Areas

Construction Stage Report: Date ____ Month_____ Year_____ Site Layout of Borrow Area and Proposed Borrow Area Redevelopment Plan to be attached with format Format to be submitted before target date as (decided by PIU) for establishing Borrow Areas Borrow Area No. BA_____
Location of Borrow Area (Km_____)

Sl. No	Item	Unit	Details	Remarks by CSC, if any
1	**Details of Borrow Area**			
a	Date of Borrow Area becoming operational dd/mm/yy			
b	Current Landuse			
c	Distance from Nearest Settlement	Km		
d	No of settlements within 200m of Haul Road	No.		
e	No of settlements within 500m of Borrow Area	No.		
f	Total Capacity	cum		
g	No of Trees with girth more than 0.3 m	No.		
h	Length of Haul Road	km		
i	Width of Haul road	m		
j	Type of Haul Road	metal/dirt		
k	Size of Borrow Area	sqkm		
l	Area of Borrow Area	km x km		
m	Quantity Available	cum		
n	Distance of Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
o	Quantity of top soil removed	cum		
p	Detail of storage of topsoil			
q	Daily/occasional use of the Borrow Area by the community, if any	-		
r	Probable reuse of Borrow pit-ask community	-		
s	Drainage channels/slope/characteristics of the area	-		
2	**Enhancement Elements**			
a	Quantity of top soil removed	sq.m		
b	Detail of storage of topsoil	sq.m		
c	Adjoining land use/Natural elements			
d	Nearby catchment for storing water			
e	Erosion Control Programme			
f	Preventive measures for			
i	Leaching			
ii	Mosquito Breeding			
iii	Water run-off/contamination			
iv	Any other environmental degradation			
3	**Details of workforce**			
a	Total No of Labourers	No.		
b	Total no of Male Workers	No.		
c	No of Male Workers below 18 years of age	No.		
d	Total No of Female Workers	No.		
e	No of Female workers below 18 years of age	No.		
4	**Details of redevelopment, Plan to be enclosed**			

Certified that the furnished information is correct the quality of work is as per good practice and all relevant information as required is attached

Contractor

EE, SRP Division

EM 4: Topsoil Conservation Monitoring

Contract _____

Report No. _____

Date_____

Location (Chainage)	Original Use of Topsoil removed	Measures for preventing spillage of topsoil on Haul Roads (Earthen/ Metalled)	Present Method of Storage	Anticipated period of Storage (Months)	Distance of nearest Water course (m)	Present Slope of Pile (V: H)	Whether silt fencing provided?	Is any other covering / measure provided? If yes, what is it?	Improvements required	Extent of Compliance as on date of report

Certified that the above is true.

Signed_____

(Authorized Representative of the contractor)

Verified

Signed_____

(EE, SRP Division)

Format EM 5: Redevelopment of Borrow Areas

Construction Stage: Report: Date ____ Month_____ Year_____
To be monitored by EE, SRP Division during construction period
Details of remarks to be appended wherever necessary.

Sl. No	Activity	Particulars	Drawbacks Identified			Improvements Required		
			Construction	Financial	Others (Ask Community)	Technical	Financial	Remarks/ Suggestions
1	Details of Borrow area and Surrounding Land use							
2	End use of the borrow area							
3	Whether rehabilitation has been carried out in line with owners request							
4	Erosion Control Measures							
5	Number of trees planted							
6	Reuse of topsoil							
7	Preventive measures taken for -Mosquito Breeding -Water runoff/ contamination -Other Environmental Degradation							
8	Any problems faced by owner							
9	Any problems faced by the local community							
10	If it has been developed as a fish pond,							
a	Details of available catchment for storing water							
b	Economic Benefits/Utility							
11	If it has been developed as an orchard							
a	Details of suitability of soil and water.							
b	Type of Plantation							
c	Economic Benefits/Utility							
12	Any Other End use							
a	Particulars							
b	Economic Benefits/Utility							

Contractor

EE, SRP Division

Format EC1: Target Sheet for Pollution Monitoring for Pre-Construction/ Post Construction (DLP)/ End of Maintenance Period

Construction Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted as per EMP)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted

Contractor

EE, SRP Division

Annexure – 7

Contractor's Checklist on Environmental and Social Issues

Project Name: _____ Contract /Road No._____

Contractor Details: _____

Project Description: _____

	Questions	Response (see note at the end of the checklist)
Activities		
1.	List the activities you will be undertaking during the works such as rock breaking, blasting, laying asphalt, establishing camp and plants etc.	
Responsibilities		
2.	Do you have any qualified/experienced person on environmental management? If not, how are you going to manage the environment and Social aspects?	
Materials		
3.	What base materials will you transport to the site such as stone, soil, diesel, lubricant?	
4.	Where will you source these materials from (non-manufactured material such as sand, soil and stone)?	
5.	Where will you store these materials?	
6.	How will you ensure materials brought to site will be stored and handled with care to avoid contamination of soil and water, reduce dust, and minimize disruption of traffic, not impairing public safety?	
Emissions to water, soil and air (Pollutants)		
7.	How will you ensure that any construction materials and works will: • Not restrict access to properties and carriageways.	

Questions		Response (see note at the end of the checklist)
	• Not damage existing trees. • Be protected from rain to reduce the loss of soil and materials washing down roads and entering drains and waterways. • Be stored to reduce leaks (such as Diesel) into the soil or waterways. • Not generate dust or cause nuisance air emissions.	
8.	How will you ensure proper drainage from the works so that water does not pond and become a hazard to health?	
9.	How will you reduce sediment from the construction activities?	
Fauna and Flora		
10.	No trees shall be felled as part of Construction/ Maintenance activity. How will you protect existing trees from construction activities?	
Waste Management		
11.	How do you plan to store and dispose of: • Construction debris? • Workers refuse and effluent? • General litter?	
Noise and Vibration		
14.	Will you be using any noisy equipment that may cause nuisance?	
15.	Are your works close to a school, or hospital or other place where people may be affected by noise?	
16.	What will you do to reduce noise and vibration impacts?	
17.	What will be your working hours?	
Construction Camp / Workers' Camp		
18.	Where you are planning to set up construction and workers camp?	
19.	Does it meet the stipulated siting criteria?	
20.	How you are going to control pollution from contraction plan and equipment?	
21.	What facilities you will provide at camp for workers?	
Community, Awareness, Consultation, Co-ordination		
22.	How will you keep owners and occupants of shops and residences and other people of the adjoining villages and road users, who are affected, informed about the works?	

Questions		Response (see note at the end of the checklist)
23.	How will you ensure all the sub-contractors, supervisor and others on the site, are aware of these environmental and social aspects?	
24.	How will you co-ordinate with utility works (such as electricity, telephone, cable)?	
25.	Can you satisfy the special regulations or environmental conditions identified in the contract for this project?	
26.	Have you attended any training course on environment, health and safety for similar construction project?	
Safety		
27.	What activities could cause harm to people or property?	
28.	How will you reduce the risk of impact on people or their property?	
29.	How will you reduce potential injury to your workers and subcontractors?	

Prepared by: _____ Date _____

Approved by: _____ Date _____

Agreed Comments: ___

Note:

- The Contractor shall fill this Checklist road-wise based on ESMF and Contract stipulation.
- This checklist shall serve as Contractor's road specific environmental management plan and serves as basis for subsequent implementation of the safeguard measures by the Contractor and monitoring the same by the EE, SRP Division.
- This checklist should be filled up during initial road inventory by the Contractor i.e. before any physical works start.