

## **0. EXECUTIVE SUMMARY**

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### **0.1 PROJECT BACKGROUND**

National Highways Authority of India (NHAI) has been entrusted by Gol to implement the development of stretches of NH under NHDP Phase-III on BOT Mode / EPC mode. NHAI has decided for Development of the existing 2 lanes carriageway to 4 / 6 lanes dual carriageway configurations including strengthening of existing 2 lanes of from proposed Km 28.200 to Proposed Km 110.542 of Solapur to Bijapur Section of NH 13 in the states of Maharashtra & Karnataka.

### **0.2 NEED OF THE PROJECT**

The demand for the project has emerged from the increase of existing traffic numbers plying on the road. The total traffic in this stretch has crossed 18000 PCUs in 2010, implying that the capacity of existing 2 lane road with shoulders has already exceeded its capacity. It is estimated that the traffic will grow at 7.71 %, 7.46 %, 5.00 % and 7.48 % for cars, LCVs, 2-axle trucks and multi axle trucks, respectively. This enormous growth calls for the development of the road to 4 / 6 lanes standards. Thus to enable that the project road is able to withstand the pressure of the traffic growth, it has been found that the proposed widening of the existing road to 4 / 6 lanes standards is needed.

### **0.3 PROJECT ROAD**

The project road starts from existing Km 19.440 of NH 13 near Solapur and ends at Km 102.000 on NH-13 near Bijapur and is 82.560 Km long. The proposed length of the project road is 82.342 Km and the road shall start at Km 28.200 near Solapur and end at Km 110.542 near Bijapur on NH-13.

### **0.4 PROJECT INFLUENCE AREA**

The project districts are Solapur in Maharashtra and Bijapur in Karnataka. The district of Bijapur is bounded by Gulbarga & Yadgir in North east, Raichur in South, Bagalkot and Belgaum in west and Maharashtra in North. Solapur district in Maharashtra is bounded by Latur in East, Osmanabad, Pune & Ahmednagar in North, Satara and Sangli in west and Karnataka in South. The project road falls under Solapur South (Maharashtra), Indi & Bijapur (Karnataka) Talukas.

The existing Right of Way (RoW) varies from 13.2m to 45 m, as per the details obtained from NH Divisions of Bijapur & Solapur on an average. The proposed RoW is 60m all throughout except at toll plaza and rest areas while the Corridor of Impact (CoI) is 75 m respectively. The project area is 500 m on either side of the project corridor i.e., a total of 1 Km.

### **0.5 PROJECT PROPONENT**

The project proponent is National Highways Authority of India, Government of India.

### **0.6 PROPOSED IMPROVEMENTS**

To cater to the future traffic, the project proposes to:

- Develop 4 / 6 lane divided carriageway with paved shoulders
- In addition the project would improve the geometric deficiencies through curve improvements and the improvement of the various intersections
- The proposed improvement includes repair / rehabilitation of existing cross-drainage (CD) structures on the highway and provision of new CD structures at appropriate locations
- To minimise the adverse impacts on the various settlements bypass proposed at Horti besides 1 major realignment at Nandani
- Service roads are also provided at 5 locations for a total length of 6.538 Km (both sides length). These locations were proposed based on the proximity to cultural properties, educational and health units, and size of settlements.
- Slip roads are also proposed for a total length of 22.128 Km of at 17 locations
- 1 cattle, 8 pedestrian and 6 vehicular underpasses have been proposed to ease access of local traffic and population
- 2 Toll plazas near Proposed Km 32.100 & Km 82.550 are proposed
- 2 Rest Area at proposed Km 57.800 near Zalki Town (RHS) & Km 98.800 Near Arikeri Tanda

Village (RHS) & 2 Truck Lay byes at proposed Km 57.800 & Km 98.800 are proposed

- Proper drainage, grade-separators, road furniture, utilities and amenities wherever required shall also be provided

## **0.7 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY IN THE PROJECT**

The Environmental Impact Assessment study of the project road has been carried out as per terms of reference of NHAI and guidelines given by the Ministry of Environment & Forests, Govt. of India. The study methodology for the EIA employs a simplistic approach in which the important environmental receptors were identified during the Environmental Screening phase. Based on the identification baseline data was generated and then analysed to predict the impacts and quantify them. Avoidance, Mitigation and Enhancements measures were then developed and these have been incorporated in the Environmental Management Plan (EMP), design drawings and / or Bills of Quantities as appropriate. Implementation arrangements including responsibilities of all the actors have been streamlined and documented for future guidance.

## **0.8 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **0.8.1 Institutional Setting**

The project has been initiated and is being carried out by the NHAI. The primary responsibility of the project rests with the NHAI in providing encumbrance free ROW to the concessionaire who shall implement the project.

### **0.8.2 Clearances**

As part of the project preparations, the Project Proponent shall take the following clearances and NOCs:

- Clearance under the Forest (conservation) Act, 1980 for diversion of 2.665 ha of forestland for the project. The application for forest diversion has also been processed and submitted to the Nodal Officer in the Forest Department
- Tree felling permission from the respective Divisional Forest Officer
- Prior Environmental Clearance from EAC of MoEF as per Environmental Impact Assessment Notification dated 14th September 2006 and its subsequent amendments as additional right of way requirement for improvement of the project road is more than 20m

Apart from the clearances that the project requires to be obtained by the Project Proponent, the concessionaire & contractor shall also obtain the required clearances NOCs & licenses from the various agencies & authorities prior to his work initiation. These are:

- NOC and Consents under Air, Water, EP Acts & Noise rules of SPCB for establishing and operating plants from SPCB. The NOC shall be made available after the SPCB completes the process of conducting Public Hearing of the project (which shall be carried out as per the Prior Environmental Clearance process)
- NOC under Hazardous Waste (Management and Handling) Rules, 1989 from SPCB
- PUC certificate for use of vehicles for construction from Department of Transport
- Quarry lease deeds and license and Explosive license from Dept. of Geology and Mines & Chief controller of explosives
- NOC for water extraction for construction and allied works from Ground Water Authority
- Apart from the above clearances, the concessionaire also has to comply with the following:
- Clearance of Engineer for location and layout of Worker's Camp, Equipment yard and Storage yard.
- Clearance of Engineer for Traffic Management Plan for each section of the route after it has been handed over for construction.
- An Emergency Action Plan should be prepared by the contractor and approved by the Engineer for accidents responding to involving fuel & lubricants before the construction starts.
- Submit a Quarry Management Plan to the Engineer along with the Quarry lease deeds

## **0.9 BASELINE ENVIRONMENTAL PROFILE**

## **0.9.1 Physical Environment**

### **Climate**

The climate of the project district is mainly of semi arid type and major part of the project district experiences hot and dry summer. There are four seasons:

- Hot Summer (from March to May),
- South west monsoon season (from June to September)
- Post monsoon season (October and November)
- Cold winter (from December to February)

### **Temperature**

May is the hottest month with a mean max of 43°C. Mean (Min) and daily temperature is 25.5°C and the mean (max) is 38.1°C. With the advance of south west monsoon into the area, by the middle of June, day temperature drop is observed. By about the first week of October the monsoon, the temperature drops to about 18°C. The monthly temperature range is smallest in August because of overcast conditions and largest in March on the contrary.

### **Rainfall**

About 60% of the annual rainfall is received during June to September, while 24% is received in October and November during the period of retreating monsoon. Average annual rainfall recorded is 553 mm.

### **Geology**

Geologically, the project district is possessed of Achaean complex composed of crystalline schist, granite gneisses and granite. The project district is well endowed with mineral deposits like sand stone, white clay, and plastic clay of the project corridor.

### **Soil**

The project districts have three types of soils viz. Black soils, Red sandy soils and mixed soils. Formation of various types of soils is a complex function of chemical weathering of bedrocks, vegetative decay and circulation of precipitated water. Soils are mostly in-situ in nature. Samples of soil have been collected and are being tested for the physical and chemical properties

### **Seismicity**

The entire stretch of the project highway traverses through sub category seismic zone II of seismic zoning classification system which is a zone of stability.

### **Air Quality**

The air quality in the project area is generally pristine. The Ambient air qualities were monitored at six locations and it is found that the concentration of PM<sub>10</sub> is higher than the standards which can be attributed to the dryness of the area and the dust present along the project corridor. Concentrations of CO, SO<sub>2</sub> & NO<sub>x</sub> are well within the standards as per the prescribed National Ambient Air Quality Standards.

### **Noise Quality**

It has been observed that noise levels are within the prescribed limits of CPCB, as normally observed in other National highways. Noise, though is a major area of concern, at locations of sensitive receptors (educational establishments like schools and colleges, hospitals) identified quite close to the road especially within the urban areas.

### **Water Hydrology and Drainage**

A number of manmade water bodies and some seasonal water bodies are found in the project area. To facilitate the cross-drainage at these water crossings, 140 cross-drainage structures are proposed. The water quality of the surface water samples are within the standards.

## **0.9.2 Biological Environment**

## **Forest Resources**

The alignment of the proposed project road passes along patches of forest lands at alignment is likely to directly impact the Reserve Forest area at Nandnani The total forestland required for the project is 2.665 ha. **There are no national park and wildlife sanctuary located within the project area.**

## **Trees within ROW**

No endangered flora has been reported along the roadside. The trees that are to be felled have been marked and jointly verified with forest department and a total of 7684 trees of various species have been identified for felling. The predominant tree species are *Acacia* sp., Neem (*Azadirachta indica*), Siris (*Albizia procera*), *Eucalyptus* sp., Banyan (*Ficus bengalensis*), Peepal (*Ficus religiosa*), Babul (*Acacia nilotica*) & Subabul (*Leucaena leucocephala*). There are no endangered trees that are to be felled.

## **Fauna**

Domesticated animals mainly constitute the faunal population within the project area. The forest department have reported the presence of some wild & endangered animals in the forest areas within the project area, however no such species were reported during the site reconnaissance and survey.

### **0.9.3 Social Environment**

#### **Census Profile**

The project highway passes through the districts of Solapur in Maharashtra and Bijapur in Karnataka. As per the 2011 census, Karnataka has a total population of 61,130,704 and the total male and female population in the state is 31,057,742 and 31,057,742 respectively. Maharashtra has a total population of 61,130,704 and the total male and female population in the state is 58,361,397 and 54,011,575 respectively. The population density per sq km is 365 in Maharashtra and 319 in Karnataka. The literacy rate of the Maharashtra is 82.91 and Karnataka is 75.60 while the sex ratios are 946 & 968 respectively. The population density, sex ratio & literacy rate of the project districts are less than the state level.

#### **Linguistic Distribution**

Marathi & Kannada are the major vernacular language spoken by the majority of the people in the project corridor.

#### **Settlement**

A total of 25 major and minor settlements varying in size and populations are present along the project corridor.

#### **Educational Institutes**

There are a number of educational institutes along the existing project corridor. These sensitive receptors are exposed to dust and noise from the road. Some of these educational institutions are located on the edge of the road and is a serious concern from the point of safety and Signage and Safety measures are required. Signage and Safety measures need to be built in the proposed road design at these locations.

#### **Cultural Properties**

The project highway traverses through a number of settlements and there are some religious and cultural properties which though not of archaeological significance are nevertheless, significant to the community.

#### **Places of Historical Importance / Cultural & Archaeological Heritage**

The project area does not have any places of historical importance or cultural & Archaeological heritage.

#### **Highway Amenities**

There are number of amenities and utility services located along the highway like dhaba, petrol pumps, bus stops etc. the location of these amenities along the highway is an issue of concern as the haphazard siting of these amenities is contributing to congestion of the highway. Traffic aid posts and medical aid posts are proposed. 21 bus bays and bus shelters are also proposed all along the project

corridor.

### **Truck Parking Lay-bys & Rest Areas**

There are no parking lay-byes for commercial vehicles along the project road. Many unorganised truck parking at certain locations on both sides were found in the project corridor creating bottlenecks. 2 Rest Area at proposed Km 57.800 near Zalki Town (RHS) & Km 98.800 Near Arikeri Tanda Village (RHS) & 2 Truck Lay byes at proposed Km 57.800 & Km 98.800 are proposed.

### **Land Use / Acquisition of the Proposed Corridor**

A total of 128.1196 hectares of land including private and government will be acquired for the construction of bypass, ROB, Flyover, junction improvement, service roads and two segregated carriageways.

## **0.10 PUBLIC INTERACTIONS, CONSULTATION & PUBLIC HEARING**

Public Interactions & consultations were conducted during the project preparations. The main purpose of these consultations was to know the community's reaction to the perceived impact of proposed project on the people at individual and settlement level. The issues of the most concern were related to rehabilitation and resettlements and have been dealt in social assessment report. It was also felt during the public consultation process that most of the people are aware about the project but they did not appreciate environmental problems associated with road projects. However, some people were concerned about environmental issues, mainly air and noise pollution. The other concerns raised at during public consultation were demand for submergence of project road and safety problems. Public Hearing for the project shall be conducted and the issues raised by the public shall be duly incorporated in project design.

## **0.11 POTENTIAL ENVIRONMENTAL IMPACTS**

The environmental components are mainly impacted during the construction and operational stages of the project and have to be mitigated for and incorporated in the engineering design. Environmental mitigation measures represent the project's endeavour to reduce its environmental footprint to the minimum possible. These are conscious efforts from the project to reduce undesirable environmental impacts of the proposed activities and offset these to the degree practicable. Enhancement measures are project's efforts to gain acceptability in its area of influence. They reflect the pro-active approach of the project towards environmental management.

### **0.11.1 Impacts on Climate**

Impact on the climate conditions from the proposed road project widening will not be significant as no major deforestation and / or removal of vegetation is involved for the project.

### **0.11.2 Impact on Air Quality**

There will be rise in PM<sub>10</sub> & PM<sub>2.5</sub> levels during the construction activities, which shall again be within prescribed limit after the construction activities are over.

### **0.11.3 Impact on Noise Levels**

The impact of noise levels from the proposed project on the neighbouring communities is addressed. It has been concluded that both day and nighttimes equivalent noise levels are within the permissible limits right from start of project life. Noise sensitive receptors have been identified along the project road.

### **0.11.4 Impact on Water Resources and Quality**

The construction and operation of the proposed project roads will not have any major impacts on the surface water and the ground water quality in the area. Contamination to water bodies may result due to spilling of construction materials, oil, grease, fuel and paint in the equipment yards and asphalt plants. This will be more prominent in case of locations where the project road crosses rivers, canals distributaries, etc. Mitigation measures have been planned to avoid contamination of these water bodies.

### **0.11.5 Impact on Ecological Resources**

There is no major loss of vegetation hence adverse impact in terms of availability of nesting sites for the bird doesn't arise. Furthermore, there is no sensitive ecological area along the existing project

roads, so the impact will be insignificant during construction period. But on the long run the project shall have a positive impact due to the compensatory forestation and avenue plantation.

#### **0.11.6 Impact on Land**

During the construction of the proposed project, the topography will change due to excavation of borrow areas, stone quarrying, cuts and fills for project road and construction of project related structures etc. Provision of construction yard for material handling will also alter the existing topography. The change in topography will also be due to the probable induced developments of the project. Benefits in the form of land levelling and tree plantations in the vicinity of the project road shall enhance the local aesthetics.

#### **0.11.7 Impact on Human Use Values**

The PAPs shall be compensated as per the RAP. Accidents are bound to increase coupled with ribbon development. There shall also be some impacts on cultural or religious properties along the corridor.

### **0.12 ANALYSIS OF ALTERNATIVES**

Detailed analyses of the alternatives have been conducted taking into account both with and without project scenario and the available alignment options. The analysis also dealt with the justification of selections of the proposed alignment and the modifications on it due to environmental considerations, realignment and bypasses and the minimisation of negative impacts. Based on all these alternative studies the present alignment was proposed.

### **0.13 MITIGATION AVOIDANCE AND ENHANCEMENT MEASURES**

Both generic and site specific mitigation and enhancement measures have been planned for identified adverse environmental impacts. The construction workers camp will be located at least 500m away from habitations. The construction yard, hot mix plants, crushers etc. will be located at 500m away from habitations and in downwind directions. Adequate cross drainage structures have been planned to maintain proper cross drainage. In order to compensate negative impacts on flora due to cutting of trees the project plans compensatory plantation in the ratio of 1:2 i.e. for every tree to be cut, two trees will be planted. The project shall also witness the plantation of trees for providing aesthetic beauty and shade. Approximately 7684 trees of various species have been identified along the proposed alignment for felling. A total of 15368 trees are to be planted to compensate the loss at a ratio of 1:2. A total of 27420 trees as avenue plantation and 82342 ornamental, medicinal & flowering plants and shrubs in the median are proposed. In order to minimise the negative impact of tree felling, it is also proposed to transplant a minimum of 1/3<sup>rd</sup> of trees proposed for felling. Thus 2562 trees are proposed for transplantation and the cost has been budgeted.

The plantation of trees shall be done subject to availability of space in the proposed ROW. The project will take an opportunity to provide environmental enhancement measures to improve aesthetics in the project area. The planned environmental enhancement measures include plantation in available clear space in ROW, enhancement of water bodies etc. In order to avoid contamination of water bodies during construction sedimentation chambers, oils and grease separators, oil interceptors at storage areas and at construction yard have been planned.

### **0.14 INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN**

The responsibility of implementing the mitigation measures and all activities under environmental management plan (EMP) lies with the concessionaire (selected through International Competitive Bidding) through the contractor. All construction activities being taken up by the contractor under the concessionaire shall be scrutinised by the Independent Engineer who in turn shall report to the NHAI. Presently the NHAI is fully equipped to meet the challenges of implementation of the environmental mitigation measures in the EMP. The implementation of RAP shall be as per the details given in the RAP report. In the pre-construction phase of the project the independent Engineer shall review the EMP and RAP to identify environmental and social issues and arrive at a suitable strategy for implementation.

For effective implementation and management of the EMP, the Concessionaire shall contrive to establish a Safety, Health and Environment (SHE) Cell headed by an Environment Officer to deal with the environmental issues of the project. This officer shall interact with the contractor, NHAI, IC and other departments to ensure that the mitigation and enhancement measures mentioned in the EMP

are adhered. The Environmental officer of the concessionaire shall be the interface between the Environmental Specialist of IE and the Environmental Officer of the contractor. His prime responsibility shall be to apprise the Environmental Specialist of the IE about the ground conditions. He shall also procure the requisite clearances and the NOCs for the project and shall also strictly supervise that the contractor adheres to the EMP. The officer shall also participate in training programmes and assist the IE in preparing documentation for good practices in environmental protection.

This Environmental officer of the concessionaire should ideally be a Postgraduate in Environmental Science / Environmental Management / Zoology / Botany / Ecology / Environmental Engineer / Environmental Planning. The EO should have 10 years of total experience with a minimum of 3 years in the implementation of EMP of highway projects and an understanding of environmental issues. The environmental officer can also look after the additional charges of safety and health. The Environmental Officer of the contractor should ideally be a Postgraduate in Environmental Science / Environmental Management / Zoology / Botany / Ecology / Environmental Planning / Environmental Engineer. The Environment Officer should have 5 years of experience with a minimum of 2 years in the implementation of EMP of highway projects and an understanding of environmental, health and safety issues. The Environmental Officer of the contractor shall report directly to the Resident Construction Manager / Project Manager so that the pertinent environmental issues that he raises are promptly dealt with. He shall also have a direct interaction with the Environmental Expert and the Environmental Officer of the IC and the concessionaire respectively.

The reporting system will operate linearly – contractor who is at the lowest rung of the implementation system reporting to the Concessionaire, who in turn shall report to IC and the NHAI. All reporting by the concessionaire shall be on a quarterly basis, while the reporting time of the contractor shall be decided upon by the concessionaire. The NHAI Site Office will be responsible for setting the targets for the various activities anticipated during construction phase in consultation with the IC and obtaining agreement from the Contractor after mobilisation but before beginning of works on site. The contractor will report from then on regarding the status on each of these. The NHAI Site Office will monitor the activities through its own staff or the consultant's Environmental Specialist after it has obtained the Contractor's report with the Consultant's remarks on it during the construction phase. During the operation phase, the supervision as well as reporting responsibilities will lie with the NHAI Site Office.

#### **0.15 ENVIRONMENTAL MANAGEMENT PLAN**

Project specific environmental management plan have been prepared for ensuring the implementation of the proposed measures during construction phase of the project, implementation and supervision responsibilities, sufficient allocation of funds, timeframes for anticipated activities etc. has been dealt with in this document, which will eventually form a part of the Contract documents between the NHAI and the Concessionaire. The cost for environmental management is INR 43.088 crores.

#### **0.16 CONCLUSIONS**

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions shall be made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project shall improve Road efficiency and bring economic growth. In terms of air and noise quality, the project shall bring considerable improvement to possible exposure levels to population.