Environment and Social Due Diligence Report

December 2013

IND: Accelerating Infrastructure Investment Facility in India –GVK Bagodara Vasad Expressway Pvt. Ltd.

Prepared by

India Infrastructure Finance Company Limited for the Asian Development Bank

India Infrastructure Finance Company Limited

Environment and Social Safeguards Due Diligence Report

Sub Project: SIX LANING OF EXISTING THREE LANE FOR BAGODARA – WATAMAN – TARAPUR – VASAD ROAD SH-8 FROM KM. 0/000 TO 101/900 IN THE STATE OF GUJARAT ON BUILD, OPERATE AND TRANSFER (BOT) BASIS

Sub-Project Developer: GVK Bagodara Vasad Expressway Pvt. Ltd.

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Environment and Social Safeguards Due Diligence Rep

Prepared by	**Dr. Abhash C. Panda, Head ESMU, IIFCL** **Mr. Krupasindhu Guru, Social Safeguard Specialist , IIFCL**	 
Reviewed and Approved by	**Mr. Sanjeev Ghai, Chief General Manger, IIFCL**	

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PROJECT BACKGROUND

1. SUB-PROJECT TITLE:

1. The Bagodara – Wataman – Tarapur – Vasad section of SH – 8 starts from Bagodara at Km. 0.000 in Ahmedabad District and ends at Vasad Km. 101.900 in Anand district with a total length of 101.900 Kms. This road connects National Highway No. 8A near Bagodara to National Highway No. 8 near Vasad on Build, Operate and Transfer (BOT) basis.

2. SUB-PROJECT DESCRIPTION:

2. Gujarat State Road Development Corporation Limited (GSRDC), Gujarat has awarded the Concession to GVK Bagodra Vasad Expressways Pvt. Ltd. for six laning of existing three lanes for Bagodara – Wataman – Tarapur – Vasad road SH-8 from km. 0/000 to 101/900 in the state of Gujarat on Build, Operate and Transfer (BOT) basis. The Concession Agreement was signed on 21st of February 2011.

3. The existing carriageway width of 12.00 m with protective brick wall of 45 cm thick from km. 0.00 to km. 35.00 on both sides and 1.0 to 1.50 m earthen side shoulders having ROW of 30.00 meters in the entire length. The riding surface of this section is fair to good. The alignment of road is generally in plain terrain and straight with few curves.

4. The length of the project road section is 101.900 km, with width of the carriage way is 6 lane divided dual Carriageway with median. Paved shoulders on both sides having equivalent crust same as the main carriageway is 1.5 M. Hard side shoulder on both sides is 1.0 M. The proposed ROW in the project corridor is 60 m, apart from 60 m ROW is also proposed for bypasses.

5. There are 5 major towns namely Tarapur, Dharmaj, Borsad, Asodar and Vasad on this alignment. Substantial flow of local as well as out-bound traffic is observed which causes lot of congestion and delays in travel time while passing through these towns. Residential buildings, commercial establishments, offices, shops, petrol pumps, hotels, temples etc. are located on both the sides of the road. Due to this reason, a symmetrical widening is adopted along these towns.

6. The existing ROW in the project corridor is 30 m. In urban areas like Borsad and Vasad the existing ROW is very less and having congested area, therefore two number of bypasses is about to 8.4 Km of length have been proposed at Borsad (5.600 Km) and Vasad (2.80 Km) in the project road.

7. Considering the safety of local people and to facilitate the movement of the local traffic at urban and semi urban locations, underpasses, total length of 29.500 Km of services road, bus bays and truck lays have also been proposed on the project road. The detail of the project salient features of the project is given in **Table-1:**

Table- 1 Project Salient Features:

Particulars	Project Road
Concessionaire	GVK Bagodra Vasad Expressways Pvt. Ltd.
Project Road	Six laning of existing three lane for Bagodara – Wataman – Tarapur – Vasad road SH-8 from km. 0/000 to 101/900 in the state of Gujarat on Build, Operate and Transfer (BOT) basis.
Length	101.900 Km.
Width of Carriage Way	6 lanes divided dual Carriageway with median.
Terrain	Plain terrain with mostly agricultural land on either side
Service Road	29.500 Km
Bypass	Borsad Bypass-5.60 Km. Vasad Bypass-2.80 Km.
Major Bridges	3 Nos.
Minor Bridges	8 Nos.
Railway Over Bridge	4 Nos.
Vehicular Underpass	10 Nos.
Pedestrian Underpass	10 Nos.
Major Junction	6 Nos.
Minor Junction	40 Nos.
Box Culverts	40 Nos.
Slab Culverts	13 Nos.
Pipe Culverts	126 Nos.
Truck lay-byes	2 Nos.
Bus bays & Bus shelters	23 Nos.
Toll Plaza	2 Nos.

Source: Monthly Progress Report June 2013

3. ROAD FURNITURE AND ENHANCEMENT:

8. Further as part of the project road furniture and enhancement of Common property Resources, various project facilities is being provided, this will also put advantage to the environmental, social safeguards of the project and health and safety concern of the traffic. The project facilities to be provided has been mentioned below:

    - Cat-eyes with white reflectors will be provided on straights and Red reflectors on curved portions;
    - Service Road;
    - Toll Plaza;
    - Pedestrian facilities;
    - Landscaping and tree plantation;
    - Truck lay-bys and bus bays;
    - Street Lighting;
    - Ambulances;
    - Cranes;
    - Traffic Aid Post;
    - Medical Aid Post;
    - vehicular underpasses, Rail over bridges;
    - Administration, Operation and Maintenance of Base Camp;
    - Junction Improvements carried out at all major junctions and intersections;
    - Highway patrolling, ambulance measures during operation;
    - MS Crash Barriers on outer side of carriageway wherever the embankment height is more than 3m.

4. DEBT SYNDICATION:

9. The debt component of the proposed project is being financed by a syndication of loan with lead Bank as Axis Bank. GVK Bagodra Vasad Expressways Pvt. Ltd has signed a Common Rupee Loan Agreement with consortium of other 5 lenders. The consortium of

Lenders comprises, India Infrastructure Finance Company Limited (IIFCL), Punjab National Bank (PNB), Central Bank of India, Oriental Bank of Commerce, Punjab and Sindh Bank and State Bank of Mysore. The total cost of the project is 1189.03 cr. and equity is 297.26 Cr, the debt component of the project is 891.77 Cr. out of which 200.00 Cr. has been allocated by IIFCL which is 22.43% of the total debt of the project.

5. CONCESSIONAIRE:

10. Gujarat State Road Development Corporation (GSRDC) has awarded the Concession to GVK Bagodra Vasad Expressways Pvt. Ltd Six laning of existing three lanes for Bagodara – Wataman – Tarapur – Vasad road SH-8 from km. 0/000 to 101/900 in the state of Gujarat on Build, Operate and Transfer (BOT) basis. The Concession Agreement signed on 21 February 2011 between GSRDC and M/s. GVK Bagodra Vasad Expressways Pvt. Ltd. The financial close has been achieved on 17th November 2011 and the appointment date is 18th November 2011.

6. EPC CONTRACTORS:

11. M/s. GVK Projects and Technical Services Ltd. have signed the EPC contract agreement with M/s. GVK Bagodra Vasad Expressways Pvt. Ltd. on 4th July 2011 and the EPC cost is 955 Cr.

7. INDEPENDENT CONSULTANT:

12. M/s Egis India Consulting Engineers Pvt. Ltd. has been appointed as the independent consultant for the project.

8. LENDER'S ENGINEER:

13. M/s. Frischmann Prabhu India Pvt. Ltd. has been appointed as Lender's Engineer for the project M/s. GVK Bagodra Vasad Expressways Pvt. Ltd. As per the Lender's Engineer report for the month of June 2013 the progress achieved up to this month is 22.23%.

DUE DILIGENCE ON ENVIRONMENTAL SAFEGUARDS

9. AVAILABILITY OF EIA/EMP REPORTS:

14. The EIA/EMP report has been prepared by Gujarat State Development Corporation Limited (GSRDC) through its consultant M/s Frischmann Prabhu (I) Private Limited. A copy of the EIA report is attached in **Appendix-I.**

10. ENVIRONMENTAL SENSITIVITY AND DUE DILIGENCE:

15. The environmental sensitivity of the Bagodara – Wataman – Tarapur – Vasad Road (SH 8) has been assessed by reviewing the Environmental Assessment and Management Plan, prepared for the project. The sub-projects were visited by the Environmental Safeguards Specialist of IIFCL on July 30-31, 2013 for field verification of environmental safeguard aspects and direct interaction with the concessionaire and EPC contractor. The site visits photographs are attached in **Photo plate-I:** The summary of environmental sensitivity assessment is presented below:

- The proposed widening of the road requires 611.40 ha of land (approx.) comprising of 47.20 % of private land and 52.80 % of government land. Tree-cutting permission has been obtained for removal of forest and non-forest species;

- The project is the important link between Central Gujarat and Saurashtra and is also the shortest route joining Saurashtra with South Gujarat regions. Majority of the project road runs in embankment, generally at a level of 1.0m to 1.5m above the ground level. There are three numbers of Major Bridges on this road namely, Sabarmati Bridge, Shelvo Bridge, Andheri Bridge and three ROBs on road alignment and one ROB on Vasad bypass (Total 4 nos.) and canal structure at km 81.000 near Borsad bypass;

- Drainage is a major problem in this area and the rainwater remains stagnant for days together during heavy rainfall;

- There are 5 major towns namely Tarapur, Dharmaj, Borsad, Asodar and Vasad on this alignment. Lane carriageway with footpath and grill is proposed in three major towns i.e. Tarapur, Dharmaj and Asodar whereas bypass is proposed around two towns of Borsad and Vasad;

- There are no protected wildlife habitats like national parks or sanctuaries along the project road;

- The terrain along the project roads are entirely plain and do not require extensive cut and fill, the magnitude of the negative impact on the terrain conditions may therefore be considered negligible;

- The project area has good agricultural land. Removal of top soil and dumping of raw materials and wastes may affect the soil quality. Also soil erosion is likely in the construction phase due to removal of vegetation and transportation of materials through excess road;

- Temporary impacts on air quality, water quality and noise levels are anticipated during the construction phase and an increase in the ambient noise level is anticipated during the operation phase of the project;

- The project road passes through Forests areas from km 43/4 to 101/760 for which 48.96 ha of protected forests have been diverted for this project;

- There are a total number of 6105 trees existing in the ROW, out of which 4457 are forest species and 1648 are non-forest species.

16. Issues mentioned above have been addressed by the Concessioning authority and the concessionaire by taking appropriate mitigation measures and clearances.

11. CATEGORIZATION OF SUB-PROJECT:

17. The sub-project can be classified as category B based upon ADB's EA requirements and as per their Safeguard Policy Statement of 2009. This classification has been made after reviewing the EA report and other available documents related to environment.

12. STATUS OF REGULATORY CLEARANCES:

18. As a requirement, the sub-project has to meet requirements of all appropriate national and local legislations considering appropriate guidelines and obligations of regulatory authorities. The sub-project would also require appropriate permits and approvals for implementation of environmental management plan. The statutory environmental clearances, tree-cutting clearance and forest clearance for the proposed sub-project are attached in **Appendix- II** and their status is listed in **Table-2:**

Table- 2 Status of Regulatory Clearances Obtained:

Sl. No.	Clearances Required	Statutory Authority	Current Status of Clearance
1	Environmental Clearance	State Level Environment Impact Assessment Authority, Gujarat	MoEF has granted Environmental Clearance to this project on 23rd April 2013, Letter no. SEIAA/GUJ/7(f)/36/2009
2	Forest Clearance	Government of Gujarat, Forest & Environment Department	Forest clearance approval given for diversion of 48.96 ha of protected forests by MoEF, GoI Letter No. 8-112/2011-FC (I) dated 08-11-2012.
3	Tree cutting Permissions for Roadside Trees	GSRDC Limited, Gandhinagar, Gujarat	Tree cutting permissions given by the CCF, Ahmedabad's Letter No. b/SVY/15/9082-85/2012-13 dated 10/1/2013
4	Consent to establish & operate	Gujarat Pollution Control Board	Consent to establish under Section 25 of Water Act 1974 and Section 21 of Air Act 1981 for i) Diesel/FO (hot mix plant / Wet mix

			plant / Asphalt plant (GPCB/CTE-KH-865/33644/27586 dated 15 Dec 2009) ii) Setting up of industrial plant / activities for the manufacturing of Aggregates- Stone crushing various sizes(GPCB/ ID37353/CCA-ABD-GEN-800/107869/21-03-12) iii) Setting up of industrial plant / activities for manufacturing of Ready mix concrete (GPCB/ID37356/CCA-ABD-GEN-816/107611/19.03.12) iv) Setting up of industrial plant / activities for BTM and WMM (GPCB/ID37531/CCA-ABD-GEN-801/106929/13.3.12
5.	Consent to operate quarry	Geology & Mining Department, Government of Gujarat	i) Village Bagodara, Ahmedabad (Permit no. 658, Letter no. AGA/QP/658/6286 dated 31.1. 2012) ii) Village Bagodara, Ahmedabad (Permit no. 674, Letter no. AGA/QP/674/6373 dated 4.2. 2012) iii) Village Bagodara, Ahmedabad (Permit no. 675, Letter no. AGA/QP/675/6376 dated 4.2. 2012)
6.	Blasting/Explosive Licence	Office of the Collector & District Magistrate, Ahmedabad	Use of explosives like Electric detonator and Buster column (Letter no. DC/3312/Bodiya/S.R. 20/2012)
7.	Certificate of Registration under sub-section (3) of Section -7 of the Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996	Office of the Assistant Director, Industrial Safety & Health, Anand, Gujarat	Number of construction workers to be employed on any day: 200 or less {No. ADISH-AND-BOCW/2012 (451) dated 20/3/2012 License No. 103}

Source: Concessionaire

19. Copies of all relevant consents, approvals and permits are given in **Appendix-III.**

13. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE:

20. As a part of Environment Clearance Process, formal Public Hearing were conducted at Dholka, Dist. Ahmedabad on 03.10.2008 and at Tarapur, Dist. Anand on 07.10.2008 under the Chairmanship of respective Additional District Magistrate, Ahmedabad & Anand to disseminate the project information and to record the views/aspirations of the affected people in the Project.

21. Apart from the formal public hearing as mandated for environmental clearance, public consultations have been held with the project affected people at the pre-construction and construction phases and are a continuous process. During public consultation, people of different sections of the society along the road corridors like the farmers, shopkeepers, squatters, poor & vulnerable groups of the project affected area were consulted as a confidence-building measure. Their invaluable suggestions have also been incorporated in the design. Apart from this, focused group discussions were held at different locations along the road to help mitigate environmental issues through suitable realignment options.

22. During preparation of EIA report, affected people were consulted throughout the road stretch and their views and suggestions pertaining to widening of road and proposed environmental mitigation measures like forests & wildlife; tree-cutting; water bodies; cross drainages, agriculture; common property resources; ancient monuments & architecture; accessibility to state, district and village roads; relocation/replacement of community assets; possible construction related pollution; source of water for construction purposes and other construction related environmental issues were discussed.

14. ALTERNATIVE ANALYSIS:

23. The analysis of alternatives is one of the most important exercises that need to be carried out with regards to environmental consequences to each alternative and the cost attributed to it. The present proposal is strengthening and widening of the existing highway sections. The alternative assessment is summarized as below:

24. Alternatives for widening play very important role in protection of the environment. By analyzing and planning right alternatives, environmental adversity could be addressed significantly. With the alternative analysis, following outcomes have resulted due to selection of proposed road alignment for widening of project section as given in EIA report:

    - All total, two bypasses at Borsad and Vasad respectively have been suggested to address existing air, water and noise pollution due to congestion. Since both sides of the bypasses have agricultural land and did not have obstructions, there was no obvious benefit to choose to the left or right of the existing carriageway. However, while selecting these bypasses, adequate steps were being taken to minimize displacement and adverse effect on people's land and livelihood;

    - In general, displacement of shops and houses have been minimized to a greater extent by adopting realignment and concentric & eccentric widening;

- Affected persons, especially the poor and vulnerable groups are less in comparison to other alternatives;

- Anticipated environmental impact will be relatively insignificant under this alternative.

25. Six-laning of the project road will require cutting of trees along the project road. About 6105 numbers of trees exist within the ROW and need to be felled; however, efforts have been made to save important tree species on either side through further realignment. Besides, a compensatory afforestation scheme @ 1:10 have been planned to improve the vegetation of the area.
26. Considering safety of local people and to facilitate crossing in settlement area, sufficient numbers of underpasses have been provided.

27. The population growth, increase in traffic volumes and the economic development along the corridor would continue to occur and will further add to the already critical situation. The existing unsafe conditions and the adverse environmental consequences, in terms of environmental quality along the highway, would continue to worsen in the absence of proposed improvements. The "with project scenario", has been assessed to be economically viable and will alleviate the existing conditions. It would therefore, contribute to the development goals envisaged by the Government of Gujarat and enhance the growth potential of the area.

28. No major change in topography and soils in the entire project stretch, however, construction better road will reduce soil erosion and dust.

15. ENVIRONMENT AND SAFETY CLAUSES IN CONCESSION AGREEMENT:

29. The Gujarat State Roads Development Corporation (GSRDC), Gujarat has signed the agreement with GVK Bagodara Vasad Expressway Pvt. Ltd., concessionaire for this project. As per Article 5 under obligations of Concessionaire in concession agreement, the concessionaire shall comply with all applicable laws and applicable permits in the performance of its obligations under this agreement. Environment and Safety related clauses of Concession Agreement are given in **Appendix-IV.**

16. ENVIRONMENT AND SAFETY CLAUSES IN EPC CONTRACT:

30. The GVK Bagodara Vasad Expressway Pvt. Ltd. has awarded the EPC works to GVK Projects and Technical Services Limited for this project. As part of the EPC contract between the concessionaire and the contractor, the Safety and Environment related measures are described in clauses 7.23, 7.24 and 7.27 of the EPC contract. These clauses specifically mention that EPC contractor shall comply with all environmental requirements stipulated in the project requirements and shall abide by all applicable environmental laws and regulations having application of the project. In the event of conflict or inconsistency among the standards stipulated in applicable laws and regulations and those stipulated in this agreement, the more stringent of these standards shall prevail. The EPC Contractor has appointed a Site Safety Officer to take care of the environmental and safety issues pertaining to the construction activities. A site safety plan has been developed to follow

good industry practices during construction phase. Details on Environment and Safety related clauses of EPC Contract are given in **Appendix-V.**

17. EMP IMPLEMENTATION BUDGET:

31. As part of the project, detailed EMP measures have been undertaken with a total budget of Rs. 4.39 Cr. (approx.), including mitigation cost of Rs 3.16 Cr. (approx.); compensatory afforestation cost of Rs. 1.18 Cr.; environmental monitoring cost of Rs. 3.76 lakh (approx.) and training & mobilization cost of Rs.1 lakh (approx.).

32. The EMP budget exclusively includes the following measures:

- Dust management through sprinkling of water;
- Environmental monitoring;
- Rehabilitation of borrow pits and quarries;
- Treatment of embankment slopes, silt fencing and rehabilitation work on ponds;
- Compensatory plantations including vegetation buffers at seven places;
- Provision of personal protective equipment (PPE);
- Periodic health checkup at labor camps;
- Provision of sewage and sanitation facilities at construction camp sites;
- Training and awareness programmes.

18. ENVIRONMENT MANAGEMENT PLAN (EMP) IMPLEMENTATION:

33. An extensive environmental management plan has been provided in **Appendix-VI.** The EMP has proposed mitigation measures which are being adopted during the pre-construction, construction and operational phases of the project. The EMP also elaborates on environmental monitoring. Implementation matrix of EMP is provided below in **Table-3:**

Table- 3 EMP Implementation Matrix Status:

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
1.	Monitoring of Ambient Air Quality, Water Quality & Noise Level at all the construction camps (Quarterly basis)	Yes		

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
2.	Permission of tree cutting from Competent Authorities like Forest Department (as applicable)	Yes		
3.	Permission for Diversion of Forest land from Competent Authorities like Forest Department (as applicable)	Yes		Diversion of 48.96 ha of protected forests
4.	Status of Site Clearance from MoEF	Yes		
5.	Sources of water for construction	Yes		
6.	Have you obtained permission from the government, if you are using river water			NA
7.	Are any water bodies / water sources being affected? Give details for each case			NA
8.	Permission for operation of Quarrying and Borrowing	Yes		
9.	Quarry: The contractor shall obtain materials from quarries only after the consent of the Department of Mining / GPCB / District Administration or will use existing approved sources of such materials	Yes		
10.	Road side utility relocation plan (Detailing / Permission and reestablishment schedule etc.)	Yes		
11.	NOC from State Pollution Control Board (SPCB) under Water (Prevention and Control of Pollution) Act – 1974 and the Air – Act 1981 and the environmental (protection) Act 1986	Yes		
12.	Status of dust control at crusher and along the road where construction is under progress	Yes		
13.	Traffic Safety / Road side signage	Yes		
14.	Are the warning signs sufficient in number	Yes		
15.	Are the warning signs adequately clear	Yes		
16.	Noise Pollution : Noise from Vehicles, Plants and Equipment:- i) All plants and equipment used in	Yes Yes		

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
	construction will strictly confirm to the MoEF/ CPCB/ GPCB noise standards; ii) All vehicles and equipment used in construction will be fitted with exhaust silencers; iii) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaces.			
17.	Emission from Construction Vehicles, Equipment and Machineries:- i) Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of GPCB/CPCB; ii) The Contractor will submit PUC (Pollution under Control) certificates for all vehicles/equipment/machinery used for the project.	Yes		
18.	Status of dust control during construction activities	Yes		
19.	Dust Pollution: i) The contractor will take every precaution to reduce the level of dust from crushers/hot mix plants, construction sites involving earthwork by sprinkling of water, encapsulation of dust source and by erection of screen/barriers; ii) The contractor will provide necessary certificate to confirm that all crushers used in consultation confirm to relevant dust emission control legislation.	Yes		
20.	Drainage: Contractor will ensure that no construction materials like earth, stone, ash or appendage is disposed of in a manner that blocks the flow of water of any water course and cross drainage channels. Contractor will take all necessary measures to prevent any	Yes		

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
	blockage to water flow.			
21.	License of labour: Insurance Policy for all labor force	Yes		
22.	Does the labour / construction have the First Aid	Yes		
23.	Has the contractor provided and maintaining temporary living accommodation and ancillary facilities for labor to the standards and scale approved.	Yes		
24.	Supply of safety equipment and safety devices (helmet / shoe / goggles etc.) to the workers	Yes		
25.	Does the contractor have a safety plan during construction	Yes		
26.	Labour Camp Management: i) Accommodation- maintained necessary living accommodation and ancillary facilities in functional and hygienic manner; ii) Potable Water- Supply of sufficient quantity of potable water (as per IS) in every workplace/labour campsite at suitable and easily accessible places and regular maintenance of such facilities; iii) Sources of water for the camp; iv) Sanitation and Sewage System- the sewage system for the camp are 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, separate toilets/bathrooms, wherever required, screened from those from men (marked in vernacular) are to be provided for women, adequate water supply provided in all toilets and urinals and all toilets in workplace are with dry-earth system (receptacles) which are to be cleaned and kept in a strict sanitary condition.			NA (Local labors go back to their villages after working hours; however facilities of accommodation, potable water and proper sanitation & sewage systems are available for the semi-skilled and skilled staff staying in the base camps.
27.	Are the garbage bins provided in the camps and regularly emptied and the garbage disposed of in a hygienic manner, to the satisfaction	Yes		

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
28.	General cleanliness of camps area	Yes		
29.	Name and location of each hot mix plant under operation	Yes		Indranej, Anand
30.	Good house-keeping practices for various work places of projects e.g. Worker's Camp, Crusher, Construction area of Road etc.	Yes		
31.	Safety arrangements for worker, public and associated environment – during construction	Yes		
32.	Is the storage of fuel/lubrication done satisfactorily?	Yes		
33.	Are you using blasting material, if you please provide the – permissions obtained, storage facility and location	Yes		
34.	Drinking water facility in camps and work site	Yes		
35.	Water: No ground water shall be tapped for the construction of the project. Water for construction works shall not be drawn from community water sources.	Yes		
36.	Air: i) Water sprinkling is carried out at mixing sites, temporary diversions, unpaved roads as well as haulage roads to control dust emission; ii) The gaseous emissions and particulate matter from the project construction confirm to the standards prescribed by the GPCB. At no time, the emission levels shall go beyond the stipulated standards; iii) Concessionaire obtained the requisite permissions for Asphalt plant, Hot-Mix Plants, Wet-Mix Plants and Concrete Batching Plants from the statutory authority before commencing any activity; iv) Occupational health surveillance of the workers shall be carried out on a regular basis and proper records shall be maintained for the same; v) Pre-employment and periodical medical examination for all workers undertaken as per statutory requirements.	Yes		

Sl. No.	Particular of Works	Compliance		Remarks
		Yes	No	
37.	Occupational health surveillance of the workers is carried out on a regular basis and proper records shall be maintained for the same. Pre-employment and periodical medical examination for all workers is undertaken as per statutory requirement.	Yes		
38.	Oil interceptors are provided wherever petroleum, oil, lubricants are handled / utilized / stored to avoid soil contamination.	Yes		
39.	Training given to all workers on safety and health aspects.	Yes		
40.	No water bodies are affected due to the project.	Yes		

Source: Concessionaire

18.1. CONCESSIONAIRE AND EPC CONTRACTOR'S HSE PLAN:

34. In order to achieve highest standards in Health, Safety and Environment, the EPC contractor GVK Projects & Technical Services Limited has developed a Road Safety Management Plan. This document works as a guidance manual for implementing good industry practices with regard to worker's health & safety and accident/hazard prevention at work site. In the Plan, emphasis has been made how to provide safe and healthy working environment to prevent accident; prevent occupational health hazards and to prevent environmental pollution. Under traffic management for work zones, measures to be adopted for safety in construction zone have been emphasized. The HSE Plan prepared for the project has been attached as **Appendix-VII.** Frequency of air pollution monitoring is once a year, water quality monitoring in non-monsoon season is once a year and noise level monitoring is done thrice a year.

18.2. EMP COMPLIANCE STATUS:

35. Concessionaire through its EPC Contractor is complying with environmental protection measures as outlined in EIA-EMP report and also comply the conditions issued by different authorities in their clearances/consents during construction phase for this project. Environmental Management Status by Concessionaire has been attached as **Appendix-VIII.**

19. ENVIRONMENTAL MONITORING:

36. Monitoring of environmental quality during construction phase and operation phase reflects the success of implementation of the mitigation measures and it also provides a chance to review the suggested measure and improve upon the measures. The environmental monitoring is the responsibility primarily of the EPC contractor. The EPC Contractor M/s. GVK Project Technical Services Ltd. has outsourced the job of environmental monitoring to an Ahmadabad based environmental consultancy and laboratory named M/s Envisafe. The environmental quality monitoring reports for project sites are enclosed as **Appendix-IX**. As informed by project developer, frequency of ambient air quality; noise level monitoring; water quality and stack monitoring will be done on half-yearly basis. As per the report attached, the levels of environmental quality parameters are found to be within the permissible limits at plant locations.

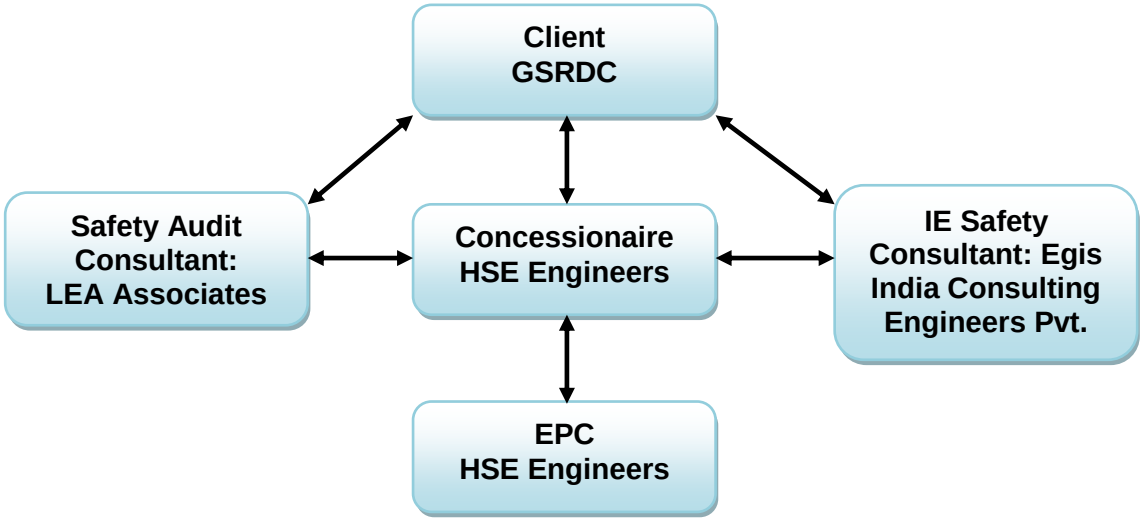
20. INSTITUTIONAL FRAMEWORK FOR EMP IMPLEMENTATION:

37. Responsibilities for environmental management associated with the proposed highway construction works involve a number of parties each with specific responsibilities for particular activities. They are as follows:

    - GSRDCI/PIU;
    - Concessionaire (HSE Engineers);
    - EPC (HSE Engineers);
    - IE Safety Consultant (Egis India Consulting Engineers Pvt. Ltd.);
    - Safety Audit Consultant (LEA Associates South Asia Pvt. Ltd.).

38. As far as implementation of environmental aspects are concerned, the overall responsibility lies with the PIU i.e. GSRDC. The GSRDC is headed by the Project Director and is supported by the Environment Officer of GSRDC. GSRDC has appointed safety consultant (IE) to assist the concessionaire in carrying out all safety aspects and have also appointed a safety audit consultant to carry out periodic audit of concessionaire's implementation of environmental and safety management plan. The institutional arrangement made for implementation of environmental aspects is given in **Figure-I:**

Figure- 1 Institutional arrangement for implementation and monitoring of EMP at Bagodra Vasad Expressway Project



21. SITE VISIT:

39. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists during 30th-31st of July, 2013 to review the implementation of the project environmental safeguards. During the site visit it has been observed that:

- Regular water sprinkling is being done in high dust generation areas like road construction sites and crushing operation areas;
- At construction plant sites, crushers have been provided with wind breaking walls and water sprinkler at the start of crushing operation in crusher equipment and Hot Mix Plants have been provided with Bag House filter;
- Median drainage work has been started to construct at some of the stretches of road length;
- Tree cutting has been completed on road side except in the bypasses;
- At present, Median and roadside plantation work has not been started;
- Proper traffic diversions and appropriate signage are being provided at the site to prevent any disruption to the highway traffic;

- Workers are being provided with the required safety gears to be worn during execution of work;

- Necessary barricading and safety precautions for deep excavations are also being ensured. Work safety signage have been provided throughout the project highway and also at Construction site offices;

- The laborers are hired from nearby villages throughout the road stretch and after work; these laborers go back to their respective villages.

- Staff accommodation facility at camp site has been provided with adequate drinking water, mess and sanitation facilities;

- Periodic Environmental quality monitoring has been carried out at the plant locations on a regular basis during construction phase. Sample copy for the same has been attached in **Appendix-IX**;

- As reported by concessionaire, Regular Traffic awareness programs are being conducted along the highway.

40. The site visit photographs showing some of the environmental safeguard measures and progress of construction work details are given in **Photo plate-I.**

22. CONCLUSION AND RECOMMENDATION:

41. Based upon the available documents, it is concluded that the concessionaire through their EPC contractor has undertaken adequate environmental safeguard measures. The conclusions for the sub-project are given below:

    - The sub-project has been prepared by GSRDC as per its own funding requirement and not in anticipation to ADB operation;

    - The sub-project has necessary environmental clearances as well as permits and approvals for project implementation as given in **Appendix-II.**

    - Concessionaire has confirmed during site visit that all required consents to establish and operate are obtained prior to operating the respective construction equipment;

    - The sub-project does not affect any eco-sensitive zones as declared by MoEF. Also the project does not pass through any national park or wild life sanctuary area. No historical or archaeologically important monuments are affected due to this road project;

    - Concessionaire has confirmed that the funds for diversion of reserved and protected forest land and compensatory afforestation have been deposited by the Project in time bound manner;

- Institutional arrangement is also being done for regular environmental management and monitoring during the project implementation by the EPC Contractor and IE;

- Based on the due diligence findings, it can be deduced that the sub-project has no significant environmental safeguard issues;

- The Sub-project therefore does not appear to involve any kind of reputational risk to Asian Development Bank funding on environmental safeguards and recommended for funding under the proposed project.

- It is confirmed by the subproject developer that, all statutory environmental clearances /approvals /consents are obtained /renewed as the case may be;

- Concessionaire has confirmed that continued compliance has been carried out by the EPC contractor with the terms and conditions stipulated for according statutory environmental clearances /approvals /consents;

DUE DILIGENCE ON SOCIAL SAFEGUARDS

23. SOCIAL SAFEGUARDS COMPLIANCE REVIEW:

23.1. METHODOLOGY ADOPTED FOR SOCIAL COMPLIANCE REVIEW:

42. The social safeguard due diligence study was carried out for the sub-project with the information and documents provided by the concessionaire, GVK Bagodra Vasad Expressways Pvt. Ltd. Social due diligence for the subproject was initiated by IIFCL after review of the Feasibility Report prepared by the Concessioning Authority Gujarat State Road Development Corporation (GSRDC) and Environmental Impact Assessment (EIA) report to understand the salient features of the project and various social and resettlement concerns. The following documents were referred in order to prepare the Social Safeguard Due Diligence Report :

- Feasibility Report;
- Environment Impact Assessment Report (EIA) and
- Lenders Independent Engineers (LIE) Report

24. MINIMIZATION OF SOCIAL IMPACTS:

43. Since the project involves the widening of an existing highway, while finalizing the road alignment efforts have been made by adopting appropriate engineering designs, to minimize resettlement impacts and additional land acquisition. To minimize displacement and to reduce disruption of livelihoods, concentric widening in village sections, bypasses to avoid settlement has been proposed. Following efforts have been undertaken to minimize negative social impact:

24.1. BYPASS:

44. In urban areas two number of bypasses is about to 8.4 Km of length have been proposed, at Borsad and Vasad in the project road the existing ROW is very less and having congested area due to the connectivity of the other villages as well as commercial activity along the stretch, two bypasses have been proposed, one bypass at Borsad (5.600 Km) and Vasad (2.80 Km).

25. PUBLIC HEARING:

45. Public hearing was conducted on 3rd October 2008 at Dhoka, Ahmedabad and on 7th October 2008 at Tarapur, Anand, in respect of Environment Assessment for Bagodara – Wataman – Tarapur – Vasad section of SH – 8 starts from Bagodara at Km. 0.000 in Ahmedabad District and ends at Vasad Km. 101.900 in Anand district.

26. LAND ACQUISITION IN THE SUB-PROJECT:

46. As documented in the Lenders Independent Engineers (LIE) Report June-2013the total land required for the project is 611.40 Ha. Out of which 42.31 Ha is Govt. land, 288.59 Ha.

is private land. The project has received diversion of 48.96 Ha. of Protected Forest land for road widening of Bagodara-vataman-Tarapur-Vasad road from Km. 53.400 to Km.101.760. The diversion of protected forest land is given in **Appendix-II.** The section wise detail summery of proposed land acquisition of the project is given in below **Table-4:**

Table- 4 Summery of Land acquisitions

Sl.No	Description	Area of Land (In Hectares)		
		Total Land Required	Acquired	Balance to be Acquired
1	Existing Road	130.90	130.90	--
2	Non Protected	85.44	85.44	
3	Protected	64.16	64.16	
4	Govt. Land	42.31	-	42.31
5	Private Land	288.59	273.27	15.32
Total (Ha.)		**611.40**	**553.77**	**57.63**
Percentage		**100%**	**90.57%**	**9.43%**

Source: Lenders Independent Engineers Report (June-2013)

47. During the discussion with the project officials and GSRDC officials, it was informed that the land acquisition is being done by the district administration, on behalf of Gujarat State Road Development Corporation (GSRDC), as per the applicable policy the Land Acquisition Act-1894.The valuation for structure has been determined by the consultant M/s. MN Associates appointed by GSRDC and accordingly the compensation for the loss of structures is being paid.

26.1. IMPACTS ON TRIBAL COMMUNITIES:

48. As per the Census of India 2001 data, the percentage of Schedule Tribe population in the affected districts is very low. The tribal communities in Gujarat are mostly found in the south-eastern region of Gujarat. Since this project comes in the Central part of Gujart and as per the information provided by the developer, there is no tribal communities are getting affected due to the sub project. Hence it is concluded that the project does not have any adverse impact to the tribal community.

26.2. IMPACT ON COMMON PROPERTY RESOURCES (CPR):

49. As documented in the EIA report there is no major property or site of archaeological importance along the project corridor. A few road side temples are located along the highway. During the site visit it was informed by the concessionaire that the CPRs are being relocated with the consultation of local people of the project area. During the site visit

it was observed that some of common properties like temples are affected due to the project. With the help of local people and village Panchayat the concessionaire is in the process of shifting of the religious structures. Some of the temples falling within the RoW are given in **Photo Plate-1.**

27. COMPENSATION AND ENTITLEMENT:

50. The land acquisition is being done by GSRDC, and the compensation for the loss of land is decided by the Competent Authority Land Acquisition. The payment for compensation of land is being done by the district administration, Gujarat as per the applicable policies.

51. The compensation of the land has been worked out after survey of the PAPs, verification of local market rates from local people and government rates prevalent in this area. Thus rate analysis was undertaken after verification of local market rates from local people and the government – registered prices were ascertained from the Registrar.

52. The affected people are being compensated for loss of structures as determined by M/s. MN Associates, according to the policies and procedures of Public Works Department (PWD), Gujarat. The compensation for the loss of land is being paid by the competent authority considering the market value obtained from the Revenue Department of the state. During the meeting with the GSRDC officials it was also informed that, In addition to the compensation for the loss of land they are also getting 30% solatium and 12% interest on value of land. A sample copy of land payment sheets is attached as **Appendix- XI.**

28. MONITORING AND EVALUATION:

53. On behalf of GSRDC the appointed Independent Consultant M/s Egis India Consulting Engineers Pvt. Ltd. is monitoring the compliance status of the subproject.

54. On behalf of Lenders the Lenders Independent Engineer (LIE) M/s Frischmann Prabhu India Pvt. Ltd is monitoring the financial as well as physical progress of the project and submitting the Monthly Report to the lenders.

29. LABOUR HEALTH, SAFETY, HYGIENE OF CONSTRUCTION WORKERS:

55. The company has hired skilled and unskilled workers belonging to the project region, these workers have been provided with adequate safety measures such as safety helmets, safety boots, earplugs, jackets and gloves. Facilities like onsite accommodation with basic amenities like water & toilets, transportation to work site and safety gears. Construction workers have also been provided with ready access to on- or off-site health care check-up facilities and provide first aid for minor injuries.

30. EMPLOYMENT GENERATION AND INCOME RESTORATION:

56. As informed by the concessionaire they have given job opportunity to 80 local people from the affected area. Based on the skill available and qualification requirements employment

preference have been given to skilled, semiskilled and unskilled labourers in the construction activity. A sample copy of the employment generated by the concessionaire for the local labour is given in **Appendix-X.**

31. SITE VISIT OBSERVATIONS:

57. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists during 30st and 31st of July 2012 to review the implementation of the environment and social safeguards of the project. During the site visit it has been observed that:

- As informed by the concessionaire local labour has been employed for skilled and unskilled activities;
- As informed by the concessionaire, the land acquisition has been done by GSRDC;
- Proper traffic diversions and appropriate signage are being provided at the site to prevent any disruption of life and the highway traffic.

58. The site visit photographs are given in **Photo plate-I.**

32. CONCLUSION AND RECOMMENDATIONS:

59. Based upon the available documents and its review it is concluded that the concessionaire has undertaken adequate social safeguard measures for the implementation of the project. The conclusions for the sub-project is given below:
    - The sub-project has been prepared by GSRDC as per its applicable policies and funding requirement and not anticipation to ADB's operation;
    - Land acquisition has been done by GSRDC, Gujarat and the compensation is being paid to the affected families before handing over the land to the concessionaire;
    - Adequate measures have been adopted for the minimization of social impacts during the planning stage of the sub-project. The design has been finalized with due consideration so that the alignment do not pass through any congested settlement area;
    - Local people's view have been given due consideration and documented during the project planning and designing of the project;
    - With public consultation of the local people, the affected cultural properties are being relocated by the concessionaire;
    - Local labours are being engaged in the construction activities for skilled as well as unskilled activities;

- It seems that the sub-project does not appear to involve reputational risk to Asian Development Bank funding on social safeguards and recommended for funding under the proposed project.

- When the project was proposed and land acquisition started, such activities were not done in anticipation of ADB fund.

ENVIRONMENTAL MANAGEMENT PLAN

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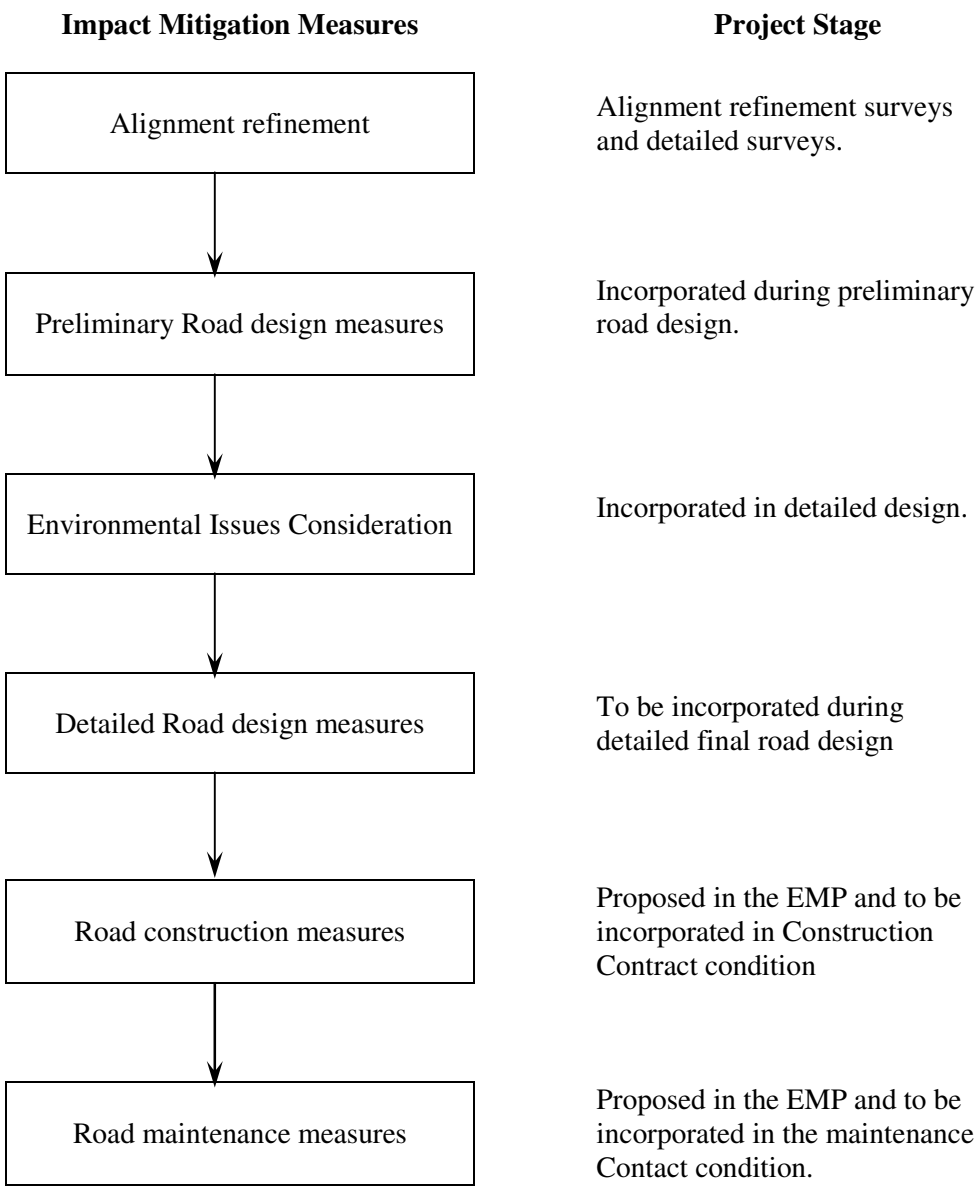
1. INTRODUCTION

Most of the negative environmental impacts associated with the proposed widening schemes can be mitigated by an appropriate Environment Management Plan. The Environment Management Plan (EMP) sets out the environmental management requirements for final detailed road design, pre-construction, construction and operation of the Project Road.

This EMP has been developed based on the inspection of project road to be constructed and prevailing experience of projects in similar terrain. The mitigation measures during the construction as well as operational stages, recommendations regarding construction and post construction monitoring, their frequency, and the responsible agencies as well as their roles, have been covered in the Environmental Management Plan. It also establishes a supervision, monitoring, auditing and reporting framework. The monitoring and evaluation of the Environmental Management Plan is critical for ascertaining the effectiveness of mitigating measures in controlling the adverse impacts. An Environmental Monitoring Schedule for the project is also included in the Environmental Management Plan.

Environmental impact mitigation measures have been incorporated into the road management & development project to date during preliminary road design, including alignment refinement and structure design as indicated in Figure 1.1. This EMP takes effect during three stages of the project: detailed road design, road construction and road maintenance.

Figure 1.1 Project Incorporation of Environmental Mitigation Measures



2. INSTITUTIONAL SETUP

Responsibilities for environmental management associated with the proposed highway construction works involve a number of parties each with specific responsibilities for particular activities. The five main parties responsible for the design and implementation of mitigation measures prior during and following the proposed highway construction are:

- GSRDCI/PIU,
- Concessionaire
- Final Design Consultant
- Independent Consultant
- Construction Contractor

GSRDC, as the project proponents, has the ultimate responsibility for the supervision of all project construction and environmental management works. Implementation of the road management development project will be the responsibility of the GSRDC

The Design Consultant will prepare final detailed design based on the preliminary road designs and EMP design recommendations.

The Independent/Supervision Consultant will supervise the day-to-day activities of the construction contractor on behalf of GSRDC. The Independent Consultant will be responsible for the technical supervision of road layout, implement contract conditions and certifying works for payment. The duties of the Independent Consultant will include overall management responsibility to ensure the effective implementation of EMP by the Contractor, with reporting direct to the PIU. The Independent Consultant shall undertake regular inspection audits of all aspects of works as specified in EMP.

The construction Contractor shall be responsible for undertaking all duties and works assigned to him/her in the road construction contract, including all specified

conditions in the EMP. The Contractor will work closely with the Independent Consultant to ensure that works are executed as per standard specification.

Throughout this EMP the construction contractor is referred to as the "Contractor". The duties assigned to both parties can be undertaken by the nominated representatives (e.g. Field Supervisors), as approved by the GSRDC.

The execution of the works related environmental measures will be the largely carried out by the Contractor. Specific activities related to Environmental measures, which are the responsibility of the contractor are indicated in the tabulated Environmental Management Plan. The contractors are recommended to employ Environmental engineer/s. The roles and responsibilities of the same shall be:

- Ensure that the mitigation measures assigned to the Contractor are complied. This would include, among others, proper construction and maintenance of facilities for the labour camps, ensuring that proper environmental safeguards are being maintained at borrow areas and quarries, ensuring that proper facilities are available for the monitoring of ambient air quality and collection of water samples as mentioned in the Environmental Monitoring Plan etc.

- Measurement and verification of quantities for environmental enhancement

- Prepare bill of quantities for the work carried out for the enhancement measures

- Ensure analysis and reporting of monitoring results.

3. MITIGATION MEASURES AND ENVIRONMENTAL MANAGEMENT

The identified measures to mitigate negative impacts will be implemented by incorporating them as an integral part of the design guidelines and tender documents. The mitigative measures are detailed below:

Table 3.1 Mitigation Measures and Environmental Management Plan

S. No	Environmental Parameter	Mitigative measures	Period	Responsible agency
	Land forms			
1		The location, shape and size of borrow pits shall be in accordance to the IRC 10-1961 recommended practice for borrow pits for road embankments.	Construction Stage	Contractor
2		Borrow pits and quarry sites have to be rehabilitated and planted	Construction Stage	Contractor
3		Construction debris will be disposed at low-lying areas within the ROW. Debris disposed near the village shall be with prior permission/consultation of the villager to develop playground and other public places The disposal of excess fill at low impact sites shall be undertaken to minimize damage to environmental and social features. Excess fill shall generally not be sidecast over the edge of the excavation.	Construction Stage	Contractor
	Soil Erosion			
1		In slopes and suitable places along the roadside, bush grass will be planted, and masonry rubbles will be built to prevent soil erosion as per Clause 306 of MOSRT&H. Temporary and permanent drainage systems are designed to minimize the soil erosion and the impact on irrigation canals per Clause 306 of MOSRT&H.	Design Stage	Design Consultant
2		No vegetation will be removed except those identified for removal for the widening.	Construction Stage	Contractor
3		Treatment of embankment slopes as per IRC: 56 – 1974	Construction Stage	Contractor
	Soil Profile			
1		Topsoil (depth of 15 cms) shall be stripped from each site prior to any associated filling or sub-surface excavation. It shall be saved by either stockpiling it adjacent to the proposed road formation batter, or by stripping it from the road section about to be excavated and respreading it immediately	Construction Stage	Contractor

		onto the previously completed adjacent section of road The preferred method is topsoil striping and respreading immediately. This has the advantages of only single handling the material and using topsoil when it is fresh, when soil fertility and seed viability have not been reduced by stockpiling. If topsoil is to be stockpiled it shall only be done above the excavation site to avoid mixing it with excavated sub-soil. Stripping and storing of topsoil for reuse during excavation for roadway and drains shall be in accordance to Clause 301.3.2 of *Specifications for Road and Bridge Works, Fourth Revision, MoRTH, Published by IRC,2001.* Topsoil shall only be respread on batters with a grade of 1:2 (V: H) or flatter. Topsoil spread on steeper batters will not stay in place. Stripping and storing of topsoil at borrow locations shall be in accordance to Clause 305.3.3 of *Specifications for Road and Bridge Works, Fourth Revision, MoRTH, Published by IRC,* *2001.*		
2		Construction vehicle, machinery and equipment shall move or be stationed in the designated areas only. Construction vehicles should operate within the Corridor of Impact i.e., approx. 6m to either side of the carriageway centreline to avoid damaging soil and vegetation.	Construction Stage	Contractor
3		While operating on temporarily acquired land for traffic detours, storage, material handling or any other construction related or incidental activities, top soil from agricultural land will be preserved.	During Construction	Contractor
4		Vehicle maintenance and refueling will be confined to areas in construction camps designed to contain spilled lubricants and fuels. Waste petroleum and lubricants must be collected, stores and taken to approved disposal sites, according to GOI laws.		
5		Disposal of Bituminous Wastes, if any, shall be done with prior intimation to the local civic body to use the local solid waste disposal site as per Hazardous Wastes (Management and Handling) Rules, 1989	Construction Stage	Contractor
6		Non bitumionous wastes shall be dumped in borrow pits covered with a layer of the conserved topsoil.	Construction Stage	Contractor

7		Section 306 of *Specifications for Road and Bridge Works, Fourth Revision, MoRTH* shall be followed for soil erosion and sedimentation control	Construction Stage	Contractor
	Loss of Waterbodies			
1		Pond at km 48/7, which will be partially filled up for the highway widening, shall be rehabilitated by increasing the depth in the remaining part of the pond to compensate for the capacity of the pond lost to the highway, which is 7500 cum (15 ms x 200ms x 2.5 ms). The rehabilitation will include dredging and construction of retaining walls along the edge of the pond.	Construction Stage	Contractor
2		All minor tanks, wells etc which are lost to the highway shall be compensated to the owner	Construction Stage	Contractor
3		The drainage systems will be periodically checked and cleared so as to ensure adequate storm water flow.	Beginning and end of monsoon, during construction and post construction	GSRDC
	Water Quality			
1		Construction work of bridges along the rivers Sabarmati, Selvo and Andheri shall be avoided during monsoon	Construction Stage	Contractor
2		Silt fencing shall be provided at the base of the embankment near the rivers Sabarmati, Selvo and Andheri as well as ponds at km 50/2, km 48/7 and km 44/2.	Construction Stage	Contractor
3		Clause 2501 of *Specifications for Road and Bridge Works, Fourth Revision, MoRTH* shall be followed for precaution during river training works	Construction Stage	Contractor
4		Asphalt plants and equipment yards will be located 500 ms away from rivers and ponds.	Construction Stage	Contractor
5		Toilets at labour camps shall be located atleast 200 ms from water sources like wells and ponds.	Construction Stage	Contractor
6		Retaining wall shall be constructed along the pond edge along highway at km	Construction	Contractor

		50/2	Stage	
7		All necessary measures have been taken to prevent earthworks and stone works related to the road form impeding cross drainage at water canals or existing irrigation and drainage systems.	Construction Stage	Contractor
	Vegetation			
1		Clearance shall be obtained from Forest Department before cutting trees. **A** request letter has to be sent to the forest department for a permit to fell trees from regional office of DCF, Ahmedabad and Anand for onward submission to Regional Forest Office, Bhopal.	Pre Construction Stage	GSRDC/PIU
2		Compensatory plantation shall be carried out with 4000 trees along the highways and at borrow pits. Refer Annexure 2 for plantation guidelines	Post Construction Stage	GSRDC/PIU
3		Vegetation Clearance shall be confined to the minimum area required for construction activities within the ROW in order to limit the loss of production resources, limit damage to surrounding features and limit ground disturbance and the associated erosion hazard. This shall be achieved by clearly marking out the extent of the proposed clearing and ensuring that clearing is only undertaken within these areas.	Construction Stage	Contractor
4		Disturbed areas shall be revegetated following construction activities, with bio-engineering measures used extensively to stabilize cut and fill batters. Vegetation stabilizes batters and other disturbed ground surfaces by providing ground cover to protect against raindrop impact and reduce overland runoff velocities, and binding soil through plant root development. Batters and disturbed areas will be progressively stabilized in order to rapidly reduce the erosion hazard of the site. Revegetation shall be undertaken in two stages following construction.Cover crop sowing by the Contractor; which will provide some rapid erosion protection and creates a micro-climate favourable for the establishment of other vegetation.	Post Construction Stage	Contractor
	Fauna			
1		Cattle crossing/ Pedestrian underpass shall be provided at 10 locations- Arnej-Koth km 9.0,Wataman km 27.5, Galiyana – Fatehpura km 31.5, Indranaj km44.3, Tol km 49,Ramdadi km 60.1,Khadali km 67.2,Bochasana km 76.3, Asodar km 93.5 and one at Borsad Bypass.	Construction Stage	Contractor

	Noise			
1		Restriction of Construction activities between 10 pm-7 am near residential areas	Construction Stage	Contractor
2		Maintaining construction equipment conforming to the prescribed noise norms. Compactors (rollers), Front loaders, Concrete mixers, Cranes (movable), Vibrators and Saws will have noise limits within 75 dBA as per Part 'E',Schedule-VI of Environment (Protection) Rules,1986, as amended on 19th May,1993	Construction Stage	Contractor
3		All vehicles and equipment used in construction shall be fitted with exhaust silencers	Construction Stage	Contractor
4		Enclosing construction areas, especially heavy machineries within temporary noise barriers near Sadat Hospital (55/200), Cancer Hospital and CJ Health Centre near 70/700, Patel Girls School at km 74/900, Akshar Purushottam School near km 76/500, Bir Chandra Vidyavihar School near km 81, Vatsala International English Medium school near km 80.	Construction Stage	Contractor
5		Regular monitoring as per the Monitoring Schedule	Construction Stage	Implementing Agency
6		Use of proper personal protective equipment like ear plugs by personnel operating the construction machines in crushing, compaction or concrete mixing operation.	Construction Stage	Contractor
7		Restriction on use of horns near school at Sadat Hospital (55/200), Cancer Hospital and CJ Health Centre near 70/700, Patel Girls School at km 74/900, Akshar Purushottam School near km 76/500, Bir Chandra Vidyavihar School near km 81, Vatsala International English Medium school near km 80. Signage to be provided for the same.	Construction Stage	Contractor
8		10 m wide vegetation buffer with three rows of trees near Sadat Hospital (55/200), Cancer Hospital and CJ Health Centre near 70/700, Patel Girls School at km 74/900, Akshar Purushottam School near km 76/500, Bir Chandra Vidyavihar School near km 81, Vatsala International English	Post Construction Stage	GSRDC/PIU

		Medium school near km 80. Trees with thick foliage shall be chosen in consultation with The Forest Department. Refer annexure 2 for tree plantation guidelines		
	Air Quality			
1		Clearance to be taken from GPCB for location of mixing plant at construction site prior to construction activities.	Pre Construction Stage	Contractor
2		Hot mix plants to be located beyond 500 ms from S Sadat Hospital (55/200), Cancer Hospital and CJ Health Centre near 70/700, Patel Girls School at km 74/900, Akshar Purushottam School near km 76/500, Bir Chandra Vidyavihar School near km 81, Vatsala International English Medium school near km 80.	Construction Stage	Contractor
3		Hot mix plants will be fitted with dust extraction systems	Construction Stage	Contractor
4		Traffic Management Plan at all major junctions. Measures should be taken to relieve the congestion with coordination of transportation and traffic police department.	Construction Stage	Traffic Police, Contractor
5		The suspended particulate matter contribution value at a distance of 40 m from a controlled isolated as well as from a unit located in cluster should be less than 500 ug/m3.	Construction Stage	Contractor
6		Construction Vehicles should be maintained in good condition, conforming to the prescribed emission norms.	Construction Stage	Contractor
7		Construction sites shall be enclosed with temporary barriers	Construction Stage	Contractor
8		Dust covers have to be placed on material transporting trucks.	Construction Stage	Contractor
9		Water will be sprayed during construction phase, at the lime and earth mixing sites, asphalt mixing site. In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying will be done at regular intervals to prevent Dust	Construction Stage	Contractor
10		Sprinkling of water once a day along the haul routes, passing through residential areas and at the construction yard. Water tankers should be deployed by the contractor through out the winter and	Construction Stage	Contractor

		summer months and during dry spells in monsoon months to water at construction yard and those sections of road which shall carry the construction material through the residential areas. Water sprinkling should be carried out twice a day.		
11		Dust Screening vegetation will be planted on the edge of the ROW for all road side crushers.	Construction Stage	Contractor
12		The drilling operations shall be coupled with dust collectors	Construction Stage	Contractor
13		Monitoring as per the Monitoring Schedule	Construction Stage	Implementing Agency
14		Stringent PU C regulation and checks shall be carried out along the project road	Operational Stage	Traffic Police, RTO
	Health and safety			
1		Temporary living accommodation shall be provided for labourers at least at two locations for the project	Construction Stage	Contractor
2		Construction of Labour camps shall be atleast 200ms from the nearest habitation to avoid conflicts over infrastructure facilities with the local community	Construction Stage	Contractor
3		The waste disposal and sewage system for the camp shall be properly designed, built and operated so that no odour is generated. Relevant Provision as the Factories Act, the building and other construction workers (Regulation of Employment and conditions of Service) Act 1996 and all other relevant legislations shall be strictly adhered to.	Construction Stage	Contractor
4		Labour Camps shall be provided with potable water	Construction Stage	Contractor
5		All workers employed in mixing asphalt material, cement and lime mortar, concrete etc shall be provided with protective foot wear All workers employed in welding works shall be provided with goggles.	Construction Stage	Contractor
6		At every work place a readily available first aid unit shall be provided as per the Factory Act.	Construction Stage	Contractor
7		Stone breakers will be provided with protective goggles and clothing and seated at sufficiently safe intervals	Construction Stage	Contractor

8		Controlled speed of construction vehicles through road safety conception. Allow for adequate traffic flow around construction areas. Provide adequate signage, barriers and persons for traffic control. Communicate to the public through radio, TV & newspaper announcements regarding the scope and timeframe of projects, as well as certain construction activities causing disruptions or access restrictions.	Construction Stage	Contractor
9		All irrigation canals, water supply lines and stand pipes and drainage ditches shall be maintained during construction or, if necessary, temporary services shall be arranged (as per Clause 110.4,) or the owner/user's permission for temporary cessation shall be gained. Services shall be progressively reinstated as soon as road excavation has been completed.		
10		Location of camps depots and storage areas shall be as per the contract specifications, prior approval from Engineer	Construction Stage	Contractor
11		Contingency plans for clean up of spills of oil, fuel, and toxic chemicals.	Operational stage	Flying Squad of Motor Vehicle Dept. and State Police
	Construction program			
	1	The construction of the project roads shall be staged over two years, thus limiting the extent of construction in any one year to manageable lengths (between 9-14 km). Individual section shall be limited in size to enable each section to be completed in a single dry season by labour-based construction.	Before construction	Contractor
	2	The proposed roads (including the full extent of works) and ancillary sites shall be surveyed and pegged prior to any construction or related activities to ensure that they are correctly sited in accordance with the detailed road designs and permits. This allows previously unnoticed design and environmental issues to be recognized prior to verification of affected persons and assets, to be undertaken prior to the commencement of construction. All roadwork survey and pegging shall be undertaken with a level to ensure that works are correctly located.	Before Construction During Construction	Contractor

4. ENVIRONMENTAL MONITORING

Environmental monitoring refers to the continuing environmental assessment of project, starting at the project preparation stage and continuing through out the construction and post construction stage of the project. In addition to site supervision for compliance with environmental management measures, the monitoring program includes the identification and selection of key environmental indicators or parameters which may be qualitatively measured and compared over time

4.1. Objective of Monitoring and Evaluation

1. To demonstrate that unfavourable effects have been addressed and adverse consequences minimized.

2. To monitor and promote favourable impacts which enhance environmental quality.

3. To record conditions, actions and project impact, enabling adoption of better mitigation methods and documentation legal or community obligations.

4. To evaluate the adequacy of Environmental Impact Assessment already carried out, and to suggest improvement

4.2. Site Supervision

The strict supervision of road construction activities is required prior to, during and following construction to ensure that works are constructed in accordance with the approved designs and that environmental impact are fully mitigated in accordance with EMP. A standard system of site inspections, reporting and approvals shall be undertaken during the life of the project, as described below.

The Independent Consultant shall undertake the following site inspections, in conjunction with the contractor where specified, to assists in site planning, to oversee construction and to certify (where necessary) the completed works and controls for payment.

4.2.1. Pre-Construction Phase

Two pre-construction inspections of each section of the alignment and all ancillary sites shall be undertaken by the Supervising Consultant and Contractor.

Pre-construction Inspection, the initial inspection shall involve a site review of between 0.5 – 1.0 Km. of the pegged centreline of the alignment and any identified ancillary sites required by the Contractor. It will serve to:

- Confirm the alignment;
- Identify site-specific construction or environmental problems;
- Identify services that are required to be reinstated;
- Identify debris disposal sites;
- Identify workforce camp sites; and
- Plan the phasing of construction along the alignments.

Prior to this inspection the contractor shall survey the clearly peg the centreline. During the inspection the Independent Consultant and Contractor shall discuss and agree upon the factors listed above, including the services that are to be reinstated and acceptable debris disposal sites.

The Independent Consultant shall document the type and location of all services that are to be temporarily reconnected and reinstated by the contractor, and provide a copy of this to the contractor.

Pre-construction Inspection – the second inspection shall occur after the contractor has surveyed and pegged the crest and toe of all banks and drains, and the Contractor had pegged all fill disposal areas and other ancillary sites.

The Independent Consultant shall review the sites pegged by the contractor and approve them for construction where appropriate, or request the contractor to repeg sites.

Follow-up Inspection – any specific sites that require repegging shall be inspected by the Independent Consultant and Contractor. The Supervising Consultant shall approve these sites and request the contractor to repeg as necessary.

4.2.2. Construction Phase

The Independent Consultant shall undertake daily, weekly and monthly supervision and inspections of road works during the period of construction, and monthly inspections of ancillary sites during their period of use, as specified below.

b) **Daily Supervision** – the Independent Consultant shall supervise the following works under construction each day :

- Vegetation clearance;
- Excavation activities;
- Fill embankment construction;
- Excess material disposal.

If any activities are not being undertaken in accordance with the contract or EMP conditions, the contractor shall be verbally requested by the Independent Consultant to rectify the situation.

c) **Weekly Inspection** – the Independent Consultant shall undertake weekly inspections in conjunction with the contractor, of all the works inspected during the daily inspections as well as the following works under construction:

- Proper Traffic Signage to divert the traffic , if, necessary;
- Drains construction;
- Reinstatement of services;
- Quarries and borrow pits.

If any activities are not being undertaken in accordance with the Contract of EMP conditions, the Independent Consultant shall document these activities and specify corrective measures in the Weekly Report. The Independent Consultant

shall provide a copy of the Weekly Report to the Contractor within 2 days of the inspection for action.

Note: All drainage works and drain outlet areas will be inspected after each major storm event.

d) **Monthly Inspections** – the Independent Consultant shall undertake a monthly inspection of all ancillary sites in use over the preceding month as well as any ancillary site activities currently in progress, at the end of each month in conjunction with the Contractor.

If any activities are not being undertaken in accordance with the contract of EMP conditions, the Independent Consultant shall document these activities and specify corrective measures in the Monthly Report. The Independent Consultant shall provide a copy of the Monthly Report to the Contractor within 2 days of the Inspection for action.

e) **Pre-monsoon Inspection** – the Independent Consultant shall undertake a pre-monsoon inspection of road construction sites in conjunction with the contractor to review monsoon drainage controls.

f) The Independent Consultant shall specify the locations and types of additional monsoon drainage controls that are required. The Contractor shall install these drainage controls by the date fixed by GSRDC/PIU for review by the Independent Consultant in the following Weekly Inspection.

4.2.3. Post-Construction Phase

Certification Inspection – the Independent Consultant shall undertake a post-construction certification inspection of each completed section of road and each rehabilitated ancillary site. Certification shall be based upon the contract condition and EMP conditions.

4.2.4. Operational Phase

The environmental monitoring of roads during the road operation phase shall concentrate on the major identified potential impacts of the roads, including slope stability, drainage and sedimentation.

The GSRDC/PIU, Environment unit shall undertake a 3-monthly inspection of each road formation and related features over the initial 2 year following completion of road works. The inspection will include a visual assessment of:

- Road surface condition;
- Road batters – cut and fill stability,
- Drains and drainage lines – drain stability; drainage line erosion;

The relevant performance indicators are:

- Road surface - no rule greater than 150 mm deep.
- Road batters - planted vegetation survival greater than 90% after one year
- Drains - drainage along the road surface not greater than 200 m;
  - side drains intact;
  - pipe/box culverts in place.

A standard report covering the above features shall be completed for project road by Environment Unit following each inspection. This report shall be submitted to the relevant district GSRDC/PIU Supervisor and the relevant GSRDC/PIU section in GSRDC within two week of inspection.

4.3. Performance Indicators Monitoring

Though the focus of monitoring during the construction period will be on compliance monitoring, the physical, biological and social components identified

as of particular significance in affecting the environment at critical locations will be examined on the basis of the following performance indicators:

- Air Quality (SPM, RSPM and CO),
- Water Quality (DO, BOD, Oil & grease and Coliform count),
- Noise Levels around sensitive locations,

All monitoring shall be as per the schedule indicated in Table 2.2 . If any parameter is found to be critical during such monitoring, further frequency of monitoring will be specified in the project completion report (PCR).

In addition to the above replantation success/survival rate (during the operation period) (for the entire stretch), erosion status (for the entire stretch, and specially for the bridge approaches),vital statistics on health (for the existing human settlement areas), and accident frequency (for the whole stretch) shall also be monitored based on visual observation and from citizen inputs.

Table 4.1 Schedule for Monitoring of Environmental performance indicators

Environmental Component	Project Stage	Parameters	Standards	Location	Frequency	Duration	Responsible Agency
Air Quality	Construction Stage	SO2, NOx, SPM and RSPM	NAAQS of CPCB	Tarapur Junction, Wataman Junction	Once a month during the construction stage	24 hours continuous	Supervision Consultant and GSRDC/PIU
Air Quality	Construction Stage	CO	NAAQS of CPCB	Same as above	Same as above	8 hours /day	Supervision Consultant and GSRDC/PIU
Noise Quality	Construction Stage	Leq day, Leq night, L10, L50 and L90 in dB A	NAAQS of CPCB	Same as above	Same as above	10 minutes intervals for 12 hours (8a.m to 8p.m)	Supervision Consultant and GSRDC/PIU
Replantation success /survival rate	Post Construction period	NA	Visual Observation	For the entire stretch	Once a year, for five years		GSRDC/PIU
Water Quality	Construction Stage	(DO, BOD, Oil & grease and Coliform count)	Water quality standards for Inland surface water, CPCB	Pond at km 48/7, pond at km 50/2	Before Construction, Once a Year During Construction, and once post construction		Supervision Consultant and GSRDC/PIU

4.4. Checklist For Environmental Monitoring

A general monitoring tool is useful and there is advantage in adopting a uniform monitoring Performa. It is frequently based on recorded project details combined with recording of expected project actions or outcomes. The suggested checklist/Questionnaire has been appended as Annexure 1. This can be further improved to suit corridor specific needs.

The methodology adopted is basically a subjective rapid appraisal base on visual observation with quantification of same key parameters. This requires a basic knowledge and some understanding of environmental impacts.

Only a limited number of key impact areas have been adopted in order to frame a simple and general questionnaire and to encourage its completion by site supervisors. Sources of information are largely visual observations and basic project details and it allows the collection of base line data. The collection of this information fed into an environmental unit provides the basic data on which further selective analysis and investigation may be undertaken. Strict specification of sampling numbers and numerous tests should be avoided. The Environmental Unit can always arrange supplementary tests if so required. This avoids the cost of unnecessary tests, the result of which is often seen as an end in themselves, and it simplifies the process. This approach of selective investigation and questioning already numerous returns and reports required from construction activity and protection of the environment should not be seen as an unnecessary additional burden on limited time resources. It should, however, become a regular procedure and part of routine contract management

5. ENVIRONMENTAL REPORTING SYSTEM

Environmental monitoring involves periodic checking to ascertain whether environmental activities are carried out as per the EMP. It provides the necessary feedback for project management to keep the project on schedule. The proposed reporting system for the environmental measures is as follows:

- The reporting system will operate linearly with the contractor at the lowest rung of the implementation system.
- The contractor will report to the Supervision Consultant, who in turn shall report to the GSRDC/PIU Environmental Unit . Responsibilities for over seeing will rest with the Independent Consultant's staff reporting to the Environmental Management Unit of the Project Implementing Agency.
- All reporting by the contractor and supervision consultant shall be on a quarterly basis.
- The compliance report during implementation stage shall include description of the items of EMP, which were not complied with by any of the responsible agencies.
- All monitoring shall primarily involve ensuring that actions taken are in accordance with the contract and specification clauses and specified mitigation measures as per the EMP
- Photographic records shall be provided to supplement environmental monitoring tools.
- A complete record will be kept as part of normal contract monitoring.

5.1. Record Keeping

A sample monitoring form is provided in ***Annexure 1*** to the present report at the end of the report. The form focuses attention on environmental issues and provides some feedback. Mitigation and enhancement measures adopted in final design will be explicitly identified under the Bill of Quantities (BoQ) so that performance and completion is readily documented. Daily project diaries would record environmental problems (spills, dust, noise, etc.) as well as safety incidents and will be retained as part of accepted modern contract management and summarised in Quarterly Environmental Reports.

5.2. Records, Audits and Corrective Action

5.2.1. EMP Records

In order to demonstrate compliance with the EMP, the Contractor shall keep records regarding environmental management issues at the site. Records must be kept for the site with a list of each category, which has been checked and monitored.

The Contractor's records shall include:

- All necessary permits, including private landowners permission for activities on their land;
- Proof of Contractor Field Supervisor training;
- All written instructions and reports provided by the Independent Consultant, including Weekly Reports, Monthly Reports and Audit Reports;
- A register of audit non-conformances and corrective actions;
- Correspondence

All records shall be kept at site premises and maintained in a legible state for the full period of construction. Records will be made available to the GSRDC/PIU and the Independent Consultant upon demand.

The Contractor should immediately report all environmental hazards or incidences to the Independent Consultant. Such as the theft or misplacement of explosives, damage to structures or land, construction activities that have occurred outside approved sites, spills of hazardous materials, forest or grassland fires or other incidents which are likely to cause pollution, other detrimental environmental effects or loss or damage to private resources.

5.2.2. Site Audits

The Independent Consultant should conduct a full compliance audit of the Contractor's operations and all construction and ancillary sites once every 3 months. Environmental compliance will be audited against the conditions of the contract and EMP, based on the phase of road development.

The audit shall be conducted by the Independent Consultant in conjunction with the GSRDC /PIU, and shall be attended by the Contractor.

The audit will involve a review of all sites currently in use or used since the previous audit, any construction and related activities in progress and the site records. An Audit Report describing the results of each audit shall be prepared by the Independent Consultant and submitted to the Contractor within 2 days of the completion of the audit. Non-conformances will be described and corrective actions will be recommended with an identified date for completion.

5.2.3. Corrective Action

The Contractor shall implement the corrective action/s recommended by the Independent Consultant in the time specified. The Contractor shall then notify the Independent Consultant of the completion of the corrective action/s.

The Independent Consultant shall verify the satisfactory implementation of corrective actions during the following Weekly Inspection and sign off on the non-conformance/s if satisfactorily rectified, or make a further request is unsatisfactory.

5.2.4. Final Audit Summary

The Independent Consultant shall prepare and Audit Summary Report at the completion of the Contractor's contract. The report will provide a summary of the type and number of non-conformance found during the course of the contract, the type of corrective actions recommended and undertaken and the Contractor's diligence and response time to corrective actions.

The report shall be used to assess the effectiveness of contract conditions and the EMP, and identify areas where these documents need strengthening in the future. It will also be used to assess the performance of the Contractor.

6. ENVIRONMENTAL BUDGET

The costs for providing the mitigation measures suggested in the Environmental Management Plan is provided in Table 1.3. No allowance has been made for mitigation measures that are included in the standard road designs, including drains and other standard road works. In addition, the cost of the supervision of environmental mitigation works by the Supervising Consultant has also not been taken in this section as it is covered in the total cost of project supervision.

Table 6.1 Cost Estimates for Mitigation Measures

Environmental Component	Stage	Item	Unit	Unit Cost in RS	Quantity	Cost in Rs
Air Quality	Construction	Dust Management with sprinkling of water , covers for vehicles transporting construction material	Km	30, 000	102	306,00000
		Environmental monitoring	Per sample	5000	24 months x2 locations, assuming 2 yrs constructi on period	2,40,000
Noise	Construction	Environmental monitoring	Per sample	2500	24 months x 2 locations	1,20,000

Water Quality	Pre Construction, Construction & post Construction	Environmental monitoring	Per sample	2000	2 location x 4 times	16,000
		Rehabilitation of Borrow pits and quarries	Sq meters	Lump sum		1,000,000
Land	Construction	Treatment of embankment slopes as per IRC: 56 – 1974, and turfing of slopes of high embankment between km 420 to 438			Covered in project costs	
		Silt Fencing at the base of the embankment near the rivers and 3 ponds	Location	Rs 20,000	6	120,000
Water	Construction	Rehabilitation works on ponds	Lump sum			200,000
Vegetation		Compensatory plantation including vegetation buffer at seven locations. (Cost of sapling, tree guards, labour for planting and maintenance for three years, including replanting of samplings which do not survive).	Per km/side of carriage way	Rs.58, 000.00	102	1,18,32,000
Fauna		Provision of Cattle crossing/ pedestrian underpass				Covered under project cost

Health and Safety		Use of proper personal protective equipment like ear plugs by personnel operating the construction machines in crushing, compaction or concrete mixing operation.	Lump sum	Rs 20,000
		Periodic Health Check up at Labor camp	Lump sum	1,00,000
		Provision of Sewage and Sanitation Facilities for the construction camp sites	Lump sum	10,00,000
		'No horns' signages near schools and residential areas		Covered in project cost
Other		Training/ Awareness Programmes	Lump sum	1,00,000
	Contingencies @ 5%			2070400
	Total			**43478400**