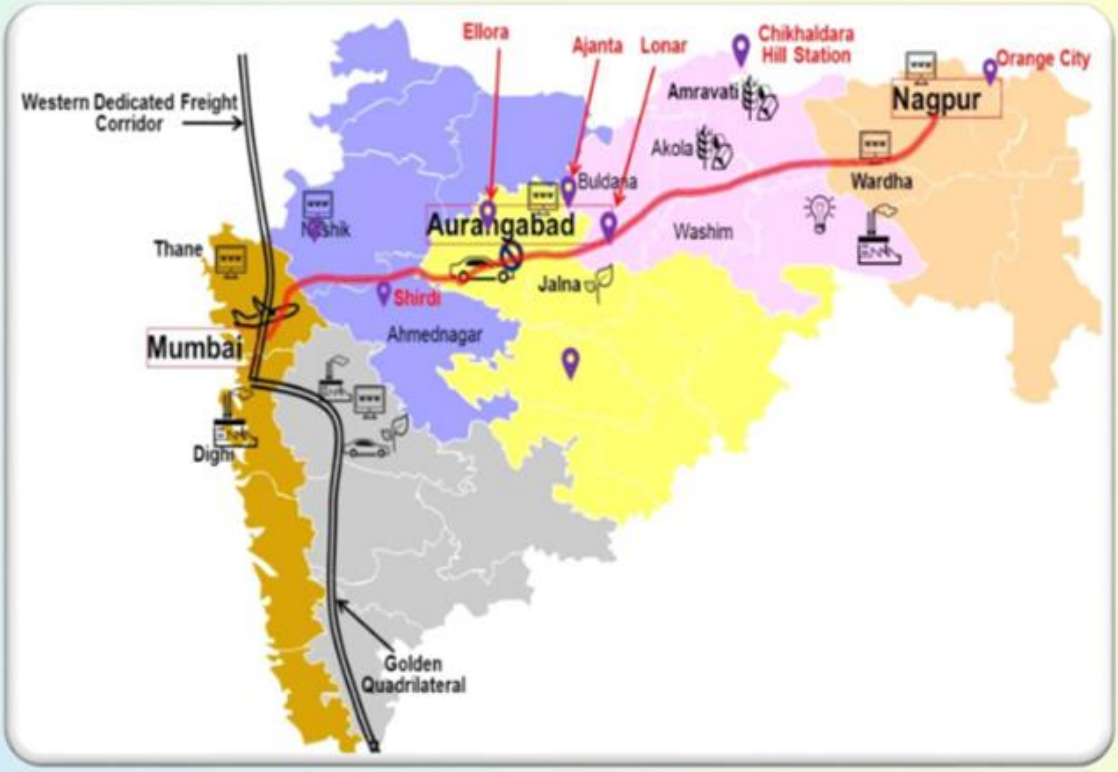
Executive Summary Report (English)
For Dhotre to Taranganpada of 120.696 Km Length (Package IV) of Access Controlled Nagpur-Mumbai Expressway.



MSRDC

Submitted by

Maharashtra State Road Development Corporation Ltd
(Government of Maharashtra Undertaking)
Mumbai

January-2017

Environmental Consultant

Building Environment India Pvt Ltd
4th Floor, Plot No.2,
Dakshina Building, Sector 11,
C.B.D Belapur, Navi Mumbai, Maharashtra
400614

Submitted To

EAC, Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhavan
Jorbagh Road ,
New Delhi - 110 003

Executive Summary

1.1 Introduction

The Government of India has planned 10 world class express highways in order to boost the road infrastructure for faster connectivity between different cities. Simultaneously Government of Maharashtra has planned Nagpur Mumbai Expressway (NMEW) which intends to divert and redistribute the heavy traffic on existing corridors. The proposed NMEW is being implemented by Maharashtra State Road Development Corporation (MSRDC) which will pass through 10 districts from Vidarbha through Marathwada to Konkan regions. The major settlements which are set to be part of this plan are Nagpur District, Wardha District, Amravati District, Washim District, Buldana District, Jalna District, Aurangabad District, Ahmednagar District, Nasik District and Thane District. The NMEW will be designated as a Maharashtra State Highway (MSH) built on National Highway standards. The NMEW is a top priority project in the Government agenda. It will start from Shivmadka in Hingna, Nagpur and will end near Bhiwandi, Thane.

The project intends to develop a 6 lane expressway with paved shoulders from Nagpur to Mumbai in the State of Maharashtra. This six-lane Nagpur-Mumbai Prosperity Corridor has a ROW of 120 m and will bring the travel time between the two cities of Nagpur to Mumbai from 16 hours to six hours. This prosperity corridor will pass through all the five regions that make up Maharashtra Vidarbha, North Maharashtra, Marathwada, Western Maharashtra and Konkan thus linking developed and developing towns. The project ensures greater regional connectivity and equitable development as it passes through Vidarbha, North Maharashtra, Marathwada, Western Maharashtra and the Konkan region. It also promises to open new avenues of economic and social growth along the drought-hit districts of Vidarbha and Marathwada.

This Prosperity Corridor (NMEW) is being designed for sustainable growth with emphasis on agro-industries in rural and underdeveloped districts of Maharashtra. The project is so massive that it will open up multiple sectors including township along the expressway emerging as a self-reliant model. From textile sector to IT hubs, each node will have its distinct character developed to tackle the local requirements of livelihood of the people and growth. An equal opportunity to grow and develop is the only way for a region to ensure a prosperous demography. Cities have concentrated employment opportunities, skilled work force, financial independence and the infrastructure to keep the demand-supply cycle intact. Most of the needs of the urban areas in terms of food and electricity are sourced from the rural areas. Urban areas act as the drivers of economy for the rural regions, whereas the rural areas provide necessary resources. Thus the urban and rural areas in any state have an interdependent relationship with each other.

The Mumbai Nagpur Expressway not only connects the major cities in the state viz. Nagpur, Aurangabad and Mumbai but also connects the rural areas along the alignment to these major market places. As the Expressway travels from Nagpur to Mumbai, it promises to revive the textile, tourism, education and manufacturing industries on its major nodes. It also connects the regional headquarters of the state to one another thereby facilitating administrative activities of the state.

Government of Maharashtra has decided to develop and strengthen the linkages and connectivity of major cities of state with Mumbai; one of such linkage being the Butibori – Wardha– Karanja – Aurangabad – Sinnar – Ghoti along with link from Karanja – Loni – Nagzari corridor. In this regard Wadia Techno-Engineering Services Limited in JV with Tata Consulting Engineers, Mumbai and Darashaw & Company Pvt Ltd (DARASHAW) has been mandated by the MSRDC for preparation of feasibility study and detailed project report for Package IV.

Wadia Techno-Engineering Services Limited appointed Building Environment India Pvt Ltd, a NABET Accredited Consultant for A category Projects, to carry out the Environmental Impact Assessment (EIA) studies and to assist the Client in obtaining Environmental Clearance and Forest Clearance.

1.2 Project Location and Description:

Sr. No.	Particulars	:	Details	
1.	Project road	:	Package-IV: Dhotre village, Kopargaon Taluka, Ahmadnagar District (Border) to Tarangpada village, Igatpuri Taluka, Nashik District (in Nashik Division)	
2.	Geographical location	:	Dhotre: 19°51'52.10"N latitude, 74°38'42.73"E longitude Taranganpada: 19°40'50.08"N latitude, 73°35'22.45"E longitude	
3.	Location the proposed project	:	State	District
			Maharashtra	Ahmednagar and Nashik
4.	Length of the Package passing through the Tehsils		The Alignment is passing through 3 tehsils – Kopargaon (29.4 km) in Ahmednagar district and Sinnar (61.25km) & Igatpuri (30.03km) Nashik District.	
5.	No. of affected villages	:	54	
6.	Proposed Interchanges	:	3 numbers. Considering the major roads crossing the proposed Expressway & access to the proposed Township	
7.	Bridges		8: Minor 2: Major	
8.	Major Crossings	:	6 (4 on road, 1 on Railway line at Samwatsar & 1 on Godavari River)	
9.	Total length of the proposed project	:	120.696	
10.	Total area of land acquisition	:	1448.03 Ha for ROW	
11.	Total cost (civil)	:	Rs. 4127 CR.	
12.	Seismic zone	:	Zone - III	
13.	Forests	:	23.548 Ha	
14.	Right of way	:	120 m	
15.	Carriageway	:	Green Field Alignment (6 lane Expressway)	
16.	Service roads/slip roads	:	5 m	
17.	Median	:	22.5m	
18.	Horticulture and landscaping	:	Throughout	
19.	Embankment	:	6m	
20.	**Highway Design Standards Contemplated (Ch:- 502.698 to 623.379 KM)**			
a.	Design Speed	:	150 Kmph	
b.	Min. Horizontal Curve Radius	:	1210 m	
c.	Camber	:	2.5%	
d.	Radius without Superelevation	:	4200m	
e.	Super elevation	:	5% for desirable min. radius	
f.	Stopping Sight Distance (SSD)	:	360m	
g.	Intermediate Sight Distance (ISD)	:	720m	
h.	Carriageway	:	3+3 Lanes (Flexible Pavement)	
i.	Lane Width	:	3.75m	
j.	Paved Shoulder	:	3.0m	
k.	Earthen Shoulder	:	2.0m	
l.	K-Value	:	295 for summit curve	
m.	K-Value	:	91.9 for valley curve	
21.	**Project Components**			
a.	**The Public facilities such as** i. Emergency telephones @ every 5km, ii. Parking and truck stops, iii. Auto services centre		iv. Ambulance and towing facilities, v. Quick response vehicle (qrv), vi. Rest areas at every 50 km vii. Fuel filling station and food plaza & restaurants, shops, police stations	

Sr. No.	Particulars : Details	
b.	**The wayside amenities includes** i. Truck terminus, bus bays, ii. Median plantation/landscaping,	iii. Tunnel lighting, iv. Bridge- beautification, street lighting and digitized signage, solar street lighting at interchanges
c.	Wi-Fi access, traffic surveillance and enforcement and CCTV for monitor throughout the project length.	

1.3 Alternative Alignments Considered

As per mentioned in the ToR of MOEF the areas were analysed by studying the satellite imageries and digital terrain models. The three alignments were drawn up based on reconnaissance survey and other data like toposheet, satellite imagery and maps made available by MRSAC showing geomorphology and land use. Alignment Fixation is done in three stages as per TOR. In first stage, three green alignments were made eccentric to existing alignment. In second stage detailed horizontal alignment corresponding to each of selected alternatives was fitted on satellite imageries and vertical profile for each alignment was developed using digital terrain model. In third stage, the final alignment plan was design for all the three alternative alignments to meet geometric standards of Expressway as well as other parameters for a design speed of 150 kmph showing location of terminal points, final alignment plan with location of interchanges, connectors, nodal hubs & facilities and Land pooling plans.

While laying the alignments, following basic principles were followed:

- Avoid Forest and Wildlife Sanctuary areas;
- Avoid passing through areas already under planning / development
- Minimize route through irrigated/ two-season crop area;
- Maximize route through barren land;
- Use existing Right of Way or Government lands wherever available;
- Minimum distance from habitations / Gaothans areas to be more than 150m;
- Alignment to have least number of curves and minimum radius to be 2000m;
- Minimize Railway over Bridges (RoB);
- Avoid water bodies.

1.4 Environmental Impact Assessment

The Environmental study for the project area has been carried out, in accordance with the requirements of the Government of India guidelines for Rail /Road /Highway projects. For the purpose of Environment Study a corridor up to 10 km on either side of the project road has been studied. The Environment assessment process includes an inventory of baseline environmental conditions using data collected from secondary sources and field investigations; the identification of environmental issues /impacts and suggestion for mitigation measures to minimize adverse environmental impacts.

The pre-feasibility EIA report has been submitted as separate volume and prepared by followed the "guidelines for preparation of pre-feasibility report for obtaining prior environmental clearance" in term of the provision of EIA notification 2006, and amended thereto.

1.4.1 Need of the Study

Development of Expressway projects is generally intended to improve the economic and social welfare of the people. At the same time it may also create adverse impact on the surrounding environment.

The environmental impact of highway projects include damage to sensitive eco-systems, soil erosion, changes to drainage pattern and thereby ground water, interference with wild life movement, loss of productive agricultural lands, resettlement of people, disruption of local economic activities, demographic changes and accelerated urbanization. Highway development and operation therefore, be planned with careful consideration of the environmental impact. To minimize these adverse effects that may be created by the highway development projects, the techniques of Environmental Impact Assessment (EIA) become necessary.

1.4.2 Scope of Work

- Air Quality, Noise level, Water Quality (surface & ground) and Soil Quality etc.
- To classify the type of environmental assessment required,
- To delineate the major environmental issues and identify the potential hotspots, which requires further study i.e. scope for Environmental Impact Assessment (EIA),
- To recognize the potential environmental concerns,
- To determine the magnitude of potential impacts and ensure that environmental considerations are given due weight-age while selecting and designing proposed highway improvements.

1.5 Project Location and Connectivity

The alignment of package I starts from Dhotre in Ahmednagar geographically between 19°51'52.09"N latitude 74°38'42.73"E longitude to Taranganpada in Nashik which is located geographically between 19°40'50.08"N latitude 73°35'22.45"E longitude. The entire project area comprises private and government land in the villages Kopargaon, Sinnar and Igatpuri.

The project intends to connect NH-50, NH-3 and AH-47 respectively at Nashik, NH-3 at Sinnar village, SH-47 and SH-7 at Kopargaon village. The project intends to connect NH – 3 at Ghoti, NH – 50 at Sinnar. The project will have connectivity with AH46 / NH7 i.e. Great Asian Expressway at Sinnar which further improve connectivity to AH43 in (Gwalior) Madhya Pradesh and (Hyderabad) Andhra Pradesh, AH47 in (Nashik, Thane) Maharashtra and AH45 in Bangalore (Karnataka). The project will also increase transportation connectivity to NH4 (Mumbai Pune Expressway) which is at distance of about 100 km.

Project also aims at creation of commercial nodes for multiple development mainly in industrial, commercial, agricultural, tourism sectors resulting into employment generation, capacity building as well as connectivity between industrial places.

1.6 Need for the Project and Its Importance

In the present scenario industrial growth remains centralized around Mumbai, Pune and to some extent in Nashik and Aurangabad as these cities remain connected through sea ports in Mumbai. Mumbai-Pune region is saturated in terms of land, population or infrastructure. There is tremendous pressure on this region, as the economic nerve-center of Maharashtra and the entire country. This may be linked to the proximity of the Mazagon Dock and Jawaharlal Nehru Port Trust, from where the finished goods are exported and raw material is imported.

On the other hand Vidarbha and Marathwada regions are less economically prosperous due to low industrial growth, area development, agricultural fertile land, lack of ample amount of water resources, lack of new technologies as compared to the rest of Maharashtra.

These cities will be projected as investment destinations for manufacturing, automobile, defense, aerospace, information technology, textile and food processing. The proposed project will set target as the new centres of industrial development, area development along with entertainment / tourism development throughout the corridor. Thus this planning will not only reduce time but also improve country's economic growth.

1.7 Project Benefits

By improving the existing road, the Project will substantially reduce the existing transport bottleneck to trade and will foster regional economic cooperation. The entire region will be benefitted from the Project, while the project area will gain through economic development and increased access to markets and social services. Improving the project road will reduce transport cost and will contribute to commercial and industrial development opportunities.

1.8 Existing Environmental Features

1.8.1 Climatic Data from Secondary Sources

Climatic conditions are strongly influenced by its geographical conditions. It is distinctly different on the coastal strip where it is very humid and warm. On the other hand, the climate on the eastern slopes and the plains at the foot slopes is comparatively less humid. The humidity ranges from 50 to 80 per cent throughout the year. On an average, the temperature ranges from 17.5o to 33.3o centigrade.

Rainfall is most dominant single weather parameter that influences plant growth and crop production because of its uncertainty and variable nature. The district gets assured rainfall of 2000-3500 mm, from the south-west monsoon during the months of June to September. Generally, the highest rainfall is recorded in the month of July. It is less towards the north than south.

1.8.2 Geomorphology and Soil Types

Topography

The alignment of the proposed expressway passes through plain and undulating terrain, ghats and passes through agricultural area. The terrains and the expressway alignment are moderate with flat and hilly gradients. The project site is bounded by surface water reservoirs. The project site is bounded by many surface water and Bhatsa River in the west. The southern and eastern part is undulating due to Sahyadri hills.

Soil:

The soil in project region of Thane district Brownish-black soil in the patches of the valleys mostly lying between the hilly slopes of Sahyadri. The soils of the Nashik district are the weathering products of Basalt and have various shades from gray to black, red and pink colour. Black, brown & alluvial soil of recent origin is found along the project road. The project area lies in the plains of Bhatsa river basin & is covered with recent alluvial soil of calcareous origin.

1.9 Policy, Legal and Administrative Framework

Review of the existing legislation, institutions and policies relevant to the Environmental Impact Assessment at the National and State levels has been done and clearance requirements for the project at various stages of the project have been identified.

1.9.1 Environmental Clearance

In terms of the provision of Ministry of Environment and Forests 2006 notification and amended thereto, this project is classified as a category ‘B’ project.

In preliminary survey at initial stage it was envisaged that project is passing through Ecosensitive zone of Kalsubai- harishchandragad Sancutry. Hence application was submitted to MOEF for grant of TOR and accordingly TOR is already granted from 159th EAC meeting (Item no.3.2) date 30th May, 2016

The project road is passing through forest area in several stretches and having about 23.548 Ha of Forest area. The details have been obtained from forest department record through which the project highway is passing through if any. Forest Clearance proposal is submitted online on MoEFCC website dated 17th August 2016.

1.10 Methodology

The approach to carry out the rapid EIA study was organized in five tasks and is based on the field investigations and reconnaissance surveys in the project area, collection, collation and analysis of secondary data and discussions with key stakeholders on the potential impacts of the project.

Task 1: Environmental Screening of the project

The Environmental Assessment for the proposed project began with the adoption of an environmental screening procedure during the feasibility stage. The purpose of the screening was to identify key environmental issues such as environmentally sensitive receptors along the selected alignment, change of land-use; impacts on surface water bodies, availability of borrow areas, impacts on community facilities, impacts on flora and fauna, etc.

Task 2: Review of Proposed Improvements and Review of Policies, Regulations and Institutional Arrangements

The objective of this review was to formulate an approach to conduct the EIA and the data requirements for the same. A review of all applicable operational policies / directives of MoEF, MSRDC and environmental laws / regulations in India, were carried out in this task. In addition to the above, the key environmental regulations / policies in India that may affect / influence the project environment both during preparation and implementation stages were also reviewed.

Task 3: Base line Environmental Profile of the Project

Base line environmental profile of the area was then prepared for the area delineated in the earlier task. This comprised of the following:

- Carrying out detailed field investigations (through specific reconnaissance survey formats and recording sensitive features through hand held GPS to prepare an environmental profile of the project area
- Collection of secondary information of physical, biological / ecological and social environment.
- Discussions with the local officials on the salient features of the project area, etc.

Task 4: Prediction of Environmental Impacts

With the base line environmental profile of the project as the base and analysis of the primary and secondary data collected, impacts of the proposed project on various environmental components were identified. The impacts were also analyzed with respect to pre-construction, construction and operation phases and were categorized in terms of magnitude and significance. The anticipated environmental impacts of proposed projects are as listed below

1. Land

- The impact assessment due to removal of vegetation, fragmentation of natural habitat, removal of buildings and severance of farm land.
- Impact assessment of the project construction leading to soil contamination, soil erosion, destabilization of slopes, side- tipping of spoil materials, loss of properties, loss of fertile lands and diversion of natural surface water flows.
- Assessment of Possibility of the adverse impacts of proposed project on road traffic in the surrounding areas (e.g. by causing increases in traffic congestion and traffic accidents).
- Assessment of Impacts on the local area developments and integration with local master plan.

2. Air

- Impact assessment on sensitive receptors such as habitation, hospitals, schools, notified sanctuaries, etc. up to 500m.
- Impact assessment during construction activities due to generation of fugitive dust from crusher units, air emissions from hot mix plants and vehicles used for transportation of materials.
- Prediction of impact on ambient air quality using appropriate mathematical model, description of model, input requirement and reference of derivation, distribution of major pollutants and presentation in tabular form for easy interpretation are carried out.

3. Water

- Impact assessment on Surface water flow modifications, flooding, soil erosion, channel modification and siltation of streams.
- Impact assessment of proposed activity on Water quality (surface and groundwater).
- Impact assessment due to temporary project offices and temporary housing area for construction workers.
- Impact assessment of water quality degradation in downstream water courses or water bodies due to soil runoff from the bare lands resulting from earth-moving activities, such as cutting and filling.

4. Noise

- Impact Assessment of Noise levels during construction activity, due to operation of various machines and equipment.
- Impact Assessment of Noise levels during operation of the highway due to increased traffic.
- Noise levels are predicted using mathematical modelling at different representative locations.

5. Biological

- Assessment of Impacts due to clearance of vegetation
- Assessment of Impacts on Wildlife habitat and biodiversity
- Assessment of Impacts on Water quality, soil profile, noise and air pollution.

Task 5: Preparation of Environmental Management and Monitoring Plan

Based on the nature and type of environmental impacts anticipated, mitigation measures for preventing / minimizing the same were identified and an Environmental Management Plan was then recommended both for the project execution and operation phases.

1.11 Environmental Impact Assessment

The main environmental impacts have been analysed covering Environmental Resources, Human Use Values and Ecological Resources. A brief description of these impacts is given herewith.

1.11.1 Construction Phase

During the construction phases there would be minimal impact on:

- Ecology (flora and fauna)
- Ambient air quality
- Noise Quality
- Water Quality (Surface & Ground water)
- Soil
- Also there would be some impact on quality of life due to inconvenience caused to public as a result of construction activities.

Causes of impacts on Air quality are:

- Land clearing,
- Air mass contamination,
- Processing of raw material,
- Handling and transportation of construction & demolition material,
- Construction of pavement,
- From wind erosion of open sites and stockpiles areas.

Noise Pollution Impacts:

- Operation of construction equipment like earth moving and material handling equipment.
- Stone crushing plants
- Blasting activities etc.

Water quality impacts:
- Surface water flow modification
- Groundwater flow modification
- Water Quality degradation (surface & groundwater)

Impact on Soil:
- Loss of productive soil
- Erosion
- Contamination of soil
- Cumulative impacts

Impact on Ecology (flora & fauna):
At the selected stretches, trees falling within the Right of Way (ROW) would need to be felled. The existing Right of Way (ROW) does not passing through forest areas (Protected & Reserve Forest).
- Corridor restriction
- Aquatic habitat damage
- Ecological disequilibrium
- Contamination of the biota

Apart from widening and strengthening of road, some additional impacts may be occurred on the surrounding environment due to construction of flyover at major junctions. Construction of flyovers may raise the noise and air pollution level to some extent.

1.11.2 Operation Phase

During the operation phase the environmental impacts are likely to be mostly positive. However, there could be some adverse impacts due to inadequate operation and maintenance or control. Decrease in air pollution is expected, but in long run due to increase in traffic volume air quality may deteriorate if long term mitigation measures are not included in the project vehicle design. Construction of Expressway will result in decrease in noise level due to smooth running of the vehicles. Construction of ROBs will shorten the travel time and cost and also reduce the probability of undue accident hazards. It is envisaged that there is possibility of positive impacts on surface water quality, during operation phase, due to the proposed widening & strengthening of existing road. Contamination of soil is expected due to deposition of the chemicals from emission of the vehicles as well as spill from the vehicles. The impact of the road improvement on the socio-economic environment will be significant beneficial, as it is likely to stimulate the economic growth of the area. The specific benefits of the road improvement will include reduction in travel time and travel cost.

1.12 Mitigation Measures

1.12.1 Construction Phase

On the basis of information collected during Environment Screening Survey, the following measures are recommended for mitigation or minimizing the environmental impacts that are likely to occur during the construction phase of the proposed project. It is, however, recognized that most of the measures, if not all, are generally taken care of in the design stage, as well as in construction and supervision stage through incorporation of suitable clauses in the project specifications. However, agency responsible shall implement these mitigation measures under supervision and direction of MSRDC.

a. Prevention of top soil / erosion:
- Store and reuse topsoil – this requires that topsoil be separated from subsoil during the initial excavation and further it utilize for the restoration of borrow pits and slope protection.
- Construction to be scheduled so that large area of soil is not laid bare during the monsoon.
- Ground disturbances to be phased so that it is limited to workable size.
- Exposed surface needs to be resurfaced and stabilized as soon as possible.
- Stabilization of soil at bridge /culverts/high embankment approach through plantation.

- Replanting disturbed areas immediately after disturbance has stopped.
- Balance cutting and filling requirements through route choice, so as to avoided the production of excess spoil material and reduce the need for borrows pits.

b. Prevention of dust nuisance:

- On exposed construction surface during dry / windy periods fugitive dust generation need to be suppressed by spraying of water or other suitable means.
- Workers working in dust prone areas to be provided with masks and goggles.
- Excavated & construction materials transported by trucks need to be covered and or wetted to prevent dust nuisance.
- Selecting road alignments which avoid passing close to housing, schools and work places.
- Set-up of crushing and hot mix plant sufficiently away from the residential or ecological sensitive areas.

c. Noise emission from vehicles and construction activities:

- All construction vehicles need to be properly maintained and will have valid "Pollution under Control Certificate".
- Noisy construction activities to be carried out only during normal working hours and local residents will be advised of any unusual or unavoidable noise.
- Where feasible, sound barrier to be provided in inhabited areas.
- Surface design and maintenance.

d. Protection of Water quality:

- Flow speed especially near water crossing need to be controlled.
- Construction activity to be such as to ensure unhindered flow of watercourse at all times.
- Plant and machinery required for concreting etc. and construction workers camp to be sited away from the watercourse. The water quality to be monitored at regular interval to monitor the change, if any, during the project implementation.
- Recharge water table through rain water harvesting.

e. Health and Safety of Workers:

- All occupational health & safety requirements of workforce to be adhered.
- Periodic health's checkup of workers to be provided.
- A physician's service shall be retained to handle emergencies.
- Workers engaged in construction activity to be provided with proper protective equipment.

f. Environmental health & safety consideration at construction campsites & work-sites:

- Camps to be located so that they do not interfere with the existing alignment.
- Camps to be contained by surrounding the site with a bund or earthen mound with controlled drainage outlet.
- Campsites will have adequate provision of shelter, water supply, excreta & solid waste management.
- Appropriate control measures to be taken to prevent insect/vector diseases especially malaria by measures such as spraying and/or preventing creation of stagnant pool of water.

g. Preventing impacts on places of cultural importance:

- Safe accesses to the cultural importance places need to be maintained.

1.12.2 Operation Phase

Impacts on physical and ecological environment and road safety due to increased vehicular traffic following completion of the project are the key aspects of operational phase impacts. These are also normally taken care of in the design and construction phase, but should be monitored during construction and operation phase.

a. Prevention of Air Quality Impacts:

- Vegetative cover to be developed as far as possible to reduced air pollution.

b. Prevention of Noise Level Impact:

- Mitigation at the same locations suggested under air quality during operational stage will also contribute in the reduction of noise levels.
- Mitigation of noise at sensitive locations and area having good habitation will also include the posting of signs prohibiting the use of horns.

c. Protection of Land Environment:

- Construction should be such as not to cause damage to the environment and the existing regulation should be enforced strictly.
- Plantation of trees, shrubs and bushes as appropriate to soil characteristic and local climatic conditions.

1.13 Environmental Management Plan

The Environmental Management Plan (EMP) is required for formulation, implementation and monitoring of environmental protective measures during and after commissioning of the projects. The Environmental Management Plan is proposed for the following two stages.

1.13.1 Construction Phase

Environmental Management Plan during construction stage is comprised the followings:

- To confirm whether all the recommended mitigate measures in environmental impact assessment have been incorporated in the detail design and engineering stages as well as construction stage.
- Adopting air, water, noise and soil pollution control measures in construction activities and construction camps.
- The construction zone in the river to be identified with flags or markers to prevent accidents/collision with moving vessels.
- The construction camp needs to be provided with adequate water supply, fuel, shelter and sanitation facilities to minimize / avoid dependence and degrading local resources.
- Primary health care facilities including a first aid unit have to be provided for the construction workers.
- Waste such as spoil or debris from the sites to be removed and the affected areas to be restored to its original site.
- Efforts to be made to prevent accidental spillage of oil and grease from construction equipment.
- All the borrow pits and quarries should be rehabilitate.
- Scarified bituminous waste generated from existing carriageway should be properly disposed at pre identified land fill sites.
- Compliance all the conditions imposed by Ministry of Environment and Forest and other concerned authorities while issuing the permits.

1.13.2 Operation Stage

- Monitoring implementation of pollution control / mitigate measures for air, water, noise, soil quality during operation stage.
- Equipment generating noise at low level to be used whenever feasible.

1.14 Environmental Monitoring Programme

Environmental Monitoring Programme is proposed to be carried out regularly to assess the quality of various environmental attributes to detect pollution. The monitoring parameters will include air, water, noise and soil. The monitoring to be carried out to record seasonal variations' The periodic monitoring programme will ensure checking whether the concentration of pollutants at the project site within the permissible limits prescribed by CPCB and in compliance with regulatory requirements. In addition, monitoring would enable early detection of rise in levels of critical pollutants and facilitate timely corrective actions to control pollution.

1.15 Additional Studies:

- Studies directed by MOEFCC during TOR hearing are carried out.
- Issues raised during public hearing and the response of the project proponent shall be prepared in tabular form.
- Road design standards and safety equipment specifications are examined and training shall be provided to ensure that design details take safety concerns into account.
- Traffic management plan is prepared.
- Laws, regulations and enforcement related to speed, alcohol and vehicle safety is reviewed.
- Institutional framework for monitoring of road safety is prepared.
- Post-accident emergency assistance and medical care to accident victims is provided.

1.16 Proposed table of content for EIA report:

- Chapter 1 - Introduction
- Chapter 2 - Project Description
- Chapter 3 - Baseline Environmental Status
- Chapter 4 - Anticipated Impacts & Mitigation Measures
- Chapter 5 - Alternative Analysis (w.r.t. Site & Technology)
- Chapter 6 - Additional Studies (Risk Assessment & Public Hearing Issues)
- Chapter 7 - Project Benefits
- Chapter 8 - Environment Management Plan
- Chapter 9 - Environmental Monitoring Programme
- Chapter 10 - Disclosure of Consultants Engaged

1.17 Identification of Implementing Authority

A separate environment management cell comprising of a team of experienced and qualified personnel / Engineer reporting to a very senior level executive preferably an environmental engineer is proposed. Engineer will be assisted by well-trained staffs comprising of environmental and safety specialists. Staff will be trained for environment control measures like air, water quality monitoring, solid waste management, noise abatement etc.

The designated official will coordinate with other institutions/organizations like Forest Department, State Pollution Control Board, State Public Health Department, State Revenue Department, etc as and when required. Monitoring of air, noise, water and soil quality may be carried out by the designated authority of PIU through an authorized agency.

1.18 Conclusion

From the detailed analysis of the environmental impacts and the proposed preventive measures, it can be concluded that no significant deterioration in the eco-system is likely to occur due to measures to be taken up during construction and operation phase of the project. On the other hand the project is likely to have several benefits like improvement in employment generation and economic growth of the area, by way of improved infrastructure and better socio- economic condition. Hence, the implementation of the project will lead to overall sustainable development in the area.